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The impact of stochastic physics on tropical variability in weather forecast models

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Many atmospheric GCMs exhibit too little tropical variability. Stochastic physics may help to reduce this problem, since this adds variability at small scales that is not captured by traditional deterministic parameterisations. Here, it is investigated whether stochastic physics improves the statistics of simulated tropical variability in the ECMWF weather forecast model. At ECMWF, multiplicative noise is applied to the parameterised tendencies and a stochastic kinetic energy backscatter scheme is employed to improve forecast skill. We show that these schemes make the climatological statistics of tropical variability on daily to weekly time scales in short-range and seasonal forecasts more realistic, which is likely to be part of the reason why these schemes have been found to improve forecast skill. Including stochastic physics in models may therefore be important for them to simulate tropical weather realistically.