Changes in heat content and mixed layer depth in the Coral Sea based on Argo observations

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The mixed layer plays a crucial role in air-sea interactions through the flux and storage of heat, CO2 and momentum. The seasonal and long-term variability of the mixed layer depth (MLD) and the ocean heat content (OHC) within the Coral Sea is investigated using Argo conductivity-temperature-depth (CTD) profiles. A distinct seasonality in the mixed layer depth was found throughout the Coral Sea, but was generally more pronounced in higher latitudes as a result of greater seasonality in sea surface temperature (SST) and wind stress. Austral winter MLDs, which tend to be much deeper than summer MLDs throughout the Coral Sea, display a shallowing trend over the last two decades, whereas the average summer MLD remains relatively constant. The trend towards a shallower MLD could have dire consequences for the Great Barrier Reef as SST is expected to increase more rapidly within a shallow mixed layer, thus likely resulting in more severe and more frequent coral bleaching events. However, a general trend towards cooler SSTs and lower OHC has been noted over the last seven years. Further CTD profiling is required throughout the entire Coral Sea in order to accurately determine the long-term trends in ocean heat content and the mixed layer depth.

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