

# Methane hydrate on the continental margins of the South Island

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Methane hydrate deposits are readily indicated by their associated seismic characteristics on seismic data from the Fiordland continental margin – off the southwest coast of the South Island. These deposits occur over well-constrained pressure and temperature ranges in the upper 500 m or so of seafloor sediments and in water depths of at least 600 m. Similar temperature / pressure regimes exist in the offshore petroleum basins of the South Island, but few if any classic methane hydrate signatures have been observed in seismic data from these locations.

Recent efforts to quantify the methane hydrate resource on the Fiordland margin will be presented. This work is primarily based on analysis of several recent industry and government seismic data sets for the occurrence of bottom simulating reflections (BSRs). A BSR is generally produced by seismic energy reflecting from the top of gas-filled sediments lying below the zone of hydrate stability (see Crutchley et al., this volume.) In an active margin such as that found in the subduction related Fiordland margin, high fluid flux often requires the maintenance of a free-gas reservoir under any significant hydrate accumulation. As a result, regions of high concentrations of hydrate will often correspond to zones of significant BSRs. Such features currently are the targets of several energy-related gas hydrate research projects around the world.

Contrasting this, recent analyses of several European and North American offshore hydrocarbon provinces, have shown significant quantities of methane hydrate – without a corresponding BSR signal. In these cases, hydrates are often detected by wireline logs in locations where strata are oriented parallel to the seafloor – and would therefore mask a BSR character. In these low-fluid-flux passive margin settings, high concentrations of hydrate are often detected without a corresponding free-gas zone underlying them. In fact, if the lithology of the sediments in such an environment is suitable, economically significant deposits of hydrate are possible. Current work is aimed at the analysis of well logs from the Canterbury and Great South Basins to determine the potential of these provinces for hydrate deposits.

## Speaker



**Andrew Gorman** is a lecturer in geophysics in the Geology Department at the University of Otago in Dunedin. His research focuses on the collection, processing and interpretation of seismic reflection data. Much of this work involves the evaluation of gas hydrate accumulations on New Zealand's continental margins. Andrew's background in controlled-source seismology started in the Canadian petroleum industry as a geophysicist with Chevron where he explored for oil and gas in the Western Canada Sedimentary Basin and the Beaufort Sea. This was followed by a PhD in geophysics at the University of British Columbia, Canada, and postdoctoral research in marine gas hydrates at the University of Wyoming, USA.