

TECTONOTHERMAL EVOLUTION OF THE COSTEIRO COMPLEX (SÃO SEBASTIÃO - BERTIOGA; SE BRAZIL). I: PETROLOGICAL AND GEOCHRONOLOGICAL CONSTRAINTS

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Paragneissic rocks from the São Sebastião-Bertioga sector of the Brazilian Costeiro Complex (SE Brazil) have experienced granulite facies (sillimanite+K-feldspar) at conditions of $750\pm 30^{\circ}\text{C}$, 5 ± 0.5 Kb. Peak metamorphism was accompanied by dehydration melting of muscovite, and it was followed by a clockwise P-T-time path involving back reactions of garnet + cordierite, garnet + K-feldspar + biotite + sillimanite, and retrogression of cordierite to biotite + sillimanite down to about 600°C , 3 Kb. Metamorphic recrystallization was contemporaneous with extensive shearing during transpressive deformation; the resulting regional fabrics define a flower structure that becomes progressively dominated by SE vergent thrusting towards the SE. Geochronology on newly formed zircon (U/Pb), plagioclase-biotite (Rb/Sr) and muscovite (K/Ar) has been used to constrain the timing of the metamorphic peak at 571 ± 10 Ma and the average cooling rate for the axial zone of the flower structure to $\sim 3^{\circ}\text{C/Ma}$. Diffusion modeling of Fe-Mg exchange between biotite inclusions and host garnet yields variable cooling rates; the results suggest an increase in cooling rates from $1\text{--}5^{\circ}\text{C/Ma}$ within the axial zone to 100°C/Ma on the SE branch of the flower structure. The former value is consistent with the geochronological data. The faster rates are in accordance with structural data and may indicate rapid cooling by thrusting of the Costeiro Complex SE branch onto cooler basement. The present study provides further support to those tectonic models proposing northward subduction/continental collision under the Costeiro Complex during the Brazilian orogeny.