

***Middle Eocene aged source rock evidence from Black Sea, Turkey; BSP14- Biozone Vedat AYDEMİR<sup>1</sup>, Y. Haluk IZTAN<sup>1</sup>, Sekhrab SHIKHLINSKY<sup>2</sup>, Zuhtu BATI<sup>1</sup> and Ay<sup>1</sup>egul GURGEY<sup>1</sup>***

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Middle Eocene-Neogene section of the Pontides encountered in the oil wells and outcropping along the Black Sea coast of Turkey has not been studied satisfactorily due to both partly erosion and lack of sedimentation. Therefore, hydrocarbon exploration activities particularly in the deeper parts of the Black sea have been conducted based on the source rock data obtained from the neighboring countries.

Recent extensive biostratigrafic study on the samples collected from the TPAO onshore wells namely Agva-1 and K.Cide-1 and the field samples collected from the Carsamba, Samsun and Bartm regions showed that Middle Eocene aged *Globerina turhnenica* (BS-P14) biozone widespread in the Kafkasya region has a perfect source rock potential.

Based on the geochemical data from BS-P14 biozones in Agva-1, N. Cide-1 and Inebolu-1 wells TOC, S<sub>2</sub> and HI values range between 1.76-2.58 %, 2.03-2.69 %, 2.09-3.80 %; 5.53-15.46 mg HC/g rock, 6.39-7.94 mg HC/g rock, 5.53-15.46 mg HC/g rock and 242-266 mg HC/g TOC, 269-348 mg HC/g TOC, 265-407 mg HC/g TOC respectively. These values indicate that the BS-P14 biozones in the studied wells have good to perfect hydrocarbon source potential. The low Tmax values (416-428°C) measured in the wells show that the BS-P14 biozones are not mature enough in order to generate hydrocarbons. In other words, they have not enter to "main oil generation zone" around these wells yet. The areas in the basin in which the facies equivalents of the studied zones that reached to the sufficient depth will be the important locations for exploration efforts. At the begining, despite the results were interpreted with some caution due to the contamination coming from the mud additives, the results taken from some field samples around Bartin recently show that the presence of source rock potential in BS-P14 zone indeed.

Tectonic interpretation made on this unit showed that it is older than the reverse faulting system which separates the Black sea coastline from the basin. Hence, it was concluded that the BS-P14 biozone will keep its source rock potential through the deeper parts of the Black Sea. This conclusion will have a paramount effect on the future hydrocarbon exploration programs conducted in the Black Sea offshore areas. **Keywords:** *Black Sea basin, P14 Biozone, source rock, geochemistry*

### **Karadeniz'de Orta Eosen yaş ana kaya bulgusu; BSP14- Biyozonu**

Tilrkiye'nin Karadeniz kıyilari boyunca mostra veren veya kuyularla kesilen Pontidler istifinde Orta Eosen sonrasi ve Neojen seksiyonu bilyilk olciide cokelmemelik, kismen de asinma nedenleriyle iyi cahsilamamistir. Karadeniz'in derin alanlarmda bilyilk cabalarla ytlrttilen hidrokarbon aramalan esas itibanyla civar illkelerden elde edilen ana kayaya yonelik yorumlar ile yitirutiilmektedir.

TPAO'nun 2007 yilinda karasulan icinde actigi Agva-1 ve K.Cide-1 kuyulan ile son olarak Carsamba-Samsun ve Bartin civarından alnan saha orneklerinde yilrutulen kapsimli biyostratigrafik cahsmalarda *Globigerina turhnenica* (BS-P14) biyozonu ile temsil olunan ve Kafkasya'da oldukca genis yayihma sahip Orta Eosen yasli kaynak kaya duzeylerinin varligi ilk defa saptanmistir.

Yukarda amlan Agva-1, K. Cide-1 ve Inebolu-1 kuyularında yapılan jeokimyasal degerlendirmeler sonucunda BS-P14 biyozonununa karsilik gelen seviyelerin olciilen TOC degerleri sirasiyla %1.76-2.58, %2.03-2.69, %2.09-3.80, S<sub>2</sub> degerleri 5.53-15.46 mg HK/g kaya, 6.39-7.94 mg HK/g kaya, 5.53-15.46 mg HK/g kaya ve HI degerleri ise 242-266 mg HK/g TOC, 269-348 mg HK/g TOC, 265-407 mg HK/g TOC araliginda degistigi gozlenmistir. Bu degerler ile cahsılan BS-P14 zonunun iyi-mukemmel kaynak kaya potansiyeli gosterdigi tespit edilmistir. Her tic kuyuda olctilen diisiik Tmax degerleri (416-428°C) BS-P14 seviyesinin, bu kuyuların bulundugu alanlarda heniiz hidrokarbon turimu icin yeterli olgunluga erismedigini, baska bir deyisle petrol turim penceresine girmedigini gostermistir. Bu seviyenin basende derine gomuldugu alanlar hidrokarbon aramacihgi acisindan onemlidir. Baslangigta yapılan jeokimyasal degerlendirmelerde bahsi gegen kuyularda kullamlan gamurun yarattigi kirlenme nedeniyle elde edilen jeokimyasal veriler konusunda

teredditler yasanmakla beraber, son donemde ozellikle Bartin civarından alınan saha orneklerinde ulasilan sonuclar BS-P14 kaynak kaya dilzeyinin varligim acik olarak ortaya koymustur.

Yapilan tektonik yorumlara gore bu birim, Karadeniz sahili boyunca etkili olarak sahil kesimini basenden ayiran ters fay sistemlerinden daha yaslidir. Dolayisiyla, ana kaya ozelligi tasryan BS-P14 seviyesinin Karadeniz'in derin kismmda da aym ozelligi ile bulunmasi gerektiği sonucu cikanlmistir. Bu sonuc hidrokarbon aramaciligi acismdan son derece onemlidir. *Anahtar Kelimeler: Karadeniz havzasi, P14 Biyozonu, ana kaya, jeokimya*