

## Pattern matching of polar mesospheric clouds with data from the meteorological satellite Himawari-8

\*穂積 裕太<sup>1</sup>、津田 卓雄<sup>1</sup>、安藤 芳晃<sup>1</sup>、細川 敬祐<sup>1</sup>、鈴木 秀彦<sup>2</sup>、中村 卓司<sup>3</sup>、村田 健史<sup>4</sup>

\*Yuta Hozumi<sup>1</sup>, Takuo T. Tsuda<sup>1</sup>, Yoshiaki Ando<sup>1</sup>, Keisuke Hosokawa<sup>1</sup>, Hidehiko Suzuki<sup>2</sup>, Takuji Nakamura<sup>3</sup>, Ken T. Murata<sup>4</sup>

1. 電気通信大学、2. 明治大学理工学部物理学科、3. 国立極地研究所、4. 情報通信研究機構

1. University of Electro-Communications, 2. Department of physics, Meiji university, 3. National Institute of Polar Research, 4. National Institute of Information and Communications Technology

A cloud tracking technique is applied to polar mesospheric cloud (PMC) data from the Geostationary-Earth-Orbit (GEO) meteorological satellite Himawari-8 to examine the horizontal movement of PMCs. While previous PMC observations from the ground and Low-Earth-Orbit (LEO) satellites have a limitation on local time coverage, observations from the GEO satellite provide a great opportunity to study the PMC variability with all local time coverage and a wide field of view. The band 1 (the blue band,  $0.47 \mu\text{m}$ ) data of the Advanced Himawari Imager (AHI) onboard Himawari-8 is resampled to the horizontal versus vertical grids data on the Earth's limb. A pattern matching technique is applied to the PMC peak radiance of the resampling data, and the horizontal movement of PMC along the transverse direction to the line of sight is derived. The tracking velocity approximates the zonal movement of PMCs around the latitude of  $81.3^\circ\text{N}$  and the longitude of  $140.7^\circ\text{E}$ . The horizontal movement shows a large oscillation with an amplitude of order 10–30 m/s and the spectral peaks at periods of 12, 14.76, and 24 hours. The mean velocity for the northern summer season of 2018 is about 7 m/s in the westward direction. The westerly mean movement is consistent with the horizontal wind derived from PMC images taken with the Cloud Imaging and Particle Size instrument (CIPS) on the Aeronomy of Ice in the Mesosphere (AIM) satellite, and the wind of HWM14. The horizontal movement of PMC observed by Himawari-8 is likely to be subjected to wind advection.

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