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Integrated biostratigraphical and geochemical dataset towards the definition of the Norian/Rhaetian boundary

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After Giordano et al. (2010) an important stratigraphic interval around the Norian/Rhaetian Boundary (NRB) is characterized by the coeval occurrences of the Tethyan conodont Misikella posthernsteini and the North American Epigondolella mosheri morphotype A at the base of radiolarian Propavicingula moniliformis A.Z. and the global disappearance of the bivalve genus Monotis.
Looking for a global geochemical signal to better define the NRB, we have investigated the variations of 87Sr/86Sr isotopic ratio directly from biogenic conodont apatite, thus enhancing the previously existing dataset (e.g. Veizer et al., 1999; Korte et al., 2003). The global potential of the Sr isotope stratigraphy rests on the homogeneity of the 87Sr/86Sr in oceanic water, since the residence time of Sr in seawater (>106 yrs) is far longer than its mixing time (>103 years). Henceforth, any given point in time should be characterized by a unique value of 87Sr/86Sr worldwide (McArthur, 1998).
In this view, we have analyzed by thermal ionization mass spectrometry (TIMS, University of Geneva, 1[U+F073] external reproducibility <7 ppm) 17 new conodont samples from Tethyan sections and one from British Columbia terrains, straddling the NRB. Our results highlight a negative shift in Sr isotopic ratio from 0.70826 to 0.70774, in correspondence of the first appearance of Misikella posthernsteini at the base of the Rhaetian, in good agreement with the drop already observed by Korte et al. (2003). Following the new biostratigraphic calibrations, we suggest to consider the negative Sr isotopic shift as a potential global geochemical marker to identify the base of the Rhaetian Stage.

References

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