

Interactive comment on “Identifying sources and controlling factors of arsenic release in saline groundwater aquifers” by C.-W. Liu et al.

Anonymous Referee #2

Received and published: 13 January 2014

The authors present a field and laboratory study on the arsenic chemistry in a coastal groundwater environment. The field study is interesting as the chemistry of arsenic in a saline environment has received little attention. Unfortunately, the paper has a few major shortcomings which makes it unsuitable for publication in its present form. First, I respect the Korean authors for writing a paper in English. Still, the text has a lot of style errors although the meaning can often be deduced from the settings. I, however, recommend a rigorous text editing. I have made many hand-written comments in the attached file. Second and most seriously, the sorption experiments have an erroneous set-up. The scientific meaning of the experiments is now very small. It can be easily deduced from the sorption constants how PO_4 , HCO_3 , Cl and SO_4 affect sorption of As as AsO_4 or AsO_3 . No new scientific insights are provided. The redox

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environment is anaerobic and the experiments were performed under aerobic conditions. It does not become clear how this affects the experiments other than ambiguous results for HCO_3 . The experiments should have been performed under natural redox conditions. Additionally, the intensity of oxidation of solid or dissolved organic matter (by oxygen) and the evolution of HCO_3 should have been monitored in order to make a sound interpretation. What now remains is a series of unsuccessful experiments. The results are thus not suitable for publication. Third, I do not understand the outcome of the HGMS analysis. I am not familiar with this technique but it sounds interesting and useful to me. However, there are no reduced forms of Fe oxyhydroxides. To the best of my knowledge, the best oxides exist in nature that contain both Fe(II) and Fe(III), but Fe(II)-oxides are rather irrelevant in environmental geochemistry. I wonder whether siderite, Fe-sulphides or glauconite and other Fe-bearing Al-silicates become measured with the technique in addition to pure Fe-oxyhydroxides. All these minerals may be present in a coastal groundwater environment. The authors should elucidate on this.

I made many small comments in the manuscript, that can be found in the attachment.

In conclusion, I recommend that the authors write an alternative paper that contains the groundwater and sediment analyses and leave out the sorption experiments. They may submit the paper to Hydrogeology Journal that has an interest in groundwater field studies.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/10/C7229/2014/hessd-10-C7229-2014-supplement.pdf>

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 10565, 2013.

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