1) TITLE OF PRESENTATION: Early evolution and dynamics of Earth from a molten initial stage

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3) ABSTRACT OF PRESENTATION:

It is now well established that most of the terrestrial planets underwent a magma ocean stage during their accretion. On Earth, it is probable that at the end of accretion, giant impacts melted a substantial part of the mantle. Considerable research has been done on magma oceans using 1-D models (*Abe,* 1997; *Solomatov,* 2007; *Elkins-Tanton,* 2008). However, its dynamics, evolution from a molten state to the present day solid state, and crystallisation are more complex than a 1-D formulation. Moreover, new developments in mineral physics indicate that melt can be denser than solid at high pressures (*de Koker et al.,* 2013) and can have very important impacts on the classical views of the solidification of magma oceans (*Labrosse et al.,* 2007).

The goal of our study is to understand and characterize the influence of melting on the long-term thermo-chemical evolution of rocky planet interiors, starting from an initial molten state (magma ocean). Our approach is to test existing published 1-D parameterisations of magma ocean dynamics and extend them into 2-D models. We will address this problem using the numerical code StagYY (*Tackley,* 2008), for which additional enhancements related to the physics and parameterisation of melting are needed.