Origin of Carbon dioxide and Hydrogen Sulphur in Dodan Field (SE-Turkey)

Hakan Hosgörmez 1, Esra İlhan Sungur 2, İsmail Bahtiyar 3, Cengiz Soylu 4, Nihal Doğruöz Güngör 2, Ayşin Çotuk 2

1 İstanbul Üniversitesi, Faculty of Engineering, Department of Geology Engineering, İstanbul
2 İstanbul University, Faculty of Science, Department of Biology, Fundamental and Industrial Microbiology, İstanbul
3 Turkish Petroleum Corporation, Exploration Department, Ankara
4 Turkish Petroleum Corporation, International Projects Department, Ankara

The most important petroleum fields of Turkey are located in the SE Anatolian region. In this region, forming the northernmost part of the Middle East Petroleum Province, mainly oil production takes place. Although the Dodan field is situated in the same petroleum system, CO2, H2S and hydrocarbon gases are the major components of production. In the Dodan field gases are produced from carbonate reservoir rocks, namely from the Garzan formation and Mardin group. The aim of this study is to investigate differences in gas composition at the different wells and to determine the origin of the carbon dioxide and hydrogen sulphur in the Dodan field. For this purpose gas samples were collected in different wells and analyzed for their molecular and isotopic composition. Dodan field consists of carbon dioxide (<83%), hydrocarbon gaseous (1-4.5 %) and a considerable amount of hydrogen sulphur (up to 1.5 %). The stable carbon isotope ratios of carbon dioxide are defined as D13CCO2 of -2.8 ‰ to -1.5 ‰. The D34SH2S values of hydrogen sulphur range from 11.9 ‰ to 13.4 ‰. The isotopic composition of CO2 in Dodan field with values of -2.8 ‰ and -1.5 ‰, suggests an abiotic origin from marine limestones. The D34SH2S isotope composition of the Dodan gases is likely derived from the bacterial sulfate reduction (BSR) and thermochemical sulfate reduction (TSR), which occurred at different time-scale.

Keywords: Gas geochemistry, carbon dioxide, hydrogen sulphur, origin, generation mechanism