

Arctic observing networks:
METEOROLOGY

Vladimir Kattsov

Voeikov Main Geophysical Observatory (MGO) of Roshydromet

Reanalyses based on numerical weather prediction models assimilating observational data play a crucial role in climate research because they provide comprehensive, homogeneous, long-period data sets and allow to fill gaps in observations, but are of insufficient quality in high latitudes revealed in inter-reanalyses scatter. Observations needed to improve reanalyses are satellite (spatial coverage is OK, but accuracy and number of characteristics – should be improved) and in situ, including surface and balloons (accuracy is an advantage of in situ observations, but not the coverage).

Guiding surface meteorological observations at arctic land stations in Russia is responsibility of MGO shared with AARI. These stations are a part of Russian state observing system (Roshydromet). The time series are available generally from 1930s (but there are much earlier data). Now 52 stations are in operation (vs. 110 couple of decades ago), almost half of them (23) are a part of the basic climate network of Russia. 48 parameters are observed at those stations. Monthly and yearly reports from high latitude climatic stations are provided by 3 regional Roshydromet's operational administrations. Such in situ observations are needed to test remote sensing data and to constrain climate models.

Needs as seen from MGO include (1) restoring the surface station network, continuing time series, accounting for spatio-temporal variability (optimum distribution of the stations), application of comprehensive models and maths to optimize the network (through testing impact of observational sites); (2) adding automatic stations including buoys, increasing network density where especially necessary, increasing the number of measured parameters (precipitation, snow depth, visibility, etc.); (3) special attention to the unification of methods, requirements, analysis.