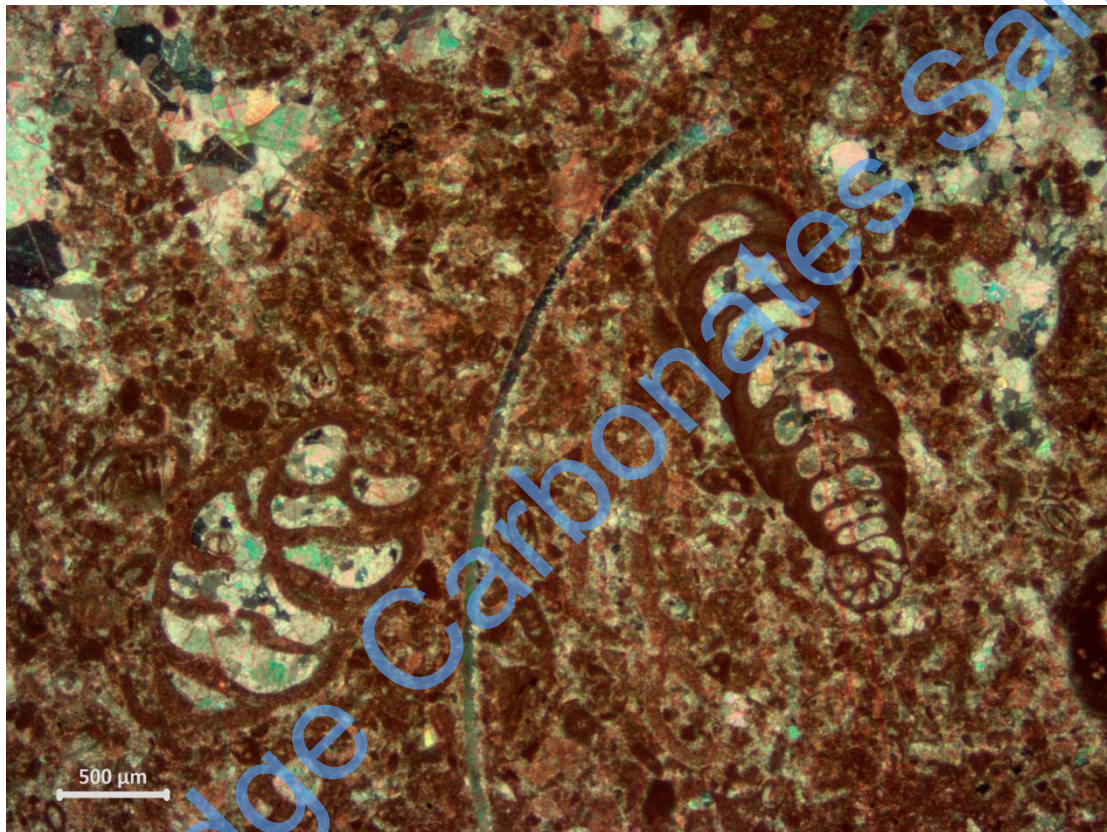


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2016

Jo Garland, Peter Gutteridge, Andrew Horbury, Julie Dewit, Victoria Meredith, and  
Julia Morgan

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**Review and Insights into Carbonate Plays of the  
Circum-Adriatic: Volume 2 – Photomicrograph  
Atlas**

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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.

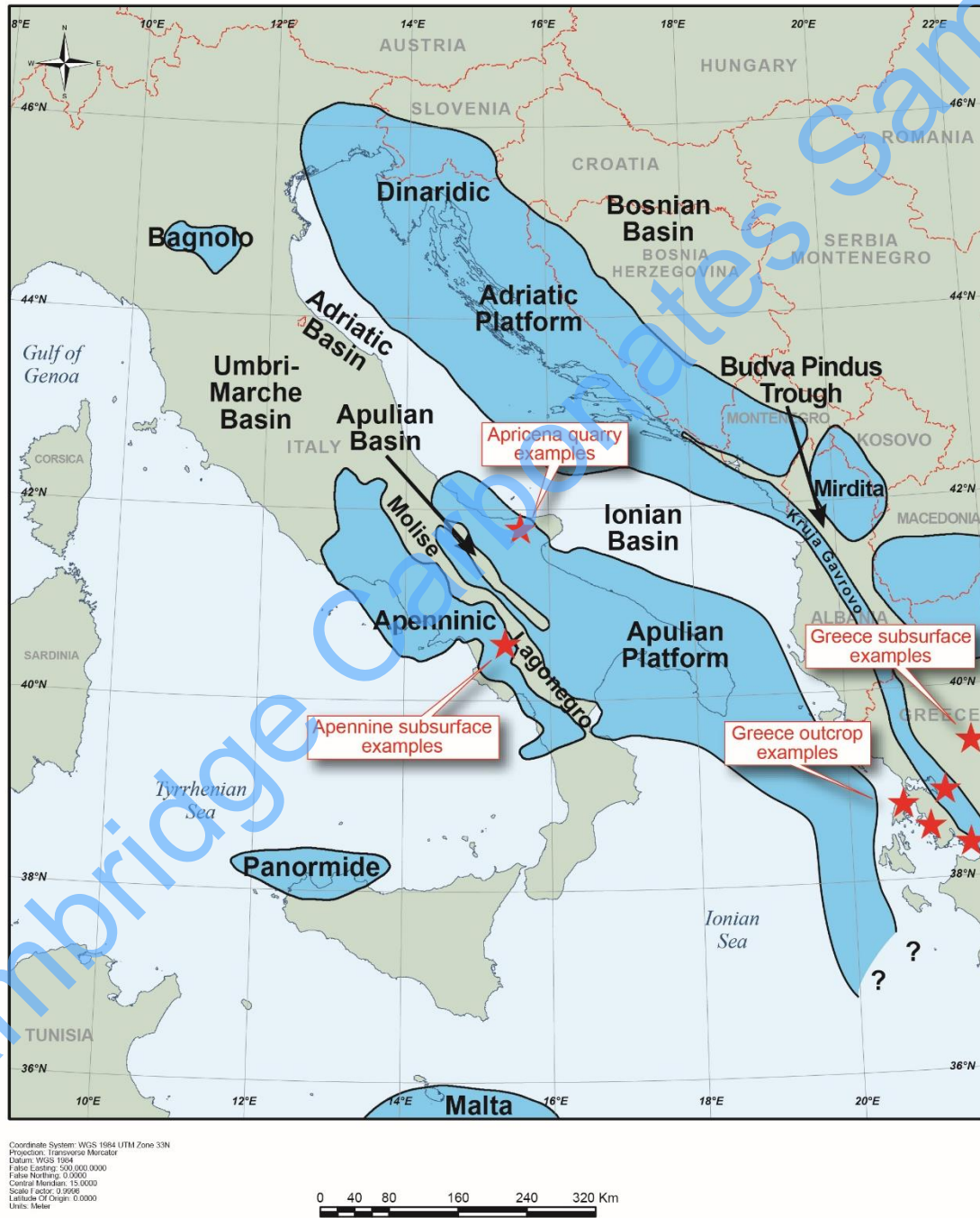


Figure 1 Map showing the location of the photomicrographs from this Volume.



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)

Cambridge Carbonates Sample

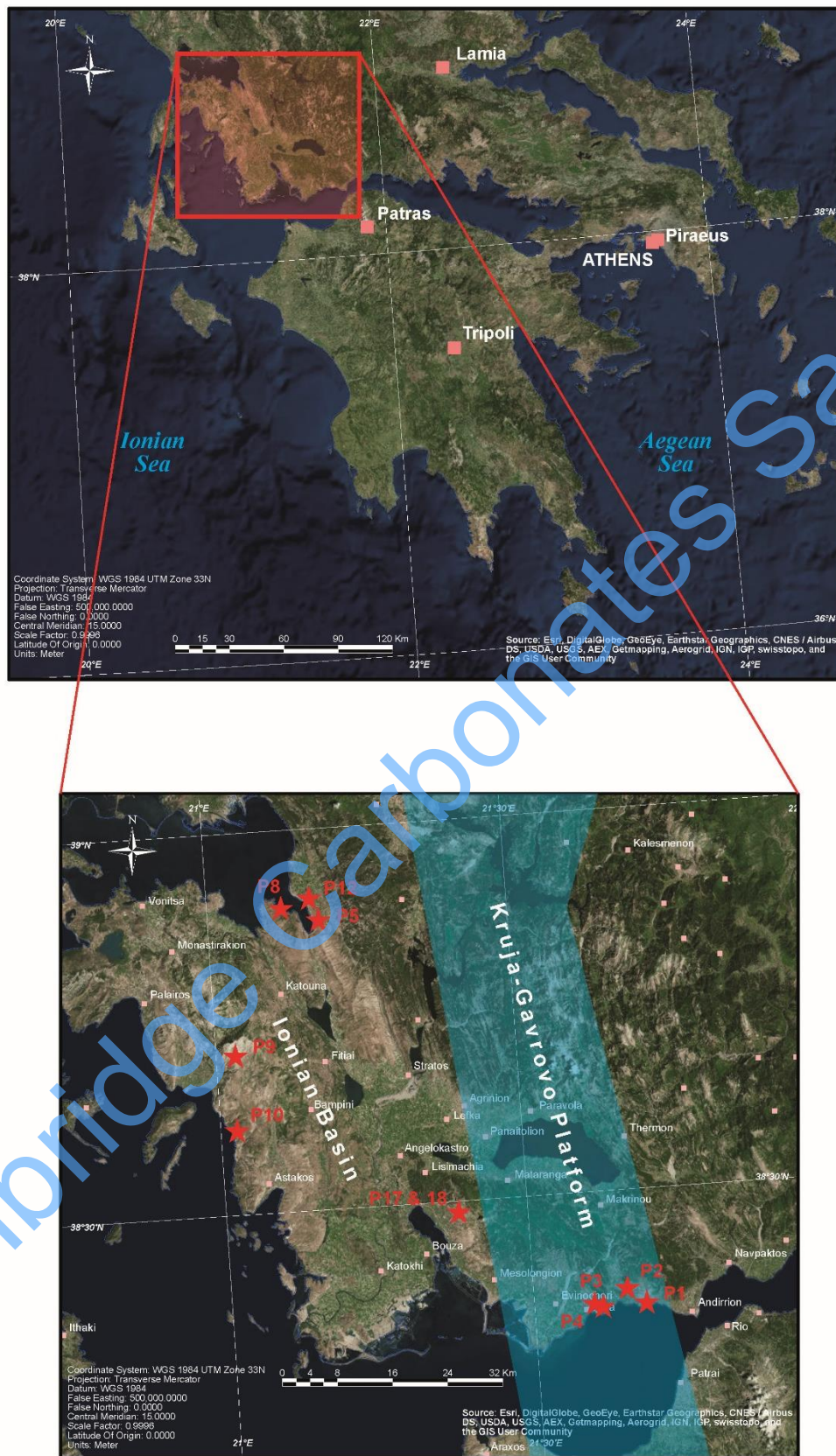
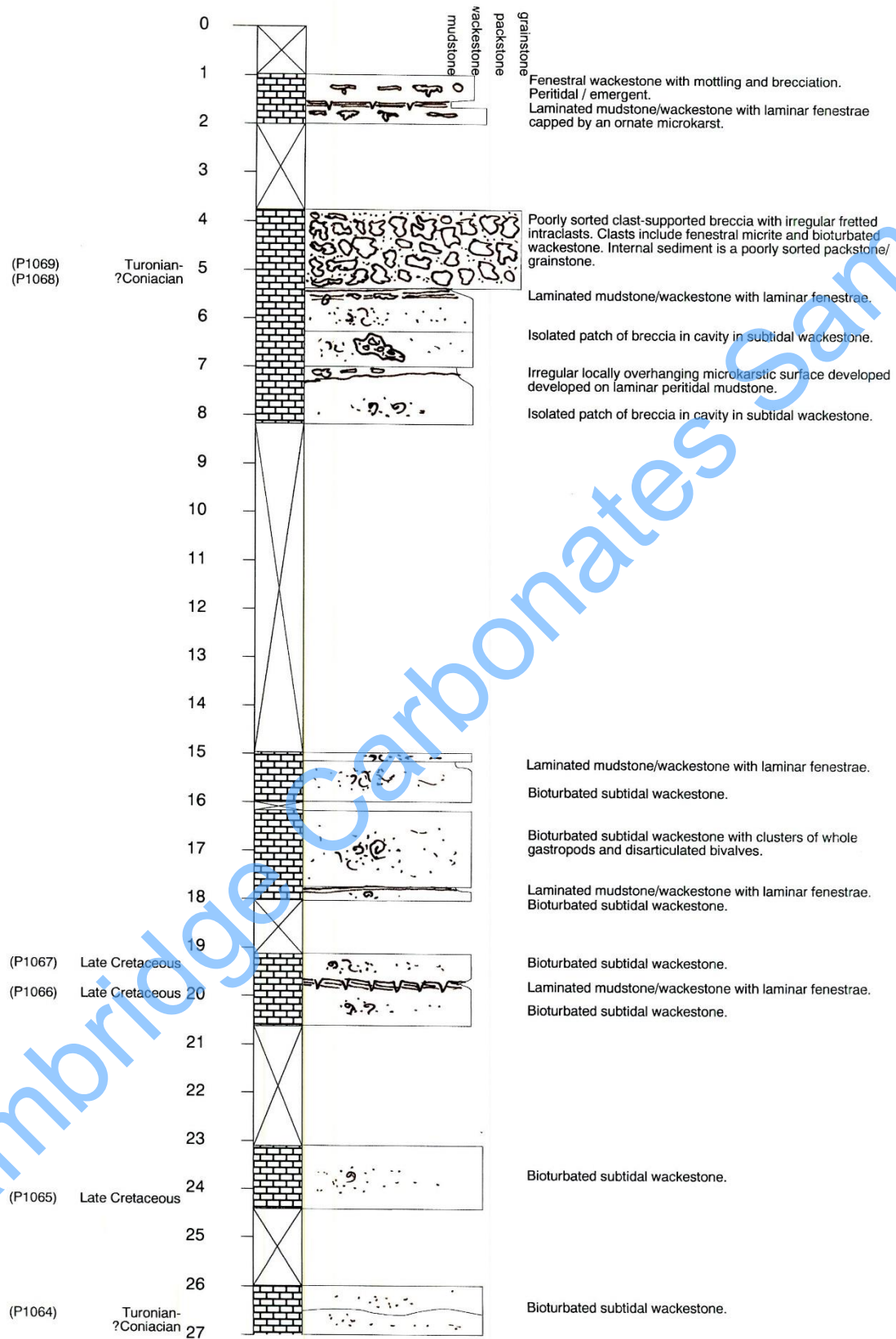
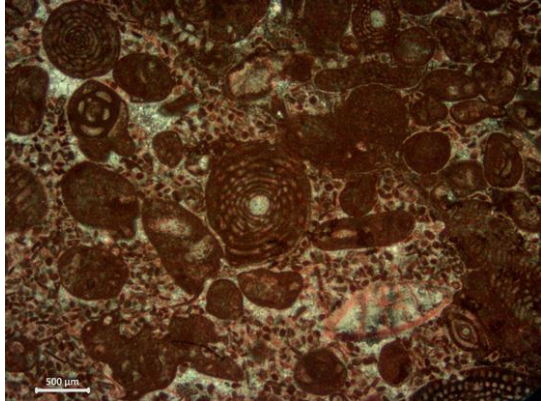

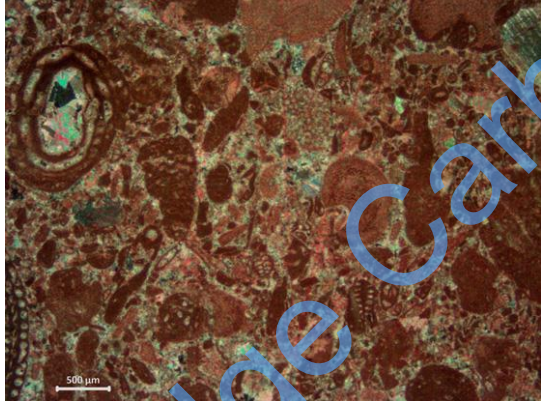
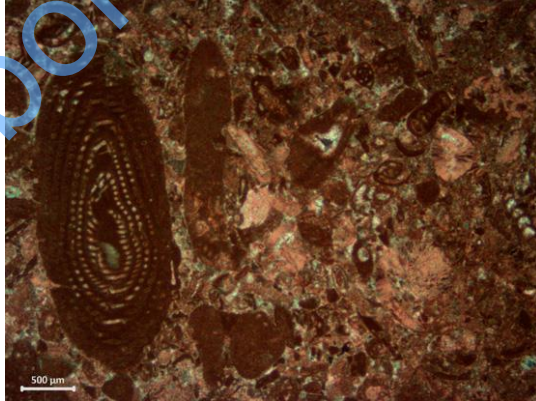


Figure 2 Map showing outcrop locations in this report. The yellow markers on the lower map show the locations of the outcrops.



**LATE CRETACEOUS LOG**

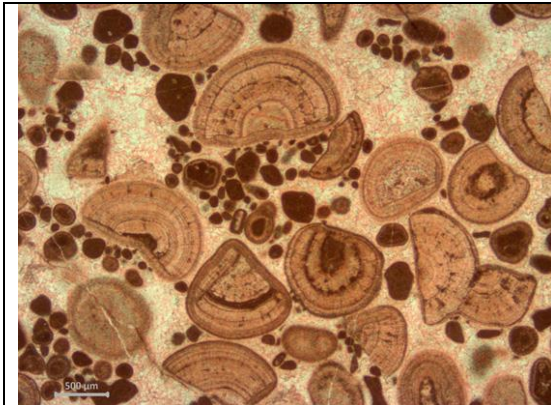


	
<p>Bimodally sorted bioclast peloid packstone/grainstone. Whole and fragmented nummulites, alveolinids, agglutinating foraminifera and large and small miliolids. Disarticulated, fragmented segmented dasycladacean algae, molluscs and echinoderm plates are also present. Rhodoids are present as discrete algal nodules as well as partial coatings of nummulites. Sample (P1056). Middle Eocene. PPL. Scale bar = 500µm.</p>	<p>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.</p>
	
<p>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.</p>	<p>Foraminifera intraclast rhodoid packstone. Whole and fragmented nummulites, alveolinids and valvulinids. Disarticulated, fragmented solitary corals, red algae and echinoderm plates are also present. Sample (P1058). Middle Eocene. XPL. Scale bar = 500µm.</p>

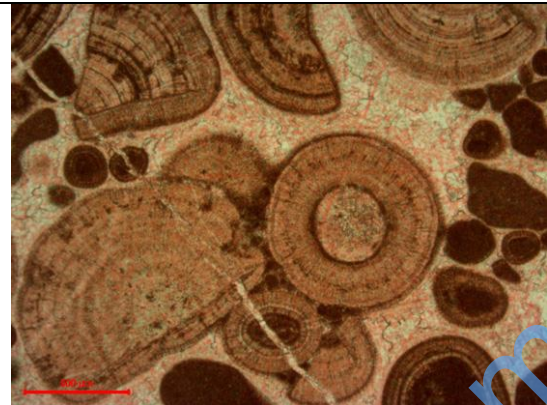
<p>Bioclast wackestone/ compacted packstone. Rounded micritised red algae, fractured rudist valves, small miliolids, ?valvulinids, rotalids and peloids or rounded micrite intraclasts. Sample (P1073). ?Cenomanian. PPL. Scale bar = 500µm.</p>	<p>Bioclast wackestone/ compacted packstone. Rounded micritised red algae, fractured rudist valves, small miliolids, ?valvulinids, rotalids and peloids or rounded micrite intraclasts. Sample (P1073). ?Cenomanian. PPL. Scale bar = 500µm.</p>
<p>Dolomitised bindstone. Very rare peloids and ghosts of small miliolids. Sample (P1075). PPL. Scale bar = 500µm.</p>	<p>Dolomitised bindstone. Very rare peloids and ghosts of small miliolids. Sample (P1075). PPL. Scale bar = 500µm.</p>
<p>Dolomitised bindstone. Very rare peloids and ghosts of small miliolids. Sample (P1076). PPL. Scale bar = 500µm.</p>	<p>Dolomitised bindstone. Very rare peloids and ghosts of small miliolids. Sample (P1076). PPL. Scale bar = 500µm.</p>



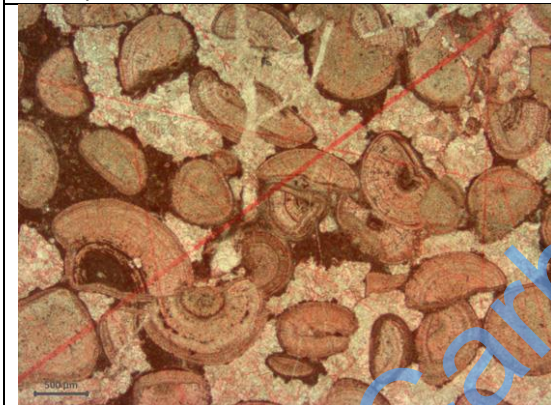
<p>Bioclast intraclast packstone/ grainstone. Very finely comminuted bioclasts, including reworked and bored rudists and orbitoidids. Sample (P1016). XPL. Scale bar = 500µm.</p>	<p>Bioclast intraclast packstone/ grainstone. Very finely comminuted bioclasts, including reworked and bored rudists and orbitoidids. Sample (P1016). XPL. Scale bar = 500µm.</p>
<p>Fine bioclast packstone. Rudist fragments, miliolid fragments, echinoderms, peloids and planktonic foraminifera. Sample (P1017). XPL. Scale bar = 500µm.</p>	<p>Fine bioclast packstone. Rudist fragments, miliolid fragments, echinoderms, peloids and planktonic foraminifera. Sample (P1017). XPL. Scale bar = 500µm.</p>
<p>Intraclast bioclast packstone. Bioclasts include rudist (radiolitid) fragments, gastropods, echinoderms and finely comminuted indeterminate bioclasts. Sample (P1018). XPL. Scale bar = 500µm.</p>	<p>Intraclast bioclast packstone. Bioclasts include rudist (radiolitid) fragments, gastropods, echinoderms and finely comminuted indeterminate bioclasts. Sample (P1018). XPL. Scale bar = 500µm.</p>



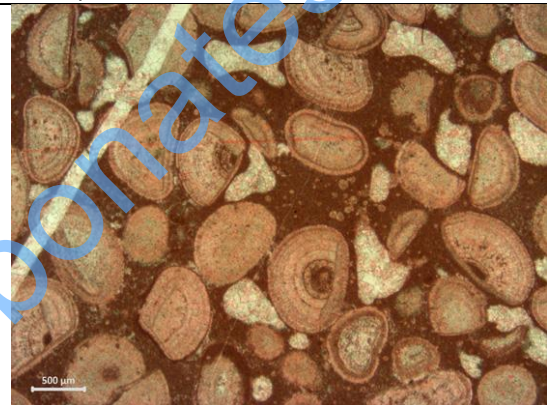
Pisoid peloid bioclast grainstone. Radially coated pisoids, green algae, aggregate pisoids and peloids. Intergranular porosity is infilled by non-ferroan calcite. Sample (029U). Aptian to Hauterivian. PPL. Scale bar = 500µm.



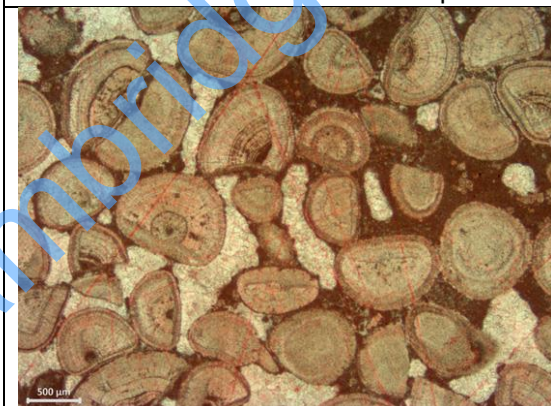
Pisoid peloid bioclast grainstone. Radially coated pisoids, green algae, aggregate pisoids and peloids. Intergranular porosity is infilled by non-ferroan calcite. Sample (029U). Aptian to Hauterivian. PPL. Scale bar = 500µm.



Pisoid packstone/ grainstone. Radially coated pisoids, aggregate pisoids and peloids. Intergranular porosity is infilled by non-ferroan calcite. Sample (029A). Aptian to Hauterivian. PPL. Scale bar = 500µm.



Pisoid packstone/ grainstone. Radially coated pisoids, aggregate pisoids and peloids. Intergranular porosity is infilled by non-ferroan calcite. Sample (029A). Aptian to Hauterivian. PPL. Scale bar = 500µm.



Pisoid packstone/ grainstone. Radially coated pisoids, aggregate pisoids and peloids. Intergranular porosity is infilled by non-ferroan calcite. Sample (029A). Aptian to Hauterivian. PPL. Scale bar = 500µm.

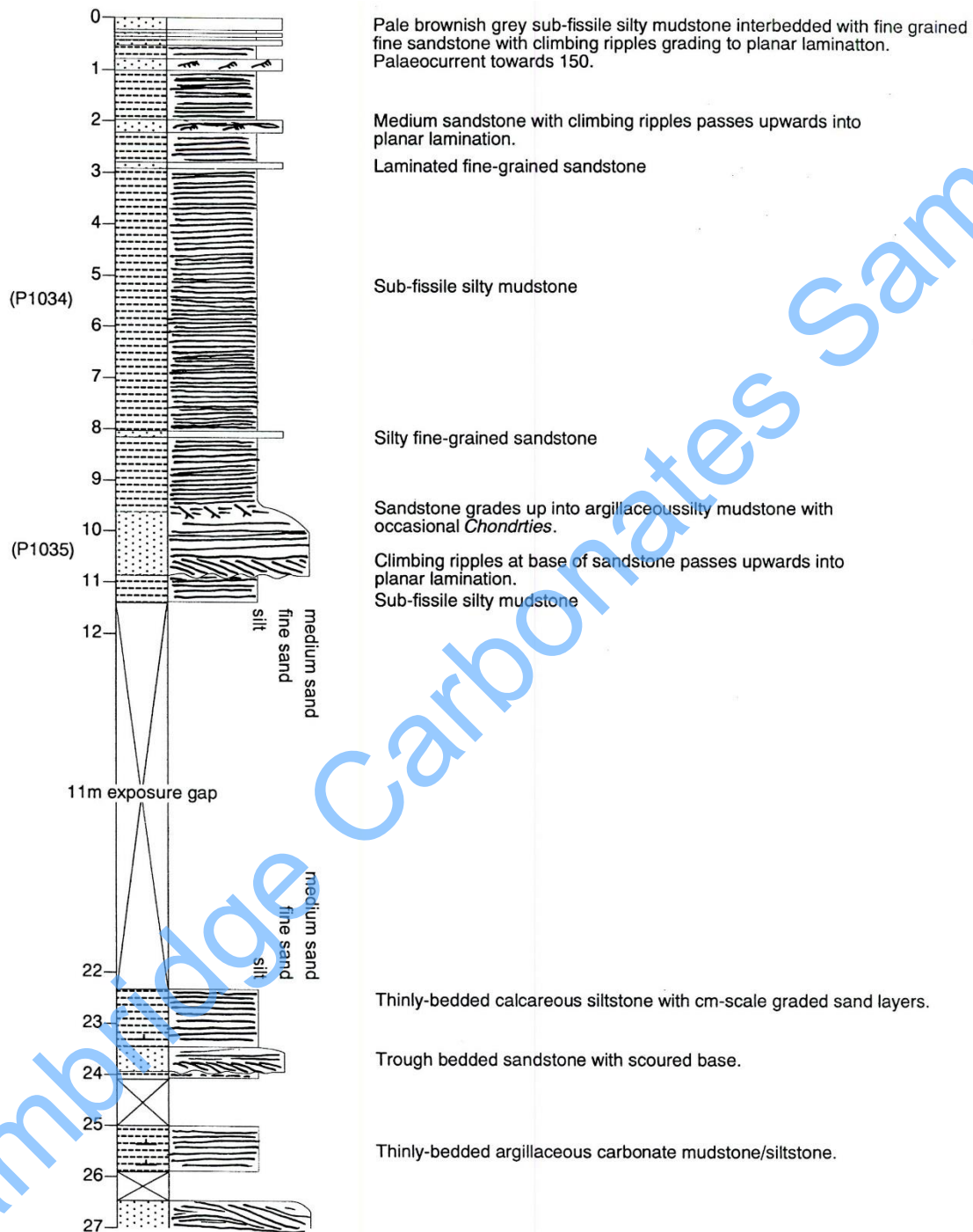


Pisoid packstone/ grainstone. Radially coated pisoids, aggregate pisoids and peloids. Intergranular porosity is infilled by non-ferroan calcite. Sample (029A). Aptian to Hauterivian. PPL. Scale bar = 500µm.

<p>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.</p>	<p>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.</p>
<p>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.</p>	<p>Pisoid peloid fenestral wackestone/ packstone. Peloids, pisoids, dasycladacean algal, small miliolids, blue-green algal nodules and intraclasts. Sample (029M). Aptian to Hauterivian. PPL. Scale bar = 500µm.</p>
<p>Pisoid grainstone. Radially coated pisoids, green algae, aggregate pisoids and peloids. Sample (029N). Aptian to Hauterivian. PPL. Scale bar = 500µm.</p>	<p>Pisoid grainstone. Radially coated pisoids, green algae, aggregate pisoids and peloids. Sample (029N). Aptian to Hauterivian. PPL. Scale bar = 500µm.</p>



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





<p>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.</p>	<p>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.</p>
<p>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.</p>	<p>Bioclast intraclast packstone/ grainstone. Nummulites, discocylinids, globigerinids, large miliolids, alveolinids, red algae, bivalves, rotalids, small miliolids, echinoderms and intraclasts. Sample (P1049). Latest Early to Middle Eocene. PPL. Scale bar = 500µm.</p>

<p>Arkosic lithic arenite. Subangular and subrounded quartz and feldspar grains. Allochems include globigerinids, echinoderm fragments, glauconite peloids and intraclasts. Eocene. PPL. Scale bar = 500µm.</p>	<p>Arkosic lithic arenite. Subangular and subrounded quartz and feldspar grains. Allochems include globigerinids, echinoderm fragments, glauconite peloids and intraclasts. Eocene. PPL. Scale bar = 500µm.</p>
<p>Arkosic lithic arenite. Subangular and subrounded quartz and feldspar grains. Allochems include globigerinids, rotalids, echinoderm fragments, glauconite peloids and intraclast. Eocene. PPL. Scale bar = 500µm.</p>	<p>Arkosic lithic arenite. Subangular and subrounded quartz and feldspar grains. Allochems include globigerinids, rotalids, echinoderm fragments, glauconite peloids and intraclast. Eocene. PPL. Scale bar = 500µm.</p>
<p>Carbonate mud stone/ wackestone. Whole and fragmented globigerinids and finely comminuted pelagic bioclasts. Eocene. PPL. Scale bar = 500µm.</p>	<p>Carbonate mud stone/ wackestone. Whole and fragmented globigerinids and finely comminuted pelagic bioclasts. Eocene. PPL. Scale bar = 500µm.</p>

### 3.3. WELL C: Late Cretaceous and Eocene Ionian Basin pelagic and resedimented carbonates

<p>Bioclast grainstone. Discocydinids, actinocylinids, alveolinids, rotalids, nummulites, miliolids, pellatispirids, segmented and encrusting red algae, echinoderms and shell fragments. Latest Early to Middle Eocene. PPL. Scale bar = 500µm.</p>	<p>Bioclast grainstone. Discocydinids, actinocylinids, alveolinids, rotalids, nummulites, miliolids, pellatispirids, segmented and encrusting red algae, echinoderms and shell fragments. Latest Early to Middle Eocene. PPL. Scale bar = 500µm.</p>
<p>Carbonate mudstone/ wackestone. Globigcrinids and morozovellids. Latest Early to Middle Eocene. PPL. Scale bar = 500µm.</p>	<p>Bioclast intraclast grainstone. Discocylinids, alveolinids, rotalids, nummulites, miliolids, pellatispirids, segmented red algae, echinoderms, shell fragments and intraclasts. Occasional phosphatic peloids are present. PPL. Scale bar = 500µm.</p>

#### 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.

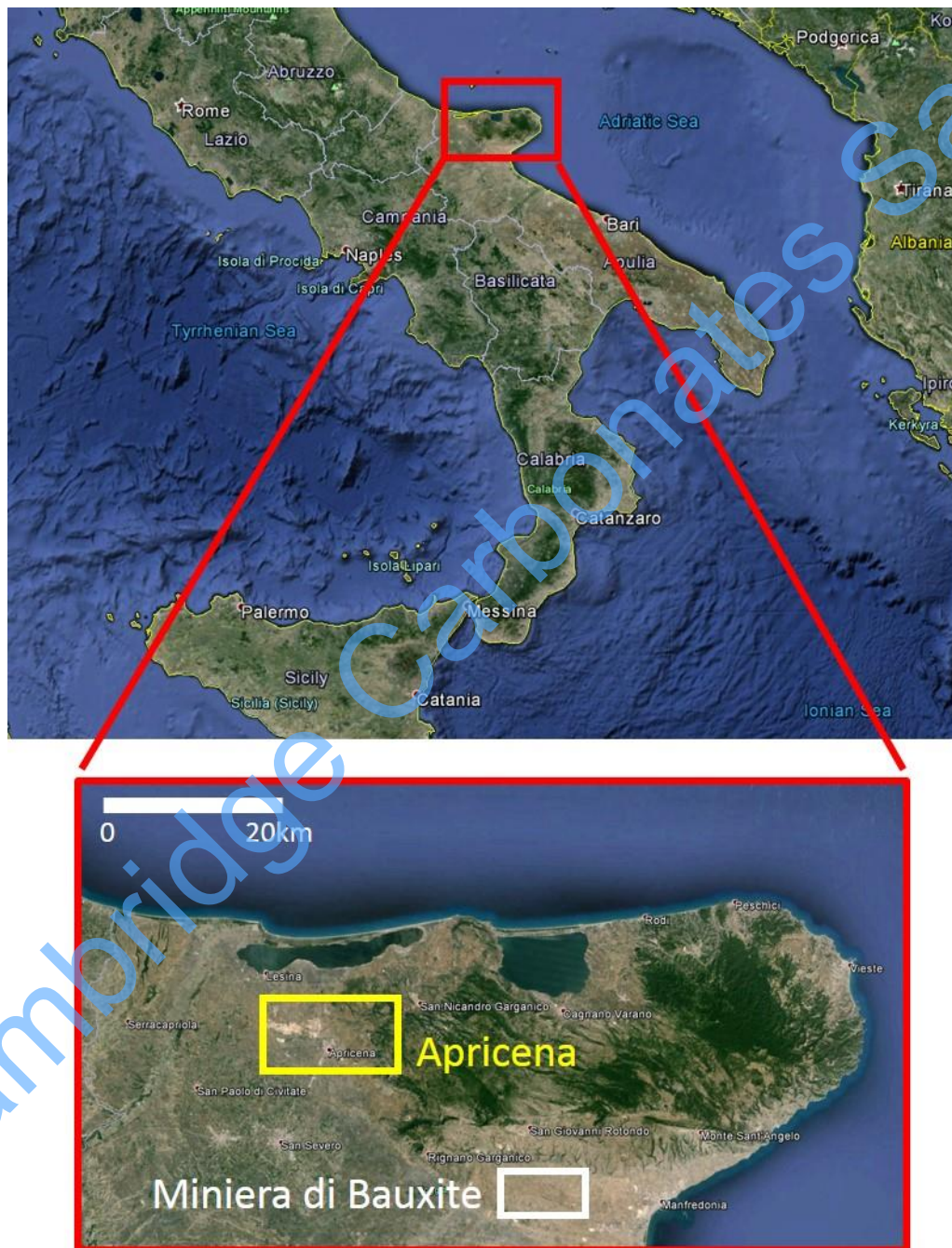
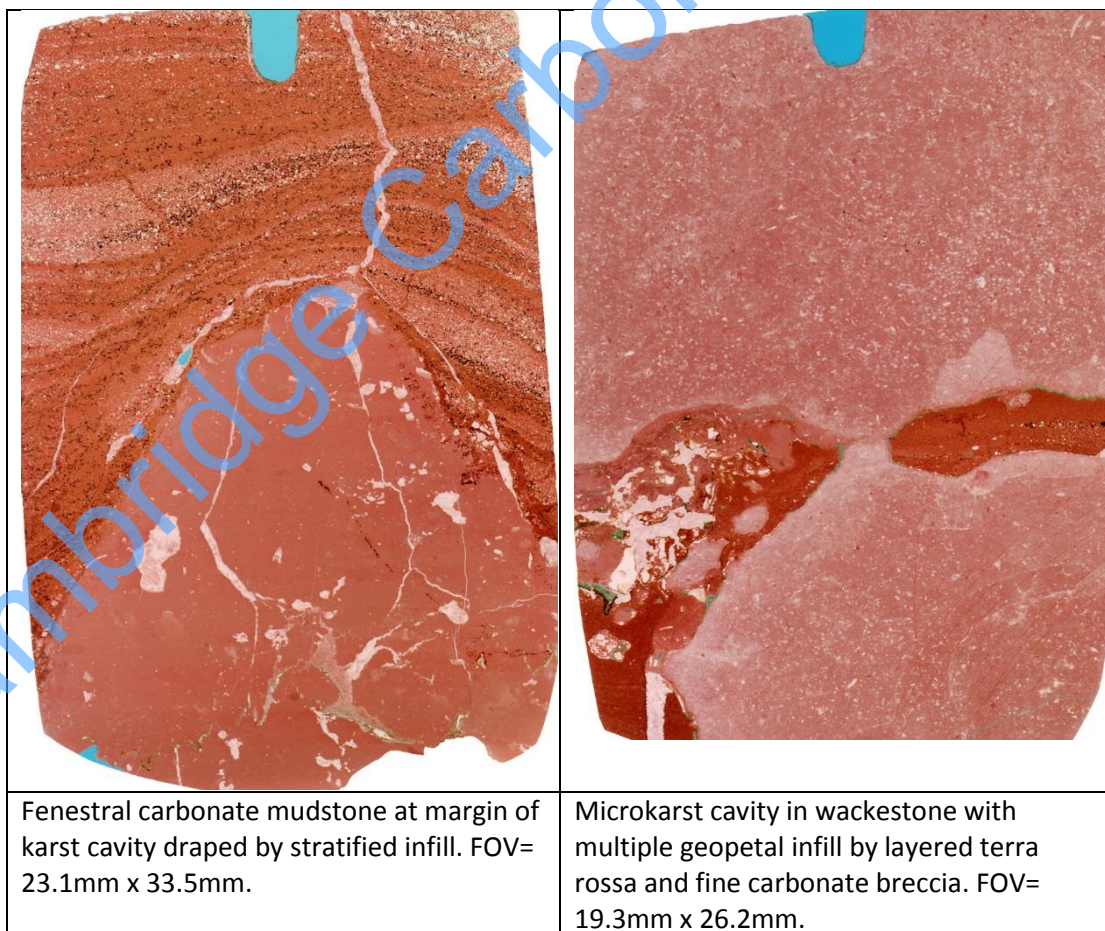
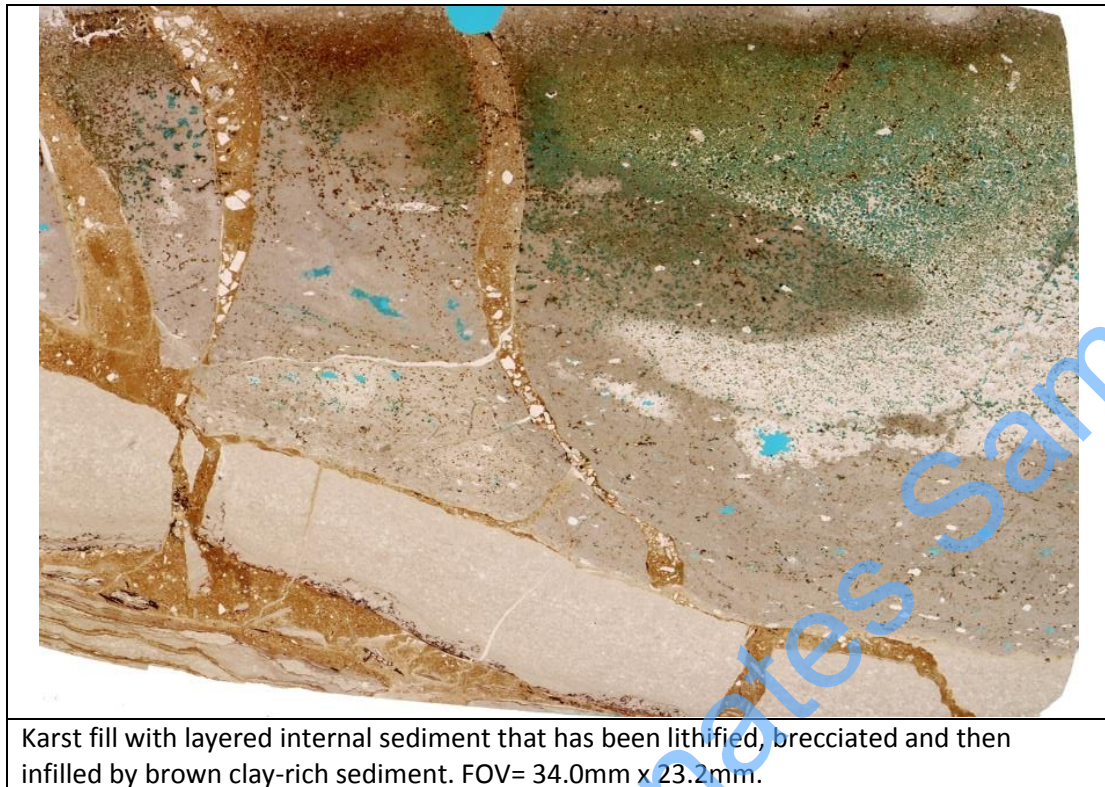


Figure 4 Map showing the location of the Apricena Quarry samples. Note also the location of the Miniera di Bauxite, where one of the samples is from.



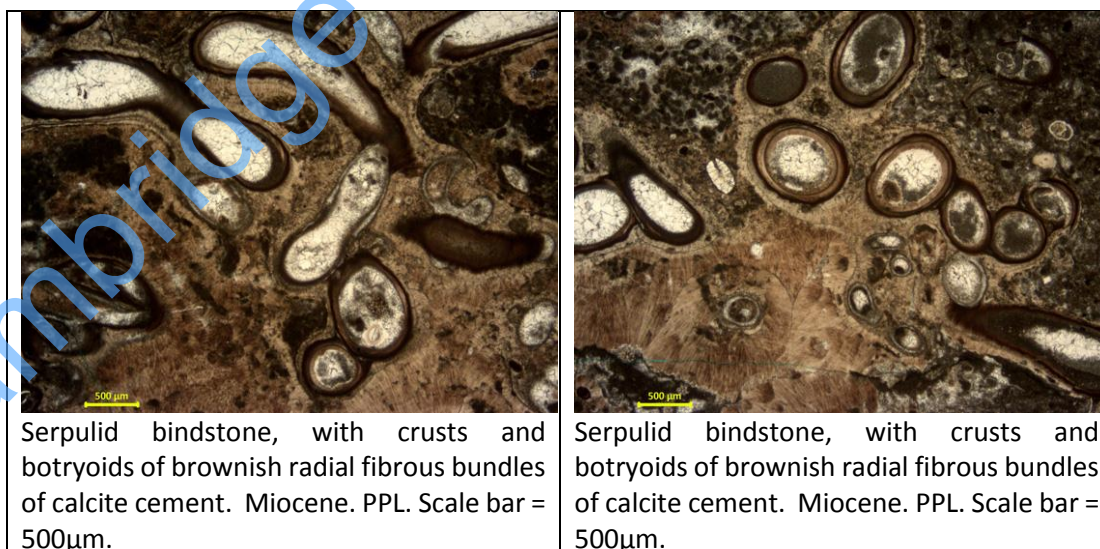


## 5. SOUTHERN APENNINES – SUBSURFACE EXAMPLES FROM THE APULIAN PLATFORM

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.



<p>Laminated coarse dolostone. Cretaceous. PPL. FOV = 3mm</p>	<p>Peloidal ghost dolostone. Cretaceous. PPL. FOV = 3mm</p>
<p>Peloidal ghost dolostone. Cretaceous. PPL. FOV = 3mm</p>	<p>Peloidal ghost dolostone, with fissure cemented by coarse calcite in a botryoidal arrangement. Cretaceous. PPL. FOV = 3mm</p>
<p>Fine karstic fissure fill conglomerate. Cretaceous. PPL. FOV = 6mm</p>	
<p>A mosaic breccia, with the early fracture lined by zoned dolospar. Cretaceous. PPL. FOV = 3mm</p>	<p>As left, but CL. FOV = 3mm</p>