

Upper Cretaceous Lower Tertiary Carbonate Outcrops Devrekani Area, Black Sea, Turkey

Hasan Güney*, Unal Bayram**, Lyndon Yose***, Ali Demirer*, Stephen Kaczmarek***, Erhan Yılmaz****, Sabri Kirici****, H. Özge Güran**** and Bedia Geyikcioğlu Erbaş****

* TPAO Exploration Department, Ankara Turkey

** ExxonMobil International Limited, Leatherhead UK (Presenter)

*** ExxonMobil Upstream Research Company, Houston, USA

**** TPAO Research Center, Ankara Turkey

In November 2008, Exxon Mobil Corporation and Turkey's state-run oil company, Turkish Petroleum (TPAO), signed an agreement for joint exploration and development of oil and natural gas in the Black Sea Basin. ExxonMobil entered the Samsun Block 3922 via a farm-in agreement. In early January 2010, ExxonMobil farmed into remaining acreage in Block 3922, which is operated by Petrobras (PB).

An integrated effort is now underway among ExxonMobil and its partner's, TPAO and PB, to evaluate carbonate leads located of the northern coast of Turkey in the Black Sea. The Black Sea formed as a back-arc basin in the Middle to Late Cretaceous. The prospective carbonate leads are of Late Cretaceous to Early Tertiary (LK-ET) age and are represented as platform and mounded seismic features that occur on structural and volcanic highs formed during the rifting phase.

As part of the study, a joint project was initiated with TPAO in the summer of 2009 to evaluate outcrop analogs exposed along the northern coast of Turkey. The outcrops are of LK-ET age and provide potential analogs for depositional and sequence-stratigraphic relationships that are expected in the subsurface. A total of seven stratigraphic sections were measured around Kastamonu Devrekani area. Biostratigraphic age dating was conducted to refine the age model for the carbonates and to guide correlations between measured sections. Sequence models and depositional patterns observed in outcrop indicate that carbonate buildups are nucleated on paleo-structures/volcanic and or basement highs. The observations from these outcrops were integrated with additional observations made by TPAO and PB in other locations.

Field observations indicate that younger sequences progressively backstep onto higher structural positions, possibly in response to strong post-rift subsidence. As a result, there is a time-transgressive "drowning" of carbonate buildups, and deeper-water hemipelagic marls drape the older carbonate buildups. Carbonate reservoir quality in outcrop is influenced by a combination of depositional and diagenetic processes. Although the outcrops provide depositional analogs, they likely experienced a different diagenetic history than prospective offshore areas. Potential reservoir facies are sequence (age)-dependent and include bioclastic grainstones, algal-coral mounds complexes, and benthic foram grainstones (e.g., Nummulites). Observations from outcrops are being used to guide seismic interpretations and to evaluate different geological scenarios for the offshore.