



Contribution of TU Delft to the SWITCH-ON project: Testing FLEX-TOPO

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The SWITCH-ON project is an EU FP7 project that started in November 2013 and will run till November 2017. SWITCH-ON stands for Sharing Water-related Information to Tackle Changes in the Hydrosphere for Operational Needs and it addresses the potential of open data. Open water data will be tailored with 14 products for end-users, a spatial information platform and the development of new forms of collaborative research.

TU Delft will, among five other universities, help developing these new forms of research. The individual goal of TU Delft is to proof the concept of FLEX-TOPO as introduced by Savenije (2010) and tested in a central European meso-scale catchment by Gharari et al.(2011).

The FLEX-TOPO modeling concept makes use of landscape classification based on slope and Height Above the Nearest Drainage (HAND) as defined by Rennó (2008). Gharari et al.(2011) defined for the Wark catchment in the Grand Duchy of Luxembourg three landscape classes: wetland, hillslope and plateau. Areas with low slope and low HAND were defined as wetland, areas with high slope as hillslope and areas with low slope and high HAND as plateau. The distinction between the several landscape units was based on threshold values of slope and HAND. After this classification each of the landscape classes was given its own conceptual model structure.

The SWITCH-ON project creates the opportunity to test the FLEX-TOPO concept in catchments all over Europe with different hydrological and climatological characteristics. It can be tested if the classification method as used by Gharari et al. (2011) still holds for other catchments or that new landscape units with different model structures should be created. It can also be discussed if the threshold values for HAND and slope in the Wark catchment can be used all over Europe. Next to that, it can be hypothesized that the different landscape units act different over Europe. For example, does a Mediterranean wetland behave similar to a Scandinavian wetland? The transferability of FLEX-TOPO will therefore be tested during this research.

Open data can also be used to make the models more robust. With extra information of for example remote sensing products the parameter sets could be made more robust, increasing the transferability of the models. It must therefore be tested which open data sets can contribute to this. However, strong upscaling and regionalisation techniques are needed to apply these distributed data sets.

As other partners in the SWITCH-ON project will use the same datasets, the model outcomes can be compared with outcomes of other models, like the HBV-concept. This will help in identifying the weaknesses and strengths of the different models. Shortcomings could for example be identified by looking at hydrological signatures as autocorrelation and flood duration curves.

The final goal of TU Delft is to come up with a conceptual FLEX-TOPO modeling approach, with a robust parameterisation and which is well transferable to other regions, gauged and ungauged, with different hydrological and climatological conditions.