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Future Changes in Northern Hemisphere Extra-Tropical Cyclones and the NAO

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Extra-tropical cyclones strongly influence weather and climate in mid-latitudes and any future changes in the frequency, distribution or intensity of these cyclones may have large impacts on the local scale. In this study extra-tropical cyclones are located and tracked in mean sea level pressure data at 6 hourly intervals from ensembles of time-slice experiments carried out with a high horizontal resolution (120km) atmosphere only model with present day and SRES A2 future greenhouse gas emissions scenarios. The simulated cyclone track densities in the present day compare fairly well with observations in all seasons. In the future simulations there are fewer cyclone tracks but more cyclones with weak relative intensity in the northern hemisphere in winter in most regions. There are local increases in track density and intensity over Hudson Bay, in the north east of the north Pacific and over the UK, possibly due to local changes in baroclinicity. There are fewer tracks in the northern hemisphere in summer and the cyclones are less intense. There are also fewer tracks in the north Pacific in spring but there are more of the most intense cyclones. The links between these changes cyclones and the NAO are considered.