Advanced Pressure Coring*

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Abstract

During the last few years, pressure coring has become an indispensable part of offshore gas hydrate expeditions, e.g. in the United States, Canada, India, China and South Korea. The tools used have been developed within the European research project HYACE and HYACINTH; continuous improvements on the prototypes lead to great successes and make the tools more and more reliable.

The depressurization during conventional coring will change a lot of properties of the core. This holds true for gas hydrates which will decompose rapidly but also for many other properties like equilibrium of gases, fluids and solids, phase boundaries, wettability, integrity of the mechanical structure, etc.

The investigation of the pressurized cores with various measurements like X-ray, gamma ray, and p-wave, revealed numerous details of gas hydrates which have been unknown before and can't be obtained with non-pressurized cores.

Now it is time to make pressure coring tools accessible to other scientists who work in the field of pressure related phenomena. Possible applications include, but are not limited to oil and gas exploration in shales and other tight formations, conventional oil and gas exploration with pressure related phenomena, CO2-sequestration, coalbed methane, and microbiology of the deep lithosphere.

For the new applications the system will consist of the pressure coring tool which is deployed on a wire through the main drill string, a transfers system which allows retrieval of the core from the autoclave section of the corer without loss of pressure, a sub-sampling system which allows cutting and transfer of smaller core sub-samples into especially designed investigation chambers, and storage chambers for long term storage of the pressurized cores.

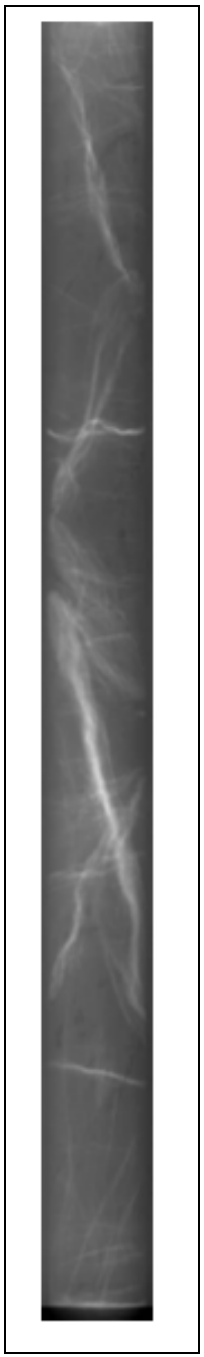

Figure 1. X-ray image taken with the Geotek MSCL-P from a core collected on Expedition 1 of the Indian National Gas Hydrate Program.

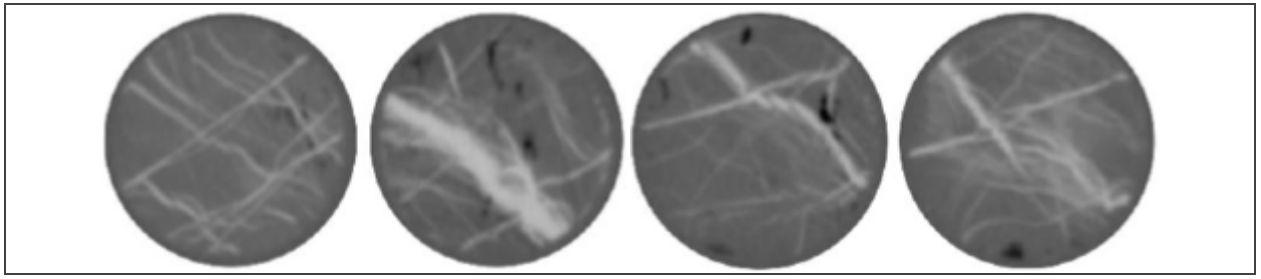

Figure 2. Cross-section examples of X-ray CT data.

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