

## Relationship between lightning activities and cloud cover around the Maritime Continent

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The Maritime Continent (MC) is one of the most important regions for convective and lightning activities in the world, which is related to the climatic phenomena, such as El Nino and Asian monsoon. Therefore, detail researches in this area lead to better understandings of climate change. However, the relationship between lightning activities and climate change around the MC remains uncertain. Takahashi et al. (2010) focused on the variation of cloud cover with ~1 month periodicity using Outgoing Longwave Radiation (OLR). As a result, they found that ~1 month periodicity appeared in Western Pacific Warm Pool (WPWP).

Until now, there have been no lightning observation network estimating location and energy information of individual discharges with uniform sensitivity for globe. Global ELF Observation Network (GEON) constructed by Hokkaido University provides information including energy of individual lightning stroke which occurs anywhere in the world. GEON consists of four observation sites and detects electromagnetic waves in the frequency range of 1-100 Hz radiated from cloud-to-ground lightning discharges with a detection threshold of 950 C-km. The estimated average location error is about 700 km.

In this study, we focused on ~1 month periodicity appeared in WPWP shown by Takahashi et al. (2010) and investigated a relationship between lightning activity estimated by GEON and OLR as a proxy of cloud cover around the MC from August 2003 to July 2004. In Eastern Indian Ocean, seasonal variation is dominant both for lightning and for cloud cover. On the other hand, monthly cycle is more prominent in WPWP. Furthermore, we calculated seasonal correlation factor between lightning activity in MC and cloud cover separated into 5 degree  $\times$  5 degree grid. As a result, the correlation factor of lightning activity in MC and cloud cover in southern Western Pacific (125 E - 145 E, 15 S - 5 S) from November 2003 to January 2004 is positive correlation ( $R = 0.52 \sim 0.71$ ). Also, the correlation factor of lightning activity in MC and cloud cover in eastern Australia (100 E - 125 E, 35 S - 20 S) from November 2003 to January 2004 is negative correlation ( $R = -0.51 \sim -0.70$ ). In this presentation, we will show these detail results and discuss including phase relation.