Changes in tropical Atlantic climate variability and its teleconnections.

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The tropical Atlantic variability is characterized by a cold tongue mode and a meridional gradient mode. Also, remote patterns of variability such as ENSO and the NAO impact the tropical Atlantic climate. Recent studies indicate that the cold tongue mode can affect the NAO, with a lead time of 4 months.

We investigate tropical Atlantic variability with the coupled *SPEEDO* model. This model consists of an atmospheric primitive equation model with simplified parameterizations (Speedy) and a suite of ocean models ranging from a simple slab mixed layer, a slab mixed layer with Ekman dynamics and wind mixing, to the MICOM isopycnic primitive equation model. Speedy is a global atmosphere model, but MICOM can be set up for any basin at any resolution.

The mean state and natural variability is simulated realistically. Future work includes:
a) Study mechanisms of natural variability in the tropical Atlantic
b) Determine teleconnections from tropical Atlantic to Western Europe
c) Characterize modulation of the tropical Atlantic climate (mean state, annual cycle, and low-frequency variability) due to CO2 rise in the atmosphere
d) Determine changes in impact of tropical Atlantic on remote regions (with emphasis on the NAO) due to CO2 rise in the atmosphere

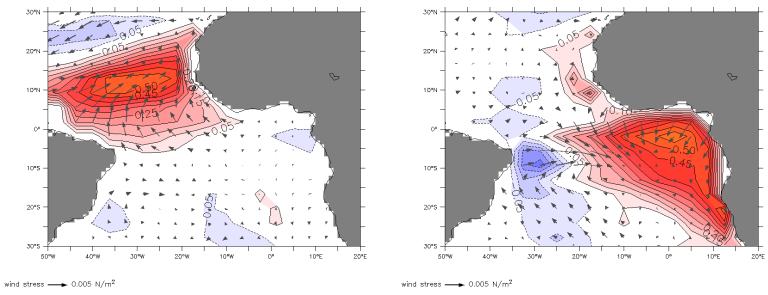

Figure: First and second rotated EOF of SST in the fully coupled SPEEDO model (Speedy T30 atmosphere coupled to 1-degree MICOM) and associated wind stresses. In accordance with observations, the first REOF dominates in spring, the second in late summer.

Hazeleger and Haarsma. Sensitivity of tropical Atlantic climate to vertical mixing in a coupled model. *Climate Dynamics*, submitted
Haarsma and Hazeleger. Teleconnections from tropical Atlantic to the Northern Hemisphere. *In preparation.*
Hazeleger, Haarsma and Breugem. Mechanisms of natural variability in the tropical Atlantic in a coupled model. *In preparation.*