Deep-marine carbonates of the northeastern flanks of the Parnassus Platform, central Greece

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An Upper Campanian-Lower Paleocene sedimentary succession, cropping out in the Agios Nikolaos area on Mt. Parnassus, NE of the town of Arachova in central Greece, displays almost continuous and well developed deep-marine carbonate facies of the northeastern flanks of the Parnassus platform, a major Late Triassic-Late Cretaceous shallow-water carbonate platform of the Hellenides orogen. This succession constitutes one of the few locations where the broader eastern margin of the Parnassus platform, towards the adjacent Beotian basin, is exposed and, moreover, it records significant tectono-sedimentary characteristics that mark the definitive interruption of the long-lasting and relatively persistent carbonate sedimentation, before the main entrance of the deep-water clastic sediments of the flysch deposits. Detailed macro- and microfacies analysis revealed that these carbonates are mostly composed of pelagites and lesser calciruditic resedimented facies, though a few very thin intercalations of calcareous mudstones to mudshales are intergraded within the central parts of the pelagites. In particular, the Upper Campanian to Late Maastrichtian carbonates are mainly represented by thin- and lesser medium- to thick-bedded pelagic mudstones-wackestones with abundant planktonic foraminifera, locally laminated and bioturbated, while they are regularly interbedded with nodular and bedding cherts. The widespread presence of various sized slumps throughout this facies documents the intense reworking of the sediments on the deep seafloor. The high instability of their depositional setting is further confirmed by the occurrence of a few intercalations of cm- to dm-scale calcarenites to calcilutites that are considered as having been deposited and reworked under the influence of relatively deep bottom currents. In fact, they comprise bioclastic grainstones to packstones-wackestones with erosive lower surfaces, faint grading, cross-lamination and thorough bioturbation, features indicating them to be calcareous contourites. The pelagic carbonate sedimentation continued throughout the Lower Paleocene with the deposition in the main of thin-bedded and locally nodular pelagic mudstones-wackestones with cherts, which were finally covered by the first flysch sediments. However, immediately after the C-T boundary, these pelagites are interbedded with two discrete coarse- to very coarse-grained carbonate units, of a few meters' thickness, consisting exclusively of resedimented pelagic carbonate materials. Specifically, they comprise gray to locally reddish, massive, very poorly sorted and chaotic calcirudites represented by intraclastic pebble- to cobble-sized oligomictic paraconglomerates and cobble- to boulder-sized polymictic and mostly clast-supported breccias, respectively. Their various pelagic intraclasts, together with a few bioclastic lithoclasts, are of an almost contemporaneous and also Upper Cretaceous age, obviously suggesting an origin for them from the Early Paleocene slope itself as well as from the paleoslope. The deposition of these intraformational carbonates was mostly brought about by cohesive debris flows, while some very large components comprising composite breccia clasts may have been deposited as rockfalls. Overall, the facies association and their organization clearly indicate the base of a steep slope, proximal to the adjacent basin, as the depositional setting for the studied carbonates. Although, their development was controlled by a range of triggering mechanisms, such as the relative sea-level changes and the activity of undercutting bottom currents, nevertheless, a major synsedimentary tectonism seems to have remarkably prevailed over their final depositional pattern, causing the retreat of the broader eastern margin and conducing to the final foundering and demise of the entire Parnassus platform.