



An experimental challenge: Unraveling the dependencies of ultrasonic and electrical properties of sandy sediments with pore-filling gas hydrates

Katja Heeschen, Erik Spangenberg, Karl Seyberth, Mike Priegnitz, and Judith M. Schicks

GFZ German Research Centre for Geosciences, Helmholtz Centre Potsdam, Germany (katja.heeschen@gfz-potsdam.de)

The accuracy of gas hydrate quantification using seismic or electric measurements fundamentally depends on the knowledge of any factor describing the dependencies of physical properties on gas hydrate saturation. Commonly, these correlations are the result of laboratory measurements on artificially produced gas hydrates of exact saturation. Thus, the production of gas hydrates and accurate determination of gas hydrate concentrations or those of a substitute are a major concern. Here we present data of both, seismic and electric measurements on accurately quantified pore-filling ice as a substitute for natural gas hydrates. The method was validated using selected gas hydrate saturations in the same experimental set-up as well as literature data from glass bead samples [Spangenberg and Kulenkampff, 2006].

The environmental parameters were chosen to fit those of a possible gas hydrate reservoir in the Danube Delta, which is in the focus of models for joint inversions of seismic and electromagnetic data in the SUGAR III project. The small effective pressures present at this site proved to be yet another challenge for the experiments. Using a more powerful pulse generator and a 4 electrode electric measurement, respectively, models for a wide range of gas hydrate saturations between 20 – 90 % vol. could be established.

Spangenberg, E. and Kulenkampff, J., Influence of methane hydrate content on electrical sediment properties. *Geophysical Research Letters* 2006, 33, (24).