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Evaluating uncertainties in reference Earth models at different scales

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To be widely used in different applications, a reference Earth model must be as smooth as possible while adjusting mean data. Thus, such a model can be considered to be over-regularized. In a stochastic approach for instance, it leads to adopt statistical parameters for regularization that do not correspond to the true a priori information. It is therefore important to distinguish clearly the regularizing parameters from those which describe a priori information. The question then arises of how to evaluate a posteriori uncertainty. In this communication, we show that, although a standard covariance analysis may not be carried out, it is possible to determine uncertainties in mean values of the parameters between different radii. Finally, we show that this approach can give more precise inference on parameters of geophysical interest, as the density, Brunt Väisälä parameter N^2 within the outer core, or strength difference and anisotropy within the upper mantle.