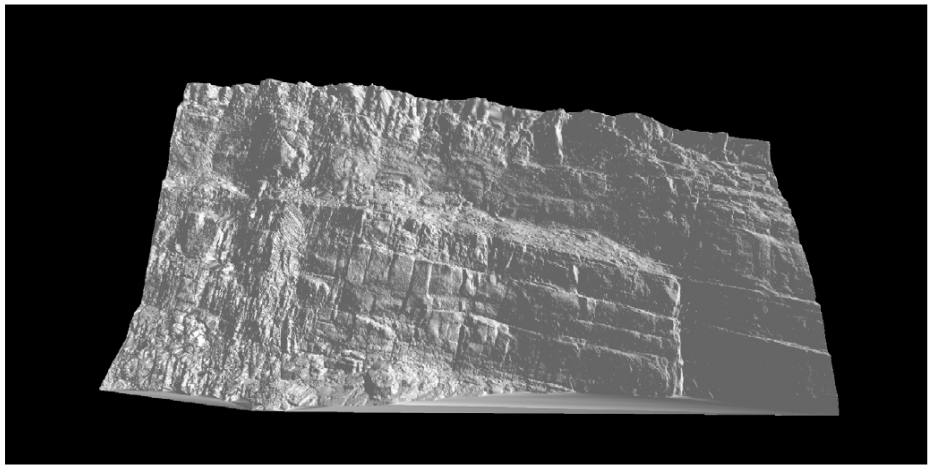
CSM research R&D programs in geothermal energy

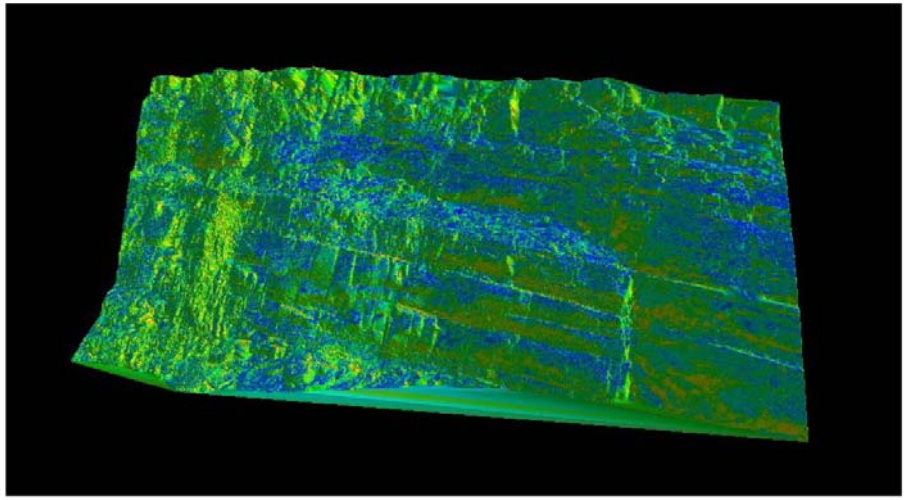
- **Fundamental issues**
  - manage the injection of water into the subsurface (for EGS),
  - predict physical, chemical and thermal consequences,
  - map subsurface flow in hydrothermal systems,
- **Bruce Trudgill**– natural and induced fractures & structures in rocks
- **John Berger/Graham Mustoe** – numerical modeling of rock fracture in response to induced stress
- **Jennifer Miskimins** – Experimental simulation of rock fractures
- **Paul Sava/Roel Snieder** – Interferometric seismic imaging, better accuracy in documenting where fractures form
- **Mike Batzle** – Geophysical assessment of hydrothermal systems (Mt. Princeton hot springs)
- **Murray Hitzman** – Mineralization in deep hydrothermal systems

Focus on Fracture Quantification

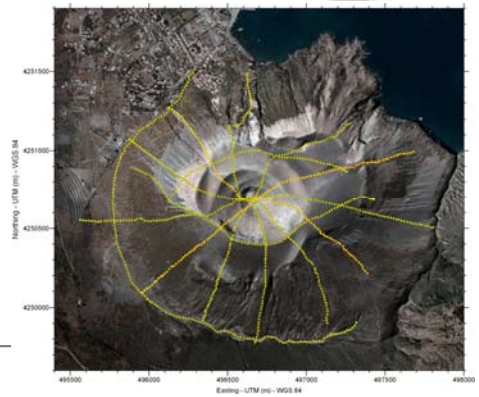


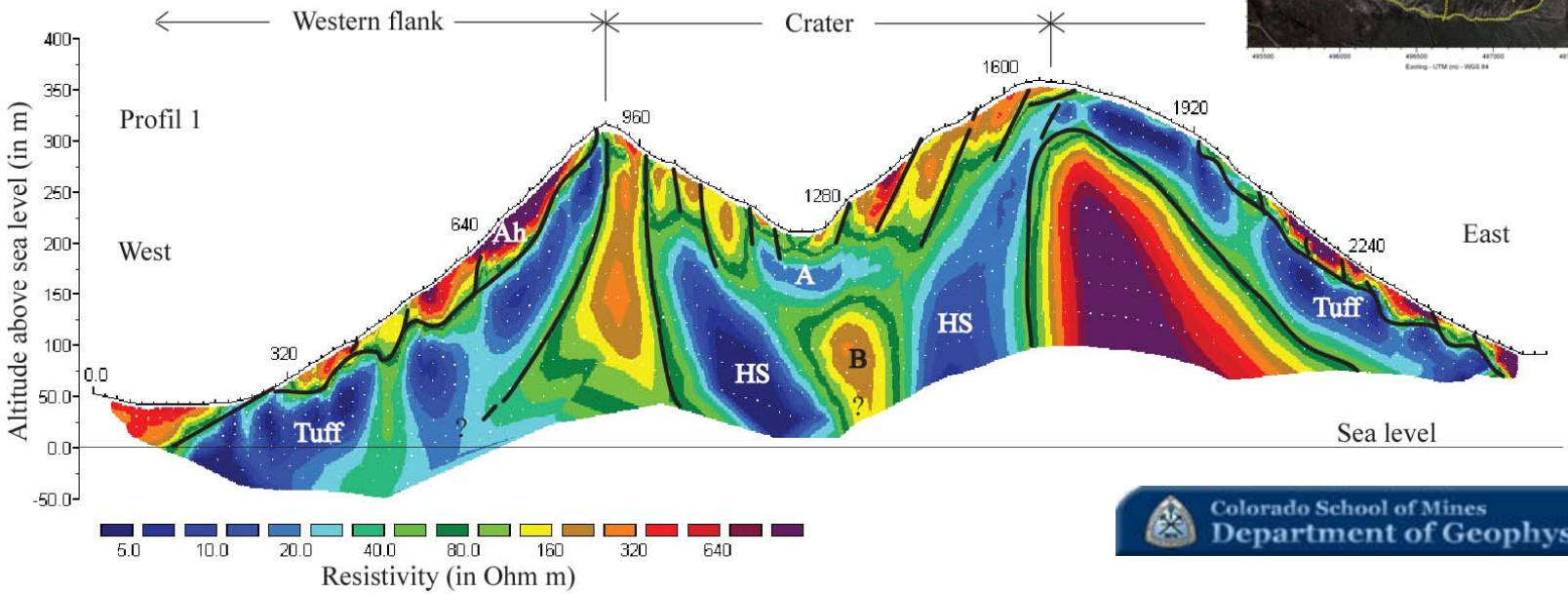
Example of TIN surface created from LIDAR point cloud data. The linear features are fractures and can be interpreted on this surface. 3DMove keeps track of the attributes of each interpreted fracture and saves them for later quantitative analysis.

Each triangle of the TIN surface can be assigned a strike and dip. This figure is a color map (360°) of the strike attribute. The fracture planes show a different color than the outcrop faces.



André Revil – Electromagnetic imaging of fluid flow





Colorado School of Mines
Department of Geophysics

Masami Nakagawa – CSM's main Iceland expert - sustainability

Krafla

- Iceland's main geothermal power station
- Uncertainty: large-scale volcanic eruptions started only two kilometers away from the station during early building
- Station went on stream early in 1977
- Some 33 boreholes have now been drilled for the Krafla station and the extension is complete. The station now operates with an installed capacity of 60 MW, as originally planned