



Local interactions between Sea Surface Temperature and Winds in the Tropical Atlantic at intraseasonal timescales.

Moussa Diakhate (1), Alban Lazar (2), Gaelle de Coetlogon (3), and Amadou T. Gaye (1)

(1) Laboratoire de Physique de l'Atmosphère et de l'Océan - Siméon Fongang, Ecole Supérieure Polytechnique, Université Cheikh Anta Diop de Dakar, Senegal (moussa1.diakhate@ucad.edu.sn, +221338259364), (2) Laboratoire d'Océanographie et du Climat : Experimentation et approches numériques, Université Pierre et Marie Curie Paris VI, France, (3) Laboratoire Atmosphères, Milieux, Observations Spatiales, Université Pierre et Marie Curie Paris VI, France

In tropical regions, Sea Surface Temperature (SST), surface wind and precipitation exhibit several modes of co-variability at intraseasonal and annual timescales. Recently, McGauley et al. (2004), Back et Bretherton (2009) and de Coëtlogon et al. (2010) have shown important modes of SST influence on the surface wind. These relations are first presented by using satellite data at intraseasonal timescales in the tropical Atlantic.

Then, the mechanisms behind the SST and surface wind interaction at these timescales are investigated by examining the link between the sea level pressure gradient, which can be strongly linked with the SST gradient, and the wind. A mixed layer model skilfully reproduces the observed surface wind to determinate the wind balance, with a simple momentum budget.

Results show several regimes: a classical one, virtually geostrophic with strong wind far from the Equator; and a near-equatorial regime. In the latter, when the SST gradient is weak, the entrainment and the surface drag force become important and interfere with the SST influence. In the case of a strong near-equatorial SST gradient, the surface pressure gradient is decomposed into a component due to the pressure gradient within the marine atmospheric boundary layer (MABL), and a component due to the pressure gradient in the free troposphere. This analysis allows us to emphasize the zones where the MABL pressure gradient strongly dominates: the influence of the SST gradient is eventually investigated in these regions.