



Contribution ID: 571

Type: **Poster (+) Presentation**

## Feedback mechanisms between precipitation and dissolution reactions across randomly heterogeneous conductivity fields

*Friday, 4 June 2021 09:40 (1 hour)*

Our study aims at investigating the interplay between the dissolution, precipitation and transport processes taking place within randomly heterogeneous conductivity domains and the ensuing spatial distribution of preferential pathways. We do so by relying on a collection of computational analyses of reactive transport performed across two-dimensional systems where the (natural) logarithm of conductivity is characterized by various degrees of heterogeneity. Our results document the joint occurrence of precipitation and dissolution. While the latter mainly takes place along preferential flowpaths associated with the generated conductivity fields, the former is observed at locations close to and clearly separated from these. The high conductivity values associated with the preferential flowpaths tends to further increase in time, giving rise to a self-sustained feedback between transport and reaction processes. The clear separation between regions where dissolution or precipitation takes place is imprinted onto the sample distributions of permeability which tend to become visibly right skewed (with a tendency to bimodality) with time. The link between conductivity changes and reaction-driven processes promotes the emergence of non-Fickian effective transport features. The latter can be captured through a continuous time random walk model where solute travel times are approximated with a truncated power law probability distribution. The parameters of such a model are seen to change with time, shifting towards values associated with increasingly high non-Fickian effective transport behavior.

### Time Block Preference

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

### References

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### Newsletter

### Student Poster Award

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**Session Classification:** Poster +

**Track Classification:** (MS8) Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media