

Re-equilibration of granulites in a transcurrent shear zone in southeastern Brazil.

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The Paraíba do Sul Shear Zone (PSSZ) contains rock units affected by two main high-grade metamorphic episodes. The first (M1) was syntectonic to the main deformational event and produced flat-lying fabrics attributed to continental collision. Thermobarometric results of M1 mineral assemblages give temperature conditions of c.850°C and pressures between 6 and 6.7 kbar in the southern area and of 807°C to 877°C in the north, interpreted as reflecting the thermal peak of metamorphism. The younger episode (M2) is syntectonic to the development of the PSSZ. M2 assemblages were only developed in the PSSZ, and this deformation promoted re-equilibration of the previously metamorphosed rocks. The P-T conditions determined for the M2 equilibrium assemblages are 715°C to 747°C and 4.5 kbar, respectively, for the southern area, and 734°C to 743°C and 5.2 kbar, respectively, for the northern area. In both areas, M2 P-T conditions are significantly lower than of M1. There is no significant difference between the M1 P-T conditions deduced for these two areas; the M2 P-T conditions of the two areas are also similar. In both areas, granulites affected by the transcurrent event show reaction microstructures indicating retrograde P-T paths dominated by cooling, consistent with relaxation of elevated geotherms characteristic of a crust that had returned to 'normal' thickness. In the southern region, the isobaric cooling path seems to have been preceded by an isothermal decompression stage that may reflect erosion and/or tectonic unroofing of crust over-thickened during collision.