ACE2 Regional Enhancement of the SRTM using Satellite Radar Altimetry methodology

R.G. Smith and P.A.M Berry

De Montfort University, EAPRS Lab, Leicester, United Kingdom (rgs@dmu.ac.uk)

The new ACE2 Global Digital Elevation Model (GDEM) provides the most accurate GDEM to date. ACE2 has been created by synergistically merging the SRTM dataset with 67 million datapoints derived from multi-mission satellite Altimeter echoes leading to the alteration of over 11 billion heights. The two datasets demonstrate very good agreement over much of the Earth's land surface (within the SRTM latitudinal limits), with 75% lying within the SRTM's stated accuracy of ±16m. However distinct areas of disagreement are clearly visible and these areas correspond to real topographic features. The major geographically correlated differences are due to Rainforests such as the Amazon basin where large vertical discrepancies of up to 50m are apparent. These differences have been found to correlate well with the height of the rainforest canopy, an expected finding since the SRTM heights relate to the upper canopy, whereas the Altimeter, being nadir-looking, penetrates to the underlying ground and thus permits the true terrain height to be calculated. For ACE2, merging multi-mission altimeter derived height datasets enabled the first true satellite derived GDEM of the Rainforest areas to be created.

Deserts were the other major areas of correlated difference, however for these areas the differences between the two datasets varied from desert to desert. In some cases the differences were uniform in spatial distribution and remained within the SRTM stated accuracy, whereas over others distinct patterns were visible in the difference values, which varied dramatically.

The case studies highlighted in this presentation demonstrate the additional content that can be derived by synergistic use of the two datasets over areas where consistent differences are present.