

A New Digital Elevation Model of the West Antarctic Ice Sheet from Altimetry and Images

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An image-enhanced digital elevation map has been generated using a combination of a recent satellite altimetry-based DEM combining radar and laser altimetry and a series of cloud-cleared MODIS Band 1 images. The images provide additional surface slope information via shape-from-shading methods. The slope-to-brightness relationship for the images is generated by comparison of low-pass filtered versions of the scenes with the slope from the satellite altimetry data set in the image's sunward direction. Comparison with airborne laser altimetry suggests that the image-enhanced DEM has an accuracy of ± 2 meters over the majority of the ice sheet. A further enhancement is planned using two-dimensional wavelet integration of the image-derived slope field to create the elevation grid.