

Amphibious Community Experiments in Alaska and Related Opportunities

Sunday December 10, 2017

AGU Fall Meeting 2017

New Orleans, LA

Workshop Committee: Geoff Abers (Cornell University), Aubreya Adams (Colgate University), Emily Roland (University of Washington), Susan Schwartz (UC Santa Cruz), Spahr Webb (LDEO, Columbia University), Lindsay Worthington (University of New Mexico)

On Sunday December 10, a group of 73 scientists met in New Orleans in advance of the AGU Fall Meeting to discuss the current status and plans for the Alaska Amphibious Community Seismic Experiment (AACSE). Attendees encompassed a broad spectrum of marine and onshore science backgrounds including representatives from GeoPRISMS, NSF, IRIS, the Alaska Volcano Observatory, and academic institutions across the US and abroad. Graduate students and early career scientists were particularly well represented in the audience. After a brief introduction from GeoPRISMS Chair Demian Saffer and workshop co-Chair Aubreya Adams, AACSE lead-PI Geoff Abers reviewed previous work in the Alaskan subduction zone and highlights of the preceding community amphibious array, the Cascadia Initiative.

Workshop co-Chair Emily Roland provided a history of the AACSE and plans for execution of the project. Data collection will commence in 2018 with onshore deployments in May and June, and offshore deployment in two cruise legs. Leg 1 (co-chiefs Spahr Webb and Lindsay Worthington) will sail from May 9-29 and Leg 2 (co-chiefs Anne Sheehan and Doug Wiens) will sail from July 11-25. The array footprint extends along strike from Kodiak Island to the Shumagin Islands, and from the onshore backarc to the outer rise 250 km past the trench. A total of 75 ocean-bottom seismometers will be deployed, including 20 in shallow water with trawl-resistant mounts design. Thirty broadband sensors will be deployed onshore to complement the ongoing EarthScope Transportable Array. In 2019 a high-density Nodal array will be deployed along the 50 km road system on Kodiak. All data will become open through the IRIS Data Management Center immediately upon recovery and pre-processing. Roland also highlighted opportunities for community engagement, including the opening of the Apply-to-Sail program to scientists from all career stages. By the January 2018 deadline, a total of 47 graduate students, postdocs, faculty and geoscience professionals applied for ~12 available berths. Applications will reopen in late 2018 for the 2019 recovery cruises, one of which will be reserved for undergraduate participants.

Following the introduction by members of the AACSE PI team, scientists from across the community gave updates on related studies and highlighted opportunities to leverage the AACSE. Jeff Freymueller (Alaska Volcano Observatory) gave insights into monitoring of volcanic activity and volcano seismology along the entire subduction area, and updates on upgrades to the AVO monitoring network. Shanshan Li (University of Alaska, Fairbanks) reviewed recent geodesy studies and investigations of locked and creeping sections of the subduction interface.

Members of the broader community then presented a series of lightning talks, highlighting related projects in Alaska and other regions of subduction. Carl Tape (University of Alaska,

Fairbanks) gave updates following the demobilization of the SALMON network, providing insights into the unique challenges of field work in this region and into designing bear-resistant stations. Kerry Key (LDEO) showed preliminary results from a joint ocean-bottom magnetotelluric data and onshore seismic from the Okmok Volcano of the eastern Aleutian Islands. Recent geochemical studies of magma ascent and volatiles in Aleutian volcanoes were reviewed by Terry Plank (LDEO). Dave Chadwell (SCRIPPS) discussed the use of seafloor geodesy to study locking and creeping patches of the subduction interface. The final talk of the evening was given by Harold Tobin (University of Wisconsin) on SZ4D, focusing on the status of that initiative, and how insights from the AACSE could inform subduction zone science across the globe.

Community discussion after the talks focused on encouraging feedback for improvement of the implementation plan and reinforcing the ongoing charge of how we use the AACSE to better understand subduction zones on a global scale. Steps toward this goal include a focus on instrumenting seismic gaps in order to span critical boundaries in seismic behavior, as well as linking new observations to numerical, theoretical and conceptual models. Other measurements such as heat flow, sea-floor pressure measurements and magnetotelluric surveys, will be key in addressing these aims and could motivate complementary experiments. Attendees noted the need to have a response plan in place in the case of a large volcanic eruption or earthquake during the deployment.