

## **Characterising Convection Schemes Using Their Linearised Responses to Convective Tendency Perturbations**

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We study the behaviour of convection schemes by probing their responses to small perturbations in temperature and moisture tendencies following the linear response function method of Kuang (2010). We compare 12 physical packages in 5 atmospheric models using single-column model (SCM) simulations under RCE conditions. Results are also compared to that of a cloud-resolving model (CRM). We show that the procedure is able to isolate the behaviour of a convection scheme from other physics schemes. We identify similarities but also substantial differences among the SCMs and between the SCMs and the CRM, some of which can be explained by scheme physics. All SCMs display kinks in their responses, which are absent from the CRM, suggesting that they might be related to switches or thresholds embedded in convective parameterisation. The models' moisture responses are related to their RCE profile, while their temperature responses do not and therefore can be regarded as independent diagnostics.