

AN OVERVIEW OF THE CASCADIA REGION EARTHQUAKE SCIENCE CENTER (CRESCENT)



Award Number: 2225286

GEOSCIENCE **EDUCATION & INCLUSION** (GEI)

Mission: Facilitate a culture for capacity building and increased diversity and inclusion in the Earth Sciences.

Goals & Activities: • Research and training opportunities for historically marginalized students

SCIENCE

WORKING GROUPS & SPECIAL INTEREST GROUPS

COUPLING, SLOW SLIP, AND SEISMICITY (C3S)

Mission: Characterize relationships among slip processes on the subduction interface.

Goals:

- Understand the interplay between stress accumulation and release
- Assess hazards from future damaging earthquakes
- Evaluate how coupling leads to an accumulation

COMMUNITY FAULT MODEL (CFM)

Mission: Develop a three-dimensional model of onshore and offshore crustal faults in the upper plates of Cascadia.

Goals:

- Utilize fault geometrics and paleoseismic histories
- Characterize crustal fault hazards within Cascadia
- Analyze data on the crustal faults and the megathrust plate boundary fault

Products:

 Cascadia-wide community fault model with fault locations and slip rates.



Offshore

Observations

COMMUNITY VELOCITY MODEL (CVM)

Mission: Construct a three-dimensional representation of subsurface material products for the Cascadia region.

Goals:

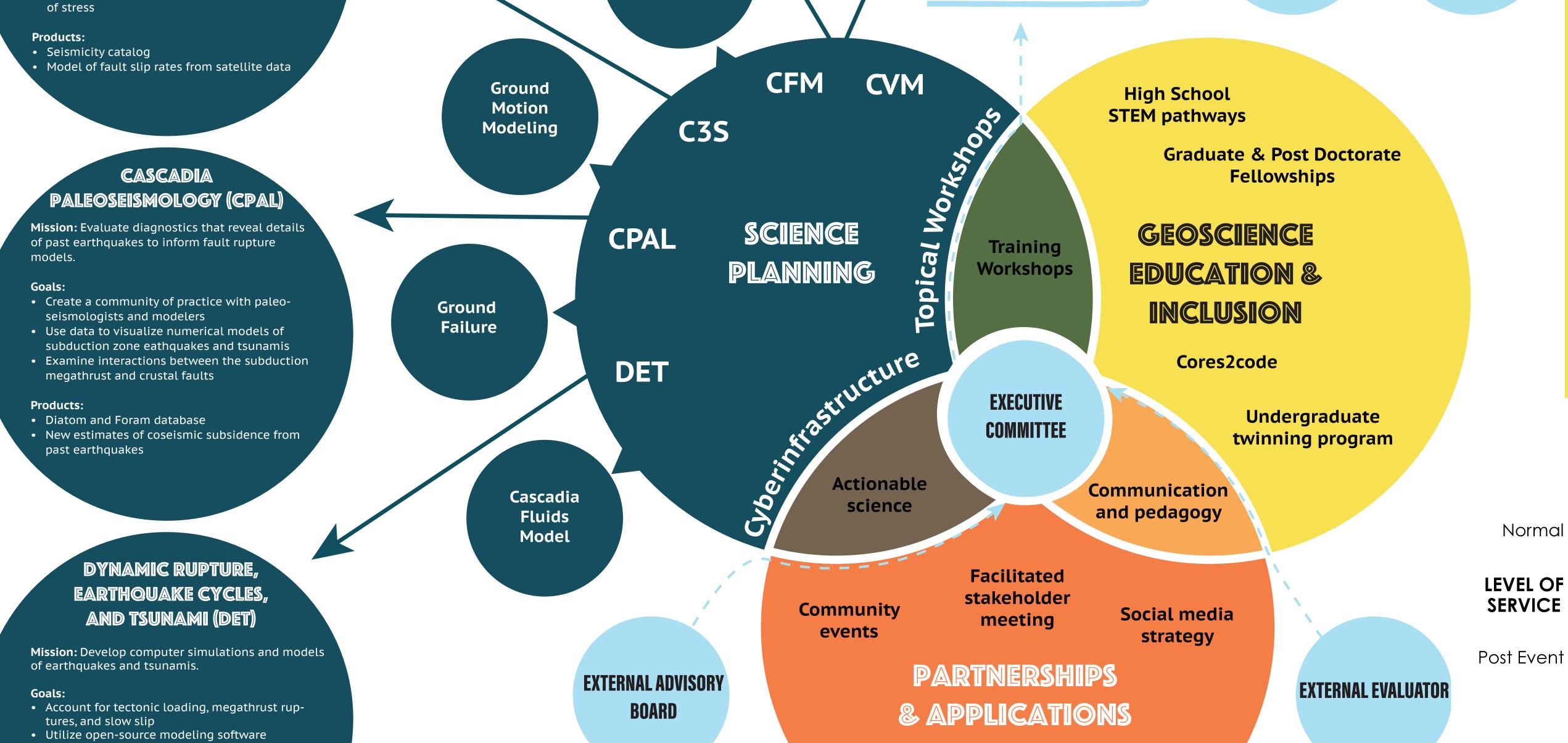
- Synthesize seismic information spanning from Northern California to British Columbia • Provide information for estimating future
- shaking
- Strengthen seismic hazard assessments through these estimations

Products:

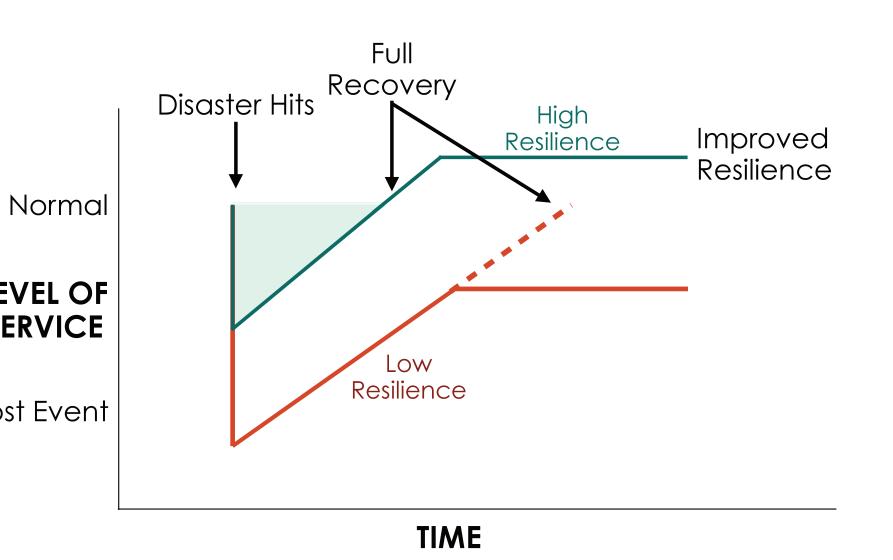
 Cascadia-wide community velocity model with shallow structure and a geotechnical layer

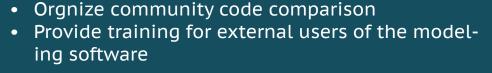
Programmatic center activities

Biennial meetings Seed grants & Quarterly Town program Halls



• Identify critical gaps in our current earth science workforce's skills Develop skills building curriculum and train the next generation of students in data science, physical process modeling, tectonic geodesy, paleoseismology (coastal, crustal, marine), and offshore sensing Technical short courses for students and early career scientists Graduate and postdoctoral travel grants

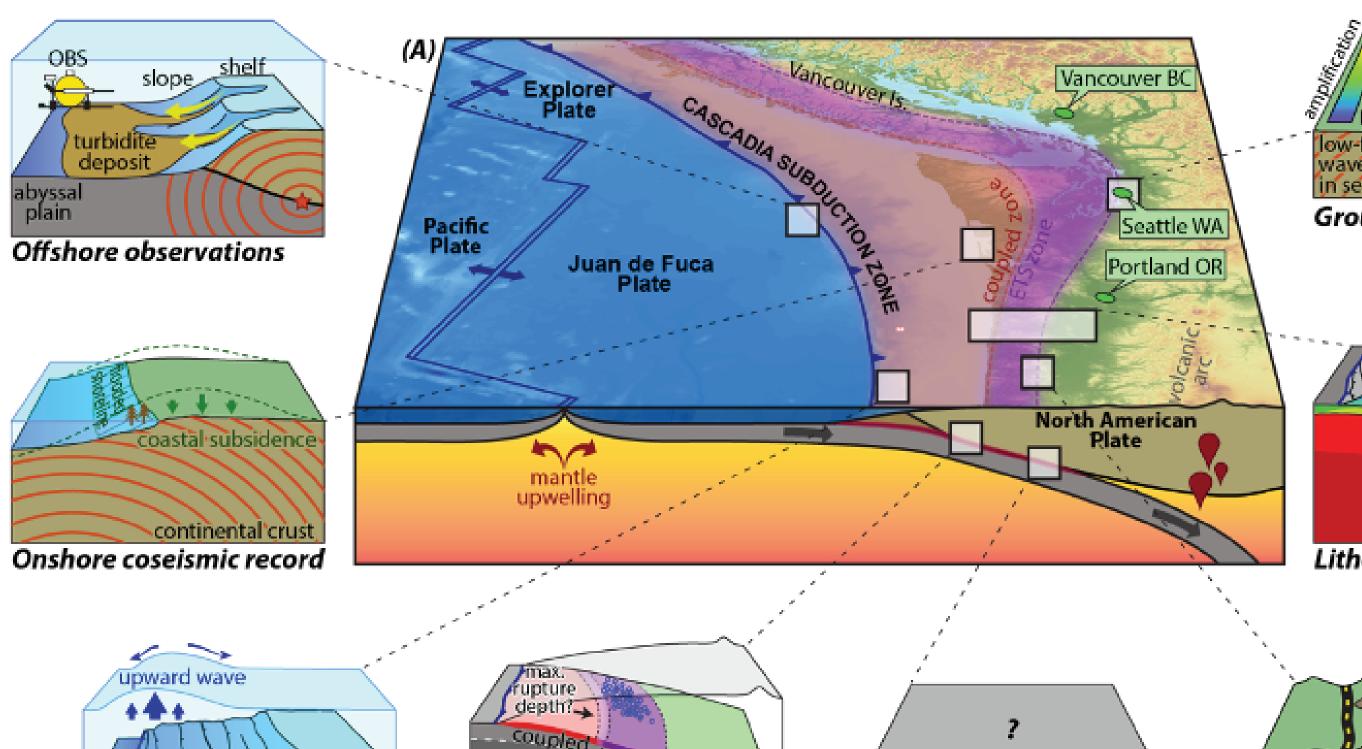


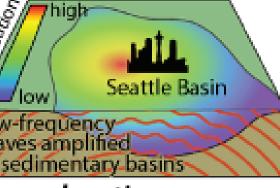


Products: Series of dynamic ruptures and tsunami sources

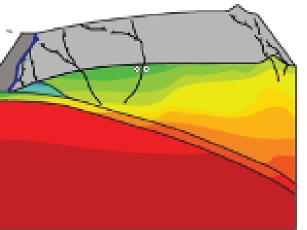
CLiP Webinars

Cartoon of a resilience triangle, demonstrating the decrease and recovery in level of service for a society after a disaster, for a low level of resilience and high resilience region. Recovery is significantly longer for less resilient societies. Courtesy of V.J. Sahakian.

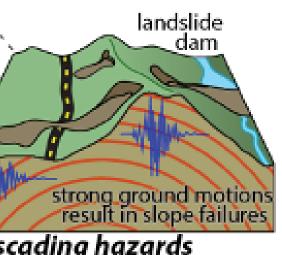




Ground motion



Lithospheric architecture

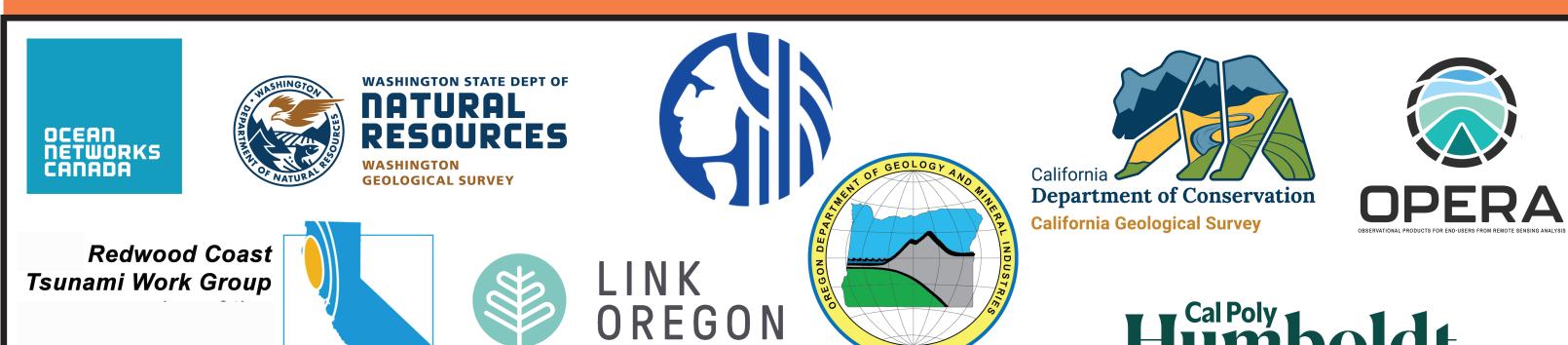


PARTNERSHIPS & APPLICATIONS (P&A)

Mission: Form partnerships and collaborations with regional organizations and groups to guide and translate CRESCENT's science to meet societal needs.

Goals & Activities:

• Establish practices and relationships that foster the co-creation of knowledge • Host annual partner and community stakeholder meetings • Co-produce Cascadia Lifelines Program (CLiP) webinars on earthquake resiliency • Share information via web, listservs, newsletter and social media campaigns • Forge collaborative connections between partners and working groups • Forge connections between partners and working groups to collaborate on how CSZ earthquake research impacts critical infrastructure and policy development



Dynamic tsunami generation

Strain accumulation and release

Role of fluids

Cascading hazards

Strategic Plan schematic, visually demonstrating the science and hazards goals of CRESCENT. Courtesy of Lydia Staisch.

Humboldt.

SEED GRANTS

The annual CRESCENT Seed Grant Program has the dual goals of broadening community participation and increasing the breadth of scientific investigations related to the center's scientific goals. Achieving these goals relies, in part, on inviting the community to participate in addressing key challenges identified through three major pillars: Science (S), Geoscience Education and Inclusion (GEI), and Partnerships and Applications (PA).

