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ENSO impact on mid-latitude circulations patterns in future climate change projections

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The remote influence of the leading mode of interannual variability in the Tropics, the El Niño/Southern Oscillation (ENSO), on the northern hemispheric mid-latitude circulation in future climate is investigated. For this, IPCC SRES scenarios of the latest version of the coupled climate model ECHAM5/MPI-OM are used. In ensembles of future climate change projections it is found, that a changing state of ENSO with increased variability has a pronounced influence on the dominant mid-latitude circulation pattern, namely the Pacific North America (PNA) pattern and the North Atlantic Oscillation (NAO). More explicitly, in the 21st and 22nd century, a positive (negative) phase of ENSO is more likely followed by a positive (negative) PNA index and negative (positive) NAO index than it is observed in the 20th century. Correlation coefficients between the winter mean Niño3.4 index and the NAO index increase substantially from the 20th century. Further possible mechanisms including the direct link via the troposphere are investigated. Here special emphasis is given on ENSO-related changes in the storm track variability and/or teleconnection.