



ECSS2025-172, updated on 17 Apr 2026

<https://doi.org/10.5194/ecss2025-172>

12th European Conference on Severe Storms

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A reconstruction of 1 August 1674 thunderstorms over the Low Countries

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On 1 August 1674 an active cold front moved over the Low Countries. The accompanying thunderstorms along the squall line were abnormally active, leading to large-scale damage in Europe, from northern France to the northern parts of Holland where damages were particularly severe. The damages included destroyed bridges, like in Antwerp, to numerous churches, churchtowers and other buildings and ships lost in the harbour or at sea. The city of Utrecht was hit hardest by this event resulting in widespread damages that are still recognizable in the city landscape. Using reported and pictured observations of damages and modern meteorological concepts, the reconstruction of the storm points to an exceptionally severe squall line. The orientation and the velocity of the squall line are reconstructed and shows a developed bow-echo structure. An estimate of the strength of the strongest wind gusts is $\approx 55\text{--}90\text{ m s}^{-1}$ and is based on an assessment of the damages caused by this event. A rough estimate of the return time of this event, based on observed hail size, is between 1000 and 10,000 years.

The view in this presentation disagrees with the common perception that the damages are caused by a single tornado and the arguments for this novel view will be presented. However, there is evidence of embedded vortices in the damages to the city of Utrecht. These observations are discussed in the presentation.