

A Surface Geochemical Survey from Deepwater Offshore Brunei

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Surface geochemical prospecting involves the search for near-surface or surface anomalies of hydrocarbons, which could indicate the occurrence of petroleum accumulations or active source rocks in the sub-surface. The methodology, as applied in offshore basins, covers a range of techniques, from observation of visible oil seepage at the surface to detection of micro-seeps in near surface sediments using sensitive analytical techniques. The methodology for surface geochemical surveys is the subject of continuous development. The current, most favoured practice is to detect possible migration pathways from the deep to the near-surface with the aid of seismic data. The expression of such pathways at the surface is then sampled and analysed. The results of such a survey, in deep water offshore Brunei, are presented, together with conclusions based on the full suite of surface geochemistry analyses, together with details regarding sampling and preservation of the shallow core samples. The use of analyses of the different gas fractions is presented, together with comparisons of Total Scanning Fluorescence and gas chromatography (GC) and combined gas chromatography – mass spectrometry (GC-MS) of the extract. A number of hydrocarbons seeps were detected in the survey area, ranging from being light oil- to condensate-associated, with varying degrees of biodegradation, and including seeps where hydrates were observed in the shallow cores. From the variation in GC-MS data, the light oils are proposed to have been generated in a deltaic / terrestrial source rock similar to known Brunei oils, with the possibility of two facies / formation variations contributing in different parts of the area.