

## **Alaska Amphibious Community Seismic Experiment (AACSE)** **Draft Deployment Plan, September 2017**

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The AACSE project team is funded to deploy an amphibious seismic array in 2018 and 2019, in the east-central Alaska Peninsula region. The plan addresses the high scientific priorities of the Amphibious Array Futures Workshop report and the GeoPRISMS and EarthScope Science plans in this region of great earthquakes and abundant volcanism, as outlined on the project web page and reports linked therein. The plan presented here addresses these scientific priorities within the framework outlined in the March 2016 Dear Colleague Letter (NSF-16061) inviting proposals for such an experiment. It is designed to coincide with the EarthScope Transportable Array (TA) deployment in Alaska and to utilize Ocean Bottom Seismometer Instrument Pool (OBSIP) resources. The deployment plan was vetted in mid-2016 through community comment on the proposed array design, and is open for continued feedback via the web page and various workshops and meetings.

Several major scientific and logistical criteria were used to design the array.

- Sampling of the megathrust at sufficient density to locate thrust-zone seismicity.
- Sampling across major segment boundaries to capture both locked and creeping sections of the megathrust.
- Spanning the outer rise sufficiently to image serpentization, e.g. via ambient noise.
- Densifying across one transect to enhance imaging of the entire subduction system from outer rise to far backarc.
- Taking advantage of forearc islands to allow deployment of onshore stations as close to the trench as possible.
- Taking advantage of TA, Alaska Earthquake Center (AEC) and Alaska Volcano Observatory (AVO) stations where possible to maximize efficiency and promotes integration with a larger data set.
- Optimize integration with existing data sets, for example active-source lines.
- Make all data available openly and freely at the IRIS DMC, as soon as they are recovered from instruments and appropriately corrected.

The deployment plan is outlined as follows; an accompanying map shows the currently planned instrument placement.

- We will deploy 75 OBSs from OBSIP and 30 onshore broadband instruments from the PASSCAL Instrument Pool. Thirty of the OBSs will be provided by WHOI and the remainder by LDEO.
- The experiment is concurrent with the TA and maximizes integrated use of TA instruments, so naturally focuses on the easternmost part of the subduction system. The TA should remain fully deployed until some time in mid-late 2019 at least.

- A dense transect crossing Kodiak and Katmai integrates with TA stations 1000 km behind the arc. AVO is enhancing several Katmai and Alaska Peninsula stations to full broadband in coordination with AACSE.
- The experiment is limited to a single deployment to minimize costs and number of support cruises, covering two consecutive summers and the intervening winter. Oceanographic noise is considerably lower during summer months.
- All OBSs have been designed or retrofitted to last up to 15 months on the sea floor. Land stations are configured to allow 16-18 months of continuous operation on a single set of (air-cell) batteries.
- Deployment starts in late spring 2018 when weather permits (after May 1), subject to instrument and ship availability.
- Current ship schedules have the LDEO OBSs deployed in May 2018 and the WHOI OBSs in July. We will deploy land instruments in May and early June of 2018. All instruments will be recovered late summer, 2019.
- To ensure on-scale recording of larger earthquakes, five of the deep-water OBSs and six of the PASSCAL onshore instruments will include accelerometers, strategically placed. These complement approximately eight TA stations equipped with accelerometers in the study area.
- Roughly half of the OBSs are equipped with high-precision absolute pressure gauges to provide on-scale vertical deformation, including all shallow-water instruments.
- Twenty OBSs are capable of operating in shallow (<200m) water, using the Trawl Resistant Mount design developed in Cascadia.
- Current ship schedules place 2018 deployment off the R/V Sikuliaq. Its home port of Seward is the likely port for most cruises.
- Onshore deployments are likely based out of Kodiak, King Salmon, and Port Moller/Nelson Lagoon. To control costs and logistical uncertainty all stations on-shore stations will be reachable by plane or boat, or truck, utilizing local vendors. All sites shown on maps are provisional, as permits are pending.

We are envisioning a series of educational opportunities as well. These include:

- Open applications for participation in cruises via Apply to Sail mechanisms;
- Opportunities for area secondary-school teachers to participate;
- A cruise with berths devoted to undergraduates, complemented by a pre-cruise short course;
- Outreach to communities within the deployment region; and
- A web page with regular updates on field progress.

The attached map shows stations, color-coded by type, as indicated by the map legend.

Project web page: <http://geoprisms.org/research/community-projects/alaska/>