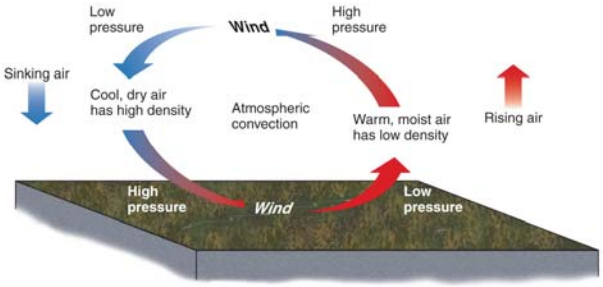
Mike Crossley of Newport Beach cruises flood waters in Costa Mesa, CA to see where he can help during the heavy flooding from the Pacific Storm strengthened by El Niño in December 1997. ©Steve Zylius/The Register



Atmospheric convection. Where does the moisture go? Pipkin et al. (2014). *Geology & the Environment*. Cengage Learning.

Defining Change:

What is the nature of Equatorial Pacific variability?

We understand climate variability and climate change by looking at data for climate attributes over a period of years. We will look together at some mapped computer estimates of precipitation for the tropical Pacific in an effort to understand this kind of data and how it reflects changes in the climate system. By applying your knowledge about the mechanisms driving wind- and precipitation-generation, you'll be able to understand and interpret these changes.

As part of this exercise you will

- Determine what happens in the tropical atmosphere over time, &
- Gain experience interpreting climate data.

You have 10 years of precipitation estimates from the equatorial tropical Pacific (1992-2001). For each year, you have plots of both precipitation rate (in mm/day) and precipitation anomaly averaged over the months of December, January, and February (DJF).

1. In 1991-92 where do you find the highest precipitation rate? (Specify with a range of latitude and longitude.) How high is the precipitation here (in mm/day)? Where do you find the highest anomalies?

2. What year(s) strike you as having the most interesting precipitation data or precipitation anomaly data? What about these years strikes you as interesting?

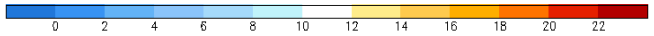
3. In which area and during which years do you find the largest positive anomalies?

4. In which area and during which years do you find the largest negative anomalies?

5. In which years do you find the largest anomalies (both positive and negative) directly on the Equator?

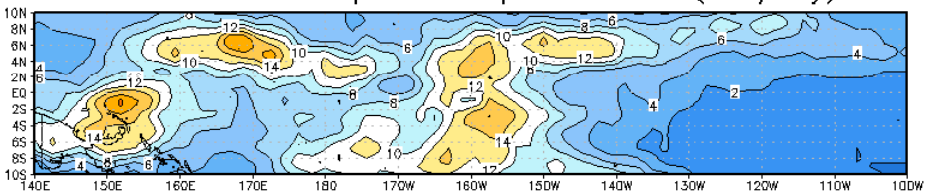
6. How do you think that only looking at the winter months, or looking at January alone affects your interpretation of the results? Is examining the winter months just as informative as looking at the annual cycle? Why or why not?

Equatorial Pacific Precipitation Data

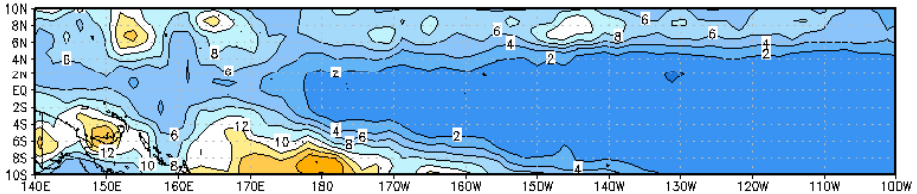


data source: NCEP/DOE Reanalysis-2

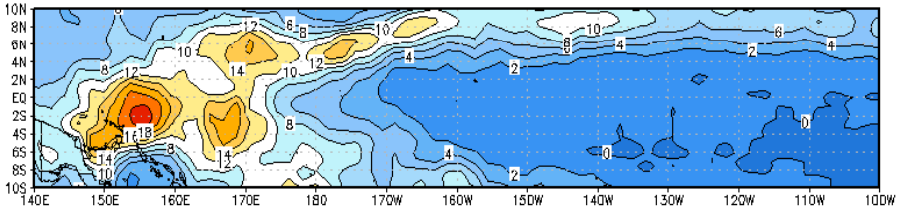
DJF 1991–92 Tropical Precipitation Rate (mm/day)



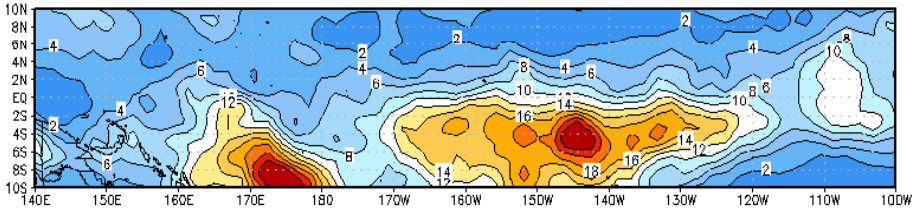
DJF 1996–97 Tropical Precipitation Rate (mm/day)



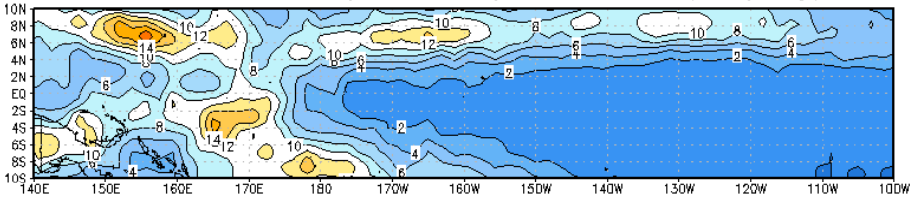
DJF 1992–93 Tropical Precipitation Rate (mm/day)



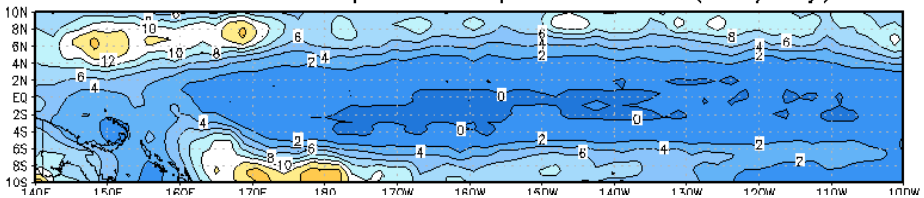
DJF 1997–98 Tropical Precipitation Rate (mm/day)



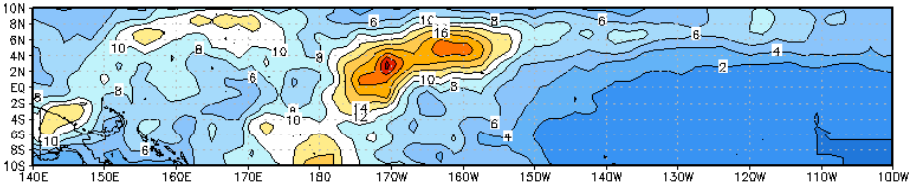
DJF 1993–94 Tropical Precipitation Rate (mm/day)



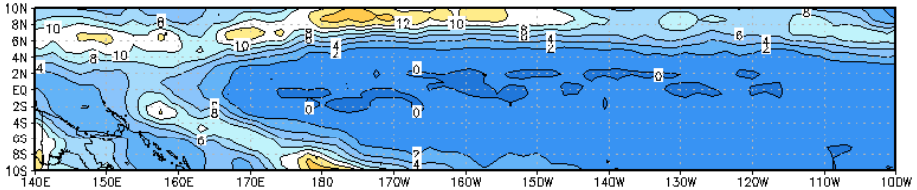
DJF 1998–99 Tropical Precipitation Rate (mm/day)



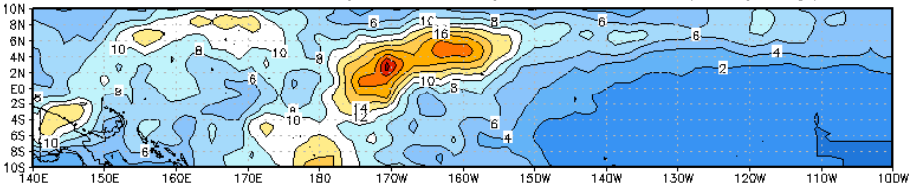
DJF 1994–95 Tropical Precipitation Rate (mm/day)



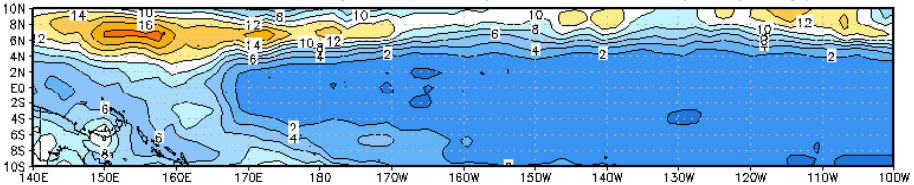
DJF 1999–2000 Tropical Precipitation Rate (mm/day)



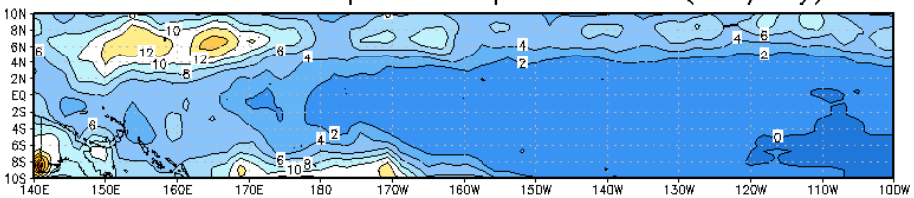
DJF 1994–95 Tropical Precipitation Rate (mm/day)



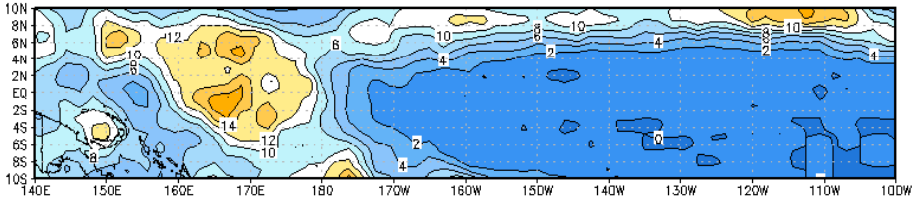
DJF 2000–01Tropical Precipitation Rate (mm/day)



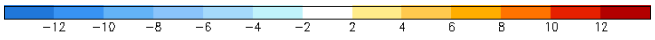
DJF 1995–96 Tropical Precipitation Rate (mm/day)



DJF 2001–02 Tropical Precipitation Rate (mm/day)

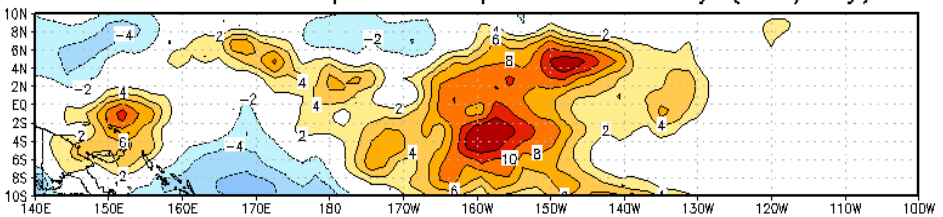


Equatorial Pacific Precipitation Data

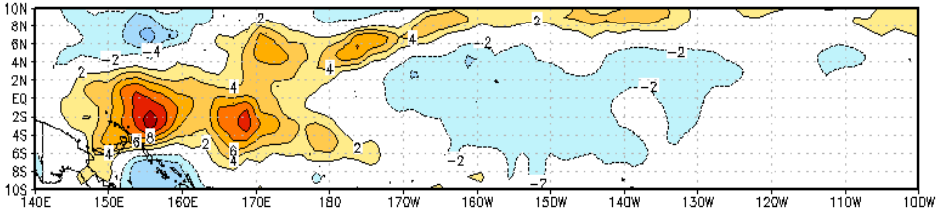


data source: NCEP/DOE Reanalysis-2

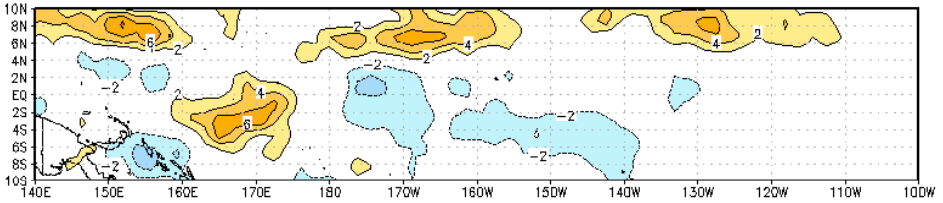
DJF 1991–92 Tropical Precipitation Anomaly (mm/day)



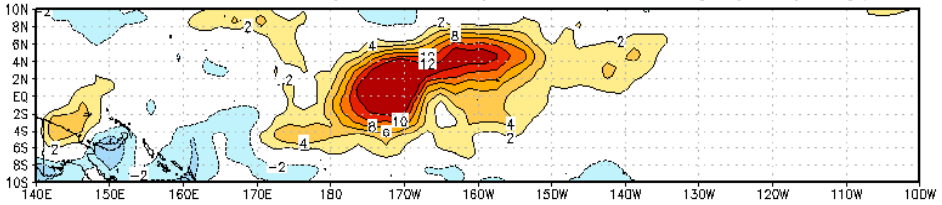
DJF 1992–93 Tropical Precipitation Anomaly (mm/day)



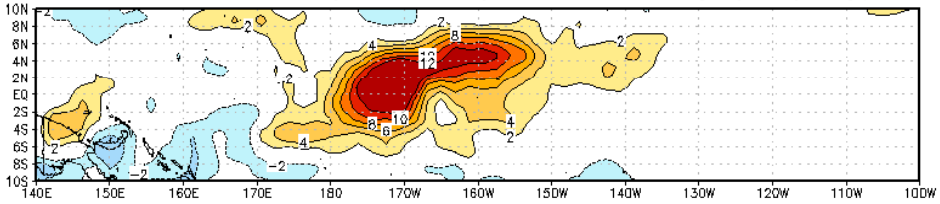
DJF 1993–94 Tropical Precipitation Anomaly (mm/day)



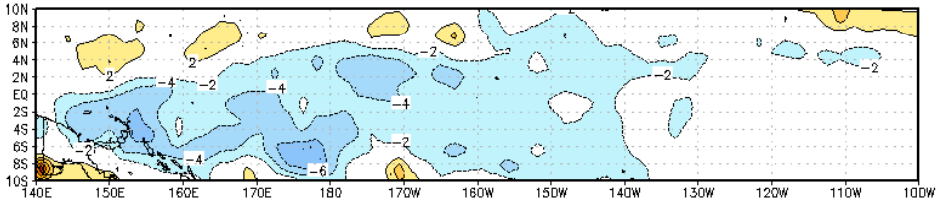
DJF 1994–95 Tropical Precipitation Anomaly (mm/day)



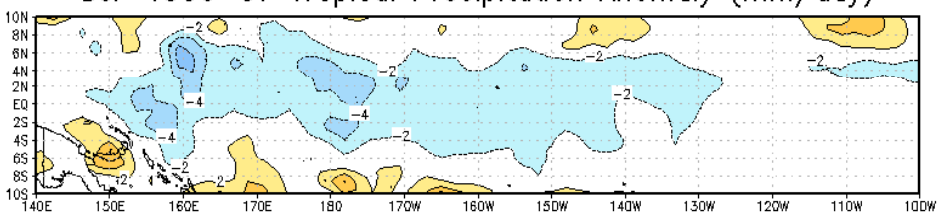
DJF 1994–95 Tropical Precipitation Anomaly (mm/day)



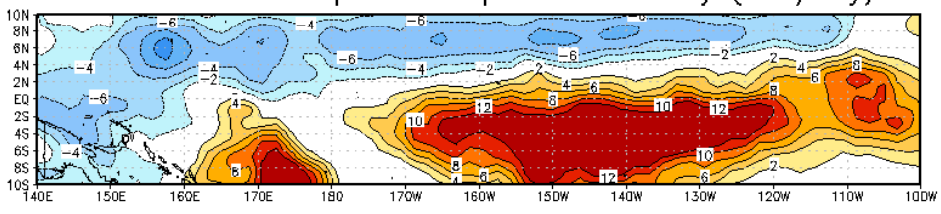
DJF 1995–96 Tropical Precipitation Anomaly (mm/day)



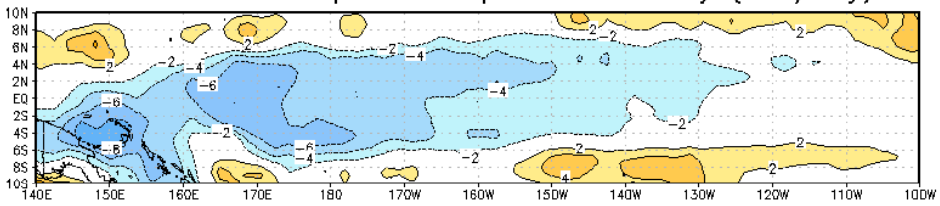
DJF 1996–97 Tropical Precipitation Anomaly (mm/day)



DJF 1997–98 Tropical Precipitation Anomaly (mm/day)



DJF 1998–99 Tropical Precipitation Anomaly (mm/day)



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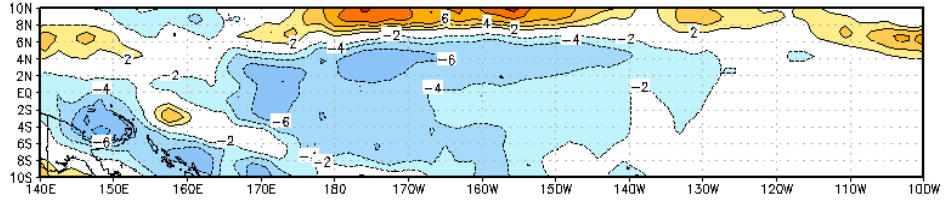
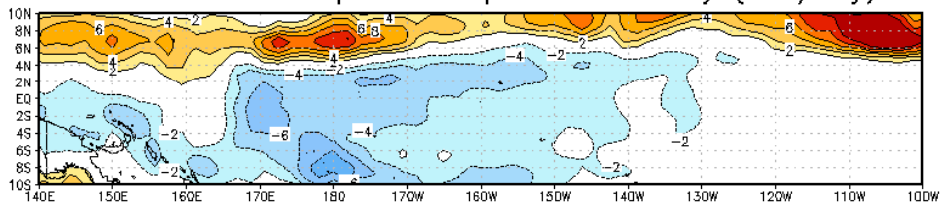


DJF 2000–01 Tropical Precipitation Anomaly (mm/day)



DJF 2001–02 Tropical Precipitation Anomaly (mm/day)