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TITLE: Along-trench Structural Variations of Downgoing Juan de Fuca Plate in relation to Regional Scale Segmentation of the Cascadia Subduction Zone: insights from Multichannel Seismic Imaging

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ABSTRACT BODY: The Cascadia subduction zone is regionally segmented in its structural characteristics, intra-slab seismicity and Episodic Tremor and Slip, and submarine morphology. The origin of these regional variations in subduction zone structure is not clear. Based on spatial correlations of the segmentation with the topography and geologic terranes of the overriding North America plate, an upper plate related origin has been proposed (e.g. Brudzinski & Allen 2007). However, characteristics of the downgoing Juan de Fuca (JdF) plate, including plate segmentation defined by pseudofaults, the distribution of buried seamounts, and changes in faulting and alteration of the plate may also contribute (Nedimovic et al. 2009).

During the Cascadia Ridge-to-Trench experiment conducted in June-July 2012 aboard the R/V Langseth, Multichannel Seismic (MCS) data along a 450 km-long trench-parallel line ~10 km seaward of the Cascadia deformation front were collected. The major scientific objective of this line is to characterize JdF plate structure along an approximately constant age transect just seaward of the trench and to assess the contribution of the down-going plate to regional segmentation of the subduction zone. Preliminary brute stacks generated at sea show bright intracrustal reflectivity, including a series of antithetic shallowly dipping events, as well as clusters of southward and northward dipping events; there are marked changes in characteristics of this reflectivity along the Oregon and Washington margins. Several strike slip faults offsetting the sediment section and an ~6 km wide small seamount are also imaged. 2D MCS processing will be conducted on this line and the results will be presented at the meeting.

KEYWORDS: [8170] TECTONOPHYSICS / Subduction zone processes, [3040] MARINE GEOLOGY AND GEOPHYSICS / Plate tectonics, [3025] MARINE GEOLOGY AND GEOPHYSICS / Marine seismics.

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