



Rainfall and Wind Patterns Along the Equator During El Niño and La Niña Events in 2000-2014

David Halpern

Jet Propulsion Laboratory, Earth Sciences Section, Pasadena, United States (david.halpern@jpl.nasa.gov)

Four El Niño events and six La Niña events occurred from March 2000 – February 2014 in the Oceanic Niño Index for the Niño 3.4 region. In the west Pacific from 150°E-150°W the surface westward wind speed in El Niño was considerably smaller than in La Niña. At the upper troposphere (13-15 km), the eastward wind speed was larger in El Niño than in La Niña. Both wind patterns were consistent with conventional wisdom of an eastward or westward longitudinal shift of the surface zonal winds of the Walker Circulation during El Niño or La Niña. However, in the east Pacific from 150°W-90°W the surface westward wind speed in El Niño was larger than in La Niña, which was not consistent with a local wind-generated thermocline depth deeper in El Niño than in La Niña. The influence of central Pacific El Niños in 2000-2014, when the sea surface temperature anomaly (SSTA) was strongest in the central Pacific, compared to 1980-1999, when the El Niño SSTA was largest in the eastern Pacific, will be discussed. This paper will review the zonal wind observations, including those at 10-m and 14-km heights in the Atlantic Ocean, where increased vertical shear during El Niño would suppress the formation of hurricanes. This paper will also examine the movements of the longitudinal position in El Niño and La Niña of the sharp zonal gradient of rainfall, which normally occurs near 170°W. In March 2000 – February 2014 the average annual amounts of rainfall in the west and east Pacific were 1.7 and 0.4 mm/hr, respectively; each value was fairly uniform over a large longitudinal region. Data sources were 10-m height wind vectors recorded by ASCAT-on-MetOp-A and SeaWinds-on-QuikSCAT, wind vectors at many troposphere heights by MISR-on-Terra, and rainfall by TMI-on-TRMM.