Simple catchment nutrient models can be as good (or better) than complex: SimplyP v2

Leah A. Jackson-Blake (1), Magnus D. Norling (1), James E. Sample (1), and Andrew J. Wade (2)

(1) Norwegian Institute for Water Research (NIVA), Norway (ljb@niva.no), (2) Department of Geography and Environmental Science, University of Reading, UK

The dynamic, catchment-scale nutrient models in common use at present are complex, with tens or even hundreds of uncertain parameters requiring calibration. This limits their usability and the robustness of their predictions. We previously demonstrated that a highly simplified catchment phosphorus model, SimplyP, could perform as well as a substantially more complex model, INCA-P, in a Scottish agricultural catchment. We now present an updated version of SimplyP, which includes the ability to split catchments into any desired arrangement of sub-catchments (e.g. linear, branched and/or nested sub-catchments). The model remains open source and two versions are available for download – a Python version, suited to research and development, and a fast C++ version with accompanying MCMC-based auto-calibration and uncertainty analysis algorithm, which is well-suited to scenario analysis incorporating uncertainty. The model performs as well as INCA-P in a Norwegian agricultural catchment, complementing results from our previous model comparison in Scotland and providing further evidence that simpler models such as SimplyP may be more appropriate than more complex models, given current data available for model set up and calibration.