



The relationship between northern hemisphere winter blocking and tropical modes of variability

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The influence of some major tropical modes of variability on northern hemisphere regional blocking frequency variability during boreal winter is investigated and the most important findings will be presented here. Reanalysis data and an experiment with the ECMWF model using relaxation towards the ERA-40 reanalysis data inside the tropics are used. The tropical modes under investigation are El Nino Southern Oscillation (ENSO), the Madden-Julian Oscillation (MJO) and the upper tropospheric equatorial zonal-mean zonal wind (U150). Comparing the impact on blocking frequency of these tropical modes with the impact of two extratropical modes, namely the North Atlantic Oscillation (NAO) and the North Pacific Gyre Oscillation (NPGO), it is found that the tropical influence is of comparable amplitude. Focusing on the Euro-Atlantic sector, it is found that cold ENSO events, late MJO phases, as well as suppressed MJO are all leading to enhanced blocking frequency at lower to middle latitudes (south of 48N) on weekly to monthly timescales. At higher latitudes (north of 48N) over Europe, the blocking anomalies associated with ENSO and the MJO are less clear than at lower latitudes. Instead, at higher latitudes (north of 48N), the westerly (easterly) phase of U150 is associated with reduced (enhanced) blocking frequency.