ひまわり8号全球画像を活用した極中間圏雲の新観測手法
PMC observation from the Geostationary-Earth-Orbit satellite: New application of Himawari-8 full disk image

*穂積 裕太[1]、津田 卓雄[1]、川浦 健斗[1]、細川 敬祐[1]、鈴木 秀彦[2]、中村 卓司[3]
*Yuta Hozumi[1], Takuo T. Tsuda[1], Kento Kawaura[1], Keisuke Hosokawa[1], Hidehiko Suzuki[2], Takuji Nakamura[3]

1. 電気通信大学、2. 明治大学、3. 国立極地研究所
1. University of Electro-Communications, 2. Meiji University, 3. National Institute of Polar Research

Polar mesospheric clouds (PMCs) or noctilucent clouds (NLCs) are water-ice particles, which can be produced at cold summer mesopause region, mainly at high latitudes. PMC has been thought to be a good proxy for the thermal structure, and a good tracer for dynamics in the high latitude summer mesosphere. Observations of PMC have been widely performed by various methods from the ground as well as from the space. However, these past methods have some limitations, especially in local time coverage or observational continuities to monitor the long-term PMC activity.

In the presentation, we will introduce a new data set of PMCs from imaging observations by Himawari-8, the Japanese Geostationary-Earth-Orbit (GEO) meteorological satellite. In the regular operation of Himawari-8, full-disk images of the Earth are obtained every 10 minutes with a spatial resolution of ~ 1km. In the Earth’ s limb region of the full-disk visible light images, we found emissions which are supposed to originate from PMCs. The emission height is 82 - 85 km, that is the typical altitude of PMCs reported in previous studies. By comparing the temporal variation of the emissions with PMC observations by the Cloud Imaging and Particle Size (CIPS) instrument onboard the NASA Aeronomy of Ice in the Mesosphere (AIM) satellite, we confirmed that the emission is surely due to the Mie scattering of the sun light by PMCs.

This new data set of PMC from the GEO satellite has great advantages in local time coverage and observational continuity for the long-term monitoring. In the presentation, we will discuss what parameters of PMC can be retrieved from the data set. The 2D horizontal structure of PMC was retrieved with the thin layer assumption, and compared with the AIM data. The local time variation of PMC was also derived. Based on these new data products, the future PMC research plan using this Himawari-8 data will be discussed.

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