

Middle to Upper Jurassic succession at Mt Kobariški Stol (NW Slovenia)

Srednje- do zgornjejursko zaporedje na Kobariškem Stolu (SZ Slovenija)

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Abstract: The Slovenian Basin represents a deeper-water paleogeographic unit that today extends approximately in E–W direction from Kobarid towards east. However, westward from Kobarid the successions of the Slovenian Basin are not present. Mt Kobariški Stol is located directly westward from the last outcrops of Slovenian Basin rocks. This area is in the Middle and Upper Jurassic represented by a unique facies association of nodular limestones, and abundant shallow-water carbonate resediments and corresponds to the transitional zone between the Dinaric Carbonate Platform located southeastward and northeastward located deeper marine sedimentary environments of the either Slovenian Basin or even more likely the submarine plateau named the Julian High. The Kobariški Stol area at that time represented a deeper-water current-swept plateau that was well connected to the adjacent shallow-water Dinaric Carbonate Platform. This proves the early idea that the Slovenian Basin in this part pinched out.

Izveček: Slovenski bazen je globljevodna paleogeografska enota, ki se danes od območja Kobarida razširja proti vzhodu. Zahodno od Kobarida izdanki Slovenskega bazena niso znani. Kobariški Stol se nahaja neposredno zahodno od Kobarida in bi lahko bil nadaljevanje Slovenskega bazena. Zgrajen je iz kamnin, ki tvorijo posebno faciesno združbo nodularnih apnencev in številnih presedimentiranih karbonatnih gravitacijskih tokov, ki jih gradijo plitvovodni klasti Dinarske karbonate platforme. Območje Kobariškega Stola je bilo tako v srednji in zgornji juri globljevodni podmorski plato, ki je bil dobro povezan z

Dinarsko karbonatno platformo. Območje Kobariškega Stola zatorej ne pripada bazenu, marveč prehodnemu območju med plitvovodno Dinarsko karbonatno platformo na jugu ter globljevodnim območjem Slovenskega bazena ali Julijskega platoja na severovzhodu oziroma severu. To dokazuje hipotezo prejšnjih raziskav, da se je Slovenski bazen vzhodno od območja Kobarida izklinil.

Key words: Slovenian Basin, Julian High, palaeogeography, Jurassic, deeper-water, transitional zone

Ključne besede: Slovenski bazen, Julijski plato, paleogeografija, jura, prehodno območje

INTRODUCTION

Slovenian Basin (SB) represents a Mesozoic deep-water paleogeographic unit surrounded by shallow-water carbonate platforms until Middle Jurassic and later by pelagic plateau on its northern side. Today it stands for a narrow facies belt of Late Triassic to Late Cretaceous deeper-water strata extending approximately in E–W direction from Kobarid towards east (COUSIN, 1970; BUSER, 1989, 1996; ROŽIČ, 2005; ROŽIČ & POPIT, 2006; BUSER et al., 2008; BUSER & OGORELEC, 2008; ROŽIČ, 2009; ROŽIČ et al., 2009; GALE, 2010; ROŽIČ & ŠMUC, 2011; GORIČAN et al., 2012; GALE et al., in press). Westward from Kobarid the successions of the Slovenian Basin are not present. According to BUSER (1996), BUSER & DEBELJAK (1996), and MIKLAVIČ & ROŽIČ (2008) the reason for this absence of SB deposits west of Kobarid area is that Slovenian Basin in this part pinched out (see also paleogeograph-

ic reconstruction in ROŽIČ & ŠMUC, 2011). These previous studies were however based on the study of Dinaric and Julian Carbonate Platform rocks of Lower Jurassic (BUSER, 1996; BUSER & DEBELJAK 1996) or Upper Cretaceous rocks formed after the disintegration of Dinaric Carbonate Platform (MIKLAVIČ & ROŽIČ, 2008) that outcrop north or south from the area of possible eastward continuation of the Slovenian Basin. Kobariški Stol succession, on a contrary, is located directly eastward from the last outcrops of Slovenian Basin rocks on Ozben hill (BUSER, 1986, 1987), is composed of different Upper Triassic to Cretaceous shallow and deeper-water strata (COUSIN, 1981) and thus represents a site of possible continuation of the Slovenian Basin.

The aims of this study are to present a detailed sedimentologic and biostratigraphic study of the Middle and Upper Jurassic rocks that outcrops at the Kobariški Stol, to interpret the sedi-

mentary environment in which they were formed, and shed a light on the Jurassic spatial distribution of the Slovenian Basin westward of Kobarid area.

GEOLOGICAL SETTING

The studied succession is located in NW Slovenia on Mt Kobarški Stol

that represents the southernmost part of the Julian Alps (Figure 1). The succession outcrops at the 1350 m of altitude, along the road that leads from Kobarški Stol peak towards the town of Kobarid. Structurally the area belongs to the Southern Alps, more exactly to the lowermost Tolmin Nappe (BUSER, 1986, PLACER, 2008) (Figure 1). Paleogeographically the area in the

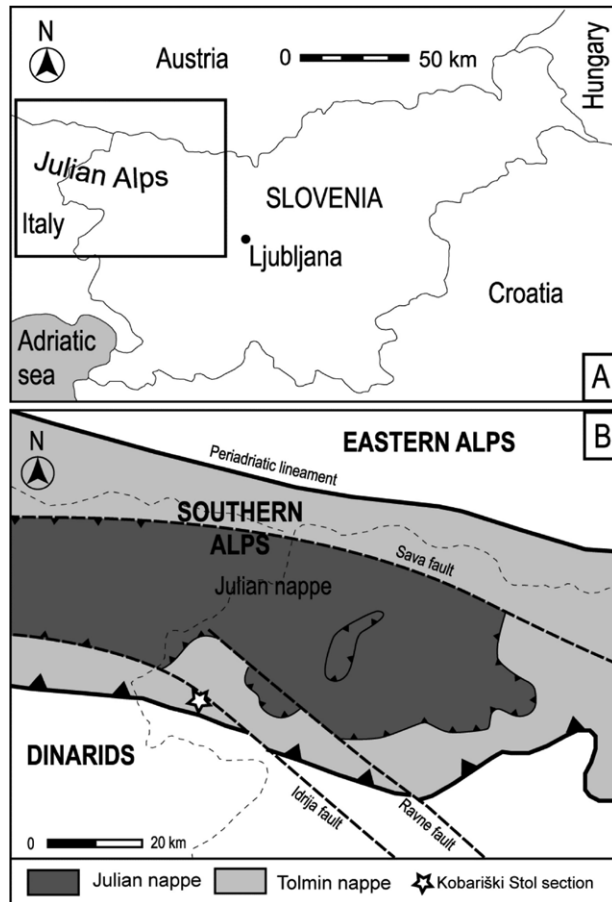


Figure 1A. Location of the Julian Alps. Insert in A represents the location of B. B: Main structural elements of the region and location of the investigated sections.

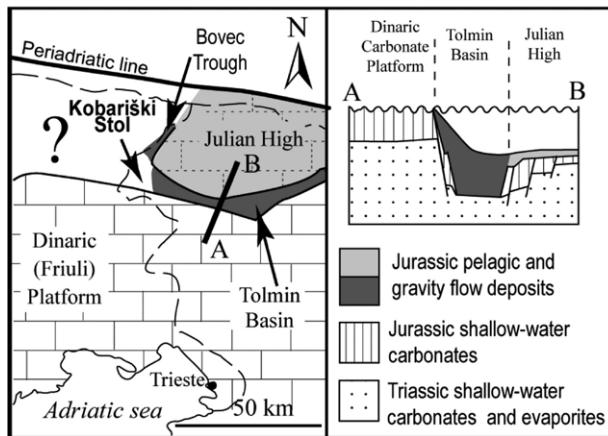


Figure. 2. Present-day position of paleogeographic units (compiled from BOSELLINI et al. 1981, MARTIRE 1992, BUSER 1989, PLACER 2008) and schematic palaeogeographic cross-sections at the end of the Jurassic (Bernoulli et al. 1979).

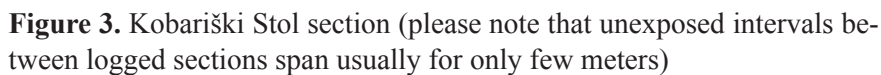
Middle and Upper Jurassic belonged to a transitional area between Dinaric Carbonate Platform to the South, Slovenian Basin to the East and Julian Plateau to the North (MIKLAVIČ & ROŽIČ, 2008, and this study) (Figure 2).

The area was investigated by COUSIN (1981) who distinguished following Middle and Upper Jurassic beds in Kobariški Stol: 1) upper Middle Jurassic (upper Dogger) to lower Upper Jurassic (lower Malmian) alternation of oolitic and crinoidal limestones, carbonate microbreccias and nodular limestones that are at places silicified; 2) Kimmeridgian to lower Tithonian Rosso Ammonitico facies; 3) Upper Tithonian/Berriasian to Valanginian micritic limestone of Biancone type.

The Kobariški Stol area was also mapped for the Basic Geological Map of Yugoslavia, at a scale of 1: 100 000 by BUSER (1986) (the Tolmin and Videm sheet).

KOBARIŠKI STOL SECTION: DESCRIPTION OF LITHOSTRATIGRAPHIC UNITS

The Kobariški Stol section was divided into three lithostratigraphic units named Unit 1, Unit 2, and Unit 3, respectively (Figure 3). Unit 1 (U1) represents the base of the investigated succession and consists of Bathonian or Callovian to lower Kimmeridgian gray, fine-grained limestones (pack-stone/wackestone to mudstone) with intercalated fine- to coarse-grained



calcarenites and fine-grained carbonate breccias. Unit 2 (U2) is represented by a gray distinctly nodular limestones with intercalated fine- to coarse-grained calcarenites and breccias of Late Kimmeridgian to early Tithonian age. Unit 3 (U3) corresponds to red nodular limestone of Rosso Ammonitico type of early Tithonian in age.

3.1 Unit 1 (U1):

The Unit 1 represents the base of the studied succession; the contact with underlying formations is not visible. The unit is at least 15 m thick and consists of 10 cm to 1 m thick beds of fine-grained limestones (mudstone to packstone) with intercalated 15 cm to 50 cm thick beds of diverse carbonate gravity-flows (Figure 3).

Fine-grained limestones

The fine-grained limestones include following facies types: bioclastic wackestone, wackestone with calcispheres, pelletal mudstone to packstone and silicified wackestone.

Bioclastic wackestone

Bioclastic wackestone to packstone is gray, thin bedded and at places nodular. Elongated grains are often oriented parallel to the bedding. It consists mainly of bioclasts of disarticulated valves of thin-shelled bivalves (*Bositra* sp.), echinoderm fragments, gastropod protoconch, juvenile ammonites, ammonite fragments, plank-

tic foraminifera (protoglobigerinids), benthic foraminifera (*Lenticulina* sp., *Textularidae*), and unidentified sparitic bioclast fragments (Pl. 1, Figs.1, 2). Small peloids, ooids, pellets and rare micritic intraclasts are rare. At places, where the wackestone exhibit nodular aspect, the matrix between the nodules consists of *Bositra* sp. rich packstone. Also common are irregular fields where peloids and filaments predominate.

Wackestone with calcispheres

This facies is represented by a thin to thick bedded wackestone to packstone. At places beds exhibit horizontal parallel lamination. Lamination is defined by alternation of thicker packstone to wackestone laminae composed mostly of calcispheres and thinner laminae of packstone to wackestone where thin shelled-bivalves (filaments) predominate (Pl. 1, Fig. 3). Other grains are echinoderm fragments, benthic foraminifera (*Lenticulina* sp., *Textularidae*) and planktic foraminifera (protoglobigerinids). Aptychi and partly recrystallized ooids are rare.

Pelletoidal mudstone to packstone

Pelletoidal mudstone to packstone is thin to medium-bedded (10 cm to 70 cm), at places laminated, grains are oriented parallel to the bedding. Laminae are represented by an alternation of thin microsparitic mudstone (Pl. 1, Fig. 4) with thicker pelletoidal mudstone to

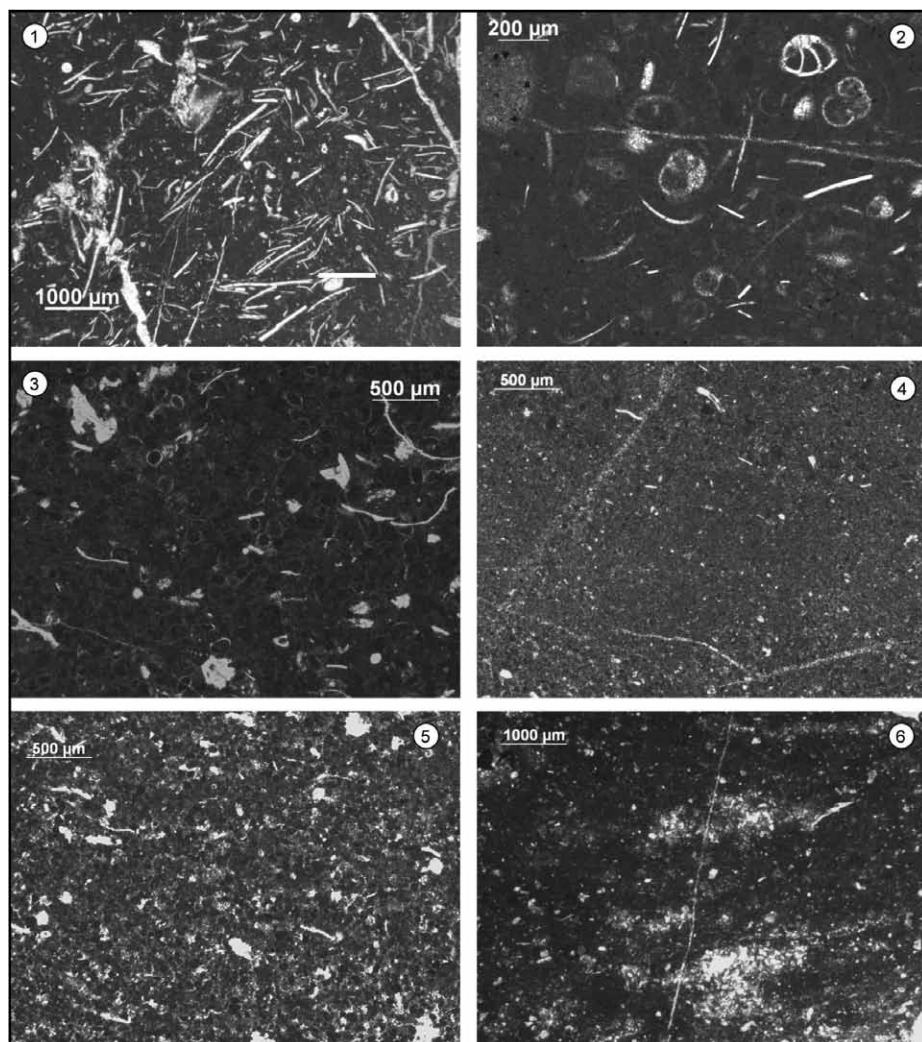


Plate 1.

Figure 1. Unit 1, fine-grained limestone; bioclastic wackestone with filaments and small echinoderm fragments.

Figure 2. Unit 1, fine-grained limestone; bioclastic wackestone with small benthic foraminifera, planktic foraminifera (protoglobigerinids) and filaments.

Figure 3. Unit 1, fine-grained limestone; wackestone/packstone with calcispheres and filaments.

Figure 4. Unit 1, fine-grained limestone; pelletal mudstone to packstone. Laminae of microsparitic mudstone.

Figure 5. Unit 1, fine-grained limestone; pelletal packstone with abundant pellets and rare echinoderm fragments

Figure 6. Unit 1, fine-grained limestone; silicified wackestone with rare calcified radiolarian moulds.

packstone (Pl. 1, Fig. 5). Mudstone to packstone are composed mainly of pellets (at places cannot be distinguished from matrix) and rare echinoderm fragments and filaments.

Silicified wackestone

Silicified wackestone exhibits parallel, wavy parallel and wavy nonparallel laminations. Silification occurs as beds and nodules of replacement chert. At places also wackestone matrix is partly silicified. Laminae are thinner mudstone to wackestone with rare radiolarian moulds, calcispheres and echinoderm fragments (Pl. 1, Fig. 6) and thicker wackestone/packstone to grainstone with small echinoderm fragments and pellets. Matrix is microsparite to sparite and at places syntaxial overgrows around echinoderm fragments.

Breccias and calcarenites

Intercalated breccias and calcarenites are thin to medium bedded and range from fine-grained breccias to fine-grained calcarenites.

Breccia beds

Thickness of breccia beds is up to 50 cm. The contact with underlying beds deposits is erosional. Additionally; at places breccias fill small channels up to 1 m wide and 20 cm deep. Breccias are poorly to medium-sorted, clast-supported and at places show inverse and normal grading. Clasts are some-

times oriented parallel to the bedding. Grains are up to few cm large and include clasts of underlying bioclastic wackestone, mudstone with calcispheres; and also shallow-water clasts of A) grainstone to packstone with *Microproblematica*, B) grainstone to packstone with peloids, echinoderm fragments, ooids, and filaments, C) pelletoidal packstone with rare benthic foraminifera, and D) ooidal packstone to grainstone. Other grains in breccia are *Microproblematica*, partly recrystallized large ooids, echinoderm fragments, rare fragments of corals, and sparitic bioclast fragments (Pl. 2, Figs. 1, 2). The matrix of the breccia consists of packstone at places also grainstone mainly with individual partly recrystallized ooids, peloids, echinoderm, algae and coral fragments, benthic foraminifera (*Lenticulina* sp., *Textulariidae*, *Protopeneroplis striata* Weynschenk), unidentified bioclasts, and thin-shelled bivalve fragments (Pl. 2, Figs. 1, 2). Grains are embedded in a micritic and microsparitic matrix, at places also cemented with syntaxial cements around echinoderm grains.

Fine to coarse-grained calcarenites

Fine to medium-grained calcarenites are medium bedded. Elongated grains are usually oriented parallel to the bedding. Normal and inverse grading and parallel laminations are sometimes present. At places also grading from breccia to calcarenites is observed. The

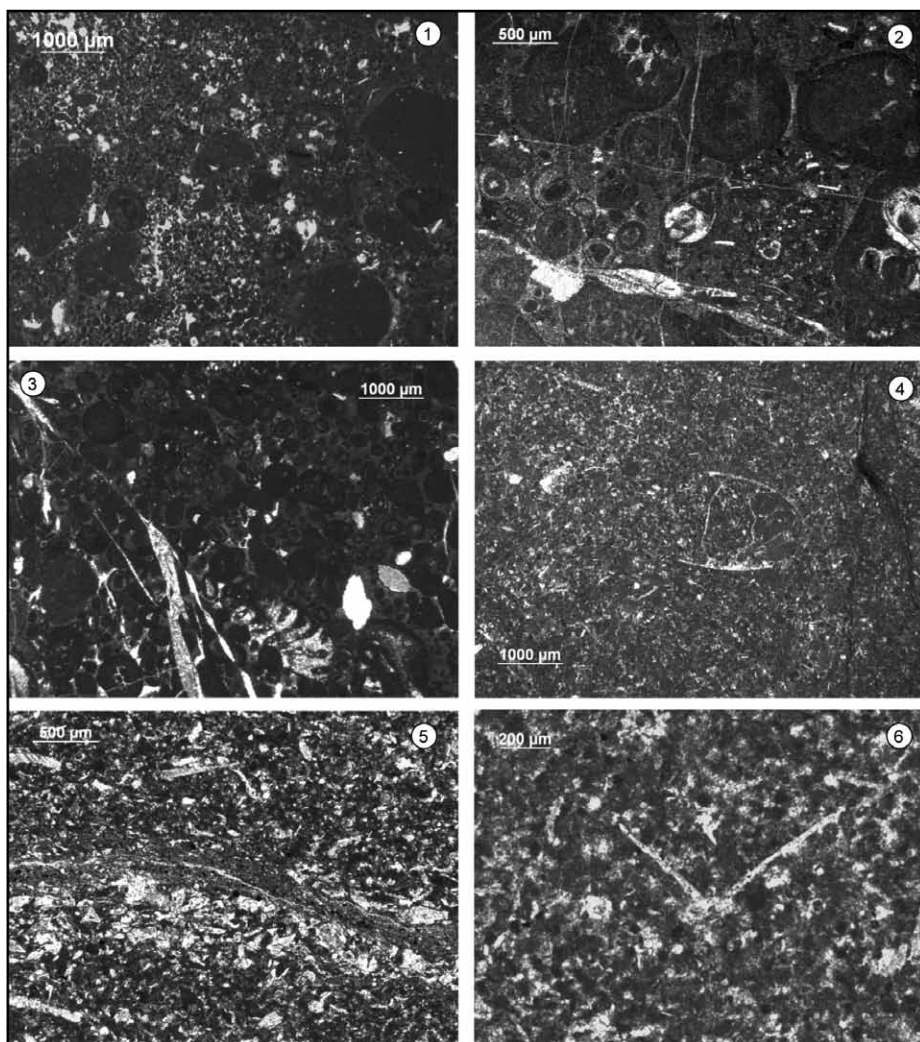


Plate 2.

Figure 1. Unit 1, limestone breccia; larger Microproblematica and partly recrystallized ooids in a packstone matrix composed of peloids, ooids, and echinoderm fragments.

Figure 2. Unit 1, limestone breccia; larger clasts of Microproblematica, lithoclasts, aggregate grains, partly recrystallized ooids and *Protopenneroplis striata* Weynschenk in a microsparitic matrix.

Figure 3. Unit 1, coarse-grained calcarenite; packstone with peloids, recrystallized ooids, echinoderm fragments and bioclasts.

Figure 4. Unit 2, nodular limestone; wackestone with pellets, calcispheres, echinoderm fragments and fragmented ammonite moulds.

Figure 5. Unit 2, nodular limestone; middle part of the photo is thin gray clay film between the nodules and around a packstone with echinoderms.

Figure 6. Unit 2, nodular limestone; packstone with pellets, echinoderm fragments and *Saccocoma* sp.

calcarenites are packstone to grainstone and have the same composition as breccia, but are devoid of larger lithoclasts (Pl. 2, Fig. 3).

Age of Unit 1

Based on the presence of planktic foraminifera (protoglobigerinids) and of individual tests of *Protopenetroplis striata* Weynschenk the age of the Unit 1 most probably ranges from Bathonian to early Kimmeridgian (cf. CARON & HOMEWOOD, 1983; SARTORIO & VENTURINI, 1988; TAPPAN & LOEBLICH, 1988; DARLING et al., 1997). Due to relatively small thickness of Unit 1 (15 m), it possibly records only upper part (Early Kimmeridgian) within this interval or contains hiatuses. The latter is also indicated by presence of nodular structure in fine-grained limestones.

Sedimentary environment of Unit 1

Fine-grained limestones (bioclastic wackestone, wackestone with calcispheres, pelletoidal mudstone to packstone and silicified wackestone) represent background pelagic and hemipelagic deposits in relatively deep-water environment as evidenced by a presence of mainly pelagic bioclasts (calcispheres, thin shelled-bivalves, radiolarians, planktic foraminifera, aptychi). Minor input from shallow-water environment is however indicated by rare shallow-water grains (ooids

and also benthic foraminifera, echinoderm fragments). Presence of different laminations (parallel, wavy parallel and wavy nonparallel) present almost in all fine-grained facies suggest some sort of hydrodynamic sorting, most probably by contour currents or redeposition of the material by fine-grained turbidites. Beds at places also exhibit nodular bedding that also indicates influence of bottom-currents that caused slower sedimentation rates and early selective cementation.

Sedimentary structures of breccias suggest deposition by debris flows or gravelly-high density turbidity currents. Different intraclasts (mud-chips) and also shallow-water lithoclasts indicate exhumation and partial erosion of underlying deposits. The fine-to medium grained calcarenites were deposited by sandy high-density turbidity currents. Presence of individual grains of ooids, *Microproblematica*, benthic foraminifera, corals and algal fragments indicates input from shallow-water areas.

Unit 2 (U2)

Unit 2 is up to 20 m thick and represented by gray nodular limestone with intercalated fine to coarse-grained calcarenites and breccias. The contact with the underlying Unit 1 is covered.

Nodular limestone

This facies usually occur in up to 70 cm

thick packages that exhibit distinct internal nodular bedding. Individual nodules are 3–7 cm thick, bedding surfaces are marked by thin brown to gray clay films. The nodules are wackestones to packstones composed of pellets, *Saccocoma* sp. and other echinoderm fragments, *Bositra* sp., calcispheres, and calcified radiolarian moulds (Pl. 2, Figs. 4, 5, 6). Benthic foraminifera, algal fragments, aptychi and poorly preserved ammonites are rare. The calcispheres at places exhibit geopetal infillings. Towards the edge of individual nodule the structure becomes tightly packed packstone with predominant echinoderm fragments (Pl. 2, Fig. 5). This facies is frequently silicified and contain beds and lenses of replacement cherts. Common diagenetic feature is also the presence of pyrite that is usually concentrated between the borders of the nodules, but occurs also within the nodules.

Breccias and calcarenites

Intercalated breccias and calcarenites are thin to medium bedded and represented by a fine-grained breccias and fine-to coarse-grained calcarenites.

Fine-grained breccias

Intercalated breccias are fine-grained, matrix to clast supported, and exhibit normal and inverse grading (from medium-breccia to medium-grained calcarenite). It contains also lenses and beds of replacement cherts. Individual breccia beds are up to 70 cm thick and

usually have an erosional contact with underlying deposits. Clasts are up to 3 cm large and are embedded in a matrix represented by a medium-grained calcarenite. Larger grains are composed exclusively of eroded underlying nodular limestones (mud-chips) or fragments of ammonite moulds filled with mudstone (Pl. 3, Fig. 1). Calcarenite matrix is composed mainly of individual grains of *Microproblematica*, small peloids, pellets, micritic and microsparitic lithoclasts and various bioclastic debris represented by fragments of corals and stromatoporoids, larger sparitic bioclasts, fragments of mollusks, brachiopods, echinoderms, benthic foraminifera, belemnites and aptychi (Pl. 3, Figs. 2, 3). Matrix is microsparite or fine-grained sparitic and syntaxial cement.

Fine to coarse-grained calcarenites

Beds of calcarenites are up to 25 cm thick, elongated grains are oriented parallel to the bedding. Beds and lenses of replacement chert are present. Calcarenites are packstone with echinoderm fragments, small peloids, and rare benthic foraminifera (*Lenticulina* sp., multichambered with micritic walls), *Bositra* sp., bioclastic sparitic fragments, algal fragments, and also larger clay clasts (Pl. 3, Figs. 4, 5). Grains are embedded in a microsparitic matrix or cemented by fine-grained sparitic and syntaxial cement.

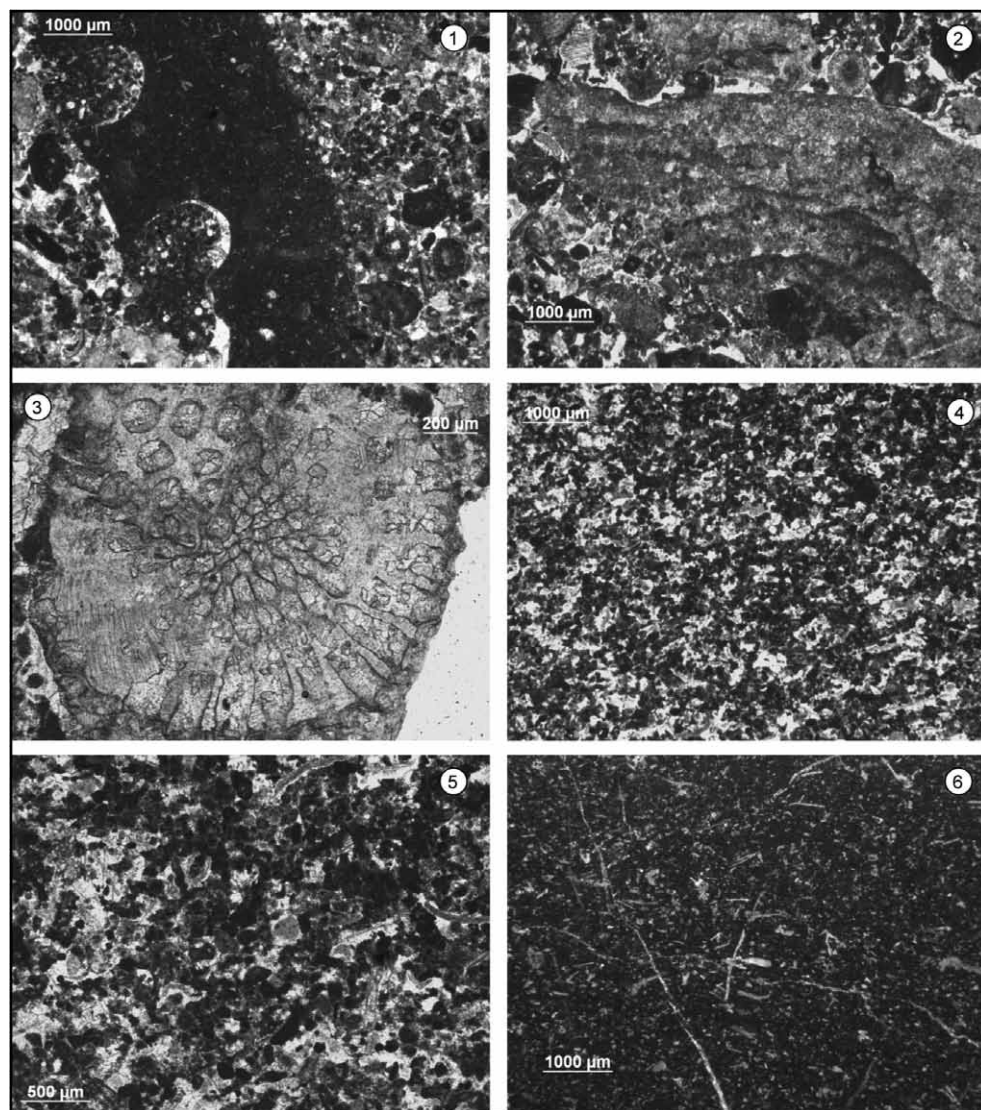


Plate 3

Figure 1. Unit 2, breccia; large clasts of micrite filled ammonite mould in a calcarenite matrix with peloids, echinoderm fragments, and other bioclastic fragments

Figure 2. Unit 2, breccia; stromatoporoid fragment in a calcarenite matrix with peloids, echinoderm fragments, and other bioclastic fragments.

Figure 3. Unit 2, breccia with coral

Figure 4. Unit 2, calcarenite; packstone with echinoderm fragments, peloids and rare filaments.

Figure 5. Unit 2, calcarenite; packstone/grainstone composed of echinoderm fragments, peloids and rare filaments.

Figure 6. Unit 3, red nodular limestone; wackestone with fragments of *Saccocoma* sp.

Age of Unit 2

Late Kimmeridgian to early Tithonian age for Unit 2 was determined on the basis of the presence of *Saccocoma* sp. (according to SARTORIO & VENTURINI, 1988).

Sedimentary environment of Unit 2

Nodular limestone represents deeper-water sediment as evidenced by presence of mainly pelagic bioclasts. Nodular structure however indicates early selective cementation on a current swept sea bottom.

Sedimentary structures of breccias suggest deposition by mud to debris flows. Lithoclasts of the nodular limestones indicates erosion of the underlying strata by over-riding flows. The fine-to coarse grained calcarenites were deposited by sandy high-density turbidity currents and represents top-cut-of Bouma sequences. The composition of shallow-water grains within the breccias and calcarenites indicate provenance area from adjacent contemporaneous shallow-water coral reef areas.

Unit 3: Red nodular limestone of Rosso Ammonitico type

The Unit 3 is at least 5 m thick; however the lower and upper contact is not visible, so the exact thickness of the Unit 3 is not known.

Nodular limestones

Nodular limestones are of wackestone

to packstone type. Individual nodules are 3–7 cm thick, bedding surfaces are marked by thin red clay films. They are composed almost exclusively of fragments of *Saccocoma* sp., while other grains (aptychi, calcified radiolarian moulds, and benthic foraminifera) are extremely rare (Pl. 3, Fig. 6).

Age

On the basis of the stratigraphic position and abundant presence of *Saccocoma* sp. the age of this unit is early Tithonian (cf. SARTORIO & VENTURINI, 1988).

Sedimentary environment

The red nodular lime-stones represent condensed sedimentation and are typical of sedimentation on isolated pelagic plateau. Nodules indicate presence of bottom currents that allowed micrite accumulation followed by long and repeated phases of cementation, bioturbation and current reworking (cf. MARTIRE, 1996). The higher clay content is most probably a secondary enrichment due to the pressure dissolution of micrite (cf. CLARI & MARTIRE, 1996).

MIDDLE AND UPPER JURASSIC SEDIMENTARY EVOLUTION OF THE KOBARIŠKI STOL AREA

Callovian to Kimmeridgian deposits of Unit 1 were deposited in a deeper-water environment and are dominated by carbonate background sediments (bio-

clastic wackestone, wackestone with calcispheres, pelletoidal mudstone to packstone and silicified wackestone). Nodular structure that is present at places indicates that this depositional area was episodically current-swept. Unit 1 also contains abundant beds composed of shallow-water calcareous material that was resedimented by debris flows and turbidity currents. The redeposition into deeper environment was from the adjacent south lying Dinaric Carbonate Platform that at that time represented the only known shallow-water environment in the area. Additionally, the breccias also contain reworked clasts of the underlying deposits and also older shallow-water lithoclasts. This indicates an important submarine erosional event cutting into older substratum, which was probably exposed due to the normal faulting. This normal faulting could be attributed to the extensional tectonic event in Callovian, that is well documented westward in Trento plateau (see MARTIRE, 1996).

In the Kimmeridgian and early Tithonian the nodular limestones and carbonate resediments of Unit 2 were deposited. The Unit 2 represents quite unique facies association of nodular limestones that are usually distinctive for a current-swept isolated pelagic plateau (cf. MARTIRE, 1989, 1992, 1996) and abundant carbonate resediments containing numerous reworked shallow-water elements (algae, coral fragments, ben-

thic foraminifera etc.). Therefore the Kobariški Stol area at that time represented a current-swept plateau that was nevertheless connected to adjacent shallow-water carbonate platform as evidenced by frequent carbonate gravity flows. The composition of the resedimented carbonates indicates an onset of coral-reef sedimentation in a provenance area and probably also progradation of reef margin, over deeper-water areas. Namely, the breccias composed mainly of coral reef fragments that are interpreted as a fore-reef facies, are well documented in Mija-Matajur Anticline (BUSER, 1987) located southward of the investigated area.

In early Tithonian the sedimentation of red nodular Rosso Ammonitico facies of Unit 3 started. It represents typical sediment of a current-swept pelagic plateau. It is devoid of shallow-water elements and most probably indicates a change in the mode of the deposition in Dinaric Carbonate Platform from highly productive reefs to the sedimentation of algal limestones of Tithonian age (cf. BUSER, 1965; TURNŠEK, 1966, 1969, 1972, 1997; STROHMENGER & DOZET, 1991).

CORRELATION WITH THE SLOVENIAN BASIN AND JULIAN PLATEAU

The investigated area show similarities and also differences to both: Slo-

venian Basin and Julian High paleogeographic domains. The correlation with the Slovenian Basin successions revealed that Unit 1 and 2 of the Kobariški Stol section are time and to some degree also facies equivalent to the Tolmin Formation of Slovenian Basin (ROŽIČ, 2006, 2009, GORIČAN *et al.*, 2012). The Tolmin Formation contains mainly siliceous limestones and thin-bedded radiolarian cherts with intercalated two intervals of carbonate resediments. Carbonate resediments of the Unit 1, especially ooidal packstone corresponds to the lower resedimented limestone of the Tolmin Formation, while carbonate resediments of Unit 2 correspond to the upper resedimented limestone of the Tolmin Formation (ROŽIČ & POPIT, 2006, ROŽIČ, 2009). The main difference between Slovenian Basin and Kobariški Stol area is absence of abundant siliceous limestones and radiolarian rich cherts in the Kobariški Stol succession. This indicates that the Slovenian Basin at that time represented deeper sedimentary environment with comparison of Kobariški Stol area.

On the other hand, when correlating solely the background sediments, the Units 1, 2, and 3 represent time and facies equivalent of the Prehodavci Formation of the Julian Plateau (ŠMUC, 2005; ŠMUC & ROŽIČ, 2011). In both areas condensed nodular limestones are presents and indicate sediment-starved

bottom current-swept deeper-water environment. The Julian Plateau however was an isolated plateau completely devoid of any shallow-water carbonate resediments, while Kobariški Stol area contains abundant calciturbidites and debris flow with shallow-water grains. This indicate that Kobariški Stol area was a site of condensed background sedimentation, but was well connected to the adjacent Dinaric Carbonate Platform and received relatively large amount of shallow-water resedimented material.

CONCLUSION

The Kobariški Stol area in the Middle and Upper Jurassic represents a unique facies association of nodular limestones, and abundant shallow-water carbonate resediments. At that time it represented a deeper-water current-swept plateau that was nevertheless well connected to the adjacent shallow-water Dinaric Carbonate Platform. Compared to the contemporary, eastward lying successions of the Slovenian Basin, the Kobariški Stol clearly represents shallower-water environment, that was however still located well below photic zone. In that sense Kobariški Stol area represents a transitional zone between the Dinaric Carbonate Platform located south, the Julian High towards north and the Slovenian Basin to the east. This

study thus confirms the idea that the Slovenian Basin in this part wedged out (BUSER, 1996; BUSER & DEBELJAK, 1996; MIKLAVIČ & ROŽIČ, 2008).

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