

## **Modeling of Ice Phenomena in the Mouth of the Vistula River**

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### **A b s t r a c t**

The mouth of the Vistula River, which is a river outlet located in tideless area, is analyzed. The Vistula River mouth is a man-made, artificial channel which was built in the 19th century in order to prevent the formation of ice jams in the natural river delta. Since the artificial river outlet was constructed, no severe ice-related flood risk situations have ever occurred. However, periodic ice-related phenomena still have an impact on the river operation. In the paper, ice processes in the natural river delta are presented first to refer to the historical jams observed in the Vistula delta. Next, the calibrated mathematical model was applied to perform a series of simulations in the Vistula River mouth for winter storm condition to determine the effects of ice on the water level in the Vistula River and ice jam potential of the river outlet.

**Key words:** river ice jam, ice dynamics, estuary, SPH, Vistula River.