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On the CMIP5 models performance in simulating atmospheric blocking

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The frequency of atmospheric blocking in both winter and summer and its projected changes by the end of twenty-first century are analysed for 12 models from phase 5 of the Coupled Model Intercomparison Project (CMIP5). One-dimensional and two-dimensional diagnostics are applied to identify blocking at the mid-latitudes (around the storm track) and at higher latitudes, on the poleward flank of the Pacific and Atlantic jet-streams.

Winter European blocking frequency is generally underestimated. The models also suggest a decrease in its maximum in the twenty-first century, although some of them hint at an eastward shift towards eastern Europe. High-latitude blocking are observed to shift poleward, particularly over the Pacific sector, but there is little agreement between the models on the details. In summer, Eurasian blocking is also underestimated in the models, whereas it now shows positive biases over the high-latitude oceanic basins. A decrease in European blocking frequency in the twenty-first-century model runs is again found. However, in summer there is a clear eastward shift of blocking over eastern Europe and western Russia. While projected summer blocking decreases in general, the poleward shift of the storm track into the region of frequent high-latitude blocking may mean that the incidence of storms being obstructed by blocks may actually increase.