

## Review

of the member of the dissertation council for the dissertation of Egorova Elizaveta Stanislavovna on the topic: "Ice Conditions in Greenland Sea and Barents Sea Under Changing Climate", submitted for the degree of candidate of Geography sciences (candidate of sciences in Geography) in scientific speciality 1.6.17. Oceanology.

Egorova Elizaveta Stanislavovna's dissertation, entitled "Ice Conditions in Greenland Sea and Barents Sea Under Changing Climate", focus on the seasonal and interannual variations of the key parameters of the sea ice cover in the Greenland and Barents Seas, which is a very important scientific topic during the background of climate change, especially the Arctic amplification effect. The dissertation extends the time series of sea ice spatio-temporal distributions in the Greenland and Barents Seas to an era before satellite remote sensing is available. The deeply analysis give a clearer understanding on sea ice changes in the Arctic Atlantic Sections.

The English version of this thesis is in general well written and presented, and scholarly. The results, figures and figure legends are well presented. The work is very clear and well written.

Chapter 1 presented the background knowledge of ice conditions and reviewed the current research state in the Greenland and Barents Seas. The lacking of research areas were pointed out, like drift ice edge position and the spatio-temporal distribution of the ice age, which is the key contributions of this dissertation to the Arctic scientific community.

Chapter 2 described data and research methods. In the 2.1 section, the author presented the data sources, time span, resolution, and biases. Those information for different ice variables (coverage, age, boundary and so on) was quite different, therefore, I suggest to add a table to clearly show that different information. Furthermore, it is better to provide example figures of the ice data sources in the data and methods section, when you described the data sources, which will help the readers to understand what the data looks like.

In the section 2.1, time span of ice coverage written here is 1950-2022, while in the results section, ice coverage was analyzed from 1928-2022, please confirm which is right.

When the author described Kola Meridian in the 2.2 section, a reference was given. This is fine, but not convenient for readers, because it is not well known to all the readers, suggest to plot its position in the map, for example, in figure 2.1.

Chapter 3 describes the patterns of seasonal and interannual variations in the main parameters of the Greenland Sea ice cover. What is the reason for the drivers of sea ice changes was not analyzed in Greenland Sea, like that done in Barents Sea.

Chapter 4 presented the sea ice analysis in the Barents Sea, similar to that structure in Chapter 3. In the Table 4.1, how to extend time series to 1928 is not mentioned in the data and methods sections. In the Figure 4.3, no subplot d) in this figure, please correct it. When the author analysis the drivers of sea ice changes, why not to use the satellite products, like sea surface temperature, which can provide large scale information and more related to the edge changes of the sea ice.

Considering the above, I believe that Egorova Elizaveta Stanislavovna's dissertation on the topic: "Ice Conditions in Greenland Sea and Barents Sea Under Changing Climate" meets the requirements of speciality 1.6.17. Oceanology;

The dissertation is an excellent scientific qualification work that provides new science-based understanding on sea ice changes in the Greenland and Barents Seas and will be an important contribution to the Arctic research community and Arctic shipping industry.

No violations of paragraphs 9 and 11 of the Order No.11181/1 as of November 19, 2021 "On the Procedure for Awarding Academic Degrees at St. Petersburg State University" have been detected.

The dissertation meets the criteria of dissertations for the academic degree of candidate of sciences, established by the specified Order. The dissertation is recommended for the defense at St. Petersburg State University.

Member of the dissertation council

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