Inter-comparison of the GCOM sea ice product on the Arctic ocean

Rigen Shimada[1], Yukio Kurihara[1] and Eri Yoshizawa[1]
[1]*Earth Observation Research Center, Japan Aerospace Exploration Agency*

Arctic sea ice is one of the most variable geophysical parameters during recent climate change. Sea ice is the key factor in terms of ice-albedo feedback and thermohaline circulation, and its dynamics have been monitored by satellite observations since the 1980s. Arctic sea ice extent has been rapidly decreasing in recent years, with the smallest extent in the satellite observation era recorded in 2012 and the second smallest extent in 2020. Space-borne microwave radiometers have been widely used for monitoring sea ice, because of its observability in all weather conditions, day or night. However, sea ice detection accuracy using microwave was decline in summer season due to the rapid changes in brightness temperature characteristics caused by sea ice surface melting (Kern *et al.*, 2020). In addition, the low spatial resolution makes it difficult to extract the detailed distribution of sea ice edges. Therefore, we developed a sea ice distribution product on the polar regions in order to clarify the detail sea ice distribution during the summer season using optical sensor, GCOM-C/SGLI. In this presentation, we evaluated the performance of the GCOM-C/SGLI sea ice product by comparing its detailed summer sea ice distribution with GCOM-W/AMSR2. And we showed its position through these comparisons.

Figure 1 shows the sea ice distribution derived from SGLI and AMSR2 during June to September in 2021 and 2022. Red indicates the sea ice area detected by only AMSR2, blue means only SGLI, and white means both products detected sea ice. In this comparison, AMSR2 overestimated from June to August. In September, there are large difference in detections depending on the area. In further work, we plan to evaluate the performance of both products by comparing with Ice Profiling Sonar in-situ observation data.

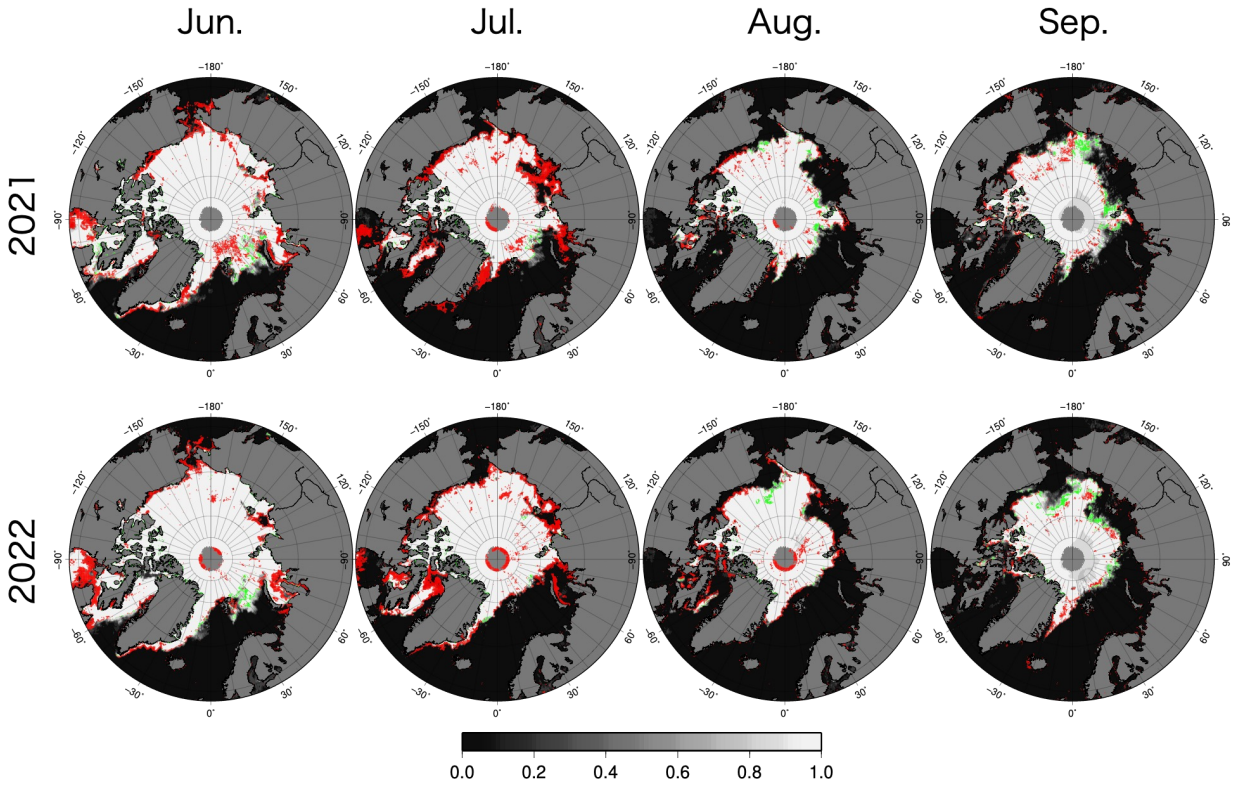

Figure 1. Comparison between AMSR2 sea ice concentration and SGLI sea ice reliability distribution during June to September in 2021 and 2022. Green color shows only SGLI, red color shows only AMSR2 and while color shows both sea ice distribution.

References

Kern, S., T. Lavergne, D. Notz, L. T. Pedersen and R. Tonboe, Satellite passive microwave sea-ice concentration data set inter-comparison for Arctic summer conditions. The Cryosphere, 14(7), 2469-2493, 2020.