

Assessing calibration issues and intrinsic limits of a convection parameterization using machine learning

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Over the past ten years, the CNRM climate model development team has developed and implemented a convective scheme that aims at representing dry, shallow and deep convection in a unified and continuous way. During its integration, the question of its effective ability to capture the various convective regimes arose. The present work investigates this latter question in a rigorous manner: does a set of tuning parameters exist for this parameterization? Or are we facing its intrinsic limits? This investigation is made possible thanks to (i) the recent availability in our SCM of a wide range of single-column model convective cases, each of them being associated with relevant references (the new input standards for SCM forcing shared within the French community were instrumental for this achievement), and (ii) the development of machine-learning tools that provide an objective framework for process-based model tuning, and which ultimately illuminate the issue of parameterization tuning.