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Flow dependence of wintertime subseasonal prediction skill over Europe

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Issuing skillful forecasts beyond the typical horizon of weather predictability remains a challenge actively addressed by the scientific community. This study evaluates winter subseasonal reforecasts delivered by the CNRM and ECMWF dynamical systems and identifies that the level of skill for predicting temperature in Europe varies fairly consistently in both systems. In particular, forecasts initialized during positive NAO phases tend to be more skillful over Europe at week three in both systems. Composite analyses performed in an atmospheric reanalysis, a long-term climate simulation and both forecast systems unveil very similar temperature and sea-level pressure patterns 3 weeks after NAO+ conditions. Furthermore, regressing these fields onto the 3-week previous NAO index in a reanalysis shows consistent patterns over Europe but also eastern North America, thereby revealing a lagged teleconnection, either related to the persistence or recurrence of the NAO+ weather regime. Since this feature is well captured by forecast systems, this is a key mechanism for determining a priori confidence in the skill of wintertime subseasonal forecasts over Europe and North America.