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Melting during planetary collisions: influence of target and impactor size

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Differences between the interiors of the terrestrial planets are likely caused by processes of core formation and element partitioning at different conditions during their formation. To follow the compositional evolution of the inner planets, information about the amount and depth of melting, caused by planetary impacts during the accretion process, is required.

In this study, the amount and depth of melting are determined for the impacts that are calculated from two different N-body accretion models [1] with different initial size distributions for the planetary embryos and planetesimals. Because of the large number of impacts, a parametrized model, based on [2], is used for these calculations.

With larger planetesimals in the N-body models, the melting depth compared to the core-mantle boundary depth is larger, as expected. However, the slower growth rate of the bodies in these models causes the pressures at the melting depth to be similar for both cases.

[1] O'Brien, D. P. et al. (2006) *Icarus* 184, 39–58.

[2] Abramov, O. et al. (2012) *Icarus* 218, 906-916.

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