



Sensitivity analysis of variable resolution precipitation data in the Sauer river catchment, Luxembourg, with regard to hydrological modelling

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The uncertainty in precipitation observations largely influences the performance of rainfall-runoff models. In this study we present first results of a sensitivity analysis that should help to improve our understanding on the impacts on hydrological model simulations of different rainfall datasets that are characterized by variable spatial resolutions. The study area is the well-equipped/observed meso-scale catchment of the Sauer River in the Grand Duchy of Luxembourg. Data used are observations from 15 rain gauges, radar rainfall estimations from the German Weather Service (RADOLAN dataset (Bartels, 2004)) and the Royal Meteorological Institute of Belgium (Wideumont C-band weather radar), as well as the outputs of the regional atmospheric model WRF. In a first step we assess the suitability of the data as forcing datasets specifically for hydrological modelling by analysing and comparing their properties with regard to precipitation climatology, extreme events and rainfall patterns. The radar and WRF grid data are combined with raingauge data by applying the Sinclair-Pegram (Sinclair and Pegram, 2005) radar-gauge merging method.

The aim of this analysis is to produce suitable data sets, which can be used in a future step to force various hydrological models based on the FLEX model (Fenicia et al, 2007), a lumped conceptual rainfall-runoff model, with different spatial model structures.

References:

Bartels H. (2004): Projekt RADOLAN, Routineverfahren zur Online-Aneicherung der Radarniederschlagsdaten mit Hilfe von automatischen Bodenniederschlagsstationen (Ombrometer), Projekt-Abschlussbericht

Fenicia F., Savenije H.H.G., Matgen P. and Pfister L. (2007): A comparison of alternative multiobjective calibration strategies for hydrological modelling. *Water Resources Research*, 43(3), W03434, doi:10.1029/2006WR005098

Sinclair S. and Pegram G. (2005): Combining radar and rain gauge rainfall estimates using conditional merging. *Atmospheric Science Letter*, 6, 19-22, 2983.