

NanoFASE Deliverable D2.2

Spatial transport framework for NanoFASE model

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Research Report Summary

This document sets out the spatial transport framework of the NanoFASE model for the spatiotemporal prediction of ENM fate, speciation and biouptake within the land-water environment (subsequently named the NanoFASE Water-Soil-Organism or WSO model). We describe the use of an object-oriented coding approach to produce a model that is flexible and futureproofed, being extensible to incorporate alternative transport, transformation and biouptake algorithms. We also describe the data input-output approaches, the structure of input data files, and the error handling approach. We describe how the existing Hydrological Modelling Framework (HMF) will be used to generate spatiotemporal predictions of water flow from soil to surface water and the routing of water through a catchment. We then describe the mathematical basis of the transport model, showing for each type of environmental compartment (soils, river reaches, lakes/reservoirs, estuary reaches and the coastal sea) the algorithms used to compute the transport of water, eroded soil and suspended particulate matter among and within compartments. We show summaries of the code and data structures (classes) for each type of compartment. Finally, we briefly describe how the model will be extended to incorporate transformation and biouptake algorithms for ENMs into each environmental compartment to produce the complete fate model.



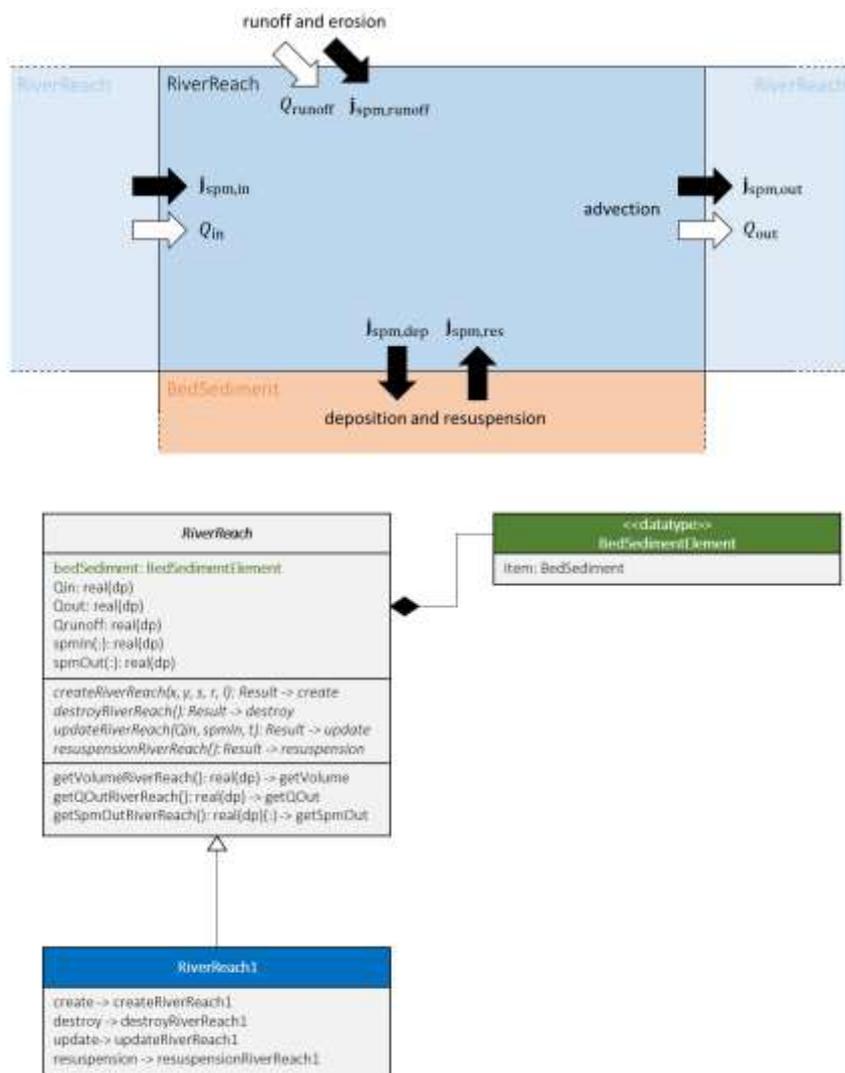


Figure 1. Example conceptual model and class structure for an environmental compartment (a river reach)

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