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ARCTIC SEA ICE AND MELT POND CHARACTERISTICS OBSERVED BY VERY HIGH RESOLUTION REMOTELY SENSED DATA

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The surface of Arctic sea ice periodically melts and refreezes, and the main controlling factor for surface melting is known as ice-albedo feedback. The more melt pond occurs, the more solar radiations are absorbed and hence the surface melting accelerates. It is necessary to use remote sensing data for quantifying the effect of this positive feedback system over vast Arctic sea ice; however, the requirement of very high spatial resolution does not meet by most operational Arctic monitoring sensors. Furthermore, frequent cloud cover reduces the possibility of making a time-series dataset using optical sensors.

Here we present the very first time-series analysis results for short-term variation of Arctic sea ice and melt ponds using spaceborne multispectral and SAR images. Since radar backscattering coefficient is closely related to the surface melt pond fraction, the rate of change in backscattering can be considered as a direct measurement of surface melting rate. Our result shows a clear positive correlation between surface melt pond fraction and surface melting rate, which supports the ice-albedo feedback mechanism.