TECHNICAL NOTE ON SEASONAL CLIMATE FORECAST OND-NDJ 2018-19

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Reviewed and verified by	Dr. Andre Kamga	Project Manager

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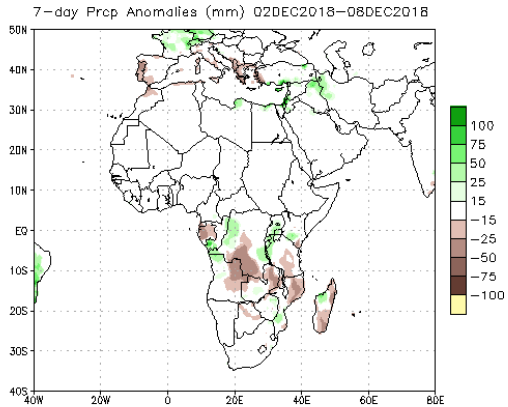
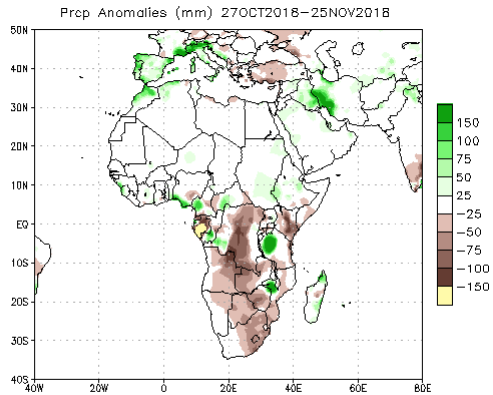
I. ANALYSIS OF CLIMATE VARIABILITY AND TREND

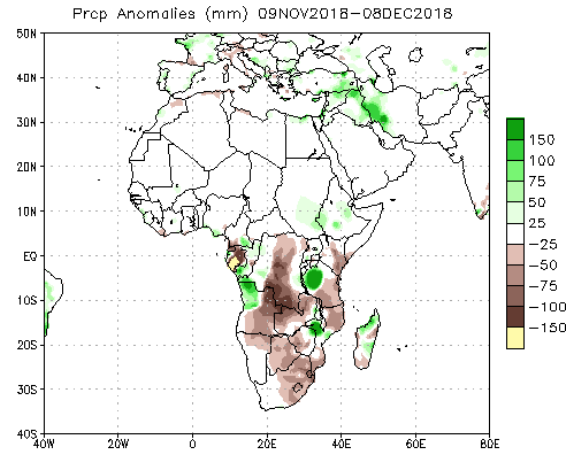
LAST OBS RAINFALL



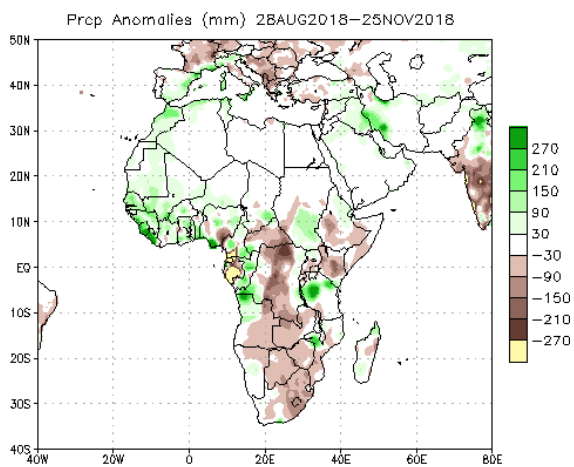
Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis Climatology (1981-2010)



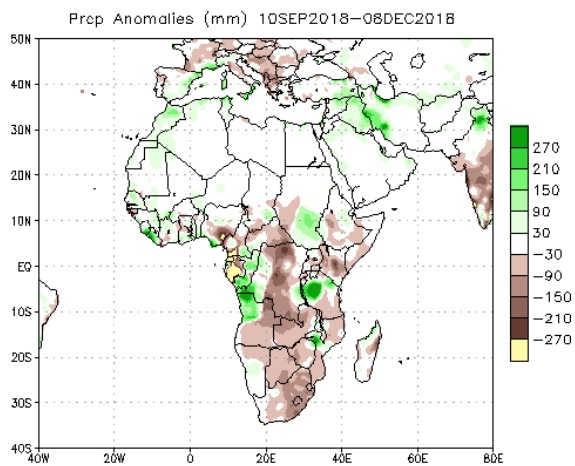
Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis Climatology (1981-2010)



Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis Climatology (1981-2010)



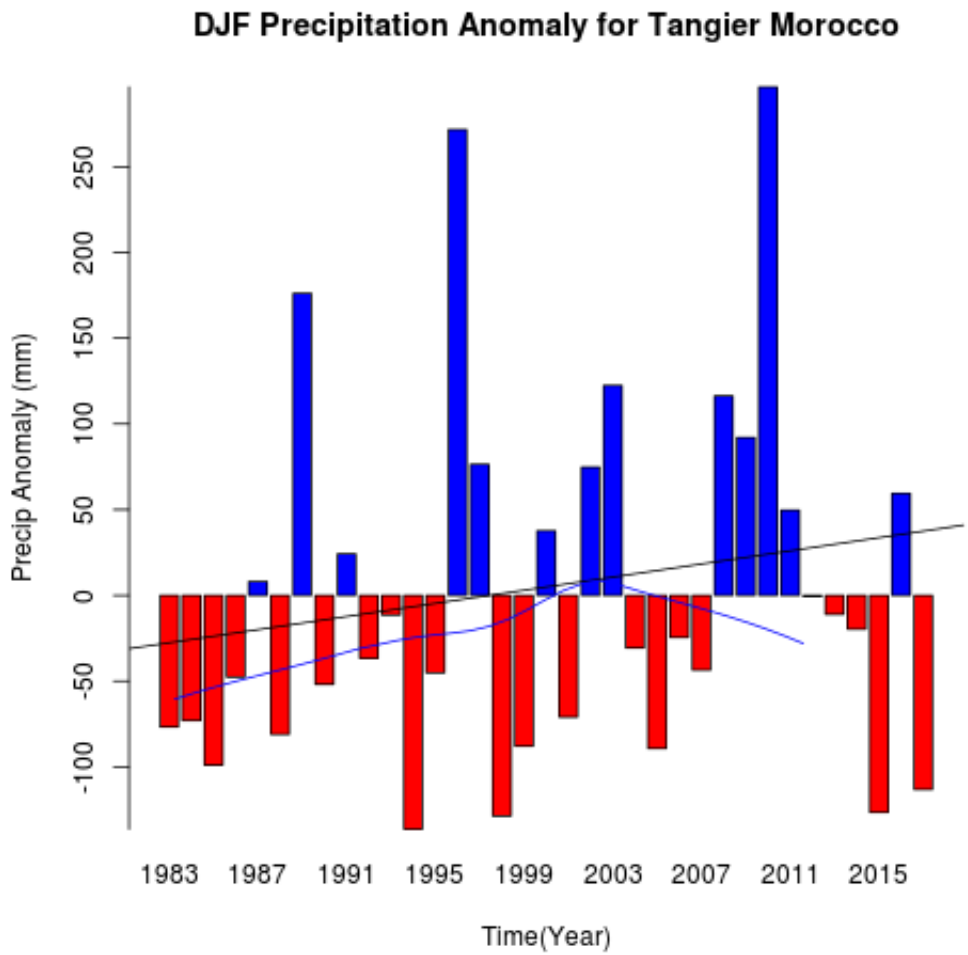
Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis Climatology (1981-2010)



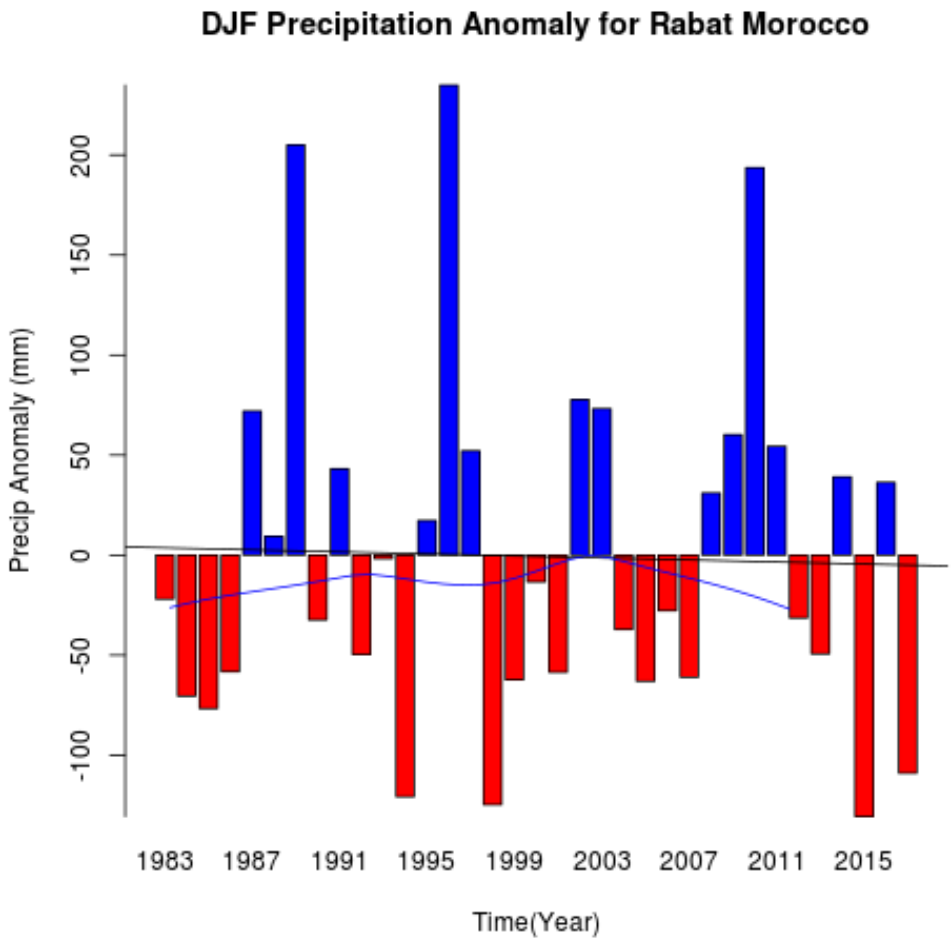
Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis Climatology (1981-2010)

ANALYSIS OF CLIMATE VARIABILITY AND TREND

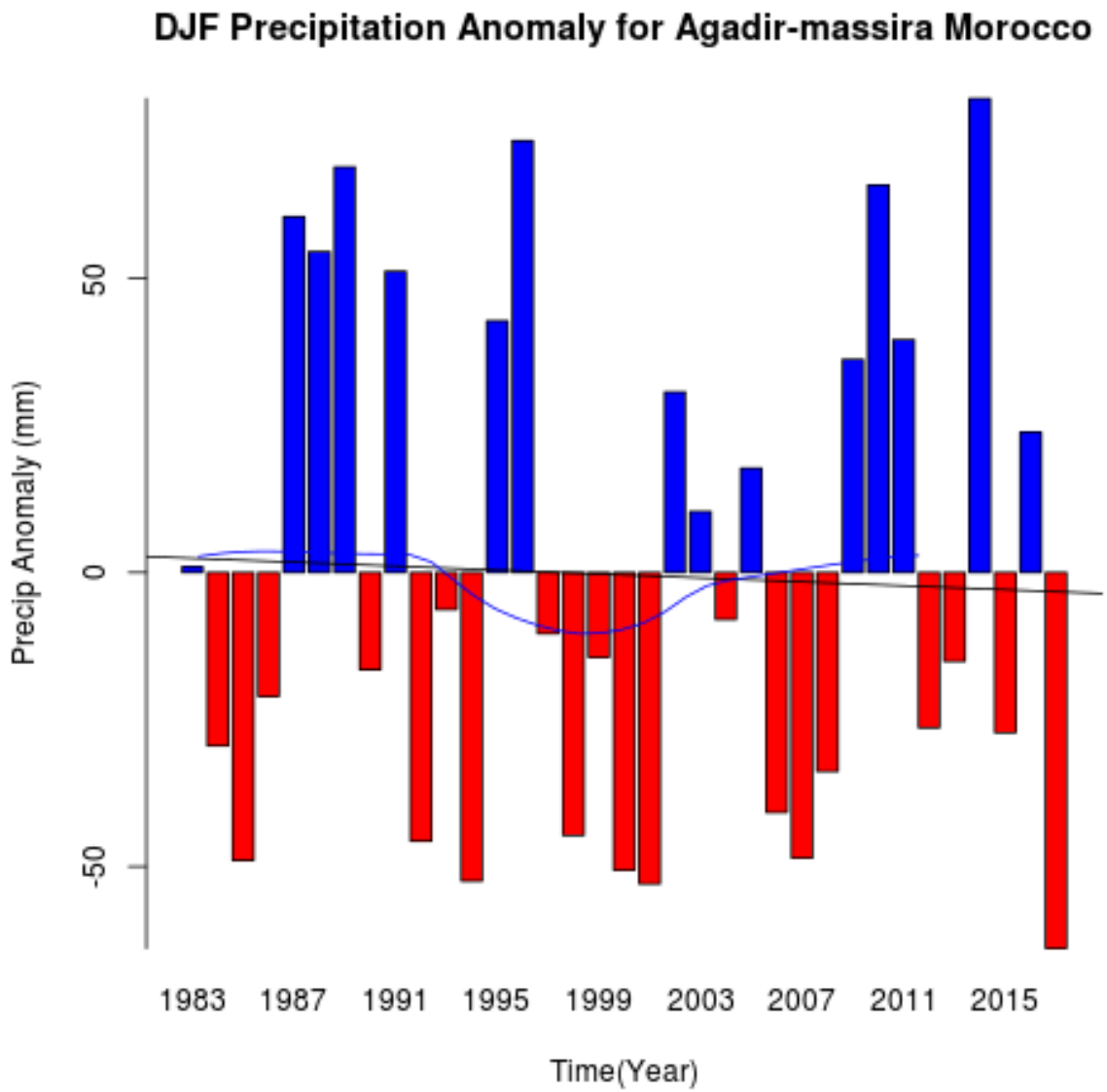
DJF PRECIPITATION ANOMALY FOR NORTHERN AFRICA



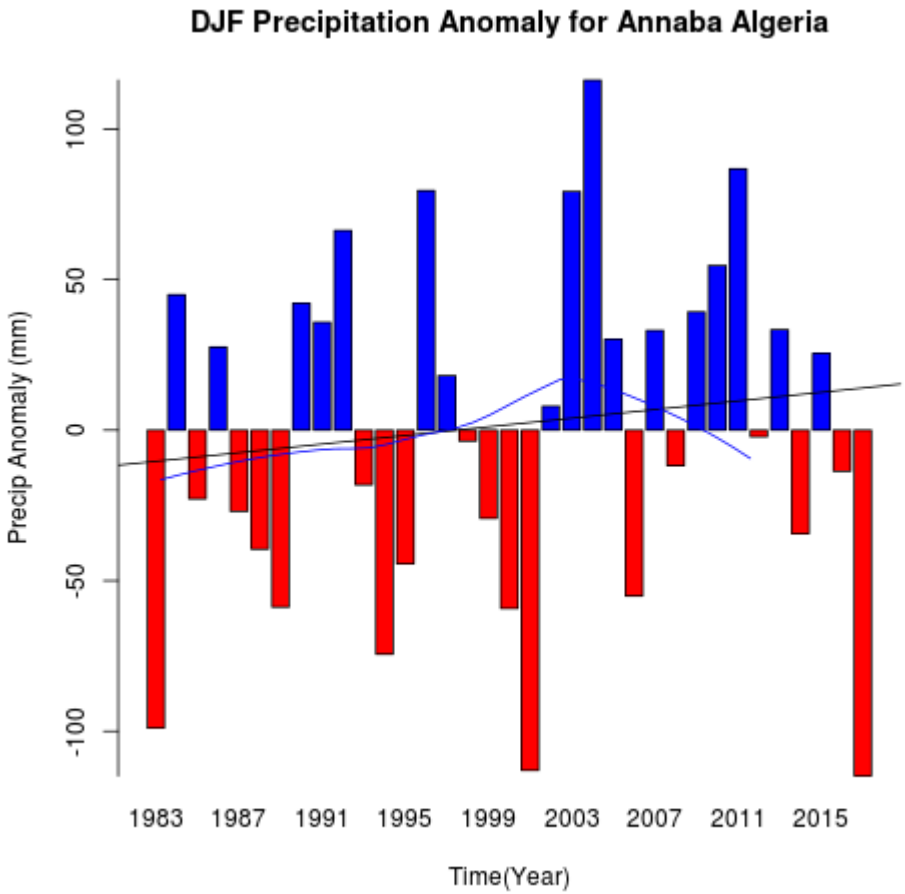
DRY YEARS	RR%	WET YEARS	RR%
1994	64.23	2008	130.52
1998	66.25	2003	132.12
2015	66.8	1989	146.2
2017	70.3	1996	171.26
1985	74.04	2010	177.77



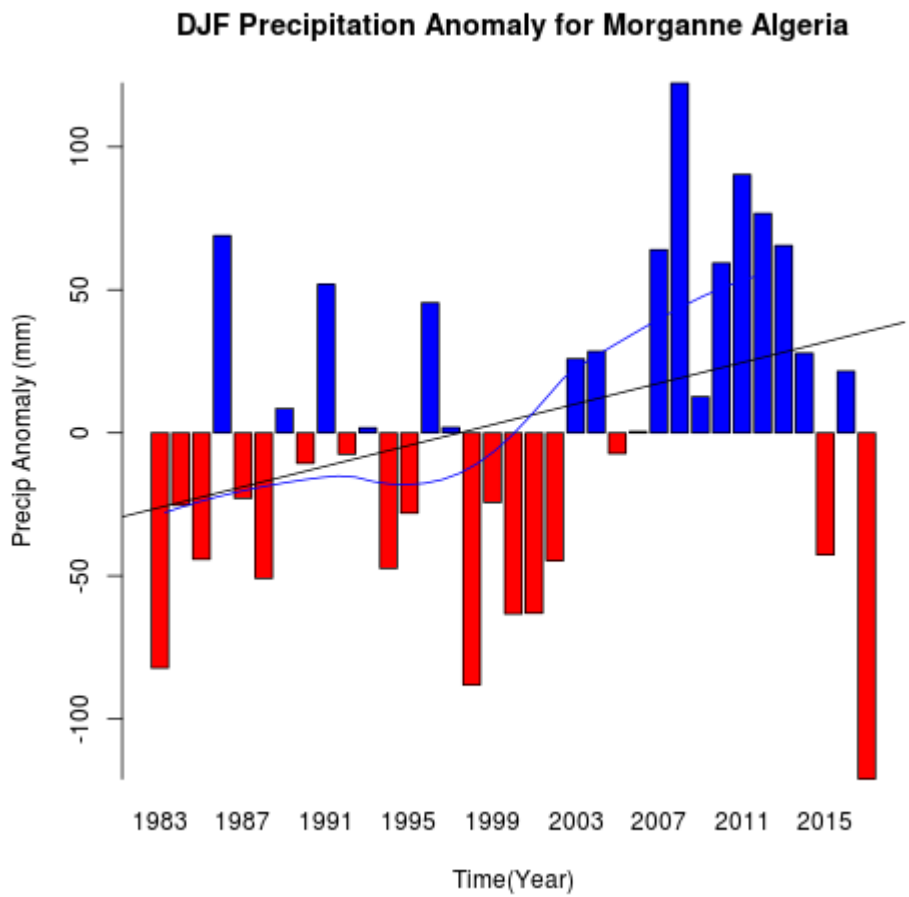
DRY YEARS	RR%	WET YEARS	RR%
2015	60.05	2010	159.23
1998	61.85	1989	162.71
1994	63.08	1996	171.85
2017	66.67		



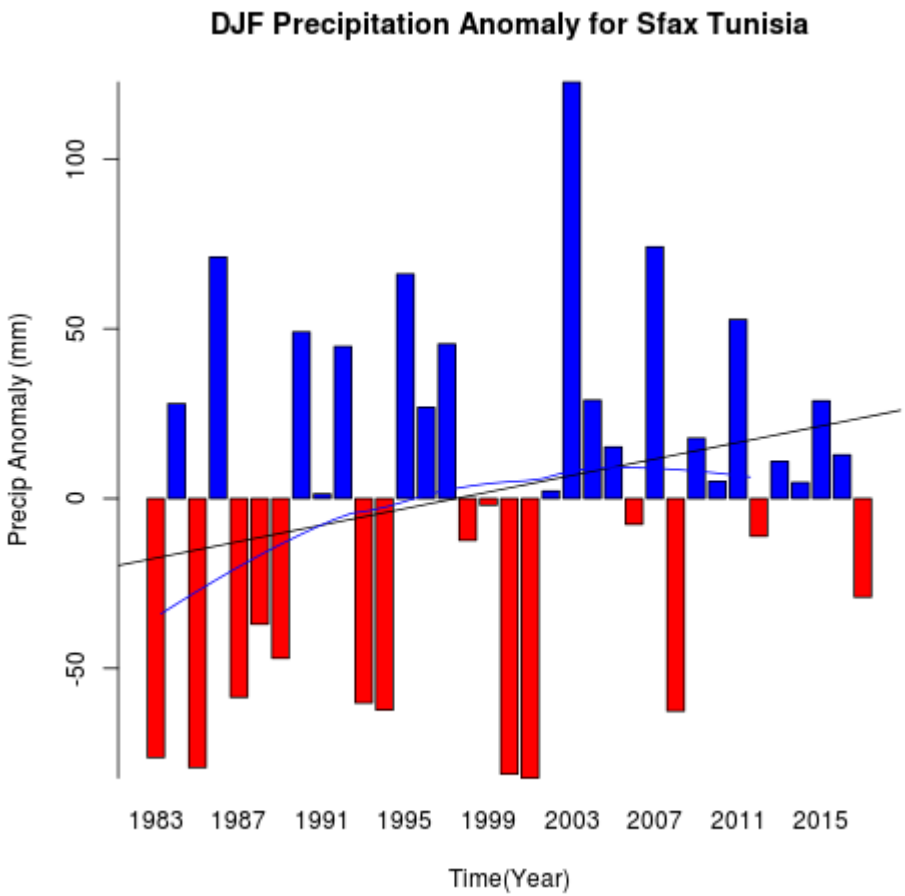
DRY YEARS	RR%	WET YEARS	RR%
2017	55.32	2009	125.32
2001	62.99	2011	127.69
1994	63.33	1995	129.9
2000	64.61	1991	135.8
1985	65.77	1988	138.15
2007	66.06	1987	142.28
1992	68.06	2010	146.05
1998	68.74	1989	148.19
2006	71.48	1996	151.32
		2014	156.32



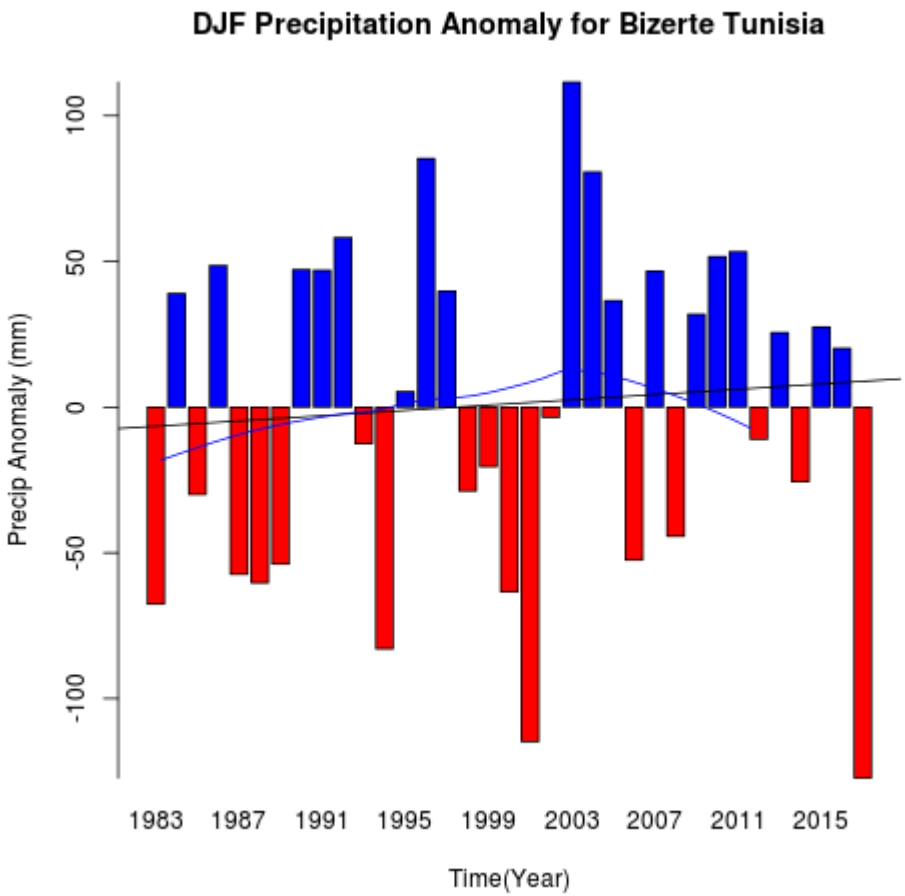
DRY YEARS	RR%	WET YEARS	RR%
2017	69.49	2004	130.88
2001	69.98		
1983	73.71		



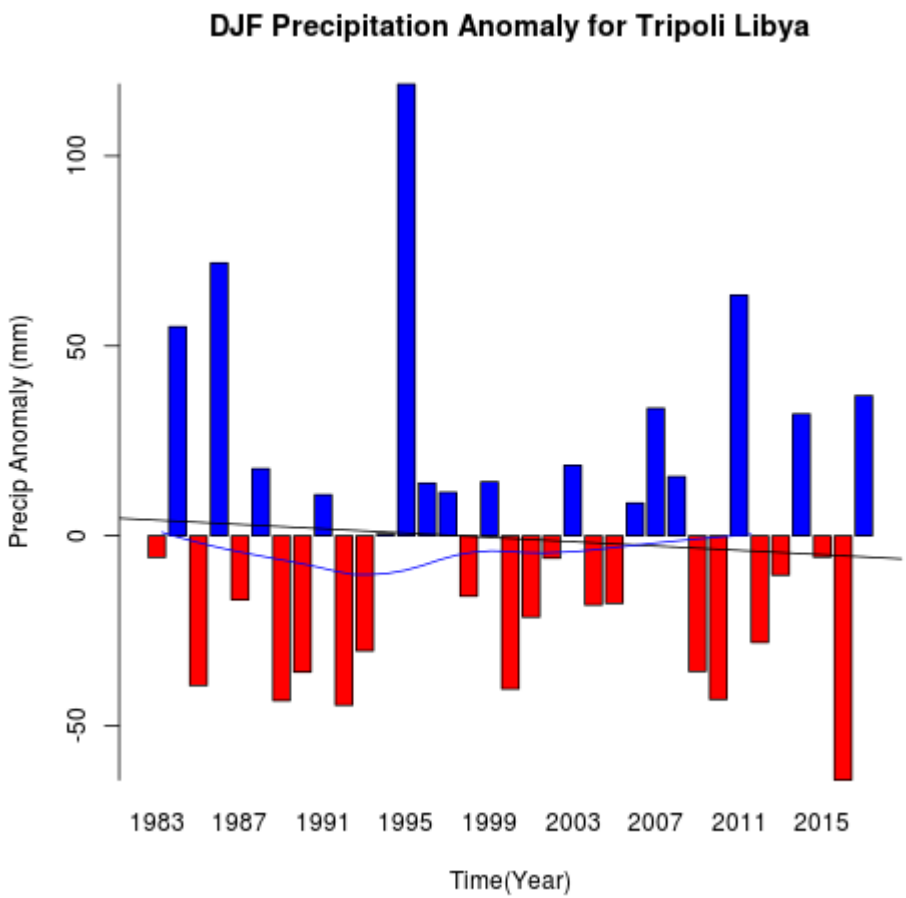
DRY YEARS	RR%	WET YEARS	RR%
2017	53.22	2013	125.31
1998	65.93	1986	126.65
1983	68.23	2012	129.66
		2011	134.91
		2008	147.26



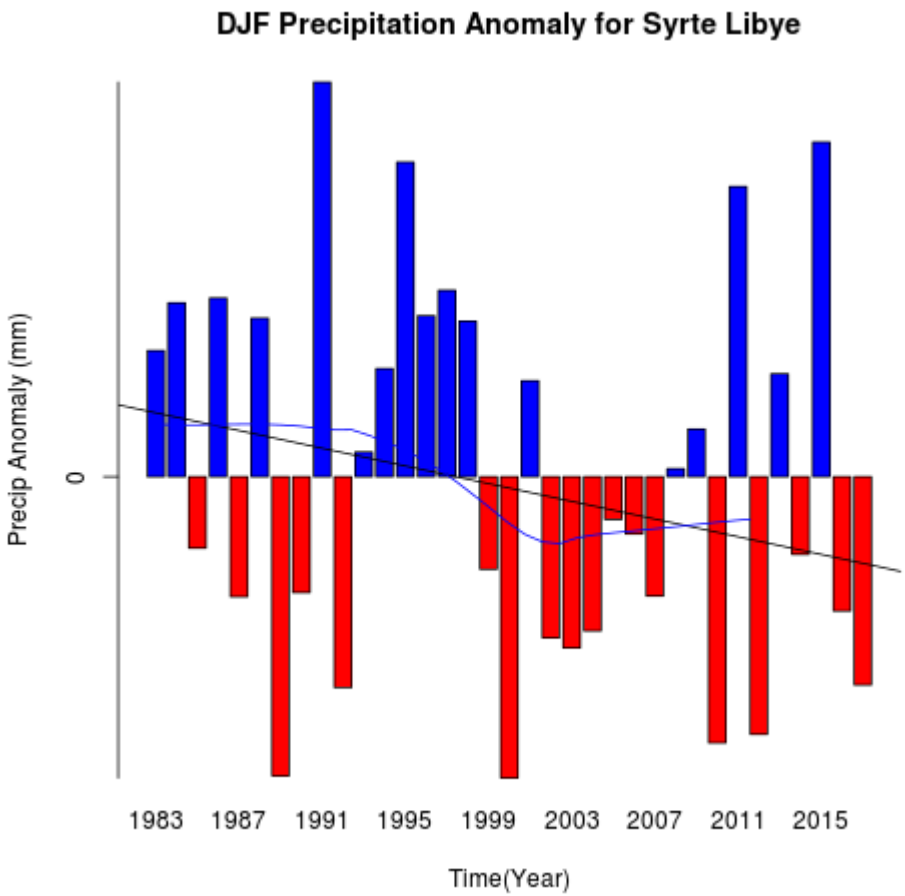
DRY YEARS	RR%	WET YEARS	RR%
2001	67.12	1995	126.42
2000	67.58	1986	128.42
1985	68.32	2007	129.61
1983	69.52	2003	148.99
2008	74.98		



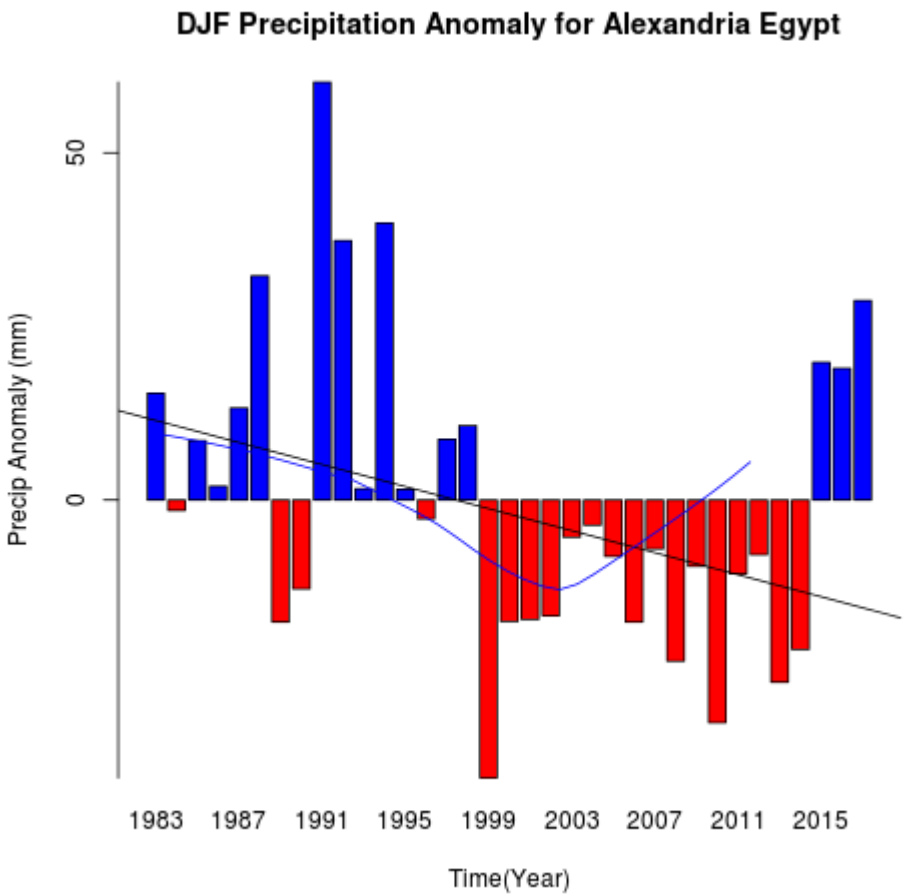
DRY YEARS	RR%	WET YEARS	RR%
2017	65.86	2003	129.91
2001	69.2		



DRY YEARS	RR%	WET YEARS	RR%
2016	52.28	2017	127.4
1992	66.89	1984	140.87
1989	67.79	2011	147
2010	68.02	1986	153.34
2000	70.06	1995	188.26
1985	70.71		
1990	73.37		
2009	73.49		

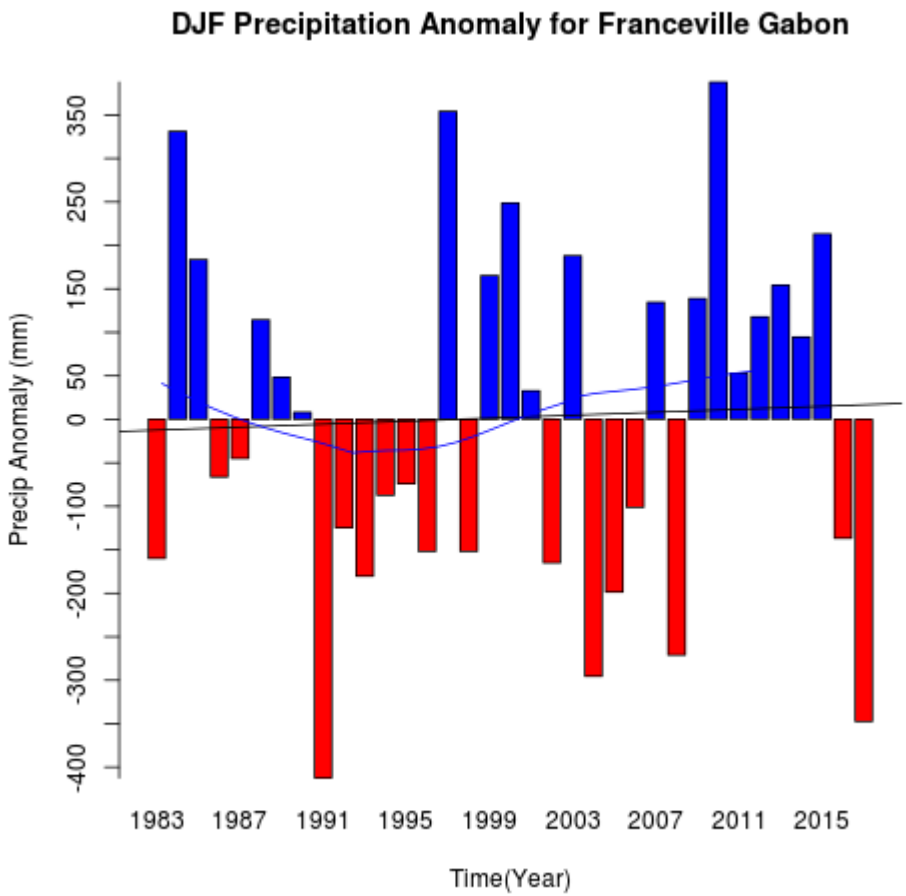


DRY YEARS	RR%	WET YEARS	RR%
2000	70.31	2011	128.59
1989	70.52	1995	131
2010	73.77	2015	132.98
2012	74.61	1991	138.88

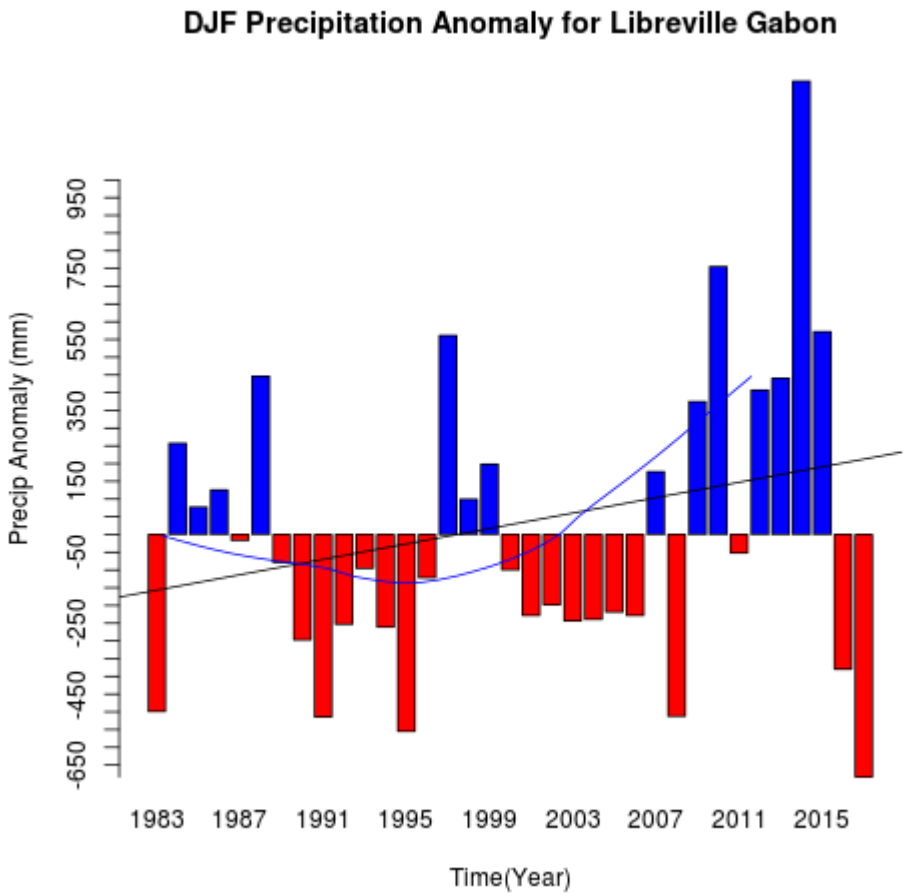


DRY YEARS	RR%	WET YEARS	RR%
1999	67.26	1988	126.4
2010	73.77	1992	130.55
		1994	132.64
		1991	149.22

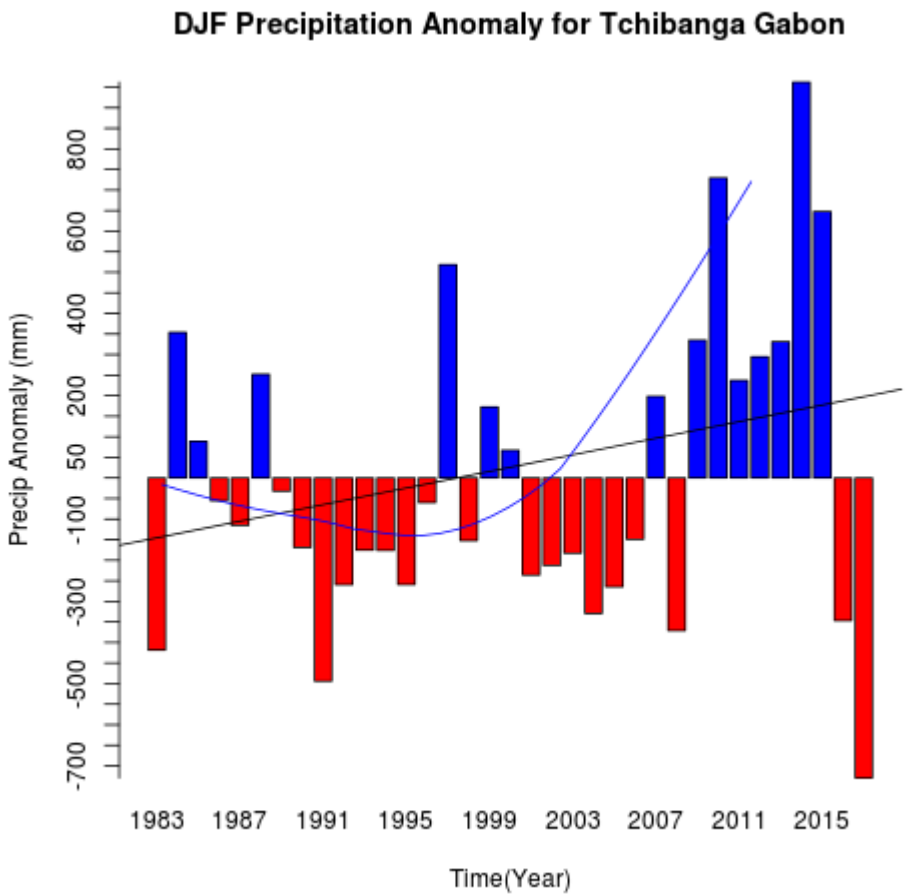
DJF PRECIPITATION ANOMALY FOR CENTRAL AFRICA



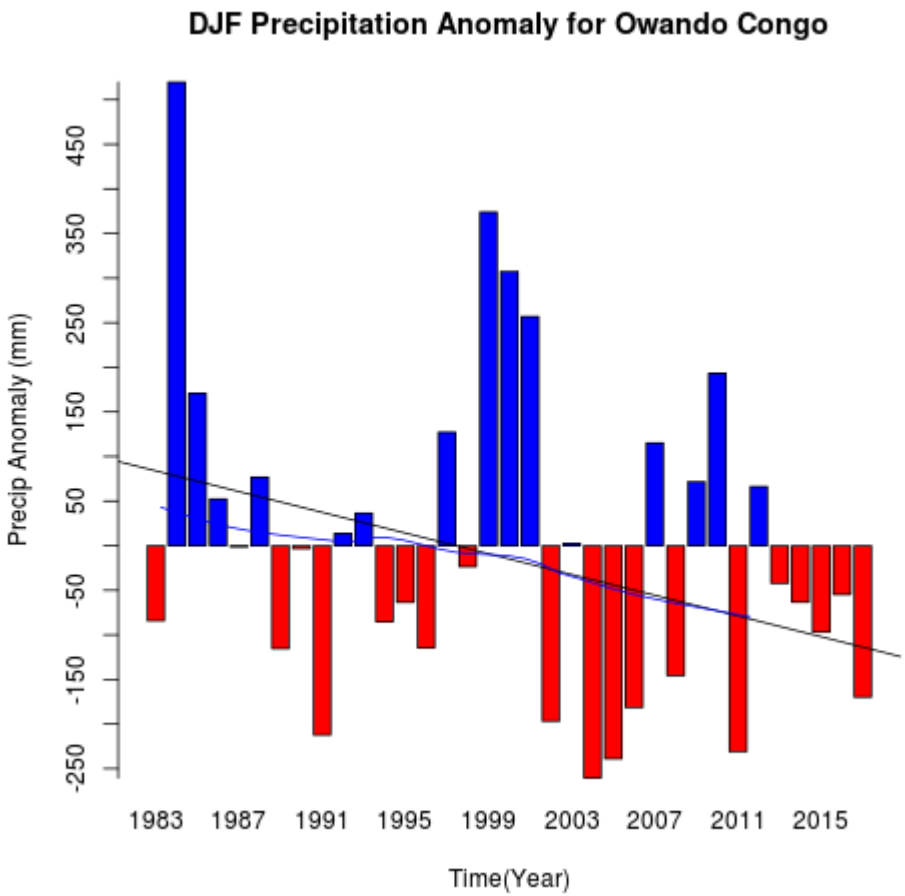
DRY YEARS	RR%	WET YEARS	RR%
1991	72.09	2010	126.23



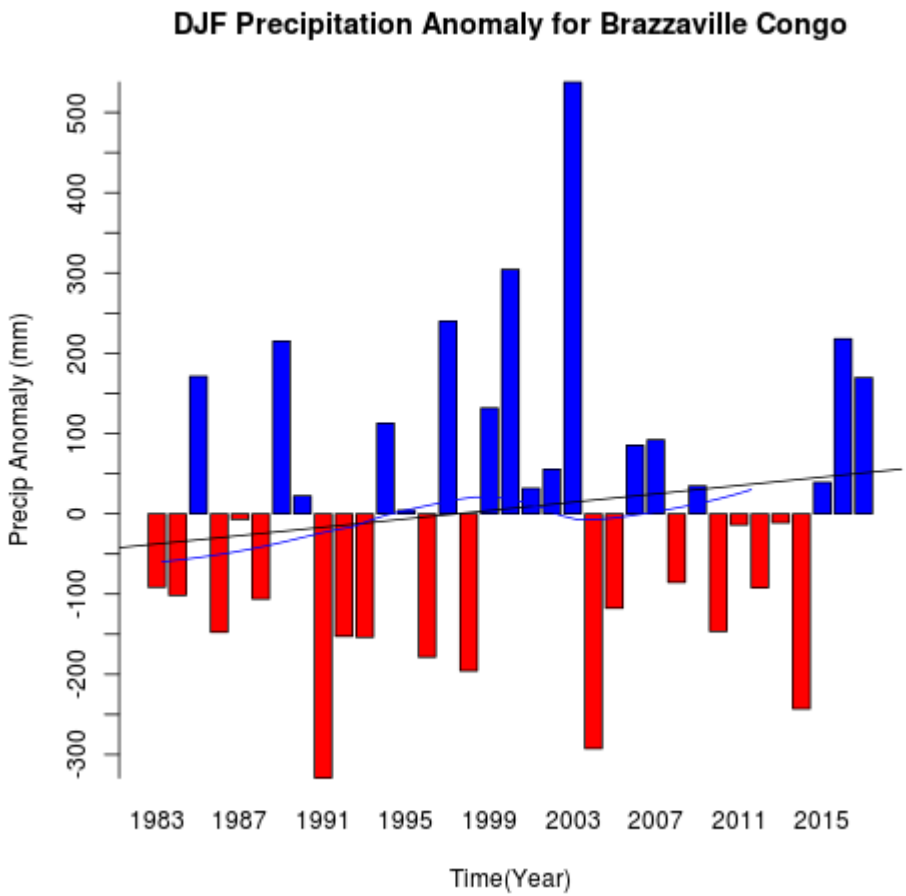
DRY YEARS	RR%	WET YEARS	RR%
2017	64.4	1997	129.23
1995	71.09	2015	129.8
1991	73.21	2010	139.36
2008	73.31	2014	166.59
1983	74.02		



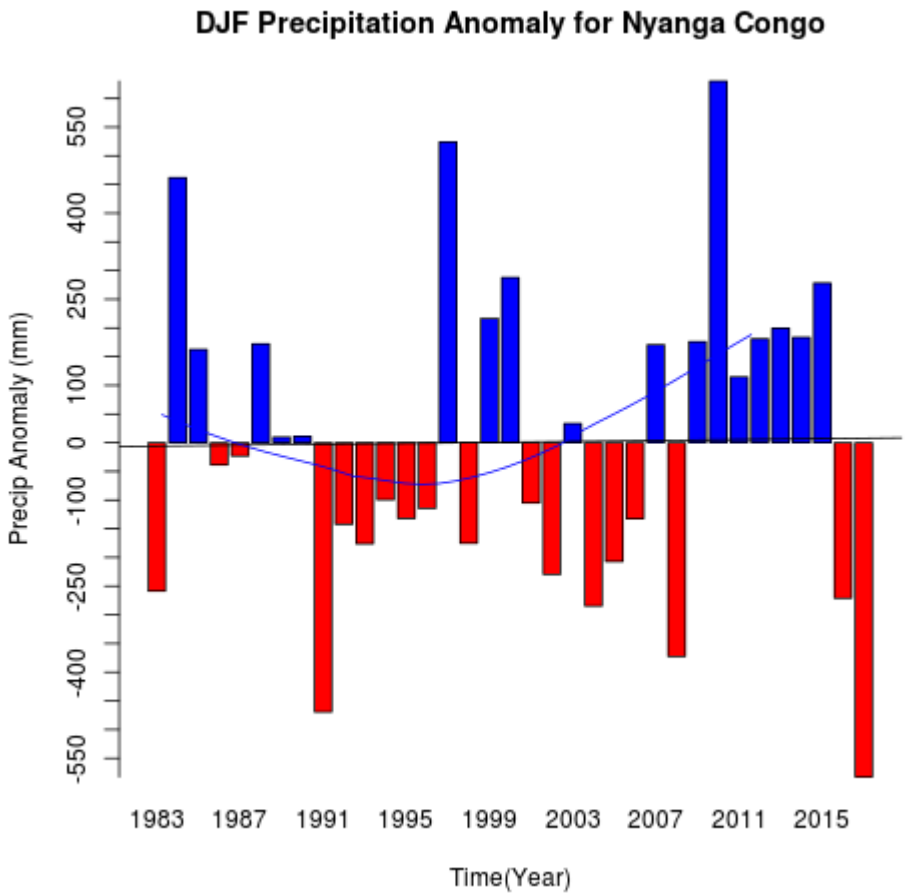
DRY YEARS	RR%	WET YEARS	RR%
2017	52.25	1997	133.
1991	67.65	2015	142.
1983	72.61	2010	147.
		2014	1



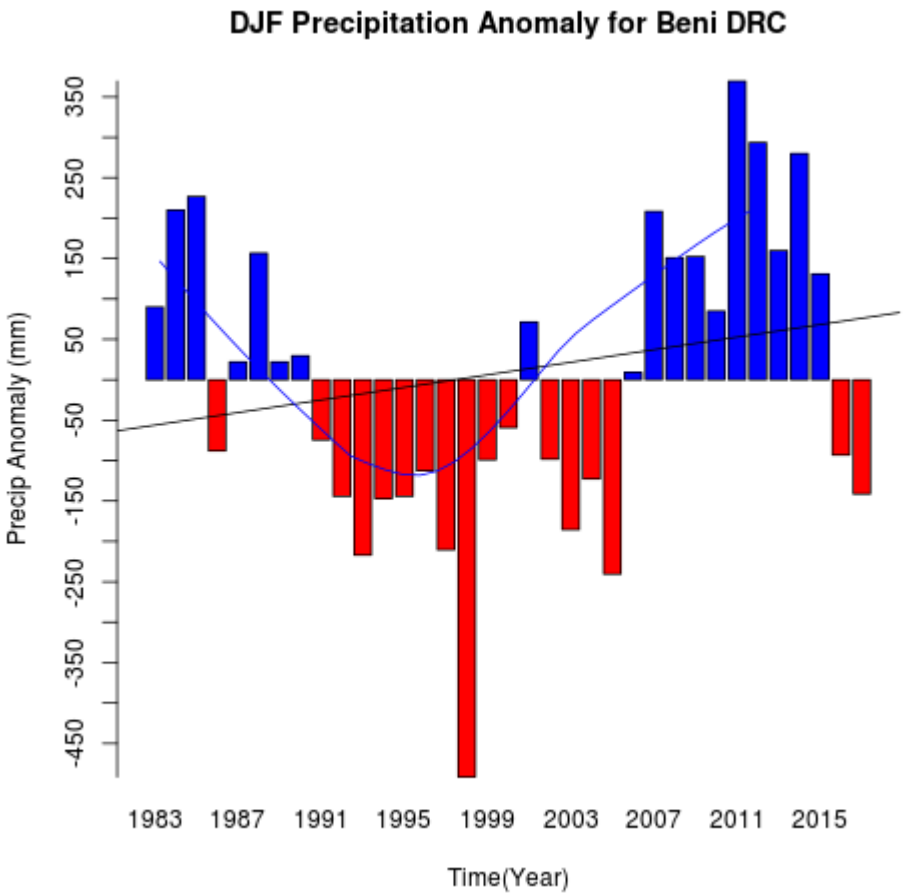
WET YEARS	RR%
1984	133.82



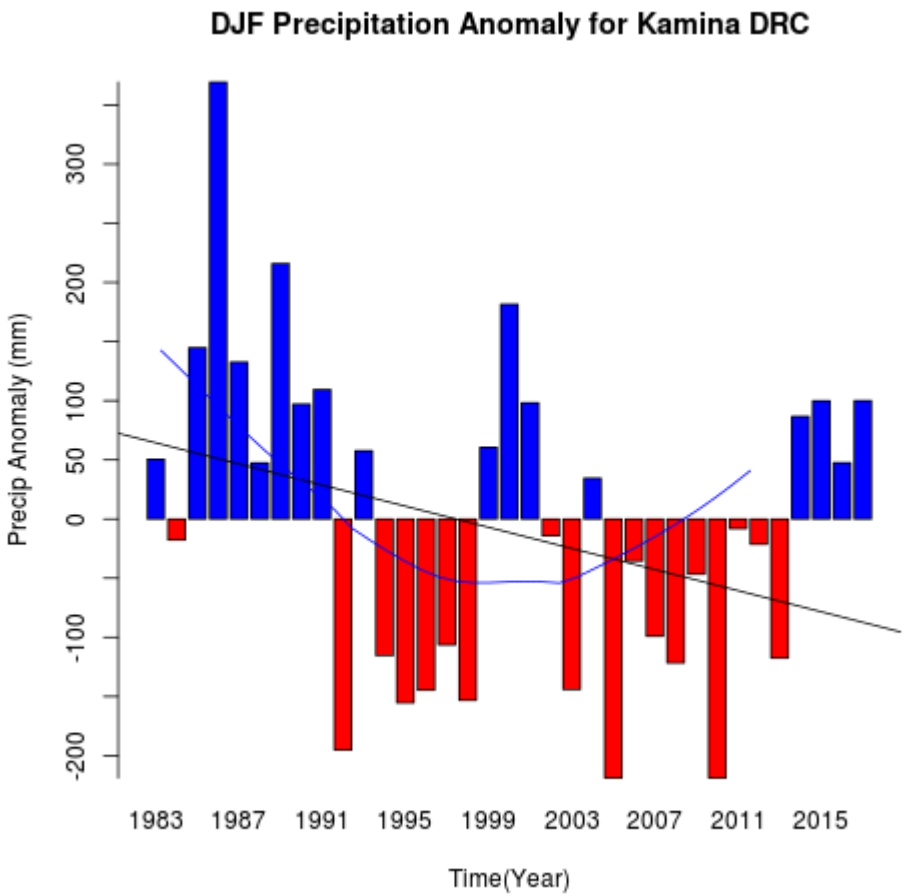
WET YEARS	RR%
2003	139.9



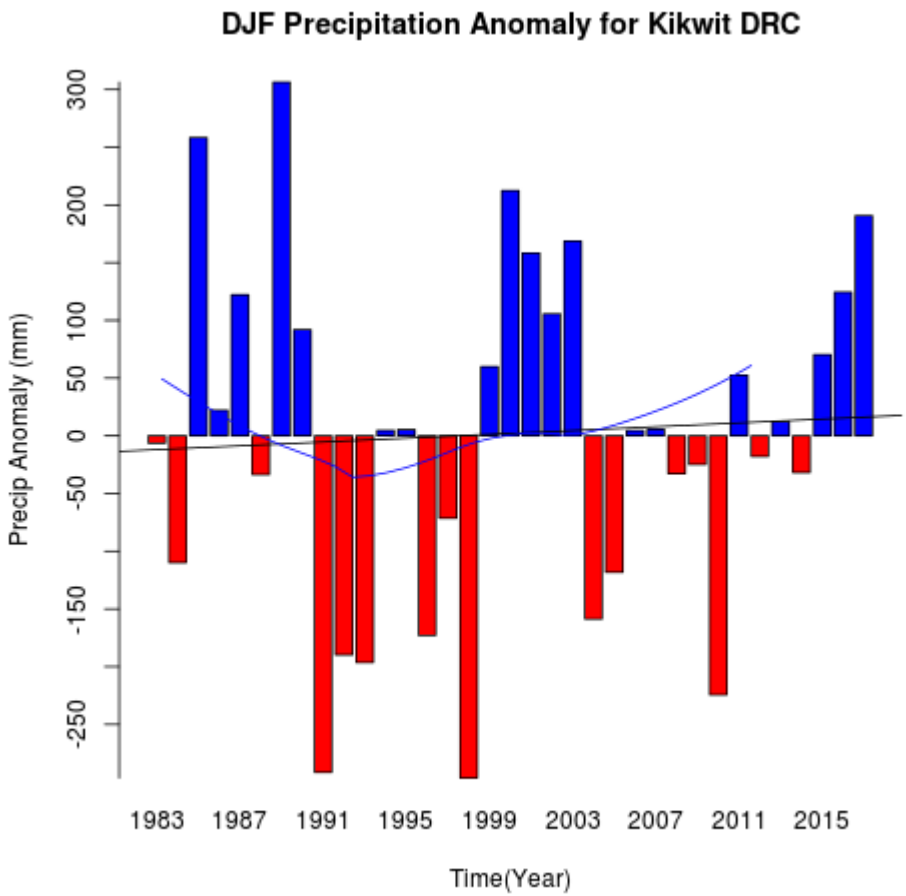
DRY YEARS	RR%	WET YEARS	RR%
2017	60.79	1984	131.1
1991	68.41	1997	135.29
2008	74.93	2010	142.41

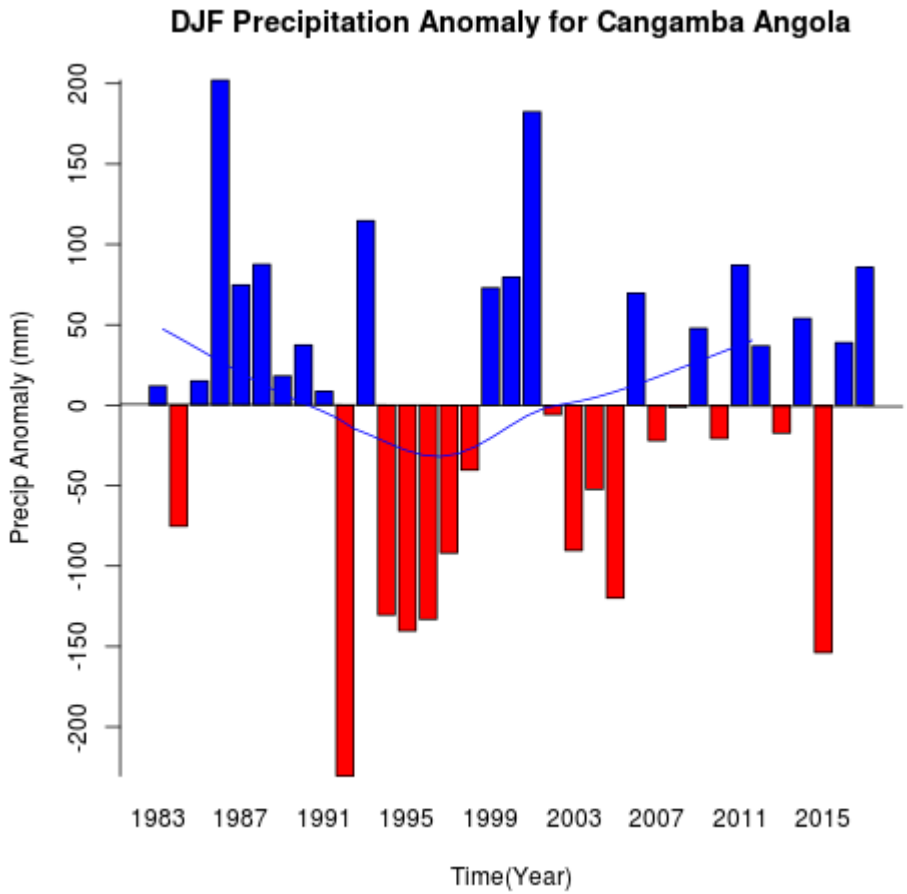


DRY YEARS	RR%	WET YEARS	RR%
1998	63.25	2011	127.62

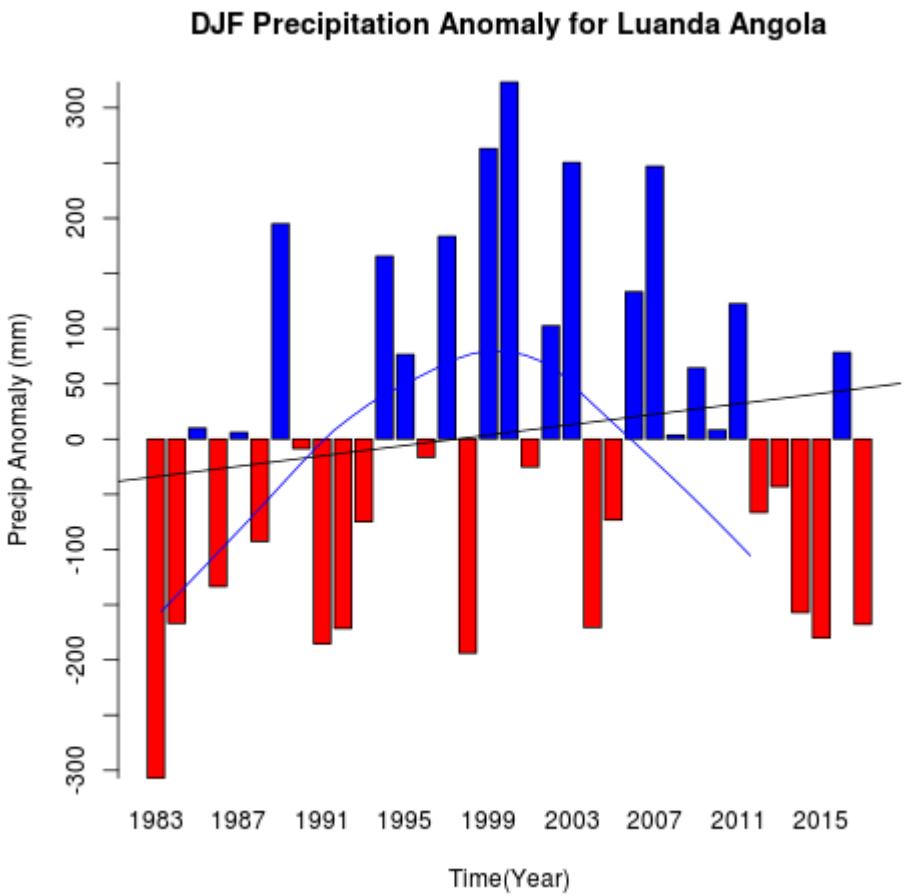


WET YEARS	RR%
1986	135.36

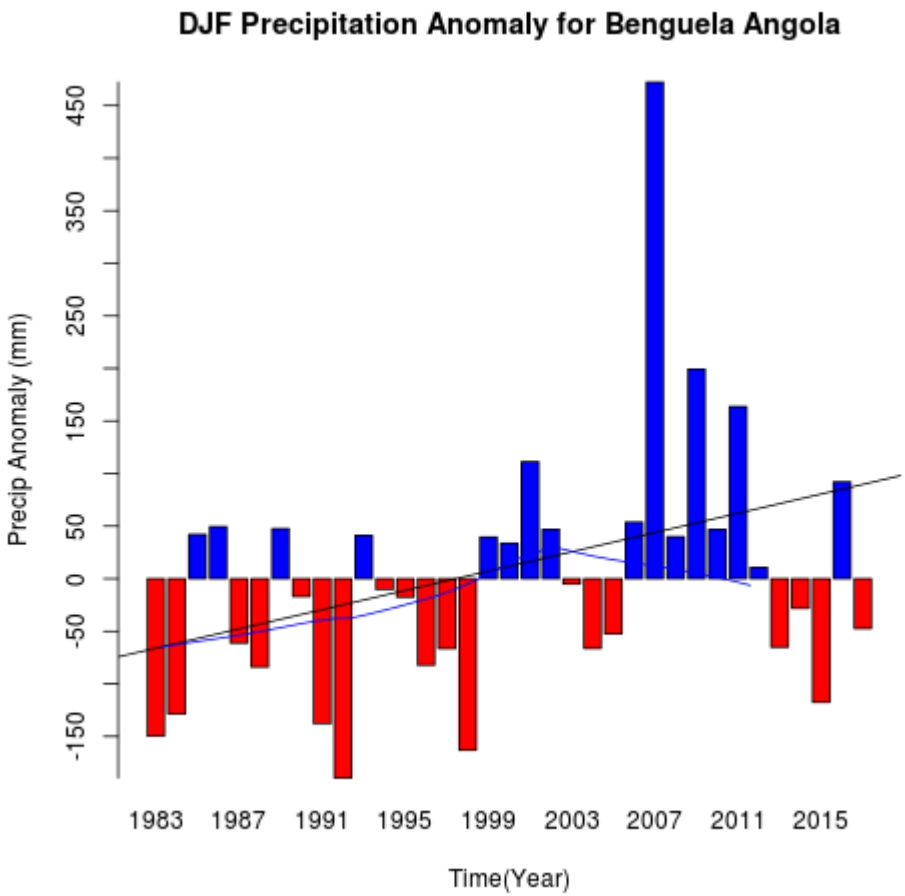

DJF Precipitation Anomaly for Kikwit DRC
Precip Anomaly (mm)
300
200
100
50
0
-50
-150
-250
1983
1987
1991
1995
1999
2003
2007
2011
2015
Time(Year)



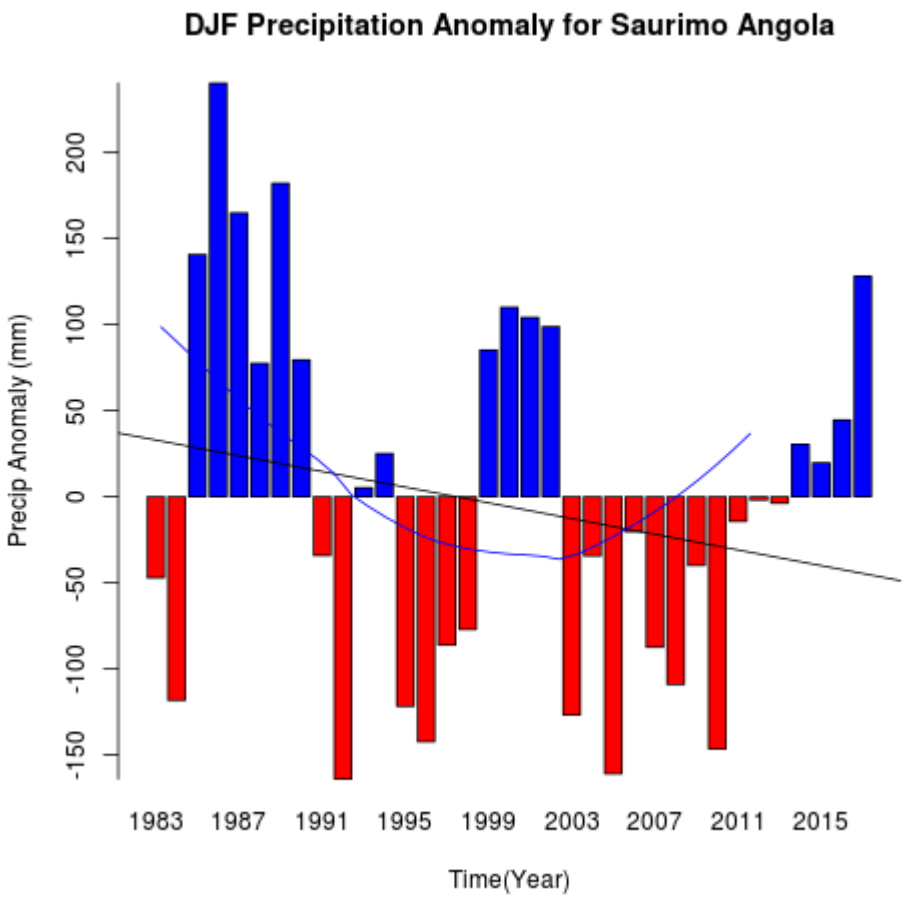
DRY YEARS	RR%	WET YEARS	RR%
1992	70.77	1986	125.63

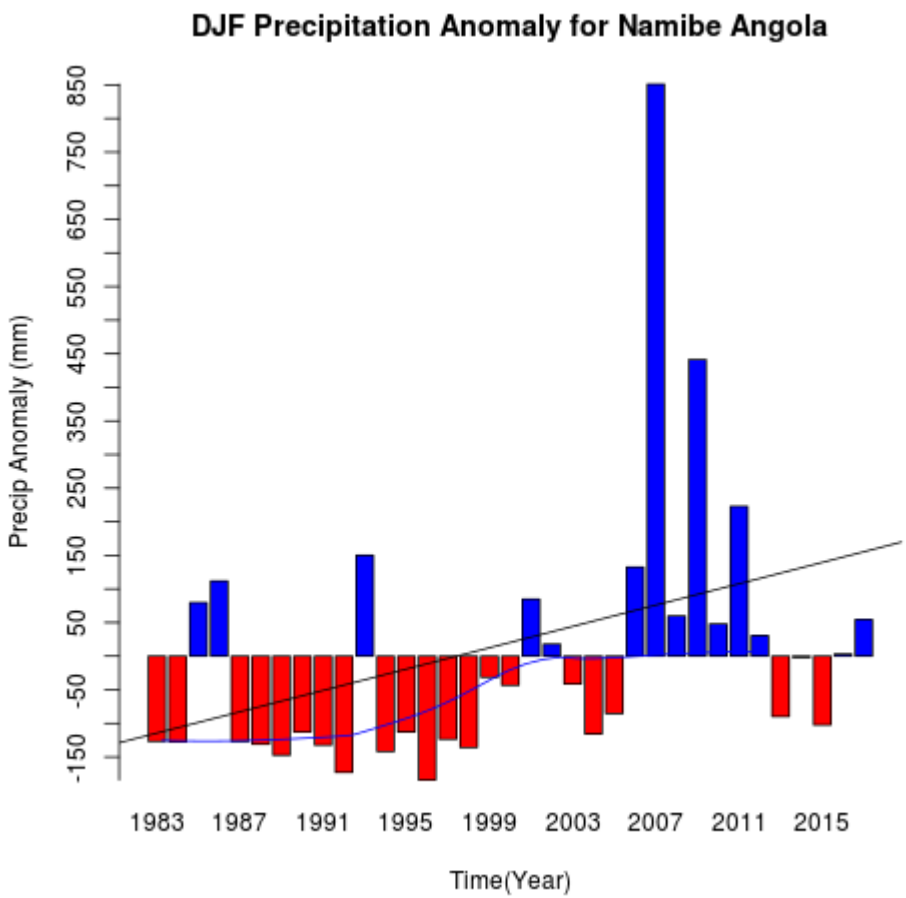


DRY YEARS	RR%	WET YEARS	RR%
1983	68.52	2007	125.34
		2003	125.7
		1999	126.98
		2000	133.16

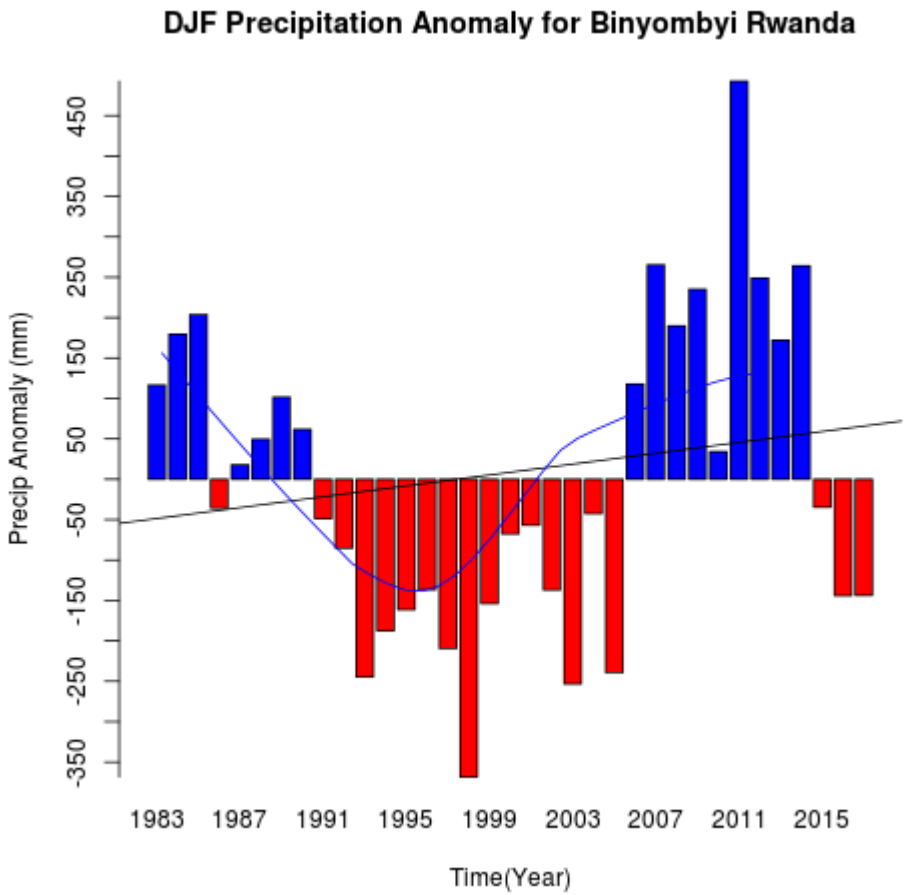


DRY YEARS	RR%	WET YEARS	RR%
1992	61.01	2011	133.68
1998	66.43	2009	141
1983	69.21	2007	197.14
1991	71.61		
1984	73.54		

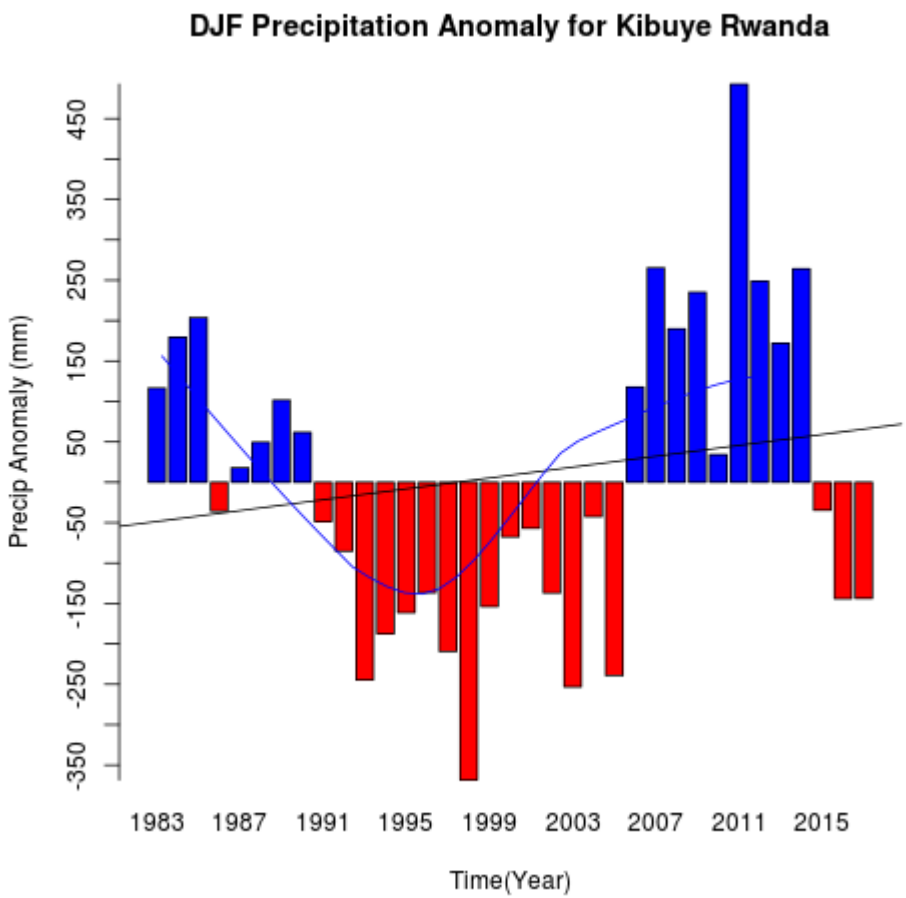

DJF Precipitation Anomaly for Saurimo Angola
Precip Anomaly (mm)
200
150
100
50
0
-50
-100
-150
1983
1987
1991
1995
1999
2003
2007
2011
2015
Time(Year)



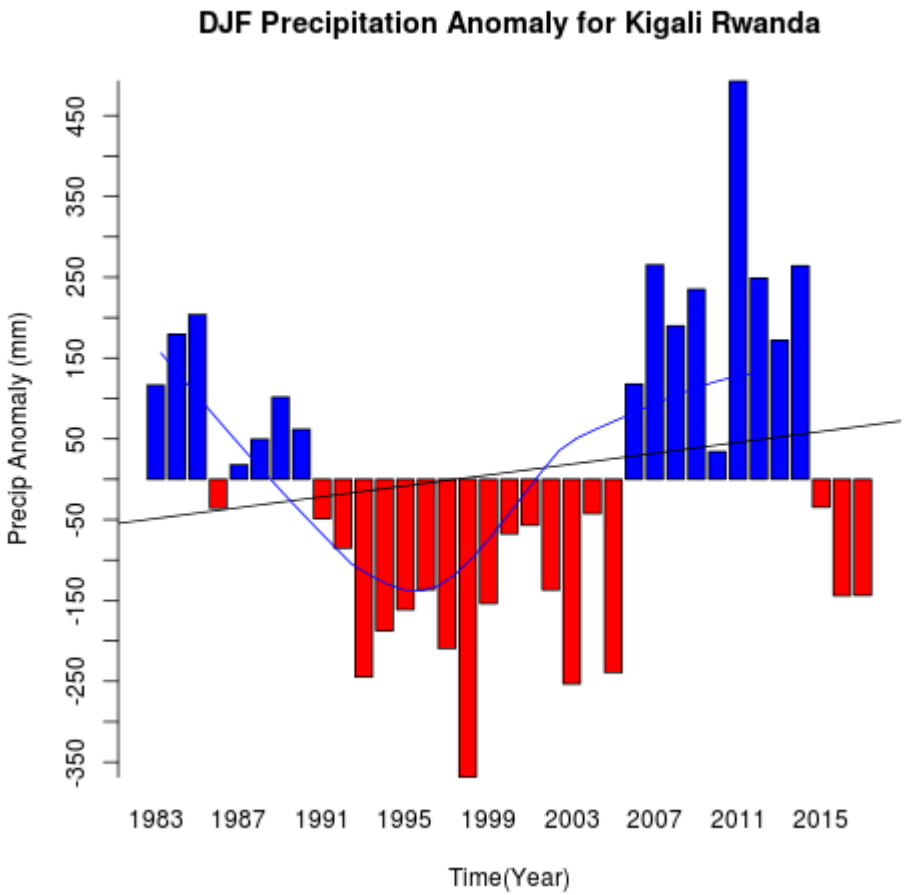
DRY YEARS	RR%	WET YEARS	RR%
1996	21.97	2008	125.32
1992	26.77	1985	133.76
1989	37.56	2001	135.92
1994	39.9	1986	147.36
1998	42.39	2006	156.12
1991	43.9	1993	163.57
1988	44.5	2011	194.41
1984	45.99	2009	286.97
1987	46.22	2007	460.49
1983	46.27		
1997	47.59		
2004	50.94		
1995	52.2		
1990	52.32		
2015	56.61		
2013	61.95		
2005	63.82		



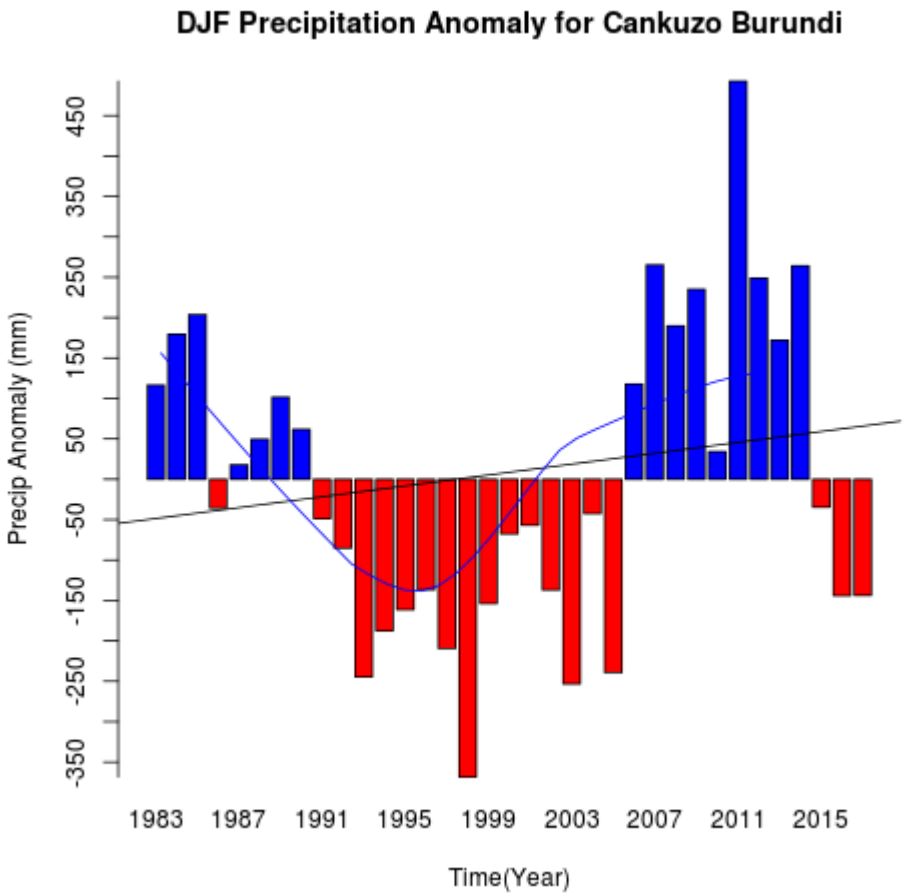
DRY YEARS	RR%	WET YEARS	RR%
1998	65.41	2011	146.25



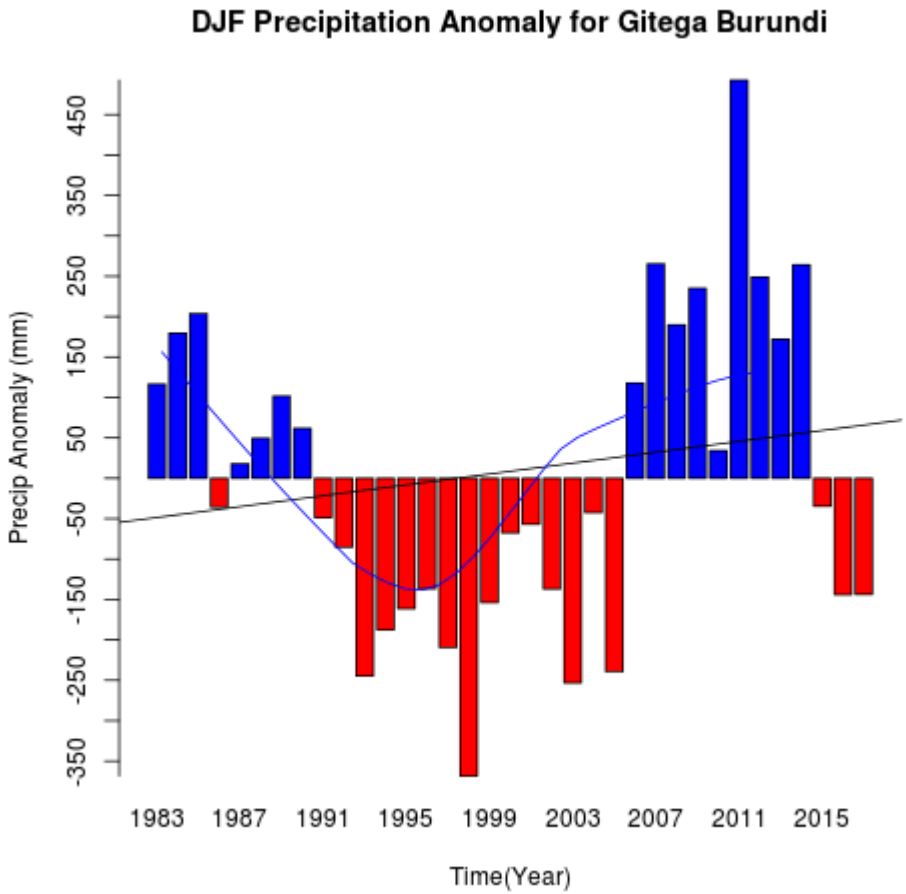
DRY YEARS	RR%	WET YEARS	RR%
1998	65.41	2011	146.25



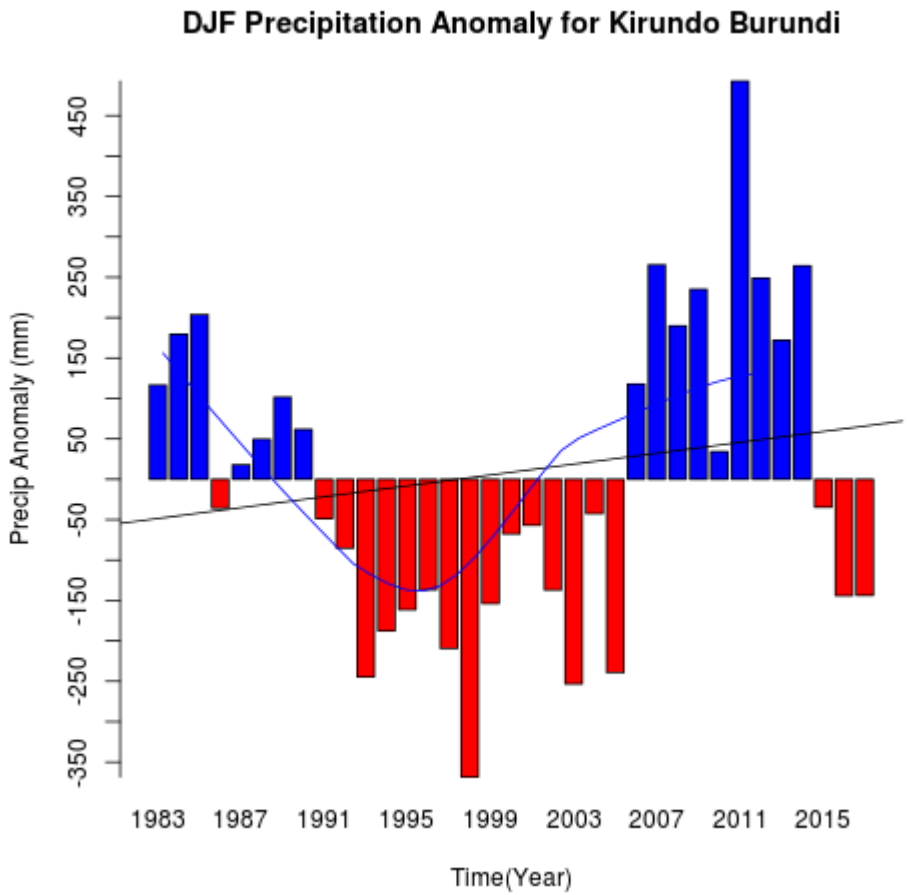
DRY YEARS	RR%	WET YEARS	RR%
1998	65.41	2011	146.25



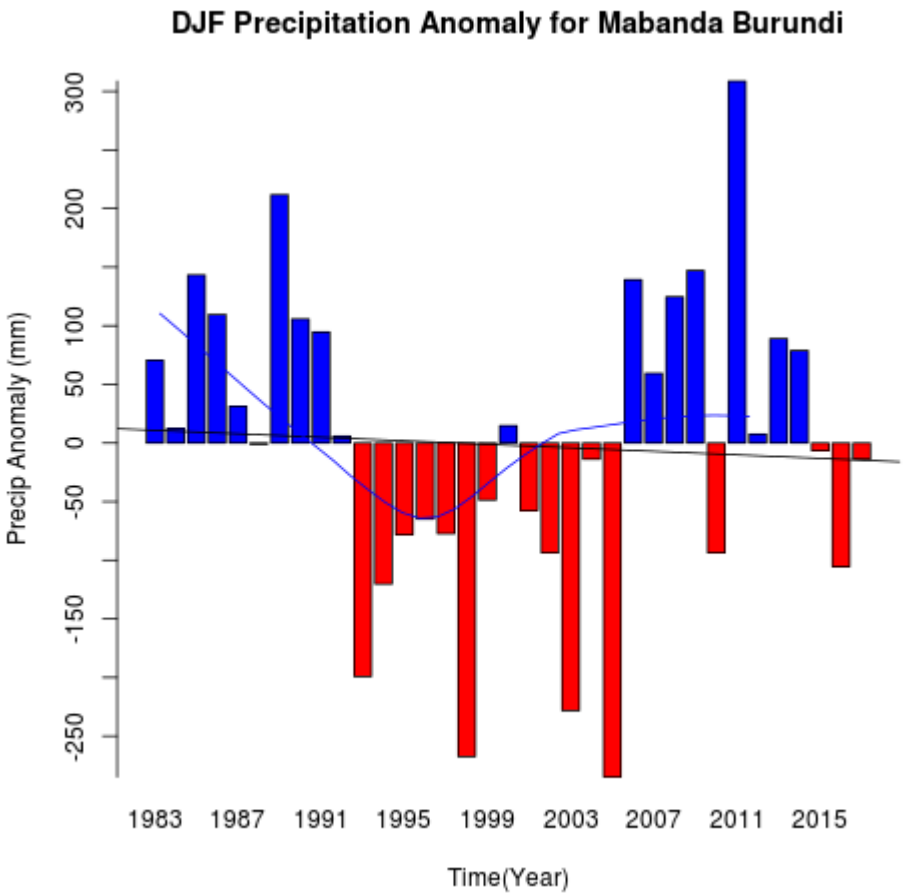
DRY YEARS	RR%	WET YEARS	RR%
1998	65.41	2011	146.25



DRY YEARS	RR%	WET YEARS	RR%
1998	65.41	2011	146.25

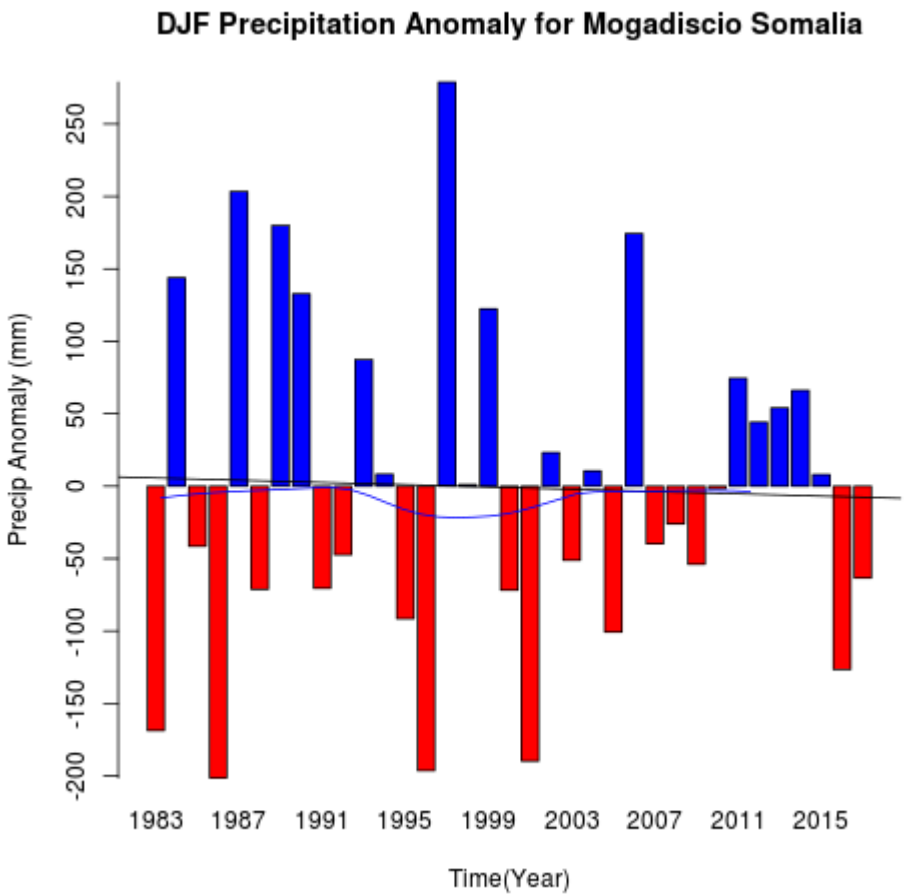


DRY YEARS	RR%	WET YEARS	RR%
1998	65.41	2011	146.25

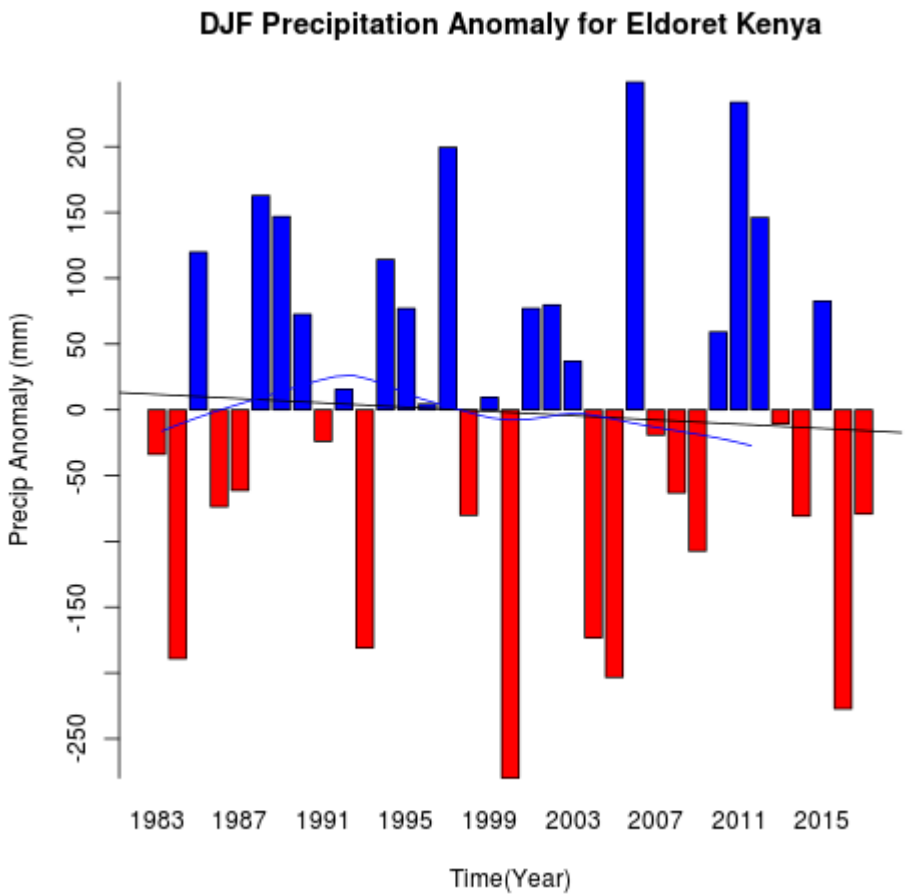


DRY YEARS	RR%	WET YEARS	RR%
2005	66.99	2011	135.76
1998	69		
2003	73.54		

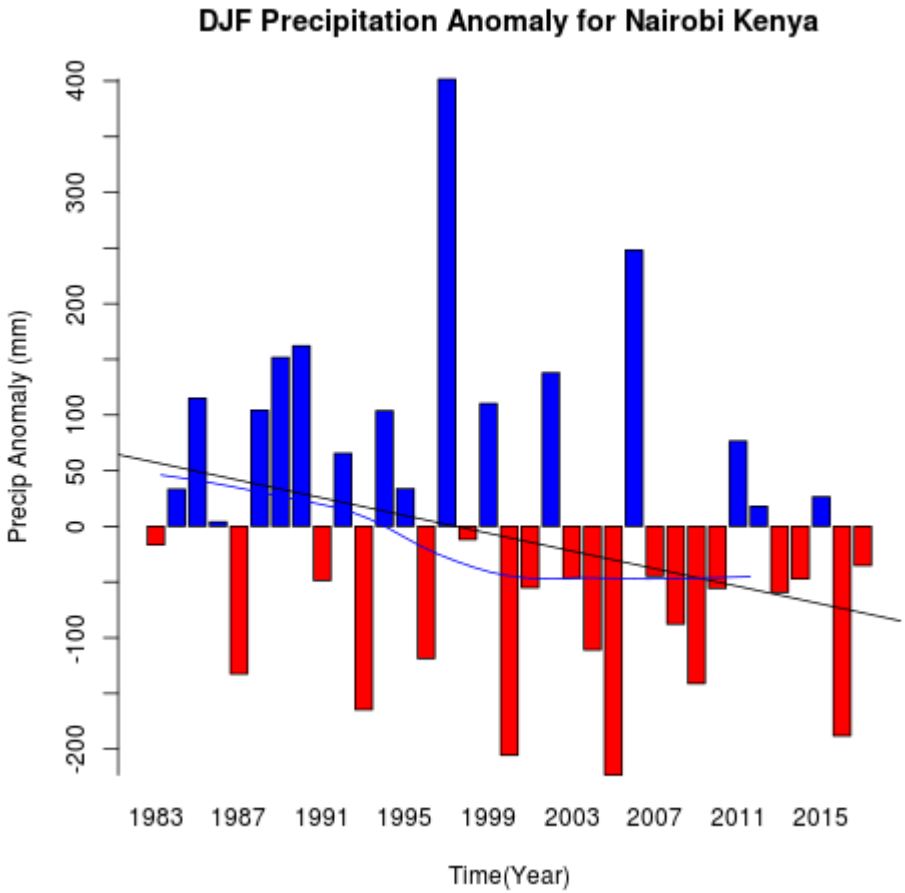
DJF PRECIPITATION ANOMALY FOR EASTERN AFRICA



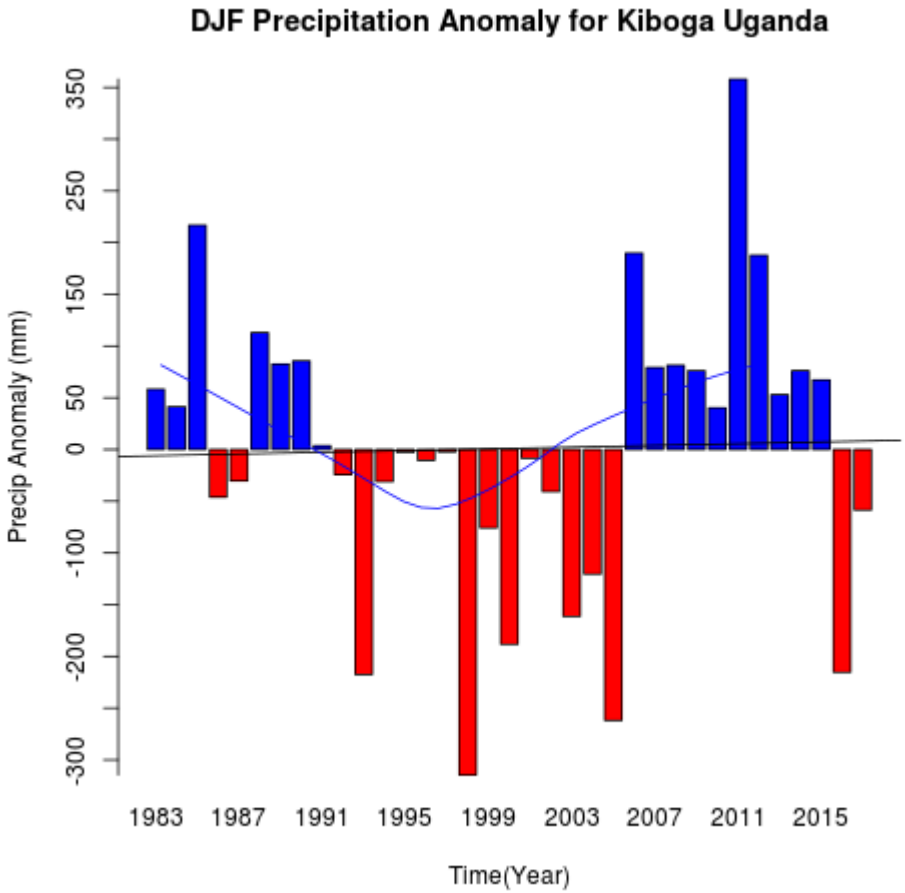
DRY YEARS	RR%	WET YEARS	RR%
1986	38.98	1993	126.51
1996	40.5	1999	137.08
2001	42.5	1990	140.23
1983	48.9	1984	143.61
2016	61.65	2006	152.84
2005	69.49	1989	154.56
1995	72.27	1987	161.65
		1997	184.49



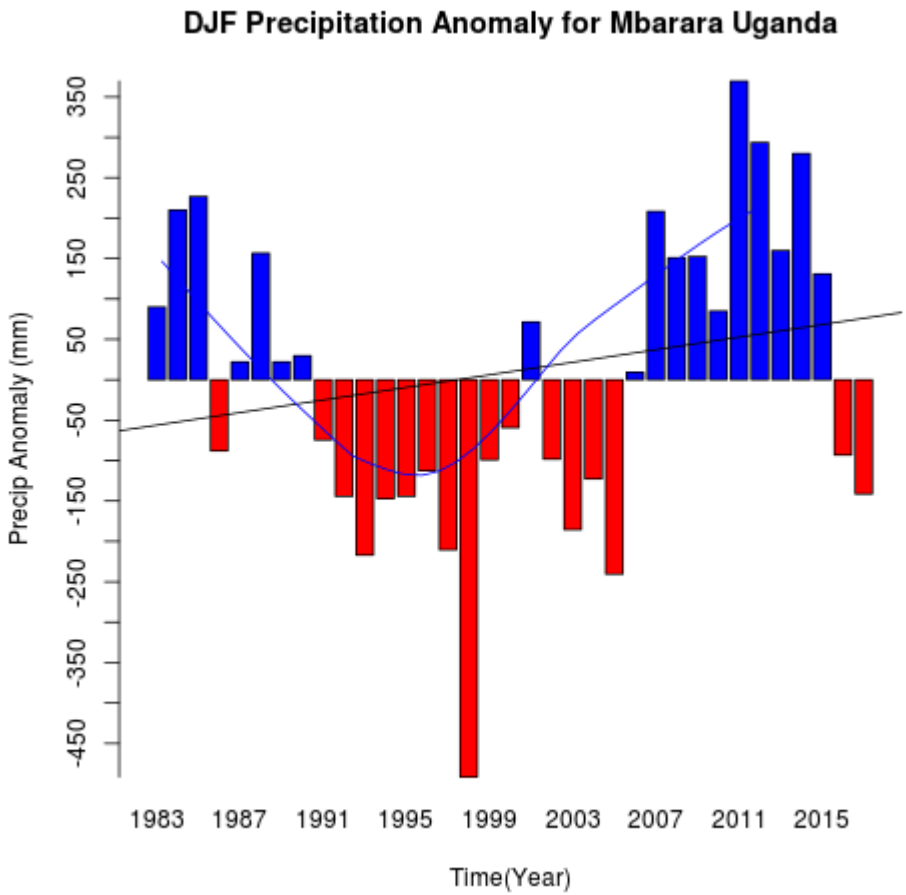
DRY YEARS	RR%
2000	72.37



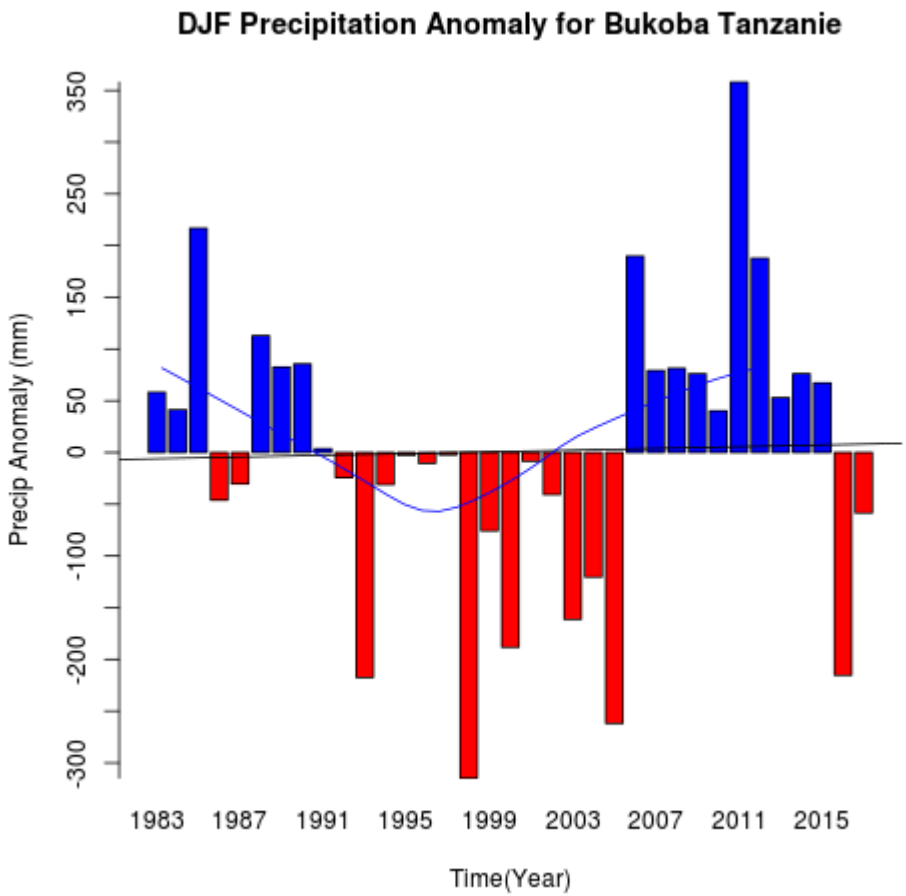
DRY YEARS	RR%	WET YEARS	RR%
2005	69.45	2006	133.94
2000	71.88	1997	154.96
2016	74.26		



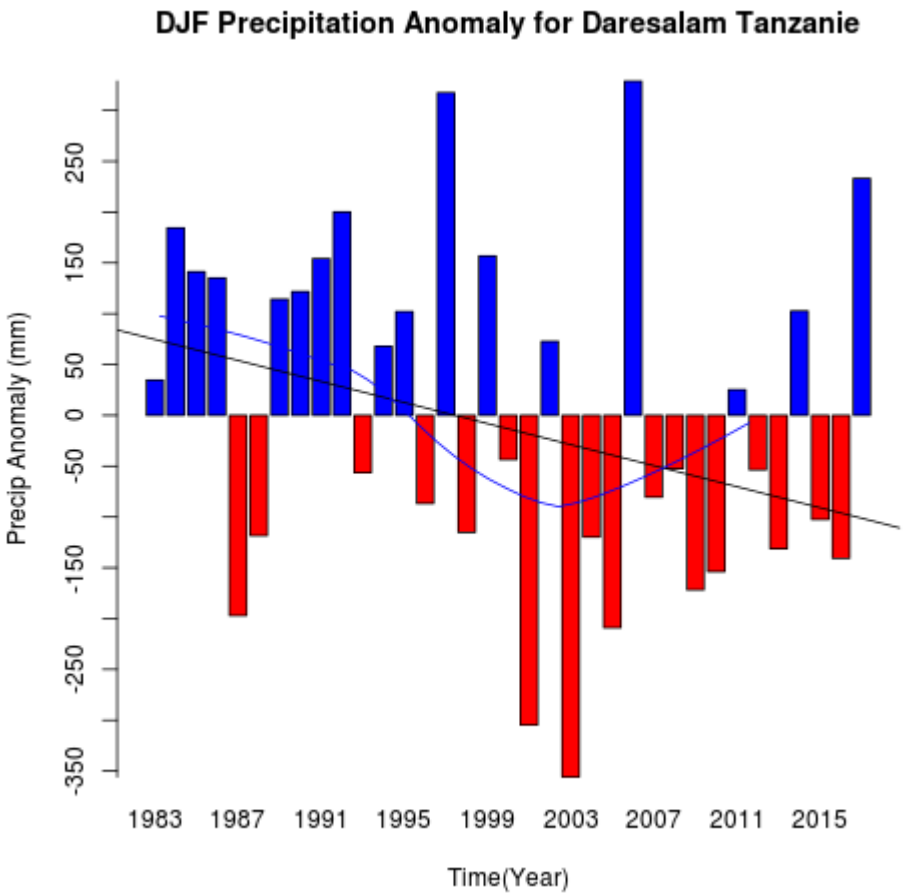
DRY YEARS	RR%	WET YEARS	RR%
1998	70.61	2011	133.44



DRY YEARS	RR%	WET YEARS	RR%
1998	63.25	2011	127.62

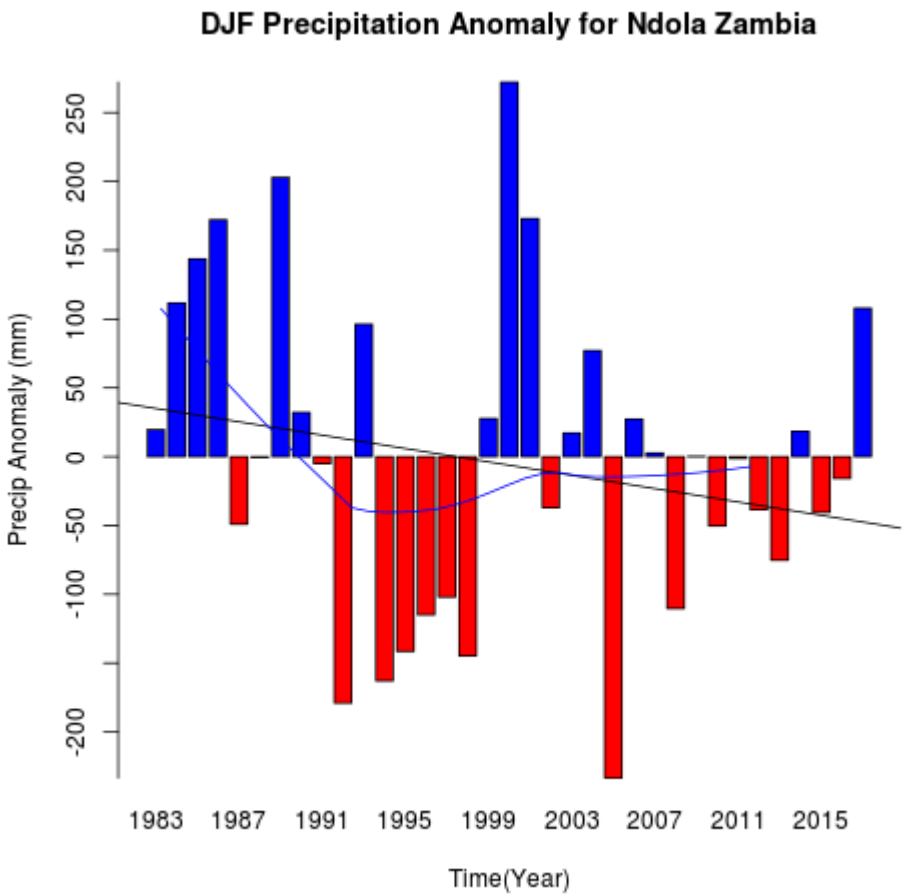


DRY YEARS	RR%	WET YEARS	RR%
1998	70.61	2011	133.44

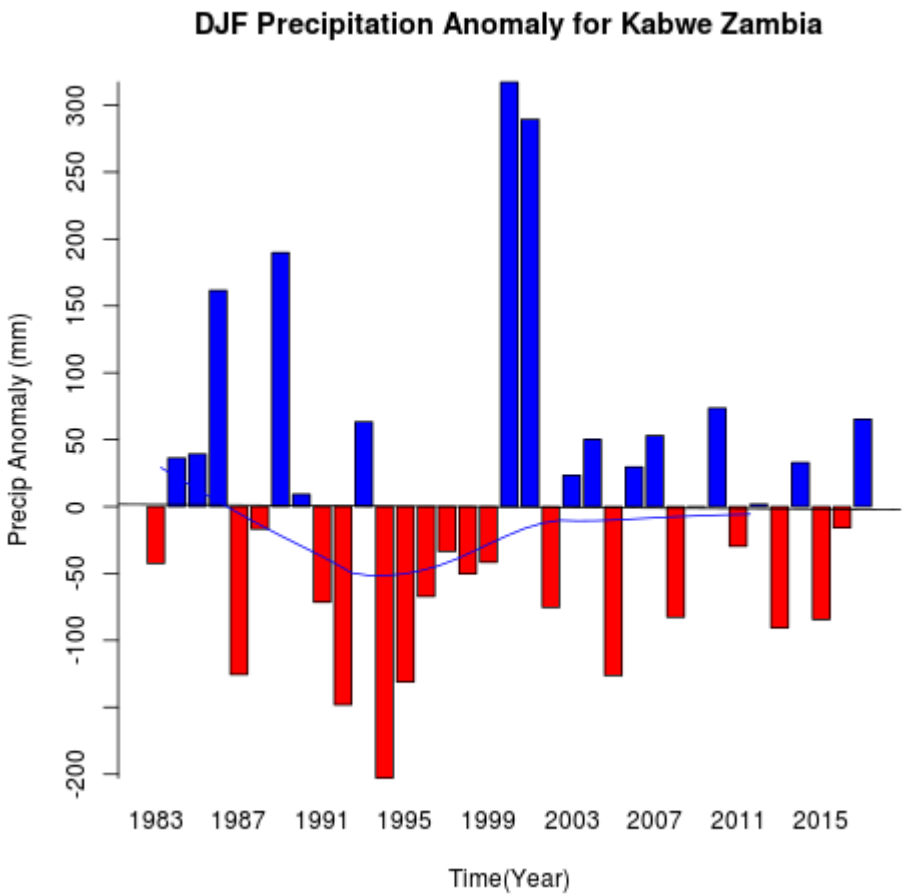


DRY YEARS	RR%	WET YEARS	RR%
2003	60.31	2017	126
2001	66.01	1997	135.41
		2006	136.67

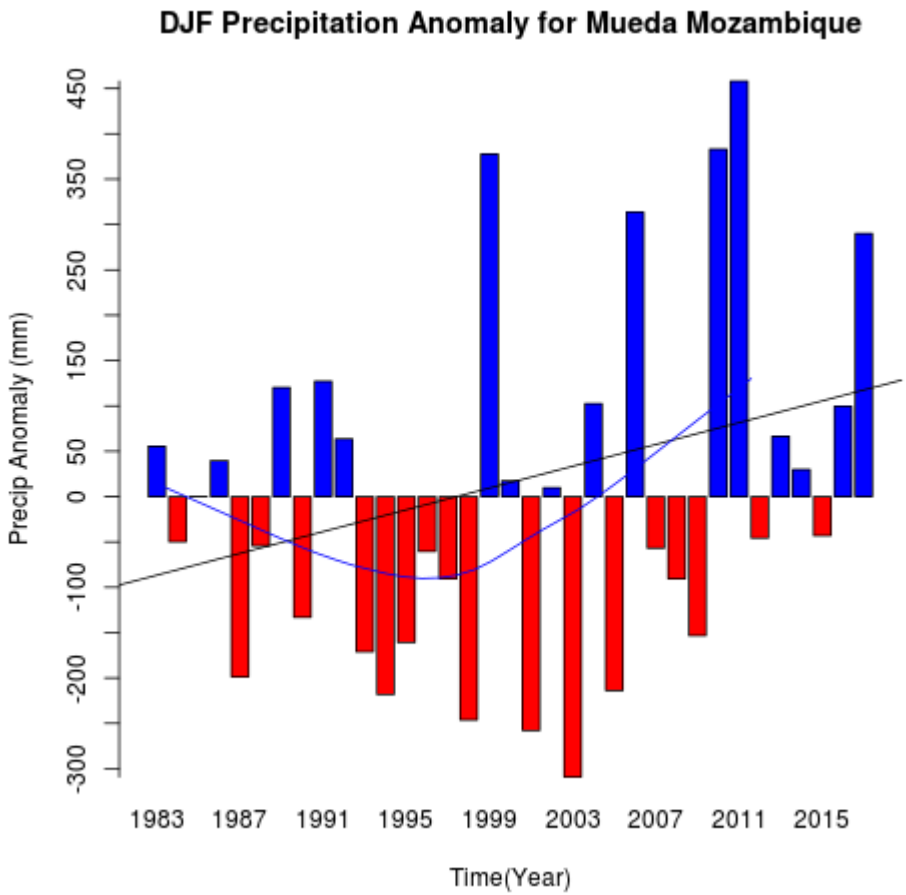
DJF PRECIPITATION ANOMALY FOR SOUTHERN AFRICA



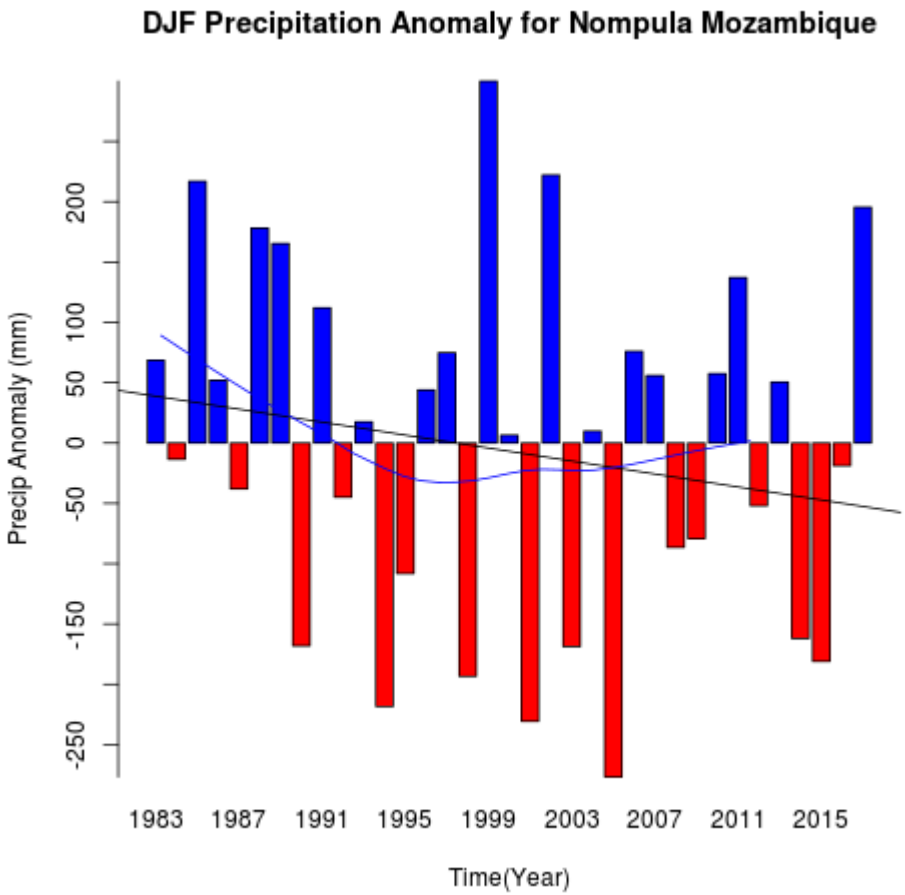
DRY YEARS	RR%	WET YEARS	RR%
2005	69.03	1989	126.93
		2000	136.1



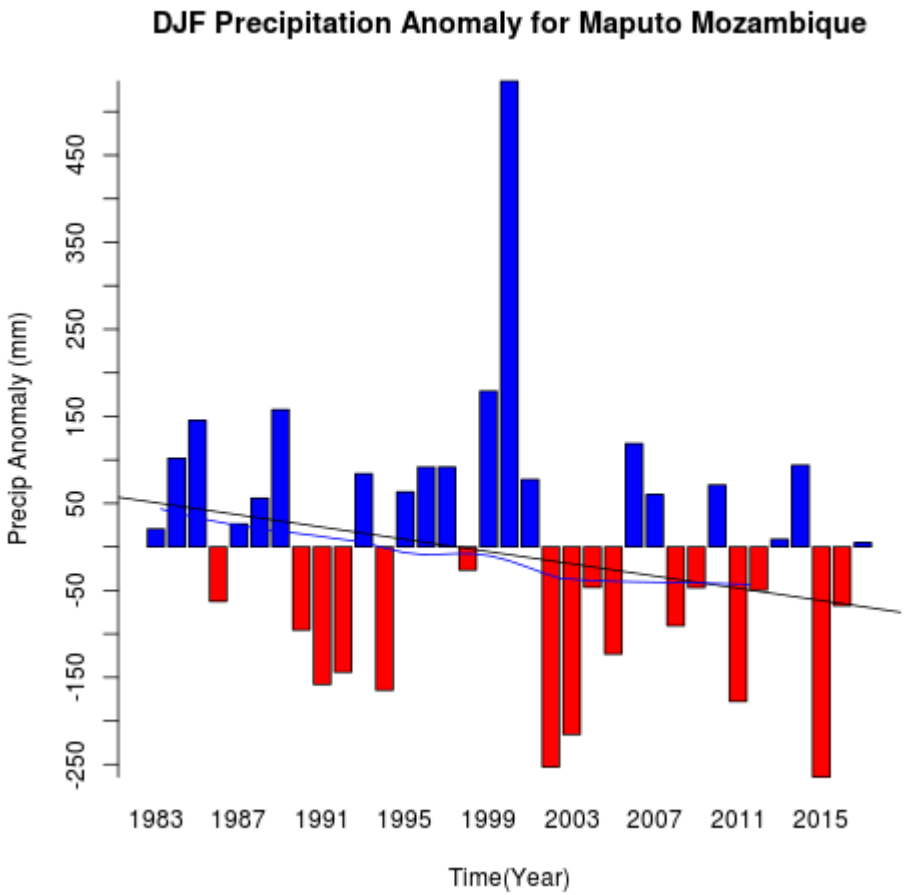
DRY YEARS	RR%	WET YEARS	RR%
1994	68.13	1986	125.38
		1989	129.81
		2001	145.5
		2000	149.84



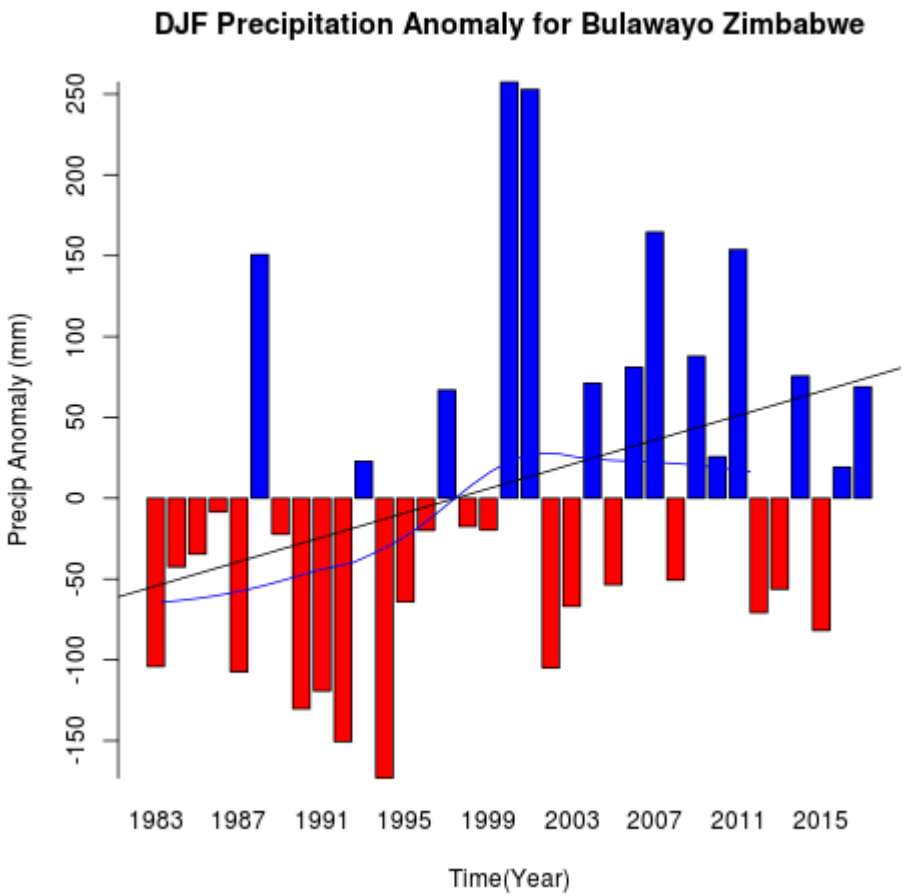
DRY YEARS	RR%	WET YEARS	RR%
2003	60.4	2017	137.16
2001	66.95	2006	140.17
1998	68.45	1999	148.4
1994	72.04	2010	149.08
2005	72.6	2011	158.68
1987	74.55		



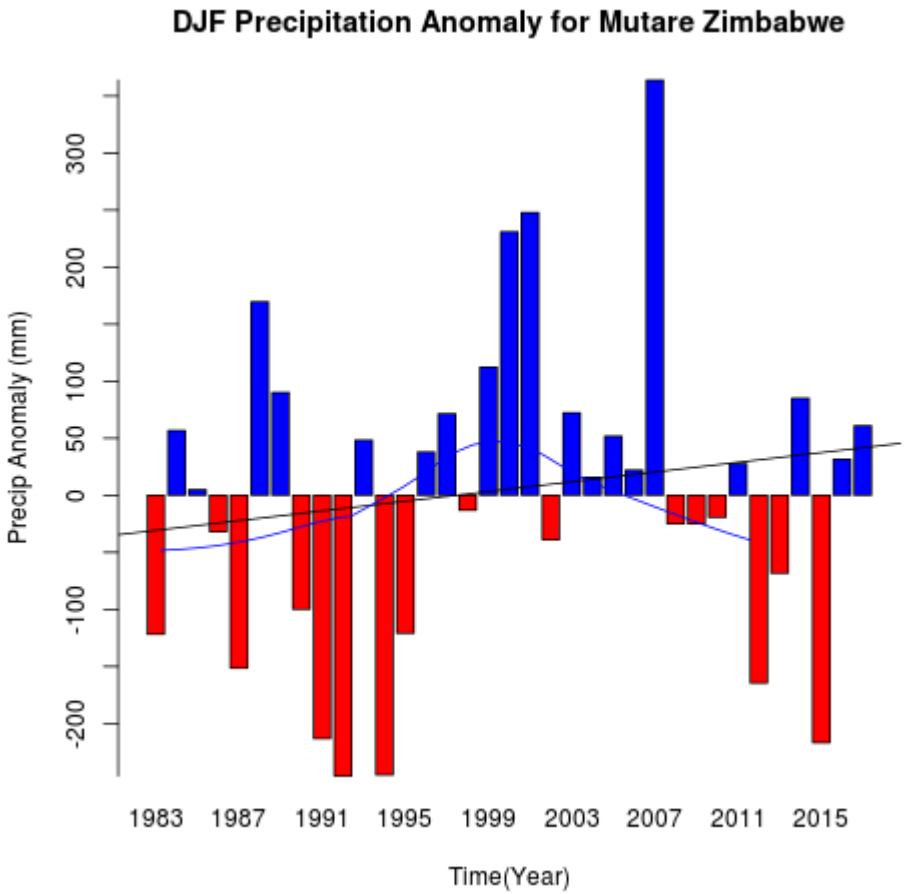
DRY YEARS	RR%	WET YEARS	RR%
2005	62.99	2017	126.13
2001	69.16	1985	129
1994	70.8	2002	129.7
1998	74.15	1999	140.1



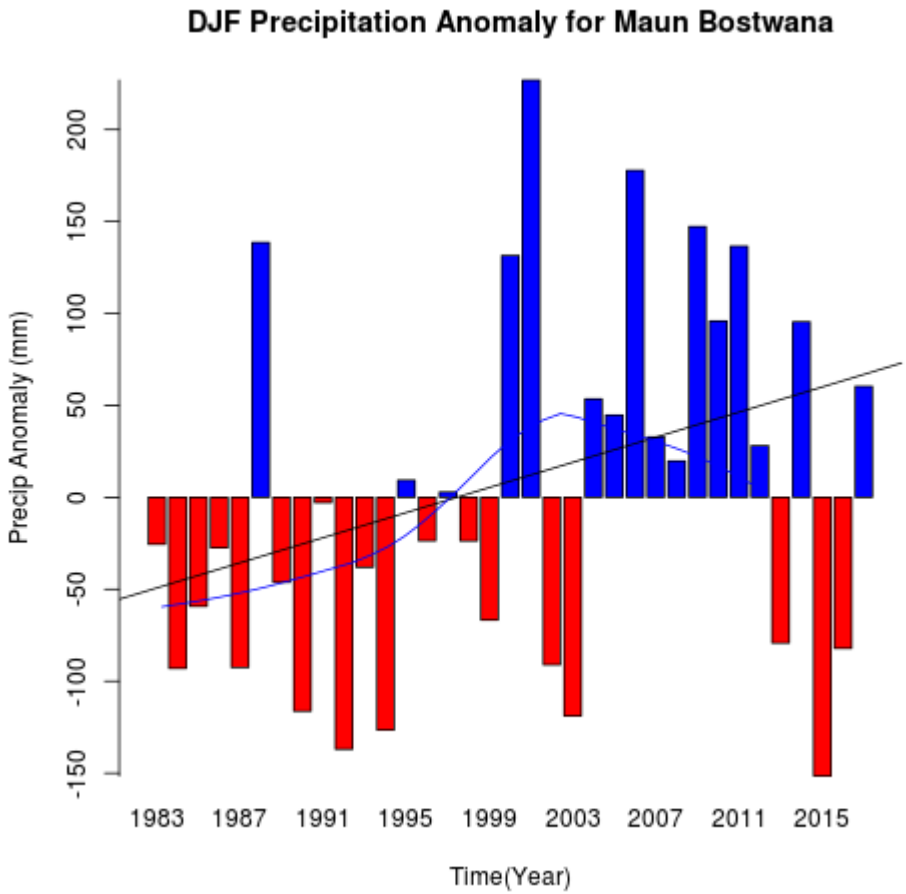
DRY YEARS	RR%	WET YEARS	RR%
2015	51.93	1985	126.43
2002	54.04	1989	128.65
2003	60.8	1999	132.53
2011	67.7	2000	197.29
1994	70.05		
1991	71.25		
1992	73.82		



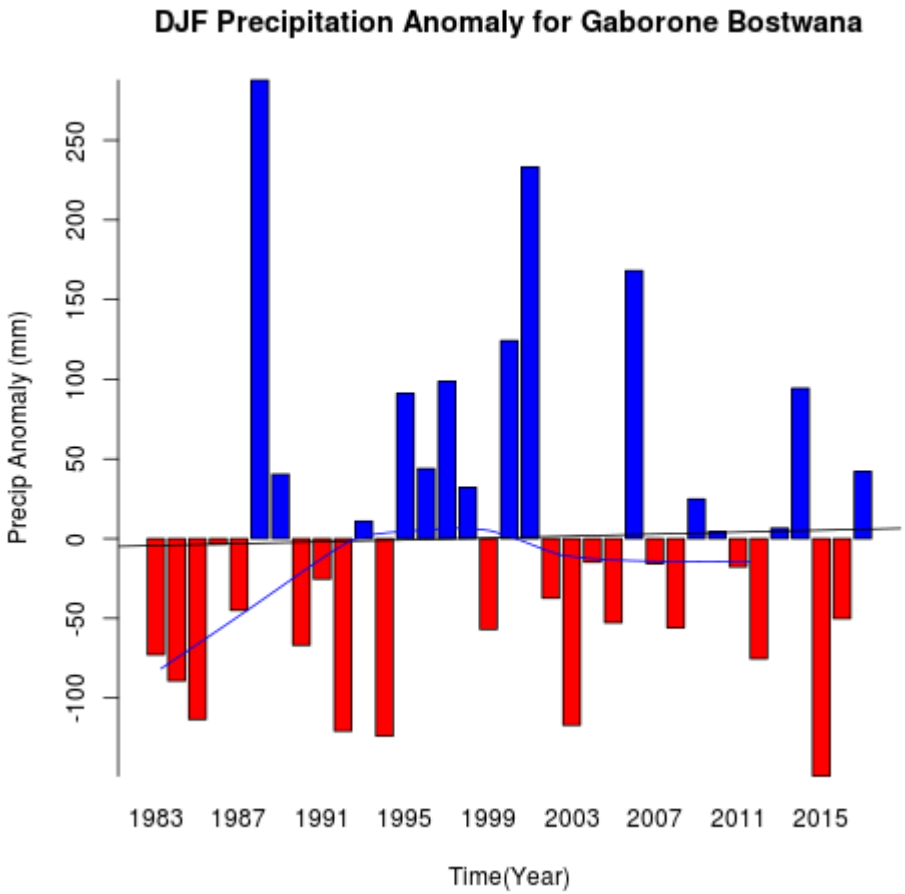
DRY YEARS	RR%	WET YEARS	RR%
1994	62.8	1988	132.41
1992	67.62	2011	133.09
1990	71.99	2007	135.39
1991	74.36	2001	154.39
		2000	155.33



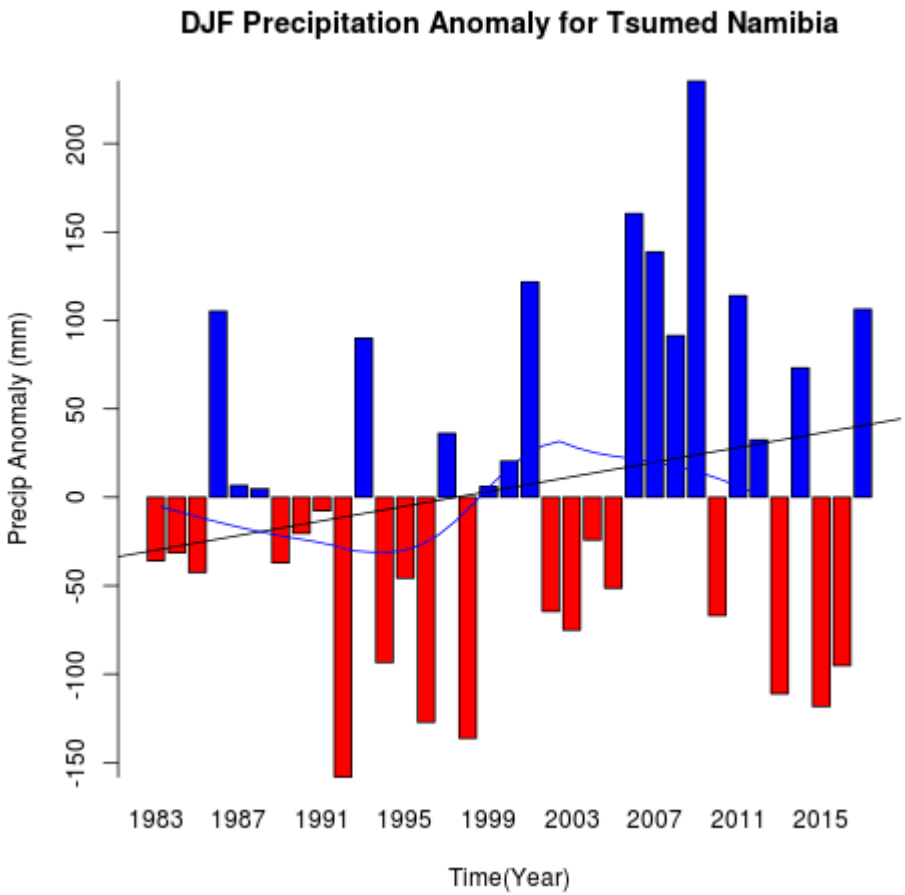
DRY YEARS	RR%	WET YEARS	RR%
1992	62.1	1988	126.14
1994	62.24	2000	135.59
2015	66.6	2001	138.18
1991	67.14	2007	156.05
2012	74.65		



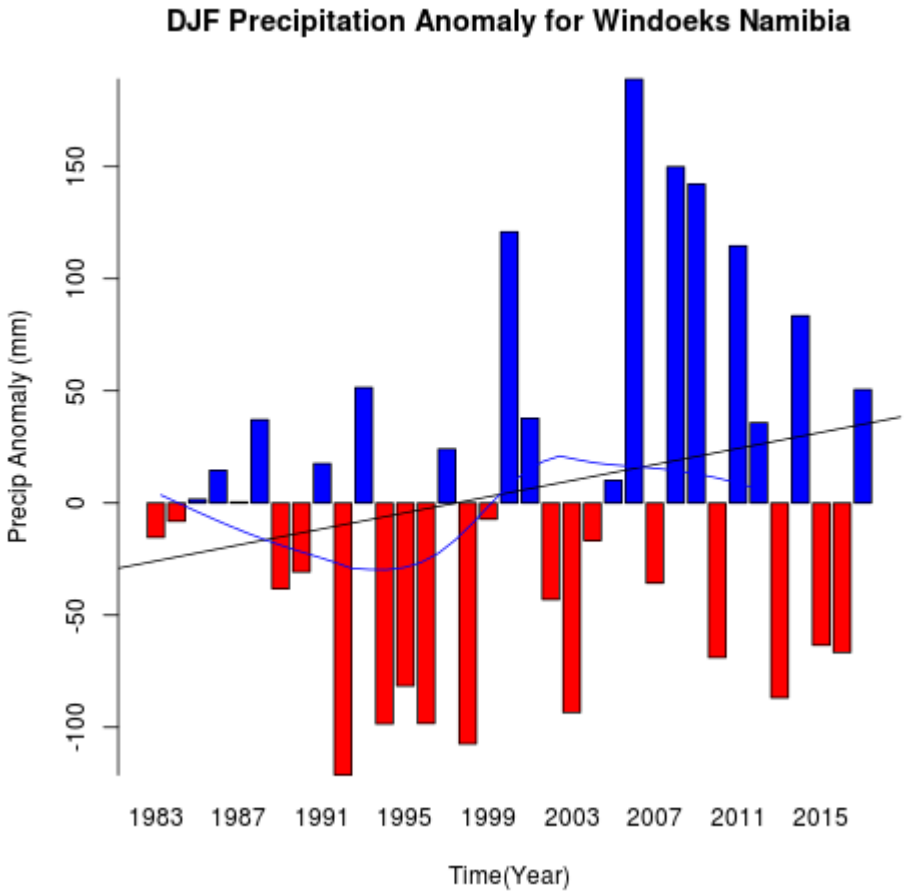
DRY YEARS	RR%	WET YEARS	RR%
2015	56.75	2014	127.26
1992	60.9	2010	127.37
1994	63.87	2000	137.55
2003	66.07	2011	138.99
1990	66.8	1988	139.57
1984	73.45	2009	142.03
1987	73.57	2006	150.75
2002	74.01	2001	164.76



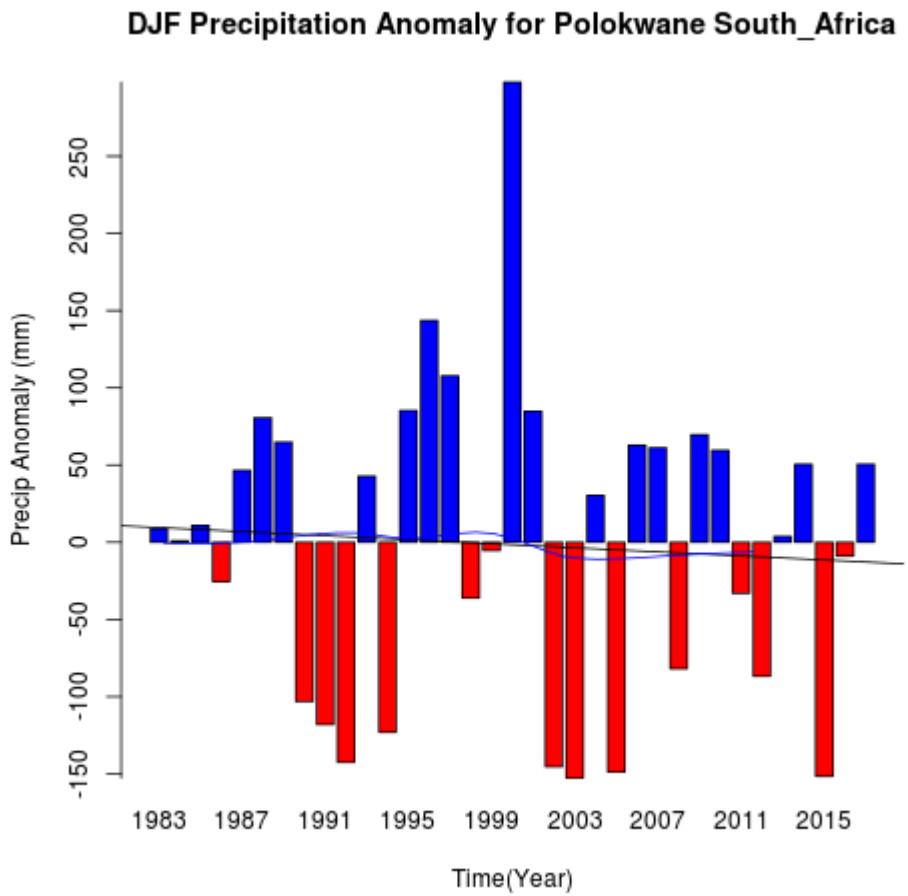
DRY YEARS	RR%	WET YEARS	RR%
2015	58.99	1995	125.1
1994	65.89	2014	125.99
1992	66.74	1997	127.19
2003	67.76	2000	134.22
1985	68.76	2006	146.33
		2001	164.24
		1988	179.23



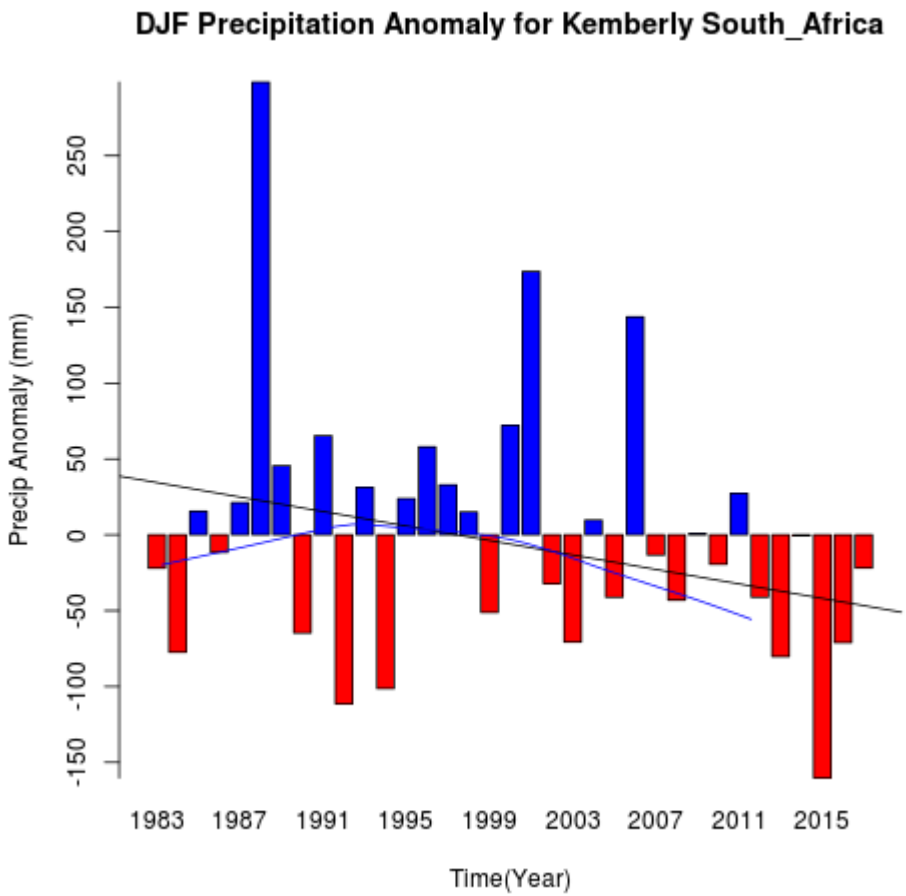
DRY YEARS	RR%	WET YEARS	RR%
1992	47.95	1993	129.59
1998	55.15	2008	130.07
1996	58.14	1986	134.62
2015	61.05	2017	134.99
2013	63.44	2011	137.51
2016	68.66	2001	140.06
1994	69.23	2007	145.66
		2006	152.77
		2009	177.41



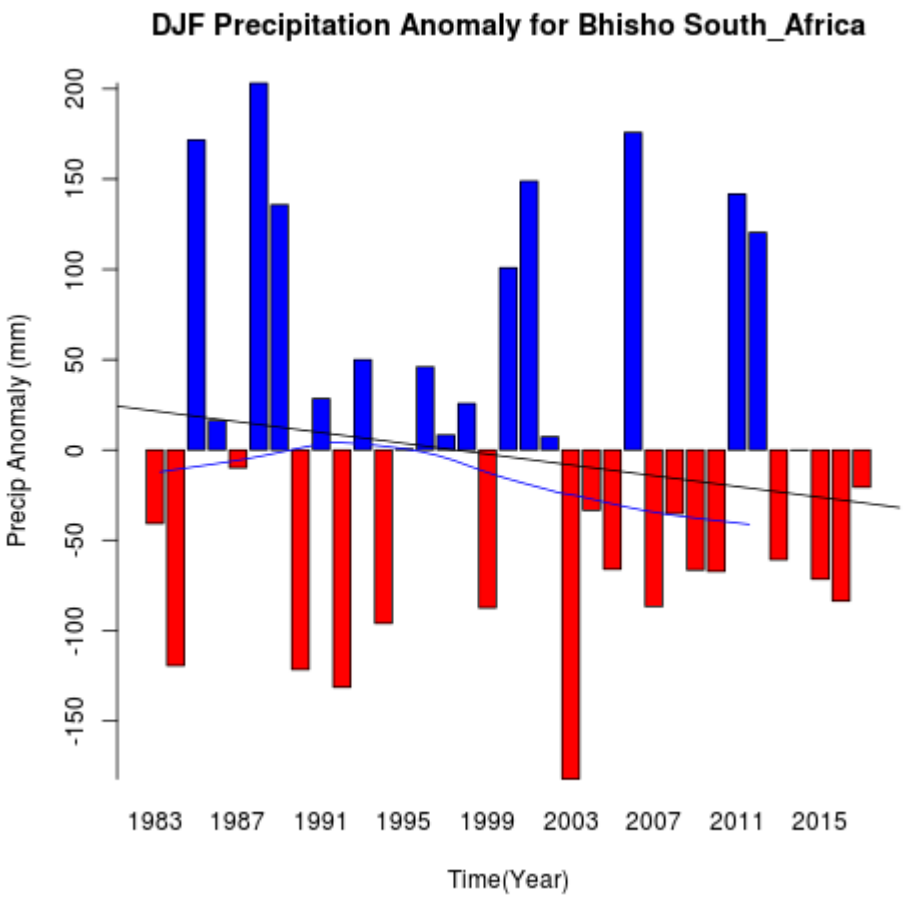
DRY YEARS	RR%	WET YEARS	RR%
1992	48.85	2014	135.22
1998	54.7	2011	148.36
1994	58.47	2000	151
1996	58.53	2009	159.97
2003	60.58	2008	163.23
2013	63.38	2006	179.71
1995	65.6		
2010	70.93		
2016	71.87		
2015	73.24		



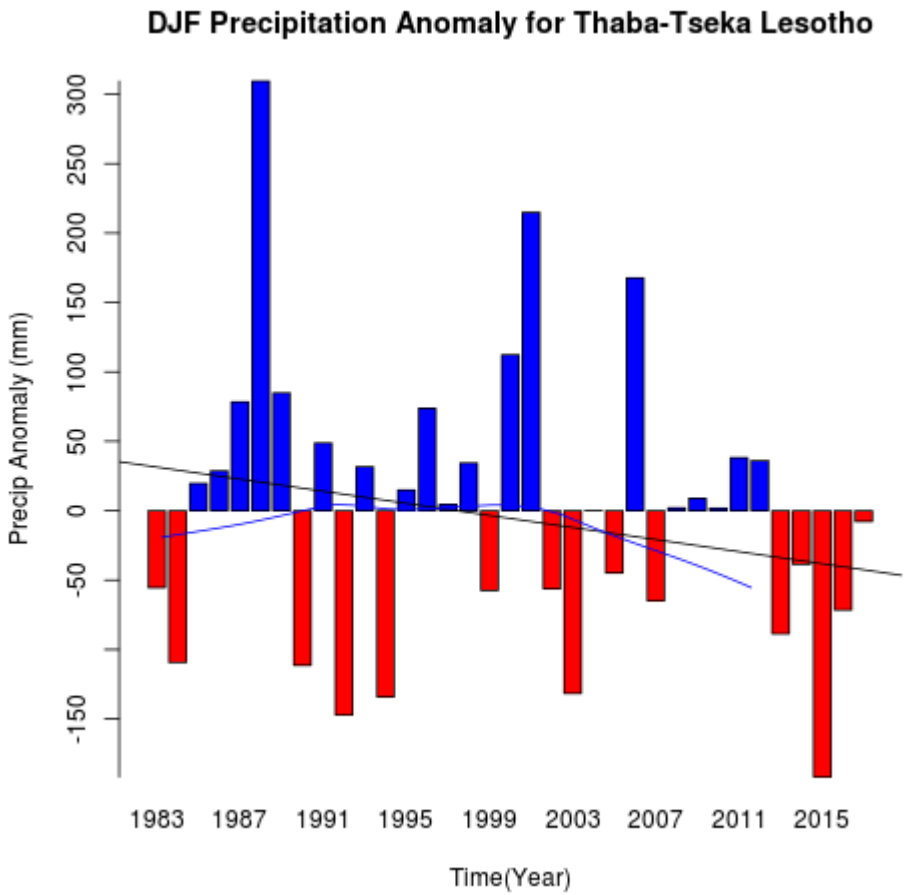
DRY YEARS	RR%	WET YEARS	RR%
2003	67.66	1996	130.42
2015	67.89	2000	163.11
2005	68.47		
2002	69.2		
1992	69.8		
1994	73.93		
1991	74.99		



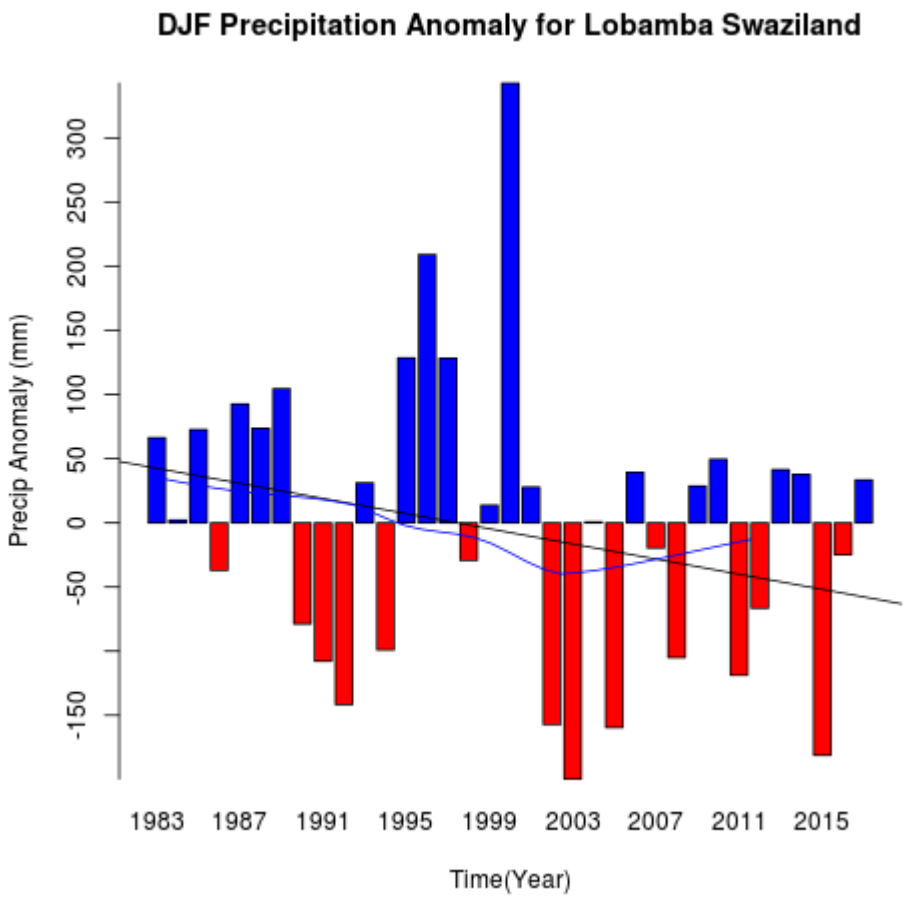
DRY YEARS	RR%	WET YEARS	RR%
2015	55.22	2006	140.14
1992	68.86	2001	148.53
1994	71.68	1988	183.37



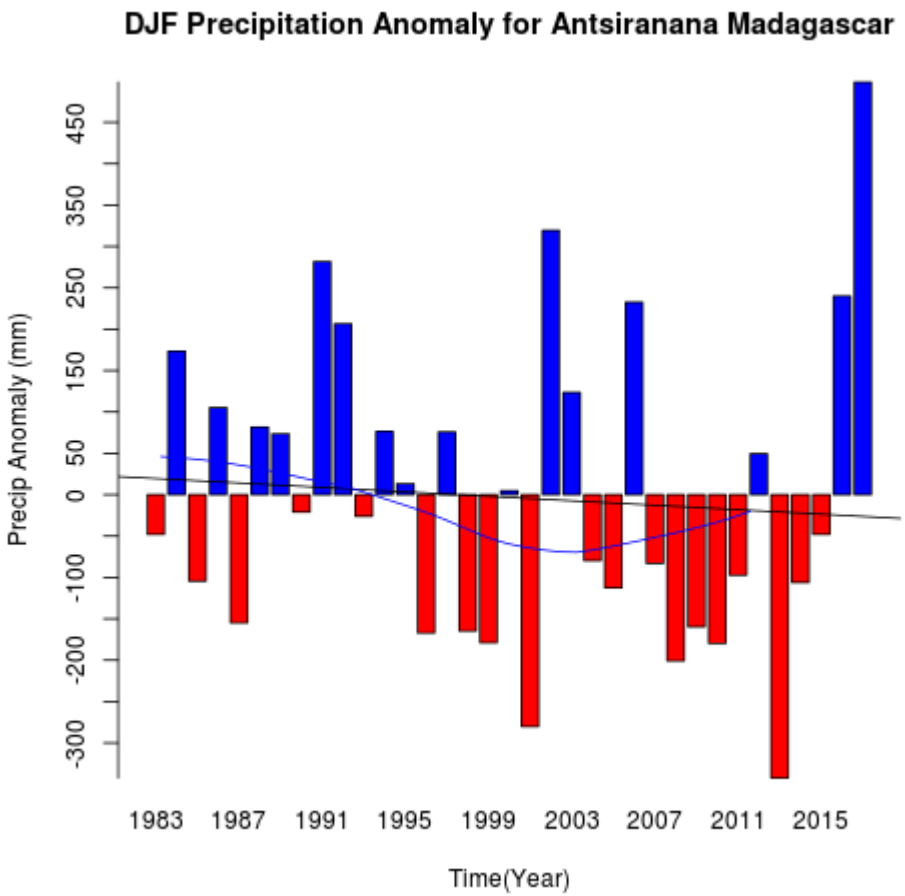
DRY YEARS	RR%	WET YEARS	RR%
2003	67.49	2011	125.28
		2001	126.56
		1985	130.61
		2006	131.37
		1988	136.24



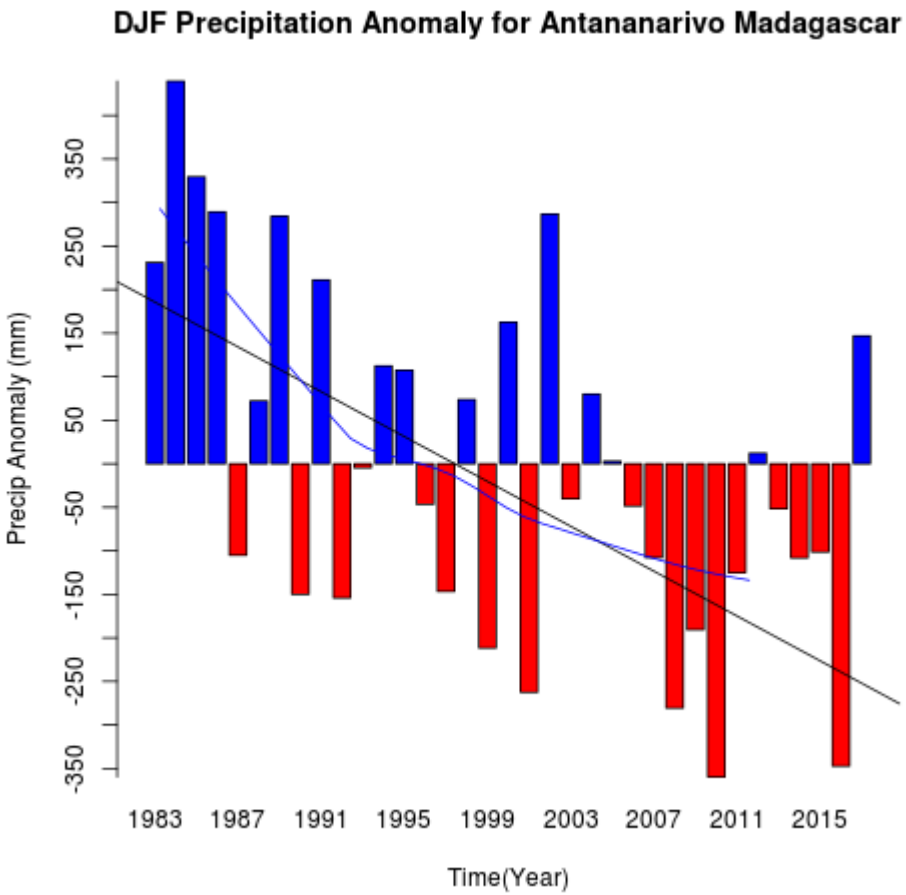
DRY YEARS	RR%	WET YEARS	RR%
2015	63.26	2006	132.14
1992	71.82	2001	141.18
1994	74.3	1988	159.28
2003	74.79		



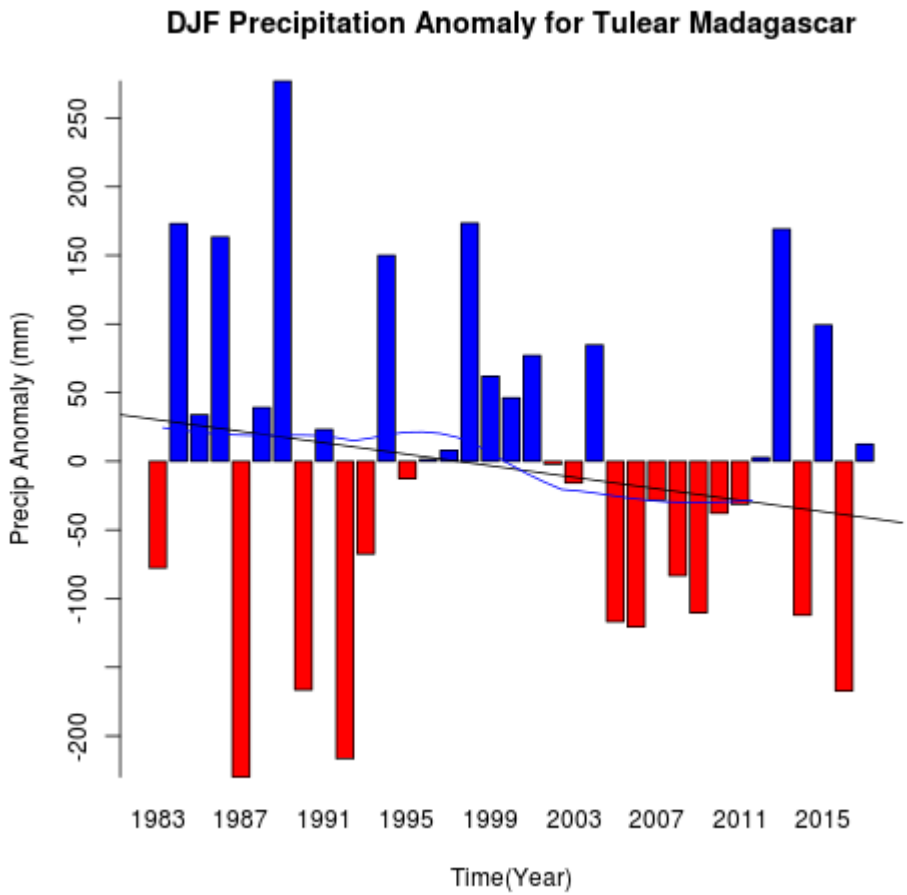
DRY YEARS	RR%	WET YEARS	RR%
2003	59.85	1997	125.82
2015	63.57	1995	125.87
2005	67.91	1996	142.09
2002	68.36	2000	168.94
1992	71.52		



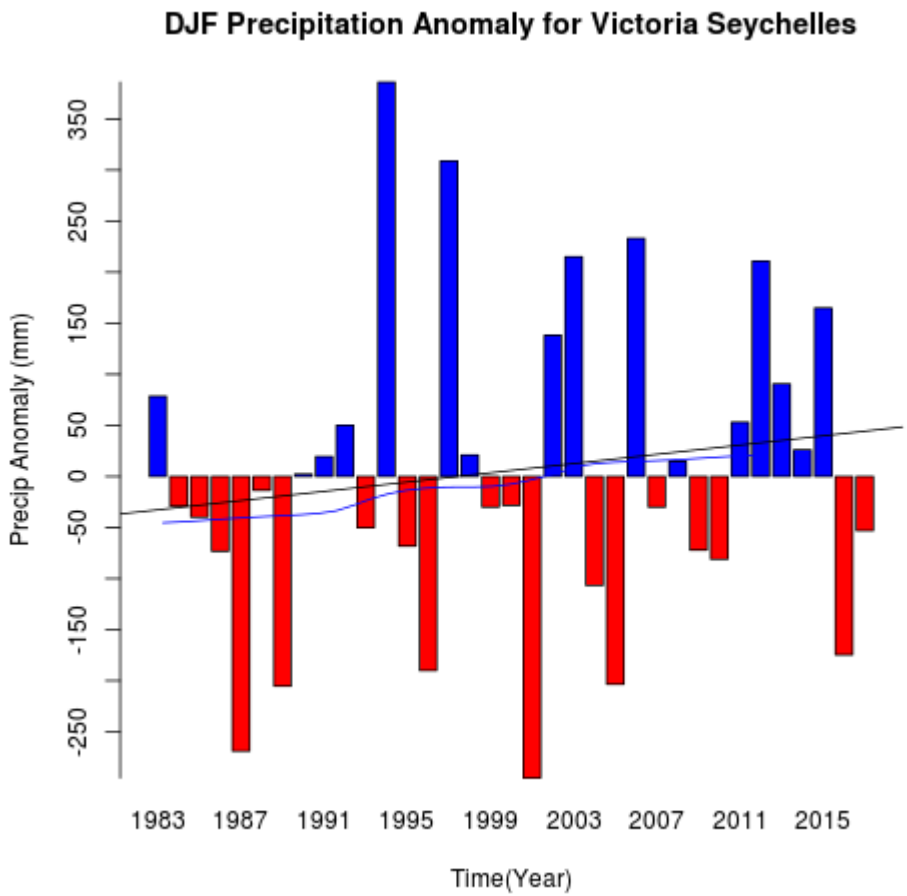
DRY YEARS	RR%	WET YEARS	RR%
2010	72.43	1985	125.27
2016	73.38	1984	133.68



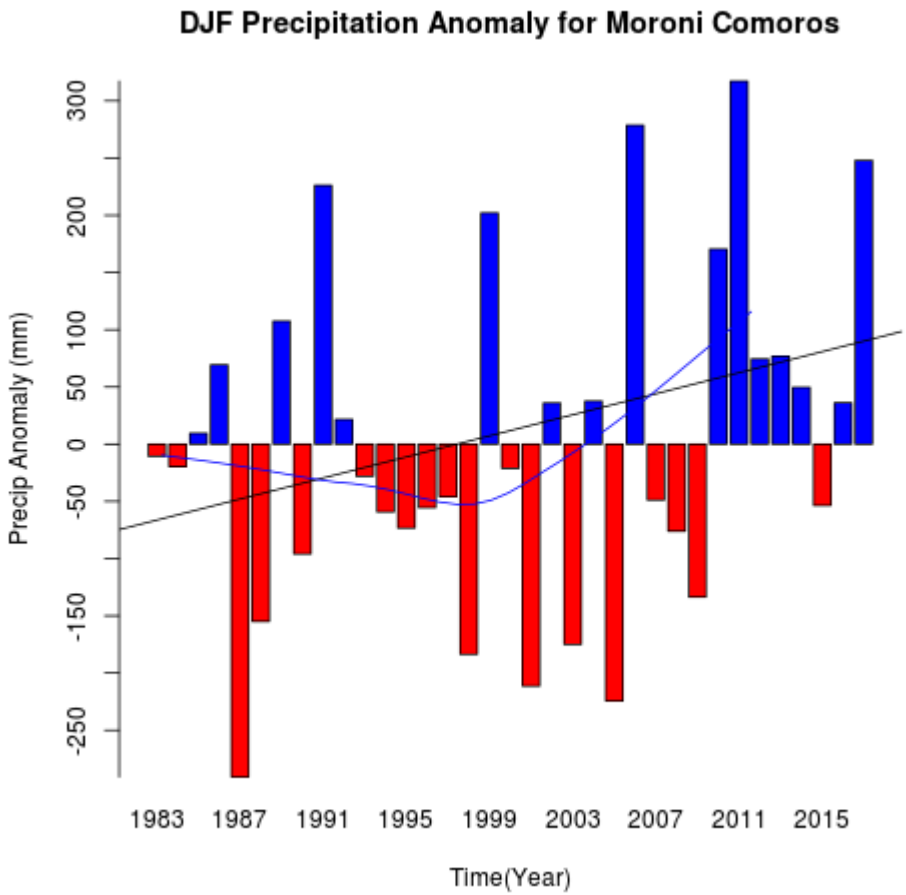
DRY YEARS	RR%	WET YEARS	RR%
2013	73.2	2002	125
		2017	139.02



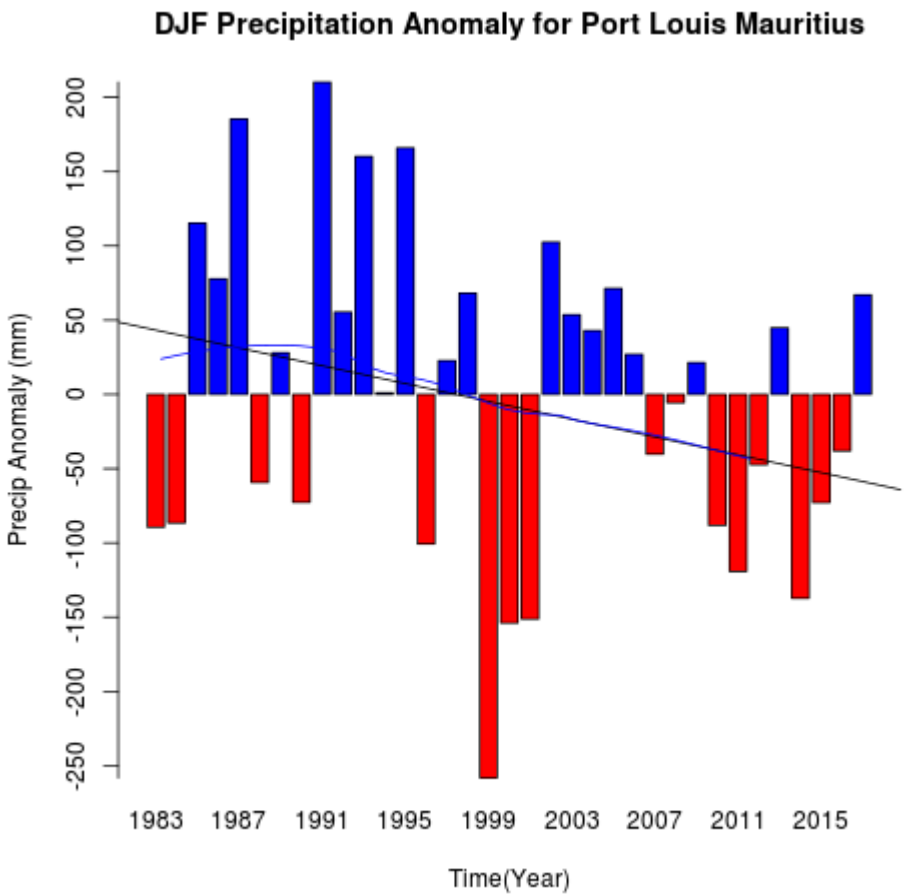
DRY YEARS	RR%	WET YEARS	RR%
1987	65.3	2013	125.53
1992	67.3	1984	126.14
2016	74.75	1998	126.18
1990	74.87	1989	141.79



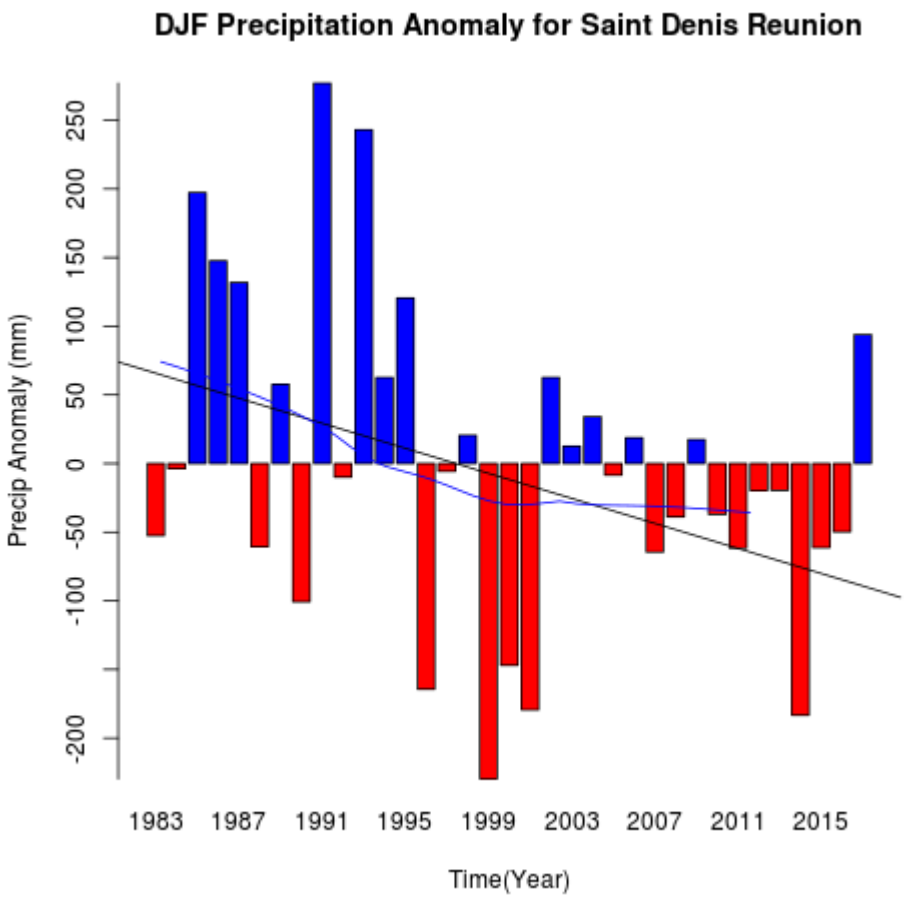
WET YEARS	RR%
1994	128.9



DRY YEARS	RR%	WET YEARS	RR%
1987	64.41	1991	127.67
2005	72.54	2017	130.35
2001	74.13	2006	134.1
		2011	138.81



DRY YEARS	RR%	WET YEARS	RR%
1999	59.89	1995	125.78
		1987	128.78
		1991	132.65



DRY YEARS	RR%	WET YEARS	RR%
1999	68.59	1985	126.98
2014	74.94	1993	133.23
		1991	137.87

JFM PRECIPITATION ANOMALY FOR NORTHERN AFRICA

PRECIPITATION TREND FOR DJF AND JFM OVER AFRICA GENERATED WITH ARC2 , CAMS_OPI AND CHIRPS DATASET REFEREENCE PERIOD: 1996-2018

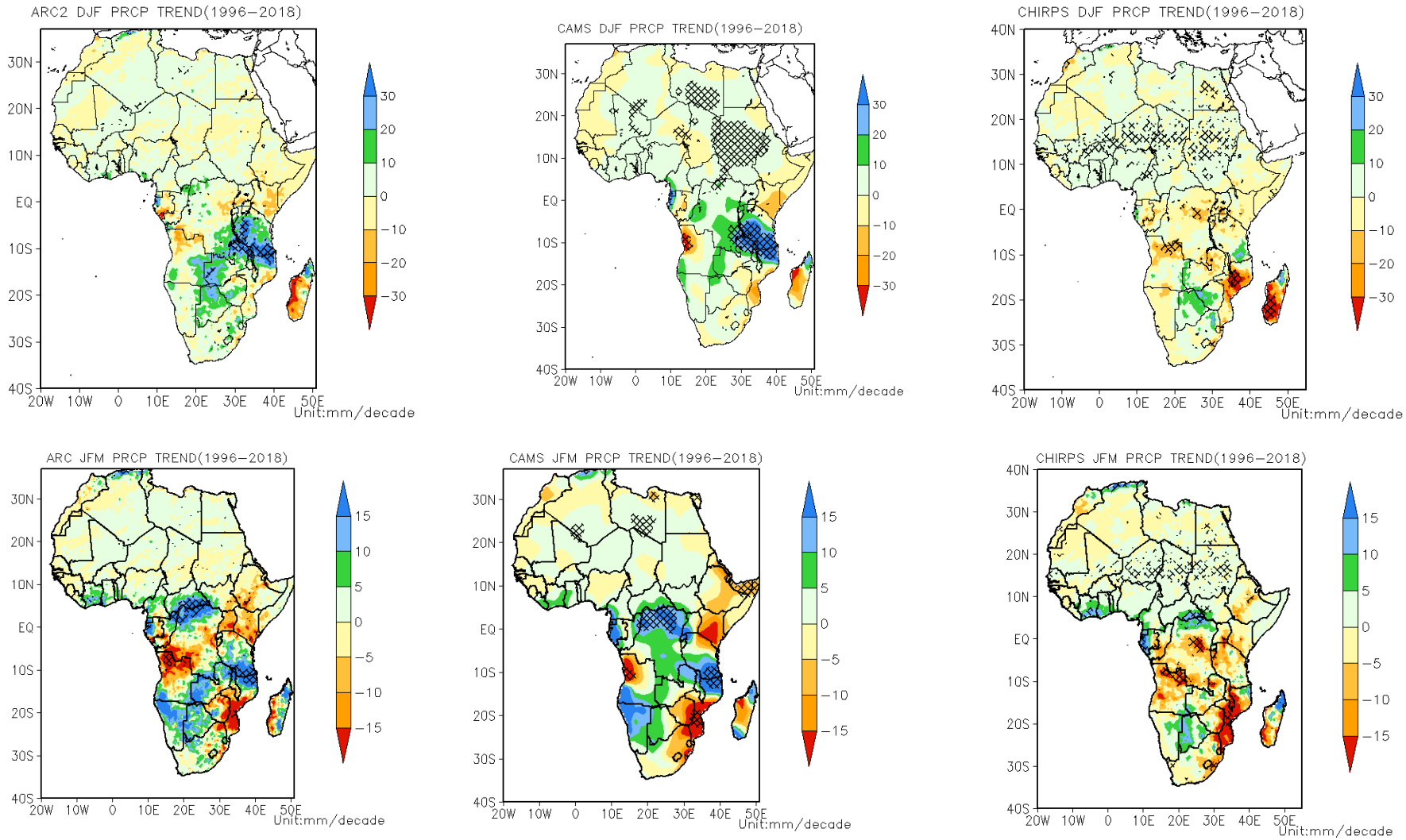


Figure T1: Precipitation trend maps (mm/decade) for NDJ season using (a) ARC2 (b) CAMS (c) CHIRPS datasets and for DJF season using (d) ARC2 (e) CAMS (f) CHIRPS datasets

http://iridl.ldeo.columbia.edu/SOURCES/.NOAA/.NCEP/.CPC/.CAMS_OPI/.v0208/.mean.prcp
http://iridl.ldeo.columbia.edu/SOURCES/.NOAA/.NCEP/.CPC/.FEWS/.Africa/.DAILY/.ARC2/.monthly/.est_prcp/?Set-Language=en
http://iridl.ldeo.columbia.edu/SOURCES/.UCSB/.CHIRPS/.v2p0/.monthly/.global/.precipitation/

SUMMARY OF PRECIPITATION TREND ANALYSIS OVER AFRICA FOR NDJ AND DJF

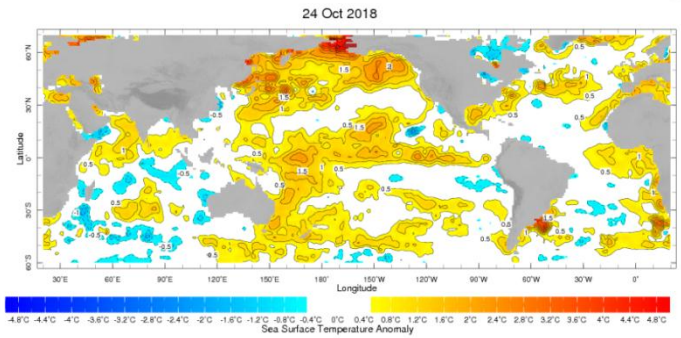
NDJ and DJF SEASON

Increasing precipitation trend is experienced over south-westernmost of Côte d'Ivoire, Nigaria, western Cameroon, Gabon, Congo, southern DRC, Rwanda, Burundi, much of Tanzania, Zambia, Zimbabwe, Botswana, nothern Mozambique, Malawi, and Madagascar and eastern and southern Angola. Decreasing precipitation trend is observed over eastern and southern Gabon, western Congo, northern and eastern DRC, much of Kenya, western Somalia, northern and western Angola and half of Madagascar.

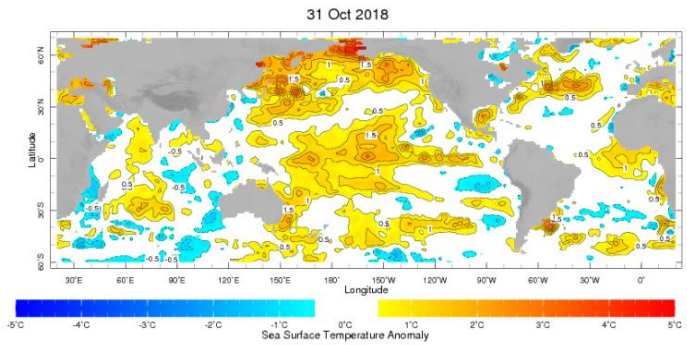
II. IDENTIFICATION OF ANALOG YEARS

WEEKLY OBSERVED SST ANALYSIS

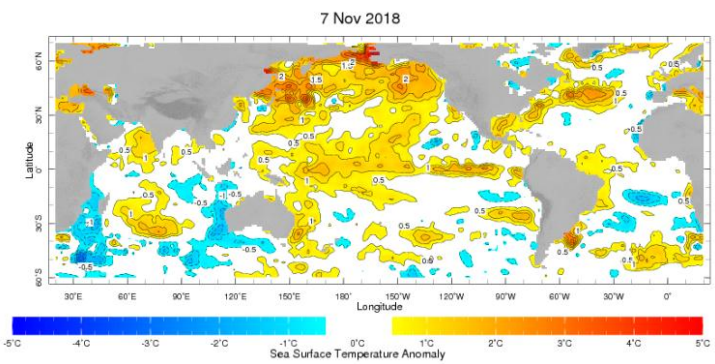
WEEK: 23rd – 29th Sep 2018



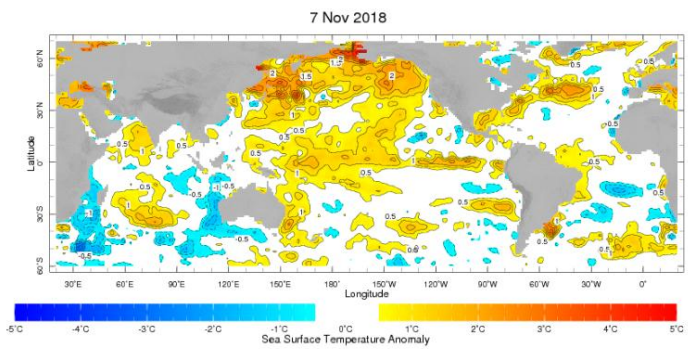
WEEK: 28th Oct- 3rd Nov 2018



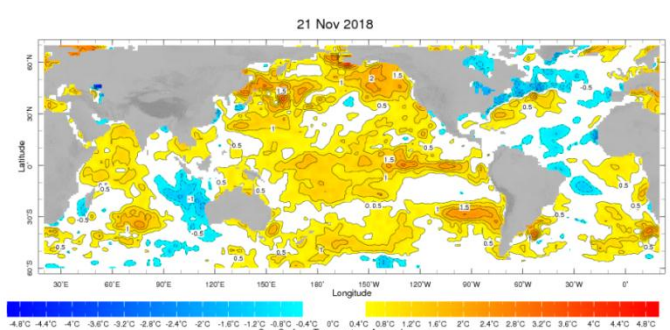
WEEK: 4th – 10th Nov 2018

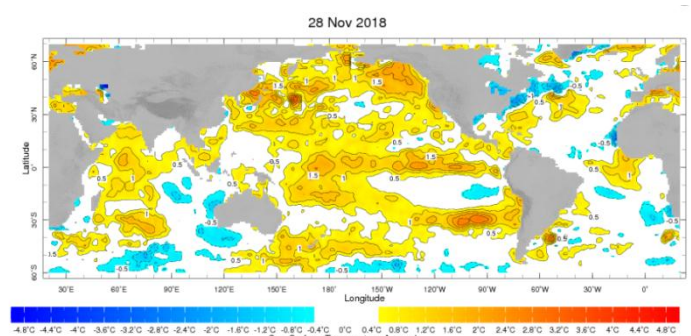


WEEK: 11th – 17th Nov 2018



WEEK: 18th – 24th Nov 2018



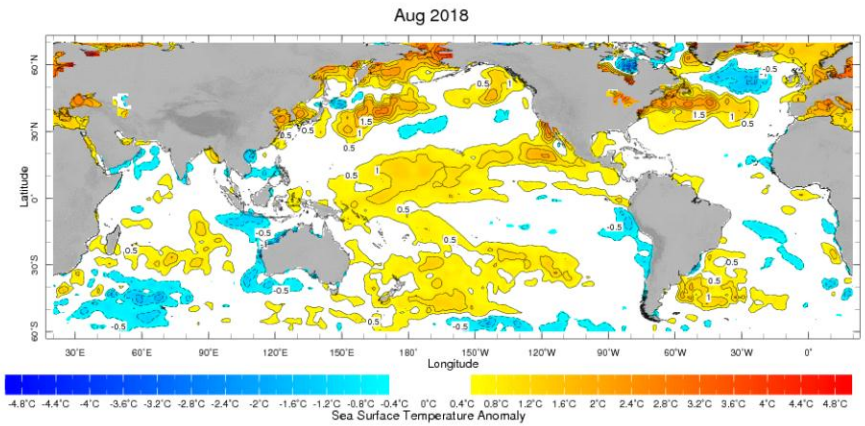


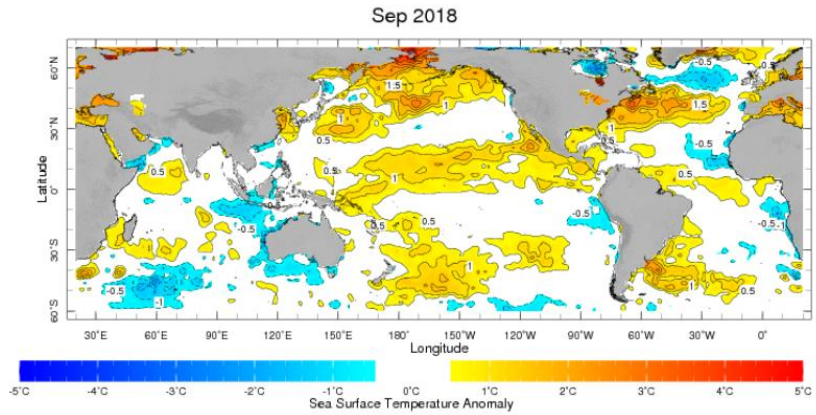
http://www.emc.ncep.noaa.gov/research/cmb/sst_analysis/images/wkanomv2.png
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Weekly_Anomaly.html

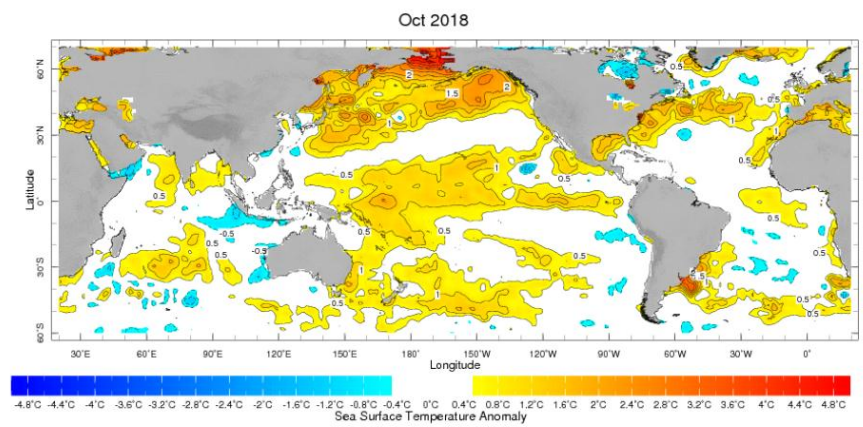
SUMMARY OF THE WEEKLY OBSERVED SST ANALYSIS

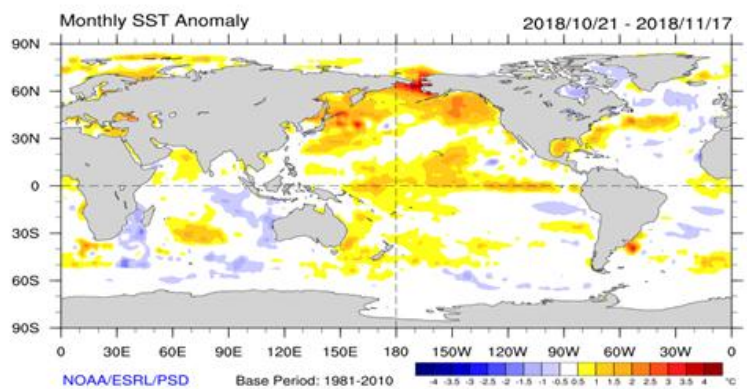
- During the last week of October until mid of November, equatorial SSTs were above average across most of the Pacific Ocean. SSTs were near average over eastern Pacific.
- The SSTs of the Mediterranean Sea have been near to above average over during the last week of October and last three weeks of November the western parts of the Mediterranean Sea was near average, and the eastern part was above average 2018.
- Over the Tropical North near to above average SSTs was prevailed from last week of October and first week of November2018. During two last weeks of November 20168 the SSTs was near avergae
- Near to obove average SSTs was observed over Equatorial Atlantic Ocean from last week of October and first week of November2018. During two last weeks of November 20168 the SSTs was near avergae.
- Near to above average conditions SSTs was obsrved over the Tropical South Atlantic- during last week of October. However near to below average from three last weeks of November SSTs prevailed.
- Over the western subtropical Indian SSTs was near to below during the three week of October, and in eastern subtropical of Indian Oceans was characterized by neutral conditions. Over South-Western was characterized by near to below average SSTs.

MONTHLY OBSERVED SST ANALYSIS







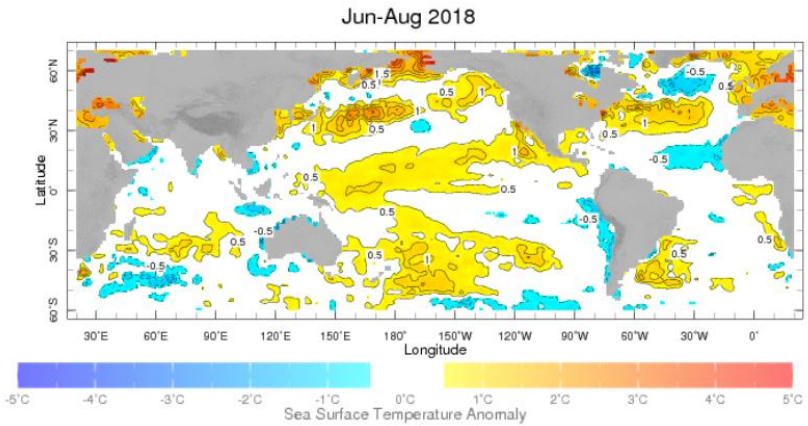


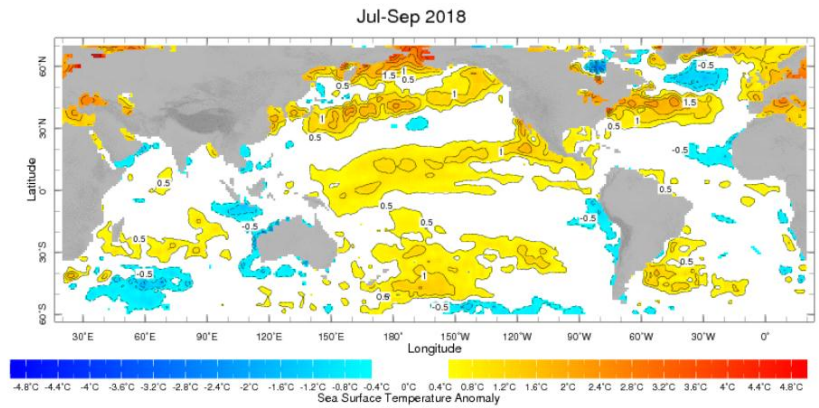
http://www.emc.ncep.noaa.gov/research/cmb/sst_analysis/images/archive/monthly_anomaly/
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Anomaly.html

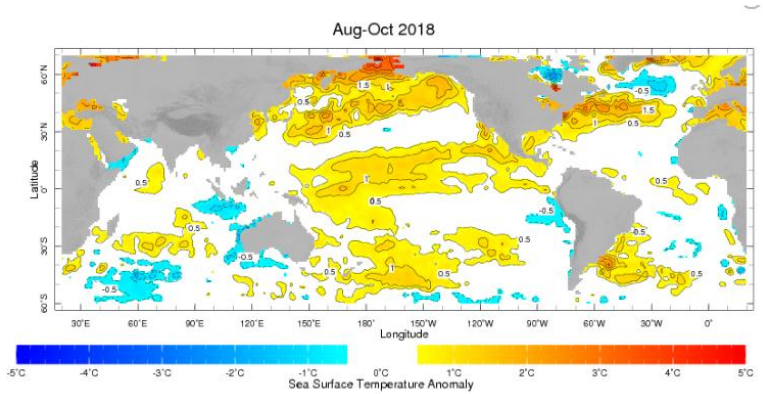
SUMMARY OF THE OBSERVED MONTHLY SST ANALYSIS

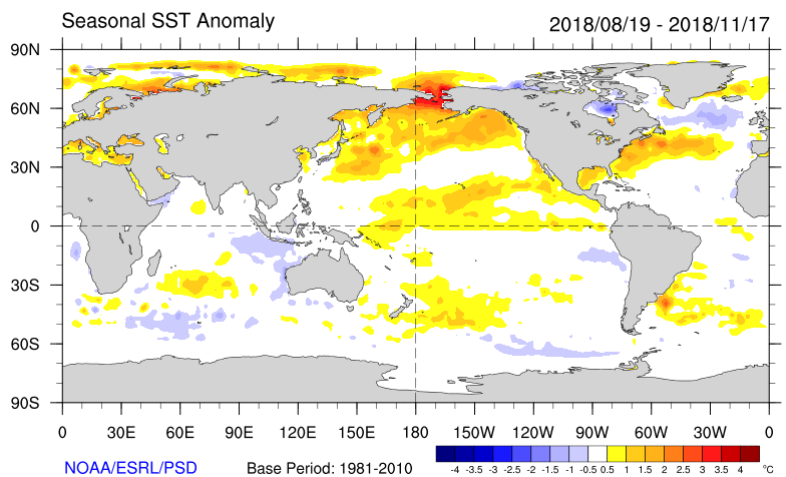
- Over the Pacific equatorial neutral condition SSTs was observed since August to November 2018 warm condition SSTs prevailed.
- The SSTs of the Mediterranean Sea have been Near to above average over the western part and over eastern part above average from August to November 2018.
- Near to below average SSTs was observed over the Tropical North Atlantic during August to September 2018. This condition was near to above October and near average during November 2018.
- Over Atlantic Equatorial tropical the SSTs was near average during August and near to above from September to November 2018.
- Near average SSTs characterized most of the Tropical south Atlantic ocean during August 2018, near to below average was observed during the September to October 2018 and near average in November 2018.
- In the Indian Ocean, near to above average SSTs persisted over western central and eastern Subtropical Indian Ocean during Augsut to November 2018.

SEASONAL OBSERVED SST ANALYSIS









https://www.esrl.noaa.gov/psd/map/clim/sst.shtml

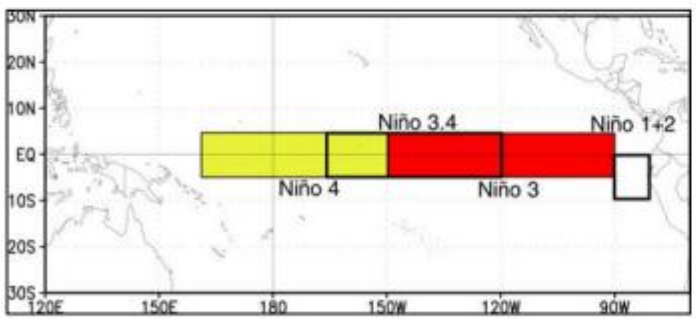
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Seasonal.html

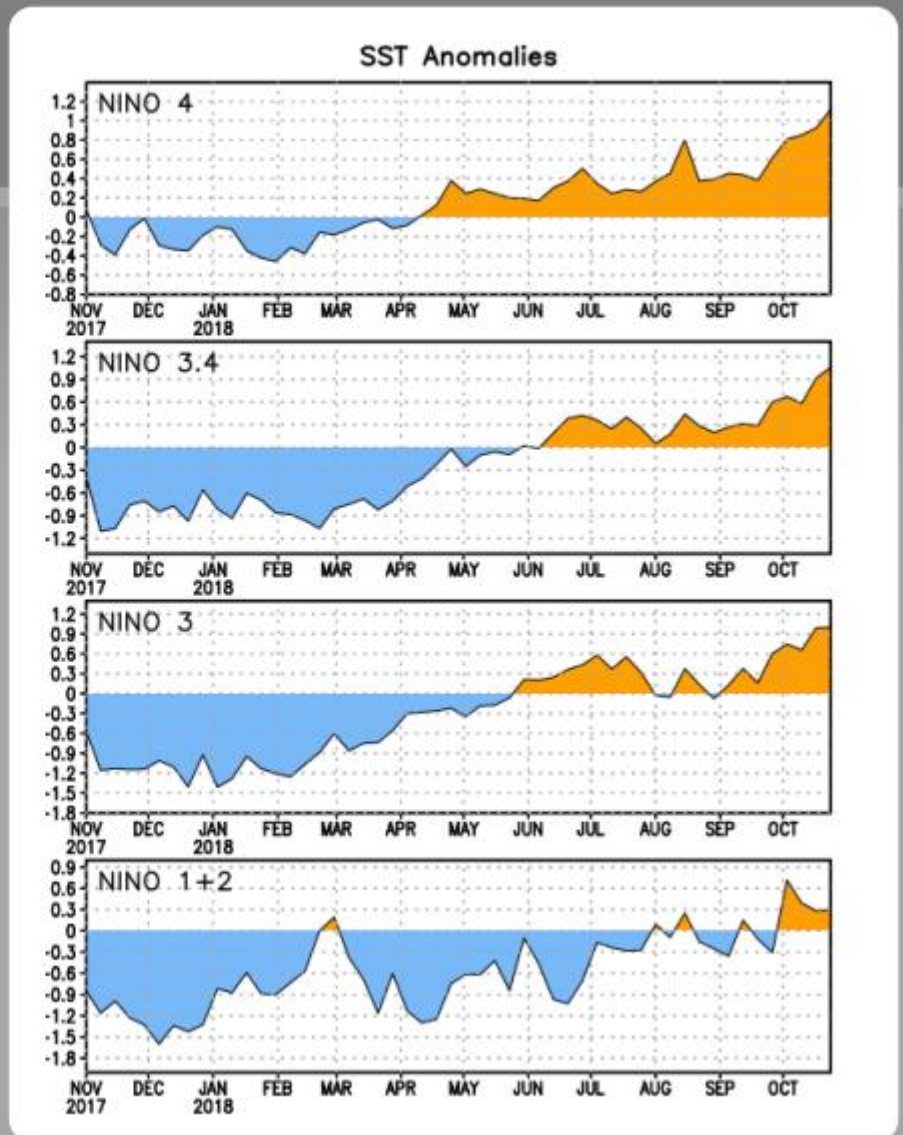
http://www.emc.ncep.noaa.gov/research/cmb/sst_analysis/images/archive/monthly_anomaly/

Niño Region SST Departures (°C) Recent Evolution

The latest weekly SST departures are:

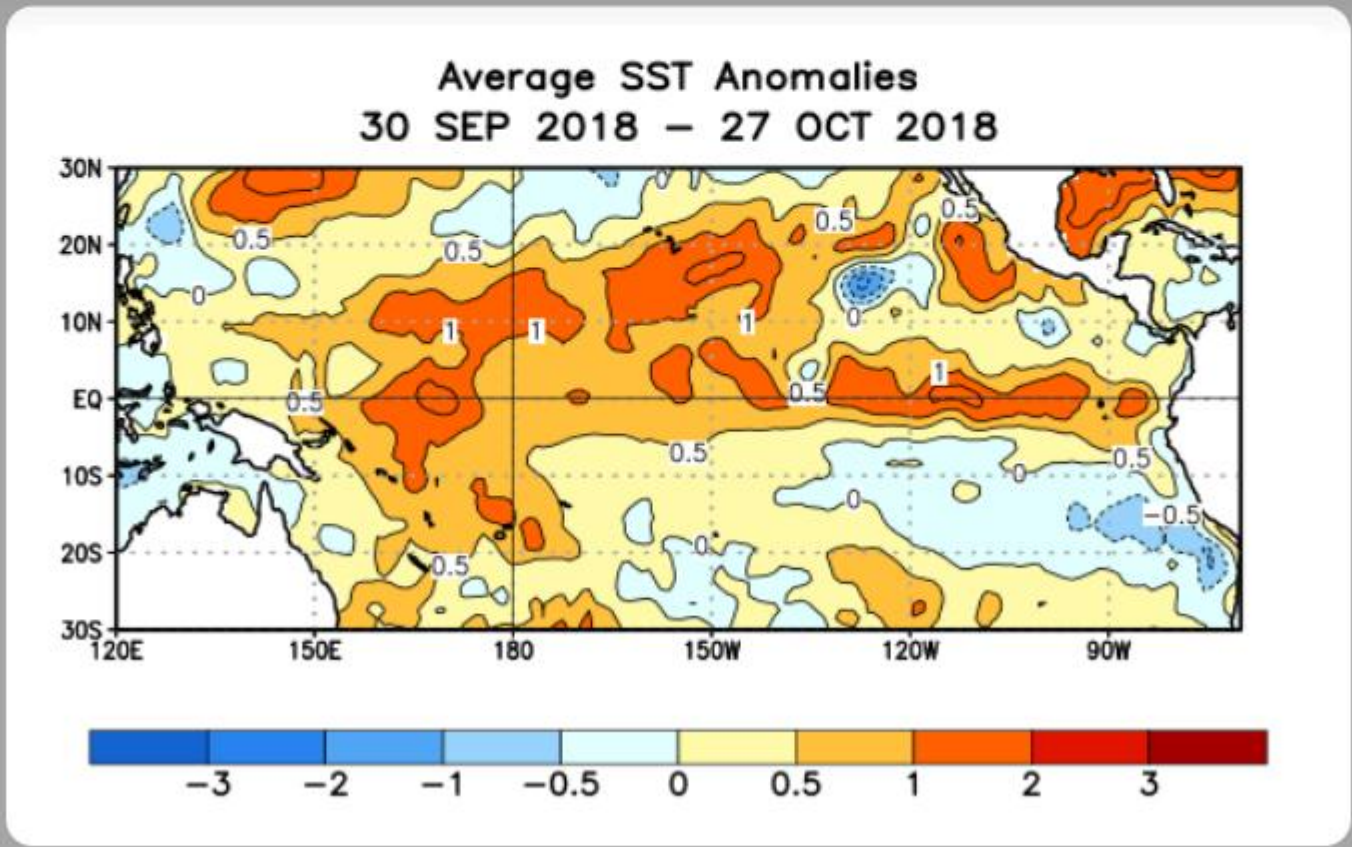
Niño 4	1.1°C
Niño 3.4	1.1°C
Niño 3	1.0°C
Niño 1+2	0.3°C





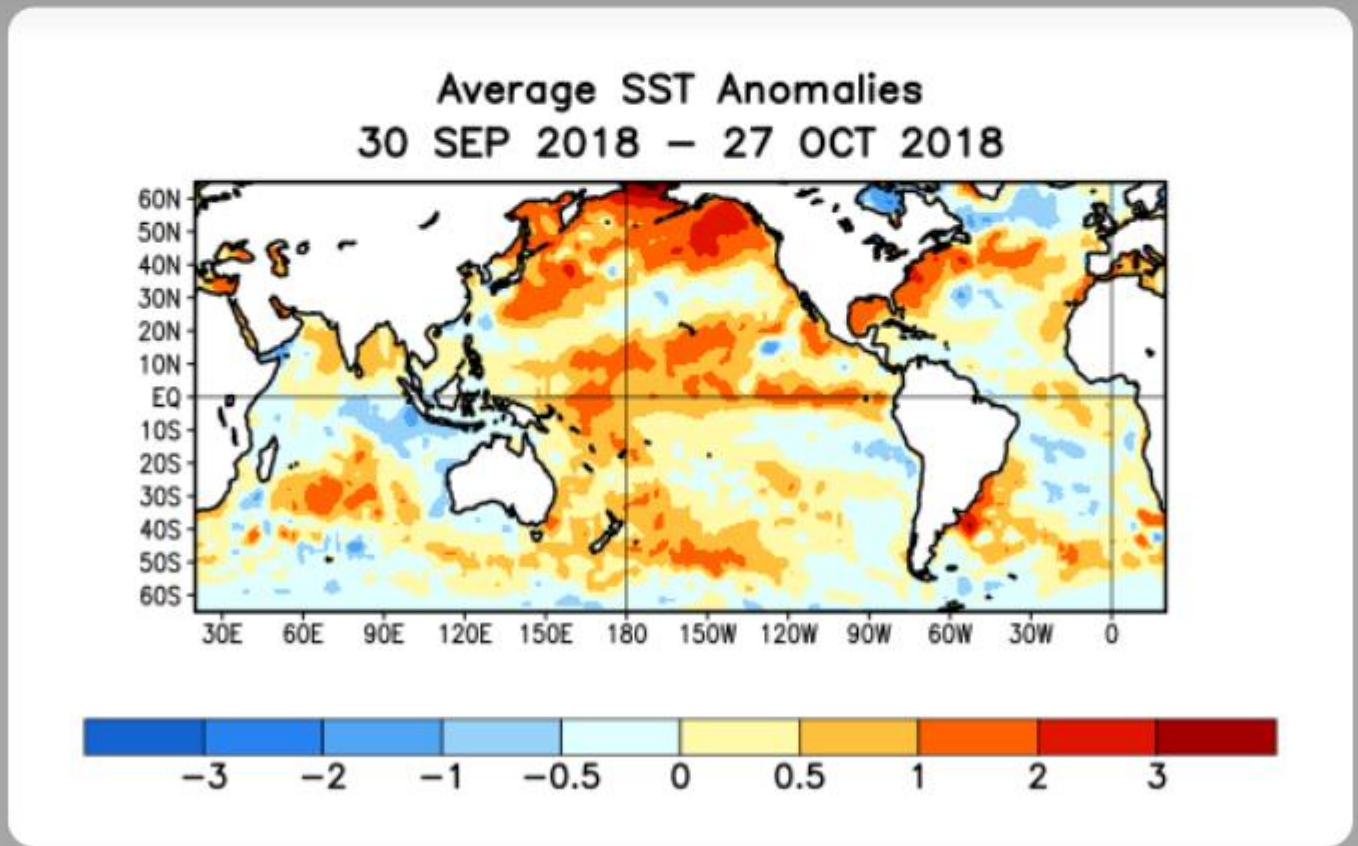
SST Departures (°C) in the Tropical Pacific During the Last Four Weeks

During the last four weeks, equatorial SSTs were above average across the Pacific Ocean.



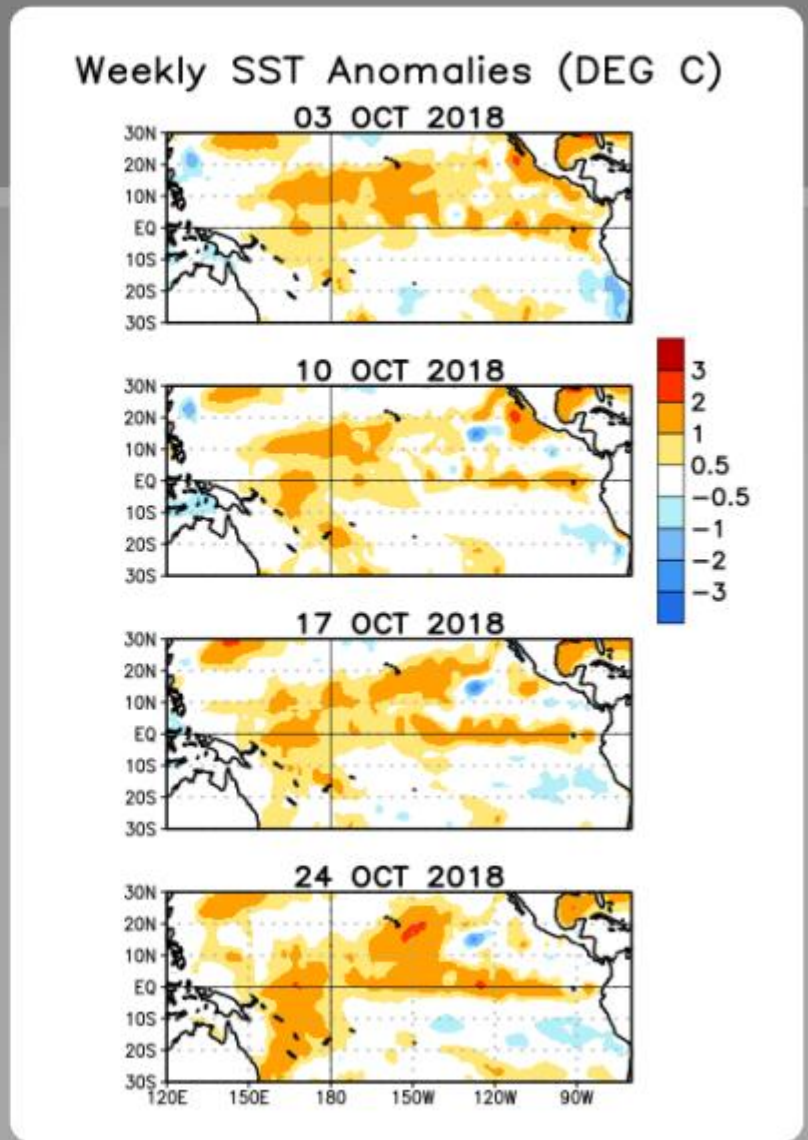
Global SST Departures (°C) During the Last Four Weeks

During the last four weeks, equatorial SSTs were above average across the Pacific Ocean and the central Atlantic Ocean. SSTs were below average near Indonesia and in the eastern Indian Ocean.



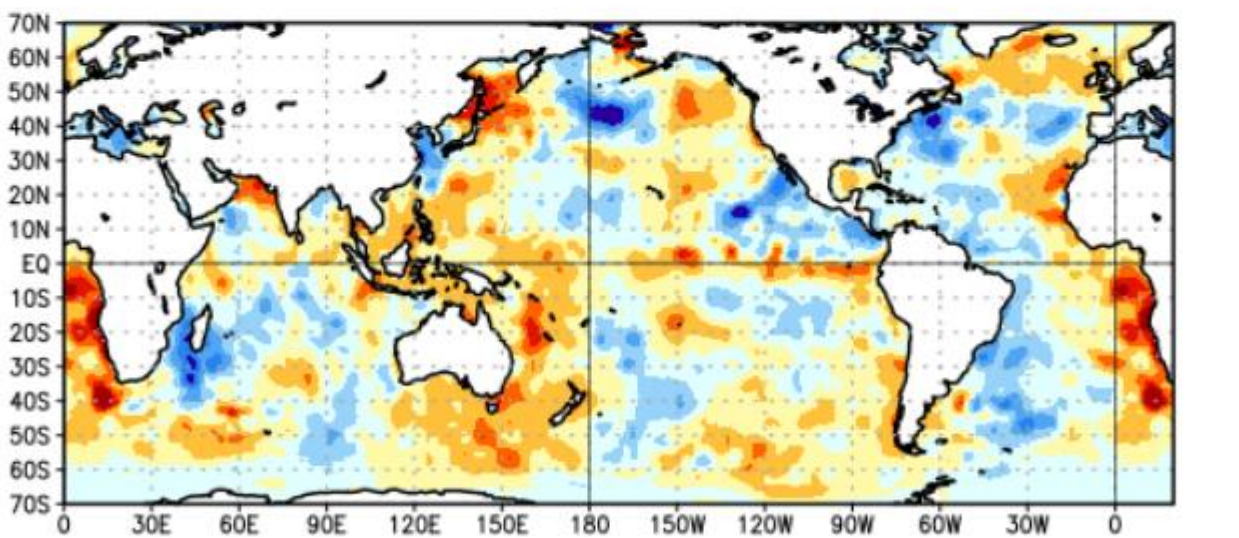
Weekly SST Departures during the Last Four Weeks

During the last four weeks, above-average SSTs have expanded across the Pacific Ocean.



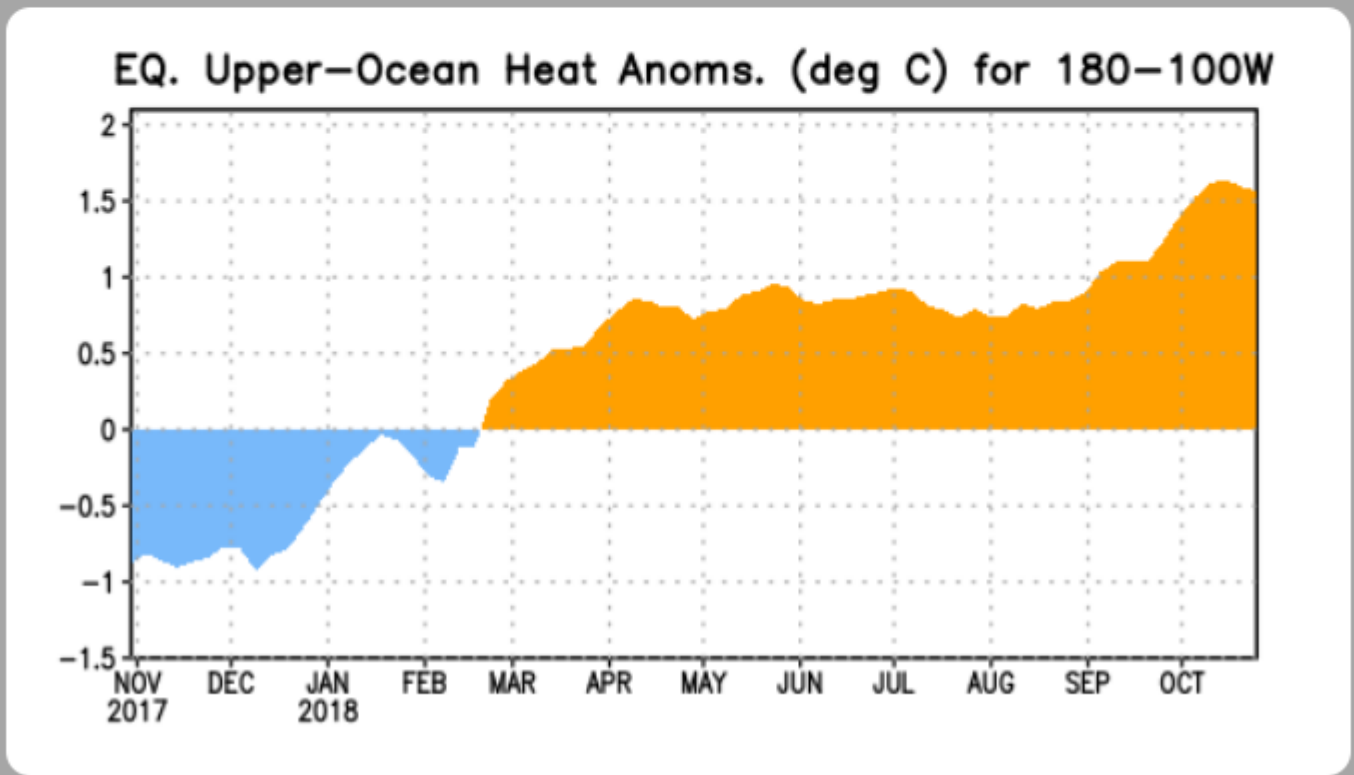
Change in Weekly SST Departures over the Last Four Weeks

During the last four weeks, positive changes were observed across most of the equatorial Pacific Ocean.



Central and Eastern Pacific Upper-Ocean (0-300 m) Weekly Average Temperature Anomalies

Negative subsurface temperature anomalies lasted from August 2017 to February 2018. Since the end of February, temperature anomalies have increased and remained positive. During September and October, positive anomalies increased.



I. IDENTIFICATION OF ANALOG YEARS BASED ON SSTA OVER THE ENSO REGION

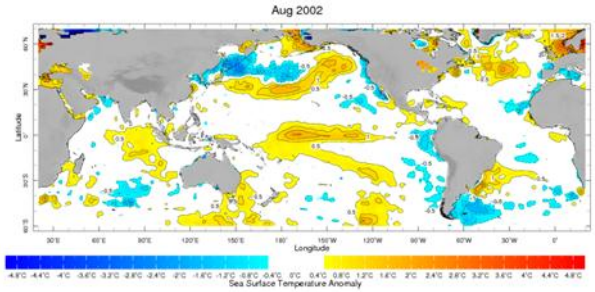
Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
1990	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4
1991	0.4	0.3	0.2	0.3	0.5	0.6	0.7	0.6	0.6	0.8	1.2	1.5
1992	1.7	1.6	1.5	1.3	1.1	0.7	0.4	0.1	-0.1	-0.2	-0.3	-0.1
1993	0.1	0.3	0.5	0.7	0.7	0.6	0.3	0.3	0.2	0.1	0.0	0.1
1994	0.1	0.1	0.2	0.3	0.4	0.4	0.4	0.4	0.6	0.7	1.0	1.1
1995	1.0	0.7	0.5	0.3	0.1	0.0	-0.2	-0.5	-0.8	-1.0	-1.0	-1.0
1996	-0.9	-0.8	-0.6	-0.4	-0.3	-0.3	-0.3	-0.3	-0.4	-0.4	-0.4	-0.5
1997	-0.5	-0.4	-0.1	0.3	0.8	1.2	1.6	1.9	2.1	2.3	2.4	2.4
1998	2.2	1.9	1.4	1.0	0.5	-0.1	-0.8	-1.1	-1.3	-1.4	-1.5	-1.6
1999	-1.5	-1.3	-1.1	-1.0	-1.0	-1.0	-1.1	-1.1	-1.2	-1.3	-1.5	-1.7
Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2000	-1.7	-1.4	-1.1	-0.8	-0.7	-0.6	-0.6	-0.5	-0.5	-0.6	-0.7	-0.7
2001	-0.7	-0.5	-0.4	-0.3	-0.3	-0.1	-0.1	-0.1	-0.2	-0.3	-0.3	-0.3
2002	-0.1	0.0	0.1	0.2	0.4	0.7	0.8	0.9	1.0	1.2	1.3	1.1
2003	0.9	0.6	0.4	0.0	-0.3	-0.2	0.1	0.2	0.3	0.3	0.4	0.4
2004	0.4	0.3	0.2	0.2	0.2	0.3	0.5	0.6	0.7	0.7	0.7	0.7
2005	0.6	0.6	0.4	0.4	0.3	0.1	-0.1	-0.1	-0.1	-0.3	-0.6	-0.8
2006	-0.8	-0.7	-0.5	-0.3	0.0	0.0	0.1	0.3	0.5	0.7	0.9	0.9
2007	0.7	0.3	0.0	-0.2	-0.3	-0.4	-0.5	-0.8	-1.1	-1.4	-1.5	-1.6
2008	-1.6	-1.4	-1.2	-0.9	-0.8	-0.5	-0.4	-0.3	-0.3	-0.4	-0.6	-0.7
2009	-0.8	-0.7	-0.5	-0.2	0.1	0.4	0.5	0.5	0.7	1.0	1.3	1.6
Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2010	1.5	1.3	0.9	0.4	-0.1	-0.6	-1.0	-1.4	-1.6	-1.7	-1.7	-1.6
2011	-1.4	-1.1	-0.8	-0.6	-0.5	-0.4	-0.5	-0.7	-0.9	-1.1	-1.1	-1.0
2012	-0.8	-0.6	-0.5	-0.4	-0.2	0.1	0.3	0.3	0.3	0.2	0.0	-0.2
2013	-0.4	-0.3	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	-0.3	-0.2	-0.2	-0.3
2014	-0.4	-0.4	-0.2	0.1	0.3	0.2	0.1	0.0	0.2	0.4	0.6	0.7
2015	0.6	0.6	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4	2.5	2.6
2016	2.5	2.2	1.7	1.0	0.5	0.0	-0.3	-0.6	-0.7	-0.7	-0.7	-0.6
2017	-0.3	-0.1	0.1	0.3	0.4	0.4	0.1	-0.2	-0.4	-0.7	-0.9	-1.0
2018	-0.9	-0.8	-0.6	-0.4	-0.1	0.1	0.1	0.2	0.4			

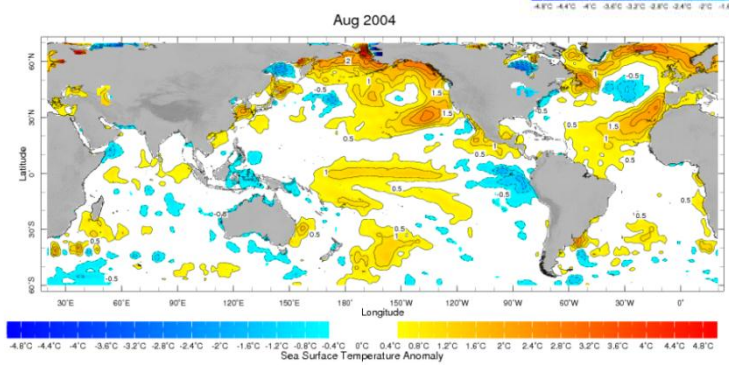
2002, 2004, 2006, 2009, and 2014 preselected as years close to 2018 and SST evolution during the coming months

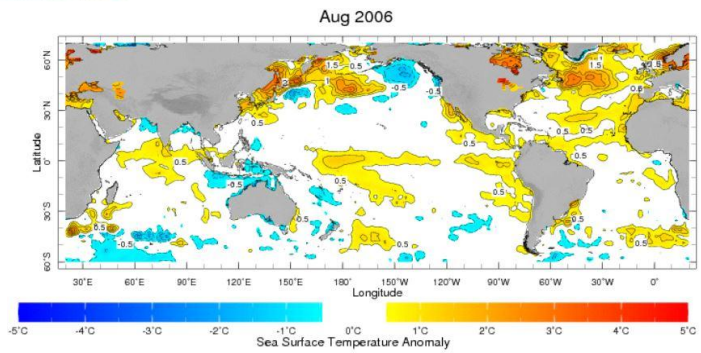
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml

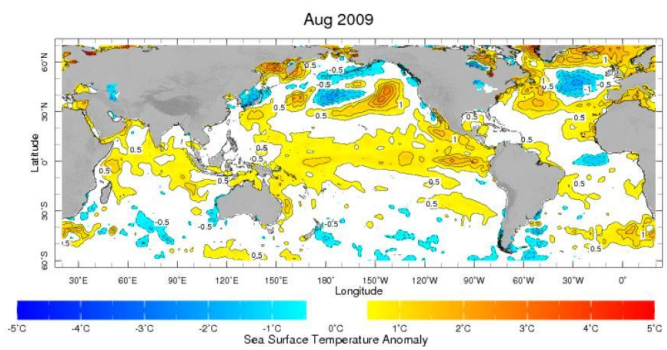
SST ANOMALY OF ANALOG YEARS FOR MONTH-3, MONTH-2 MONTH-1, CURRENT MONTH, MONTH+1 , MONTH+2, MONTH+3, MONTH+4 AND FOR SEASONS

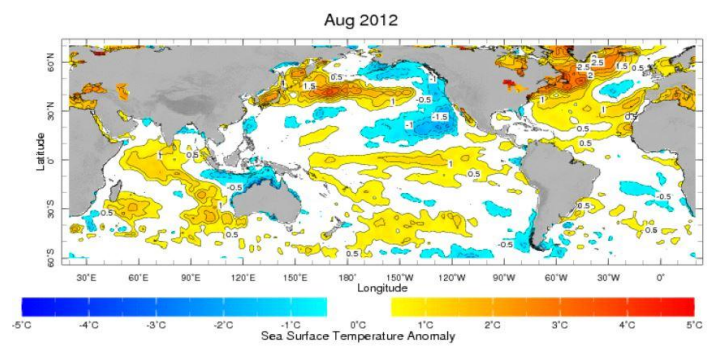
SSTA FOR AUGUST 2006, 2009, 2012, 2014 AND 2018

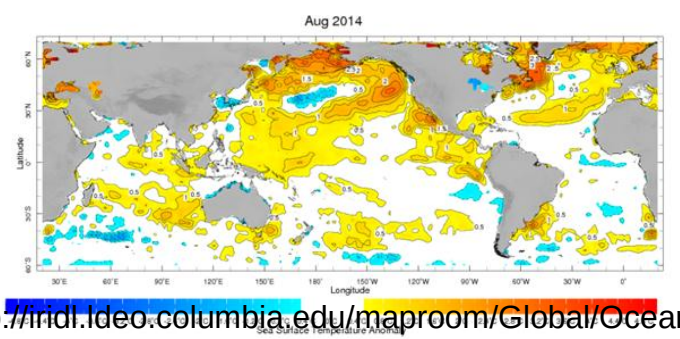


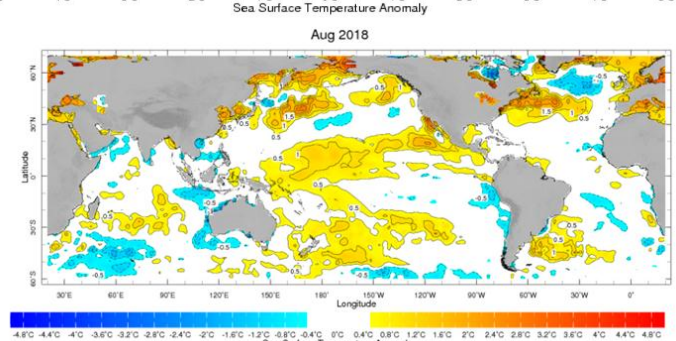






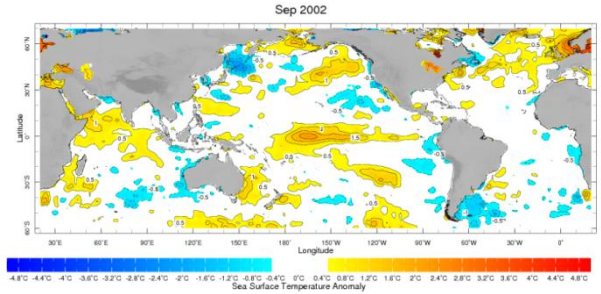


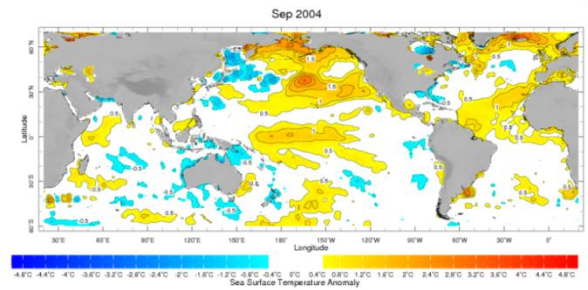


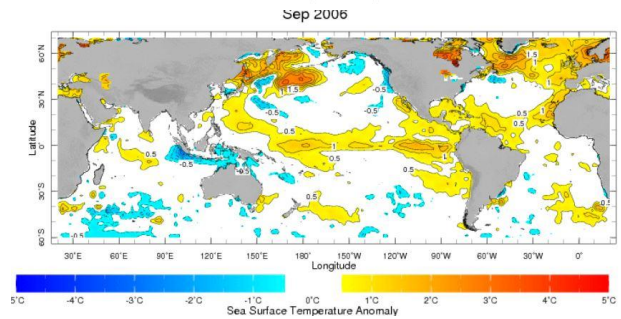


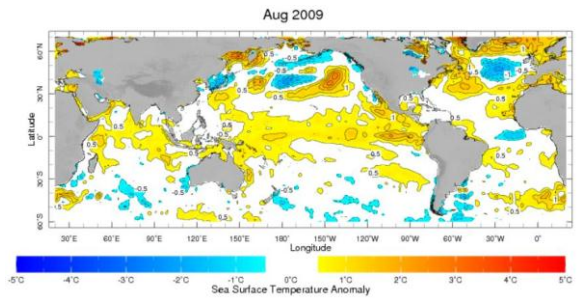
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Anomaly.html

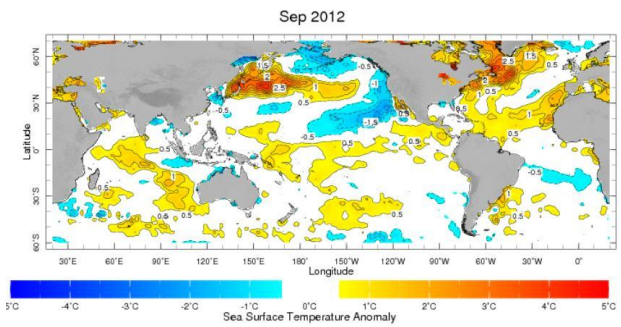
SSTA FOR SEP 2006, 2009, 2012, 2014 AND SEP 2018

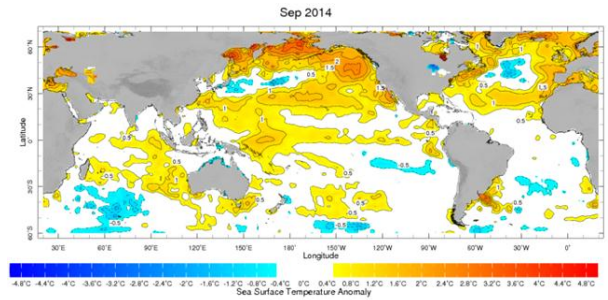


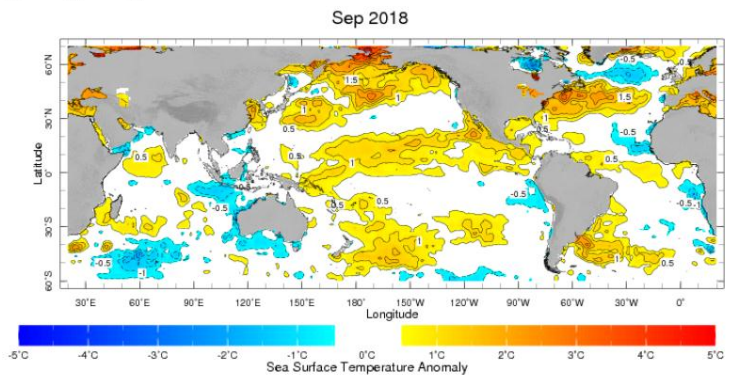






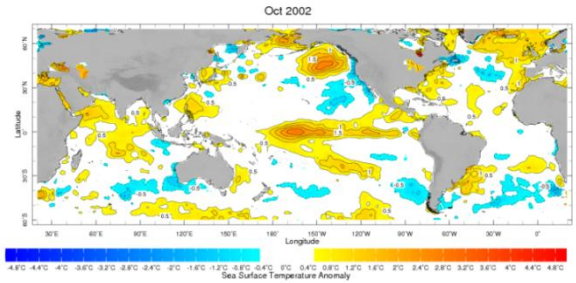


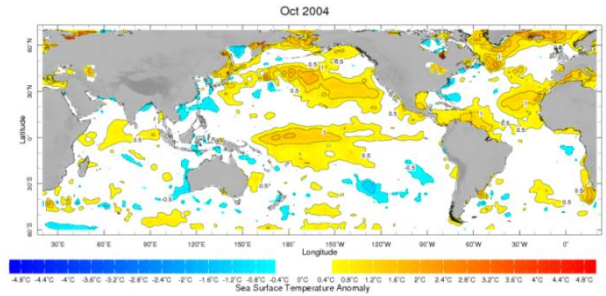


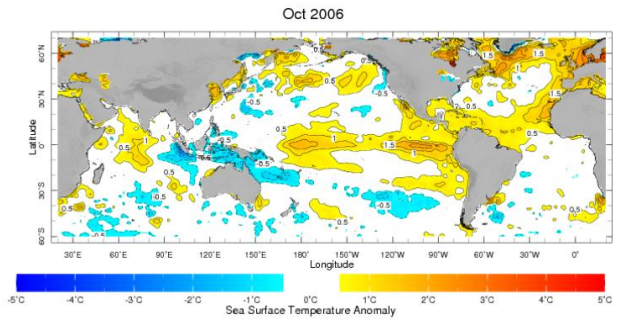


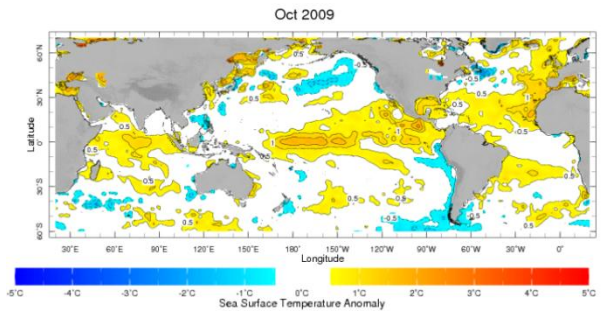
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Anomaly.html

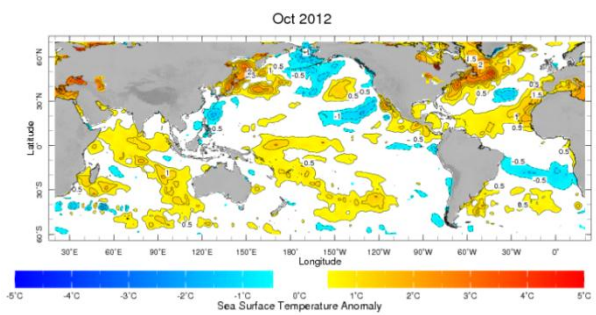
SSTA FOR OCT 2006, 2009, 2012, 2014 AND FCST OCT 2018

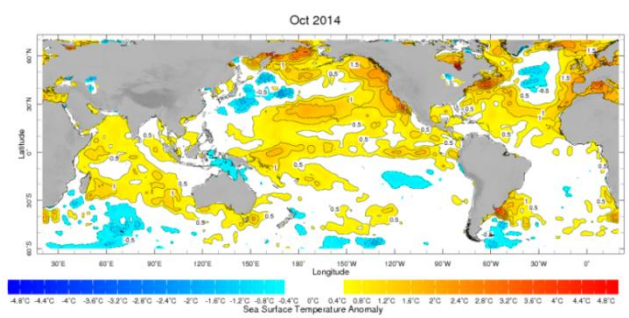


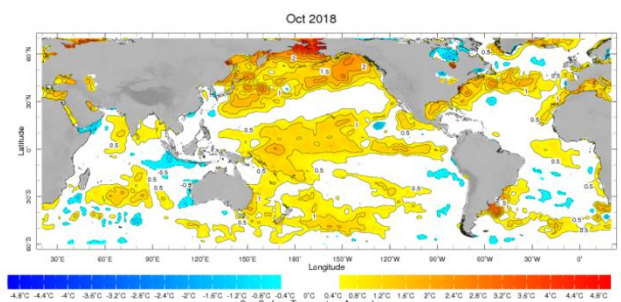






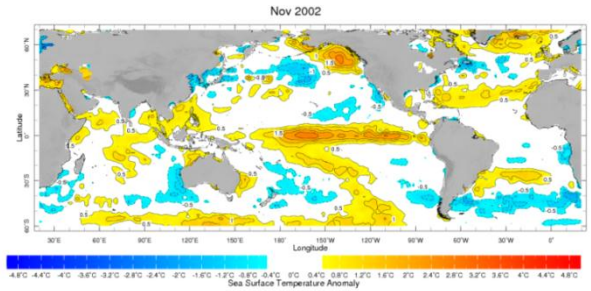


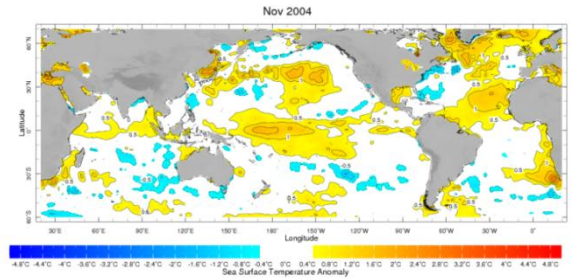


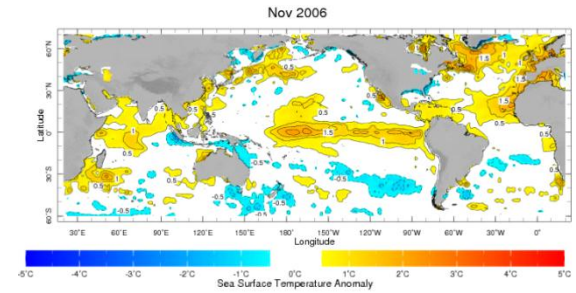


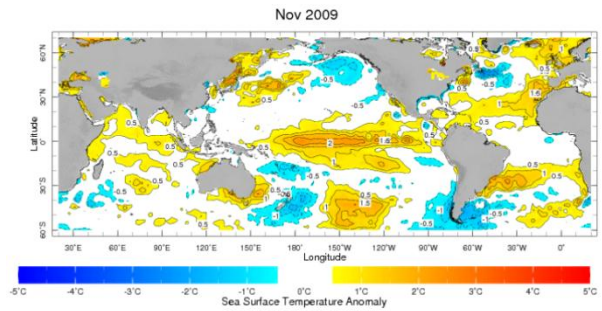
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Anomaly.html

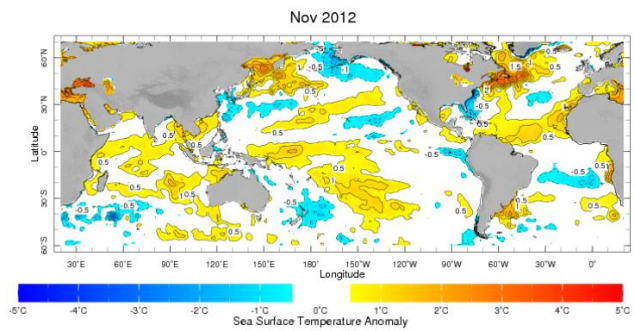
SSTA FOR NOV 2002, 2004, 2006, 2009, 2012, 2014 AND FCST NOV 2018

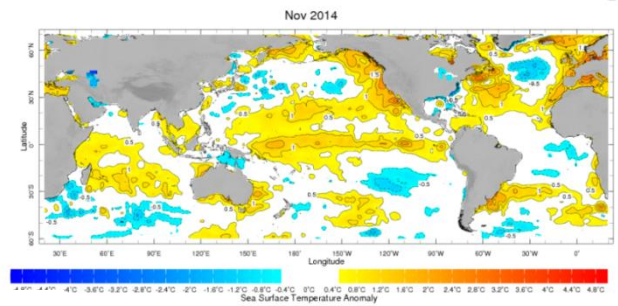


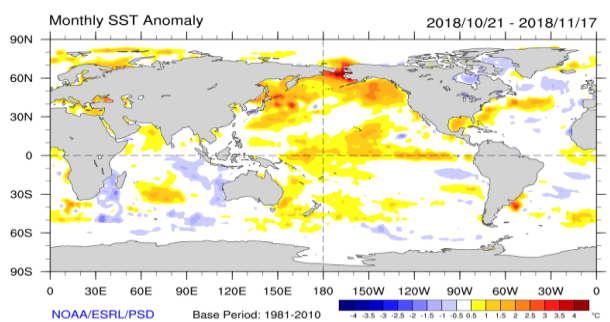








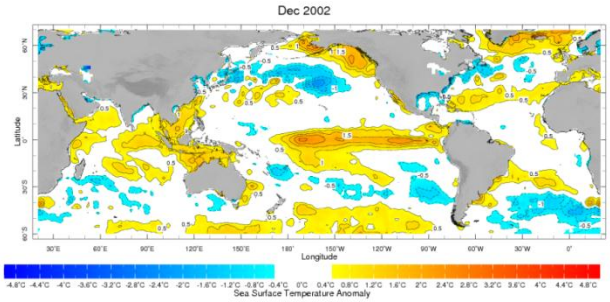


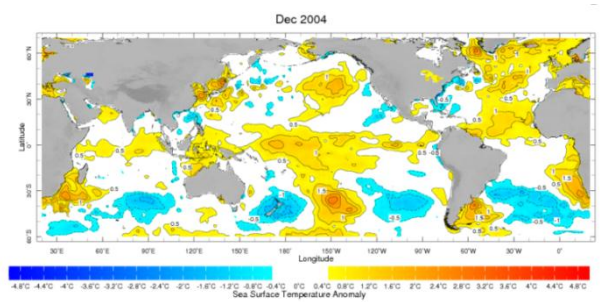


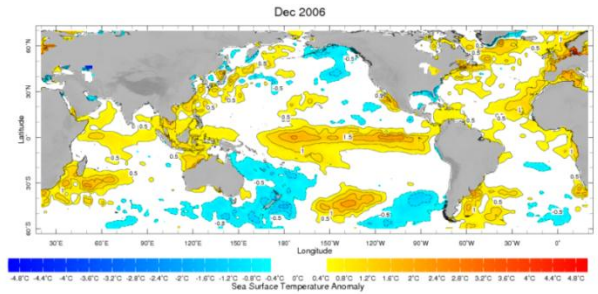
http://www.cpc.ncep.noaa.gov/products/international/nmme/plots_monthly/glbOcean_nmme_sst_anom_OctIC_Nov2018.png

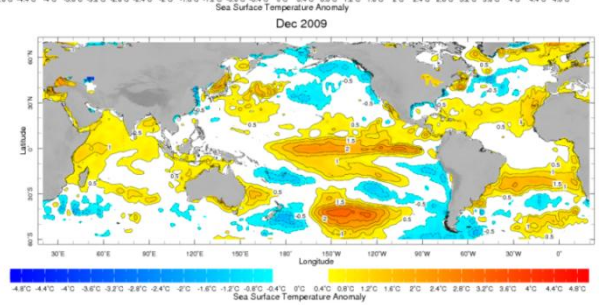
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Anomaly.html

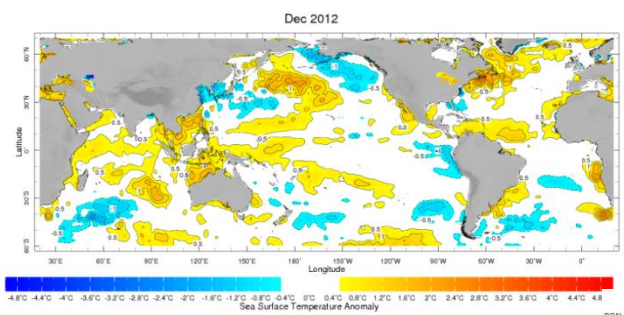
SSTA FOR DEC 2002, 2004, 2006, 2009, 2012, 2014 AND FCST DEC 2018

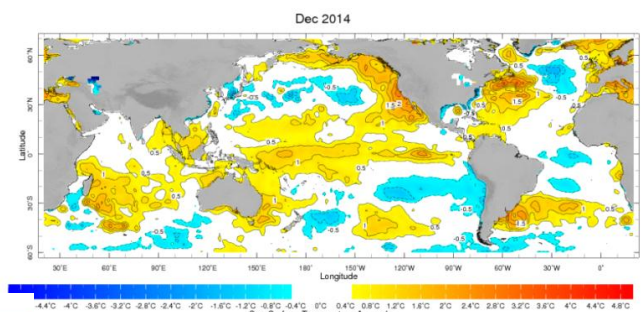


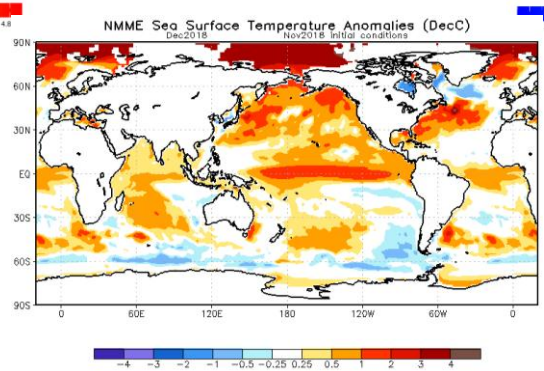








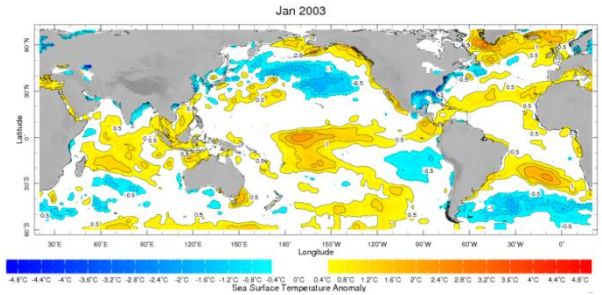


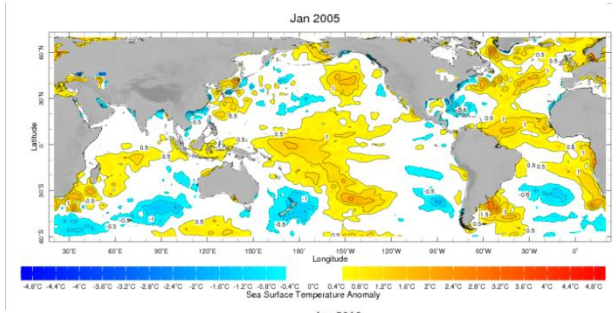


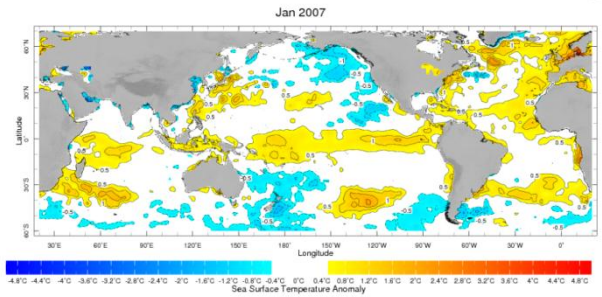
http://www.cpc.ncep.noaa.gov/products/international/nmme/plots_monthly/glbOcean_nmme_sst_anom_OctIC_Dec2018.png

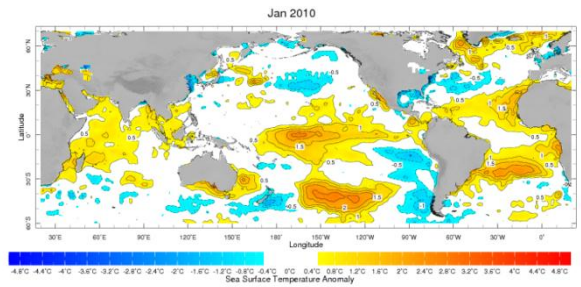
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Anomaly.html

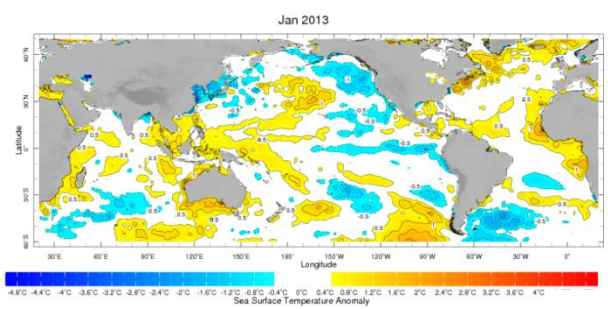
SSTA FOR JAN 2003, 2005, 2007, 2010, 2013, 2015 AND FCST JAN 2019

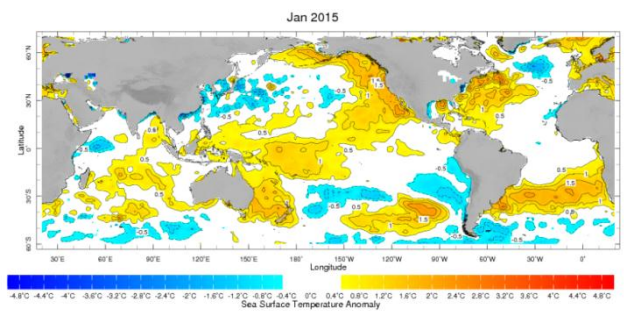


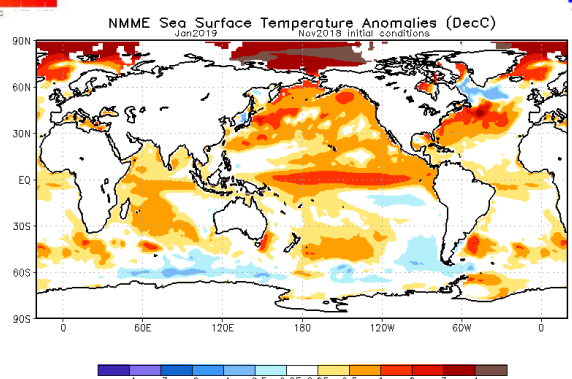








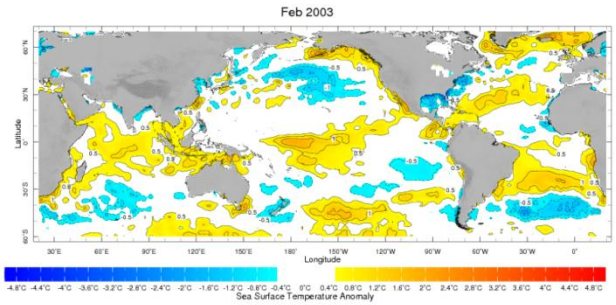


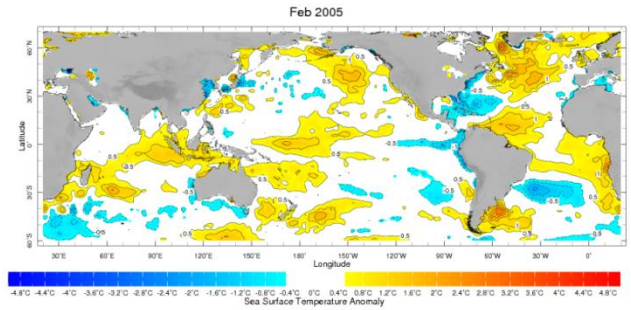


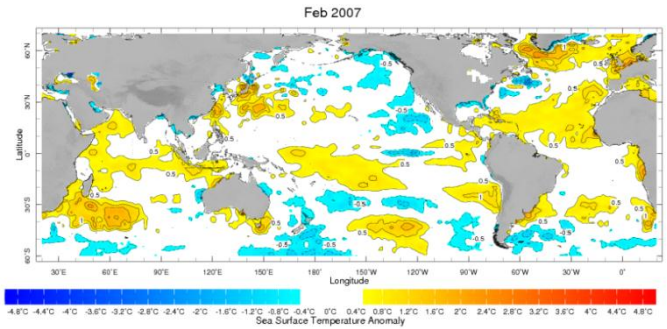
http://www.cpc.ncep.noaa.gov/products/international/nmme/plots_monthly/glbOcean_nmme_sst_anom_OctIC_Jan2019.png

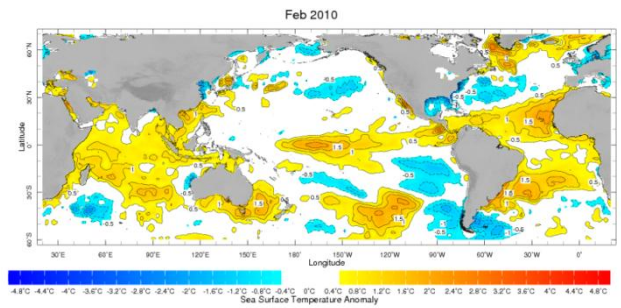
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Anomaly.html

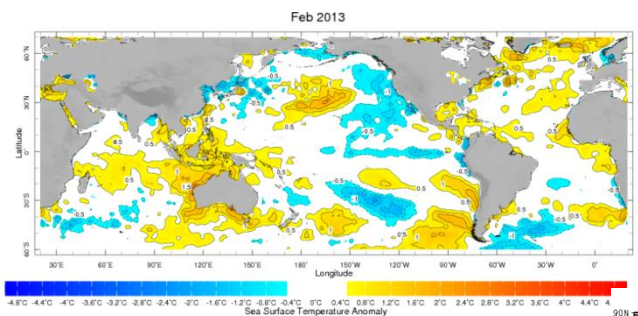
SSTA FOR FEB 2003, 2005, 2007, 2010, 2013, 2015 AND FCST FEB 2019

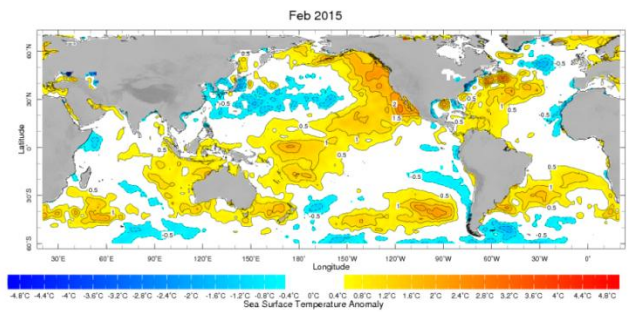


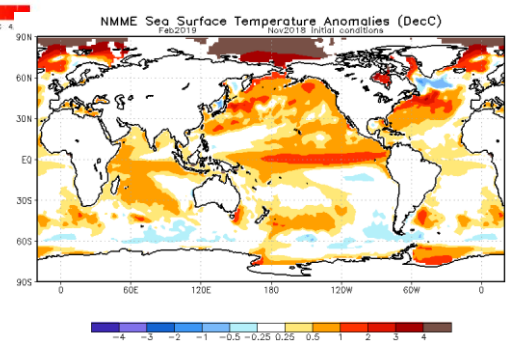












http://www.cpc.ncep.noaa.gov/products/international/nmme/plots_monthly/glbOcean_nmme_sst_anom_OctIC_Feb2019.png

http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Anomaly.html?T=Feb%202015

SSTA FOR MAR 2003, 2005, 2007, 2010, 2013, 2015 AND FCST MAR 2019

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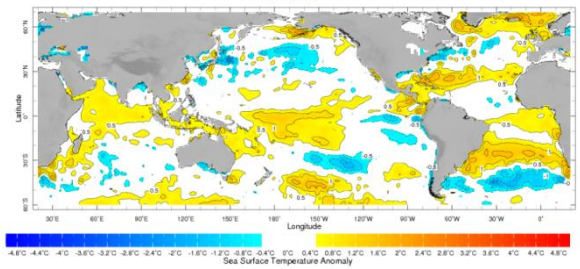

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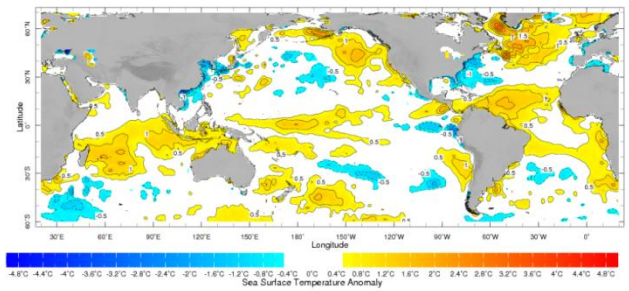

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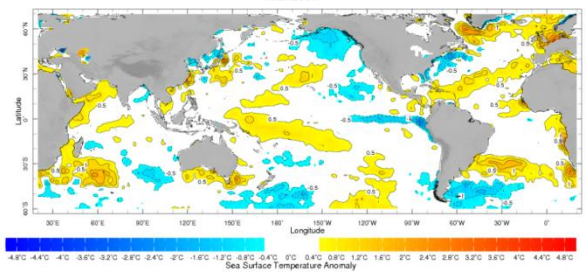

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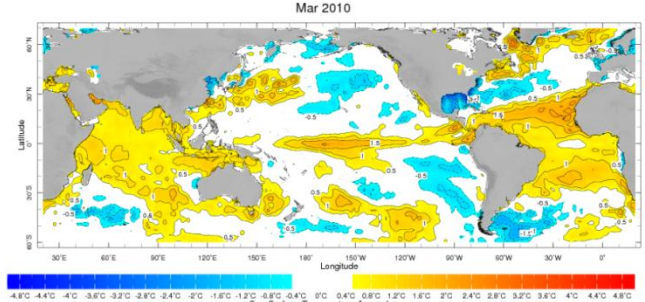

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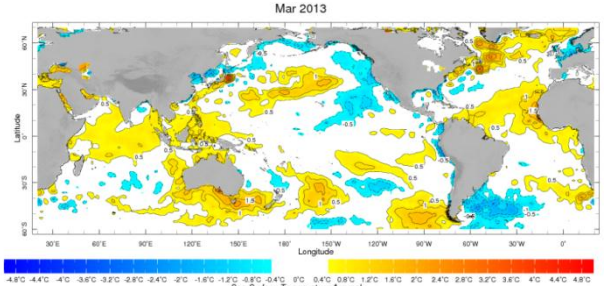

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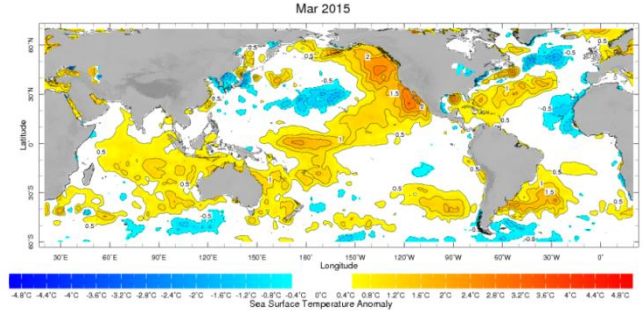
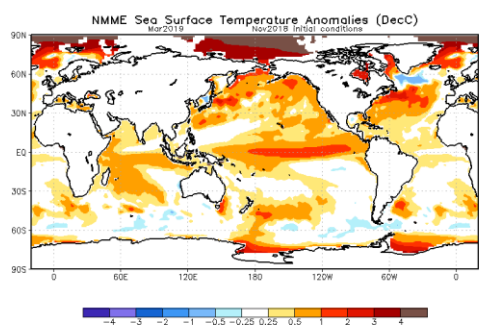
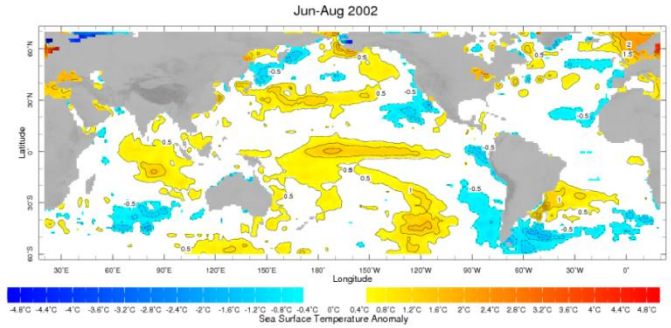


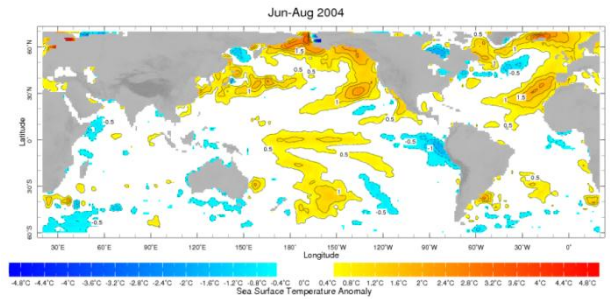
NMME Sea Surface Temperature Anomalies (DecC)

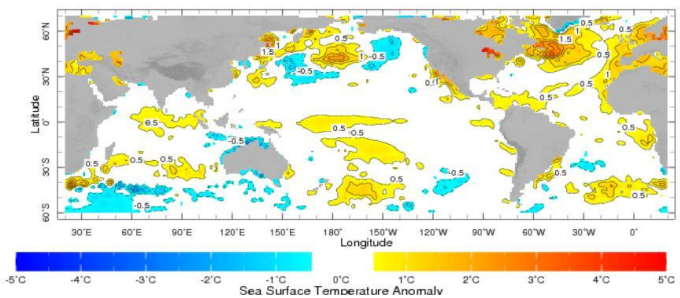


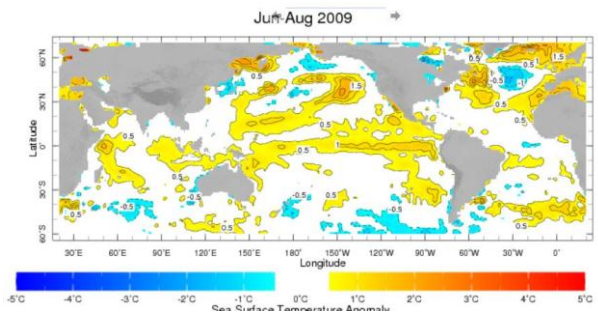
SEASONAL SST FORECASTS WITH ANALOG YEARS USING IRI AND NMME

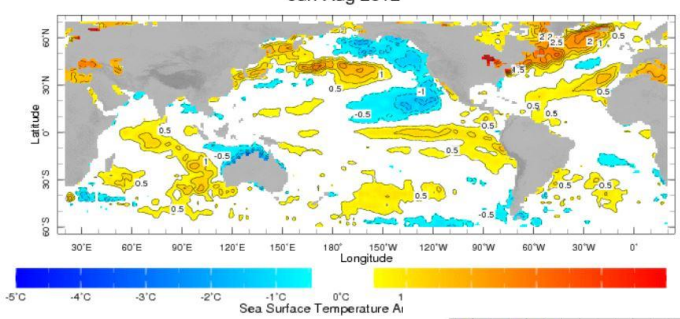
OBSERVED SSTA FOR JJA 2002, 2004, 2006, 2009, 2012, 2014 AND 2018

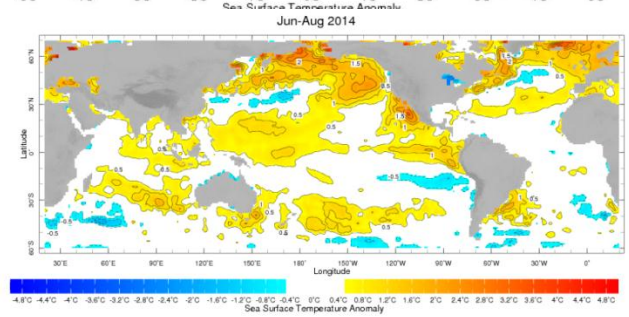


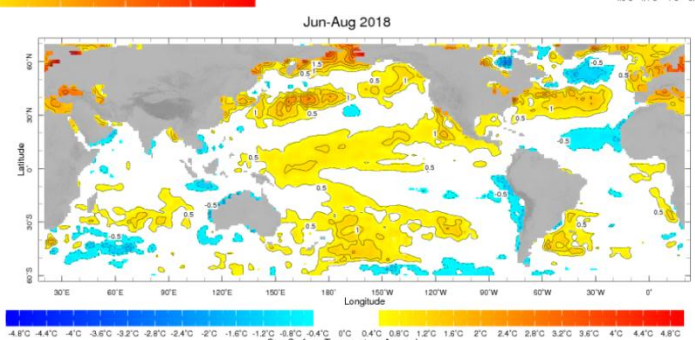






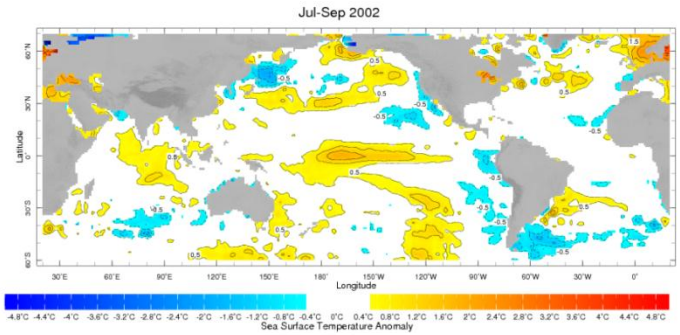


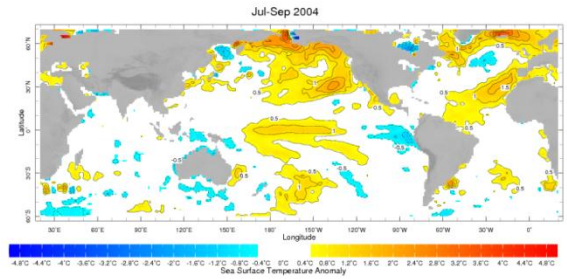


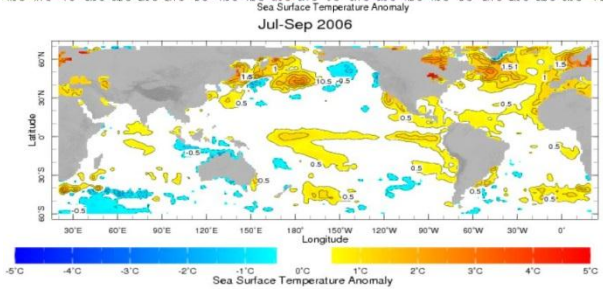


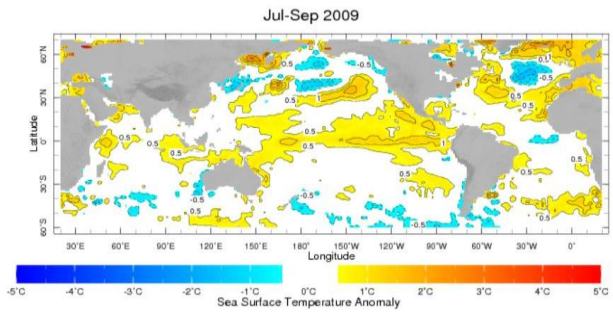
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Seasonal.html

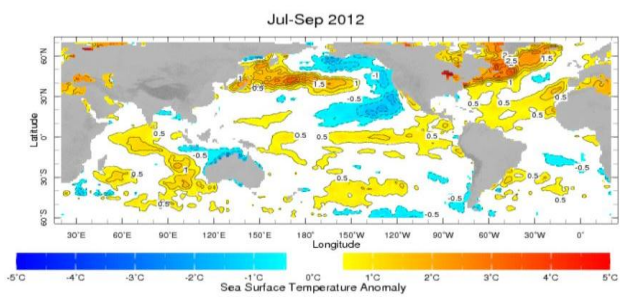
OBSERVED SSTA FOR JAS 2002, 2004, 2006, 2009, 2012, 2014 AND 2018 FORECAST

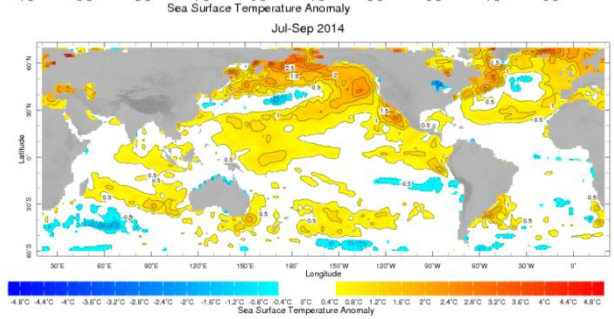


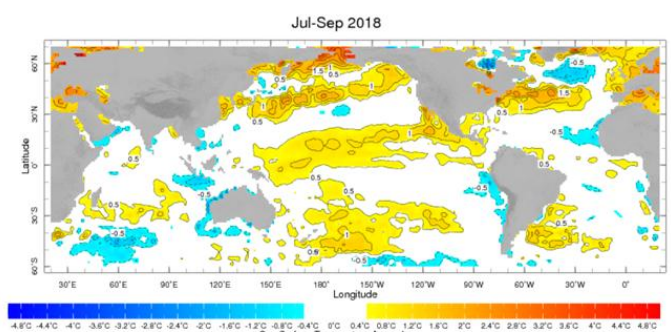






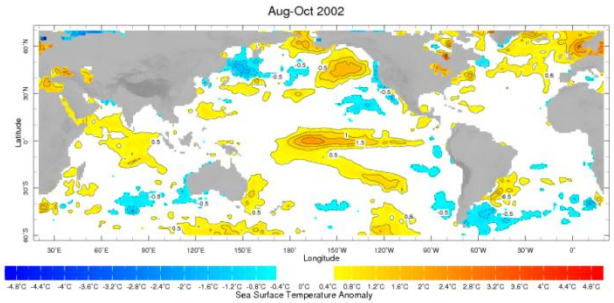


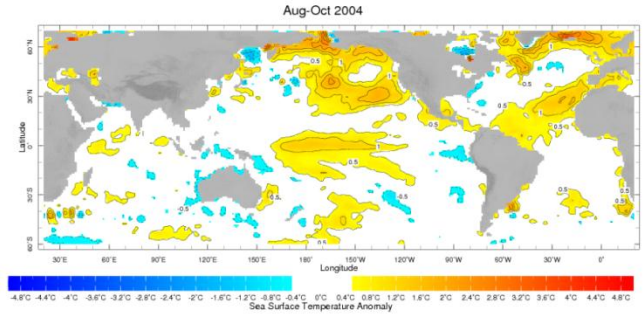


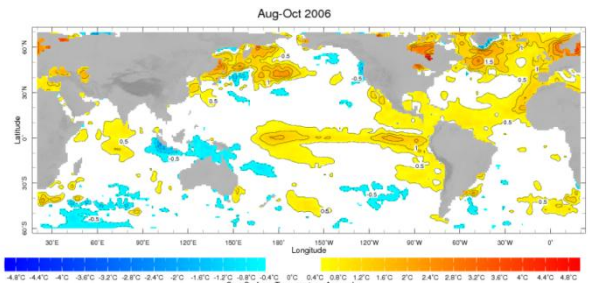


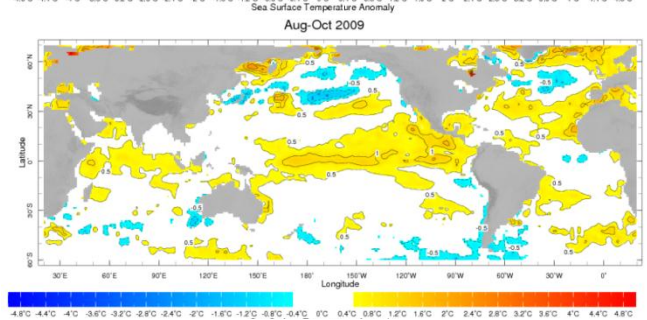
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Seasonal.html

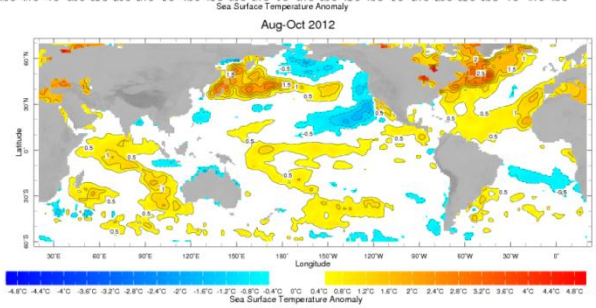
OBSERVED SSTA FOR ASO 2002, 2004, 2006, 2009, 2012, 2014 AND 2018 FORECAST

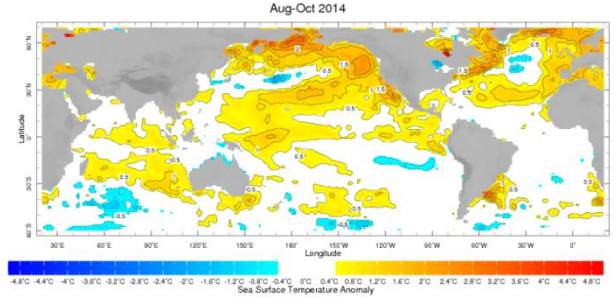


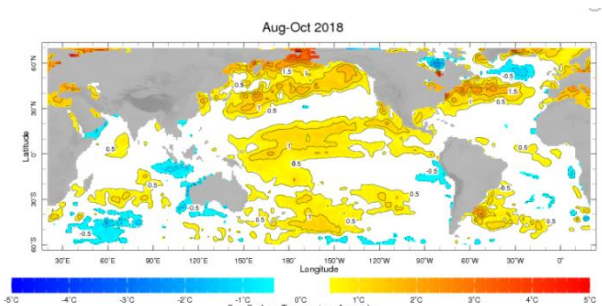






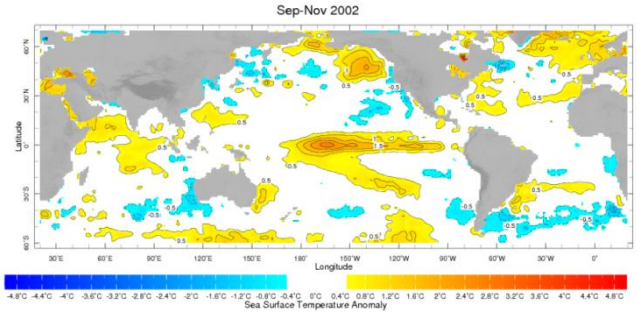


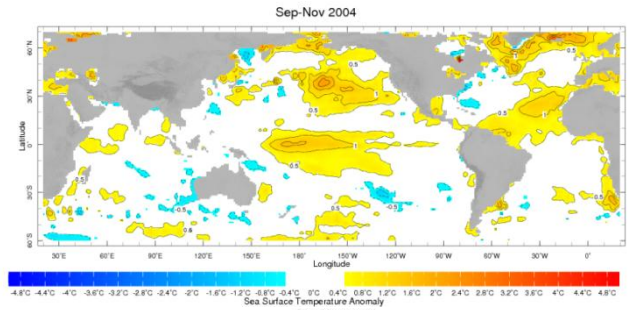


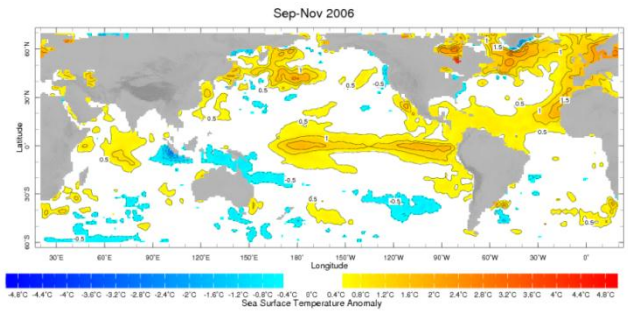


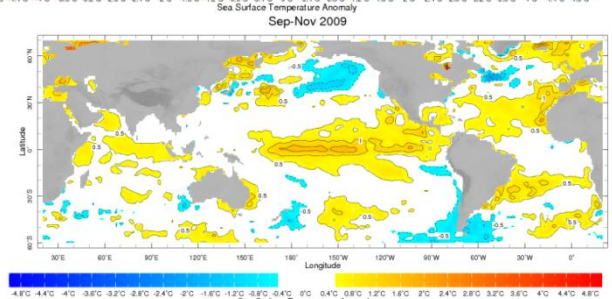
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Seasonal.html

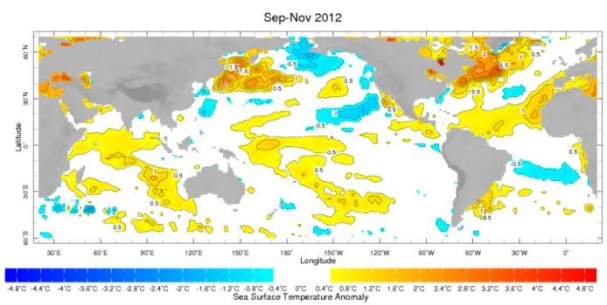
OBSERVED SSTA FOR SON 2002, 2004, 2006, 2009, 2012, 2014 AND 2018 FORECAST

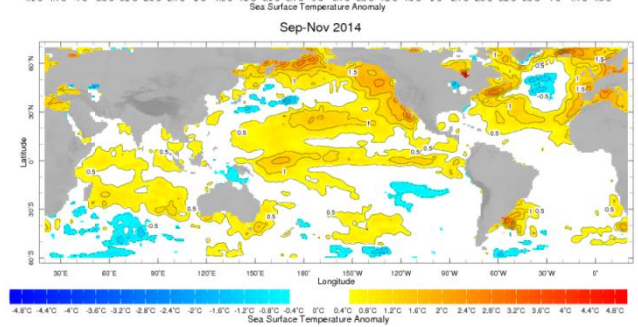


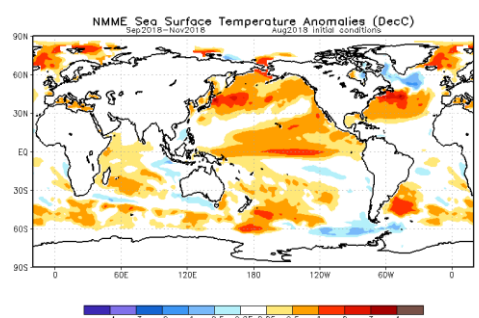






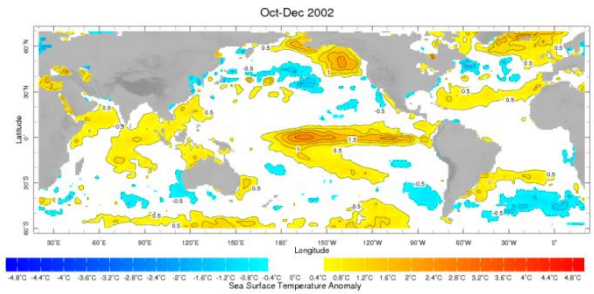


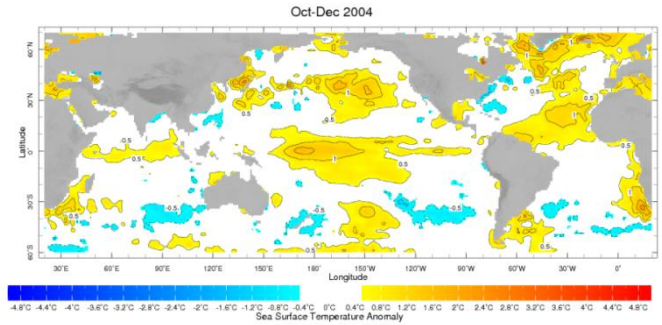


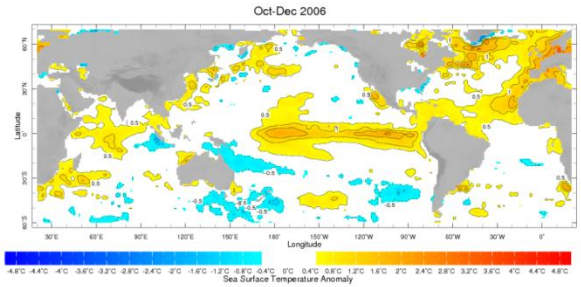


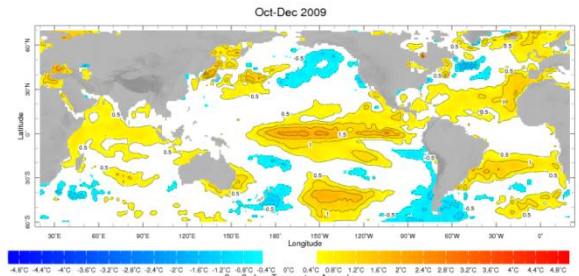
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Seasonal.html

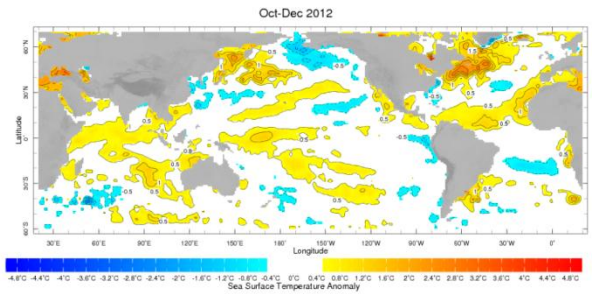
OBSERVED SSTA FOR OND 2002, 2004, 2006, 2009, 2012, 2014 AND 2018 FORECAST

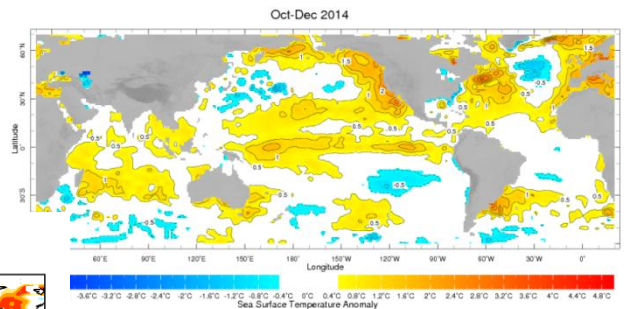


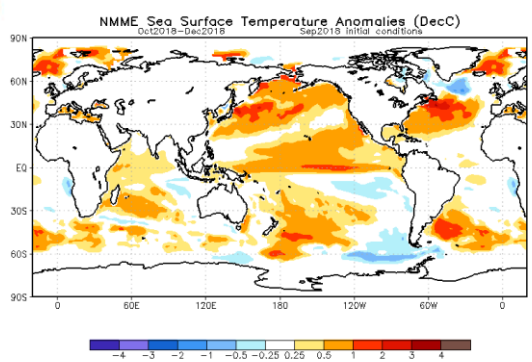






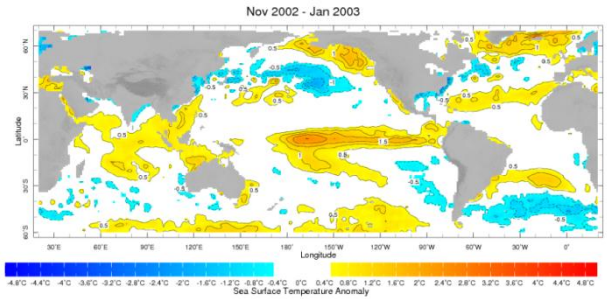


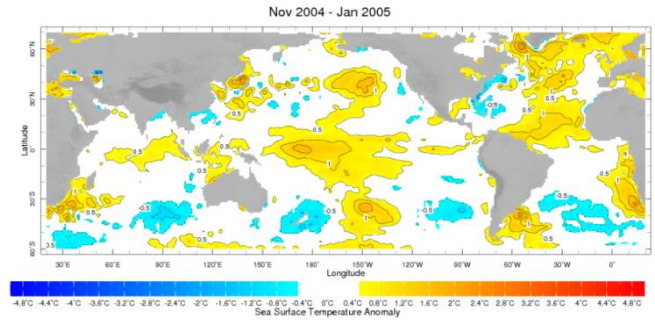


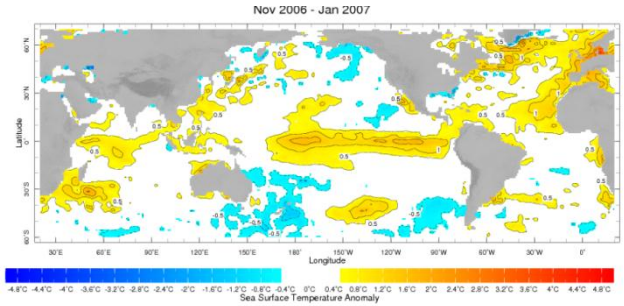


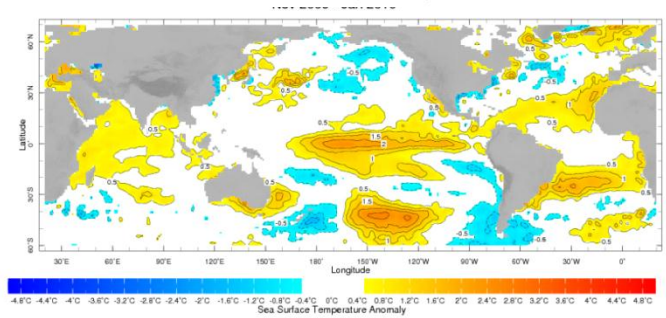
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Seasonal.html

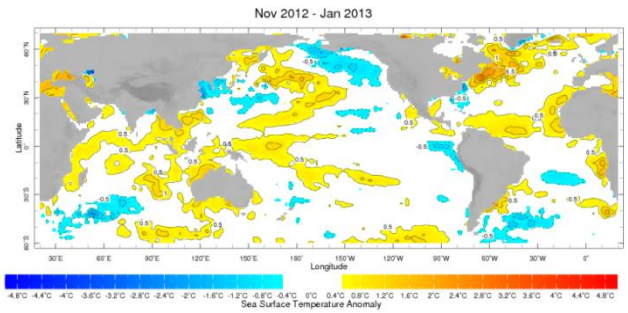
OBSERVED SSTA FOR NDJ 2002-03, 2004-05, 2006-07, 2009-10, 2012-13, 2014-15 AND 2018-19 FORECAST

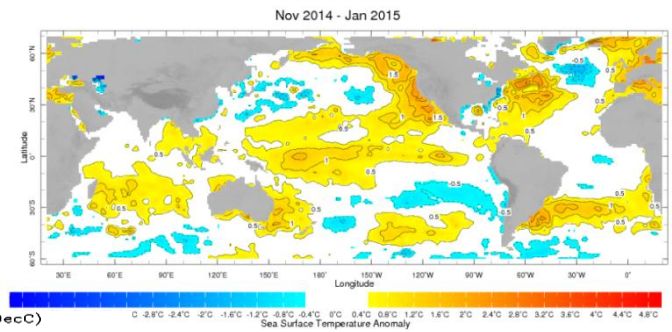


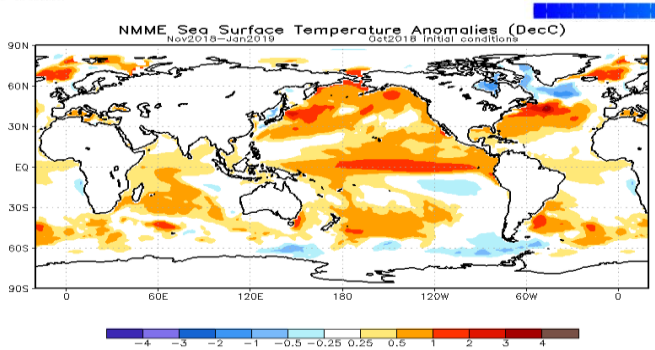






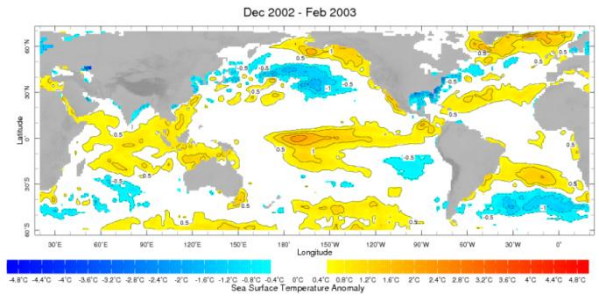


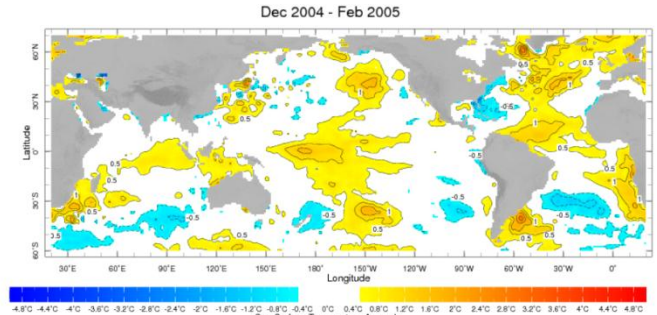


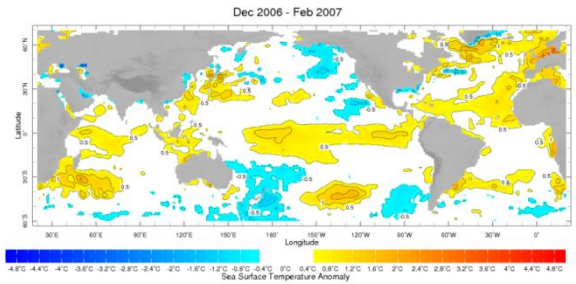


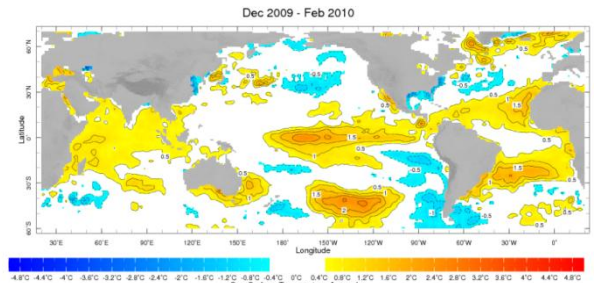
http://iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Seasonal.html

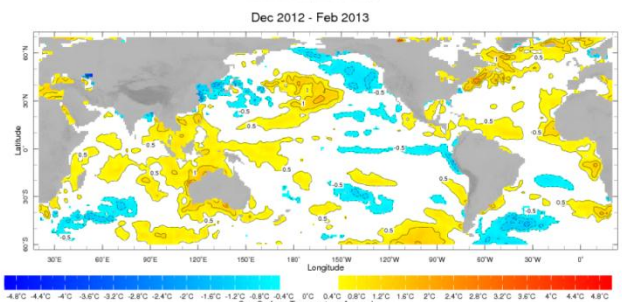
OBSERVED SSTA FOR DJF 2002-03, 2004-05, 2006-07, 2009-10, 2012-13, 2014-15 AND 2018-19 FORECAST

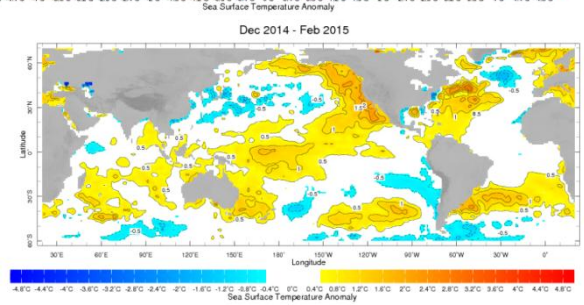


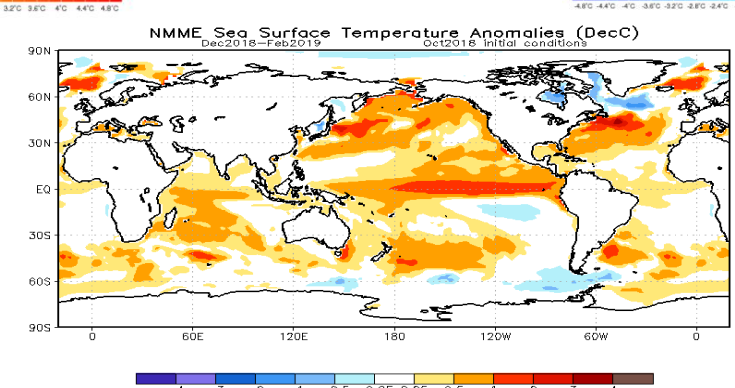








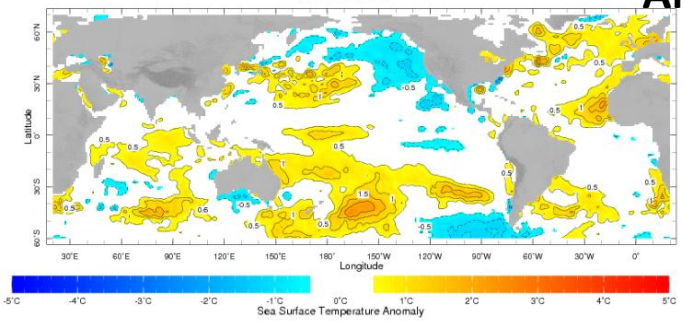




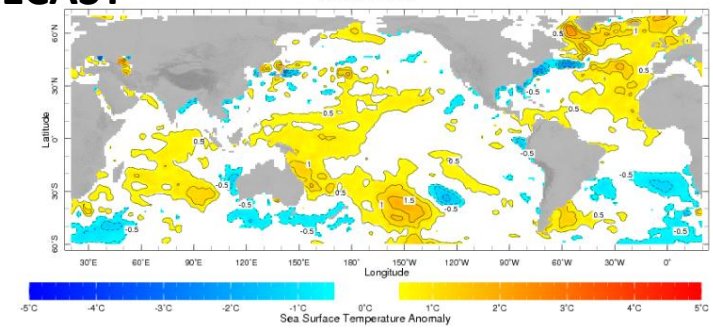
iridl.ldeo.columbia.edu/maproom/Global/Ocean_Temp/Seasonal.html?T=Dec%202014%20-%20Feb%202015

OBSERVED SSTA FOR JFM 2002-03, 2004-05, 2006-07, 2009-10, 2012-13, 2014-15 AND 2018-19 FORECAST

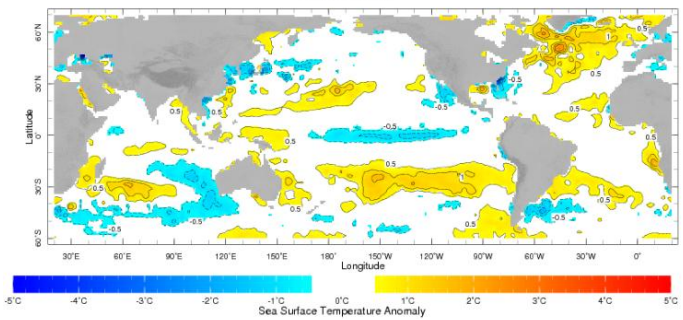
Jan-Mar 2002



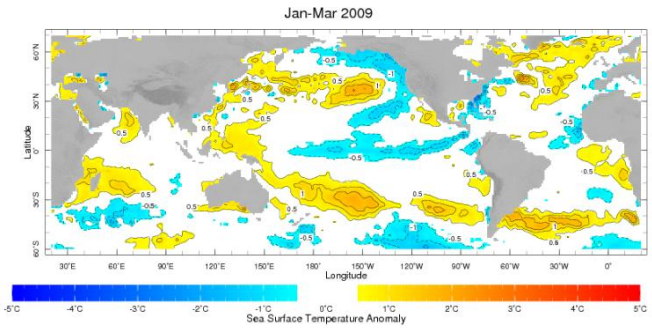
Jan-Mar 2004



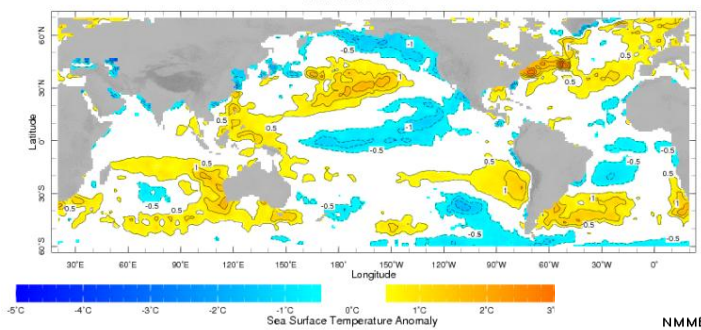
Jan-Mar 2006



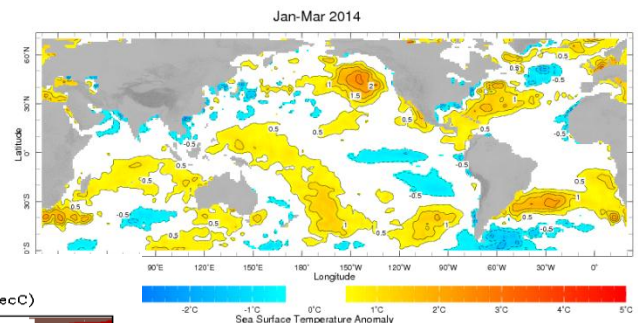
Jan-Mar 2009



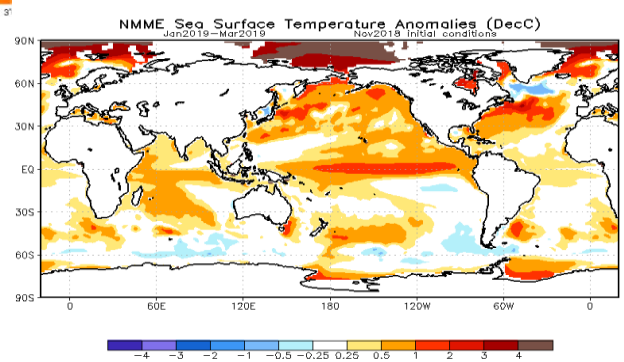
Jan-Mar 2012



Jan-Mar 2014

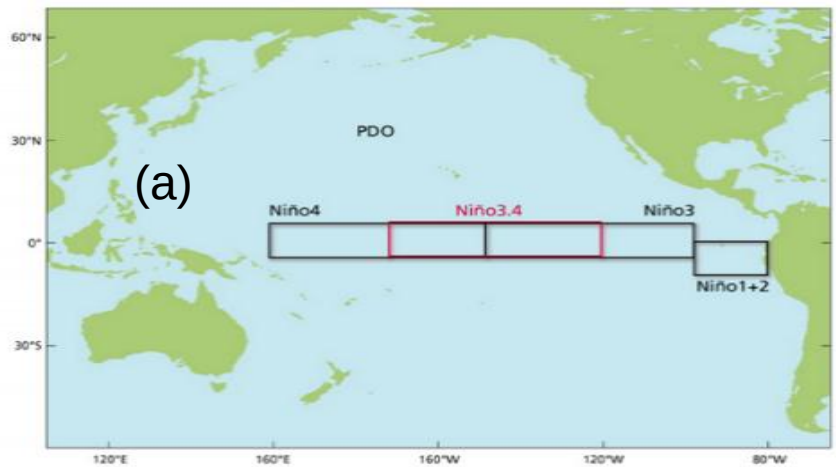


NMME Sea Surface Temperature Anomalies (DecC)



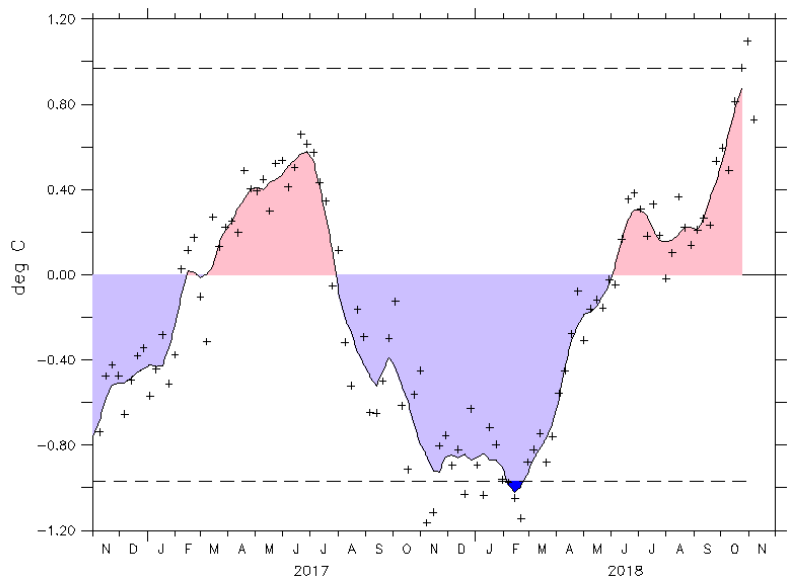
TELECONNECTIONS INDICES

PACIFIC BASIN: NINO3.4

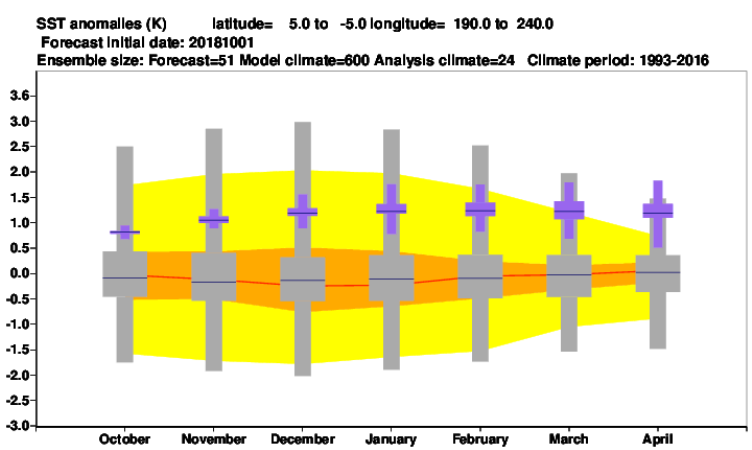


OOPC Observed SST timeseries

(b)



(c)



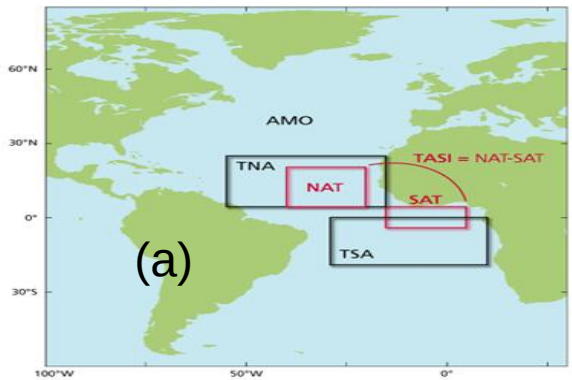
Above average SST prevailed in the Equatorial Pacific during the month of November 2018. These warm conditions will be persist during from December 2018 to March 2019

Figure S16: (a) Pacific Ocean basin showing NINO3.4 region (b) Observed SST time series from the Ocean Observations Panel for Climate (c) SSTA model forecast

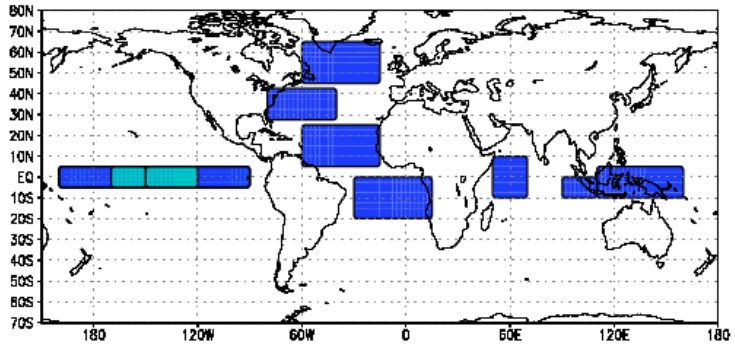
https://www.ecmwf.int/en/forecasts/charts/catalogue/?facets=Range,Long%20%28Months%29%3BType,Forecasts
https://stateoftheocean.osmc.noaa.gov/sur/pac/nino34.php

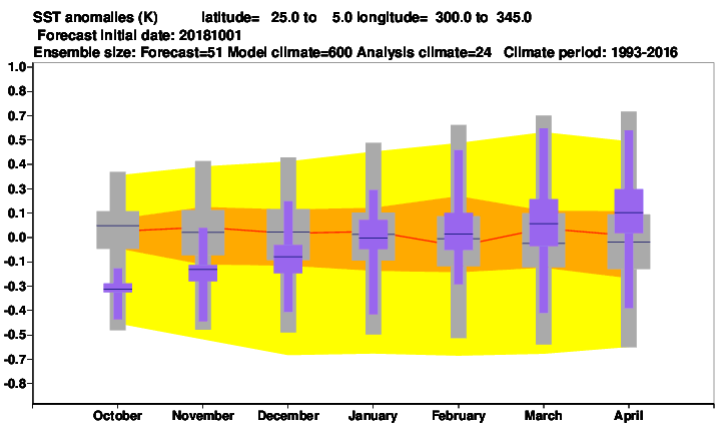
ATLANTIC BASIN INDEX

TROPICAL NORTH ATLANTIC: TNA



(c)





(b)

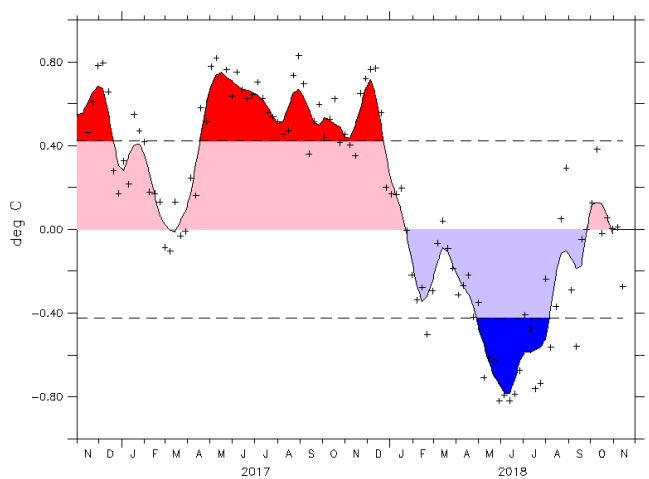


Figure S17: (a) Atlantic Ocean basin showing TNA region (b) Observed TNA SST time series from the Ocean Observations Panel for Climate (c) TNA SSTA model forecast

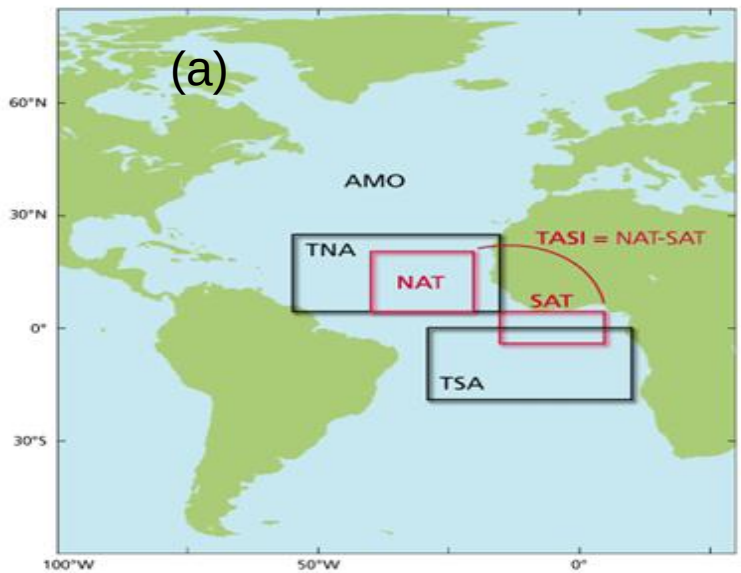
In Tropical North Atlantic near average SSTs prevailed from September to November 2018. These conditions will be persist during coming months.

http://www.ecmwf.int/en/forecasts/charts/seasonal/sea-surface-temperature-area-averages-long-range-forecast?time=2016010100,0,2016010100&index_type=Northern%20Trop%20Atlantic
/seasonal/forecast/seasonal_range_forecast/groupp/Climagrams_sst!Sea%20Surface%20Temperature!Northern%20Trop%20Atlantic!201508!/
http://ioc-goos-oopc.org/state_of_the_ocean/sur/atl/tna.php

ATLANTIC BASIN INDEX

NORTH ATLANTIC TROPICAL: NAT

(b)



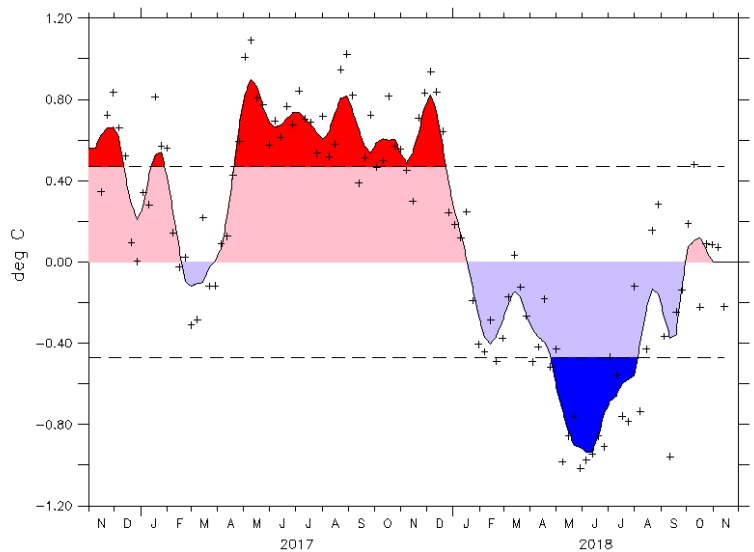


Figure S18: (a) Atlantic Ocean basin showing NAT region (b) Observed NAT SST time series from the Ocean Observations Panel for Climate

In North Atlantic Tropical, near average SSTs prevailed during September to November 2018

http://stateoftheocean.osmc.noaa.gov/sur/atl/nat.php

ATLANTIC BASIN INDEX

SOUTH ATLANTIC TROPICAL : SAT

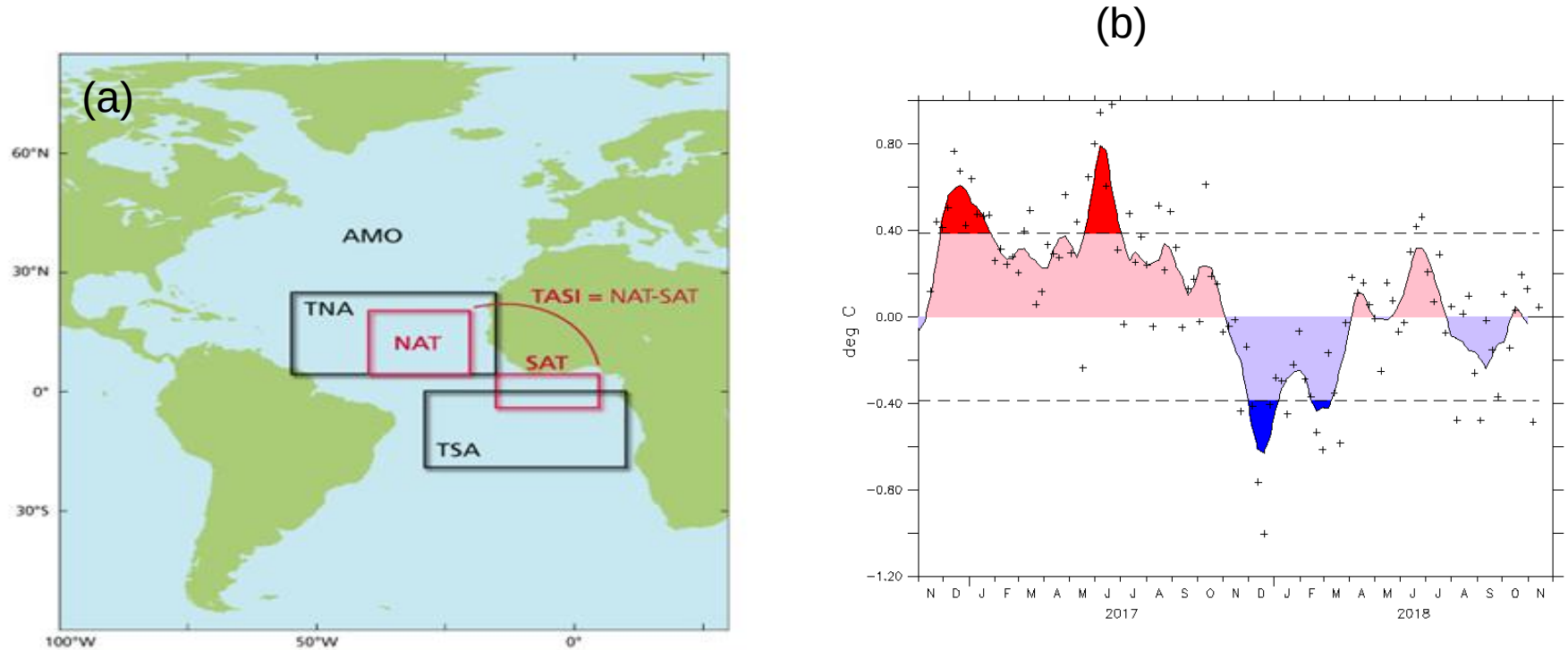


Figure S19: (a) Atlantic Ocean basin showing SAT region (b) Observed SAT SST time series from the Ocean Observations Panel for Climate

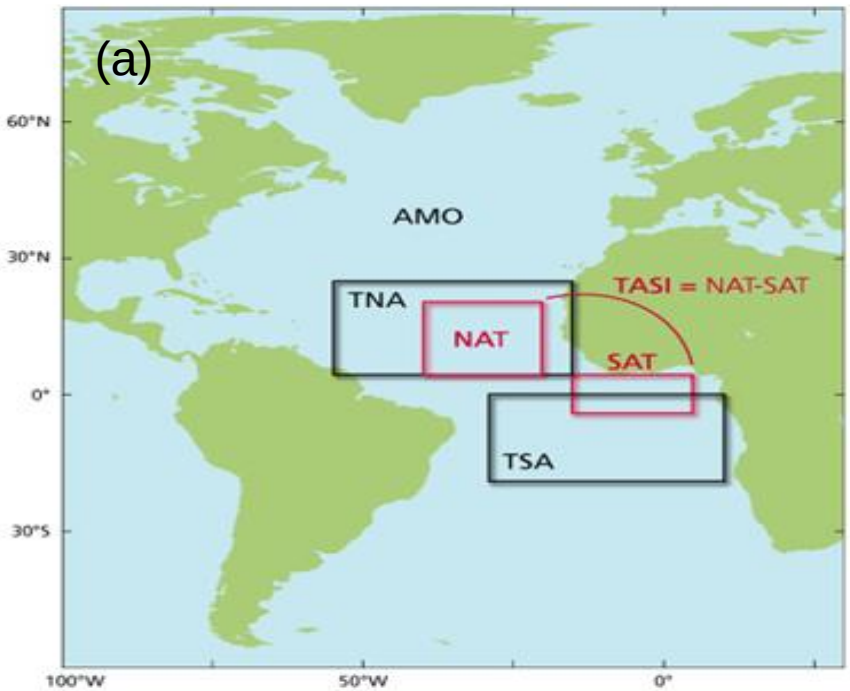
Over South Tropical Atlantic was near average from September to Novemebr and near average during October 2018. A persistence of these conditions are very likely during coming months 2018.

http://ioc-goos-oopc.org/state_of_the_ocean/sur/atl/sat.php

ATLANTIC BASIN INDEX

Tropical Atlantic SST index: TASI

(a)



(b)

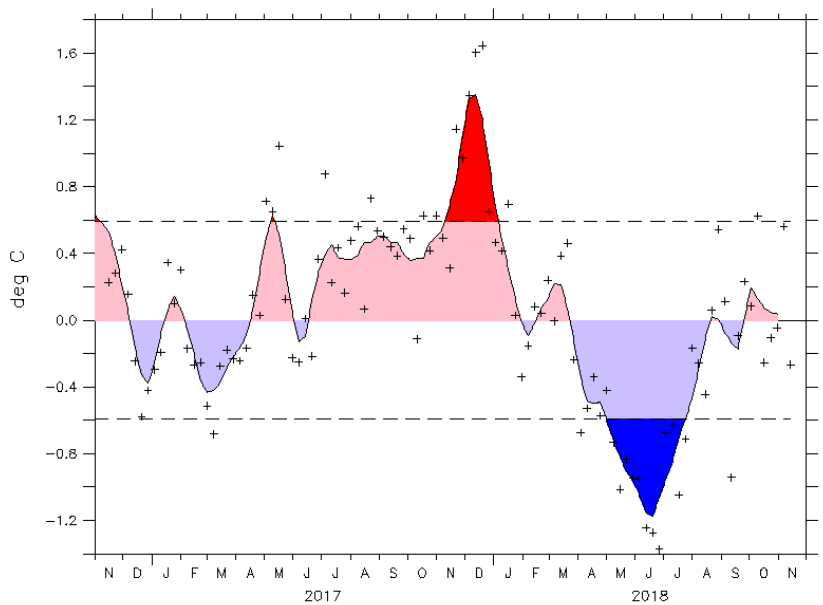


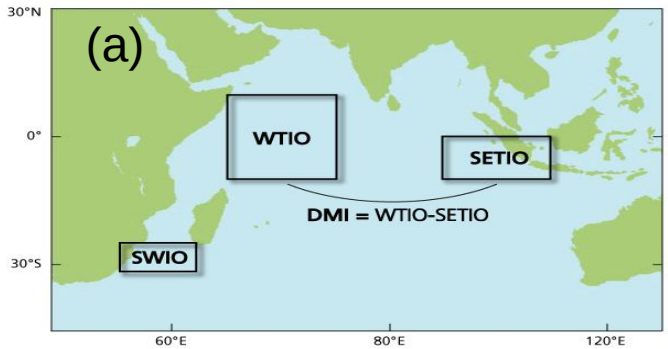
Figure S20: (a) Atlantic Ocean basin showing TASI region (b) Observed TASI SST time series from the Ocean Observations Panel for Climate.

Near average SSTs prevailed in Tropical Atlantic South Index during September to November 2018.

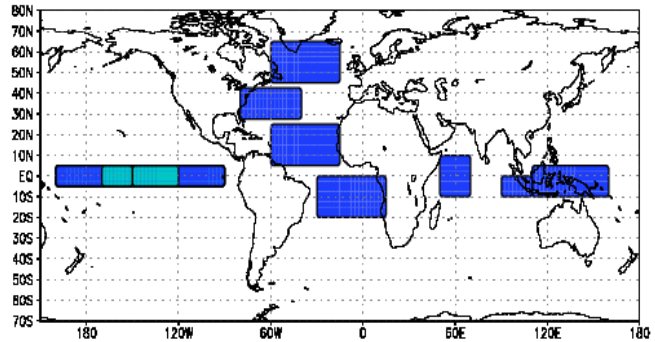
http://ioc-goos-oopc.org/state_of_the_ocean/sur/atl/tasi.php

INDIAN BASIN INDEX

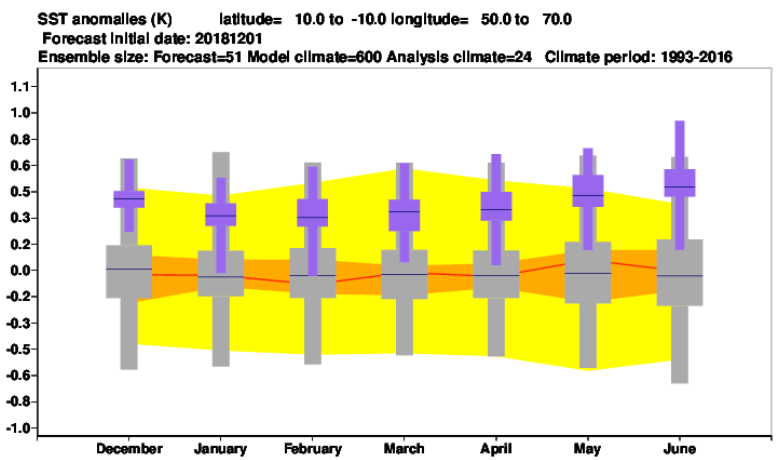
Western Tropical Indian Ocean (WTIO) SST index



(c)



(b)



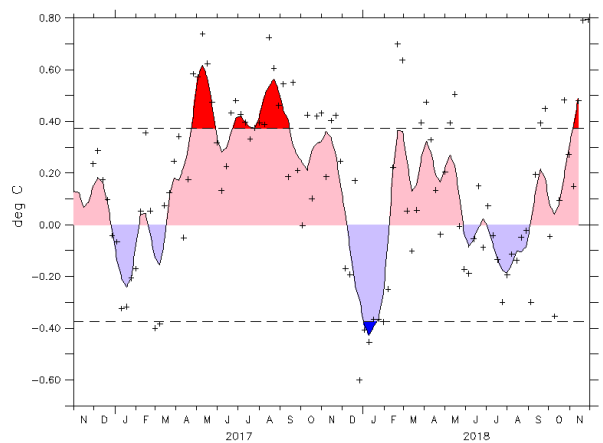


Figure S22: (a) Indian Ocean basin showing WTIO region (b) Observed WTIO SSTA time series from the Ocean Observations Panel for Climate (c) WTIO SSTA model forecast.

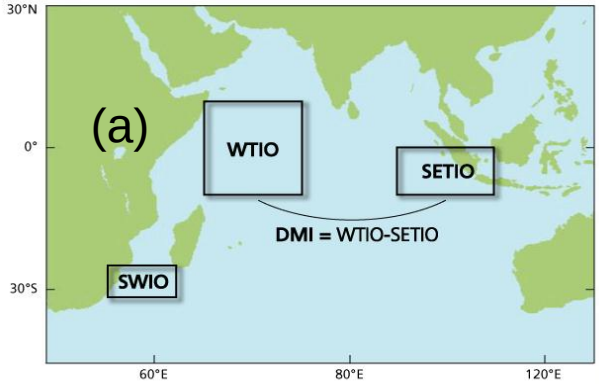
Near to above average SSTs prevailed in Western Tropical Indian Ocean during past few months. These conditions will be persist during next three month

http://ioc-goos-oopc.org/state_of_the_ocean/sur/ind/wtio.php

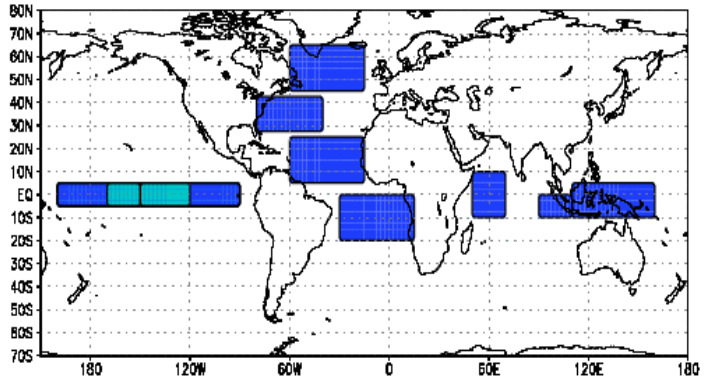
http://www.ecmwf.int/en/forecasts/charts/seasonal/sea-surface-temperature-area-averages-long-range-forecast?time=2016020100,0,2016020100&index_type=Western%20Trop%20Indian!/

INDIAN BASIN INDEX

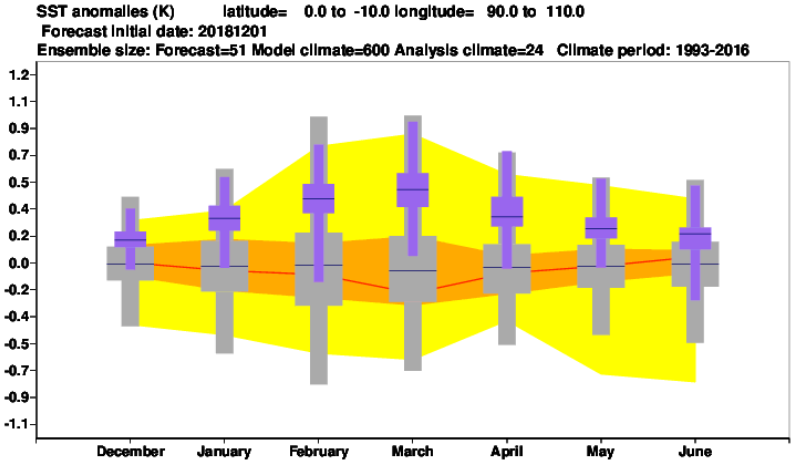
Southeastern Tropical Indian Ocean (SETIO) SST index



(c)



(b)



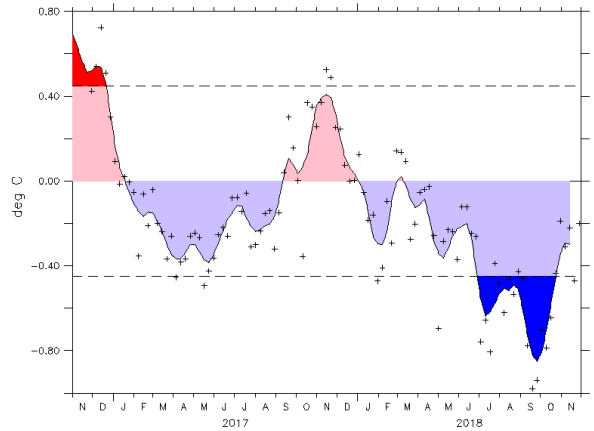


Figure S23: (a) Indian Ocean basin showing SETIO region (b) Observed SETIO SSTA time series (c) SETIO SSTA model forecast.

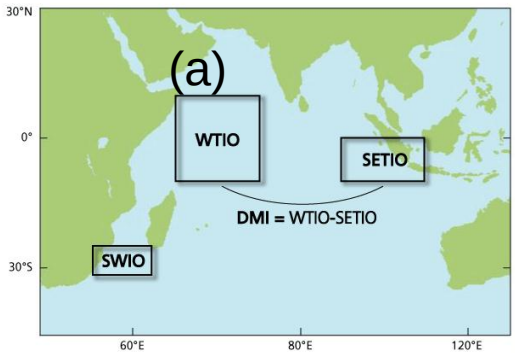
Below average SSTs prevailed in Eastern Tropical Indian Ocean during July to October 2018. This condition are expected to be near average to near to above average from November 2018 to March 2019.

http://ioc-goos-oopc.org/state_of_the_ocean/sur/ind/setio.php

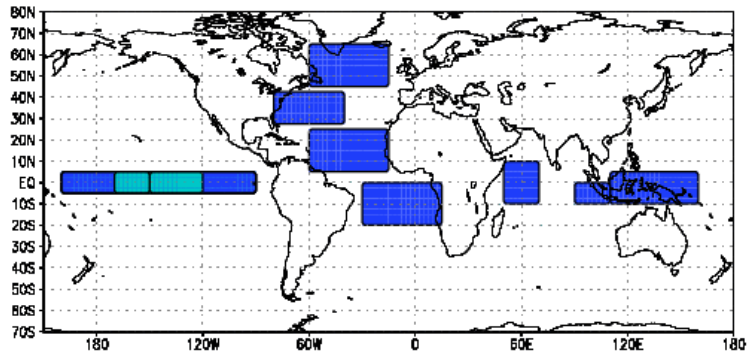
http://www.ecmwf.int/en/forecasts/charts/seasonal/sea-surface-temperature-area-averages-long-range-forecast?time=2016020100,0,2016020100&index_type=Western%20Trop%20Indian!/

INDIAN BASIN INDEX

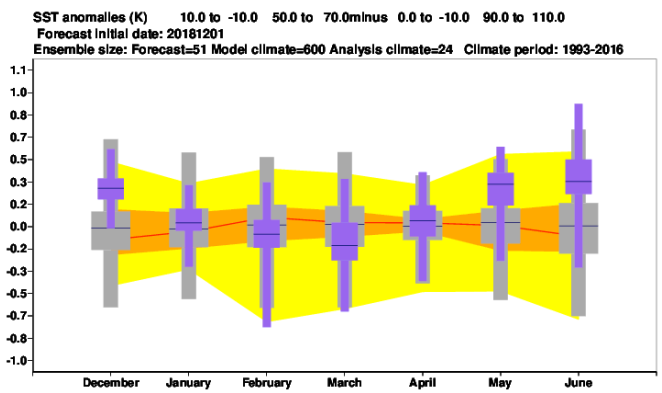
Dipole Mode Index (DMI)



(c)



(b)



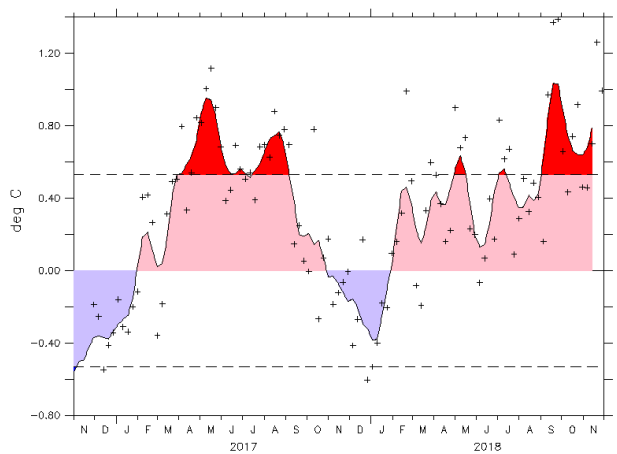


Figure S24: (a) Indian Ocean basin illustrating DMI location (b) Observed DMI time series (c) DMI related SSTA model forecast.

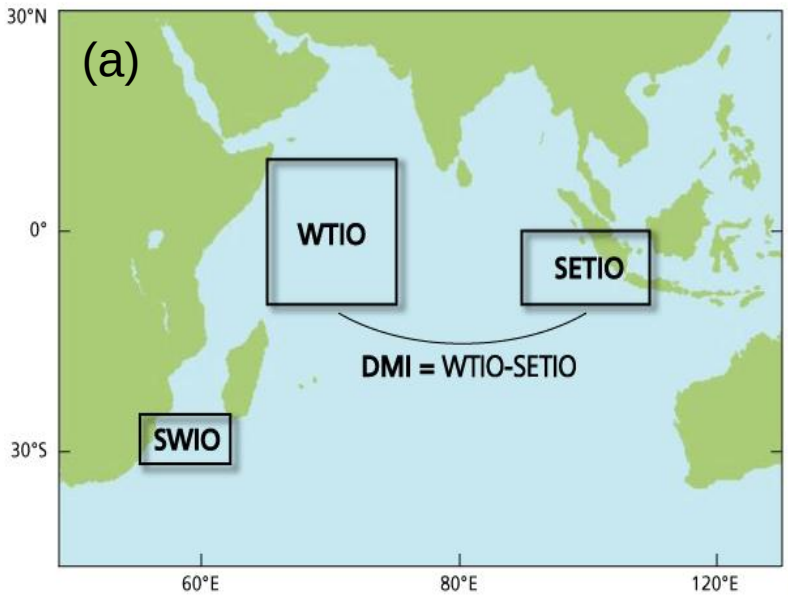
Positive Dipole Mode Index was observed from May to October 2018. These conditions will be near average during coming months.

http://ioc-goos-oopc.org/state_of_the_ocean/sur/ind/dmi.php
http://www.ecmwf.int/en/forecasts/charts/seasonal/sea-surface-temperature-area-averages-long-range-forecast?time=2016010100,0,2016010100&index_type=Indian%20Ocean%20Dipole

INDIAN BASIN INDEX

South Western Indian Ocean (SWIO) SST index

(b)



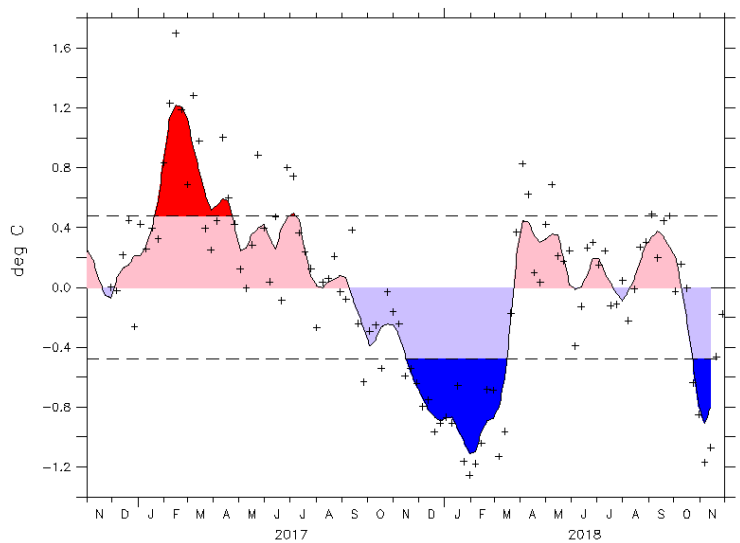


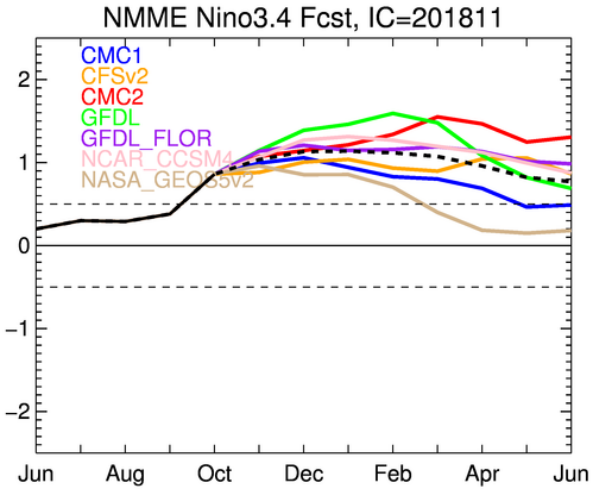
Figure S25: (a) Indian Ocean basin showing SWIO region (b) Observed SWIO time series.

Near average SSTs prevailed in South Western Indian Ocean from March to October 2018

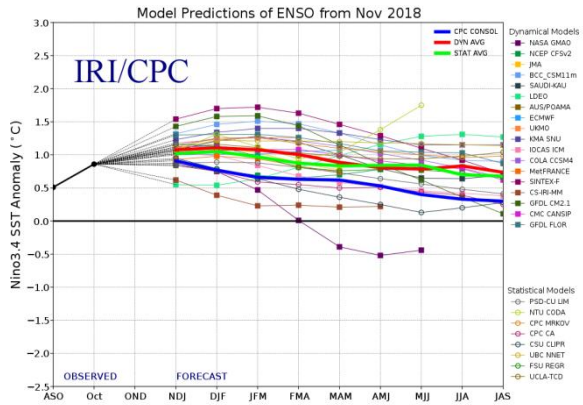
http://ioc-goos-oopc.org/state_of_the_ocean/sur/ind/swio.php

ENSO (NINO3.4) FORECAST

(a)

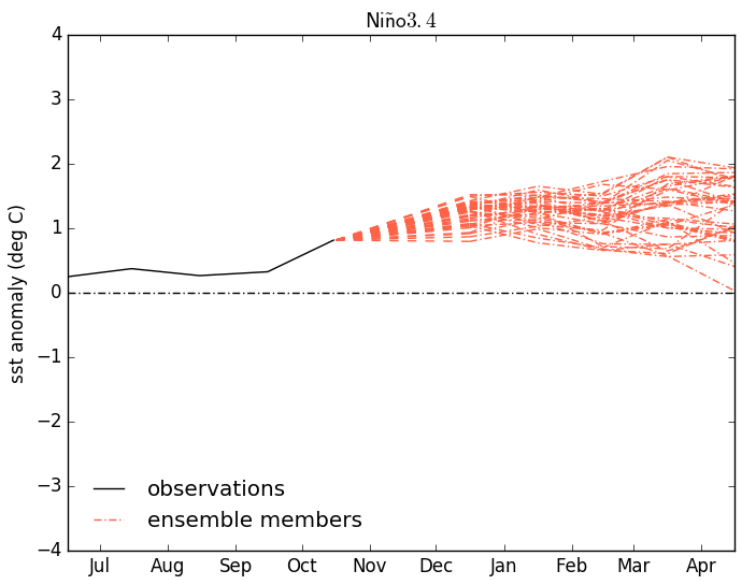


(b)



(c)

(d)



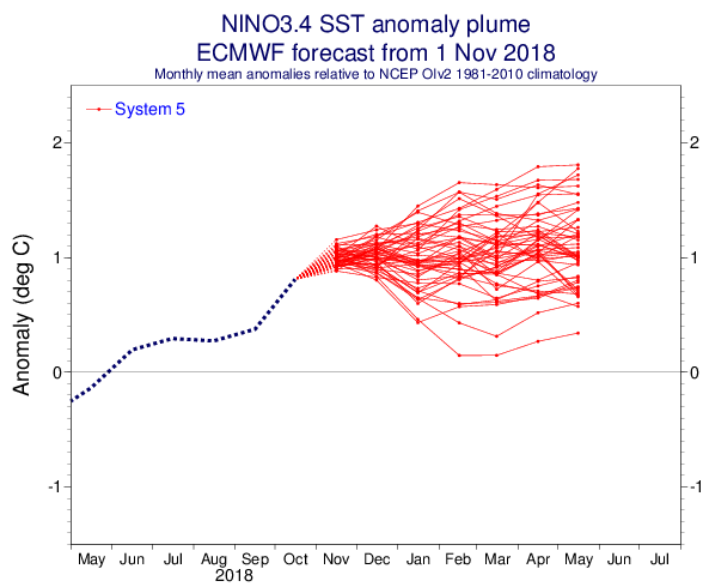
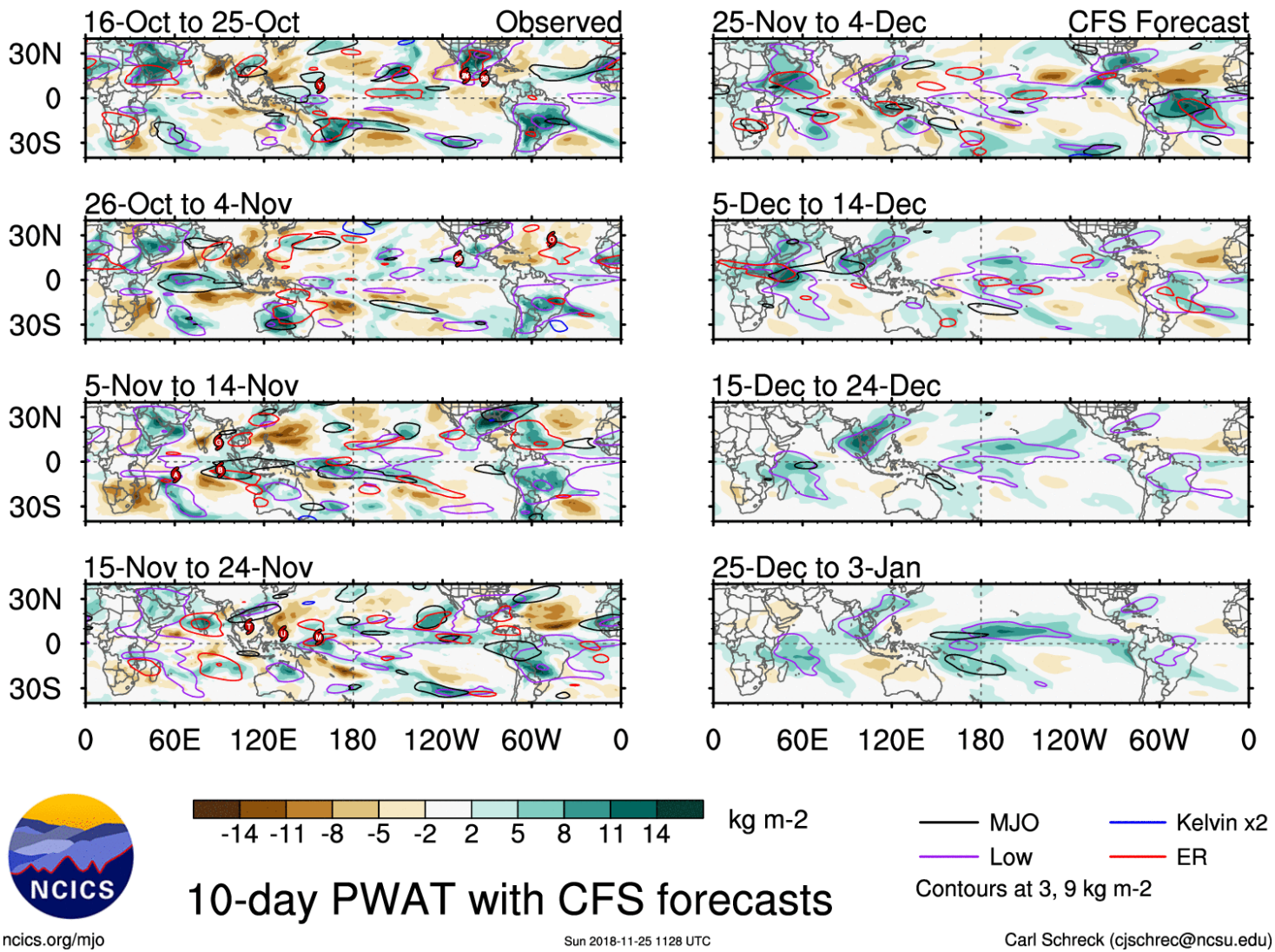


Figure S25: (a) NMME+ENSO Model prediction (b) Plume of Model ENSO prediction (c) NINO3 SST anomaly plume (d) NINO3.4 SST anomaly plume

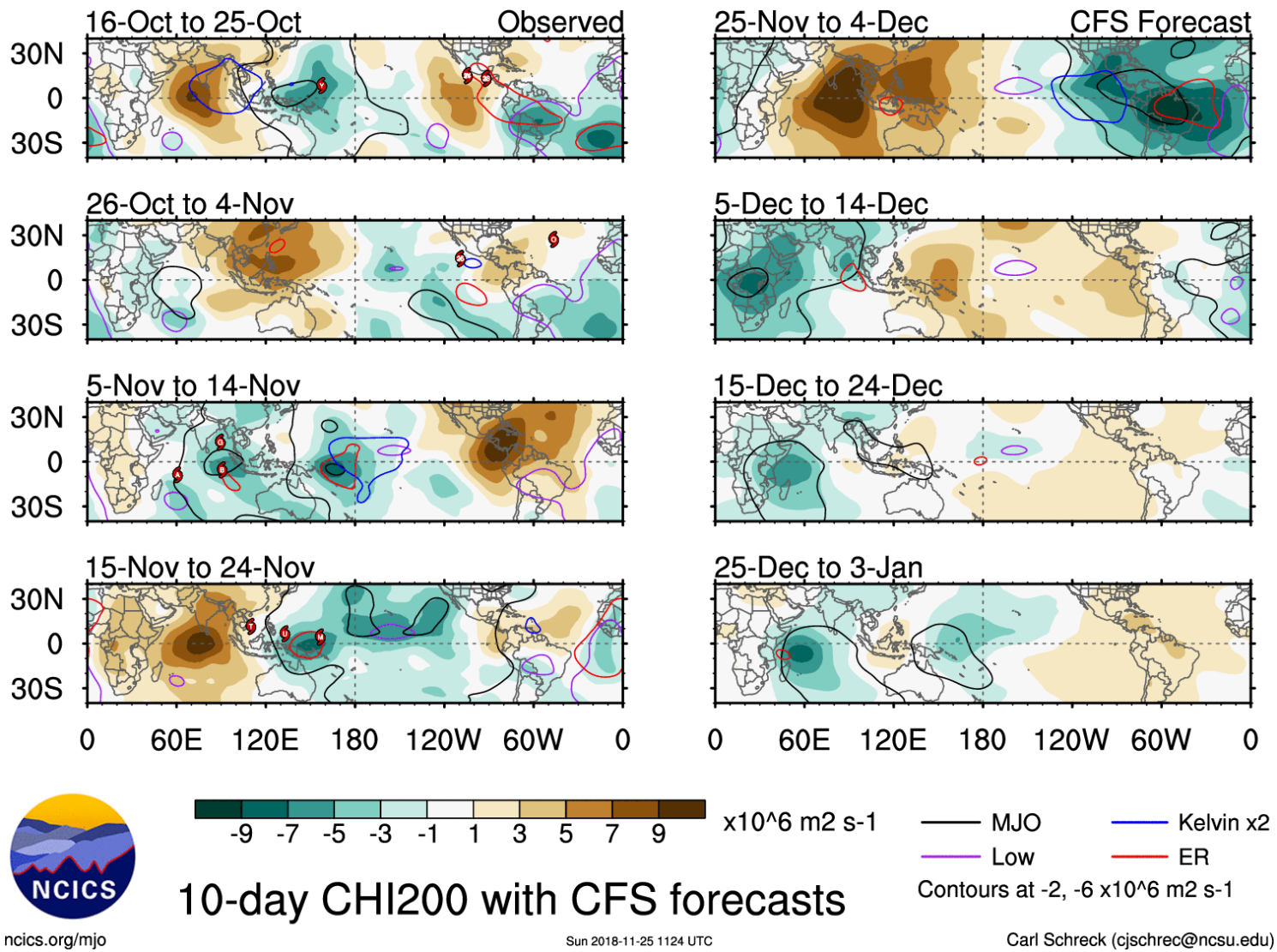
http://www.ecmwf.int/en/forecasts/carts/catalogue?f[0]=im_field_chart_type_2%3A607&f[1]=im_field_chart_type%3A483
http://www.cpc.ncep.noaa.gov/products/NMME/current/images/nino34.rescaling.ENSMEAN.png
http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/

OBSERVED AND FORECASTED MJO



https://ncics.org/portfolio/monitor/mjo /

VELOCITY POTENTIAL



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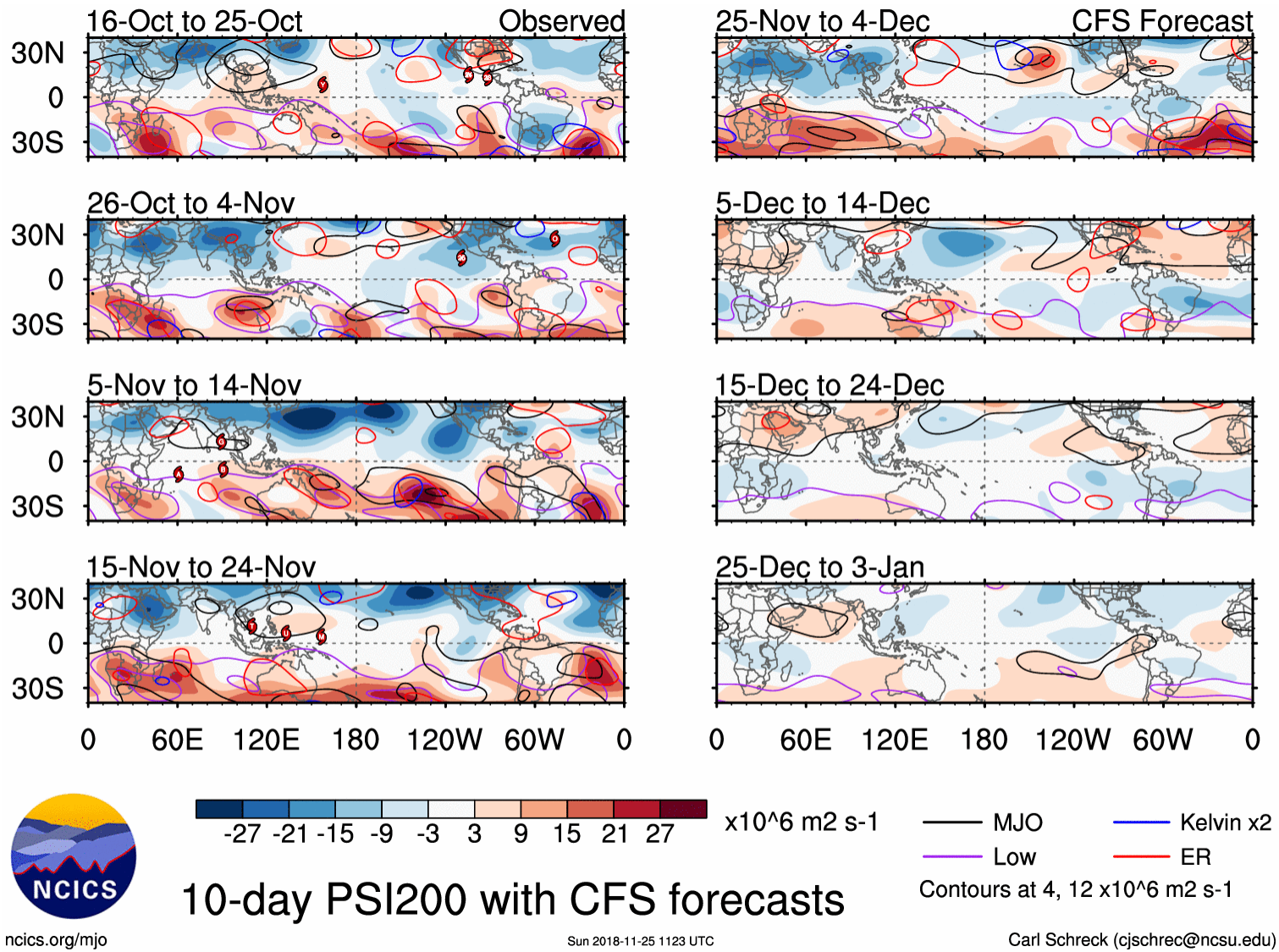
STREAM FUNCTION



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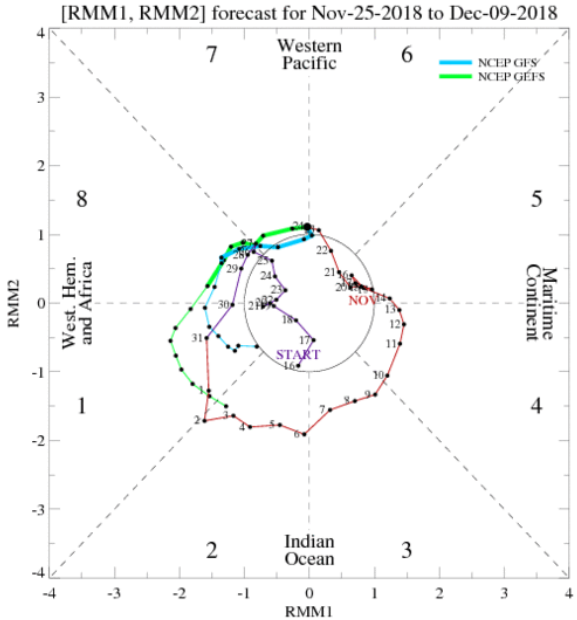
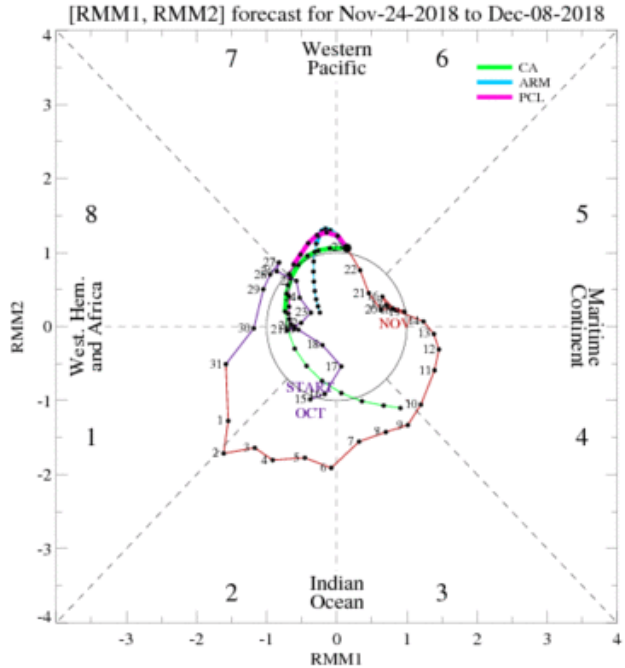
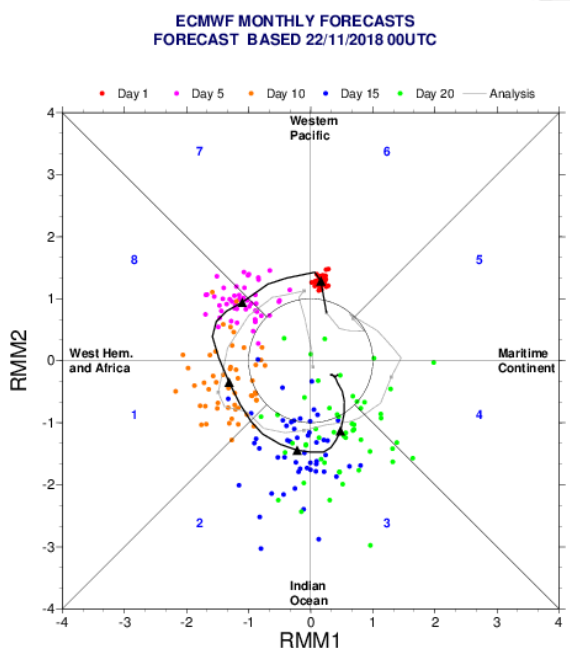
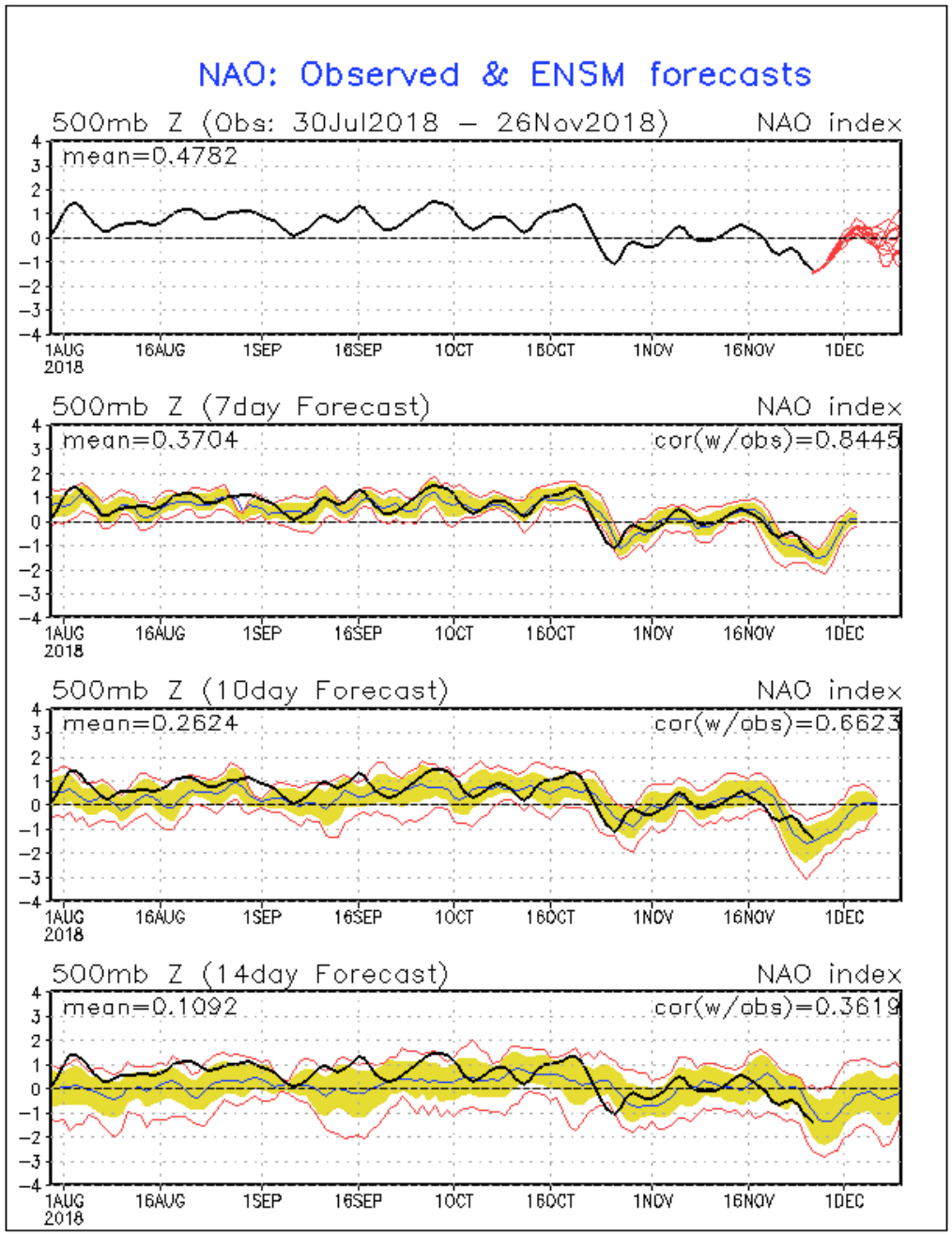






http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/mjo.shtml#forecast

https://www.ecmwf.int/en/forecasts/charts/catalogue/mofc_multi_mjo_family_index?facets=undefined&time=2018100400,0,2018100400



http://www.cpc.ncep.noaa.gov/products/precip/CWlink/pna/nao_index_ensm.shtml

ANALOG YEARS COMPARED WITH 2018

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2002	-0.1	0.0	0.1	0.2	0.4	**0.7**	**0.8**	**0.9**	**1.0**	**1.2**	**1.3**	**1.1**
2004	0.4	0.3	0.2	0.2	0.2	0.3	**0.5**	**0.6**	**0.7**	**0.7**	**0.7**	**0.7**
2006	**-0.8**	**-0.7**	**-0.5**	-0.3	0.0	0.0	0.1	0.3	**0.5**	**0.7**	**0.9**	**0.9**
2009	**-0.8**	**-0.7**	**-0.5**	-0.2	0.1	0.4	**0.5**	**0.5**	**0.7**	**1.0**	**1.3**	**1.6**
2012	**-0.8**	**-0.6**	**-0.5**	-0.4	-0.2	0.1	0.3	0.3	0.3	0.2	0.0	-0.2
2014	-0.4	-0.4	-0.2	0.1	0.3	0.2	0.1	0.0	0.2	0.4	**0.6**	**0.7**
2018	**-0.9**	**-0.8**	**-0.6**	-0.4	-0.1	0.1	**0.1**	**0.2**	**0.4**			

SST CONDITIONS FOR ANALOG YEARS COMPARED TO THOSE IN 2018-19

❖The SSTA conditions of 2002, 2004, 2006, 2009, 2012, 2014 are similar to those of 2018, particularly over the Pacific.

❖Over Atlantic, the observed SSTA conditions and related outlook show that 2002, 2012, 2014 have similar characteristics with 2018.

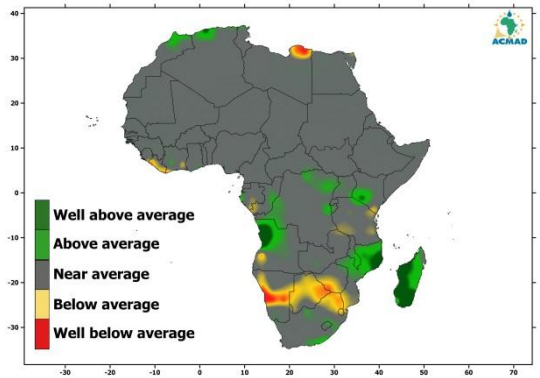
❖Over the Mediterranean region, the SSTA conditions of 2014, 2002 and 2004 are close to those of 2018.

❖The SSTA conditions over Indian Ocean and outlook reveal that 2002, 2006, and 2014 are similar to 2018.

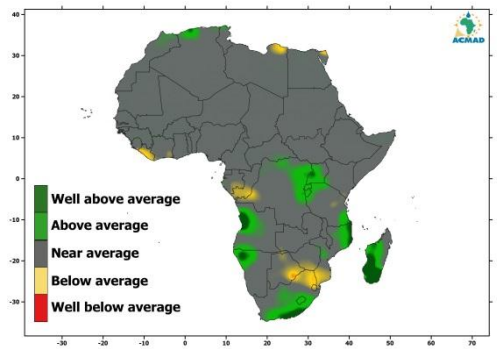
Conclusion: The SSTA conditions of 2014, 2012, 2002, 2004 and 2009 are similar to 2018 over the global Oceans.

PRECIPITATION IN PERCENT OF AVERAGE FOR THE ANALOGUE YEARS FOR DJF SEASON [2002-03, 2004-05, 2006-07 , 2009-10, 2012-13 AND 2014-15]

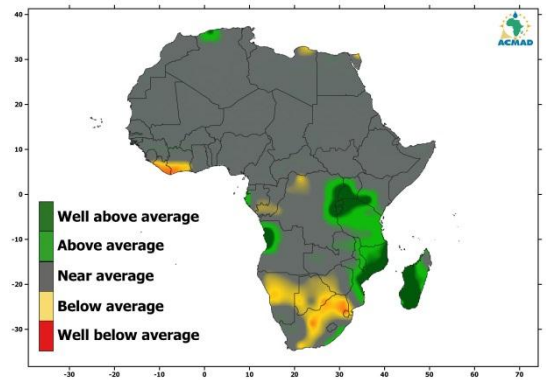
(a) **DJF 2002-03**



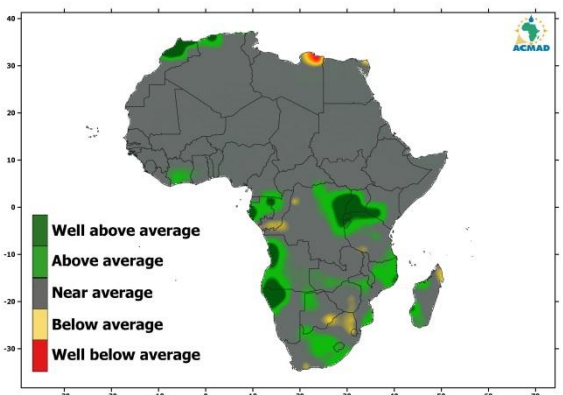
(b) **DJF 2004-05**



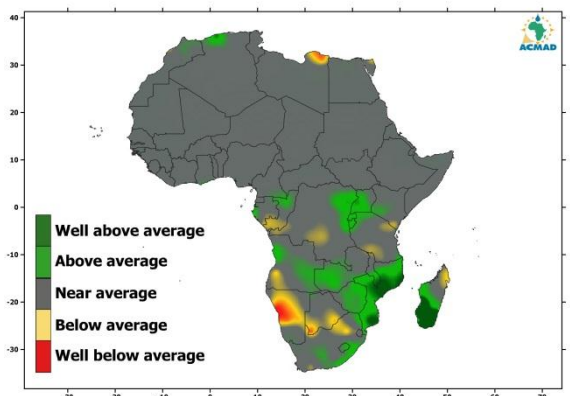
(c) **DJF 2006-07**



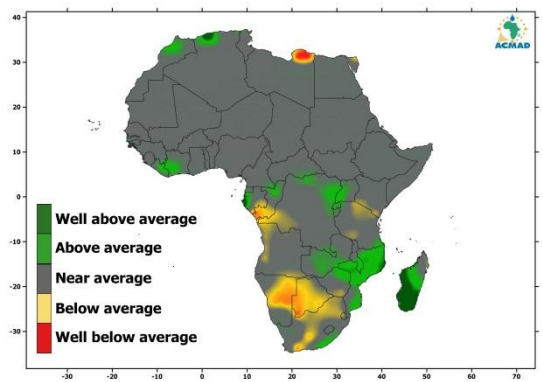
(d) **DJF 2009-10**



(e) **DJF 2012-13**



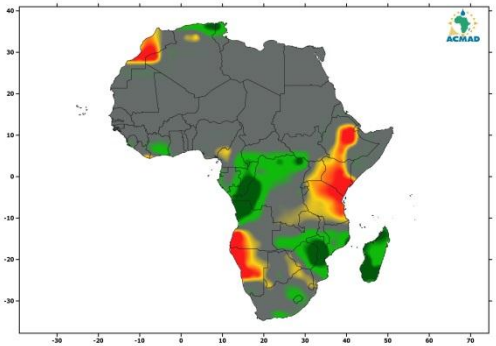
(f) **DJF 2014-15**



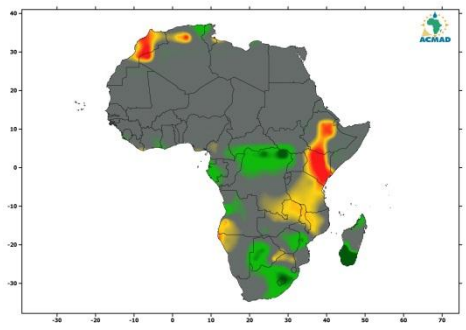
http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Seasonal.html

PRECIPITATION IN PERCENT OF AVERAGE FOR THE ANALOGUE YEARS FOR JFM SEASON [2002, 2004, 2006, 2009, 2012 AND 2014]

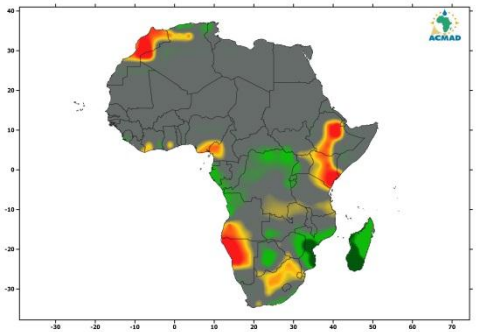
(a) **JFM 2003**



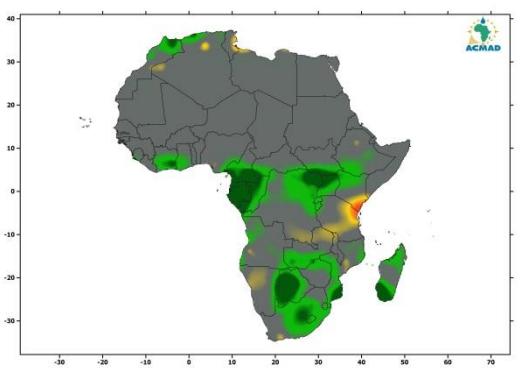
(b) **JFM 2005**



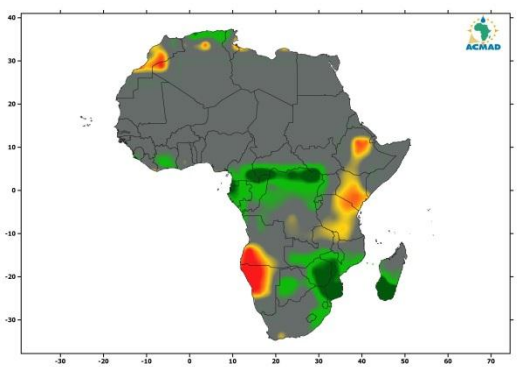
(c) **JFM 2007**



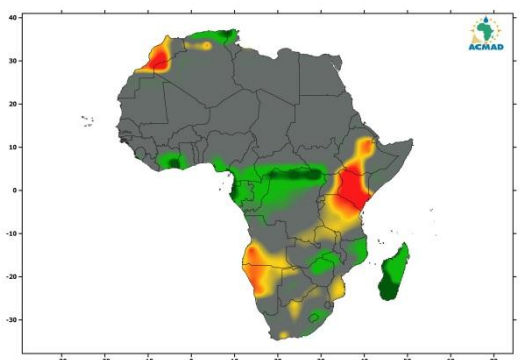
(d) **JFM 2010**



(e) **JFM 2013**



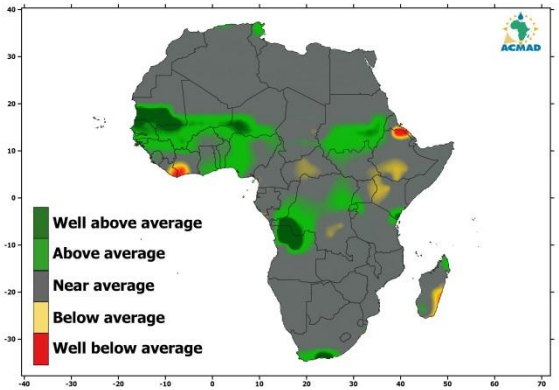
(f) **JFM 2015**



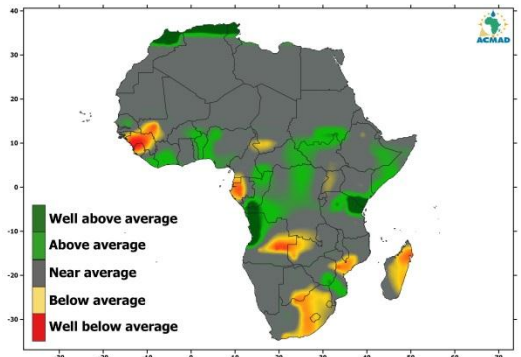
http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Seasonal.html

ANALYSIS OF PERSISTENCE OF MONTHLY AND SEASONAL PRECIPITATION

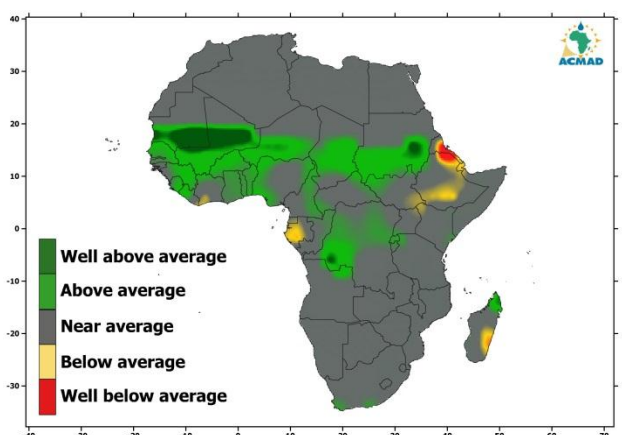
September 2018



October 2018



July-August-September 2018



August-September-October 2018

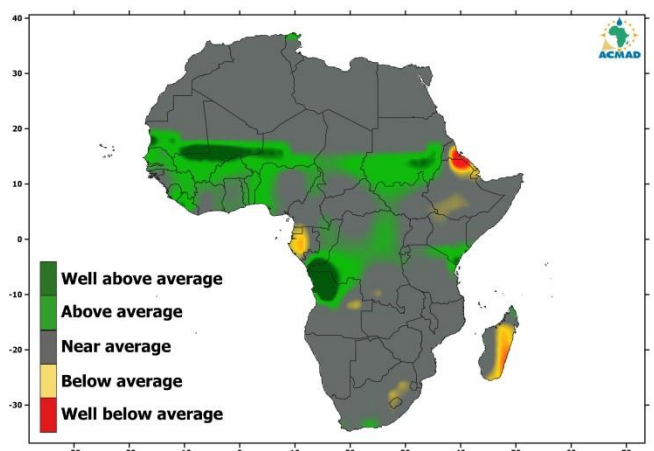


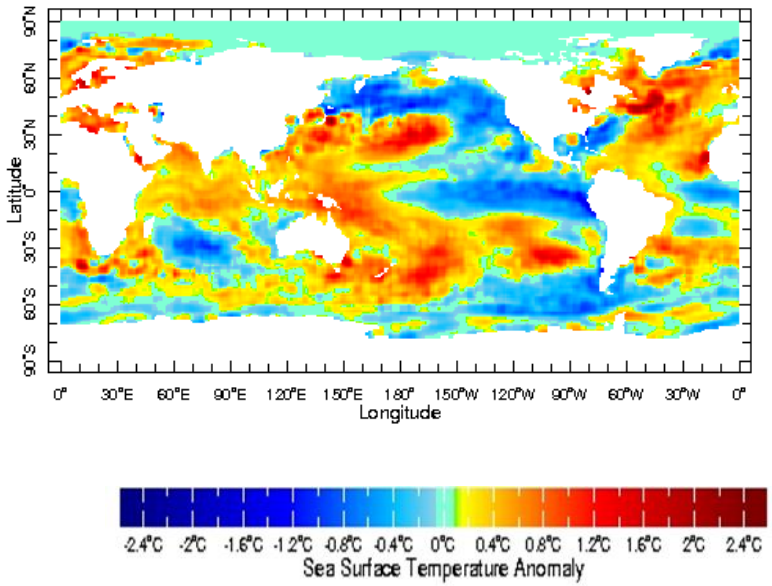
Figure P3: Mean monthly precipitation in percent of average for (a) September 2018 (b) October 2018 (c) JAS 2018 (d) ASO 2018

IV. GLOBAL SST COMPOSITE ANALYSIS

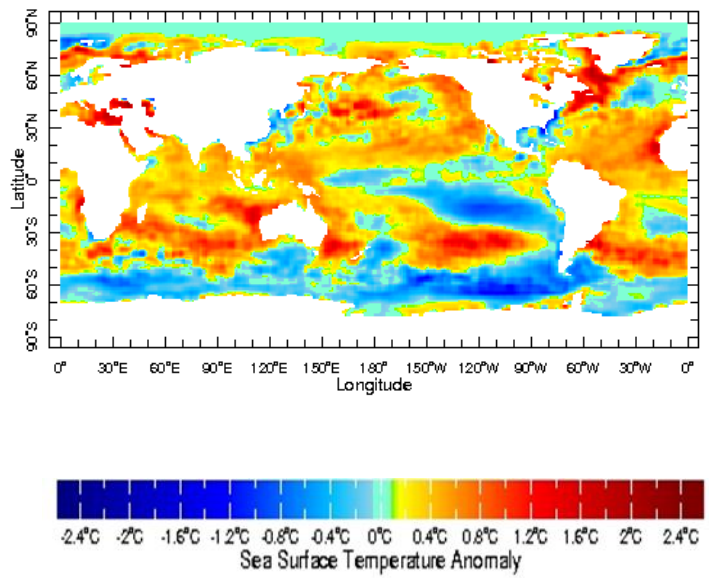
SST COMPOSITES FOR NDJ

NDJ DRY YEARS & WET YEARS FOR NORTHERN REGION

DRY YEARS

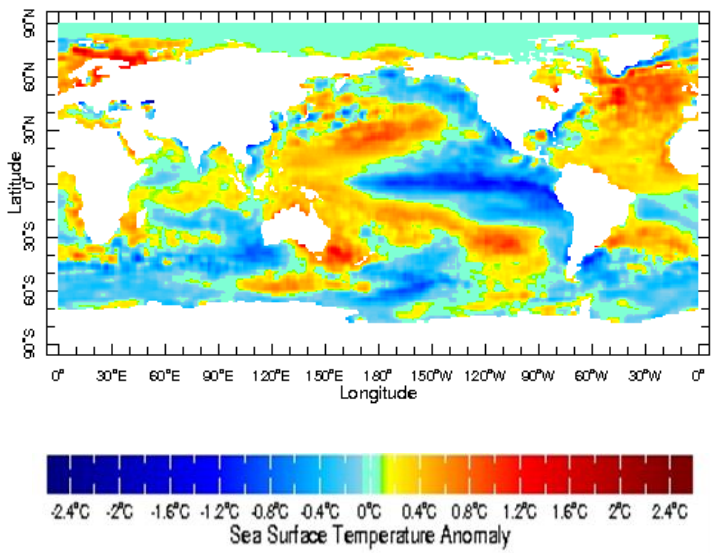


WET YEARS

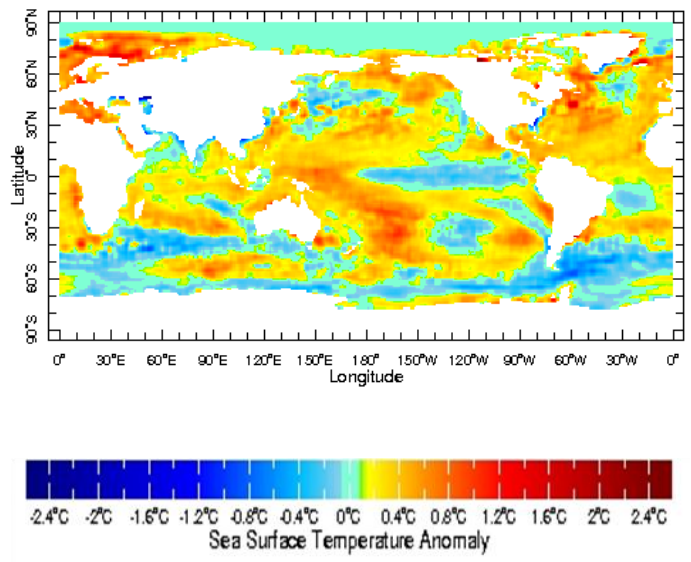


NDJ DRY YEARS & WET YEARS FOR GULF OF GUINEA REGION

DRY YEARS

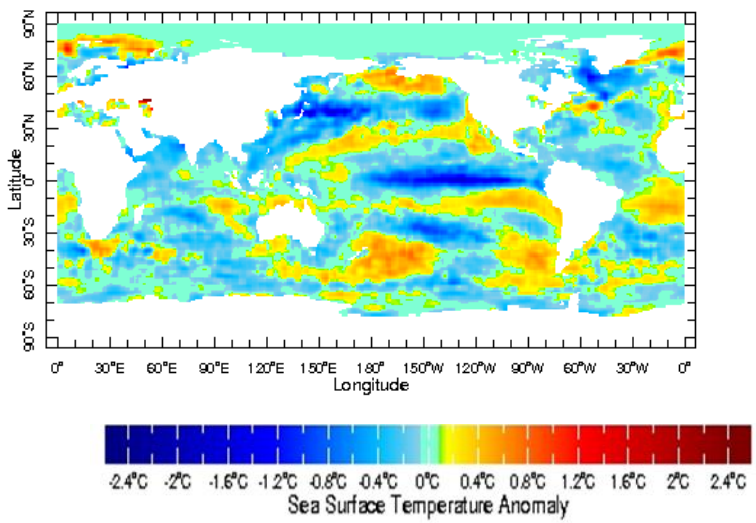


WET YEARS

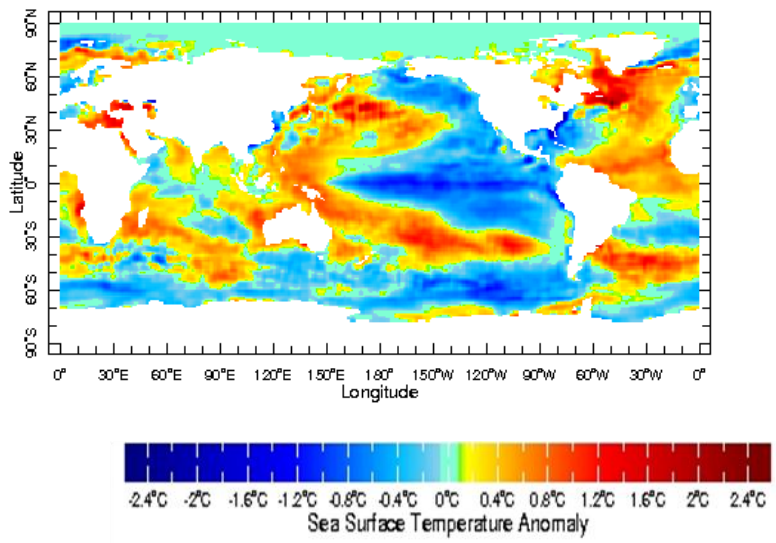


NDJ DRY YEARS & WET YEARS FOR CENTRAL AFRICA

DRY YEARS

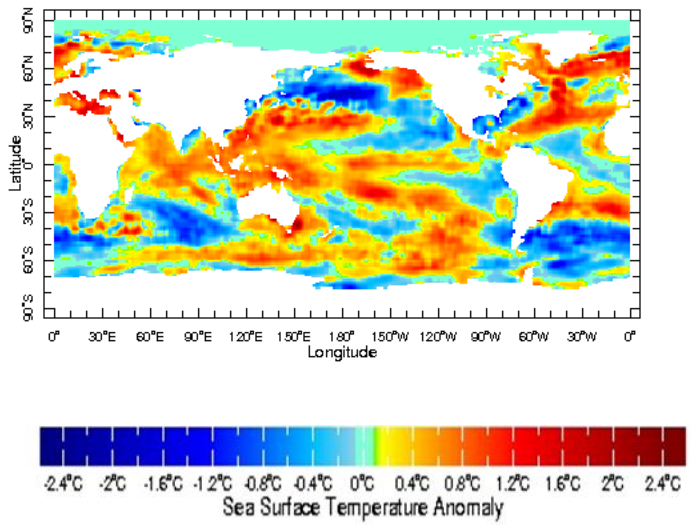


WET YEARS

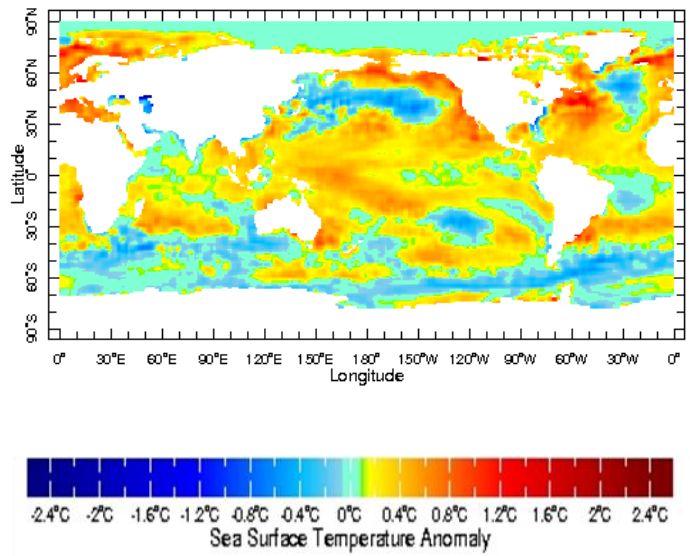


NDJ DRY YEARS & WET YEARS FOR EASTERN AFRICA

DRY YEARS

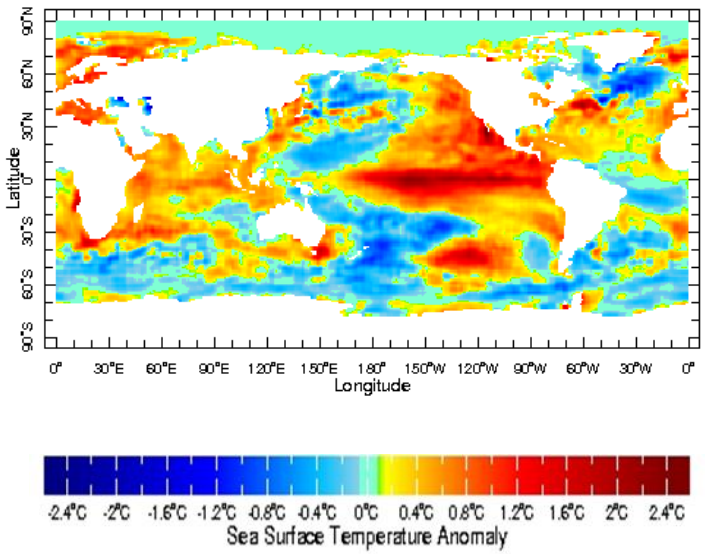


WET YEARS

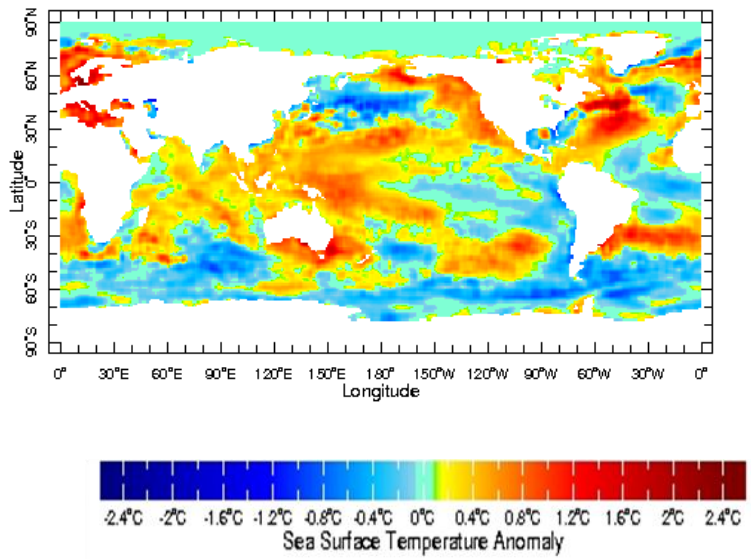


NDJ DRY YEARS & WET YEARS FOR SOUTHERN AFRICA

DRY YEARS



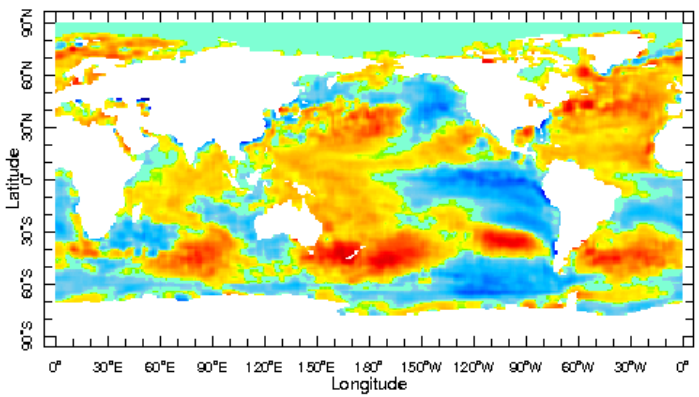
WET YEARS

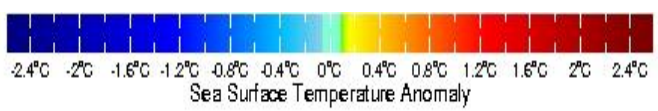


SST COMPOSITES FOR DJF

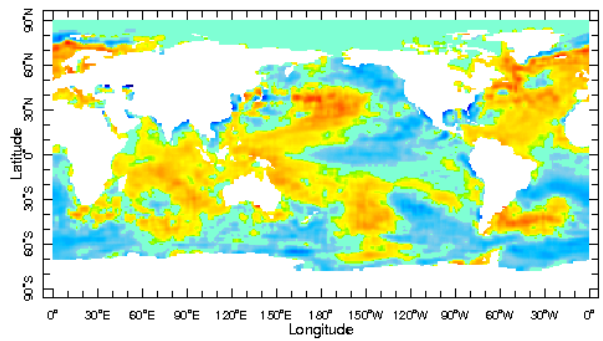
DJF DRY YEARS & WET YEARS FOR NORTHERN AFRICA REGION

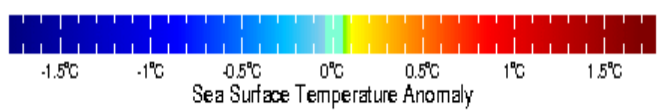
DRY YEARS





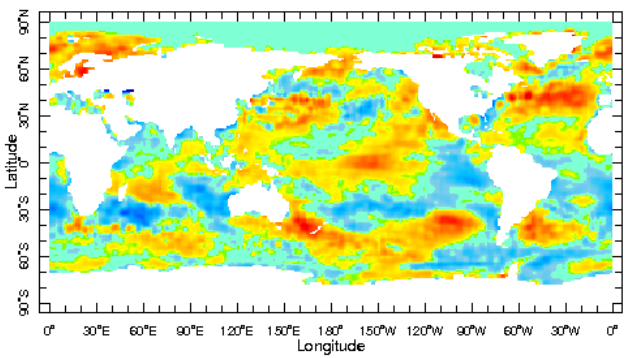
WET YEARS

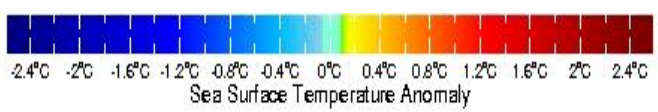




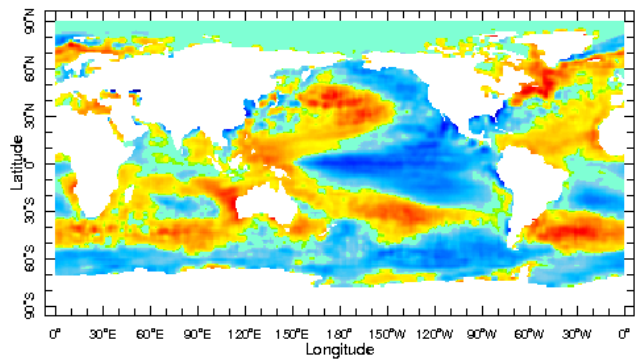
DJF DRY YEARS & WET YEARS FOR CENTRAL AFRICA

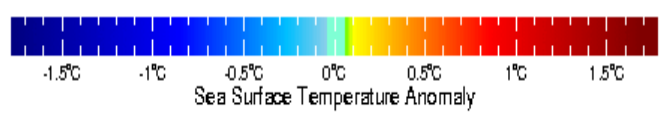
DRY YEARS





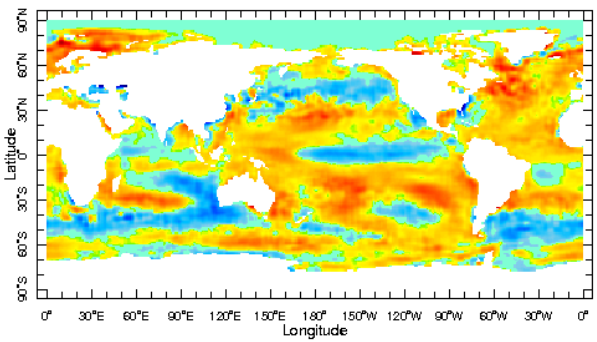
WET YEARS

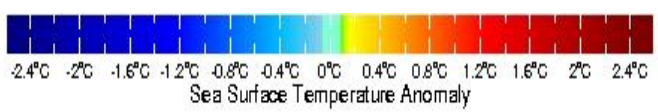




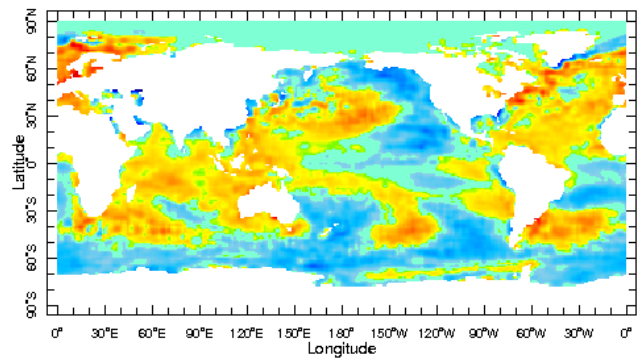
DJF DRY YEARS & WET YEARS FOR EASTERN AFRICA

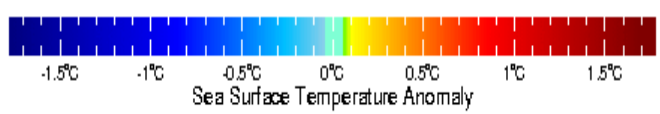
DRY YEARS





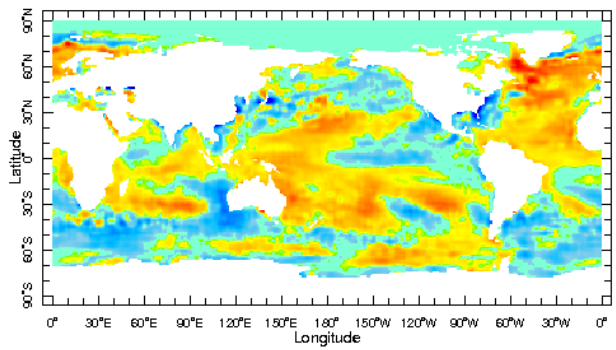
WET YEARS

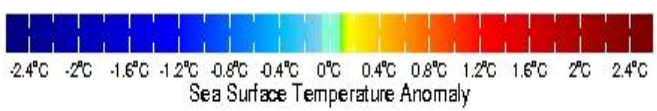




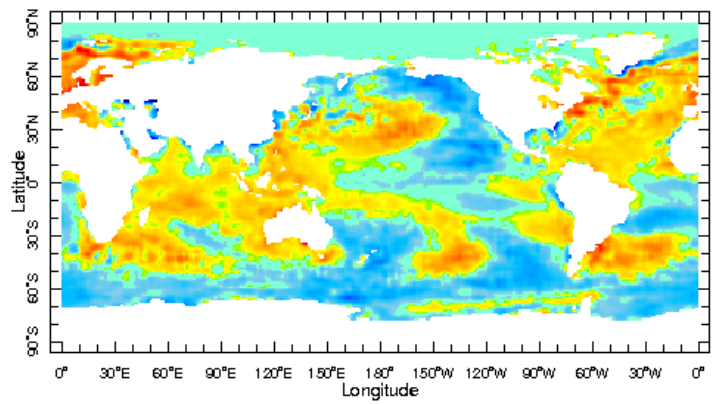
DJF DRY YEARS & WET YEARS FOR SOUTHERN AFRICA

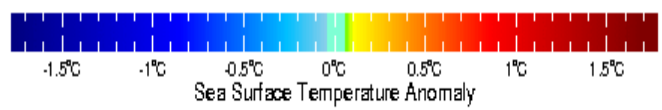
DRY YEARS





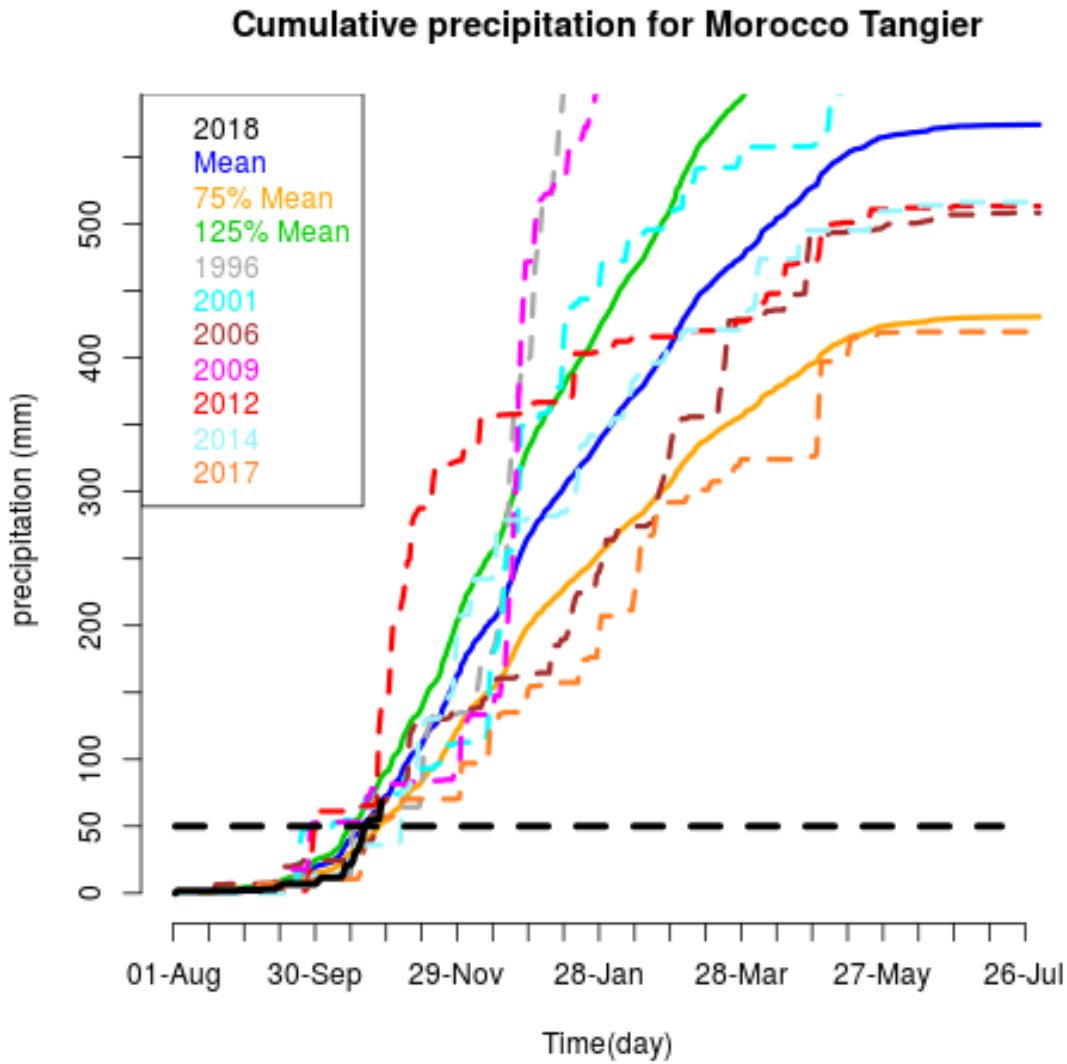
WET YEARS

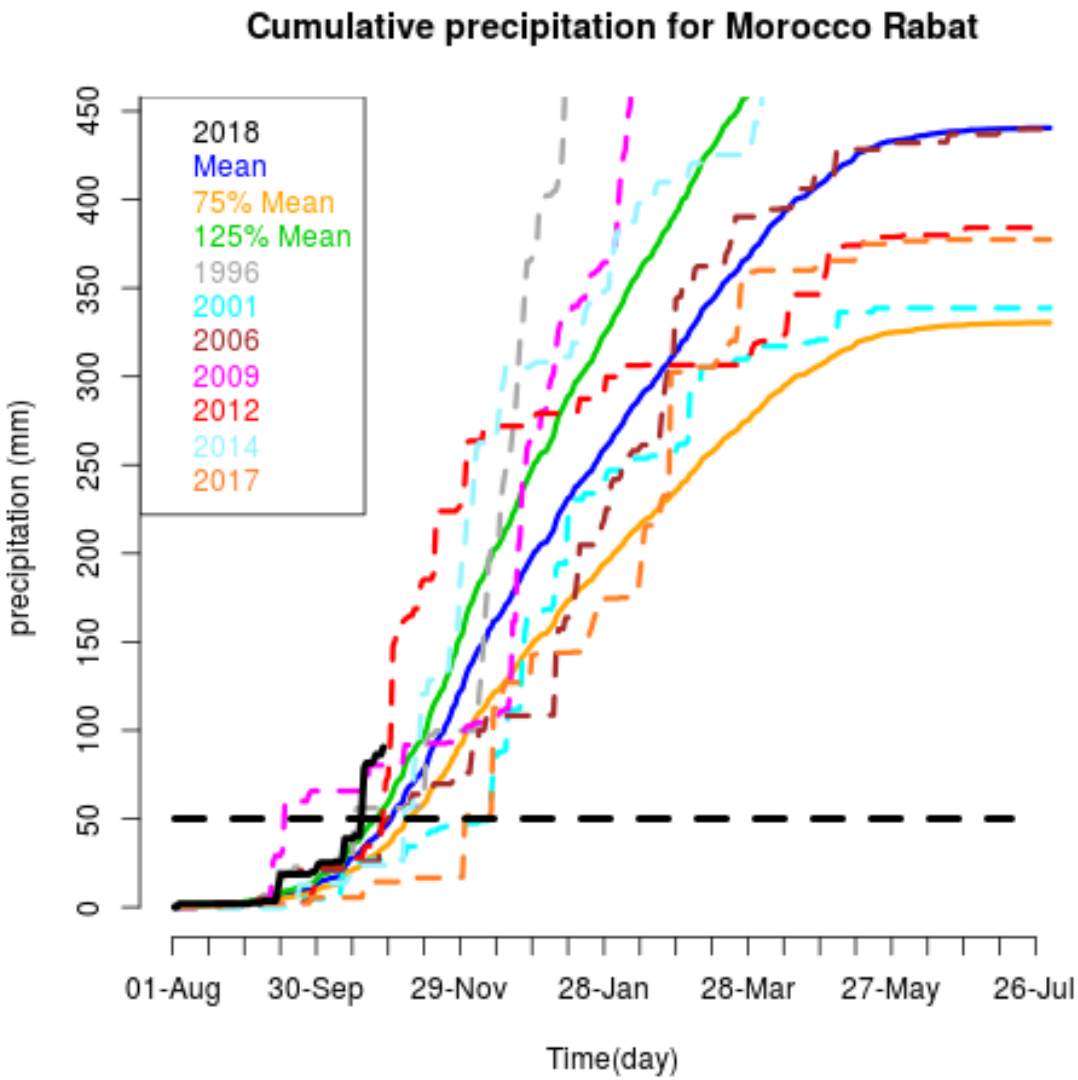


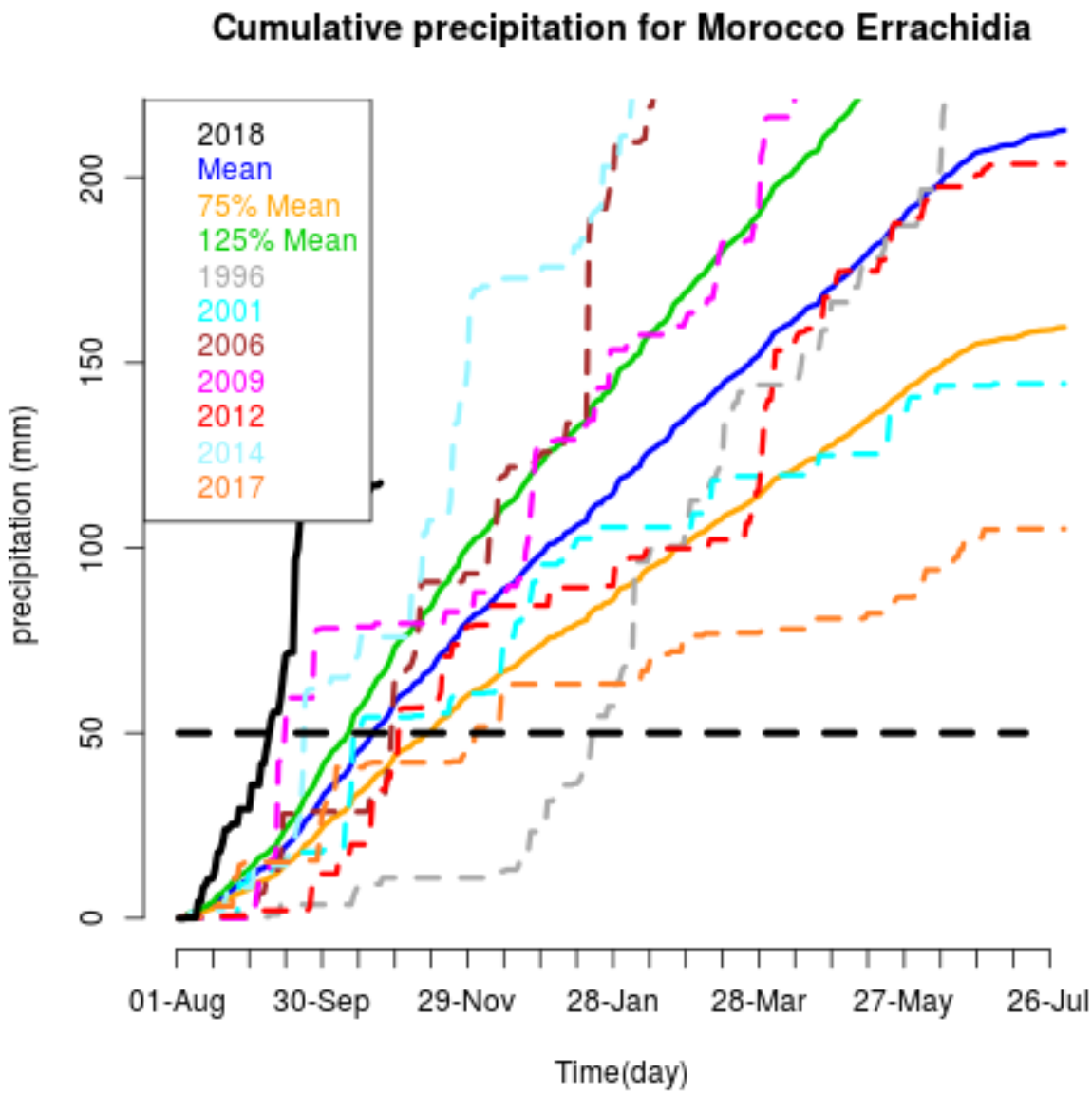


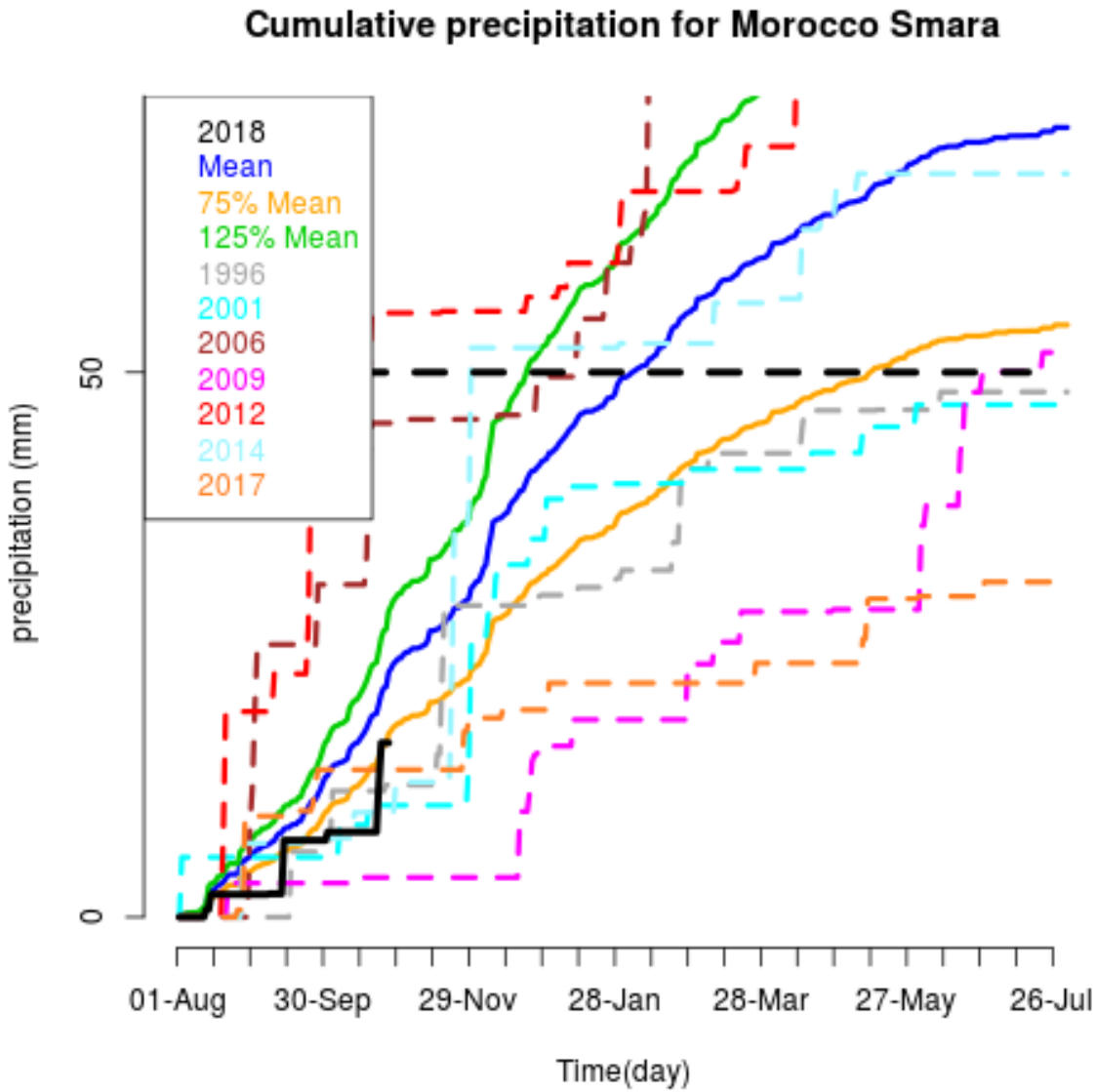
V. ANALYSIS OF CUMULATIVE ESTIMATED PRECIPITATION

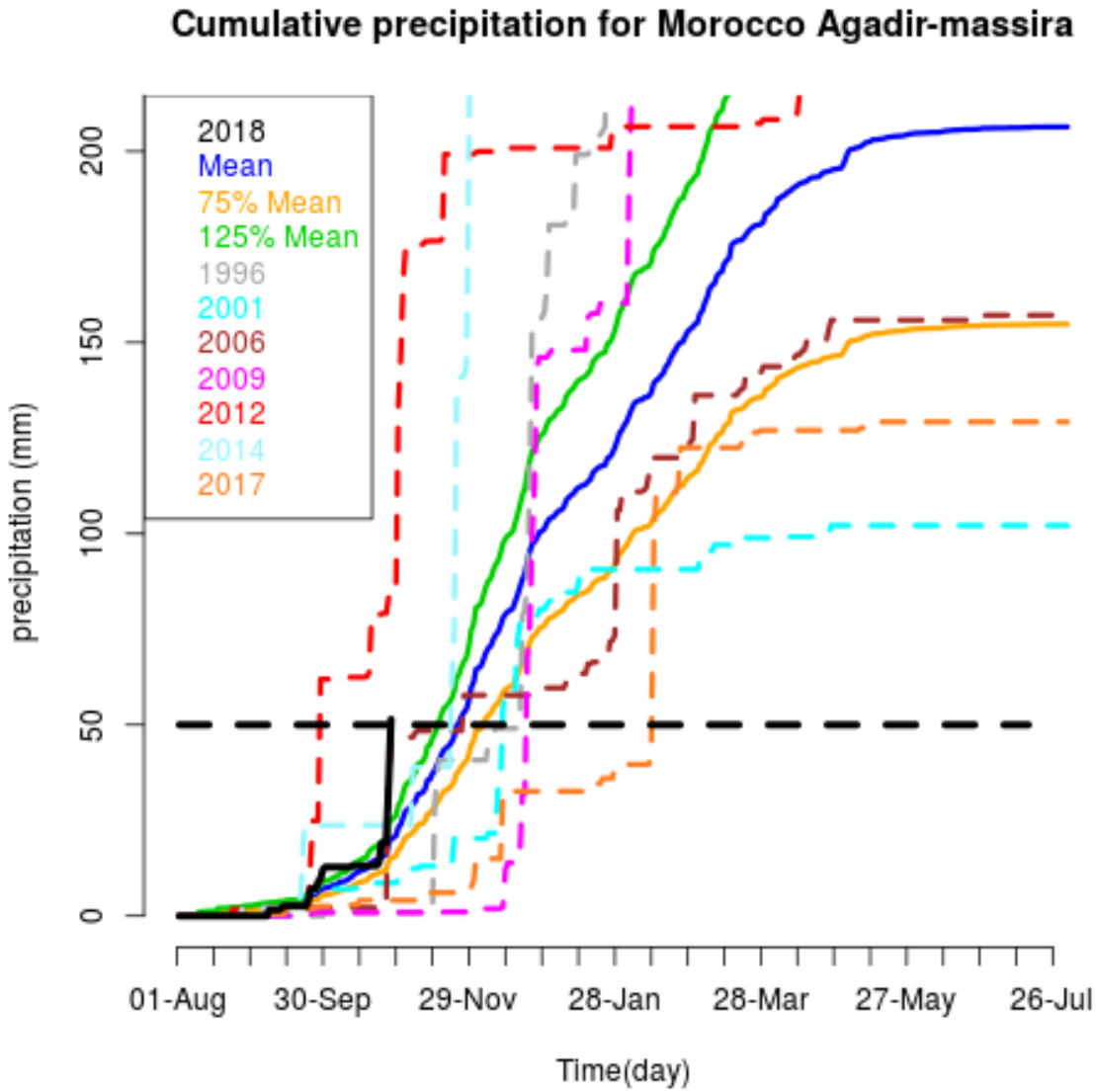
CUMULATIVE PRECIPITATION FOR NORTHERN AFRICA

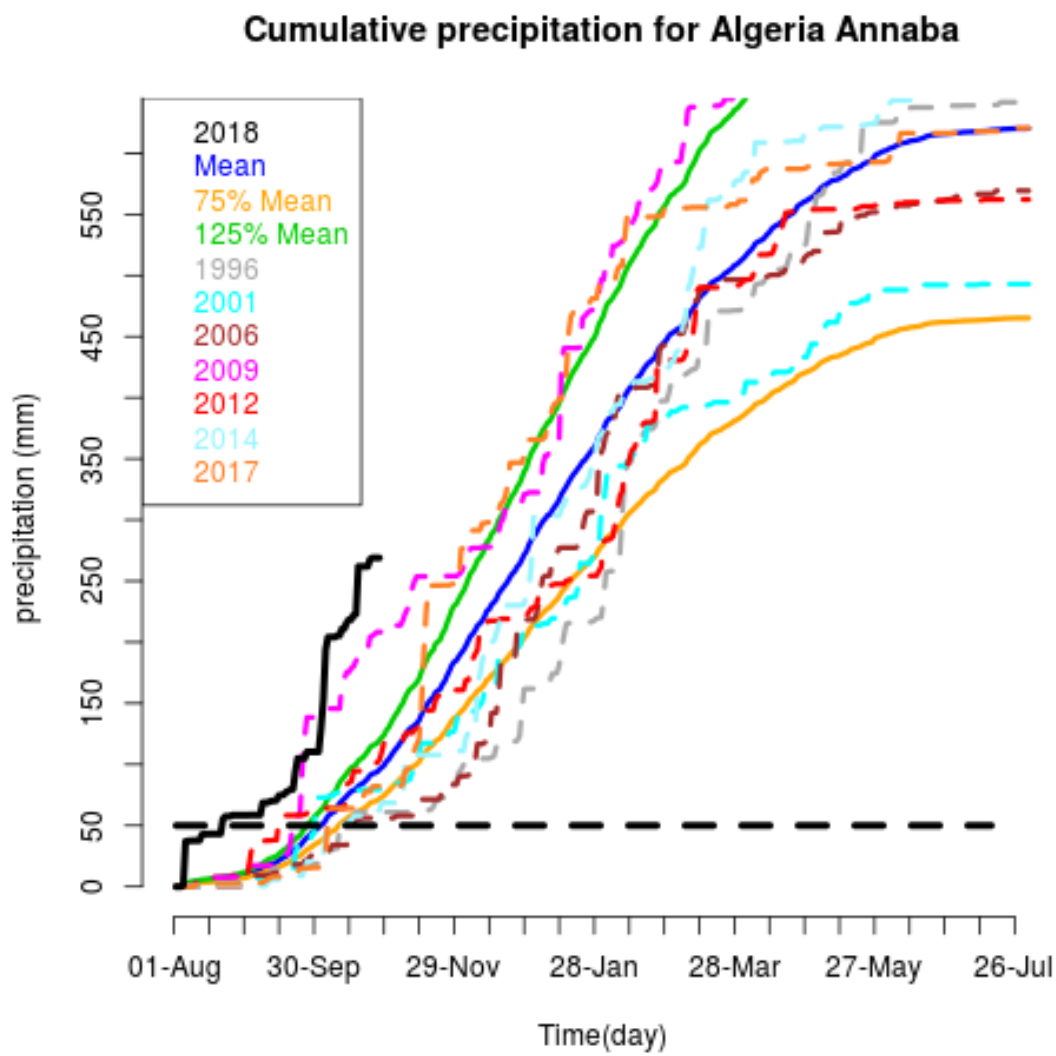

Cumulative precipitation for Morocco Tangier
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
200
300
400
500
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

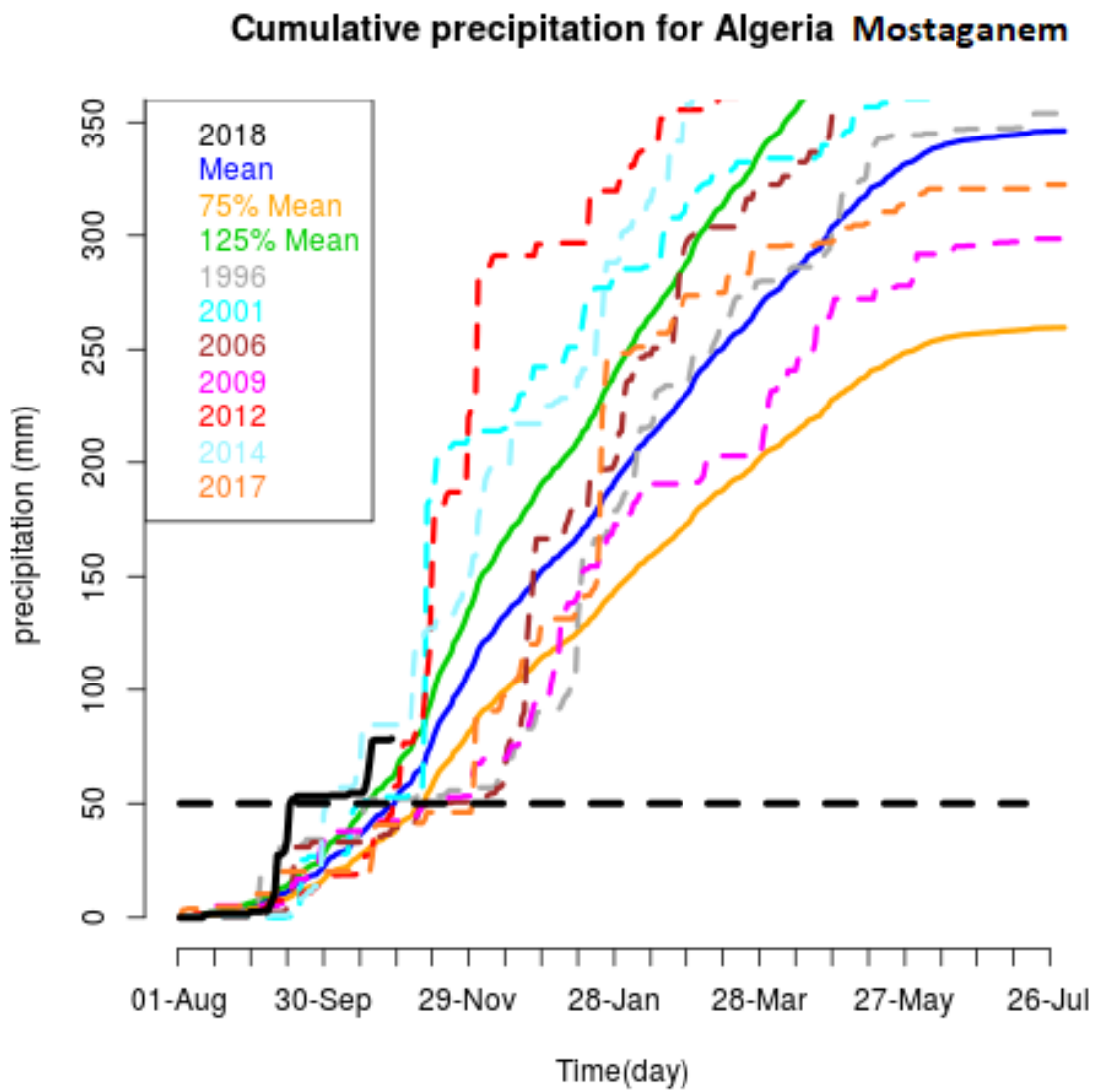

Cumulative precipitation for Morocco Rabat
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
250
300
350
400
450
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

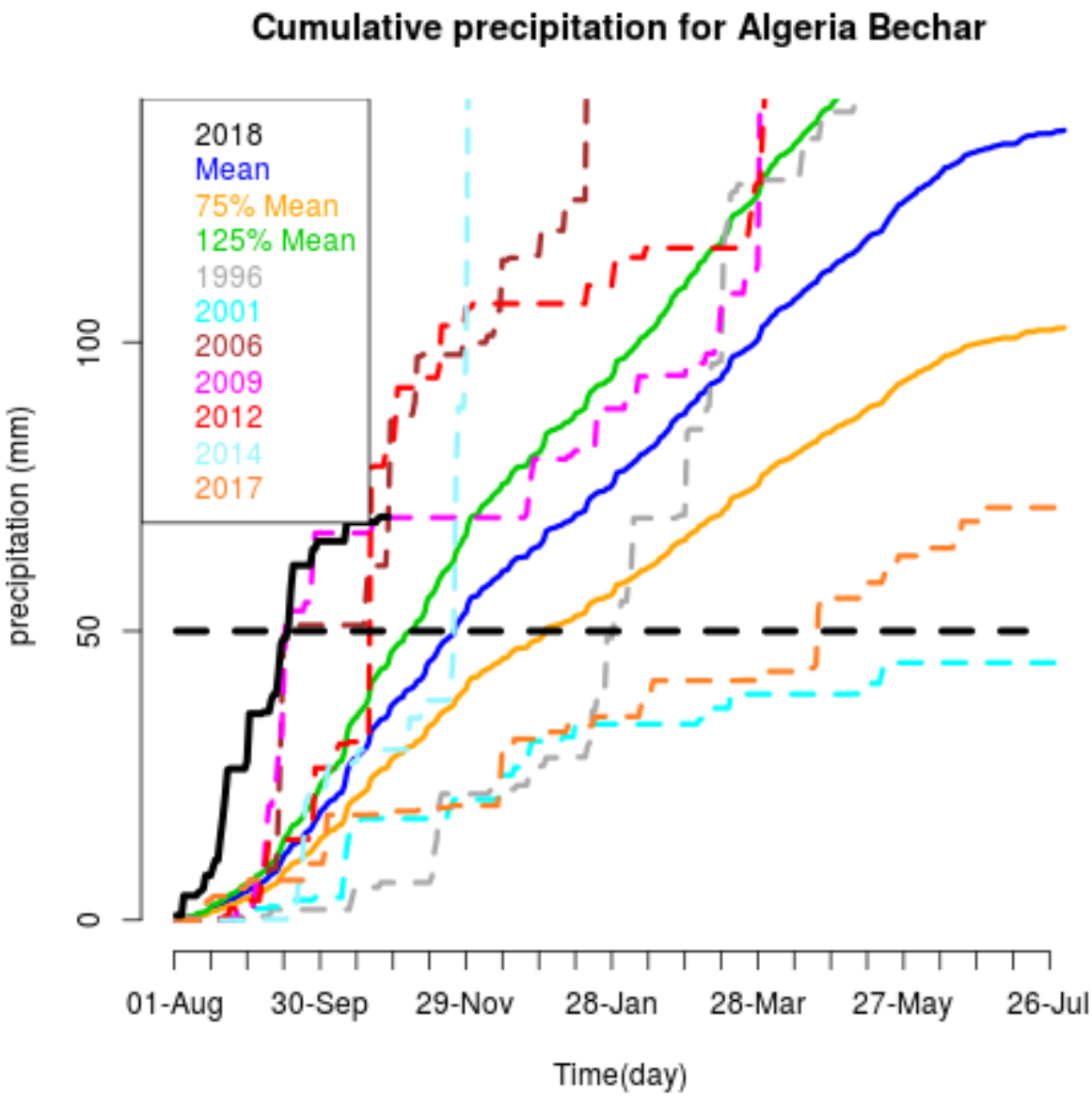

Cumulative precipitation for Morocco Errachidia
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

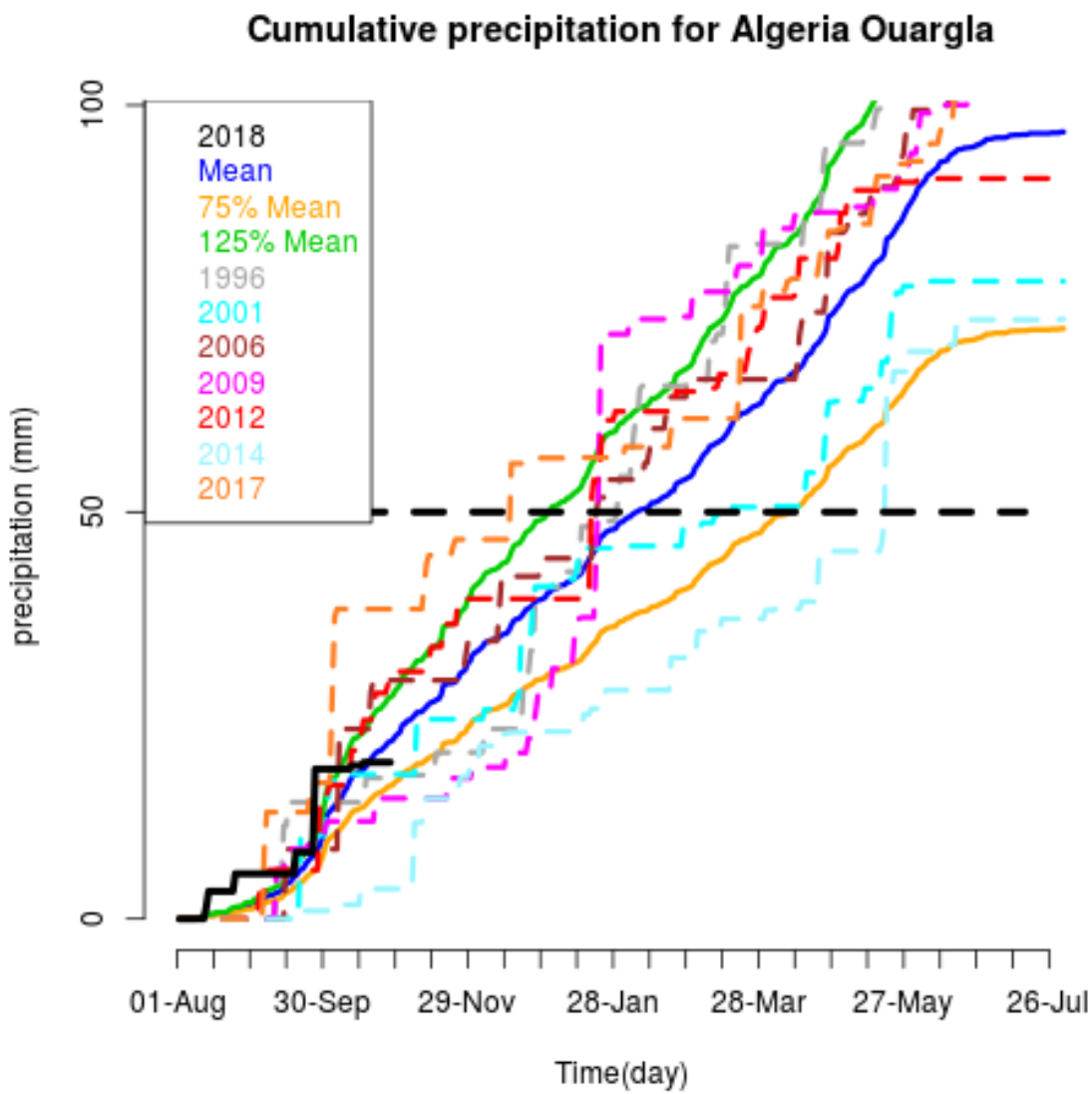

Cumulative precipitation for Morocco Smara
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

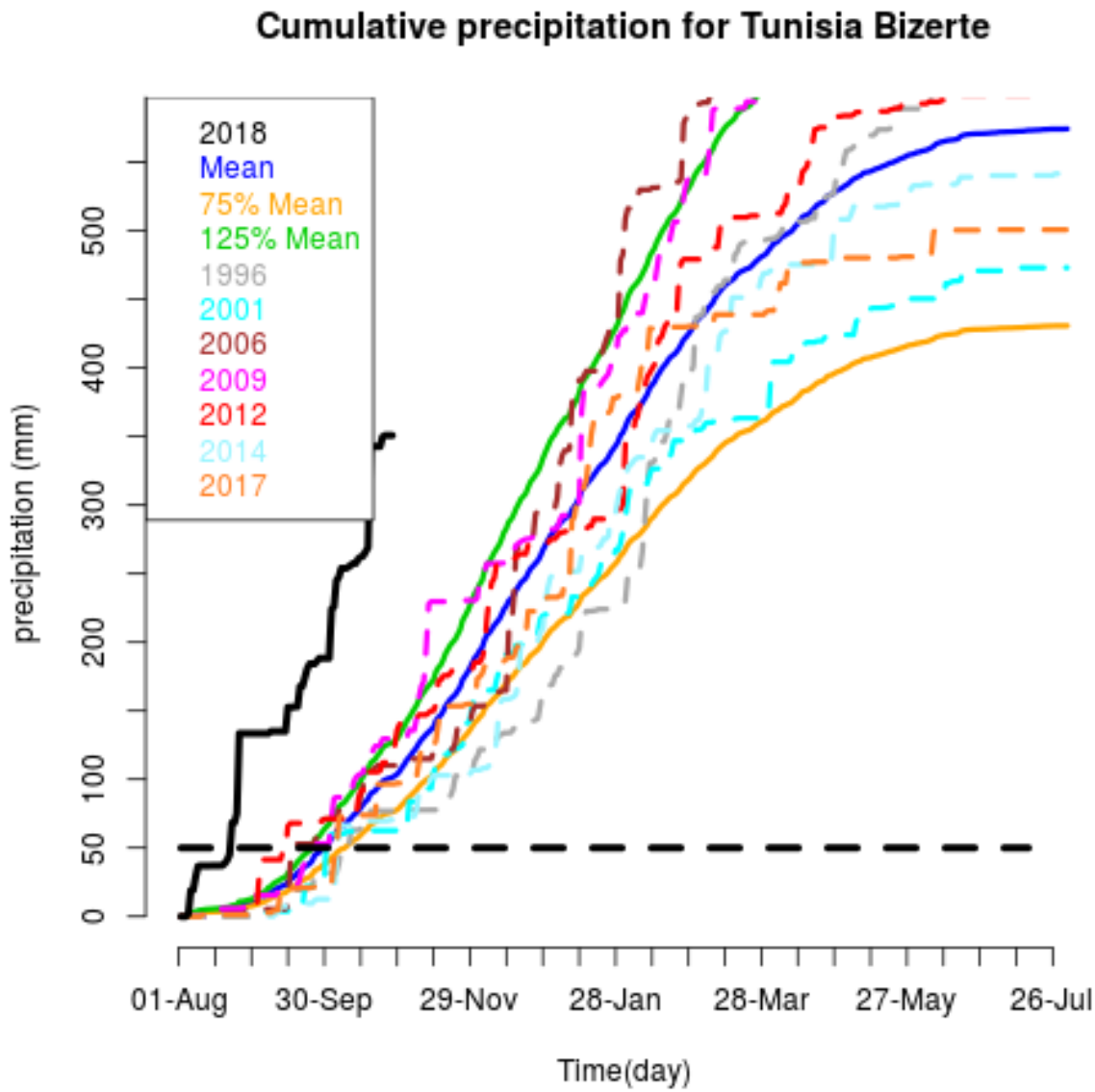

Cumulative precipitation for Morocco Agadir-massira
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

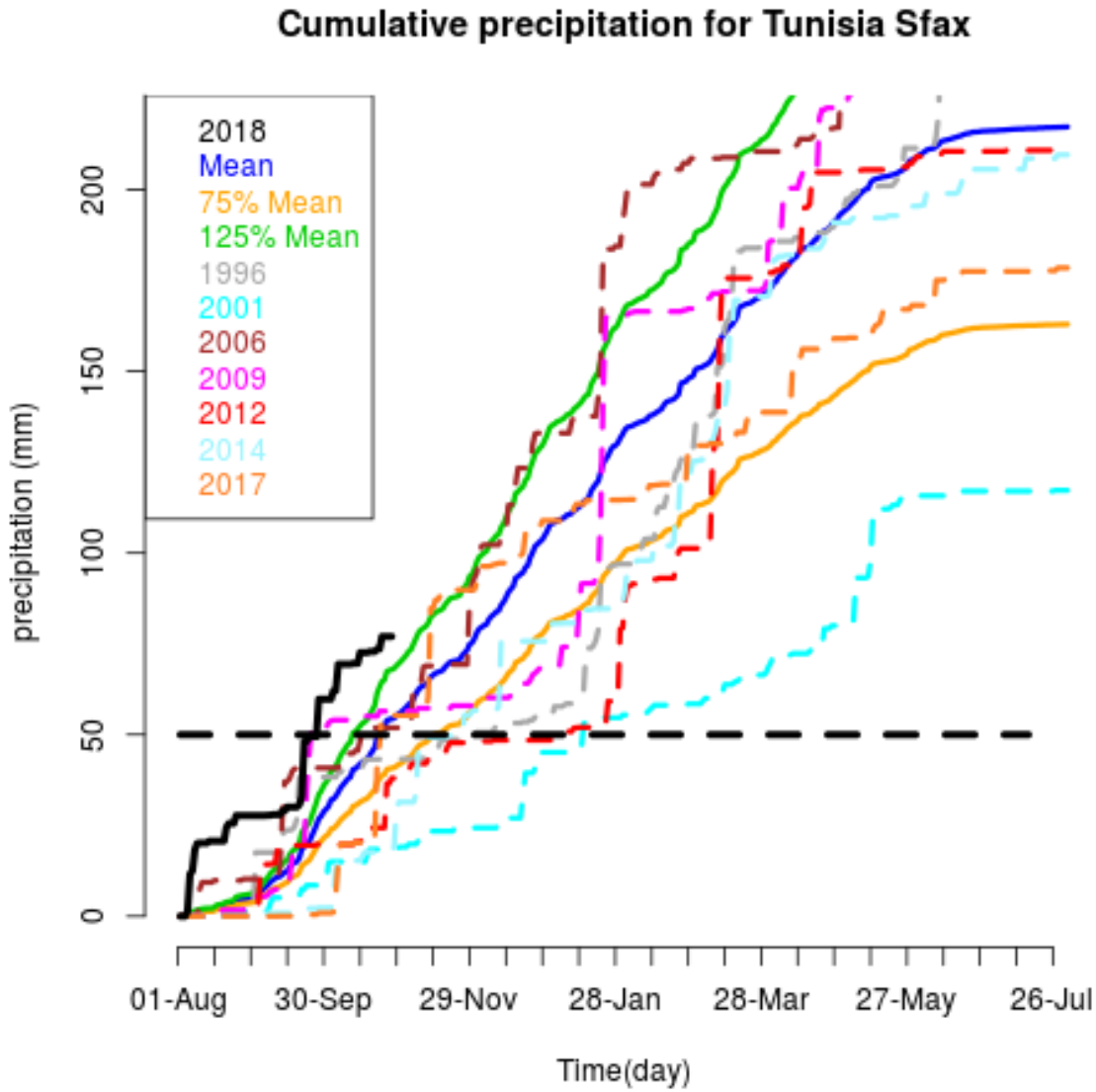

Cumulative precipitation for Algeria Annaba
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
150
250
350
450
550
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

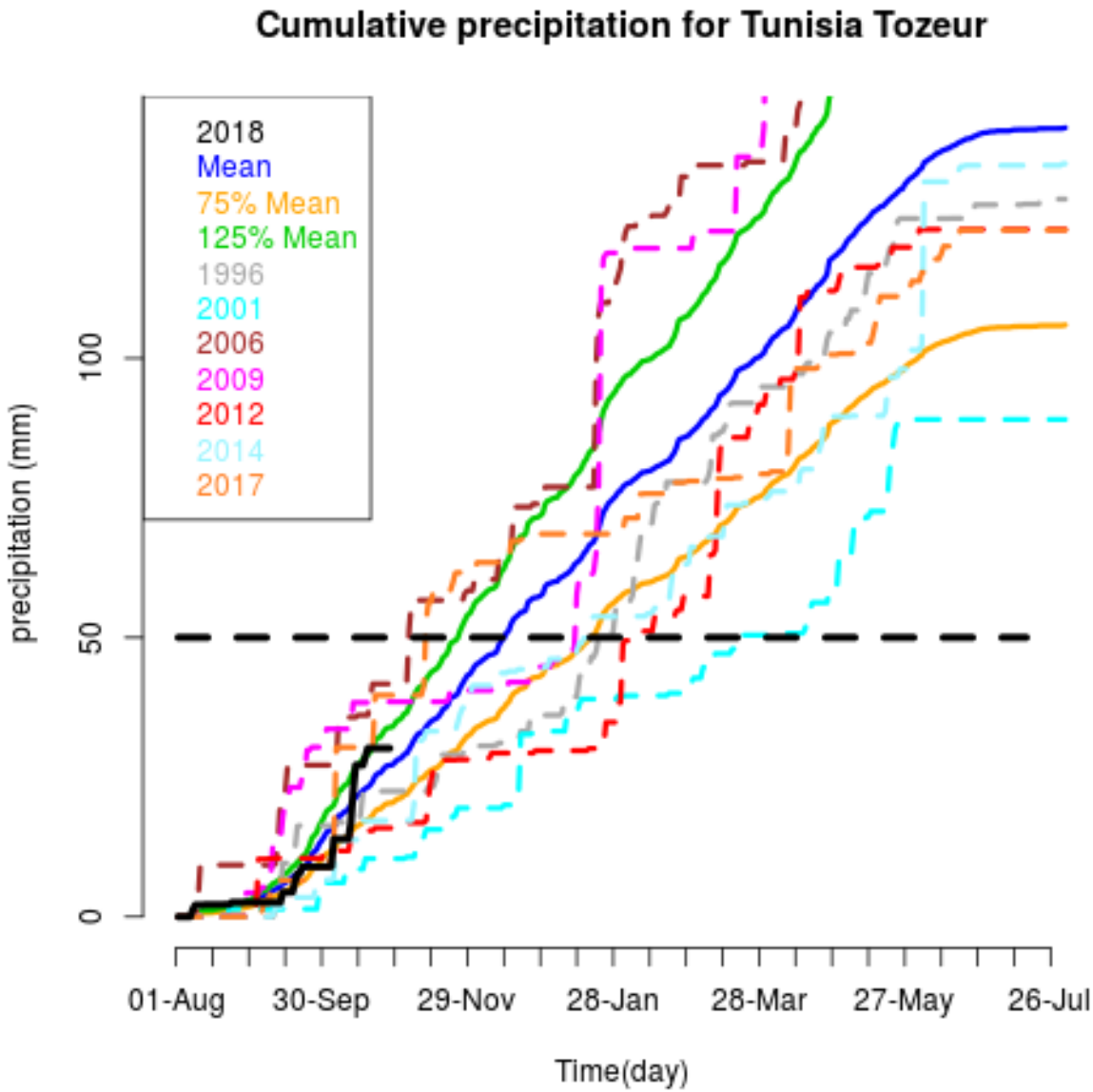

Cumulative precipitation for Algeria Mostaganem
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
250
300
350
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

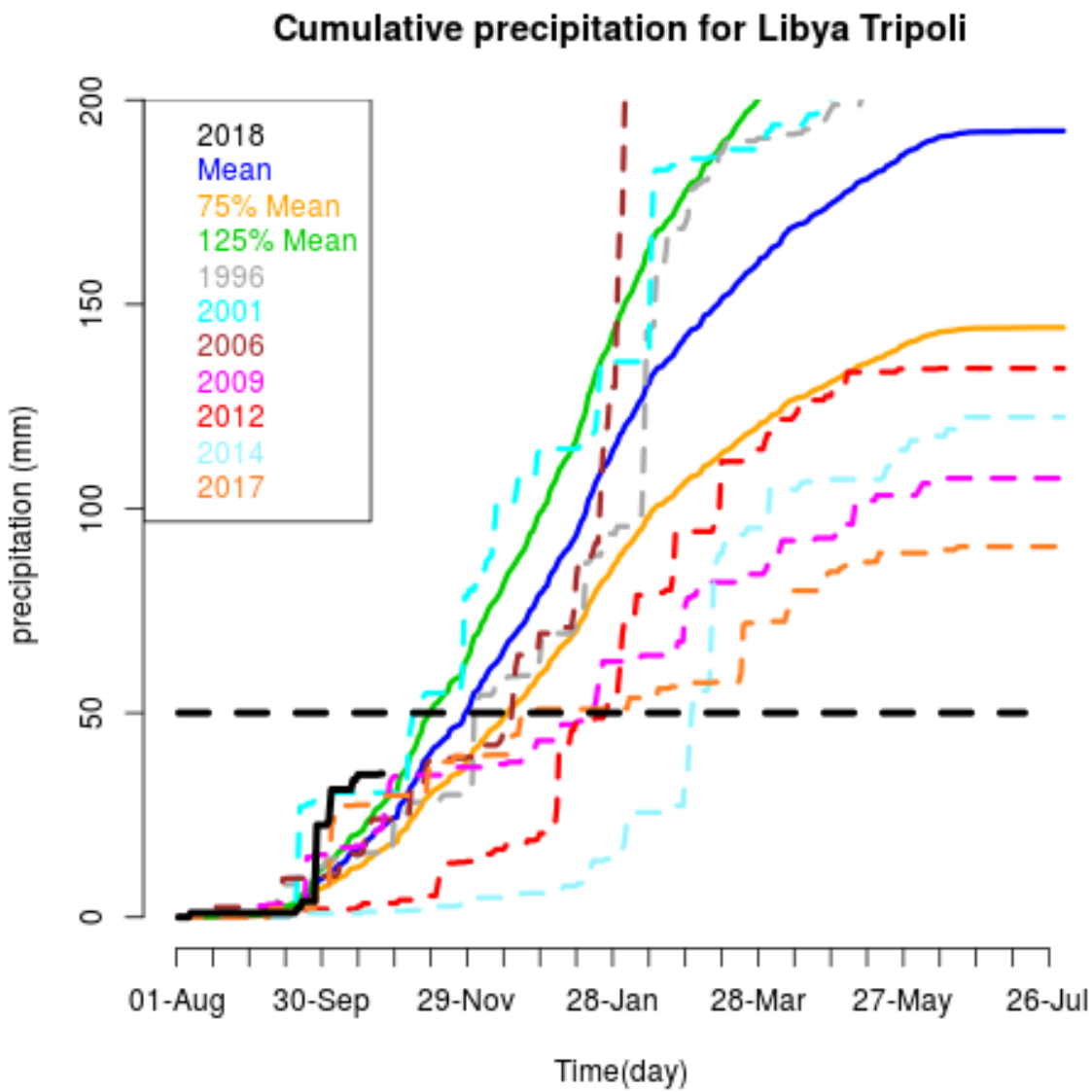

Cumulative precipitation for Algeria Bechar
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

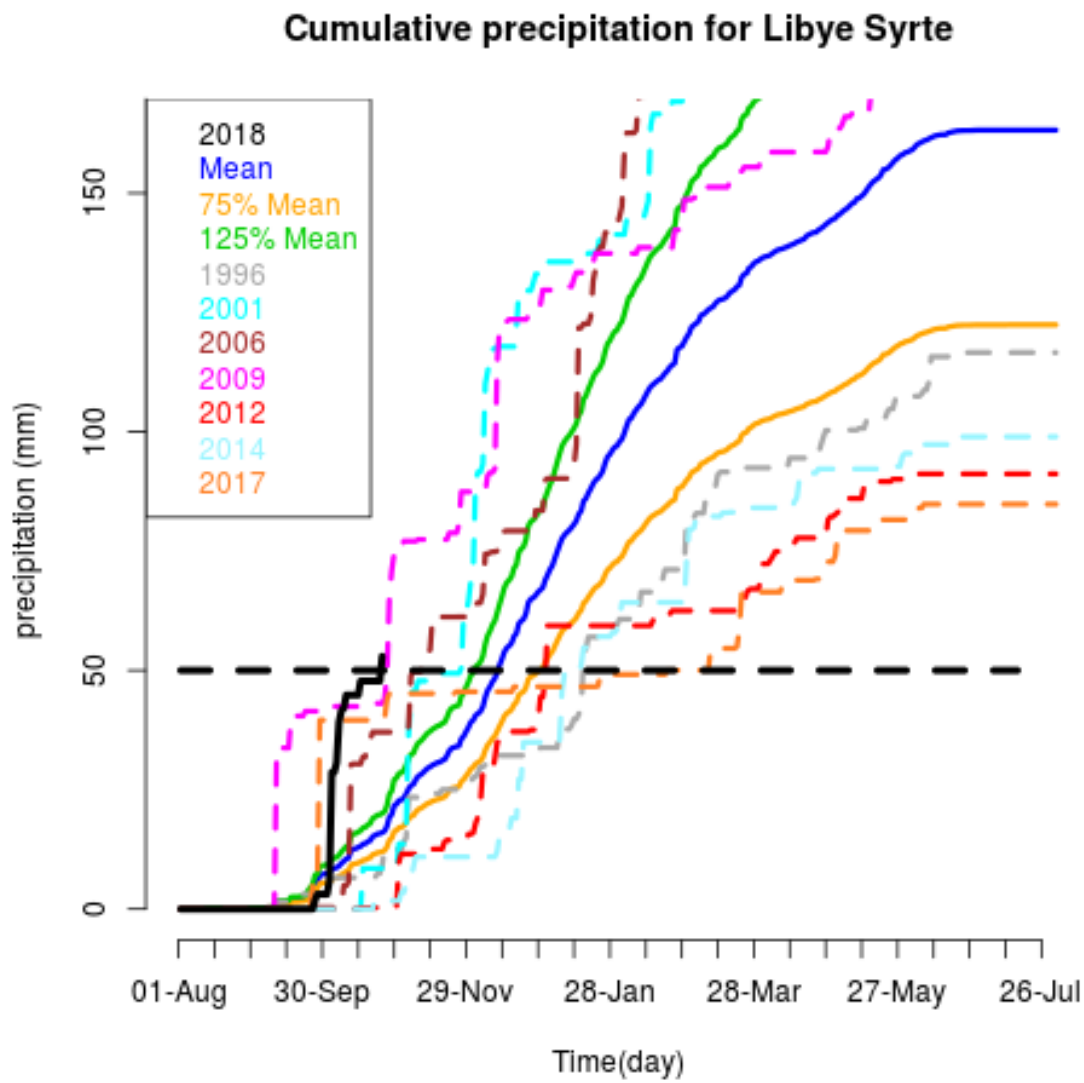

Cumulative precipitation for Algeria Ouargla
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

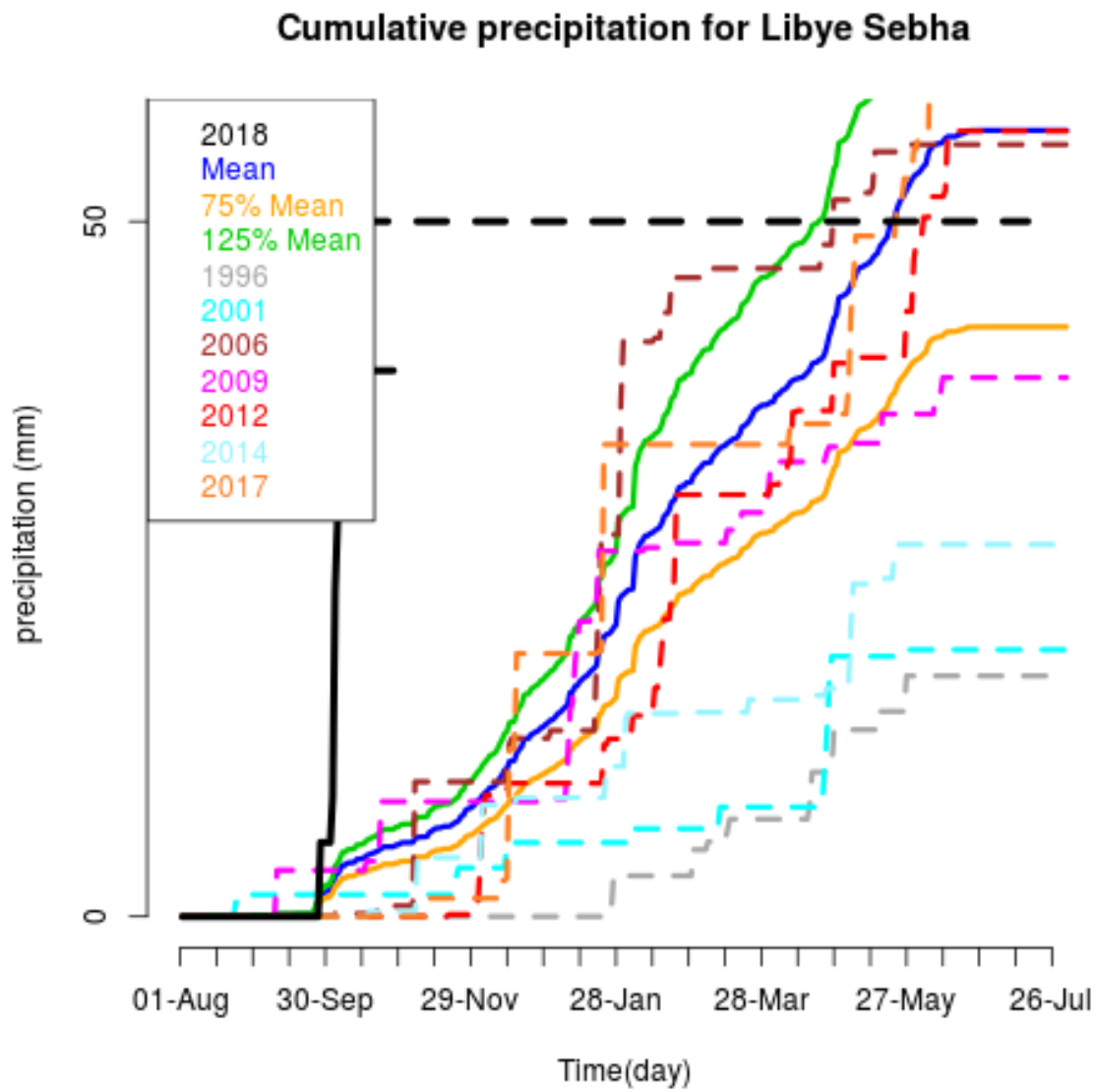

Cumulative precipitation for Tunisia Bizerte
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
200
300
400
500
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

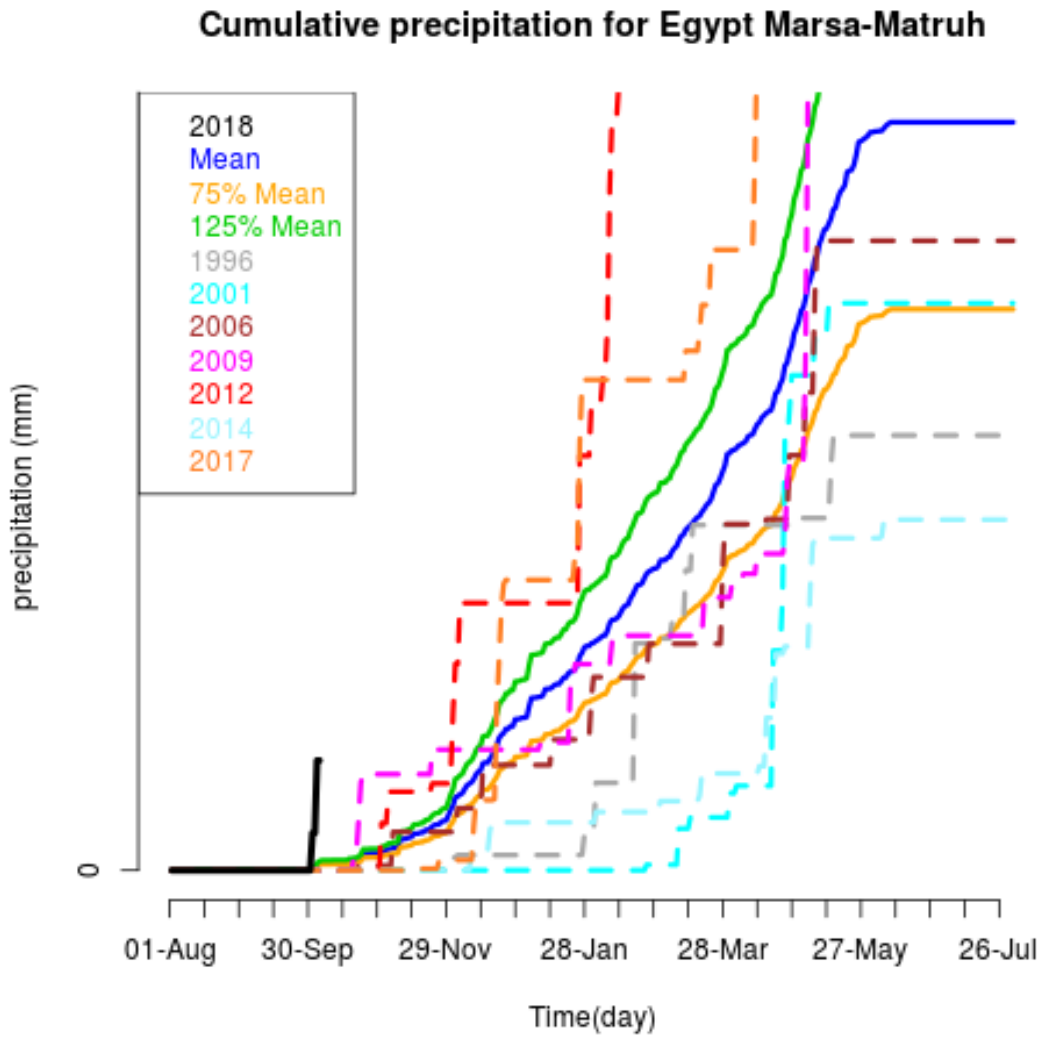

Cumulative precipitation for Tunisia Sfax
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

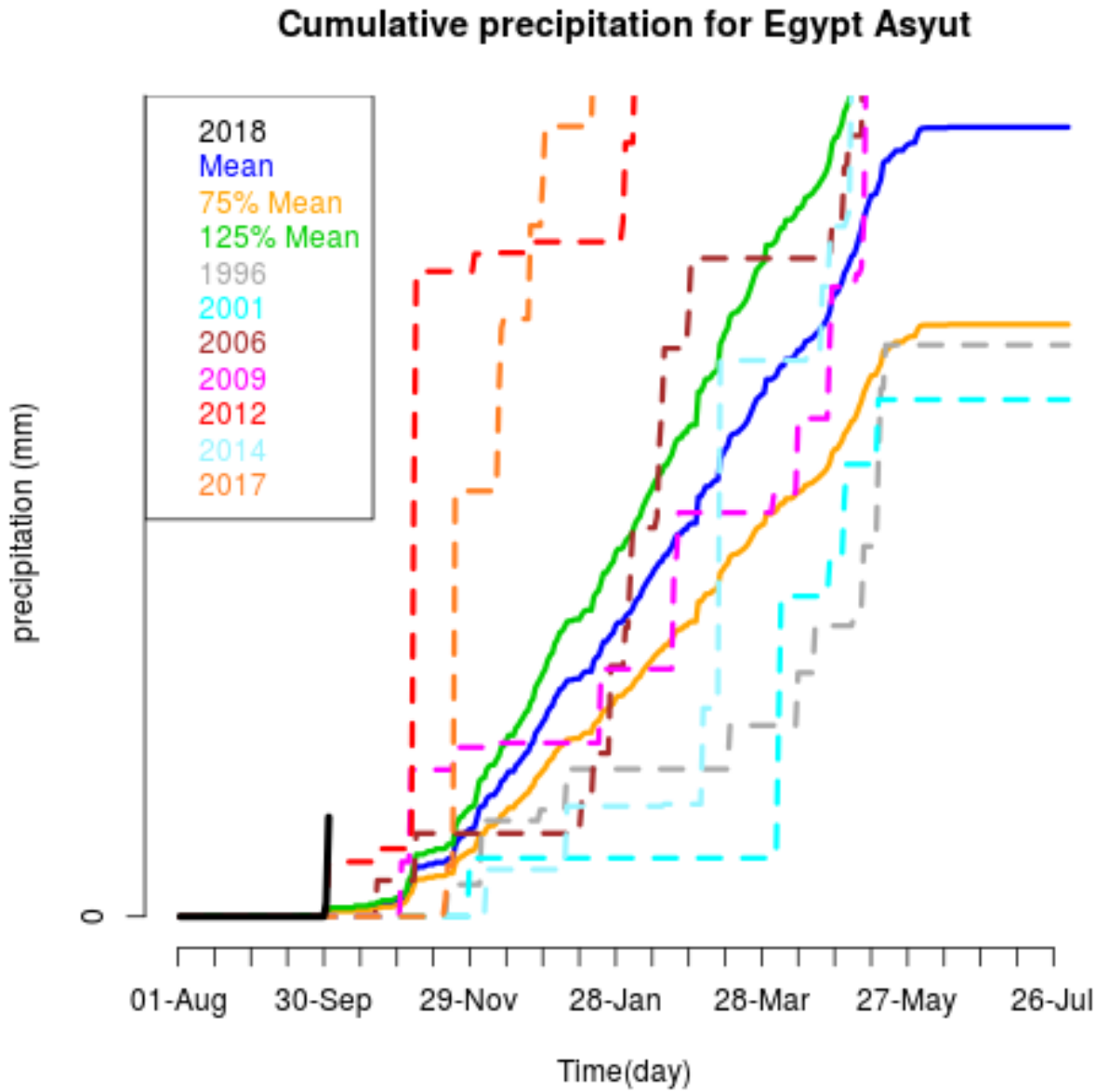

Cumulative precipitation for Tunisia Tozeur
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

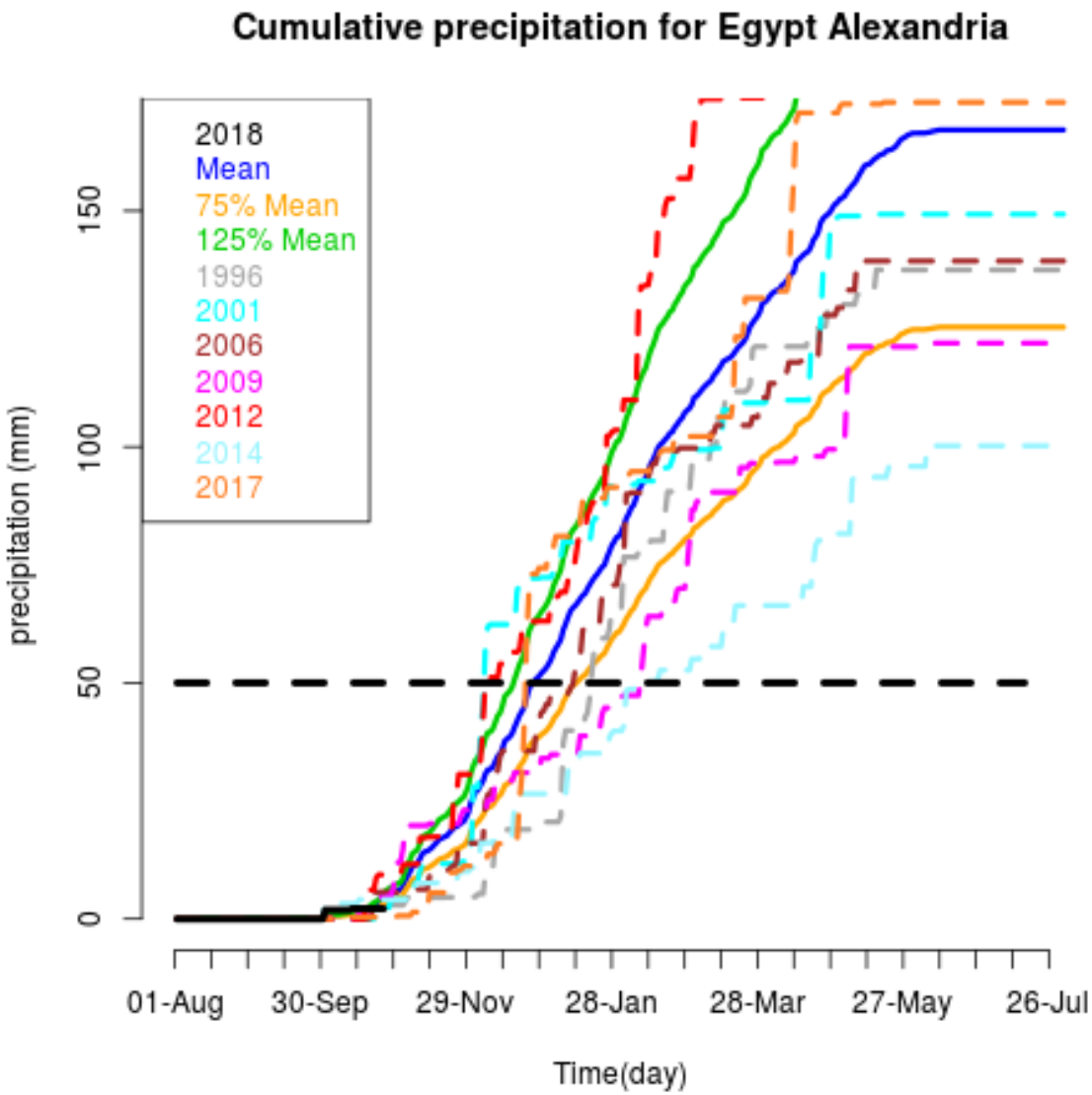

Cumulative precipitation for Libya Tripoli
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)


Cumulative precipitation for Libye Syrte
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

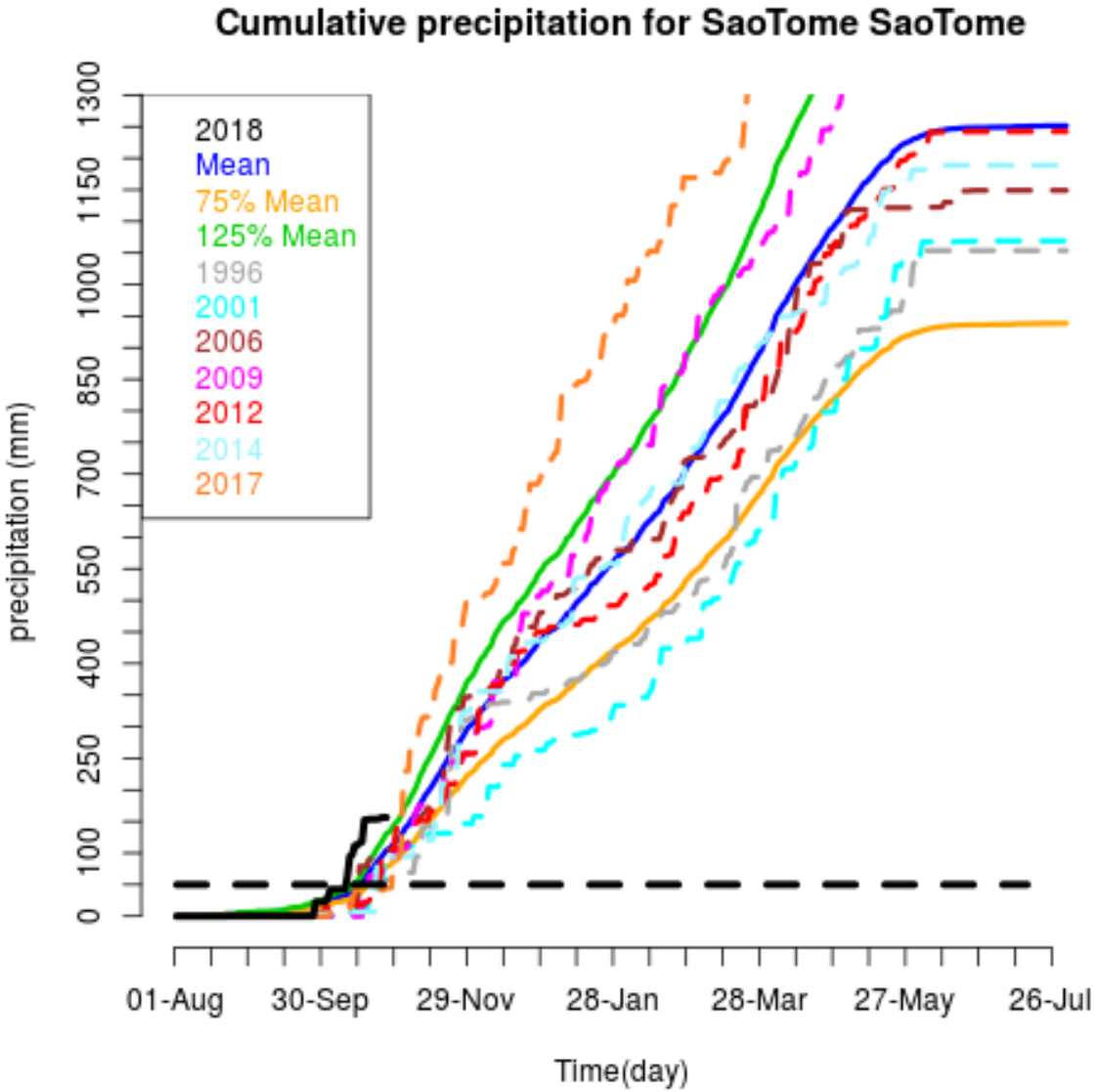

Cumulative precipitation for Libye Sebha
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

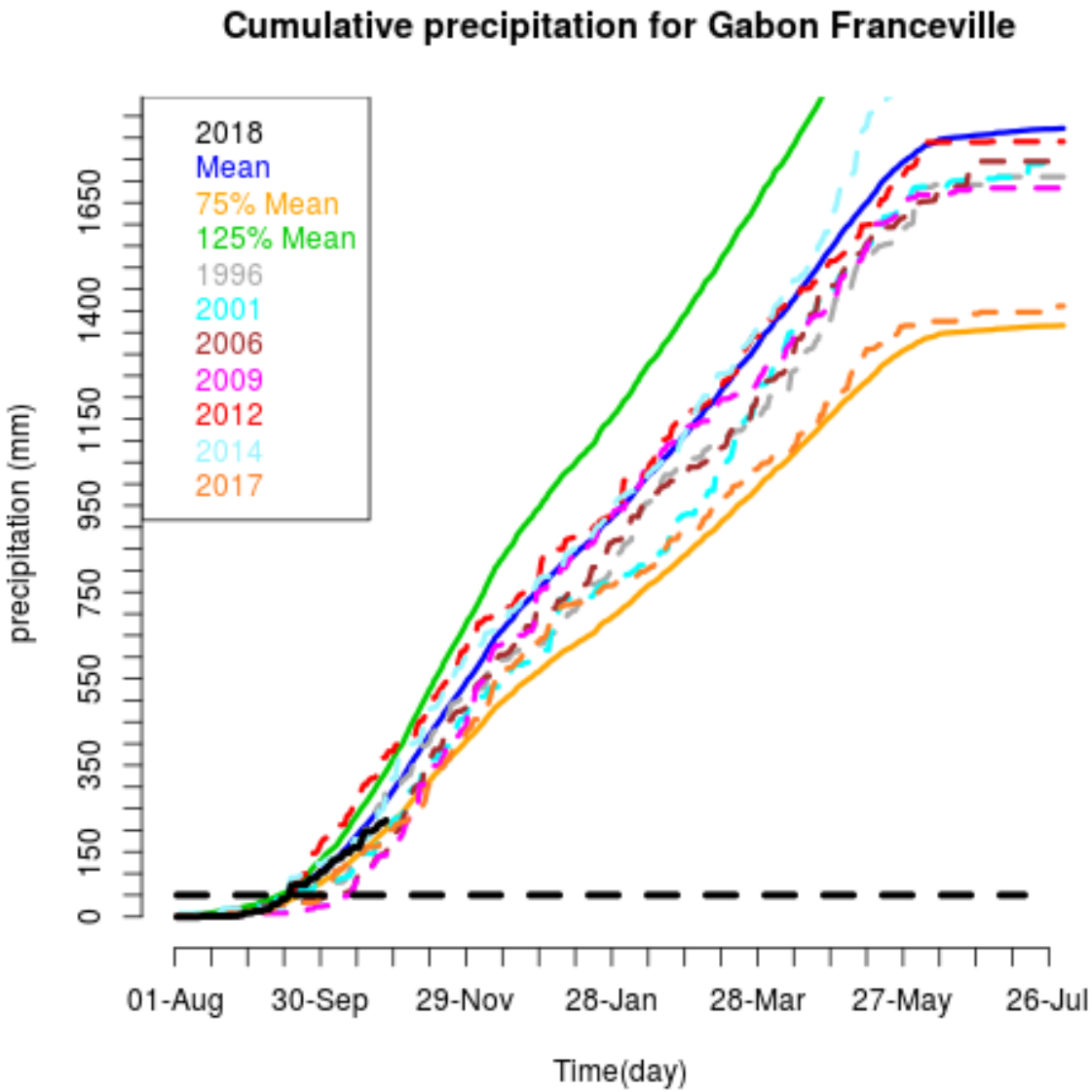

Cumulative precipitation for Egypt Marsa-Matruh
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

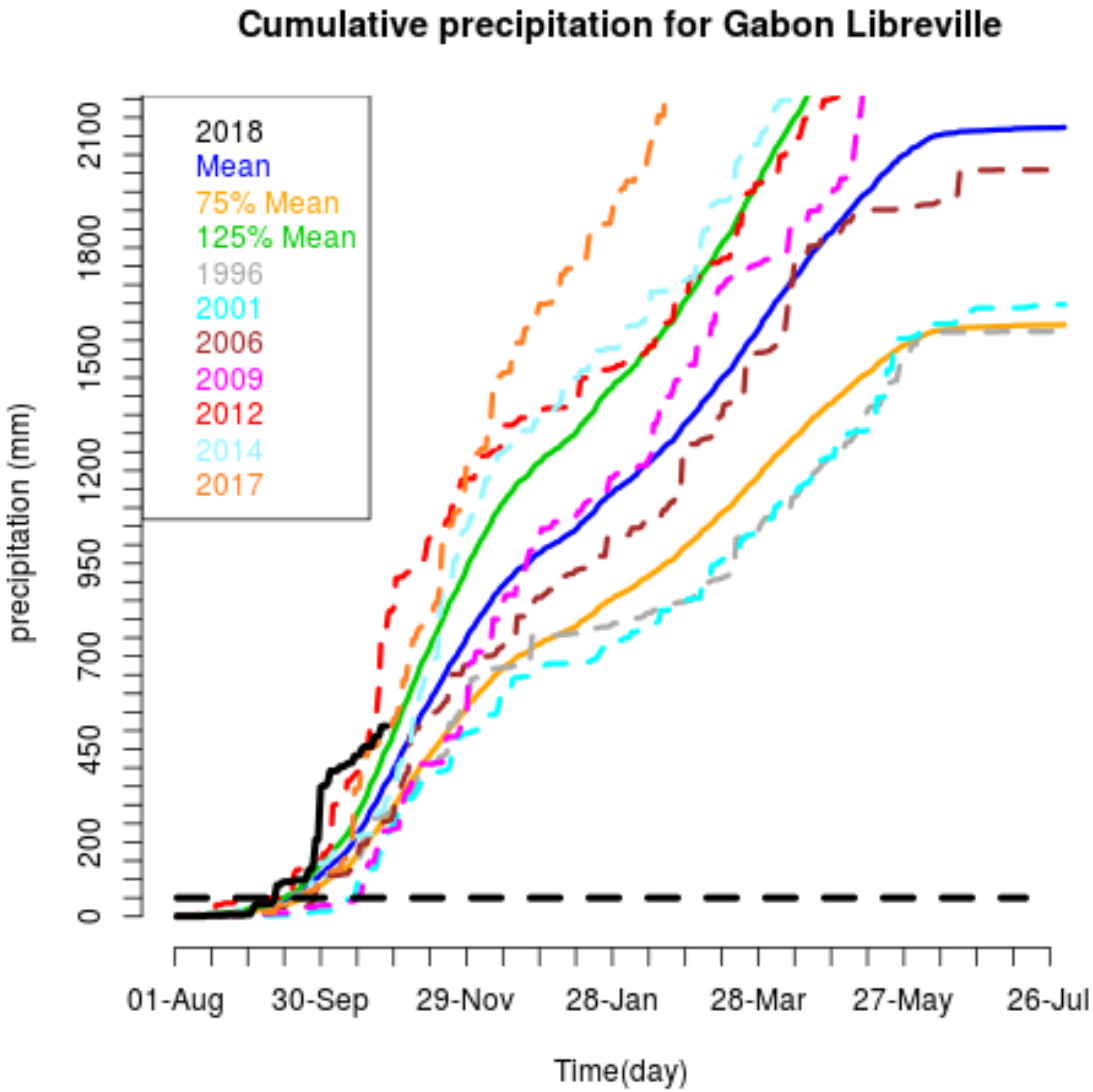

Cumulative precipitation for Egypt Asyut
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

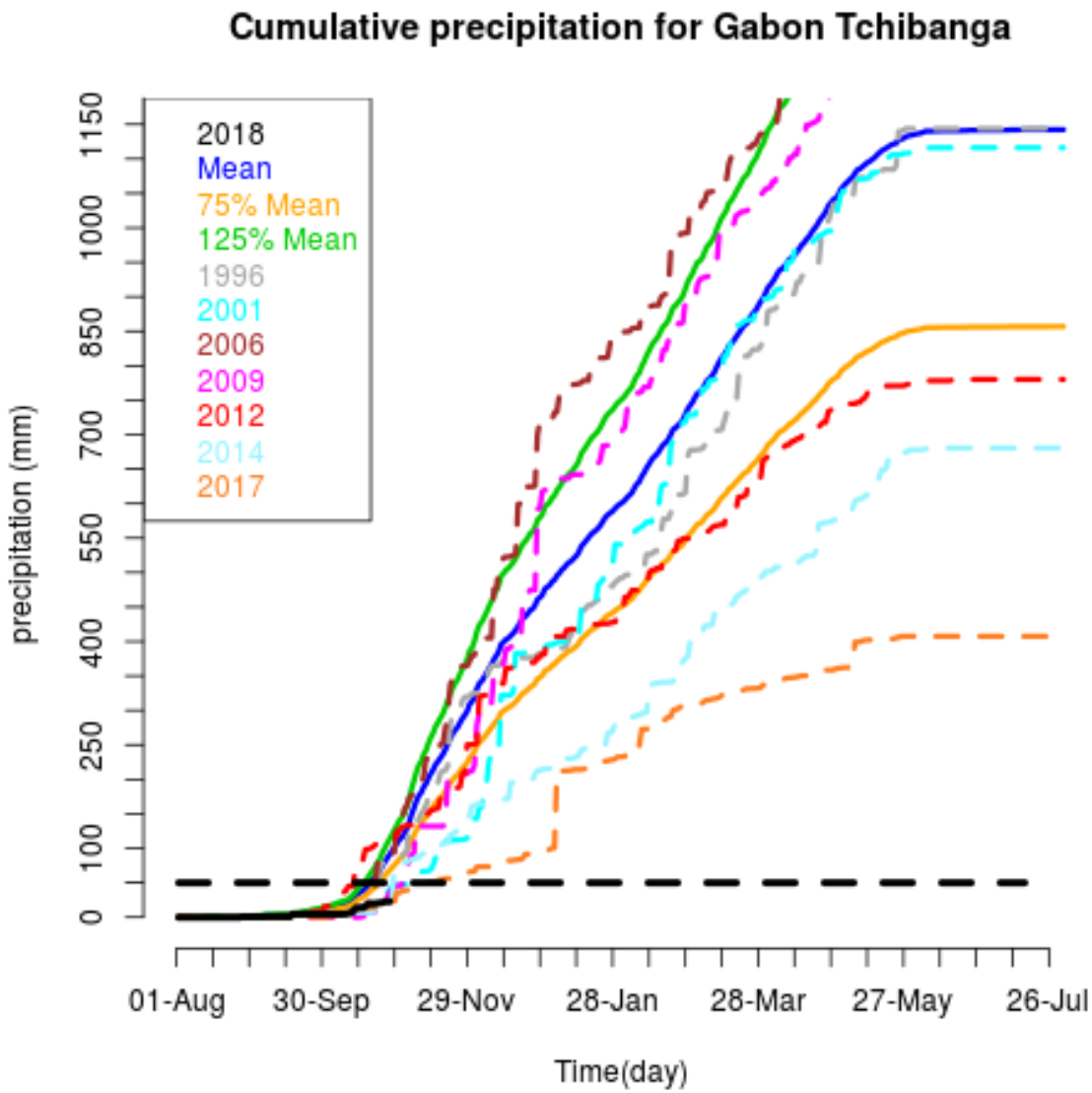

Cumulative precipitation for Egypt Alexandria
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

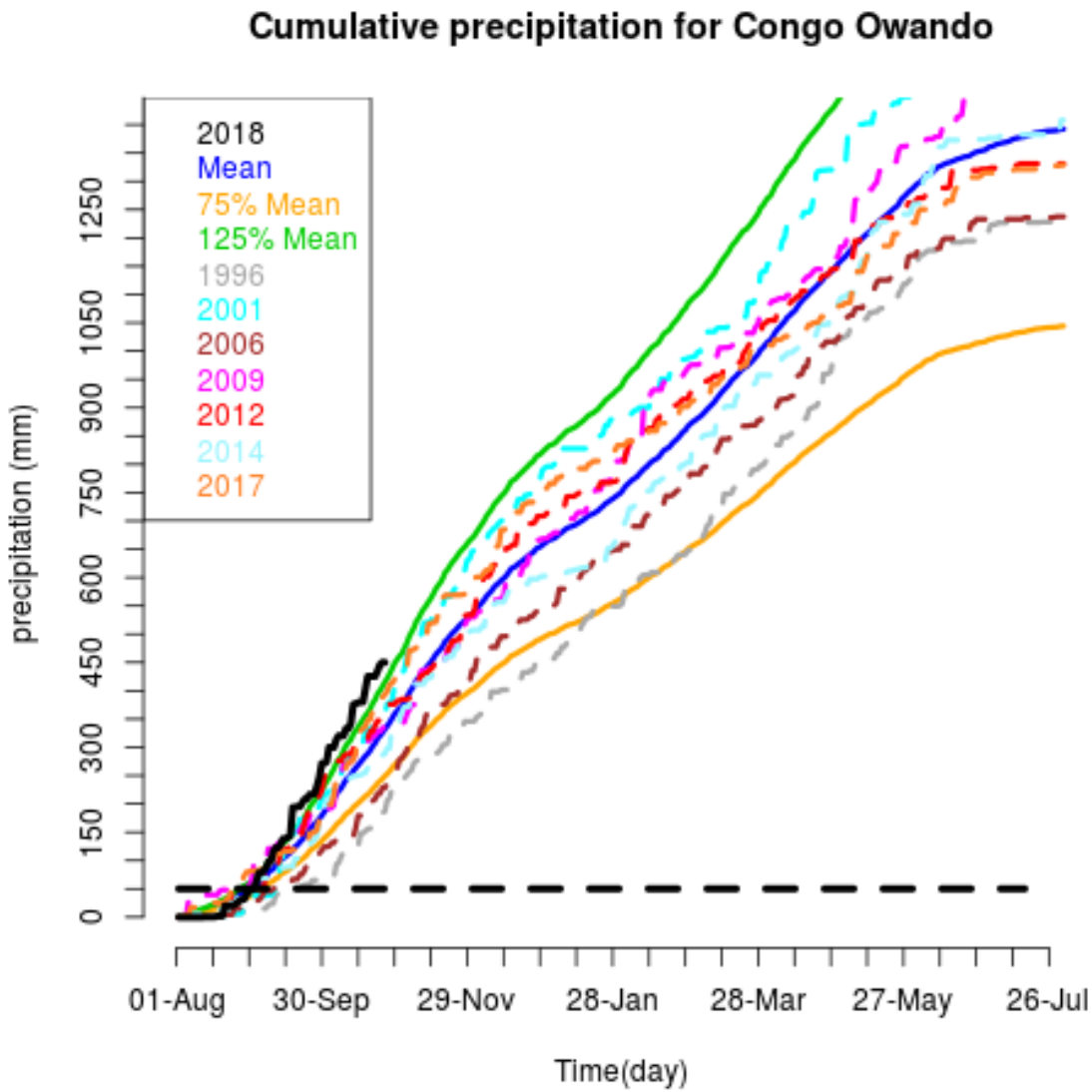
CUMULATIVE PRECIPITATION FOR CENTRAL AFRICA

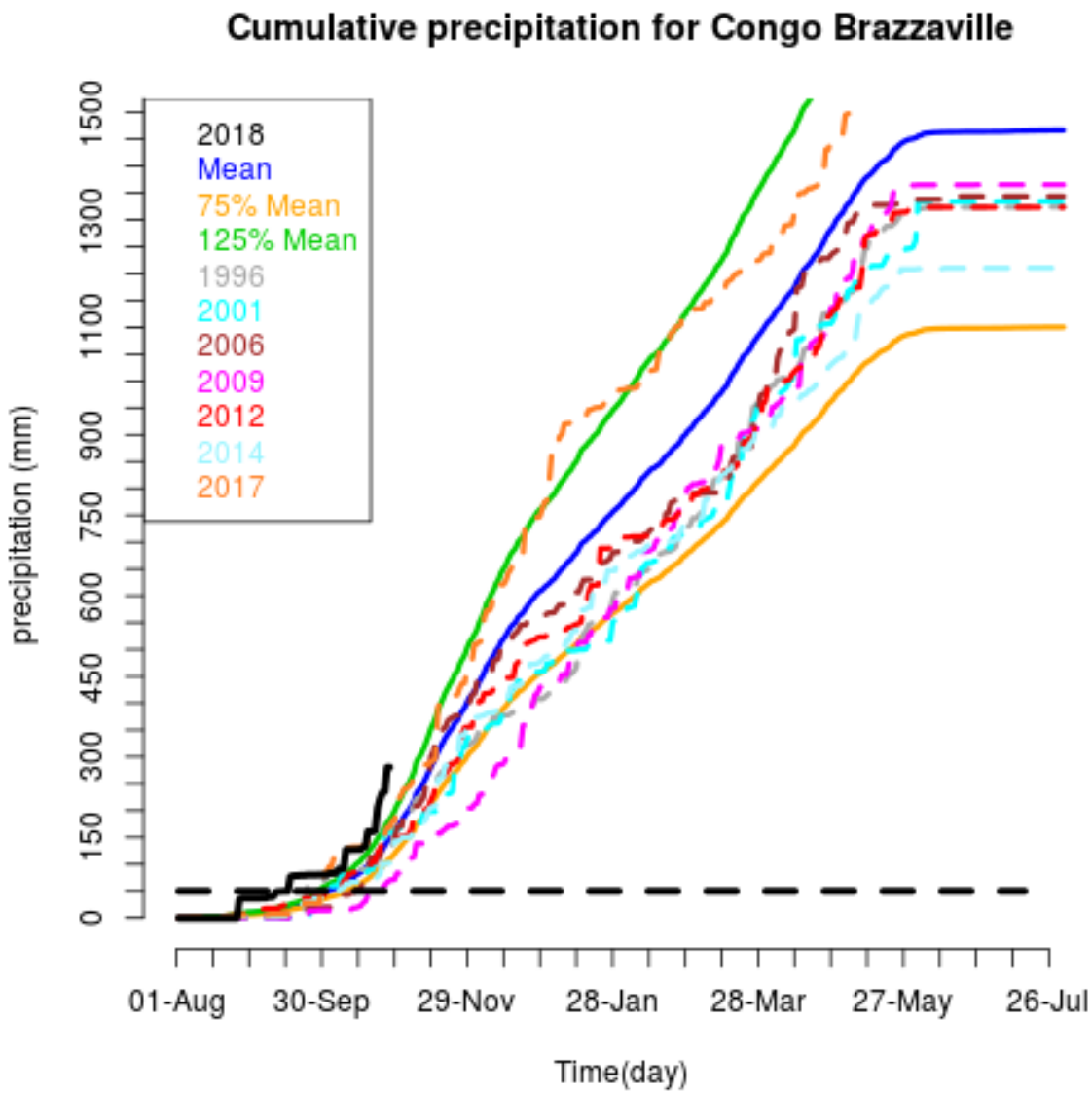

Cumulative precipitation for SaoTome SaoTome
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
250
400
550
700
850
1000
1150
1300
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

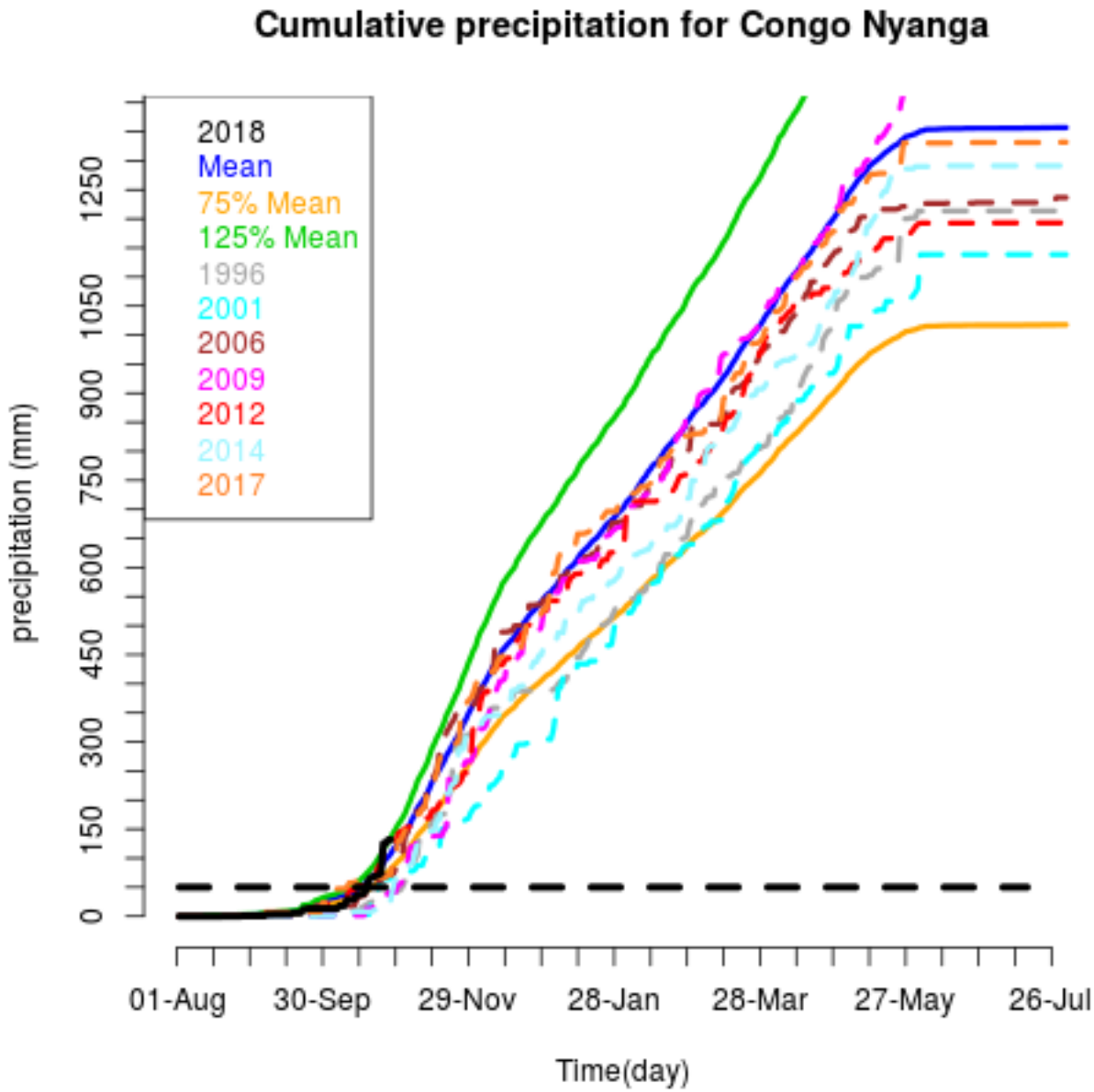

Cumulative precipitation for Gabon Franceville
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
150
350
550
750
950
1150
1400
1650
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

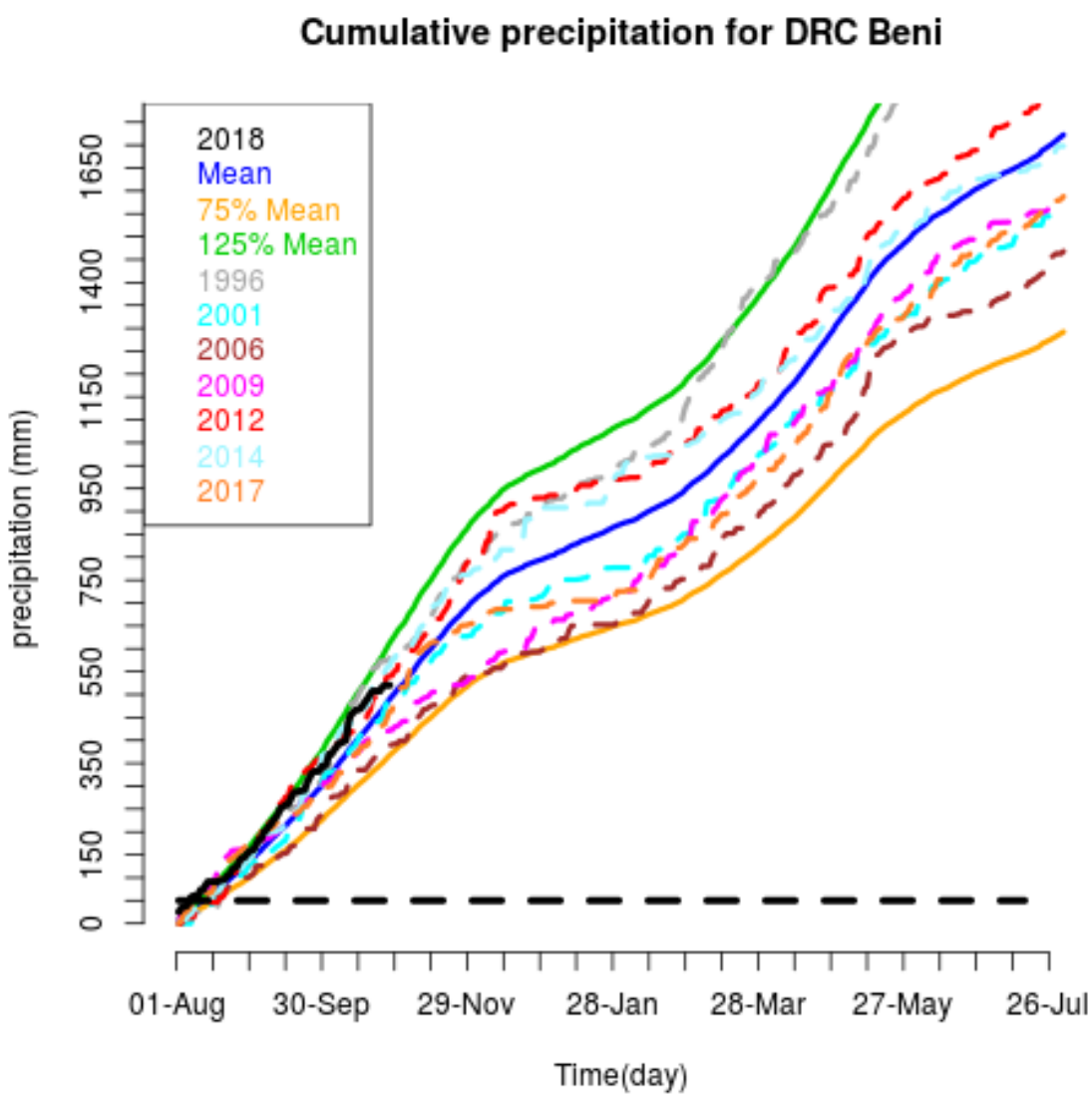

Cumulative precipitation for Gabon Libreville
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
200
450
700
950
1200
1500
1800
2100
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

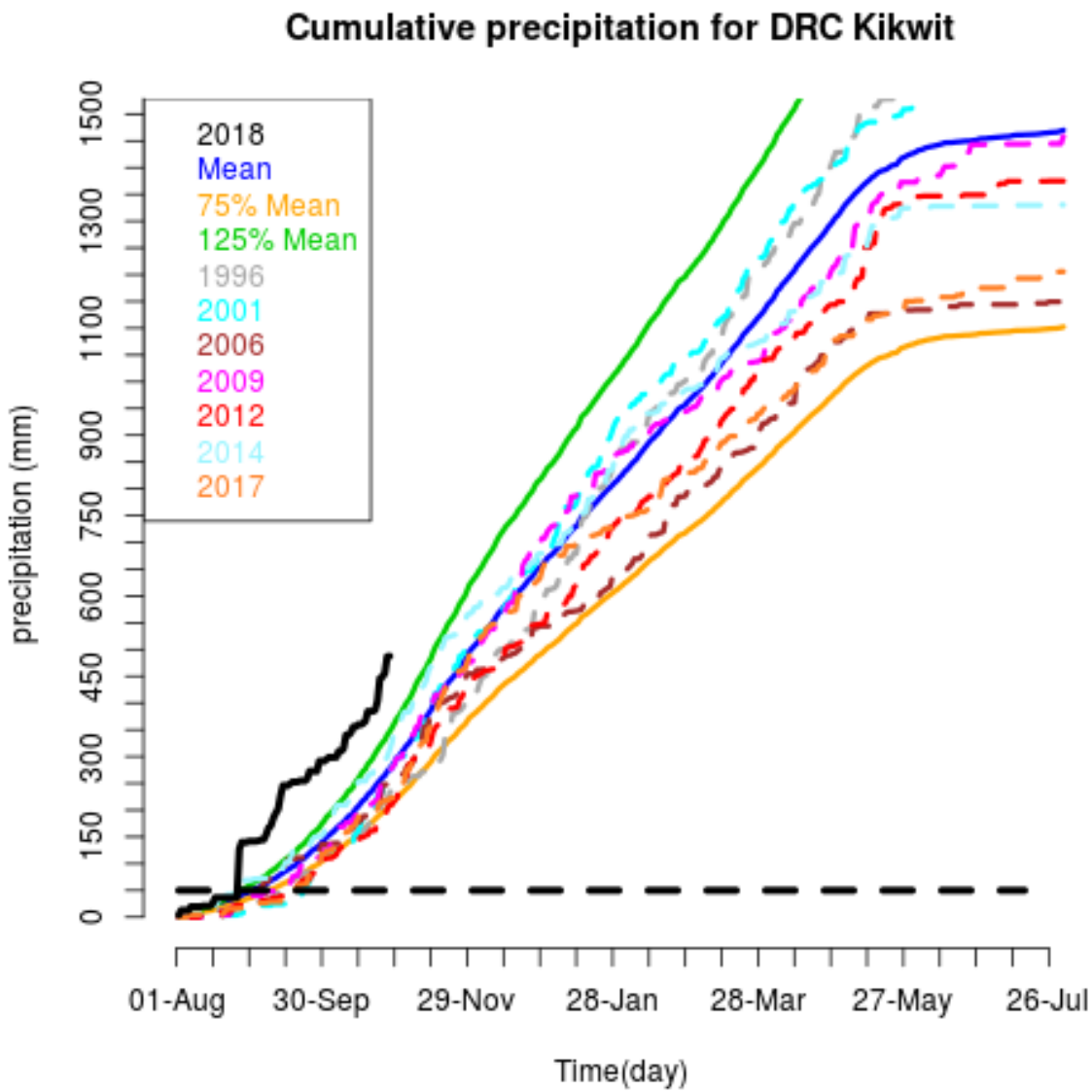

Cumulative precipitation for Gabon Tchibanga
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
250
400
550
700
850
1000
1150
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

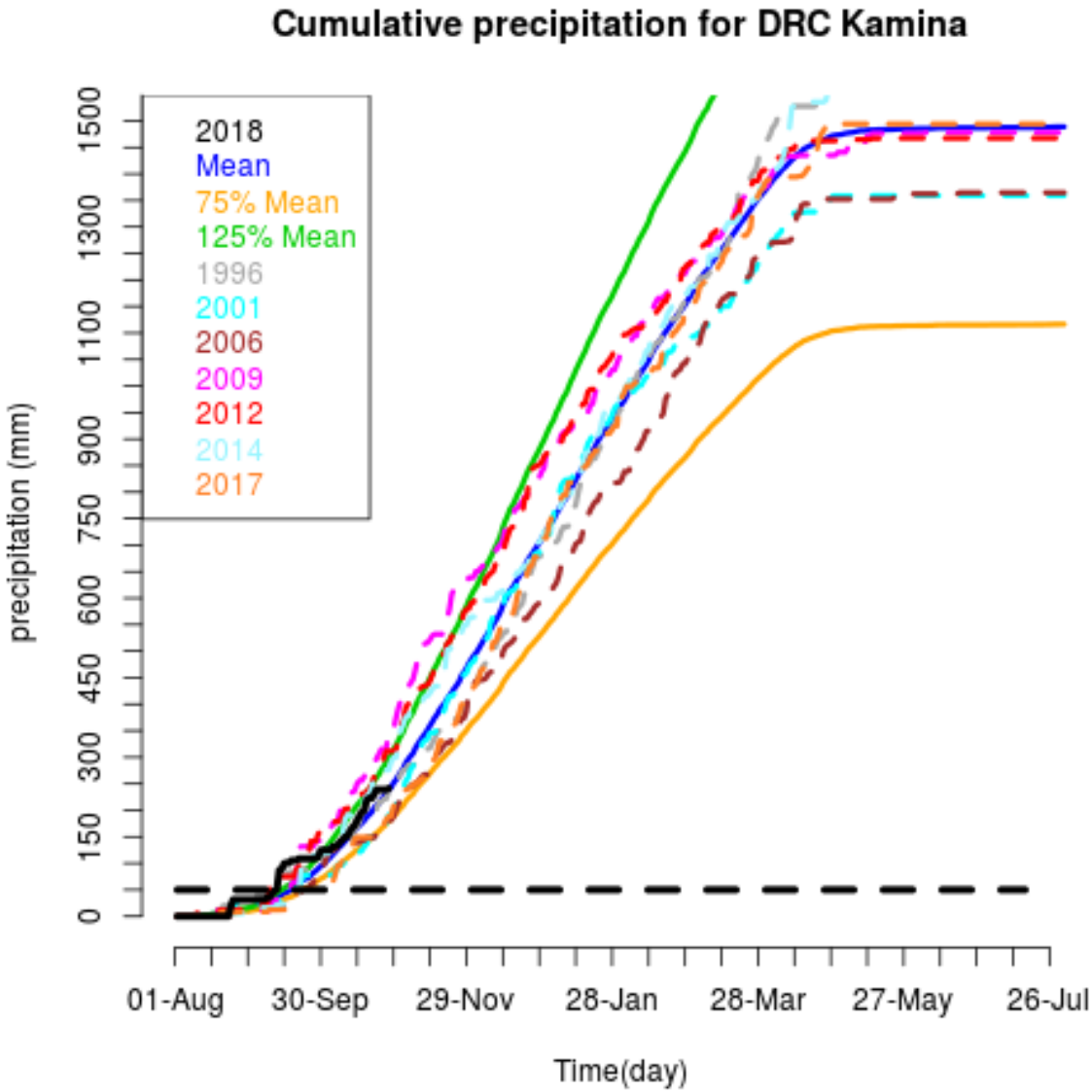

Cumulative precipitation for Congo Owando
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
150
300
450
600
750
900
1050
1250
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

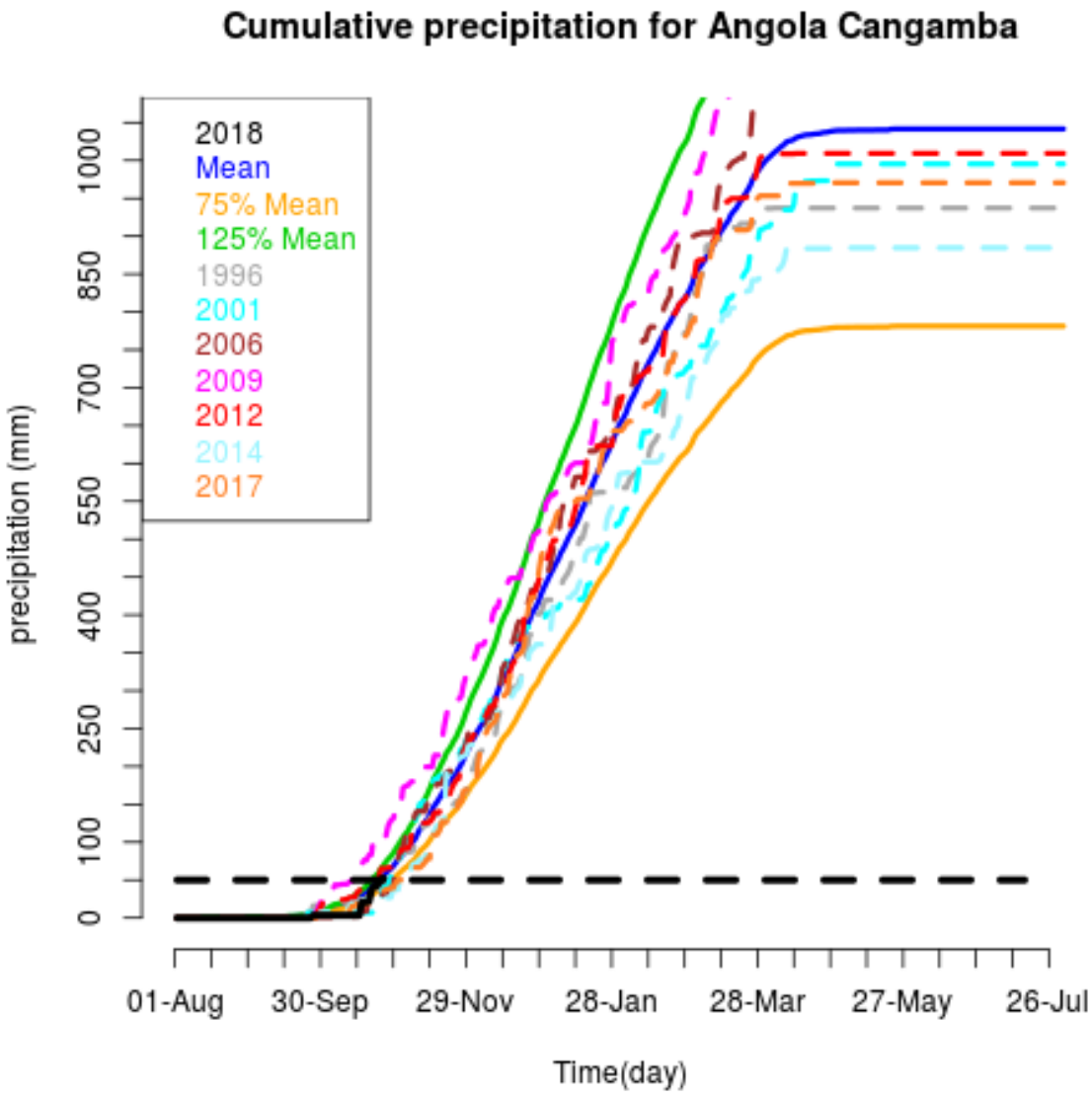

Cumulative precipitation for Congo Brazzaville
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
150
300
450
600
750
900
1100
1300
1500
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

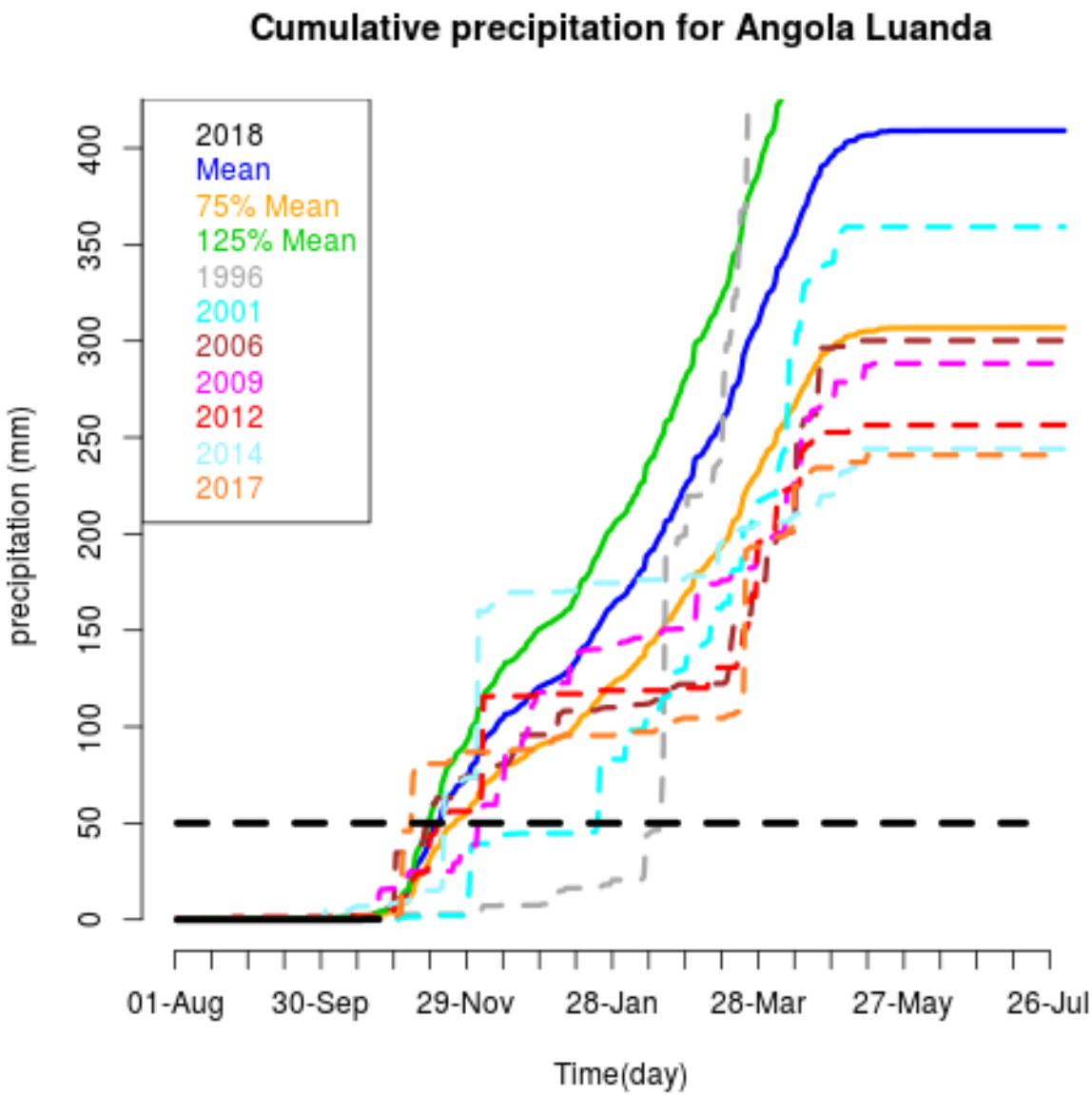

Cumulative precipitation for Congo Nyanga
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
150
300
450
600
750
900
1050
1250
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

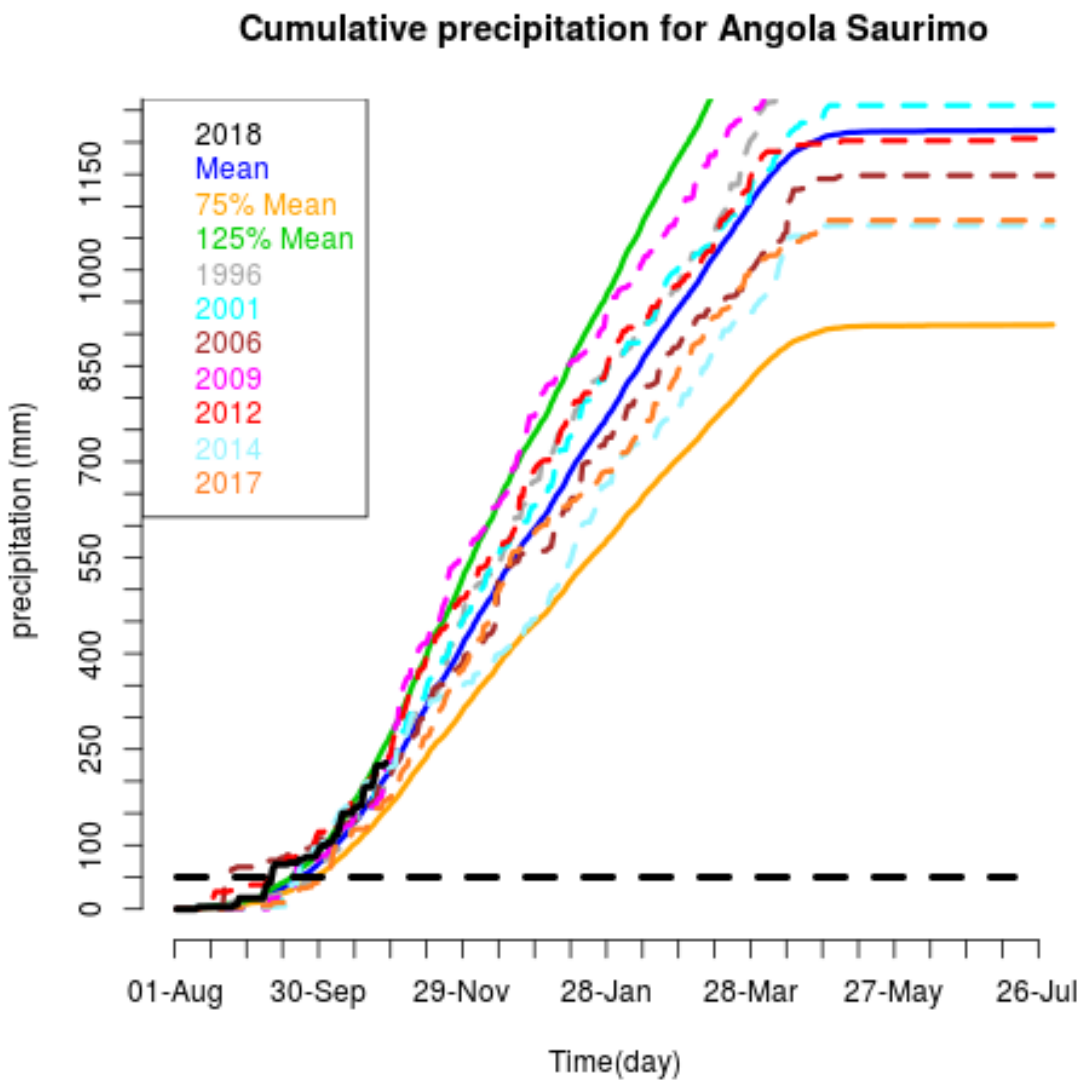

Cumulative precipitation for DRC Beni
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
150
350
550
750
950
1150
1400
1650
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

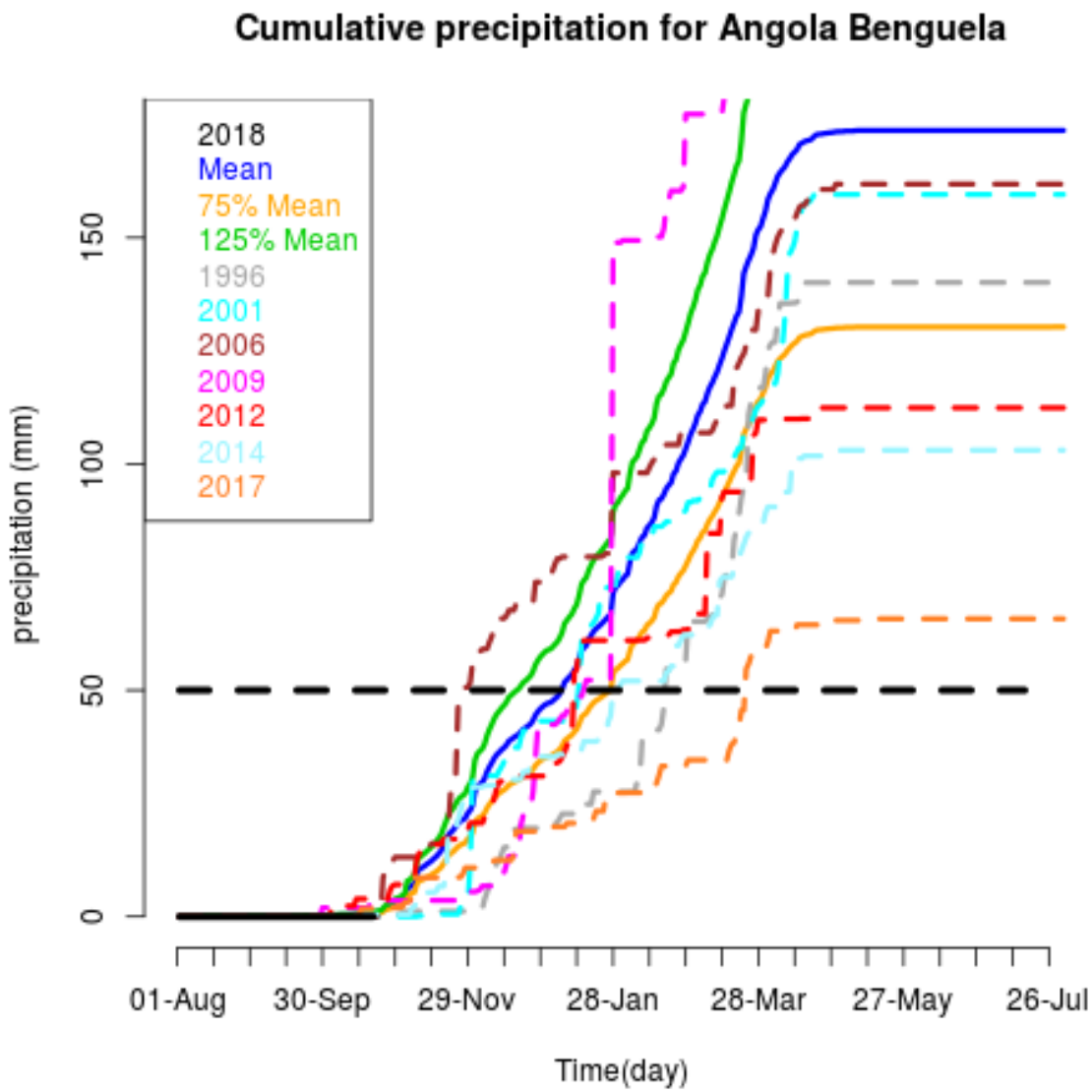

Cumulative precipitation for DRC Kikwit
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
150
300
450
600
750
900
1100
1300
1500
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

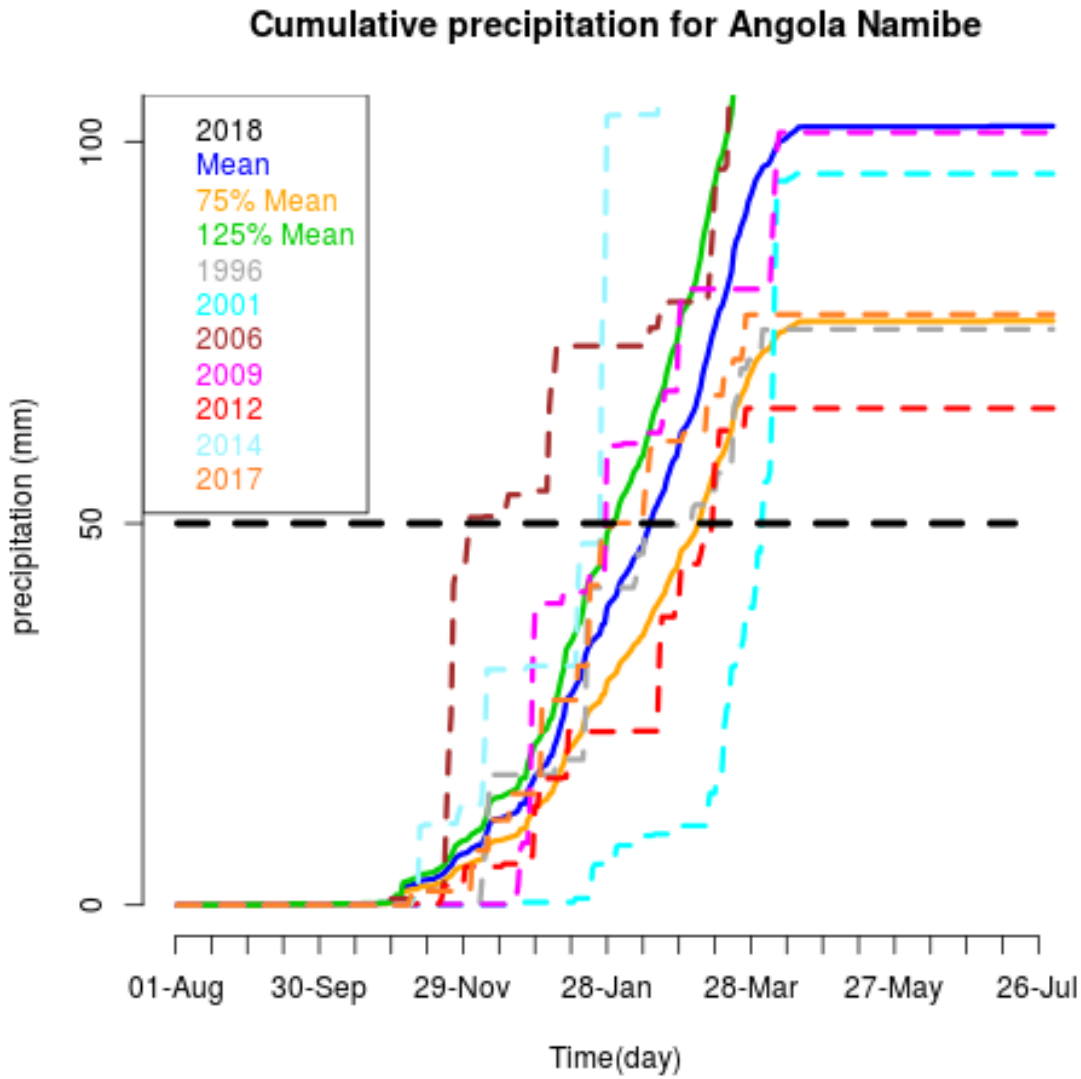

Cumulative precipitation for DRC Kamina
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
150
300
450
600
750
900
1100
1300
1500
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

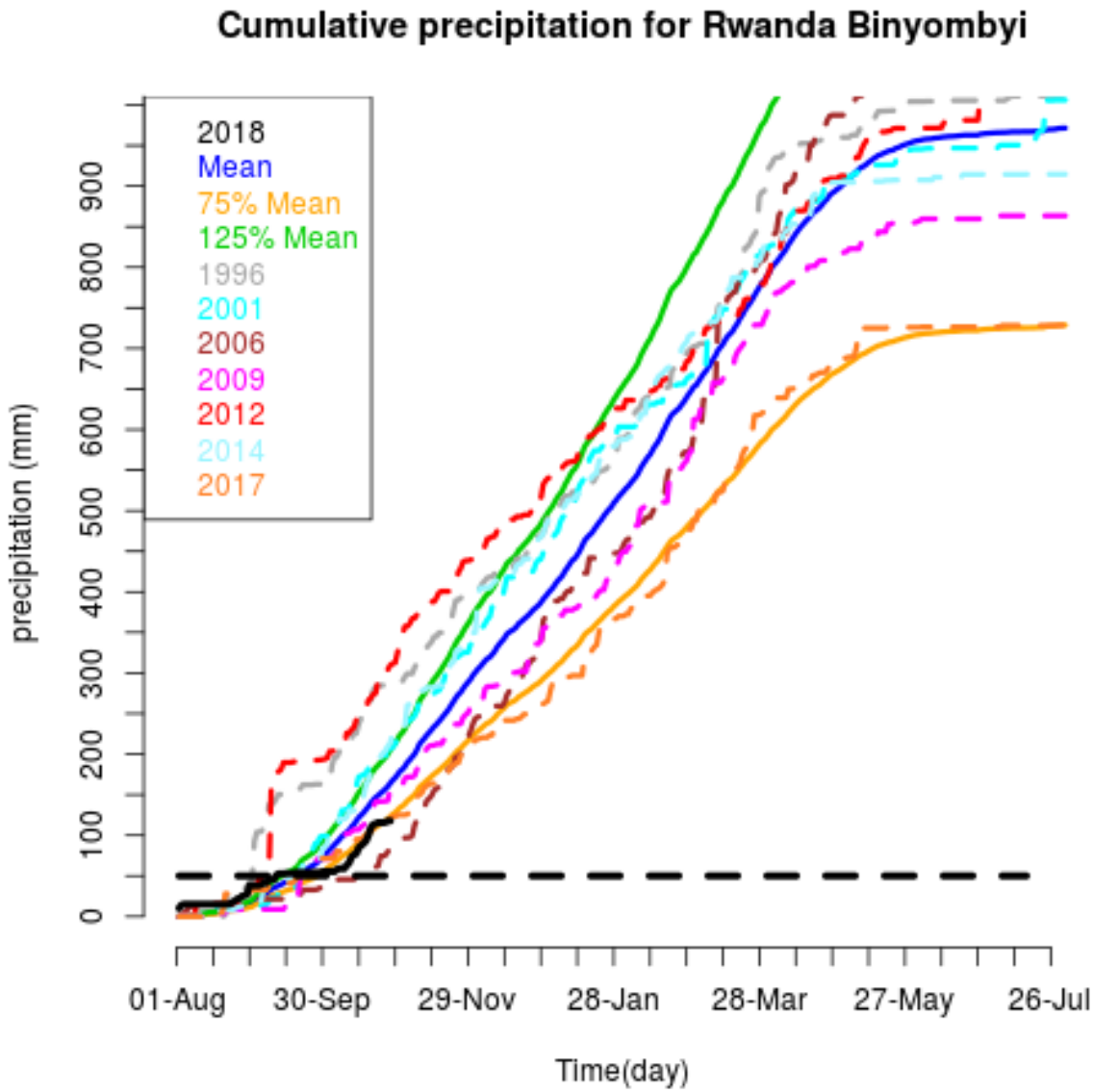

Cumulative precipitation for Angola Cangamba
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
250
400
550
700
850
1000
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

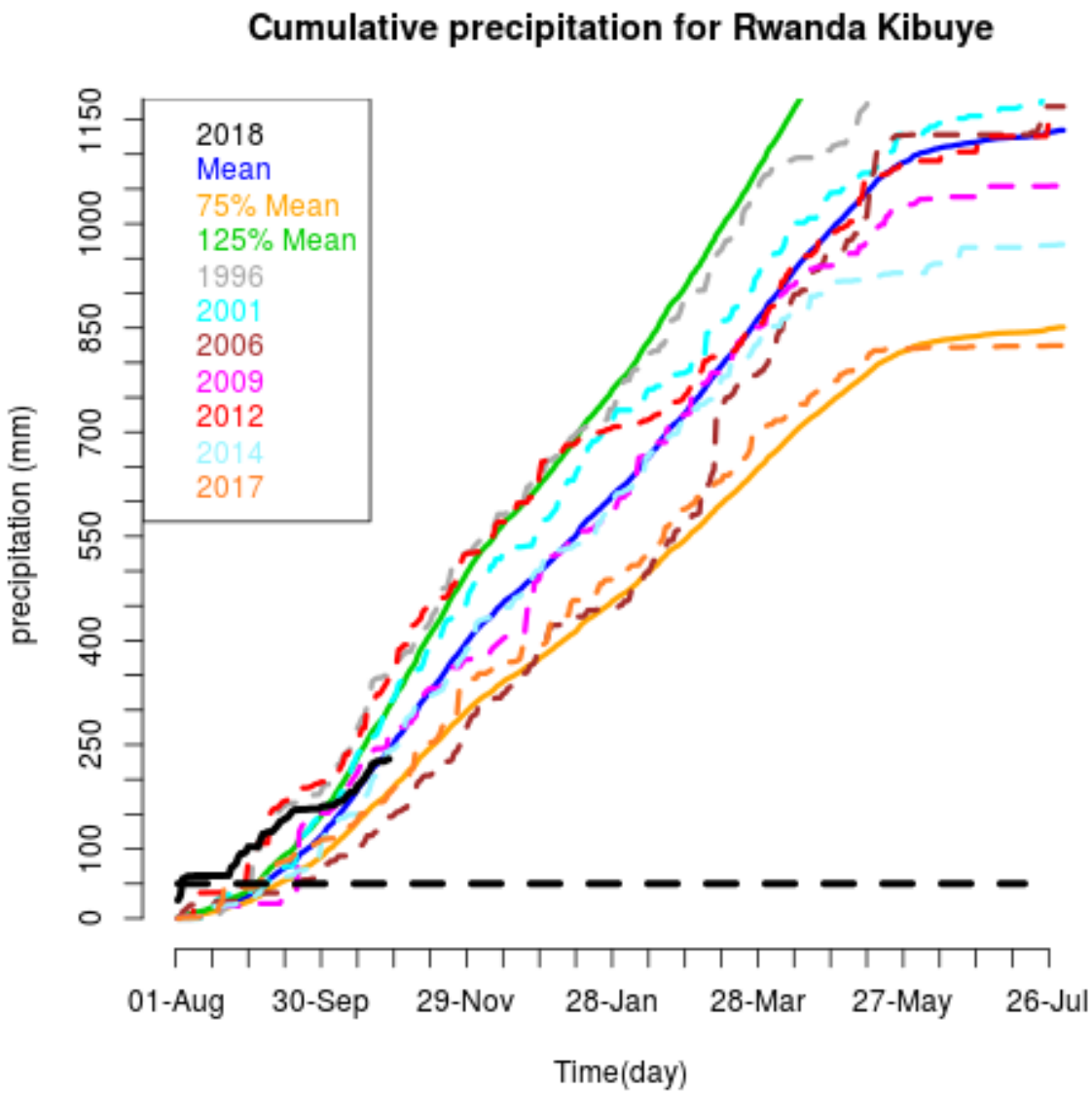

Cumulative precipitation for Angola Luanda
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
250
300
350
400
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

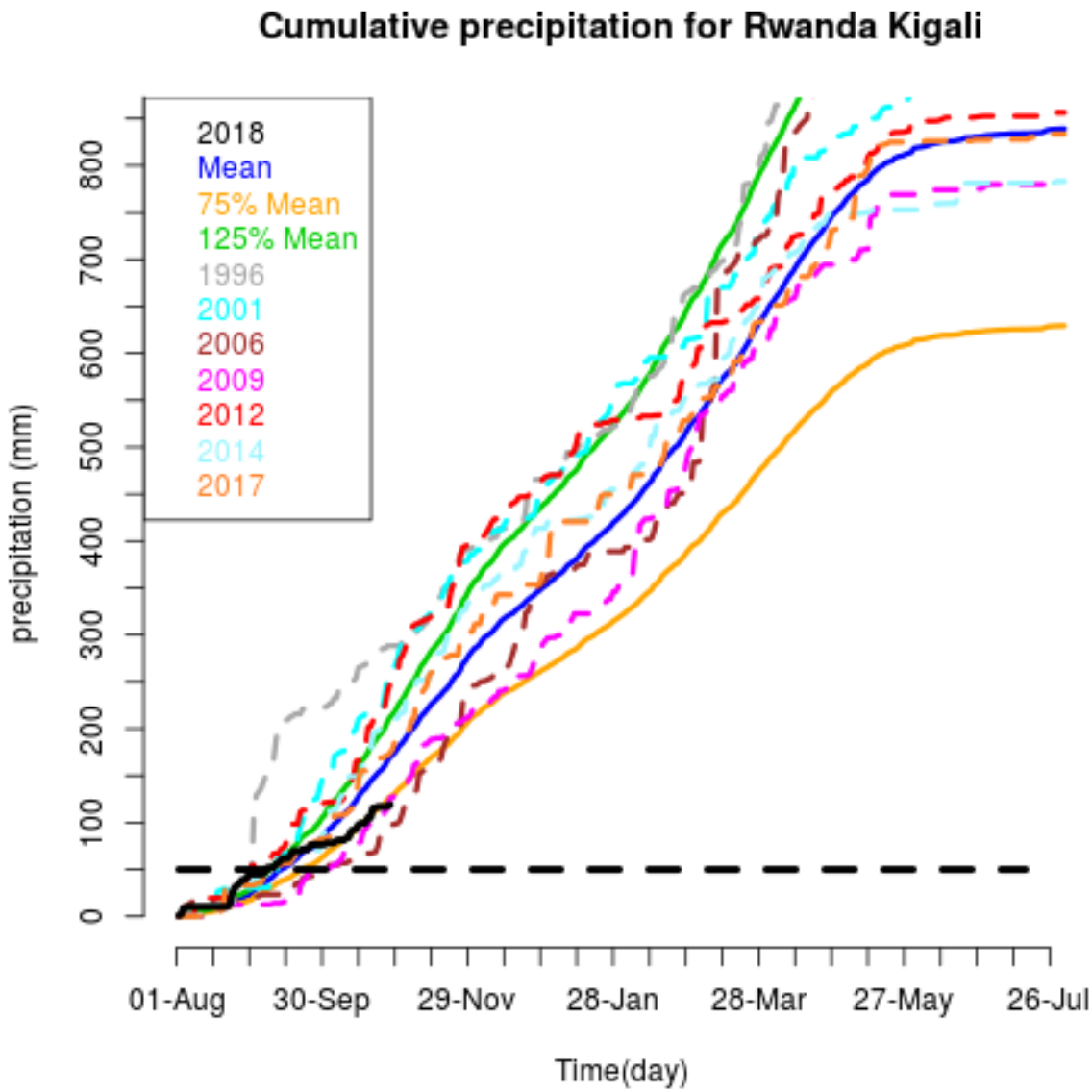

Cumulative precipitation for Angola Saurimo
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
250
400
550
700
850
1000
1150
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

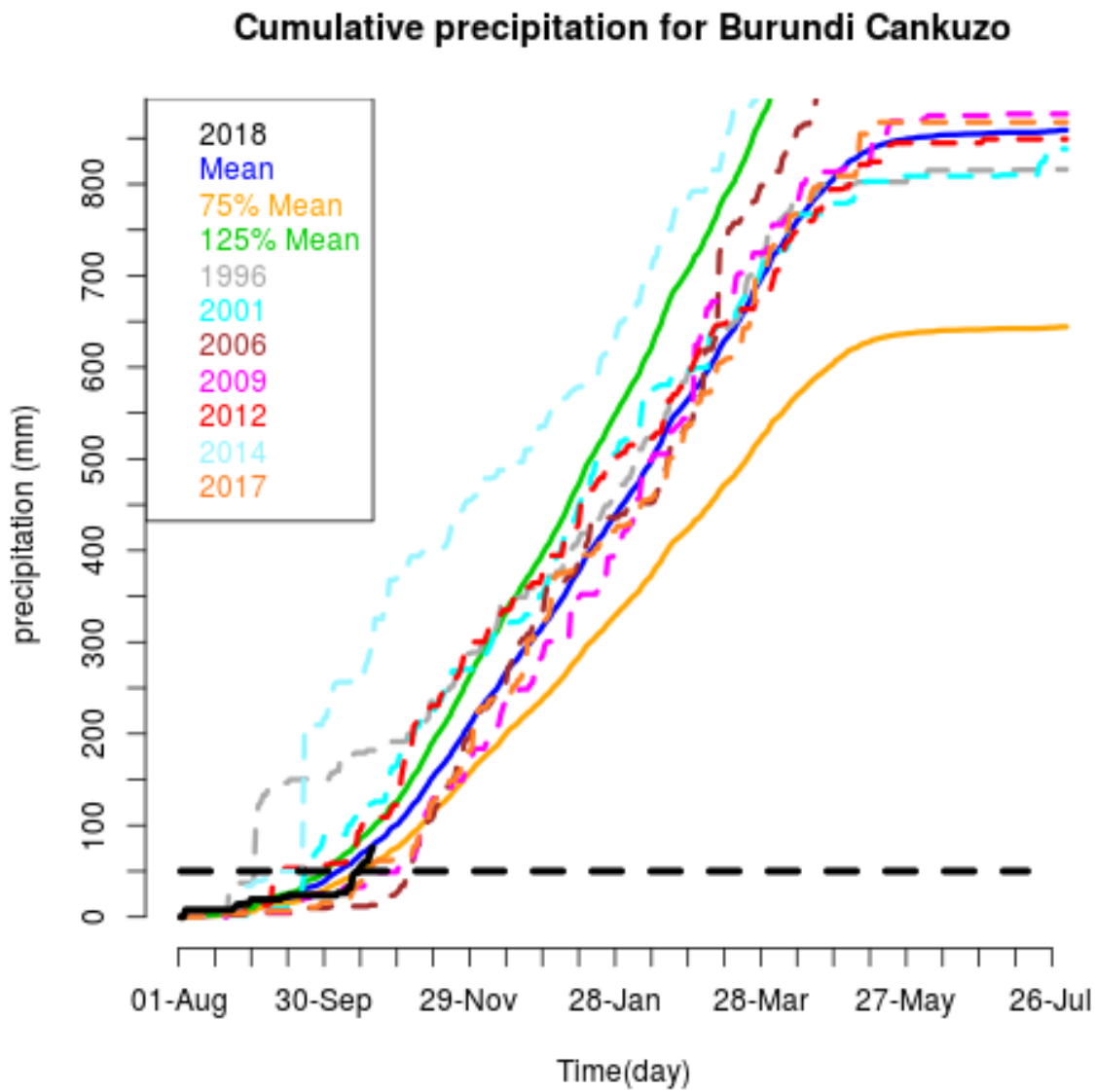

Cumulative precipitation for Angola Benguela
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

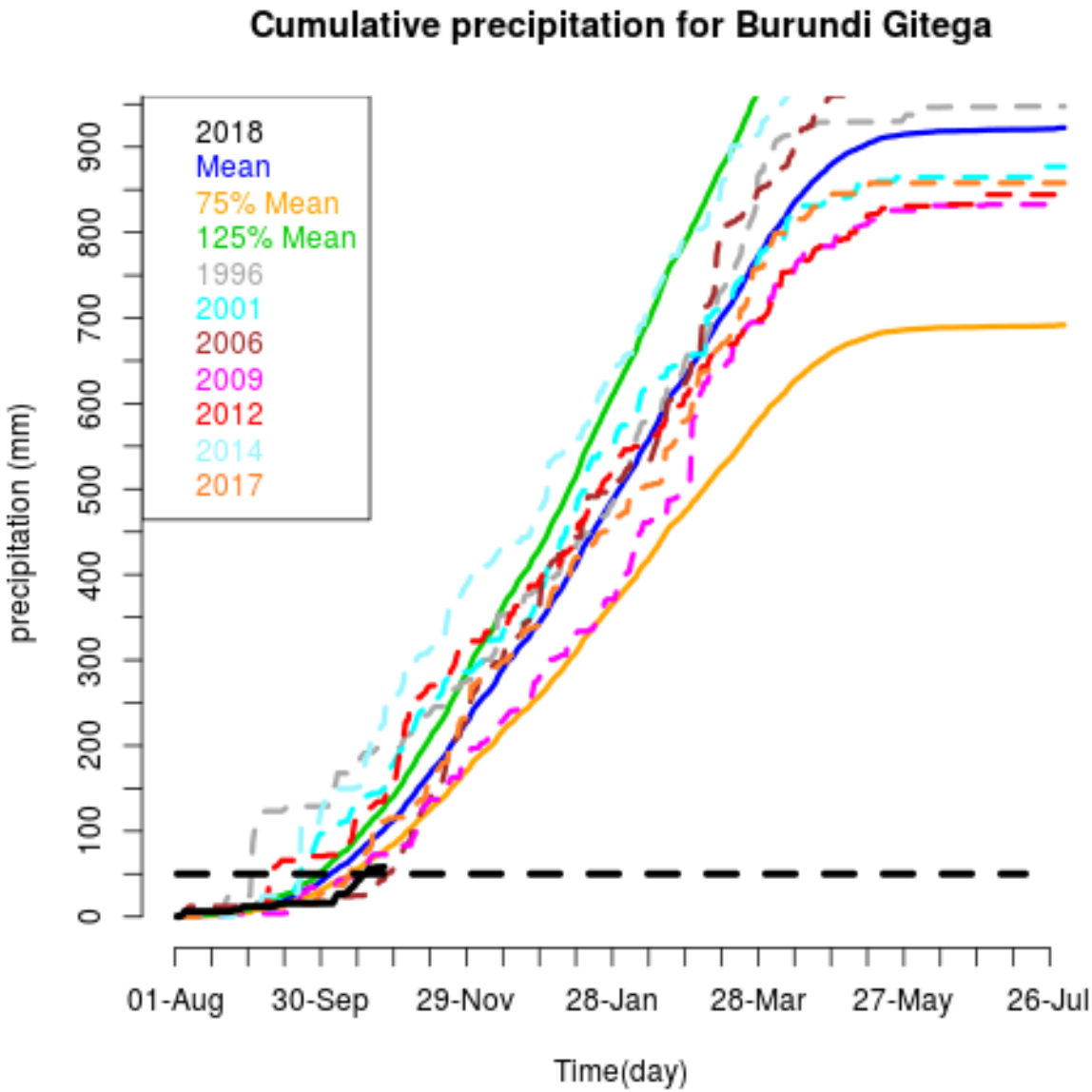

Cumulative precipitation for Angola Namibe
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

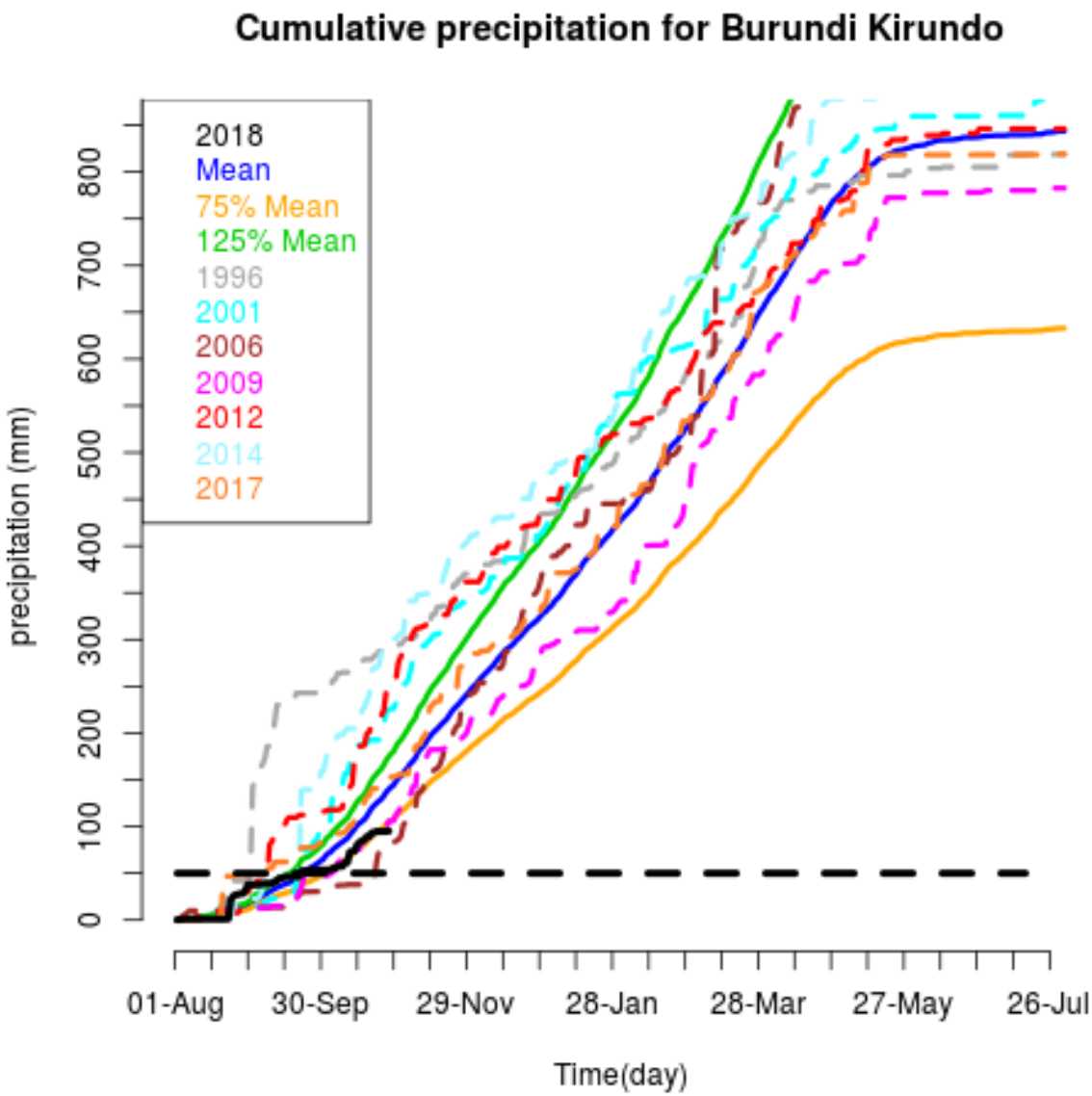

Cumulative precipitation for Rwanda Binyombyi
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
900
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

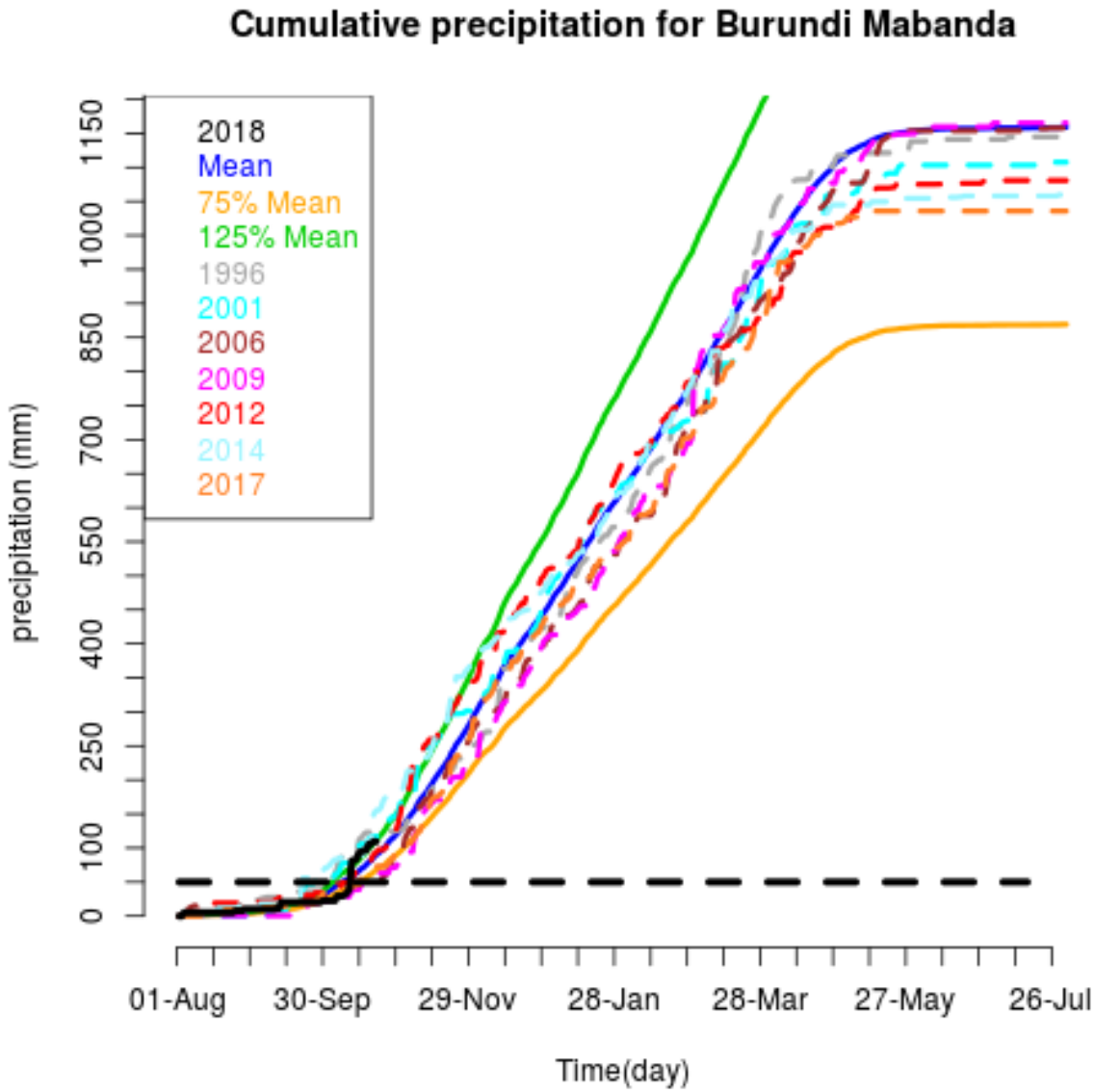

Cumulative precipitation for Rwanda Kibuye
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
250
400
550
700
850
1000
1150
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)


Cumulative precipitation for Rwanda Kigali
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

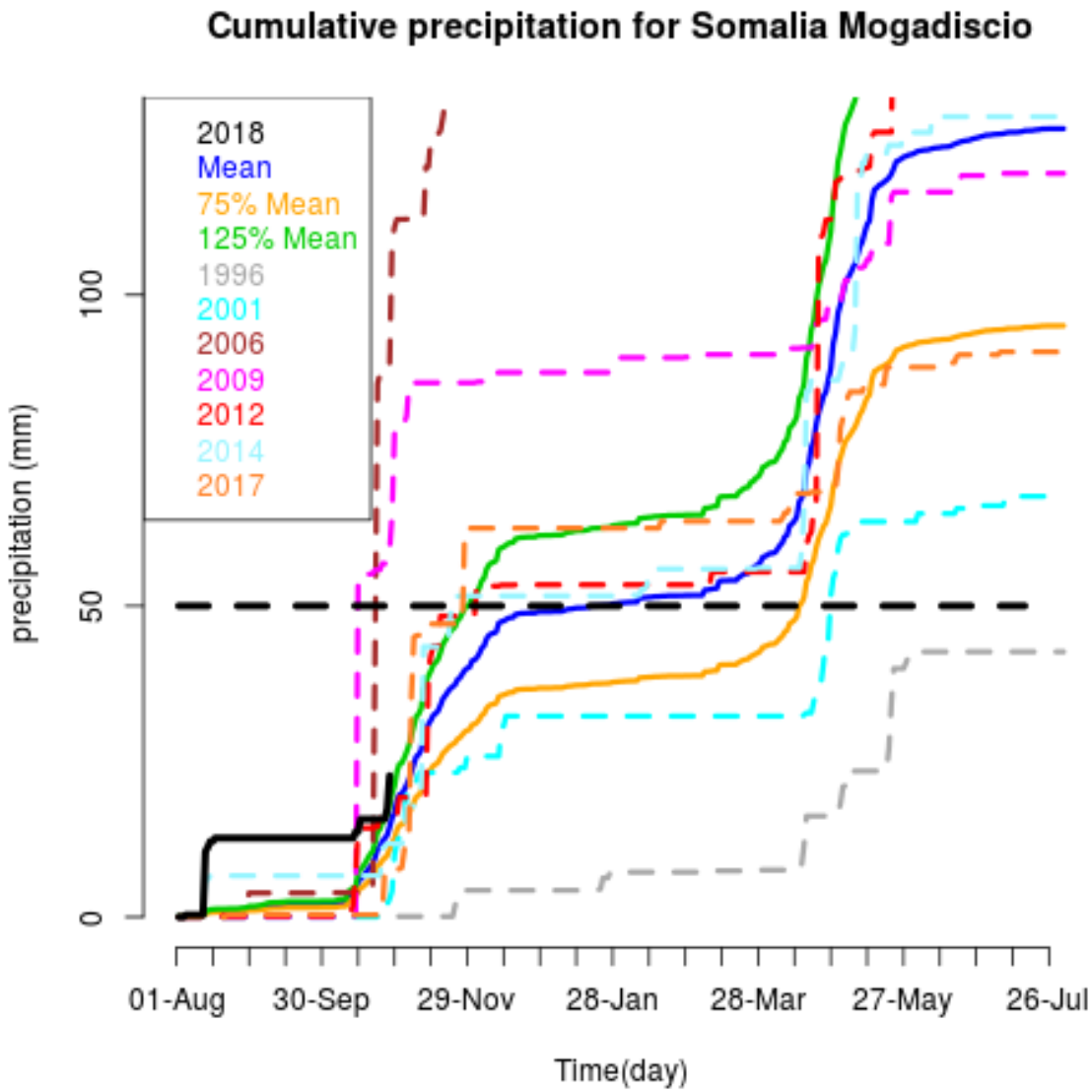

Cumulative precipitation for Burundi Cankuzo
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

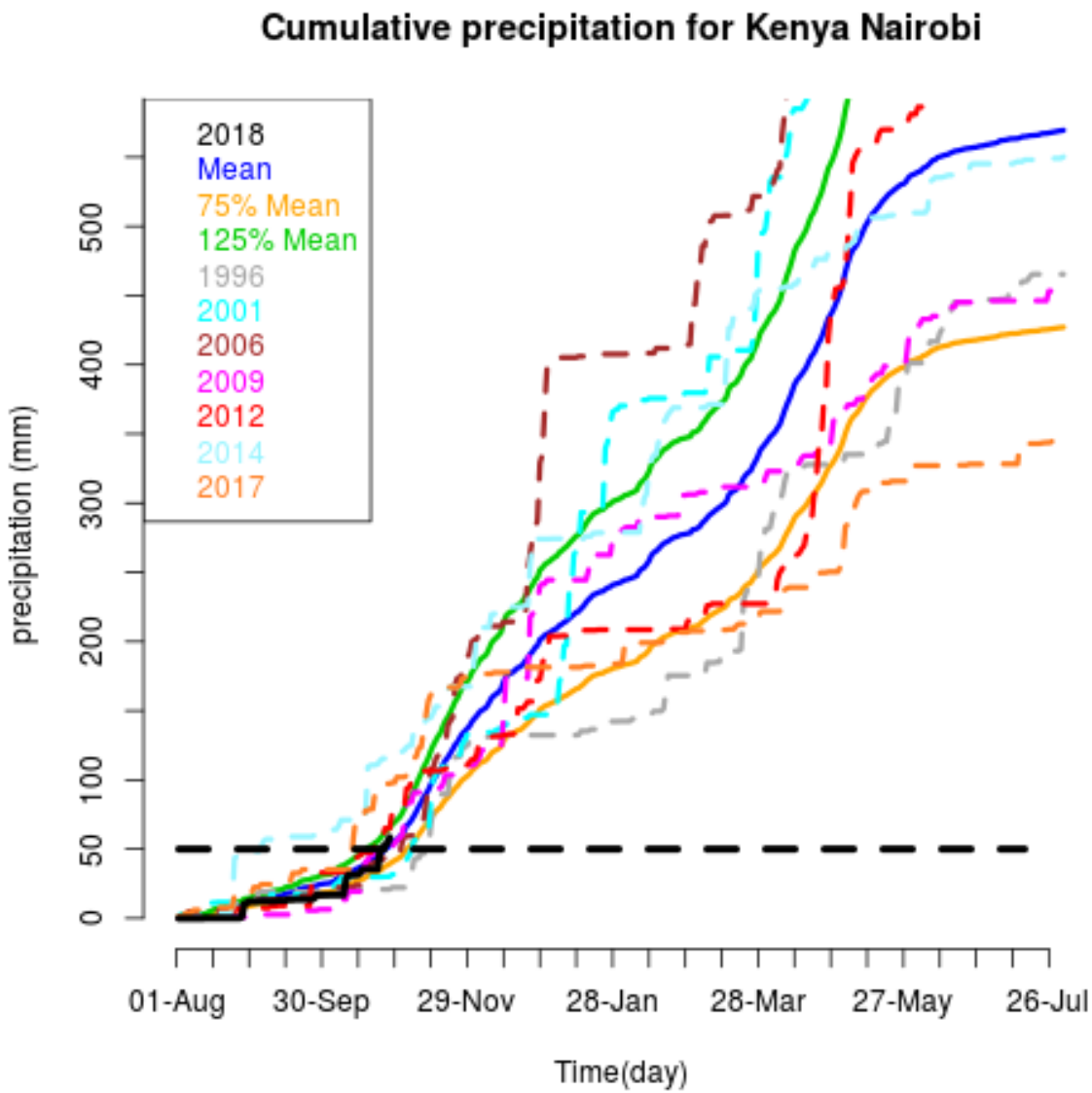

Cumulative precipitation for Burundi Gitega
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
900
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

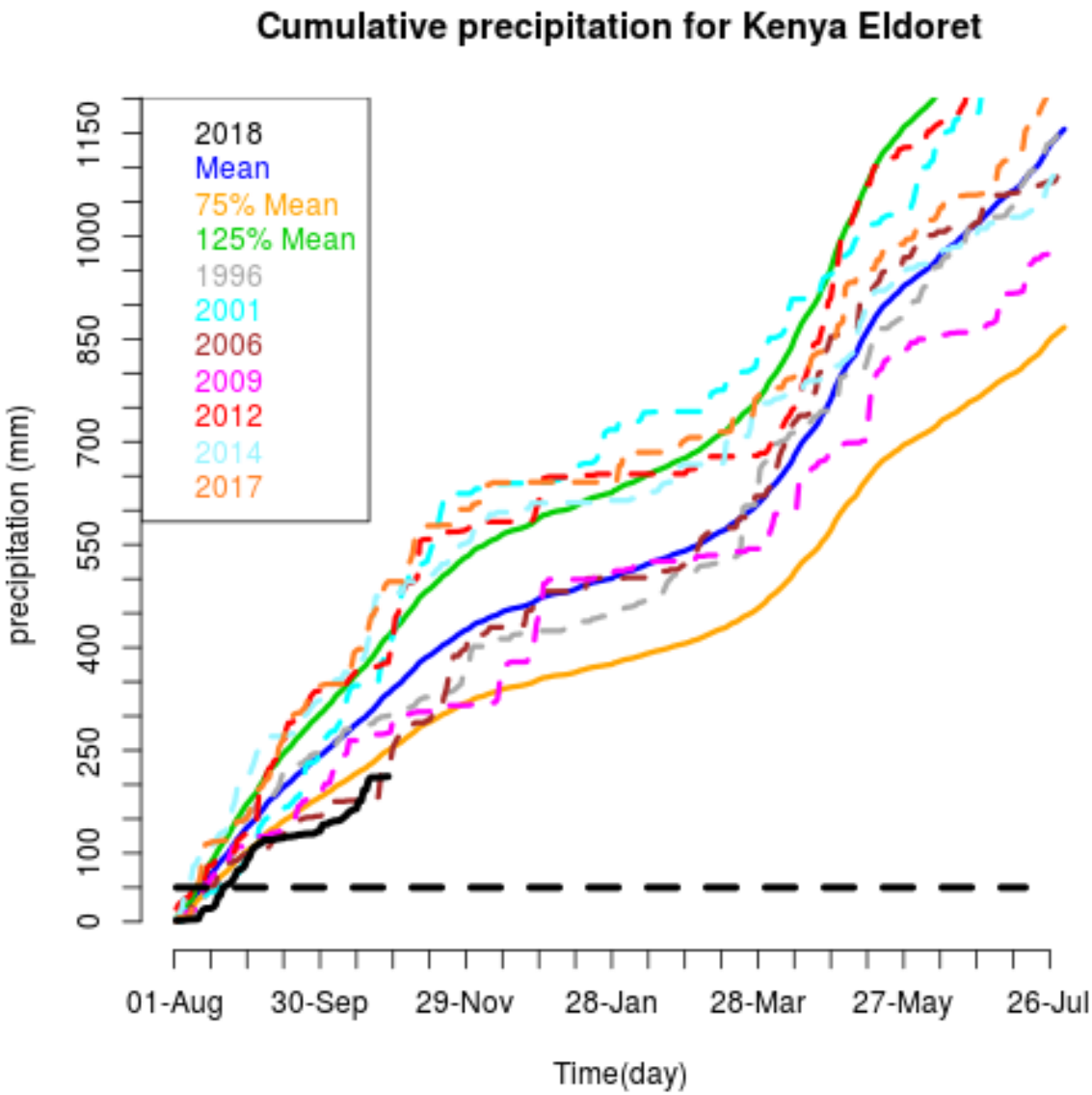

Cumulative precipitation for Burundi Kirundo
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

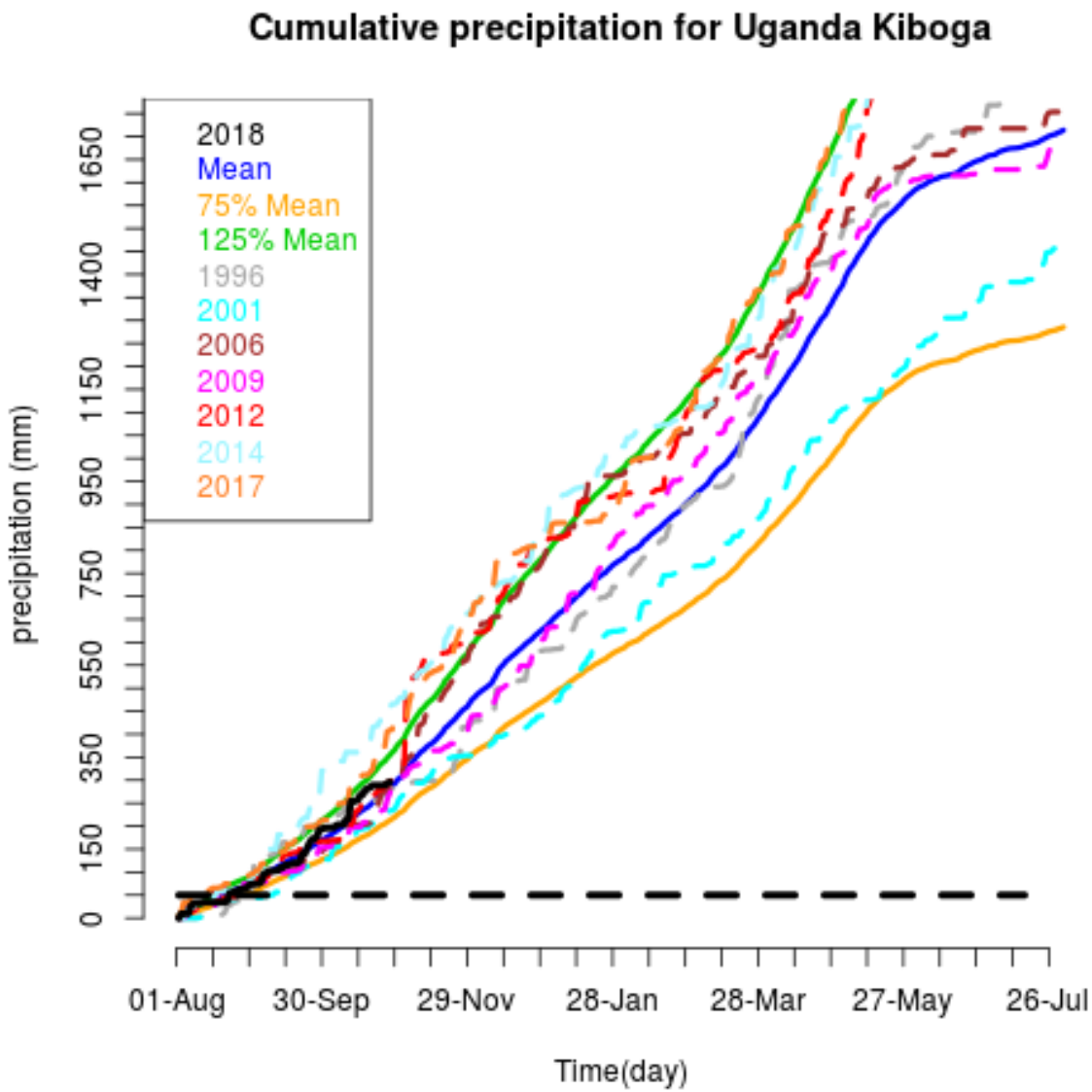

Cumulative precipitation for Burundi Mabanda
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
250
400
550
700
850
1000
1150
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

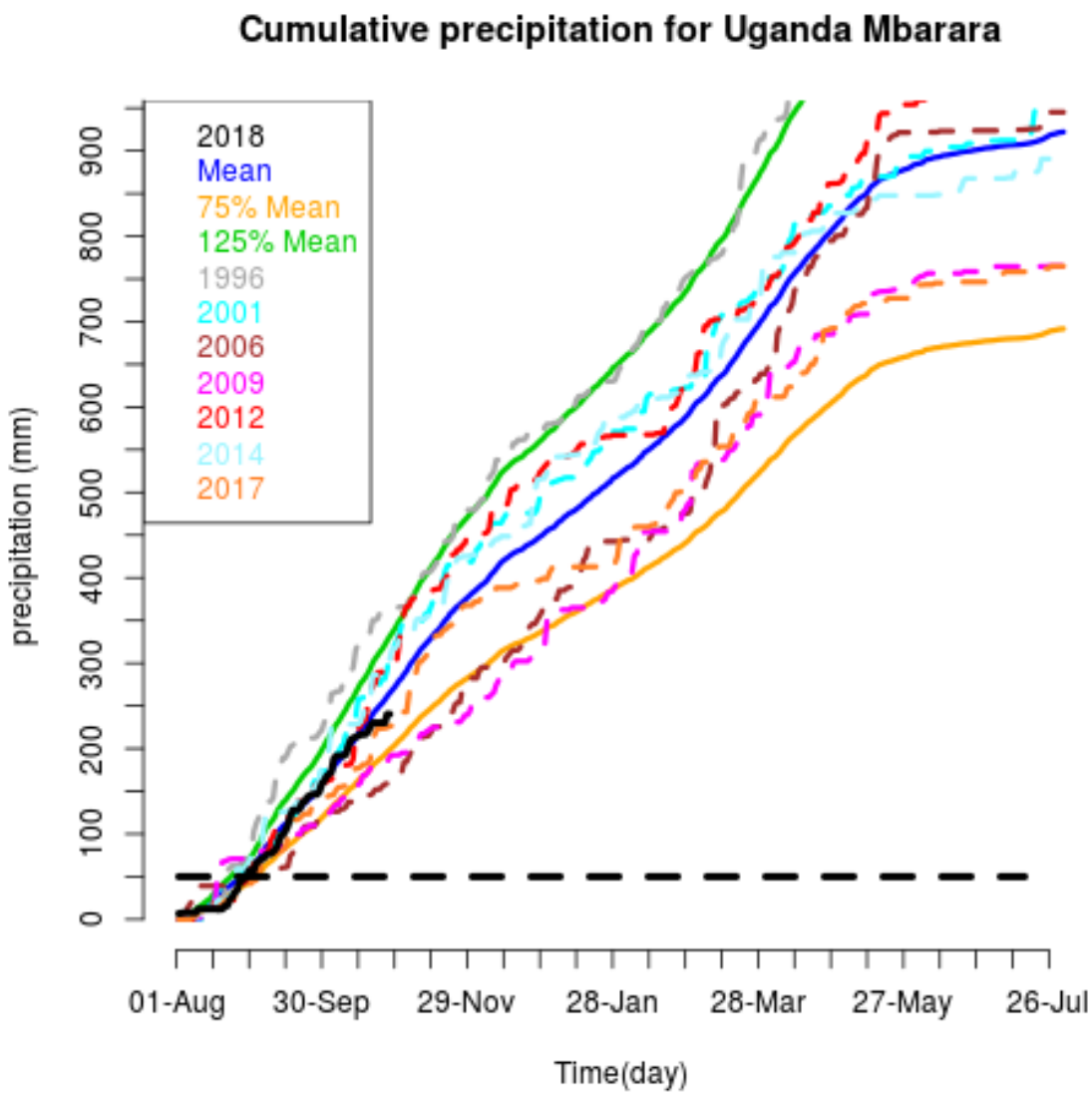
CUMULATIVE PRECIPITATION FOR EASTERN AFRICA

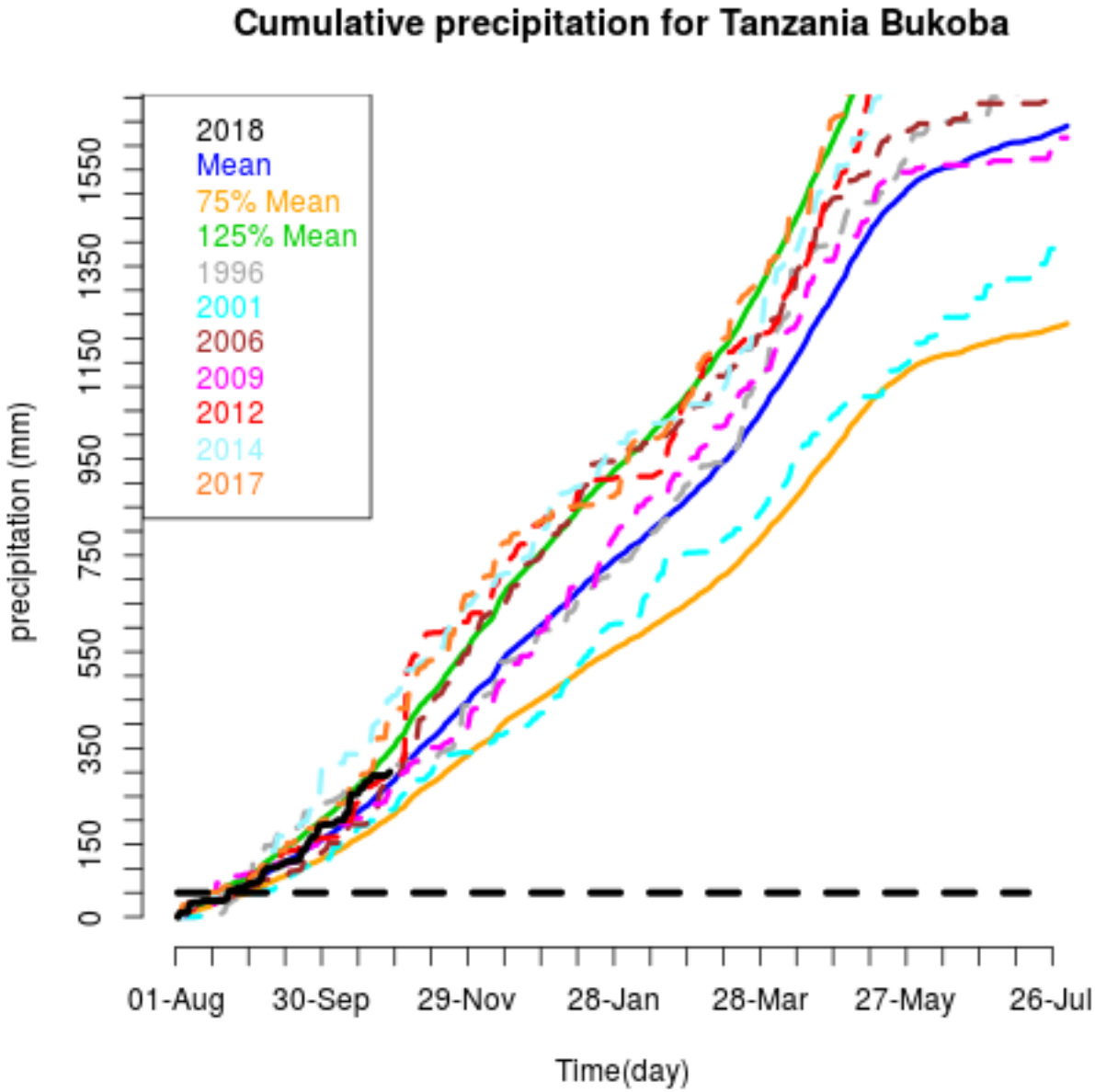

Cumulative precipitation for Somalia Mogadiscio
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

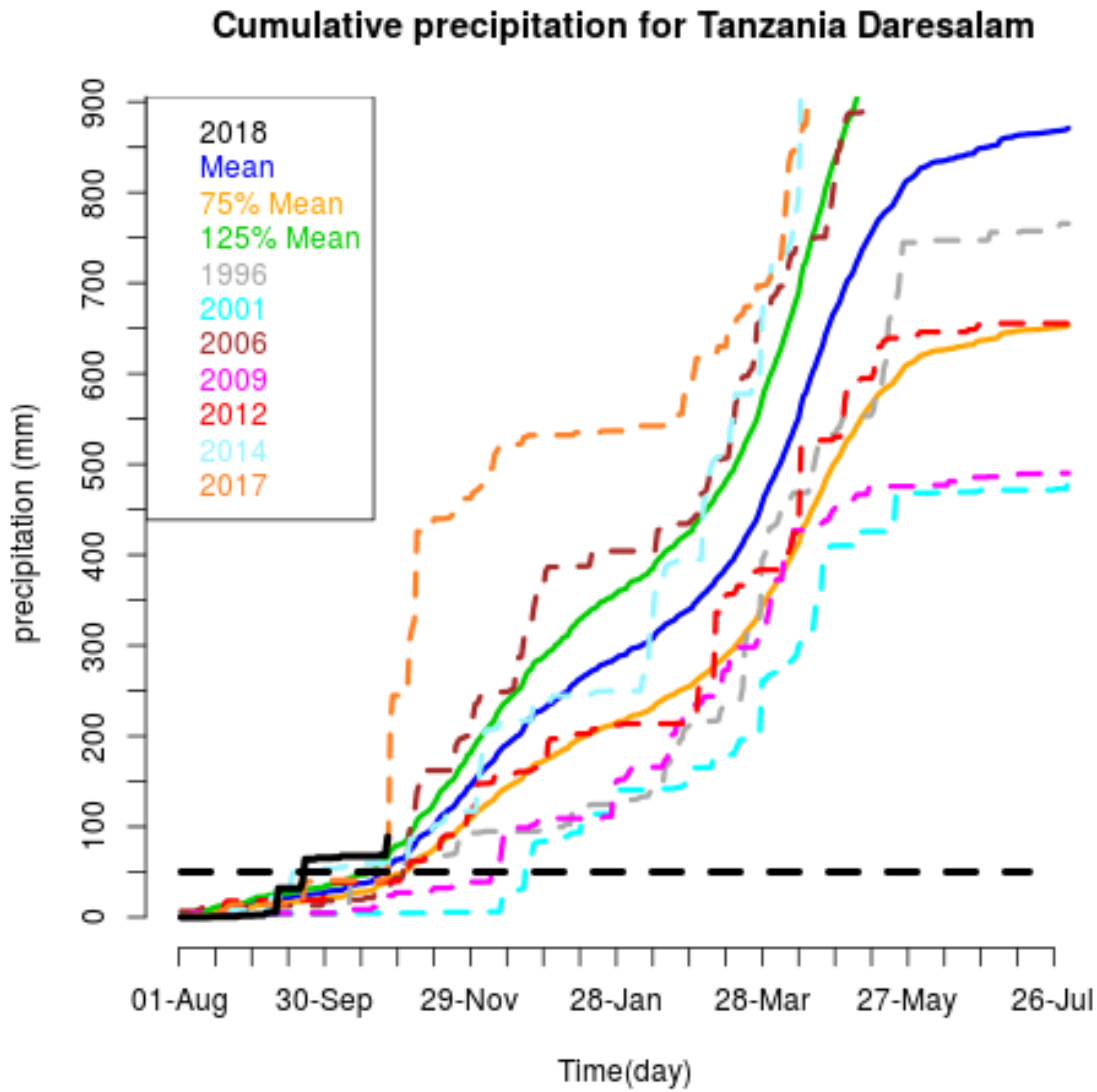

Cumulative precipitation for Kenya Nairobi
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
200
300
400
500
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)


Cumulative precipitation for Kenya Eldoret
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
250
400
550
700
850
1000
1150
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

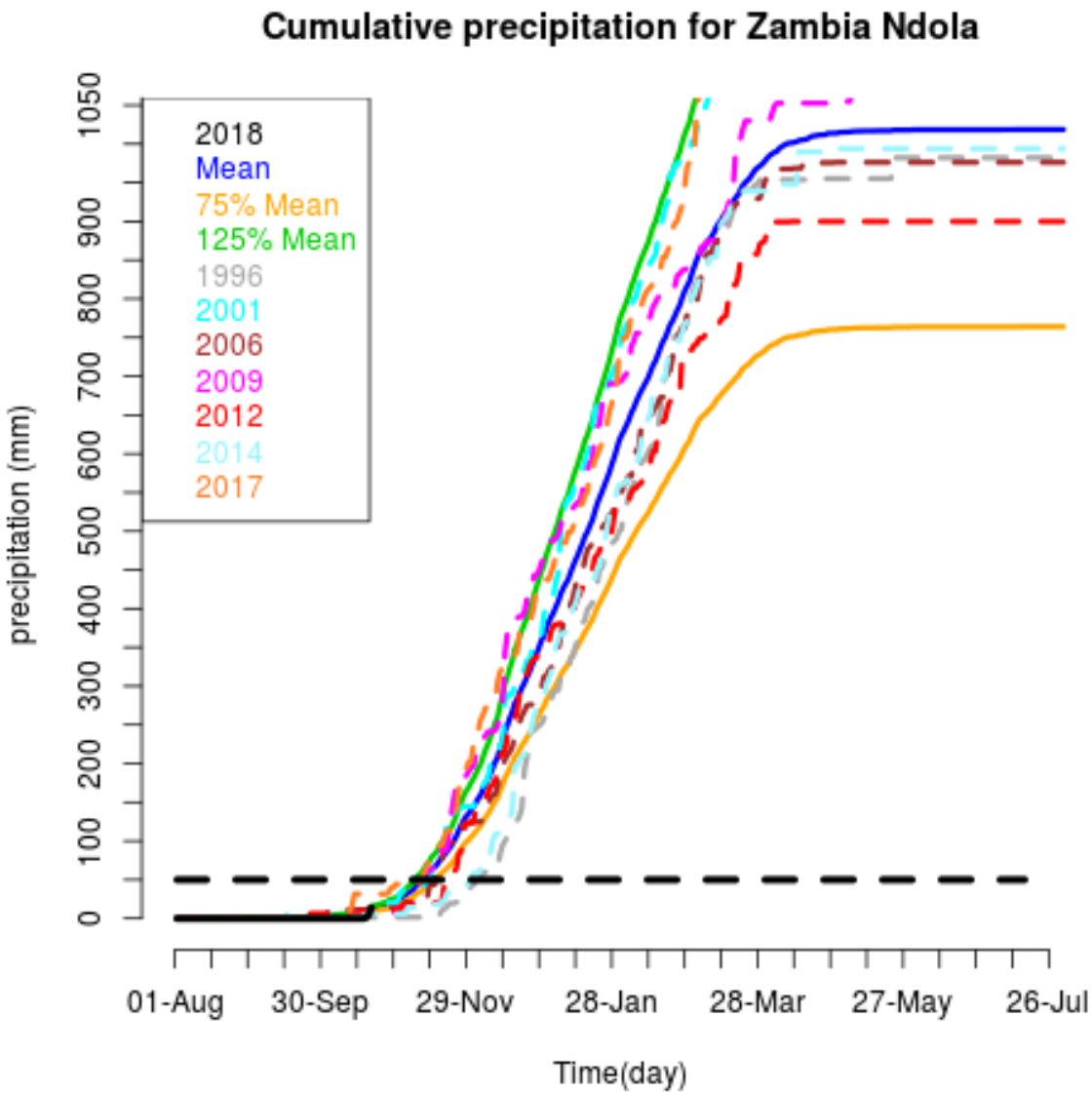

Cumulative precipitation for Uganda Kiboga
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
150
350
550
750
950
1150
1400
1650
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

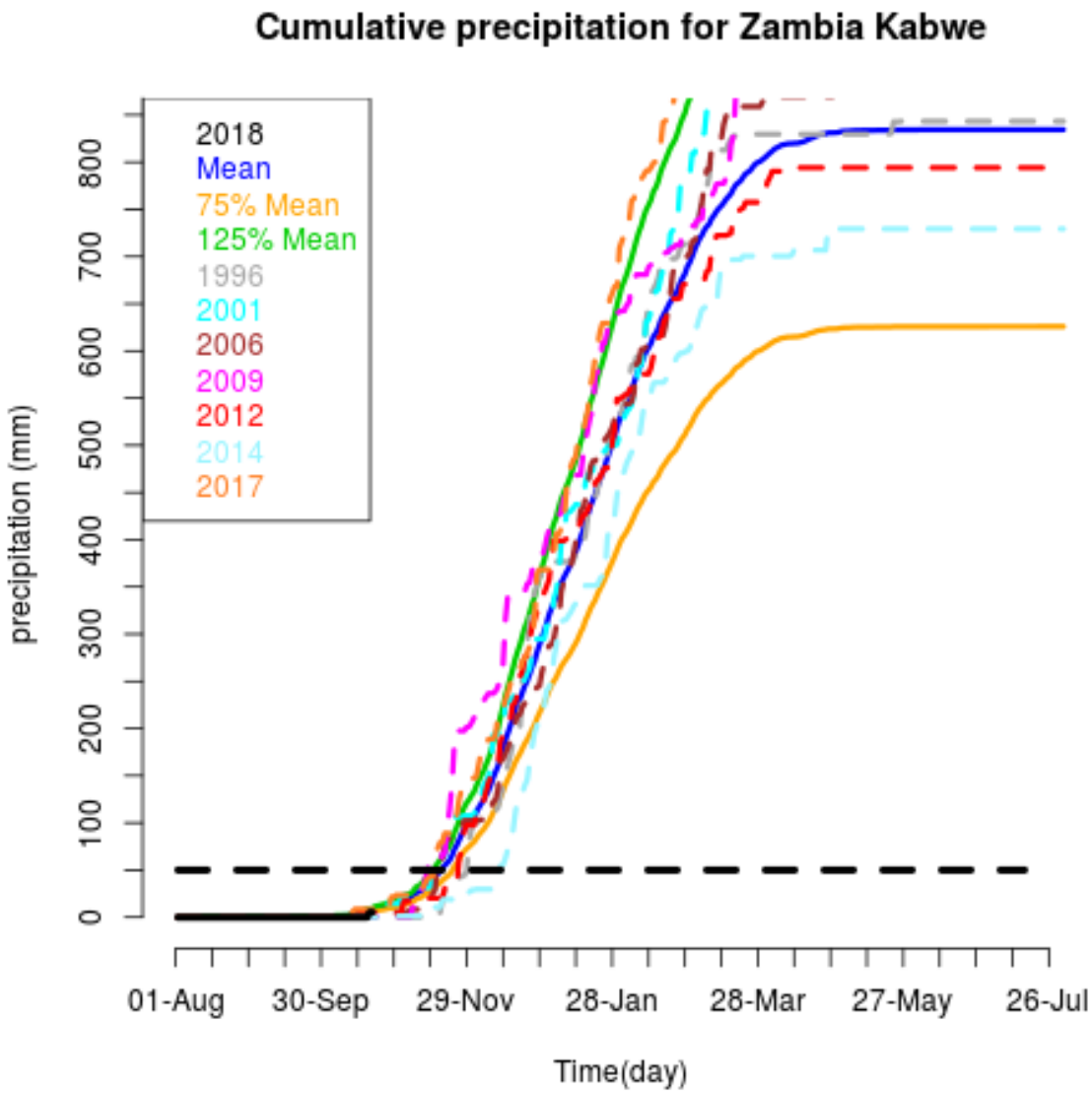

Cumulative precipitation for Uganda Mbarara
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
900
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

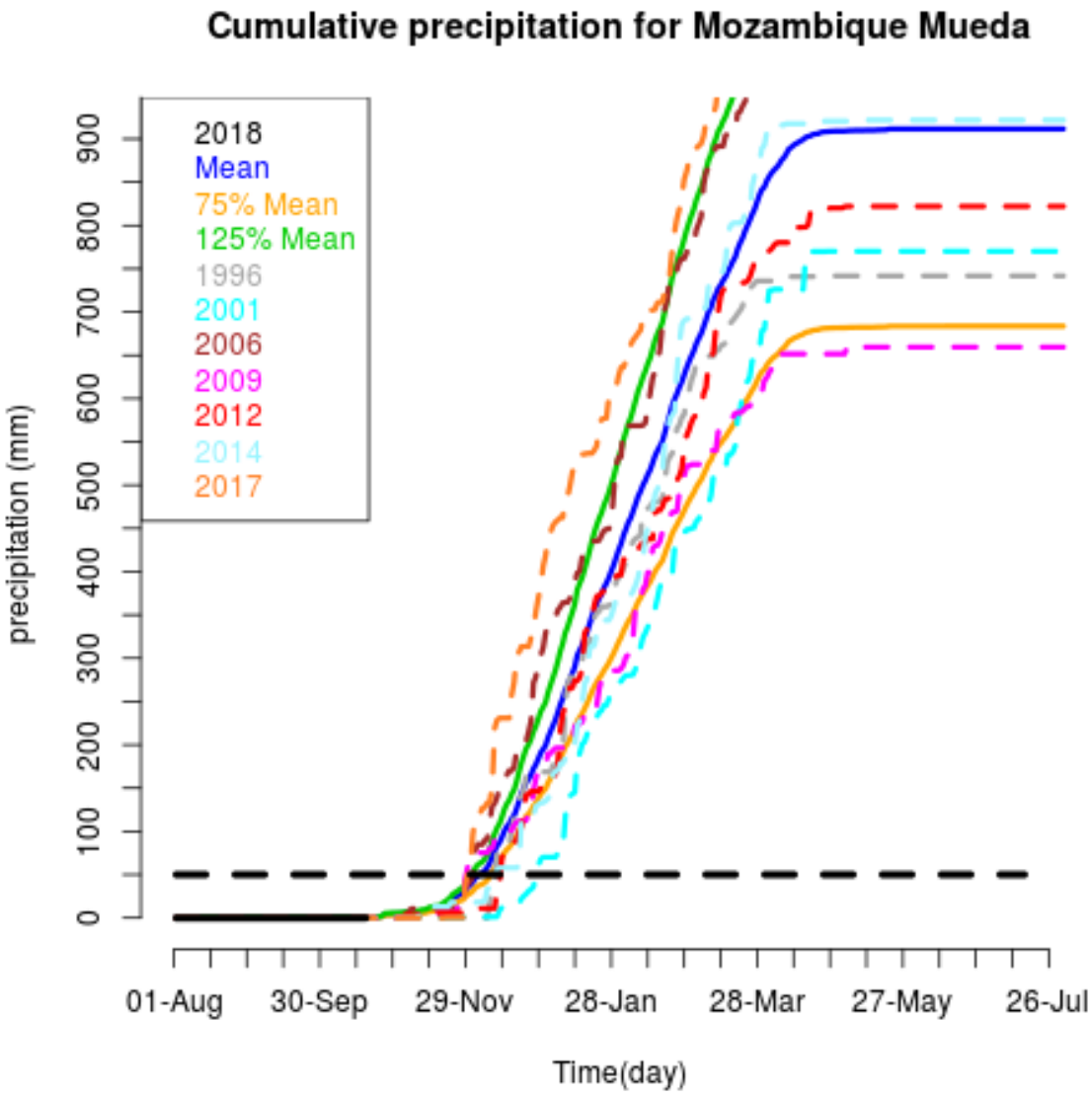

Cumulative precipitation for Tanzania Bukoba
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
150
350
550
750
950
1150
1350
1550
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

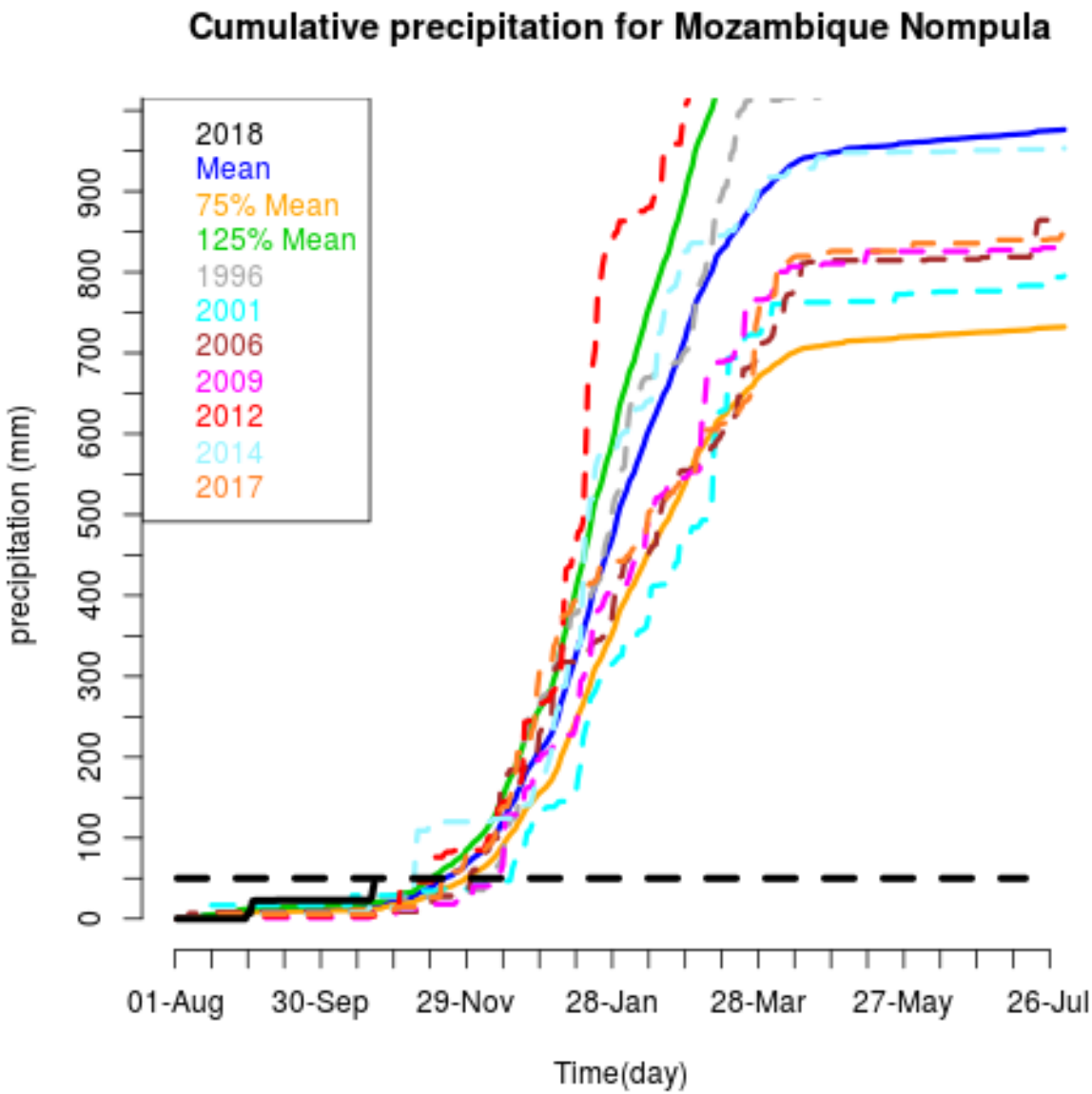

Cumulative precipitation for Tanzania Daresalam
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
900
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

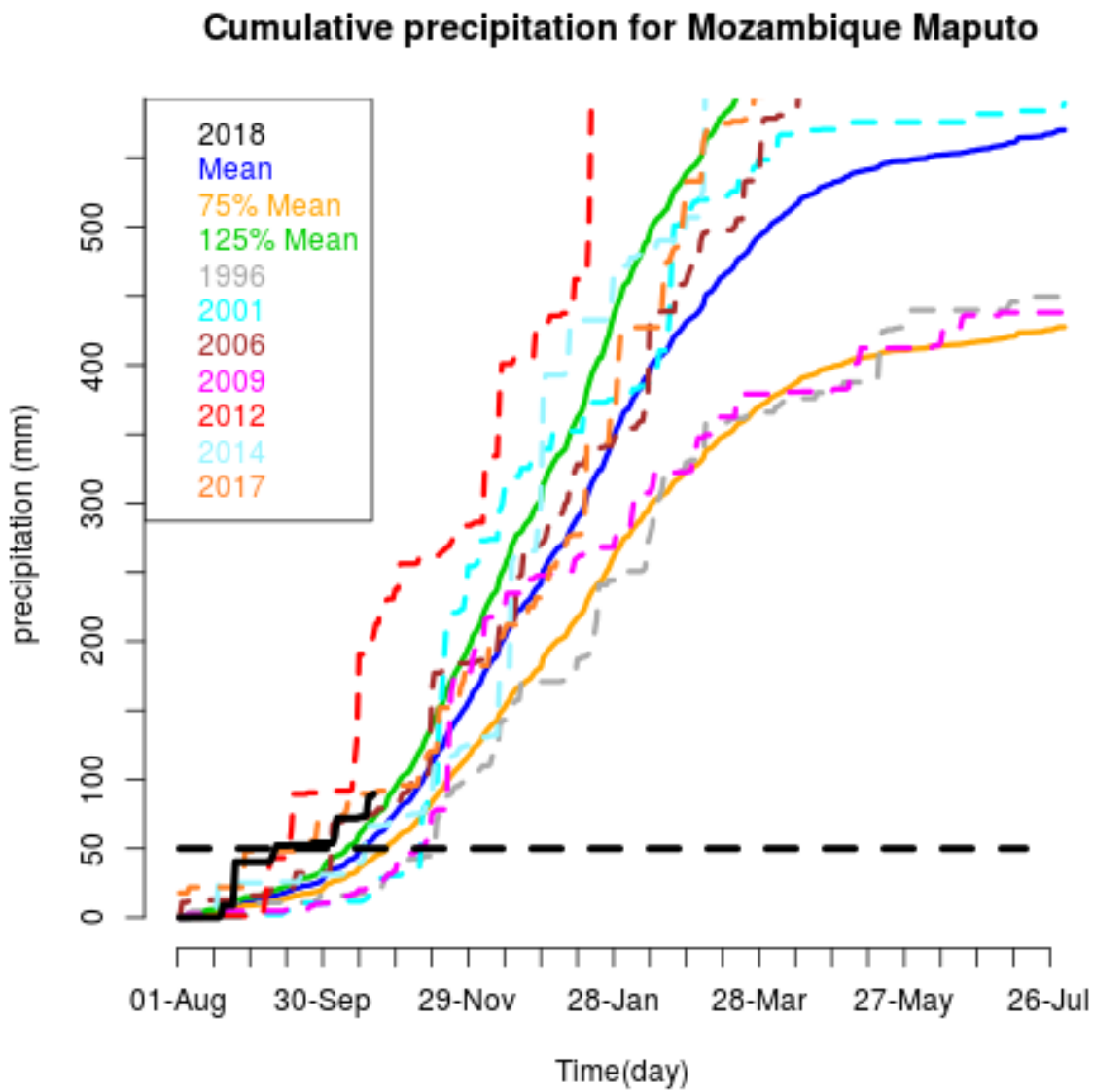
CUMULATIVE PRECIPITATION FOR SOUTHERN AFRICA

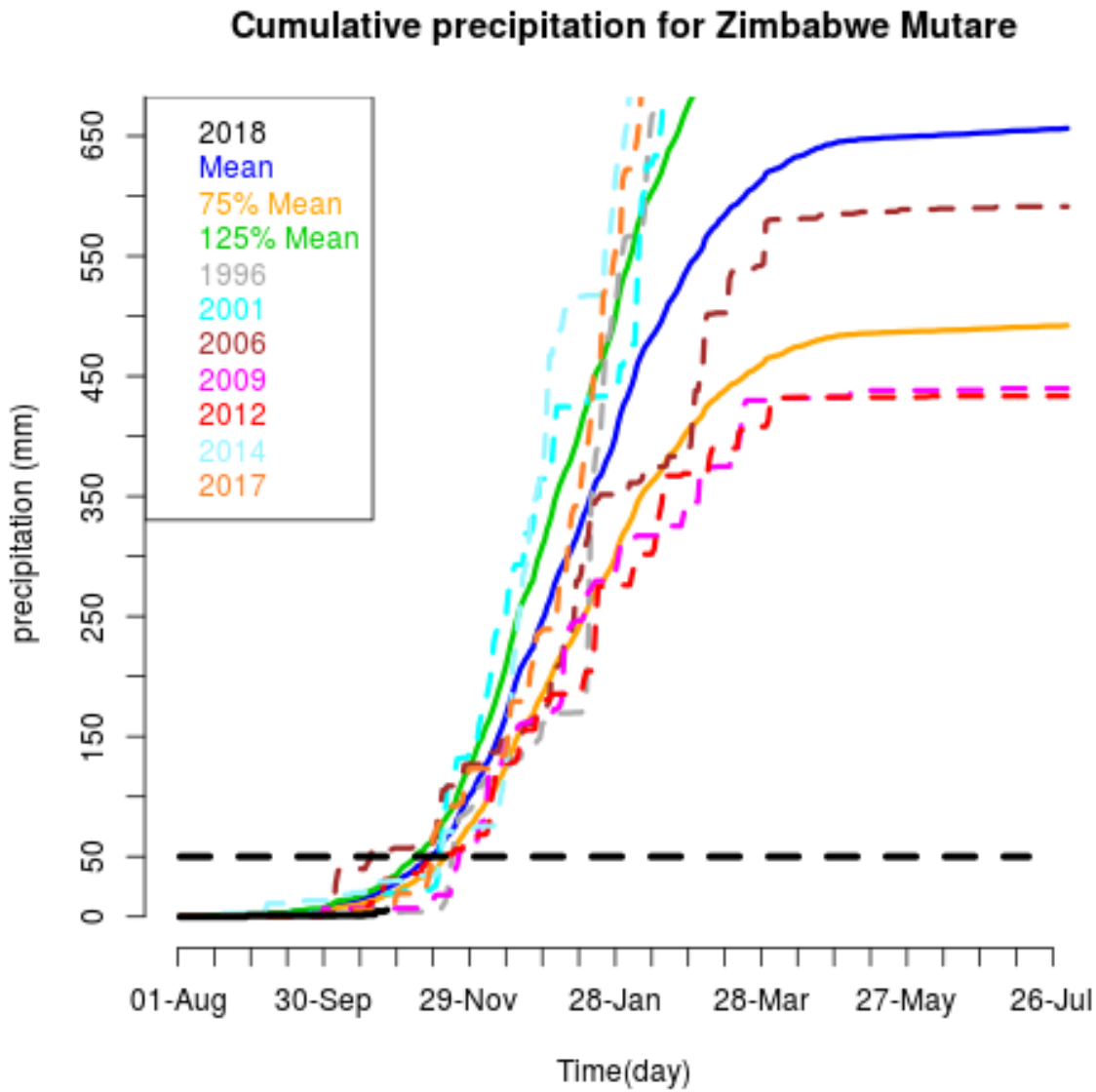

Cumulative precipitation for Zambia Ndola
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
900
1050
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

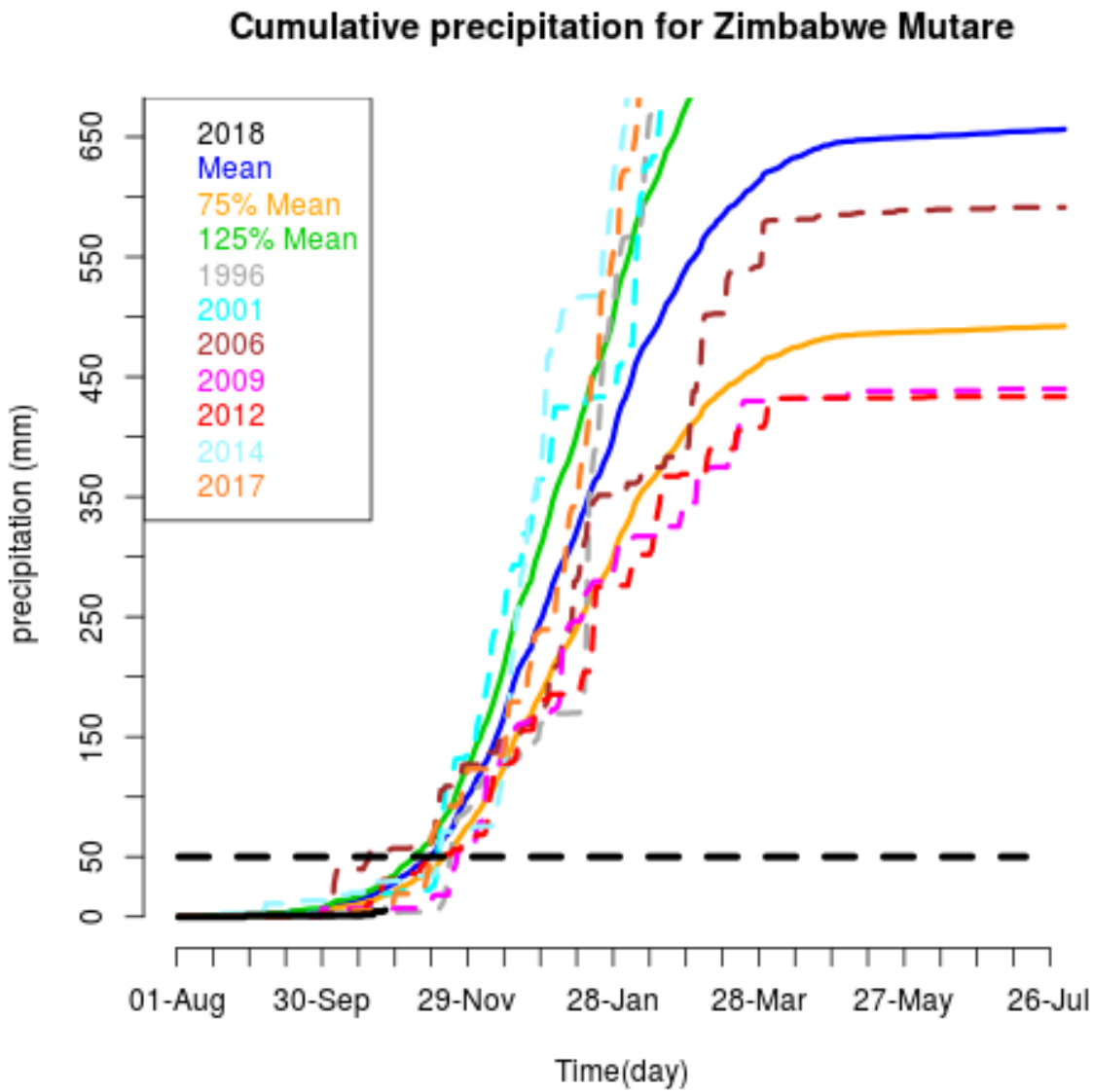

Cumulative precipitation for Zambia Kabwe
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

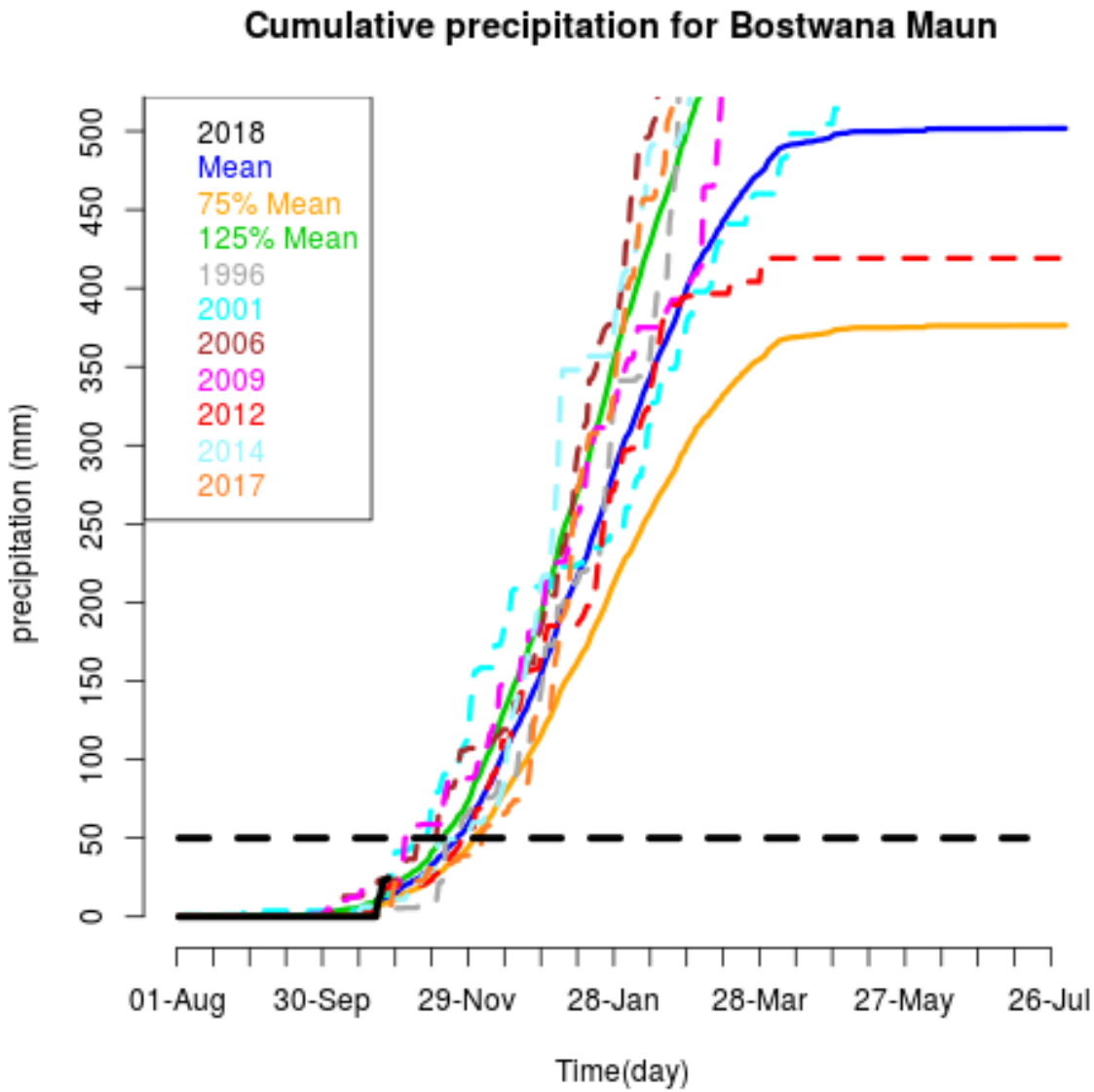

Cumulative precipitation for Mozambique Mueda
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
900
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

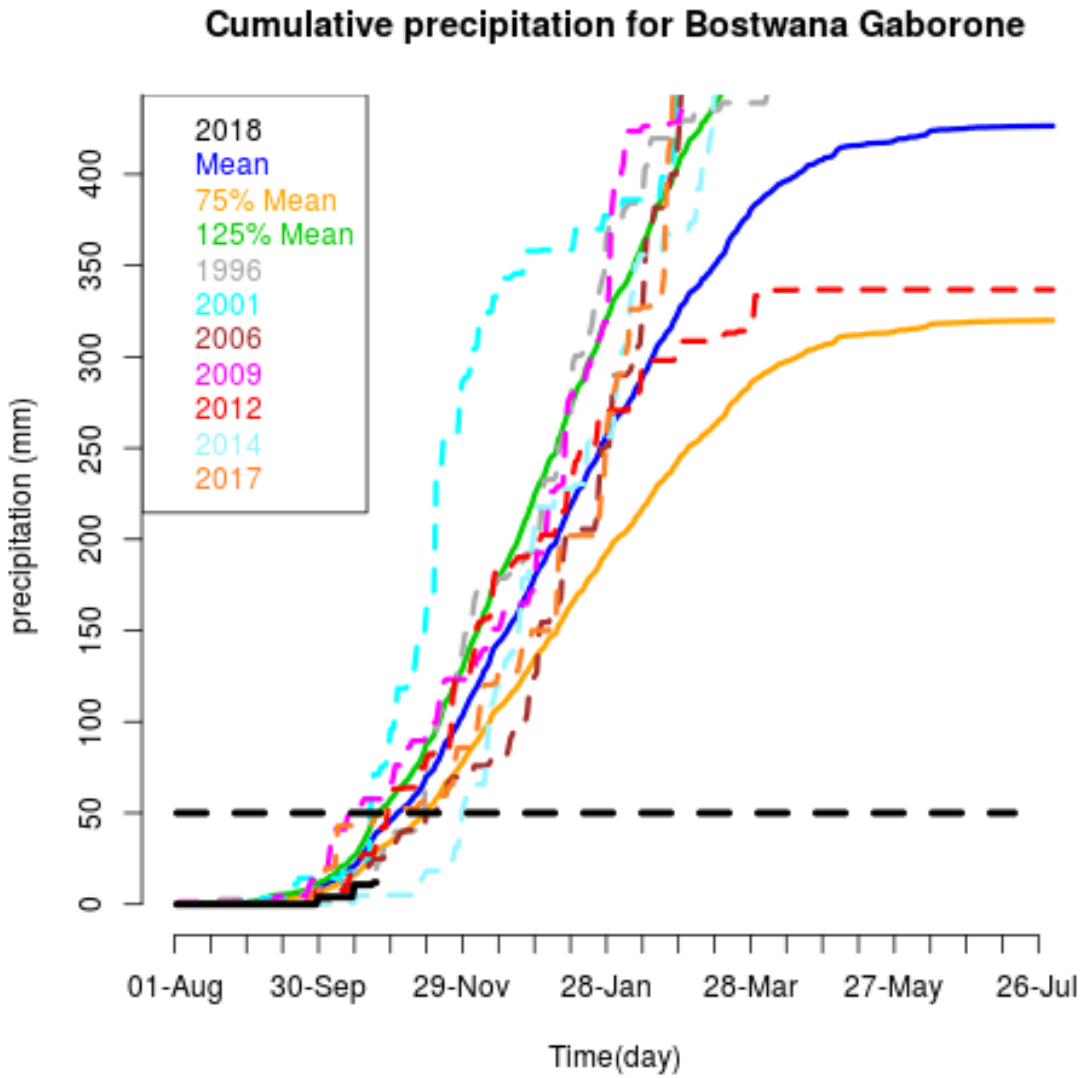

Cumulative precipitation for Mozambique Nompula
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
900
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

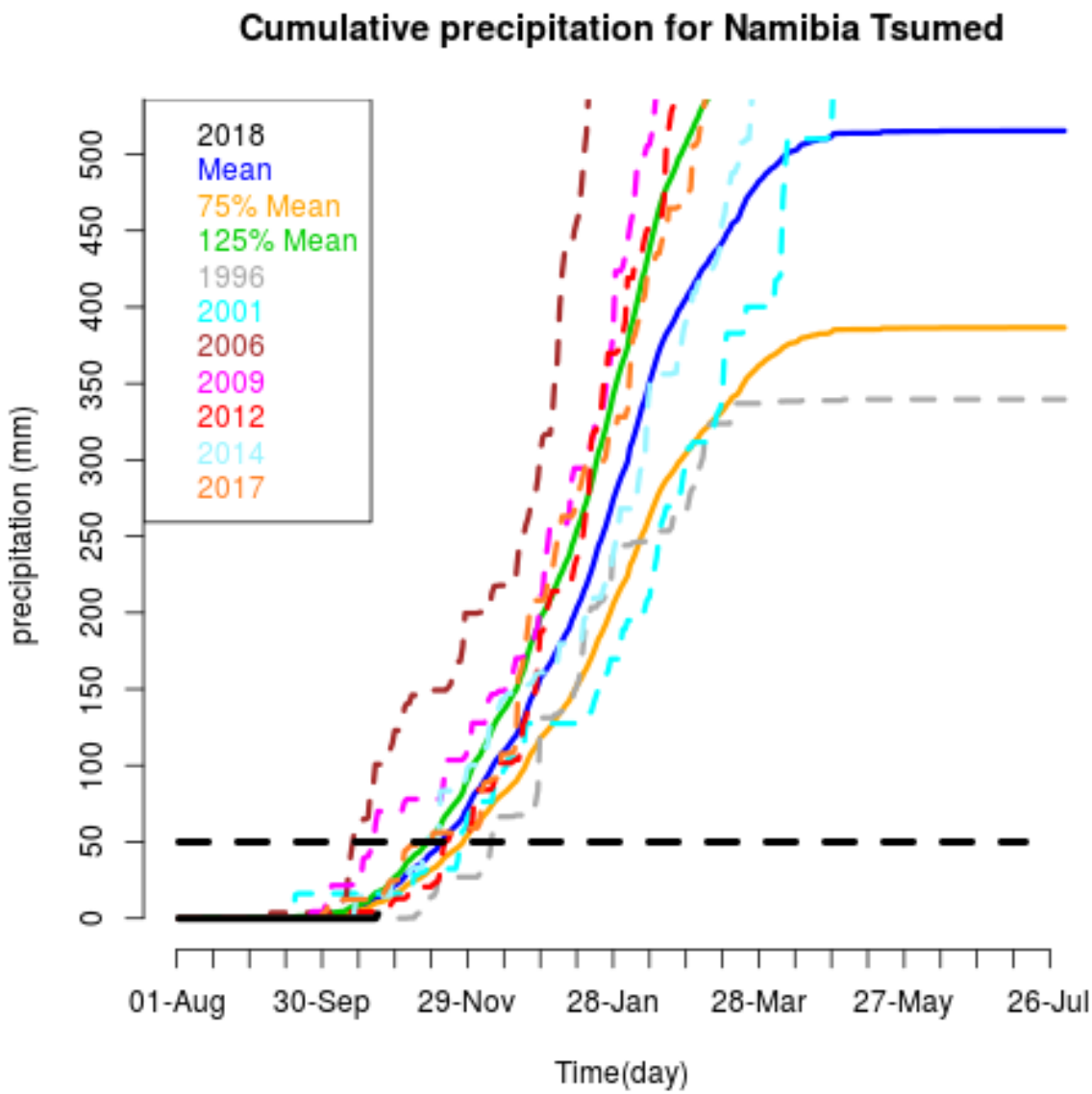

Cumulative precipitation for Mozambique Maputo
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
200
300
400
500
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

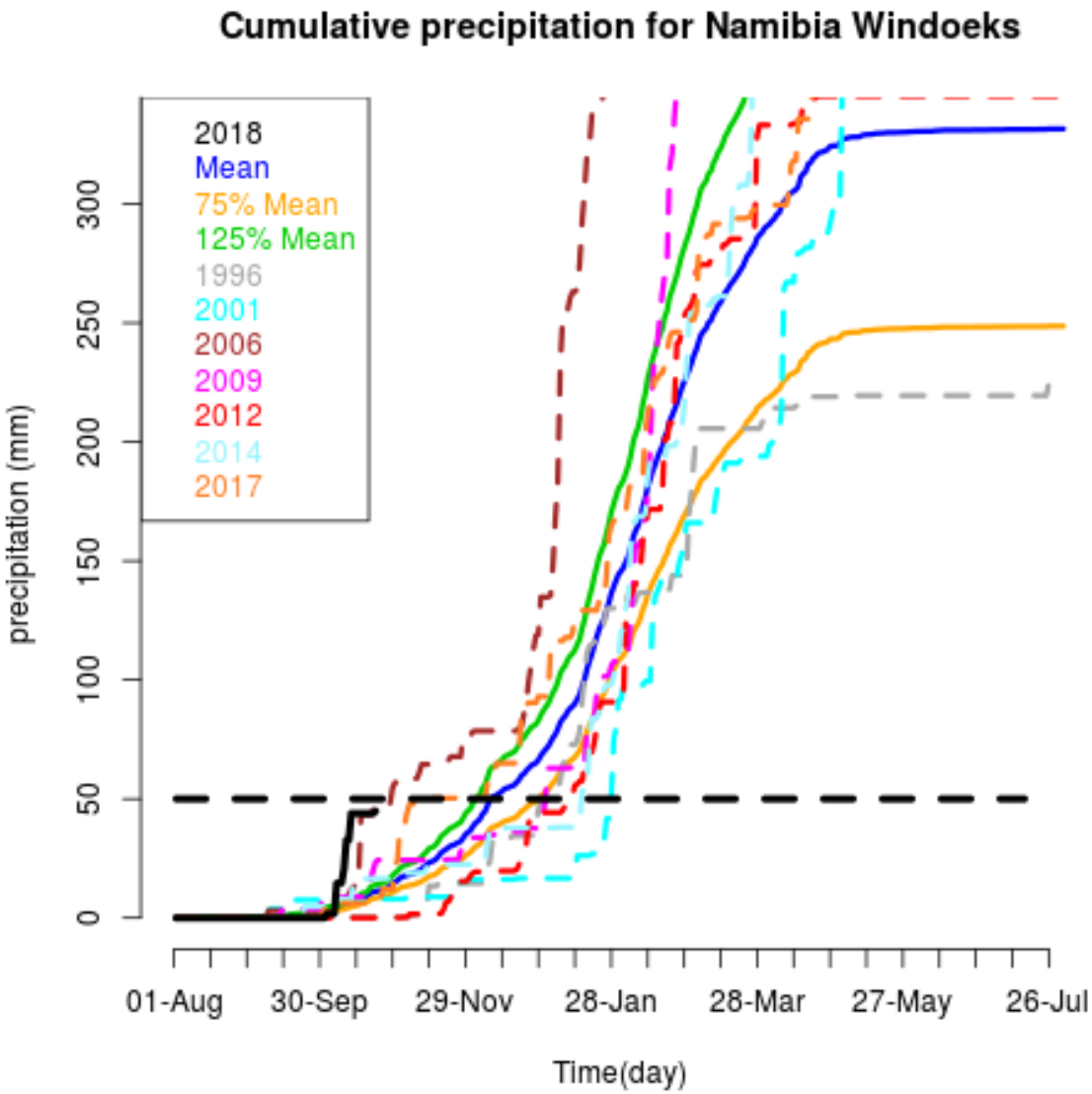

Cumulative precipitation for Zimbabwe Mutare
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
150
250
350
450
550
650
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

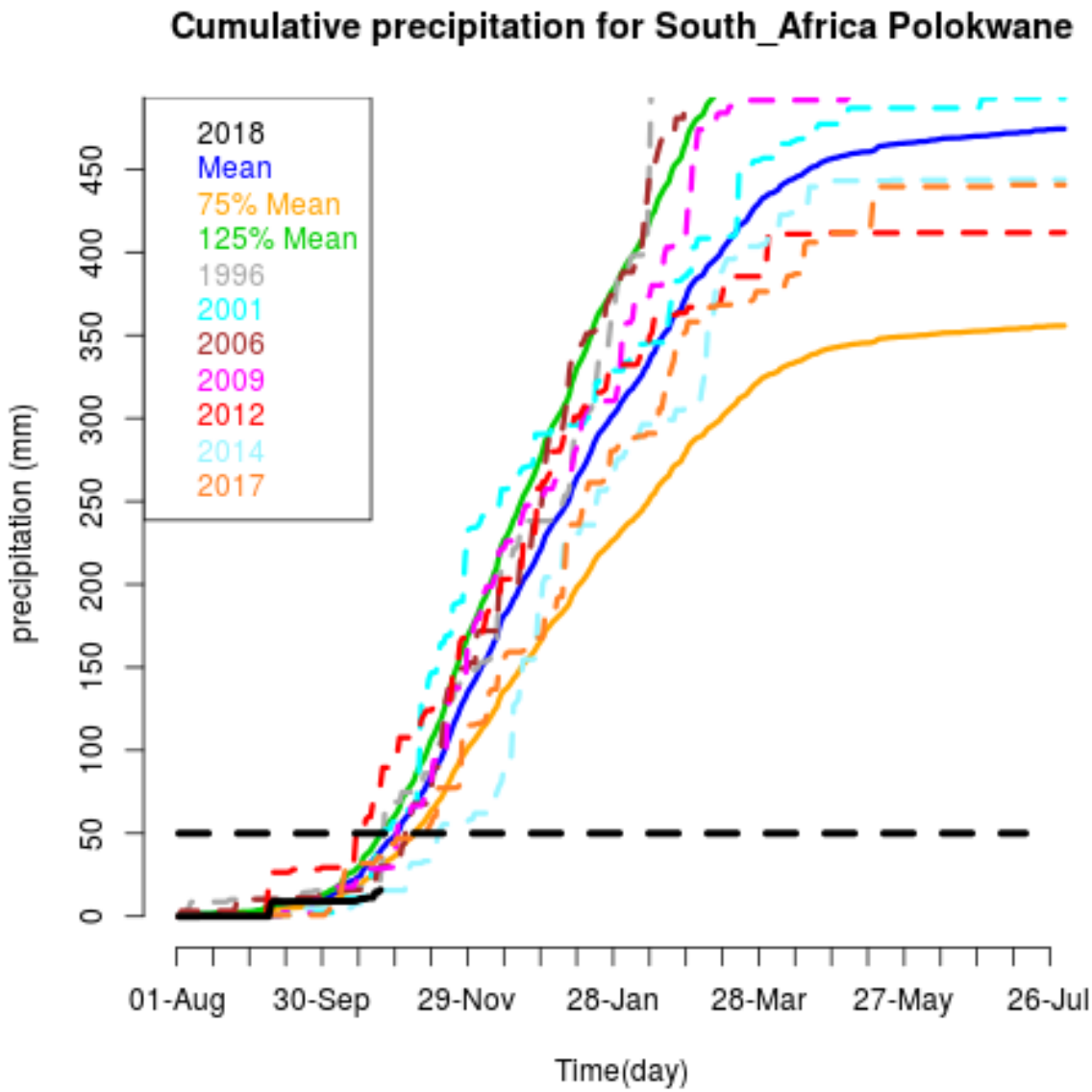

Cumulative precipitation for Zimbabwe Mutare
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
150
250
350
450
550
650
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

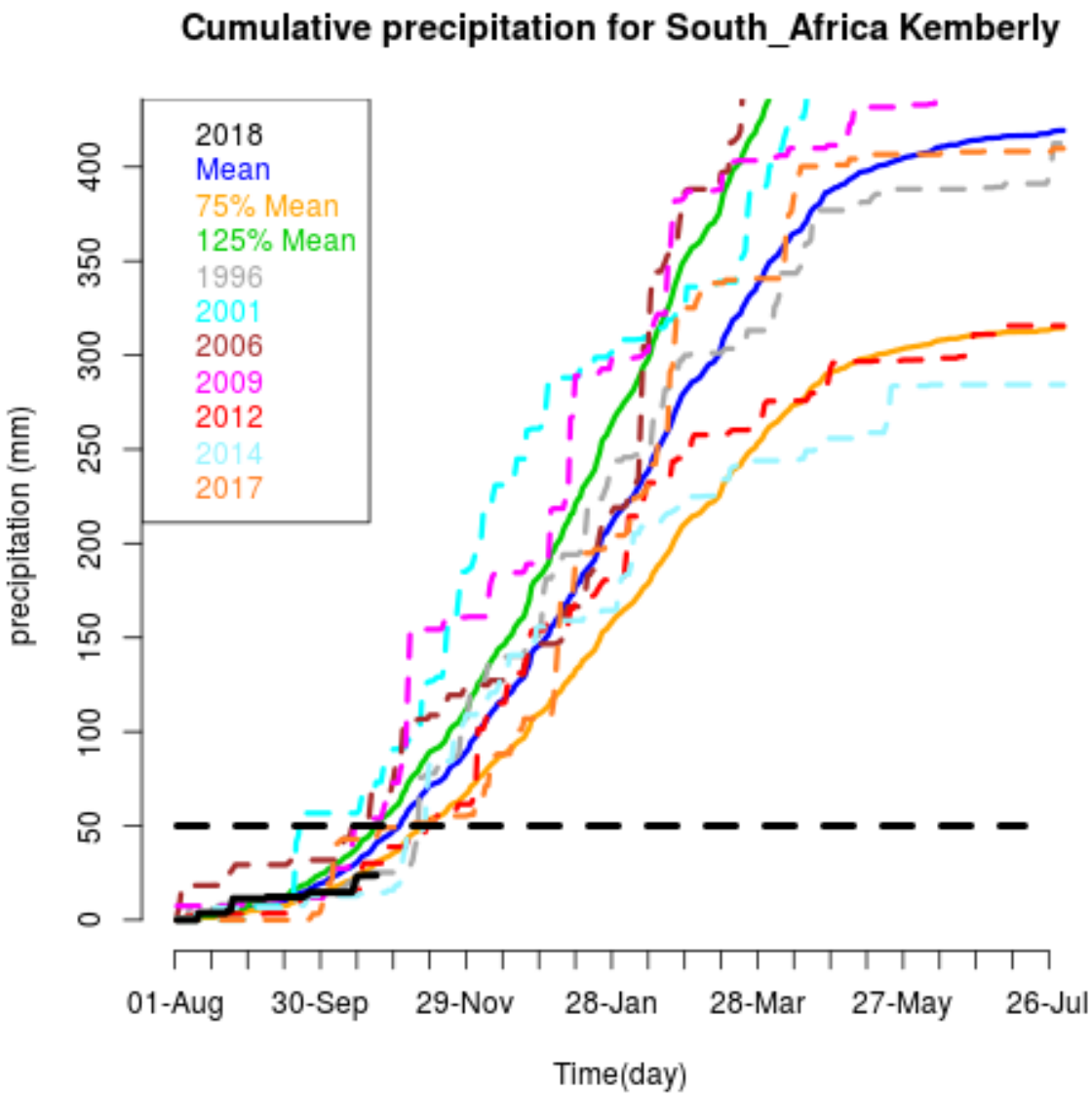

Cumulative precipitation for Bostwana Maun
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
250
300
350
400
450
500
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

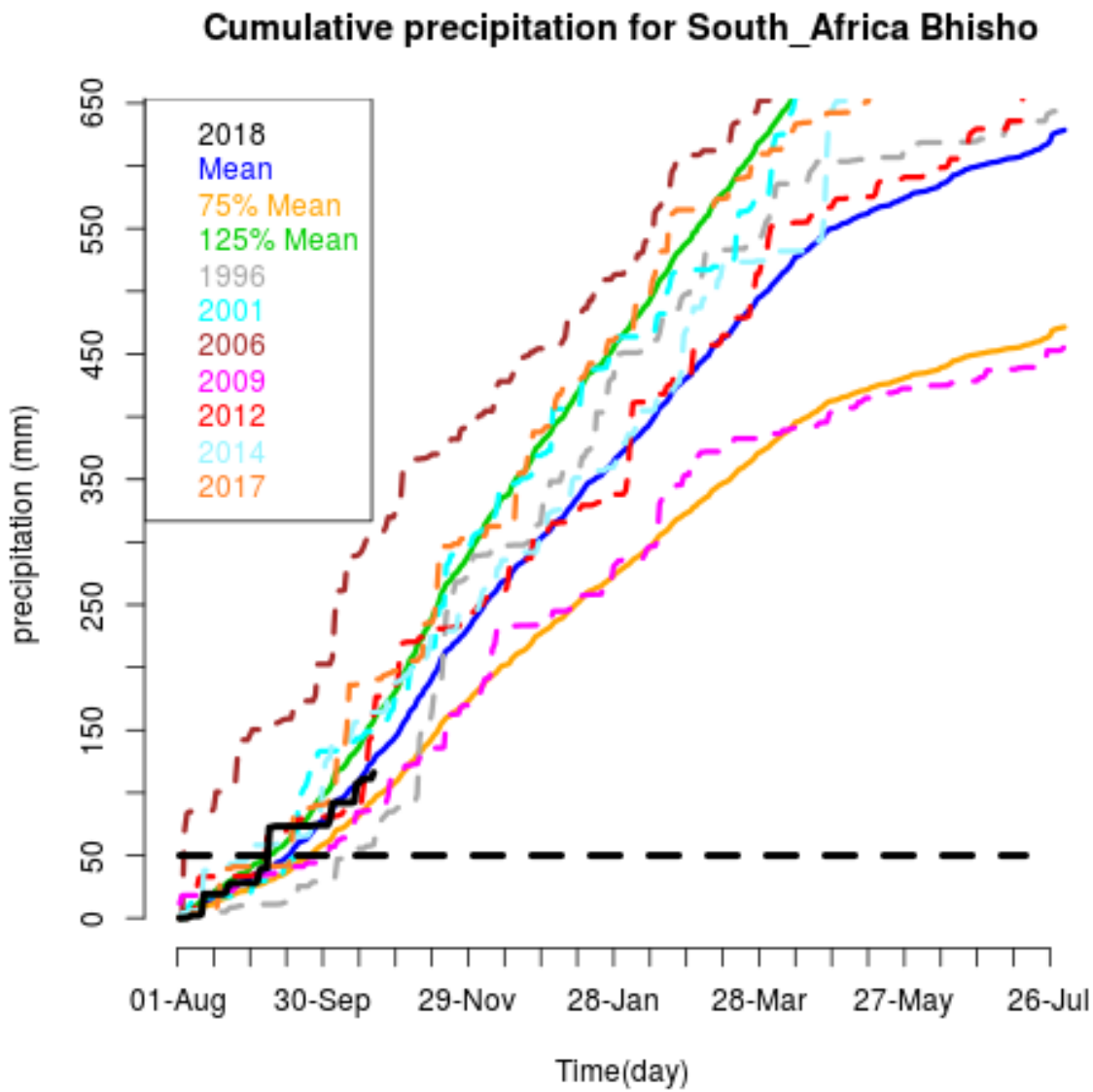

Cumulative precipitation for Bostwana Gaborone
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
250
300
350
400
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

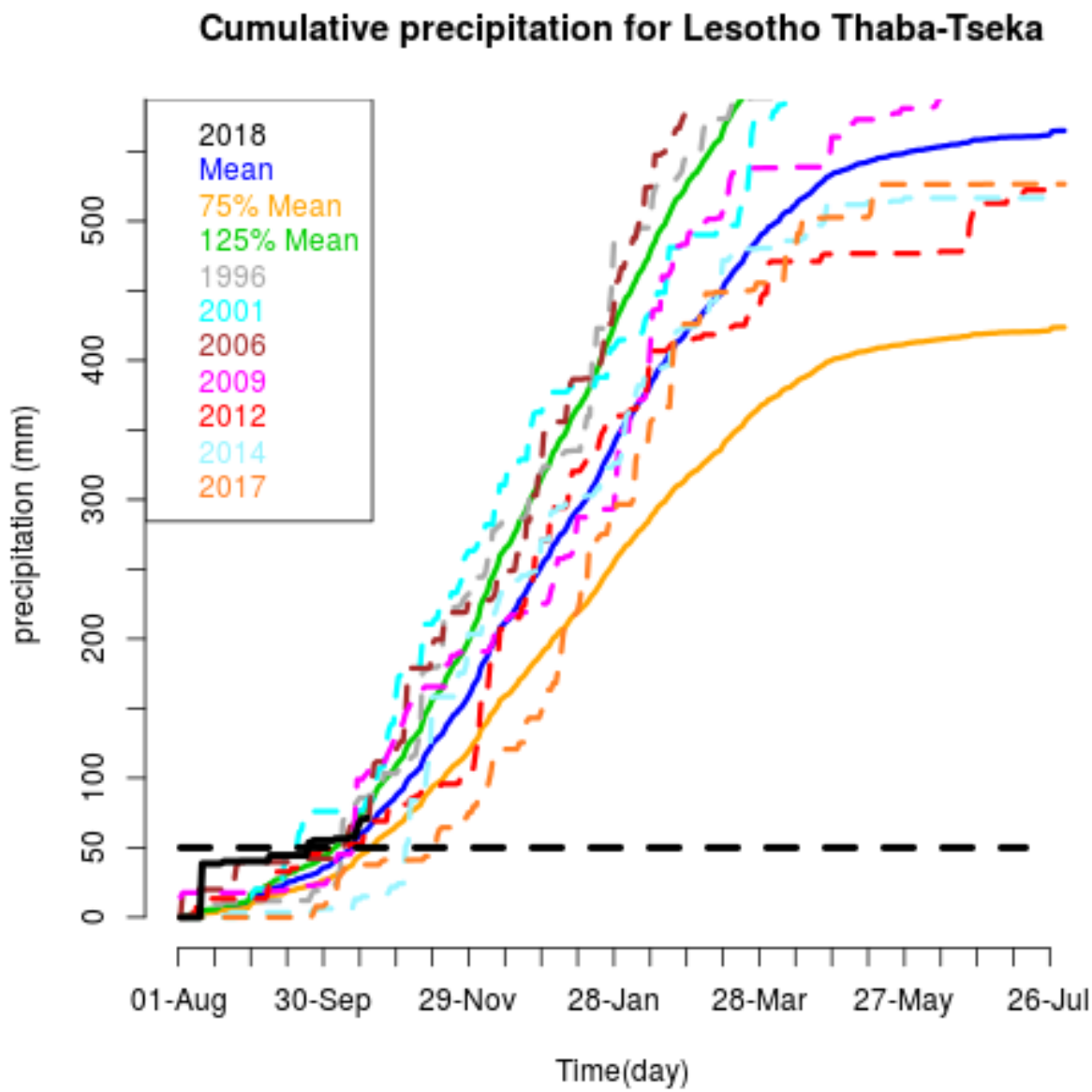

Cumulative precipitation for Namibia Tsumed
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
250
300
350
400
450
500
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

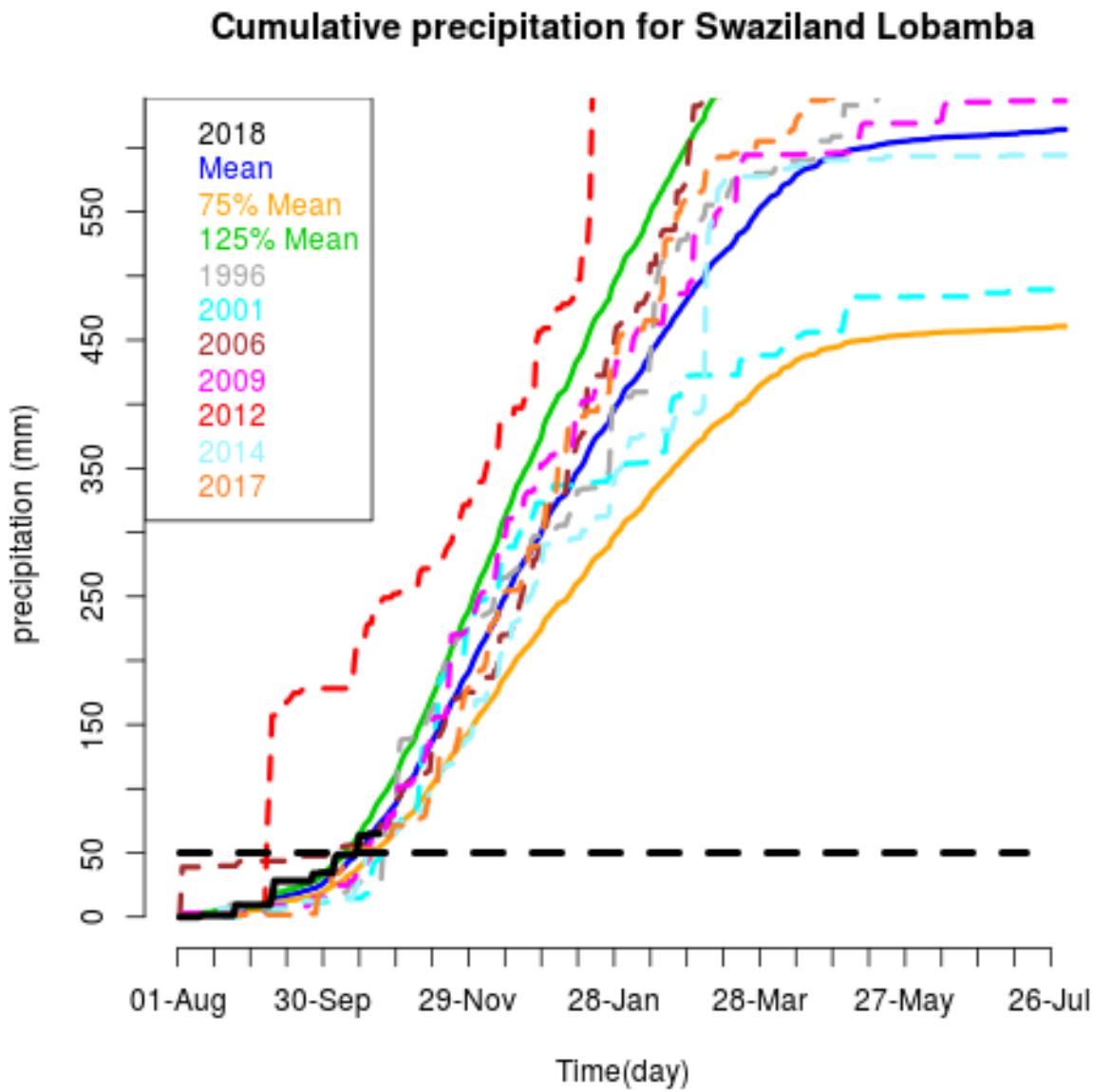

Cumulative precipitation for Namibia Windoeks
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
250
300
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

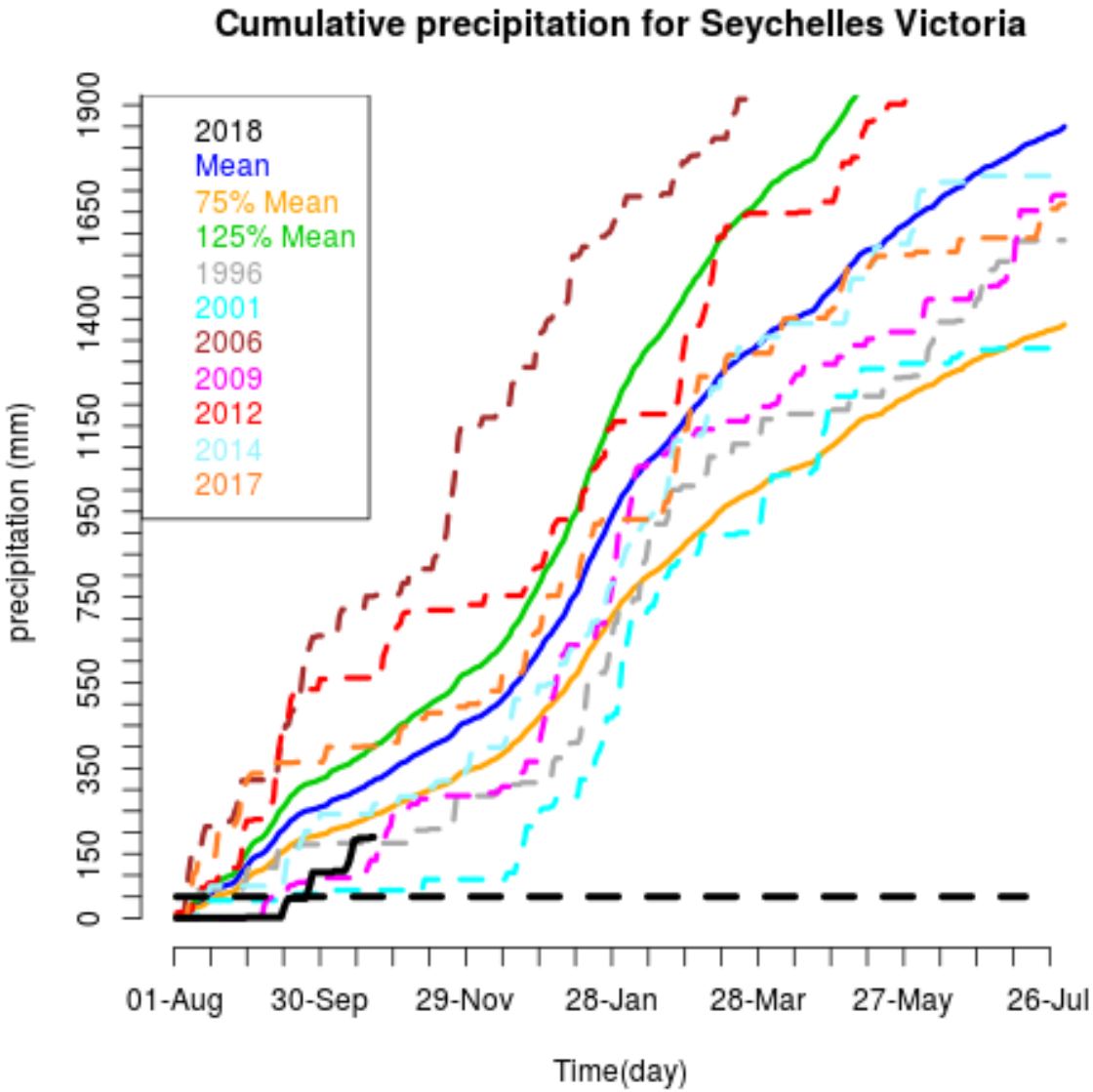

Cumulative precipitation for South_Africa Polokwane
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
250
300
350
400
450
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

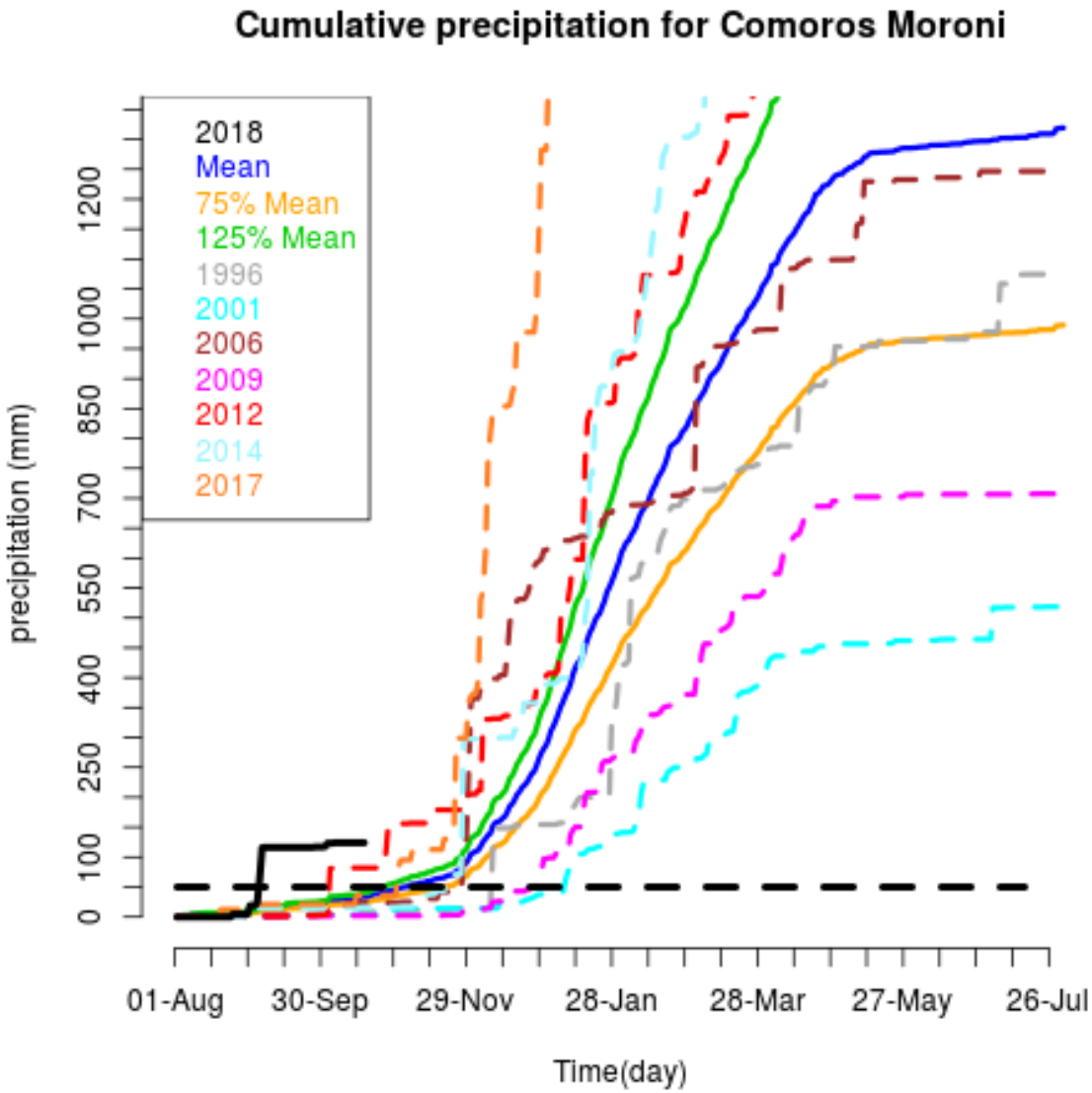

Cumulative precipitation for South_Africa Kemberly
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
250
300
350
400
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

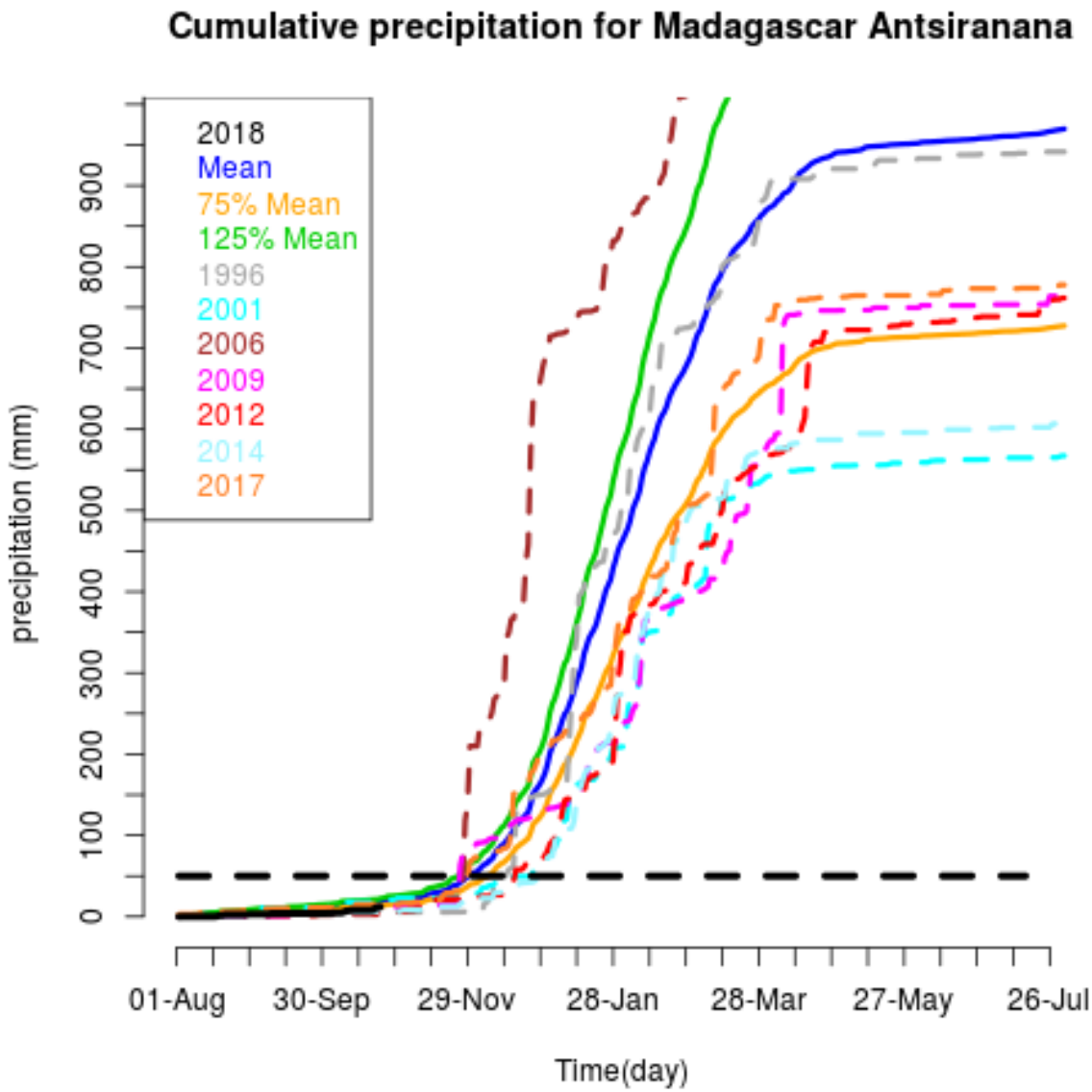

Cumulative precipitation for South_Africa Bhisho
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
150
250
350
450
550
650
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

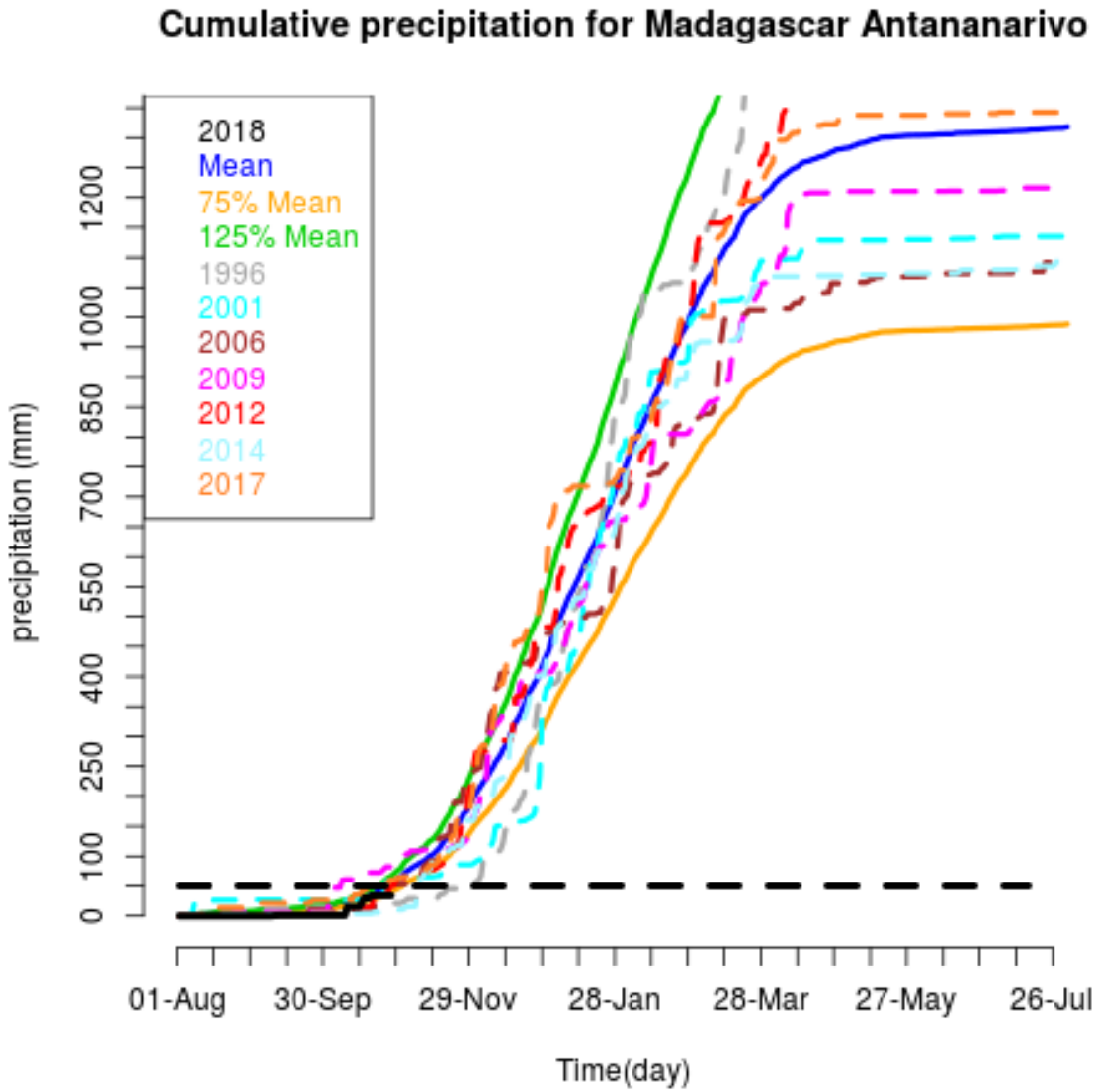

Cumulative precipitation for Lesotho Thaba-Tseka
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
200
300
400
500
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

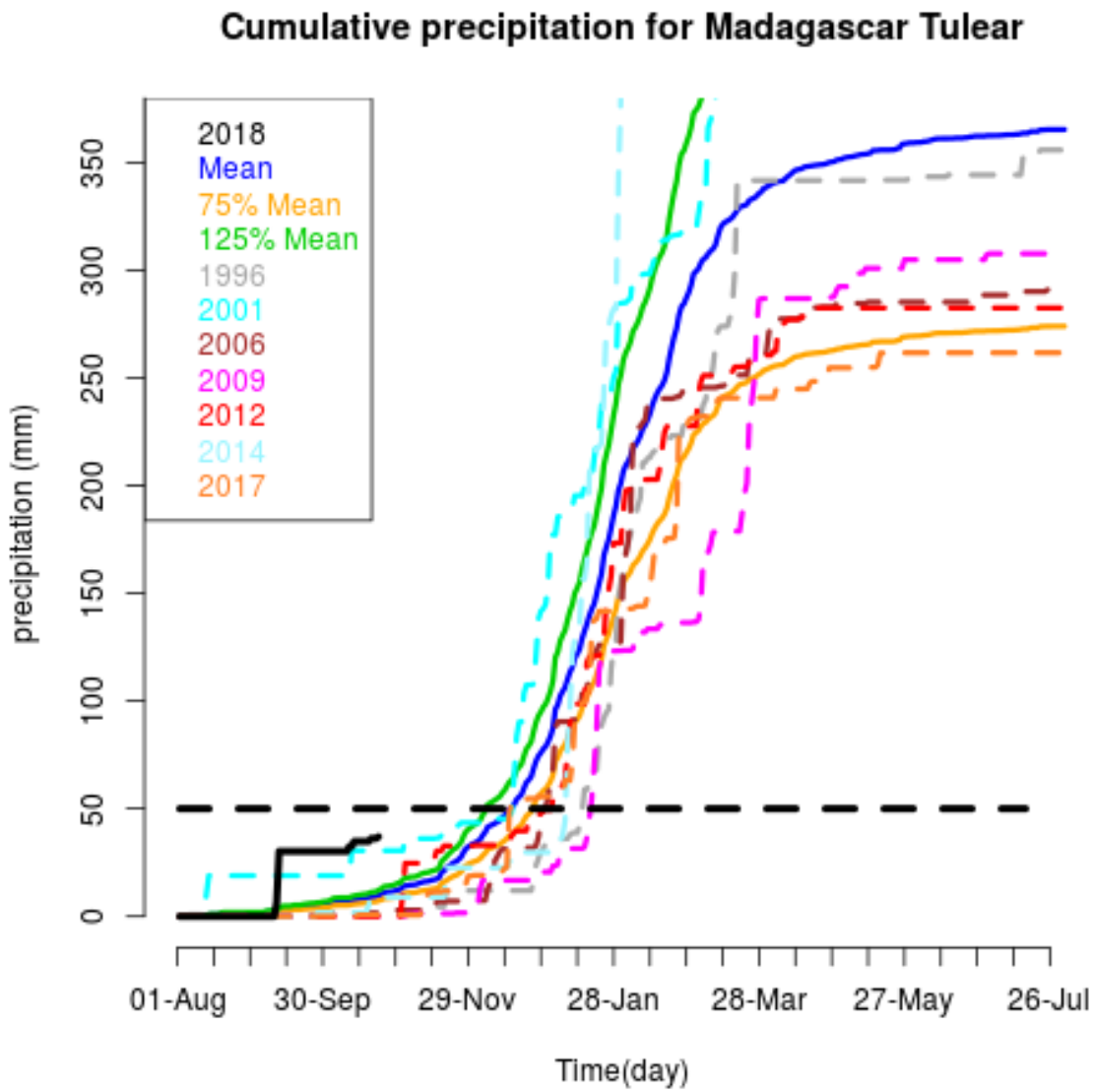

Cumulative precipitation for Swaziland Lobamba
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
150
250
350
450
550
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

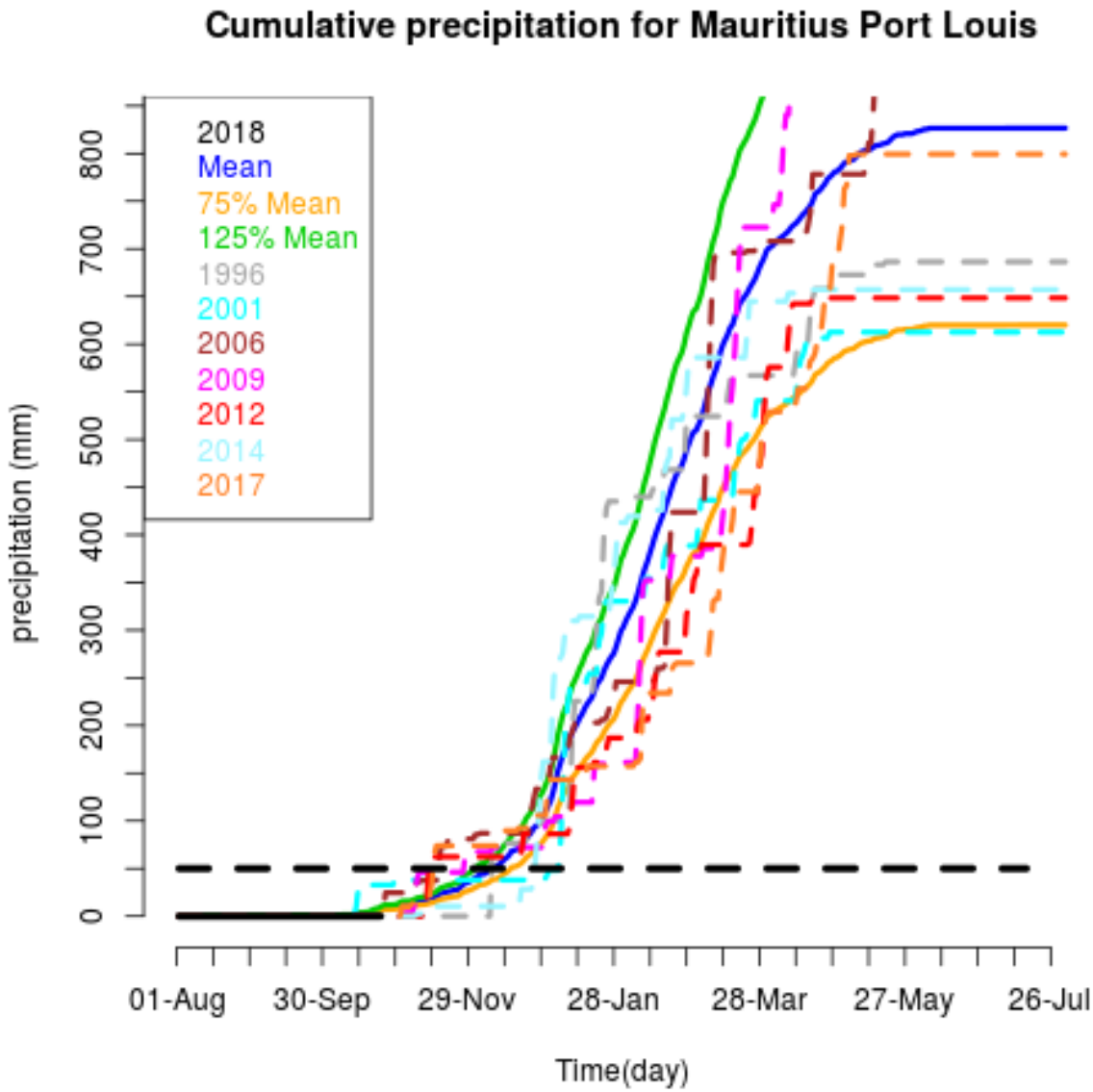

Cumulative precipitation for Seychelles Victoria
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
150
350
550
750
950
1150
1400
1650
1900
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

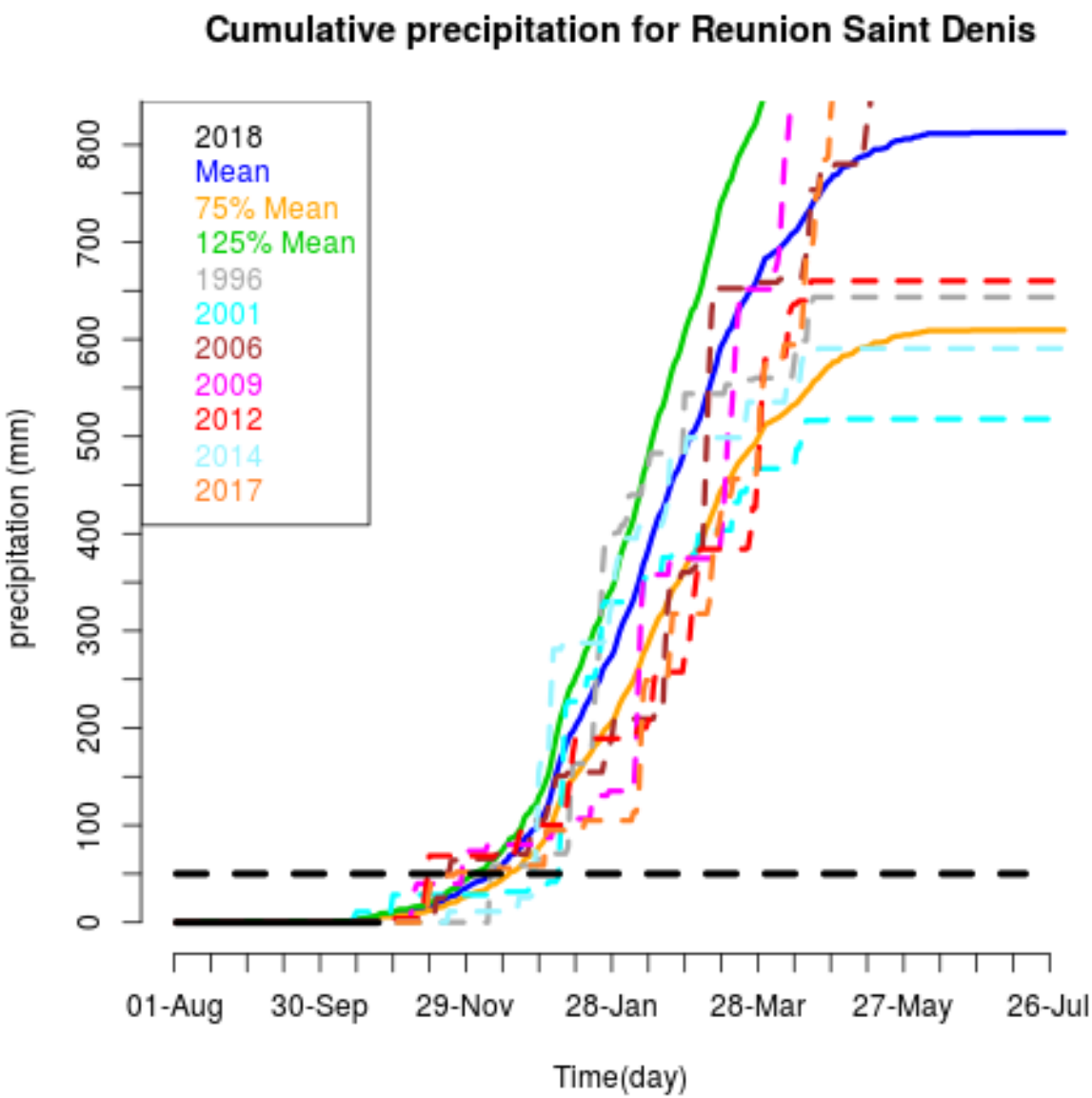

Cumulative precipitation for Comoros Moroni
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
250
400
550
700
850
1000
1200
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)


Cumulative precipitation for Madagascar Antsiranana
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
900
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

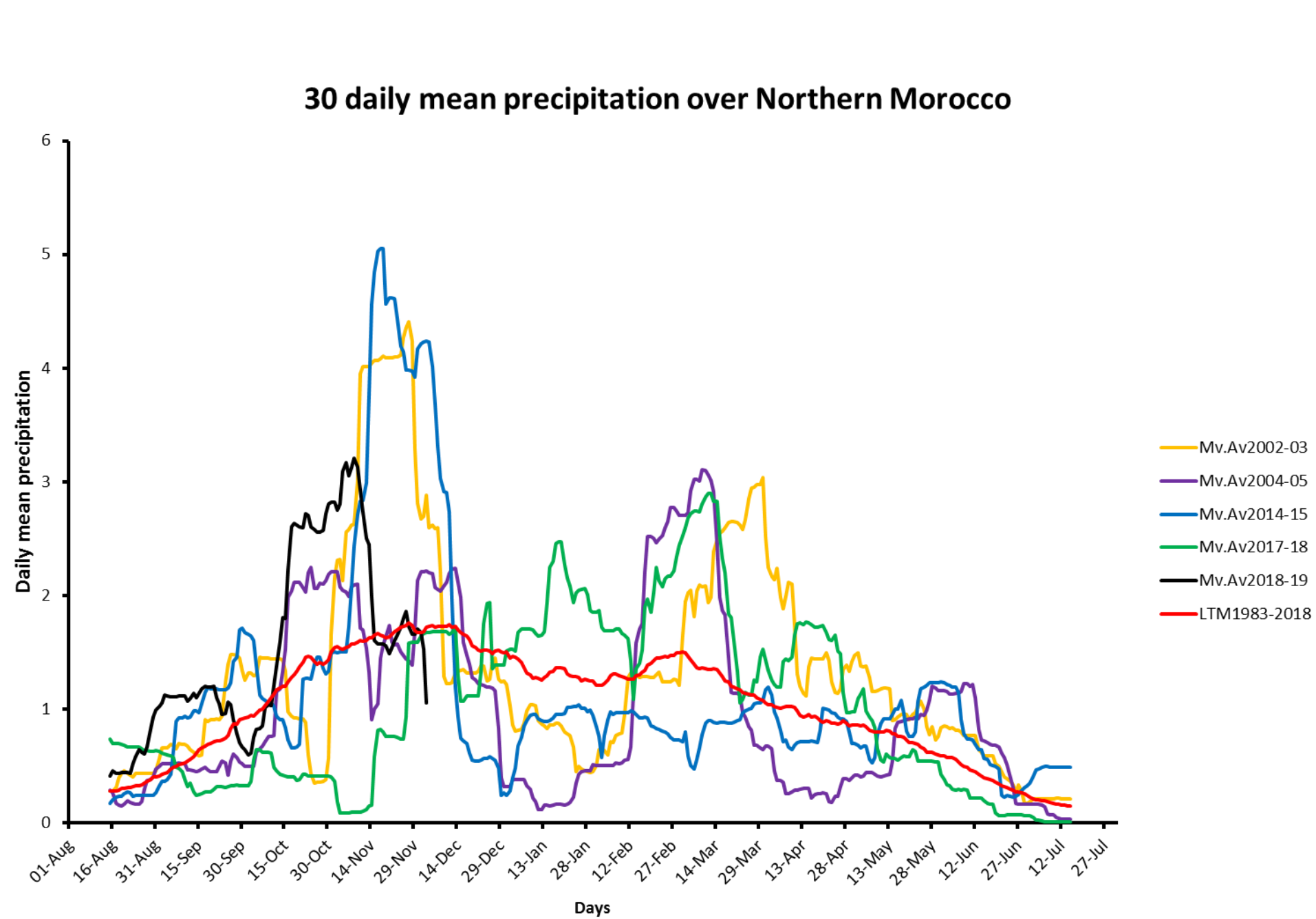

Cumulative precipitation for Madagascar Antananarivo
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
250
400
550
700
850
1000
1200
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

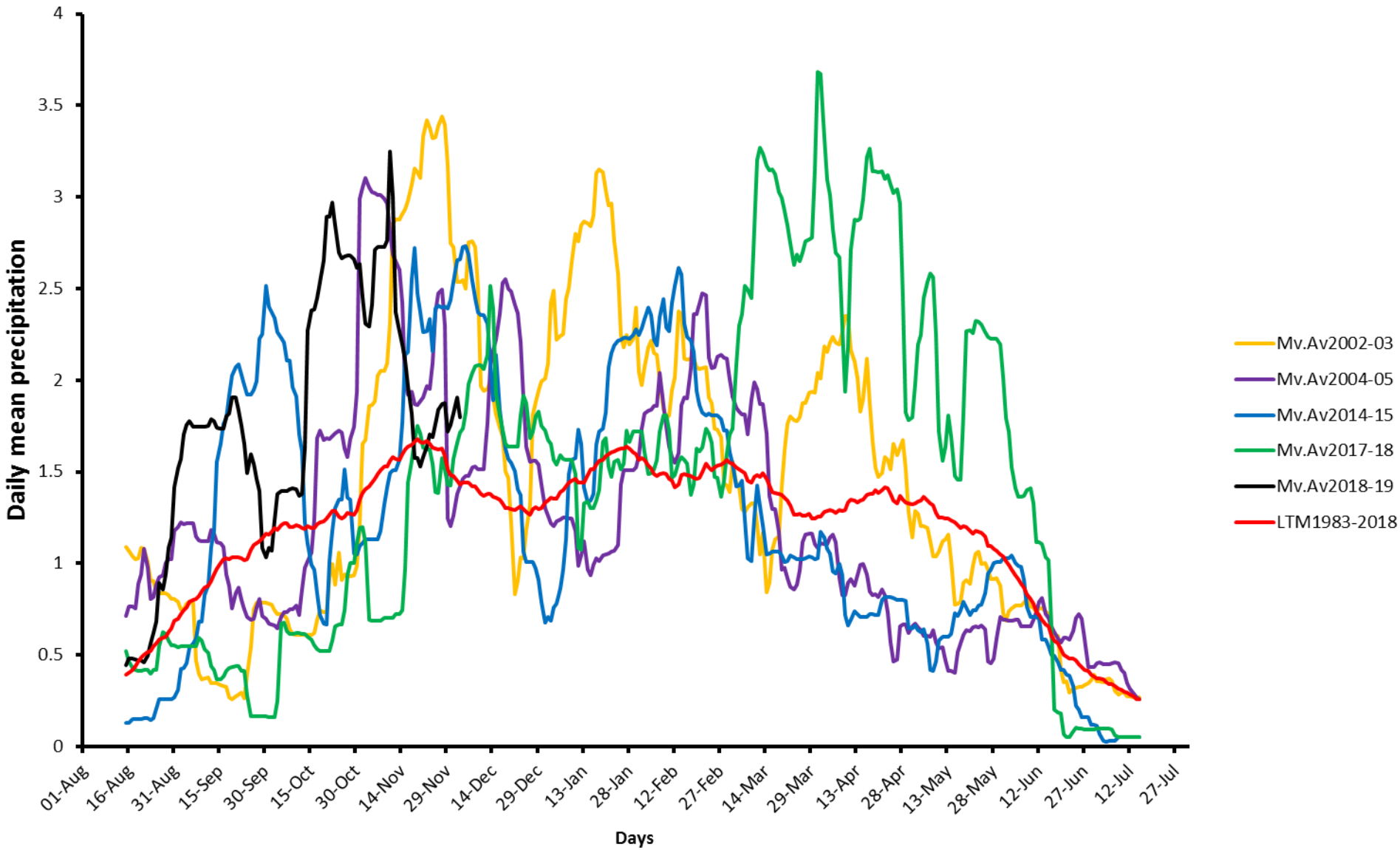

Cumulative precipitation for Madagascar Tulear
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
50
100
150
200
250
300
350
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

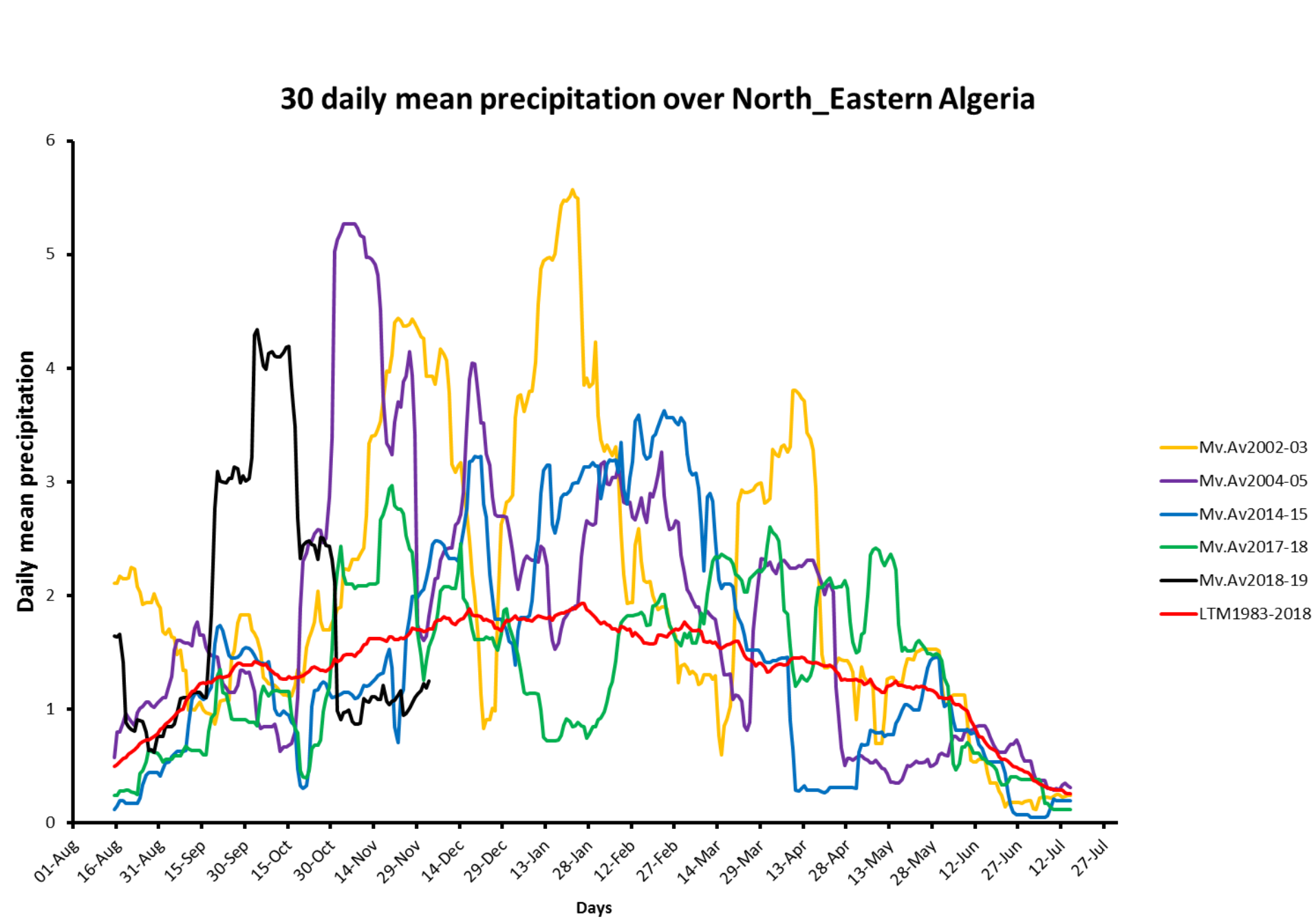

Cumulative precipitation for Mauritius Port Louis
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

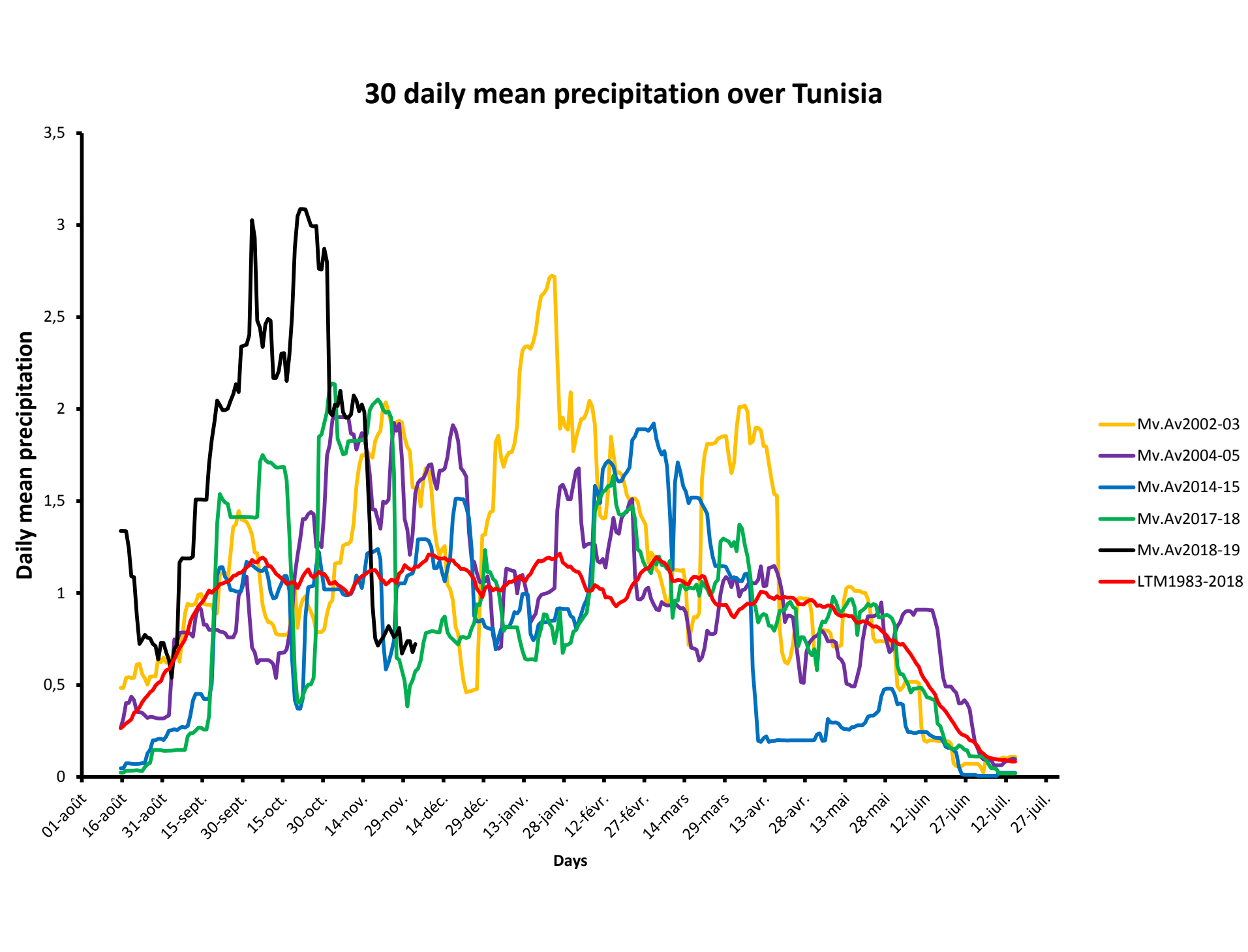

Cumulative precipitation for Reunion Saint Denis
2018
Mean
75% Mean
125% Mean
1996
2001
2006
2009
2012
2014
2017
precipitation (mm)
0
100
200
300
400
500
600
700
800
01-Aug
30-Sep
29-Nov
28-Jan
28-Mar
27-May
26-Jul
Time(day)

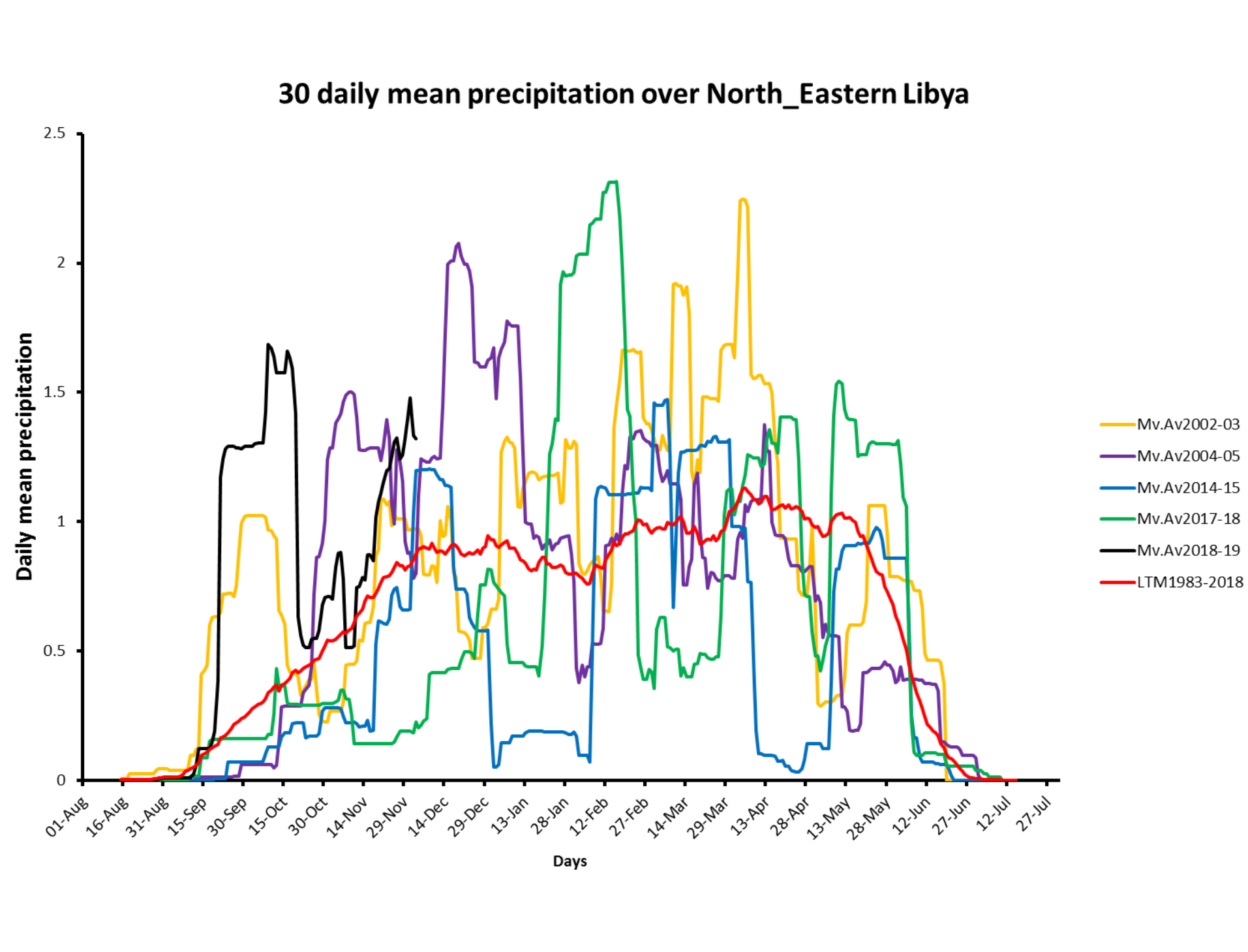
Annual Cycle

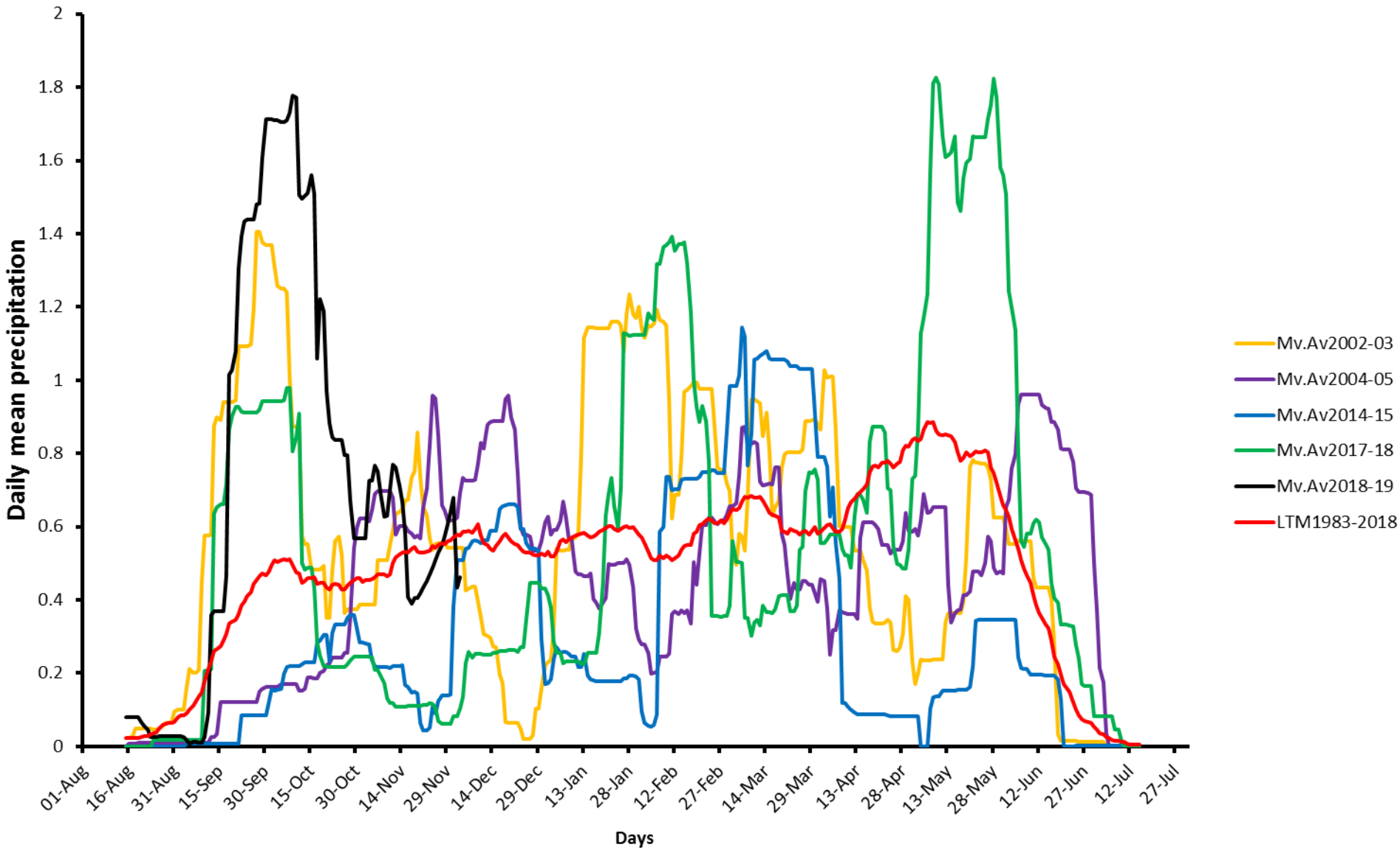

30 daily mean precipitation over Northern Morocco
Daily mean precipitation
0
1
2
3
4
5
6
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
Days
Mv.Av2002-03
Mv.Av2004-05
Mv.Av2014-15
Mv.Av2017-18
Mv.Av2018-19
LTM1983-2018

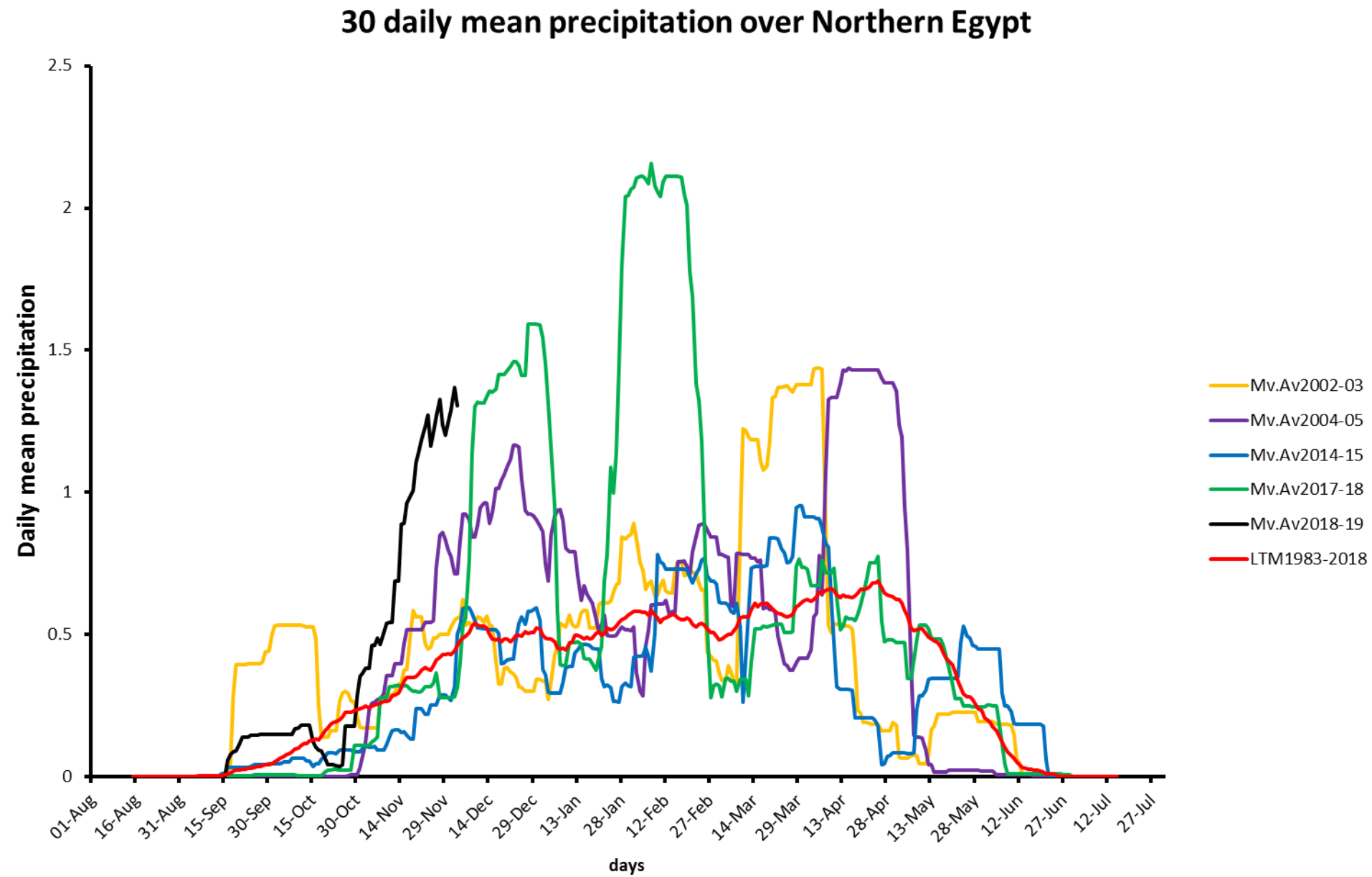

30 daily mean precipitation over Noth-western Algeria
Daily mean precipitation
4
3.5
3
2.5
2
1.5
1
0.5
0
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
Days
Mv.Av2002-03
Mv.Av2004-05
Mv.Av2014-15
Mv.Av2017-18
Mv.Av2018-19
LTM1983-2018

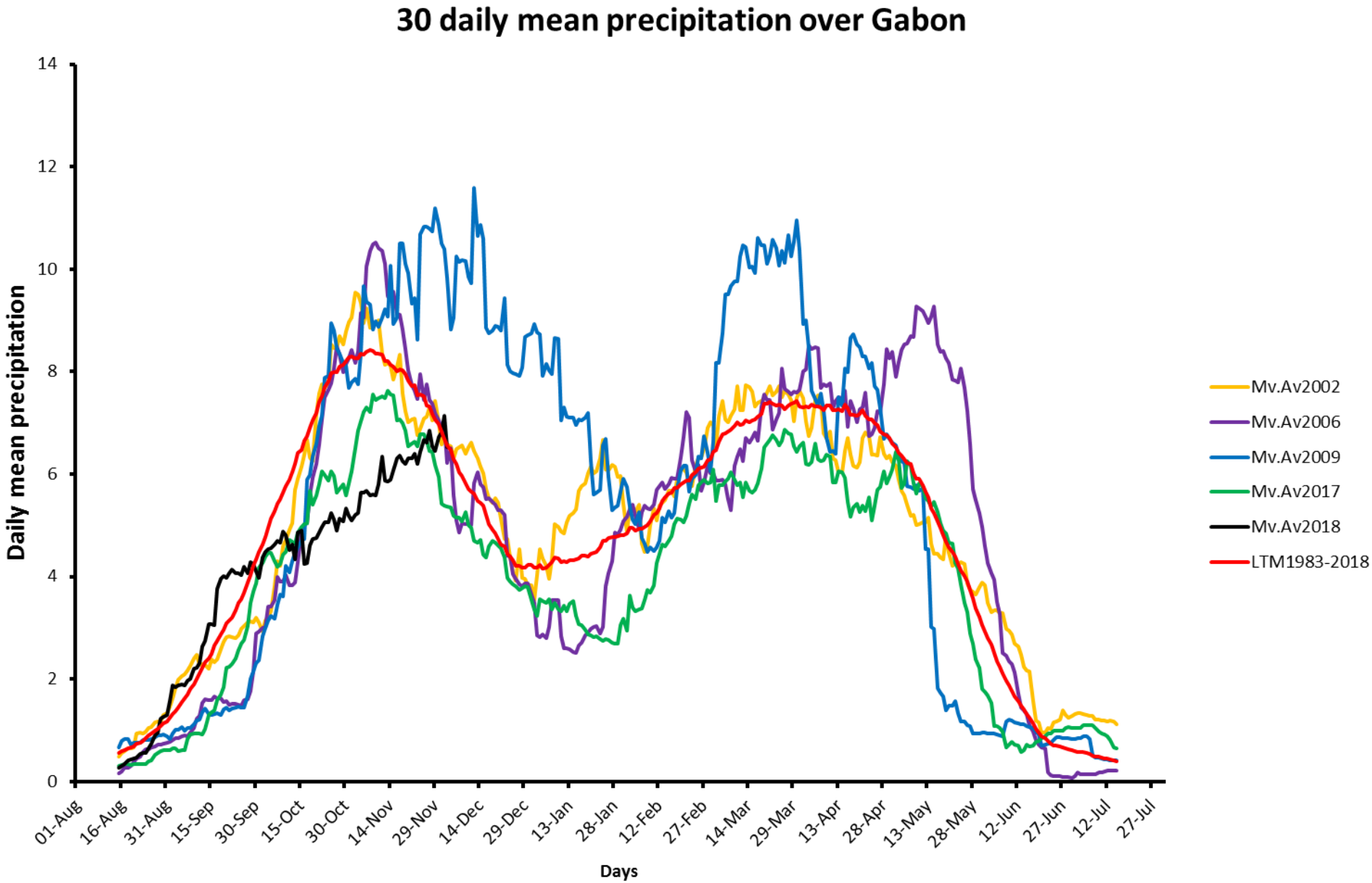

30 daily mean precipitation over North_Eastern Algeria
Daily mean precipitation
0
1
2
3
4
5
6
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
Days
Mv.Av2002-03
Mv.Av2004-05
Mv.Av2014-15
Mv.Av2017-18
Mv.Av2018-19
LTM1983-2018

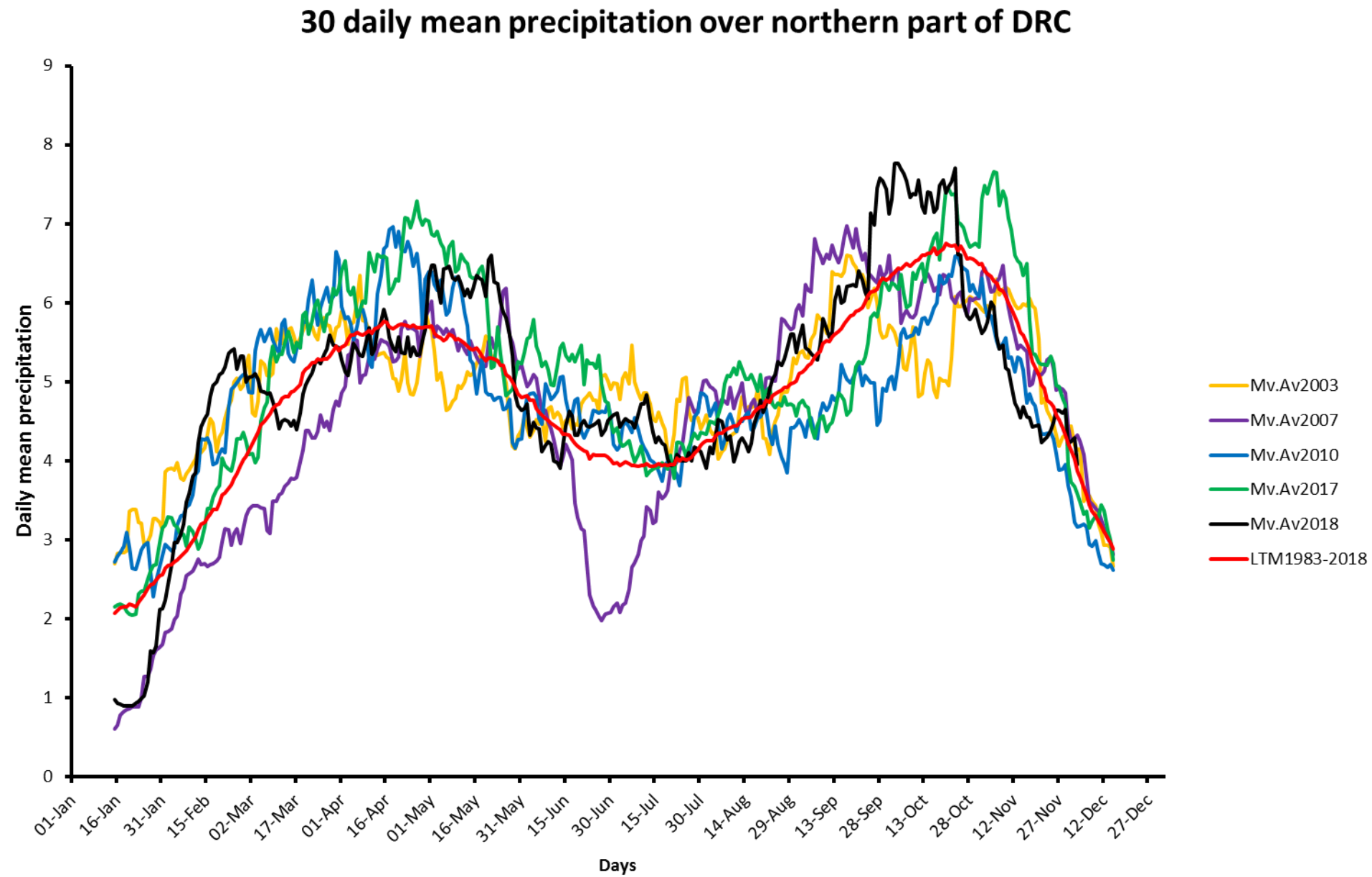

30 daily mean precipitation over Tunisia
Daily mean precipitation
3,5
3
2,5
2
1,5
1
0,5
0
01-août
16-août
31-août
15-sept.
30-sept.
15-oct.
30-oct.
14-nov.
29-nov.
14-déc.
29-déc.
13-janv.
28-janv.
12-févr.
27-févr.
14-mars
29-mars
13-avr.
28-avr.
13-mai
28-mai
12-juin
27-juin
12-juil.
27-juil.
Days
Mv.Av2002-03
Mv.Av2004-05
Mv.Av2014-15
Mv.Av2017-18
Mv.Av2018-19
LTM1983-2018

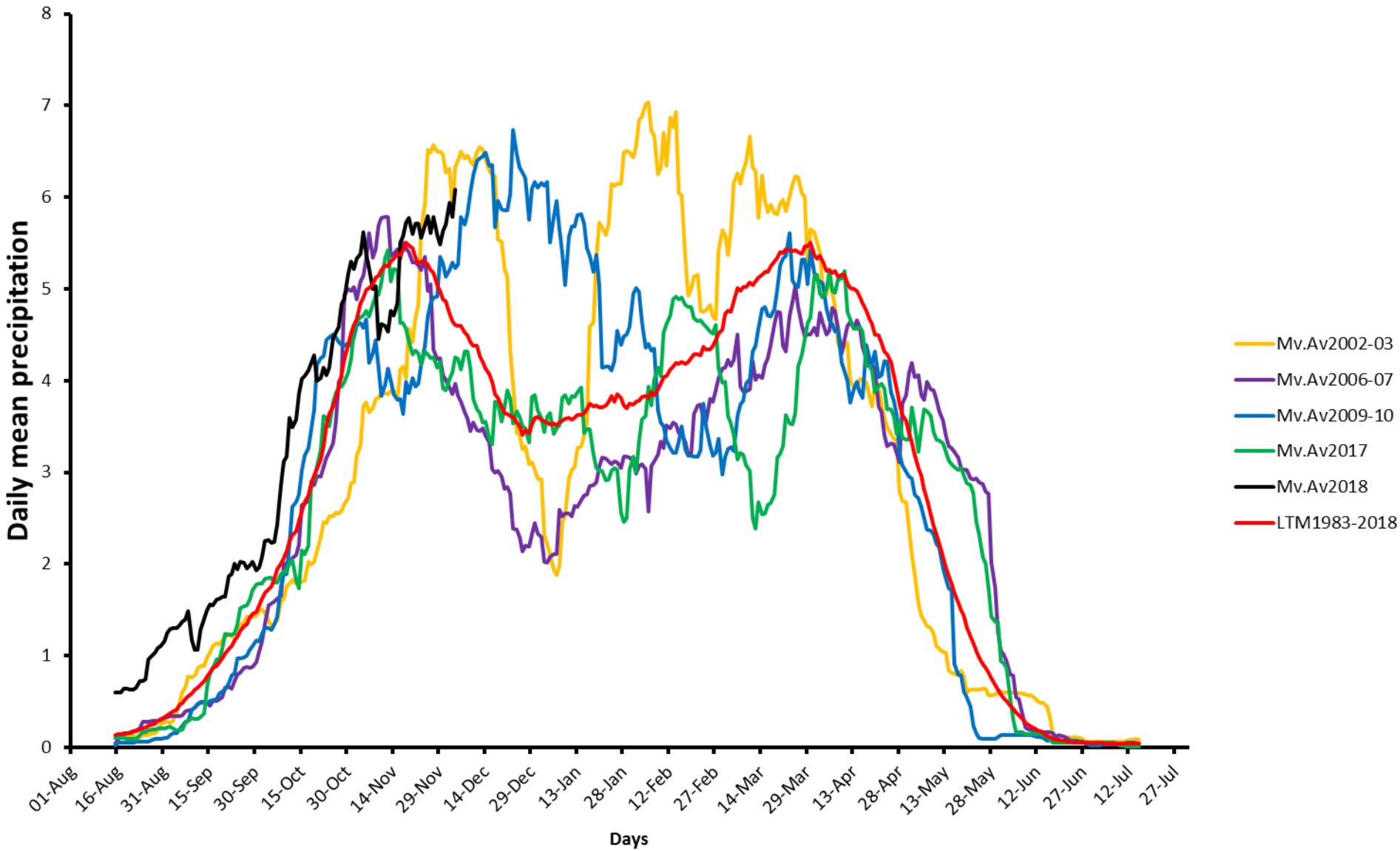

30 daily mean precipitation over North_Eastern Libya
Daily mean precipitation
2.5
2
1.5
1
0.5
0
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
Days
Mv.Av2002-03
Mv.Av2004-05
Mv.Av2014-15
Mv.Av2017-18
Mv.Av2018-19
LTM1983-2018

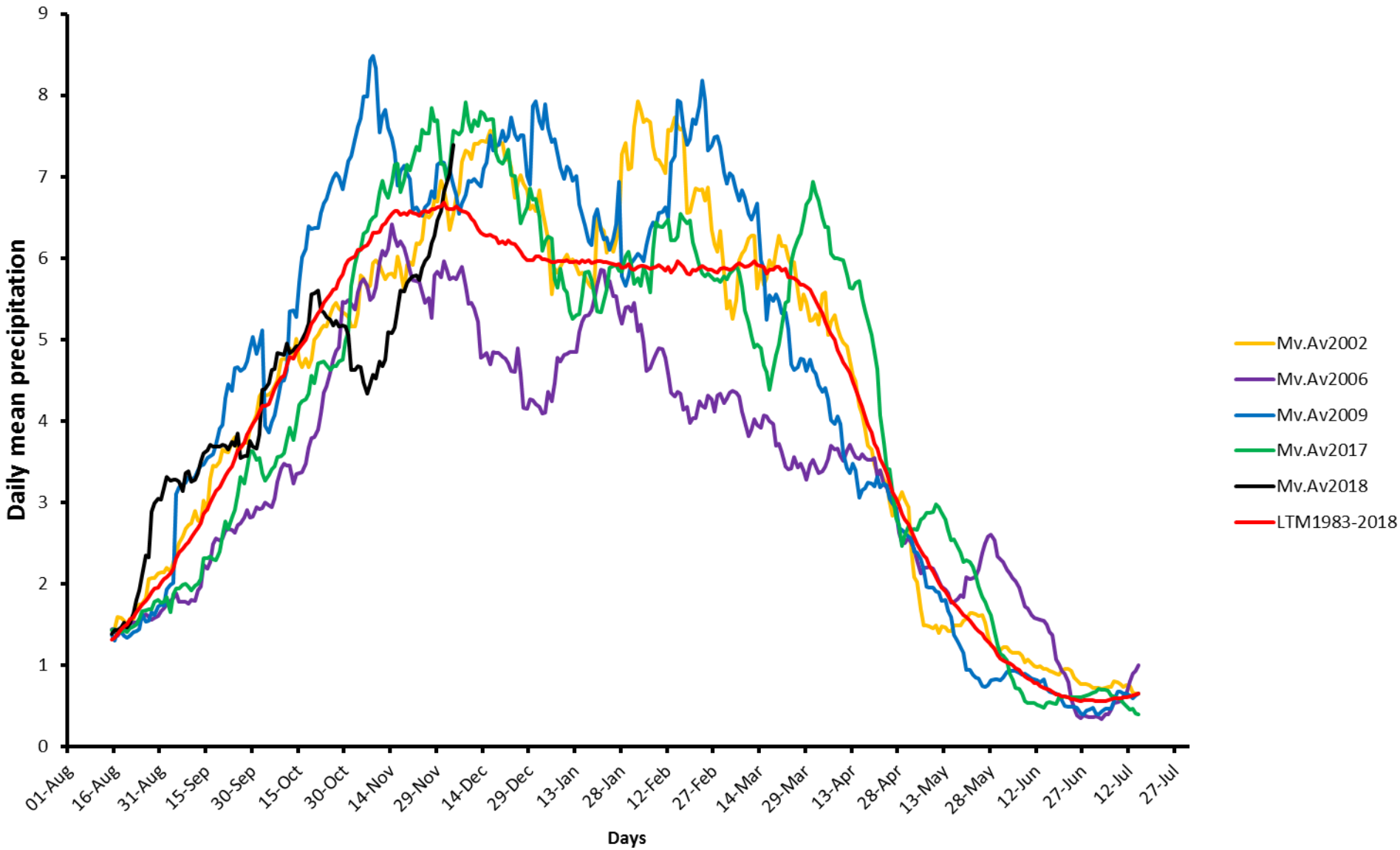

30 daily mean precipitation over North_western Libya
Daily mean precipitation
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
Days
Mv.Av2002-03
Mv.Av2004-05
Mv.Av2014-15
Mv.Av2017-18
Mv.Av2018-19
LTM1983-2018

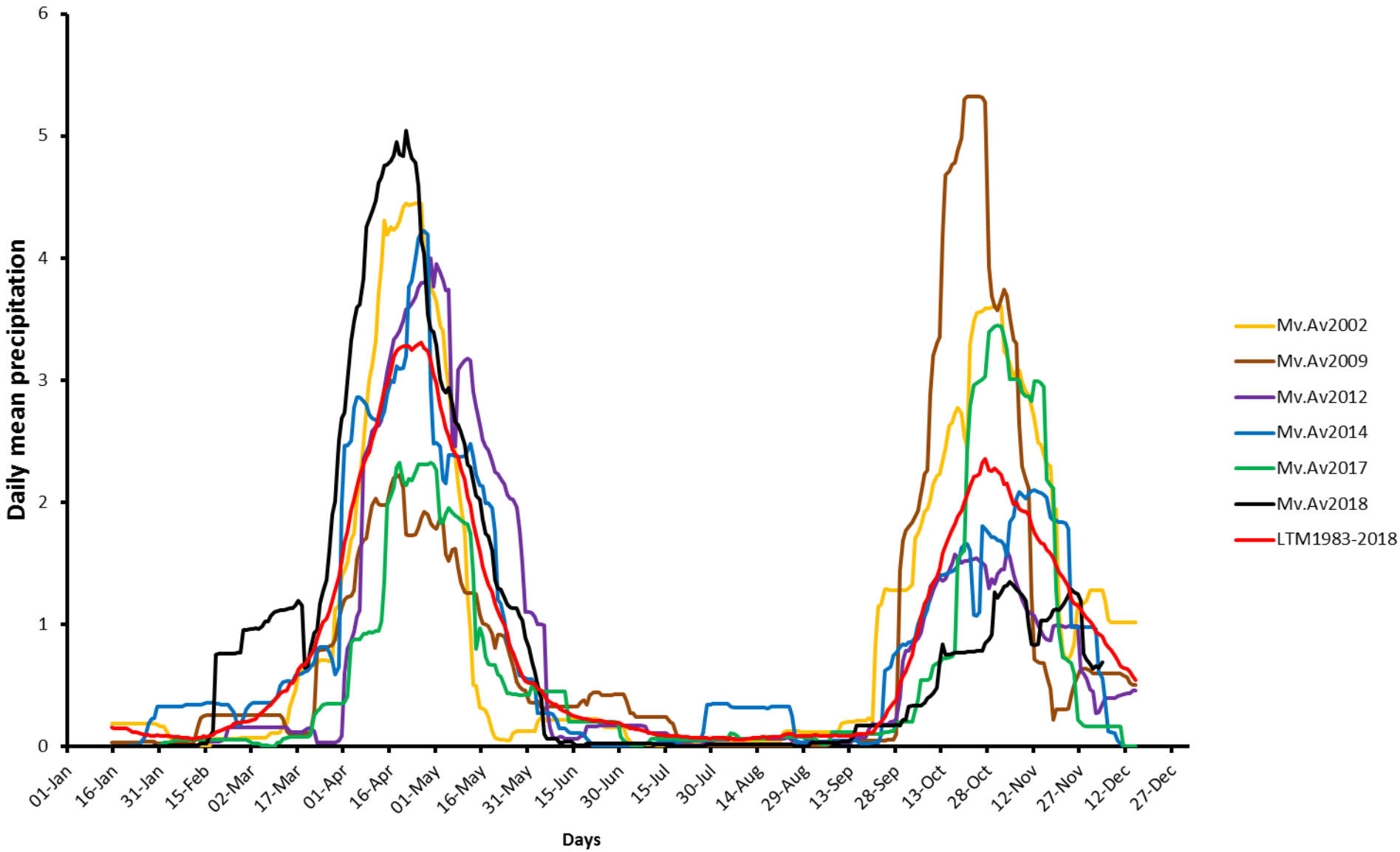

30 daily mean precipitation over Northern Egypt
Daily mean precipitation
2.5
2
1.5
1
0.5
0
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
days
Mv.Av2002-03
Mv.Av2004-05
Mv.Av2014-15
Mv.Av2017-18
Mv.Av2018-19
LTM1983-2018

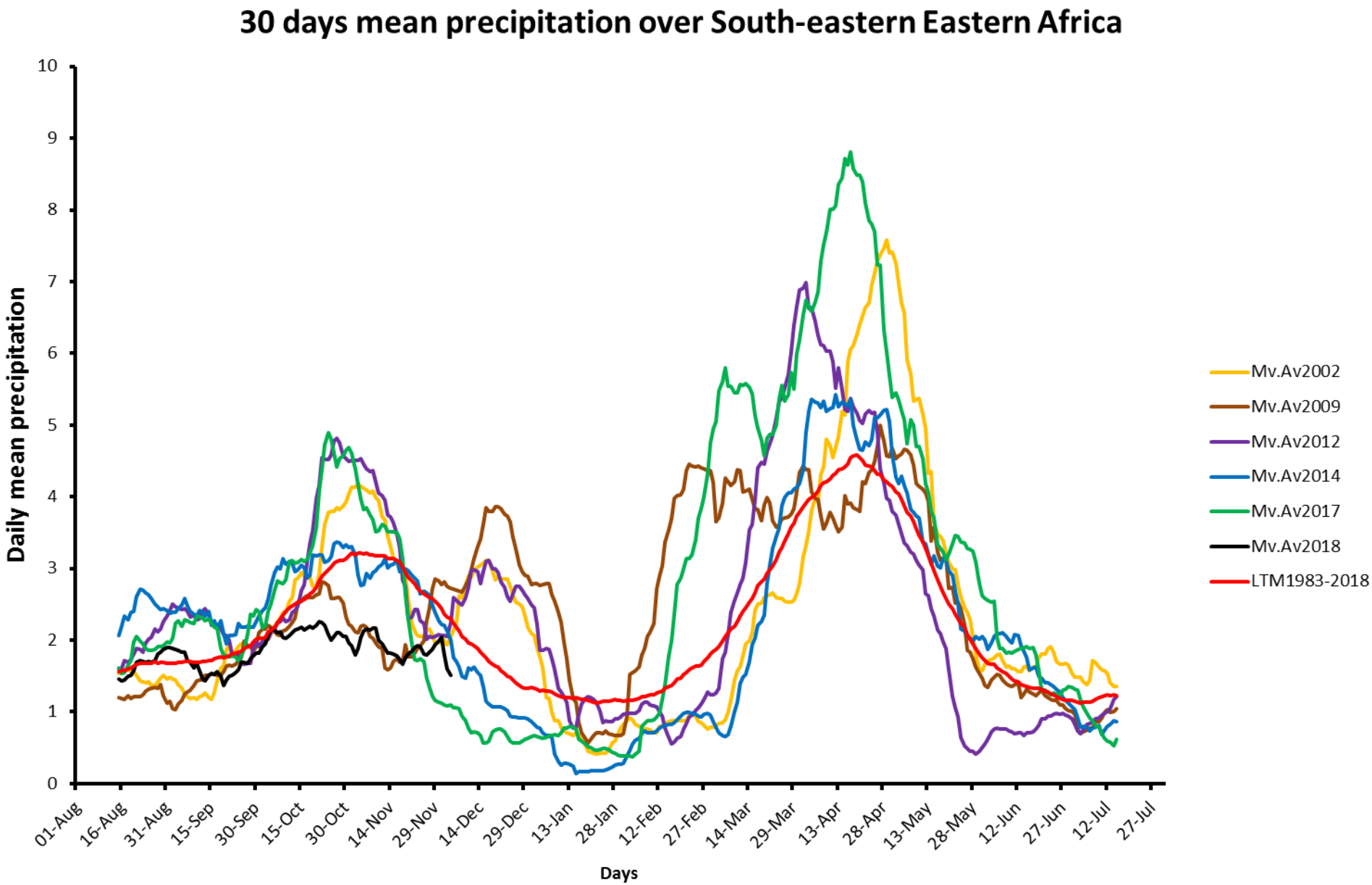

30 daily mean precipitation over Gabon
Daily mean precipitation
0
2
4
6
8
10
12
14
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
Days
Mv.Av2002
Mv.Av2006
Mv.Av2009
Mv.Av2017
Mv.Av2018
LTM1983-2018

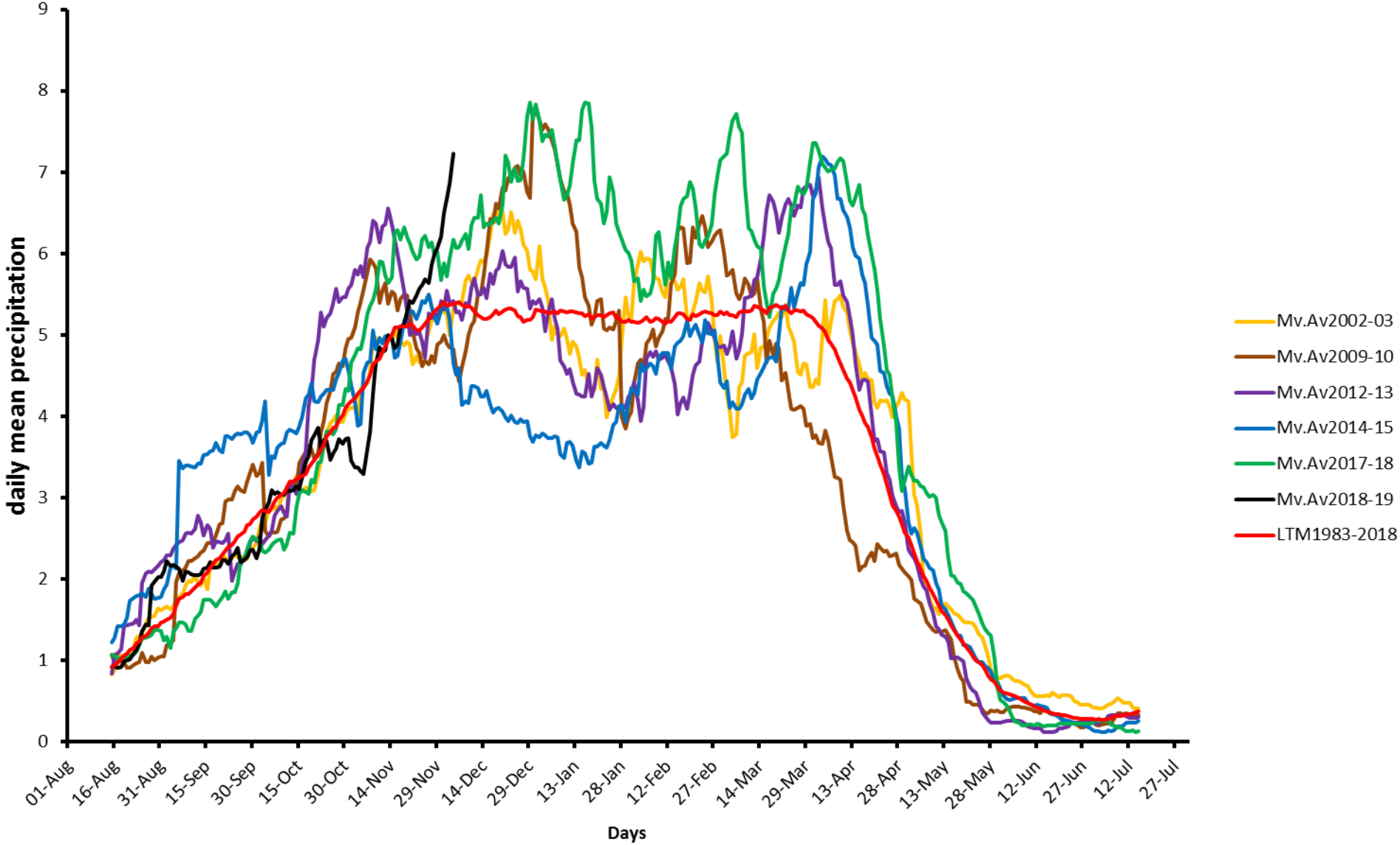

30 daily mean precipitation over northern part of DRC
Daily mean precipitation
0
1
2
3
4
5
6
7
8
9
01-Jan
16-Jan
31-Jan
15-Feb
02-Mar
17-Mar
01-Apr
16-Apr
01-May
16-May
31-May
15-Jun
30-Jun
15-Jul
30-Jul
14-Aug
29-Aug
13-Sep
28-Sep
13-Oct
28-Oct
12-Nov
27-Nov
12-Dec
27-Dec
Days
Mv.Av2003
Mv.Av2007
Mv.Av2010
Mv.Av2017
Mv.Av2018
LTM1983-2018

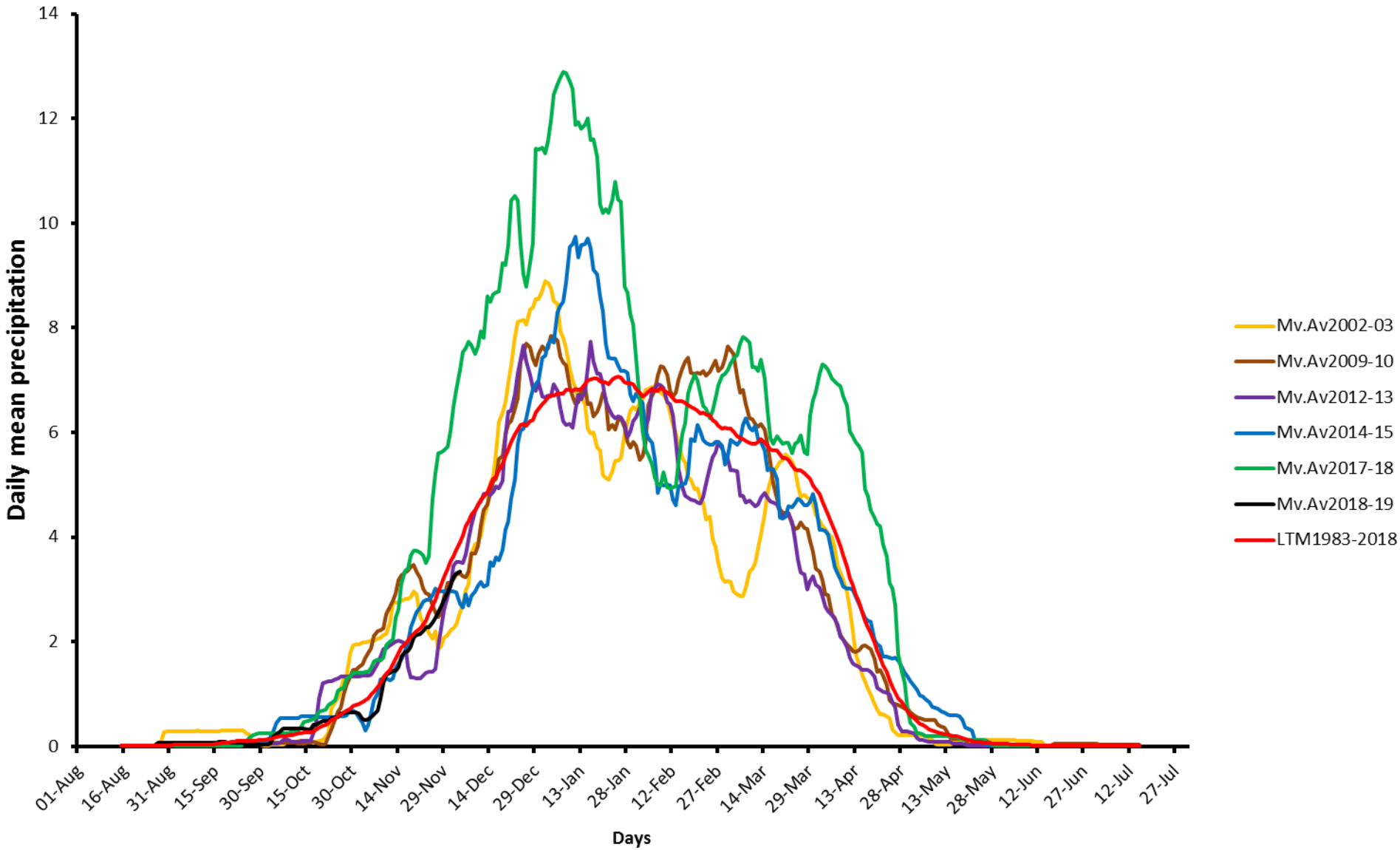

30 daily mean precipitation over SW_DRC_NW_ANGOLA
Daily mean precipitation
0
1
2
3
4
5
6
7
8
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
Days
Mv.Av2002-03
Mv.Av2006-07
Mv.Av2009-10
Mv.Av2017
Mv.Av2018
LTM1983-2018

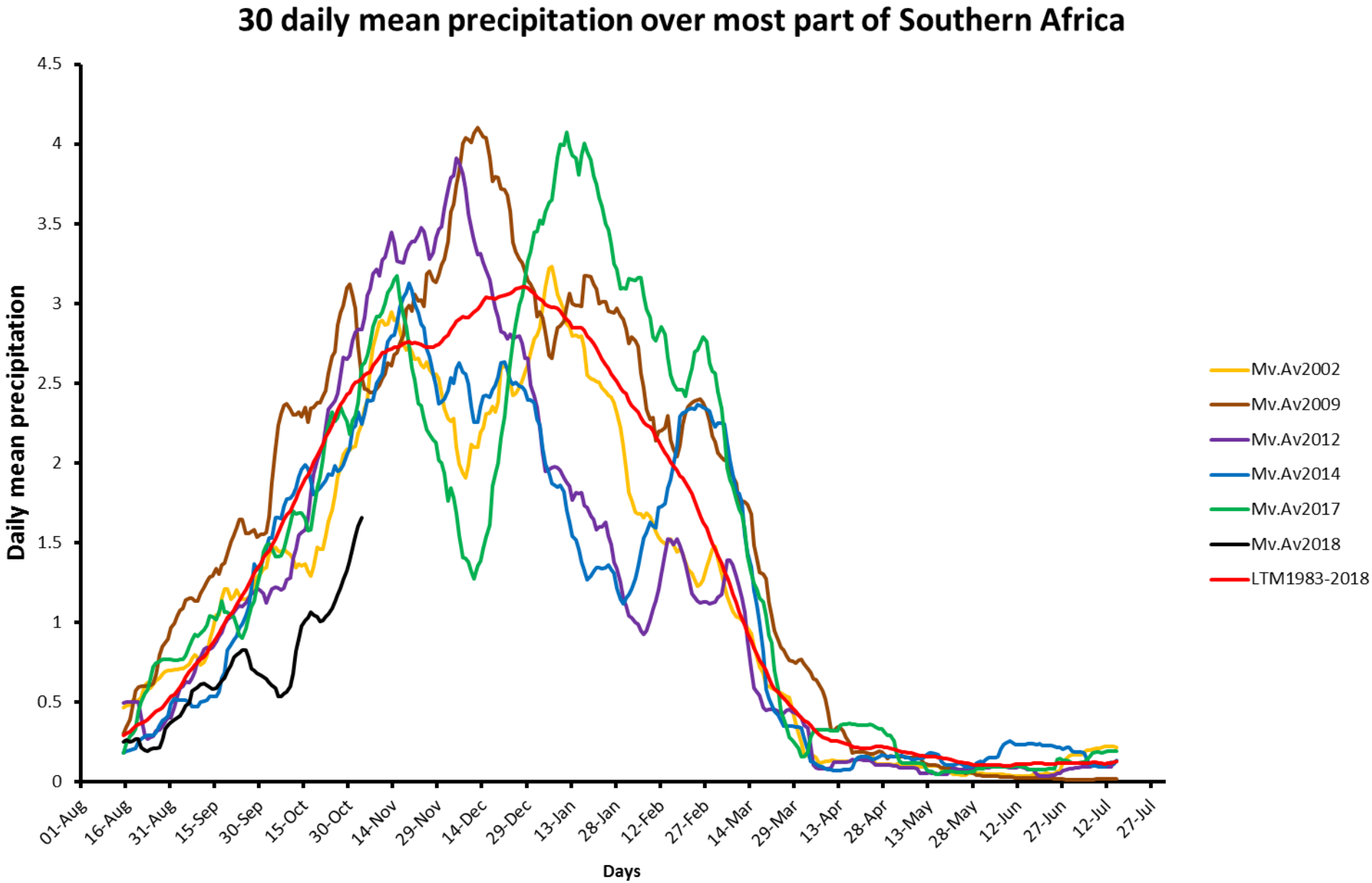

30 daily mean precipitation over Half of DRC
Daily mean precipitation
0
1
2
3
4
5
6
7
8
9
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
Days
Mv.Av2002
Mv.Av2006
Mv.Av2009
Mv.Av2017
Mv.Av2018
LTM1983-2018

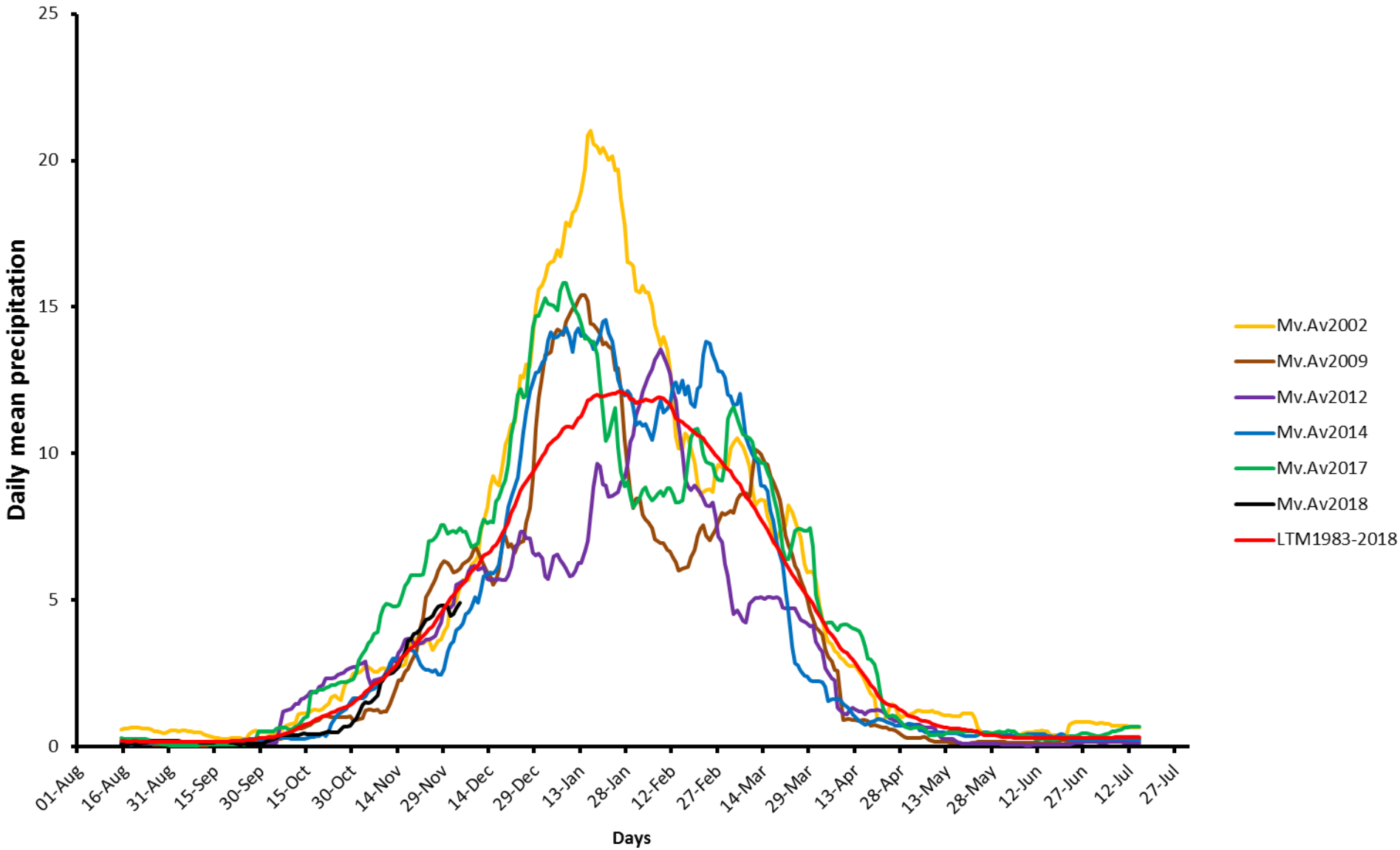

30 daily mean precipitation over South-western SOuth Sudan
Daily mean precipitation
0
1
2
3
4
5
6
01-Jan
16-Jan
31-Jan
15-Feb
02-Mar
17-Mar
01-Apr
16-Apr
01-May
16-May
31-May
15-Jun
30-Jun
15-Jul
30-Jul
14-Aug
29-Aug
13-Sep
28-Sep
13-Oct
28-Oct
12-Nov
27-Nov
12-Dec
27-Dec
Days
Mv.Av2002
Mv.Av2009
Mv.Av2012
Mv.Av2014
Mv.Av2017
Mv.Av2018
LTM1983-2018


30 days mean precipitation over South-eastern Eastern Africa
Daily mean precipitation
10
9
8
7
6
5
4
3
2
1
0
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
Days
Mv.Av2002
Mv.Av2009
Mv.Av2012
Mv.Av2014
Mv.Av2017
Mv.Av2018
LTM1983-2018


30 daily mean precipitation over Western Tanzania
daily mean precipitation
0
1
2
3
4
5
6
7
8
9
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
Days
Mv.Av2002-03
Mv.Av2009-10
Mv.Av2012-13
Mv.Av2014-15
Mv.Av2017-18
Mv.Av2018-19
LTM1983-2018

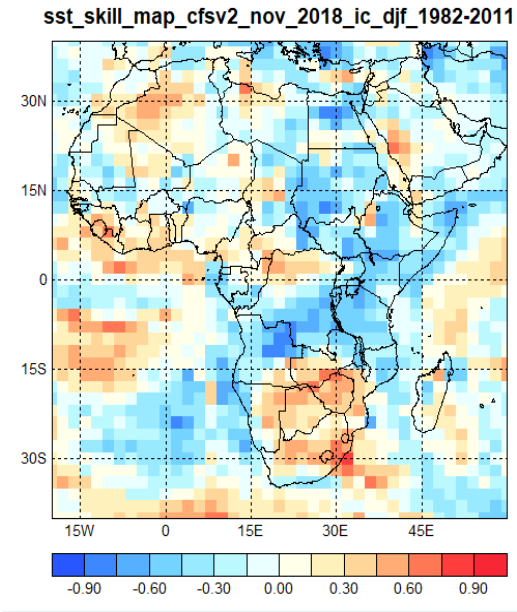

30 daily mean precipitation over Southern Tanzania
Daily mean precipitation
0
2
4
6
8
10
12
14
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
Days
Mv.Av2002-03
Mv.Av2009-10
Mv.Av2012-13
Mv.Av2014-15
Mv.Av2017-18
Mv.Av2018-19
LTM1983-2018

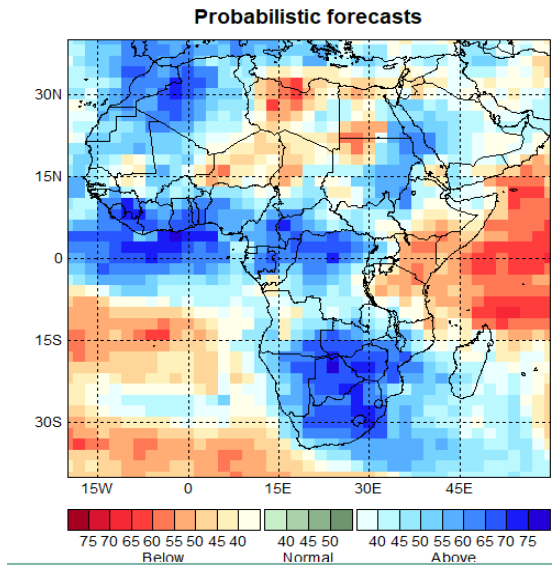

30 daily mean precipitation over most part of Southern Africa
Daily mean precipitation
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
Days
Mv.Av2002
Mv.Av2009
Mv.Av2012
Mv.Av2014
Mv.Av2017
Mv.Av2018
LTM1983-2018

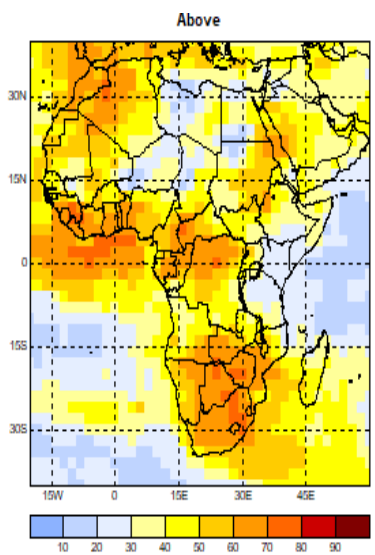

30 days mean precipitation over Central Mada
Daily mean precipitation
25
20
15
10
5
0
01-Aug
16-Aug
31-Aug
15-Sep
30-Sep
15-Oct
30-Oct
14-Nov
29-Nov
14-Dec
29-Dec
13-Jan
28-Jan
12-Feb
27-Feb
14-Mar
29-Mar
13-Apr
28-Apr
13-May
28-May
12-Jun
27-Jun
12-Jul
27-Jul
Days
Mv.Av2002
Mv.Av2009
Mv.Av2012
Mv.Av2014
Mv.Av2017
Mv.Av2018
LTM1983-2018

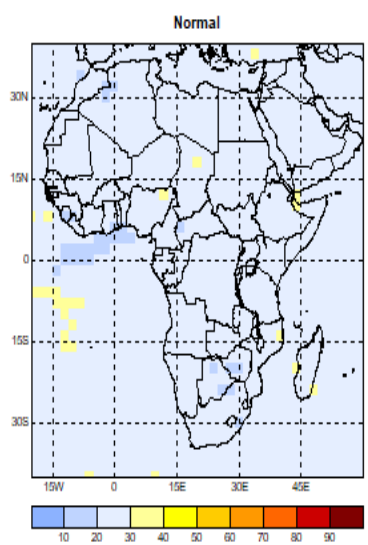
CPT OUTLOOK

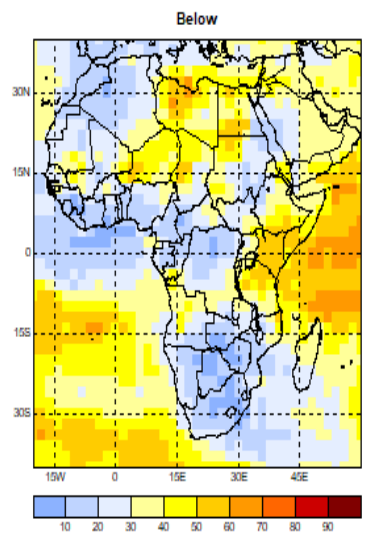
CFSv2_FCST_DJF_2018-19



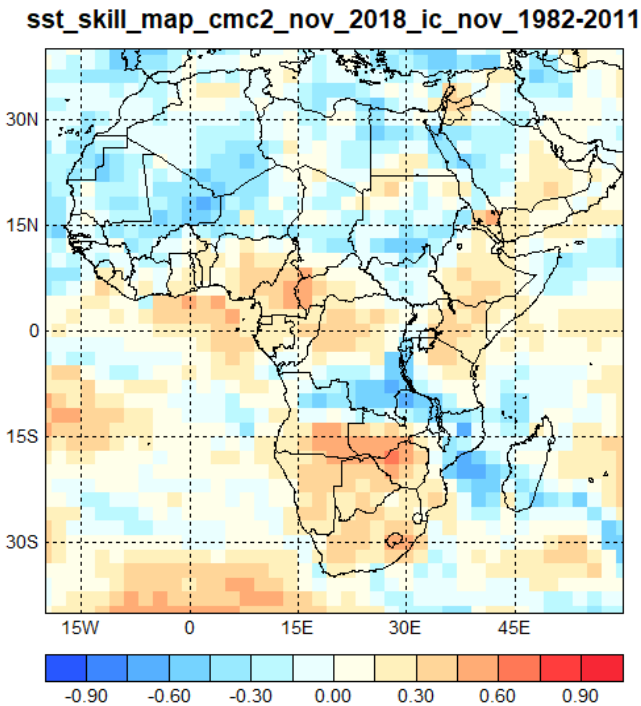


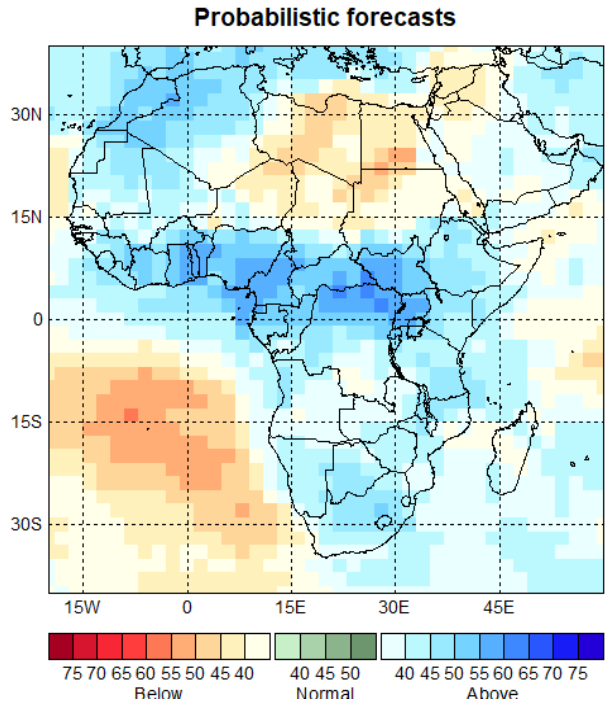


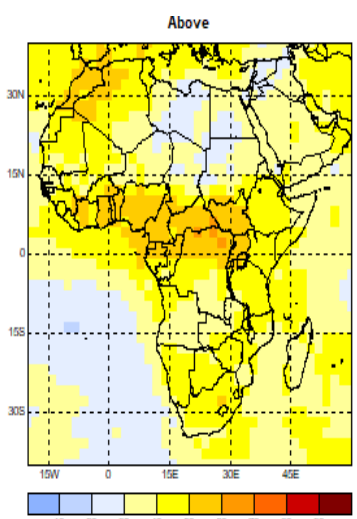


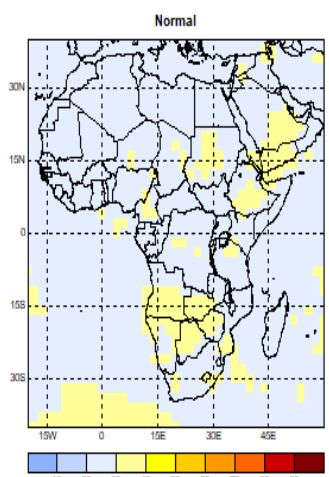


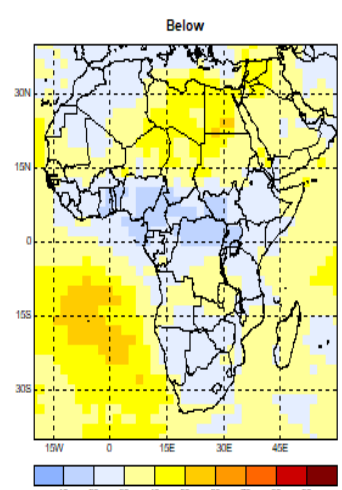
CMC2_FCST_DJF_2018-19



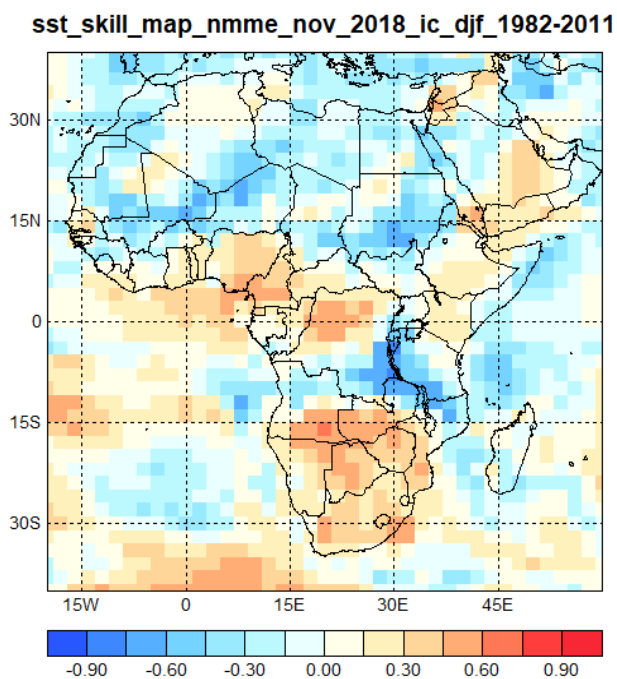


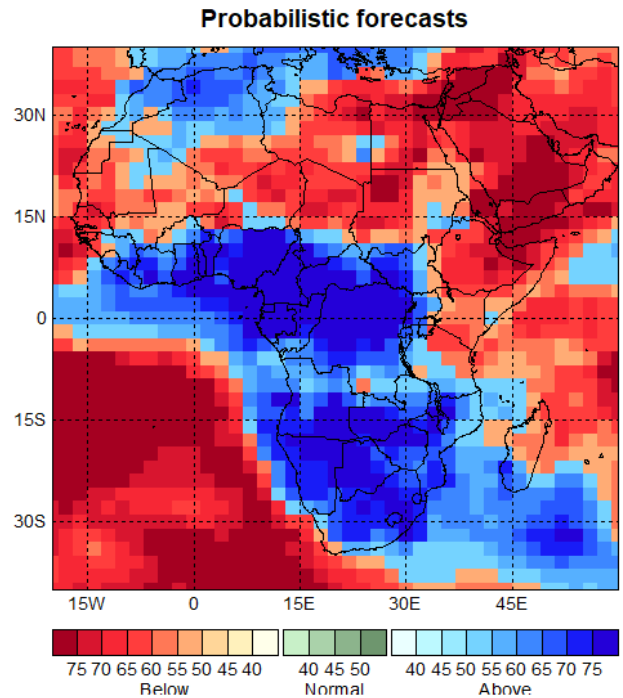


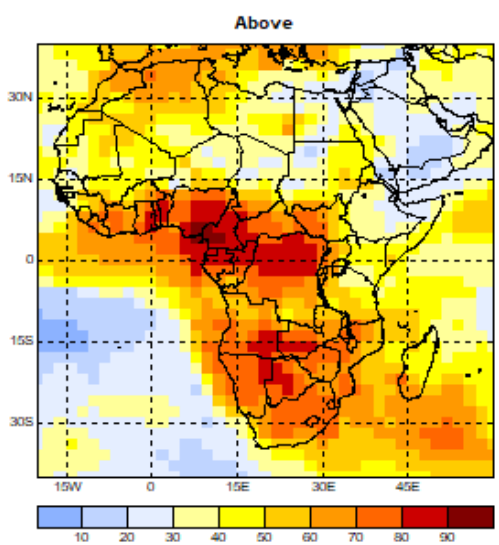


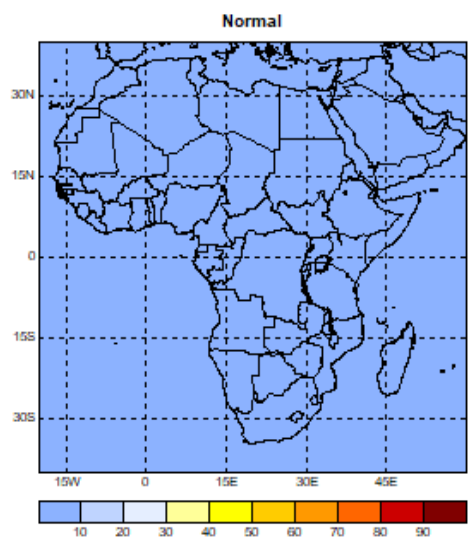


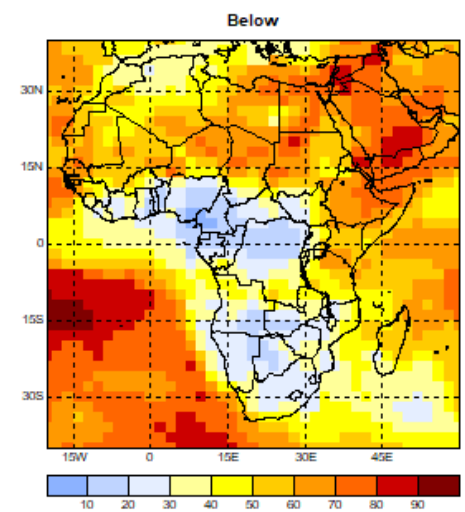
NMME_FCST_DJF_2018-19



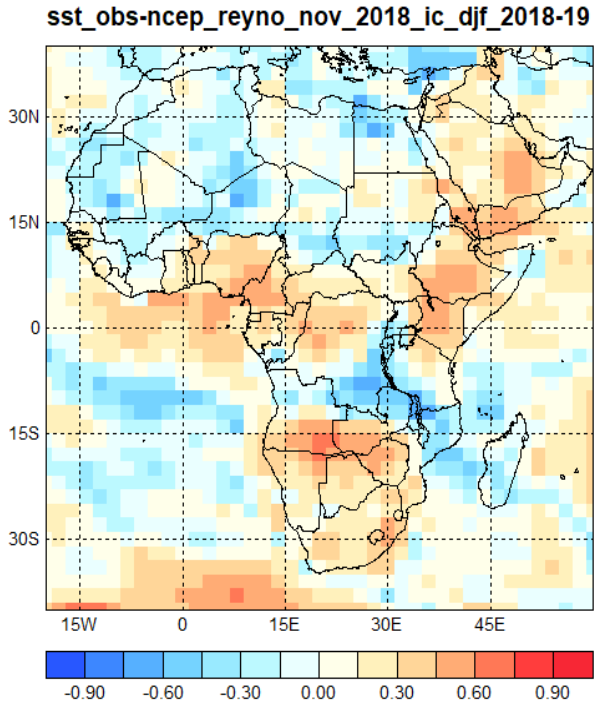


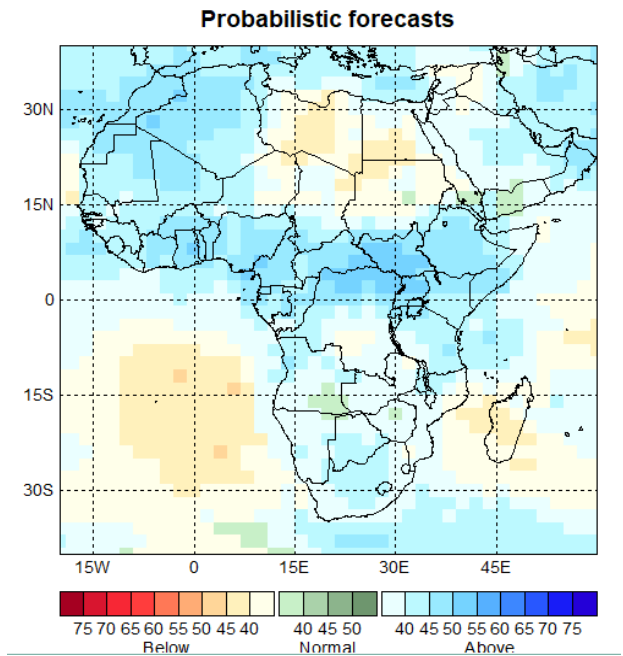


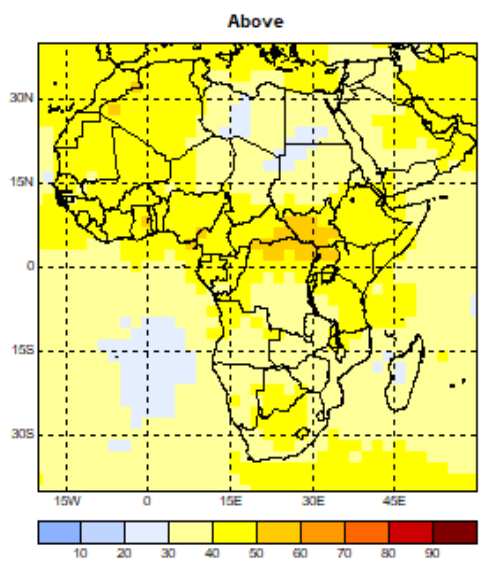


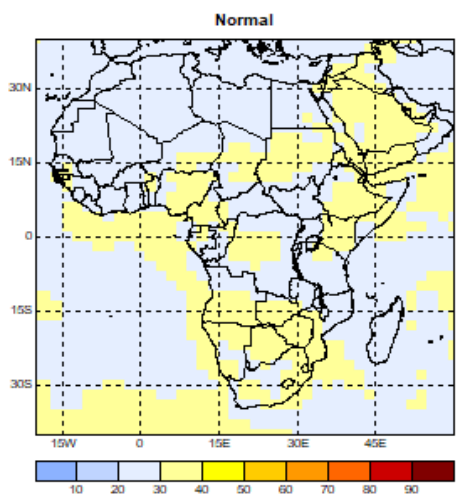


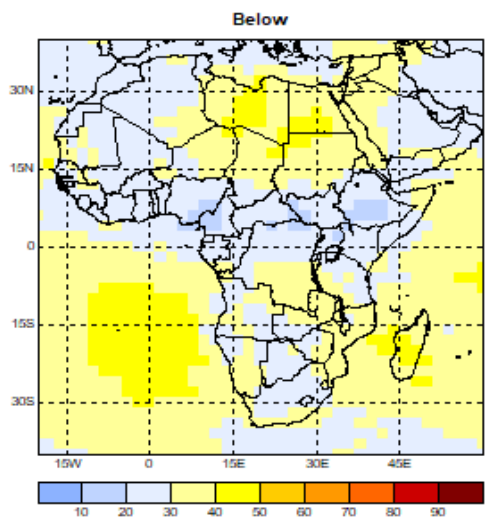
SST_OBS_FCST_DJF_2018-19



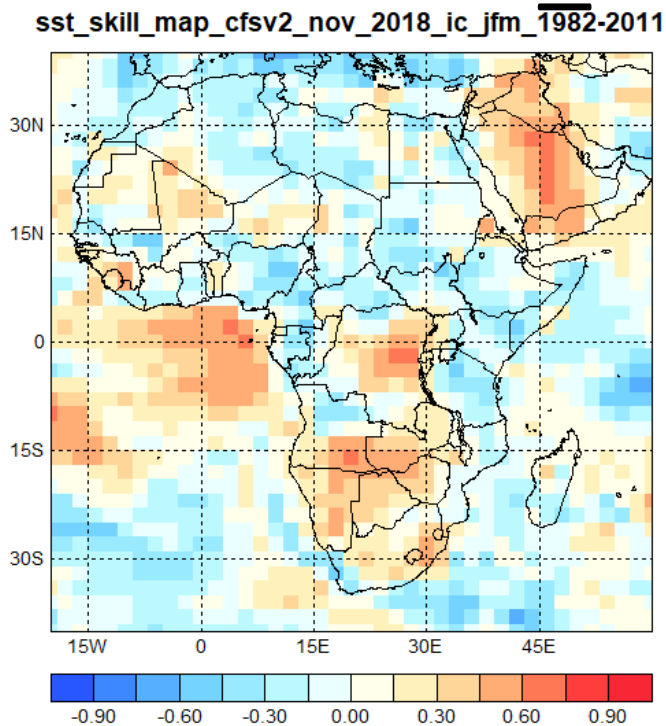


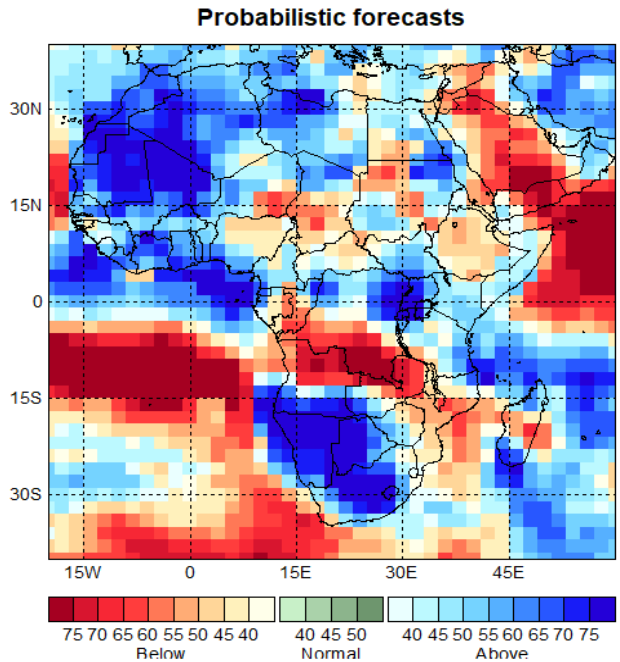


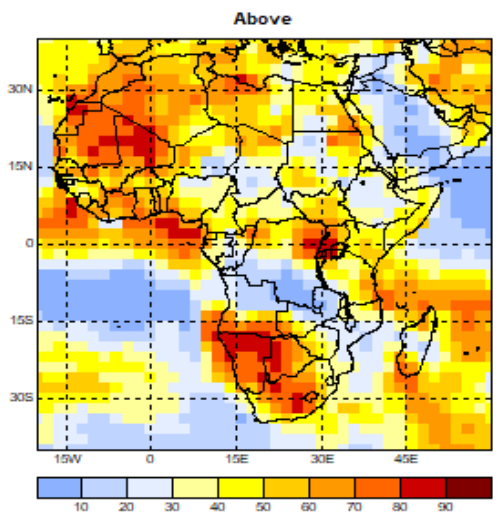


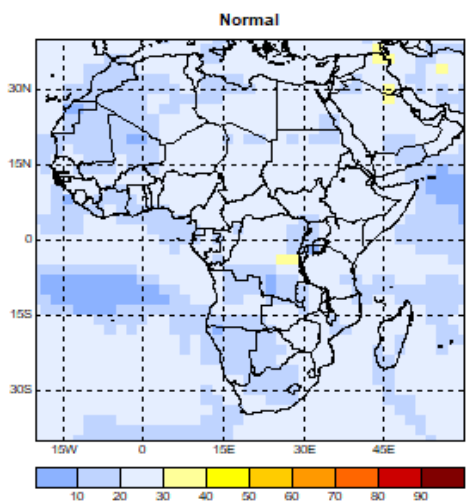


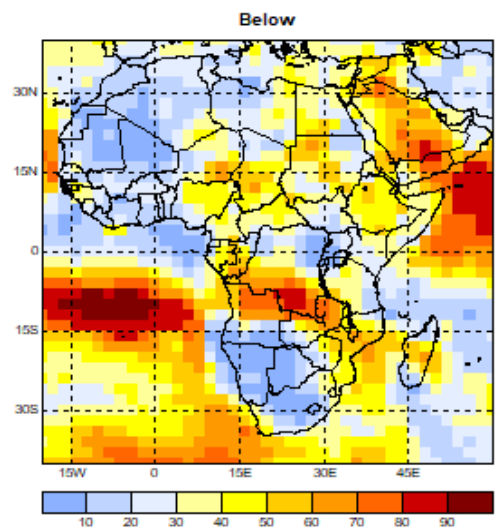
CFSv2_FCST_JFM_2019



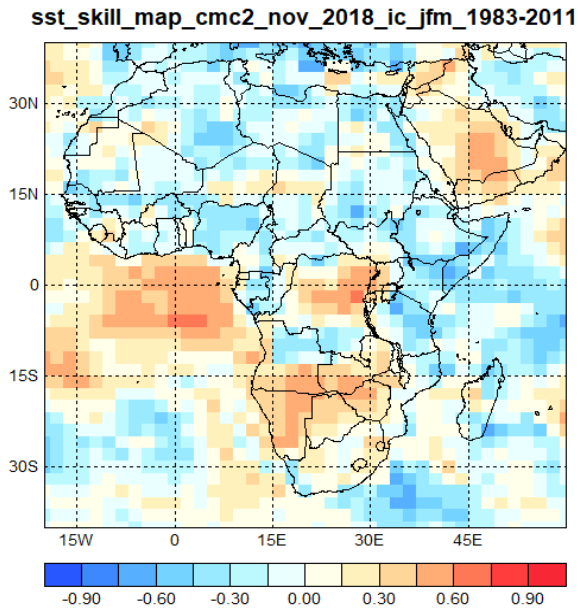


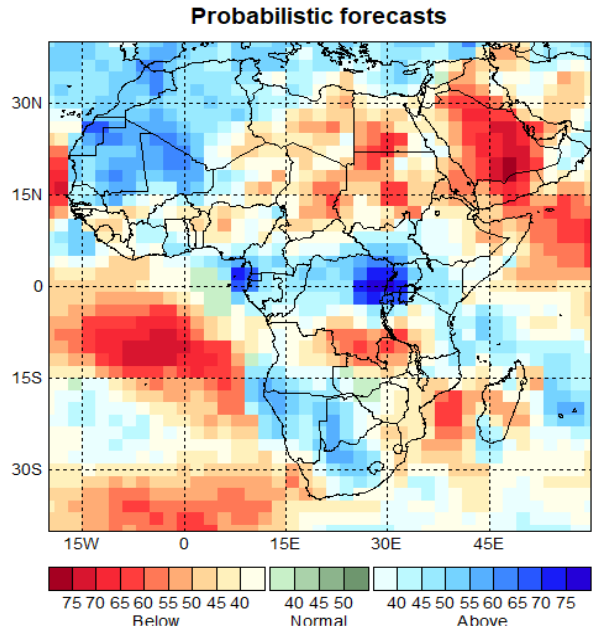


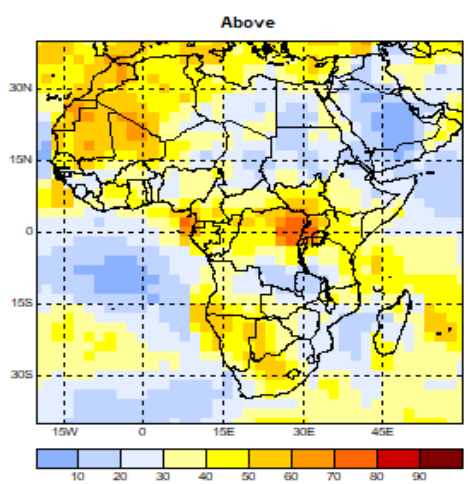


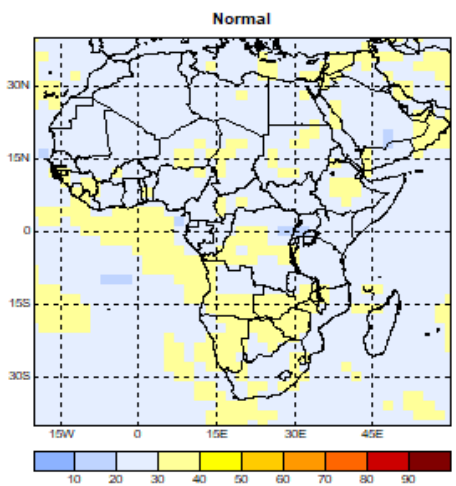


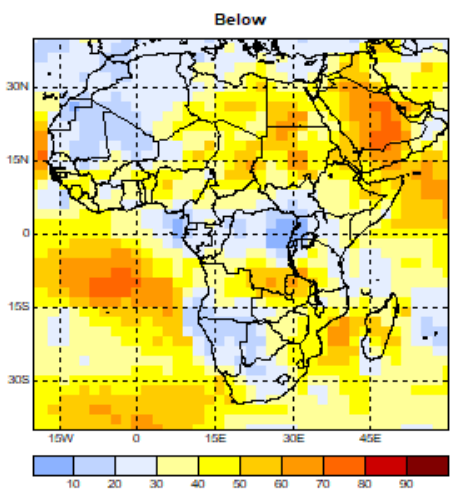
CMC_FCST_JFM_2019



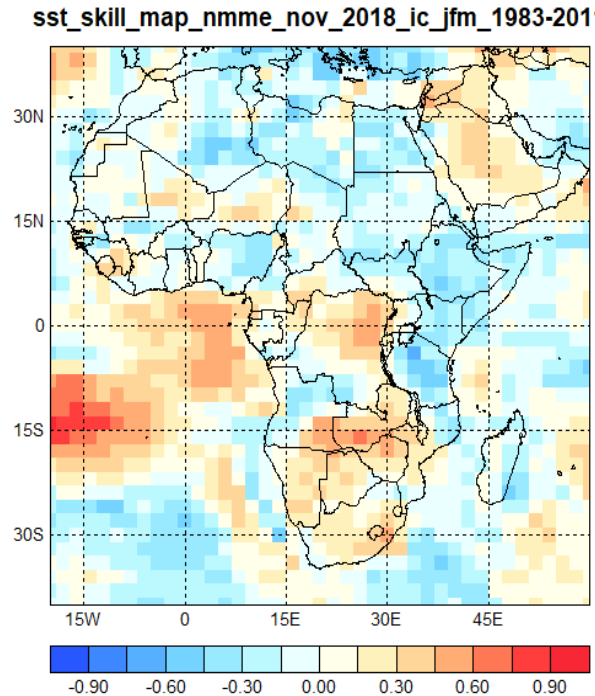


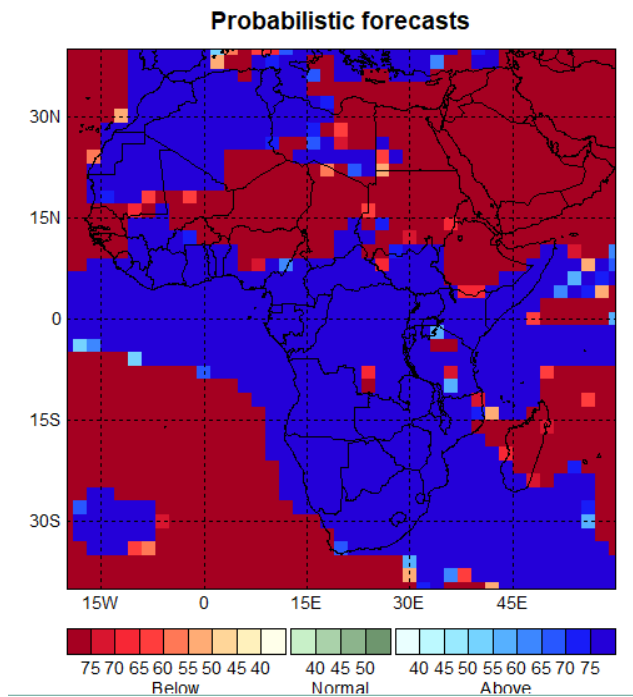


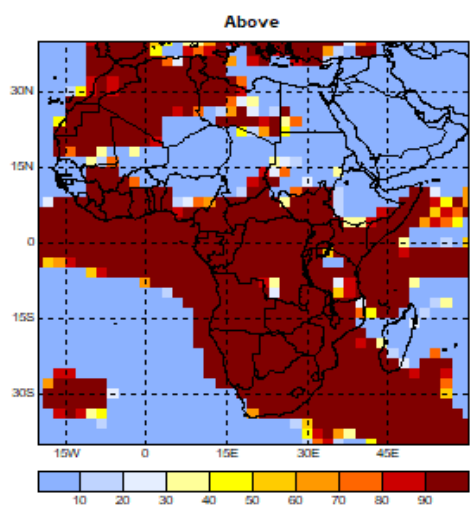


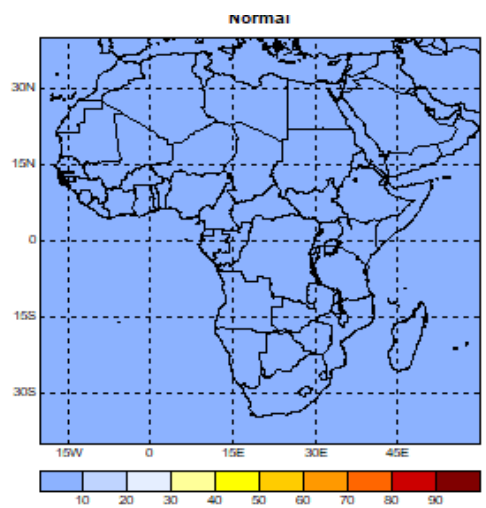


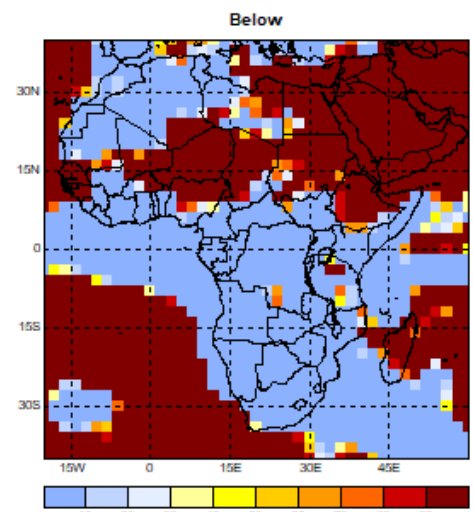
NMME_FCST_JFM_2019



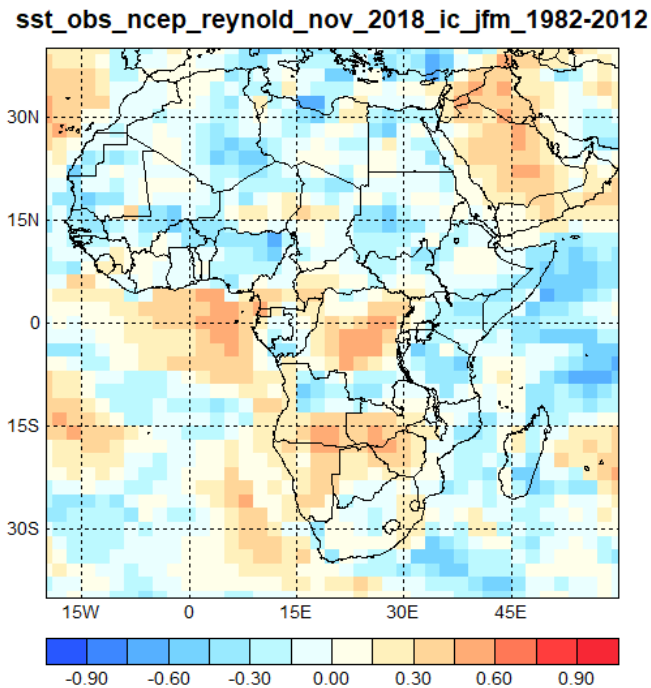


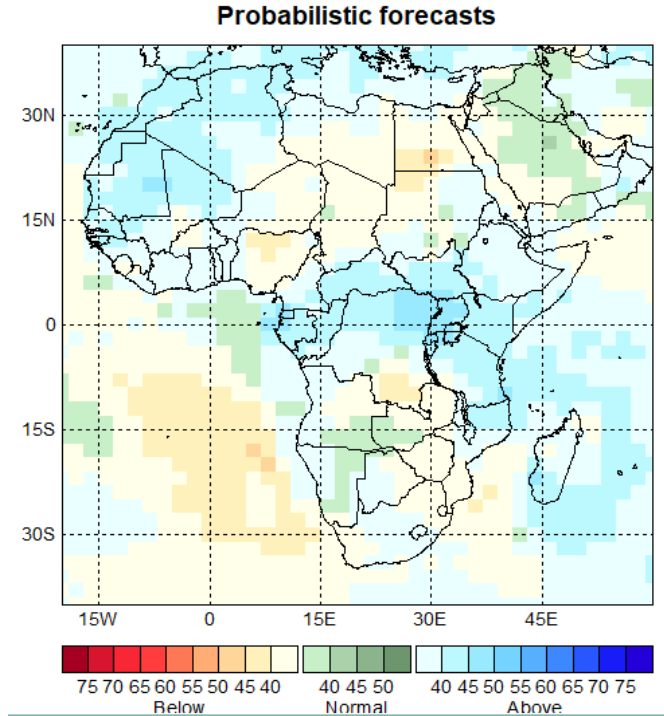


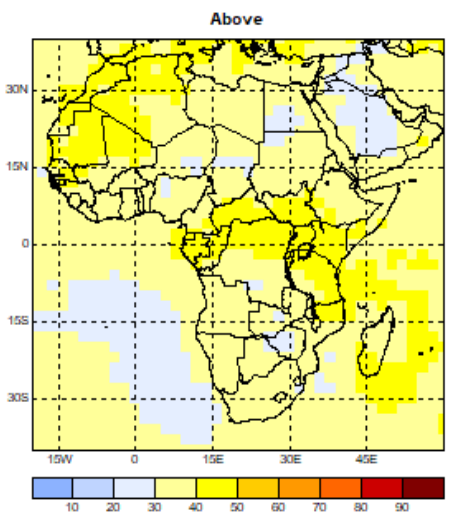


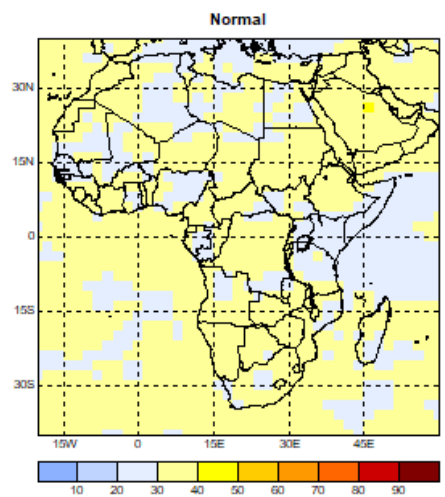


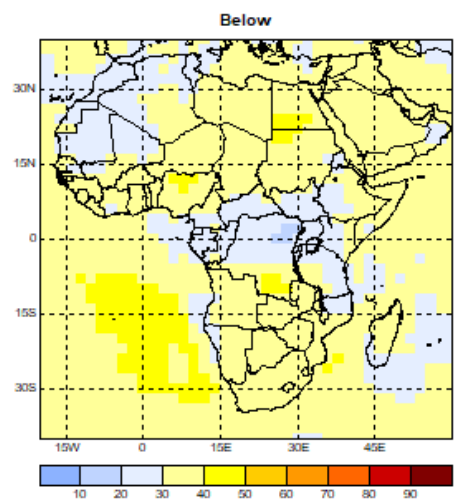
SST_OBS_FCST_JFM_2019











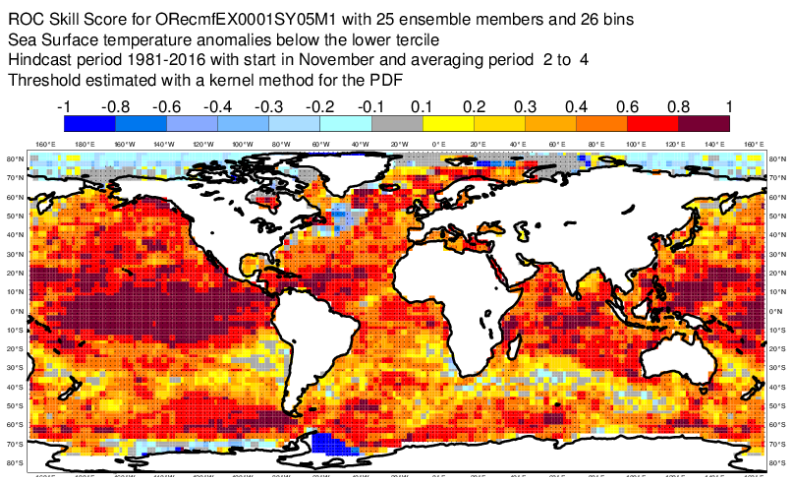
VII. ANALYSIS OF EACH GLOBAL PRODUCING CENTRES FOR LONG RANGE FORECAST

SST DJF 2018-19 FROM SINGLE MODELS

ECMWF MODEL

(a)

(b)



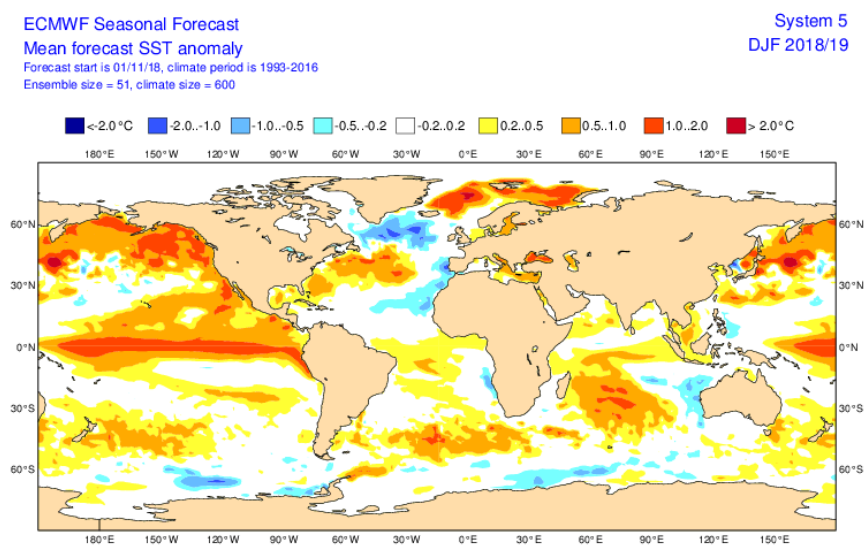


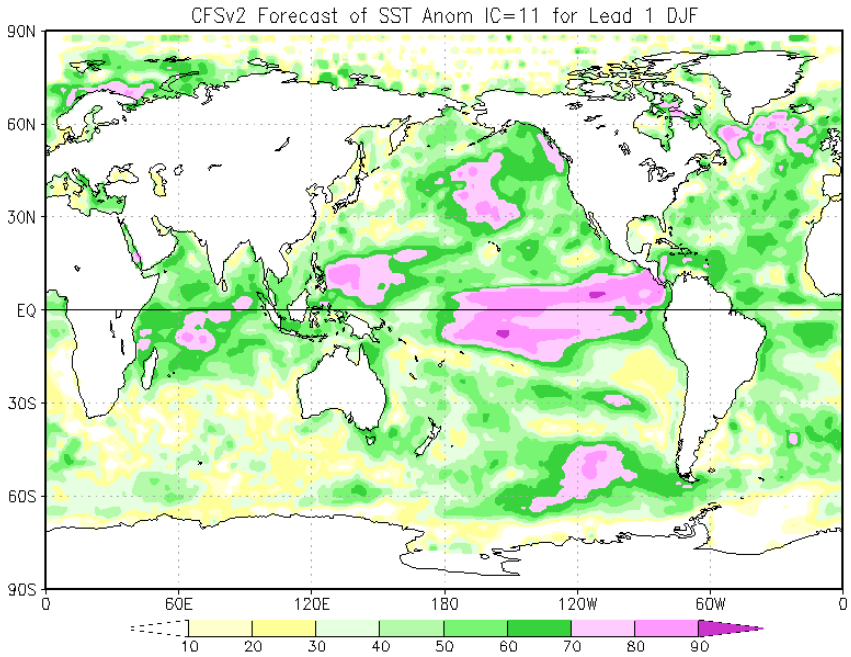
Figure M1: DJF SST anomaly maps (a) ECMWF Model forecast Skill (b) ECMWF Model forecast

http://www.ecmwf.int/en/forecasts/charts/seasonal/sea-surface-temperature-long-range-forecast?time=2016020100,2880,2016053100&area=Global&forecast_type_and_skill_measures=ensemble%20mean

https://www.ecmwf.int/en/forecasts/charts/catalogue/seasonal_charts_ecmwf_sst?time=2017080100,2904,2017113000&area=Global&forecast_type_and_skill_measures=anomaly%20correlation

CFSV2 MODEL

(a)



(b)

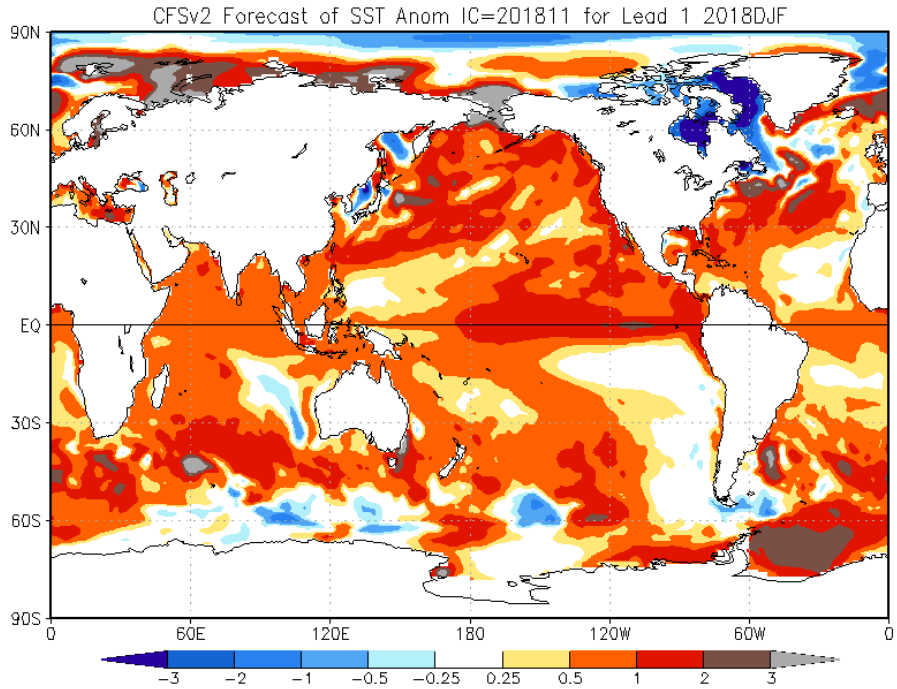


Figure M2: skill (a) CFSv2 Model forecast DJF SST SST maps (b) CFSv2 Model forecast

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/CFSv2_ensemble_tmpsfc_season1.png

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/skill_CFSv2_ensemble_tmpsfc_season1.png

CMC2 MODEL

(a) **(b)**

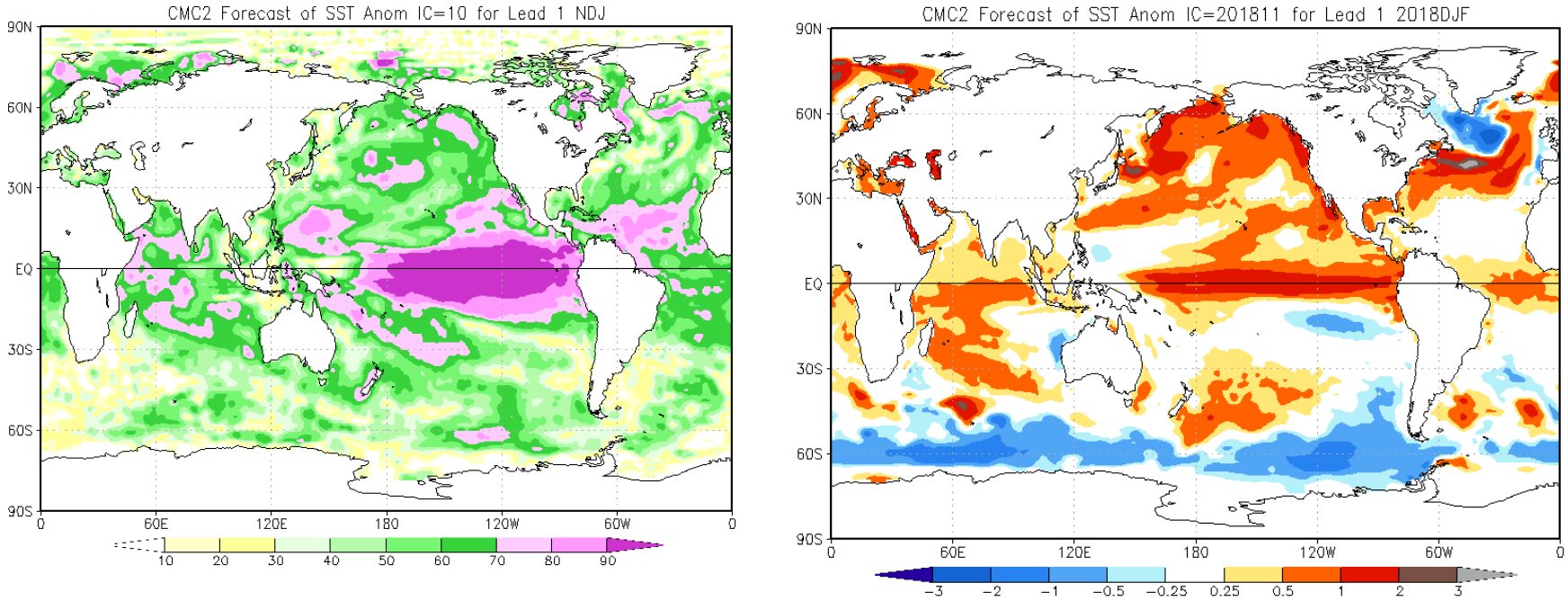


Figure M3: skill (a) CMC2 Model forecast DJF SST SST maps (b) CMC2 Model forecast

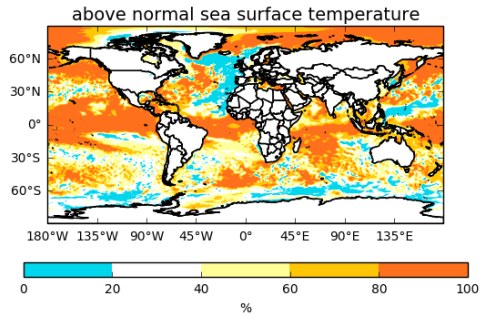
http://www.cpc.ncep.noaa.gov/products/NMME/current/images/CMC2_ensemble_tmpsfc_season1.png

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/skill_CMC2_ensemble_tmpsfc_season1.png

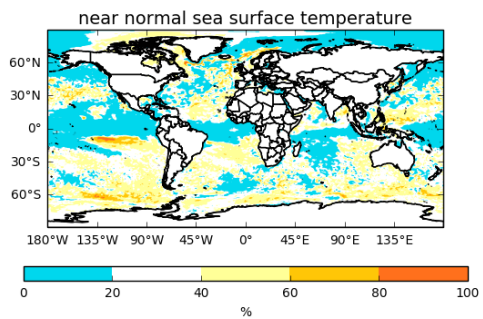
UK METOFFICE

Probability of tercile categories Dec/Jan/Feb Issued November 2018

(a)



(b)



(c)

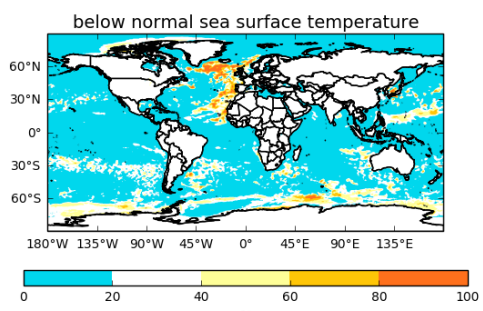


Figure M4: NDJ Global sea surface temperature (a) Above average (b) Near average (c) Below average

http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob

VIII. ANALYSIS OF WMO LEAD CENTRES FOR LONG RANGE FORECATS MULTIMODEL PRODUCTS

MULTI-MODELS FOR SST VALID FOR DJF 2018-19

NMME

(a) **(b)**

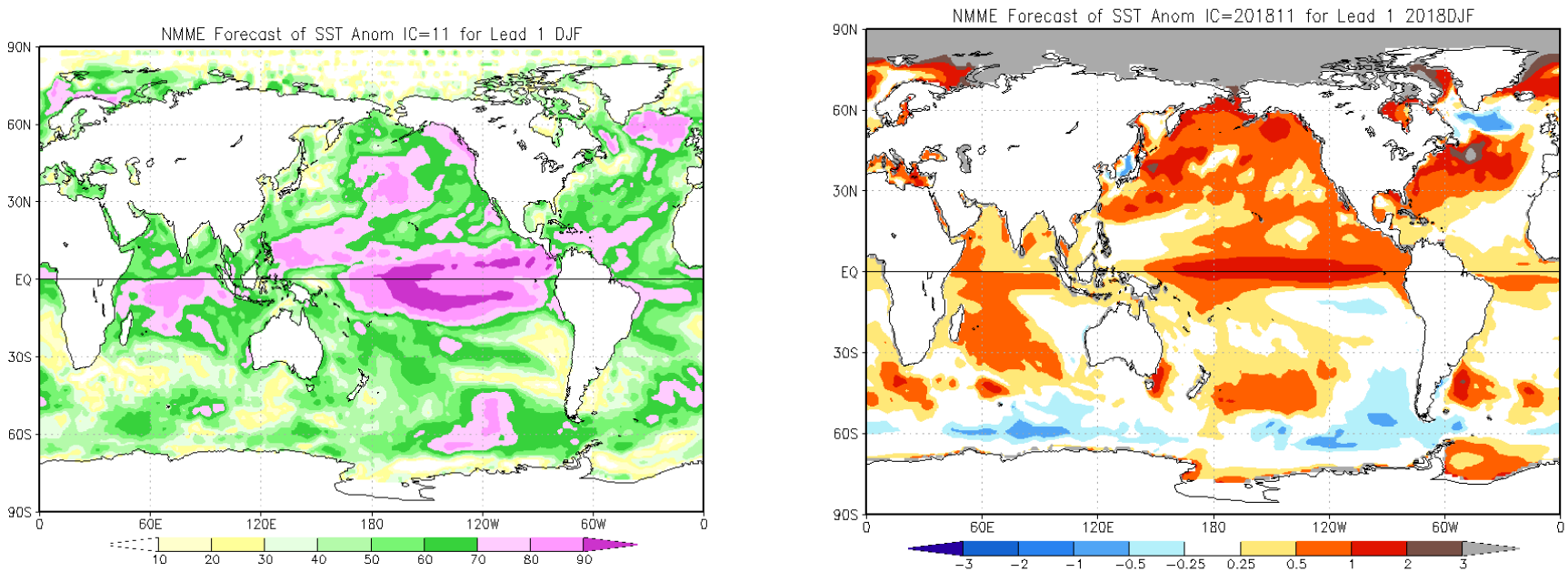


Figure M5: skill (a) NMME Model forecast DJF SST SST maps (b) NMME Model forecast

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/NMME_ensemble_tmpsfc_season1.png
http://www.cpc.ncep.noaa.gov/products/NMME/current/images/skill_NMME_ensemble_tmpsfc_season1.png

EUROSIP MULTI-MODEL

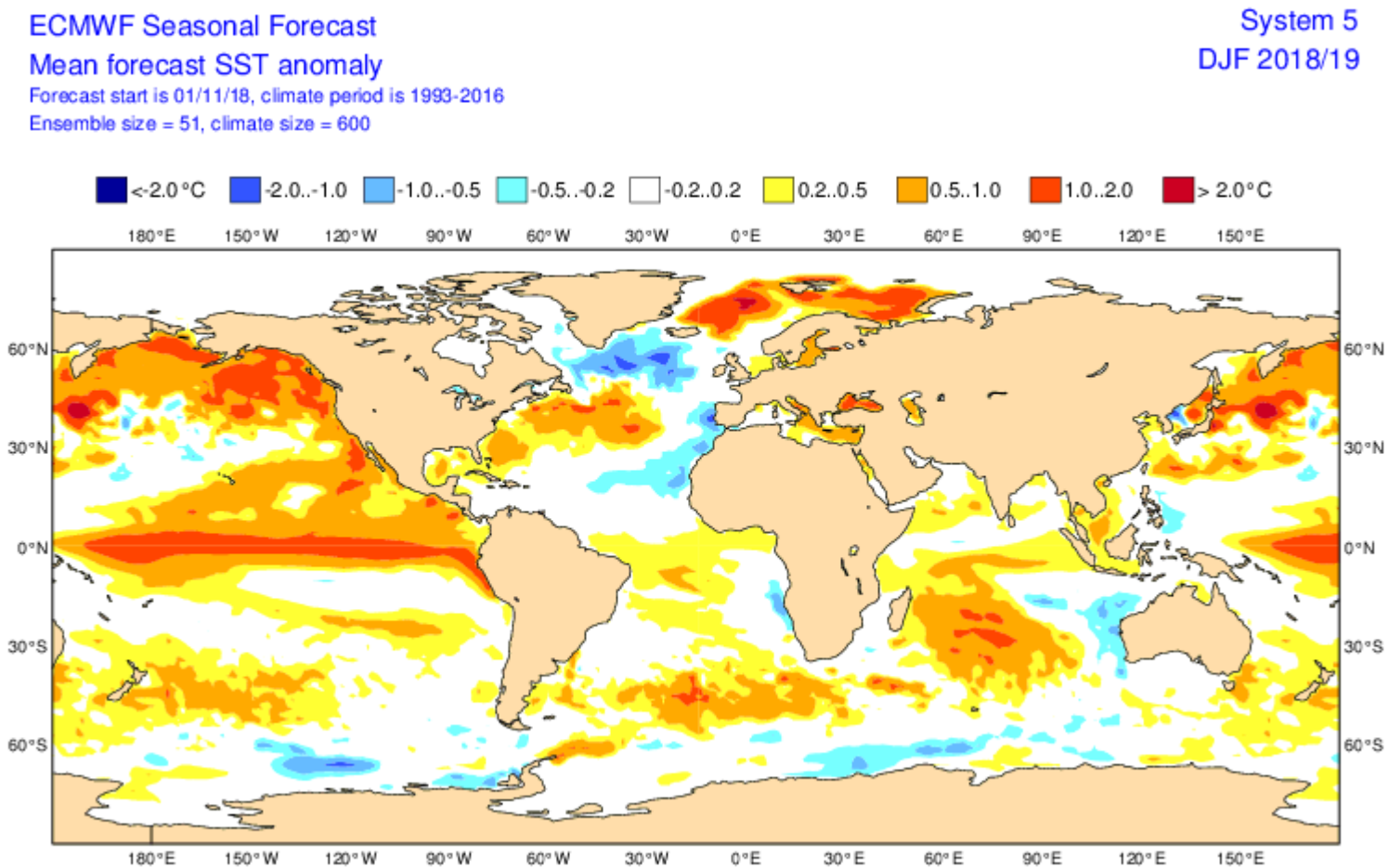


Figure M6: EUROpean Seasonal to Inter-annual Prediction (EUROSIP) multi-model seasonal forecast of NDJ 2018-19 SST anomaly

https://www.ecmwf.int/en/forecasts/charts/seasonal/seasonal_charts_eurosip_sst?time=2017090100,2904,2017123100&area=Global

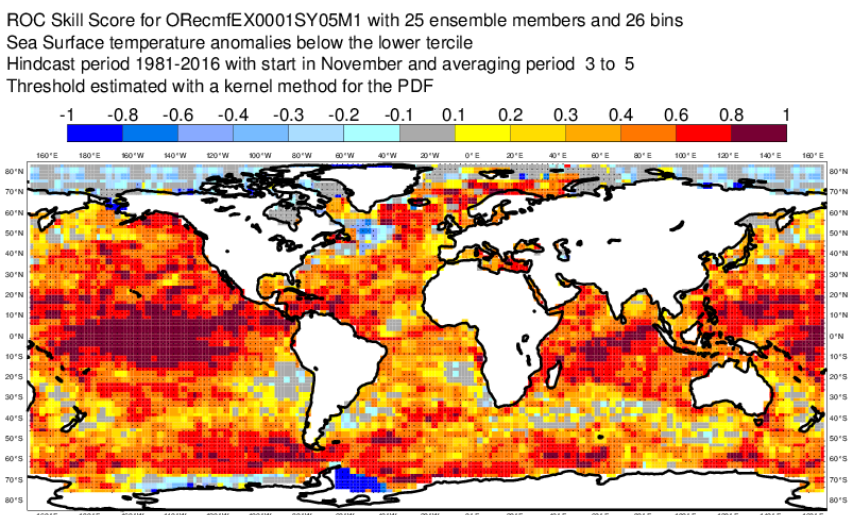
VII. ANALYSIS OF EACH GLOBAL PRODUCING CENTRES FOR LONG RANGE FORECAST

SST JFM 2018-19 FROM SINGLE MODELS

ECMWF MODEL

(a)

(b)



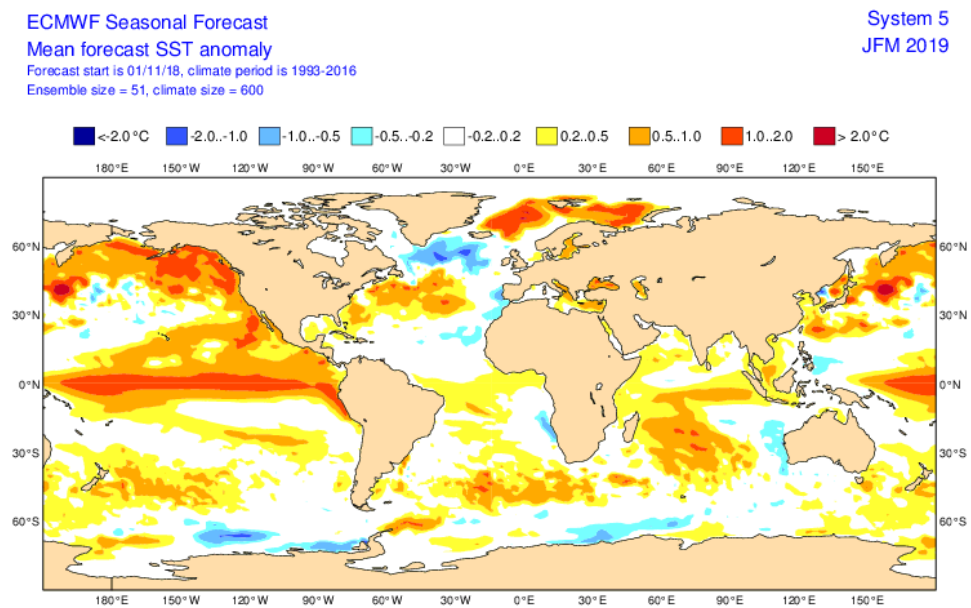


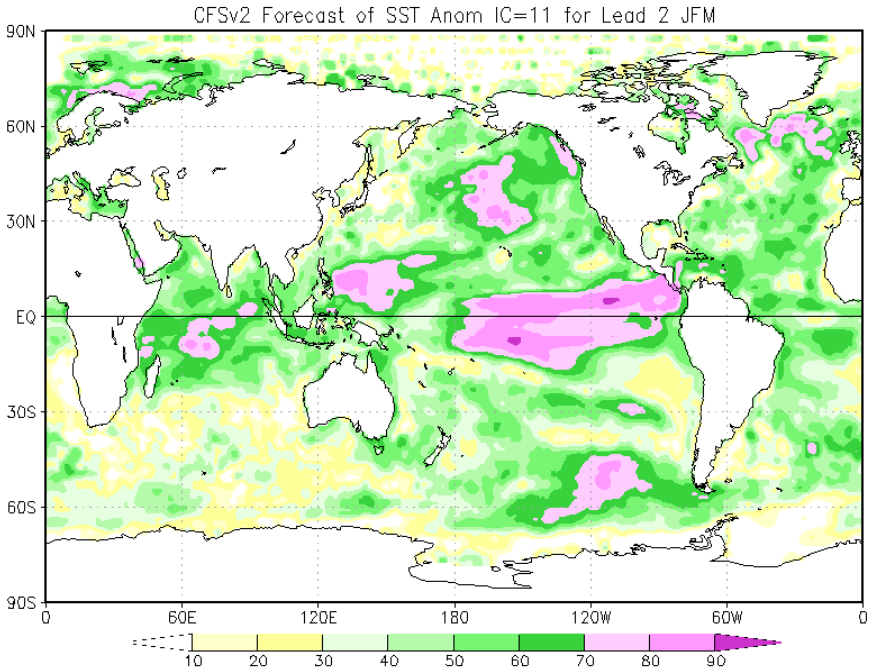
Figure M7: JFM SST anomaly maps (a) ECMWF Model Skill (b) ECMWF Model forecast

http://www.ecmwf.int/en/forecasts/charts/seasonal/sea-surface-temperature-long-range-forecast?time=2016020100,2880,2016053100&area=Global&forecast_type_and_skill_measures=ensemble%20mean

https://www.ecmwf.int/en/forecasts/charts/catalogue/seasonal_charts_ecmwf_sst?time=2017080100,2904,2017113000&area=Global&forecast_type_and_skill_measures=anomaly%20correlation

CFSV2 MODEL

(a)



(b)

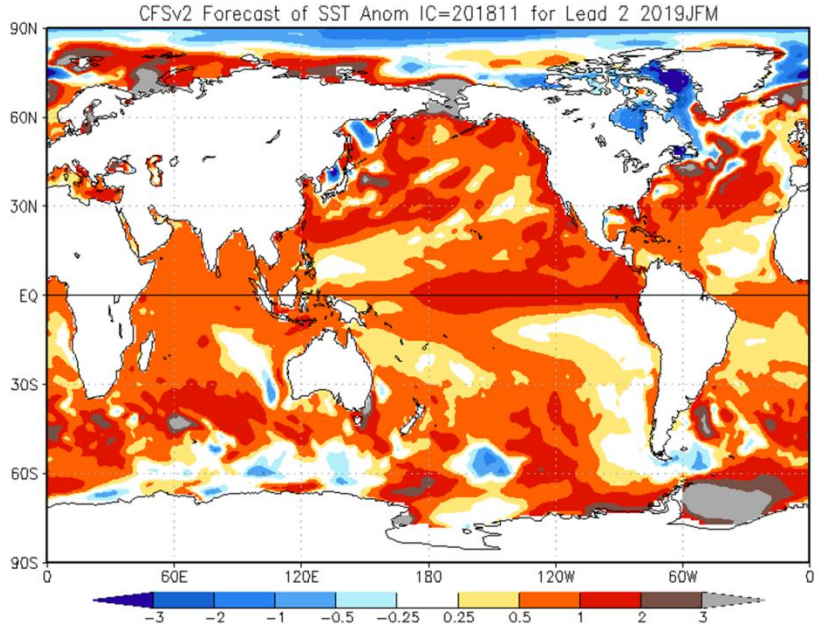


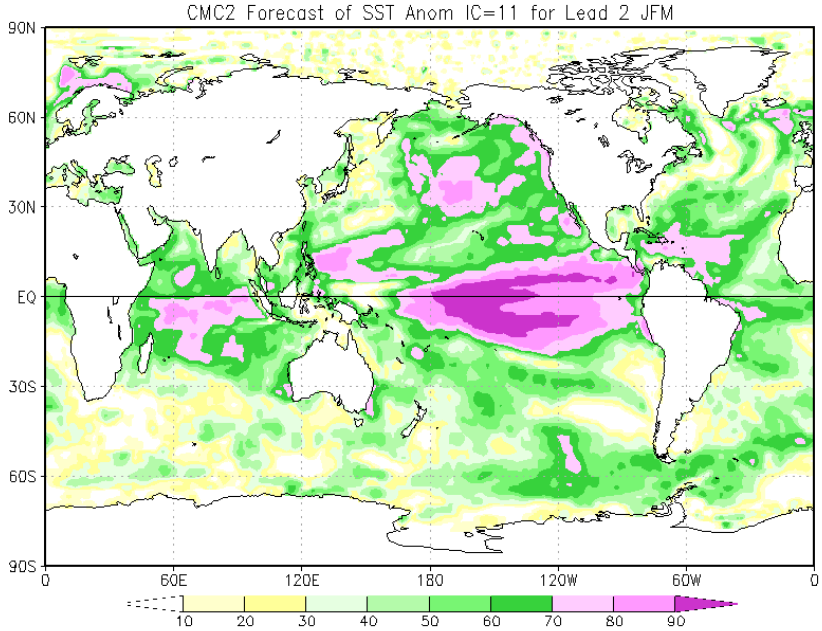
Figure M8: skill (a) CFSv2 Model forecast JFM SST SST maps (b) CFSv2 Model forecast

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/CFSv2_ensemble_tmpsfc_season2.png

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/skill_CFSv2_ensemble_tmpsfc_season2.png

CMC2 MODEL

(a)



(b)

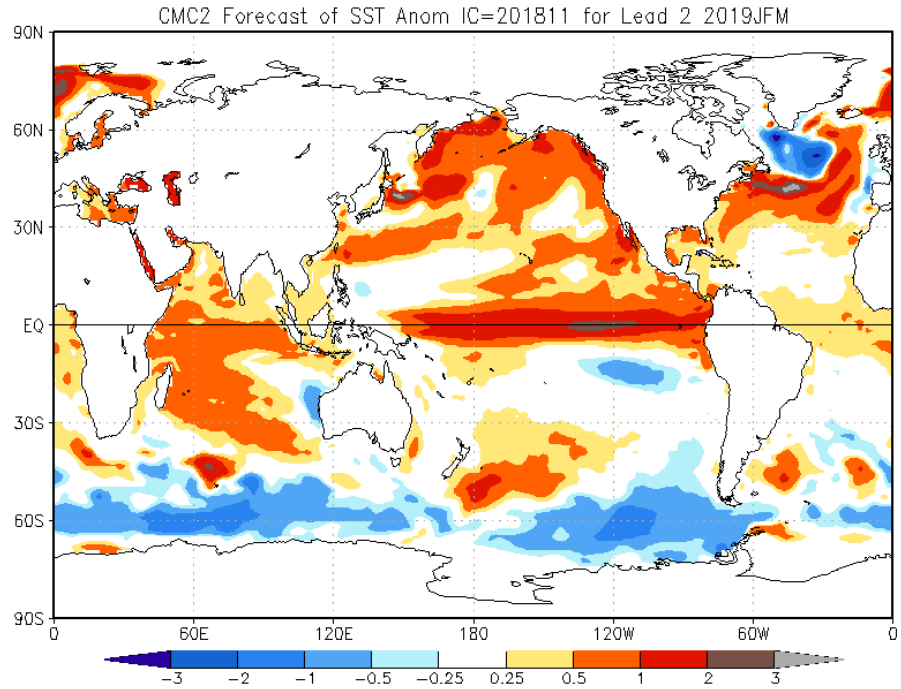


Figure M9: skill (a) CMC2 Model forecast JFM SST SST maps (b) CMC2 Model forecast

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/CMC2_ensemble_tmpsfc_season1.png

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/skill_CMC2_ensemble_tmpsfc_season1.png

UK-MET OFFICE

Probability of tercile categories Jan/Feb/Mar Issued November 2018

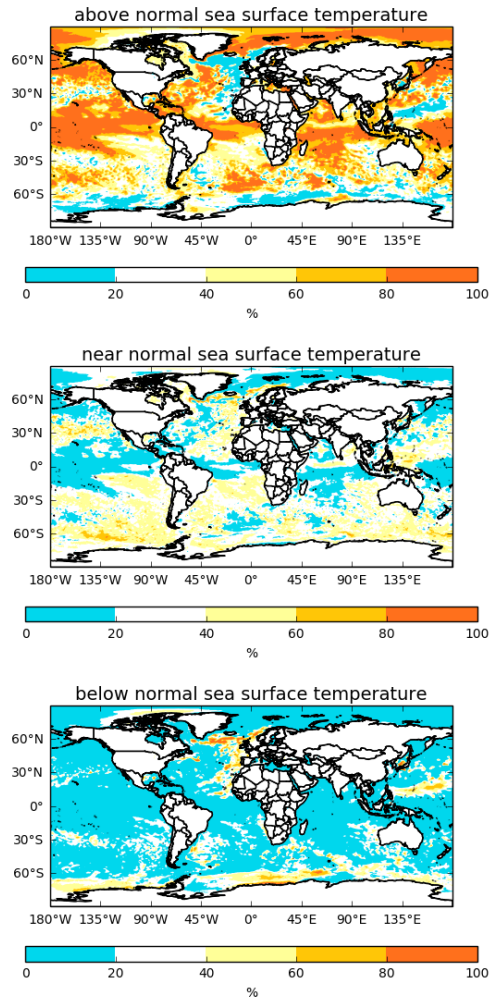


Figure M10: JFM Global sea surface temperature tercile categories (a) Above normal (b) Near normal (c) Below normal

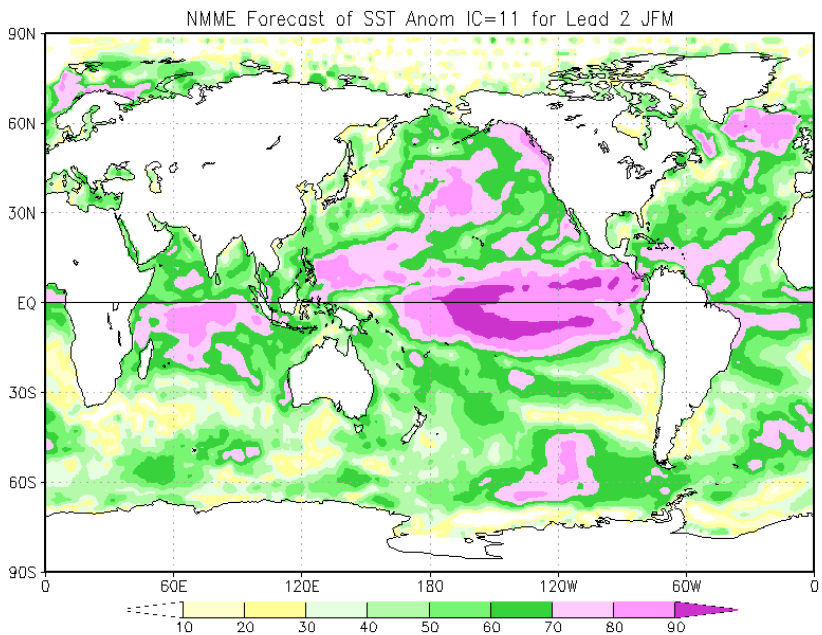
http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob

VII. ANALYSIS OF WMO LEAD CENTRES FOR LONG RANGE FORECATS MULTIMODEL PRODUCTS

SST JFM 2019 FROM MULTI MODELS

NMME

(a)



(b)

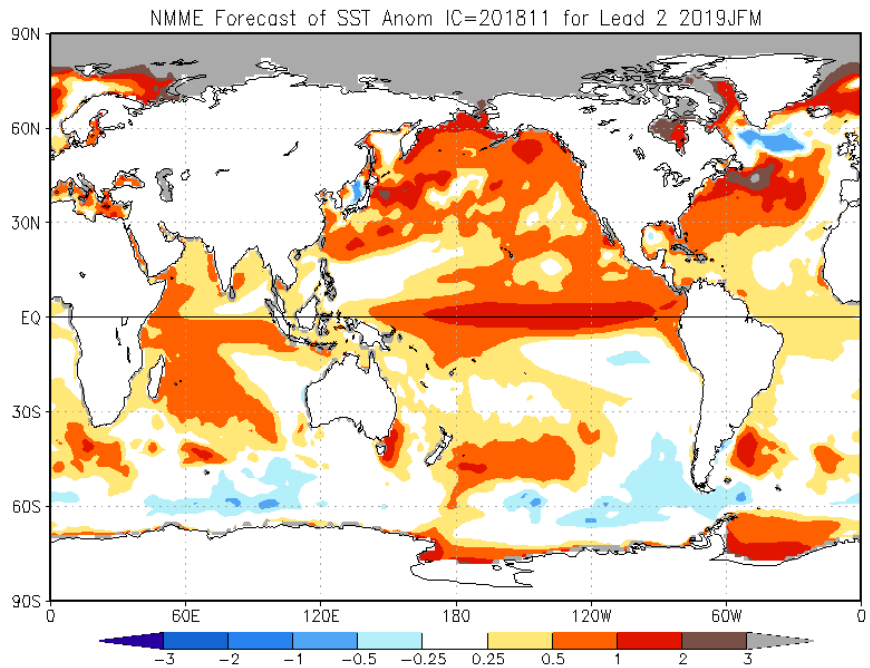


Figure M11: skill (a) NMME Model forecast DJF SST SST maps (b) NMME Model forecast

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/NMME_ensemble_tmpsfc_season2.png
http://www.cpc.ncep.noaa.gov/products/NMME/current/images/skill_NMME_ensemble_tmpsfc_season2.png

EUROSIP MULTI-MODEL

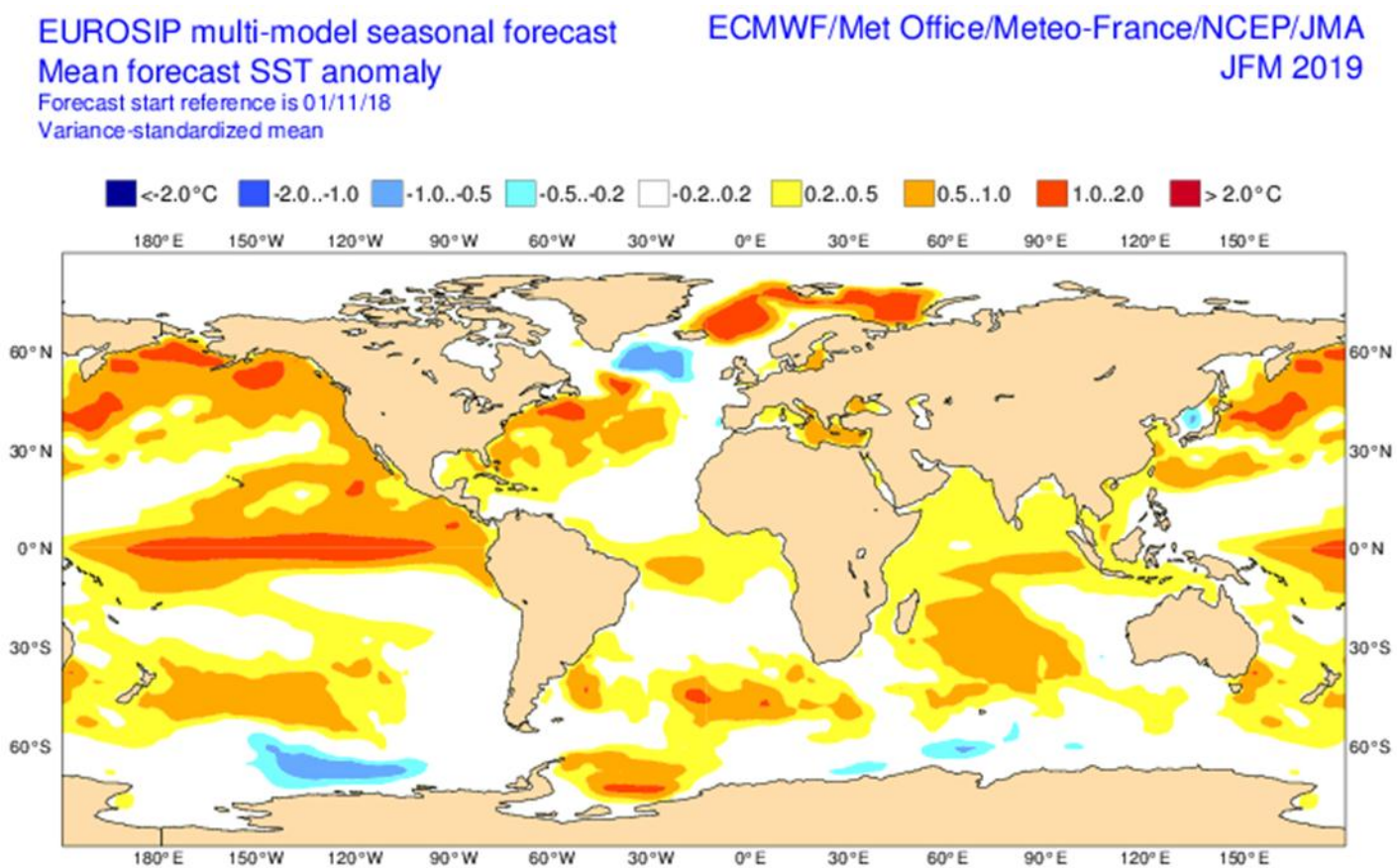


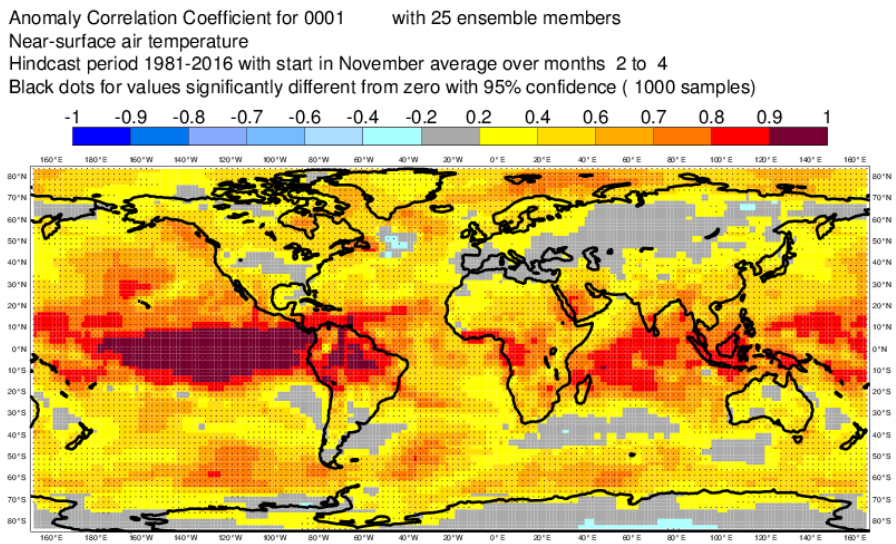
Figure M12: EUROpean Seasonal to Inter-annual Prediction (EUROSIP) multi-model seasonal forecast of JFM 2019 SST anomaly.

https://www.ecmwf.int/en/forecasts/charts/seasonal/seasonal_charts_eurosip_sst?time=2017070100,2928,2017103100&area=Global

SINGLES MODELS FOR NEAR SURFACE AIR TEMPERATURE FORECAST FOR DJF 2018-19

ECMWF MODEL

(a)



(b)

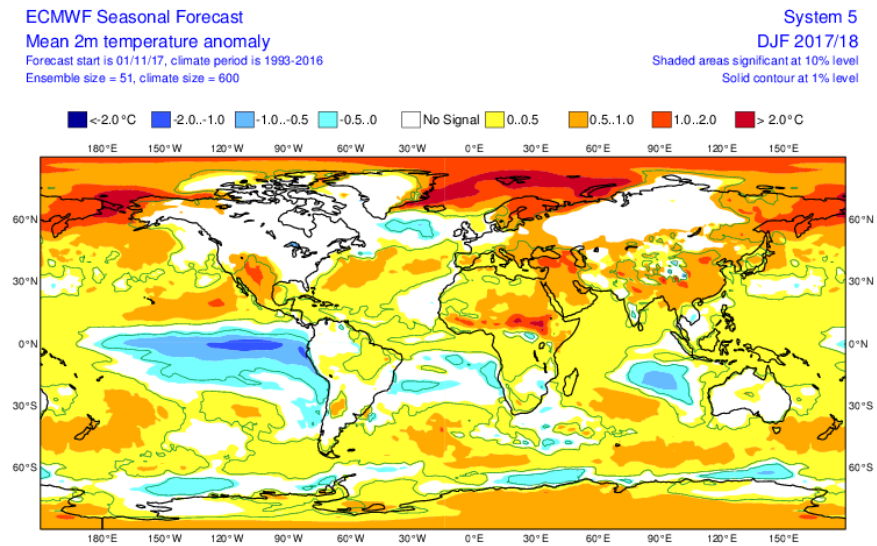


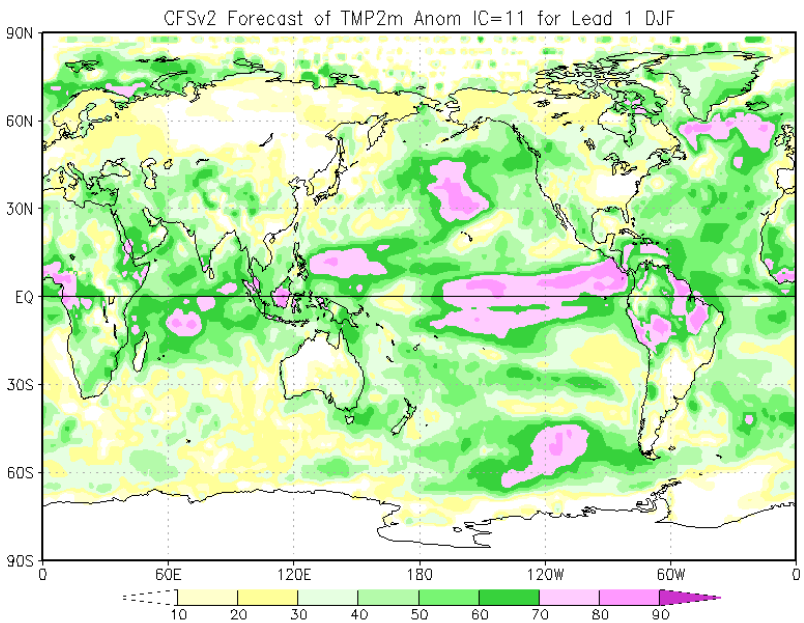
Figure T1: skill (a) ECMWF Model anomaly forecast Mean DJF 2m temperature maps (b) ECMWF Model forecast

https://www.ecmwf.int/en/forecasts/charts/catalogue/seasonal_charts_ecmwf_2tm?time=2017050100,3648,2017093000&area=Global&forecast_type_and_skill_measures=ensemble%20mean

https://www.ecmwf.int/en/forecasts/charts/catalogue/seasonal_charts_ecmwf_2tm?time=2017050100,3648,2017093000&area=Global&forecast_type_and_skill_measures=anomaly%20correlation

CFSV2 MODEL

(a)



(b)

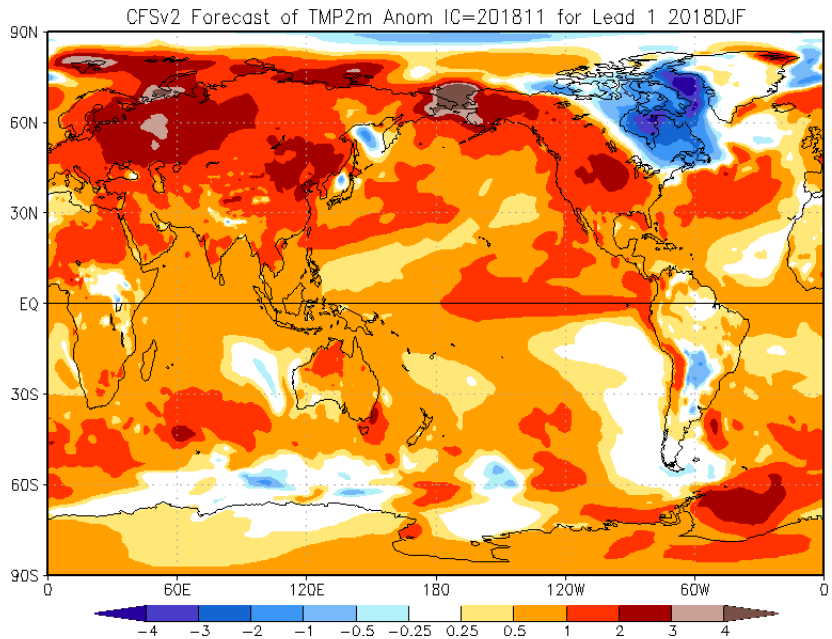


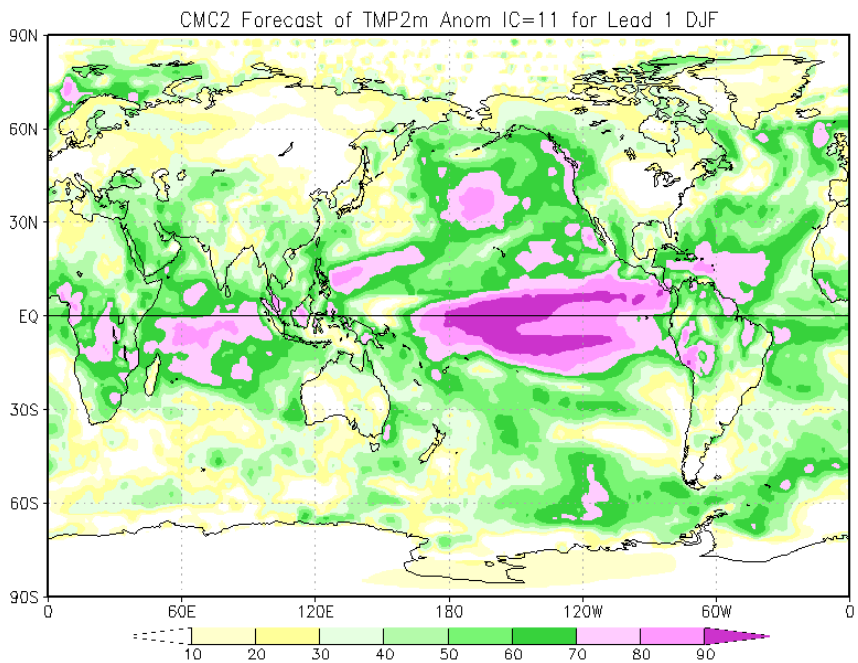
Figure T2: skill (a) CFSV2 Model anomaly forecast Mean DJF 2m temperature maps (b) CFSV2 Model forecast.

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/CFSv2_ensemble_tmp2m_season2.png

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/skill_CFSv2_ensemble_tmp2m_season2.png

CMC2 MODEL

(a)



(b)

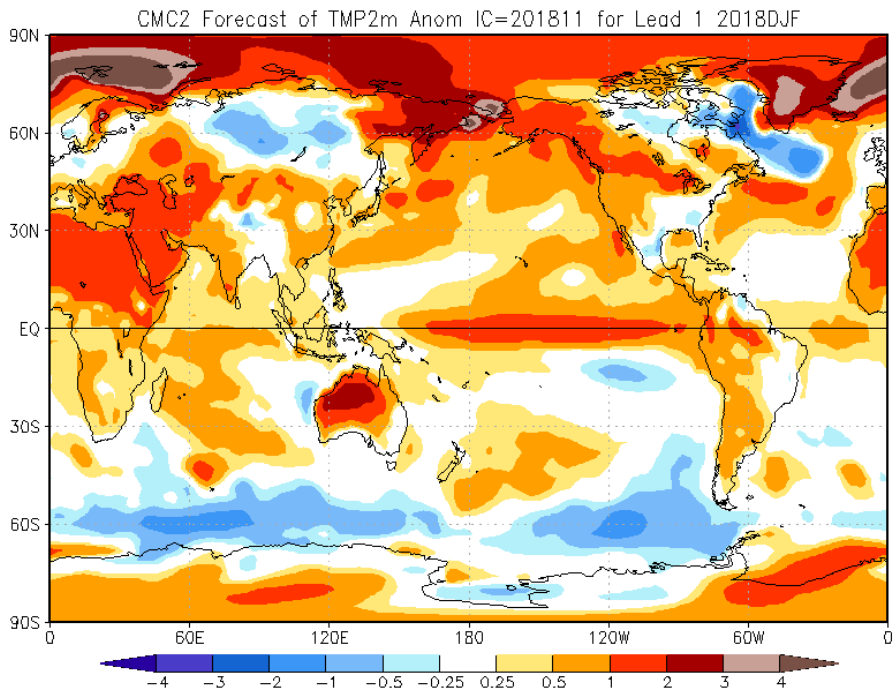


Figure T3: skill (b) CMC2 Model anomaly forecast Mean DJF 2m temperature maps (a) CMC2 Model forecast

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/CMC2_ensemble_tmp2m_season2.png

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/skill_NMME_ensemble_tmp2m_season2.png

UK-MetOffice

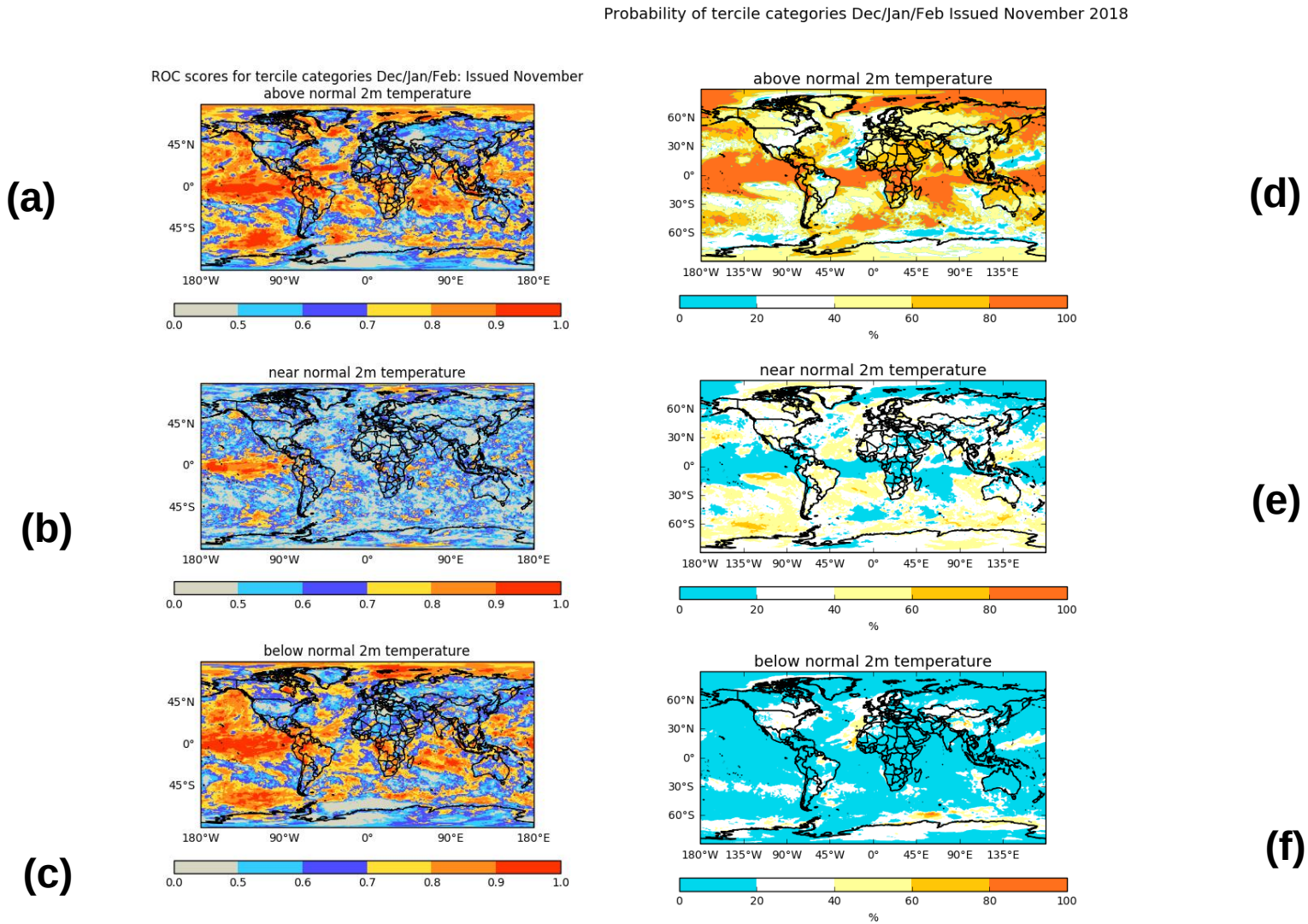


Figure T4: DJF Global 2m temperature, with (a), (b) and (c) showing the ROC scores for the tercile categories; above, near and below average, respectively. The probability forecasts for the tercile categores are(d) above average, (e) near normal and (f) below average.

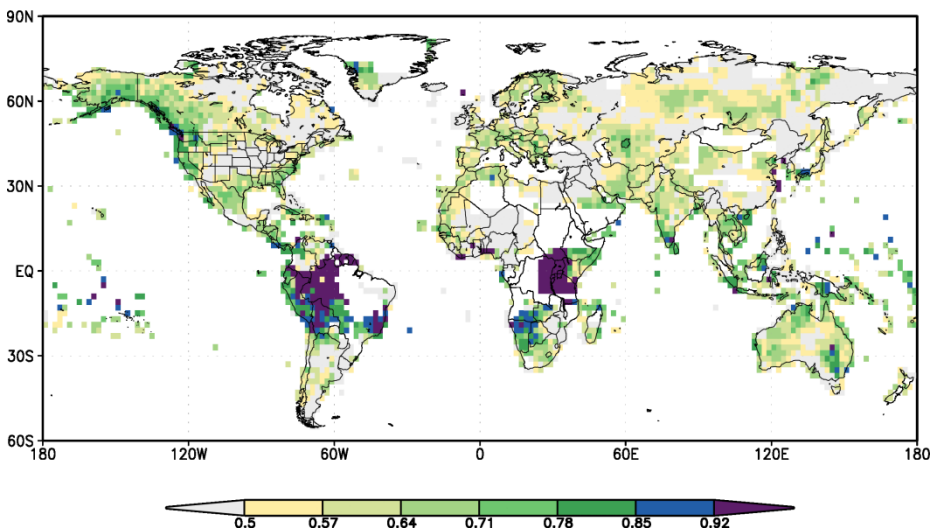
http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob
http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob-skill

MULTI-MODELS FOR 2m TEMP FORECAST VALID FOR DJF 2018-19

IRI MODEL

Generalized ROC (GROC)
2m temperature **Forecast Skill**

(a)



(b)

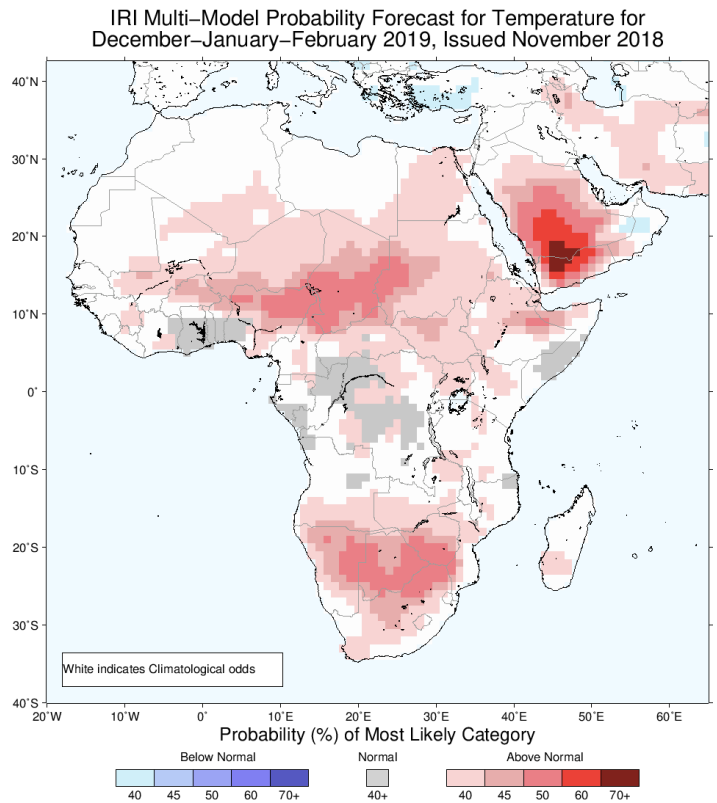
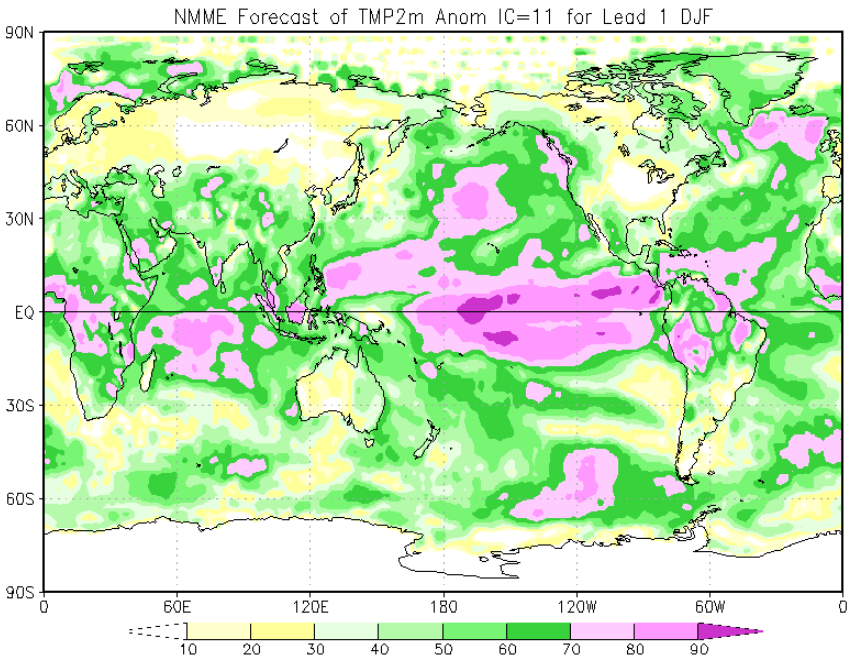


Figure T5: skill (a) IRI Multi-Model probability forecast. DJF 2018-19 2m temperature (b) IRI Multi-Model forecast

https://iri.columbia.edu/our-expertise/climate/forecasts/verification/
https://iri.columbia.edu/our-expertise/climate/forecasts/seasonal-climate-forecasts/

NMME

(a)



(b)

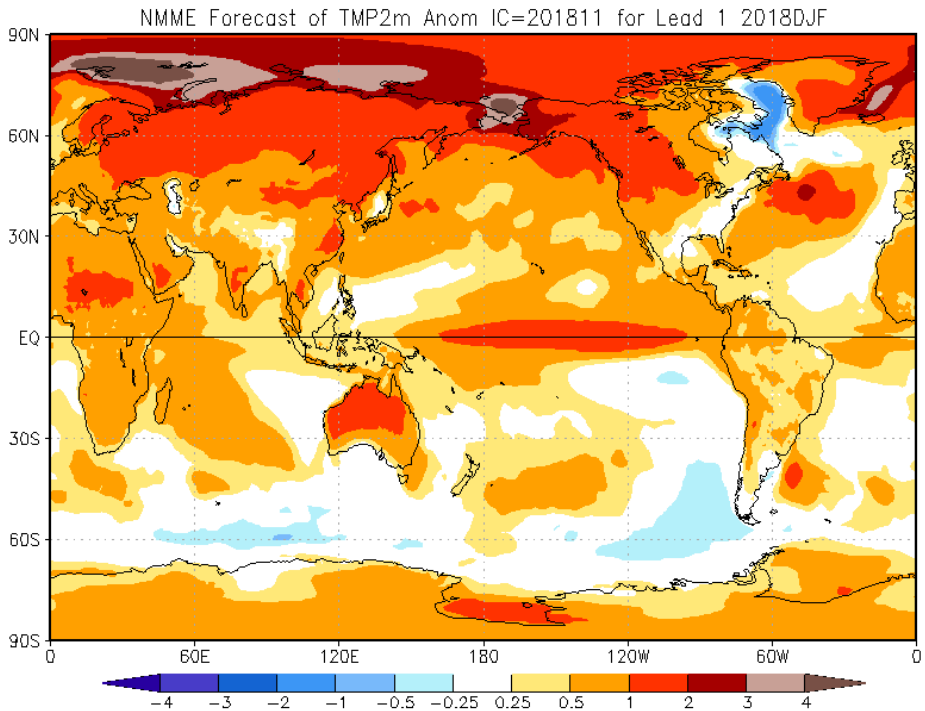


Figure T6: Mean NDJ 2018-19 2m temperature (a) NMME forecast skill (b) NMME anomaly forecast.

http://www.cpc.ncep.noaa.gov/products/NMME/current/imme/IMME_tmp2m_season2.png

EUROSIP MULTI-MODEL

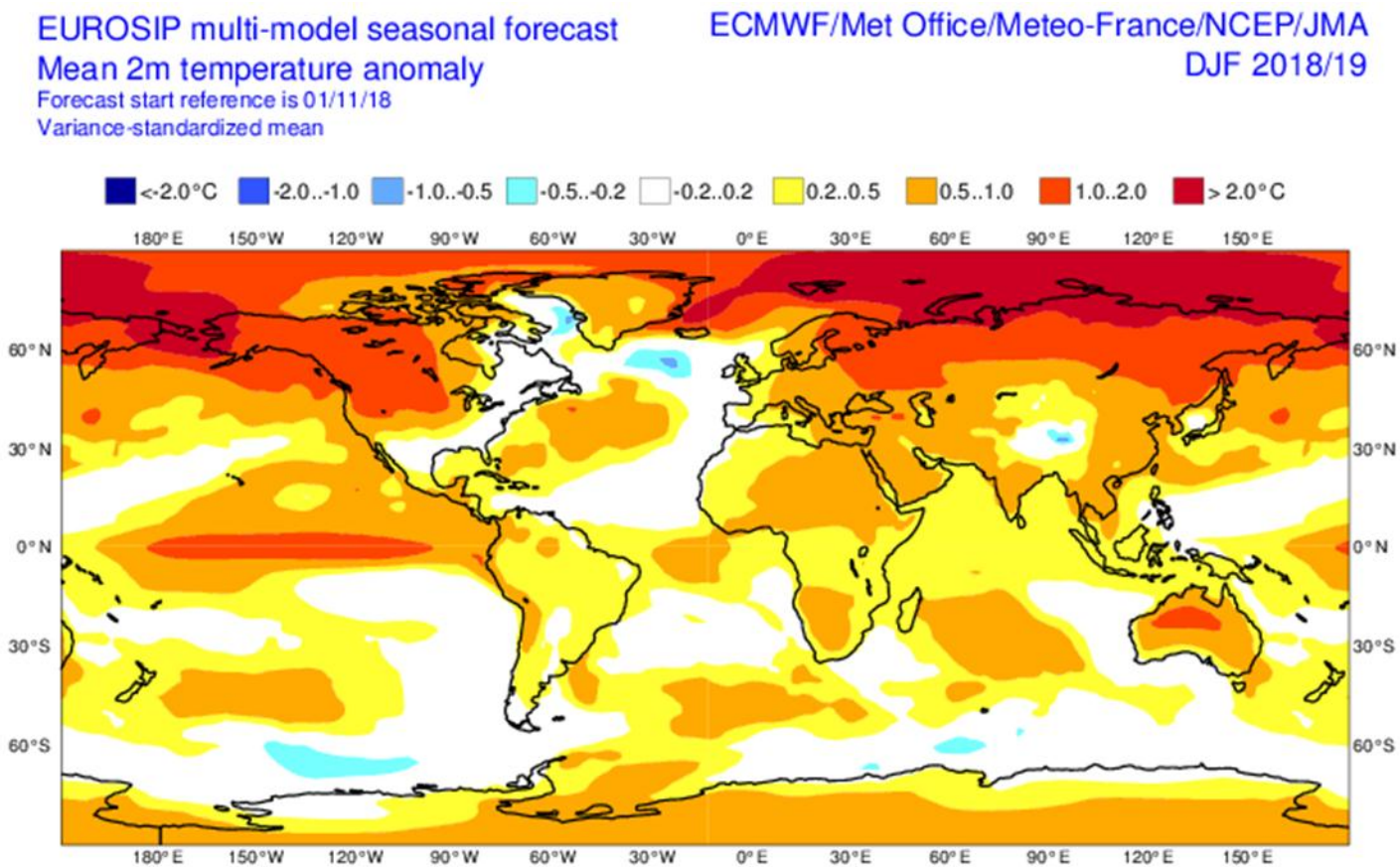


Figure T7: Mean NDJ 2018-19 2m temperature anomaly forecast by EUROSIP Multi-Model

https://www.ecmwf.int/en/forecasts/charts/seasonal/seasonal_charts_eurosip_2tm?time=2017050100,3648,2017093000&forecast_type_and_skill_measures=ensemble%20mean&area=Global

SINGLE MODELS FOR 2m TEMP FORECAST VALID FOR DJF 2018-19

ECMWF MODEL

(a)

(b)

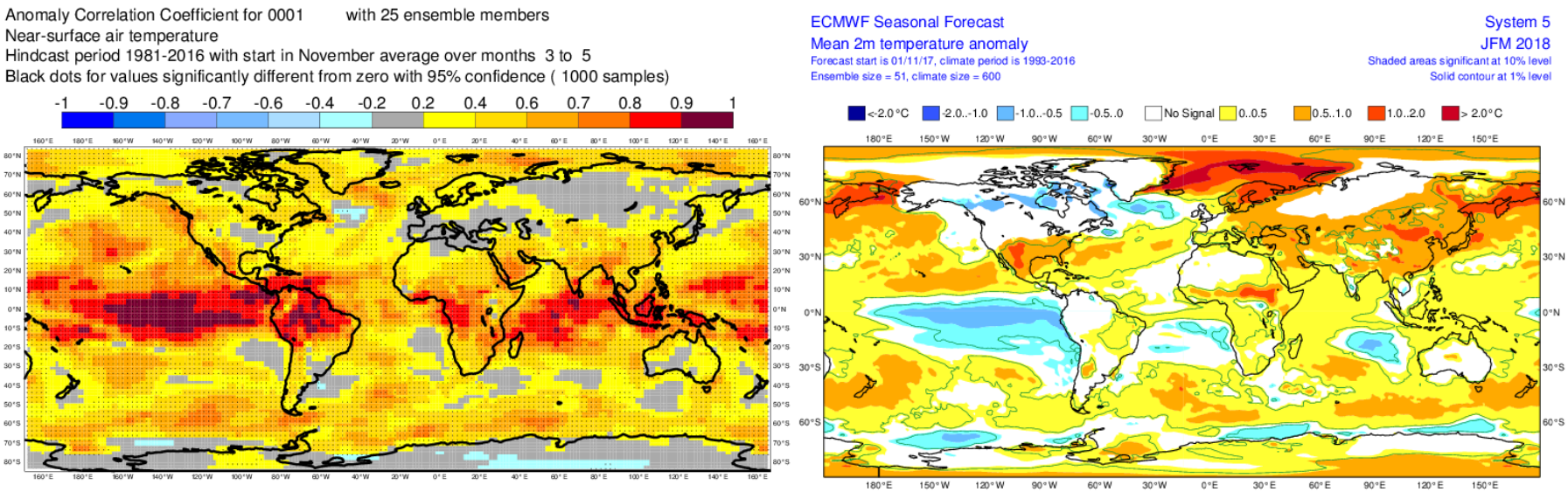
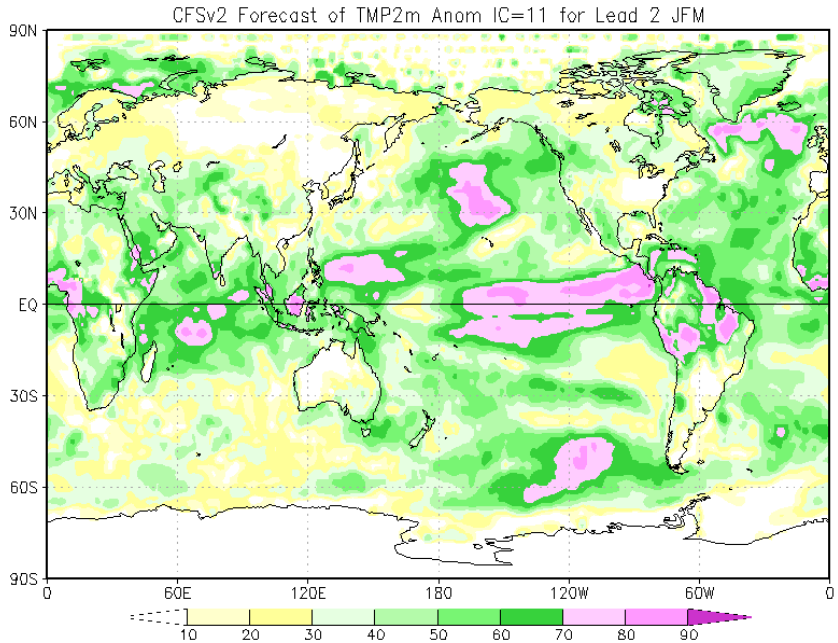


Figure T8: skill (a) ECMWF Model anomaly forecast.Mean JFM 2m temperature (b) ECMWF Model forecast

CFSV2 MODEL

(a)

(b)



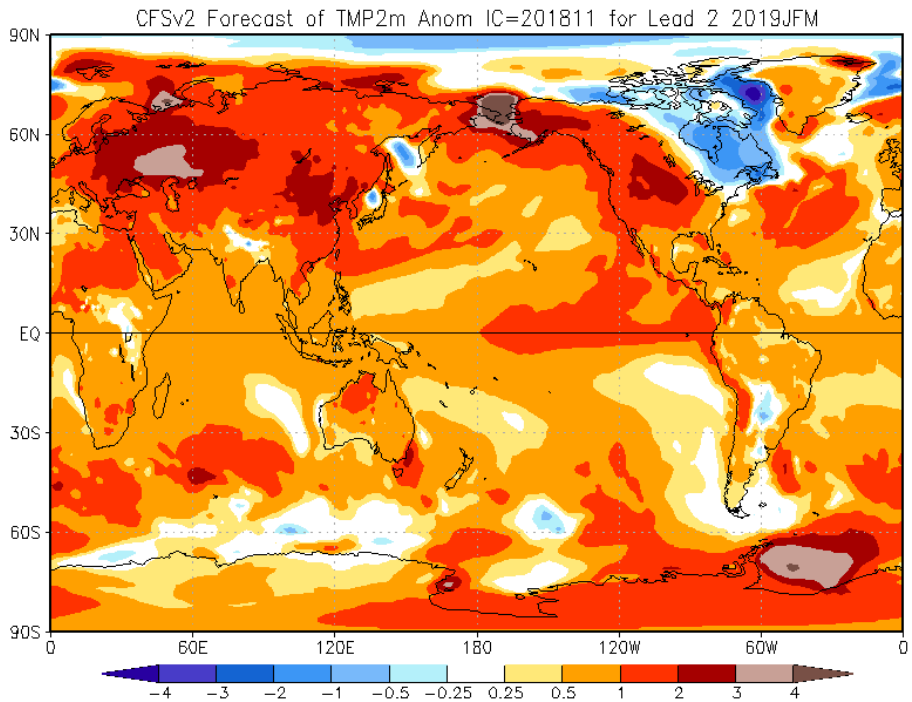


Figure T9: Mean JFM 2m temperature (a) CFSv2 Model forecast skill (b) CFSv2 Model anomaly forecast.

CMC2 MODEL

(a) **(b)**

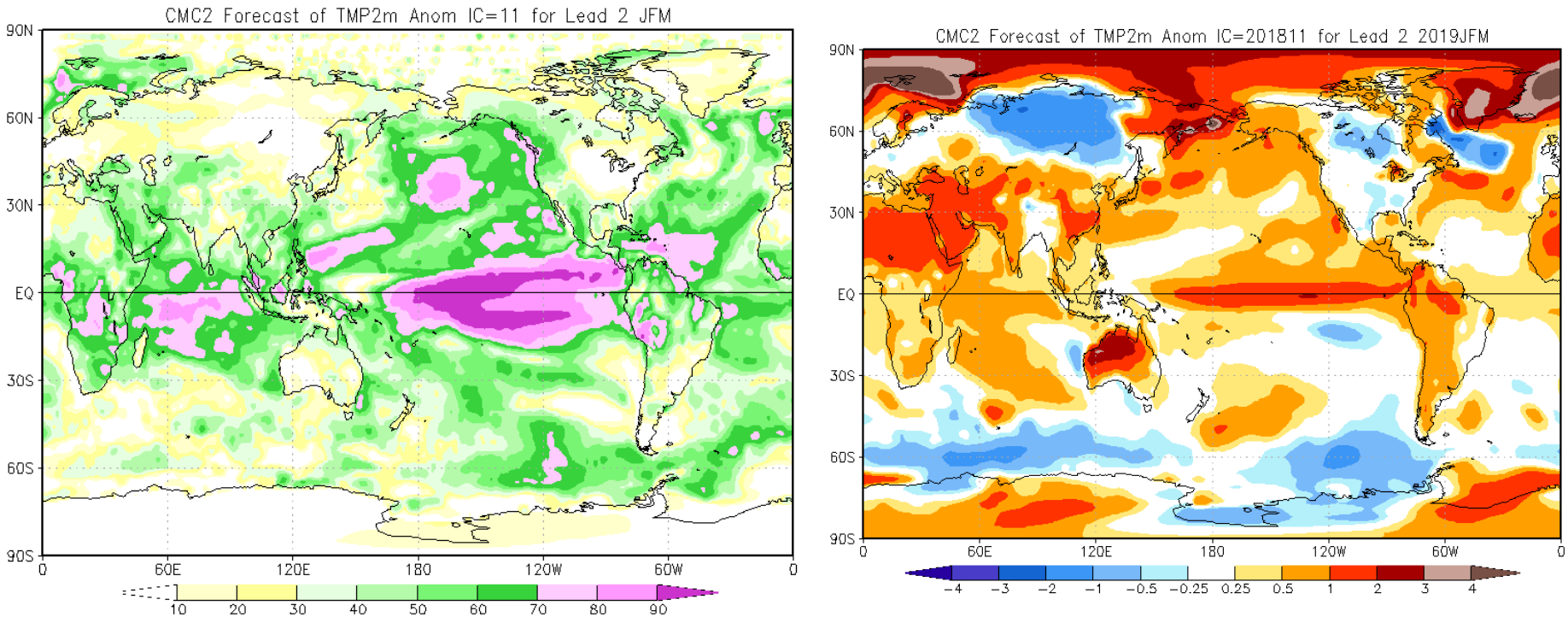
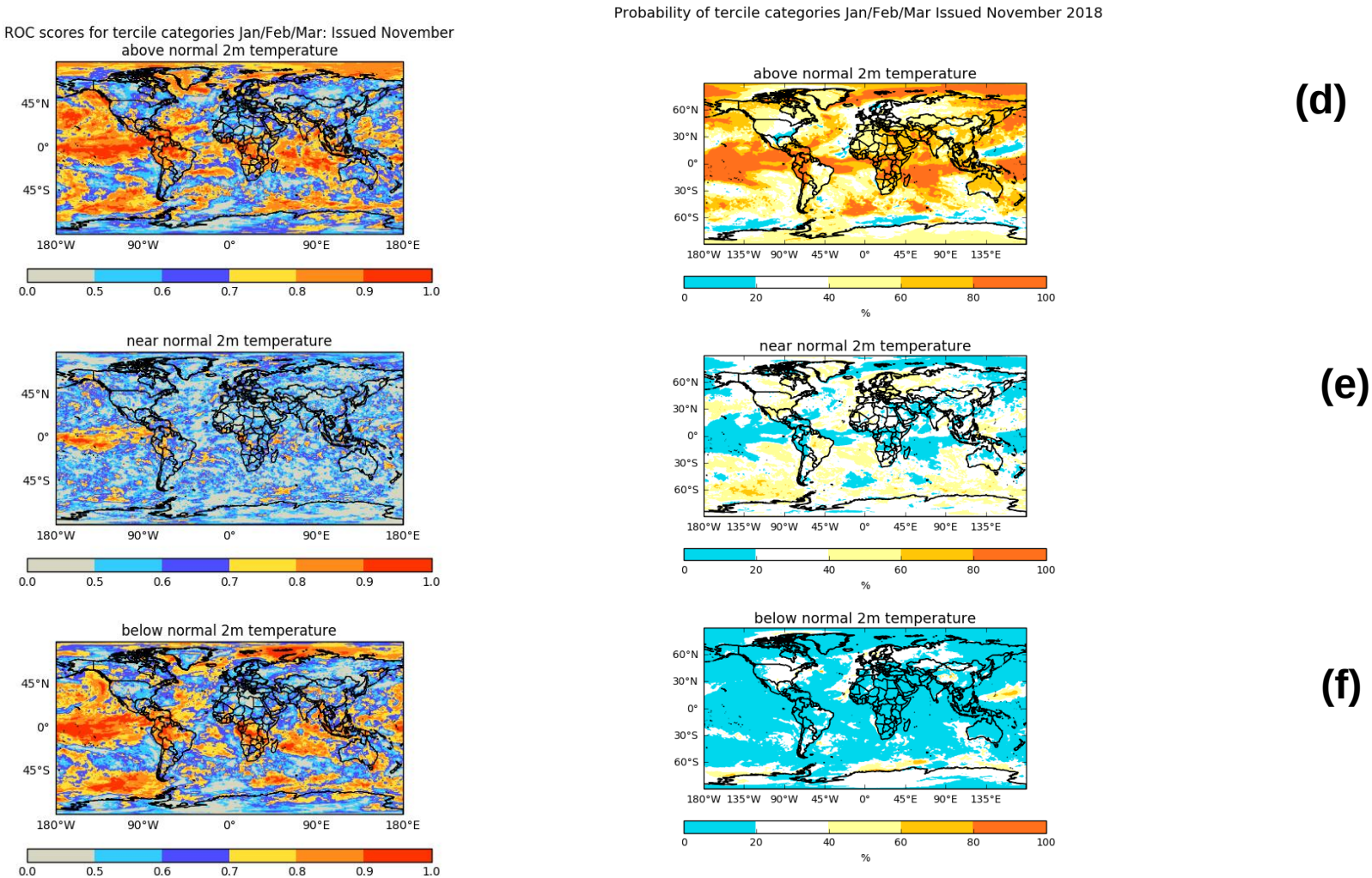


Figure T10: skill (a) CMC2 Model anomaly forecast.Mean JFM 2m temperature (b) CMC2 Model forecast

UK MET OFFICE



(a) (b) (c) (d) (e) (f)

Figure 11: JFM Global 2m temperature, with (a), (b) and (c) showing the ROC scores for the tercile categories; above, near and below normal, respectively. The probability forecasts for the tercile categores are(d) above normal, (e) near normal and (f) below normal

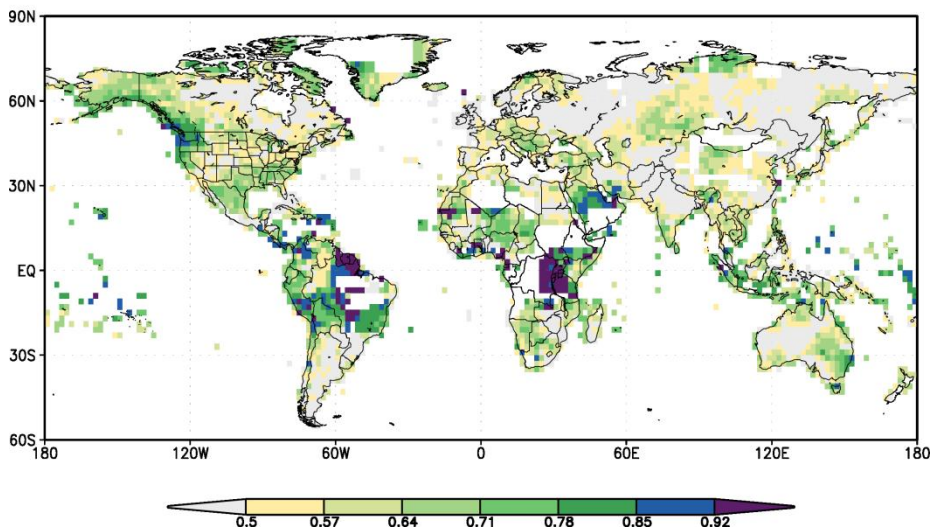
http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob-skill
http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob

MULTI-MODEL FORECAST FOR 2m TEMP VALID FOR JFM 2019

IRI MULTI-MODEL

(a)

Generalized ROC (GROC)
Precipitation Forecast Skill



(b)

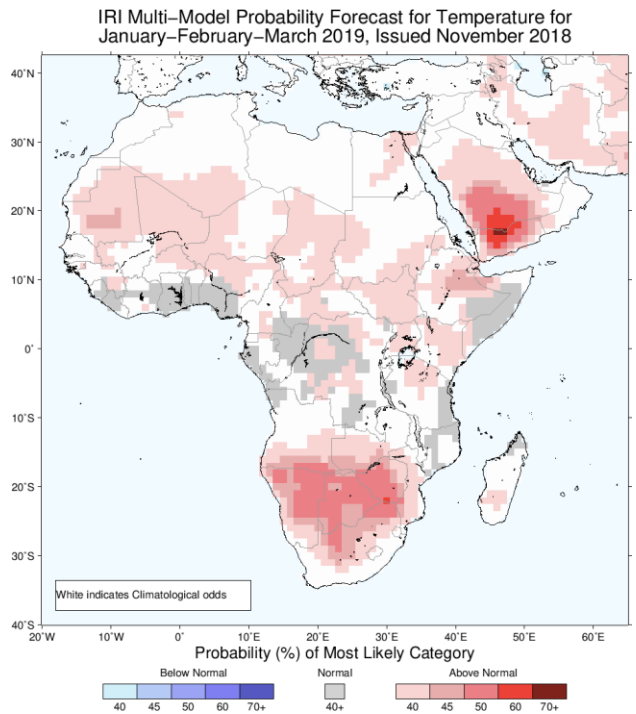


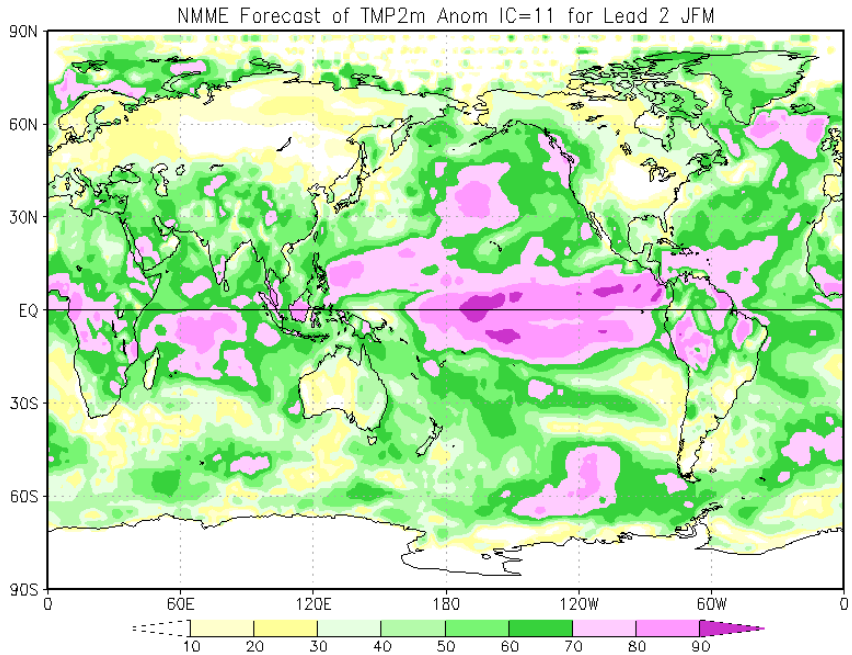
Figure T12: skill (a) IRI Multi-Model probability forecast.DJF 2018-19 2m temperature (b) IRI Multi-Model forecast

http://iri.columbia.edu/our-expertise/climate/forecasts/verification/

http://iri.columbia.edu/our-expertise/climate/forecasts/seasonal-climate-forecasts/

NMME

(a)



(b)

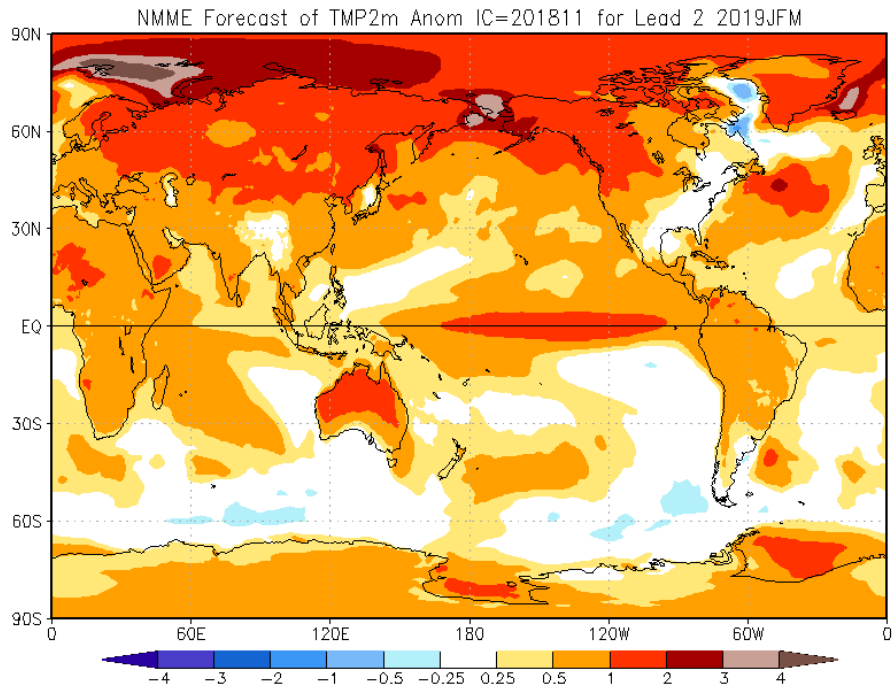


Figure T13: skill (a) NMME anomaly forecast.Mean JFM 2019 2m temperature (b) NMME forecast

EUROSIP MODEL

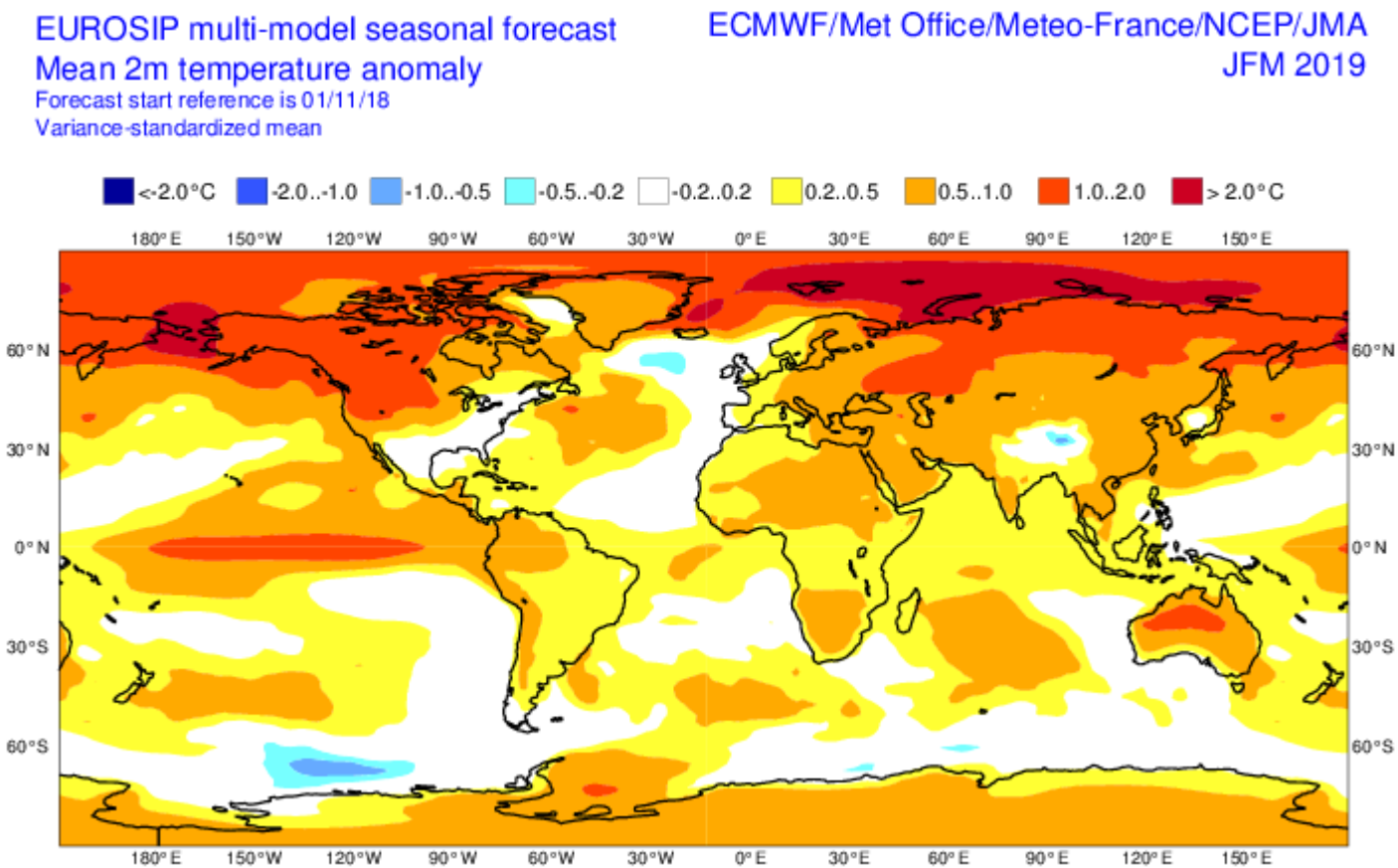


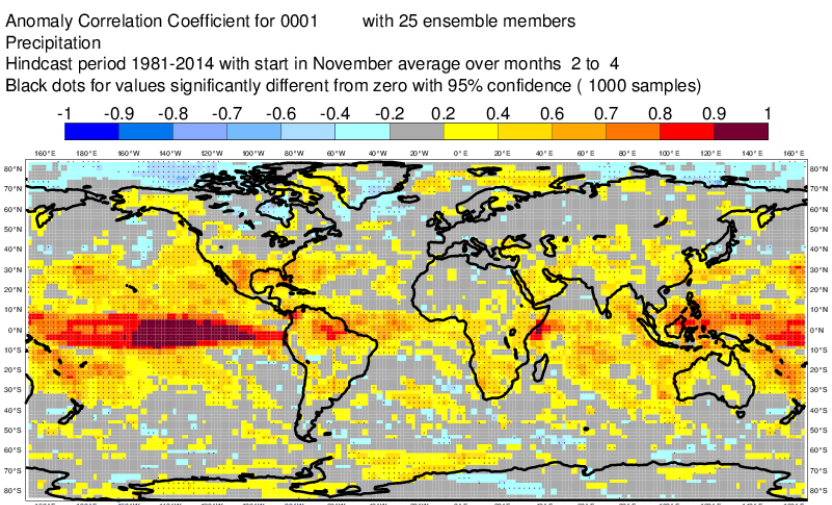
Figure T14: Mean JFM 2019 2m temperature anomaly forecast by EUROSIP Multi-Model

PRECIPITATION FORECAST VALID FROM DECEMBER 2018 TO MARCH 2019

PRECIPITATION FORECAST FROM SINGLE MODELS FOR DJF 2018-19

ECMWF MODEL

(a) **(b)**



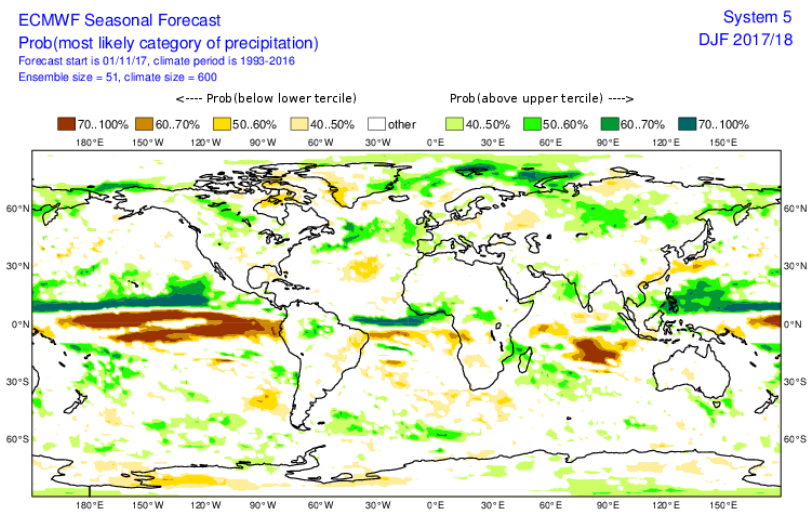
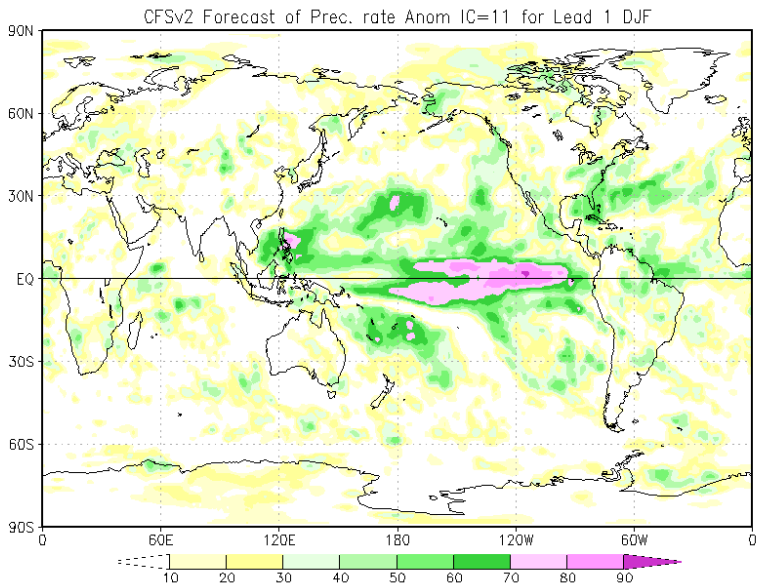


Figure PR1: skill (a) ECMWF Model anomaly forecast.Mean DJF precipitation (b) ECMWF Model forecast

http://www.ecmwf.int/en/forecasts/charts/seasonal/rain-long-range-forecast?time=2016020100,2880,2016053100&area=Global&forecast_type_and_skill_measures=tercile%20summary
http://www.ecmwf.int/en/forecasts/charts/seasonal/rain-long-range-forecast?time=2016020100,2880,2016053100&area=Global&forecast_type_and_skill_measures=anomaly%20correlation

CFSv2 MODEL

(a)



(b)

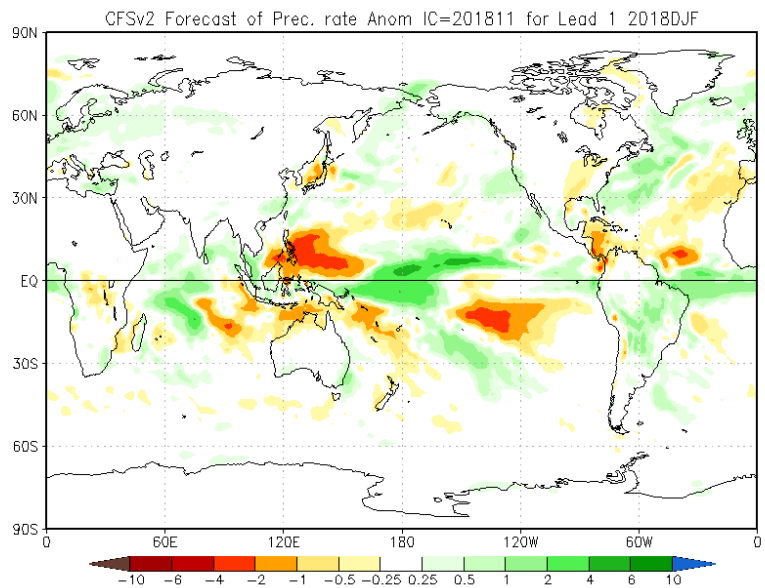


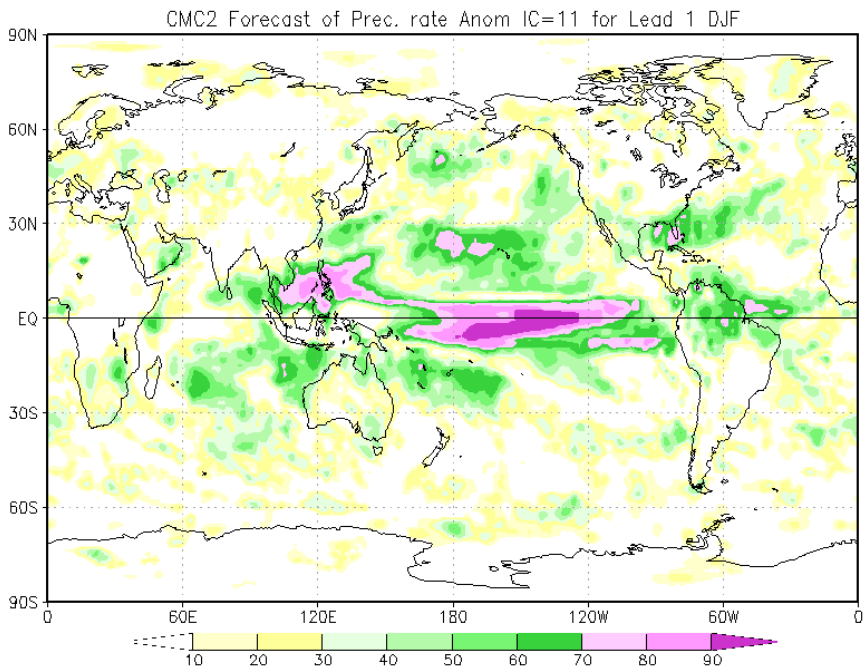
Figure PR2 : skill (a) CFSv2 Model anomaly forecast Mean DJF precipitation rate (b) CFSv2 Model forecast

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/CFSv2_ensemble_prate_season1.png

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/skill_CFSv2_ensemble_prate_season1.png

CMC2 MODEL

(a) **(b)**



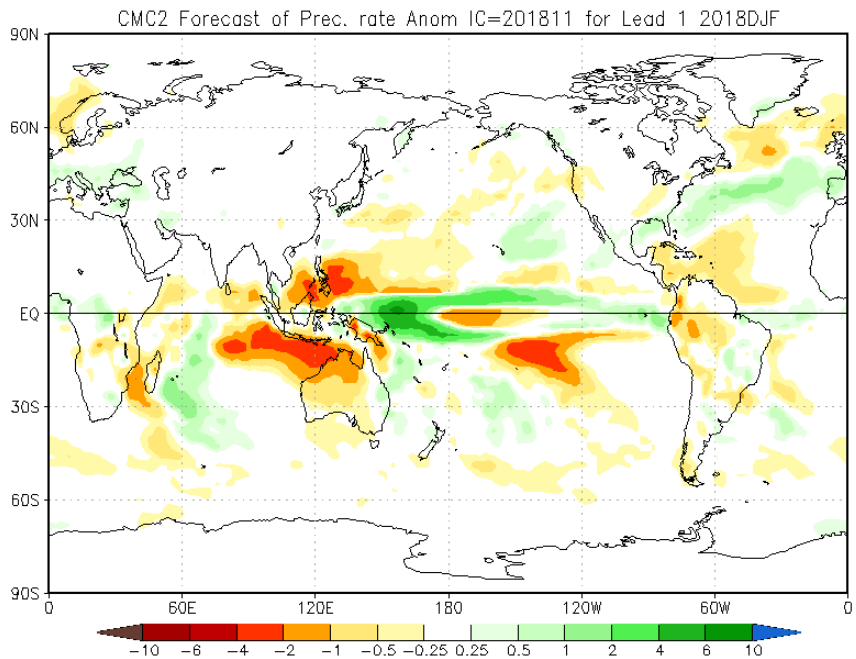


Figure PR3 : skill (a) CMC2 Model anomaly forecast. Mean DJF precipitation rate (b) CMC2 Model forecast

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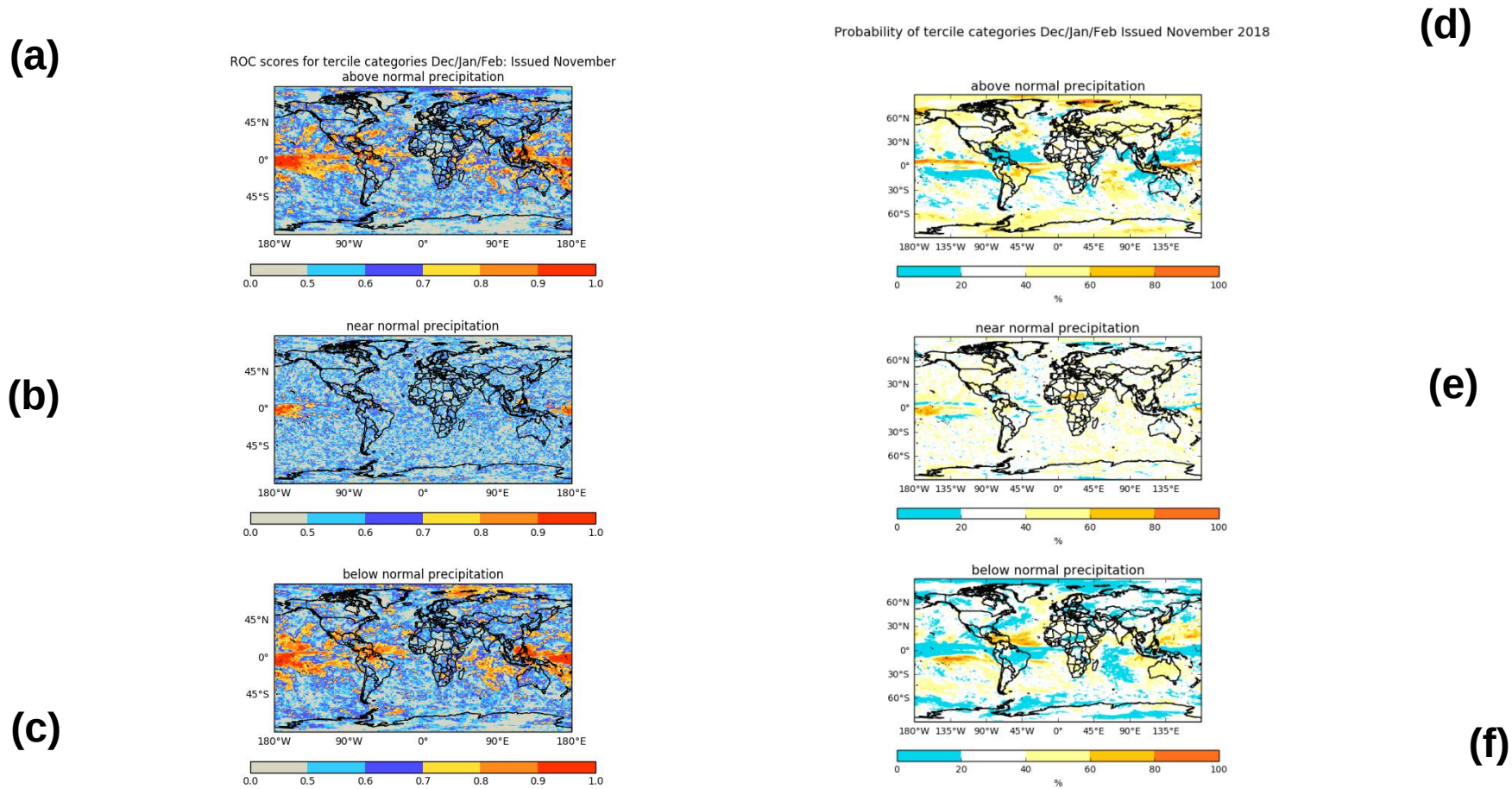


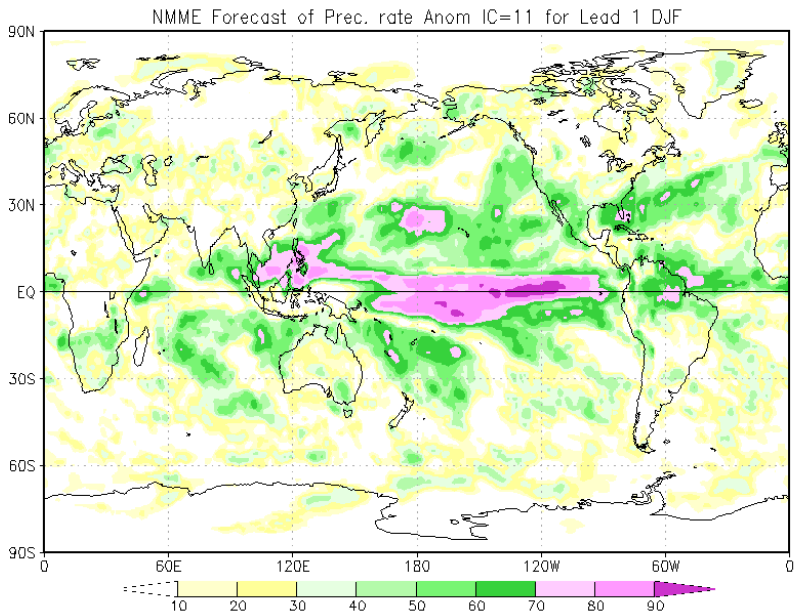
Figure PR4: Mean DJF precipitation, with (a), (b) and (c) showing the ROC scores for the tercile categories; above, near and below normal, respectively. The probability forecasts for the tercile categores are(d) above normal, (e) near normal and (f) below normal.

http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob-skill
http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob

PRECIPITATION FORECASTS FROM MULTI-MODELS FOR NDJ 2018-19

NMME

(a)



(b)

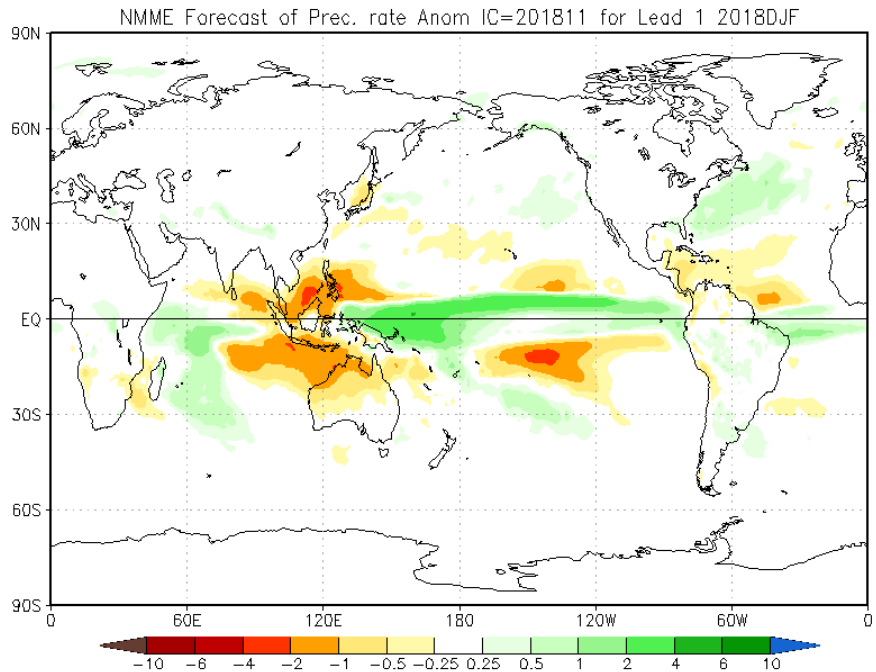


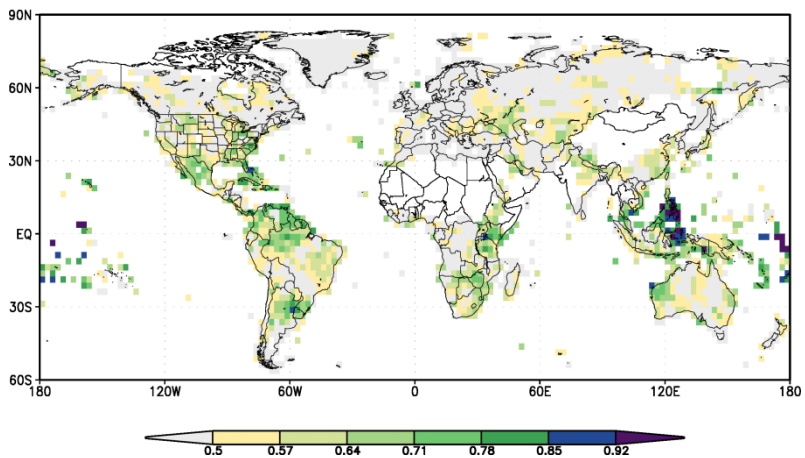
Figure PR5: Mean NDJ precipitation rate (a) NMME forecast skill (b) NMME anomaly forecast

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/NMME_ensemble_prate_season1.png
http://www.cpc.ncep.noaa.gov/products/NMME/current/images/skill_NMME_ensemble_prate_season1.png

IRI MULTI-MODEL

Generalized ROC (GROC)
Precipitation Forecast Skill

(a)



(b)

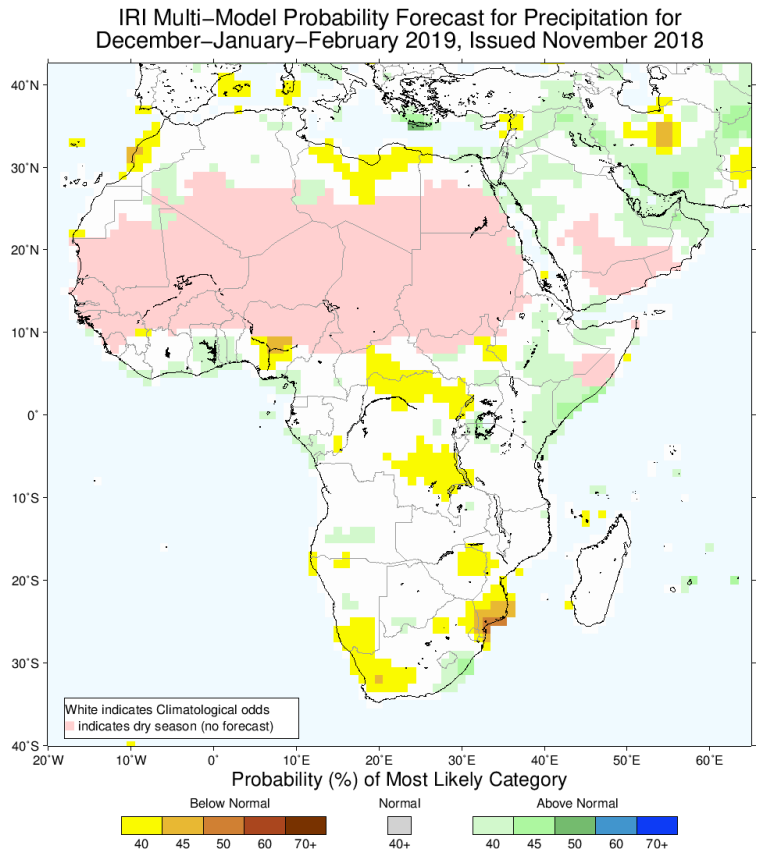


Figure PR6: skill (a) IRI Multi-Model probability forecast.DJF 2018-19 precipitation (b) IRI Multi-Model forecast

http://iri.columbia.edu/our-expertise/climate/forecasts/verification/

http://iri.columbia.edu/our-expertise/climate/forecasts/seasonal-climate-forecasts/

EUROSIP MULTI-MODEL

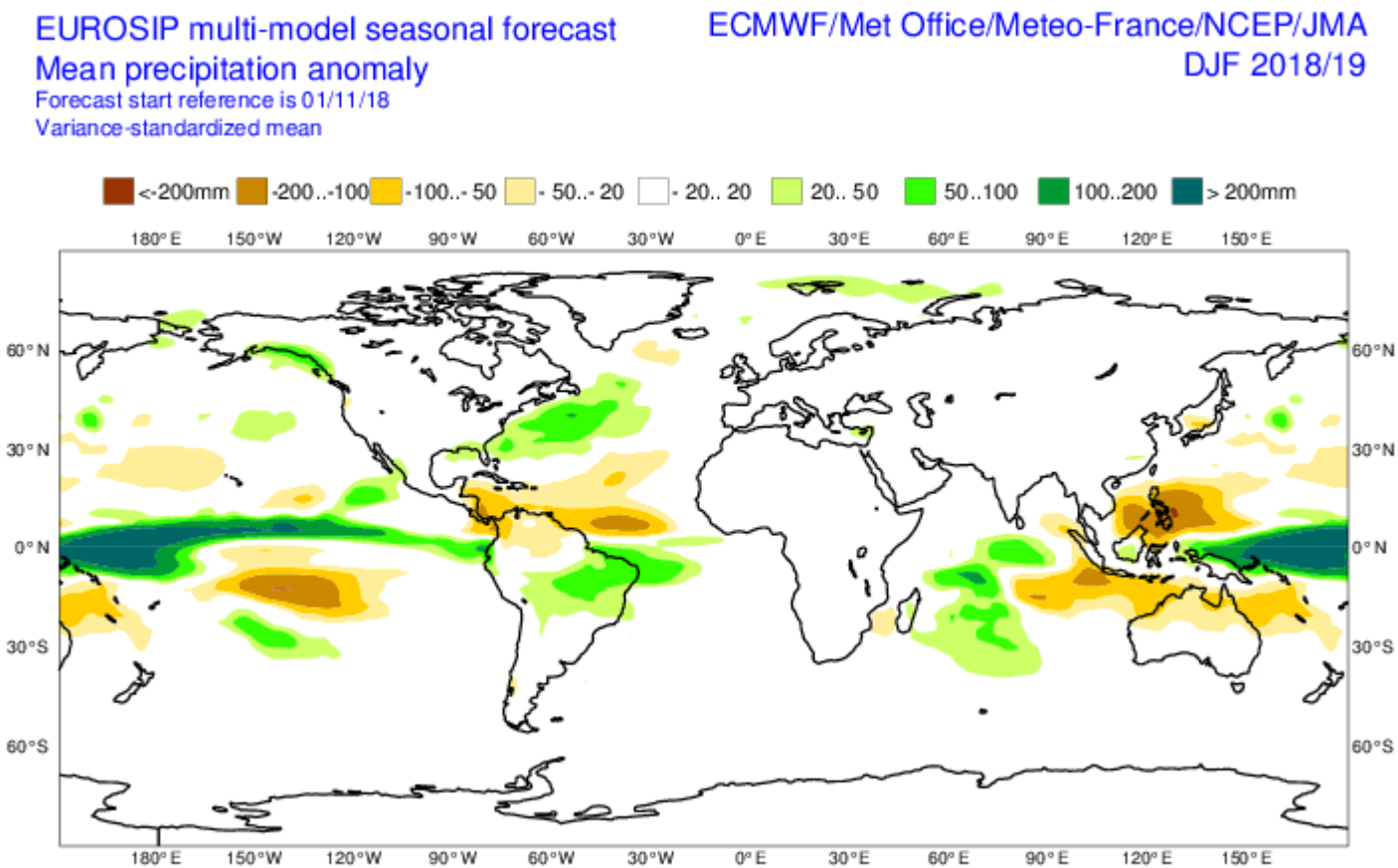


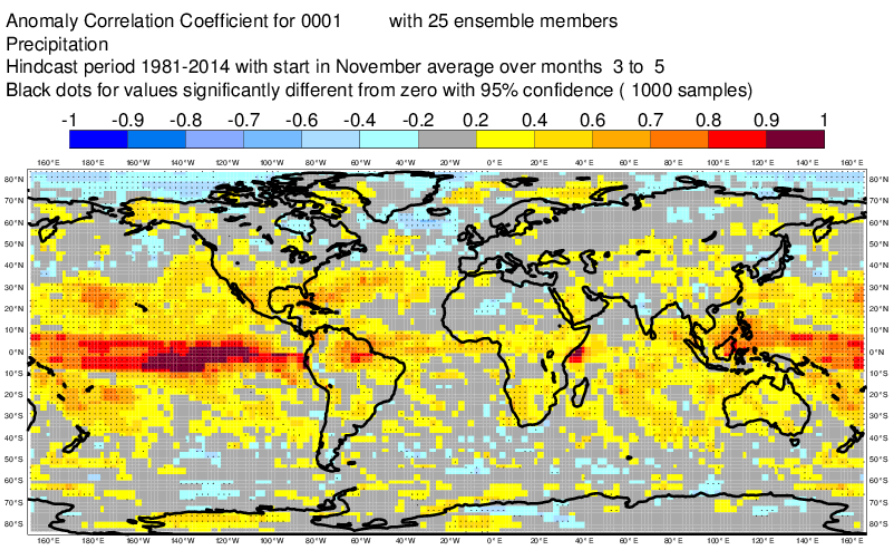
Figure PR7: DJF 2018-19 precipitation forecast by EUROSIP Multi-Model

https://www.ecmwf.int/en/forecasts/charts/seasonal/seasonal_charts_eurosip_rain?time=2017100100,2928,2018013100&forecast_type_and_skill_measures=tercile%20summary&area=Global

PRECIPITATION FORECASTS FROM SINGLE MODELS FOR JFM 2018-19

ECMWF MODEL

(a)



(b)

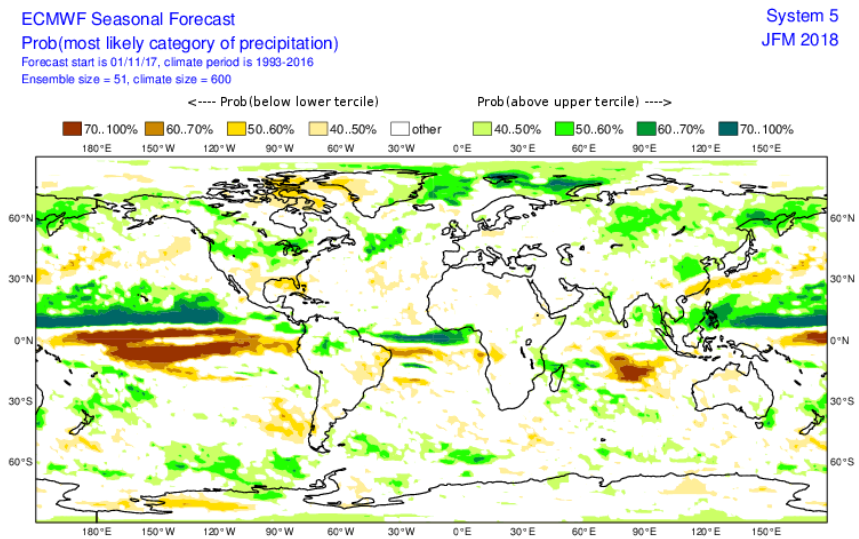
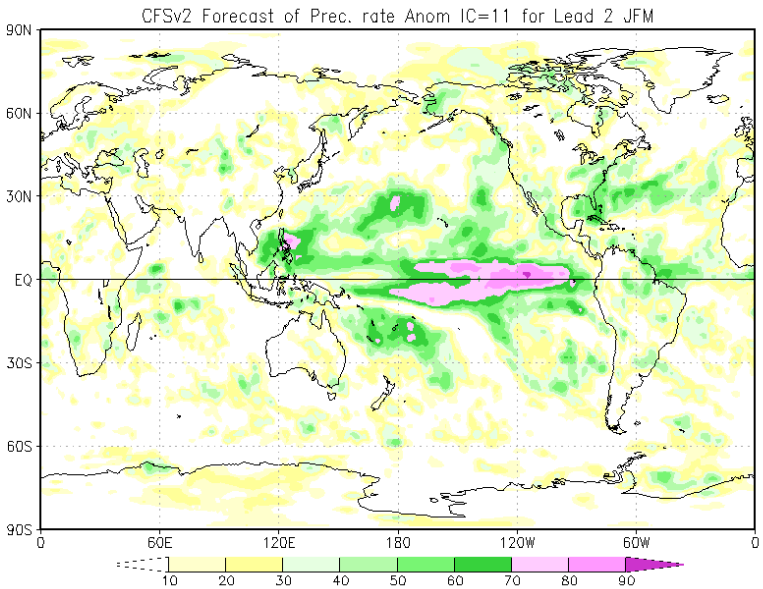


Figure PR8: skill (a) ECMWF Model forecast. Mean JFM precipitation anomaly (b) ECMWF Model forecast

CFSV2 MODEL

(a)



(b)

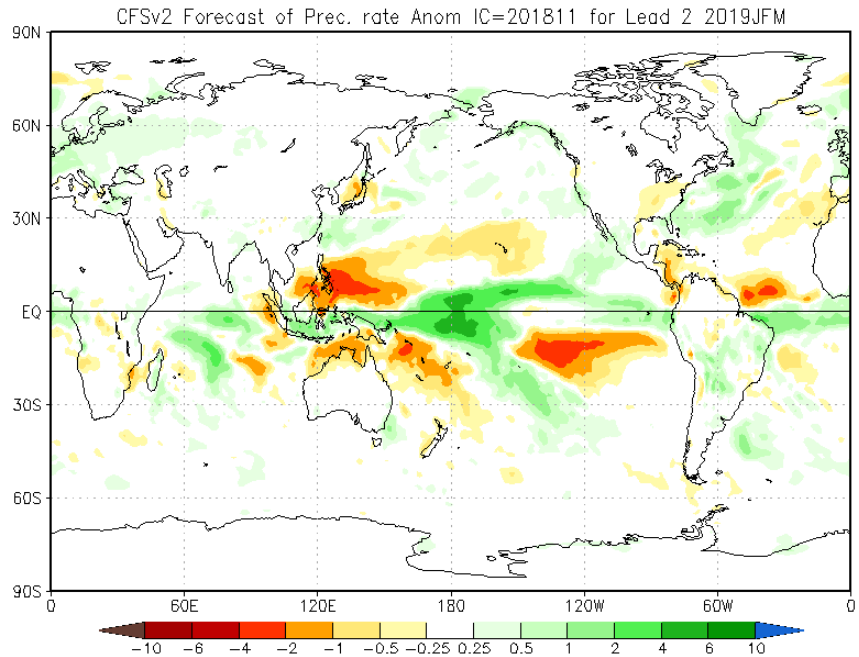


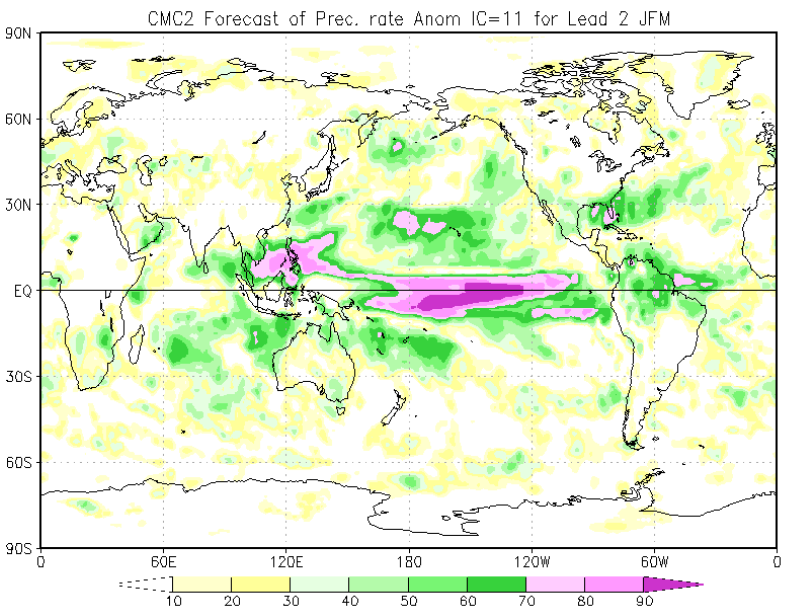
Figure PR9 : skill (a) CFSv2 Model anomaly forecast. Mean JFM precipitation rate (b) CFSv2 Model forecast

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/CFSv2_ensemble_prate_season2.png

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/skill_CFSv2_ensemble_prate_season2.png

CMC2 MODEL

(a) **(b)**



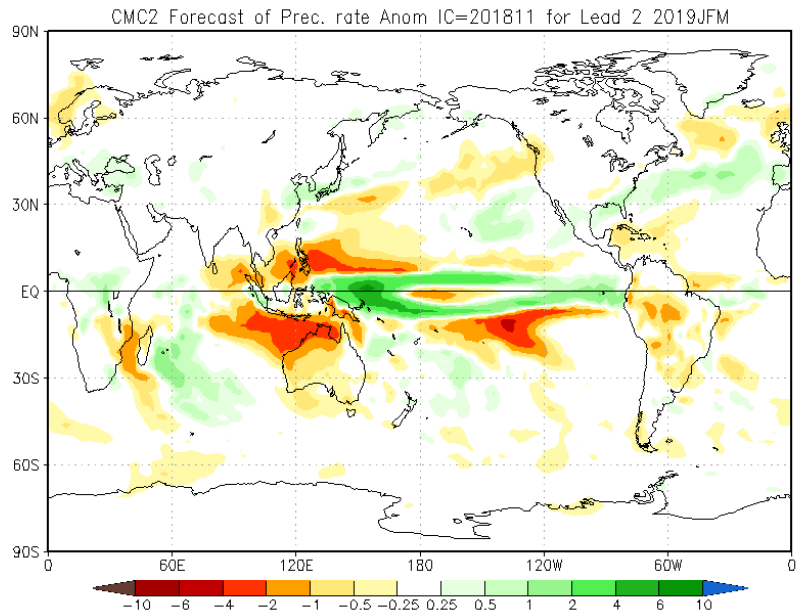


Figure PR10 : skill (a) CMC2 Model anomaly forecast.Mean JFM precipitation rate (b) CMC2 Model forecast

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/CMC2_ensemble_prate_season2.png

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/skill_CMC2_ensemble_prate_season2.png

UK MET OFFICE

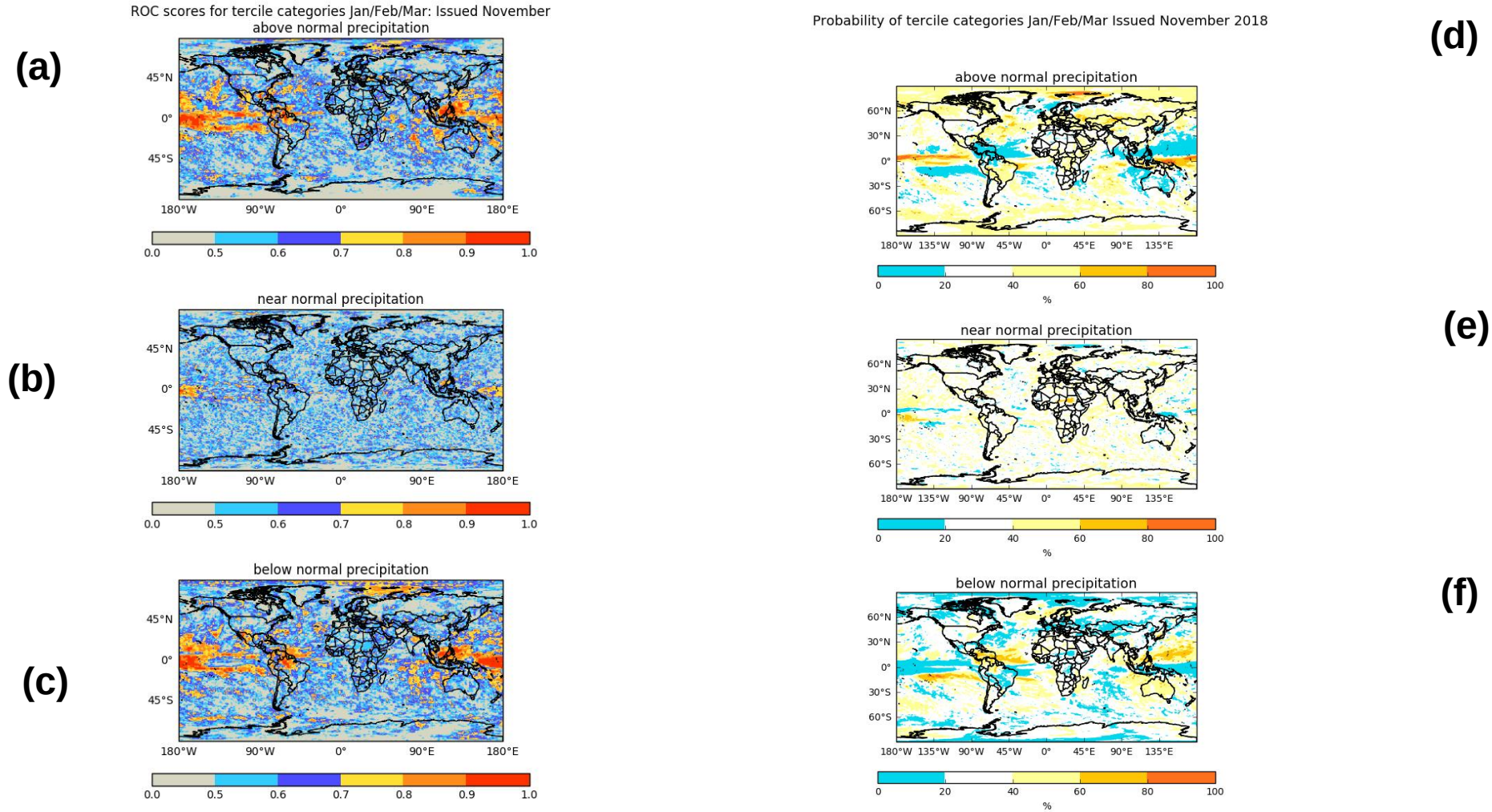
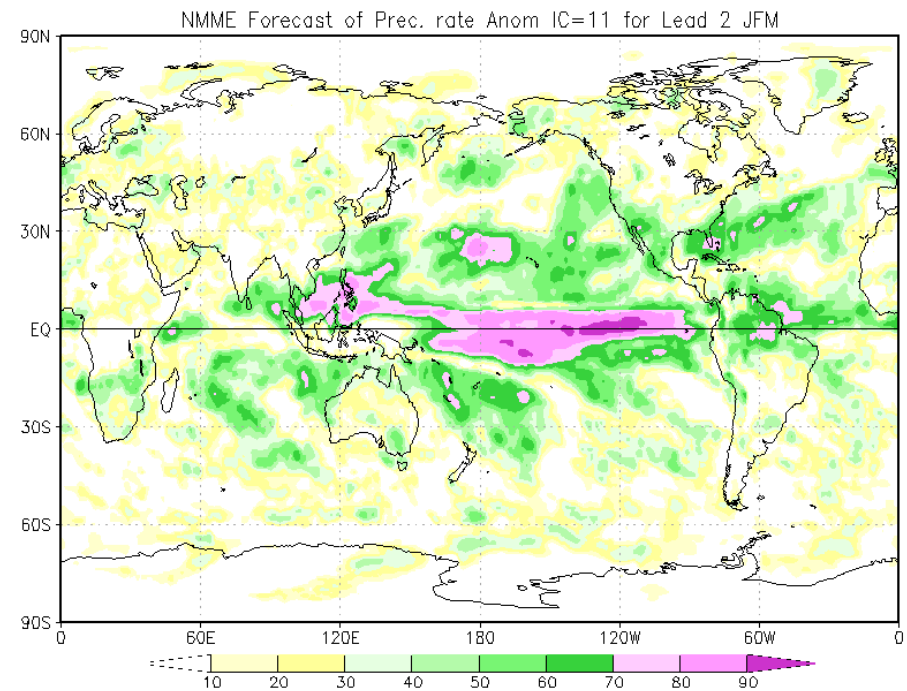


Figure PR11: Mean JFM precipitation, with (a), (b) and (c) showing the ROC scores for the tercile categories; above, near and below normal, respectively. The probability forecasts for the tercile categores are(d) above normal, (e) near normal and (f) below normal.

http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob
http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob-skill

PRECIPITATION FORECASTS FROM MULTI-MODELS FOR JFM 2019

NMME



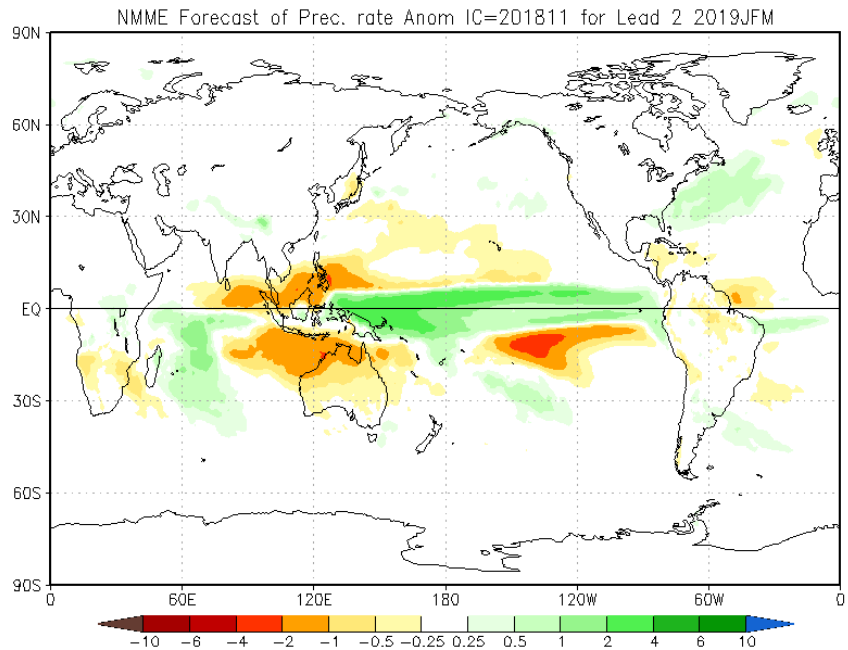
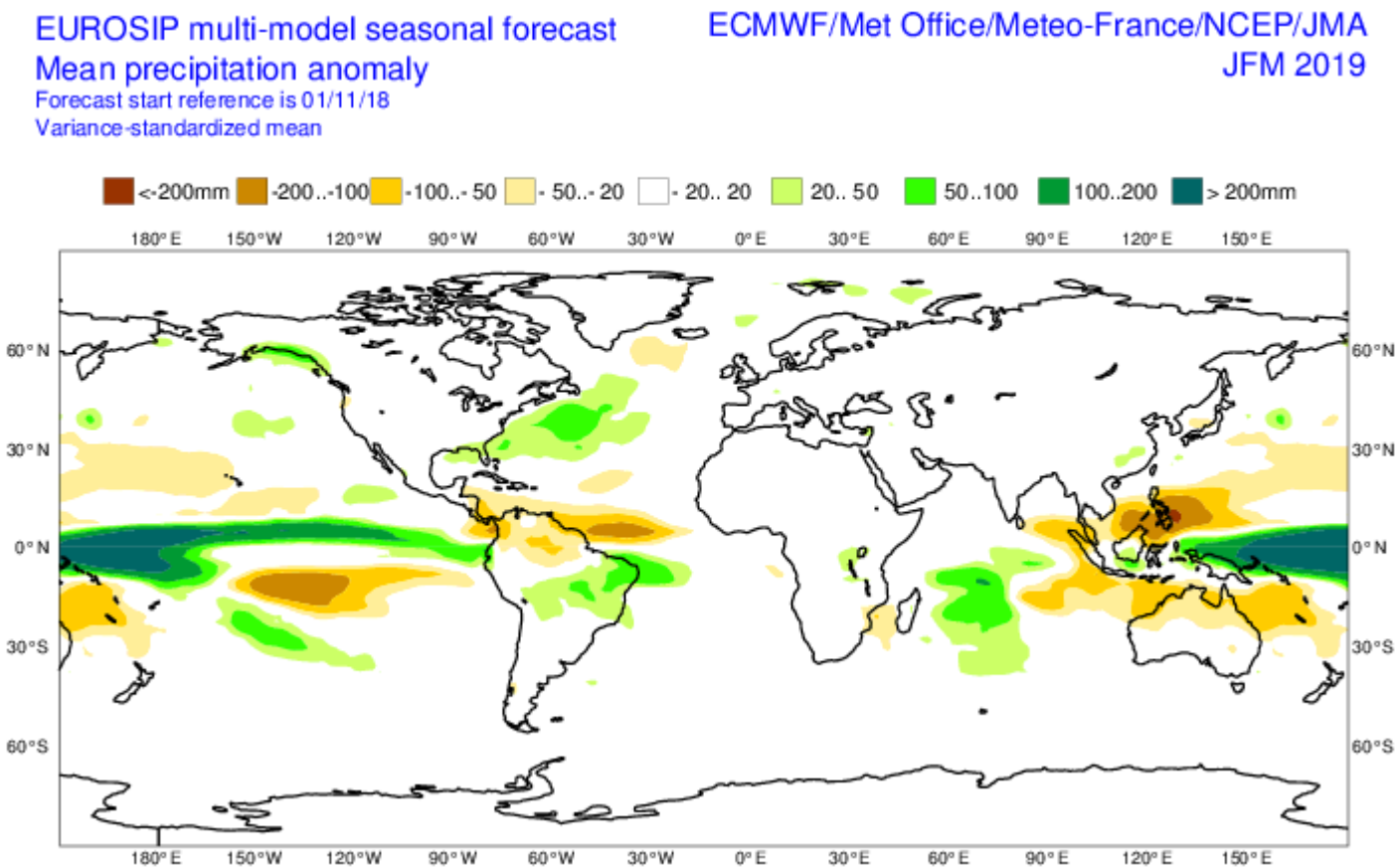


Figure PR5: Mean JFM precipitation rate (a) NMME forecast skill (b) NMME anomaly forecast

http://www.cpc.ncep.noaa.gov/products/NMME/current/images/skill_NMME_ensemble_prate_season1.png

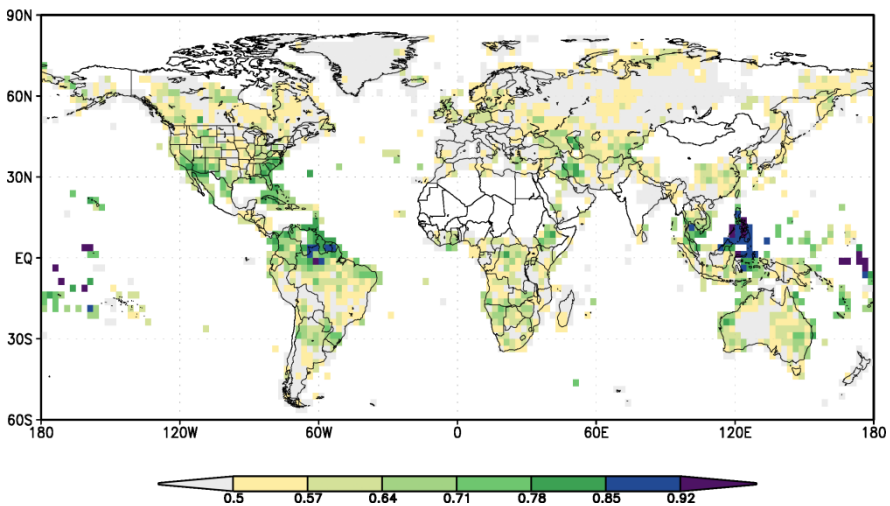
EUROSIP


EUROSIP multi-model seasonal forecast
Mean precipitation anomaly
Forecast start reference is 01/11/18
Variance-standardized mean
ECMWF/Met Office/Meteo-France/NCEP/JMA
JFM 2019
<-200mm
-200..-100
-100..- 50
- 50..- 20
- 20.. 20
20.. 50
50..100
100..200
> 200mm
180° E
150° W
120° W
90° W
60° W
30° W
0° E
30° E
60° E
90° E
120° E
150° E
60° N
30° N
0° N
30° S
60° S

IRI MULTI-MODEL

Generalized ROC (GROC)
Precipitation Forecast Skill

(a)



(b)

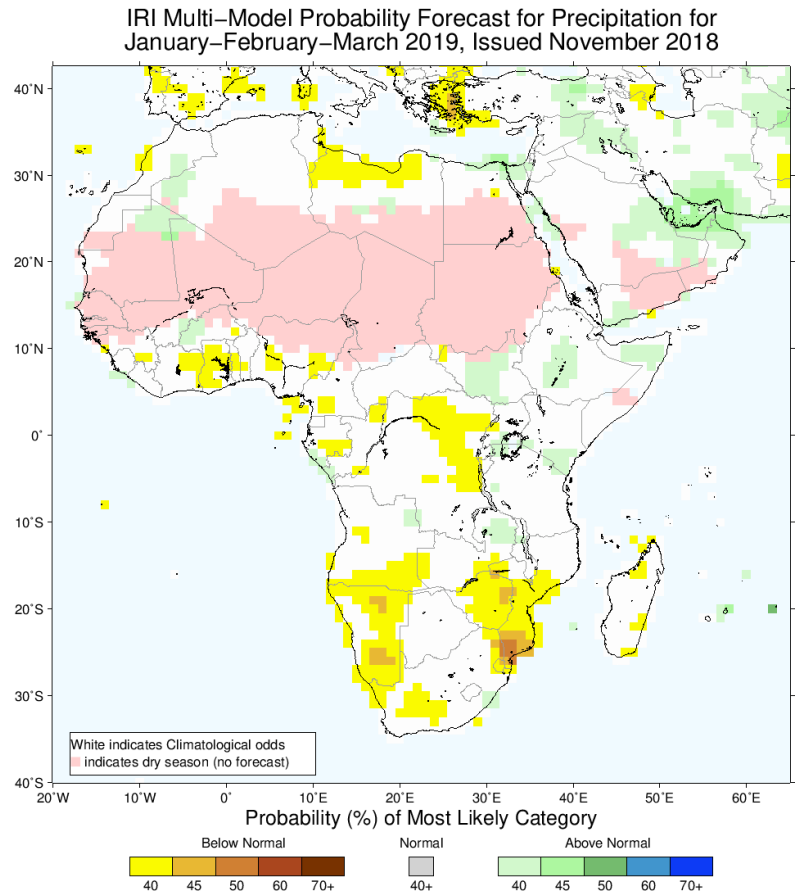


Figure PR6: skill (a) IRI Multi-Model probability forecast.JFM 2019 precipitation (b) IRI Multi-Model forecast

http://iri.columbia.edu/our-expertise/climate/forecasts/verification/

http://iri.columbia.edu/our-expertise/climate/forecasts/seasonal-climate-forecasts/

COMBINATION OF OUTPUTS FROM STEP 1 TO STEP 8 AND GENERATION OF THE CONTINENTAL SEASONAL CLIMATE FORECAST FOR FMA AND MAM 2018

SEASONAL FORECAST

DJF 2018-19

JFM 2019