

Limits of a-posteriori interpretation of electrical conductivity in terms of water content

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SUMMARY

Electrical conductivity profile of the mantle, derived from EM inversion, can be itself viewed as data for further interpretation. This interpretation in terms of the thermochemical state of the mantle rock can be obtained using Gibbs energy minimalization and experimental mantle rock electrical conductivity data. If we constrain the temperature and some dimensions of the chemical composition it is possible to obtain the water content from electrical conductivity. This inversion can have significant a-posteriori error margins. This is not only due to the a-priori error estimate of the electrical conductivity and the thermochemical data or the error of the forward problem derived from Hashin-Shtrikman bounds, but also due to the significant error of the experimentally derived mantle rock conductivity data. I would like to present a few examples of this local inversion and show how different errors are projected into the final a-posteriori distribution of the local water content.

Keywords: electrical conductivity, Gibbs energy minimization, mantle composition