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Dominant mode of Northern Hemisphere blocking variability during winter and its relation with temperature and sea surface temperature anomalies

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The dominant mode of the Northern Hemisphere blocking variability during winter is derived through Empirical Orthogonal Functions (EOF) analysis of the blocking anomalies as captured by a one-dimensional blocking indicator. The dominant pattern captures an in-phase variability of Pacific and Euro-Atlantic blocking. Positive phase of this pattern, i.e. enhanced blocking activity over North Pacific and Euro-Atlantic regions, is related with weak meridional temperature gradient over Eurasian continent as well as with relatively cold conditions in the tropical Pacific and relatively warm (cold) conditions in the north-western (south-western) part of the North Pacific ocean. This large-scale temperature pattern is related with relatively weak zonal mean flow which increases the probability of blocking formation both in Pacific and Euro-Atlantic sectors. Correlation and composite analysis reveal that the dominant pattern of winter blocking is significantly related with previous autumn temperature and sea surface temperature anomalies from several key regions. We argue that these autumn temperature anomalies can be used as predictors for blocking activity during winter.