Coupling, Slow Slip, and Seismicity (C3S) Working Group

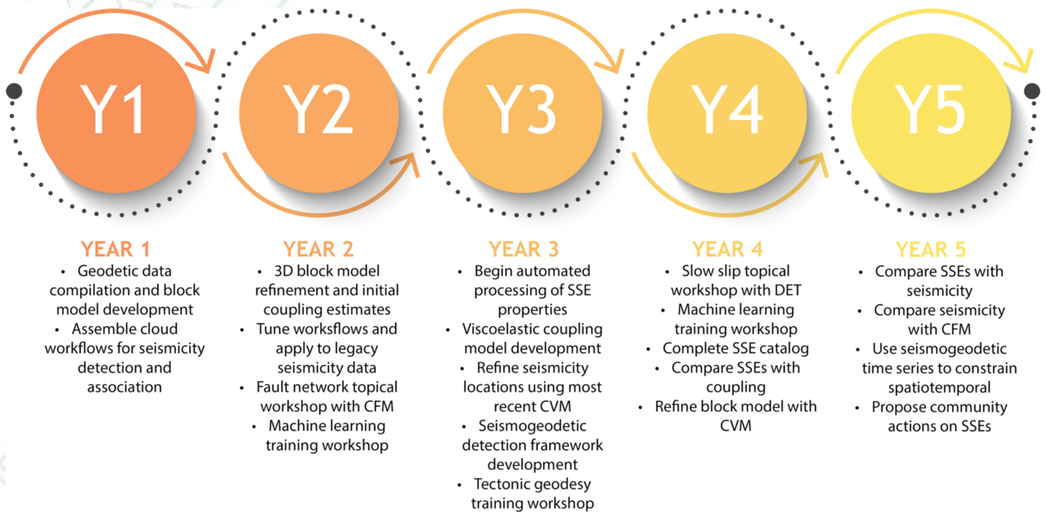
https://cascadiaquakes.org/c3s/

Mission:

Understand the patterns of how and where stress is built up and released in the Cascadia Subduction Zone.

Product:

- Model of faults and the stress they are accumulating from satellite data
- Catalogs of small earthquakes
- Algorithms to detect different types of deformation in the subduction zone



Working Group Background

The coupling, slow slip, and seismicity (C3S) working group aims to understand how stress is built up and released within the Cascadia Subduction zone. Coupling between the Juan de Fuca and North American plates builds up stress, which is released by ordinary earthquakes, as well as slow slip (earthquakes occurring over days to months, without producing significant shaking). Understanding the patterns of stress and slip accumulation is essential for assessing hazards from large, damaging future earthquakes.

C3S Products and Potential Applications

- Block and Coupling Model: A model of the Cascadia Subduction Zone with known faults (from the CFM), that, using satellite data, indicates how much stress is accumulating on them in the present day. This can be used for understanding fault slip rates to put in the CFM, which in turn is important for seismic hazard assessments.
- Seismogeodetic Detection Framework: Algorithms that detect different types of deformation in the Cascadia Subduction Zone. Satellite data, such as global navigation satellite system (GNSS, or GPS) data, detect motions of the Earth's surface, which we can use to learn how the Earth is deforming. Many signals are present in this – earthquakes and tectonic motion, but also volcanic signals, hydrologic signals, and anthropogenic signals. Algorithms that identify these types of signals, and classify them, are critical to improving our ability to identify and characterize the signals that are related to just earthquakes. This framework can be applied to a suite of satellite data (InSAR, GRACE gravity data, etc.), improving our ability to detect tectonic-related deformation.
- Seismicity Catalogs: Identifying small earthquakes is important to understanding the location and large earthquake behavior of faults. However, small earthquakes can be hard to detect. C3S will produce an enhanced catalog of small seismicity in the CSZ using machine learning methods, that can then be applied to groups like CFM to improve our characterization of faults.

Engage with C3S

C3S will run workshops, some training workshops and some topical joint with other working groups, over the course of the center. In addition, there will be machine learning methods workshops related to C3S products. Products from C3S will be available on the CRESCENT website along with tools for their use.

Contact Us

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