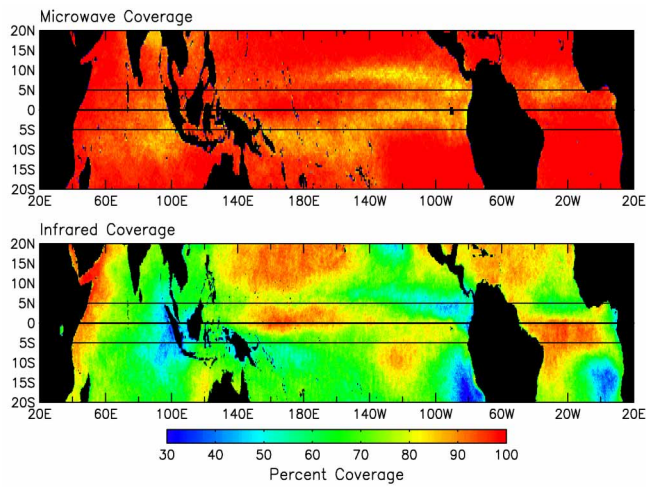
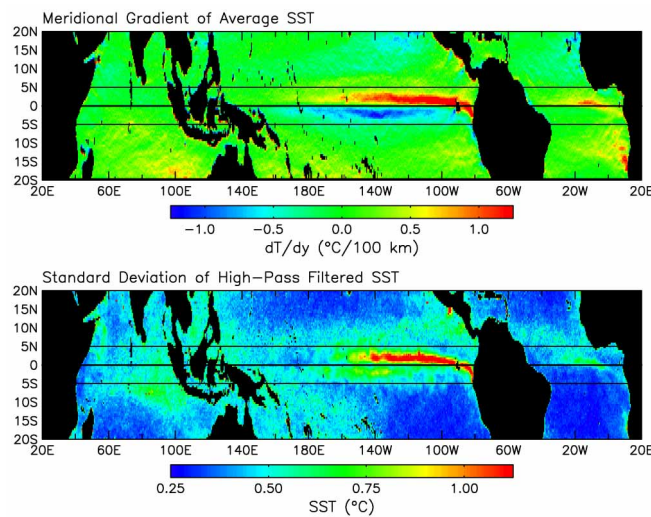


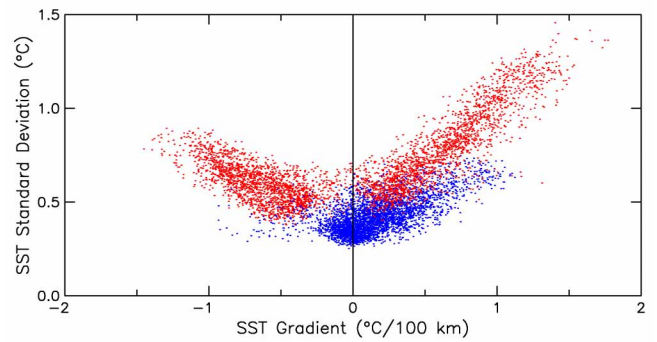
**Figure on Cover.** Sequential maps of sea surface temperature at 10-day intervals measured by the satellite Microwave Imager onboard the Tropical Rainfall Measuring Mission during two selected periods. Except in raining conditions, the atmosphere is nearly transparent at microwave frequencies. White areas represent missing data owing to rain contamination. The cusp-shaped features along the temperature fronts a few degrees north and south of the equator in the Pacific and a few degrees north of the equator in the Atlantic are signatures of tropical instability waves. These waves and associated vortices between the cusps develop from hydrodynamic instabilities of the equatorial current system and subsequently propagate westward with periods of about a month, wavelengths of about 1000 km and phase speeds of about  $0.5 \text{ m s}^{-1}$  and  $0.3 \text{ m s}^{-1}$  in the Pacific and Atlantic, respectively.



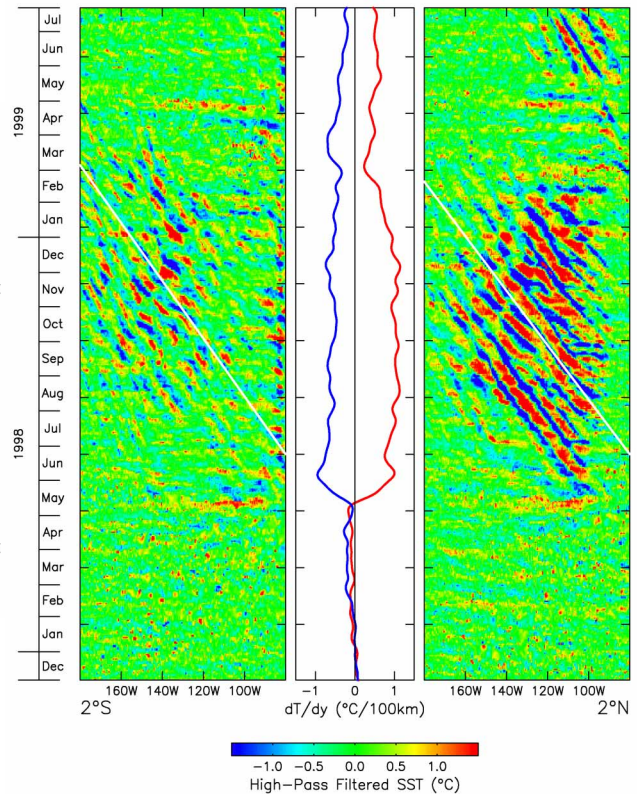
**Figure 1.** Percent coverage of SST measurements from the microwave TMI (upper panel) and the infrared AVHRR in 3-day composite-average maps during calendar year 1998.



**Figure 2.** The meridional gradient of average SST (upper) and the standard deviation of 50-day high-pass filtered SST (lower) during the TIW season June 1998 through February 1999.



**Figure 3.** Scatter plot comparison between 50-day high-pass filtered SST and  $dT/dy$  for the region  $110^{\circ}\text{W}$ - $160^{\circ}\text{W}$ ,  $5^{\circ}\text{S}$ - $5^{\circ}\text{N}$  in the Pacific (red dots) and the region  $0$ - $60^{\circ}\text{W}$ ,  $5^{\circ}\text{S}$ - $5^{\circ}\text{N}$  in the Atlantic (blue dots).



**Figure 4.** Time-longitude plots of 50-day high-pass filtered SST along  $2^{\circ}\text{S}$  (left) and  $2^{\circ}\text{N}$  (right). White lines represent phase speed estimates (see text). Time series in the middle panel are 20-day low-pass filtered meridional SST gradients averaged over the longitude range  $160^{\circ}\text{W}$ - $110^{\circ}\text{W}$  between  $3^{\circ}\text{N}$  and the equator (red curve) and between the equator and  $3^{\circ}\text{S}$  (blue curve).