2012 Fall Meeting
Search Results

Cite abstracts as **Author(s) (2012), Title, Abstract xxxxx-xxxx presented at 2012 Fall Meeting, AGU, San Francisco, Calif., 3-7 Dec.**

Your query was:
nedimovic

HR: 1340h
AN: **T13H-01**
TI: Evolution and hydration of the Juan de Fuca crust and uppermost mantle: a plate-scale seismic investigation from ridge to trench *(Invited)*
AU: ***Carbotte, S M**
EM: *carbotte@ldeo.columbia.edu*
AF: *Lamont-Doherty Earth Obs, Palisades, NY, USA*
AU: **Canales, J**
EM: *jpcanales@whoi.edu*
AF: *WHOI, Woods Hole, MA, USA*
AU: **Carton, H D**
EM: *hcarton@ldeo.columbia.edu*
AF: *Lamont-Doherty Earth Obs, Palisades, NY, USA*
AU: **Nedimovic, M R**
EM: *mladen@dal.ca*
AF: *Dalhousie University, Halifax, NS, Canada*
AU: **Han, S**
EM: *han@ldeo.columbia.edu*
AF: *Lamont-Doherty Earth Obs, Palisades, NY, USA*
AU: **Marjanovic, M**
EM: *milena@ldeo.columbia.edu*
AF: *Lamont-Doherty Earth Obs, Palisades, NY, USA*
AU: **Gibson, J C**
EM: *jacgibso@ucsc.edu*
AF: *Lamont-Doherty Earth Obs, Palisades, NY, USA*
AU: **Janiszewski, H A**
EM: *helenj@ldeo.columbia.edu*
AF: *Lamont-Doherty Earth Obs, Palisades, NY, USA*
AU: **Horning, G**
EM: *ghorning@whoi.edu*
AF: *WHOI, Woods Hole, MA, USA*
AU: **Delescluse, M**
EM: *delescluse@geologie.ens.fr*
AF: *ENS, Paris, France*
AU: **Watremez, L**
EM: *louise.watremez@dal.ca*
AF: *Dalhousie University, Halifax, NS, Canada*
AU: **Farkas, A**
EM: *aaron.farkas.dal@gmail.com*
AF: *Dalhousie University, Halifax, NS, Canada*
AU: **Biescas Gorriz, B**
EM: *berta.biescas@dal.ca*
AF: *Dalhousie University, Halifax, NS, Canada*
AU: **Bornstein, G**

EM: *golembo@gmail.com*
AF: *Dalhousie University, Halifax, NS, Canada*
AU: **Childress, L B**
EM: *lbchildr@u.northwestern.edu*
AF: *Noerthwestern University, Evanston, IL, USA*
AU: **Parker, B**
EM: *parkerb@mit.edu*
AF: *MIT, Boston, MA, USA*
AB: The evolution of oceanic lithosphere involves incorporation of water into the physical and chemical structure of the crust and shallow mantle through fluid circulation, which initiates at the mid-ocean ridge and continues on the ridge flanks long after crustal formation. At subduction zones, water stored and transported with the descending plate is gradually released at depth, strongly influencing subduction zone processes. Cascadia is a young-lithosphere end member of the global subduction system where relatively little hydration of the downgoing Juan de Fuca (JdF) plate is expected due to its young age and presumed warm thermal state. However, numerous observations support the abundant presence of water within the subduction zone, suggesting that the JdF plate is significantly hydrated prior to subduction. Knowledge of the state of hydration of the JdF plate is limited, with few constraints on crustal and upper mantle structure. During the Cascadia Ridge-to-Trench experiment conducted in June-July 2012 over 4000 km of active source seismic data were acquired as part of a study of the evolution and state of hydration of the crust and shallow mantle of the JdF plate prior to subduction at the Cascadia margin. Coincident long-streamer (8 km) multi-channel seismic (MCS) and wide-angle ocean bottom seismometer (OBS) data were acquired in a two-ship program with the R/V Langseth (MGL1211), and R/V Oceanus (OC1206A). Our survey included two ridge-perpendicular transects across the full width of the JdF plate, a long trench-parallel line ~10 km seaward of the Cascadia deformation front, as well as three fan lines to study mantle anisotropy. The plate transects were chosen to provide reference sections of JdF plate evolution over the maximum range of JdF plate ages (8-9 Ma), offshore two contrasting regions of the Cascadia Subduction zone, and provide the first continuous ridge-to-trench images acquired at any oceanic plate. The trench-parallel line was designed to characterize variations in plate structure and hydration linked to JdF plate segmentation for over 450 km along the margin. Shipboard brute stacks of the MCS data reveal evidence for reactivation of abyssal hill faulting in the plate interior far from the trench. Ridgeward-dipping lower crustal reflectors are observed, similar to those observed in mature Pacific crust elsewhere, as well as conjugate reflectivity near the deformation front along the Oregon transect. Bright intracrustal reflectivity is also observed along the trench-parallel transect with marked changes in reflectivity along the Oregon and Washington margins. Initial inspection of the OBS record sections indicate good quality data with the expected oceanic crustal and upper mantle P-wave arrivals: Ps and Pg refractions through sedimentary and igneous layers, respectively, PmP wide-angle reflections from the crust-mantle transition zone, and Pn upper mantle refractions. The Pg-PmP-Pn triplication is typically observed at 40-50 km source-receiver offsets. Pn characteristics show

evidence for upper mantle azimuthal anisotropic propagation: along the plate transects Pn is typically weaker and difficult to observe beyond ~80 km offsets, while along the trench-parallel transect Pn arrivals have higher amplitude and are easily observed up to source-receiver offsets of 160-180 km. An overview on the Cascadia Ridge to Trench data acquisition program and preliminary results will be presented.
DE: [3025] MARINE GEOLOGY AND GEOPHYSICS / Marine seismics
DE: [3040] MARINE GEOLOGY AND GEOPHYSICS / Plate tectonics
DE: [8170] TECTONOPHYSICS / Subduction zone processes
SC: Tectonophysics (T)
MN: 2012 Fall Meeting

New Search

AGU Home