AGU FALL MEETING
Chicago, IL & Online Everywhere
12–16 December 2022

SCIENCE LEADS THE FUTURE

- ? Help / FAQ
- 🏠 Home
- 🔍 Search
- 📅 Schedule by Day
- 📖 Browse Program
- ⓘ Sessions and Events
- 🔍 Index Terms
- Ⓢ Suggested Itineraries
- Ⓟ Pod Reservation System 2022
- ⓘ Meeting Resources

T25E-0170 - Seismic Imaging across the Northern Chukchi Borderland: Implications of the Canada Basin Opening

📅 Tuesday, 13 December 2022

🕐 15:45 - 19:15

📍 *McCormick Place - Poster Hall, Hall A (South, Level 3)*

Abstract

Multichannel-seismic data were collected in August and September 2021 over the Northern Chukchi Borderland and Central Canada Basin from the R/V Sikuliaq. The data were acquired with two 520 cu inch GI airguns and a 200 meters (32 channels) streamer.

The preliminary processing started by screening the bad traces caused by the broken hydrophone and misfires during acquisition. Bandpass and F-K filtering were applied to the traces. The bandpass filtering eliminates energy that is outside of the band of energy emitted by the airguns. The F-K filter is implemented by bringing the signal amplitude into the frequency-wavenumber (f-k) domain to exclude the reflection signal with the noise amplitude.

Our seismic data contains multiples that interfere with the primary image, obscuring the data. These multiples usually occur when seismic signals are trapped in the water column. We utilized surface related multiple elimination (SRME) method to attenuate the multiples. Surface related multiple elimination is applied by developing multiple prediction models from the primary reflection and generating the high order and low order multiple to subtract or eliminate the multiple. We find the SRME method is improved adjusting the sediment velocity and the filter length. The bandpass and F-K filter show a significant improvement in the signal coherence. The SRME method is effective in improving the clarity and continuity of the primary reflectors.

Profiles were generated by performing post-stack time migration. Post-stack migration was applied by summing all the reflected signals into a CDP gather, strengthen the coherent reflectors, then migrating or relocating the dipping reflector to its actual location and eliminating the diffraction effects. We have tied our interpretation to the previous project acquired in 2011 from the southern part of the Chukchi Borderland. The 2011 survey sailed over wells drilled by Shell in the late 80s on the Chukchi Shelf and directly tied the reflectors with the stratigraphy.

The processed multichannel-seismic profiles from the Northern Chukchi Borderland show horsts with grabens continuous with those imaged from RV Langseth in 2011. These basins are filled with syn-rift and post-rift stratigraphy. Stratigraphic sequences imaged on Northwind Ridge are segmented by multiple unconformities and minor structures. The origin of these unconformities may be related to the opening of Canada Basin and multiple generations of glacial ice contact over the bathymetric high. The seismic profile on Canada basin showed a prominent feature recognized as a basement, which seems to support the interpretation of the extinct mid-ocean ridge as an unsegmented, ultra-slow spreading ridge.
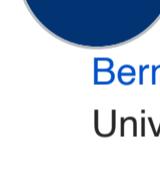
First Author

Ⓟ **Wisnu Priyanto**
University of Alaska Fairbanks

Author

Ⓒ **Bernard Coakley**
University of Alaska Fairbanks

View Related

T25E - The Alaskan and Northern Canadian Cordillera: Geology, Geochemistry, Geophysics, Petrology, and Tectonics II Poster

Derek Schutt, Colorado State University, Geosciences, Fort Collins, United States, Julie Elliott, Michigan State University, Department of Earth and Environmental Sciences, East Lansing, United States, Jeffrey Todd Freymueller, Michigan State University, Earth and Environmental Sciences, East Lansing, MI, United States and Matthew E Brueseke, Kansas State University, Department of Geology, Manhattan, KS, United States

📅 Tuesday, 13 December 2022

🕐 15:45 - 19:15

📍 *McCormick Place - Poster Hall, Hall A (South, Level 3)*

Tectonophysics

Similar

Seismic reflection imaging of along-strike changes in forearc structure in the Andreanof segment of the Aleutian subduction zone

Valeria Cortes-Rivas, Northern Arizona University, Flagstaff, AZ, United States, Donna J Shillington, Northern Arizona University, School of Earth and Sustainability, Flagstaff, AZ, United States, Daniel Lizarralde, Woods Hole Oceanographic Institution, Geology and Geophysics, Woods Hole, MA, United States, Hannah Mark, Woods Hole Oceanographic Institution, Woods Hole, United States, Justin Estep, Main Marine Academy, CED-General Consulting, Castine, United States and Brian Boston, Lamont-Doherty Earth Observatory of Columbia University, Palisades, NY, United States

Imaging Induced Seismicity Locations and Updating Seismic Velocity Models with Wave-equation Methods for a Large-N Nodal Array Dataset in Northern Oklahoma, USA

Chenglong Duan, University of Texas at Dallas, Geosciences, Richardson, TX, United States and David E Lumley, University of Texas at Dallas, Geophysics, Physics, Richardson, TX, United States