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Upgrade of the Met Office HadGEM3-A based attribution system, and a new validation framework for probabilistic event attribution

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Event attribution is the science of assessing the role of human influence in the often rapidly changing risk of extreme weather and climate events, a question that will only become more pressing in the near future. The Met Office HadGEM3-A based system for event attribution is designed to address this question in near real time and has recently been upgraded as part of the development of an operational attribution service in tandem with European projects, EUCLEIA and EUPHEME, as well as contributing simulations to further international collaborations such as C20C+.

Meanwhile the validation of attribution experiments and their relationship with closely related seasonal forecast and hindcast ensembles is still being understood. In attribution ensembles an assessment of the degree of model skill (predictability in the timing of variability) does not necessarily allow us to infer the degree of model error and so make statements regarding model performance. Rather, the framing of the attribution question - the very definition of the event and precise question that is being asked - typically determines the level of predictability present by hiding or revealing predictability upon conditioning of the ensemble.

We will clarify the relationship between model skill and performance before motivating a new validation framework which for ensembles conditioned on common boundary conditions amounts to a detection and attribution to boundary condition forcing. We will discuss the bias correction of attribution experiments and after applying our methods to seasonal mean temperatures across the globe we will present examples of systematic analyses of the type that could inform operational attribution assessments in the future.