

Fluid-absent and H₂O-fluid-present Melting Experiments and the Evolution of Peraluminous Granites in the Sul-río-grandense Shield, Brazil

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In order to understand the evolution of peraluminous granites syntectonic to the Dorsal de Canguçu Transcurrent Shear Zone (DCTSZ) of the Sul-río-grandense Shield in Brazil, we have melted one of the potential protoliths, a natural high-grade cordierite gneiss, retrometamorphosed to low grade (semi-pelitic composition). Experiments were performed at pressures of 5 kbar (Internally heated gas pressure vessel), 10 and 15 kbar (Piston-cylinder), at temperatures of 700 to 900°C, under fluid-absent and H₂O-fluid-present (5 %) melting conditions. Our experiments show that at 5, 10 and 15 kbar, dehydration melting begins around 700°C, promoted by participation of phengitic muscovite in the reactions, producing a very small amount of melt (< 2%), and with widely ranging compositions. All hypersolidus experiments (>800°C) produce S-type granitic melts (10 to 63% in volume), and at 900°C and 15 kbar under fluid-absent conditions, melt has a similar composition to the DCTSZ syntectonic granites.

Together with previous experimental results and others geological tools, our new data can be used to suggest the protolith of the syntectonic peraluminous granites and the extent to which it was melted, as well as to place some constraints on pressure, temperature, and the influence of water in the melt production.