

Seismic imaging of water column structure across the Juan de Fuca ridge system

Newman, K. R., Nedimovic, M. R., Carbotte, S. M., Diebold, J. B.

We select the three longest multichannel seismic profiles collected across the Juan de Fuca ridge system and process them for water column reflections. Our initial results reveal the first reflection images of water column structure across a spreading center. Reflections within the water column are well imaged in the upper 750 to 1000 m. The strong, low frequency direct water wave, which obscures the higher frequency reflections in the upper 200 m, was removed using bandpass filtering and CMP mutes. In our first finalized section, the ~130 km-long profile across the Endeavour ridge, we image an entire eddy and find evidence that the presence of the ridge affects the water column structure. The thermocline beneath the eddy extends down to a maximum depth of about 750 m and the eddy is bounded on top by a concave down reflector. This geometry suggests that the eddy could be an intrathermocline feature, formed around a lens of water that has intruded along the thermocline. No CTD or XBT data were collected along this line, so the thermal structure through the eddy is unknown. However, inspection of historic CTD data often shows a temperature excursion around 150 m. This is in agreement with the depth of ~150 m for the center of the imaged water lens. We will finalize processing of the other two long profiles crossing Northern Symmetric and Gorda ridges to determine if similar features exist in these areas further south, and to examine what effect the topography of this spreading center has on circulation in the upper water column.