

Different origins of BSRs in Antarctic sedimentary environments

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Abstract

In the Antarctic region several Bottom Simulating Reflectors (BSRs) have been observed in different crustal domains of the offshore. In this paper we have explored several new and known BSRs in the Dove basin-Ona high (South Scotia Sea), in the South Shetland margin and in the Victoria Land basin (Ross Sea) by applying different techniques of seismic analysis as velocity spectra, seismic instantaneous attributes and AVO. These different approaches have been supplemented by geometry, depth and geological information of the explored sedimentary layers. Various environments and depths result to be characterized by different BSRs origin. In particular (i) fossil-diagenetic BSRs have been observed in the deep Dove basin at water depth of 3000-4000m which is not favourable to methane hydrates, while (ii) methane hydrate BSRs have been observed on the South Shetland accretionary complex and in the Ross Sea continental shelf.

The fault systems generally represent a preferred pathway for fluids migration and often this process produces mud volcanoes on the sea floor. This analysis aims to improve the general understanding of BSRs formation in the Antarctic region and suggests that integrated use of all the seismic information can give important information in areas where there are not available boreholes to calibrate sediments and fluids.

Keywords: Antarctic, seismic reflection profiles, Bottom Simulating Reflector, methane hydrates