

EGU22-6310

<https://doi.org/10.5194/egusphere-egu22-6310>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Latest developments in research on mineral reactions: Accessibility of results and progress versus convenience

Andreas Lüttge

University of Bremen, Bremen, Germany (aluttge@uni-bremen.de)

How do we connect the results generated at the molecular scale with meso- and large scale processes? Or, in other words how do we make frontier research results accessible for the multitude of applications that our daily work demands?

During the last couple of decades the combined effort of field and experimental studies, sophisticated analytical methods and computational models has generated fast and important progress in our fundamental understanding of mineral reactions. Here, we will briefly present and highlight some of these exciting results. Results that are highly appreciated in light of the ever increasing number of applications that demand a better in-depth and quantitative understanding of mineral reactions and their often critical role in large scale processes such as the prediction of long-term behavior of geo-reservoir rocks, ocean acidification, hazardous (nuclear) waste safety, and – of course – global climate change.

Surprisingly enough, our main challenge is often to make the cutting-edge achievements of mineralogical and (geo)chemical research accessible to a broad audience in sedimentology, geochemistry, and geobiology. To highlight just one example, we recognize that crystal dissolution, corrosion and weathering rates are not correctly described by a rate constant but by a multitude of rates, a rate spectrum. However, this insight is difficult to implement in reactive-transport models and is met with significant skepticism.

We will have to focus on new strategies that will not only provide better (and easier) accessibility of cutting-edge research results but address also the even greater challenge of up-scaling our results, i.e., how do we utilize the fast increasing results at the molecular scale with the meso- and large scale problems. It looks like that we need the interfaces that connect the results both in length scale as well as in time.