



## **The role of the tropical West Pacific in the extreme northern hemisphere winter of 2013/14**

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In the 2013/14 winter, the eastern USA was exceptionally cold, the Bering Strait region was exceptionally warm, California was in the midst of drought and the UK suffered severe flooding. It has been suggested that elevated SSTs in the tropical West Pacific (TWPAC) were partly to blame due to their producing a Rossby wavetrain that propagated into the extratropics. We find that seasonal forecasts with the tropical atmosphere relaxed towards a reanalysis give 2013/14 winter-mean anomalies with strong similarities to those observed in the Northern Hemisphere, indicating that low-latitude anomalies had a role in the development of the extremes. Relaxing just the TWPAC produces a strong wavetrain over the North Pacific and North America in January, but not in the winter-mean. This suggests that anomalies in this region alone had a large influence, but cannot explain the extremes through the whole winter. We also examine the response to applying the observed TWPAC SST anomalies in two atmospheric general circulation models. We find that this does produce winter-mean anomalies in the North Pacific and North America resembling those observed, but that the tropical forcing of Rossby waves due to the applied SST anomalies appears stronger than that in reanalysis, except in January. Therefore both experiments indicate that the TWPAC influence was important, but the true strength of the TWPAC influence is uncertain. None of the experiments indicate a strong systematic impact of the TWPAC anomalies on Europe.