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On the timing of high-pressure metamorphism in Alpine Corsica: the first Lu-Hf garnet and lawsonite ages

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Timing of HP metamorphism in Alpine Corsica is highly debated. Controversial biostratigraphic and radiometric constraints results in a poor understanding of the evolution of Alpine Corsica and its meaning in the Western Mediterranean dynamics. Age estimates provided by means of several techniques (e.g. Ar-Ar, Sa-Nd, U-Pb) vary form Late Cretaceous to Late Eocene. Some authors favor a Late Cretaceous peak metamorphism under HP conditions followed by Late Eocene and Early Oligocene blueschist and greenschist retrogression, respectively. Others favor a Late Eocene peak metamorphism and consider the older estimates as affected by analytical inaccuracy.

In order to unravel this debate, we provide new Lu-Hf constraints on garnet and lawsonite from the lawsonite-eclogite and lawsonite-blueschist units of Alpine Corsica, which represent a part of the so-called Schistes Lustrés complex. The two investigated units are interpreted to represent remnants of the former Corsican ocean-continent transition zone [2]. As Lu concentrates in the cores of the selected minerals during the early stages of growth and blocking temperatures are high, this method provides robust insight on the timing of prograde/peak metamorphism [1]. Garnet and lawsonite separated form three lawsonite-eclogite samples yield systematic Late Eocene ages at $\sim$ 34 Ma, while lawsonite from the lawsonite-blueschist unit yields a slightly older age at $\sim$ 37 Ma. These data are in agreement with U-Pb data on zircon from the lawsonite-eclogite unit ($\sim$ 34 Ma) [3], but are in contrast with a recent U-Pb estimate on the Corsican continental margin unit metamorphosed under blueschist condition, yielding an age of $\sim$ 55 Ma [4]. These discrepancies indicate a complex paleogeographic setting and a diachronous metamorphic evolution along the Corsican ocean-continent transition zone. The Late Eocene HP metamorphism in the Schistes Lustrés of Alpine Corsica also provides important constraints in the evolution of the Alps-Apennine system and the surrounding Western Mediterranean area.

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