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Avraam Zeligidis

University of Patras, Greece

Late cretaceous to early Eocene geological history of the eastern Ionian Basin, southwestern Greece: A sedimentological approach

Sedimentological studies of the Upper Cretaceous–Lower Eocene limestones in the western part of the Ionian basin (Araxos area) indicate that these sediments are composed of calciturbidites interbedded with breccia-microbreccia. Breccia - microbreccia deposits are structureless, display channelized geometry with calciturbiditic blocks internally to the channels. Most of the clasts were sourced from the underlying Lower Cretaceous "Vigla limestones". Calciturbidites include Ta to Te Bouma sub-divisions and are organized in cycles that form channelized deposits with a high degree of amalgamation. Statistical analysis confirms the presence of order in the sub-division sequence. The thickness of the calciturbidite event beds of the section is also well characterized by a lognormal statistical distribution, possibly produced by multiplicative processes during carbonate gravity flow sedimentation. The microfacies analysis suggests that most of the examined samples represent allochthonous bioclastic material that has been transported from a nearby platform/reef environment of deposition. In this case, the depositional environment should be defined as a top of slope or toe of slope environment, where microbrecciated or brecciated deposits rested and accumulated. The nature of the bioclasts and lithoclasts that constitute the respective deposits represent shallow shelf environments, thus the allochthonous material originated from the platform.

Resuspension or slumping of platform edge sediments produced turbidity currents (calciturbidite unit) that were time-equivalent to the debris flows (breccia unit) formed by the slumping of the platform margin. Breccia deposits and calciturbidites with Ta to Tc sub-divisions are more proximal deposits, whereas microbreccia and calciturbidites with the complete Bouma sequence were located in more distal positions from the source. By the uppermost Cretaceous, reefs built up on the platforms within the Ionian basin (Fig. 25) and contributed detritus to the microbreccia/breccia unit.

Following the facies analysis and the suggested depositional environments and their conditions indicated that the Ionian Basin was influenced by intense tectonic activity during the early Cretaceous. Synthetic and antithetic faults caused the formation of asymmetric grabens with their uplifted shoulders serving as major sediment contributors into the basin. As a result, a significant amount of coarse-grained material was delivered into the basin. During the late Cretaceous, the shoulders of these asymmetric grabens were most active causing erosion of the pre-existing deposits of Lower Cretaceous "Vigla Formation", developing the channelized microbreccia and breccia. The basin asymmetry and variations of water depth resulted in variable thicknesses of the breccia/microbreccia channels and calciturbidites.

The early Cretaceous to early Eocene depositional history in the Ionian Basin indicates that the regional tectonic activity, rather than the eustatic sea-level changes, was the major factor that influenced the basin evolution, suggesting a syn-rift stage being active from the Jurassic to the early Eocene.

Speaker Biography

Avraam Zeligidis was graduate Geologist in 1984 and earned PhD in 1988 from the Department of Geology of the University of Patras. He was appointed as a lecturer in 1993 and since 2009 as a full professor in the Department of Geology of the University of Patras. He served as Dean of the Faculty of Natural Sciences at the University of Patras from 2006 to 2010. Research deals with the Analysis of Sedimentary Basins, Sequence Stratigraphy, Seismic Stratigraphy and Petroleum Geology. Have produced many research projects for oil companies using data in both surface and subsurface, while he organized many field seminars for foreign oil companies. He has published more than 100 papers in International journals, most of which refer to the Hydrocarbon potential in Greece and have been presented in International conferences in an effort to highlight the issue of existence-exploitation of Hydrocarbon fields in Greece.

e: Zeligidisavvaram@patras.gr