



Blocking detection using synoptic filters

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Blocking of the zonal flow is a frequent mid-latitude phenomenon with impacts on weather on time scales up to several months. For the automatic detection of blocking events several indices have been developed to identify extended and long-lasting high pressure cells, however, some with draw-backs like the inclusion of cut-off lows and subsynoptic structures. For improvement, the blocking index defined by Tibaldi and Molteni (1990) is amended by additional filter criteria to concentrate on the synoptically relevant blocking phenomena. Three blocking filters are introduced and their sensitivities analysed: (1) a quantile filter requiring a minimum geopotential height anomaly to reject cut-off lows, (2) an extent filter to extract scales above a minimum zonal width, and (3) a persistence filter to extract events with a minimum duration. Practical filter application is presented for two case studies and the blocking climatologies for the Northern and the Southern Hemisphere. The results show that events with a duration less than one day are frequent and contribute similarly to the blocking frequency as events of 6 to 7 days duration. Spatially small structures ($<5^\circ$) do not show the same features as they contribute only marginally to the blocking frequency.