

A MAGNETIC GRADIOMETRIC METHOD AS AN ADJUNCT FOR MARINE CSEM

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The marine Controlled-Source Electromagnetic (CSEM) method has proven itself an invaluable adjunct to the seismic method in petroleum exploration in the last few years. The problem is that it is not easily adapted to the Australian scene because most of Australia's petroleum deposits are in relatively shallow waters where CSEM does not work very well. Depending on the target, depths up to 500 m can be considered shallow water for CSEM. CSEM surveys in shallow water can have problems with the airwave dominating the received CSEM signal and also with electromagnetic noise induced by ocean waves. Modelling studies suggest that it is feasible to measure CSEM magnetic field gradients as a supplement to E and B field measurements and use this extra information to remove environmental noise (wave effects and magnetotelluric noise), airwave and direct wave components, and other unwanted contributions to the measured E and B fields. This can improve the signal/noise ratio of the CSEM measurements, thereby producing more reliable interpretations, and extend the useful range of the method, which can reduce survey costs. We have been developing a magnetic gradiometer that can be used for marine CSEM surveys. This poster will present the results from preliminary field trials conducted off Sydney's coast, in water depths up to 62 m, which show that the OceanMAG gradiometer was able to measure the magnetic field induced by ocean waves. Approaches for using magnetic gradient measurements as an adjunct to marine CSEM data will also be described.

Technical Area: Petroleum - Electromagnetics