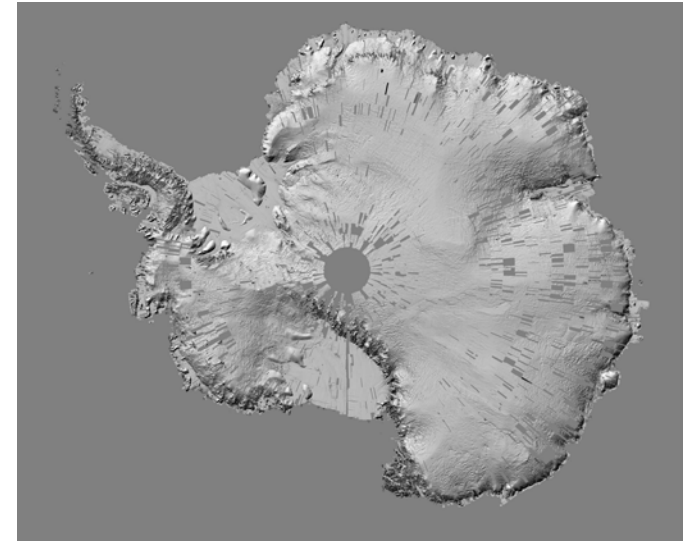


**Allocation:** Innovation & Exploration /1200 Knh  
**PI:** Ian Howat  
The Ohio State University  
*Geoscience*



Hill shade representation of a preliminary Reference Elevation Model of Antarctica (REMA) consisting of over 500,000 individual 8-m resolution elevation models processed from satellite imagery on Blue Waters.

## THE REFERENCE ELEVATION MODEL OF ANTARCTICA

### Research Challenge

The overall goal is to accurately map a high-resolution (8 m), high-precision (accuracy better than 1 m) reference surface for the continent of Antarctica

Accurate surface elevation is an essential dataset for glaciology, comprising vast sets of images and laser generated elevation data.

There is a large sub-meter set of stereo imagery held by the Polar Geospatial Center that is being utilized.

### Methods & Codes

Fully automated algorithm (SETSM) which utilizes node parallelized OpenMP

SETSM is written in stand-alone C code with no external dependencies and requires no libraries, ensuring simple, multi-platform installation, support, and optimization.

SETSM is called from a single command line with the only required inputs being the filenames of the two stereo images and the RPC (Rich Photorealistic Content) file, typically provided in XML (eXtensible Markup Language) format

### Why Blue Waters

Rapid throughput of thousands of individual jobs of highly variable and unpredictable wall times.

Impressive capacity for throughput of job volume

Backfill scheduling capabilities

### Results & Impact

Displayed Antarctica's ongoing rapid changes regarding overall ice coverage.

Estimated overall sea level change in the future based on findings

Useful for a wide range of applications beyond glaciology, ranging from geodynamics to multi-disciplinary logistics planning.