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A perturbed land surface parameter experiment with the ECMWF seasonal forecasting system

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The representation of soil moisture physics in land surface schemes is subject to uncertainty in parameterisation, but is known to have an importance influence on the quality of atmospheric predictions as well as land surface predictions of runoff and river discharge. Perturbed and stochastic parameterisation techniques in meteorology and hydrology are one way to try to capture this uncertainty. Here we evaluate the impact of land surface parameter perturbations on ECMWF seasonal forecasts. Several fully coupled ensemble seasonal forecast experiments were run to investigate the influence of the land surface perturbations in combination with the atmospheric stochastic physics on summer seasonal forecasts across the globe. The results show that land surface perturbations can influence seasonal predictions in some cases, but this is resolution and location dependent. This initial analysis demonstrates the potential of implementing a stochastic parameterisation of land surface equations in coupled atmospheric models.