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GAS ACCUMULATIONS and WIDE-SPREAD BSRs OBSERVED on CENTRAL BLACK SEA*

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Black Sea has two interconnected basins named Eastern and Western Black Sea basins with extremely large sediment thickness. The study area is located in the Turkish margin of western basin. Previous studies in the area indicate potential of gas and gas hydrate accumulations in the continental rise. 1950 km of high resolution multichannel seismic reflection, Chirp sub-bottom profiler and multibeam bathymetry data were collected offshore of Zonguldak – Kozlu region from continental shelf to abyssal plain of Black Sea along the magrin. We used 216 channel 1350 m long digital streamer and a 45+45 cubic inch Generator-Injector (GI) gun fired at every 25 m. Chirp sub-bottom profiler system has 9 transducers operating at 2,7-6,7 kHz frequency band with 3,5 kHz central frequency.

Wide spread BSRs are observed on the high resolution multichannel seismic reflection data and we attribute them to the gas hydrate accumulations. They have negative polarity reflections and cross-cut the sedimentary strata. There are two distinct BSR zones in the area, the western and eastern zones. Western BSR zone is larger and occupies approx. 630 square km. We speculate that huge amount of BSR reflections may not be produced by biogenic gas sources and probably they are related to thermogenic gases from deeper sources in the study area. We also observe multi-BSR reflections in which there are secondary BSR reflections that reverberate primary BSR reflections periodically approximately every 100 ms. Secondary BSR levels can be interpreted as paleo-BSRs related to paleo-gas hydrate stability zones and indicate a possible change in the thermobaric conditions of the gas hydrates. There are several responsible agents for BSR relocation. These include a change in the heat flow regime, a possible change of the sea level after last glacial maximum, change of the hydrate forming gases or gas composition. We suggest that the change in the thermobaric conditions was possibly due to the variations of temperature distribution due to the rapid sedimentation.

Interpretation of the seismic sections also show possible gas accumulations as transparent and scattered zones. Seismic attributes of the gas related zones are clearly point out gas accumulations in the study area. Possible gassy zones have bright reflections at top side and these levels have negative polarity within the low frequency zone below the bright reflections. In addition, Akçakoca-1 and Ayazlı-1 wells which are very close to the study area produces considerable amount of gas from Eocene turbidites and study area is suggested to have high potential in terms of energy resources.

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