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Simulated northern hemispheric storm tracks of the Eemian interglacial and the last glacial inception

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The question whether previous interglacial periods could be used as analog for a warmed future climate has been a matter of debate. Here we present an analysis of storm tracks in climate simulations of the last interglacial (the Eemian interglacial at around 125,000 yr before present (BP)) and the last glacial inception (at around 115,000 yr BP). They have been performed by forcing the coupled ocean-atmosphere general circulation model ECHO-G with insolation patterns of these periods. For that purpose, the parameters of the Earth's orbit have been set to conditions of 125,000 and 115,000 yr BP. Compared to today, these dates represent periods with enhanced and weakened seasonality of insolation on the northern hemisphere. The change in the orbital configuration has a strong impact on the meridional temperature gradients and therefore on the strength and location of the storm tracks. The North Atlantic storm track is strengthened, shifted northward and extends further to the east in the simulation for the Eemian at 125,000 yr BP. As one consequence, the northern parts of Europe experience an increase in winter precipitation. The frequency of winter storm days increases over large parts of the North Atlantic. Analyses of storm tracks in experiments with GCMs driven by greenhouse gas scenarios show similar spatial patterns in storm tracks (e.g. Bengtsson et al, J. of Climate, 2006), although the seasonal and regional distribution of the forcing is different. Opposite but weaker changes in storm track activity are simulated for 115 kyr BP.