

O41.1**The influence of estuarine geomorphology and tidal wetlands on hydrodynamic changes associated with sea-level rise: examples from estuaries of SE Australia.**

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Abstract

Examining the effects of sea-level rise (SLR) on estuarine hydrodynamics and ecosystem services provided by estuarine wetlands is of importance for coastal management and general process understanding of estuarine-wetland systems. Estuarine hydrodynamics and tidal wetland morphology are interrelated, however, current approaches of assessing SLR effects typically consider estuarine hydrodynamics and estuarine wetlands independently.

This study explores the inter-relationships between SLR, estuarine hydrodynamics and tidal wetlands by using empirical observations of tidal dynamics and wetland inundation regime, and hydrodynamic modelling of SLR. The analysis focussed on the “wave –dominated” coastline of SE Australia which includes wetlands within estuaries at a range of infilling stages. Results of hydrodynamic modelling of SLR for several microtidal estuaries suggests that changes in estuarine hydrodynamics are mainly controlled by the geomorphology and degree of estuarine infill. For example, the modelling indicated a doubling of tidal range in an immature estuary, while tidal range remained stable in mature estuaries with extensive wetlands. Furthermore, analysis of tidal observations showed that estuarine hydrodynamics are influenced by the presence of mangroves and salt marsh along estuarine banks, indicating changing wetland morphology should be taken into account when modelling SLR in estuaries. This study confirms that integrating approaches are required to study the effects of SLR on estuarine hydrodynamics and tidal wetlands, which should be considered simultaneously to accurately incorporate the links between estuarine geomorphology, sedimentary infilling and tidal wetlands.

Improved understanding of the estuarine-wetland system will support managing estuaries and tidal wetlands more effectively because important inter-relationships can be considered in coastal management and SLR planning. In addition, comparison of SLR modelling in different estuaries presented in this study may enable first-pass estimates of how hydrodynamics change in certain estuarine-wetland settings.

Keywords

estuary, sea-level rise, geomorphology, tidal wetlands