

Interactive comment on “How unusual was autumn 2006 in Europe?” by G. J. van Oldenborgh

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Received and published: 26 June 2007

Your nice paper demonstrates how unusual autumn 2006 was within a temporal context over Europe. But addressing the "unusualness" of Autumn 2006 only within the context of Europe risks some statistical bias, in that an event with a return period of, say, 100 years becomes more likely to occur somewhere in the globe, and Europe has been selected a-postiori because that area was unusual.

The question of how unusual the autumn of 2006 was in a hemispheric context can usefully be addressed by the technique of Chase et al. (Chase, T. N., K. Wolter, R. A. Pielke Sr., and I. Rasool (2006), Was the 2003 European summer heat wave unusual in a global context?, *Geophys. Res. Lett.*, 33, L23709, doi:10.1029/2006GL027470). Using the NCEP-NCAR reanalysis for September-October-November, the interannual standard deviation of the field (in this case near surface temperature, T1.5) can be

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calculated pointwise and the anomalies measured relative to the standard deviation (SD). I have used data from 1979-2006 because the re-analysis is most likely to be reliable for this period, and complicating trends in climate are reduced. I have not done any de-trending.

Figure 1 (<http://www.antarctica.ac.uk/met/wmc/vano.png>; sorry I don't know how to insert graphics into a comment) then shows the fraction of the area of 22-80N covered by warm or cold anomalies by year, that exceed (respectively) 2, 2.5, 3 and 3.5 SD.

For "unusual but not exceptional" anomalies, ie 2 SD, it is unsurprising to see cold anomalies predominating in the early part of the record and warm in the latter. But the year with the largest anomalies at 2, 2.5 and 3 SD is 1998, not 2006. Only at 3.5 SD does 2006 become the most exceptional year.

Figure 2 (<http://www.antarctica.ac.uk/met/wmc/vano1.png>) shows the geographical distribution of the anomalies in 2006. The largest in magnitude are in east Siberia; but as variability is larger there they are smaller measured against SD. Europe, and an area in central Asia, both show small regions with 3 SD anomalies. The only 3.5 SD anomaly is one grid point in central Asia.

The lower panel of figure 2, for comparison, shows the same field for 1998: the largest anomalies are in the Canadian Arctic but the most significant are in the Atlantic.

We might prefer to restrict attention to land-areas only; figure 3 (<http://www.antarctica.ac.uk/met/wmc/vano2.png>) shows this. By this measure 2006 is most significant at 2.5 and 3.0 times SD but does not greatly exceed 1998; however in all cases the largest anomalies are negative (for autumn; this is not true for summer).

Hence whether the warmth over Europe in autumn 2006 was exceptional in a hemispheric context depends on exactly how it is examined.

Interactive comment on Clim. Past Discuss., 3, 811, 2007.