



Contribution ID: 41

Type: **Oral presentation**

The Evolution of the Dynamical Ellipticity of the Earth

Tuesday, February 9, 2021 2:00 PM (15 minutes)

The “timescale problem” of the Lunar origin is one of the major concerns in understanding the past history of the evolution of the Earth-Moon system. Using the present rate of tidal braking of the Earth’s rotation, a backward integration of the system places the Moon at the Roche limit just 2 billion years ago, which is not compatible with modern theories of Lunar formation. A possible resolution of the problem is in varying the tidal dissipation rate during earlier times and reducing the Earth’s dynamical ellipticity and rotational period. A combination of dissipative mechanisms, both astronomical and geophysical can possibly lead to such a scenario.

In this talk, we will focus on the variation of the dynamical ellipticity, or the figure change of the Earth due to the past ice ages. During these ice ages, cycles of glaciation and deglaciation exert a varying surface load on the Earth forcing it to deform to maintain its equilibrium. The modelling of this deformation requires two key elements that happen to be a spatio-temporal history of the glacial spread over the surface of the Earth and the internal rheological structure that dictates how the Earth responds to any exerted force. We will visit the history of the problem and present our prediction of the effect of these glacial cycles on the oblateness of the Earth for the past 50 million years. This ellipticity evolution will be utilised in constraining the present uncertainties of the rotational and orbital solution of the Earth-Moon system.

Field

Planetology (including small bodies and exoplanets)

Day constraints

Tuesday 9/2

Wednesday 10/2

Author: FARHAT, Mohammad (IMCCE)

Presenter: FARHAT, Mohammad (IMCCE)

Session Classification: Talk

Track Classification: Astrophysics