

Analysis of precipitation in the Arctic region by using data of "Mirai"

*Yorito Uchida¹, Koki Shinagawa¹, Natsumi Yamamoto¹, Amane Takeuchi¹, Rakuyou Rin¹

1. Makuhari Junior And Senior High School Shibuya Kyoiku Gakuen

In the Arctic region, maritime meteorological data are limited, and precipitation observation satellites such as the Global Precipitation Measurement (GPM) cannot adequately observe high-latitude regions due to their orbital constraints. However, Arctic atmospheric conditions are significant because they can serve as an early indicator of global climate change. Therefore, we focused on the observations from the vessel Mirai to understand the meteorological characteristics of the Arctic Ocean. Mirai has conducted in-situ observations in the Arctic Ocean (north of the Bering Strait) every autumn for many years. In this study, we used the precipitation, air temperature, and sea surface temperature (~4.5m depth) north of 65 degrees N observed by Mirai during 1999-2024. In addition, we used sea ice extent data obtained from the NSIDC Sea Ice Index. We examined the long-term trends and relationships among precipitation, sea surface temperature, air temperature, and sea ice extent.

As a result, we found increases in precipitation and temperature. In contrast, Arctic sea ice extent decreases over the period. After 2012, precipitation observed by Mirai increased significantly. When examined by marine region, a notable rise in precipitation was seen along the northern coast of Alaska. This suggests a change in the region's autumn precipitation patterns. For future work, we plan to perform further analysis using land-based observation data from Alaska.

Keywords: arctic, Mirai, Global Warning, Glacier

