



Validation of winter atmospheric circulation over Europe and the North Atlantic in CMIP5 global circulation model outputs

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An analysis of winter atmospheric circulation over Europe is carried out based on outputs of historical runs of thirty-two CMIP5 global circulation models (GCMs) (1961–2000). GCMs are validated against five reanalysis datasets, in terms of the frequency and persistence of circulation types (CTs). Previous research has shown that diverse results can be obtained if different classification methods are employed. Therefore, to achieve reliable results, CTs are successively defined by eight methods included in the COST733 software and for four domains (Europe, British Isles, Central Europe, and Eastern Mediterranean). The multi-model ensemble median in most cases shows an overestimation of CTs with (south)western advection over Europe, and over- and underestimation of cyclonic and anticyclonic types, respectively, both in their frequency and spatial extent of the respective pressure systems. The size and significance of these biases are, however, considerably dependent on the chosen classification method, domain, and even the reanalysis dataset.