

"Granitization": A long debated issue in metamorphic petrology

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Gradual transition between metasediments and K-feldspar bearing augen gneisses is a quite common feature in metamorphic terranes. This transition has been attributed to melt infiltration and/or metasomatism connected with orogenic metamorphism. An improved knowledge of both metamorphic and metasomatic processes has seriously undermined these interpretations.

In the Strona Ceneri (Serie dei Laghi) of the Western Southern Alps of Italy (Variscan metamorphism of lower amphibolite facies), this transition is displayed by two different rock types. i) Amphibolites, of tholeiitic character, grade into K-feldspar bearing hornblende-biotite augen gneisses; ii) Paragneisses, derived from coarse grained felsic sandstone, grade into leucogranite-like augen gneisses. Field data and petrologic-microstructural studies on the entire Strona Ceneri Zone, revealed that this "granitization" occurred before the Variscan orogenic metamorphism.

Field observations and new extensive geochemical studies enable us to connect this "granitization" to the intrusion of the Ordovician granites of Serie dei Laghi. According to our modeling, "granitization" may have occurred in their contact aureole through melt infiltration and infiltration metasomatism in non-metamorphic silicoclastic sediments. Hydrous magmatic residua from the granite plutons may have infiltrated the host rocks through a porosity kept open by the pressurized water saturating the sediments.

The results of these investigations suggest that at least part of the inexplicable transitions between metasediments and augen gneisses, observed in many metamorphic belts, may be due to processes completely unrelated with regional metamorphism.