

## **The grain size of the lower mantle**

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We have combined literature grain growth-rate laws for the main mantle phases with geodynamical simulations of an Earth-like convecting system to predict the grain size of the mantle. The predicted grain size of olivine in the upper mantle agrees well with grain sizes of mantle xenoliths, with a mean diameter of 1.2 mm. The grain size of perovskite in the lower mantle is predicted to be fairly constant throughout, varying by a factor of 2, with a mean value of 19 mm. The constant grain size of lower-mantle perovskite means that grain size evolution can be neglected for most purposes but the very small grain size of the lower mantle means that grain boundaries might make a significant contribution to the behaviour of the bulk lower mantle.