

2005 Fall Meeting
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AN: **V31B-0616**TI: [Reduced fO₂ Recorded in the Metasomatized Peridotite Xenoliths From the Sub-Arc Mantle in the Southernmost South America](#)AU: * **Wang, J**EM: jian.wang@science.uottawa.caAF: *University of Ottawa, Department of Earth Sciences, Ottawa, ON K1N 6N5 Canada*AU: **Hattori, K H**EM: khattori@uottawa.caAF: *University of Ottawa, Department of Earth Sciences, Ottawa, ON K1N 6N5 Canada*AU: **Kilian, R**EM: kilian@uni-trier.deAF: *Universitat Trier, Lehrstuhl fur Geologie, Trier, D-54286 Germany*AU: **Stern, C R**EM: SternC@colorado.eduAF: *University of Colorado, Department of Geological Sciences, Boulder, CO 80309 United States*

AB: We examined nine representative peridotite xenoliths from the Quaternary basalts in the Cerro Del Fraile area, which are described in Kilian & Stern (2002). They represent samples of the upper mantle less than 25 km east of the Austral volcanic zone that is characterized by adakitic magmas (Stern & Kilian, 1996). fO₂ was determined using the Sp-Ol-Opx oxybarometer of Wood (1990) and spinel standards with known Fe³⁺ contents. The temperature estimates used the two-pyroxene thermometer of Brey & K^hler (1990). There are two types of Sp-lherzolites; weakly metasomatized coarse-grained (2-5mm) and highly metasomatized fine-grained (0.5-2mm). The former shows protogranular texture contains thin veins of solidified melt, which is now composed of fine-grained aggregates of minerals. Fluid inclusions are common adjacent to the melt. Spinel occurs as fine lamellae along pyroxene cleavages, and large grains intergrown with Ol, Opx and Cpx. Olivine is high Fo (0.90-0.91) and Sp shows a range in Cr#, 0.17-0.34. They show the equilibration temperatures of 930-1030 °C and fO₂ ranging from FMQ-0.37 to +0.31. Fine-grained lherzolites are equigranular and contain abundant sulfides, fluid inclusions, and melt that pseudomorphs amphibole or Cpx. They contain high Al₂O₃ (~ 54 wt %) in spinel, low Mg in Ol (Fo=0.84), Opx (Mg#=0.86) and Cpx (Mg#=0.88). They show low equilibration temperatures of 860 °C, low Cr# in spinel (0.13), and show relatively low fO₂ (FMQ-0.9 to -1.0). Increased Al and lowering of Mg of fine-grained spinel lherzolites are consistent with their extensive reactions with adakitic melt. The fO₂ values for weakly-metasomatized spinel lherzolites are similar to those of abyssal peridotites and SCLM in the western North America and Central Asia. The highly metasomatized samples show much lower fO₂ than sub-arc mantle samples from elsewhere. We suggest that the lowering of fO₂ during the metasomatism is due to the organic matter in sediments overlying the subducted slab as they would have fused and incorporated into adakitic melt.

DE: 1031 Subduction zone processes (3060, 3613, 8170, 8413)

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