



On the seasonal cycle of the Atlantic North Equatorial Undercurrent

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The North Equatorial Undercurrent (NEUC) is part of the complex current system in the tropical Atlantic which takes part in the wind-driven equatorial gyre circulation, the shallow subtropical and tropical overturning cells and in the basin-wide Atlantic meridional overturning circulation. Although its core velocity is low (0.1ms⁻¹ to 0.3 ms⁻¹) it has been suggested to act as an important oxygen supply route towards the oxygen minimum zone in the Eastern Tropical North Atlantic (ETNA). Estimates of the mean NEUC strength based on shipboard observations are uncertain due to the presence of energetic tropical instability waves. Consequently, the seasonal cycle of the NEUC has not been estimated from observations yet. Here, the annual variability of the NEUC and its impact onto oxygen levels in the ETNA is investigated based on a unique data set of 21 ship sections and mooring time series (Dec 2012- Jun 2014) along 23°W as well as experiments with a shallow water model. First analyses indicate a higher transport in boreal winter and summer. The shallow water model is used to simulate the wind-forced seasonal cycle of the NEUC and investigate the role of resonant equatorial basin modes for its structure. Furthermore, the relationship between the seasonal cycle of the NEUC and oxygen variability at the mooring locations at 4.5°N and 5°N, 23°W is investigated.