

Workshop on Arctic measurements to validate sub-grid scale parameterizations and to improve the performance of regional and global climate models in the Arctic

9/25-9/27, Potsdam, Germany

Title

October cloud increases over the Arctic Ocean as observed by MISR and CALIPSO

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Abstract

The Beaufort and East Siberian Sea (BESS) shows a large increase in surface air temperature (SAT) in the recent decade for months of Sep-Nov, and NASA's Terra satellite have provided valuable measurements for this important decade of the intensified Arctic warming. In particular, MISR data since 2000 and CALIPSO cloud measurements since 2006 reveal a significant increase of low cloud cover in October, which is largest in the daylight Arctic months (March-October). Causes of the warming remain unclear; but increased absorption of summer solar radiation and autumn low cloud formation have been suggested as a positive ice-temperature-cloud feedback in the Arctic. The observed increase of low cloud cover supports the theorized **positive ice-temperature-cloud feedback**, whereby more open water in the Arctic Ocean increases summer absorption of solar radiation, and subsequent evaporation, which leads to more low clouds in autumn. Trapping longwave radiation, these clouds effectively lengthen the melt season and reduce perennial ice pack formation, making sea ice more vulnerable to the next melt season.