

A Regional Climate Mode Discovered in the North Atlantic: Dakar Niño/Niña

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The interannual variability of coastal sea surface temperature (SST) anomalies confined off Senegal is explored from a new viewpoint of the ocean-land-atmosphere interaction. The phenomenon may be classified into "coastal Niño/Niña" in the North Atlantic as discussed recently in the Northeastern Pacific and Southeastern Indian Oceans. The interannual variability of the regional mixed-layer temperature anomaly that evolves in boreal late fall and peaks in spring is associated with the alongshore wind anomaly, mixed-layer depth anomaly and cross-shore atmospheric pressure gradient anomaly, suggesting the existence of ocean-land-atmosphere coupled processes.

The coupled warm (cold) event is named Dakar Niño (Niña). The oceanic aspect of the Dakar Niño (Niña) may be basically explained by anomalous warming (cooling) of the anomalously thin (thick) mixed-layer, which absorbs shortwave surface heat flux. In the case of Dakar Niña, however, enhancement of the entrainment at the bottom of the mixed-layer is not negligible.

The atmospheric aspect is a warming (cooling) of the lower atmosphere, in response to the warming (cooling) of the upper ocean. Locally, this modifies the cross-shore pressure gradient and helps to maintain weaker (stronger) than normal wind along the coast. This can be viewed as a "coastal Bjerknes feedback".