Vienna | Austria | 3–8 April 2022

Lunar Science, Exploration & Utilisation

https://meetingorganizer.copernicus.org/EGU22/session/44172

Lunar TLP's and the tectonic processes of the Earth and the Moon

D.Ouzounov, P.Taylor, M.Kafatos, K. Cutchins

We study the transient lunar phenomena (TLP) as an indicator of lunar tectonic. Seismic phenomena can be used as a direct indicator of some tectonic activities of the planets
The Moon-Earth gravitational interaction has been studied extensively as a triggering mechanism to geodynamics. In this work, we study the reverse interaction Earth-Moon in relation to the TLP activities. The lunar outgassing potentially is the leading cause for TLP activities resulting from the lunar interior's dynamic mechanism. We have studied Earth venting and earthquakes processes and have found that radon was frequently activated before significant seismic events due to Moon-Sun interaction with Earth (Ouzounov et al., 2018). Earthquake lights, an associated phenomenon reported before some major earthquakes, are analog to TLP activities on the moon. In 1972, N. Kozyrev suggested a possible moon response to the significant seismic events on Earth. To understand whether TLP's activities have any possible connection with Earth geodynamics, we perform a statistical check between the significant seismic activities from the NEIC catalog and lunar TLPs for 1907-1977 for four lunar areas: Aristarchus, Plato, Gassendi, and Alphonsus. We use TLP compiled catalog based on Middlehurst et al. (1968), Cameron (2006a,b), and Crotts (2008) catalogs. Our results revealed a causal relationship between significant earthquakes and TLP events. However, this relation varies from the location and depth of the seismic events. Deformation triggers the degassing process, and TLPs are indicators for those underlying activities. Our work can provide new information about the origin of TLP and the existence of a possible relationship between the tectonic processes of Earth and the Moon.