

Monthly and Interannual Variability of the Eastern Pacific Warm Pool

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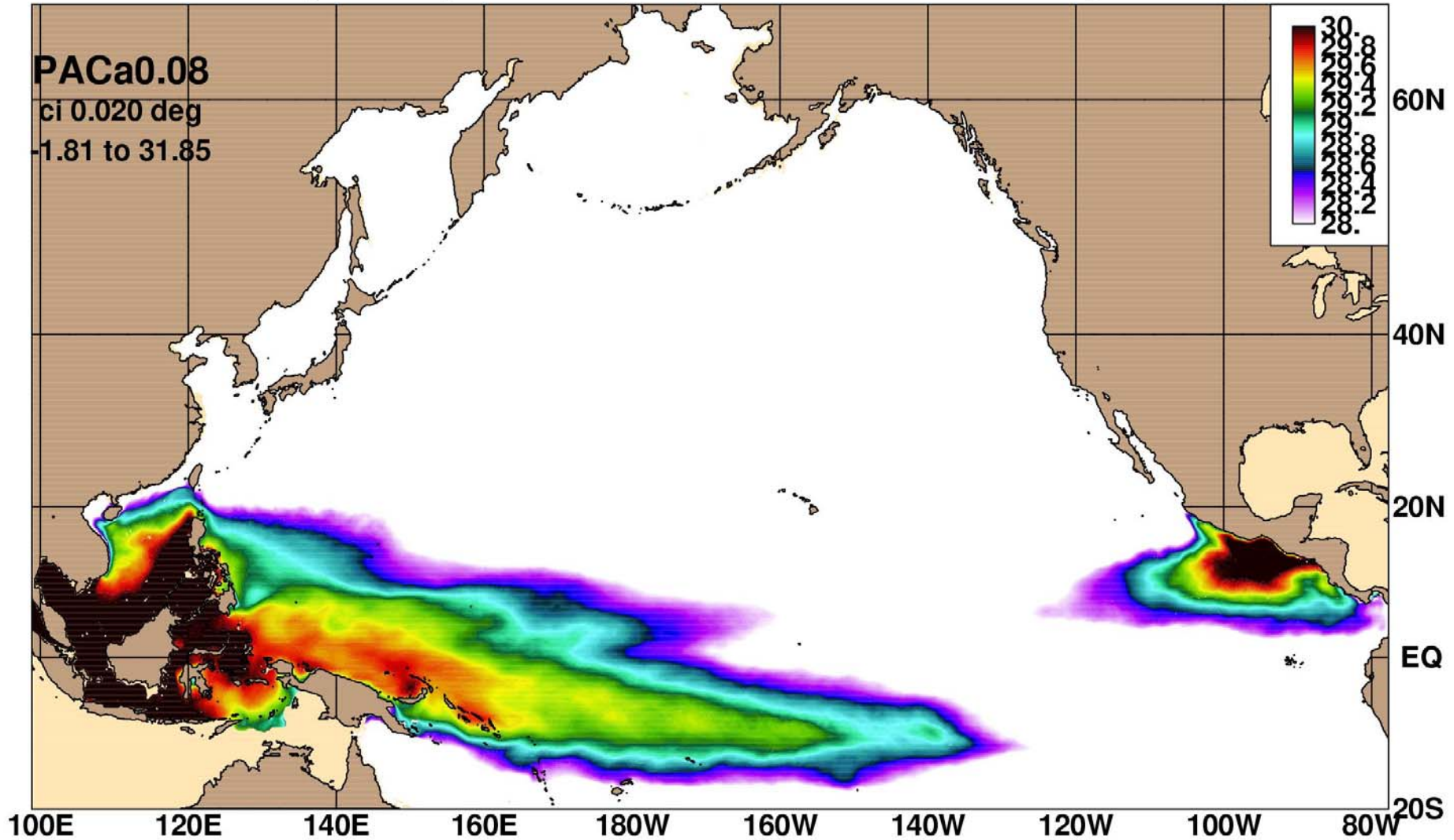
- The Eastern Pacific Warm Pool (EPWP) strengthens and weakens, but remains throughout the year.
- The monthly variability of the EPWP is forced by the surface heat fluxes.
- The interannual variability of the EPWP is modulated by the warm water advected poleward by interannual coastally trapped waves.

Tools

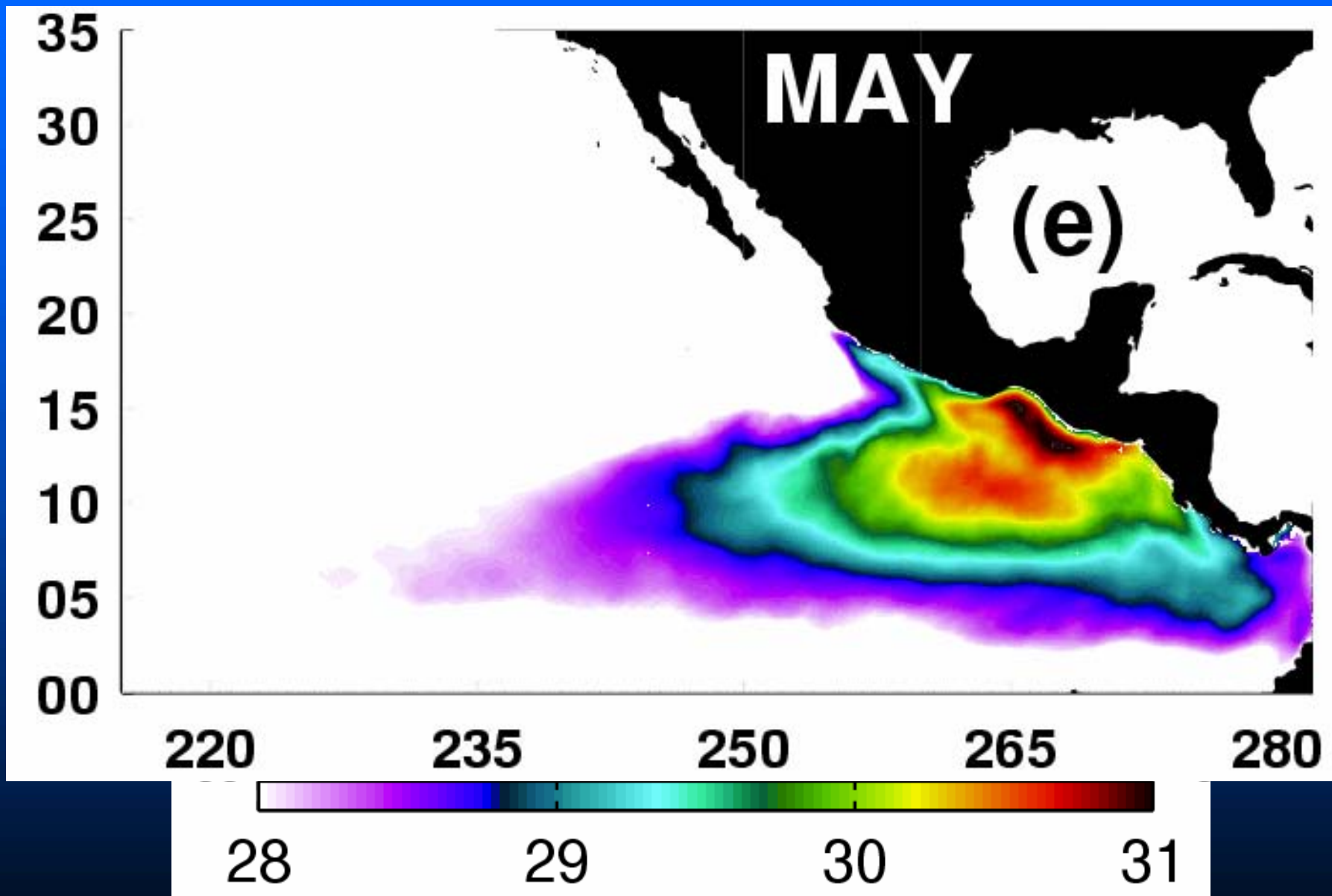
- 25 year non-assimilative simulation (1979-2003) of a Pacific configuration of HYCOM.
- 13 year (1993-2006) of Sea Surface Temperature data from the Modular Ocean Data Assimilation System (MODAS).

1/12° Pacific HYCOM Basin-scale Temperature

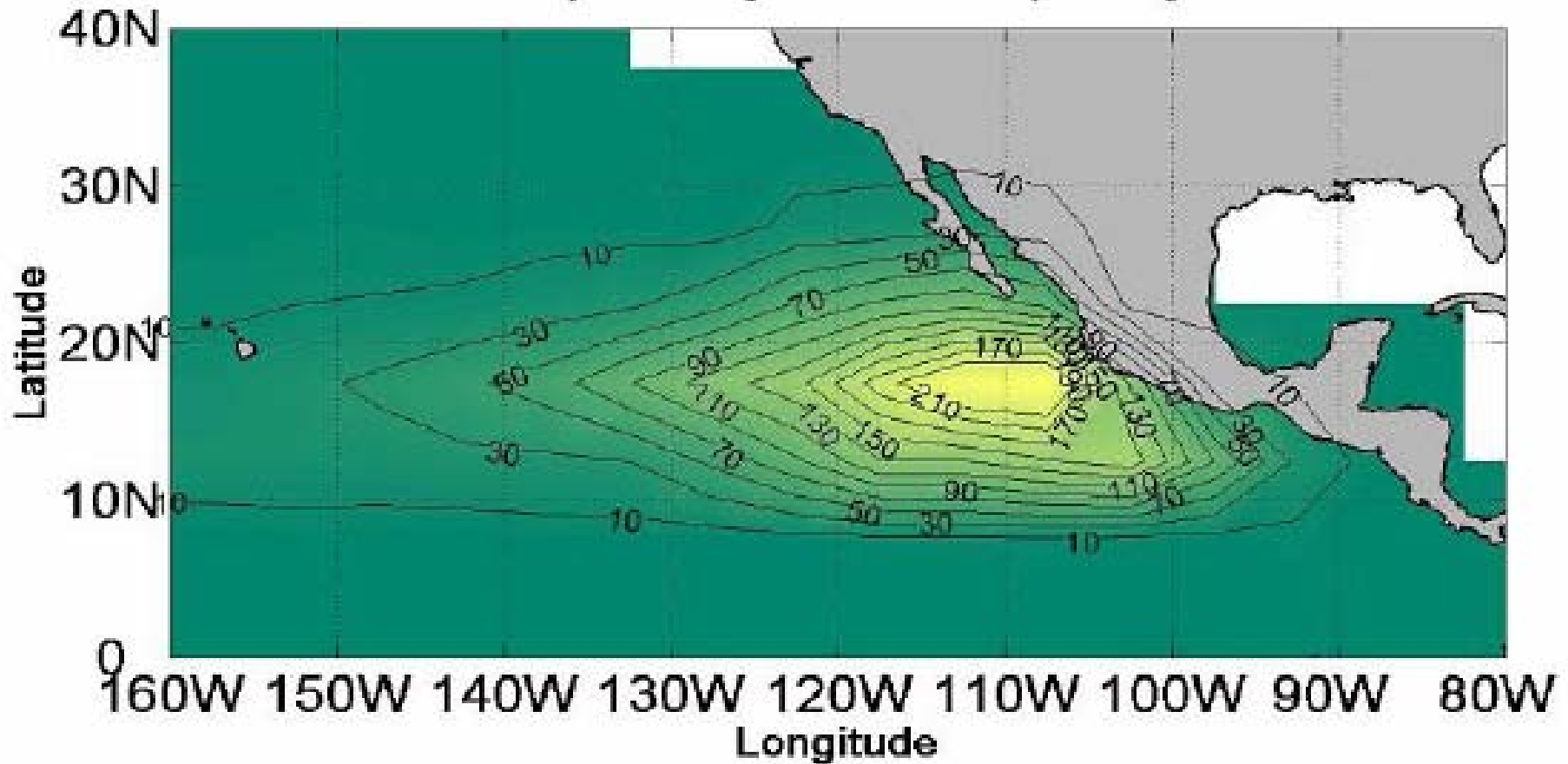
SST Climatological Mean (1979-2003) for May



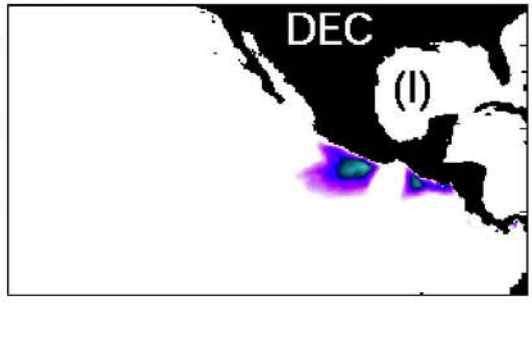
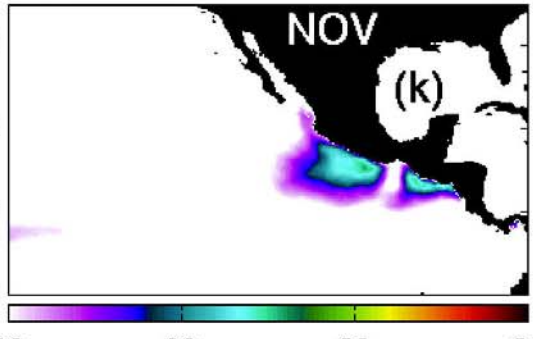
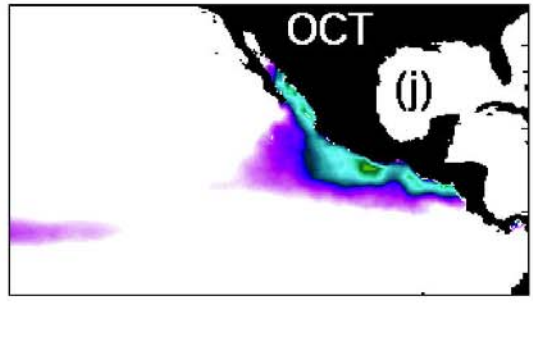
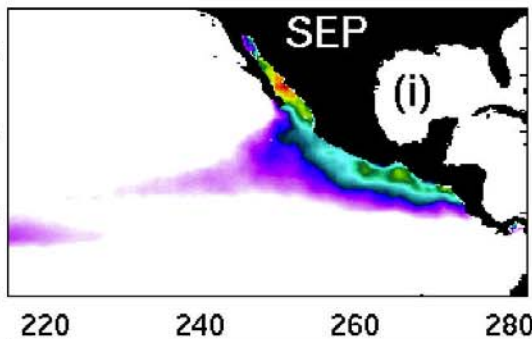
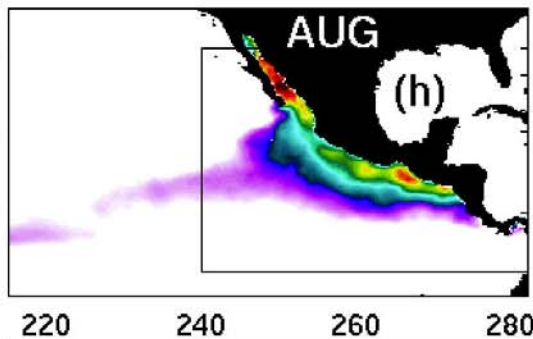
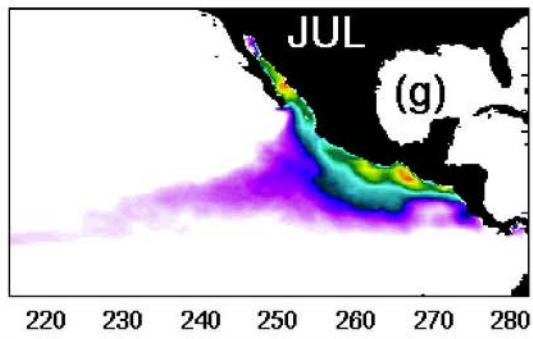
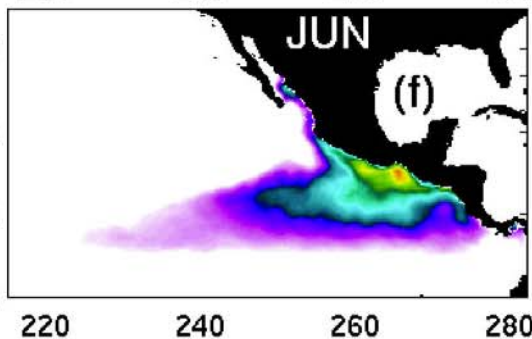
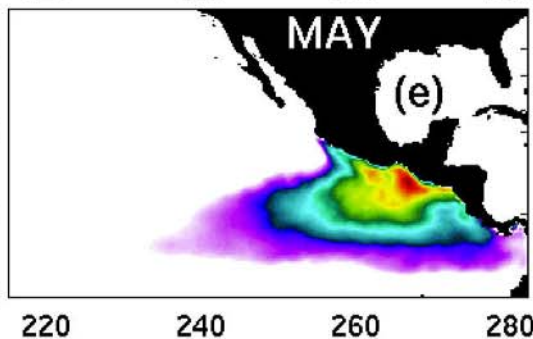
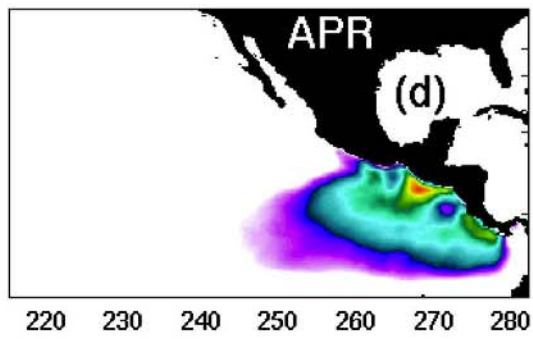
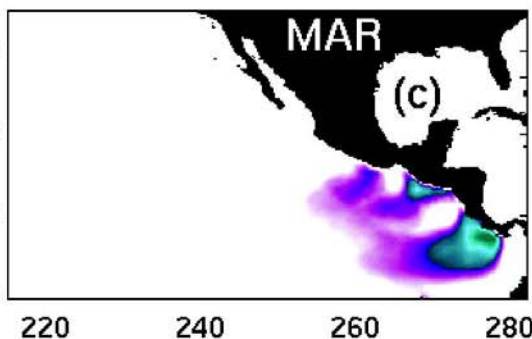
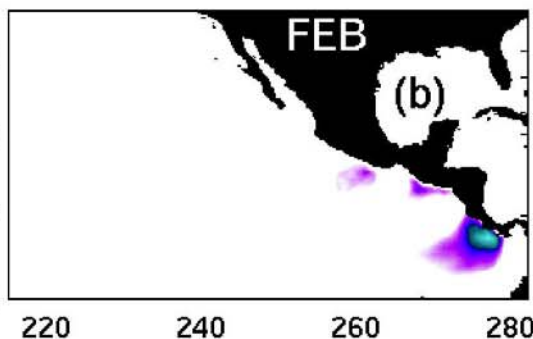
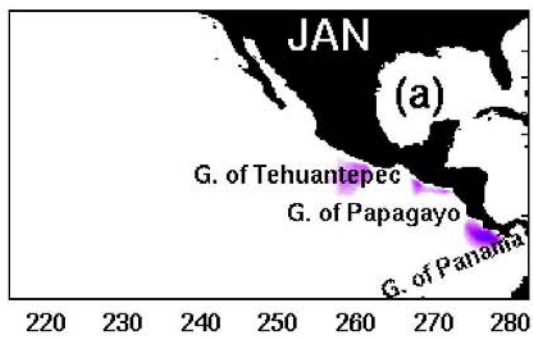
SST Climatological Mean (1979-2003) for May

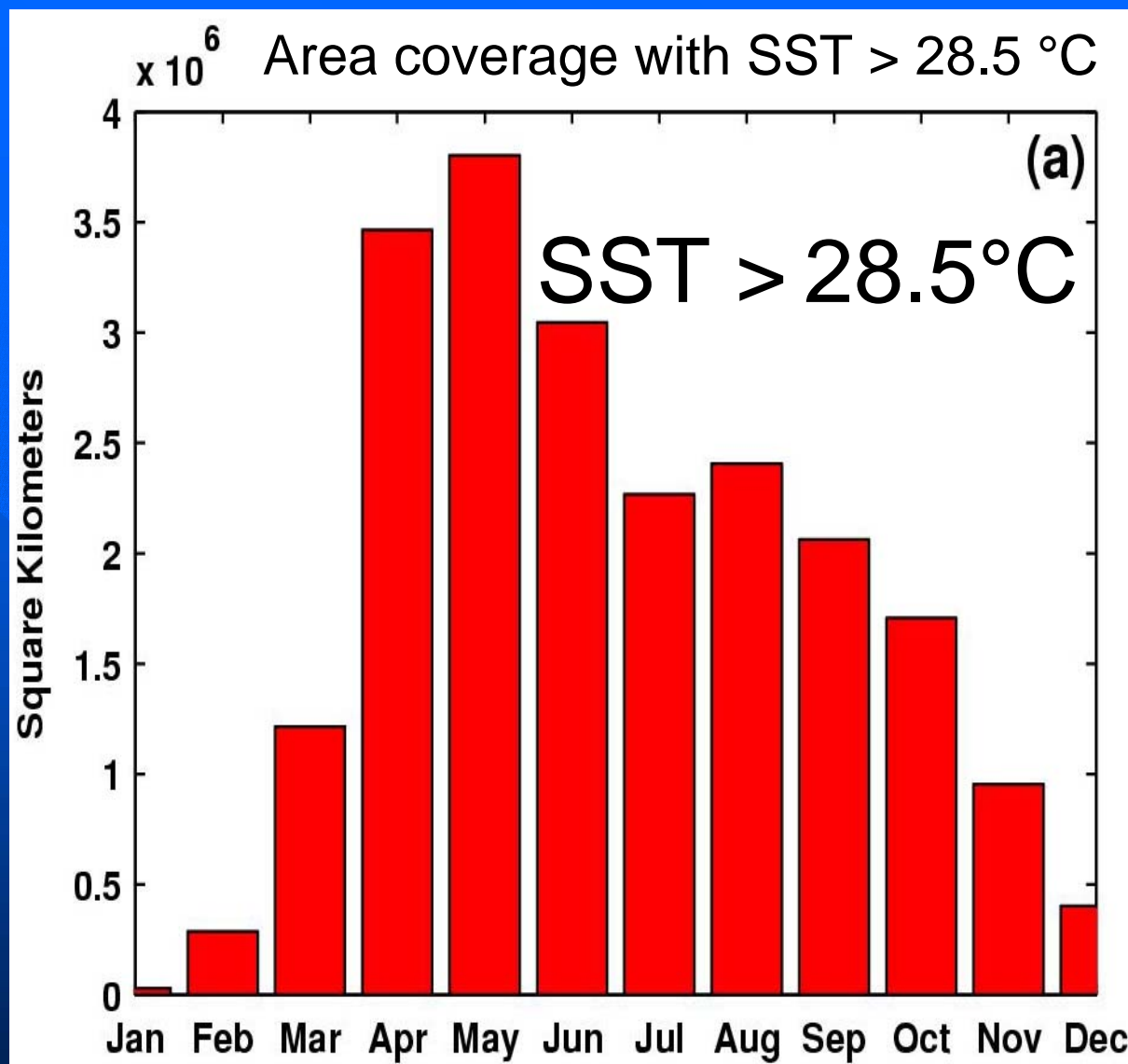


Tropical Cyclone Frequency

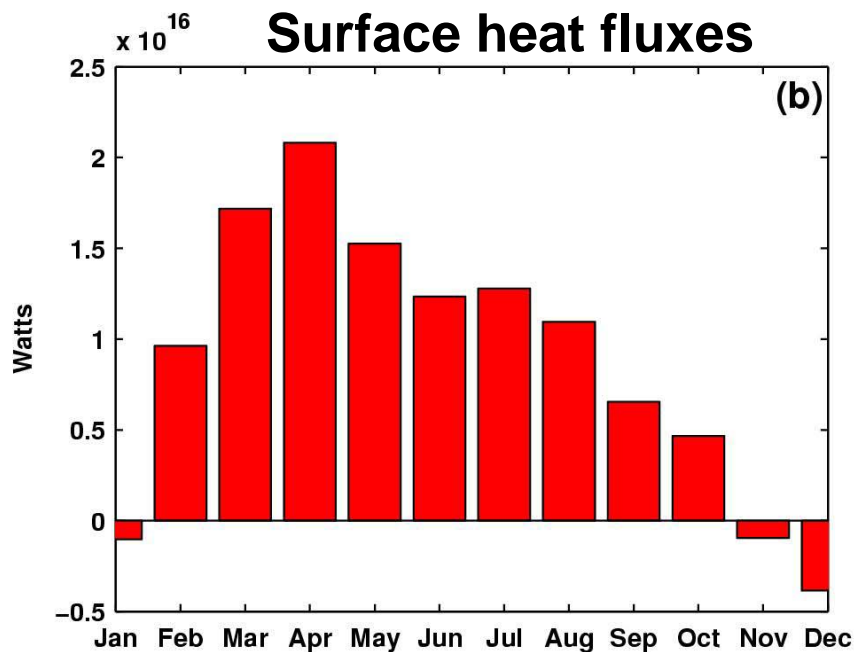
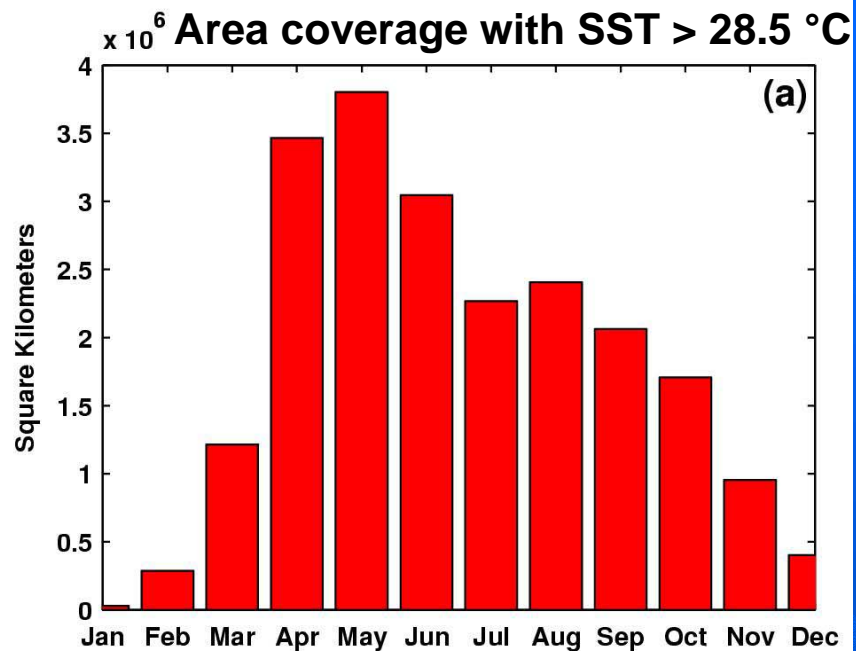


The eastern Tropical Pacific area of cyclone formation accounts for ~17% of the global total of tropical storm development (Amador et al., 2006).





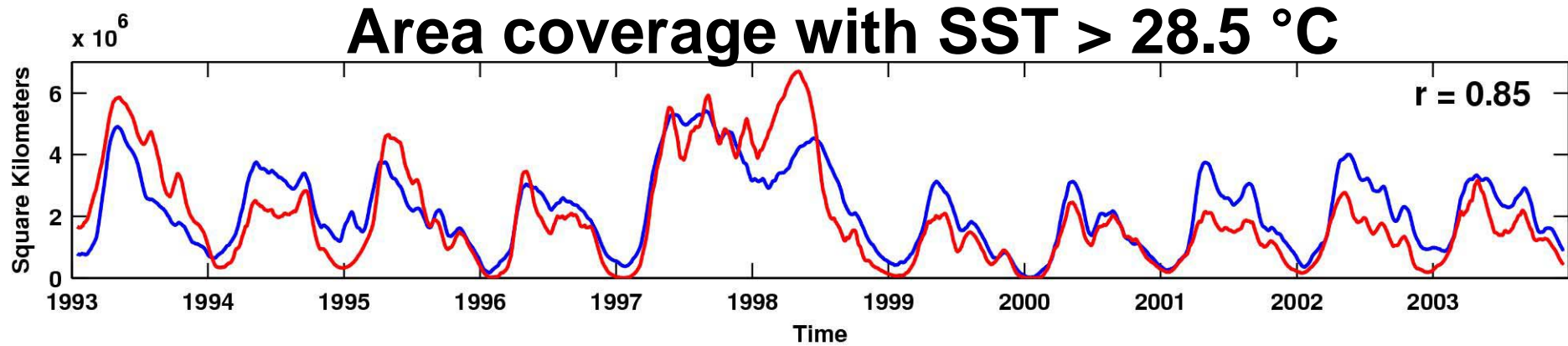
- Why does the EPWP reach its maximum during May ?
- Why does the EPWP weaken during mid summer ?



SST > 28.5°C

- EPWP's May maximum of ~4,000,000 km²
- EPWP's January minimum of ~30,000 km²
- EPWP's July mid-summer minimum of ~2,300,000 km²
- EPWP gains heat through the surface from February to October
- EPWP loses heat from November to January.

SST > 28.5°C

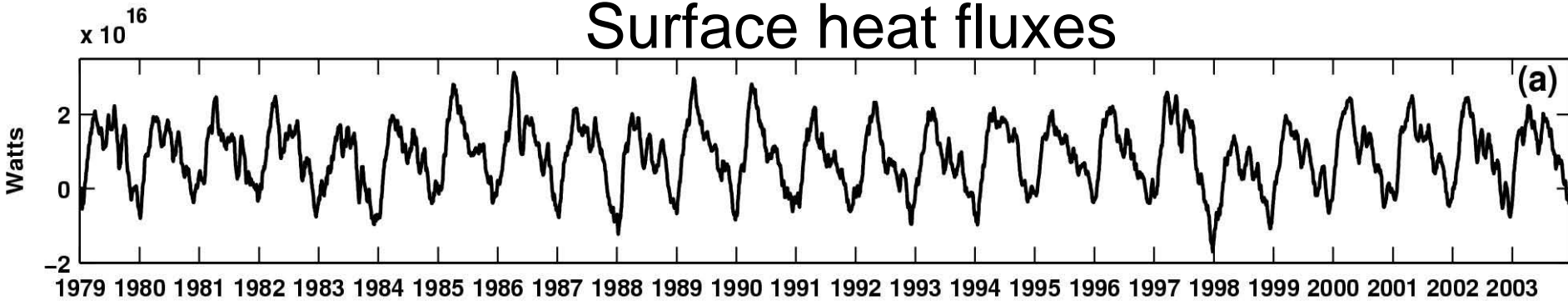


MODAS is blue

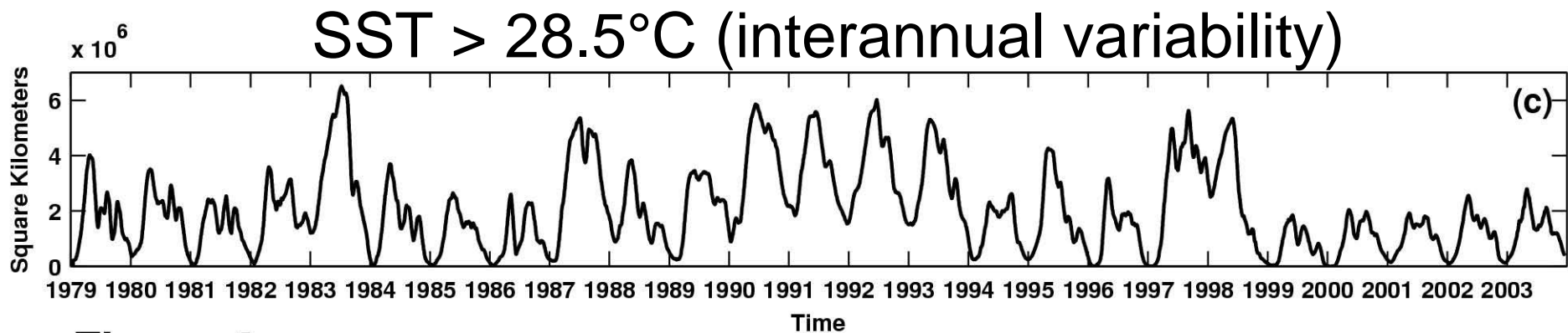
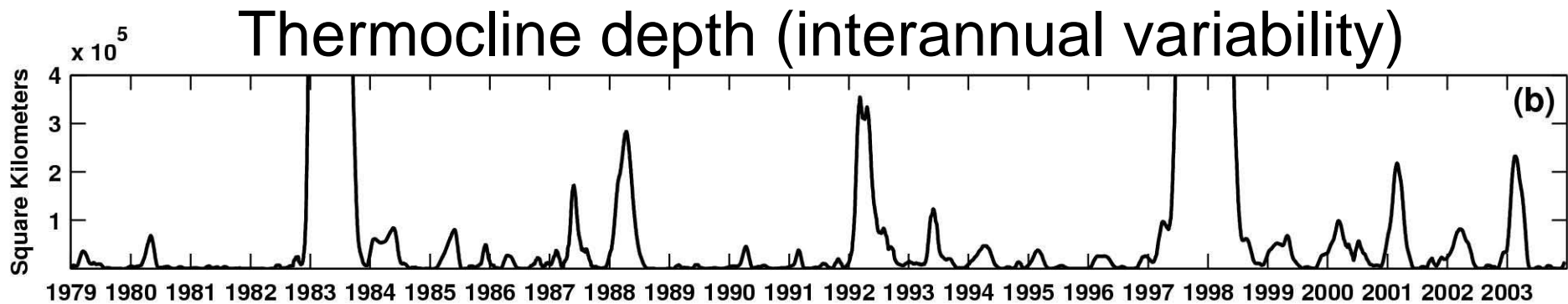
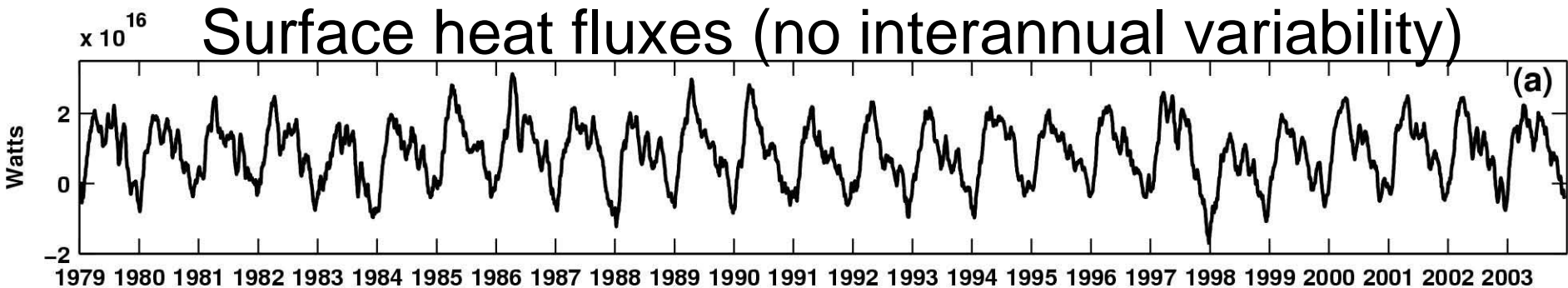
HYCOM is red

- The monthly variability of the EPWP is forced by the surface heat fluxes.
- If the surface heat fluxes are the main forcing of the EPWP, then the surface heat fluxes should include an interannual variability, since the EPWP includes interannual variability in extension and strength.

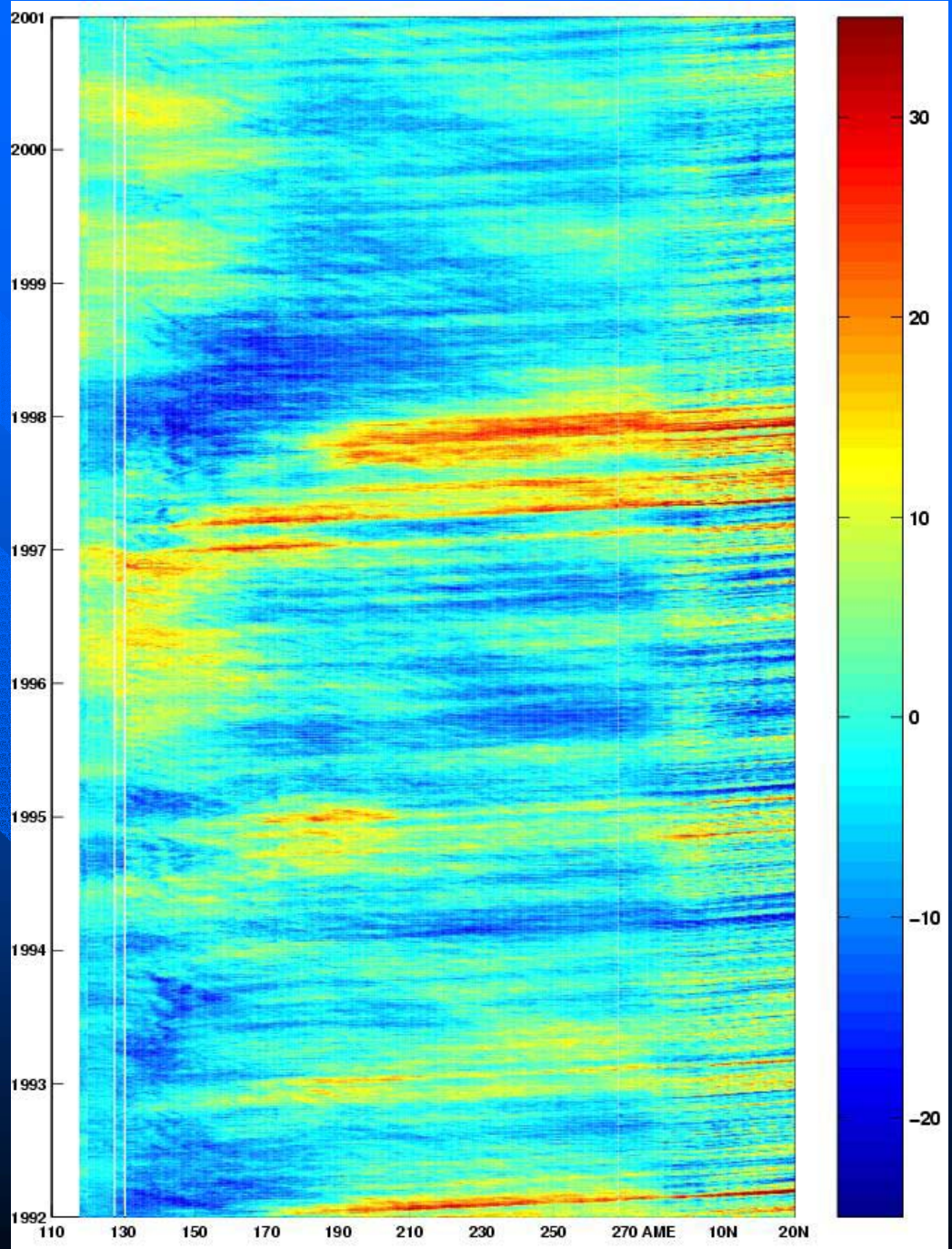
Surface heat fluxes



(a)



■ Sea surface height anomaly time series from 1/16° Pacific NLOM, first along the equator (starting in the western Pacific and propagating eastward until arrival at the Americas West Coast), and second along the coast to the 20°N.

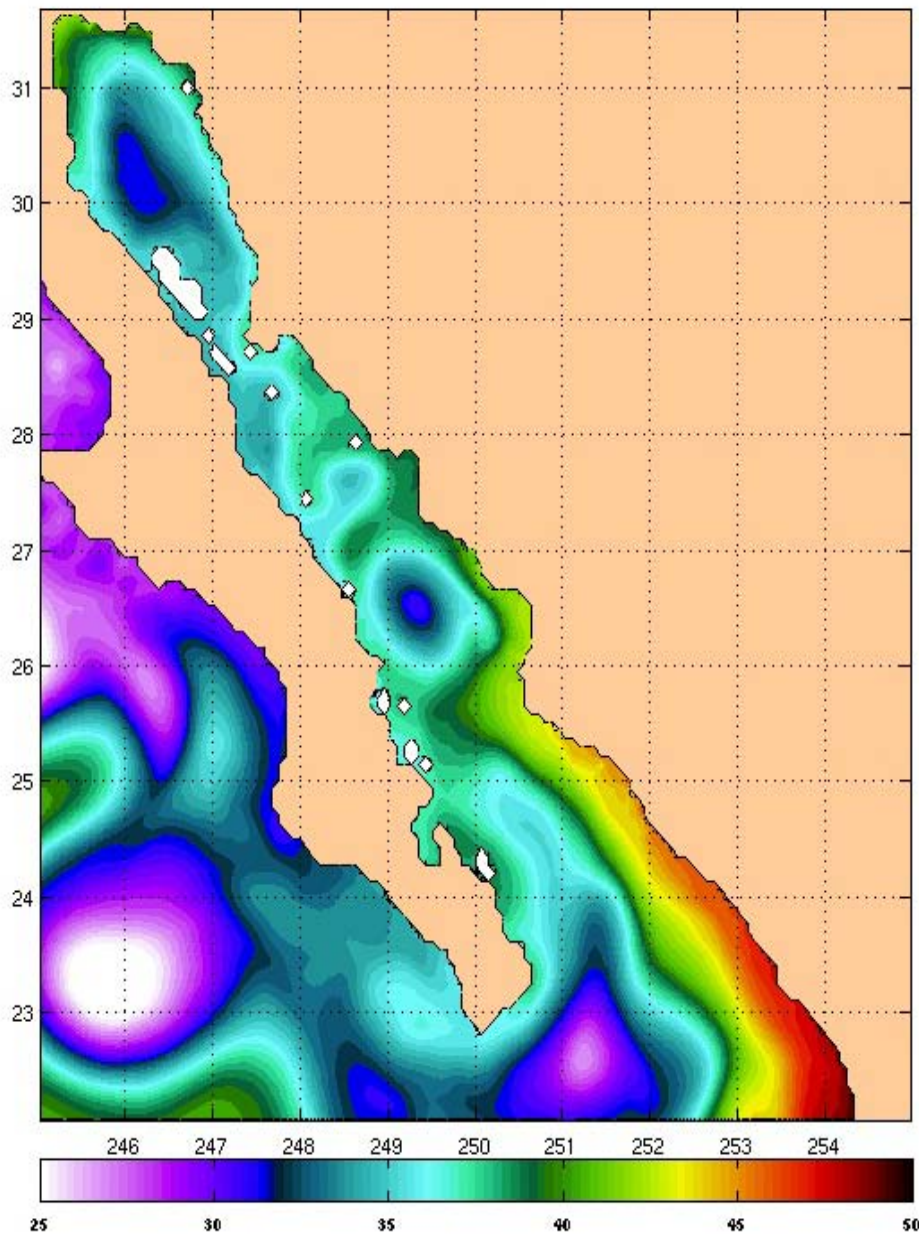


Summary

- The EPWP includes maximums and minimums of $\sim 4,000,000 \text{ km}^2$, and $\sim 30,000 \text{ km}^2$ during May and January, respectively and a mid-summer relative minimum of $\sim 2,300,000 \text{ km}^2$ during July. Those maximums and minimums are partially explained by the corresponding one month lagged maximums and minimums in the Surface heat fluxes.
- The extension of the EPWP has a strong interannual variability increasing (decreasing) during El Niño (La Niña) years. That is due to the interannual variability in the generation of Equatorial Pacific Kelvin waves.

Research in Progress

HYCOM-GLB-053 SSH and Currents for 2004-154-00



HYCOM-GLB-053 SSH and Currents for 2004-214-00

