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Lightning bursts observed in the tropical cyclone during the genesis over the western north Pacific

Hisayuki Kubota, Yukihiro Takahashi, and Mitsuteru Sato

Hokkaido, Sapporo, Japan (hkubota@ep.sci.hokudai.ac.jp)

The accuracy of tropical cyclone (TC) track forecast has been improved year by years, on the other hand, the forecast of tropical cyclone intensity still has a difficulty of improvement. Recently the relationship between lightning activity and tropical cyclone intensity has been investigated. Lightning tends to increase during the rapid intensification of the TC. Therefore, monitoring the lightning activity becomes important for a TC intensity forecast. Lightning observation network are deployed over the western north Pacific by five very long frequency events trigger measurements called V-POTEKA at Palau, Guam, Manila, Okinawa Japan and Serpong Indonesia under the ULAT (Understanding Lightning and Thunderstorm) of SATREPS (Science and Technology Research Partnership for Sustainable Development) in the Philippines.

Tropical storm (TS) Bavi and Maysak were generated over the Philippine Sea on August 2020. We found that lightning activity drastically increased in the TC during the TC genesis stage when the TC reached TS criteria. Numbers of lightning reached the maximum during the life cycle of the TCs. Lightning was concentrated in the convective clouds about 100 to 200 km size. They are located around 400 to 500 km and 100 to 200 km from the TC center respectively and lasted about few hours. We called this phenomenon as “lightning burst”. On the other hand, when TS Haishen and Dolphin were generated over the Philippine Sea in September 2020, they did not observe lightning burst. About half of the TCs observed lightning burst in the Philippine Sea in 2020. We will investigate further what kind of structure occurred during the lightning burst and what kind of mechanism responsible for the lightning burst.