

Arctic snow monitoring through satellite microwave observations

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Cryospheric change due to accelerated warming in the Arctic is a major concern. Such a change influences the environment, resulting in atmospheric, oceanic, and terrestrial changes. Arctic research projects are sending field research groups and establishing observation sites at various places in this region.

Satellite observations are available to support research planning, and evaluation of observation period and place, as these observations cover both time and space. The present study used satellite passive microwave observations as they are available even for polar nights when sunlight is not available and also for cloudy or foggy conditions. Microwave data were collected from research sites in North America, Siberia, Svalbard, Scandinavia, and Greenland, where Japanese research groups are visiting. The data were sampled by pixels based on the location data of observation sites and were used for monitoring local snow cover and melting durations (Fig. 1).

Continental scale migration patterns of snow melting show south–north and west–east trends. The snow melting area migrates from south–west to north–east at the high latitudes in North America and then reaches Greenland and Svalbard. The snow melting area in the Eurasian Continent was observed to move from west to east, namely Scandinavia to north–east of Siberia, in a shorter period (Fig. 2).

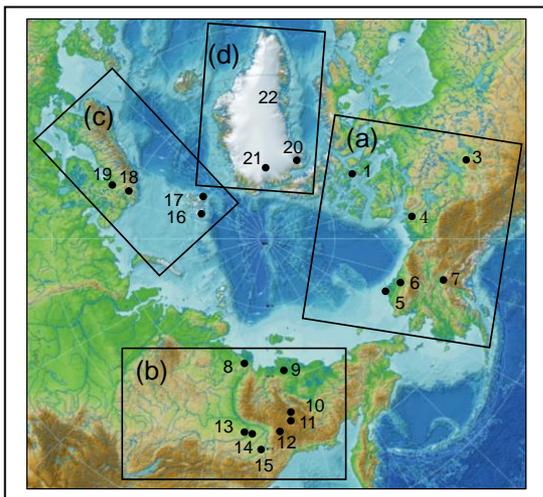


Figure 1. Arctic sites monitored by this study.

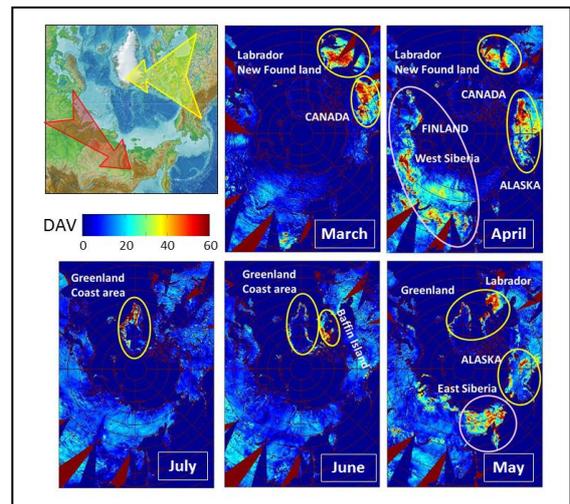


Figure 2. Arctic snow melting monitor by satellite.

References

- Alimasi, N. and H. Enomoto, Arctic snow monitoring by satellite microwave observation - Estimation of snow cover and melting periods-, Jour. Japanese Society of Snow and Ice, 79(1), 17-30, 2017.