Uncovering Faults at the Cascadia Subduction Zone
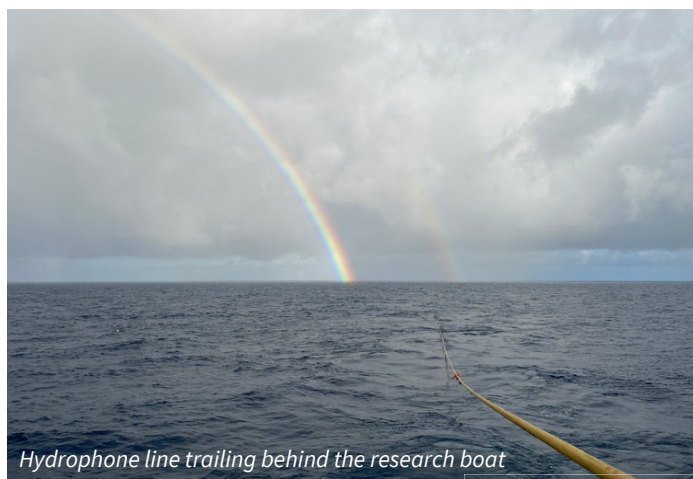

Janet Watt, Madeleine Lucas, and Anna Ledeczi.

Project at a glance

🎯 Current hazard modeling for earthquakes and tsunamis at the Cascadia Subduction Zone use oversimplified inputs for active offshore fault zones due to a lack of modern field data.

🎯 We are working to better locate and characterize offshore fault zones in Cascadia using recently collected marine seismic images of the subsurface earthquake zone.

🎯 Using these new datasets, we are building 3D models of active fault zones capable of producing large earthquakes and tsunamis.

🎯 Our 3D fault models will be used in simulations of Cascadia earthquakes and tsunamis expected to happen in the future.

The University of Washington (UW) Fault Structure, Stress, & Tectonics (FaSST) group and the United States Geological Survey (USGS) Marine Geohazards group are working in collaboration with the Cascadia CoPes Hub Faults subteam to understand faulting in the Cascadia region. Their primary objective is to characterize active fault zones at the Cascadia Subduction Zone using recently acquired marine seismic imagery. This geophysical fieldwork technique, akin to an ultrasound of the Earth, uses sound waves to create a picture of features hidden beneath the ocean floor.

PhD students Madeleine Lucas and Anna Ledeczi from the UW FaSST group, advised by Harold Tobin of UW and Janet Watt of USGS, are working to analyze deep seismic images from the CAscadia Seismic Imaging Experiment 2021 (CASIE21) alongside shallow seismic images from the USGS. Their work aims to discern which deep-seated fault zones are also active at the seafloor. Identifying these fault zones is important because they have the potential to trigger larger tsunamis in the event of a major Cascadia Subduction Zone earthquake.

Hydrophone line trailing behind the research boat

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Cascadia CoPes Hub
THE CASCADIA COASTLINES AND PEOPLES HAZARDS RESEARCH HUB

USGS
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CASIE21

Fault Structure Stress & Tectonics at UW