



## **On the Wind-Mixed layer-SST modes in the tropical Atlantic**

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The Atlantic meridional mode, the dominant climate variability in the tropical Atlantic, is associated with a cross-equatorial sea surface temperature (SST) anomaly gradient. This mode is thought to be destabilized owing to the thermodynamic coupling between the wind speed, evaporation, and SST (WES feedback). Based on eigenanalyses of a simple ocean-atmosphere coupled model, it is shown that two additional air-sea coupled feedback, which contribute to a cross-equatorial SST anomaly gradient, exist in the tropical Atlantic when oceanic mixed layer depth (MLD) variations are taken into account. It is found that those feedback processes are as strong as the canonical WES feedback in our simple model framework. In the presence of damping effects, they exist either as a weakly unstable mode or a least damped mode like the WES feedback. The SST and MLD structures in the simple model bear a resemblance to those of observed Atlantic meridional modes.