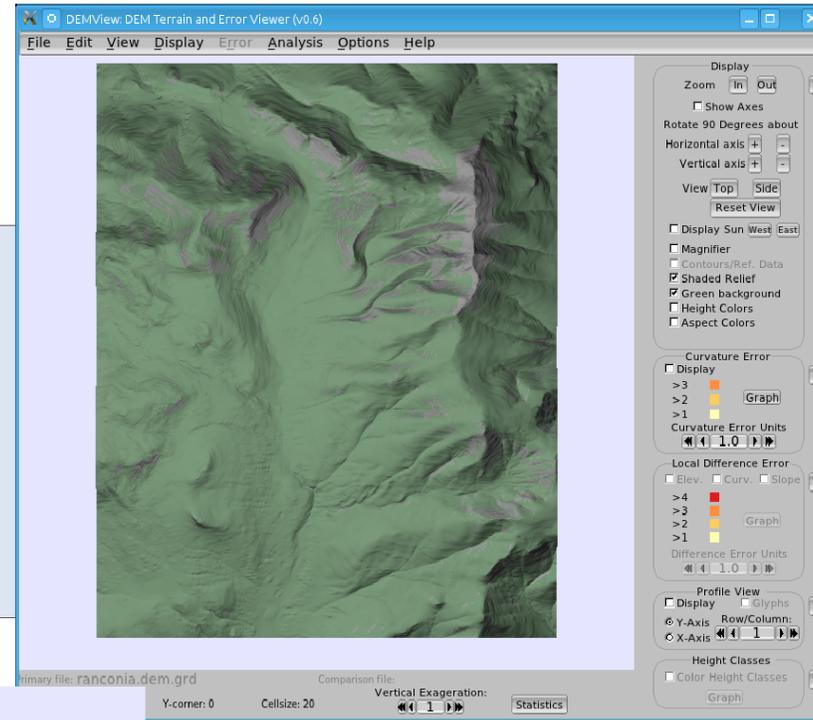


Focus + Context for Visualizing Uncertainty in DEMs

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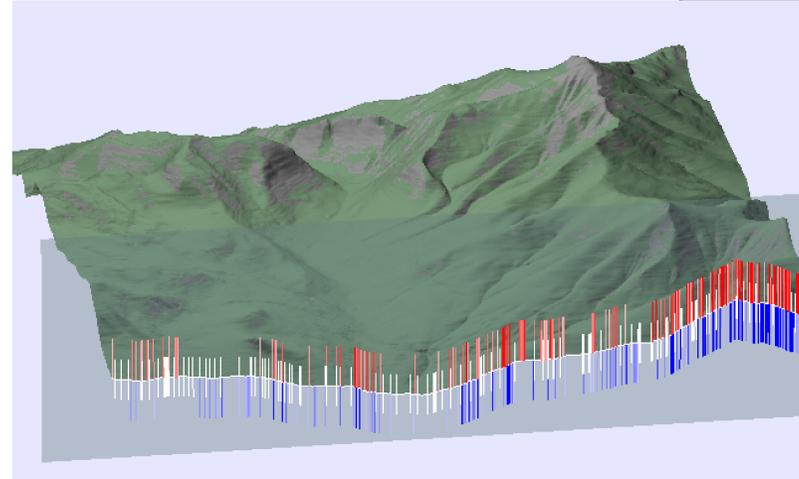
The Digital Elevation Model, or DEM, is a common way to store elevation data. However, errors in various stages of DEM processing mean that the validity of a particular data point is uncertain. DEMView is a prototype DEM display system that incorporates several uncertainty visualizations while viewing the surface in three dimensions. The profile cutter and the magnifier are components of the system that allow the user to view a portion of the surface while keeping in the context of the overall area.



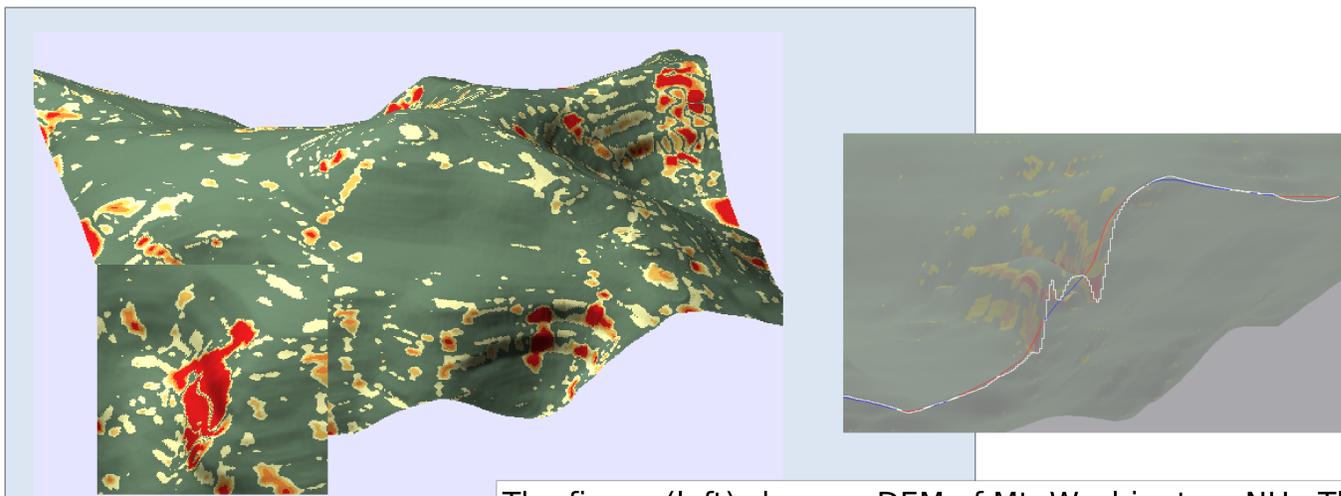
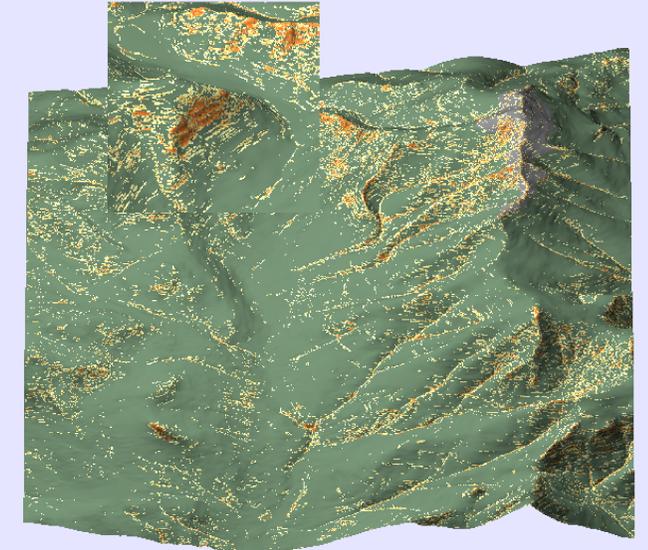
Snapshot of DEMView showing a digital elevation model (DEM) of Franconia, NH.

The system allows the user to view several visual uncertainty measures, including curvature and difference errors along with standard quantitative statistics.

One of the novel aspects of the system is the Profile Cutter (right). While other systems allow the user to view a profile, DEMView keeps the profile in the context of the overall three-dimensional surface. Furthermore, two DEMs of the same area can be compared simultaneously. Glyphs can be displayed which show the differences between the two DEMs; more red indicates a higher elevation at a grid point compared to the comparison DEM while more blue indicates a lower elevation.



This figure (right) shows curvature error overlaid on the Franconia DEM. More orange indicates higher curvature error at a grid position. In addition, the magnifier shows a portion of the DEM while keeping the rest of the surface in context. The magnifier may be moved via the mouse in real time. Below, the surface is shown with a standard slope visualization, but again with the magnifier being used to inspect a small portion of the DEM.



The figure (left) shows a DEM of Mt. Washington, NH. The colors indicate the difference error between two DEMs. The red indicates a poor match between the two, while green indicates a near-perfect match (user-parameter). Once again, the magnifier is being used to view details of a small area to help ascertain why there might be such differences between two DEMs of the same area. The figure above shows differences in the two DEMs using the profile cutter; two profiles are being viewed simultaneously.

