

Reduction of atmospheric effects in sea ice concentration estimation using satellite microwave radiometers

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ABSTRACT: Due to the global warming issue, the trend analysis of sea ice area is becoming quite important. Passive microwave sensors on board satellites can monitor the global distribution of sea ice on daily basis. In extracting sea ice concentrations from passive microwave sensors onboard satellites, atmospheric effects mainly caused by the presence of atmospheric water vapor, cloud liquid water, rain and sea surface roughening by winds are likely to estimate certain sea ice concentrations at the open water area. We call this kind of area as “false sea ice area”. To solve the problem, usually, weather filters are applied in sea ice concentration algorithms. The basic idea of weather filters is to differentiate clouds over open water from sea ice in the characteristic domain derived from brightness temperatures, and reject clouds by using certain threshold. So far, the threshold level for rejecting clouds is fixed globally. However, through our detailed study in the Sea of Okhotsk, it has become clear that the threshold cannot reject some of the false sea ice areas mainly produce by the heavy clouds. Moreover, most of the false sea ice area could be rejected by changing the threshold level of the weather filter.