

Changes of Arctic Clouds and Its Implications

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There has been studies (e.g., Schweiger, 2004) suggest significant increase of Arctic clouds during the last three decades, especially in the western Arctic region. Such studies are based on passive remote sensing that are not highly reliable due to the lack of contrasts in temperature and reflectance between clouds and snow/ice surfaces. Changes in the Arctic clouds can be evaluated more accurately using the space-based lidar measurements from CALIPSO during the last nine years since CALIPSO can provide much more accurate detection and classification of both water and ice clouds in the Arctic.

Time series of Arctic cloud properties (e.g., cloud fraction, cloud thermodynamic phase, water cloud depolarization ratio and droplet number concentration) from CALIPSO data are analyzed in this study. This study reveals the changes in both cloud fraction and cloud microphysical properties during the last nine years when CALIPSO data are available. We will evaluate the changes in Arctic cloud fraction and cloud microphysical properties, their seasonal and spatial characteristics and the potential impact on the energy budget and the climate of the Arctic.

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