

Cloud Measurements with an All-sky Camera System for Investigating Long-term Variability of Cloud Properties at South Pole

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Since December 2005, an all-sky camera system has been used to acquire images for monitoring cloud conditions at the Amundsen-Scott South Pole Station. The project has been conducted in collaboration with the ESRL/GMD. The system is comprised of a Prede Model PSV-100 that includes a 3-color CCD camera with a fish-eye lens and a laptop computer for acquiring JPEG images. The camera was placed on the roof-top of the Atmospheric Research Observatory and programmed to collect images at 10-minute intervals continuously each year during the sunlit period from October into March. Measurements were made from 18 December, 2005 until 24 March, 2017. For the purpose of this study, only the data collected during November through February were analyzed to avoid issues related to low sun angles and very cold temperatures. An analysis method proposed by Yabuki et al. (2014) was applied to obtain the cloud fraction from the all-sky images. In this paper, variability of the South Pole cloud fraction will be shown for the Antarctic summer season for the last decade. Figure 1 depicts monthly mean cloud fraction at South Pole derived from the all-sky camera measurements made from December 2005 to February 2017. The result shows large variation of cloud fractions for both month-to-month and from year-to-year. Consequently, no clear trend is manifested in the decade-long time series.

*The project was initiated in 2004 with the advice and support of E. G. Dutton (1949-2012).

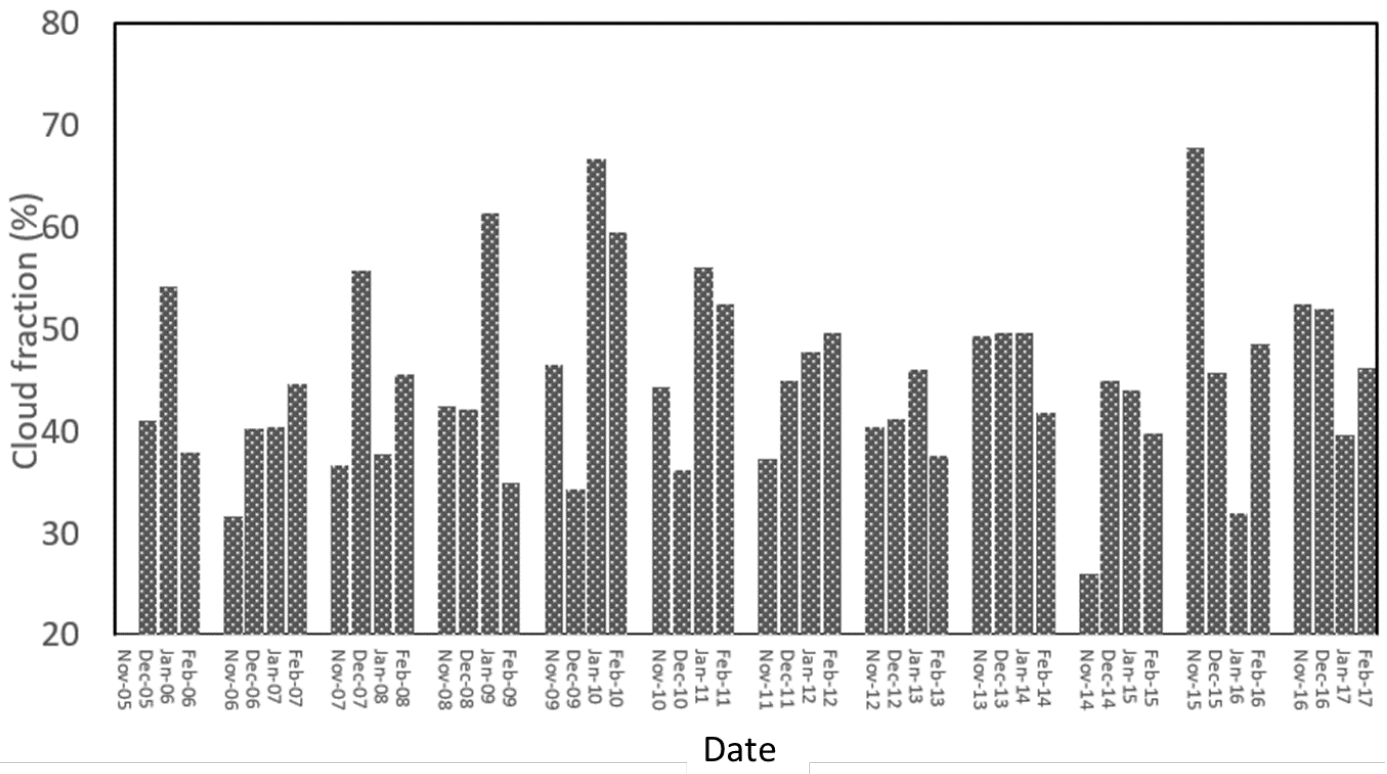


Figure 1. Monthly mean cloud fraction at South Pole for December 2005 - February 2017.