The Community Fault Model version 5.3 and new web-based tools
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Abstract

We present version 5.3 of the SCEC Community Fault Model (CFM). The CFM is an object-oriented, comprehensive three-dimensional (3D) model of faults in southern California deemed capable of generating damaging earthquakes. The model is designed as a community resource to be used widely with a focus on hazard assessments. It is organized in a multi-level hierarchy of more than 400 fault objects. Each fault object has associated metadata including (but not limited to) hierarchical identification, surface area, and references. Metadata are provided in a spreadsheet, and 3D geometry data in plain-text t-surf files. Updates from CFM Version 5.2 include a much refined representation of the complete Little Lake Fault zone (LLFZ, Flesch et al., 2020), responsible for the M6.4 and M7.1 2019 Ridgecrest sequence, new representations of faults situated between the LLFZ and the Owens Valley Fault (OVF) including the Rose Valley fault, Coso Junction fault zone, and the southern extension of the OVF, and more than 60 other additions and improvements (see Nicholson et al., this meeting).

Preparing this release, we have improved internal consistency of the model hierarchy and association of model objects with data files through the development of software tools that automate these quality checks. We have also corrected and completed average strike/dip and fault area metadata for each fault object, generated map trace data for new or updated faults, and corrected native meshes of numerous t-surf files. Importantly, we have improved web-accessibility. The entire CFM archive and updated user tools are available for download at the CFM homepage (https://www.scec.org/research/cfm). This website provides maps of the CFM, fault trace data in km, shapefile, plain-text formats (GMT-style), and links to a refined viewer and search tool for the CFM. The web viewer is map-based and allows users to search for faults by several methods (e.g., keyword, area) or by clicking on a fault trace. Once faults are selected, users can either download the mesh data, or use the newly developed Plot3D option to interact in 3D with the selected faults directly in the web browser. This new 3D visualization tool will greatly facilitate use of the model as it provides a simple interface with no downloads or installations required. Furthermore, the web-based tools developed for the CFM have provided the backbone for various other SCEC community models (see Maechling et al., this meeting).

1. The Community Fault Model

The Community Fault Model has reached version 5.3, the latest in a series of continued, incremental improvements both in terms of coverage and in terms of accuracy as well as detail of included fault representations. This version comprises more than 400 fault objects which are organized in a hierarchical, self-consistent manner that is reflected in a naming system. The hierarchy has 13 fault areas at the highest level, 105 fault zones, 205 fault section names, and 339 fault names. The largest represented object is the 1951 San Andreas rupture with a surface area of about 4400 sq. km. The distribution of the average strike of all included fault objects has maxima at ca. 140° and 320°. Average dips are most frequent at very steep, 80° - 90° dips.