

Decadal Variability of Tropical Pacific Temperature in Relation to Solar Cycles

Alexander Ruzmaikin [alexander.ruzmaikin@jpl.nasa.gov], Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California

Global response of the Earth's climate system to solar variability appears to be weak and more strong responses are expected from the Earth climate patterns. These large-scale spatial patterns are associated with the Earth's atmospheric and ocean dynamics. Examples of the patterns are the Northern and Southern Annular Oscillations and tropical El Niño. I will discuss how solar variability influences the tropical climate pattern on decadal time scale.

The 8-year long satellite temperature and water vapor data (2002-2010) from Atmospheric InfraRed Sounder (AIRS) and Atmospheric Microwave Sounding Unit (AMSU) on the Aqua satellite show temperature and water vapor trends in the troposphere and low stratosphere over the Niño 3.4 region of the Tropical Ocean in the most recent 11-year solar cycle. Linear discriminant analysis of more extended sea surface temperature (SST) data for five solar cycles (1950-2009) in this region demonstrates that the satellite trends reflect a typical decrease of the SST in the Niño 3.4 region in the declining phase of the solar cycle. The magnitude of the SST decrease depends on the solar cycle and ranges between 0.5K and 1.9K for the last five solar cycles. The mechanisms of solar forcing that might lead to the trends are discussed.