

Simultaneous occurrence of polar stratospheric clouds and upper tropospheric clouds caused by blocking anticyclones

KOHMA, Masashi^{1*} ; SATO, Kaoru¹

¹The University of Tokyo

Occurrence frequency and type of the polar stratospheric clouds (PSCs) are largely affected by atmospheric waves including planetary-scale waves, synoptic-scale waves and gravity waves. Recent studies indicated that PSCs and upper tropospheric clouds are frequently simultaneously observed. The present study statistically examined the simultaneous occurrence of the clouds which are dominant in two height regions and considered possible dynamical mechanisms. Using the 5-year CALIPSO observational data and reanalysis data over the Antarctic, it is shown that lower altitude clouds are dominant around the tropopause and the simultaneous occurrence are frequently observed in association with relatively large scale anticyclones including blocking highs in the troposphere. The composition of PSCs is investigated as a function of relative longitude to the anticyclone centers. It was revealed that relatively high proportion of PSCs containing nitric acid trihydrate (NAT) is distributed in the leeward side of anticyclones while proportion of non-depolarizing (liquid) PSCs is high on its windward side.

Keywords: polar stratospheric clouds, blocking anticyclone, CALIPSO