The Great Circuit

Finding the Longest Great Circle With Respect to Terrain

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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

*Relief graph (in meters) of longest sea floor circle.*
Results

Sea Surface

Sea Exclusion
Further Issues

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