

Title: Climate Change and the Coastal Zone: Science, Uncertainties and Risks

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#### Abstract

Australia's coastal zone is arguably one of the most vulnerable sectors to the impacts of climate change. What does the latest climate science say about the risks that our coasts may face from climate change this century and beyond? The IPCC Fourth Assessment Report, published last year, provides an authoritative account of the state of climate change science. This science is advancing rapidly, however, and there have been important developments since the IPCC report, many of them of direct relevance for the coastal zone. For example, global mean temperature and sea-level rise are tracking at or near the upper limits of the IPCC projections, as are the emissions of carbon dioxide from human activities. Recent research also points to possible instabilities in the large polar ice sheets in Greenland and Antarctica, which could increase the rate at which sea level rises the rest of the this century and beyond. A sea-level rise of between 0.5 and 1.0 m by 2100 is now within the realm of possibility. There is also evidence that the natural carbon sinks – the uptake of carbon dioxide from the atmosphere by oceans and land – can no longer keep pace with the increasing human emissions, leaving a larger fraction of our emissions in the atmosphere. Although the reality of climate change and its human causes are no longer questioned within the credible scientific community, many uncertainties remain about the magnitude and rate of climate change that we will experience in the coming decades. Nearly all of these uncertainties lie at the upper end of the projections, suggesting that we have underestimated how severe climate change will be. The latest scientific research, even with the considerable uncertainties surrounding it, emphasises the risks that Australian, and global, society faces if rapid and effective mitigation is not undertaken.