After field work leaves the field – The AACSE active source supplement

Emma Myers

It has been over a year since the Alaska Amphibious Community Seismic Experiment (AACSE) Active Source Supplement cruise with co-Principal Investigtors Anne Bécel and Anne Sheehan. With many cruises this year having been cancelled, delayed, or certainly forced to become much more complex in the response to the global pandemic, reflecting on this cruise provides a greater recognition of how important these experiences are.

This cruise was part of the multiple AACSE research legs in 2018 and 2019 focusing on the Alaska Subduction Zone, a GeoPRISMS primary site and EarthScope target. The Active Source Supplement was a fortunate addition between the primary ocean-bottom seismometer (OBS) deployment and retrieval operations, spanning three weeks in June 2019 aboard the *R/V Marcus G. Langseth*. Using the active source airgun array, this cruise was designed to provide 400-m shot spacing arrivals for 3D refraction imaging using the AACSE ocean bottom seismometer array as well as the onshore seismometers and nodal array. Additionally, coincident deployment of a 4 km-long streamer, allowed us to acquire 1751 km of multi-channel seismic (MCS) data. This imaging promotes the investigation of the subducting sediments and the topography of the down-going plate over the SW Kodiak asperity and the Semidi segment. It was also used as part of an educational field experience for several undergraduate and graduate Apply-to-Sail students, many with no prior experience collecting, processing, and interpreting seismic reflection data.

Since the cruise, Anne Bécel presented the acquired data and reflection processing at AGU in December last year (Bécel et al., 2019). Her work showed that despite the low fold coverage for this MCS data, we clearly image along-strike variations in the incoming plate sediments and bathymetric features, as well as changing accretionary prism deformation structures. On-going additional work include shallow fault mapping incorporating a subset of imaging from this cruise (Peter Haeussler) and 3D tomography using the refraction data from this active source cruise (Anne Bécel) which will later be used in a joint inversion with the passive local earthquake dataset (Juan-Pablo Canales). An SRL paper has also been published this year summarizing the breadth of data acquisition and research covered by the entire AACSE (Barcheck et al., 2020).

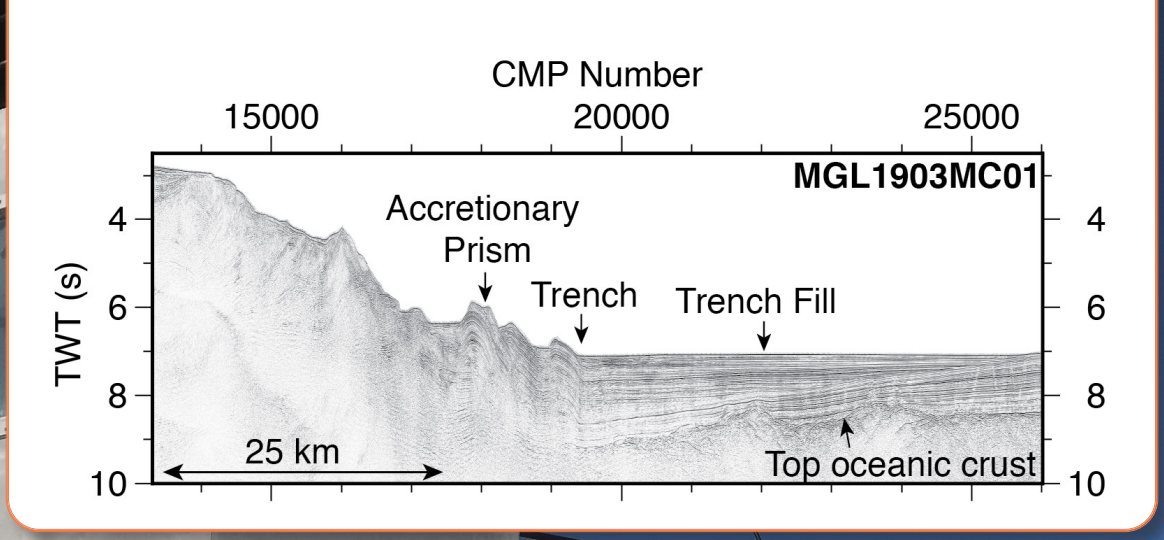
Following up with students that I instructed at sea, while not working on the collected data, they shared the on-going effect the cruise had on their own research. One student, Gökçe Astekin (Masters student at Oklahoma State University), said the best part was "getting together and working with students with different backgrounds, and listening to their own way of interpretation and learning from them." Another student, Carlos Gomez (PhD Candidate at Southern Illinois University), agreed, saying, "Good research should be equal parts discovery and theory-refinement, modeling and field work, wherever that may take you." These students help to highlight the success of this cruise not only in its data acquisition for on-going research, but in demonstrating the importance of field experiences such as these for the future when circumstances improve. ■

References

Bécel, A., A.F. Sheehan, E.K. Myers, G.A. Abers, D.S. Foster, L.L. Worthington, A.N. Adams, P.J. Haeussler, E.C. Roland, S.Y. Schwartz, D.J. Shillington, D. Wiens, S.C. Webb (2019). Along-strike variations in sediment input at the Alaska Peninsula subduction zone from new open access multichannel seismic reflection data of the Alaska Amphibious Community Seismic Experiment, Abstract [T51F-0330] 2019 Fall Meeting, San Francisco, CA

Barcheck, B., G.A. Abers, A.N. Adams, A. Bécel, J. Collins, J.B. Gaherty, P.J. Haeussler, Z. Li, G. Moore, E. Onyango, E. Roland, D.E. Sampson, S.Y. Schwartz, A.F. Sheehan, D.J. Shillington, P.J. Shore, S. Webb, D.A. Wiens, L.L. Worthington (2020). The Alaska Amphibious Community Seismic Experiment. Seismol Res Lett, doi:10.1785/0220200189

Right page. The AACSE science party from top to bottom, left to right, Hongda Wang, Lucia Gonzalez, Gökçe Astekin, Emma Myers, Anne Bécel, Carlos Gomez, Mitchell Spangler, Ellyn Huggins, Brandon VanderBeek, Anne Sheehan, and William Frazer. Photo credit: A. Sheehan



Example of an MCS profile crossing the accretionary prism, trench, and sediment-covered incoming plate (Bécel personal communication).