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Sensitivity analysis to interrogate the effects of parameter choice on species distribution modelling output uncertainty

Numerous studies have shown that species distribution model predictions vary extensively depending on a host of choices made during the model building process, from how background data are selected, to the choice of predictor variables, to the choice of model settings, among numerous others. This suggests that SDM practitioners need not only be completely transparent about the choices they have made during the model building and evaluation processes, but should also evaluate model outputs in relation to these choices. These choices are essentially parameter settings of the model and allow for formal sensitivity analyses to be conducted. Sensitivity analyses show which parameters have the strongest influence on model results, and can help researchers fine tune their models, as well as provide a clearer picture of uncertainty in the model results. While sensitivity analyses are extensively used in many other research fields, such as in hydrology, engineering and climatology, they are rarely used in species distribution modelling. We hope to address this shortcoming by providing a review of suitable methods for conducting sensitivity analyses for species distribution modelling.