if so whether the methane originated from an organic or inorganic source. This will require compound specific isotopic analysis of the carbon in the isoprenoids.

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New Lu-Hf ages from the eclogite type-locality in the Eastern Alps (Grünburgerbach, Saualpe and Hohl, Koralpe)

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The Koralpe-Saualpe region is the largest region in the Eastern Alps exposing high-pressure metamorphic rocks form the Cretaceous Eo-Alpine orogenic event and contains the type locality for eclogite (Hauy, 1822). The Koralpe and Saualpe complexes also expose the Variascan metamorphic basement of the Lower Central Austroalpine. The grade of the Cretaceous metamorphism in the Eastern Alps increases to the southeast, with maximum pressures and temperatures reaching up to 3.5 GPa and 850 °C in the Pohorje Mountains (Janak et al., 2015). Here we present new Lu-Hf isotopic data from eclogites from the Hohl locality in the southern Koralpe (1) and from the Grünburgerbach locality in the southern Saualpe complex (2) in the Eastern Alps. Two-point isochrones from samples of both localities based on one whole rock and one garnet separate yield an age of 100.1 ± 1.4 Ma and 99.2 ± 1.1 Ma, respectively. The garnets in the eclogite from Hohl display a homogenous composition with no zoning of major elements, whereas the garnets of the samples from Grünburgerbach shows an enrichment of Mn in the cores and lower contents towards the rims, which indicates prograde garnet growth during increasing P and T.
This new Lu-Hf garnet age data for the timing of the eclogite-facies metamorphism within the rocks of Saualpe and Koralpe units displays slightly older ages than the Lu-Hf garnet age data from the Pohorje Mountains in Slovenia (96 Ma; Sandmann et al. 2011), which constraints the peak metamorphic conditions to Cenomanian times.

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Crustal setting of the Apennines from joint inversion of seismic tomography and magnetic anomaly data: Evidence from L'Aquila fault zone (Italy)

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High-resolution tomography from the 2009 L'Aquila extensional seismic sequence has shown that the Mw 6.1 main shock and most of the aftershocks occurred within a high velocity body (6.6≤Vp≤6.8 Km/s), located between depths of 3 and 12 km (Di Stefano et al., 2009). The nature of the high Vp-body has remained speculative because the Vp velocities are compatible with different lithologies: exhumed mafic lower crustal rocks, hydrated mantle rocks (serpentinites), or dolomites. We used 3D magnetic anomaly modelling to investigate the nature of the L'Aquila body and the deep crustal setting in the central Apennines (Fig. 1). The modelling does not support serpentinites (30-50% serpentinization degree) and gabbros as possible sources of the seismic wave high-velocity body. Accordingly, we conclude that the high Vp-body may represent non-magnetic upper Triassic and possibly lower Liassic dolomites that have been drilled in neighbouring wells for 2-4 km. This conclusion is also consistent with the lack of a coherent gravity anomaly for the body. We speculate that ultra-thick Triassic dolomites, reaching a thickness of 8 km, may have been deposited either in the hanging-wall of Triassic normal faults or in releasing bends of strike-slip faults. In either case, strong mid-late Triassic tectonics is needed to provide the thick dolomite pile and the significantly thickness change across the L'Aquila fault (Speranza and Minelli, 2014). Triassic faults controlling dolomite deposition may have been reactivated later as high-angle thrust ramps during the latest mid-Pliocene Apennine compressive episodes, and finally as normal faults during the Pleistocene-to-present-day extensional tectonics.