



## **Development of fog detection algorithm using Himawari-8/AHI data at daytime**

Ji-Hye Han, So-Hyeong Kim, and Myoung-Seok Suh

Dept. of Atmospheric Science, Kongju Nat'l Univ., Gongju, Korea, Republic Of (sms416@kongju.ac.kr)

Fog is defined that small cloud water drops or ice particles float in the air and visibility is less than 1 km. In general, fog affects ecological system, radiation budget and human activities such as airplane, ship, and car. In this study, we developed a fog detection algorithm (FDA) consisted of four threshold tests of optical and textual properties of fog using satellite and ground observation data at daytime. For the detection of fog, we used satellite data (Himawari-8/AHI data) and other ancillary data such as air temperature from NWP data (over land), SST from OSTIA (over sea). And for validation, ground observed visibility data from KMA. The optical and textual properties of fog are normalized albedo (NALb) and normalized local standard deviation (NLSD), respectively. In addition, differences between air temperature (SST) and fog top temperature (FTa(S)) are applied to discriminate the fog from low clouds. And post-processing is performed to detect the fog edge based on spatial continuity of fog. Threshold values for each test are determined by optimization processes based on the ROC analysis for the selected fog cases. Fog detection is performed according to solar zenith angle (SZA) because of the difference of available satellite data. In this study, we defined daytime when SZA is less than  $85^\circ$ . Result of FDA is presented by probability (0 ~ 100 %) of fog through the weighted sum of each test result. The validation results with ground observed visibility data showed that POD and FAR are 0.63 ~ 0.89 and 0.29 ~ 0.46 according to the fog intensity and type, respectively. In general, the detection skills are better in the cases of intense and without high clouds than localized and weak fog. We are plan to transfer this algorithm to the National Meteorological Satellite Center of KMA for the operational detection of fog using GK-2A/AMI data which will be launched in 2018.