Geophysical Research Abstracts
Vol. 18, EGU2016-11771, 2016
EGU General Assembly 2016

The South Asian Monsoon Circulation in Moist Isentropic coordinates

Sabin Thazhe Purayil (1,2) and Olivier Pauluis (1,3)

(1) The Center for Prototype Climate Modeling, New York University, Abu Dhabi , (2) Center for Climate Change Research, Indian Institute of Tropical Meteorology, Pune, India, (3) Courant Institute of Mathematical Sciences, New York University, New York

The atmospheric circulation and thermodynamic structure during the South Asian Summer Monsoon season is analyzed in isentropic coordinates through the mass transport represented in terms of the potential temperature and equivalent potential temperature. This approach, originally developed to analyze the global meridional circulation, makes it possible to identify the thermodynamic properties of the inflow and outflow of different air mass. To understand the thermodynamic properties of air mass in south Asian monsoon region, we have used three diagnostics; a) the joint distribution of the mass transport as a function of dry and moist entropy, b) the vertical mass flux over the monsoon domain and c) the mass transport and isentropic thickness for different moist ventilation range of tropical atmosphere. The thermodynamic properties of the various air masses, such as the inflow of warm moist air in the boundary layer, upper tropospheric outflow, and midlatitude dry air intrusion are being systematically identified. The isentropic distribution of the vertical mass flux transport in terms of equivalent potential temperature is used to explain the characteristics of ascending and descending air parcels over the Indian subcontinent. Diagnosis based on the isentropic thickness reveals that the regional monsoon circulation and associated precipitation features can be systematically explained by this method. This technique is used to study the evolution of the monsoon flow in the seasonal scale. We used the data from AMIP-type simulations carried out with prescribed Sea Surface Temperature and sea ice for a 25 year period (1981-2005) from the GFDL High-resolution atmospheric model (HiRAM) with an average grid spacing of $\sim$25km over the globe.