



Paraparaumu Beach: MIKE FLOOD vs. TUFLOW

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ABSTRACT

Kāpiti Coast District Council (KCDC) has invested in computer models for simulating urban flooding for twenty years. Seven MIKE FLOOD Classic models have been developed and upgraded over the years and are still in use today in testing development designs. Much of the data that informs these models is out of date and so KCDC have embarked on a refresh of these models. Due to the progression in industry understanding of flood modelling, and also in software and hardware, new techniques are to be employed in conceptualising the stormwater catchments as models. Additionally, KCDC has decided to move their flood modelling platform from MIKE FLOOD to TUFLOW. In order to ensure consistency between legacy and newly developed models, KCDC has commissioned Awa to undertake a technical comparison of MIKE FLOOD and TUFLOW. The results of this comparison will be presented and conclusions as to the capability, useability and performance of the two software platforms are drawn.

Key aspects of the comparison study include the following.

- The catchment used for this comparison is Paraparaumu Beach. This catchment is bounded to the west by the coastline, to the north by the Waikanae River and to the south and east by neighbouring catchments. This model does not contain hill catchments; however, it does contain major open channels, tidal and riverine boundaries and flat or gently undulating suburbs with a comprehensive stormwater drainage system and soakholes.
- While all efforts have been made to use equivalent parameter sets and identical schematisation for MIKE FLOOD and TUFLOW models, open channels have been treated very differently. In MIKE FLOOD the open channels are one-dimensional (1D) branches laterally linked to the adjacent floodplain; in TUFLOW the SGS functionality has been used to represent the channel bed at a 500 mm resolution within 2 m resolution computational cells. In both cases these approaches are current best practice for the corresponding software engines.
- Recent versions of MIKE FLOOD Classic and MIKE FLOOD Flexible Mesh (FM) variants and TUFLOW HPC with Sub-grid Sampling (SGS) and Quadtree variants have been included in this study. Both single- and double-precision versions of the engines have been tested. Low- and high-order temporal and spatial schemes available in MIKE FLOOD FM have been tested.
- The machine used for testing has a Intel i7-6700K 64-bit Central Processing Unit (CPU) running at 4.0 GHz and a NVIDIA GeForce RTX 3090 Graphics Processing Unit (GPU), which is used extensively by the MIKE FLOOD Flexible Mesh and TUFLOW HPC engines.