

Retrieval of ice cloud properties from HIMAWARI-8 satellite measurements with Voronoi light scattering model

Husi Letu^{a,b,*}, Hiroshi Ishimoto^c, Takashi M. Nagao^d, Takashi Y. Nakajima^b, and Jerome Riedi^e

^a*Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China*

^b*Research and Information Center, Tokai University, Japan*

^c*Meteorological Research Institute, Tsukuba, Japan*

^d*Earth Observation Research Center, JAXA, Ibaraki, Japan*

^e*Universite de Lille 1-Sciences et Technologies, Villeneuve d'Ascq, France*

*Presenting author (husiletuw@hotmail.com)

Single-scattering properties of the Voronoi habit model are calculated by a combination of the finite-difference time-domain (FDTD) method, Geometric Optics Integral Equation (GOIE) technique, and geometric optics method (GOM) for use in ice-cloud remote sensing [1,2]. A Voronoi scattering database is implemented in the forward radiative transfer model (RTM) to develop a look-up table for the cloud property retrievals.

The CAPCOM algorithm [3] is improved to retrieve ice cloud properties from MODIS and HIMAWARI-8/AHI satellite measurements. Ice cloud properties from the AHI measurements are compared to MODIS collection-6 ice cloud products for characterizing the retrieval accuracy of the Voronoi model. Furthermore, downward shortwave radiative flux in cloudy sky is calculated by the implemented RTM model.

In this presentation, we will introduce the scattering properties of the Voronoi model and retrieval accuracy of the ice cloud parameters from the AHI data.

References

- [1] Ishimoto, H., Masuda, K., Mano, Y., Orikasa, N., and Uchiyama, A. 2012: Irregularly shaped ice aggregates in optical modeling of convectively generated ice clouds, *J. Quant. Spectrosc. Radiat. Transfer* **113**, 632–643.
- [2] Letu, H., Ishimoto, H., Jerome, R., Nakajima, T. Y., Labonnote, C., Baran, A., Nagao, K. T., Sekiguchi, M., 2016: Investigation of ice particle habits to be used for ice cloud remote sensing for the GCOM-C satellite mission, *Atmos. Chem. Phys.* **16**, 12287–12303.
- [3] Nakajima, T. Y., and Nakajima, T., 1995: Wide-area determination of cloud microphysical properties from NOAA AVHRR measurements for FIRE and ASTEX regions, *J. Atmos. Sci.* **52**, 4043–4059.

Preferred mode of presentation: Oral