

Outline of 4 Lectures

1. Sept. 17, 2008: TC best track definition and datasets, global distribution of TCs; Review of history of meteorological satellites, introducing different orbits, scanning patterns, and space-time samplings. Also introduce the differences between the satellites and the instruments.

2. Sept. 19, 2008: Introduction of space borne instruments including visible, IR and microwave. Will briefly talk about radiative transfer theories in different channels and rainfall retrieval algorithms from IR and microwave.

Problem set: Due on the Oct. 6, 2008

3. Oct . 10, 2008: Homework presentation. **Climatology of tropical cyclone rainfall and its contribution to global precipitation.**

4. Nov. 19, 2008: QuikSCAT & SFMR sea surface wind retrieval; Current status of TC intensity and rainfall forecasts. Introduction of satellite-based TC intensity and rainfall prediction techniques, including DVORAK, SHIPs, and R-CLIPER.

5. Nov. 21, 2008: Convective properties of tropical cyclones. An introduction of TRMM-base TCPF database.

Two More TC websites

RSS TC webpage:

http://www.ssmi.com/hurricane/data_archive.html

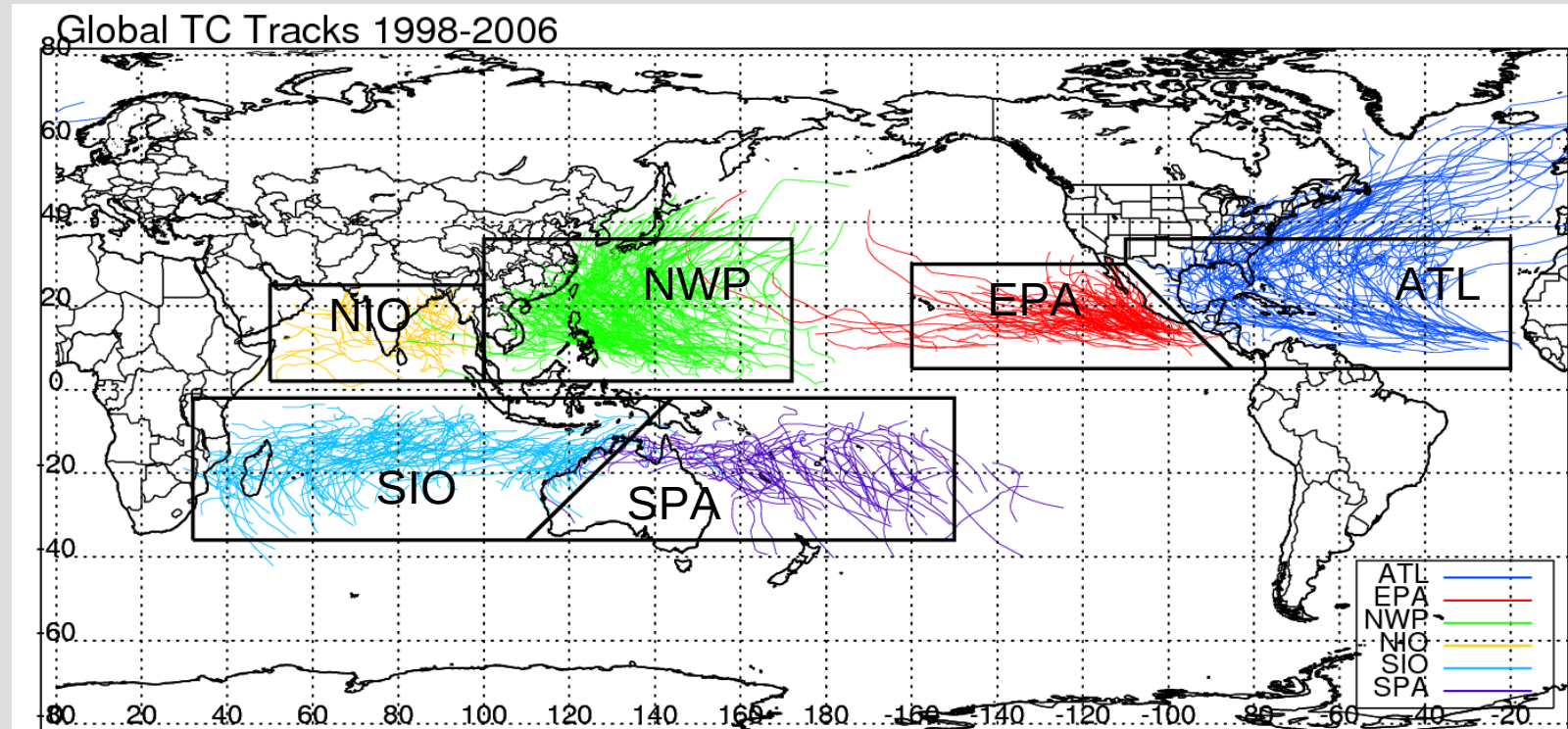
JAXA TRMM TC webpage:

http://sharaku.eorc.jaxa.jp/TYP_DB/index_e.shtml

**Contribution of tropical cyclones to the global precipitation
from 9 years of TRMM data: Regional, seasonal, and
interannual variations**

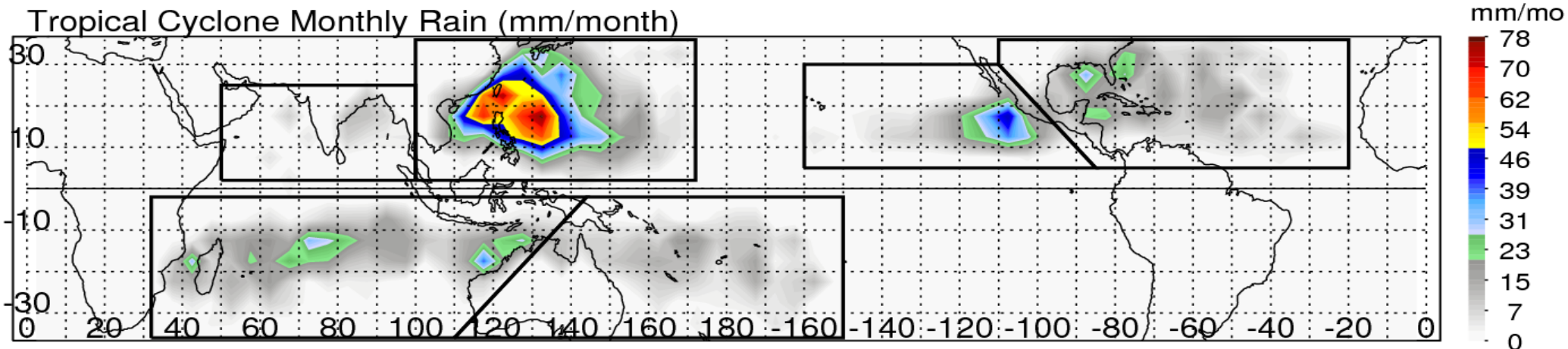
Data

- The University of Utah (UU) TRMM Tropical Cyclone Precipitation Feature (TCPF) database is based on TC best track data, the UU TRMM precipitation feature (PF) database, and the TRMM 3B42 product. For 1998-2006, TCPFs are identified for 771 TCs in six basins: Atlantic (ATL), East Pacific (EPA), Northwest Pacific (NWP), North Indian Ocean (NIO), South Indian Ocean (SIO), and South Pacific (SPA).



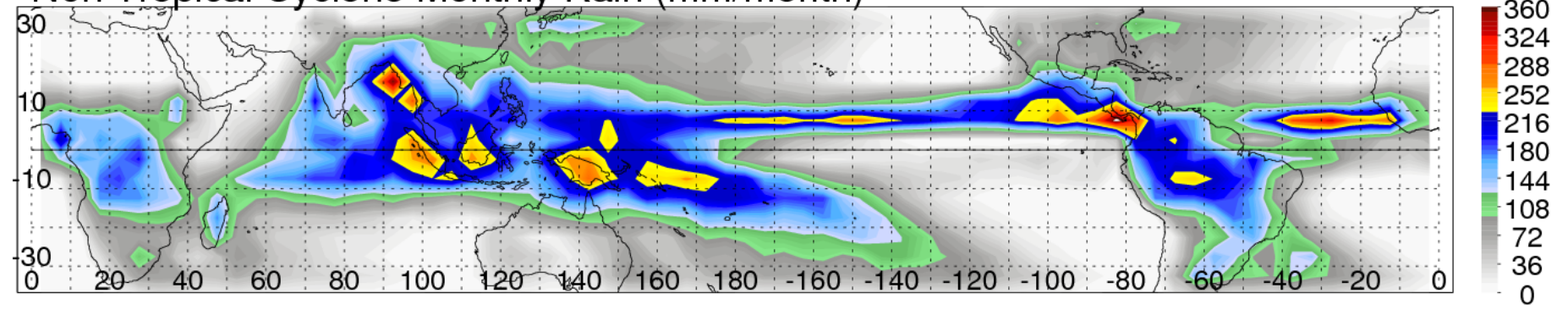
Analysis Method

- Mean monthly rainfall from TRMM 2A25, 2A12, and 3B42 is derived in 5x5 lon-lat grid box for nonTCPFs and TCPF for 1998-2000 and 2002-2006 during June-November for northern hemisphere and for 1998/1999-2005/2006 during November-April for southern hemisphere (total 8 years).

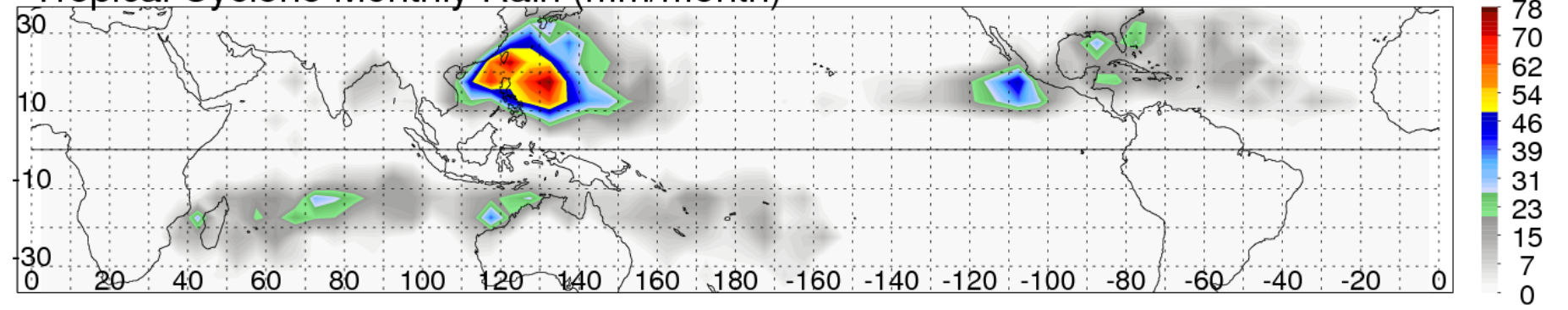


TRMM 2A25 Mean Monthly Rain (in 5x5 degree resolution) Contributed by Non TC Systems, TCs, and Percentage of Rainfall Contributed by TCs

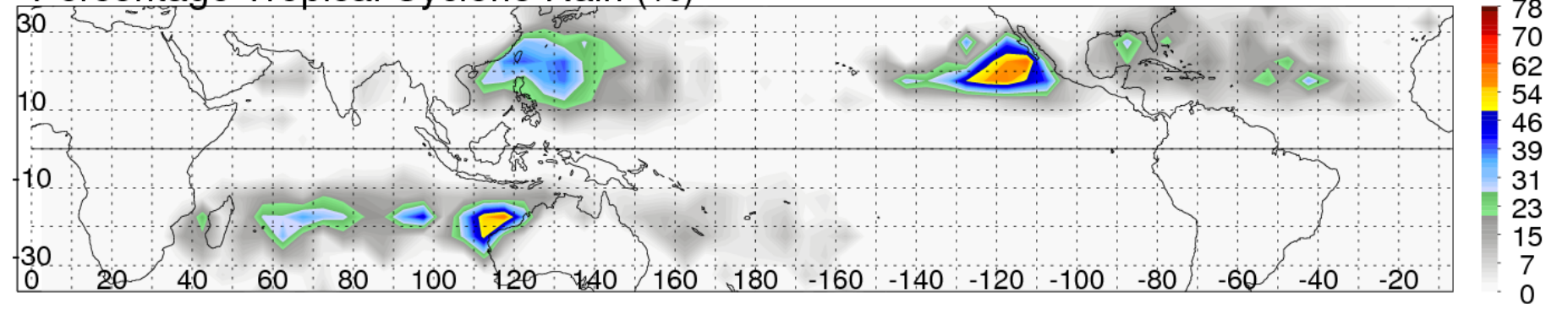
Non Tropical Cyclone Monthly Rain (mm/month)



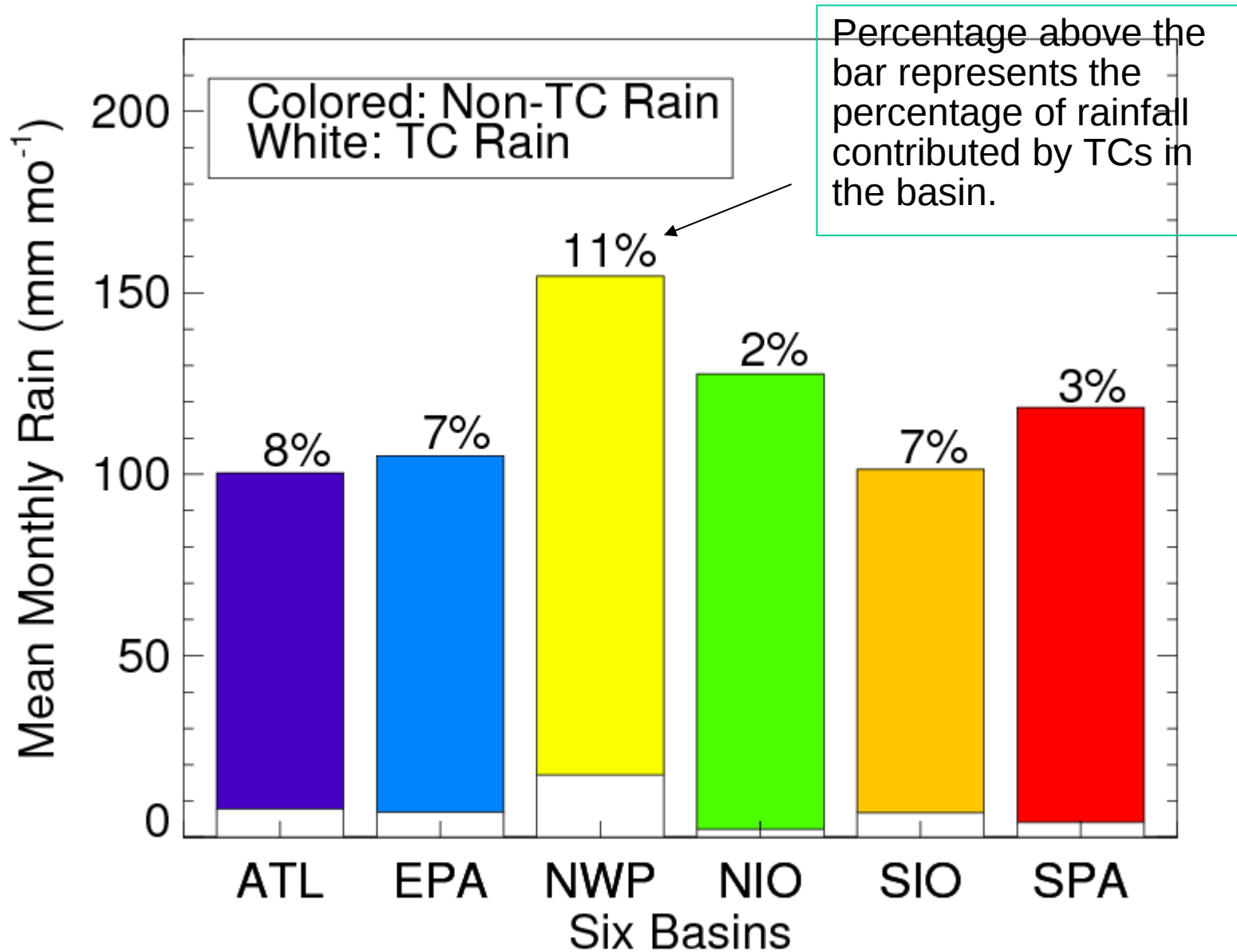
Tropical Cyclone Monthly Rain (mm/month)

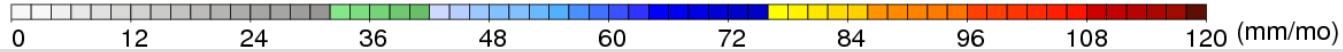
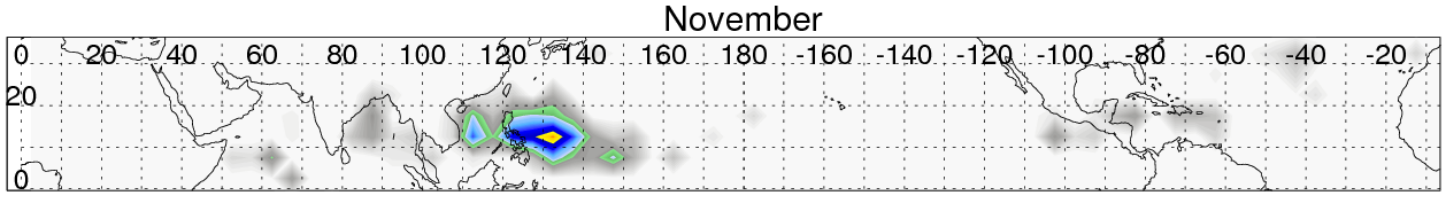
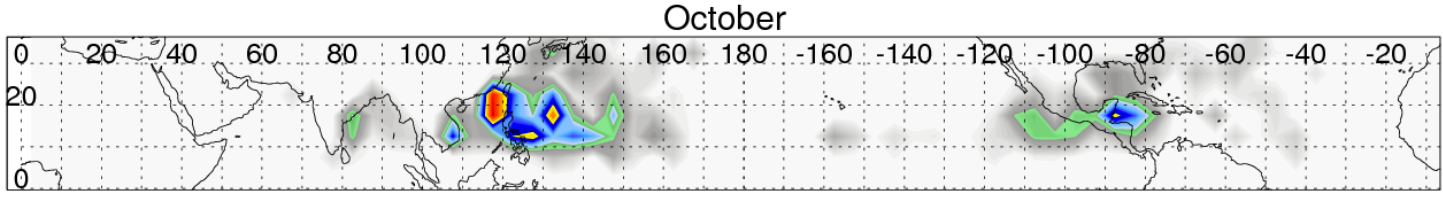
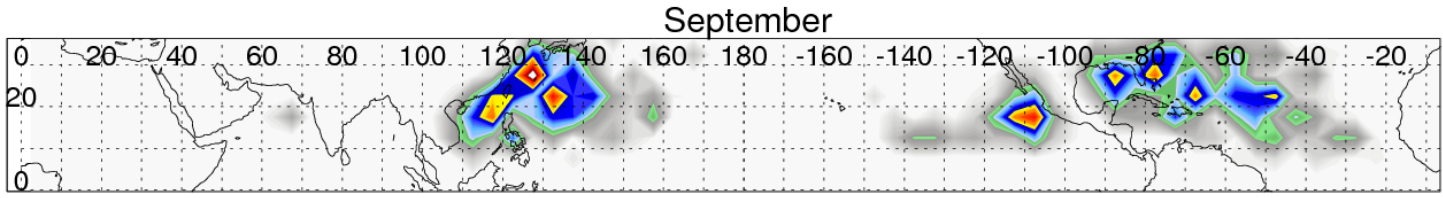
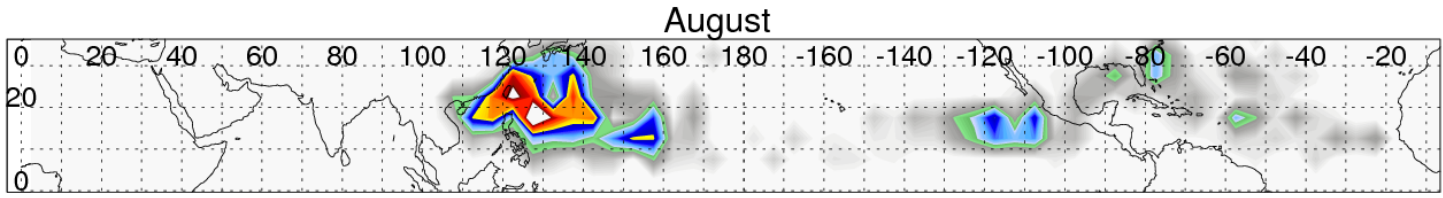
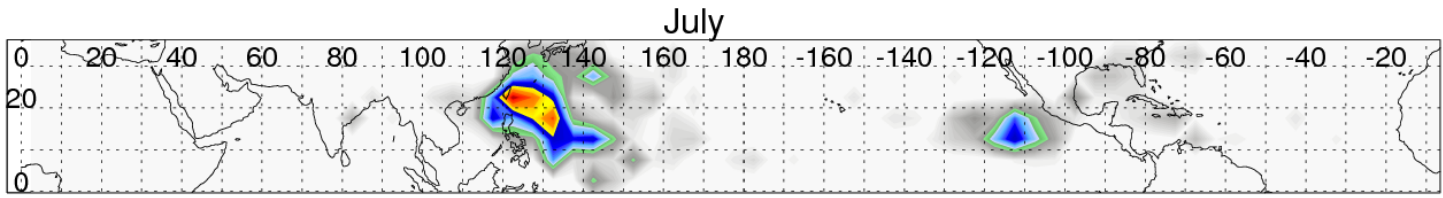
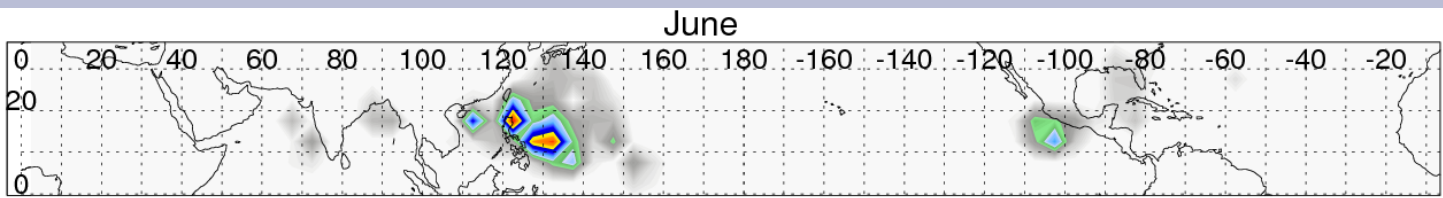


Percentage Tropical Cyclone Rain (%)



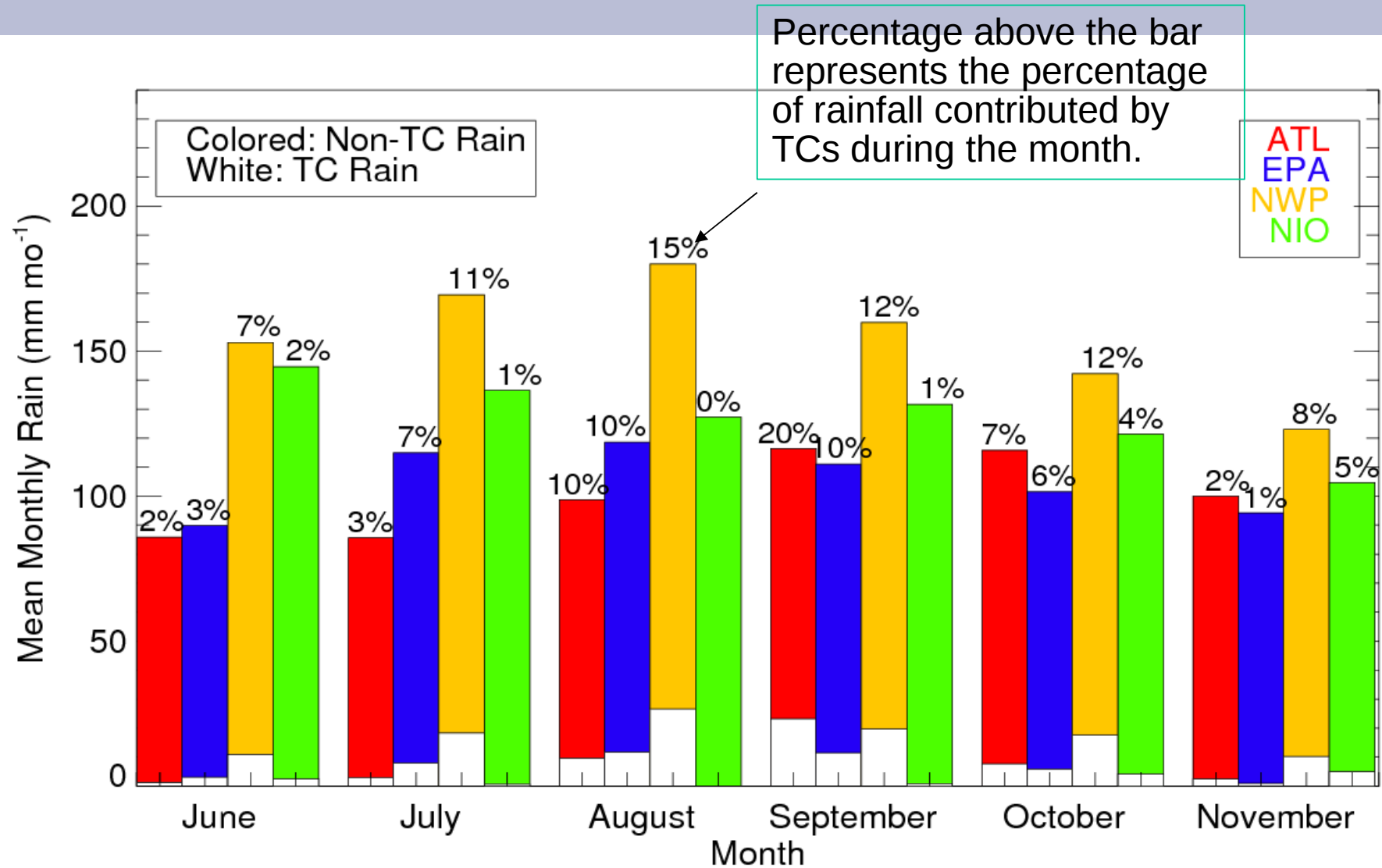
Mean Monthly Rainfall Contributed by non-TC Systems and TCs, and the Percentage of Rainfall Contributed by TCs in Different Basins



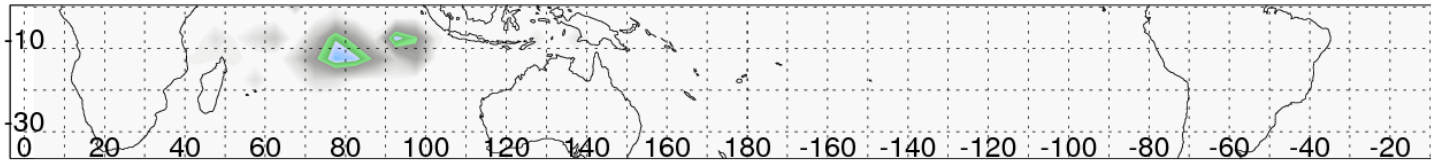


Seasonal Variations:
TRMM
2A25 TC
Mean
Monthly
Rain in
Northern
Hemisphere
during
1998-2000
& 2002-2006

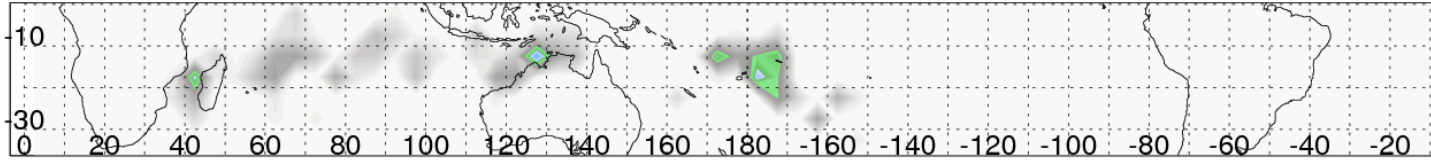
Mean Monthly Rainfall Contributed by non TC Systems and TCs for 1998-2000 and 2002-2006 during Jun-Nov for ATL, EPA, NWP, and NIO Basins



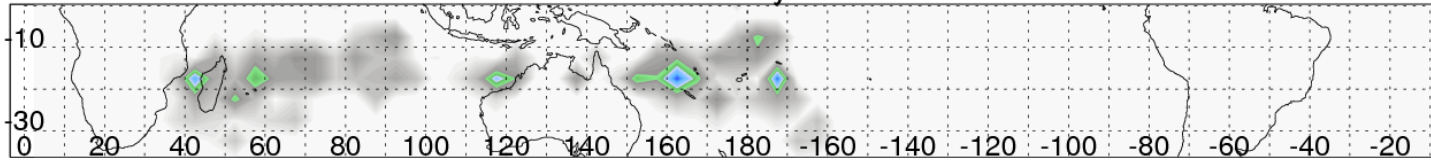
November



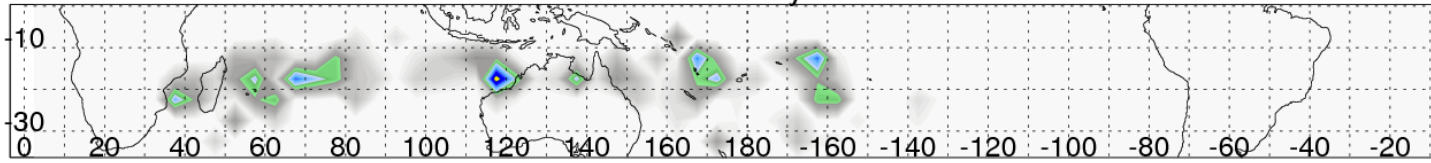
December



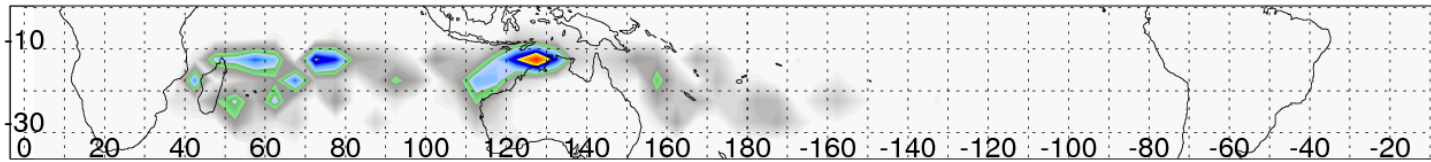
Januray



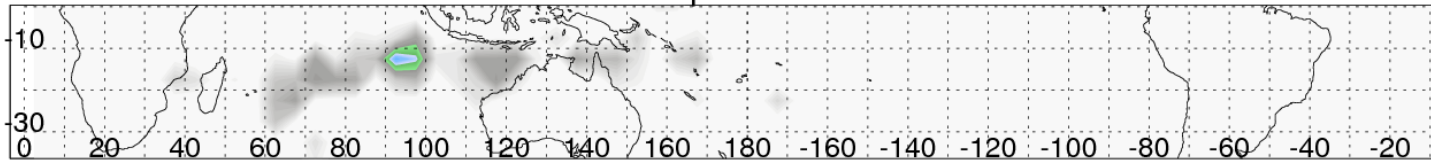
February



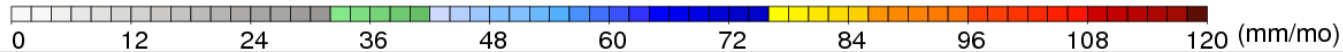
March



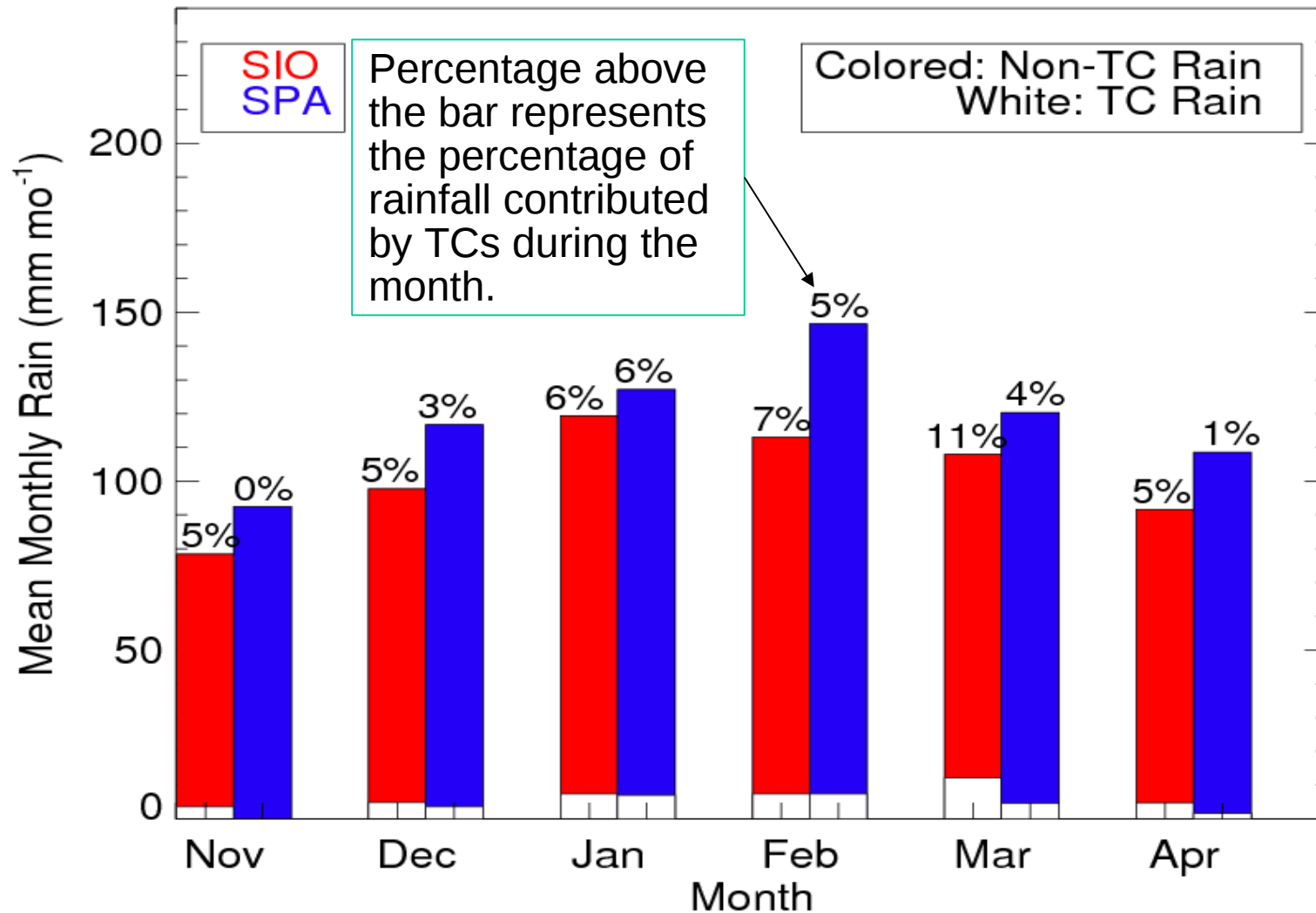
April



Seasonal Variations:
TRMM RPF
2A25 TC
Mean
Monthly
Rain in
Southern
Hemisphere
during
1998/1999-
2005/2006

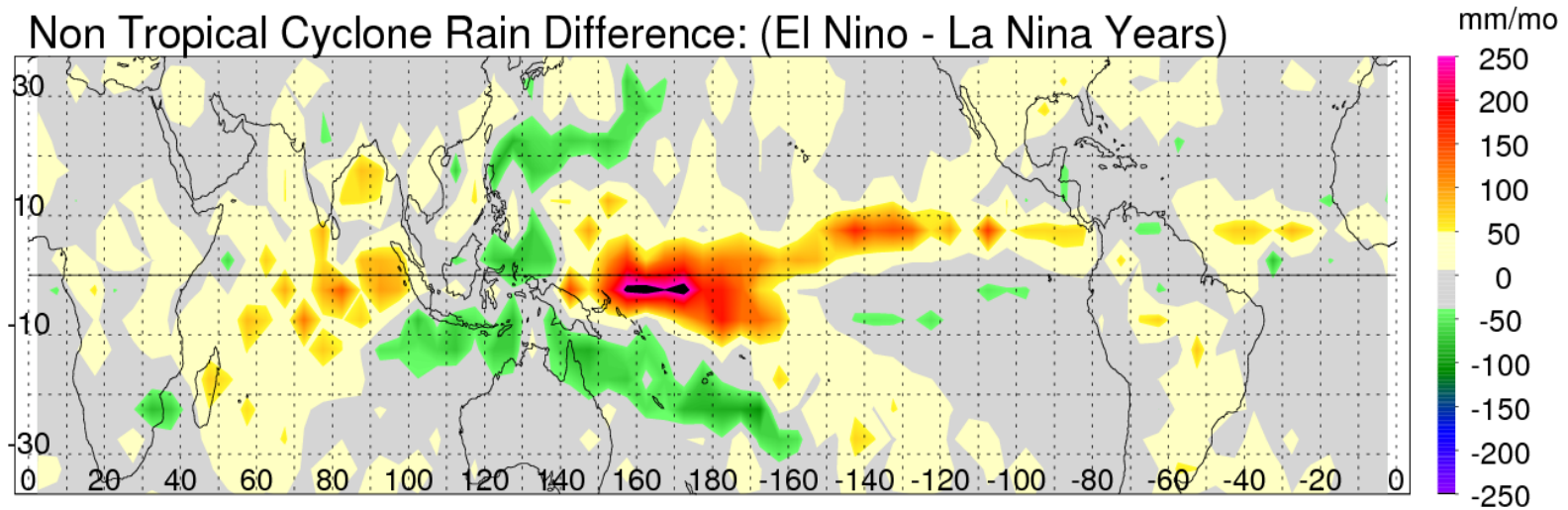


Mean Monthly Rainfall Contributed by non TC Systems and TCs for 1998/1999-2005/2006 during Nov-Apr for SIO and SPA Basins

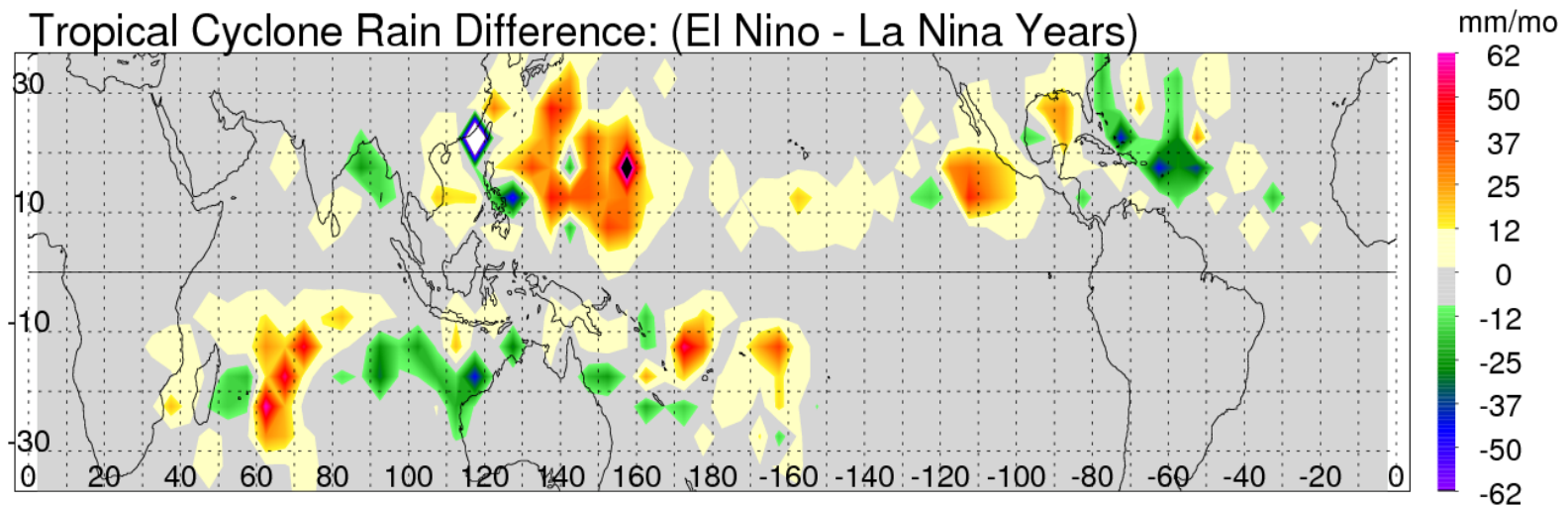


TC and Non TC Mean Monthly Rainfall Difference Between El Nino and La Nina Years

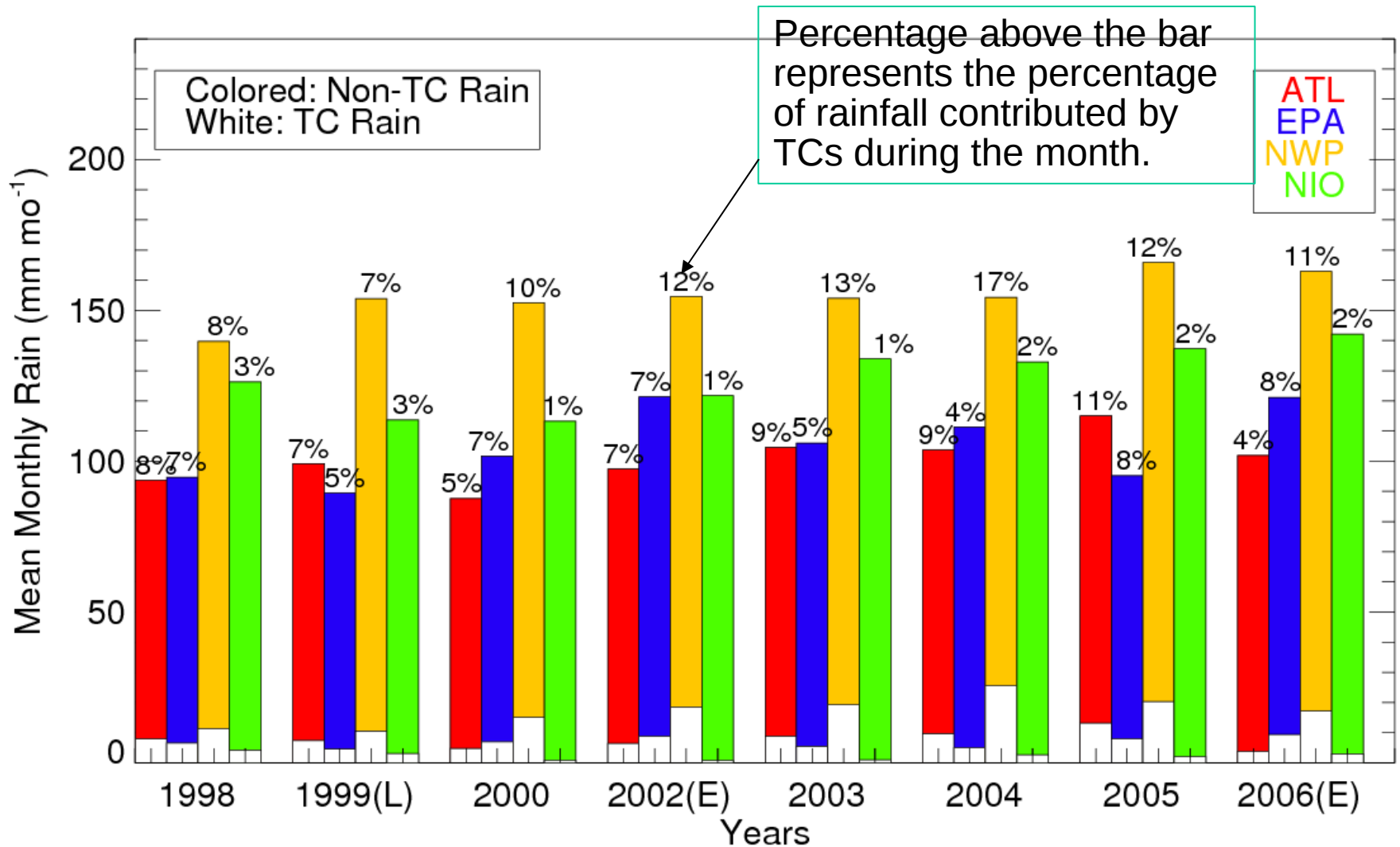
Non Tropical Cyclone Rain Difference: (El Nino - La Nina Years)



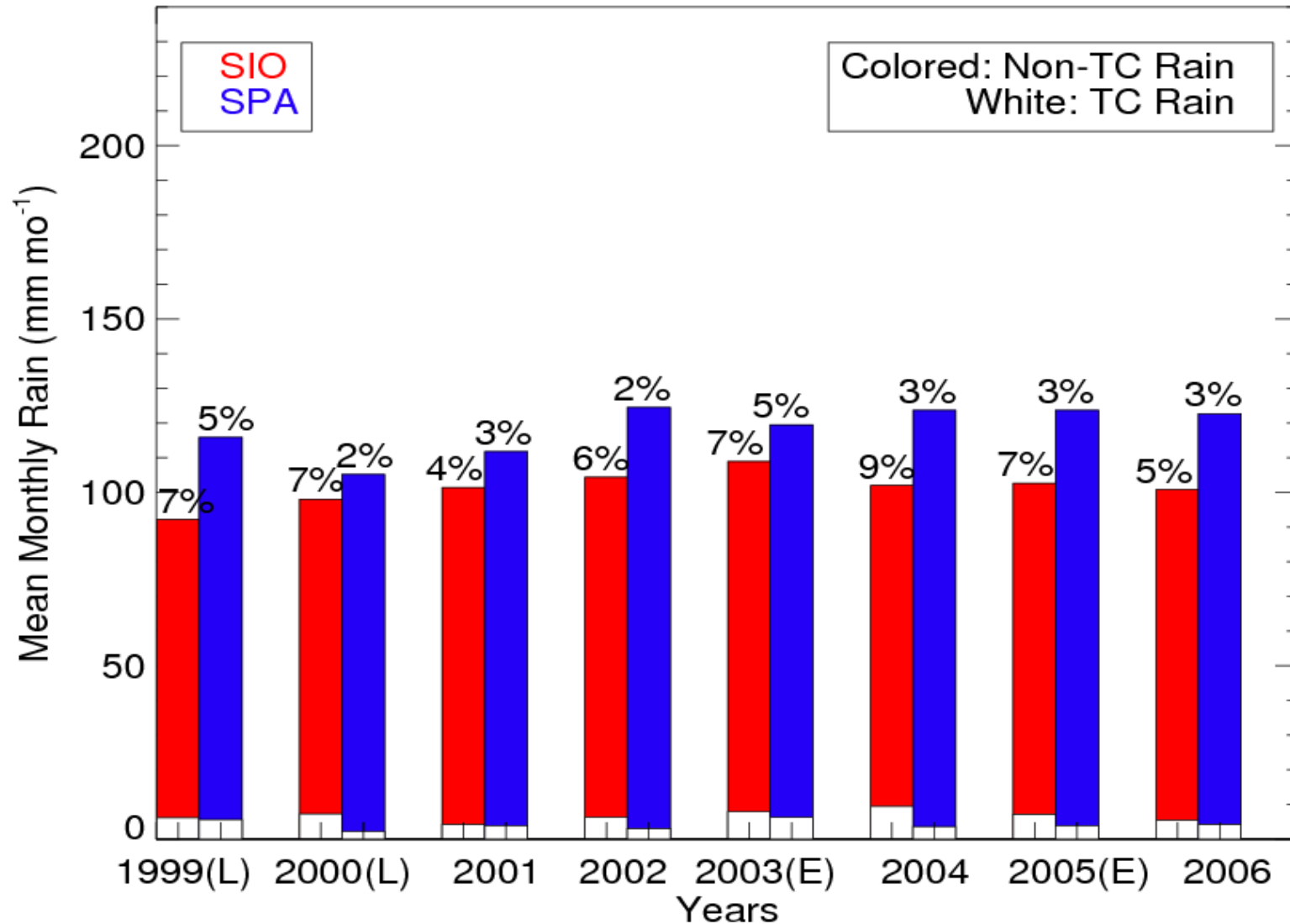
Tropical Cyclone Rain Difference: (El Nino - La Nina Years)



Mean Monthly Rainfall Contributed by non TC Systems and TCs for the Years of 1998-2000 and 2002-2006 during Jun-Nov for ATL, EPA, NWP, and NIO Basins

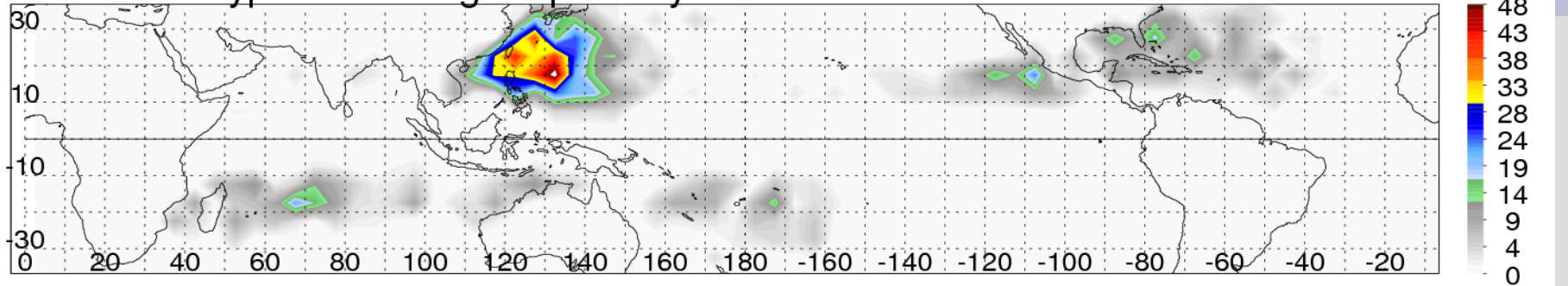


Mean Monthly Rainfall Contributed by non TC Systems and TCs for the Years of 1998/1999-2005/2006 during Nov-Apr for SIO and SPA Basins

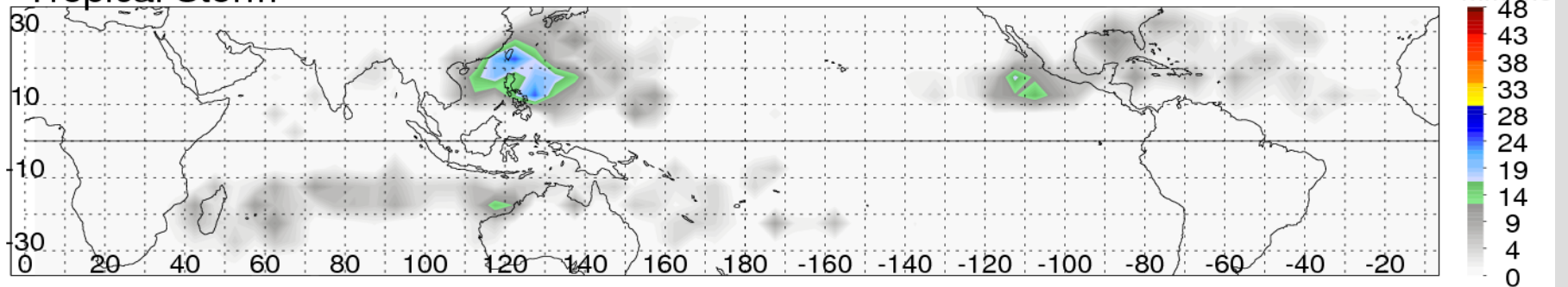


TRMM 2A25 RPF TC Mean Monthly Rain Contributed by TCs at Hurricane/Typhoon/Strong TC, Tropical Storm, and Tropical Depression Stages

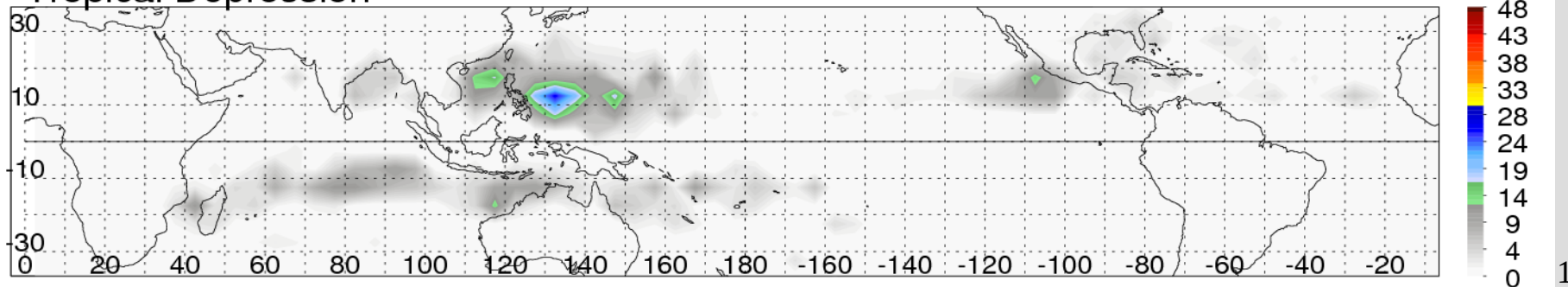
Hurricane/Typhoon/Strong Tropical Cyclone



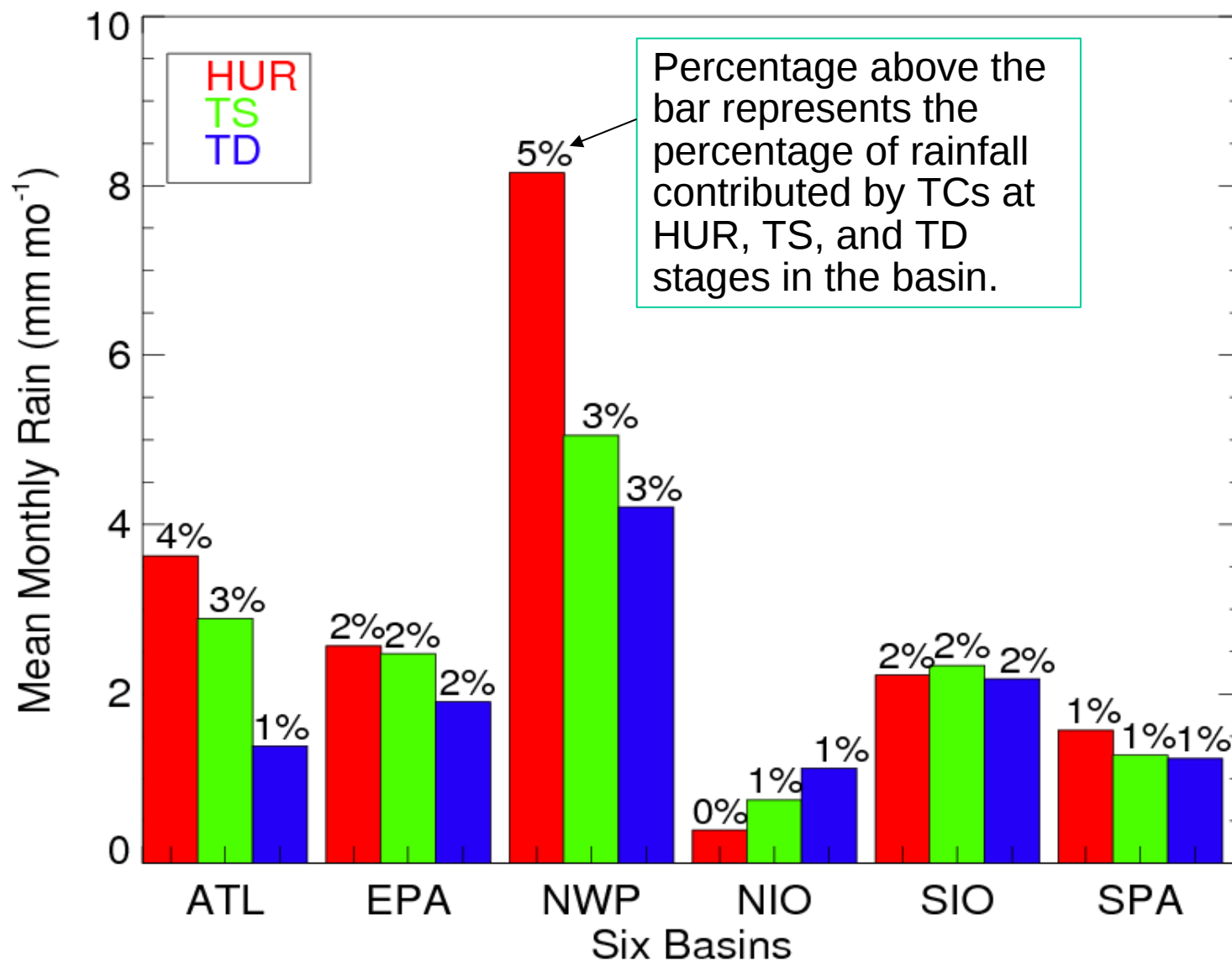
Tropical Storm



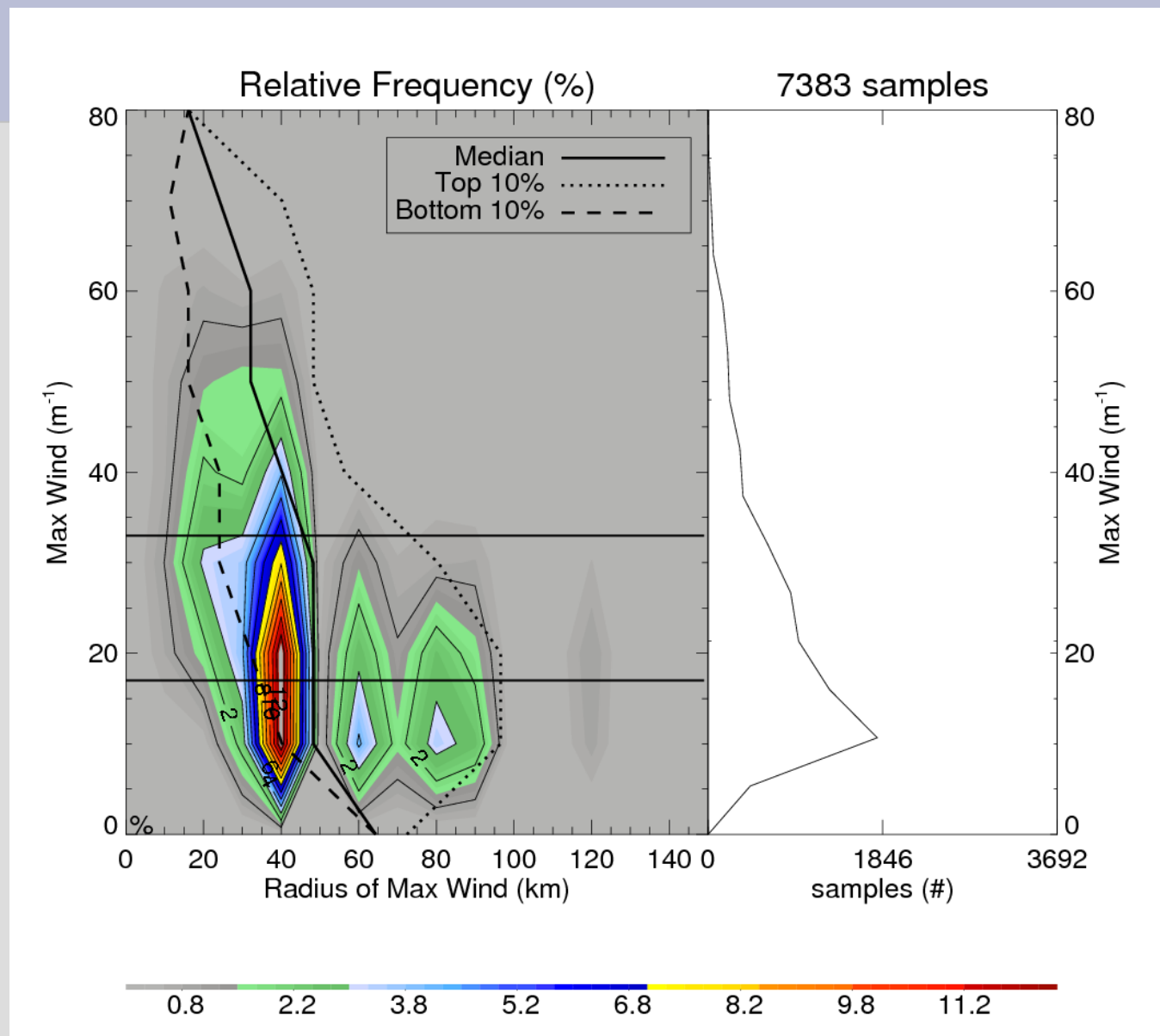
Tropical Depression



Mean Monthly Rainfall Contributed by TCs at Hurricane/Typhoon/Strong TC (HUR), Tropical Storm (TS), and Tropical Depression (TD) Stages in Six Basins



2D Histogram of MaxWind and Radius of MaxWind for ATL & EPAC TCs during 1998-2006

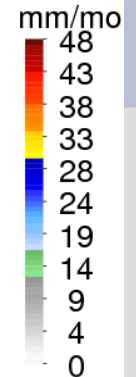
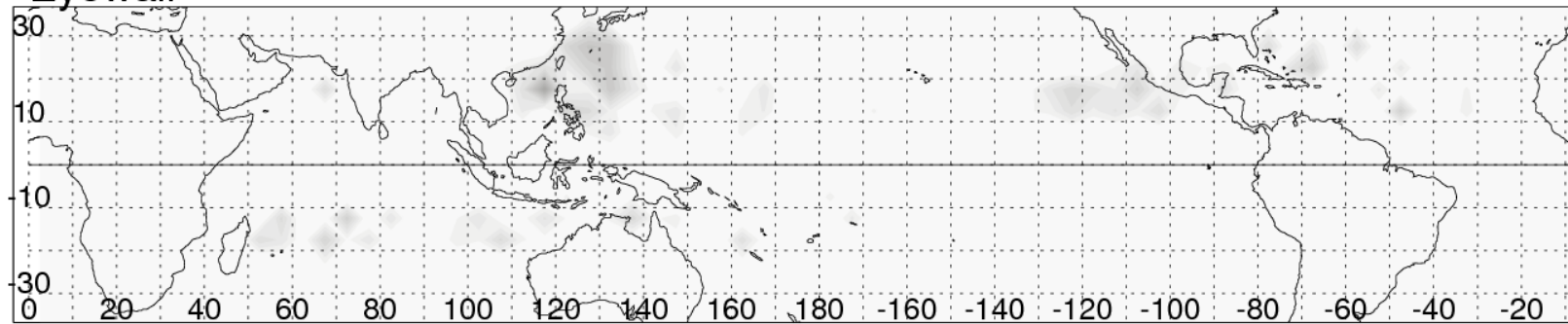


This figure shows how eyewall (EW) features are defined:

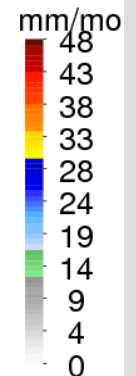
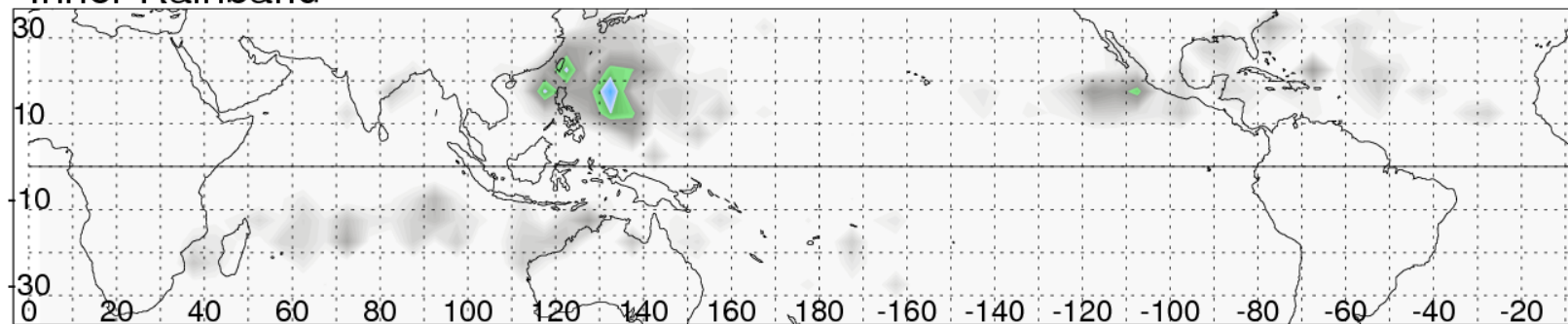
- For HUR: radius of EW=0-50km, IB=50-100km, OB=100-500km
- For TS: radius of EW=0-70 km, IB=70-140km, OB=140-500km
- For TD: radius of EW=0-90 km, IB=90-180km, OB=180-500km

TRMM 2A25 RPF TC Mean Monthly Rain Contributed by Eyewall (EW), Inner Rainband (IB), and Outer Rainband (OB) Features

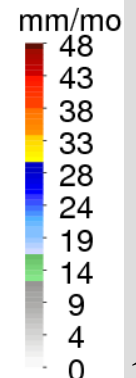
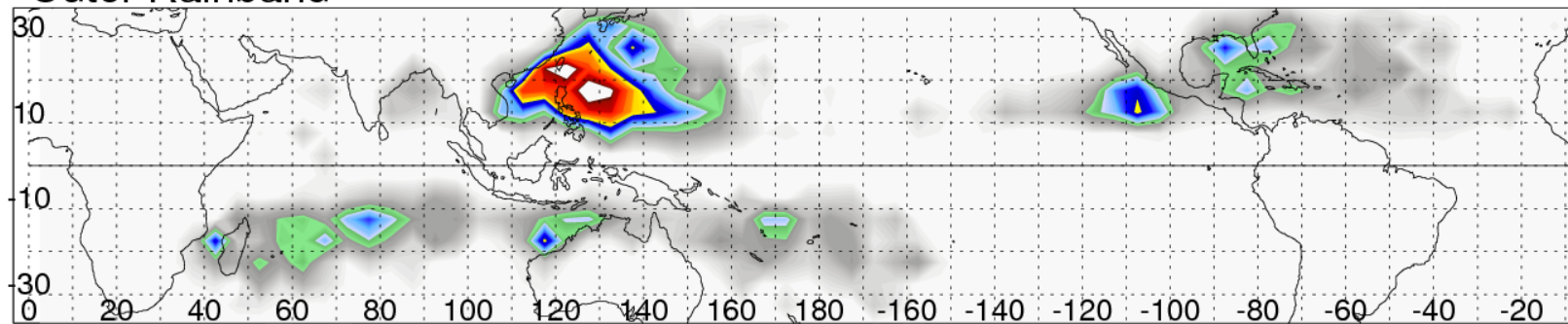
Eyewall



Inner Rainband



Outer Rainband



Mean Monthly Rainfall Contributed by TC Eyewall (EW), Inner Rainband (IB), and Outer Rainband (OB) Regions in Six Basins

