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# A reconciling blocking index applied to 1000-yr model simulations

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A novel blocking index is proposed reconciling two traditional approaches. Blocks are considered from a two-folded complementary perspective as a signature in the anomalous height field capable of reversing the meridional jet-based height gradient in the total flow. The new index accounts for the duration, intensity, extension, propagation, and spatial structure of a blocking event. The method succeeds in identifying 2-D persistent anomalies associated to a weather regime in the total flow with blockage of the westerlies, and is applicable to observations and model simulations of different resolutions, temporal lengths and time variant basic states.
The characteristics of blocking for 40 years of reanalysis (1950-1989) over the Northern Hemisphere are compared to present-day (1950-1989) simulations of the ECHO-G model. The model shows an overall underestimation of blocking activity over the Euro-Atlantic sector and a southward shift of Eurasian blocks, which are mainly due to a model bias consisting of excessive zonal winds over the Euro-Atlantic sector and a southward shift of synoptic activity at the exit zone of the jet stream, respectively. Albeit these deficiencies, the main blocking features (location, annual cycle and persistence) are captured with reasonable realism.
Results from two forced simulations of the ECHO-G model for the 1000-1989 period are also described. The observational-based hypothesis that blocking may have played a significant role in the excessively cold conditions recorded in Europe during the Maunder Minimum is tested.