Contrasting dynamics of short and long blocks in the Northern Hemisphere

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In this study, we aim at identifying dynamical differences between short blocks, which last only five days, and long blocks, which last at least ten days, to better characterise long blocks. We show that long blocks often involve cyclonic Rossby wave breaking, while short blocks are equally associated with cyclonic and anticyclonic wave breaking. This main result is reproduced in several coupled climate models. We propose three mechanisms that might explain the lower number of long anticyclonic blocks: 1/ a downstream reinforcement of the anticyclone during anticyclonic blocks might be associated with a stronger downstream advection of the block; 2/ the mean zonal wind is reinforced by synoptic eddies towards a more northward position during anticyclonic blocks, whereas synoptic eddies force the mean zonal wind to the south of the block during cyclonic blocks, which has been previously shown to be associated with more persistent weather patterns; 3/ strong and/or sustained eddy feedback is needed to maintain long anticyclonic blocks. All these parameters combined might explain why blocks last longer and why anticyclonic blocks are less present at extreme durations.