Monitoring the evolution of coastal zones under various forcing factors using space-based observing systems

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About 10% of the global population is currently livingalong the coasts. In many regions, populations are exposed to a variety of natural hazards (e.g., extreme weather such as damaging cyclones and their associated storm surges), as well as to the effects of global climate change (e.g., sea level rise), and to the impacts of human activities (e.g., urbanization). Today, our knowledge regarding these processes still remains limited by the lack of observations. For example, theproportion of the world's shorelines currently affected by erosion still remains uncertain. This lack of information not only prevents us from addressing important scientific questions, but it has also practical implications for coastal managers in charge ofmanagingcoastal risks and adapting to climate change.

In this poster, we present the outcome of the International Space Science Institute (ISSI) Forum on "Monitoring the evolution of coastal zones under various forcing factors using space-based observing systems" (http://www.issibern.ch/forum/costzoneevo/) held at ISSI, Bern, Switzerland on 11-12 October 2016.

This posterfirst reviews the scientific questions with high societal significance, where improved remote sensing observations are needed: this includes (1) separating the contributions of climate-induced sea-level changes and vertical ground motions (uplift and subsidence) in relative (coastal) sea-level changes; (2) understanding the roles, for each different coastal geomorphological setting, of human interventions, extreme events, seasonal interannual and multidecadal variability and trends in driving coastal evolution. In a second step, we reviewtheobservations currently available or needed to address these questions. Overall, we show that since the publication of the latest IGOS report on coastal zone observational requirements (2006), the availability of high resolution topographic data, hydrometeorological reanalysis (e.g., wind, waves, pressures) and historical surge databases have greatly improved the ability to understand and model coastal flooding. In addition, there is a continued need for tide gauges collocated with GNSS and other geodetic data. However, research is needed in many other topics such as the retrieval of changing topographic and bathymetric features at the required accuracy and frequency, and in processing radar altimetry measurements in the coastal ocean. Concerningocean color, global analyses are expected to provide useful information (e.g. on suspended materials).

Besides the improvements of the current observing infrastructure, there is a need of strengthening the exchanges between different scientists and stakeholders concerned with coastal risks and climate change. Today, information on the evolution of coastal zones is managed at local to regional scales by coastal observatories. These entitieslinkscienceinformation to operational observations (including space-based)and coastal stakeholders. We argue that establishing links between global providers of Earth Observation data (such as space agencies), and the emerging networks of coastal observatories, can be beneficial to both coastal science and the management of coastal risks.