



Are cold winters in Europe associated with low solar activity?

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A new geomagnetic index of solar variability shows clear links with winter temperatures and weather patterns across much of Europe. This 'open solar flux' is significantly correlated with the winter Central England Temperature back to 1675. Over the recent reanalysis period it correlates well with the occurrence of blocking in the East Atlantic, part of a distinctive circulation pattern which extends deep into Eurasia and is associated with large sea level pressure and temperature anomalies. Variations in temperature in the equatorial lower stratosphere are more closely linked to the open solar flux than to other solar indices, suggesting mechanisms by which the tropospheric flow is affected. While it is not possible to say if the current exceptional solar minimum contributed to this year's cold winter, the dramatic blocking and atmospheric circulation anomalies we experienced are consistent with the general pattern identified. Solar activity has been unusually high over the last few decades, suggesting that a return to weaker levels of activity is possible. Europe may experience more cold winters in the coming decades, despite the effects of climate change.