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Understanding the seasonality of interannual ocean-atmosphere coupling in the equatorial Atlantic

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The interannual variability of the Atlantic Niño is presumably governed by ocean dynamics; however, the effects of atmospheric diabetic heating that constitutes an important component of the prevailing Bjerknes theory is poorly understood. Here we investigate the relative significance of the oceanic and atmospheric components of the Bjerknes mechanism for the interannual seasonality, using satellite observations of precipitation as a proxy for diabetic heating and thermocline data. We find that the seasonality is strongly related to diabetic heating fluctuations, associated with the seasonal migrations of the inter-tropical convergence zone, which explains the Atlantic Niño peaks in June and November. Precipitation leads oceanic variability suggesting that diabetic heating plays a leading role and ocean dynamics is of secondary importance for the Atlantic Niño. These findings are inconsistent with the Pacific El Niño-3 region where ocean dynamics drives the interannual precipitation variability as expected from the Bjerknes theory.