P13. Tectono-metamorphic processes from micro-scale to plate margins: Geological, Geophysical and Petrological approaches in unravelling...

NEW INSIGHTS FOR THE TECTONO-METAMORPHIC EVOLUTION OF THE UPPER-INTERMEDIATE CRUSTAL SECTION EXPOSED IN THE SOUTHERN SERRE MA SOUTHERN ITALY): PHASE EQUILIBRIA MODELLING OF A GARNET-HORNBLENDE BEARING METANDESITIC LENSE

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The reconstruction of the tectono-metamorphic evolution of the Variscan intermediate and upper crustal section exposed in the southern Serre Massif (Calabria, southerr broader understanding of the crustal dynamics during the Variscan orogeny. In the southern Serre Massif, Variscan tectonics juxtaposed the Mammola Paragneissic representative of the intermediate crust, and the Stilo-Pazzano Phyllite unit (SPu), representative of the upper crust. Subsequently, both units were affected by a contact met to the emplacement of the Upper-Carboniferous Serre batholith. Within the MPu, in the Levadio Stream area, garnet-hornblende bearing metandesitic lenses are locally paragneisses. The juxtaposition of the MPu and SPu is marked by a mylonitic shear zone affecting also the metandesite.

This study examines via phase equilibria modelling the metamorphic evolution of a sheared garnet-hornblende bearing metandesite. To this purpose, the rock was modelled –K2O–FeO–MgO–Al_2O_3–SiO_2–H_2O–TiO_2–O system using the software THERMOCALC v.3.45, with the thermodynamic dataset ds63, including *a – x* models for both met minerals. The pre-peak metamorphic mineral assemblage (ep-q-pl-mu-chl-bi-rieb) is hosted as primary inclusions in garnets having the following composition: almandine (50 31%) - spessartine (17-20%). The constructed P-T pseudosection shows that the peak mineral assemblage (g-ep-mu-bi-chl-rieb-ab-sph-q-H_2O) was stable in a wide, low-varia kbar and 350 – 525 °C. Garnet isopleth modelling suggests P-T conditions for the regional metamorphic peak of 7.9 – 9.2 kbar and 495 – 510 °C. The subsequent, near isothe about 32 to 10 km depth at 450 – 500 °C brought the metandesite close to the emplacement level of the Serre batolith (at 2.7 kbar). The constructed T-M_{H2O} pseudosectio 570 – 593 °C for the peak pl-bi-q-g-hb-sph mineral assemblage of the contact metamorphism, under H_2O-saturated conditions. The derived P-T path for the garnet-hornblenc is consistent with the one derived by Angì et al. (2010) for the MPu paragneiss, and highlights that comparable peak pressures were reached at the regional metamorphic Serre Massif within the MPu, as well as within the granulite facies rocks cropping out in the north. This suggests that the thermal gradient significantly changed across the Va Calabria in response to distinct tectono-magmatic contexts.

References

Angì G., Cirrincione R., Fazio E., Fiannacca P., Ortolano G. & Pezzino A., 2010. Metamorphic evolution of preserved Hercynian crustal section in the Serre Massif (Calal Southern Italy). Lithos, 115, 237-262.

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