



The role of tectonic folding in gas hydrate formation – Hikurangi margin, New Zealand

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Gas hydrates form in the submarine environment over a broad range of water depths and in a variety of geological settings. In recent years there has been a growing appreciation of the role of stratigraphic layering, and indeed the dip of sedimentary layers, for the formation of concentrated gas hydrate accumulations. In this study we investigate gas hydrate formation on New Zealand's Hikurangi subduction margin, where convergent tectonics have produced pronounced fold and thrust ridges. Two-dimensional seismic data from the margin reveal striking examples of concentrated gas hydrates within folded strata of anticlines. In many cases, these gas hydrate accumulations are underlain by thick free gas columns. Interestingly, these gas columns and the overlying gas hydrate accumulations tend to occur preferentially in the hanging-wall sides of thrust faults. We interpret that uplift within the hanging-walls leads to effective hydrate recycling, gas mobilisation, and, ultimately, concentrated gas hydrate formation in dipping layers. Our ongoing work is investigating spatial relationships between gas hydrate formation and shallow tectonic deformation to improve the understanding of the interplay between these two processes.