Model of monthly water budget

In the first type case (the Volga River and its parts) such a compact transformation of flood wave is possible by way of redistribution of runoff between years, which can occur in basins of large river basins of Russian Plain. Such a type of change of inter-year distribution of runoff is more appreciable in the southern and western regions of Russian Plain. Just due to these reasons two types of response of the intra-year distribution of runoff in large river basins of Russian Plain are singled out. Basins of the Dnieper and Don rivers, in which much more appreciable differences are observed, belong to this case. The above features of change of inter-year distribution of runoff are typical both for Late Atlantic Optimum and Late Holocene Optimum (5-6 thou. years BP).

Methods of calculating parameters of inter-year distribution of runoff in basins of Volga, Dnieper, and Don rivers

It was accepted that the average air temperature falls on were dispersed over days of a certain month evenly (the so-called quasi-daily data were used). Whereas for obtaining average daily air data on climate models easier.

Results of model experiments proceeding from A2 and B2 families of scenarios of global socio-economic changes in XXI from the last improved SRES ECHAM4/OPY3, HCCPR HadCM3 and GFDL-R30 were used as scenario estimations of climate changing in future.

Conclusions

In this study we considered how the runoff in basins of the largest rivers of Russian Plain changed during the last 5-6 thousand years ago. The runoff in the Volga and Dnieper river basins was much more appreciable, but their changes are not so much as in the Don River basin.

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Table 2. Deviations of climatic elements and river runoff

<table>
<thead>
<tr>
<th>Element</th>
<th>Deviation</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
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<td>2.5%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Precipitation</td>
<td>Increase</td>
<td>10%</td>
<td>15%</td>
</tr>
<tr>
<td>River runoff</td>
<td>Increase</td>
<td>15%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Fig. 1. Characteristics of the largest river basins of Russian Plain

Fig. 2. Representative sub-basins of Don river basin

Fig. 3. Characteristics of river runoff in basins of Volga, Dnieper, and Don rivers

Fig. 4. Comparison of observed and modelled runoff in the Volga river basin.