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Modeling the development of high turbidity in Torres Strait marine ecosystem

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A model of ocean circulation and sediment movement has been developed for the Torres Strait region, with a view to better understand the significant dieback of sea-grasses in the northern parts. The most recent atmospheric and oceanographic reanalysis products have been used to force the hydrodynamics, which provide a transport framework for an embedded model dealing with fine sediment movements. This model has been calibrated against available data, including temperature and salinity profiles, tidal predictions, long term tide gauge records, and suspended sediment concentrations.

The resulting 5-year simulation provides time series for investigating the seasonal variability of the circulation. Results reveal that seasonal currents driven by winds are typically around 10% of the tidal current magnitude. Trade winds drive a westward flow through strait for more than nine months of the year, resulting in an annual net inflow into the Gulf of Carpentaria. Fine sediments tend to accumulate to the west of Torres Strait during the trades, but then are resuspended during the monsoon and transported back into the strait where they settle. This mechanism is responsible for observed cycle in the strait of increasing turbidity during the monsoon decreasing turbidity during the trades.

Future work will focus on estimating the bottom light reduction due to the presence of suspended sediment in northern Torres Strait, so as to assess the potential impact on seagrass health.