EarthScope's Transportable Array Spans Alaska, the Last Frontier

Legacy of the Alaska Transportable Array



The Alaska Transportable Array (TA), funded by the National Science Foundation as part of the EarthScope program, was a dense network of 281 temporary seismic stations installed throughout Alaska and northwestern Canada to record earthquakes and other ground motions. Although network operations by the Incorporated Research Institutions for Seismology (IRIS) ended in September 2021, scientists will continue to use the free and publicly available data for years to come.

Fortunately, the Alaska Transportable Array legacy will live on. Over the last several years, the Alaska Transportable Array team assisted partner organizations by upgrading over 30 existing seismic stations, improving the overall quality of Alaska's permanent seismic network. Additionally, the team has successfully transitioned 117 temporary Alaska Transportable Array stations into permanent stations that are now operated and maintained by the Alaska Earthquake Center, Alaska Volcano Observatory, Canadian Hazards Information Center, and Geological Survey of Canada. By working with these organizations on permitting, transferring equipment, and establishing data collection, these stations continue to operate and record local earthquakes as well as those from other parts of the globe.

Officials push to keep dozens of earthquake sensors slated for removal across Alaska

https://www.adn.com/alaska-news/2019/01/05/ https://www.adn.com/alaska-news/2019/01/05/ officials-push-to-keep-dozens-of-earthquake-sensorsofficials-push-to-keep-dozens-of-earthquake-sensorsofficials-push-to-keep-dozens-of-earthquake-sensorsofficials-push-to-keep-dozens-of-earthquake-sensorsofficials-push-to-keep-dozens-of-earthquake-sensorsofficials-push-to-keep-dozens-of-earthquake-sensorsofficials-push-to-keep-dozens-of-earthquake-sensorsslated-for-removal-across-alaska/

All Those Data

Data collected as part of the Alaska Transportable Array are publicly available. They include seismic (ground motion) data collected at all stations, in addition to meteo-rological (wind, temperature, precipitation), infrasound, and ground temperature at selected locations. The seismic data are ingested into real-time processing systems for detection, location, and characterization of earthquakes in Alaska and Canada as well as around the world. These data are also used by hundreds of researchers in a wide range of fields and projects. Hear what scientists are saying...

Alaska earthquakes offer new insight into improving hazard assessment

https://phys.org/news/2018-12-alaskaearthquakes-insight-hazard.html We are only able to do this study because the Transportable Array installed high-quality, state-of-the-art instruments in many otherwise inaccessible places. ?? – Michael Mann, Cornell University

Without the USArray, some of those far-flung earthquakes would be like listening to thunder over the horizon. You know it's over there, but you don't really know what happened.
Mike West, Alaska State Seismologist, Alaska Earthquake Center

View the Data

To view seismograms from currently operating seismic stations, visit the IRIS Station Monitor at https://www. iris.edu/app/station_monitor/.

To view data from decommissioned stations, try IRIS Station QuickLook http://ds.iris.edu/ds/nodes/dmc/tools/station_quicklook/ or one of the other access tools available through the IRIS Data Management Center: http://ds.iris.edu/ds/nodes/dmc/tools/.



Researchers at the University of Massachusetts Amherst use Alaska Transportable Array data to learn more about plate tectonics in the region, particularly the controls on subduction zone segmentation and how volcanoes are distributed along this boundary.

Yang, X., & H. Gao (2020). Segmentation of the Aleutian-Alaska subduction zone revealed by full-wave ambient noise tomography: Implications for the along-strike variation of volcanism. *Journal of Geophysical Research: Solid Earth*, 125, doi: 10.1029/2020JB019677

⁶⁶ For a long time, the whole central Alaska region was thought to have one simple subduction plate. What we discovered is that there are actually two major subduction slabs. **99** – Xiaotao Yang, Purdue University

Strong aurora-caused disturbances are recorded by the Alaska Transportable Array. Normally considered an undesired noise, in this study, scientists at the University of Alaska Fairbanks and US Geological Survey use seismic data to detect these magnetic signals.

Tape, C., A.T. Ringler, & D.L. Hampton (2020). Recording the aurora at seismometers across Alaska, *Seismological Research Letters*, 1–15, doi: 10.1785/0220200161



⁶⁶ This [dense seismic station array] has provided unprecedented coverage in the high Arctic region with broadband seismometers that can record subtle signals. **99**– Carl Tape, University of Alaska Fairbanks



Temporary seismic stations were fortuitously installed in time to capture a number of large and significant earthquakes in Alaska, including the 2016 M7.1 Iniskin and the 2018 M7.1 Anchorage earthquakes that shook the most populated areas of the state. Researchers at Cornell University study the mechanics of intra-slab earthquakes like these and how the local geology affects the intensity of ground motions.

Mann, M.E., & G.A. Abers (2020), First-order mantle subduction zone structure effects on ground motion: the 2016 Mw 7.1 Iniskin and 2018 Mw 7.1 Anchorage earthquakes, *Seismological Research Letters*, 91, 85–93, doi: 10.1785/0220190197

66 We've known for some time that you occasionally do get big intra-slab earthquakes and there's been some concern they are underrepresented globally in hazard estimates in the places in the world where they occur. So, this is an opportunity to delve a little bit deeper to try to understand what was going on here. ??

- Geoff Abers, Cornell University

Information about the Alaska Transportable Array is available at: www.usarray.org/Alaska

Staff at the IRIS Alaska Operations Center were supported by the Array Operations Facility at New Mexico Tech, the Array Network Facility at the University of California San Diego, the IRIS Data Management Center in Seattle, Washington, and IRIS Headquarters in Washington, DC. Support from the Alaska Earthquake Center was also invaluable, along with the cooperation of the Alaska Volcano Observatory, Alaska Tsunami Warning Center, UNAVCO, Canadian Hazards Information Service, Yukon Geological Survey, Government of Yukon Wildland Fire Management, and Natural Resources Canada.

