

Interactive comment on “Spaceborne infrared imagery for early detection and cause of Weddell Polynya openings” by Céline Heuzé and Adriano Lemos

Anonymous Referee #3

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The manuscript has serious weaknesses and is largely not reproducible. First and foremost, the aim of the study is unclear to me. Is it about improving remote sensing methodology or a forecasting system for the opening of the Weddell Polynya? Or both at the same time? The not very scientific approach and the sloppy writing is bothering (e.g. “debate is closed”, “infrared out of fashion”).

There is a lack of hypotheses, statistical tests for the significance and descriptions of the uncertainty. References are used in the wrong context and much of the existing literature is ignored. The description of the data is careless and incorrect in some places. If the goal were to analyze the AVHRR data using a new methodology, the

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question of cloud cover would first have to be analyzed more thoroughly. It remains e.g. unclear whether passive microwaves and AVHRR data give consistent results. This would be the first step towards a suitable long-term study.

An investigation into the causes is difficult to do with observational data alone. The Weddell Polynya is a phenomenon in the coupled system of ocean-ice-atmosphere and is based on feedback effects and tides. Forcings such as fresh water fluxes through precipitation or melting of meteoric ice and the heat reservoir in the deep ocean play a role. Without a coupled model system, causal research is inadequate or must remain empirical. The empirical aspects of the study are however not solid because of the lack of hypotheses, statistical testing and significance.

However, the topic is very suitable for the journal and I suggest that the author should resubmit the work after a major revision. Because my concerns are about the main aim of the study I would encourage the author to withdraw the study and to resubmit it with better defined scopes, e.g. in two parts. First a validation of the AVHRR approach to detect the polynya, and a second part about the forecast method. The first part shall include a thorough error analysis about the influence of clouds. The second part should use advanced statistical methods.

References [https://doi.org/10.1175/1520-0485\(1999\)029%3C1251:FAMOAP%3E2.0.CO;2](https://doi.org/10.1175/1520-0485(1999)029%3C1251:FAMOAP%3E2.0.CO;2)
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