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Modelling yearly accumulation and outflow budgets of macro-plastics on a river basin scale

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A novel transport model of macro-plastics in rivers is applied to the River Meuse (Netherlands) to estimate yearly outflow quantities towards the North Sea, and to predict locations where waste accumulations along the banks and in the floodplain are likely to occur. The model has been calibrated to measurements of plastic concentrations in the flow, thereby giving a realistic indicative value of yearly plastic budgets. A comparison to aerial images of plastic waste hotspots observed after a recent flood event shows that the model is capable of predicting approximate waste accumulation sites. We explain how the model could be applied to other river cases around the world and, next, argue how the model can be used to make monitoring campaigns more effective, and how it can help in the design of effective clean-up strategies.