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Evaluating atmospheric blocking in the global climate model EC-Earth

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Atmospheric blocking is a phenomenon of the midlatitudal troposphere, which plays an important role in climate variability. Therefore a correct representation of blocking in climate models is necessary, especially for evaluating the results of climate projections. In my master's thesis a validation of blocking in the coupled climate model EC-Earth is performed.
Blocking events are detected based on the Tibaldi-Molteni Index. At first, a comparison with the reanalysis dataset ERA-Interim is conducted. The blocking frequency depending on longitude shows a small general underestimation of blocking in the model - a well known problem. Scaife et al. (2011) proposed the correction of model bias as a way to solve this problem. However, applying the correction to the higher resolution EC-Earth model does not yield any improvement.
Composite maps show a link between blocking events and surface variables. One example is the formation of a positive surface temperature anomaly north and a negative anomaly south of the blocking anticyclone. In winter the surface temperature in EC-Earth can be reproduced quite well, but in summer a cold bias over the inner-European ocean is present.
Using generalized linear models (GLMs) I want to study the connection between regional blocking and global atmospheric variables further. GLMs have the advantage of being applicable to non-Gaussian variables. Therefore the blocking index at each longitude, which is Bernoulli distributed, can be analysed statistically with GLMs. I applied a logistic regression between the blocking index and the geopotential height at 500 hPa to study the teleconnection of blocking events at midlatitudes with global geopotential height. GLMs also offer the possibility of quantifying the connections shown in composite maps. The implementation of the logistic regression can even be expanded to a search for trends in blocking frequency, for example in the scenario simulations.