Climate and nature management in the Middle Ages in the Upper Volga basin

Vyacheslav Nizovtsev¹ and Natalia Erman²

¹Lomonosov Moscow State University, Moscow, Russian Federation (nizov2118@yandex.ru)
²S.I. Vavilov Institute for the History of Science and Technology of the Russian Academy of Sciences

A paired analysis of historical documents was performed for the Upper Volga Basin (primary chronical sources published in the Complete Collection of Russian annals were analyzed), and papers on the dynamics of fluctuations in lake levels, river water levels, dendrological and palynological data were published. The peak of the medieval optimum was at the turn of the first and second millennia, and its maximum in the region was noted at the end of the X century. During this period there were no severe winters. A small amount of summer rainfalls led to a reduction in shallow water bodies, water-logging and a decrease in river floods. This is evidenced by the settlements on the floodplains of a number of Upper Volga rivers. At this time, the Upper Volga route and the "route from the Varangians to the Greeks" began to function. The exploration by the Slavs of the Upper Volga basin and the development of the settlement structure took place in favorable conditions for agriculture and settlement. Climatic conditions not only provided good harvests, but also contributed to the economic growth and development of relations between Slavic tribes during the formation of the ancient Russian state. The transition period of the XIII - XIV centuries was called the “period of contrasts,” because it was a harbinger of the Little Ice Age. It was characterized by the following features: an increase in the intra-seasonal climate variability, an increase in humidity, drastic fluctuation in humidity and relative warmth from year to year, a widespread decrease in summer temperatures by 1-2 ° C. The XIII century accounts for one of the longest periods in which various extreme natural phenomena concentrated. It refers to the years 1211-1233, 15 of which were years of famine. Climatologists call XIV-XIX centuries the Little Ice Age (LIA). The average annual temperature dropped by - 1.4 ° C, and the average summer temperature dropped by 2-3° C. Periods of increased humidity alternated with dry periods more frequently, cyclonic activity increased dramatically, and the duration of the growing season decreased by almost three weeks. In the XV century already more than 150 extreme adverse natural phenomena were recorded. In the era of the Little Ice Age, dramatic climate fluctuations were recorded by various sources more and more often. In Central Russia chroniclers recorded drastic climate cooling in the last third of the XVI century. Simultaneously with the beginning of the Little Ice Age, the process of developing watershed areas took place during the internal colonization of the land. The determining factors were demographic, socio-economic and historical, but the role of the natural factor cannot be ignored. The climax of the increase in the number of extreme natural phenomena falls on the XV-XVII centuries. Only at the end of the XVII century climate conditions in Russia somewhat leveled off.
This work was financially supported by the RFBR (Russian Foundation of Basic Research) grant: Project № 19-05-00233.