



Northern Hemisphere winter atmospheric blocking response to solar activity

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Northern Hemisphere atmospheric blocking response to the 11-year solar cycle is investigated for 44 winters (1955–1999) stratified according to the level of solar activity. Several blocking features are modulated by solar activity, irrespective of the Quasi-Biennial Oscillation (QBO) phase, although the responses tend to amplify under the QBO-west phases. Solar activity modulates the preferred locations for blocking occurrence over both Oceans, causing local but marginally significant frequency changes therein. Although solar effects are negligible in blocking frequency for the entire Atlantic sector, other blocking features exhibit significant responses. Thus, low solar Atlantic blocking episodes last longer, are located further east and become more intense than high solar blocking events. Further analyses suggest that the excessively cold conditions recorded in Europe during the Maunder Minimum may partially have arisen from an eastward shift of long-lasting blockings with near-normal frequencies.