limestones are of Ladinian age, proven by conodonts. These red limestones pass continuously into grey hemipelagic limestones of Late Ladinian age (with *Gladigondolella tethydis* and *Gondolella foliata*), topped by shallow-water dolomites of Late Ladinian to Early Carnian age.
This short-lasting latest Anisian radiolarite event in the succession of the High Karst Nappe is contemporaneous with the complete demise of shallow-water carbonate production in the whole western Tethyan realm and corresponds to the onset of the first radiolarites on the Neotethys Ocean floor, as proven in Albania (Gawlick et al. 2008) and northern Croatia (Gorican et al. 2005) as well as in the Meliata Unit in Slovakia and Hungary (Kozur & Mock 1997). In the late Anisian the huge parts of the passive margin facing the newly formed Neotethys Ocean became flooded and volcanic ashes and radiolarites were deposited in the whole Dinarides reaching the palaeogeographic realm of the High Karst Nappe. Obviously volcanics in our sections are preserved only as some thin intercalations of metabentonites. The latest Anisian radiolarite deposition corresponds also to the onset of intense volcanism in the Dinarides more to the north and in the Southern Alps in Italy. The studied successions are nice examples of short-lived hemipelagic basins that formed on continental margin during the late Anisian rifting and were later, in the Ladinian and Early Carnian, completely infilled with sediments of prograding carbonate platforms.

Dimitrijevic, M.N. & Dimitrijevic, M.D. (1991): Triassic carbonate platform of the Drina-Ivanjica element (Dinarides). - Acta Geologica Hungarica, **34**/1-2: 15-44, Budapest.

Gawlick, H.-J., Frisch, W., Hoxha, L., Dumitrica, P., Krystyn, L., Lein, R., Missoni, S. & Schlagintweit, F. (2008): Mirdita Zone ophiolites and associated sediments in Albania reveal Neotethys Ocean origin. - International Journal of Earth Sciences, **97**: 865-881, (Springer) Berlin Heidelberg.

Gorican, S., Halamic, J., Grgasovic, T. & Kolar-Jurkovsek, T. (2005): Stratigraphic evolution of Triassic arc-backarc system in northwestern Croatia. - Bull. Soc. Geol. France, **176**/1: 3-22.

Kozur, H. & Mock, R. (1997): New paleogeographic and tectonic interpretations in the Slovakian Carpathians and their implications for correlations with the Eastern Alps and other parts in the Western Tethys. Part II: Inner Western Carpathians. - Mineralia Slovaca, **29**: 164-209, Bratislava.

Tollmann, A. (1976): Analyse des klassischen nordalpinen Mesozoikums. Stratigraphie, Fauna und Fazies der Nördlichen Kalkalpen. - 1-580, (Deuticke) Wien.

The Hallstatt Mélange occurrence of Vodena Poljana in the Inner Dinarides (Zlatar Mountain, SW Serbia)

Gawlick, H.-J.[1], Sudar, M.[2], Lein, R.[3], Missoni, S.[2], Jovanovic, D.[4] & Suzuki, H.[5]

[1] University of Leoben, Department for Applied Geosciences and Geophysics, Prospection and Applied Sedimentology, Peter-Tunner-Strasse 5, 8700 Leoben, Austria; hans-juergen.gawlick@mu-leoben.at; s.missoni@daad-alumni.de;
[2] University of Belgrade, Faculty of Mining and Geology, Department of Palaeontology, Dusina 7, 11000 Belgrade, Serbia; sudar@eunet.rs;
[3] University of Vienna, Centre for Earth Sciences, Althanstrasse 14, 1090 Vienna, Austria; richard.lein@univie.ac.at;
[4] Geological Institute of Serbia, Rovinjska 12, 11000 Belgrade, Serbia; djdivna@gmail.com;
[5] Otani University, Koyama-Kamifusa-cho, Kita-ku, Kyoto 603-8143, Japan; hsuzuki@res.otani.ac.jp

The different mélanges in south-western Serbia represent a key to solve palaeogeographic questions and to reconstruct the passive margin arrangement of the Inner Dinarides facing the Neotethys Ocean to the east. Of special interest are the different carbonate-clastic radiolaritic mélange areas in the Zlatar Mountain below the Dinaridic Ophiolite Belt.
The present study describes an occurrence of a late Middle to early Late Jurassic mélange in the area of Vodena Poljana in the Zlatar Mountain, SW Serbia (Fig. 1). The section starts 8 kilometres south of Nova Varos on a forest road in direction to Vodena Poljana between the mountain peaks Krseljci and Gulaver. In this area a completely dismembered Anisian shallow-water to Late Anisian-Norian Hallstatt Limestone succession occurs in a late Middle to early Late Jurassic radiolaritic matrix. The dismembered succession occurs as big slides and as clasts in several polymictic mass-flow deposits between the radiolarites and cherty marls. Bigger blocks show partly well constrained parts of the original sedimentary succession, e.g., the Late Anisian drowning of the shallow-water Ravni carbonate ramp (equivalent to the Steinalm carbonate ramp in the Northern Calcareous Alps). The drowning of these carbonate ramp is dated by the occurrence of *Nicoraella germanica* (Kozur), *Gladigondolella*-ME and *Gondollela* sp. in red Bulog Limestones (sample SRB 296) intercalated by turbidites with shallow-water material on top the shallow-water Ravni Formation. Upsection follows a section up to the Illyrian, dated by *Gondolella bulgarica* (Budurov & Stefanov), *Gladigondolella tethydis* (Huckriede), and *Gladigondolella*-ME (sample A 4748); *Gladigondolella budurovi* Kovács & Kozur, *Gondolella bifurcata* (Budurov & Stefanov), *Gondolella* cf. *cornuta* (Budurov & Stefanov), and *Gondolella excelsa* (Mosher) (sample A 4747): *Gladigondolella budurovi* Kovács & Kozur and *Gondolella bifurcata* (Budurov & Stefanov) (sample A 4749), Also the occurrence of *Gondolella* cf. *cornuta* (Budurov & Stefanov) in red limestone components in mass-flow deposits (sample SRB 301) confirm the age of the Late Anisian (Illyrian) drowning. Illyrian is proven in an other slide by the occurrence of *Gondolella transita* Kozur & Mostler, *Gondolella* cf. *excelsa* (Mosher), and *Gladigondolella tethydis* Huckriede from grey limestones (sample SRB 312); *Gladigondolella*-ME and *Gondolella basissymmetrica* (Budurov & Stefanov) (sample A 4755). Early Ladinian reddish-grey limestones bear *Gondolella trammeri* Kozur, *Gondolella excelsa* (Mosher), *Gladigondolella tethydis* Huckriede, and *Gladigondolella*-ME (sample SRB 314; sample A 4756). Late Ladinian to Early Carnian grey limestones with some shallow-water debris contains *Gondolella* cf. *inclinata* Kovacs (sample SRB 316). The Ladinian limestones contain metabentonites and partly volcanics. Late Carnian

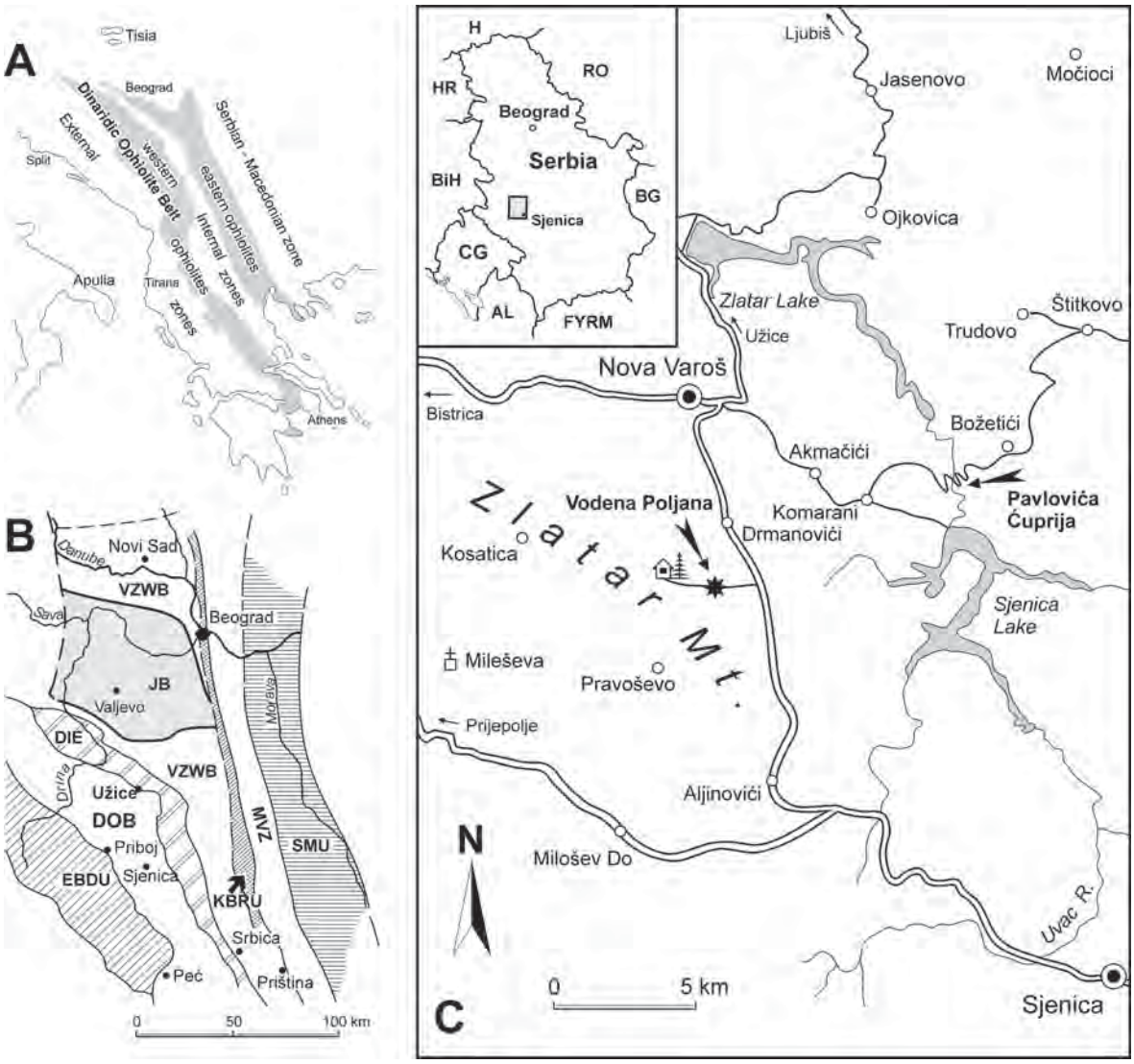

Fig. 1: **A.** Regional geological setting showing the External zones, the western ophiolites (Dinaridic, Mirdita, Hellenic ophiolites), the Internal zones (Korabi-Pelagonian Microcontinent = Pelagonian Zone, Korab Zone, Drina-Ivanjica Element) and the eastern ophiolites (Vardar Zone). **B.** Tectonic units and terranes of part of the Balkan Peninsula in the sense of KARAMATA et al. (2000) and KARAMATA (2006). **SMU** = Serbian-Macedonian Unit, **MVZ** = Main Vardar Zone, **KBRU** = Kopaonik Block and Ridge Unit, **VZWB** = Vardar Zone Western Belt, **JB** = Jadar Block, **DIE** = Drina-Ivanjica Element, **DOB** = Dinaridic Ophiolite Belt, **EBDU** = East Bosnian-Durmitor Unit. **C.** Location of the study area.

limestones as breccia components as well as metre-scaled blocks are proven by *Epigondolella echinata* (HAYASHI), *Gondolella nodosa* (HAYASHI), *Gondolella polygnathiformis* BUDUROV & STEFANOV, and *Neocavitella cavitata* SUDAR & BUDUROV (sample MS 1721/1; sample A 4752), *Epigondolella abneptis* (HUCKRIEDE), *Gondolella nodosa* (HAYASHI) and *Gondolella polygnathiformis* BUDUROV & STEFANOV (sample MS 1315), and *Epigondolella echinata* (HAYASHI) and *Gondolella polygnathiformis* BUDUROV & STEFANOV (sample MS 1721). They are also proven by the occurrence of *Meta-polygnathus communisti* HAYASHI and *Carnepigondolella* sp. from a polymictic mass flow (sample SRB 301; sample A4752), which prove probably a latest Carnian age. Grey massive limestones (equivalent to the Massiger Hellkalk) contain *Norigondolella navicula* (HUCKRIEDE) and *Epigondolella pseudodiebeli* (KOZUR) (sample SRB 307; early Lacian 1); *Norigondolella navicula* (HUCKRIEDE) and *Epigondolella* cf. *quadrata* ORCHARD (sample A4750); *Epigondolella* cf. *rigoi* KOZUR (sample SRB 310; Lacian 1/2 boundary); the higher part of the Lacian 2 is proven by the occurrence of *Norigondolella navicula* (Huckriede) and a transitional form between *Epigondolella triangularis* (BUDUROV) and *Epigondolella spatulata* (HAYASHI) (sample SRB 303). Red to violet nodular limestones (equivalent to the Hangendrotkalk) contains *Norigondolella stein-bergensis* (MOSHER) and *Epigondolella abneptis* (HUCKRIEDE) (sample SRB 306); *Epigondolella postera* (KOZUR & MOSTLER) and *Norigondolella steinbergensis* (MOSHER) (samples MS 1722/1 and MS 1722/2) or only *Norigondolella steinbergensis* (MOSHER) (sample A 4754); *Epigondolella postera* (KOZUR & MOSTLER) (sample MS 1723);

Epigondolella abneptis (Huckriede), *Epigondolella postera* (Kozur & Mostler), and *Norigondolella steinbergensis* (Mosher) (samples MS 1724); *Epigondolella abneptis* (Huckriede), *Epigondolella postera* (Kozur & Mostler) and *Norigondolella* cf. *hallstattensis* (Mosher) (sample MS 1726). or *Norigondolella* cf. *steinbergensis* (Mosher) (sample SRB 311). Interestingly the older components occur in a higher position of the succession. This proves a step by step erosion and resedimention of the original sequence. The radiolaritic matrix is dated by means of radiolaria. Following taxa proves a Callovian to Middle Oxfordian age: *Archaeodictyomitra mitra* Dumitrica in Dumitrica et al., *Archaeodictyomitra rigida* Pessagno, *Archaeodictyomitra* sp. B sensu Wegerer et al., *Droltus galerus* Suzuki, *Eucyrtidiellum unumaense* (Yao), *Eucyrtidiellum nodosum* Wakita, *Gongylothorax favosus* Dumitrica, *Hsuum brevicostatum* (Ozvoldova), *Hsuum maxwelli* Pessagno, *Loopus doliolum* Dumitrica, *Praewilliriedellum spinosum* Kozur, *Praezhamoidellum* cf. *parvipora* (Tan), *Stichocapsa robusta* Matsuoka, *Striatojaponocapsa conexa* (Matsuoka), *Striatojaponocapsa synconexa* O'Dogherty et al., *Tricolocapsa* aff. *fusiformis* Yao, *Tricolocapsa* sp. C sensu Auer et al., *Williriedellum dierschei* Suzuki & Gawlick.

Hallstatt Limestone successions are only known from the distal passive Europaean (or Adria) margin facing the Neotethys Ocean to the east. The clasts and slides of the mélange in the area of Vodena Poljana derive therefore from the outer shelf region and resemble the known situations in the Eastern Alps or the Albanides. The situation resembles of the Bathonian to Oxfordian Sandlingalm Formation (Hallstatt Mélange) in the Northern Calcareous Alps (Gawlick et al. 2009) and equivalents in the Western Carpathians or Albanides. The Hallstatt Mélange is interpreted to be formed in front of advancing nappes, formed in the outer shelf region due to the onset of ophiolite obduction in the Middle Jurassic, confirmed in the Inner Dinarides by the overlying ophiolitic mélange in the Zlatar Mountain. These nappes propagated during Middle to Early Late Jurassic from the outer to the inner shelf area (Late Triassic carbonate platform) forming a thin-skinned thrust belt.

We consider therefore westward transport of the carbonate-clastic Hallstatt Mélange, the ophiolitic mélange and the ophiolite nappes from the Neotethys realm. An autochthonous origin of a Triassic Ocean (Dinaridic or Pindos Ocean) between the Outer Dinarides and the Drina-Ivanjica Unit to the east as northward continuation of Pelagonia/Korabi Units can be excluded. This ocean would have existed in the lagoonal area of the Triassic carbonate platforms in the Dinarides, separate for example in Late Triassic times the restricted lagoon (Hauptdolomit) from the open lagoon (lagoonal Dachstein Limestone).

Karamata, S. (2006): The geological development of the Balkan Peninsula related to the approach, collision and compression of Gondwanan and Eurasian units. - (In: Robertson, A.H.F. & Mountrakis, D. (Eds.): Tectonic development of the eastern Mediterranean region), Geological Society, London, Special Publications, **260**: 155-178, London.

Karamata, S., Dimitrijevic, M.D., Dimitrijevic, M.N. & Milovanovic, D. (2000): A correlation of ophiolitic belts and oceanic realms of the Vardar Zone and the Dinarides. - (In: Karamata, S. & Jankovic, S. (Eds.): Proceedings of the International Symposium „Geology and Metallogeny of the Dinarides and the Vardar Zone"), Academy of Sciences and Arts of the Republic of Srpska, Collections and Monographs, Department of Natural, Mathematical and Technical Sciences, 1: 61-69.

Gawlick, H.-J., Missoni, S., Schlagintweit, F., Suzuki, H., Frisch, W., Krystyn, L., Blau, J. & Lein, R. (2009): Jurassic Tectonostratigraphy of the Austroalpine domain. - Journal of Alpine Geology, **50**: 1-152, Wien.

Age and provenance of the Dinaridic Ophiolite Belt in the Zlatibor area (SW Serbia)

Gawlick, H.-J.[1], Sudar, M.[2], Missoni, S.[1], Suzuki, H.[3], Jovanovic, D.[4] & Lein, R.[5]

[1] University of Leoben, Department for Applied Geosciences and Geophysics, Prospection and Applied Sedimentology, Peter-Tunner-Strasse 5, 8700 Leoben, Austria; hans-juergen.gawlick@mu-leoben.at; s.missoni@daad-alumni.de;
[2] University of Belgrade, Faculty of Mining and Geology, Department of Palaeontology, Dusina 7, 11000 Belgrade, Serbia; sudar@eunet.rs;
[3] Otani University, Koyama-Kamifusa-cho, Kita-ku, Kyoto 603-8143, Japan; hsuzuki@res.otani.ac.jp;
[4] Geological Institute of Serbia, Rovinjska 12, 11000 Belgrade, Serbia; djdivna@gmail.com;
[5] University of Vienna, Centre for Earth Sciences, Althanstrasse 14, 1090 Vienna, Austria; richard.lein@univie.ac.at

The Dinaridic Ophiolite Belt of western and south-western Serbia is made of ophiolites and widespread mélanges containing different components up to nappe-size, interpreted as radiolaritic-ophiolitic trench fills in front of advancing nappes. Matrix ages of the different mélange complexes are very rare, but play a crucial role in the reconstruction of the formation and emplacement of the ophiolite nappes. From the radiolaritic matrix between different ophiolite, radiolarite and rare carbonate blocks of the ophiolitic mélange in the Zlatibor area (localities: **A.** south of Trnava in the valley of Katusnica River, **B**. south of Ljubis in one double road curve in direction to Gornja Bela Reka, and **C**. east of Ljubis near Visoka) we isolate radiolarians of Early Callovian to Middle Oxfordian age on locality A with *Archaeodictyomitra* cf. *rigida*, *Eucyrtidiellum* cf. *unumaense*, *Gongylothorax* cf. *favosus*, *Williriedellum dierschei*, and *Tritrabs* sp. (sample SRB 216); and on locality B with *Archaeodictyomitra rigida*, *Archaeodictyomitra* sp., *Eucyrtidiellum unumaense*, *Eucyrtidiellum unumaense unumaense*, *Gongylothorax favosus*, *Gongylothorax* sp. C, *Helvetocapsa* cf. *matsuokai*, *Praezhamoidellum* aff. *buekkense*, *Striatojaponocapsa conexa*, *Striatojaponocapsa* sp., *Theocapsomma* cf. *cucurbiformis*, *Theocapsomma medvednicensis*, *Theocapsomma* sp., *Unuma latusicostatus*, *Unuma* cf. *gordus*, and *Williriedellum dierschei* (sample SRB 240). In both regions therefore the age of the mélange can be dated as Early Callovian to Middle Oxfordian, and belong to the same mélange belt. Blocks of ribbon radiolarites in