



The development of a new Global Digital Elevation Model, ACE2

P.A.M. Berry (1), R.G. Smith (1), and J. Benveniste (2)

(1) De Montfort University, EAPRS Lab, Faculty of Technology, Leicester, United Kingdom (pamb@dmu.ac.uk, 0044 116 2078159), (2) European Space Agency, Earth Observation Applications Department, Via Galileo Galilei, I-00044, Frascati (RM), Italy

The Shuttle Radar Topographic Mission has provided a unique near-global database of heights at 3" resolution, significantly increasing the height information over much of the Earth's land surface. However, validation of these data is difficult, and has primarily been performed in the form of regionally based comparisons with Digital Elevation Models not available in the public domain. These comparisons have shown both areas of good agreement, and substantial regional differences. To move forward, a global independent assessment is required.

Multi-mission satellite radar altimetry provides this capability. By retracking the complex echoes returned from the Earth's land surfaces, over 100 million height measurements have been derived from the ERS1/2, EnviSat, Jason-1 and TOPEX altimeter echoes. A global comparison with the SRTM heights revealed a very variable level of agreement between the two datasets. After detailed analysis, it was determined that the altimeter derived heights could be used to assess, correct and, where necessary, replace the SRTM heights to create a new and more accurate GDEM, ACE2. Among the generic changes in this ESA funded development is the removal of rain forest canopy, and the replacement of SRTM inland water heights with more accurate altimeter derived values.

Over 11 billion SRTM height pixels have been changed leading to the generation of the ACE2 dataset at 3", 30" and 5' resolutions. In addition to the heights, auxiliary matrices containing information about the data source, the estimated vertical accuracy and the confidence level associated with these accuracy estimates are provided. ACE2 is made freely available to the global research community.