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Thunderstorm activity and characterization of atmospheric instability according to ERA5 reanalysis data over the Asian part of the Russian Arctic / Nechepurenko O.E., Kuzhevskaia I.V., Pustovalov K.N., Gorbatenko V.P., Kravets K.A.// Hydrometeorological Research and Forecasting, 2023, no. 4 (390), pp.. 25-45

Thunderstorms in the Arctic sector of the Russian Federation are a key indicator of climate change, as they signal a temperature rise in this cold region. The paper considers the variability of the number of days with thunderstorms in the Asian part of the Russian Arctic for 2015–2021 based on ground-based observations. No rapid increase in the number of days with thunderstorms as compared to the long-term data was found. However, an increase in the frequency of thunderstorm activity is registered at some stations. A verification of the Total Totals instability index values obtained from the ERA5 reanalysis product with the same name and rawinsonde data did not show critical differences. The best fit was demonstrated for Yakutsk station (1.4 %); at Turukhansk and Vanavara stations, the percentage of inconsistency was 3.1 and 3.5 %, respectively. The use of the ERA5 Total Totals product in the Arctic regions is relevant for the retrospective determination of the presence of thunderstorms and their localization in sparsely populated areas.

Keywords: Arctic, number of days with thunderstorm, verification, Total Totals, rawinsonde

Tab. 2. Fig. 4. Ref. 52.