



## **Satellite passive microwave retrievals of snow depth on sea ice: Recent studies and its potential contributions to the ICESat and Cryosat missions**

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Snow on sea ice plays an important role in the polar climate system. Its thermal heat conductivity is about an order of magnitude less than the heat conductivity of sea ice so that a thin layer of snow significantly changes the ocean-ice-atmosphere heat exchange. Changes in snow depth can also serve as a proxy for polar precipitation. For these reasons, an algorithm has been developed that derives snow depth on sea ice from satellite passive microwave data. Results from this algorithm are a standard product of NASA's EOS Aqua AMSR-E sensor. SSM/I and AMSR-E snow depth data for both hemispheres have been analyzed. The paper will provide details of the spatial distributions and variabilities, as well as trends of Arctic and Antarctic snow depth.

The snow load on sea ice also significantly impacts the sea ice freeboard and thus the accuracy of ice thickness measurements from altimeters. With ICESat in orbit and Cryosat scheduled to be launched in the very near future it is timely to investigate how the passive microwave snow depth retrievals can contribute to these altimeters missions.