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Malvin Bjorøy[1], Ian L. Ferriday[2] (1) Surface Geochemical Services AS (SGS), Trondheim, Norway
(2) Geolab Nor AS, Trondheim, Norway

Surface Geochemistry as an Exploration Tool in Frontier, Deep Water, Areas—Case Studies from Atlantic Margin Areas

Offshore surface geochemistry, i.e. the analysis of seabed cores for gaseous and liquid hydrocarbons that may have seeped from mature source rocks or reservoirs in a basin, has now applied in numerous frontier areas.

Most of the published studies concentrate on the analysis of the samples and integration of the geochemical data with the geological framework. It is, however, important that the samples are collected properly and that the samples are preserved and protected from bacterial activity in such a way that the original hydrocarbon assemblage present in the samples when they are brought onboard is preserved for analysis.

Another important factor when undertaking surface geochemical studies is cost. In all such studies, sampling constitutes by far the greatest cost. It is therefore important that the methods used for sampling are streamlined for the purpose, i.e. that methods are not used merely because they give apparently impressive results without increasing the quality of the samples. It is very easy to double the sampling cost by using expensive techniques which do not enhance the quality of the samples.

Surface geochemistry has been used in most deep water exploration areas such as the western North Atlantic Margin, Barents Sea, West Africa, Mediterranean, Caspian Sea, Gulf of Mexico and South East Asia. The authors have experience from most of these areas. In this paper we will discuss sampling methods, preservation of samples and present data from three studies from the North Atlantic Margin and compare the geochemical data with drilling results where such are available.