Timing of Subduction and Exhumation of the Voltri Ophiolite: evaluating exhumation mechanisms for HP Massifs

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The Voltri Ophiolite, located within the Ligurian Alps, provides a perfect field laboratory to test the various proposed mechanisms for exhuming dense high-pressure (HP) metamorphic rocks within subduction zones. This study aims to answer two main questions: (1) whether the Voltri Ophiolite or material within individual units within the ophiolite were exhumed as coherent blocks or as a more chaotic 'melange' structure; and (2) whether different units within the ophiolite record different prograde and retrograde metamorphic ages reflecting sequential subduction and exhumation episodes in different parts of the ophiolite.

A number of lenses of metamorphosed Fe-Ti gabbro within the Beigua Unit (Vara area) were dated using Sm-Nd garnet geochronology on 'bulk' garnet separates. Ages for four different Fe-Ti blocks are: 40.38±0.33Ma, 39.37±0.62Ma; 40.4±1.3Ma; and 38.15±0.89Ma, which are interpreted to represent peak or close to peak metamorphism. These ages are tightly grouped and suggest that the investigated domain of the Voltri Ophiolite is more consistent with subduction and exhumation as part of a coherent package than as part of a tectonic melange. These ages are younger than the majority of ^{39}Ar-^{40}Ar white mica ages, previously interpreted to reflect the timing of peak metamorphism, that span ~55-40Ma [e.g. 1,2], and represent some of the youngest subduction-related peak metamorphic ages recorded within the Western Alpine/Ligurian Orogen.

This data will be complemented by P-T analysis and garnet geochronology on samples from the overlying Erro-Tobbio Massif and eclogite clasts from the sedimentary Tertiary Piedmont Basin in order to investigate the relative timing of subduction and exhumation across the ophiolite and reconcile the younger garnet ages of the Beigua Unit with the large spread of predominantly older ^{39}Ar-^{40}Ar ages.

[1] Federico et al. (2005) *Earth and Planetary Science Letters* **240**; [2] Vignaroli et al. (2010) *Tectonics* **29**