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# Quasi-stationary waves and their connection to oceanic anomalies

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Persistent extreme weather events are commonly associated with strong quasi-stationary atmospheric waves (QSW). Specific QSW patterns can further be associated with European temperature anomalies, persistent or frequently recurrent QSW patterns during one season can lead to particular strong seasonal temperature anomalies. These QSW patterns are further investigated in regard to possible oceanic drivers. The existence of such oceanic drivers would suggest potential predictability, or at least a better risk assessment of extreme events or persistent periods of anomalous weather conditions, on a timescale of several weeks or more.

The QSWs are isolated from the longitudinal envelope of the lowpass filtered (15 day) meridional wind at upper levels. The envelope field, which is a measure of wave amplitude, is calculated by a spatial filtering using a latitude dependent zonal wavenumber range of about 4 to 8 in midlatitudes.

Analysis suggests that some of the prominent QSW patterns are strongly associated with well-known global pattern indices, especially the Arctic Oscillation/North Atlantic Oscillation and the El Nino-Southern Oscillation. The strongest QSWs in winter occur during negative values of the Arctic Oscillation, with a poleward shift of wave activity. Furthermore, Northern Hemisphere sea ice extent also seems to be associated with specific QSW patterns. To increase our understanding of these connections we additionally set up aquaplanet simulations and investigate the basic link between quasi-stationary waves and ocean anomalies which were found to be relevant in reanalysis data.