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Global warming signal-to-noise pattern in the Challenge ensemble

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Where to look for global warming? This question is studied with data from the Dutch Challenge Project. In this project, the NCAR-CCSM1.4 model was used to make a 62-member ensemble of model simulations. After a common spin-up, independent runs were made for the period 1940-2080. In the analysis presented here, we focus on period 1971-2000, where historical estimates for atmospheric composition, solar irradiance and sulfphate and volcanic aerosols where used. The external forcings have the same systematic effect on all ensemble members and result in warming almost everywhere on the globe. Internal variability is straightforward to determine from the ensemble spread. As in observations, the largest changes in temperature are found in mid to high latitudes. However, this is also the region where internal variability is largest. The signal-to-noise ratio of global warming to internal variability is largest in the tropical regions. This result stresses that although the size of the global warming signal is largest in the extratropics, the size of the impacts might be relatively strong in the tropics.