International Conference
Analysis and Management of Changing Risks for Natural Hazards
18-19 November 2014 l Padua, Italy

EO1

Use of global terrain data for future sea-level rise scenarios - A comparison

Virginia Herrera Cruz, Nora Meyer Zu Erpen, Stefan Mühlbauer, Wolfgang Koppe
Airbus Defence and Space, Geo-Intelligence

Corresponding author details:
Virginia Herrera Cruz, Airbus Defence and Space | Infoterra GmbH, Claude-Dornier Str., 88090 Immenstaad, Germany, Tel: +49 7545 8 3382, virginia.herrera@astrium.eads.net

Keywords
Sea-level rise, SRTM, ASTER, WorldDEM™, modelling, comparison, IncREO

Abstract

Sea-level rise (SLR) is a global phenomenon that affects natural and human systems and whose influence is expected to continue and intensify in the future. Effects of SLR can include inundation, saltwater intrusion or erosion and other geomorphological changes as well as changes in the daily and seasonal water cycle dynamics with intensification of tidal floods, storm surges or cyclones. The processes behind depend on a complex interaction of factors in space and time. SLR modelling is important for a better understanding of these processes and for more efficiently supporting decision-makers on the global, regional or local scale.

However, the results of SLR modelling are related to inherent uncertainties which include unpredictable natural processes on Earth, and to the data and models used. Among the input data needed to model inundation impact of SLR, the quality of the terrain data used has a key role in reducing or increasing the uncertainties related to these data. In this sense, not only the accuracy and resolution of the terrain data but also its ability for describing the geomorphology of the area of interest plays an important role.

For global studies with homogeneous data the choices of Digital elevation Models (DEM) are reduced to the nearly global USGS programs SRTM and ASTER (GDEM2) with 90 and 30 m spatial resolution respectively. With the upcoming WorldDEM™ new possibilities arise for such studies (12m spatial resolution).

Here, in IncREO, the WorldDEM™ was compared with SRTM and ASTER with respect to the datasets suitability to determine areas susceptibility to inundation for various scenarios of different degrees of sea level rise. On a quantitative level, flooded areas and assets affected per scenario were modelled and compared. Regarding the qualitative aspect, a visual analysis of the water distribution per use case was done. Further to the DEM data including their technical specifications, auxiliary interpretation material such as optical high resolution data and land cover maps were used for explaining the results and drawing conclusions.