

Giant oil accumulations and their areal concentration efficiency

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The ratio of the areal concentration (barrels of oil equivalent/sq km) of accumulated oil in the richest sedimentary basin to that in the poorest basin, among those basins having "giants" and "supergiants", is more than 500 to 1. On the contrary, the ratio of the richest to the poorest petroliferous basin in terms of the total organic concentration may be less than 20 to 1. Such a large discrepancy between these two ratios suggests that the organic concentration alone cannot account for oil concentration in commercial reservoirs, because significant quantities of oil may have been lost to the surface and also disseminated throughout the sedimentary sequence in the geological past. Most of the disseminated oil cannot be produced economically by the present-day technology.

For a better petroleum assessment, the author stresses the importance of the petroleum accumulation/preservation

efficiency in commercial reservoirs; this may be evaluated as combining, 1) the organic concentration of the source rock, 2) the duration of oil generation, 3) the thickness of the oil-generating "window", 4) the total geologic age involved, and 5) the fluid expulsion efficiency and the presence or absence of undercompacted intervals. Other parameters such as the trap, reservoir and cap rock, and also the types of organic matter in the source rock, would have a great influence on the efficiency of oil concentrations in commercial reservoirs as well. However, most of them are related to the geologic conditions of each specific area or basin, and thus are more difficult to generalize than those mentioned above in the context of the global distribution and concentration of oil reservoirs.