

Underwater Glider Platform Survey for Frontier Exploration

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Abstract

Hydrocarbons may leak to the near surface from subsurface accumulations, from mature source rock, or by buoyancy along major cross-strata routes. The presence of migrating near-surface hydrocarbons can provide strong evidence for the presence of a working petroleum system, as well as valuable information on source, maturity, and migration pathways. Detection and characterization of hydrocarbons in the water column may then help to de-risk hydrocarbon plays at a very preliminary stage of an exploration program. In order to detect hydrocarbons in the water column, an underwater glider survey was conducted in an offshore frontier area. Driven by buoyancy variation, underwater gliders enable collecting data autonomously along the water column for weeks to months. Underwater gliders are regularly piloted from shore by satellite telemetry and do not require a surface supervising vessel resulting in substantial operational costs savings. The data compiled, over 700m depth of the water column, included temperature, salinity, pressure, dissolved oxygen and hydrocarbon components (phenanthrene and naphthalene) measured by “MINIFLUO” sensors to particularly target representative crude oil compounds. Two gliders were deployed at sea, one from coast in shallow water and the other one offshore on the survey area. Both accurately squared the survey area following pre-defined lines and cross lines. Data files were transmitted by satellite telemetry in near real time during the performance of the mission for real time observations and appropriate re-positioning of the gliders. Using rechargeable underwater gliders increased reliability reducing the risk of leakage and associated logistics during operation at sea.