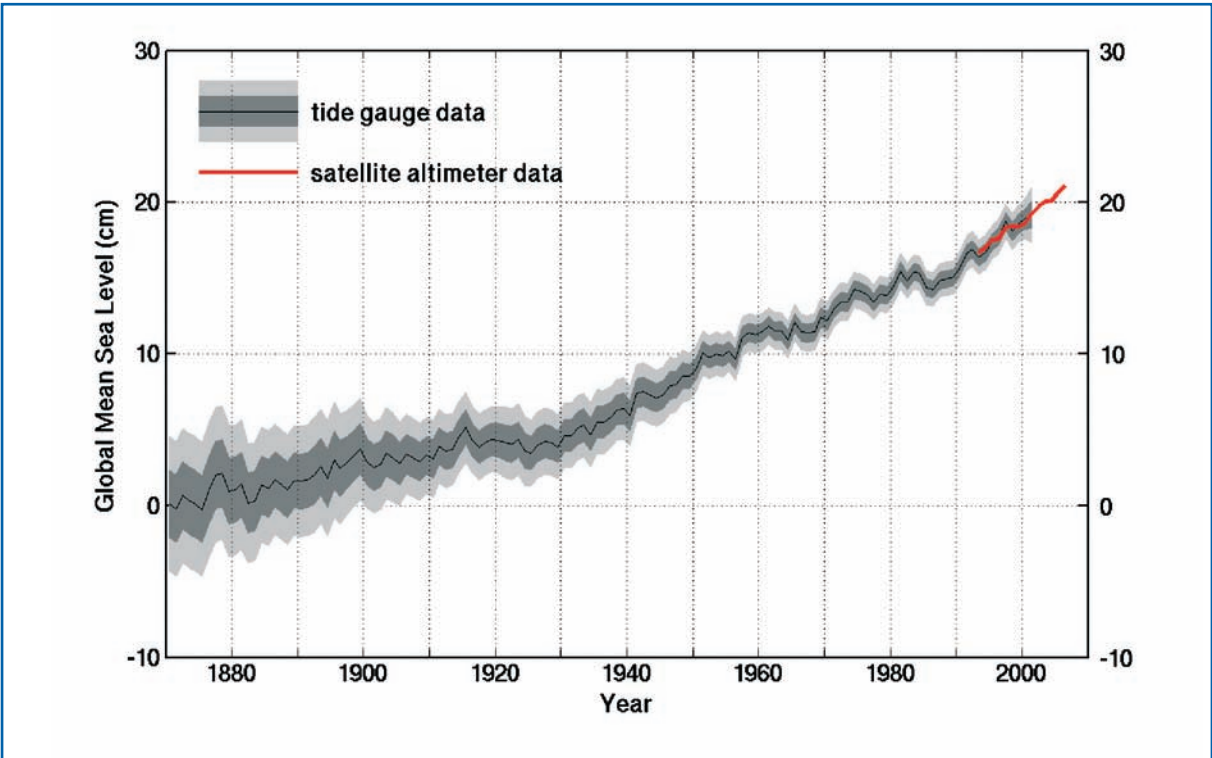


Improving projections of sea-level rise and variability – A World Climate Research Programme Workshop in support of the Global Earth Observation System of Systems (GEOSS) 10-Year Implementation Plan

Description

The coastal zone has changed profoundly during the 20th century. In 1990, 23 percent of the world's population (or 1.2 billion people) lived both within a 100 km distance and 100 m elevation of the coast at densities about three times higher than the global average. By 2010, 20 out of 30 mega-cities will be on the coast, with many low-lying locations threatened by sea-level rise. With coastal development continuing at a rapid pace, society is becoming increasingly vulnerable to sea-level rise and variability -as Hurricane Katrina recently demonstrated in New Orleans. Rising sea levels will contribute to increased storm surges and flooding, even if hurricane intensities do not increase in response to ocean warming. Rising sea levels will also contribute to the erosion of the world's sandy beaches, 70 percent of which have been retreating over the past century. Low-lying islands are also vulnerable to sea-level rise.



Global averaged sea levels from 1870 to 2006 as inferred from tide-gauge data (black line, with 66% and 95% confidence limits given in dark and light shading) and satellite altimeter data (red line).

An improved understanding of sea-level rise and variability will help reduce the uncertainties associated with sea-level rise projections, thus contributing to more effective coastal planning and management. Adaptation measures, including enhanced building codes, restrictions on where to build, and developing infrastructures better able to cope with flooding, should help to minimize the potential losses.

Since the beginning of high-accuracy satellite altimetry in the early 1990s, global mean sea-level has been observed by both tide gauges and altimeters to be rising at a rate of just above 3 mm/year, compared to a rate of less than 2 mm/year from tide gauges over the previous century. About half of the sea-level rise during the first decade of the altimeter record can be attributed to thermal expansion due to a warming of the oceans; the other major contributions include the combined effects of melting glaciers and ice sheets. Changes in the storage of water on land (such as the depletion of aquifers and increases in dams and reservoirs) remain very uncertain.

Added Value

In support of the Global Earth Observation System of Systems (GEOSS) 10-Year Implementation Plan, the World Climate Research Programme (WCRP) organized the Workshop on Understanding Sea-level Rise and Variability to bring together all relevant scientific expertise with a view towards identifying the uncertainties associated with past and future sea-level rise and variability, as well as the research and observational activities needed for narrowing these uncertainties. The Workshop develop international and interdisciplinary scientific consensus for those observational requirements needed to address sea-level rise and its variability.

Relevance to GEO

Sea-level rise is a high impact aspect of climate change and it is directly relevant to the Disasters, Health, Climate, Water, Weather, Ecosystems and Biodiversity Societal Benefit Areas.

Understanding of many factors is required to narrow uncertainties of projections and the impacts of sea-level rise. International collaboration on global observations across a range of disciplines is an essential element of improving projections of sea-level rise.

Participants

163 scientists from 29 countries and representatives of GCOS (and GOOS, GLOSS and OOPC), GGOS and space agencies attended the Workshop on Understanding Sea-level Rise and Variability, hosted by the Intergovernmental Oceanographic Commission of UNESCO in Paris June 6-9, 2006.

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Current Status and Next Steps

The Workshop clearly spelt out the satellite and in situ observational priorities. Urgent action is required to ensure that there are no gaps in satellite observational programs. Action is also required on implementation of the in situ observational priorities. The conference statement is available at

http://wcrp.wmo.int/AP_SeaLevel.html.