Sea Level Futures Conference

2 – 4 July 2018
Liverpool, UK

National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

EuroGOOS
European Global Ocean Observing System

esa

IOC

BODC British Oceanographic Data Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

The Challenger Society for Marine Science

Sea Level Futures Conference Statement

Over 100 experts from 65 organisations around the world attended the Sea Level Futures Conference, celebrating the 85th anniversary of the Permanent Service for Mean Sea Level (PSMSL), in Liverpool, UK (2-4 July 2018). Participants discussed the current status of our knowledge of sea level science, covering key aspects of sea level change, and outlined the requirements for new and augmented research, technical development and observations to improve our understanding of global, regional and coastal sea level rise and variability. Special emphasis was given to current sea level observations, synthesis of available data and discussion of future novel observational techniques in coastal areas.

Global Sea Level is one of seven key indicators defined by the World Meteorological Organisation (WMO) to describe the changing climate. The importance of, as a minimum, maintaining existing sea level observing systems to preserve global sea level as one of these indicators cannot be understated. Participants recognised that sea level changes in coastal areas, with rapidly growing urban populations and associated infrastructure, are a major challenge for coastal societies due to sea level rise, storm surges and flood risk. The availability of coastal observations, scientific analysis and interpretation of the complex measurements in the coastal zone, and future projections of sea level rise in a warming climate are crucial for impact assessment, risk management, adaptation strategy and long-term decision making in coastal areas.

In summary, current sea level science provides clear evidence that sea level is rising and this is already impacting vulnerable coastal areas. Addressing these challenges in a warming climate requires integrated sustainable and continued observations, data products and advanced modelling capability Conference participants recognised the need for close collaboration between scientists from different disciplines and the broad stakeholder community to develop plans for responding to sea level change affecting the coastal zone and to implement adequate adaptation and mitigation measures.

Conference recommendations:

- Commitment to sustained and systematic global and coastal sea level measurements, including the different components of sea level change (cryosphere, ocean thermal expansion and salinity effects, land hydrology, solid earth effects and associated fingerprints of past and ongoing land ice melt) in order to understand the observed sea level changes. This must include a commitment to the Global Ocean Observing System (GOOS), Global Sea Level Observing System (GLOSS), Global Geodetic Observing System (GGOS) and others.
- Implementation of comprehensive observations in coastal areas (including measurement of sea level, vertical land movement, waves, sediment transport), with special emphasis on monitoring changes in coastal regions worldwide where a variety of climate and non-climate related processes interact (e.g. deltas, cities, small island states).
- Implementation of a multi-purpose approach to tide gauge networks, focusing on the requirements of all users (e.g. scientists, port authorities, coastal engineers and hazard forecasters), to ensure the sustainability of the networks. This is particularly important when establishing stations in developing economies. Tide gauge networks are essential for improving our knowledge of coastal sea level variability, which is one of the main gaps in sea level science.
- Development of new technologies for sea level observations on both coastal and global scales, for example, low cost tide gauges and low cost Global Navigation Satellite System (GNSS) units fitted to buoys/floating platforms, GNSS-reflectometry, coastal altimetry and wide-swath altimetry.
- Broad-scale assessment of uplift/subsidence, especially human-induced subsidence, to guide analysis of local sea level change. The international community should take steps to provide all available information about the uplift/subsidence in coastal areas, e.g. GNSS or Interferometric Synthetic-Aperture Radar (InSAR). This work should involve the use of GNSS at all tide gauge stations (as per GLOSS standards) and the maintenance of an accurate International Terrestrial Reference Frame (ITRF).

- Commitment to extend the historical sea level record through data rescue, digitisation and the accurate detailed integration of historic tide gauge data into international repositories to improve wide spatial and temporal gaps in the climate record and validate process-understanding and climate models.
- Development of improved coastal sea level projections, providing up-to-date global mean and regional projections, and accounting for the additional key processes at work in the coastal zone (e.g. local sea level rise, tides, wave run-up, storm surges, river discharge etc.). Cooperation between the scientific community, stakeholders, policy- and decision-makers will ensure that sea level data are accessible and are used correctly and appropriately to facilitate adaptation and mitigation for vulnerable coastal areas (e.g. cities, deltas, small islands etc.).