Finite element meshing of three-dimensional faulted domains

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Meshing of 3-D spaces for finite element applications is often a complicated and time-consuming process. The introduction of internal boundaries in order to represent (subduction) faults further complicates the mesh generation process. We present two new tools which result in a significant simplification of the meshing process for geodynamic problems. The first is a mesh generator which uses a regular grid to rapidly generate a finite element mesh for a faulted spherical shell or spherical shell segment (figure 1). It includes radial mesh refinement, and iterative optimization of the finite element aspect ratio. The second is a graphical tool to facilitate the step from geodynamical maps to finite element meshes. Currently in the final stages of development, these tools will be applied to global and regional scale geodynamical modeling studies, using the large-scale mantle convection model of Geenen et al. (see poster "Large scale mantle dynamics modeling").

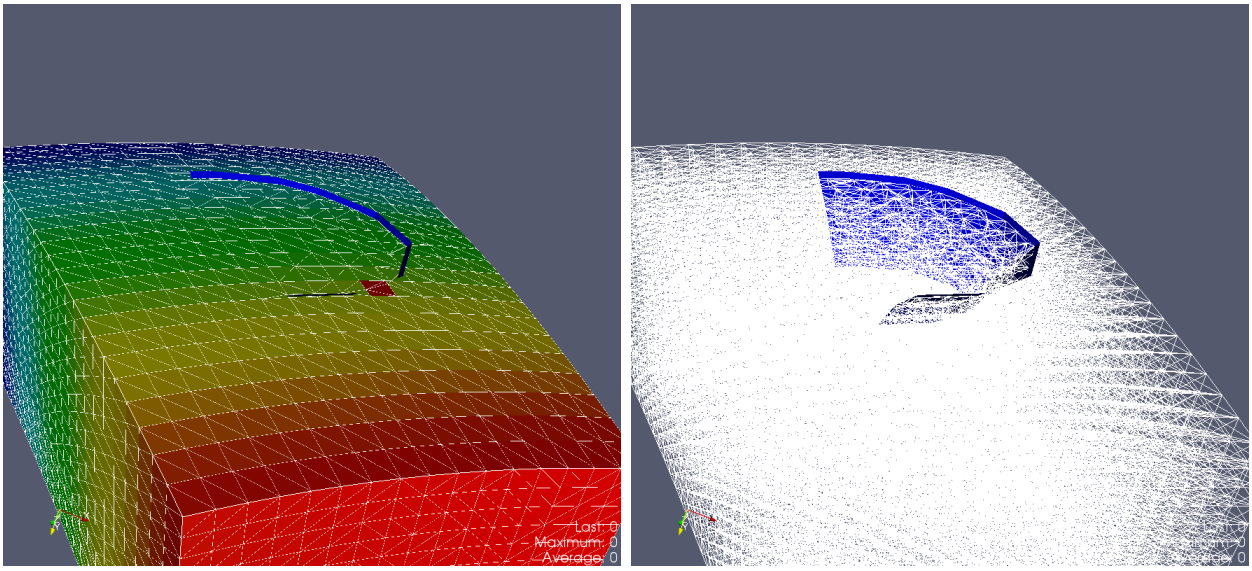

Figure 1: Finite element mesh including subduction fault.