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## **Petroleum System Characteristics of the Giant Oil Fields of Val D' Agri Region, Southern Apennines, Italy**

The geology of Italy is ranked as one of the most complex and least understood in Europe. This presentation focuses on the hydrocarbon resources in Val D' Agri region within the Southern Apennines Thrust Belt (SATB). The buried Apulian Platform contains both source rock and reservoir zones. A positive correlation is established between the produced oils and source rocks within the Cretaceous sequences. The carbonate reservoirs include karsted vuggy intervals, as well as extensively developed fracture systems, which provide flow rates in the range of 3,000 to 12,000 bo/d from oil columns that range from 600 to 1000 meters thick. The entire producing complex is sealed by the overlying Neogene sequences.

The combination of tectonic regime and reservoir character contribute to an unstable oil column. This disequilibrium condition is described as compositional grading, and is a process whereby an oil fractionates heavier components towards the base (128 API) and volatiles toward the top (548 API). This compositional grading is consistent with thick oil columns within fractured reservoirs and its formation is promoted by a reduction in pressure and temperature as illustrated by 2-D basin modeling results. The influx of late charge volatile hydrocarbons (CSIA data) further reduced oil column stability. Determination of reservoir compartmentalization with molecular methods requires advanced geochemical analysis and chemometric processing due to the oil quality overprint. Despite the technical challenges, these fields will yield over a billion barrels of oil to rank them among Europe's largest onshore accumulations.