The S-HYPE model usefulness for WFD and floods directive in Sweden

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The integrated catchment model HYPE calculates water and nutrients for the whole of Sweden (450 000 km^2) in 38000 subbasins linked to 118 main rivers entering the surrounding sea. This national simulation system is called S-HYPE (S for Sweden) and is used both for the status-characterization requested by the WFD, and in forecast mode for the operational flood warning service. To judge the models capability to map spatial variability, the model results have been evaluated scientifically for ungauged basins in independent observations sites of various sizes and land-uses (some 400 for water and about 800 for nutrients). In addition, its predictive power to forecast fluctuations of river discharge is being evaluated in some 80 indicator sites. The calculated and observed time-series can be down-loaded for free from http://vattenweb.smhi.se/ along with judged model uncertainty for each subbasin.

For the WFD, the S-HYPE model is also used for estimating remedial-measures effects and evaluating measure plans. This is done in cooperation with local stakeholders. Other analyses, when the simulation system has been used on stakeholders' initiatives, include source apportionment, natural flows, accumulated retention, and downstream effects of status improvements. The model is linked to a biogeochemical coastal model to estimate the effect on eutrophication in the coastal zone from land-based measures to reduce nutrients. To judge model credibility for scenario estimates the internal processes, model variables, turn-over times and path-ways are continuously being evaluated. At present, the model is also being set-up for the European continent to deliver water and nutrients to oceanographers and marine biologists for analysis in the surrounding seas. The presentation at EGU will focus on the S-HYPE model contribution to WFD and water authorities in Sweden, scientific evaluations of its predictive power, and the role of national institutes when bridging between science and practitioners. Finally, further scientific needs are identified for efficient water management.