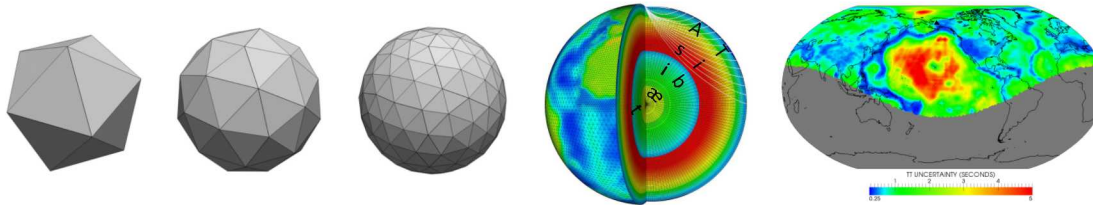
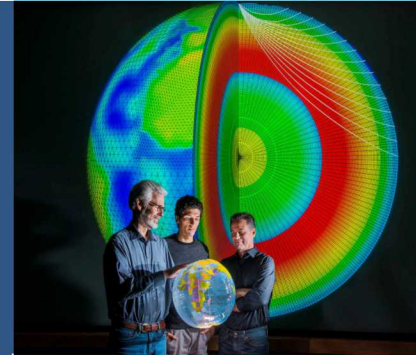


# GeoTess



PRESENTED BY

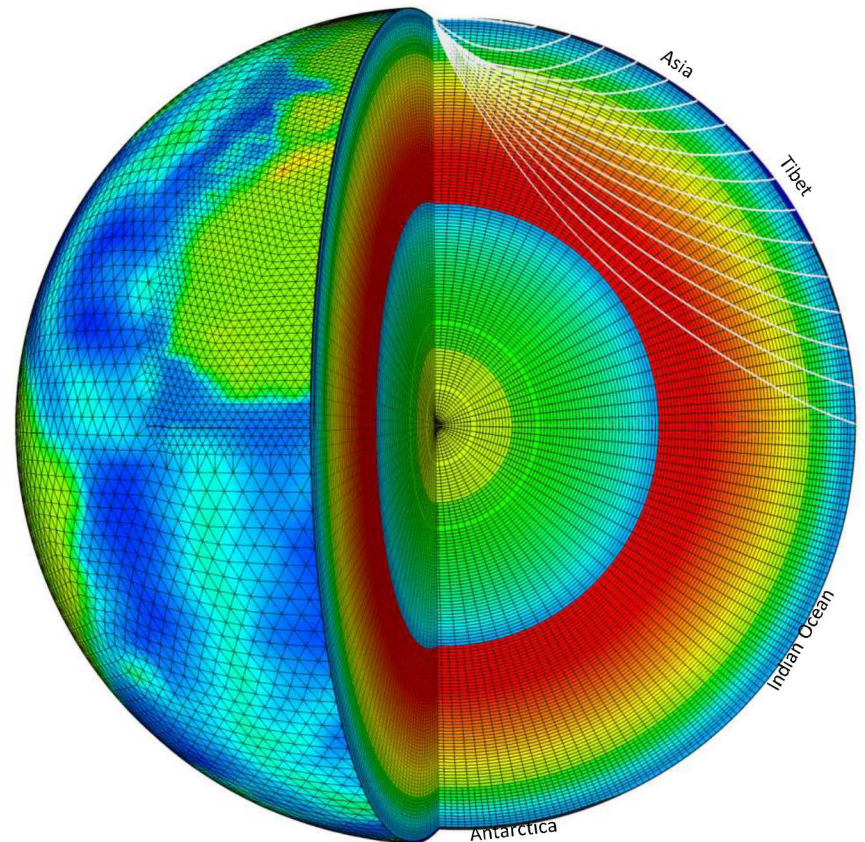
Sandy Ballard



# GeoTess

A model parameterization and software support system that implements the construction, population, storage and interrogation of data stored in 3D Earth models.

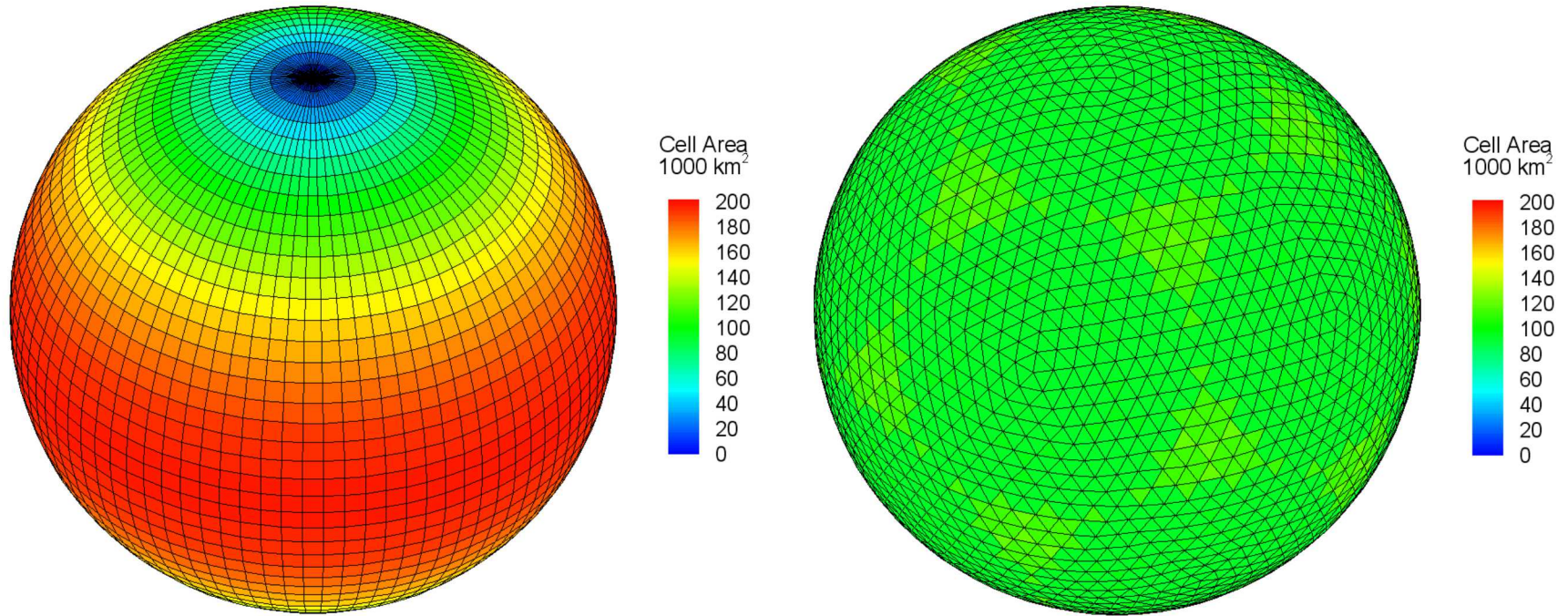
- Grid based on triangular tessellations
- Variable resolution in both geographic and radial dimensions
- Supports internal radial discontinuities with variable topography.
- Wide variety of data types for storage of information at grid nodes
- Linear and natural neighbor interpolation of values
- Open source software in C, C++ and Java
- Compiled for Linux, Mac, Windows and SunOS.
- Software available at [www.sandia.gov/geotess](http://www.sandia.gov/geotess)



# GeoTess Applications

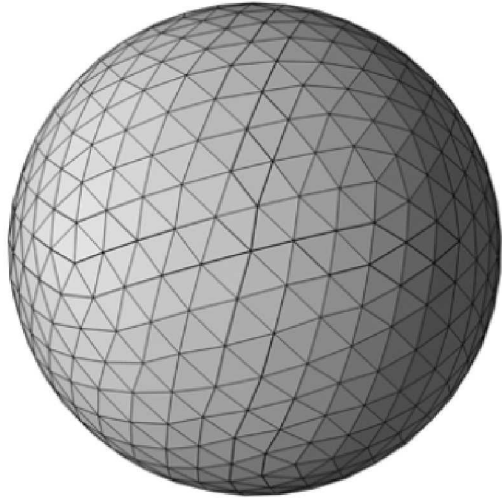
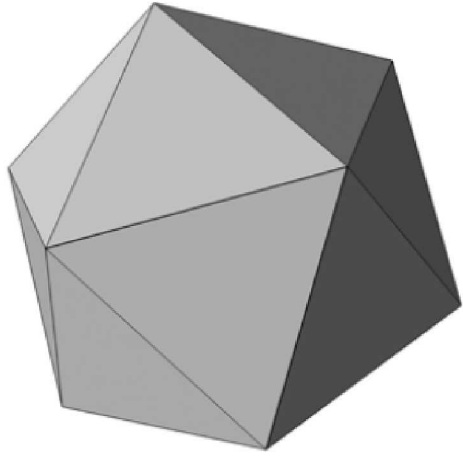
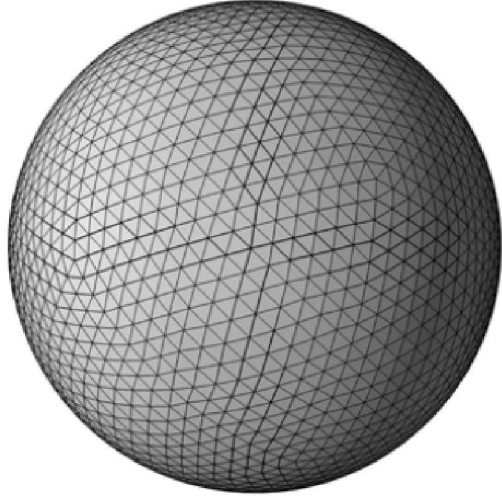
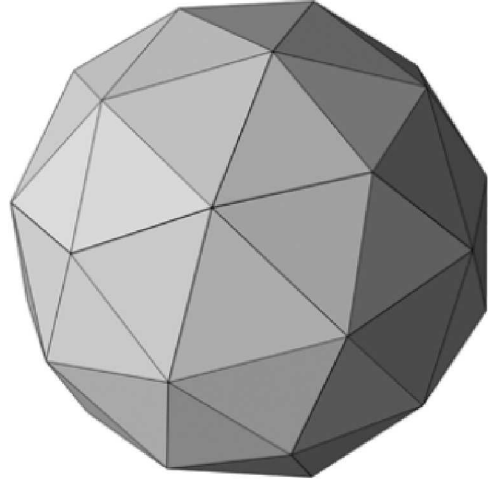
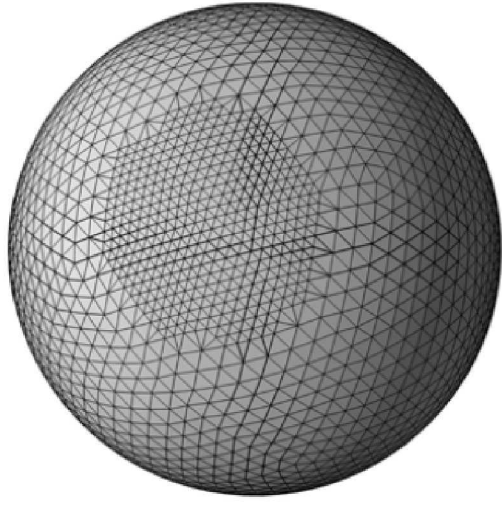
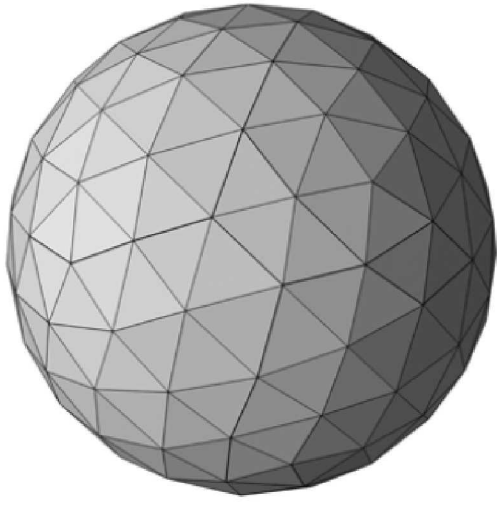
- SALSA3D
- LibCorr3D
  - 3D travel time lookup tables
  - Used at AFTAC for empirical corrections
- RSTT
- Amplitude tomography at LANL
- Currently being evaluated for use in the Geophysical Monitoring System

# Triangular Tessellation

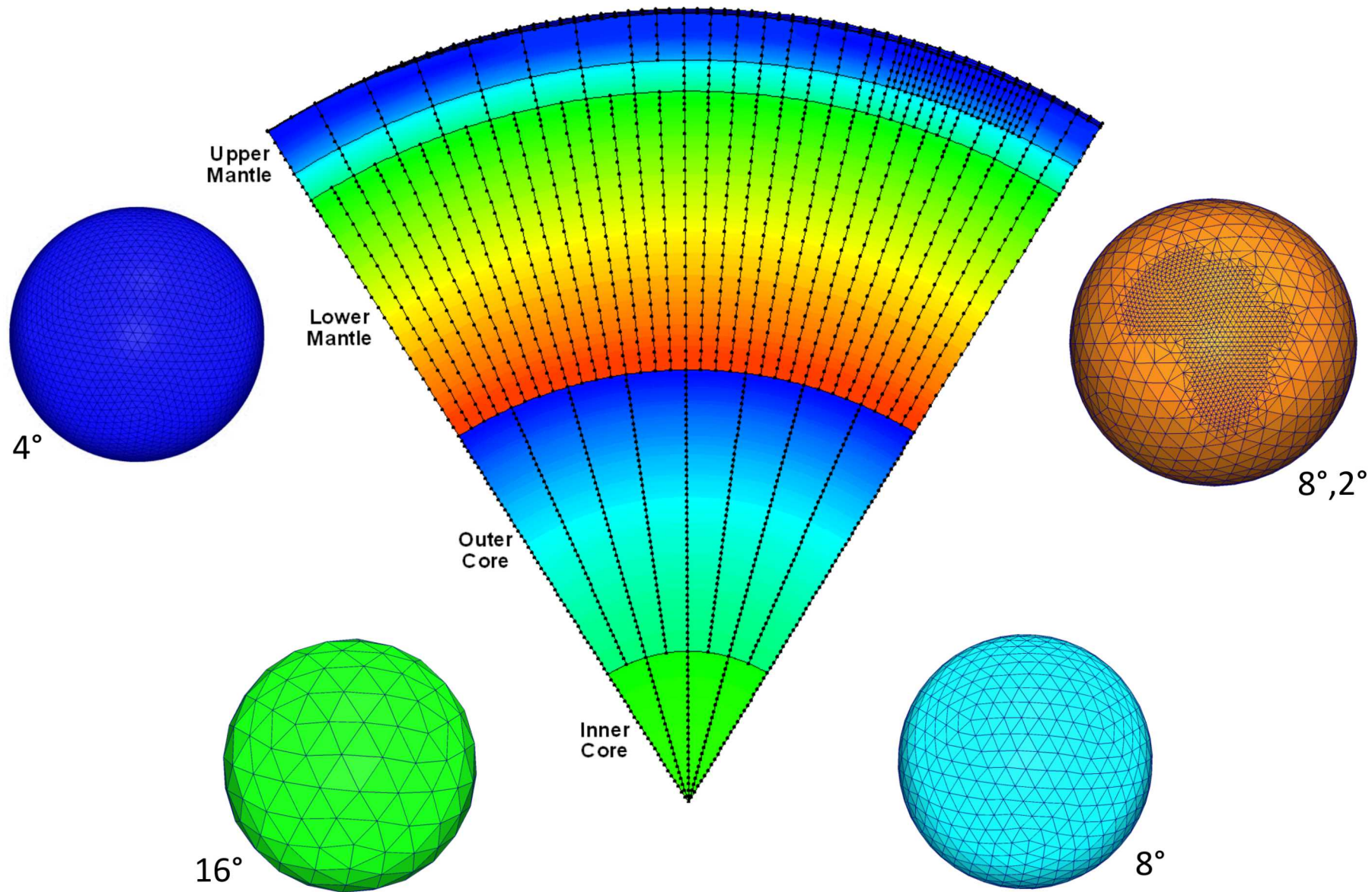


Comparison of a regular latitude longitude grid and a uniform triangular tessellation. In both grids the edge lengths are approximately  $4^\circ$ .

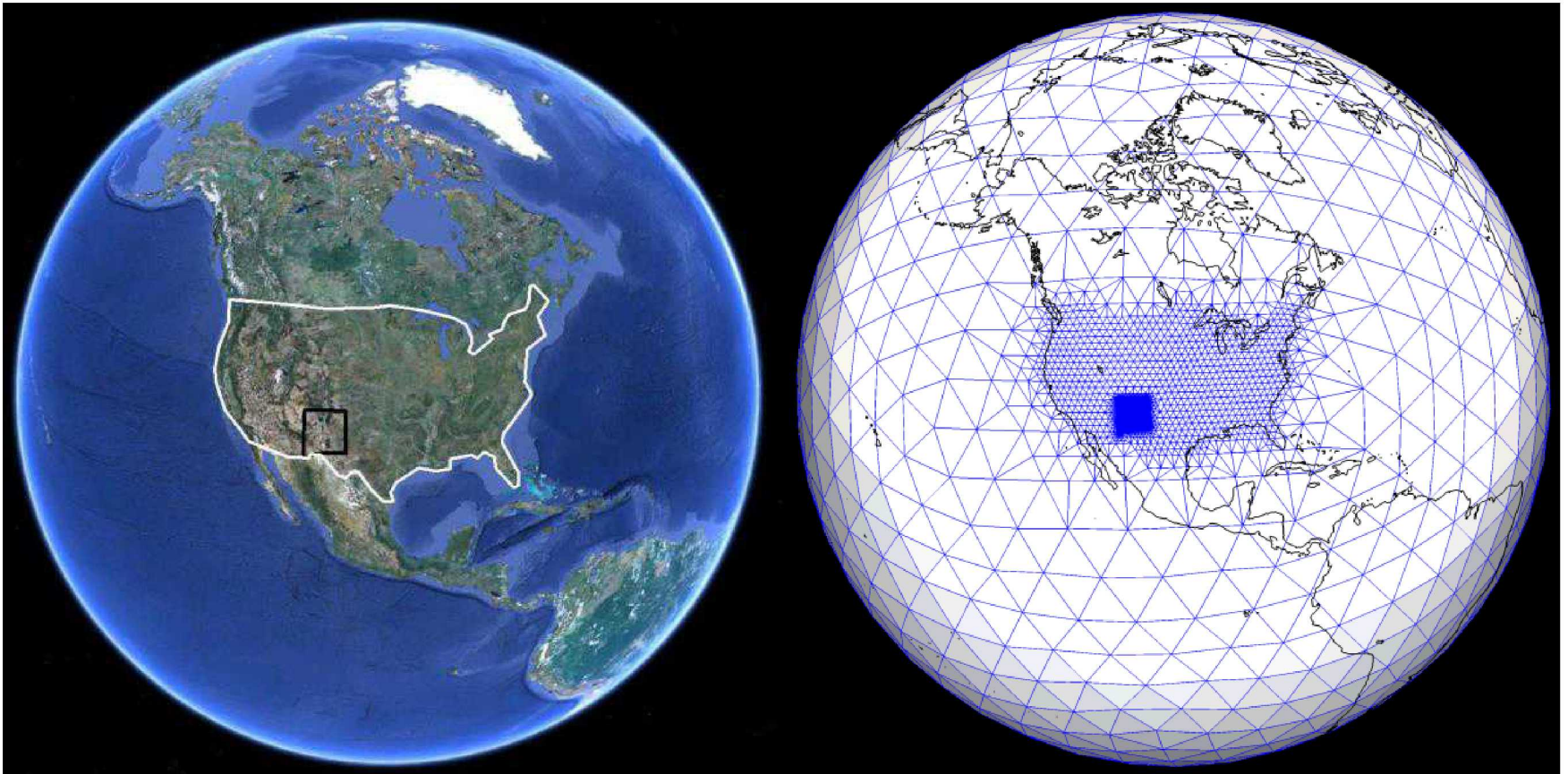
# GeoTess Multi-level Tessellation



# Radial Node Distribution and Resolution



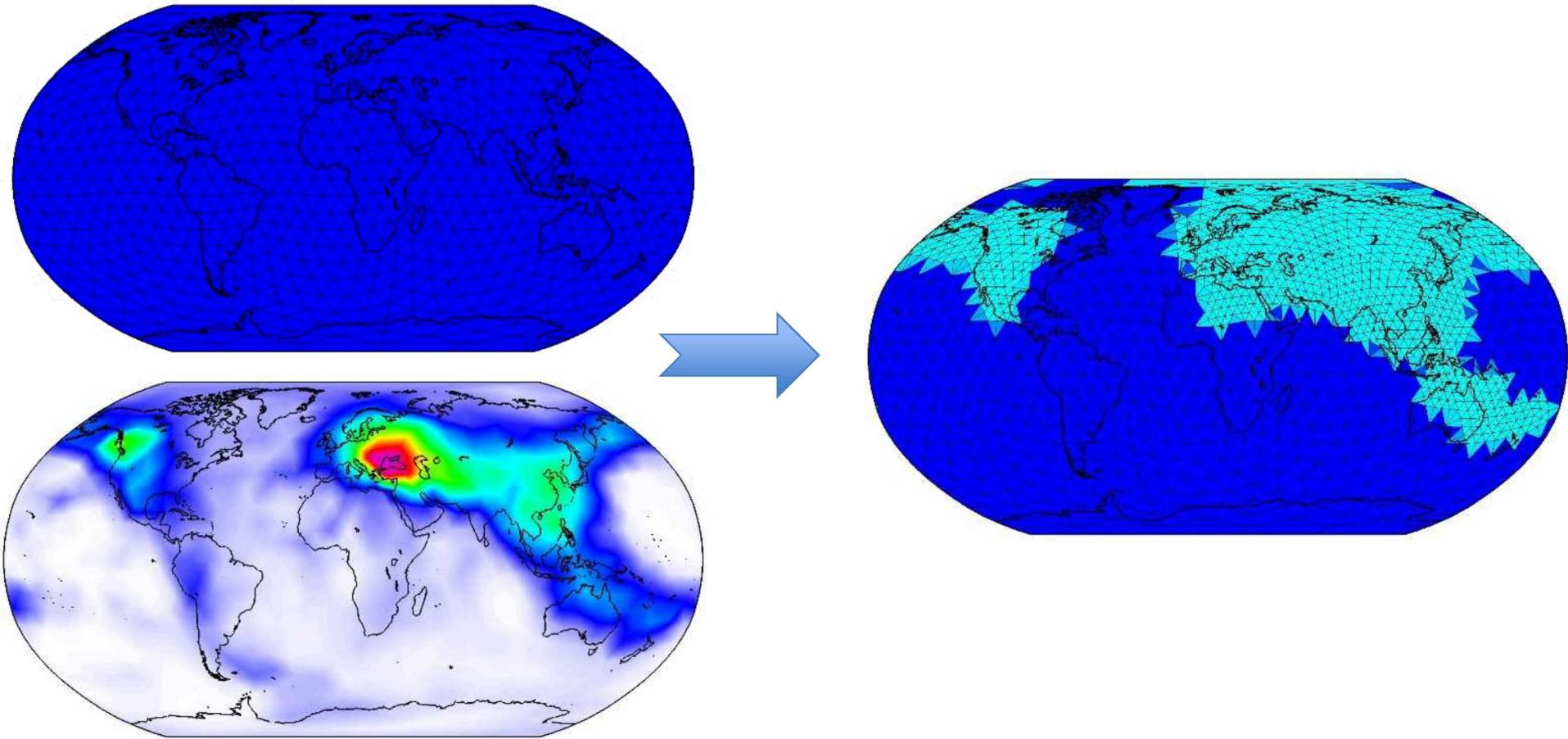
# GeoTessBuilder



## Property File:

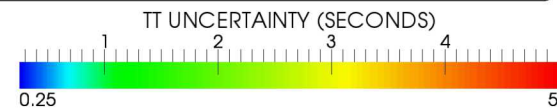
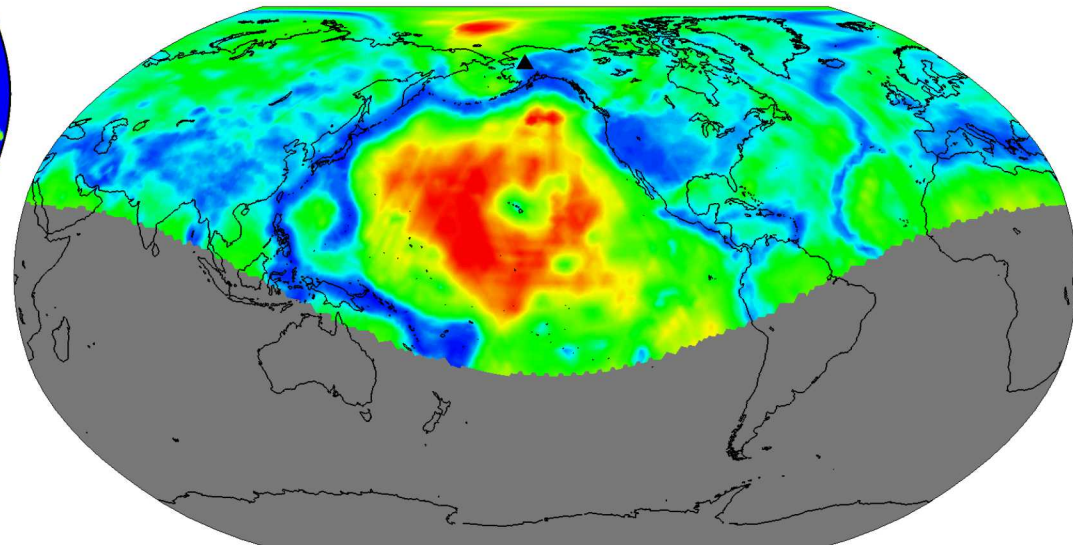
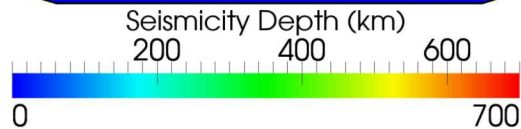
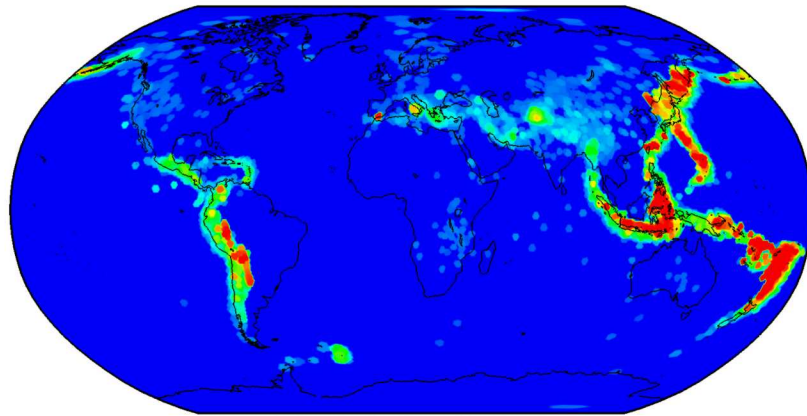
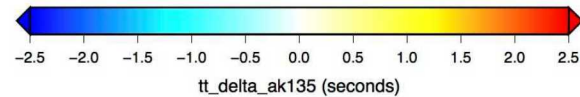
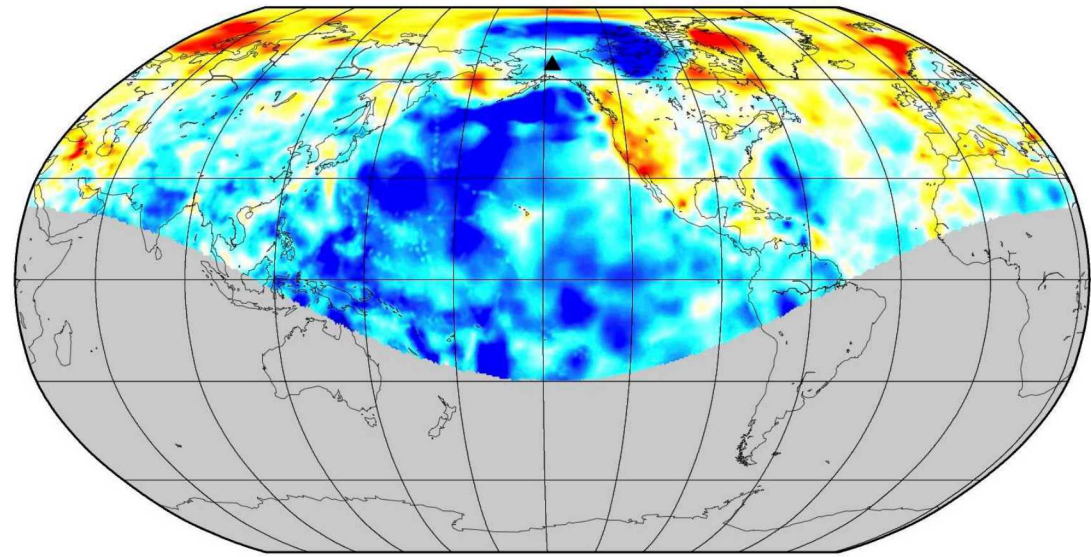
```
gridConstructionMode = scratch  
baseEdgeLengths = 8  
polygons = united_states.kml, 0, 1.0; new_mexico.kmz, 0, 0.125  
outputGridFile = grid.geotess
```

# GeoTessBuilder



# LibCorr3D

- Station-phase specific travel time difference relative to ak135.
- Path-dependent travel time prediction uncertainty (model error).



# Memory Requirements for 3D, Global, ½° Grid

Item	Memory
Grid	140 MB
1 station-phase (data only)	20 MB
Total 150 stations * 5 phases	15 GB
Time to load 150 stations * 5 phase	2 minutes

With 1 TB of RAM, first P travel time tables for 50,000 stations could be stored.

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