

Multi-variable evaluation of an integrated model system covering Sweden (S-HYPE)

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Abstract Integrated models claim to simulate coupled behaviour of several compartments and processes in a system. The integrated output from such a model could be resulting from several combinations of internal variables and compensating errors. This paper suggests that complex models should be evaluated using a multi-variable approach, also including internal model variables. The idea is currently tested using the HYPE model, which is applied for the entire country of Sweden (450 000 km²) with a resolution of some 10 km². So far, the nationwide modelled data has been compared with observed values for snow storage, groundwater levels, river discharge, lake-water levels, and nutrient concentrations. Spatial variations are well captured by the model, while nutrient dynamics are poorer. The high correlation between fluxes of internal model variables and observations supports the overall model concept and chosen parameter values, although equifinality certainly exists in such a complex integrated model.

Key words model; validation; monitoring; Sweden; discharge; nitrogen; phosphorus; snow; groundwater; lakes