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## The seasonal teleconnections of the Indian Ocean Dipole to the North Atlantic region

Tim Hempel<sup>1</sup>, Antje Weisheimer<sup>1,2</sup>, and Tim Palmer<sup>1</sup>

<sup>1</sup>University of Oxford, Physics, Atmospheric, Oceanic and Planetary Physics, United Kingdom of Great Britain – England, Scotland, Wales

<sup>2</sup>European Centre for Medium-Range Weather Forecasts, Reading, United Kingdom of Great Britain – England, Scotland, Wales

The Indian Ocean Dipole (IOD) is a major source of seasonal climate variability in the Indian Ocean. This dipole has major impacts on the Indian Ocean region and through teleconnections can influence the seasonal climate of remote regions as well. In late 2019 a major IOD event contributed to a strong positive North Atlantic Oscillation (NAO) of that winter. Thus, a good understanding of the mechanism that transports information from the Indian Ocean to the North Atlantic is desirable. In this contribution we investigate the special teleconnection of the winter of 2019 and analyse the transport mechanism.

In model experiments with the OpenIFS from ECMWF we show that the NAO in the winter 2019 is influenced by the Indian Ocean Dipole. We use hindcast ensemble model experiments to analyse the behaviour of the IOD and its impact on the NAO. These seasonal hindcast experiments are started from the 01. November 2019 and run for the DJF season 2019/2020. Since the OpenIFS is uncoupled we change the Sea Surface Temperature (SST) boundary conditions in regions of importance to the NAO (like the ENSO region, the North Atlantic, and also the Indian Ocean). With these perturbations we identify the relative importance of individual ocean regions to the state of the NAO in the winter of 2019.

We contrast the experiments with the perturbed SST conditions to a control forecast and ERA5 reanalysis. We find that removing the IOD has a significant impact on the NAO of the 2019/2020 DJF season, pushing the NAO to a more negative state. Additionally the contrast between control forecast and model experiments shows Rossby Waves emanating from the Indian Ocean over the North Pacific and the Arabian Peninsular.

Experiments with perturbations in other ocean regions show that some signals, like ENSO, can suppress the impact of the IOD on the NAO, but in their absence the positive IOD event of 2019 did likely contribute to the strong positive NAO of 2019/2020.