International Session (Oral) | Symbol S (Solid Earth Sciences) | S-IT Science of the Earth's Interior & Techtonophysics

# [S-IT02_29PM2]Aqueous fluids and melts in subduction zones: Experiment, modeling, and geophysical observations

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Tue. Apr 29, 2014 3:45 PM - 5:00 PM 211 (2F)

Characterization of the geophysical and geochemical interaction between minerals, fluid and magmatic liquid in subduction zone processes is central to our understanding of this environment. To this end, integrated observational, experimental, and theoretical studies are needed. Solubility and solution mechanisms of fluids in minerals and melts, and of silicate in fluids and linkages between solubility, solution mechanisms, chemical and physical properties of these materials under appropriate temperature, pressure, and redox conditions are needed. This session will bring together scientists with focus on current experimental, theoretical, and observational understanding of ?how to model physicochemical properties of subducting slabs including?spatial relation between intraslab seismicity such as slow-slip events and fluids pore pressure of fluids and their role in the weakening of shear strength of rocks?accumulation and transfer of fluids and melts ?solubility measurements of minor elements, trace elements, and stable isotopes in aqueous fluids and melts, ?how water and oxide components in aqueous fluids govern element and isotope partitioning between fluid, melt, and crystalline materials, and?linkages between solubility, partitioning, and rheological properties and solution mechanisms of water and silicate in minerals, melts, and fluids

4:45 PM - 5:00 PM

# [SIT02-P02_PG]Pore fluid geochemistry and carbonates in cores and cuttings from the Nankai accretionary prism

3-min talk in an oral session

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Keywords:Accretionary prism, GRIND method, IODP Expedition 348, Nankai Trough, Pore water

The recent IODP Exp 348 at Site C0002 has successfully deepened Hole C0002F (Exp 338) down to 3058.5 mbsf, deep into the accretionary prism of the Nankai Trough. During Exp 348, cuttings were collected and analysed from drilled interval of Holes C0002N (875 mbsf- 2325 mbsf) and C0002P (1965 mbsf- 3059 bsf) and limited coring was performed from 2163 to 2218 mbsf in Hole C0002P. The major-element composition of the solid cuttings and the geochemistry of interstitial water in cores was determined. Results provide insights into exchange of elements between minerals and pore water phases, and into geochemical signatures related to lithological changes within the prism. This study reports the main geochemical results from IODP Exp 348. Interstitial waters were collected using the GRIND method (Wheat et al., 1994), in which core sediments were ground in an agate mill with ultra-pure water. The interstitial water percentage was determined by drying sediments at 60℃ and 105℃, the former to minimize loss of clay-bound water, and the latter to follow the GRIND procedure used in previous expeditions. Concentrations were interpreted with data corrected for dilution at 60℃, 105℃ and

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normalised to chlorinity values. Profiles of carbonates (as $CaCO_3$), organic carbon and total nitrogen were determined from cuttings of 1-4 mm and >4 mm sizes and are compared with the observed lithological boundaries. Carbonate veins were observed in a core sample exhibiting a fault zone at ?2205 mbsf, but no increase was observed at the same depth in the carbonates profile. The GRIND method has limitations in recovering absolute values of dissolved ions in interstitial waters, and yielded very high dissolved-ion concentrations in some samples. But comparison of ions normalized to chlorinity yielded results comparable to what was observed in pore waters at shallower depths of Site C0002. Some of the trend variations in the cuttings profiles of carbonates, organic carbon and nitrogen match the unit boundaries determined by observation of lithological changes in the cuttings. Therefore, it can be suggested to integrate these data when defining geological units. *Wheat, Boulegue and Mottl (1994) Proc. ODP, Sci. Results, 139: College Station, TX (Ocean Drilling Program), 429-437*

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