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Correcting for Model Changes in Statistical Post-Processing - An approach based on Response Theory

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For most statistical post-processing schemes used to correct weather forecasts, changes to the forecast model induce a considerable reforecasting effort. We present a new approach based on response theory to cope with slight model change. In this framework, the model change is seen as a perturbation of the original forecast model. The response theory allows then to evaluate the variation induced on the averages involved in the statistical post-processing, provided that the magnitude of this perturbation is not too large.

This approach is studied in the context of a simple quasi-geostrophic model. It provides a proof-of-concept of the potential performances of response theory in a chaotic system. The parameters of the statistical post-processing used - an *Error-in-Variables* Model Output Statistics (EVMOS) - are appropriately corrected when facing a model change. The potential application in a more operational environment is also discussed.