

Modeling the Impact of Climate Change on the Australian Southeast Seabed

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The Australian seabed is influenced by extreme weather conditions of various types: cyclones, high tidal ranges, offshore currents and storm waves. Over the past two centuries substantial progress in our understanding of the seabed and environmental conditions has been made by studies of seabed sedimentology, hydrodynamics, and habitat mapping. As part of the CSIRO Wealth from Oceans Flagship programme the Predictive Geoscience team are involved in a new five year study to investigate and predict the effect of possible climate change scenarios on the seabed over the next 50 years.

As an initial phase of this project we have taken the southeast region of the Australian seabed as our study area. The seabed responses to current climate, and future possible climatic conditions into the next 50 years have been simulated for the first time by a state-of-the-art numerical model, Sedsim. It was found that:

- the contribution of river carried sediment (redistributed by marine processes) to the region's seabed, even with the wettest predicted climate change, is limited. In general the fluvial sediment in the southeast region can not keep pace with the action of strong marine forces, such as waves and currents. Therefore, most of the seabed suffers from erosion, due to lack of sediment to distribute. This situation would get worse if the local climate swings towards the high energy side;
- the general high wave energy, significant tidal currents, and frequent surges of wind-driven currents make the local seabed highly mobile and sensitive to hydrodynamic change;
- the change of turbidite activity between different climate scenarios is insignificant in both the number of submarine slope failures and the affected areas as is the seabed median grain size.