

Earth's Atmosphere Observed in the Antarctic

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The Antarctic is an important site to watch the earth climate in two meanings. First, even very weak signals of climate change can be detected with sufficient accuracy, as the Antarctic is in a distance far from human activities so that noises such as urbanization can be negligible. Second, there is large seasonal variation of solar radiation as described with the words, "polar night" and "mid-night sun", and hence the Antarctic atmosphere shows extreme nature. For example, earth surface, winter lower stratosphere (altitudes around 20 km), and summer upper mesosphere (90km) serve sufficiently low temperature to allow water to exist in solid phase. Ice sheets, polar stratospheric clouds, and polar mesospheric clouds are formed only in the polar region. Consequently, the temperature increase in association with global warming is remarkable, and the Antarctic ozone hole occurs. Such extreme phenomena cannot be understood without taking it into consideration that the Antarctic atmosphere is connected to the lower latitude atmosphere by global circulation. Characteristics of the earth's atmospheric system seen from the Antarctic will be explained.