

Thunderstorm Activity in Asia Maritime Continent and Global Cloud Variation

TAKAHASHI, Yukihiro^{1*} ; SATO, Mitsuteru¹ ; YAMASHITA, Kozo²

¹Department of CosmoSciences, Hokkaido University, ²Salesian Polytechnic

Global relationship among the thunderstorm activities especially in Asia Maritime Continent, cloud variations in tropical regions and solar parameters was examined based on lightning data measured by Global ELF observation Network (GEON) operated by Hokkaido University and Outgoing Longwave Radiation (OLR) intensity. A correlated analysis between the number of the lightning strokes, cloud variation in the tropical regions, and solar parameters was examined, looking into the variation with ~one month periodicity. It was found that the number of lightning strokes in Asia Maritime Continent (AMC) varies with about month periodicity in the period from February to June 2004 and shows positive correlation ($R \sim 0.8$) with OLR in the Western Pacific Warm Pool (WPWP). On the other hand, OLR in the central Africa shows negative correlation with the number of lightning strokes in the AMC in that period. It is also found that the galactic cosmic rays or UV intensity associated with solar activity shows good correlation with tropical OLR or lightning activity in AMC. One explanation to connect such global variations in thunderstorm / cloud amount with solar parameters would be the electrical circuit between lower and upper atmospheres. The radars distributed globally would provide some essential information for this hypothesis, such as conductivity in the lower ionosphere, which may determine the strength of electrical connection in the vertical and horizontal directions.

Keywords: Maritime Continent, thunderstorm, tropical region, cloud amount, OLR, solar activity