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TI: [Oxidation State of Subcontinental Lithospheric Mantle Below the Southern South America](#)

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AB: Oxidation state of subcontinental lithospheric mantle (SCLM) below the southern South America was evaluated using the mantle xenoliths in the Quaternary Pali-Aike alkaline basalts. Xenoliths are mantle peridotites and cumulates. The former includes Grt-Sp lherzolite, Grt-Sp harzburgite, Sp-lherzolite and Sp- harzburgite. The PT estimates of samples yielded the local geotherm lying between continental and oceanic geotherms and defined the Sp-Grt transition at 1.9-2.5 kb, and 875-1020 °C. Cumulates are orthopyroxenites and websterites which also occur as veinlets in the mantle peridotites. Their parental magmas are co-genetic with the hosting alkaline basalts and responsible for modal and cryptic metasomatism in peridotites, which resulted in lowering of Mg and enrichment of Ti in bulk rocks and minerals. The values of fO_2 for xenoliths range from FMQ-0.33 to +0.75, which are higher than those for abyssal peridotites, but lower than those for subarc mantle peridotites. This is consistent with the origin and evolution of the SCLM in the area that formed through the underplating of oceanic lithosphere in early Paleozoic and underwent modification during the subducting of oceanic plate before the development of a slab window that was accompanied by the infiltration of asthenosphere-derived melt. This asthenosphere-derived melt is responsible for cryptic metasomatism in many Grt-bearing peridotites. fO_2 values do not show any significant change between metasomatized (FMQ-0.33 to +0.47) and non-metasomatized samples (FMQ-0.23 to +0.39). This is supported by low fO_2 , below the FMQ buffer, for Grt-bearing cumulates that could not change fO_2 of peridotites. For Sp-bearing samples, metasomatized samples show higher fO_2 (FMQ+0.59 to +0.75) than non-metasomatized peridotites (FMQ-0.23 to +0.48), suggesting that the melt infiltration resulted in the oxidation in the upper Sp-facies mantle peridotites. This is most likely explained by increased fO_2 of the melt in the upper mantle through fractional crystallization of olivine, pyroxenes, and decompressional oxidation of melt.

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