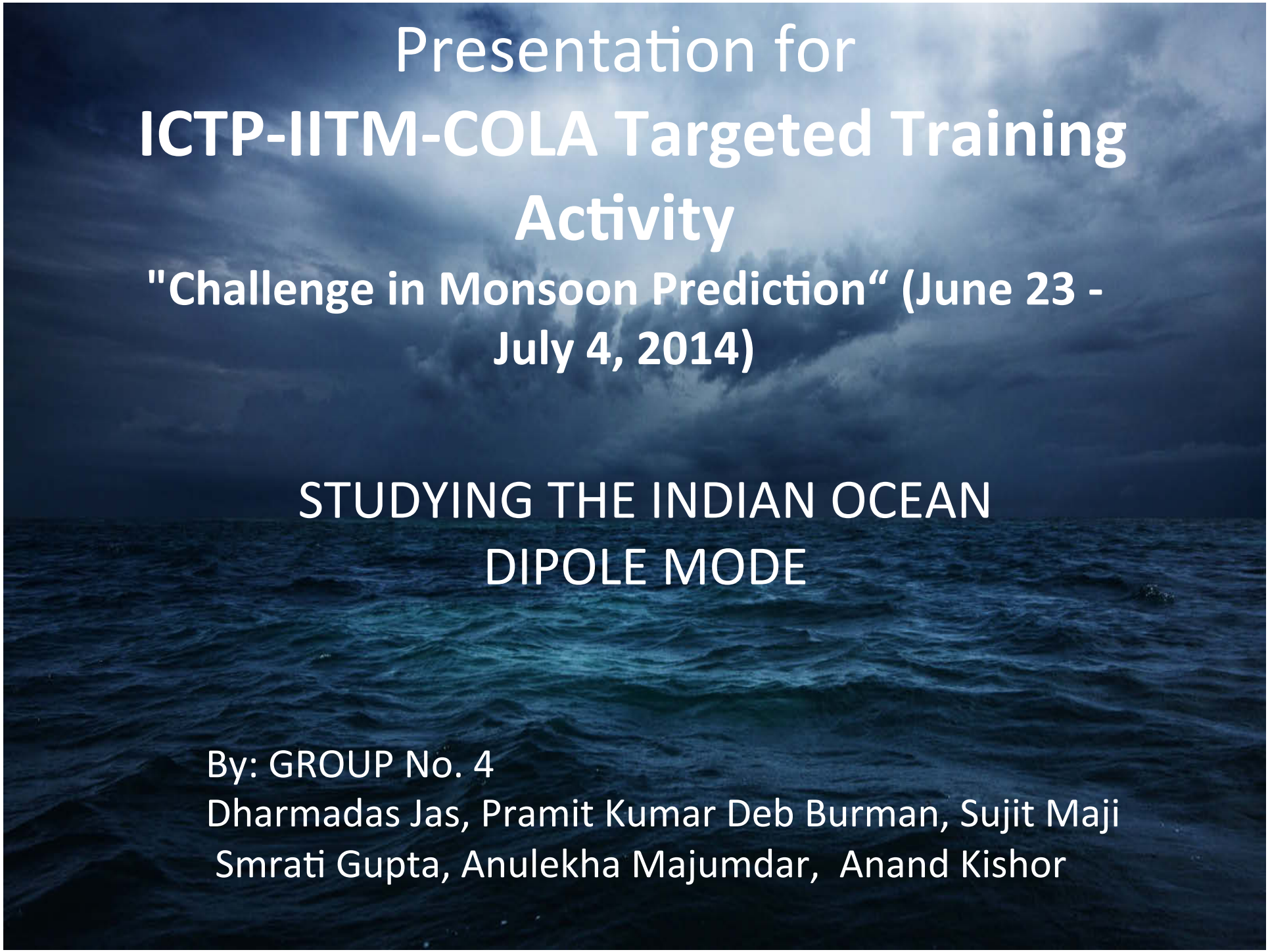


Presentation for

ICTP-IITM-COLA Targeted Training Activity

"Challenge in Monsoon Prediction“ (June 23 - July 4, 2014)

STUDYING THE INDIAN OCEAN DIPOLE MODE

By: GROUP No. 4
Dharmadas Jas, Pramit Kumar Deb Burman, Sujit Maji
Smrati Gupta, Anulekha Majumdar, Anand Kishor

Tools &Technique

- **Model** : ECMWF
- **Dipole Mode Index (DMI)**

  Difference between SST anomalies in western (50°E to 70°E and 10°S to 10°N) & eastern (90°E to 110°E and 10°S to 0°S) equatorial Indian Ocean (Saji et al, *Nature*,1999)

  Positive IOD: DMI is positive

  Negative IOD: DMI is negative

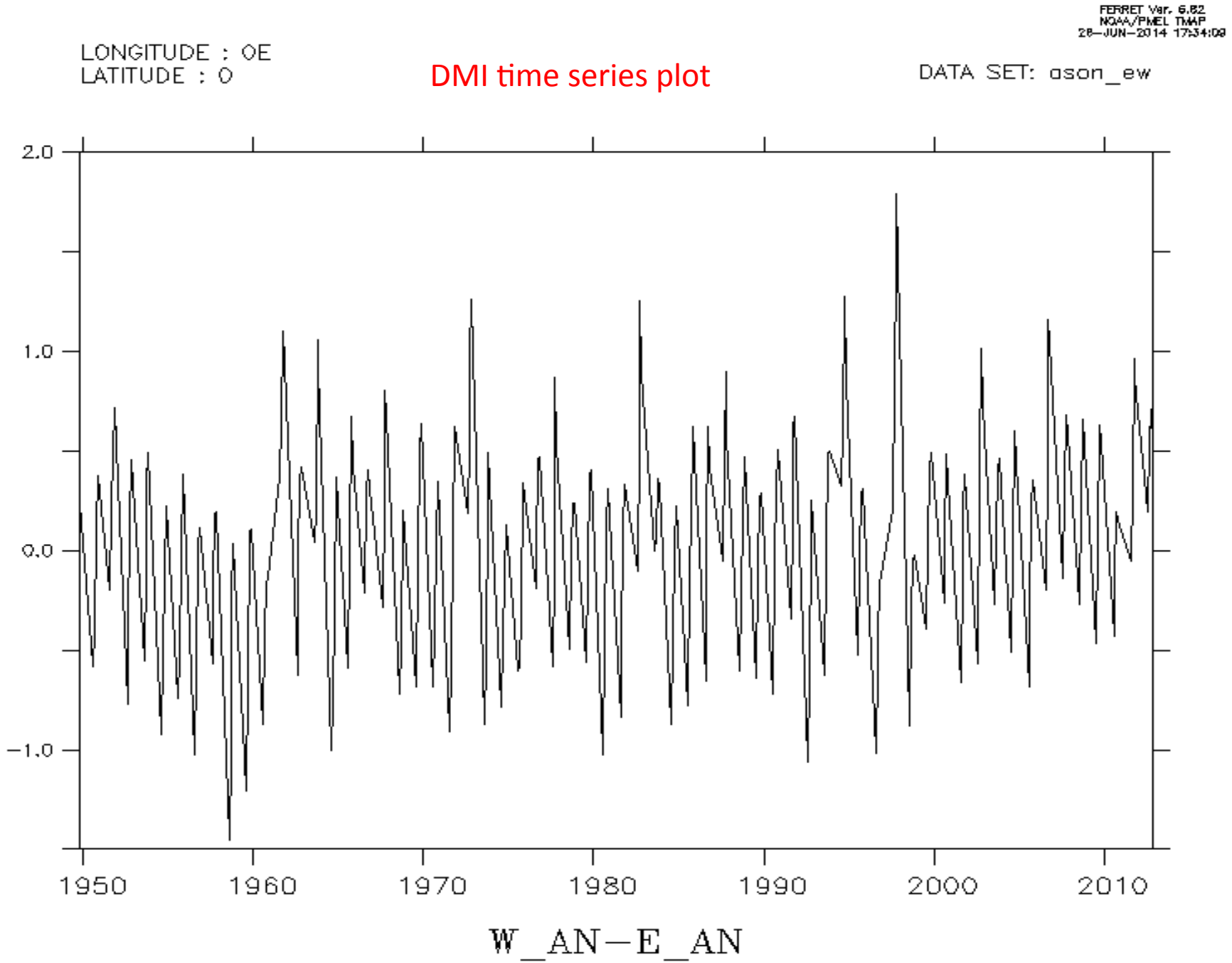
- **Data source**

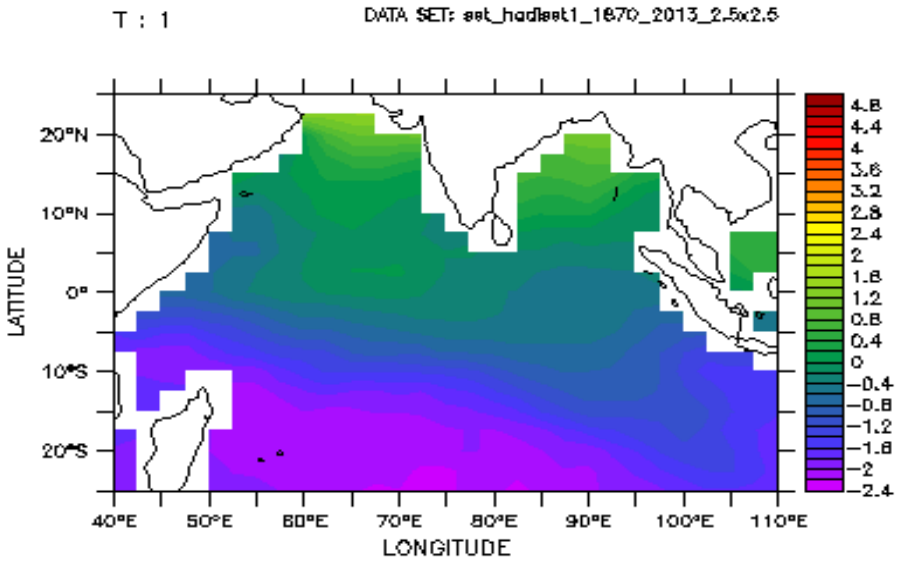
  The index is calculated using the HadSST 2.5x2.5

  Observed data for precipitation is from GPCP

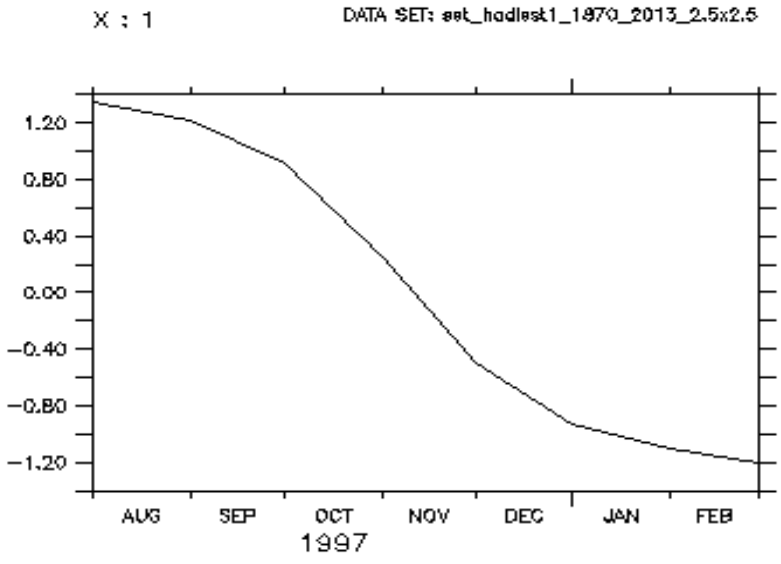
- **Calculation**

  The anomaly is calculated based on the data given for years 1870-2013.


FERRET Ver. 6.82
NOAA/PMEL TMAP
28-JUN-2014 17:34:09
LONGITUDE : 0E
LATITUDE : 0
DMI time series plot
DATA SET: oson_ew
2.0
1.0
0.0
-1.0
1950
1960
1970
1980
1990
2000
2010
W_AN-E_AN

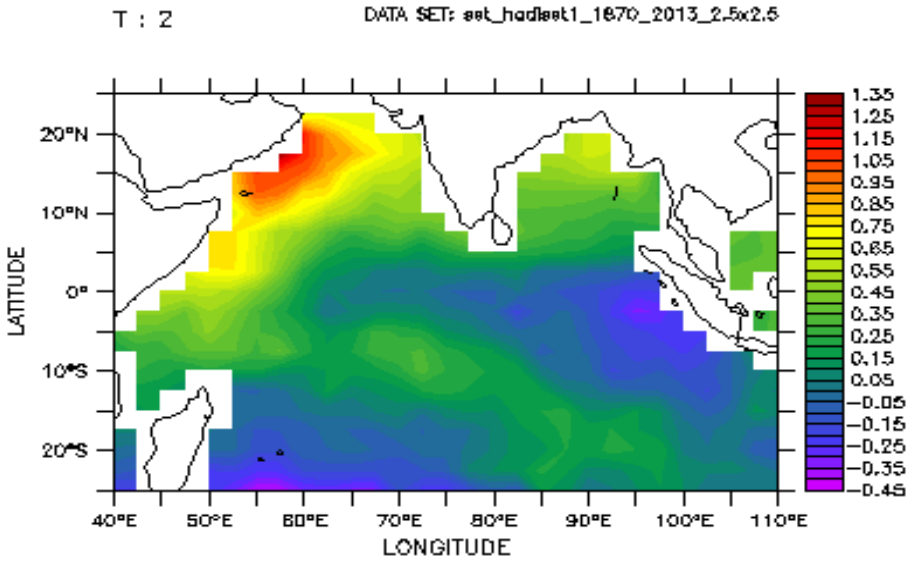


EOF 1

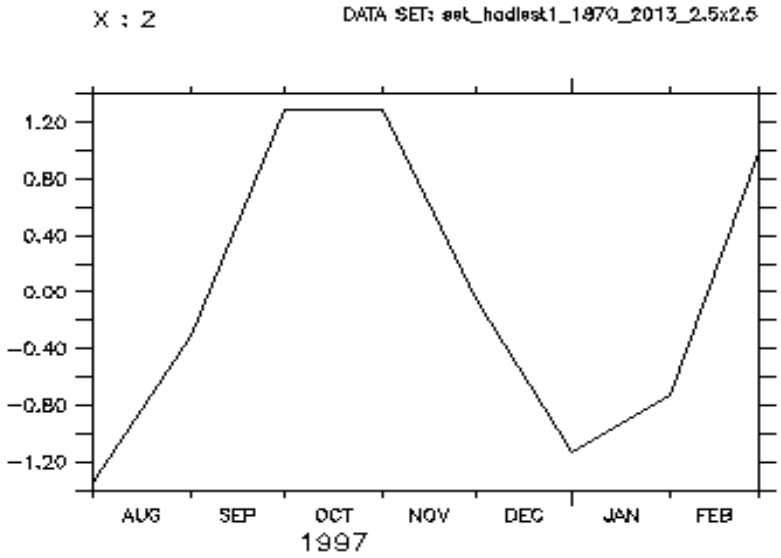


taf1

EOF1 mode dominated by ENSO, EOF2 gives IOD Mode



EOF 2

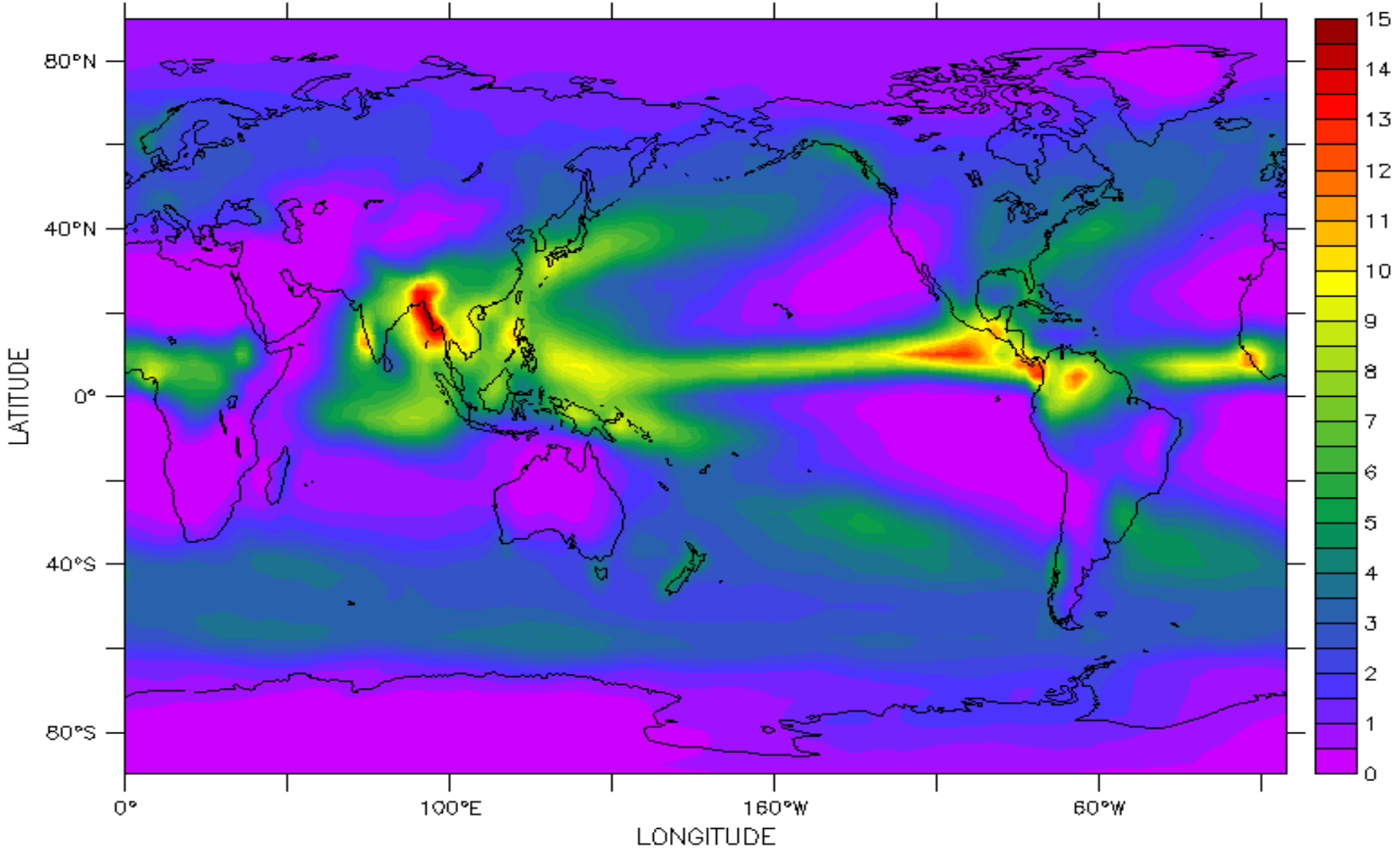


taf2

FERRET Ver. 6.82
NOAA/PMEL TMAP

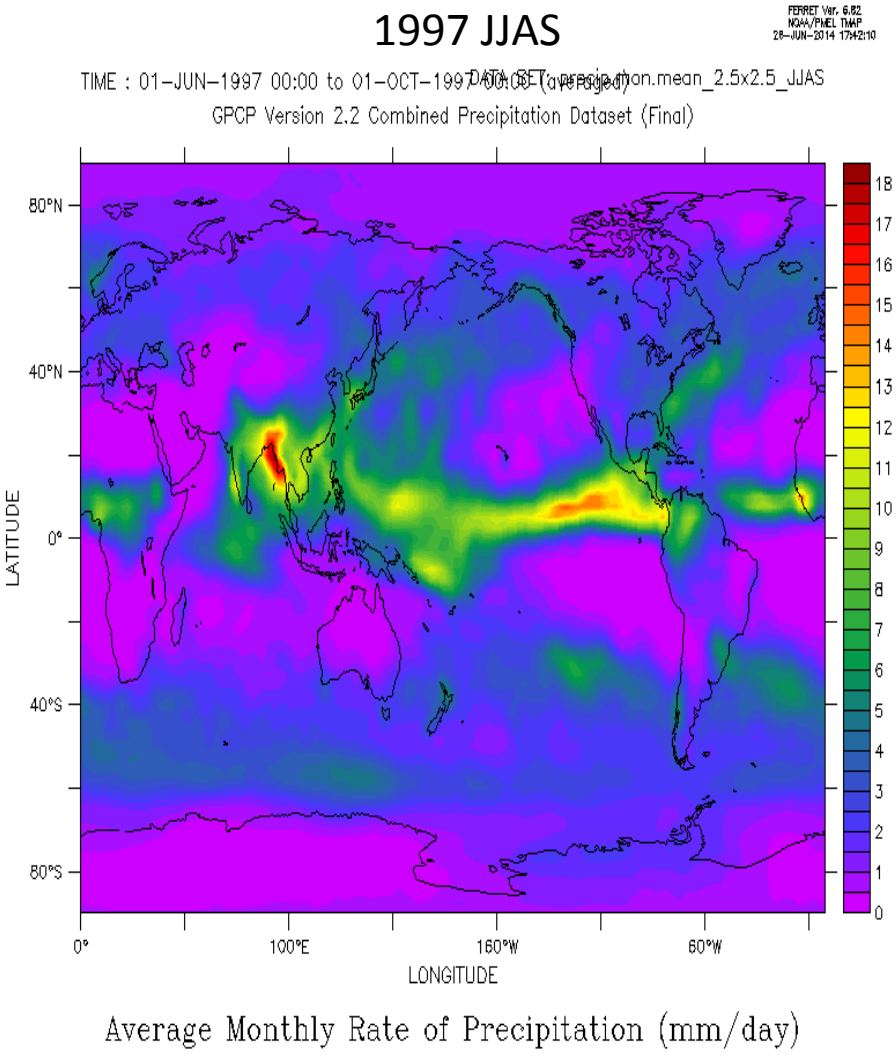
Climatology Precipitation mean : JJAS (1979-2013) 2.5x2.5

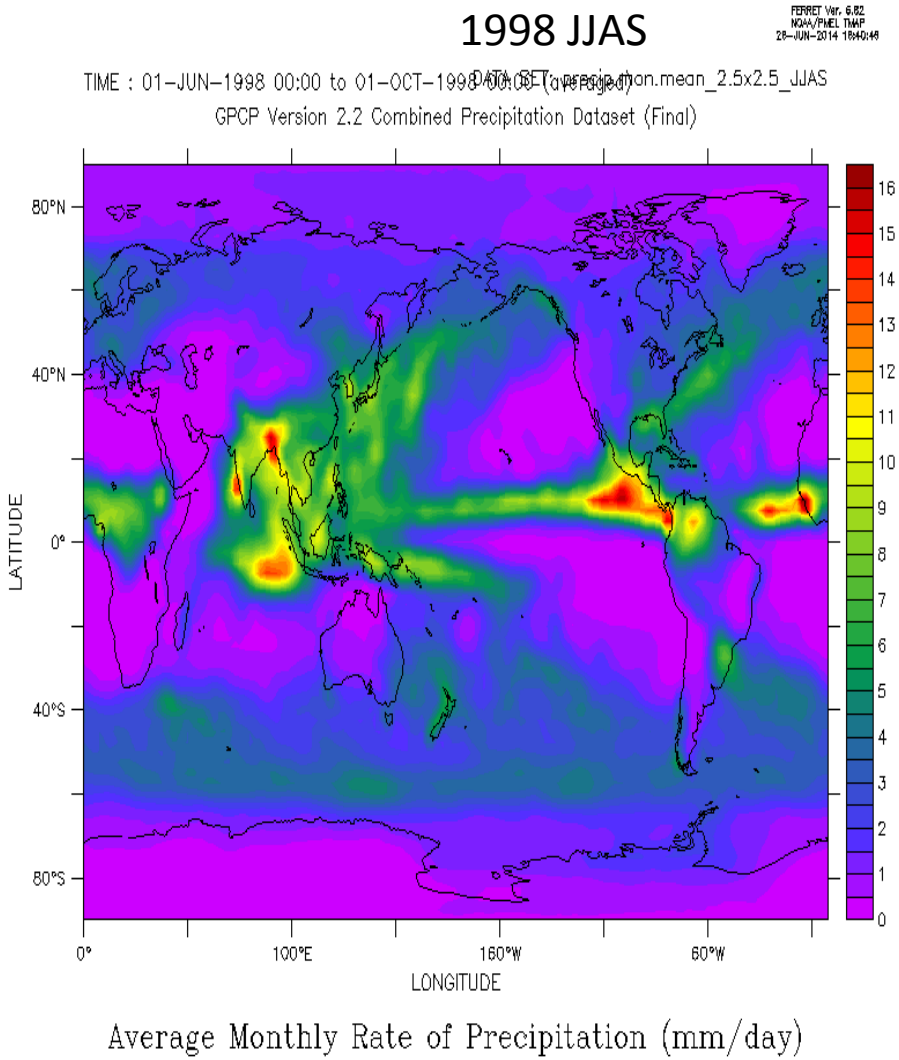
GPCP Version 2.2 Combined Precipitation Dataset (Final)



Average Monthly Rate of Precipitation (mm/day)

1997 Dipole event :

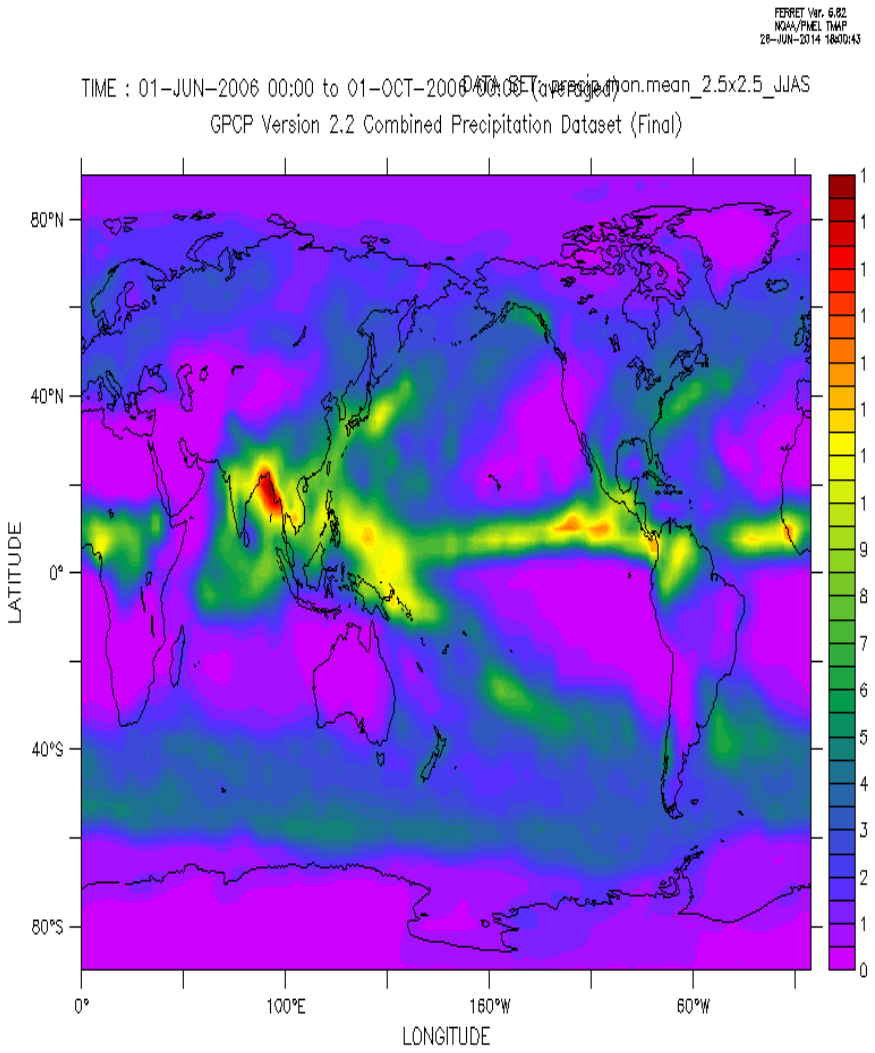




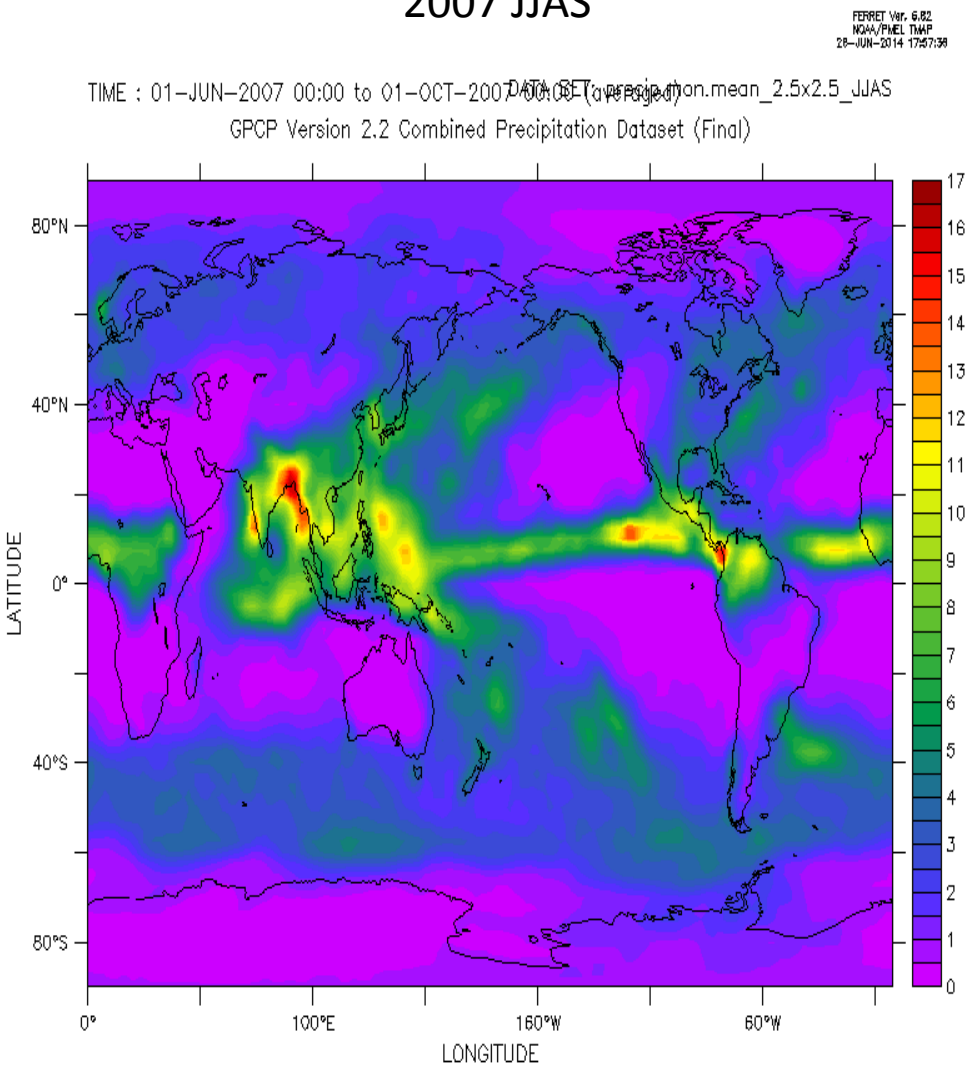
Rainfall is observed to increase after dipole event

2006 Dipole event :

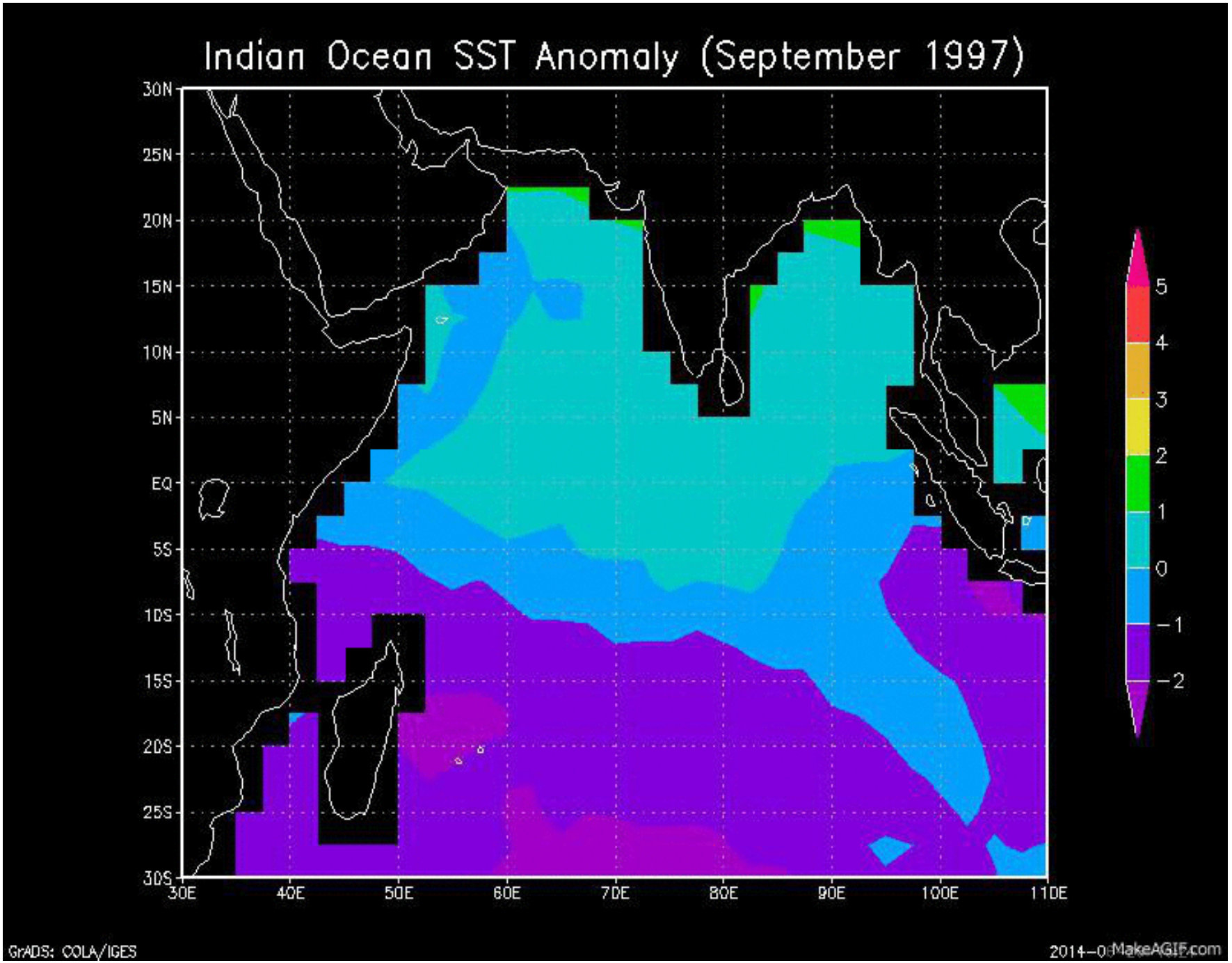
2006 JJAS

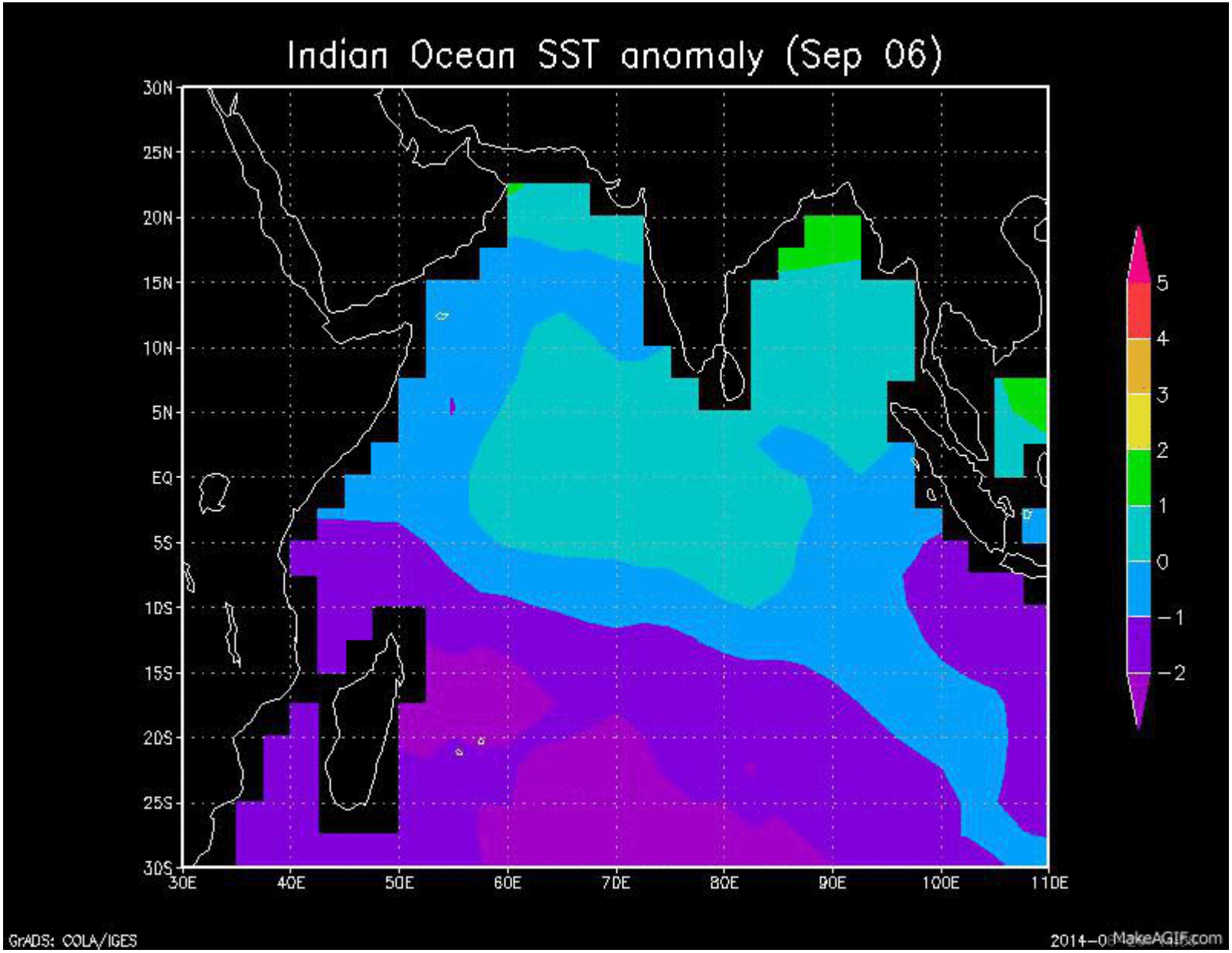


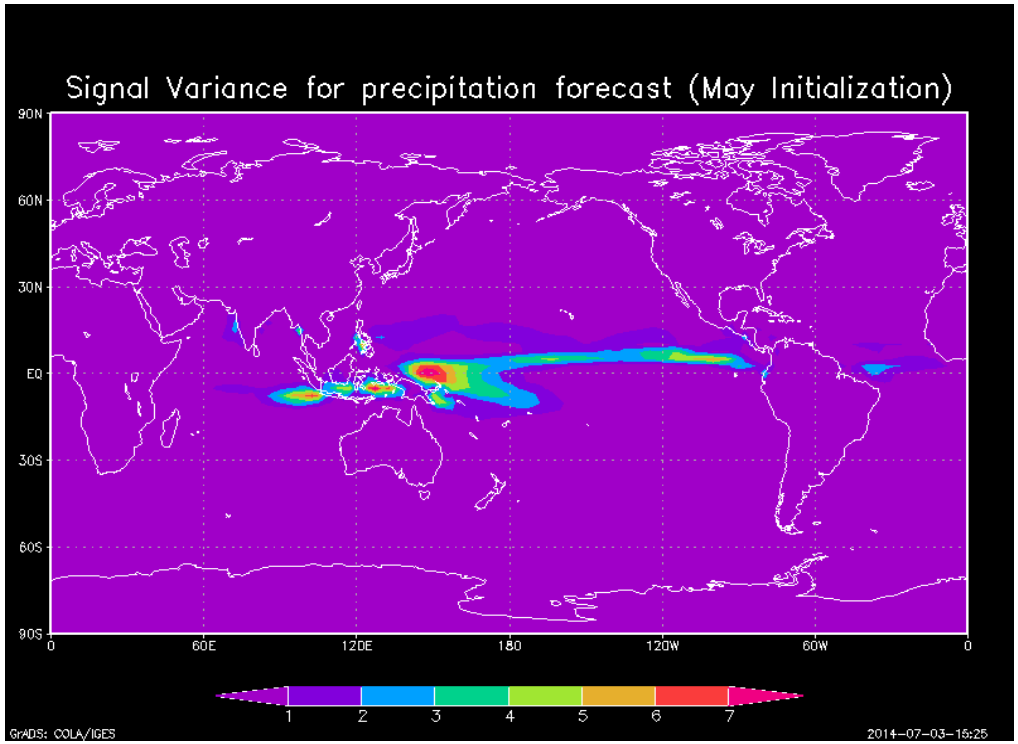
2007 JJAS

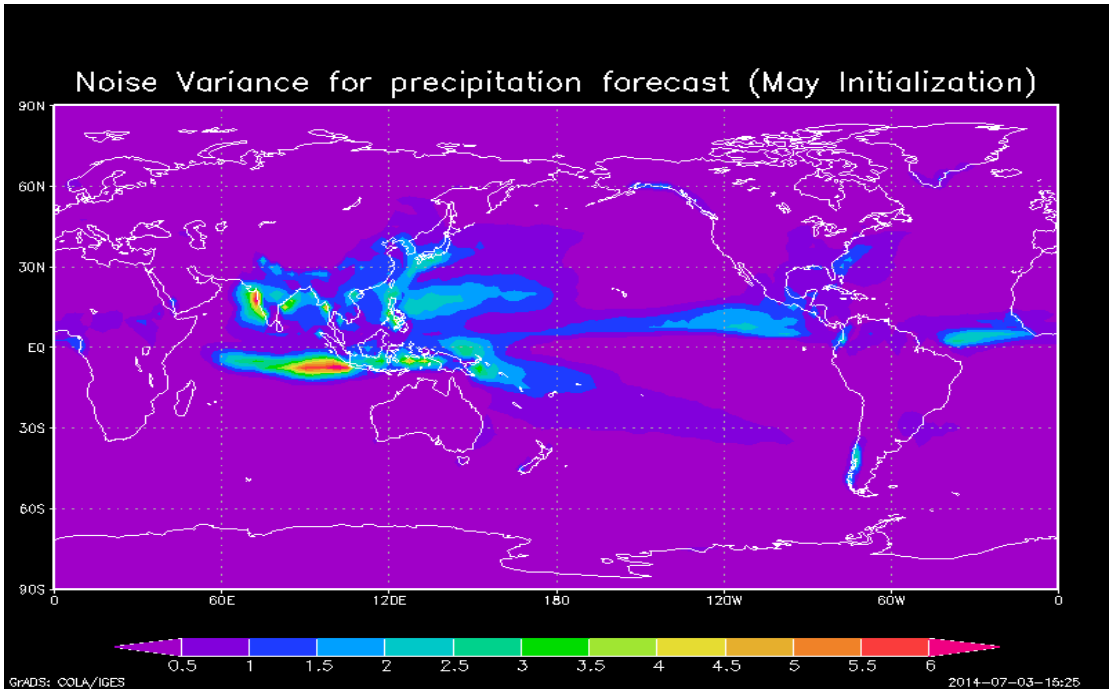


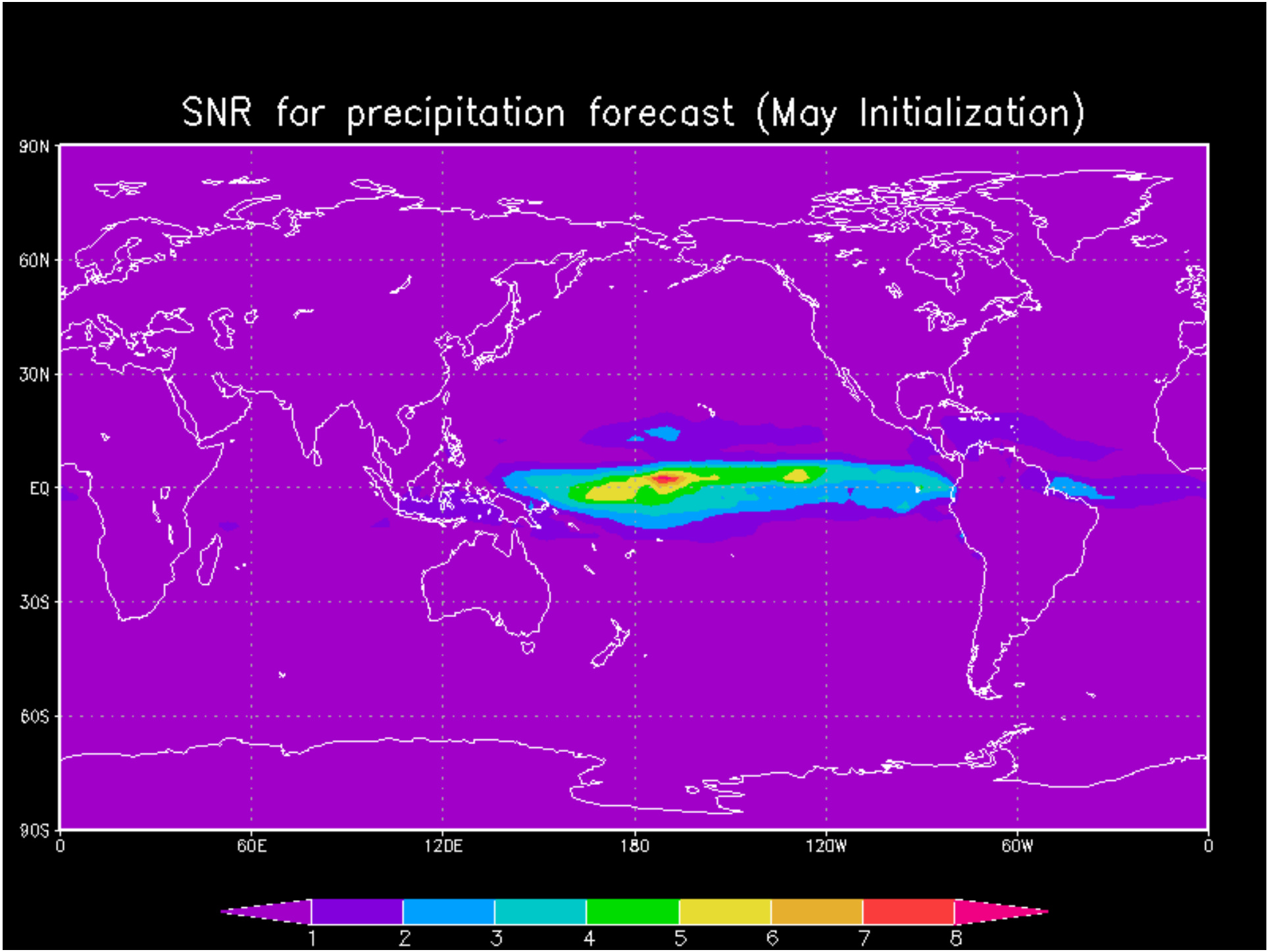
Rainfall is observed to increase after dipole event

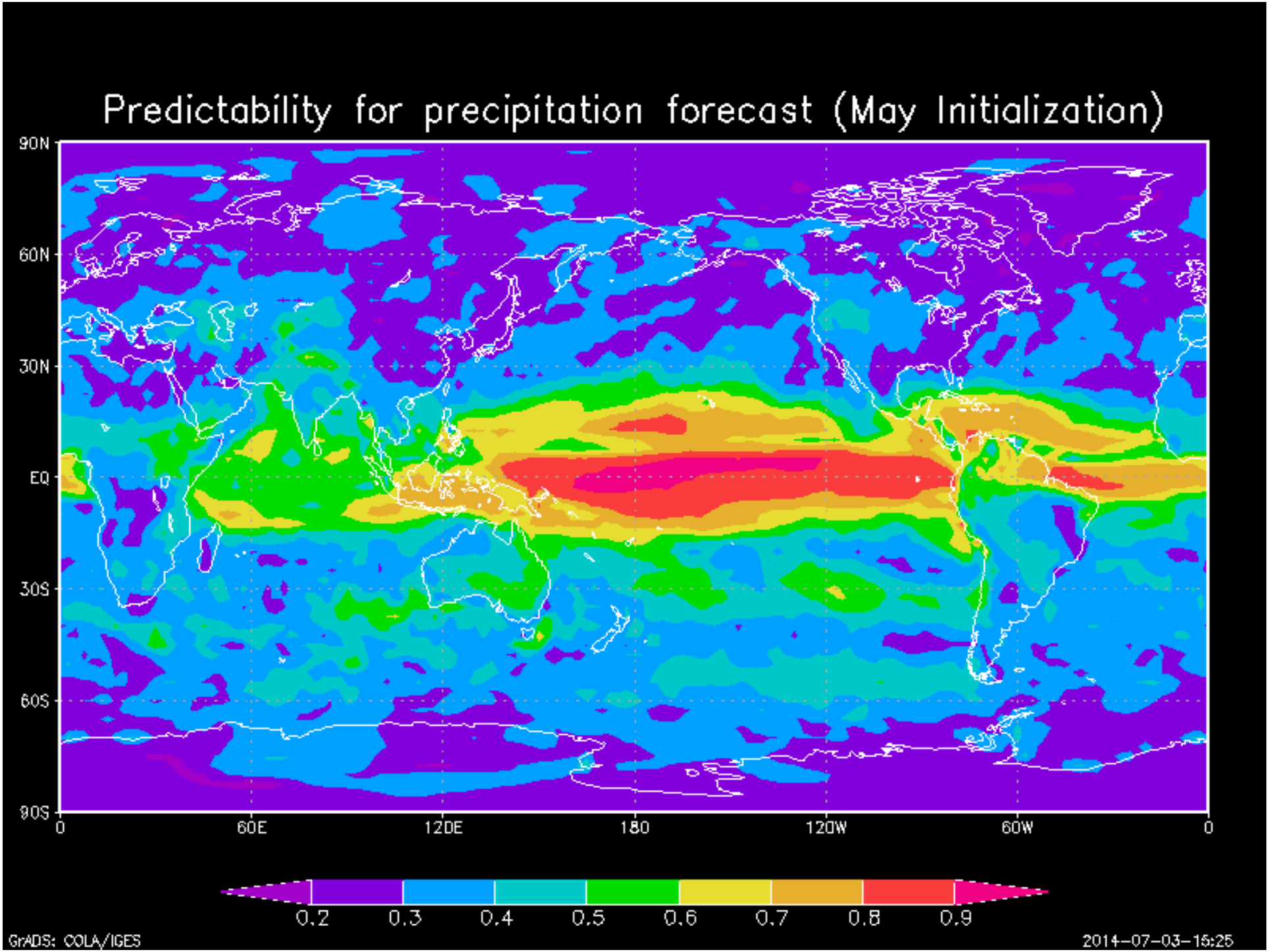

Indian Ocean SST Anomaly (September 1997)
30N
25N
20N
15N
10N
5N
EQ
5S
10S
15S
20S
25S
30S
30E
40E
50E
60E
70E
80E
90E
100E
110E
5
4
3
2
1
0
−1
−2
GrADS: COLA/IGES
MakeAGIF.com

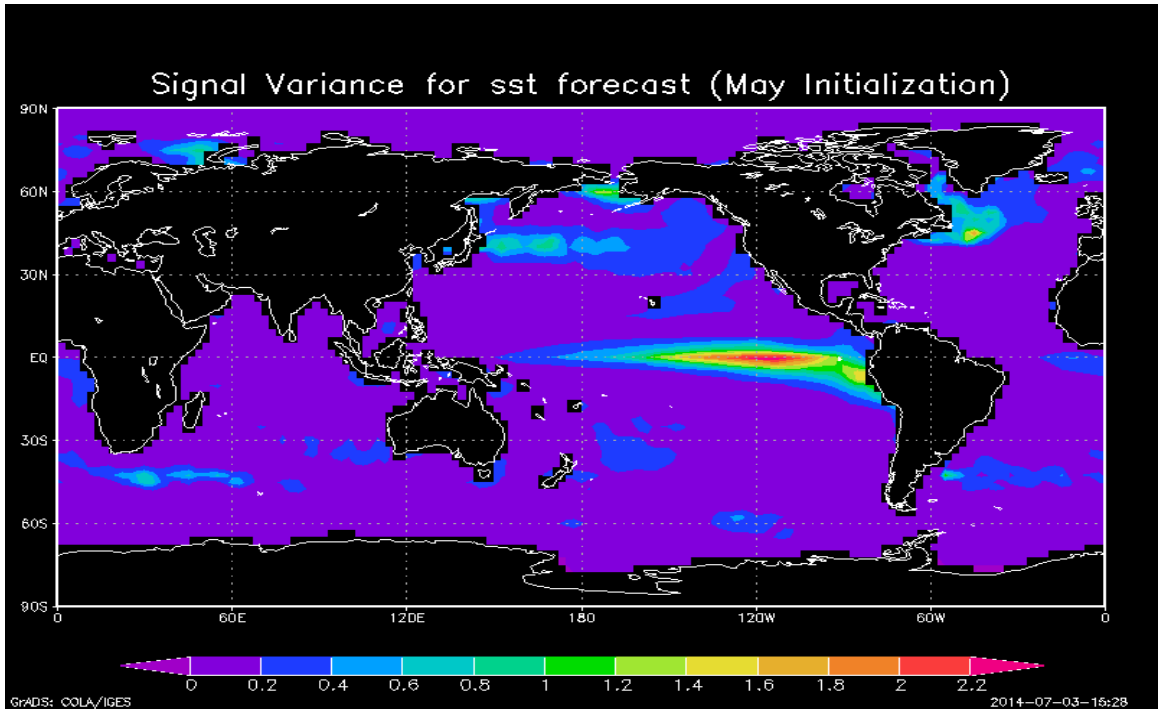

Indian Ocean SST anomaly (Sep 06)
30N
25N
20N
15N
10N
5N
EQ
5S
10S
15S
20S
25S
30S
30E
40E
50E
60E
70E
80E
90E
100E
110E
5
4
3
2
1
0
−1
−2
GrADS: COLA/IGES
2014−0
MakeAGIF.com

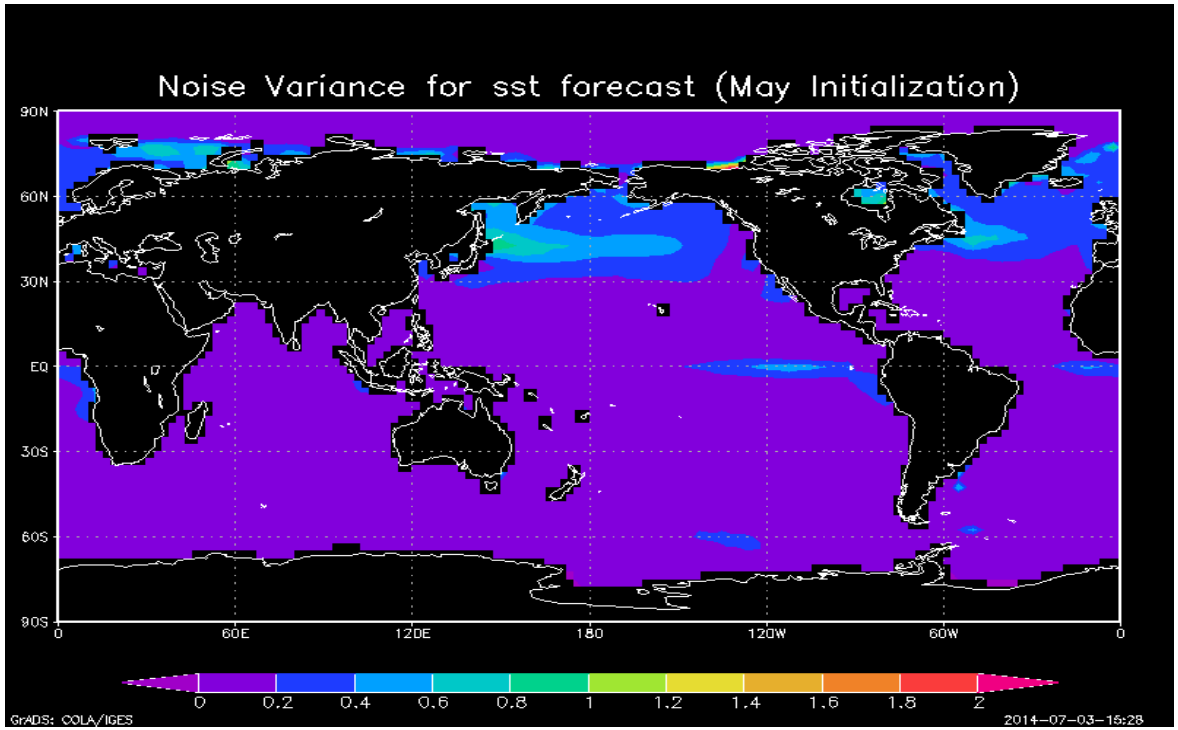

Signal Variance for precipitation forecast (May Initialization)
90N
60N
30N
EQ
30S
60S
90S
0
60E
120E
180
120W
60W
0
1
2
3
4
5
6
7
GrADS: COLA/IGES
2014-07-03-15:25

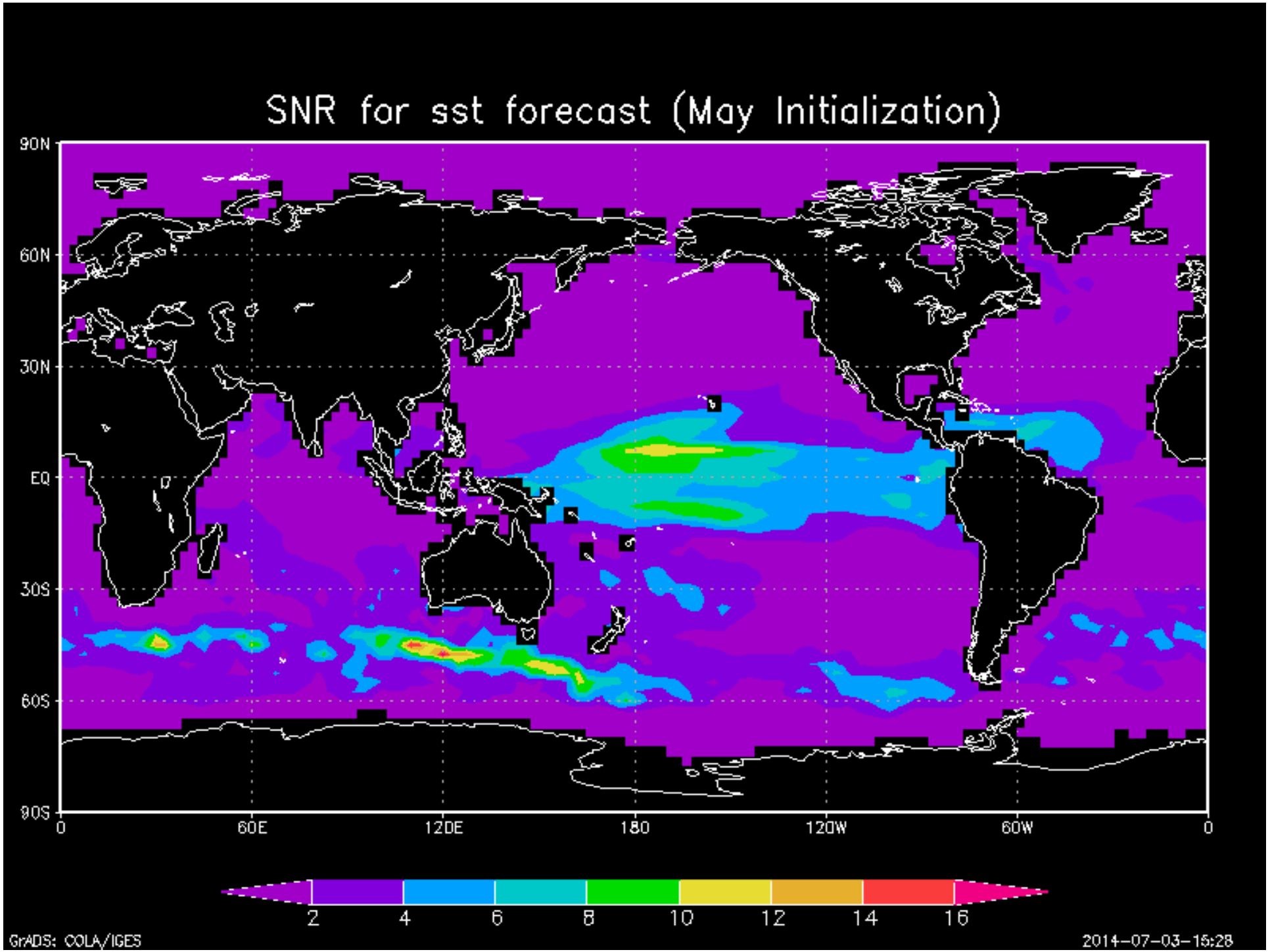

Noise Variance for precipitation forecast (May Initialization)
90N
60N
30N
EQ
30S
60S
90S
0
60E
120E
180
120W
60W
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
GrADS: COLA/IGES
2014-07-03-15:25

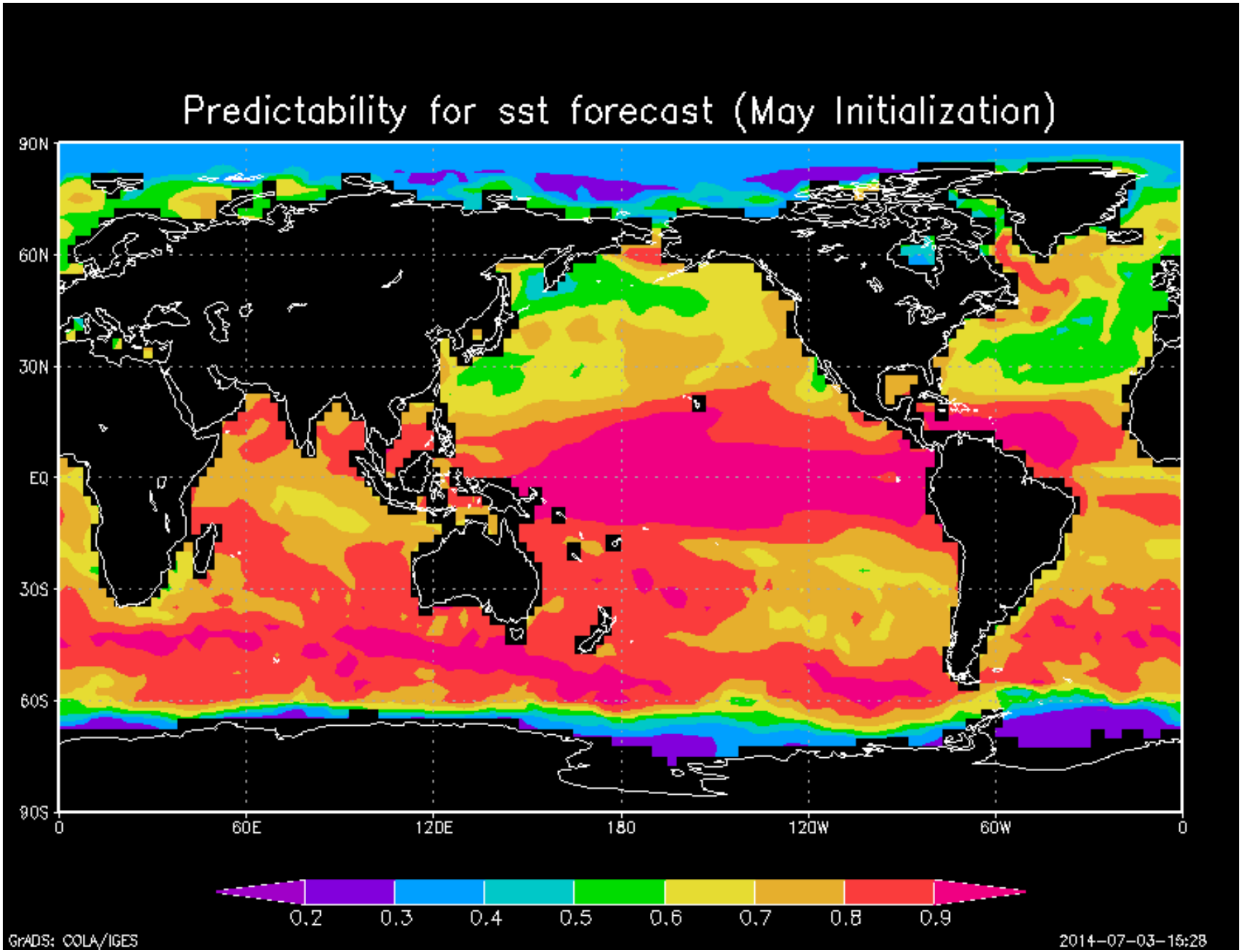

SNR for precipitation forecast (May Initialization)
90N
60N
30N
EQ
30S
60S
90S
0
60E
120E
180
120W
60W
0
1
2
3
4
5
6
7
8


Predictability for precipitation forecast (May Initialization)
90N
60N
30N
EQ
30S
60S
90S
0
60E
120E
180
120W
60W
0
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
GrADS: COLA/IGES
2014-07-03-15:25


Signal Variance for sst forecast (May Initialization)
90N
60N
30N
EQ
30S
60S
90S
0
60E
120E
180
120W
60W
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
GrADS: COLA/IGES
2014-07-03-15:28


Noise Variance for sst forecast (May Initialization)
90N
60N
30N
EQ
30S
60S
90S
0
60E
120E
180
120W
60W
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
GrADS: COLA/IGES
2014-07-03-15:28


SNR for sst forecast (May Initialization)
90N
60N
30N
EQ
30S
60S
90S
0
60E
120E
180
120W
60W
0
2
4
6
8
10
12
14
16
GrADS: COLA/IGES
2014-07-03-15:28


Predictability for sst forecast (May Initialization)
90N
60N
30N
EQ
30S
60S
90S
0
60E
120E
180
120W
60W
0
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
GrADS: COLA/IGES
2014-07-03-15:28

Thank you ICTP.. Ciao!!
Thanks to all of You!!!