V.N. Sukachev Institute of Forest, SB R AS
Address: 28/50, Akademgorodok, 660036
Krasnoyarsk, Russian Federation

Musokhranova A.V., Onuchin A.A.

ATMOSPHERIC PRECIPITATIONS TRENDS ON TAIMYR PENINSULA AND PUTORAN PLATEAU

Purpose:

- to analyze of precipitation trends for the area of interest from 1955 for 2009
- to reveal tendencies of change of quantity of precipitation depending on an distance between weather stations and enterprises of Norilsk Industrial District (NID), the sources of pollution.

Atmospheric precipitation is a major water budget component influencing forest growing conditions, river flow, and site hydrological regimes. Precipitation formation is a complex process that depends on atmospheric conditions and underlying surface. The former factor exhibits the most pronounced changes in time, whereas changes of the latter are most easily noticeable in mountains. Interaction of these two factors controls temporal and spatial precipitation patterns.

Precipitation analysis conducted for the area of interest revealed precipitation trend dependence on distance between weather stations and enterprises of Norilsk Industrial District (NID), the sources of pollution.

Data obtained at weather stations located close to pollution sources (Fig. 1a) showed that precipitation tended to increase rapidly, up to 3-4mm annually, before early 1990s and then it decreased gradually to the end of the period of observation in 2009. This precipitation decrease is assumed to result from decreasing industrial pollution due to reduction of production volume.

Precipitation trends appeared to be very poorly pronounced at weather stations located far from pollution sources (Fig.1b).

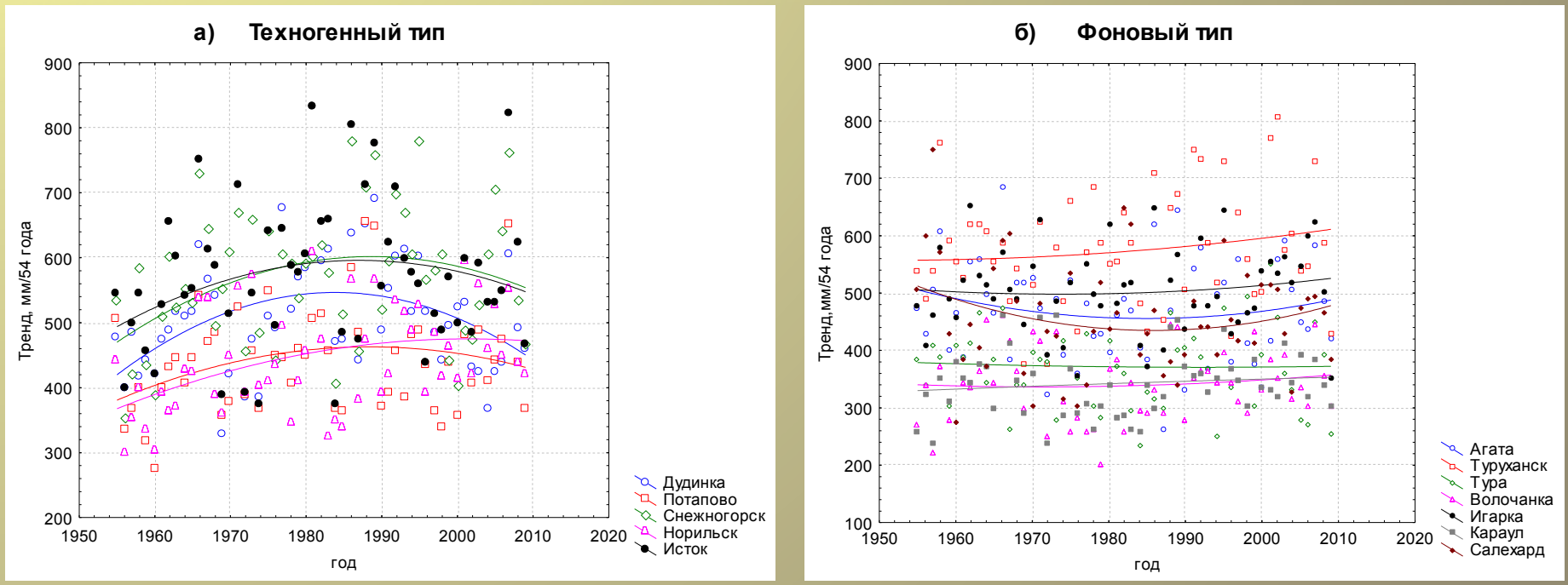
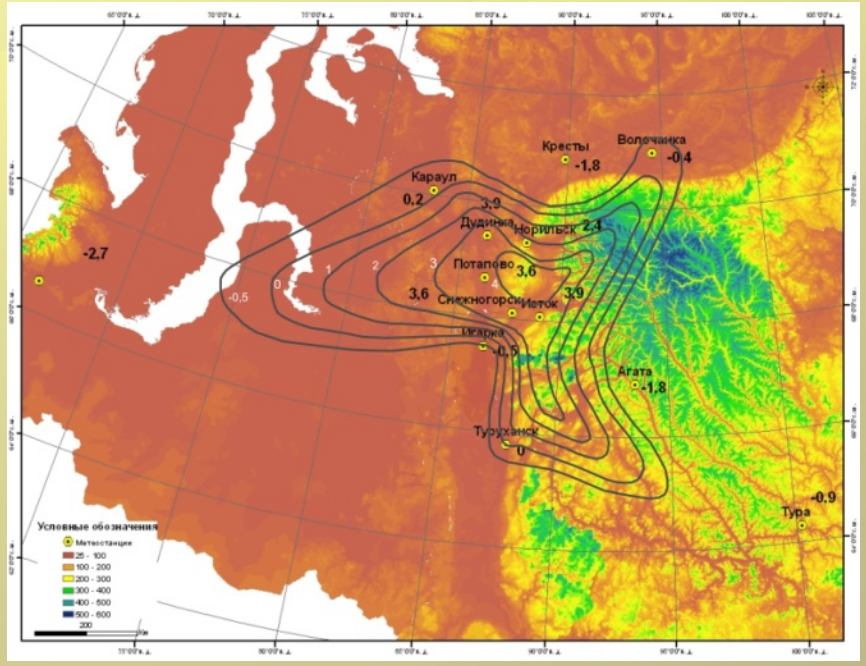


Figure 1. The 1955-2009 precipitation trends at different distances from NID; (a) pollution-influenced precipitation trends and (b) the background trends

High levels of pollution were considered as a reason of an increase in precipitation in the areas located close to NID, since atmospheric aerosols are known to increase number of active condensation nuclei and, hence, to promote precipitation.

А)



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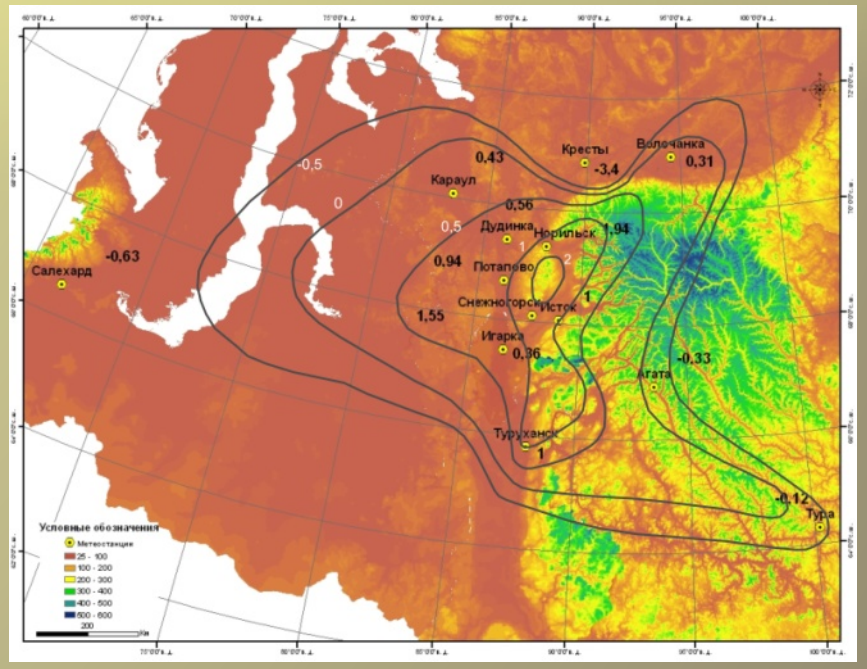

Figure 2. Precipitation trends: (A) 1955-1990 and (B) 1995-2009

The precipitation trends identified for NID by our study can be considered as an ecological component of estimation of environmental effects of large industrial enterprise operation.

Thank you for your attention !