
Contribution ID: **390** Type: **Oral Presentation**

# Pore scale modeling of the moisture transport in cementitious porous media

*Wednesday, 1 June 2022 16:45 (15 minutes)*

Understanding of moisture transport through cementitious porous media, such as concrete or mortar, is of great importance since it is directly related to degradation mechanisms and has great impact on durability of cement-based structures. Prediction of water transport throughout such a complex pore system is usually based on traditional models relying on a homogenization approach and requires different macroscopic properties such as porosity, permeability and tortuosity, among others<sup>1</sup>. In recent years, the pore scale modeling of multiphase flow has received significant attention and started to be used as a predictive tool in many different porous media applications<sup>2</sup>. These models account for complex microstructure heterogeneities and together with pore scale experiments (e.g. neutron and X-ray imaging) have potential to improve our understanding of multiphase flow processes and lead development of improved upscaled models by connecting microscale mechanisms with macroscopic properties required for large scale modeling. In the context of cementitious media, application of pore-scale modeling is still limited and yet an emerging tool. Thus, the goal of this work is to advance prediction of moisture transport in cement-based materials by using a pore scale modeling. Among different computational methodologies used for investigation of the multiphase flow at pore-scale, our focus is on direct pore scale modeling since this approach preserves the complexity of the pore-space geometry, while grid-based approach using finite volume discretization and interface capturing approach implemented in OpenFOAM code is used to get insight into relevant physical processes of multiphase flow at pore scale.

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## Country

Switzerland

## References

1 Zhang, Zhidong, and Ueli Angst. “A Dual-Permeability Approach to Study Anomalous Moisture Transport Properties of Cement-Based Materials.”Transport in Porous Media 135, no. 1 (October 2020): 59–78. https://doi.org/10.1007/s11242-020-01469-y.

2 Golparvar, Amir, Yingfang Zhou, Kejian Wu, Jingsheng Ma, and Zhixin Yu. “A Comprehensive Review of Pore Scale Modeling Methodologies for Multiphase Flow in Porous Media.”Advances in Geo-Energy Research 2, no. 4 (December 25, 2018): 418–40. https://doi.org/10.26804/ager.2018.04.07.

## Time Block Preference

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

## Participation

In person

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**Session Classification:** MS09

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