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

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We are studying the transient lunar phenomena (TLP) as an indicator of lunar tectonics. Seismic events 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 for earthquakes. However, this is a controversial topic. Our present study investigated the reverse Earth-Moon interaction concerning the TLP activities. The lunar outgassing is potentially the leading source of TLP activities. We have investigated both Earth venting and earthquakes and have found that radon was frequently activated before significant seismic events due to the Moon-Sun interaction with the Earth (Ouzounov et al., 2018). Earthquake lights, an associated phenomenon reported before some major earthquakes, are analogous to TLP activities on the Moon. In 1972, N. Kozyrev suggested a possible lunar response to the significant seismic events on the Earth. To understand whether TLP's have any possible connection with earthquakes, we performed a statistical review between significant earthquakes, using the NEIC catalog and TLPs during 1907-1977, for four lunar areas: Aristarchus, Plato, Gassendi, and Alphonsus. We used TLP catalogs published by Middlehurst et al. 1968; Cameron, 2006; and Crotts, 2008. Our results revealed a causal relationship between significant earthquakes and TLP events. However, the strength of this relationship varies from the location and depth of the earthquakes. Deformation on the Moon 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. The Earth causes crustal tides on the Moon, and the Moon produces tides on the Earth.