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Atmospheric phenomena in the Antarctic recorded by cameras in 2009

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Various kinds of optical phenomena are observed in the Antarctic atmosphere because most clouds are composed of ice crystals. Moreover, the Antarctic atmosphere is characterized by the presence of a strong inversion layer near the surface due to radiative cooling, the polar stratospheric clouds (PSCs) in winter, and the polar mesospheric clouds (PMCs) in summer. In this talk, I will introduce various atmospheric phenomena by showing photos and movies taken at Syowa Station in 2009. PMCs with wavy patterns were observed in the lower part of the sky in the south around midnight of 12 February 2009. In July and August when the stratospheric temperature became lower than -80 degrees, PSCs were observed by the naked eye, a micro-pulse lidar and aerosol sondes. At night, time variation of shapes and colors of airglows as well as auroras was recorded by a digital camera. Mirages of the sun, moon, icebergs, and Antarctic continent, Kelvin-Helmholtz waves around the top of the inversion layer, diamond dusts, and iridescent clouds and halos caused by small ice crystals were also recorded. Various types of snowflakes were recorded using a microscope and the relation to the meteorological condition was examined. These photos and movies will help to improve our understanding the atmospheric phenomena that are frequently observed in the Antarctic but rarely detected in other regions.