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The theoretical analysis of modern neural network models used for processing time series is carried out. At the same time, special attention is paid to the architecture of building deep machine learning algorithms. The advantages of the neural network model Temporal Fusion Transformer (TFT), which is selected as the base for modeling the process of spring flood formation, are shown. The possibilities of using the TFT model for a long-term forecast of maximum water levels with a lead time of 60 and 90 days for several points of the Iset river (the basin of the Tobol river system) are numerically analyzed in detail. The daily time series for 27 years (1991-2017) for eight hydrometeorological characteristics were used as the initial information for training the model (dependent (trainable) sample). The results of forecasts for an independent sample (2018-2022), as well as operational forecast data for 2023 are presented. Several directions of development of neural network modeling for long-term and short-term forecasts of streamflow are identified.

Keywords: hydrological long-term forecasts, flooding, neural networks, discharge, water level, water regime, artificial intelligence, deep machine learning, Temporal Fusion Transformer

Tab. 3. Fig. 5. Ref. 13