

Utilization of Prior Knowledge with Bayesian Framework

TSUYOSHI TADA

National Defense Academy

The Generalized Likelihood Uncertainty Estimation (GLUE) methodology was introduced in hydrology and can evaluate uncertainty of predictions and model parameters quantitatively by considering an error to be likelihood. For prediction in ungauged basins, this methodology has serious limit because the likelihood is depend on the data set. The likelihood distribution is unknown in ungauged basin. The standard likelihood distribution reflects the regional hydrological characteristics is made as prior distribution from many training data sets and prior geographical knowledge empirically. The performance of model is evaluated with mean marginal standard likelihood of the model and Bayesian Information Criterion (BIC) which is an approximator of the marginal likelihood. This framework is applied to an example application with three lumped conceptual models; storage function, Sugawara's tank model and the Australian Water Balance Model. prediction uncertainty estimation and relationship between empirical prior knowledge and prior likelihood distribution are discussed.