From reef to basin – progradation of the shallow water carbonates over the Middle Triassic Northwestern Croatian rift related basin (Ivanščica Mt., NW Croatia)

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the uplifted Hercynian Mountains and deposited and reworked in a coastal part of the Paleo-Tethys. Due to their structural and textural features, the Košna conglomerates are comparable with Late Paleozoic conglomerates from other areas in the Dinarides, Eastern and Southern Alps.

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FROM REEF TO BASIN – PROGRADATION OF THE SHALLOW WATER CARBONATES OVER THE MIDDLE TRIASSIC NORTHWESTERN CROATIAN RIFT RELATED BASIN (IVANŠČICA MT., NW CROATIA)

OD GREBENA DO BAZENA – PROGRADACIJA PLITKOVODNIH KARBONATA PREKO SREDNJETRIJASKOG RIFTNOG BAZENA SJEVEROZAPADNE HRVATSKE (IVANŠČICA, SZ HRVATSKA)

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The NW part of Croatia represents a tectonically complex area at the junction of the Dinarides and the Southern Alps. In Očura Quarry on Ivanščica Mt. there is 34 m thick section composed of volcanic, volcaniclastic and carbonate rocks that can be divided into three parts. The lower interval (7 m) is composed of dominantly basaltic rocks (SiO_2 = 43–51 wt%). In the basal part glomeroporpyric basalt is followed by basaltic autoclastic breccia. The second interval (7–19 m) is composed of cm–dm irregularly and wavy bedded calcarenites, occasionally coarsening upward, with lithoclasts varying in size from fine sand up to fine breccia. Carbonate lithoclasts are mostly micritic limestones – biomicrite, pelmicrite, pelsparite, intrasparite, also bioclasts of bivalves, crinoids, ammonoids, brachiopods, and gastropods. Two types of basaltic lithoclasts are present in the dominantly calcarenite interval, one with the porphyric to glomeroporphyric texture, similar to the basalts of the lower part; and the other type completely hyaline. Lithoclasts are cemented by sparry calcite. In the coarser varieties lithoclasts are the same, with the only difference in the matrix found between the clasts, that is composed of fine calcarenites with basaltic lithoclasts. Calcarenites are interlayered by thin layers of biomicrites with filaments and radiolarians, and thin layers of fine to coarse ash vitriclastic tuffs. In the middle of this interval around 1.5 m thick matrix supported breccia occurs with limestone and basaltic lithoclasts. Third interval of the section (19–34 m) is composed of extremely unsorted breccia with slump texture. Clasts of limestones, calcarenites, and subordinary basalts are supported by fine grained matrix of carbonate and basaltic particles. Abundant framestone clasts are present in the breccia, containing complex reef community, dominating of sponge *Celyphia zoldana*, with other microorganisms of uncertain taxonomy *Plexoramea cerebriformis* and *Olangocoelia otti*, and others. Generally in this interval carbonate material is predominant over basaltic lithoclasts.

The investigated section represents sedimentation in the deeper marine environment near the steep edge of the carbonate platform and reef. Basalts found at the base of the section present effusions in the marine areas, and their fragmentation and reworking. A thick interval of calcarenites with basaltic lithoclasts is formed by shedding of the carbonate material from the nearby platform to the pelagic/basinal areas, indicated by the pelagic limestone interlayers. Chaotic breccia with meter sized fragments of reefal limestones indicates a more proximal position to the shallow marine area from which these clasts were derived. Slump texture emphasizes gravitational processes. The general trend of coarsening upward, as well as the predominance of the framestone clasts in the breccias

imply the progradation of the platform over the basinal areas. Therefore, indicating a relatively rapid closure of the basinal/pelagic areas and cessation of the extensional tectonics related to the Neotethyan rifting. One sample (OD-15A) bears conodonts *Gladigondolella tethydis* (Huckriede), *Paragondolella trammeri* (Kozur), that indicate Illyrian to Lower Longobardian age of this section. That age is in the accordance with the regional cessation of the volcanic activity in the Ladinian, and progradation of the platforms over the basinal areas that were filled with various clastic, volcaniclastic, silicious and pelagic sediments.

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SARMATIAN SEDIMENTS OF THE SOUTHWESTERN PART OF THE HRVATSKO ZAGORJE BASIN (HZB), CROATIA

SARMATSKI SEDIMENTI JUGOZAPADNOG DIJELA HRVATSKO ZAGORJE BAZENA (HZB), HRVATSKA

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A number of lithostratigraphic columns within the Sarmatian deposits were documented during the geological mapping of the area of the southwestern part of the Hrvatsko Zagorje Basin (HZB) resulting in thorough measurements and sedimentological description. It is well known that at the end of the Badenian, the isolation of the Pannonian Basin System started, which at the beginning of the Sarmatian resulted in the establishment of marine environment characterized by reduced salinity (AVANIĆ *et al.*, 2018). Two distinct depositional environments gave rise to the deposition of Sarmatian sediments in the southwestern part of the Hrvatsko Zagorje Basin – nearshore deposits made of conglomerate, sandstone, biocalcirudite, biocalcarenite and marl, and offshore deposits with a local input of clastic material represented by marl and silt with sand intercalations. A bentonite clay layer is documented near the Sutla River in the border region with Slovenia. Bentonite mineralogy accounts dominantly for montmorillonite (60–70 %) and in lesser content opal-CT, calcite and quartz. Marls predominantly consist of calcite and clay minerals, while quartz and feldspars are less abundant. The calcite content varies from 20 to 80 %. Clay fraction is made of smectite, illite, chlorite and kaolinite. The mineral association of garnet, dolomite, glauconite, tourmaline, zircon, and rutile in the sand and silts indicate a local origin of the material. Abundant fossil assemblage served as a tool for biostratigraphical correlation and interpretation of the depositional environment. The bentonite clay likely originated as an alteration product of distant tephra sourced from the north-eastern part of the Carpathian–Pannonian Region (GRIZELJ *et al.*, 2023). Furthermore, the development of the Sarmatian deposits from the southwestern part of the Hrvatsko Zagorje Basin is consistent with the development in other parts of the Central Paratethys.

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