



Numerical Simulation of Petroleum Generation and Migration in the Song Hong Basin, Vietnam

Byeong-Kook Son (1), Hong Thi Nguyen (2), and Mee-Sook Park (3)

(1) Korea Institute of Geoscience and Mineral Resources (KIGAM), Daejeon, Korea, Republic Of (sbk@kigam.re.kr), (2) University of Science and Technology, Daejeon, Korea, (3) Korea Institute of Geoscience and Mineral Resources (KIGAM), Daejeon, Korea

The numerical modeling of petroleum systems is an effective tool to understand generation, migration and accumulation of hydrocarbons in a sedimentary basin and hence to determine future targets for the hydrocarbon exploration. The numerical modeling identifies two petroleum systems in the Song Hong Basin, which is a petroliferous Cenozoic basin, offshore eastern Vietnam. These petroleum systems were named DinhCao-PhuCu(.) Petroleum System and SongHuong-BienDong(.) Petroleum System.

DinhCao-PhuCu(.) Petroleum System covers northern and central parts of the Song Hong basin with Oligocene shale and coaly shale source rocks of Dinh Cao formation, which are dominated by type II-III kerogens. The hydrocarbon generation starts at 13 Ma within deeply buried Oligocene strata located in the centre of the basin. The hydrocarbon expels from the Oligocene source rock and migrates laterally and then up dip toward marginal areas where Middle Miocene sandstones of Phu Cu formation are present as major reservoirs. The numerical model shows that the critical moment occurs at about 3.5 Ma. The DinhCao-PhuCu(.) petroleum system is confirmed by sparse occurrence of oil and gas along the coast of eastern Vietnam.

SongHuong-BienDong(.) Petroleum System is identified in limited areas of the central and southern Song Hong basin. The major source rock of this petroleum system is Lower Miocene dark claystones of Song Huong formation which contain gas prone, type III kerogen. The migration model shows that hydrocarbons are generated from the Miocene source rocks in the center of the basin at about 12 Ma, and migrates updip through sand bodies of Quang Ngai formation to the major boundaries faults, and further moves into highly permeable up-dipping units, the Bien Dong formation. The best depiction of the generation-migration-accumulation of hydrocarbons occurs at about 2 Ma. The presence of the SongHuong-BienDong(.) Petroleum System is indicated by the large gas fields in the central and southern Song Hong Basin.