



## **The interplay between clouds and sea ice**

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Clouds play an important role on the climate system through two main contrasting effects: (1) cooling the Earth by reflecting to space part of incoming solar radiation; (2) warming the surface by reducing the Earth's loss of thermal energy to space. Recently, scientists have paid more attention to the warming role of clouds because of the acceleration of Arctic sea ice melting and because of recent studies that did not find any response of cloud cover fraction to reduced sea ice in summer. Here, we investigate this potential link over last 16 years (2001-2016) using Clouds and the Earth's Radiant Energy System (CERES) satellite data, passive microwave sea ice concentration data from the National Snow and Ice Data Center (NSIDC), and 23 state-of-art-climate models from Coupled Model Intercomparison Project phase 5 (CMIP5) archive. We find that the cooling role of clouds in both observed and simulated datasets is important but not sufficient to counterbalance the observed polar warming, and this will continue in the future in projections under rcp8.5 scenario.