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## Representation of the Scandinavia-Greenland Pattern and its Relationship with the Polar Vortex in S2S Models

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The strength of the stratospheric polar vortex is a key contributor to subseasonal prediction during boreal winter. Anomalously weak polar vortex events can be induced by enhanced vertically propagating Rossby waves from the troposphere, driven by blocking and wave breaking. Here, we analyse a tropospheric pattern—the Scandinavia–Greenland (S–G) pattern—associated with both processes. The S–G pattern is defined as the second empirical orthogonal function (EOF) of mean sea-level pressure in the northeast Atlantic. The first EOF is a zonal pattern resembling the North Atlantic Oscillation. We show that the S–G pattern is associated with a transient amplification of planetary wavenumber 2 and meridional eddy heat flux, followed by the onset of a persistently weakened polar vortex. We then analyse 10 different models from the S2S database, finding that, while all models represent the structure of the S–G pattern well, some models have a zonal bias with more than the observed variability in their first EOF, and accordingly less in their second EOF. This bias is largest in the models with the lowest resolution, and consistent with biases in blocking and Rossby wave breaking in these models. Skill in predicting the S–G pattern is not high beyond week 2 in any model, in contrast to the zonal pattern. We find that the relationship between the S–G pattern, enhanced eddy heat flux in the stratosphere, and a weakened polar vortex is initially well represented, but decays significantly with lead time in most S2S models. Our results motivate improved representation of the S–G pattern and its stratospheric response at longer lead times for improved subseasonal prediction of the stratospheric polar vortex.