



## **Numerical simulation of transverse mixing of waters at the confluence of two rivers**

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Surface water bodies, both natural (rivers, lakes) and artificial (ponds, reservoirs) are the main source of drinking water. In this regard, special attention should be paid to their pollution, first of all, to extreme pollution, creating a direct danger to their consumption properties. Traditionally, it is believed that the primary mechanism of the pollutants transport in surface water bodies is the Fik diffusion for which the concentration and nature of the pollutants does not affect the transport mechanisms. However, recent studies have shown that these traditional concepts are not always acceptable. In some cases, even relatively low concentrations of pollutants can fundamentally change the hydrodynamics of a flow through a change in density. Density effects playing in these cases an important role can be very important in solving applied problems of water consumption.

One an important question is the mechanism of the formation of the streams do not mixing at large distances from the place of confluence of two rivers with significantly different physical and chemical properties of water. In particular, the Vishera river and the Kama river in Perm Region, as evidenced by the numerous space- and aero photographs, virtually do not mix from the place of their confluence to the territory of Solikamsk-Berezniki industrial area. This is fundamentally important for solving the problem of regulation of technological impacts of this source of technogenic pollution, largest in the basin of the Kama river.

In the present paper, the phenomenon of a significant weakening of the transverse mixing of water masses in the surface water bodies is investigated with the help of the numerical simulation of the transverse mixing of water masses at the confluence of two rivers. The calculations are carried out with the help of CFD package ANSYS Fluent using k-epsilon model to describe the turbulent pulsations. The dependence of the transverse mixing speed on the flow rates in the confluent rivers typical for the various seasonal periods is studied. It is found that with the growth of the flow rates in confluent rivers the intensity of mixing is reduced.

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