
Contribution ID: **304** Type: **Oral Presentation**

# Study on poromechanical problems of hydrate sediment during phase transition process

*Tuesday, 1 June 2021 11:00 (15 minutes)*

This paper establishes a comprehensive model to describe the deformation of hydrate sediment involved in the hydrate recovery process. It combines two parts: phase transition of hydrate in porous media and unsaturated poromechanics. This model considers that the substances in the pores are modeled as two phases: the hydrate solid phase, and free gas stay in continuous liquid water as individual gas bubbles namely the equivalent fluid phase. Because of capillary effects between hydrate and fluid, the phase equilibrium conditions in fine sediments are shown as a zone rather a line in p-T diagram. When recovery hydrate by different stimulation methods, we calculate the deformation of hydrate sediment respectively by using this comprehensive model. In undrained condition, the pore pressure rises significantly during the hydrate dissociation process. This is because the gas released from the melting hydrate cannot be expelled from pores. This build-up of pore pressure lead to the deformation of the sediment, it also increases the hydrate dissociation temperature, and thus more heat supply is required when all the hydrates are dissociated. Finally, we compared the results of different recovery methods and got those conclusions: the thermal stimulation method in drained condition that leads to least deformation, and thus it's the favorable way. But in undrained condition, the thermal stimulation method results in the largest deformation and so it's the dangerous way in low permeability hydrate sediment.

## Time Block Preference

Time Block A (09:00-12:00 CET)

## References

## Acceptance of Terms and Conditions

Click here to agree

## Newsletter

I do not want to receive the InterPore newsletter

## Student Poster Award

**Primary authors:** Dr WANG, Linlin; Mr DAI, Xiaoliang; Mr ZHANG, Shuitao

**Presenter:** Dr WANG, Linlin

**Session Classification:** MS12

**Track Classification:** (MS12) Advances in modeling and simulation of poromechanics