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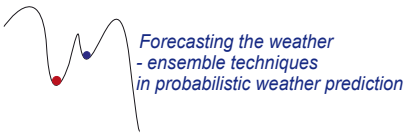

Effects of solar activity on teleconnections and teleconnectivity in the Northern Hemisphere in winter

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We examine the dependence of the teleconnectivity (i.e. the property of being (anti)correlated over large distances) of atmospheric circulation in the Northern Hemisphere on the phase of the solar cycle. The teleconnectivity is characterized here using one-point correlation maps in 500 hPa heights north of 20°N in two ways: the teleconnectivity is defined at each grid point as the most negative correlation with any other gridpoint; the teleconnected area is defined at each gridpoint as the area with strong negative correlations (a threshold of -0.3 is used here, but results are only little sensitive to the choice of the threshold) with that gridpoint. Winter months (December to March) are divided into three classes by the level of solar activity, quantified by F10.7 solar flux. The maps of teleconnectivity and teleconnected area are produced separately for each solar acitivity class. Results indicate that the teleconnections are more spatially extensive under a high solar activity over large parts of the Northern Hemisphere; the response to solar activity is highly statistically significant. The difference in correlation patterns between solar minima and maxima is largest in the midlatitudes over the Atlantic and Pacific oceans where large responses to solar activity of the variability modes have been detected recently. The results support recent finding concerning the effects of the solar cycle on the modes of low-frequency variability and on the blockings.