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Conceptualizing Space Elevators and Tethered Satellites (3)

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ATMOSPHERIC ELECTRICITY MODULATION CAUSED BY SPACE ELEVATOR

Abstract

We investigate the atmospheric electricity modulation caused by space elevator, because the atmospheric electricity such as global electrical circuit (GEC), corona discharge, transient luminous events (TLEs), and lightning might be modulated by conductive tether geocentrically between the earth's surface and the space for the space elevator. In addition, the conductive tether might cause the corona discharge inside and in the vicinity of the thunderstorm, and be stroked by lightning and TLEs. As the tether made by the carbon nanotube (CNT) which will be employed would be resistive material, the GEC modulation should be estimated in detail to avoid unexpected global phenomena such as climate change. For the corona discharge caused by intensive electric field of thunderstorm, TLEs, and lightning strokes, the tether should be investigated to be sustainable. In our presentation, we evaluate the feasibility of the space elevator using the CNT tether from the numerical calculation for the GEC modulation and laboratory experiments for the corona and spark discharges.