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New data from the upper Cenomanian of southern Apennines tell a new story about the relations between changes in the Sr isotope ratio of the ocean and OAE-2.

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The potential of Strontium Isotope Stratigraphy (SIS) as a high-resolution tool of chronostratigraphic dating and correlation of marine sedimentary rocks has been widely demonstrated during the last 25 years (Burke *et al.*, 1982; McArthur & Howart, 2004). The use of SIS relies on the fact that the $^{87}Sr/^{86}Sr$ value of the ocean varied through geological time and that the residence time of Sr in the ocean is sufficiently long so that the ocean is well mixed with regards to Sr isotopes. The $^{87}Sr/^{86}Sr$ of marine water is controlled by the fluxes from two reservoirs with different isotopic ratios: erosion of continental crust and seafloor hydrothermal activity. Therefore variations in $^{87}Sr/^{86}Sr$ are also a very useful tool for investigating climatic and geodynamic processes. A link has also been proposed between changes in Sr isotope ratios and anoxic events. In particular the Ce–Tu OAE-2 is said to occur at the onset of an excursion of $^{87}Sr/^{86}Sr$ toward lower values (Jones & Jenkyns, 2001). However there are very few data around the CTB in the reference curve of McArthur & Howart (2004) and data from other sources show a pretty large scatter (Bralower *et al.,* 1997). We have studied five different sections of Cenomanian–Turonian shallow-water carbonates in southern Apennines (Italy). Petrographic and geochemical screening and internal consistency of data showed that the low-Mg calcite of compact portions in the outer layer of rudist shells (requienids and radiolitids) is the best material for SIS in these facies. The chronostratigraphic age of our samples is constrained by biostratigraphy, with reference to their stratigraphic position relative to the upper Cenomanian marker *Cisalveolina fraasi.* Higher resolution chronostratigraphic dating was obtained with carbon-isotope stratigraphy, through chemostratigraphic correlation with the standard reference curve of Eastbourne Chalk (Frijia, 2005; Parente *et al.*, 2005). The first set

of samples, about 20m below the F.O. of *C.fraasi*, has an $^{87}Sr/^{86}Sr$ average value of 0.707386 $\pm$ 5*10^{-6} (n=3). The numerical age, derived from the "look-up table" of McArthur's group (version V4 08 04), is 94.42 Ma (upper Cenomanian, guerangeri zone). This age is in agreement with carbon-isotope stratigraphy, which places these samples below the onset of the CTB $\delta^{13}C$ excursion, in the guerangeri zone. The second set of samples, closely spaced around the *C.fraasi* level, gives an average value of 0.707418$\pm$8*10^{-6} (n=14), that would correspond to a numerical age of 97.09 Ma (lower Cenomanian, dixoni zone). This age obviously can not be reconciled with that of the previous set. Moreover carbon-isotope stratigraphy places these samples in the middle part of the geslinianum zone. The evident mismatch with the $^{87}Sr/^{86}Sr$ reference curve (and look-up table) and with the original data of McArthur *et al.* (1994) can not be attributed to diagenetic alteration because our samples have been carefully screened through petrographic and geochemical analyses. A further argument supporting the good quality of data is the internal consistency of the data-set, comprising 14 samples from closely spaced levels. Our data show a rising trend of Sr isotope ratios from the guerangeri to the first part of geslinianum zone; the excursion toward lower values starts late in the geslinianum zone. On the contrary in the reference curve the descending trend begins well before, close to the middle–late Cenomanian boundary. A better agreement is found between our data and those by Bralower *et al.* (1997), with regard both to absolute values and to trend of strontium-isotope ratios. Considering that the Cenomanian portion of the standard $^{87}Sr/^{86}Sr$ curve is at present based on very few points, incorporating our data will considerably improve its reliability as a stratigraphic tool. More than their stratigraphical impact the most intriguing implication of these new data from the Cenomanian of southern Apennines is that they tell a different story on the relations between changes in the Sr isotope ratio of the ocean and OAE2: Sr-isotope values are still rising well after the beginning of the carbon-isotope positive excursion!

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