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Abstracts

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The Holocene turbiditic sedimenttion on the south-eastern Crimean slope and rise referred to the Yalta deep-sea fan formation

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Two cores taken during the second Leg of the TTR-6 Cruise aboard R/V GELENDZHIK recovered three major lithostratigraphic units of the Black Sea Holocene sediments (Ross & Degens, 1974). The first and the second units were complicated with abundant muddy and silty turbidite layers of different thickness that were sandwiched in between laminated sediments. The presence of these turbidites considerably increased the thickness of the Holocene sediments. Besides these cores, sampling data of the previous cruises were included into the present study, and a total of 72 cores taken from the area was analyzed with the purpose to investigate Holocene turbidites' behavior and distribution. Detailed stratigraphy of the Black Sea sediments allowed the timing of turbiditic events to be established.

Thickness and sedimentation rate distribution of the upper two lithostratigraphic units were mapped. The maps obtained display two local depocenters of the Holocene turbiditic sedimentation. One of them was formed within a time interval of 1635-1750 years BP (Jones & Gagnon, 1994) and the corresponding sedimentation rate is 80 cm/ka. The second depocenter located towards upslope from the first one belongs to a time interval of from 1635 years BP till recent (Jones & Gagnon, 1994), and the sedimentation rate of 50 cm/ka was calculated. These depocenters are referred to a deep-sea fan formation resulted from activity of several canyons coming from the area of the Yalta Bay and cutting through the slope. The presence of these depocenters is explained by the fan upslope migration caused by the Holocene sea-level rise. The fan development is controlled by a growing clay diapiric ridge well-expressed in the sea-bottom morphology as an elongated rise 170 m high. This ridge probably caused the turbiditic flow to shift to the south-west in the beginning of the Holocene and is also a barrier for recent turbiditic flow preventing from its spread farther to the abyssal plain.

Insignificant shelf width and high seismicity of the region are involved to explain the existence and modern activity of the Yalta deep-sea fan. Considering earthquake events as a trigger mechanism for turbiditic flows, it is suggested that such events, leading to the origination of turbiditic flow capable to rich the abyssal plain, can occur approximately each 90 years.

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Upper Palaeozoic sedimentary rocks from Gorski kotar, Croatia: new sedimentological and palaeontological data

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Based on the new sedimentological and palaeontological data from the region of Gorski kotar, an obvious heterogeneity of facies of the Upper Palaeozoic rock record has been recognized. The investigated area is located between the well known Palaeozoic sediments of the Velebit mountain (Sremac, 1991) and Palaeozoic rocks of Outer Dinarides in Slovenia (Ramovs *et al.,* 1987). The stratigraphy of the Permian clastic assemblage in Gorski kotar, as well as the interpretation of facies, have long been the matter of the different opinions (Salopek, 1960; Raffaelli & Scavnicar, 1968).

During our investigations we recognized up to 300 m thick clastic sequence with thin-bedded blackish shales and micaceous siltstones; thick-bedded sandstones and quartz rich conglomerates. Limestone rich conglomerates and breccias also appear, but have unraveled position within the investigated sedimentary complex. Permian clastic sedimentary rocks have features of the alluvial fan delta facies occurring after the uplift, probably in the Saalian phase. Fossiliferous limestones are incorporated in some of the clastic successions in form of the stratified biocalcarenites, or as large blocks, and pebble to cobble sized clasts in limestone rich conglomerates and breccias. The dominating microfossil groups in biocalcarenites and limestone clasts are: foraminifers, algae, calcisponges, echinoids and bryozoans. Determined fossils range from the Upper Carboniferous to the Permian. Among 71 species, 22 are strictly Carboniferous, while 29 show Carboniferous to Permian age, and 20 are Permian in age (most of them typical for the Rattendorf Beds). Nevertheless, we have not found Middle Permian genera typical fortheTrogkofel Beds, which have been reported earlier (Kochansky-Devide, 1964). Fossils younger than Permian have not been found. Although all skeletal fragments have been redeposited, some stratigraphic conclusions can bee inferred. Stratified biocalcarenites reflect the age of the clastic facies they intercalate with, and the whole clastic sequence is surely younger then the youngest fossil found in biocalcarenites. The age of the late Middle

Permian, or the beginning of the Upper Permian has been suggested. This proposal is supplemented by the character of sedimentary rocks, which record molase-type sedimentation occurred after the Saalian uplift. Sedimentologically, clastic sediments from Gorski kotar can be compared to the similar clastic Trogkofel succession in Slovenia (Middle Permian in age) (Ramovs *et al.,* 1987). Fossil genera determined from clasts in limestone rich conglomerates and breccias show the same age (Carboniferous to Lower Permian), but the recent palynological research of black shales which appear to be matrix, indicates even Carnian age. This presumption is supplemented by signs of at least twice resedimented clasts.This facies need to be more thoroughly investigated.

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Morphology and high-resolution seismic features of the Magdalena turbidite system: preliminary results of the MAGDALENA'97 Hesperides cruise

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The MAGDALENA Cruise was carried out in April 1977, onboard the Spanish research vessel HESPERIDES. During this cruise an area of 39,500 km^2 from the proximal to distal areas of the Magdalena turbidite system, between 700 to 4,300 m water depth, was imaged with Simrad EM12S 120 multibeam bathymetry. 2,500 km of high resolution seismic records were also obtained with the TOPAS (TOpographic PArametric Source) system and sleeve guns (160 c.i.). The preliminary results allow to recognize three sectors based on morphologic and seismic features. The eastern sector is characterized by the presence of morphological ridges of about N 40° trend and reliefs up to 1,300 m high. These ridges (up to 176 km long and 11.5 km wide) have a structural origin due to the uplifting produced by the collision between the Southamerican and Caribbean plates. Locally, these ridges are eroded by at least three canyons of several hundred metres long. The central sector is characterized by the development of submarine canyons having U-shaped cross-sections and rectilinear pathways, whose reliefs attenuate quickly seaward at 2,500 m water depth. The canyons pass into an area that displays a rough surface, and seismically the most recent sediments comprise transparent, chaotic and hyperbolic reflections, all of them of high amplitude. This area could reflect the presence in the actual seafloor of disorganized sediments deposited from gravity flows. The most distal areas of the eastern and central sectors show a hummocky seafloor surface due to the development of sediment waves. These waves display an asymmetrical profile, and range from 0.4 to 2 km in wavelength and from 7 to 25 m in amplitude. Seismically, the sediment waves are defined by stratified facies of up to 35 m thick. The western studied sector is defined, from proximal to distal areas, by at least two channel-levee systems arranged in a radial pattern. They have about 186 km long and bifurcate repeatedly seaward becoming a dendritic system. In the proximal areas the channels have about 225 m high, 2.5 km wide and asymmetric levees, and their morphology attenuate progressively seaward having 3 km wide and reliefs less than 30 m. Seismically, the channel deposits are characterized by chaotic facies, and, locally, opaque and hyperbolic echoes defining an irregular channel-floor surface are identified; levees comprise continuous and discontinuous stratified facies. This cruise gives new insights into a very poorly known area that is one of the few places in the world where large scale turbidity current activity is relatively frequent.