Contribution ID: **150** Type: **Oral Presentation**

Suction Cup System-Dependent Variable Boundary Condition: Transient Water Flow and Multi-Component Solute Transport

Monday, 31 May 2021 20:05 (15 minutes)

Suction cups are widely used in agricultural and environmental research and monitoring under the hypothesis that the samples chemistry represents the soil pore water solute composition around the cup location. The objective of this study was to analyze the sampling procedures that lead to the most representative sample for soil aqueous phase composition when using a falling head suction cup. This was achieved by simulating simultaneously the hydraulic and geochemical response of the suction cup sampled soil solution and its immediate surroundings when evacuated by a system-dependent variable boundary condition. Different soils, water contents, vacuum applications and suction cup internal volumes, as well as variable hydraulic conductivities of the ceramic cup were evaluated and their effect on the sampling rate and sample chemical composition reported. Model results showed that potential extracted soil solution volume depends on a combination on internal suction cup volume and vacuum applied, independently from soil type or water content. A linear relationship was defined between the ratio of the extracted sample to suction cup volumes and the initial applied vacuum, for all simulations. pH values and general chemistry of the sampled solution were found to be more similar to those in the soil when a porous cup system is filled until hydraulic equilibrium is reached. Following this, a small volume suction cup system with a high initial applied vacuum, which allows for faster sample collection, could be optimal.

Time Block Preference

Time Block C (18:00-21:00 CET)

References

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