Geophysical Research Abstracts
Vol. 19, EGU2017-19627-1, 2017
EGU General Assembly 2017

Do sea surface temperature drive the climatological surface wind convergence in the tropical Atlantic

Moussa Diakhaté (1), Alban Lazar (2), Gaelle de Coëtlogon (3), and Amadou Thierno Gaye (1)

(1) LPAOSF, UCAD, Dakar, Senegal, (2) LOCEAN-IPSL,UPMC Sorbonne Université, Paris,France, (3) LATMOS-IPSL,UPMC Sorbonne Université, Paris,France

We present a climatological study of the tropical Atlantic surface wind convergence, in order to establish wether is constitutes a major drivers of the marine precipitations distributions in general, and particularly over the coastal parts of Brazilian and African monsoon rainfalls. We analyze the climatological monthly-mean surface wind convergence budget, as well as that of their month-to-month variations over the 2000-2009 decade. Our main tool is an atmosphere mixed layer model forced by atmospheric reanalyses; and observed satellite datasets. We articularly investigate the influence of sea surface temperature (SST), via comparison of its Laplacian with that of sea level pressure.

The convergence model is qualitatively very accurate for monthly means over the whole basin, with the notable exception of the core of the marine ITCZ, but generally overestimates the intensities. Results show that the positive and negative convergence signals are generally to the first order due at least qualitatively to sea level horizontal pressure gradient structures. Effect of advection of convergence or divergence may be as important however near the continents. Convergence and divergences moreover occur essentially within the marine atmospheric boundary layer (MABL), from about 850hPa to the sea surface where interactions with SST are expected to be the strongest. Our most remarkable results consists in the evidence of frequent tight correspondence between the Laplacian of MABL pressure, which explains principally the convergence distribution of the model, and the Laplacian of SST. This suggests the possibility of a local control of marine rainfall by the temperature distribution of underlying waters.