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DISSERTATION TITLE:	*IMPACT OF DENSITY AND LOCATION OF RAIN GAUGES ON PERFORMANCES OF HYDROLOGICAL MODELS*

Denne studien fokuserer på om tetthet og plassering av regn målere har noen effekt på ytelsen til lumped og distribuerte hydrologiske modeller. Resultatene viste at en distribuert hydrologisk modell er mye mer følsom for tetthet og plassering av regn målere enn for en lumped hydrologiske modell.

In hydrology, computer models are used to predict and measure water flow. This study investigates how the input of precipitation data would impact the results of lumped and distributed hydrological model simulations. The Xiangjiang River basin, located in southern China, is used to demonstrate the methodology and discuss the results. The lumped Xinanjiang Model and the distributed SWAT Model are applied in the study.

This PhD study focuses on three aspects, first study test the suitability of global grid data (original and bias corrected) in hydrological modelling in the study region with different temporal resolutions and spatial scales. Linear and non-linear bias adjustment methods are used to correct the bias of first and second moment of the TRMM and WFD datasets grid by grid. In hydrological modelling, the discharge is simulated by daily and monthly steps using the original and bias corrected TRMM 3B42 and WFD datasets. The evaluation of the performances of the two models show that the linearly corrected WFD data are reasonably suitable for daily step simulation in the Xinanjiang Model and produced satisfactory results in monthly step simulation. The second study evaluates the stochastically diluted rain gauge network on discharge simulation and investigates the effects of the density and location of rain gauges on the performances of hydrological modeling. The results indicates that the location and density of rain gauges have considerably impact on the simulation results of lumped hydrological models. Rigorous evaluation of the influence of different rain gauge density and distribution on the model performance, as shown by the simulated runoff compared with the observed runoff, improved gradually with increasing number of rain gauges up to some threshold, beyond this, the model performance had no considerable improvement.

In the third study, an entropy theory based multi-criteria method is used to design an optimal rain gauge networks. The entropy theory based multi-criteria method simultaneously considers the information derived from rainfall series and minimizing the bias of areal mean rainfall to resample the rain gauge networks with different gauge densities. The discharge simulations show that the lumped model using different optimized networks performs stable results while the performance of the distributed model keeps on improving as the number of rain gauges increases.