



Extra-tropical modes of atmospheric climate variability and meridional temperature gradients

Michael Deininger (1,2) and Frank McDermott (2)

(1) Institute for Geosciences, Johannes Gutenberg-University Mainz, J.-J.-Becher-Weg 21, 55128 Mainz, Germany (michael.deininger@uni-mainz.de), (2) UCD School of Earth Sciences, University College Dublin, Belfield, Dublin 4, Ireland

Idealized modelling studies infer that meridional atmospheric temperature contrasts drive shifts of the latitudinal position (termini) of the Hadley cell boundaries and the mid-latitude storm tracks. To further test these model inferences, here we investigate this predicted relationship between meridional temperature contrasts and extra-tropical modes of atmospheric climate variability expressed in two re-analysis datasets (ERA20C and ERA-Interim) for the period from 1900 to 2010 (ERA20C) and 1970 to 2015 (ERA-Interim), respectively. We present correlation results calculated from the seasonal (December to March and June to September) relationship of the Northern and Southern Hemisphere extra-tropical as well as tropical modes of climate variability and the temperature contrast between the Northern (NET) and Southern Hemisphere (SET) extra-tropical regions and tropical regions (TR), respectively. Finally, these results are used to illustrate how these relationships are imprinted in global temperature and precipitation pattern. The observed modern relationships between extra-tropical and tropical modes of atmospheric climate variability and meridional temperature gradients can serve as an analogue for past climates on various time scales.