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Atlantic opportunities for ENSO prediction

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El Niño-Southern Oscillation (ENSO) is the dominant mode of tropical climate variability with worldwide impacts. Major advances in ENSO research have been done in the last decades, focusing on the mechanisms involved in its onset and development, as well as, its global climate teleconnections. Although modelling efforts have been made in ENSO forecast, the prediction of these episodes still remains a challenge for the scientific community. Recent studies put forward the role of extra-tropical and tropical regions as precursors of ENSO, but these teleconnections have changed along the 20th century. In particular, an Atlantic Niño precedes the development of a Pacific La Niña (and vice versa) 6 months in advance, taking part of an air-sea coupled mode of variability which only shows up during negative phases of the Atlantic Multidecadal Oscillation (AMO). The non-stationarity of this mode opens window opportunities for ENSO forecast, using the Tropical Atlantic Sea Surface Temperature (SST) as the predictor field. Here, we present for the first time a statistical crossvalidated hindcast of ENSO events based on an Extended Multiple Maximum Covariance Analysis (EMMCA). This method considers a unique predictor field, the summer Atlantic SSTs, and a set of predictant fields in different regions and seasons, according to the Atlantic-Pacific mechanism. The predicted tropical Pacific variables involved in ENSO development, show a good agreement with the observed ones during negative AMO phases, with a remarkable increase of the predictability skill based on correlations. During those negative AMO decades, the hindcast reproduces quite well the observed Atlantic-modulated ENSO episodes, but with stronger signal than observations. This AMO-dependency of the ENSO predictability could help to resolve some open questions about the seasonal to decadal ENSO forecast and its impacts.