Medical-geographical analyses of distribution of natural focal diseases in Yamalo-Nenets Autonomous Okrug (West Siberia) accounting for climate change

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Introduction

Natural focal diseases are a serious danger to human health including in the Arctic. The climatic factor is deemed one of the main determinants for their spread. The purpose of this study is to analyze the situation on natural focal diseases in YNAO and to develop recommendations for improve the technical characteristics and monitoring capabilities of SMEAR-type stations (Stations for Measuring Ecosystem-Atmosphere Relations) for obtain new knowledge about the natural focal diseases and the possibilities of early diagnostics of epidemiological hazards.

Methods

The statistical data on the natural focal diseases morbidity for a twenty-year period (1997-2016) and meteorological data were used. A number of new methodological solutions have been proposed, in particular, a cartographic methodology for transforming statistical data for the transition from administrative units to natural geographic mapping units.

Results

The series of maps were created as a result of this research. Maps shown the morbidity level of natural focal diseases in the region, the dynamics of morbidity and links between the natural focal diseases distribution and climatic conditions on the studied territory. In addition, the first recommendations on using the SMEAR stations for forecasting the epidemiological situation in the region were developed.

Conclusions

PEEX (Pan-Eurasian Experiment international program) is aimed at development of a new environmental monitoring system (based on the network of SMEAR-type stations), covering quantitative characteristics of both abiotic (traditionally measured) and biotic factors, characterizing the state of the ecosystem as a whole. Potentially, this system can allow for monitoring of especially dangerous diseases at a principally new level.