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Assessment of the predictability of cold-wet-windy Pan Atlantic compound extremes

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Occurrence of cold spells in different North American regions has been related to concurrent wet and windy extremes in Western Europe. This link is driven by an anomalous state of the North Atlantic storm track. Two dynamical pathways have been defined as potential origins of the Pan-Atlantic compound extremes. The first pathway is linked to a Rossby wave train propagating from the Pacific toward the Atlantic, associated with a pronounced Alaskan ridge. The second pathway is characterized by the presence of a high west of Greenland, that favors simultaneously a southward displacement of a trough over eastern USA and an upper-level trough over South western Europe. The aim of this study is to assess the predictability of these two pathways in the ERA5 reanalysis using dynamical systems indicators. These indicators are the local dimension and the persistence of the large-scale atmospheric flow, and can be used as proxies for the predictability of each pathway. We complement this analysis using the ECMWF ensemble reforecasts at different lead times, and computing skill scores for the two pathways.