Geophysical Research Abstracts
Vol. 16, EGU2014-14414, 2014
EGU General Assembly 2014

Spatial Coherence of Tropical Rainfall

Ram Ratan (1,2), Venugopal V. (1,2), Jai Sukhatme (1,2), and Raghu Murtugudde (3)

(1) Center for Atmospheric and Oceanic Sciences, Indian Institue of Science, Bangalore, India (ratan@caos.iisc.ernet.in; venu@caos.iisc.ernet.in; jai@caos.iisc.ernet.in), (2) Divecha Centre for Climate Change, Indian Institue of Science, Bangalore, India , (3) Earth System Science Interdisciplinary Centre, University of Maryland, College Park, Maryland, USA (ragu@essic.umd.edu)

We characterise the spatial coherence of tropical rain and its wet spells from observations (TRMM) and assess if models (CMIP5) are able to reproduce the observed features. Based on 15 years (1998-2012) of TRMM 3B42 (V7) 1-degree, daily rainfall, we estimate the spatial decorrelation scale (e-folding distance) of rain at each location in the tropics. A ratio of zonal to meridional spatial scales clearly illustrates that while rain patterns tend to be anisotropic (ratio of 4) over tropical ocean regions (particularly over Pacific ITCZ); over land regions, rain tends to be mostly isotropic. This contrast between ocean and land appears to be reasonably well captured by CMIP5 models, although the anisotropy (ratio) over ocean is much higher than in observations. A very curious behaviour in observations is the presence of a coherent band of spatial decorrelation lengths straddling the equator, in the East Pacific, reminiscent of a double ITCZ that some models tend to simulate. A similar analysis of wet spells of different durations suggests that the decorrelation scale is largely independent of the duration of wet spell.