

## ***Interactive comment on “Effect of chemical composition on the electrical conductivity of gneiss at high temperatures and pressures” by Lidong Dai et al.***

### **Anonymous Referee #1**

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This article reports the effect of chemical composition on the electrical conductivity of biotite-bearing felsic gneiss at high P-T conditions. They tried to explain the conductivity differences by the contribution of total  $K^{++}Na^{++}Ca^{2+}$  of three natural gneiss samples. The experimental technique is top-notch but the strategy and discussion are not convincing. I think the manuscript must be revised largely and more evidences should be provided before publication.

The authors measured the electrical conductivity of gneiss parallel to foliation. There are at least two reasons may contribute to the conductivity differences, including chemical composition effect and textural difference. How to evaluate the effect of textures?

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Biotite usually deforms and aggregates to form the band texture and it may exhibit strong conductivity anisotropy, highest along the layered surface and lowest perpendicular to the layered structure. The conductivity differences, therefore, may result from the texture differences. The authors did not describe the samples carefully. Even that the effect of chemical compositions dominates on the conductivities, the authors cannot use the composition data of a whole rock as that of the unique sample used in conductivity measurement because of the inhomogeneity. To overcome these uncertainties, well mixed powder samples must be used instead although the geological application will be penalised. It is also a strange strategy that the authors haven't choosed the samples from Dabie-Sulu as the starting materials, despite finally they apply the results to explian the HCL within Dabie-Sulu.

Other comments: (1) Quality of writing: In its present state, this article is not publishable. Writing needs tremendous improvements to match the requirements of any peer-reviewed journal. (2) The authors should calculate the activation volume for Run DS12, and explain the possible mechanism of positive pressure effect on the conductivity. (3) Line 322-325: The authors should clearly show how to convert the conductivity-temperature data to conductivity-depth profile with the aid of heat flow for the general readers.

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