Relation between Lightning and Typhoon Activities (Typhoon LAN) in the Western Pacific Region

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Recent studies revealed that there is a close relation between the lightning activity and the tropical cyclone intensity, such as the maximum wind velocity and the minimum surface pressure. As many countries in the western Pacific region suffer from the attack of many tropical cyclones (typhoons) and related severe weather events, they have a strong demand to predict the intensity development of these phenomena by means of a cost-effective way. Thus, we started installing the new lightning and weather observation system, named as V-POTEKA, at Guam, Palau, and Manila in the Philippines since September 2017. The lightning observation system consists of a VLF receiver having the sensitivity in the frequency range of 1-5 kHz, an automatic data-processing unit, solar panels, and batteries. Lightning-excited pulse signals detected by the VLF receiver are automatically analyzed by the data-processing unit, and only the extracted information of the trigger time and the pulse amplitude is transmitted to the data server via the 3G data communications. From the V-POTEKA data analysis, we confirmed that there is clear relation between the lightning occurrence number in the typhoon and the maximum wind speed of Typhoon LAN, which is the category-1 weak typhoon. There is ~12-18 h time difference between the peak lightning occurrence number and peak typhoon intensity. At the presentation, we will show the results derived from these lightning observation systems and will present the relation between lightning and typhoon activities more in detail.

Keywords: lightning activity, typhoon, intensity prediction

