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Constraining near to mid-term climate projections by combining observations with decadal predictions

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The implementation of adaptation policies requires seamless and relevant information on the evolution of the climate over the next decades. Decadal climate predictions are subject to drift because of intrinsic model errors and their skill may be limited after a few years or even months depending on the region. Non-initialized ensembles of climate projections have large uncertainties over the next decades, encompassing the full range of uncertainty attributed to internal climate variability. Providing the best climate information over the next decades is therefore challenging. Recent studies have started to address this challenge by constraining uninitialized projections of sea surface temperature using decadal predictions or using a storyline approach to constrain uninitialized projections of the Atlantic Meridional Overturning Circulation using observations. Here, using a hierarchical clustering method, we select a sub-ensemble of non-initialized climate simulations based on their similarity to observations. Then, we try to further refine this sub-ensemble of trajectories by selecting a subset based on its consistency with decadal predictions. This study presents a comparison of these different methods for constraining surface temperatures in the North-Atlantic / Europe region over the next decades, focusing on CMIP6 non-initialized simulations.