

EVOLUTION OF THE NORTHERN PART OF THE PALEOGENE CENTRAL-CARPATHIAN BASIN, SLOVAKIA

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The forearc Central-Carpathian Paleogene Basin (CCP Basin) lies in the northern part of the Central Western Carpathians. The tectonics and sediments of the basin suggest a complex kinematic history with prevailing extensional regime and minor compression mostly occurring in its northern part. The main volume of the CCP Basin fill deposits consists of deep-water turbidite systems prevailing elongated in the SE-NW direction in the eastern part of the basin and in the NW-SE and W-E direction in the western part of the basin. Minor volume of the basin fill is composed of perpendicular, mostly gravity flow aprons. The basin fill consists of sedimentary succession divided into 4 units reflecting different stages of the basin evolution. Based on the analysis of the reflection seismics and deep boreholes, the maximum thickness of the sediments is estimated to some 4 000 m. Breccias, conglomerates, sandstones and sandy limestones, originating in a shallow-water environment, comprise the base of the succession (unit 1). The age of the unit, determined by analysis of nummulite fauna, is the late Middle Eocene and Late Eocene (Bartonian and Priabonian, P14 – P15 zones of planktonic foraminifera). The overlying Eocene - Early Oligocene (NP zones 17 –21) deposits of unit 2 consist of three subunits: subunit 2-1 is composed of thick conglomerates commonly filling erosional scars cut into unit 1 and the basement (deep-water canyon); subunit 2-2 consisting of dark shales containing up to 5 m thick bodies of conglomerates and thick sandstone beds (slope deposits); and subunit 2-3 which is composed of dark shales with minor thin sandstone and conglomerate beds (interchannel deposits of deep turbiditic system). The unit 2 is gradually passes into unit 3 mostly showing the Early Rupelian age based on nanoplankton. The alternating sandstone and shale deposits may be divided into two subunits based on sandstone:shale ratio and sandstone bed thickness. The spatial distribution of both subunits varies both vertically and laterally. The deposits are interpreted as proximal and distal overbank deposits of a turbidite system. The lowermost deposits of unit 1 were deposited during marine transgression and represent transgressive systems tract. The coarse-grained deposits of subunit 2-1 and shales with conglomerates and sandstones of subunit 2-2 are thought to be deposited during relative sea level fall representing a lowstand systems tract. The shales of subunit 2-3 reflect deposition in a quiet, low-energy environment during rise of sea level (transgressive system tract). The gradual transition to the unit 3, interpreted as turbidite system deposits, suggest lowering of relative sea level. The nanoplankton from these deposits was mostly assigned to the nanoplankton zones NP 20-21 suggesting building of this turbidite system on the boundary between Eocene and Oligocene. Comparison of the relative sea level curve constructed from sedimentary record in the studied area and the eustatic sea level curve shows little match suggesting that the eustatic sea level variation was not the main trigger responsible for the sedimentation in the investigated part of the CCP Basin. Similarly the climate during the Late Eocene and Early Oligocene was stable and probably did not influenced the sedimentation. It seems that the most important factor influencing sedimentation was the tectonic activity. It controlled basin size and shape, canyon floor gradient, shelf width and local relative sea level determining the type of sedimentation and resulting sedimentary succession.