

The results have been promising in the stratigraphically complex Munderfing gas field and in the Oligocene Friedburg gas field. Less successful have been attempts to use this method where well control is sparse. The Miocene Upper Puchkirchen A1 and A2 series were analyzed in the Puchkirchen area. The complex lithology that overlies the unconformity at the top obscures the reservoir distribution maps. The results from the geostatistics in the Puchkirchen area are not yet tested.

In general, the resulting maps show patterns that have to be compared with the general sedimentological model. They can lead to modification and refinement of the existing models, and tell us something about the specific processes and basin geometry at the time of deposition. The maps and its subtle patterns also form a validation criterion for the still experimental method of (geo)statistics within RAG.

### Middle Permian fan-delta complex of the Gorski Kotar (Croatia)

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Intensive uplift occurred at the end of Lower or at the beginning of Middle Permian resulted in molasse type sedimentation and the of vast quantities of siliciclastic sediments were accumulated in the Gorski Kotar area (central part of Republic Croatia). The presence of autochthonous marine fossils (ammonoids, brachiopods, crinoids), found in black shales that intercalate with conglomerates and sandstones, allow the assumption of fan delta type sedimentation.

The successions described in the northern part (successions in the vicinity of Tršće) and in central part of Gorski Kotar (vicinity of Mrzla Vodica) envisioned the two different fan delta type sedimentation which reflect the different depth of the sedimentary basin. Deeper and shallower part of the delta assume the different basin floor morphology and possibly resulted as a consequence of a different subsiding processes due to subbasinal faulting in a tectonically active area.

The sedimentation processes in central part of Gorski Kotar were determined by steep delta slope. Sliding as well as formation of chutes have been noticed. The following fan delta facies were recognized: 1) delta-slope facies and 2) prodelta-shelf facies. The delta slope facies is characterized by several types of conglomerates and usually coarse grained sandstones that are: matrix supported massive conglomerates (Gms), clast supported massive conglomerates (Gmc), normally graded conglomerates (Gg), inversely to normally graded conglomerates ((in)g<sub>2</sub>g<sub>1</sub>G), gravelly mudstones (GyM), calcrudites (D) and massive sandstones (Sm). The prodelta-shelf facies is determined by: sandstone-shale intercalations (SM), shales (M) and planar bedded calcilithites (C). In shale intercalations the autochthonous ammonoid fauna has been found. Sedimentation processes record the slope-type delta of ETHRIDGE & WESCOTT (1984).

In northern part of Gorski Kotar the sedimentation was determined by low inclined relief with coarse clastic sedimentary rocks described as 1) mouth bar facies and 2) subareal or coastal facies. The mouth bar facies association consists of: normally graded conglomerates (Gg), inversely graded conglomerates ((in)gG), inversely to normally graded conglomerates ((in)g<sub>2</sub>g<sub>1</sub>G), massive matrix supported conglomerates (Gms), massive clast supported conglomerates (Gmc) planar cross bedded conglomerates (Gp), trough bedded conglomerates (Gt), gravelly sandstones, where gravels faintly mark shallow troughs, (GyS) and parallel laminated sandstones (IS). Subareal or coastal fan delta facies is characterized by irregularly bedded sandstones and gravelly sandstones (A) and micaceous sandstones (B) containing coarse plant detritus. Shales

(M) and sandstone-shale intercalations (SM) are interpreted as prodelta-shelf facies. The delta type sedimentation corresponds to shelf-delta of ETHRIDGE & WESCOTT (1984).

Sandstone-shale intercalations, interpreted as prodelta-shelf facies, have similar characteristic in central and northern part of Gorski Kotar and were interpreted as unique "back-ground" sediment deposits connecting the two fan delta types. According to fossiliferous sediments associated with sandstone-shale intercalations (found only in the central part), the same age is proposed for the clastic fan delta sequence of the Gorski Kotar. Analyses of the fossil assemblage in calcilithites (C), although considered as resedimented detritus, permit the conclusion of Middle Permian age (SREMAC & ALJINOVIC 1997).

Carbonate sedimentation, equivalent of Bellerophon formation, is missing in Gorski Kotar, thus assuming the hiatus between Permian and Lower Triassic sedimentary rocks. During Upper Permian the intensive inundation lowered the uplifted relief and the Lower Triassic sedimentation was characterised by shallow marine deposition on flat relief.

ETHRIDGE, F.G. & WESCOTT, W.A. (1984): Tectonic setting recognition and hydrocarbon reservoir potential of fan delta deposits. - (In: KOSTER, E.H. & STEEL, R.J. (Eds): Sedimentology of Gravels and Conglomerates), Mem. Can. Soc. Petrol. Geol., 10: 217-235.

SREMAC, J. & ALJINOVIC, D. (1997): Upper Palaeozoic fossils from clastic sedimentary rocks in the Gorski Kotar region. - Geol. Croat. 50/2: 187-199, Zagreb.

### Die ICE-Neubaustrecke Köln-Rhein/Main in Hessen: Ein geologisches Schaufenster

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Von der Deutschen Bahn AG wird zur Zeit die Neubaustrecke zwischen Köln und dem Rhein/Main-Gebiet (Frankfurt) gebaut. Der Geologische Landesdienst Hessen war bei den Voruntersuchungen beteiligt und dokumentiert z. Z. die Geologie während der Baumaßnahmen, wobei Einschnitte und Tunnelbauten zusammenhängende Aufschlüsse bieten. Der hessische Teil der ICE-Trasse ist ca. 65 km lang und quert das südliche Rheinische Schiefergebirge und den Nordrand des Oberrheingrabens bis zur Mainebene. Dabei durchläuft sie von N nach S folgende geologische Großeinheiten: Moselmulde, Lahnmulde mit Limburger Becken, Hintertaunus mit Idsteiner Senke, Taunuskamm, Vordertaunus, Hofheimer Rotliegend-Scholle, Mainzer Becken und Nördlichen Oberrheingraben. Die ältesten Gesteine findet man im Vordertaunus mit ordovizisch-silurischen Metavulkaniten/ Metasedimenten und nach N jünger werdend im Hintertaunus mit unterdevonischen Schiefern und Sandsteinen und in der Lahnmulde zusätzlich mit Kalksteinen und Metavulkaniklastika ("Schalstein"). Nach S zu folgen Rotliegend-Fanglomerate sowie tertiäre und quartäre Sedimente wie Ton, Mergel, Kalksteine und Schluff, Sand, Kies. Da sich der Verlauf der Trasse an geologisch jungen Senken orientiert, sind häufig quartäre Deckschichten über tiefgründig verwitterten Gesteinen (Saprolith) angeschnitten. Die geologischen Großeinheiten werden von großen Störungssystemen getrennt, wie z. B. die Taunus-Südrand-Störung oder die Westrand-Störung des Oberrheingrabens. Sie begrenzen auch die verschieden gebauten tektonischen Einheiten des Taunus mit kompliziertem Schuppenbau im Vordertaunus und Taunuskamm sowie einfacherem Schuppen- und Faltenbau in Hintertaunus und Lahnmulde.

Eine Fülle neuer Beobachtungen konnte gemacht werden: Es gelang der Nachweis von Mittel- und Oberdevon im Vordertaunus sowie von Pechelbronn-Schichten (O-Eozän/U-Oligozän) im nördlichen Oberrheingraben und der nach Norden übergreifenden Mitteloligozän-Transgression (Rupelton - Cyrenenmergel) auf den