

The Great Circuit

Finding the Longest Great
Circle With Respect to Terrain

Presented by Keith French

Purpose & Data Requirements

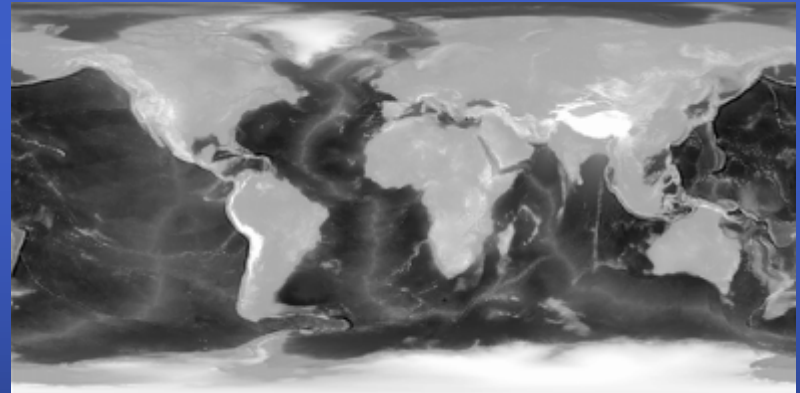
❖ Find Longest and Shortest Circles:

- Sea Floor, Surface, & Exclusion

❖ Using Dataset:

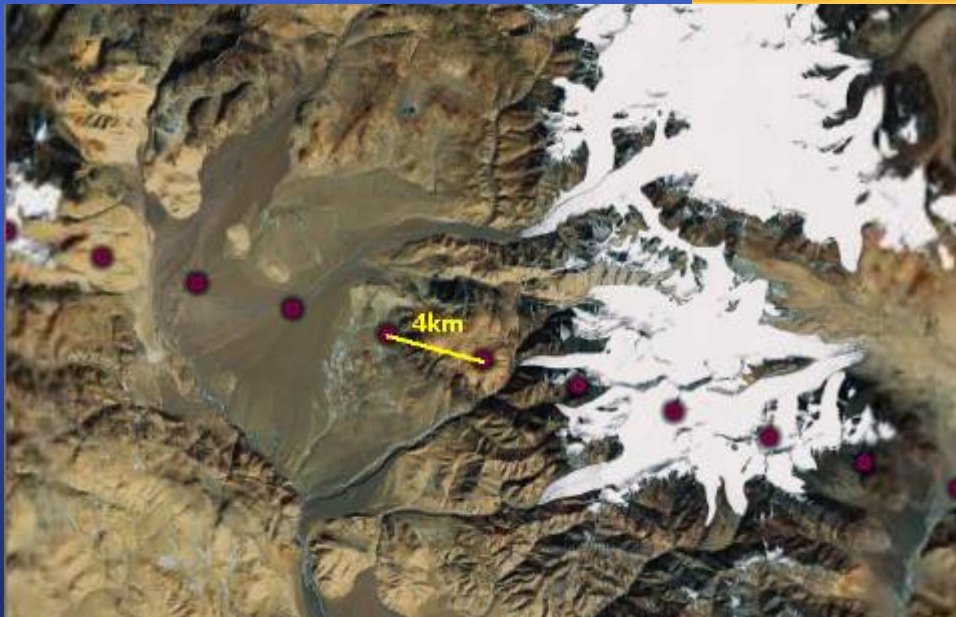
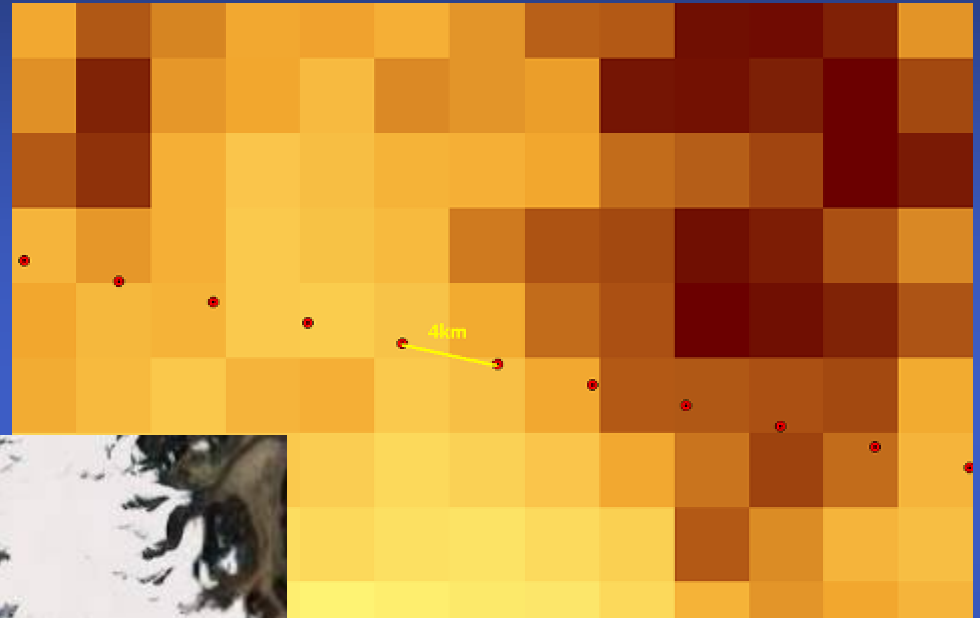
ETOPO2 DEM

- Global Coverage
- 2' Resolution



Purpose & Data Requirements

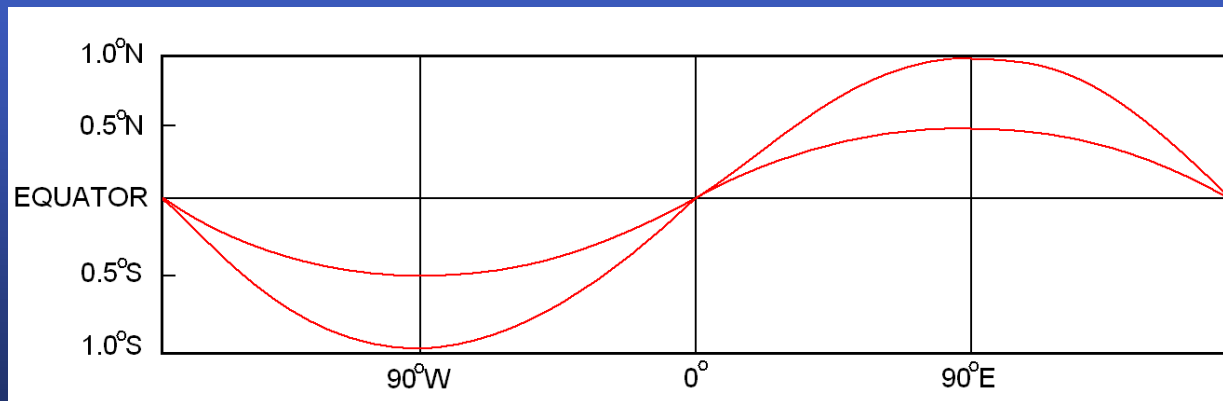
The ETOPO 2
Digital Elevation
Model



Google Earth
Imagery

Methods

- ❖ Derive a Sample of Great Circles:
 - 720 points of longitude along equator
 - ✓ every half degree around the globe
 - 180 circles at each longitude
 - ✓ half degree intervals from 0.5° to 90°
 - 1 Equator
 - $(720 \times 180) + 1 = 129,601$ circles to be examined.



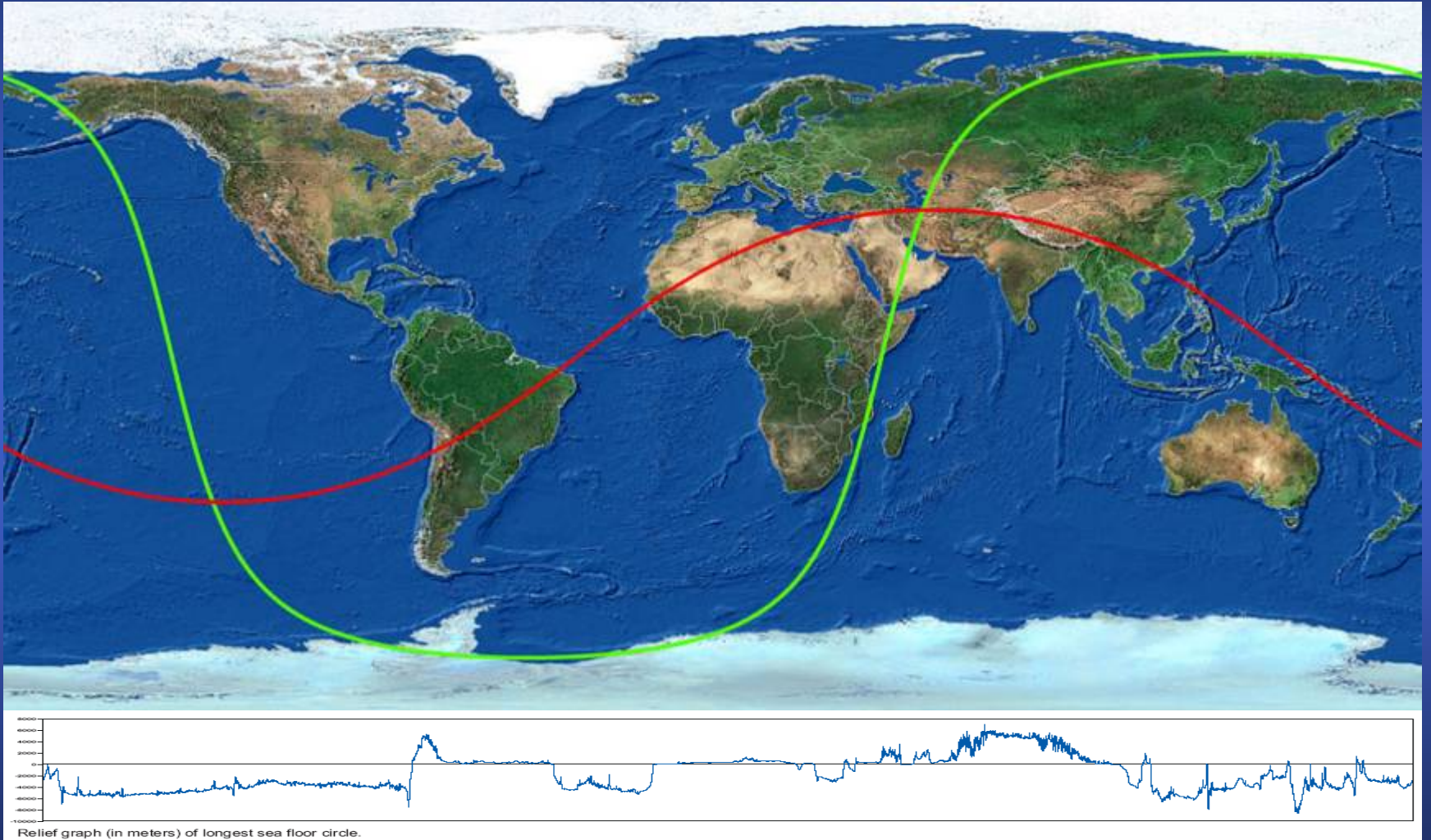
Methods

❖ Calculate Each Sample Circle's Length

- VBA Code in ArcMap:
 - ✓ Cycle through each sample circle.
 - ✓ Examine each at approximate 2 minute intervals (to match ETOPO 2 resolution).
 - ✓ Using elevation data from ETOPO, calculate surface distance.
 - ✓ Keep track of longest and shortest circles.
 - ✓ Export circles as shapefiles.

Results

Sea Floor

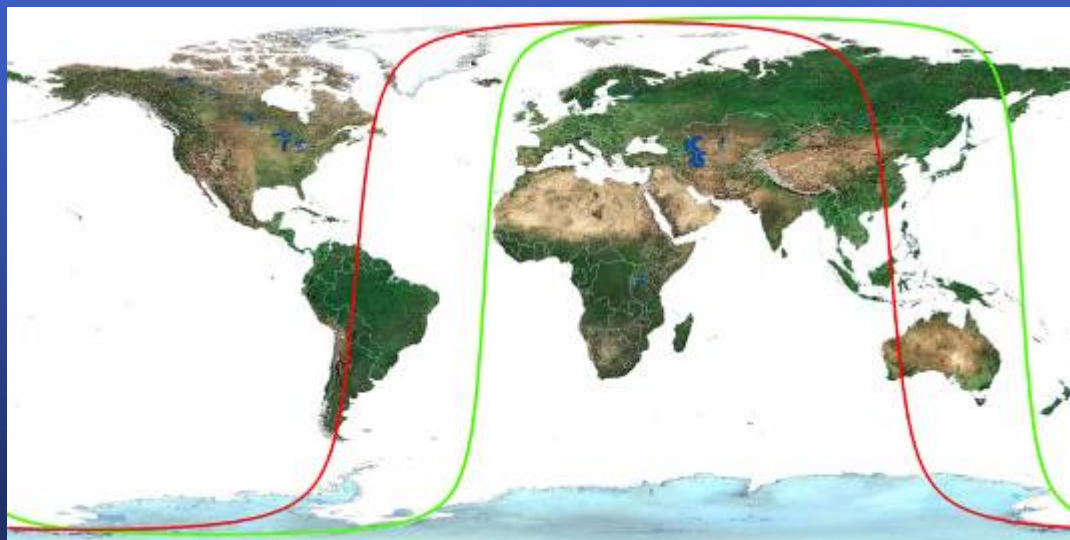


Results



Sea
Surface

Sea
Exclusion



Further Issues

- Sample size & selective sampling
- Ellipsoid vs. spheroid
- Digital Elevation Model resolution
- Algorithm & Code optimization

