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Stratigraphy and Reservoir Architecture of the Apulian Carbonate Platform-Ionian Basin System (Late Cretaceous, Albania)

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ABSTRACT

In the Late Cretaceous peri-Adriatic domain, the Apulian carbonate platform was located along the eastern side of the NW-SE-oriented Ionian Basin. Both basinal and platform successions were studied in eight outcrops exposed along three mountain belts that are presently part of the Albanian fold-and-thrust system. The Apulian carbonate platform documents significant in-situ sediment production and accumulation in intertidal to subtidal environments producing 1415 m of Cenomanian-Maastrichtian carbonates. The uppermost part of the platform succession evidences syn-sedimentary deformation inserted in well-bedded intertidal to shallow-subtidal platform deposits. Mass Transport Deposits (MTDs) demonstrate significant lateral variability accompanied by both brittle and ductile deformation. In the adjacent Ionian Basin, the slope and basinal deposits comprise hemipelagites, calciturbidites, and calcidebrites. In addition, spectacular MTDs were recognized and studied analysing the detachment surfaces, syn-sedimentary faults and folds. Their lateral extent points toward multiple regional destabilization events affecting the Late Cretaceous Apulian platform margin. The age of the Upper Cretaceous Ionian Basin series is constrained in more detail by bio- and chronostratigraphy.

The Late Cretaceous sedimentary evolution of the Apulian-Ionian system shows three stages: (i) A Cenomanian–Turonian period characterized by stable shallow-water conditions on the platform and the associated deep Ionian Basin with no significant influx from the platform; (ii) A Coniacian–Santonian interval typified by a broad development of rudist build-ups on

the platform shelf. Toward the end of the Santonian, the sedimentary dynamics in the basin changed abruptly with the onset of a massive influx of platform-derived calciclastics; (iii) The Late Campanian–Early Maastrichtian period is marked by a major change in the (re-) sedimentation processes marked by the influx of three massive MTD units that make up ca. 25% of the succession. They contain reworked thick sediment packages of up to 40 m thick.

This study aims to discuss reservoir-scale heterogeneities of the carbonate gravity deposits and the associated hemipelagic basin sequence by mapping out the spatial distribution of the bed-packages that compose the slope to basin succession. Ancient carbonate platform-slope-basin systems may host important hydrocarbon reservoirs as demonstrated by ongoing industrial surveys that focus on this particular carbonate reservoir in Albania and Greece, and investigations elsewhere. This stresses the need for detailed sedimentological research of carbonate platform-slope-basin systems studying grain-size distributions, depositional morphologies (submarine fans vs. sheet like deposits) as well as petrophysical variations and fracture development.