

# Relationship between low pressure and sea ice during the development of a turbulent ice belt in Antarctica.

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In Antarctica, strong snowstorms or ground blizzards called "blizzards" occur. During Japanese Antarctic Research Expedition (JARE) 64, the Shirase was delayed by a turbulent ice sheet generated by strong winds in the ocean around Antarctica. Many analyses of snowstorms and blizzards on the continent have been reported (Nishimura et al., 2005; Sato and Hirasawa, 2007). However, the relationship between cyclones and sea ice in the Antarctic region has not been well studied. Therefore, we analyzed the effects of low-pressure systems on sea ice in the Antarctic region.

In this study, we used the ECMWF monthly mean ERA5 reanalysis data at a horizontal resolution of 30km. Sea ice thickness data obtained from EM observations on board the Shirase during JARE64 were also used in the analysis.

Figure 1 shows the sea level pressure around Antarctica during the development of the turbulent ice belt at JARE64. It can be seen that a low pressure system was approaching around Lutzholm Bay. At this time, easterly winds were prevailing (Figure2), and it is thought that the sea ice was pushed and solidified, resulting in the development of the turbulent ice belt. In this study, we analyze the atmospheric conditions at this time and estimate the conditions for the development of a turbulent ice belt.

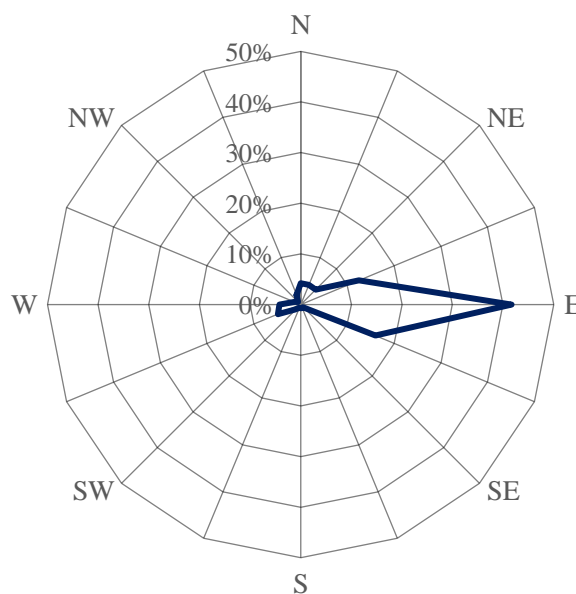
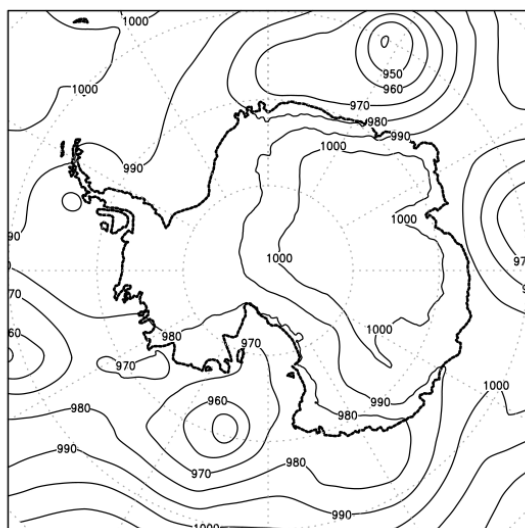


Figure 1. Sea level pressure around Antarctica on December 15, 2023. Figure 2. Wind direction at the onset of the turbulent ice belt (December 15, 2022).

## References

- Nishimura, N. and M. Nemoto, Blowing snow at Mizuho station, Antarctica, Philosophical Transactions of the Royal Soc. of London, A, 363, 1647-1662, 2005.
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