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Origin of fine-grained carbonate particles for the quantification of export processes in periplatform sediments

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Periplatform deposits consist of a mixture of autochtonous low-magnesium calcitic pelagic particles and of platform-derived components (low-magnesium calcite, high-magnesium calcite, aragonite). Shallow-water material transport occurs almost exclusively during sea-level highstand when platform top are flooded.

Based on a granulometric separation technique, which produces homogeneous fractions, a micropaleontological, mineralogical and geochemical (carbon and oxygen stable isotopes) characterization and quantification of each carbonate components is possible in both soft and lithified sediments. This allows to properly estimate the proportion of the autochtonous and allochtonous carbonate particles in periplatform bulk sediments.

This method has been tested on the well-studied carbonate tropical setting of the leeward margin of the Great Bahama Bank (ODP Leg 166) with focus on Mid-Miocene sediments, associated to a highstand system tract. A bahamian model thus defined, an application was attempted for Mesozoic sediments. A transect through the Maiella platform and the Umbria-Marches basin in Central Italy at the Cenomanian-Turonian boundary was chosen. This interval was selected because it is related to a global sea-level highstand.

In Miocene and Cretaceous sediments, the biogenic components are easily differentiated from "particles without a distinct biogenic structure" according to crystallograph-

ical, granulometrical, mineralogical and geochemical criteria. In these latter particles, we have distinguished the macroparticles and the microparticles (similar to the micarb particles).

This study highlights that the particles "without biogenic structure" do not result of a more intensive diagenesis or a fragmentation of pelagic organisms as usually considered (in particular for the micarb). They are mostly related to a biogenic origin resulting from the fragmentation of platform top organisms or a precipitation (inorganic or bioinduced) in the platform top domain. They thus can be linked to an export process (turbidity current and/or suspension).

Consequently, this work allows to identify the source of the carbonate components (platform top *versus* basin) and their precipitation process (skeletal fragments, abiotic/bioinduced precipitation, authigenic precipitation). This permits to determine the proportion of platform-derived, pelagic and authigenic components within periplatform bulk sediments. Therefore, the sedimentary processes associated can be distinguished and it is then possible to conclude on the role of the export process, which is controlled by the production and the hydrodynamism on the platform top, linked to sea-level fluctuations and margin morphology.