
T51E-0535: Vp/Vs Ratio of Juan de Fuca Plate Sediments Along the Cascadia Deformation Front From Analysis of Controlled-Source Multi-Component OBS Records

Friday, 15 December 2017

08:00 - 12:20

📍 *New Orleans Ernest N. Morial Convention Center - Poster Hall D-F*

The seismic characteristics (Vp, Vs, Vp/Vs, anisotropy) and derived physical properties (porosity, effective stress, pore fluid pressure, and crack density/orientation) of sediments entering a subduction zone are key parameters to understand subduction plate interface properties and seismogenic behavior. Here we present preliminary results of the average Vp/Vs within the ~2-3-km-thick sediment section along the Cascadia deformation front between ~44°-48°N offshore Oregon and Washington. We use data acquired in 2012 during the Juan de Fuca Ridge to Trench (R2T) controlled-source seismic experiment. We use P-waves and PPS converted-wave modes (i.e., P-to-S conversions of up-going waves at the crust-sediment interface) observed in 25 multi-component, short-period ocean bottom seismometers (OBS) deployed along an ~400-km-long profile located 10-15 km seaward from the trench. The Vp/Vs was calculated following the method of Tsuji et al. (2011), which uses the seafloor-to-basement two-way traveltimes determined from a coincident multichannel seismic reflection profile, and the time lag DT between the crustal P-refracted and PPS-converted waves. Processing of the OBS data included rotation into radial and traverse components, bandpass filtering, and predictive deconvolution. Our preliminary results show that the average sediment Vp/Vs along the profile varies from 2.8 to 3.35. Along the central-northern Oregon margin, Vp/Vs ranges between 2.8 and 2.95, while along the northern Washington margin Vp/Vs are slightly higher (2.95-3.05). We find the largest Vp/Vs values (≥ 3.1) offshore southern WA (between 46°-46.7°N). These preliminary results imply along-margin variations in subducting sediments along Cascadia. Implications for the physical properties of the sediments entering Cascadia are currently being explored and will be presented at the meeting.

Plain Language Summary

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