Geophysical Research Abstracts
Vol. 14, EGU2012-1594-1, 2012
EGU General Assembly 2012

Cloud properties in the present-day tropical climate

C. Lacagnina and F. Selten
Royal Netherlands Meteorological Institute (KNMI), Netherlands (lacagnin@knmi.nl)

We estimate the dependence of the tropical cloud radiative forcing (CRF) and cloud amount upon mid-tropospheric pressure velocity (ω_{500}) and sea surface temperature (SST) and emphasize the deficiencies by using these two proxies separately as tools to sort cloud regimes. For this reason a bivariate approach has been used to systematically investigate marine cloud properties at different spatial and time scales in the present-day (1985 to 2001) tropical climate. During the 1997-1998 El Niño, the greatest regional change in CRF and cloud cover on average coincides with the greatest local change in circulation and SST. In addition, we find the stratiform low-clouds tend to reduce their cooling effect at the rate of approximately 1 $\mathrm{W/m^2}$ per percent of less cloudiness in the subsidence cold pools of the Pacific ocean. However, not all the temporal fluctuations in cloud properties are associated with ω_{500} and SST changes. An extension of the Bony et al. method is proposed using different environmental factors instead of ω_{500} as a proxy. Taking advantage of this diagnostic technique, various cloud-related variables have been explored with the aim of understanding and assessing the relative contribution of the regional meteorological conditions responsible for the interannual and seasonal variations. In this analysis framework, we quantify the contribution of El Niño-Southern Oscillation (ENSO) to the observed anomalies of tropical cloudiness and radiative balance at the top of the atmosphere, at the interannual time scale.