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Uncertainty estimation for environmental predictions: the BLUECAT approach and software

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We propose here a data-driven approach to estimate prediction uncertainty for environmental models. The method is based on the analysis of prediction errors for past observations of the model output. It allows to estimate uncertainty for single model or multimodel predictions. The approach, called BLUECAT, operates by transforming a point prediction provided by deterministic models to a corresponding stochastic formulation, thereby allowing the estimation of a bias corrected expected value along with confidence limits. For multimodel predictions, at each prediction step we select the best performing model according to an uncertainty measure that is used as model selection criterion. We emphasise the value of BLUECAT for gaining an improved understanding of the underlying environmental systems and multimodel combination. Examples of applications are presented, highlighting the benefits attainable through uncertainty driven integration of several prediction models. A publicly available open software for the application of BLUECAT is available along with help facilities.