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1. INTRODUCTION

This microfacies atlas contains more than 420 thin section photomicrographs, and highlights the range of microfacies exhibited on the Cretaceous to Eocene shallow-water Apulian and Gavrovo Platforms, and also within the deeper Ionian Basin. The photomicrographs are from outcrop and subsurface locations in Greece and Italy.

Figure 1 Map showing the location of the photomicrographs from this Volume.
For each thin section photomicrograph there is:

- Summary description of the thin section. Note that the description is of the thin section as a whole, and thus not all elements may be present in the photomicrograph itself.
- Age of sample
- Field of view/ scale bar size
- Location/sample number (where appropriate)
Figure 2 Map showing outcrop locations in this report. The yellow markers on the lower map show the locations of the outcrops.
LATE CRETACEOUS LOG

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Cambridge Carbonates Sample

Review and Insights into Carbonate Plays of the Circum-Adriatic Volume 2
Bimodally sorted bioclast peloid packstone/grainstone. Whole and fragmented nummulites, alveolinids, agglutinating foraminifera and large and small miliolids. Disarticulated, fragmented segmented dasycladacean algae, molluscs and echinoderm plates are also present. Rhodoids are present as discrete algal nodules as well as partial coatings of nummulites. Sample (P1056). Middle Eocene. PPL. Scale bar = 500µm.

Foraminifera intraclast rhodoid packstone. Whole and fragmented nummulites, alveolinids and valvulinids. Disarticulated, fragmented red algae and echinoderm plates are also present. Rhodoids are present as discrete algal nodules as well as partial coatings of nummulites. Sample (P1057). Middle Eocene. XPL. Scale bar = 500µm.

Foraminifera intraclast rhodoid packstone. Whole and fragmented nummulites, alveolinids and valvulinids. Disarticulated, fragmented red algae and echinoderm plates are also present. Rhodoids are present as discrete algal nodules as well as partial coatings of nummulites. Sample (P1058). Middle Eocene. XPL. Scale bar = 500µm.


Dolomitised bindstone. Very rare peloids and ghosts of small miliolids. Sample (P1076). PPL. Scale bar = 500µm.
Bioclast intraclast packstone/ grainstone. Very finely comminuted bioclasts, including reworked and bored rudists and orbitoidids. Sample (P1016) XPL. Scale bar = 500µm.

Fine bioclast packstone. Rudist fragments, miliolid fragments, echinoderms, peloids and planktonic foraminifera. Sample (P1017) XPL. Scale bar = 500µm.

Intraclast bioclast packstone. Bioclasts include rudist (radiolitid) fragments, gastropods, echinoderms and finely comminuted indeterminate bioclasts. Sample (P1018) XPL. Scale bar = 500µm.
Pisoid peloid bioclast grainstone. Radially coated pisoids, green algae, aggregate pisoids and peloids. Intergranular porosity is infilled by non-ferroan calcite. Sample (029U). Aptian to Hauterivian. PPL. Scale bar = 500µm.

Pisoid peloid wackestone/packstone. Small and large miliolids, peloids, pisoids, blue-green algal nodules and intraclasts. Sample (029L). Aptian to Hauterivian. PPL. Scale bar = 500µm.


2.9. Locality P17 and P18: Eocene Ionian Basin pelagic carbonates to flysch transition

Pale brownish grey sub-fissile silty mudstone interbedded with fine grained fine sandstone with climbing ripples grading to planar laminaton. Palaeocurrent towards 150.

Medium sandstone with climbing ripples passes upwards into planar laminaton.
Laminated fine-grained sandstone

Sub-fissile silty mudstone

Silty fine-grained sandstone

Sandstone grades up into argillaceous silty mudstone with occasional Chondrites.
Climbing ripples at base of sandstone passes upwards into planar laminaton.
Sub-fissile silty mudstone

Thinly-bedded calcareous siltstone with cm-scale graded sand layers.

Trough bedded sandstone with scoured base.

Thinly-bedded argillaceous carbonate mudstone/siltstone.
Wackestone. Globigerinids dominate the assemblage. A discocylinid fragment is present in the sample. Other bioclasts include fragmented pelagic bioclasts and finely comminuted bioclasts. Sample (P1048). Latest Early to Middle Eocene. PPL. Scale bar = 500µm.

Bioclast intraclast packstone/ grainstone. Nummulites, discocyclinids, globigerinids, large miliolids, alveolinids, red algae, bivalves, rotalids, small miliolids, echinoderms and intraclasts. Sample (P1049). Latest Early to Middle Eocene. PPL. Scale bar = 500µm.
Arkosic lithic arenite. Subangular and subrounded quartz and feldspar grains. Allochems include globigerinids, echinoderm fragments, glauconite peloids and intraclasts. Eocene. PPL. Scale bar = 500µm.

Carbonate mud stone/wackestone. Whole and fragmented globigerinids and finely comminuted pelagic bioclasts. Eocene. PPL. Scale bar = 500µm.
3.3. WELL C: Late Cretaceous and Eocene Ionian Basin pelagic and resedimented carbonates

Bioclast grainstone. Discocyclinids, actinocyclinids, alveolinids, rotalids, nummulites, miliolids, pellatispirids, segmented and encrusting red algae, echinoderms and shell fragments. Latest Early to Middle Eocene. PPL. Scale bar = 500µm.

Carbonate mudstone/wackestone. Globigerinids and morozovellids. Latest Early to Middle Eocene. PPL. Scale bar = 500µm.

Bioclast intraclast grainstone. Discocyclinids, alveolinids, rotalids, nummulites, miliolids, pellatispirids, segmented red algae, echinoderms, shell fragments and intraclasts. Occasional phosphatic peloids are present. PPL. Scale bar = 500µm.
4. APRICENA QUARRY OUTCROP, SE ITALY

The Apricena succession was located on the Apulian platform, and was deposited in an inner shelfal palaeoenvironment at littoral water depths, and was subjected to multiple karstification events. The thin section photomicrographs presented in this section are of the host rock, whilst the thin section scans are of the karst.

Figure 4 Map showing the location of the Apricena Quarry samples. Note also the location of the Miniera di Bauxite, where one of the samples is from.
Karst fill with layered internal sediment that has been lithified, brecciated and then infilled by brown clay-rich sediment. FOV= 34.0mm x 23.2mm.

Fenestral carbonate mudstone at margin of karst cavity draped by stratified infill. FOV= 23.1mm x 33.5mm.

Microkarst cavity in wackestone with multiple geopetal infill by layered terra rossa and fine carbonate breccia. FOV= 19.3mm x 26.2mm.
5. SOUTHERN APENNINES – SUBSURFACE EXAMPLES FROM THE APULIAN PLATFORM

The carbonate successions of the southern Apennines reach great thicknesses (often >1500m), with ages ranging from Early Cretaceous to Miocene in age, which were deposited on the shallow-water Apulian Platform. In several subsurface oil fields, the entire stratigraphic interval is within closure, resulting in a reservoir deposited in varying depositional settings over a significant stratigraphic interval. It is therefore important to recognise the variation in depositional facies, and subsequent matrix properties associated with that facies.

Diagenesis is also extremely important, affecting the properties of the reservoir. Karstification is of particular importance, as is tectonic fracturing and dolomitisation. With many fields having extremely thick hydrocarbon columns, it is also worth noting that diagenetic processes occurring near the crest of the structure could be substantially different to those affecting reservoir near the OWC.

This section exhibits photomicrographs of Cambridge Carbonates in-house collection from the southern Apennines. The samples range from Early Cretaceous to Miocene in age. Note that the photomicrographs are arranged in approximate stratigraphic order from youngest to oldest.

Serpulid bindstone, with crusts and botryoids of brownish radial fibrous bundles of calcite cement. Miocene. PPL. Scale bar = 500µm.

Serpulid bindstone, with crusts and botryoids of brownish radial fibrous bundles of calcite cement. Miocene. PPL. Scale bar = 500µm.
Laminated coarse dolostone. Cretaceous. PPL. FOV = 3mm

Peloidal ghost dolostone. Cretaceous. PPL. FOV = 3mm

Peloidal ghost dolostone. Cretaceous. PPL. FOV = 3mm

Peloidal ghost dolostone, with fissure cemented by coarse calcite in a botryoidal arrangement. Cretaceous. PPL. FOV = 3mm

Fine karstic fissure fill conglomerate. Cretaceous. PPL. FOV = 6mm

A mosaic breccia, with the early fracture lined by zoned dolospar. Cretaceous. PPL. FOV = 3mm

As left, but CL. FOV = 3mm