

Interactive comment on “A reconstruction of the August 1st 1674 thunderstorms over Holland” by Gerard van der Schrier and Rob Groenland

P. Brohan (Referee)

philip@brohan.org

Received and published: 29 September 2016

This paper presents a reconstruction of a notable historical extreme weather event - a storm in Holland in August 1674: it collects and summarises documentary records of the storm and its impacts, interprets those records as evidence of a particular type of weather event (strong squall line), estimates the magnitude and return period of the storm, and compares it to a present-day event.

This is a useful activity as the nature and frequency of extreme weather is vital for hazards assessment, and the rarity of extreme storms mean that historical data can make a big difference to frequency estimates. It is impressive as it combines the distinct fields of documentary data and storm meteorology, I'd like to see it published.

I think, however, it needs to be improved in presentation, in particular it needs to make

C1

an explicit connection to hazards research. I read the paper with a general feeling of 'Very interesting, but why are you telling me this?' The virtue of historical reconstruction is in what it tells us about the present and the future - the paper does contain information on this: we should perhaps reduce our expectation of tornado damage, and increase our expectation of straight-line wind damage (in Holland), and we should be more cautious about using only modern storms to estimate return periods. This is implicit in the paper - make it explicit and many more people will be interested. What should we worry more (or less) about as a result of the research?

The documentary data is treated as reliable. In general this is probably OK as it is diverse and consistent, but I am suspicious of the reported hail sizes. 20cm diameter hail is way-out extreme - extraordinary claims require strong evidence and it's not clear to me from the paper how strong the evidence is here. Is this one report taken at face value or multiple independent lines of evidence?

Similarly, estimating a return period for 20cm hail based on a distribution fitted to hail between 2 and 8cm is not a good idea. Such extrapolation (fig 8) is not 'wrong' but the confidence we should have in the extrapolated result is very small, and we should be clear about this. Also, the damage in the storm was from wind, so we need the return period of the wind fields rather than the hail - I'm betting that we'd get similar winds much more often than once in 10,000 years.

I was confused by the discussion of embedded vortices (section 3.2) - I accept that the pattern of observed damage can be attributed to straight-line winds with embedded vortices, but I suspect that just about any pattern of damage could be so attributed. Can this be clearer: why are we sure it wasn't tornados, why are we sure it was straight-line winds, why are we sure we need embedded vortices? Also, are church towers always blown down in the direction of the wind? I know nothing at all about this, but it seems possible that structural weaknesses might cause them to fall in other directions.

In section 6 the paragraph 'It has been argued that the nave of the Dom ... which makes

C2

that the wind gusts hit these churches from the side as well' made no sense to me. I just didn't get either the point it was making or how it contributed to the conclusions.

I think the abstract could be improved by making it more specific. Instead of 'An estimate of the wind speeds associated with this event and an estimate of the return time of this event is given', why not say 'The event had wind gusts estimated at up to 90 m/s and a return period larger than once in a thousand years.' Instead of 'an interpretation using modern meteorological concepts is given' why not say, 'the event is interpreted as an exceptionally active cold front'. The specific is almost always more compelling than the general.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., doi:10.5194/nhess-2016-263, 2016.