

***Interactive comment on “Transport processes at quartz-water interfaces: constraints from hydrothermal grooving experiments” by K. Klevakina et al.***

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The manuscript by Klevakina et al. presents results from a series of experiments on quartz-water interaction performed at  $\sim 400$ – $600$  °C and  $\sim 200$  MPa in the system SiO<sub>2</sub>-H<sub>2</sub>O. The focus of the study was the physical aspects of quartz-water interface reactions with a detailed study on the surface and groove evolution on quartzite samples as a function of time and temperature. Additionally, the chemical aspects of quartz-water interaction were studied using kinetic rate law calculations and linked to the observed physical aspects to describe grooving. These results were then compared to the formation of healing fractures in the crust. Although the system SiO<sub>2</sub>-H<sub>2</sub>O has been the

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subject to numerous studies in the past, the results of this study present a nice scientific contribution to our knowledge on quartz-water interface reactions linking physical and chemical aspects. The experimental results are generally well presented and the manuscript clearly written. The results were also fitted to theoretical predictions (e.g. Fig. 12) and analyzed grooving profiles are well characterized (e.g. Fig. 8). Additionally, I find the description of surface evolution during hydrothermal alteration as a function of crystallographic orientation (e.g. Fig. 4) very interesting. There are several points that need to be revised or clarified before final submission, but overall I recommend this manuscript for publication in Solid Earth.

See my comments in the attached pdf for revision

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/5/C181/2013/sed-5-C181-2013-supplement.pdf>

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