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Carbonate geochemistry of Meso-Cenozoic pelagic successions: Specific analyses on calcareous nannofossils and diagenetic precipitations

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The reconstructions of the physico-chemical evolutions of the seawater are mostly inferred from bulk carbonate analyses. To interpret such results, the effects of changes in sediment composition must be disregarded. But, it is a primary importance to decipher each specific signal composing the bulk.

We present a new sedimentological approach enabling:

1) a precise quantification of each calcareous particles (biogenic producers, diagenetic precipitations,. . .) contained in original samples,

2) a complete unravelling of the bulk signatures based on targeted geochemical analyses for each particles class.

For that, the particles are physically separated according to their respective differences in size, microstructure and differential solubility. After treatment, we obtain, for each studied stratigraphic level, subsamples mainly composed by one particle class that reflect a specific environment (photic zone seawater for calcareous nannofossils, interstitial fluids for diagenetic particles). Since each of these particles are analyzed, we can i) assess for each interval the meaning of bulk geochemistry and eventually ii) compare the geochemical evolutions of each specific environment.

We present geochemical results including stable isotopes and trace elements from various lithologies and paleoenvironments. Oligospecific nannofossil assemblages obtained from Miocene and Pliocene calcareous oozes (Equatorial Pacific, Indian Ocean) lighten the influence of specific vital effects on the coccolith isotopic signatures. For

lithified sediments, we present monospecific assemblages of coccoliths and calcispheres from the Early Toarcian Black Shales (Sancerre core, France) and the K-P transition (Bidart section, France). The comparison between both geochemical evolution of the photic-zone (calcareous nannoflora) and diagenetic overprint (dolomite rhombs) is useful for a better understanding of critical paleoceanographical changes during these two periods.