Alaska Amphibious Community Experiment (AACE)
Draft plan and request for public comment, June 30, 2016

A proposal for a community amphibious seismological experiment in Alaska is being prepared for the GeoPRISMS deadline, to address high-priority scientific problems across the Alaska margin. The plan addresses the high scientific priorities of the Amphibious Array Futures Workshop report as they address the GeoPRISMS and EarthScope Science plans in a region of great earthquakes and abundant volcanism, as outlined on the project web page and reports linked therein (http://geoprisms.org/research/community-projects/alaska/). The PI team is listed there as well.

The plan presented here attempts to address these scientific priorities within the framework outlined in the March 2016 Dear Colleague Letter (NSF-16061) inviting proposals for such an experiment. We outline the draft deployment plan and rationale below and on the accompanying deployment map. This community experiment proposal is due at the July 26, 2016 GeoPRISMS deadline. At present we are seeking cost estimates from OBSIP on various components, and may adjust the plan somewhat depending on those estimates.

In keeping with the community nature of this project we are now soliciting community feedback, through **July 10, 2016** at which time we will finalize the budgets and proposal. Send your feedback to the form on the project web page, under Leave A Reply. All feedback comments will be publically posted to this web page shortly after posting. If you wish to keep your comments confidential, please indicate that clearly at the beginning of your comment text and the moderator will communicate your comment to the PI group. Please use the web page mechanism for any comments to the plan rather than emailing the PI's directly.

We do not expect to be able to deploy significantly more stations than described below, so it is most valuable to receive input about the particular choices of deployment scheme. The main limitations to keep in mind are the small number of instruments (25) available for deployment in shallow water (<200 m), the importance of integration with the TA described in the Dear Colleague Letter, and the importance of accomplishing objectives in a single 1-1.5 year deployment. We are particularly interested in thoughts about tradeoff between areal coverage and station density, for example over the thrust zone or in the outer rise.

Some of the major design criteria include:

- Sampling of the megathrust at sufficient density to locate thrust-zone seismicity;
- Sampling across major segment boundaries capturing both locked and creeping sections of the megathrust;
- Staggered transects in at two locations with contrasting inputs and megathrust behavior that allow imaging of the entire subduction system from outer rise to far backarc;

- Coverage of the outer rise sufficient to image serpentinization, e.g. via ambient noise;
- Optimize ability to integrate with existing data sets, for example active-source lines.

The deployment plan is outlined as follows.

- The experiment is limited to a single deployment to minimize costs and number of support cruises, covering two consecutive summers and the intervening winter, starting spring 2018 when ships become available.
- Only 25 instruments would be capable of operating in shallow (<200m) water, using existing Trawl Resistant Mount instruments and modifying a limited number of deep-water instruments.
- The experiment is concurrent with the Alaska Transportable Array (TA) and maximizes integrated use of TA instruments, so naturally focuses on the easternmost part of the subduction system. A transect crossing Kodiak and Katmai nicely integrates with onland TA stations 1000 km behind the arc. A transect near the creeping fault near the Shumagin Islands utilizes several Alaska Peninsula and island stations, and at low resolution benefits from stations on the east coast of the Bering Sea.
- We anticipate being able to deploy 85 broadband OBS's, including the 25 TRM's. Where possible those near the thrust zone may include absolute pressure gages for recording potential creep events and on-scale recording of moderate-to-large earthquakes.
- We are exploring the use of short-period OBS's in the deep-water parts of the forearc. Should they result in significant cost savings, we could deploy ten in this region in place of five of the deep-water OBS's.
- We are exploring the costs of a limited number of accelerometers added to OBS's.
- On shore we would deploy a limited number of broadband stations, particularly along the two primary transects on Kodiak, across and north of the Katmai volcanic field, and perhaps near the Alaska Peninsula. To control costs and logistical uncertainty all stations should be reachable by plane or boat; helicopters will not be used due to cost and logistical uncertainty in Aleutian weather.
- The land station geometry is notional at present, while access and permissions are being evaluated.

We are envisioning a series of educational opportunities as well, including open applications for participation in cruises and onshore fieldwork, a data-oriented post-cruise short course for scientists new to these data types, outreach to communities within the deployment region, and a web page with regular updates on field progress. We welcome suggestions for maximizing the broader impacts of this program.

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