Contribution ID: **368** Type: **Oral Presentation**

Visualization and Quantification of micro-particle transport in rough fractures

Wednesday, 15 May 2024 12:30 (15 minutes)

Particle transport in rough natural fractures has seen diversified potentials and applications in environmental engineering and resource development engineering.
Despite intensive and outstanding research on their transport phenomena, the impact of surface attachment and confined space of rough natural fractures on particle transport remains poorly understood.
In this study, we constructed a 3D-printed rough fracture model to investigate the transport behavior of micro-particles within the rough fracture. Here, we develop a particle transport imaging system using silica micro-particles coated with fluorescence material, in conjunction with a Particle Image Velocimetry (PIV) system. We investigated the transport and settling behavior of fluorescent micro -particles in several rough fracture models under different fluid injection rates, and fracture roughness. The experimental results revealed that as the surface roughness of a fracture increases, the particles tends to settle more rapidly near the entrance of the fracture. This phenomenon substantially diminishes the lateral transport of the particle within the fracture, leading to a swift accumulation and consequent plugging at the entry of the fracture. Notably, even with a increased fluid injection rate, the rough fracture are not entirely obstructed by the clogging of particles. The overall findings will shed light on understanding clogging and deposition characteristics of particles in subsurface rough natural fractures.

Acceptance of the Terms & Conditions

Click here to agree

Student Awards

Country

中国

Porous Media & Biology Focused Abstracts

References

Conference Proceedings

I am interested in having my paper published in the proceedings.

Primary authors: ZHANG, Yaochen (China University of Petroleum-Beijing); ZHANG, Yunpeng (China University of Petroleum, Beijing); WANG, Bin (China University of Petroleum - Beijing); Prof. WANG, Haizhu (China University of Petroleum, Beijing); Prof. ZHOU, Mengmeng (China University of Petroleum, Beijing); ZHOU, Qianqian

Presenter: ZHANG, Yaochen (China University of Petroleum-Beijing)

Session Classification: MS03

Track Classification: (MS03) Flow, transport and mechanics in fractured porous media