Geophysical Research Abstracts
Vol. 12, EGU2010-4652, 2010
EGU General Assembly 2010

Gas hydrate amount in a reservoir offshore Antarctic Peninsula

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A gas hydrate reservoir, revealed by the presence of Bottom Simulating Reflector, is present offshore of the Antarctic Peninsula (SW of Elephant Is.). The analysis of geophysical dataset, acquired during three oceanographic cruises carried out in the Austral summer 1989/90, 1996/97 and 2003/04, allowed us to characterized the gas hydrate reservoir.
Detailed 2D velocity fields were obtained by using pre-stack depth migration and the analysis of the flatness of reflections in the Common Image Gathers. Then, velocity information obtained along the seismic lines were translated in terms of gas hydrate amount, applying the Biot-Geerstma-Smit theory.
The regional geothermal gradient, estimated by the depth of the BSR, using the Sloan theory, results in a range of 37.2-40°C/km from the inner slope toward the trench. It shows higher values close to a mud volcano where intense hot fluid up-welling are supposed controlled by the tectonics.
The total volume of gas hydrate derived by the 3D model ,obtained interpolating the results of the 2D sections, and considering an area of 2957 km2, resulted of 55 109 m3. Assuming that 1 m3 of gas hydrate correspond to 140 m3 of free gas in standard conditions, the reservoir contains a total volume of 7.7 1012 m3 of free gas.