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Inefficient compaction in small planetary cores -- application to the Moon

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Growth of the solid inner core is generally considered to power the Earth's present geodynamo. Cristallisation of a solid central inner core has also been proposed to drive the lunar dynamo and to generate a magnetic field in smaller bodies. In a previous work, we estimated the compaction of planetary cores for different scenarios of growth (with or without supercooling) and different sizes of the inner core. Our main results indicated that small inner cores are unlikely to compact efficiently the liquid trapped during the first steps of the growth.

This is especially true for small bodies for which the typical size of the core is similar to the compaction length. The light elements are thus trapped during the cristallisation, reducing the release of latent heat and of light elements. We present here a model to include the effect of an inefficient compaction in the energy budget of a planetary core and investigate the implications for the dynamo evolution in small bodies. We apply this model for the evolution of the core of the Moon.