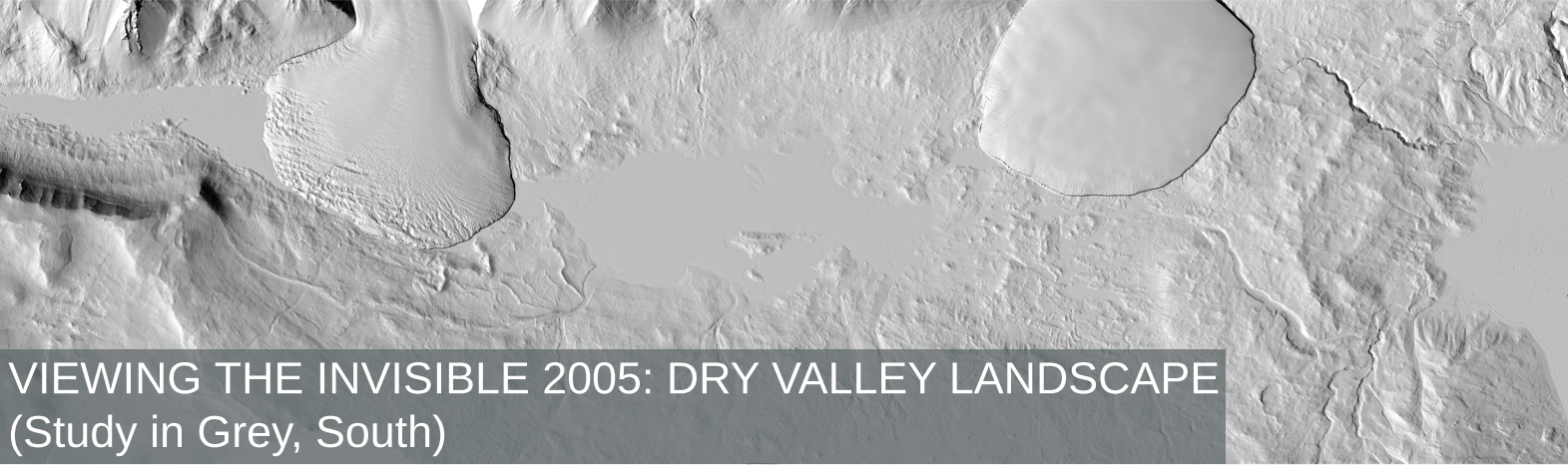

VIEWING THE INVISIBLE 2005: DRY VALLEY LANDSCAPE (Study in Grey, South)

VIEWING THE INVISIBLE, is an OSU exhibition of images created as by-products of research in such disciplines as cognitive science, chemistry, medicine, engineering, physics, neurobiology, psychology and ophthalmology, which reveal aspects of the "hidden worlds" unique to each discipline.

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IMAGE LOCATION: East end of Taylor Dry Valley, adjacent to McMurdo Sound. Lat 77.6°S, 163.5°E

IMAGE REVEALS: The surprising detail of landforms, beyond that of aerial photographs and topographic maps, provides further insight into the processes and earth history of the region. The image also reveals the quality of image produced with an advanced technique, developed at OSU, for processing LIDAR data. Numerous geomorphic processes operate in this unusual hyperarid environment, where the mean annual temperature is -20°C, the range is –55 °C to +10°C, and most of the ice is lost by sublimation. Landforms are the result of glacial, periglacial, mass wasting, fluvial, eolian and lacustrine processes. The image helps us see the landforms to interpret past and current processes. Specific features of note: Glaciers with meltwater channels and wind-sculpted surfaces, ice-covered lakes, river channels in the valley and small gullies partly fed by melting ground ice, ice-covered McMurdo Sound, lateral moraines, end moraines and hummocky ground moraines, eskers, ice-marginal channels, raised deltas, alluvial fans, and shore lines recording higher levels of a large ice-covered lake in the valley during the last glacial maximum, 10,000 to 20,000 years ago. Some debris ridges on the valley floor (parallel and perpendicular to the valley) have been interpreted by others as being transported by lake ice, fed by debris from the McMurdo Sound Glacier. End moraine in front of Canada Glacier has been interpreted by others to be from the last interglacial, 70 to 120,000 years ago when higher precipitation and temperatures caused the mountain glaciers to advance farther into the valley.

IMAGE GENERATION: The image is a visualization of a huge three dimensional point cloud that was obtained by airborne laser scanning—a rapidly emerging technology combining laser ranging, GPS positioning and inertial navigation technologies. Researchers from the Byrd Polar Research Center and the Digital Photogrammetry Laboratory developed unique methods to analyze the raw laser points, to detect and eliminate outliers, and to interpolate a Digital Elevation Model (DEM) from the irregularly distributed laser points. Different visualization methods are used to represent the surface in a suitable fashion for researchers to analyze the different landscapes. This particular rendering, presenting the topography as shaded relief, reveals how well the topographic details have been captured by the airborne laser scanning mission and encoded in the DEM.

CREDITS: Survey was conducted by NASA's Airborne Topographic Mapper airborne laser scanning system from a Twin Otter aircraft during the 2001-2002 Antarctic field-season as part of a joint NASA, NSF, USGS project. We thank members of NASA's ATM group for collecting and processing the data, students of OSU photogrammetry group, Cathrine Tremper, BPRC and Impyeong Lee, University of Seoul, Korea for assisting the DEM generation, Kathleen Welch, BPRC for advice on interpretation, Marcus Dora, Dresden University of Technology for graphical design, and the pilots and staff of McMurdo Station for field support.