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Lightning observation network in SE-Asia as a tool for monitoring of atmospheric convection in thunderstorm

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SE-Asia is one of the most important regions in the world, which is closely related to the important meteorological phenomena, such as Madden Julian Oscillation, El Nino, etc. Also very sever weathers sometimes happen in this area, which leads to loss of human lives and estates. Therefore, monitoring and understandings of atmospheric activities in this region is quite important. However, it is not easy only with existing observation equipments and the limited number of advanced facilities such as expensive meteorological radars. Lightning observation in frequency range of VLF would be a very effective methodology to monitor the activity of thunderstorms, which are driving the global atmospheric circulation and may cause significant disasters. We have been developing Asia VLF observation network: AVON, which now consists of 3 stations located at Taiwan, Thailand and Indonesia. The geolocation will be carried out by time-of-arrival method with an error of 10 km. From AVON data, we could estimate the charge moment change of the lightning stroke, which might be a good proxy of meteorological parameters in thunderstorm. In order to improve the accuracy of geolocation and to achieve the redundancy, we plan to add 2 or 3 more stations in SE-Asian countries, such as Philippines, Vietnam. Based on information of lightning, we will try to establish the methodology for prediction of thunderstorm location and strength. Here we discuss the scope of AVON observation including various possibilities of applications to meteorology and climate studies in SE-Asia.

Keywords: lightning, network, thunderstorm, monitoring, SE-Asia