Eliminate the organic nitrogen fraction to perform $\delta^{15}N_{tot}$-$\delta^{15}N_{bnd}$ analyses in bulk rocks: Application for Iguanodon-bearing Wealden facies of Bernissart (Belgium)

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$\delta^{15}N_{org}$ on bulk could be a useful proxy for reconstructing paleoclimatic and paleohydrologic conditions of the pre-Quaternary Past [1]. Total nitrogen (N_{tot}) and inorganic nitrogen bound (N_{bnd}) concentrations are automatically determined for each sample, to provide nitrogen isotopes on organics ($\delta^{15}N_{org}$) using of a mass balance equation. The inorganic nitrogen bound is deciphered by treating decalcified subsample with KOBr–KOH solution to eliminate the organic nitrogen fraction [2,3,4]. Here we experienced this procedure on samples from a borehole cutting the lacustrine succession of the Iguanodon-bearing Wealden facies of Bernissart, middle Barremian to earliest Aptian in age [5,6,7]. $\delta^{15}N_{org}$ data show positive trend upwards whereas $\delta^{13}C_{org}$ show negative trend, suggesting variations in paleoclimatic and paleohydrologic conditions. However samples with relatively high TOC contents, after boiling with KOH-KOBr solution by ~5 minutes, show chaotic $\delta^{15}N_{org}$ values, maybe due to uncomplete extraction of organic nitrogen. Similar analyses are required to understand the extraction of organic nitrogen during preparations. Many tests have to be performed such as: use of HCl or other acid, analysis of the type of organic matter in the sediments, limits of TOC contents, KOH-KOBr treatment before or after HCl treatment, etc. Matching this with other proxies in other successions will improve our knowledge of $\delta^{15}N_{org}$ variations in geological Pre-Quaternary successions.

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Evidence for North to South Progression of Pulsed Intrusion and Metamorphism in the Lower Crust of a Gondwana Arc, Fiordland NZ

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Exhumed magmatic arcs are critical for understanding subduction processes and the growth and deformation of continents. The duration and rates of tectonic shortening and the transition from over-thickened arc crust to thinned crust and ocean floor spreading are poorly understood. This transition may be related to buoyancy changes and delamination of dense lower crust. The Cretaceous rocks of New Zealand's Median Batholith provide a natural laboratory for understanding these processes because the rocks show evidence for eclogite facies metamorphism, magmatism and granulite-facies metamorphism with local loading during metamorphism. Garnet Sm-Nd ages indicate pulses of metamorphism that closely follow magmatic pulses in the Western Fiordland Orthogneiss suite (WFO). Eclogite facies rocks (Breaksea Orthogneiss) SW of the extensional Resolution Island shear zone (RISZ) juxtaposed these ca. 1.8 Gpa rocks against one (Malaspina Pluton) of three large granulite-facies WFO plutons. Rocks on both sides of the RISZ experienced granulite facies conditions, but those on the NE were metamorphosed at a lower P of 1.2 – 1.4 Gpa. Garnet Sm-Nd ages for peritectic garnet indicate that Malaspina rocks in the hanging wall of the RISZ underwent 116-112 Ma granulite-facies metamorphism shortly after pluton emplacement. Preliminary garnet Sm-Nd ages for eclogite-facies metamorphism SW of the RISZ indicate initial high P at ca. 123 Ma, then high T granulite facies metamorphism that lasted until ca. 108 Ma, following initial extension and collapse of the magmatic arc. Granulite facies metamorphism in the Malaspina and Breaksea postdates similar metamorphism in N Fiordland (Pembroke Granulite) by 10 Ma. Compilation of igneous and metamorphic ages along the lower crust exposed in Fiordland indicates temporal pulses of high-temperature metamorphism which may have progressed from north to south over ca. 15 Ma. preceding extension and continuing during initial extensional collapse of the over-thickened arc crust.

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