3D Reconstruction of Typhoon and Thunderstorm Cloud Top Using Airborne and Satellite-borne Camera

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Typhoons or individual thunderstorms are natural disasters which cause deaths and damaged properties to several countries. Consequently, it is important to analyze this meteorological phenomenon to allow researchers to understand its behavior, and properly deal with the hazards that go with it. A standard mode of visualization of typhoons involves the use of three-dimensional representations of a typhoon cloud top. This could help meteorologists determine the typhoon’ s height and estimate the amount of its precipitation. Creating a three-dimensional model requires visible distinct features or landmarks in the cloud’ s stereo images. This is difficult as clouds does not normally have rigid structures like points and corners to serve as landmarks. In this study, an experiment under the ULAT project (ULAT: Understanding Lightning and Thunderstorm) was conducted where images of Typhoon Trami were taken from an aircraft and by DIWATA-1 satellite last September 26, 2018. A 3D model of Typhoon Trami’ s cloud top was reconstructed from the images using a commercially available software. Aircraft or low-altitude satellite images provide closer views of the typhoon cloud top than that of geostationary satellite images making it easier to reconstruct a 3D model. This allows for the manual adjustment of the camera to capture images ideal for 3D reconstructions. From the result, an estimate of the cloud top dimension can be derived.

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