Determination of the Impacts of Landscape Offsets on the 30-metre SRTM DEM through a comparative analysis with Bare-Earth Elevations

Peter Nwilo, Emmanuel Ayodele and Chukwuma Okolie (Nigeria)

SUMMARY

Digital elevation models (DEMs) are fundamental spatial data infrastructure that support a wide range of applications in environmental modelling. However, in areas with forest cover, the DEMs record systematically too-high heights. This is because the forest canopy tends to block a portion of the satellite pulses from reaching the ground, thus introducing gaps in the data. This effect also masks the true performance of the DEM in measuring the elevations in open-terrain conditions adjacent to such forest cover. On the DEM, these trees manifest as abrupt transitions between open-terrain and tree-covered areas. The presence of these offsets limits the use of the DEM for many analytical operations where height of the bare ground is a requirement. Extracting the terrain height component from the data in areas influenced by such terrain cover is a challenging task.

The availability of an automated workflow/model is paramount to optimise the realization of this bare-earth product. This paper presents the development of methods for separating tree offsets from digital elevation models and discusses the implications of their deployment on a country-level scale. A methodology for deriving a bare-earth DEM for Nigeria that copes with the challenge of low elevation data density in forest covered areas is also considered.

Determination of the Impacts of Landscape Offsets on the 30-metre SRTM DEM through a comparative analysis with Bare-Earth Elevations (8560)
Peter Nwilo, Emmanuel Ayodele and Chukwuma Okolie (Nigeria)

FIG Working Week 2017
Surveying the world of tomorrow - From digitalisation to augmented reality
Helsinki, Finland, May 29–June 2, 2017