

SEA LEVEL RISE AND COASTAL INUNDATION

KATHLEEN L. MCINNES

Centre for Australian Weather and Climate Research, CSIRO

Sea level rise as a consequence of increased anthropogenic greenhouse gases in the atmosphere is one of the more confident predictions arising from climate science. Sea level rise occurs as a result of contributions from a number of sources, including ocean thermal expansion, the addition of melt water from the world's glaciers and the ice sheets of Greenland and Antarctica. Recent progress on understanding the contributions to the observed sea level rise over the twentieth century will help to narrow the uncertainty around future sea level rise projections although significant uncertainties will remain due to uncertainties around the response of the ice sheets to enhanced warming. The magnitude and rate of sea level rise will not be uniform across the globe but will vary due to factors such as changes in large scale ocean and atmospheric conditions and changes in the gravitational fields arising from the melting of land-based ice.

Rising sea level is a significant issue for coastal populations. In Australia, where around 85% of the

Australia's population resides, about 6% of Australian addresses are situated below 5 m elevation and within 3 km of the coast. In view of this potential exposure to sea level rise impacts, there has been much effort in recent years to identify particularly exposed areas and quantify the impacts of sea level rise. A consequence of higher global mean sea levels will be an increase in the frequency of extreme coastal high waters that can cause inundation and erosion of coastal land. Extreme coastal high waters arise from a range of processes that include tides and weather-driven storm surges and high waves. Climate change may also bring about changes to the severe weather events that cause hazardous storm surges and waves although these changes will be regionally specific. This talk will present an overview of observed sea level rise and its causes. It will also describe recent efforts to quantify the changes to the risk of extreme sea level inundation from sea level rise and changes in weather conditions.