1 **Supplementary Information for**

2 **Attribution of NAO predictive skill beyond two weeks in boreal winter**

3

4 Lantao Sun[1][*], Judith Perlwitz[2], Jadwiga (Yaga) Richter[3],
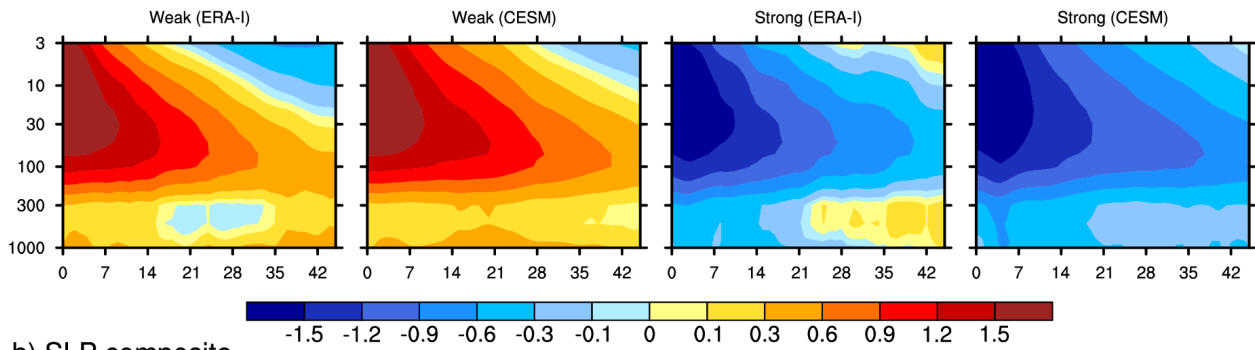
5 Martin Hoerling[2], James W. Hurrell[1]

6

7

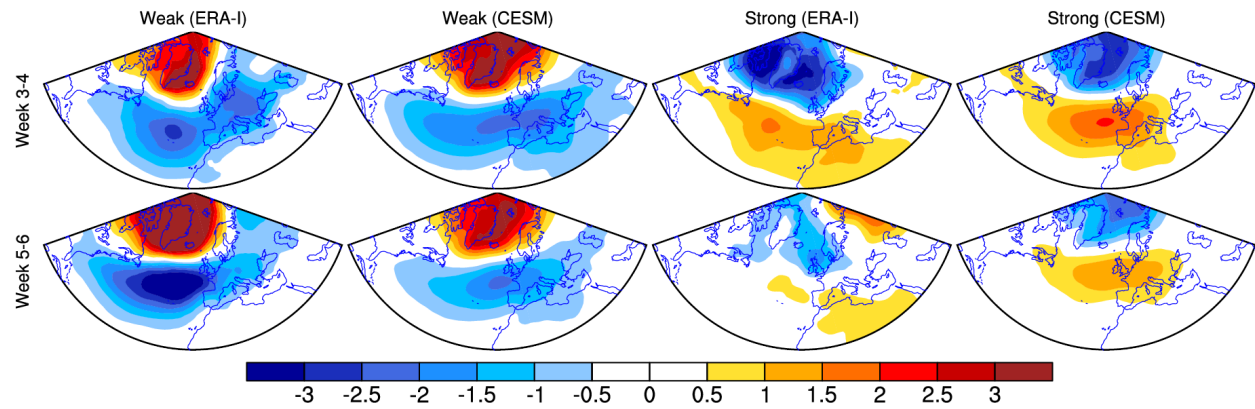8 [1] Department of Atmospheric Science, Colorado State University, Fort Collins, CO

9 [2]NOAA Earth System Research Laboratory Physical Science Division, Boulder, CO

10 [3]National Center for Atmospheric Research, Boulder, CO

11

a) Polar-cap Z3 composite

b) SLP composite

Figure S1: a) Composite of the standardized polar-cap geopotential height anomalies for weak and strong polar vortex events based on ERA-Interim and CESM reforecast. b) As in a), but for the anomalous sea-level pressure (SLP) composite based on ERA-Interim and week 3-4/5-6 of the CESM reforecast.
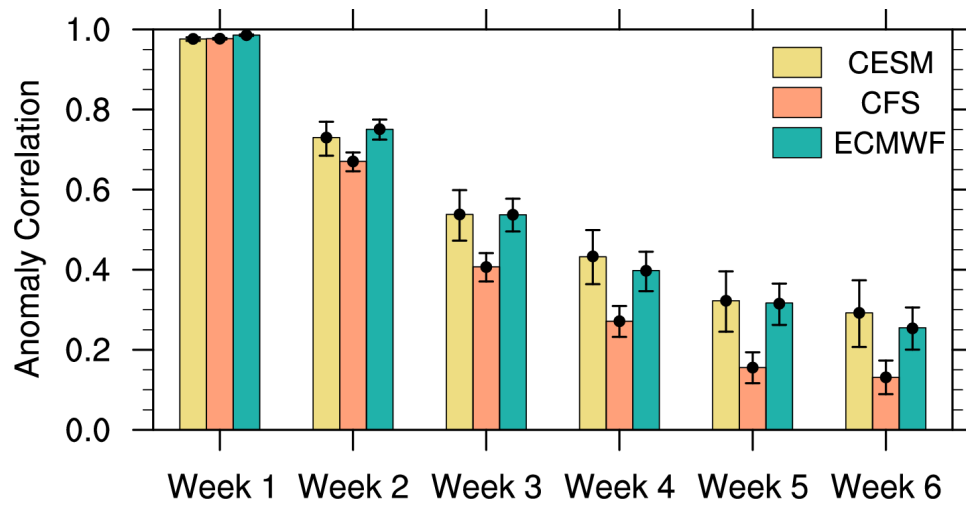
Figure S2: Weekly North Atlantic Oscillation (NAO) skill for CESM, NCEP and ECMWF. Error bars indicate the 5% and 95% statistical level based on 10000 bootstrap resamples.

24

a) Persistence   b) AMIP   c) NAO skill

0.06   0.13
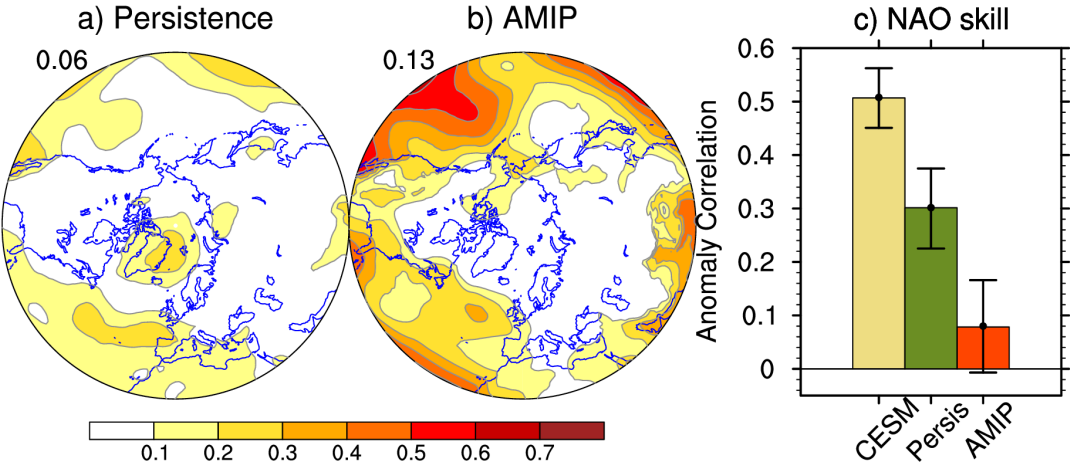
25
26
27 **Figure S3**: As in Fig. 1a, but for the SLP predictive skill due to persistence (a) and in the
28 uninitialized AMIP simulations (b). Values on the left corner denote the skill averaged over
29 northern hemisphere extratropics. c) week 3-6 NAO skill comparison among CESM, persistence
30 and uninitialized AMIP simulations. Error bars indicate the 5% and 95% statistical levels by
31 bootstrapping.

3