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Maurizio Marino[1] (1) University La Sapienza, Rome, Italy

Understanding the Geological Record of Carbonate Platform Drowning: Examples from the Early Jurassic of Central Apennines (Central Italy)

The use of the term "platform drowning" in geology is potentially ambiguous: this term does not provide a clear separation between the process, generally linked to oceanographic, environmental, and tectonic factors, and the final product, represented by rocks and/or surfaces, constituting its geological record. This paper tackles the subject of drowning of a carbonate platform focussing on products, by analyzing the geometries of syn- and early post-drowning deposits, with an emphasis on regionally widespread vs. local features, on how and if drowning can be recorded by rocks, and on how different processes can produce similar products and viceversa.

In Central Apennines (Central Italy), the Early Jurassic drowning of a regional carbonate platform is marked by the superimposition of carbonate pelagites on peritidal limestone. This drowning followed the rift-related break-up of the platform, which created a submarine pattern of basins and structural highs.

The record of this drowning is described across different palaeostructures through physical stratigraphy, analyisis of the litho-biofacies, chronostratigraphy, sedimentology, isotope geochemistry, and by reconstructing the regional and local palaeogeographic/palaeotectonic setting. Pelagic-on-peritidal contacts are discussed in structural high-top and edge, escarpment, and basinal settings.

Through this multidisciplinar approach, the local features of drowning are separated from those that can be correlated at regional and super-regional scale. Then the factors that caused the drowning, generally synchronous and effective over vast areas, are separated from those that constrained its geological expression, which instead strongly depend on local variables. This can hopefully result in a more thorough understanding of the drowning process.