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Robustness of modelling the forced change of the ENSO-Indian monsoon teleconnection

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Beside means, the forced response of the internal variability of the climate system is also of considerable practical interest. Teleconnections are one aspect of internal variability, and they derive their importance partly from their role in seasonal predictability. We compare the forced response of the ENSO-Indian monsoon teleconnection — as a first step of investigating the robustness of its modelling — in two Earth System Models, making use of the Large Ensemble data sets of the MPI-GE and CESM1-LE. We find considerable similarities of climatologies and the forced responses with respect to spatial patterns, in terms of e.g. MCA (Maximum Covariance Analysis) modes. However, because of the mismatch of these patterns, both in terms of their weight and shape, the teleconnection associated with restricted areas, such as the domain of the so-called All-India Summer Monsoon Rainfall (AISMR) differ very considerably in the two models. While most representations of the teleconnection involving the principal modes of variability show a strengthening in the MPI-GE, not much change is detectable in the CESM1-LE. In fact, the second modes, EOF2 or MCA2, are associated with much more change in the CESM1.