ABSTRACT. Natural geophysical flows, such as those caused by floods, often involve complex multi-physics models. In addition, the release of pollutants such as plastics, microplastics or pesticides in rivers is an environmental hazard and therefore, a tool capable of predicting their temporal and spatial evolution is needed. The purpose of this work is to develop a mathematical model to simulate debris transport in rivers. This model is implemented in the SERGHEI framework [1], aiming to create an open-source, high-performance computing (HPC) modeling tool for surface hydrodynamics.

MOTIVATION. Floods, either due to rising river levels or extreme rainfall, are occurring more frequently and causing a greater number of damages [2]. In addition, environmental catastrophes due to the dumping of plastics into rivers and seas is a daily occurrence, such as the recent one off the Spanish coast of the Galicia region. Thus, the development of a debris transport model that can predict how large objects move and how the flow evolves, is something that solves the current problems of our society.

CONCLUSIONS AND FUTURE WORK. The results provide valuable information about how small objects are transported by the flow, leading to the conclusion that the model implemented can be combined with the SERGHEI framework as a tool for environmental risk prediction. However, more experiments should be sought/performed to further validate the model, so that it can be corrected and improved. Future work is planned to extend the model to large debris, such as cars, waste containers or boulders.

References