Contribution ID: **759** Type: **Poster**

Direct inversion for joint parameter and boundary conditions estimation for fractured aquifer

Tuesday, 15 May 2018 17:45 (15 minutes)

A new direct inverse method is developed that is capable of simultaneous estimation of hydraulic conductivity (K), boundary conditions, and flow field for both confined and unconfined aquifers. In this research, the direct inverse method is applied to the inversion of discrete fractured aquifers. By sampling synthetic aquifer problems with different fracture patterns, the inverse method is tested under varying measurement data quality, data density, and the ratio of fracture (Kf) to matrix hydraulic conductivity (Km). The method achieved stable K estimations under measurement errors up to +/-10% of the total hydraulic head variation of a given problem. The accuracy of K estimation, however, is sensitive to measurement density. Given sufficient and high quality measurements, inversion is successful for Kf/Km up to 10^6. Moreover, hydraulic heads, Darcy fluxes, streamlines, and boundary conditions are also satisfactorily recovered. For a set of test problems, direct inverse solutions were compared to those obtained with PEST and the importance of boundary conditions estimation is highlighted. Assuming that aquifer is homogeneous, directional equivalent K that can represent bulk flow in fractured aquifers is also successfully estimated.

References

Yifan Zhang (2015) Physics-Based Groundwater Inversion of Fractured Aquifers with unknown Boundary Conditions, M.S. Thesis, Department of Geology and Geophysics, University of Wyoming, 63 p.

Acceptance of Terms and Conditions

Click here to agree

Primary authors: Mr ZHANG, Yifan (Shell, Inc.); Prof. ZHANG, Ye (University of Wyoming)

Presenter: Prof. ZHANG, Ye (University of Wyoming)

Session Classification: Poster 2

Track Classification: MS 1.06: Upscaling of mass transfer in fractured porous media