ADRIATIC CARBONATE PLATFORM – REVIEW OF SOURCE ROCK POTENTIAL

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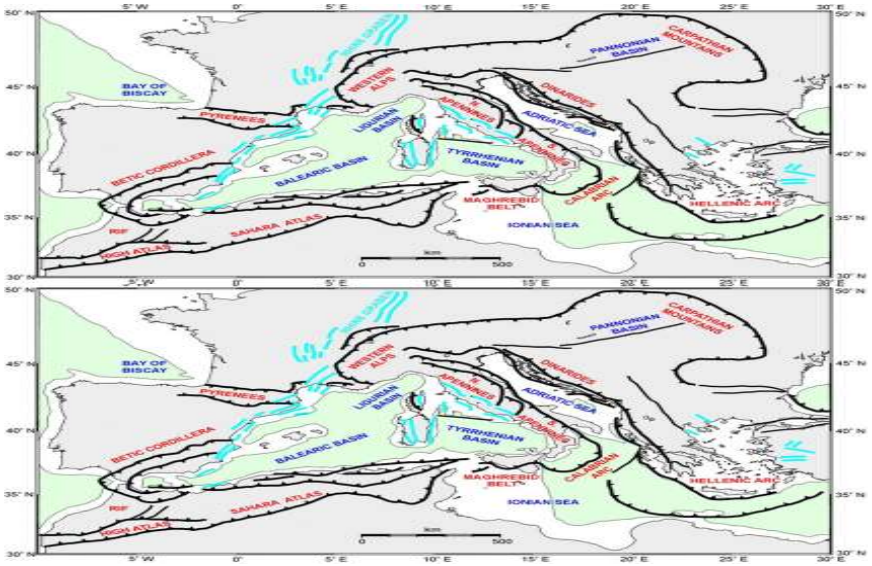
Dinarides are regional tectonic province (see Figure), described in many papers and other publications. This abstract comprises short review of source potential, of Adriatic Carbonate Platform (ACP) as part of Dinarides. After Zappaterra (1994) in Periadriatic region (including ACP and Dinarides) hydrocarbon production exists in Central Adriatic heavy oil zone (Pescara Basin) and Southern Adriatic heavy to light oil and asphalt zone (Albanian Foredeep and Ionian Basin). Exploration in Croatian part did not result in commercial discoveries.



Geotectonic settings of Adria microplate, including Dinarides and ACP (Oldow et al., 2002)

Generally, Dinarides (including ACP) comprise sediments from Triassic to Quaternary age, which can be followed also in Southern Alps and Carpatho-Balkanides areas. Croatian Karst (External or Outer) Dinarides carbonate (Middle Permian-Eocene) succession thickness can reach more than 8000 meters (Vlahović et al., 2005). This area has long tectonic evolution history. In Carboniferous-Middle Triassic period, these sediments were deposited along Gondwana margin. In Middle Triassic ACP was inner part of South Tethys magaplatform, which was disintegrated in Lower Jurassic to smaller carbonate platforms. ACP is one of such platform characterised mostly by shallow water sedimentation, and total sediment thickness 3500-5000 meters (Vlahović et al., 2005).

Generally, in entire Periadriatic region (Zappaterra, 1994) three source facies are defined – (a) Middle Triassic to Liassic source facies including oil-prone and rich source rocks, deposited in intrabasin areas; (b) Jurassic - Cretaceous sequence sedimented in anoxic basins of carbonate platforms; (c) Upper Tertiary terrigenous, gas-prone facies of turbiditic and flysch sequences.

In ACP and Dinarides regions interesting good to excellent source facies, according geological and geochemical analyses, are of Upper Jurassic and Lower Cretaceous sediments. In Outer Dinarides are famous Lemeš beds that contain organic matter (TOC) in concentration between 0.53 and 26.71 %. Sapropelic, hydrogen rich organic matter, show corresponding high petroleum potential in range of 2.07-153.12 mg HC/g rock. Organic matter concentration in wells of Adriatic offshore varies 0.37-4.70 %, and petroleum potential reaches values up to 10.76 mg HC/g rock. Mentioned source facies include

extreme amounts of sulphur, but also of heavy bitumens. Source rocks are in immature to early thermal maturity stage, however specific facies makes possible hydrocarbon generation in this early diagenetic/catagenesis phase (Barić & Tari, 2005). Biomarker analyses (from bitumen), performed at southeast part of platform, indicate on often sedimentation environments changes (Moldowan et al., 1992), and consequently variable rate of organic matter quantity and quality.

Generally, more interesting are Cretaceous sediments, characterized with larger source potential. Thick, organic rich sequence could be found across entire ACP. At Jurassic/Cretaceous border platform subsidence reached maximum, with domination of sabkha and carbonate-evaporitic facies (Grandić et al., 1997) and Cota & Barić (1998) described typical source rocks as part of carbonate-evaporitic sequences, with good to excellent generation potential. Lateral changes of generation potential are reflection of depositional facies changes, which Jenkyns (1991) regionally addressed, for Cenomanian - Turonian facies rich with organic matter, to oceanic anoxic event that partially covered ACP, while Gušić & Jelaska (1990) found evidences about flooding across entire ACP. Anyway, importance of this event was sedimentation of black limestones and dolomites, with variable content of organic matter. It varies from several percents (e.g. Slovenia Komen beds in Slovenia; Ogorelec et al., 1987) to somewhere more than 20 % (Jenkyns, 1991). But, generally geochemical analyses from central part of ACP indicated on TOC in range 0.30-4.72 %.

Present-day oil-window depth is assumed at 5000-6000 meters. Regarding geothermal gradient, entire ACP is relatively cold petroleum geology province with geothermal gradient 1-2.8 ^{o}C/100 m (Cota & Barić, 1998), and sporadically in areas of Korčula is. Lastovo is. and Dinara Mt. with gradient even lower than 1.0 ^{o}C/100 m (Britvić at al., 1991).

Source potential of Jurassic and Cretaceous rocks is very good, somewhere to excellent, varying between immature to early mature stage. Special properties of generated bitumens make impossible longer migration of hydrocarbons and their accumulation in study area (Barić & Tari, 2005).

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