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Seasonal mixed layer heat budget in coastal waters off Angola

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The Angolan shelf system represents a highly productive ecosystem that exhibits pronounced seasonal variability. Productivity peaks in austral winter when seasonally prevailing upwelling favorable winds are weakest. Thus, other processes than local wind-driven upwelling contribute to the near-coastal cooling and nutrient supply during this season. Possible processes that lead to changes of the mixed-layer heat content does not only include local mechanism but also the passage of remotely forced coastally trapped waves. Understanding the driving mechanism of changes in the mixed-layer heat content that may be locally or remotely forced are vital for understanding of upward nutrient supply and biological productivity off Angola. Here, we investigate the seasonal mixed layer heat budget by analyzing atmospheric and oceanic causes for heat content variability. We calculate monthly estimates of surface heat fluxes, horizontal advection from near-surface velocities, horizontal eddy advection, and vertical entrainment. Additionally, diapycnal heat fluxes at the mixed-layer base are determined from shipboard and glider microstructure data. The results are discussed in reference to the variability of the eastern boundary circulation, surface heat fluxes and wind forcing.