Dear Editor,

we would like to thank you and the two referees for a very accurate and constructive revision of our manuscript. We appreciate the time and effort that you and the referees have dedicated to providing your valuable feedback on our manuscript. We have carefully considered the referee's comments and tried our best to address each one of them to improve our manuscript. The changes will be highlighted in red and blue in the revised manuscript. Please find below our detailed point-to-point responses to the individual comments.

Referee's comment:

1) *Section 4.1., para 2. The authors state that one reason that the DVC method works is because grain centres did not deform. Can this be explained somewhere, e.g. in the method. Or perhaps give a reference that explains this. Would the method really not work if the aggregates had been deformed by entirely crystal plastic deformation? I ask this because, while the authors claim that plastic deformation would have been restricted to small grain contacts, there is plenty of literature showing significant crystal plastic strains in NaCl single crystals at differential stresses in the range 5-10 MPa at room T.*

Authors' response:

We have addressed the referee's concern in Section 4.1, lines 303-314, where we clarify why DVC can be used in our case as a criterion for the negligible effect of crystal plastic deformation upon the bulk deformation of our samples.

Referee's comment:

2) *Fig 16. The authors have made a serious attempt to address the issue of consistency between their compaction data and previous data in this figure. However, they have compared rates at similar times since the onset of compaction, rather than making the comparison at similar values of porosity, which is the relevant microstructural state variable here (see the cited papers on the porosity/strain dependence of compaction rate by p-sol). Comparison at similar times really has no physical meaning. This may be why the authors obtain up to 2 orders discrepancy. I would urge a comparison at similar porosity, or else avoid any claim that the compaction data are "in accordance" with previous data beyond pointing out the qualitative similarity with previous compaction curves, except for the attainment of an apparent steady state. Previous compaction data on analytical salt and salt backfill materials (e.g. WIPP site) consistently show continuously decelerating creep, even over periods of years.*

Authors' response:

We agree with the referee and have changed Fig. 16 accordingly. In its updated form it compares the strain rate at similar porosity not compaction time. In the accompanying text, we further avoided to claim consistency with previously published data beyond a qualitative similarity.

We hope that you feel the revised manuscript adequately addresses the referee's concerns.

Best wishes,

Berit Schwichtenberg