



Micromechanical control of gas hydrate texture in sediment

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Natural gas hydrates in sediments have been found in various textures: 3D-cements, nodules and layers are common and there is evidence for fine disseminated gas hydrates in sediments at greater depth. It is generally accepted that the sediments grain size and the stress state are factors influencing the development of different textures, but a prediction of the texture is not (yet) possible. Since several submarine tsunami-genetic mega slides have been attributed to dissociating gas hydrates, there is interest to understand the texture and mechanic behavior of gas hydrate bearing sediment.

A method simulating gas hydrate growth and the surrounding sediment with the Distinct Element Method in two dimensions is proposed and used for micromechanical experiments. These experiments reveal a combination of controlling factors like stress state, grain size, grain shape and cohesion, that may either lead to growth in nodules or to growth in layers. The used method is applicable for more general questions of place-taking-processes in the pore space.