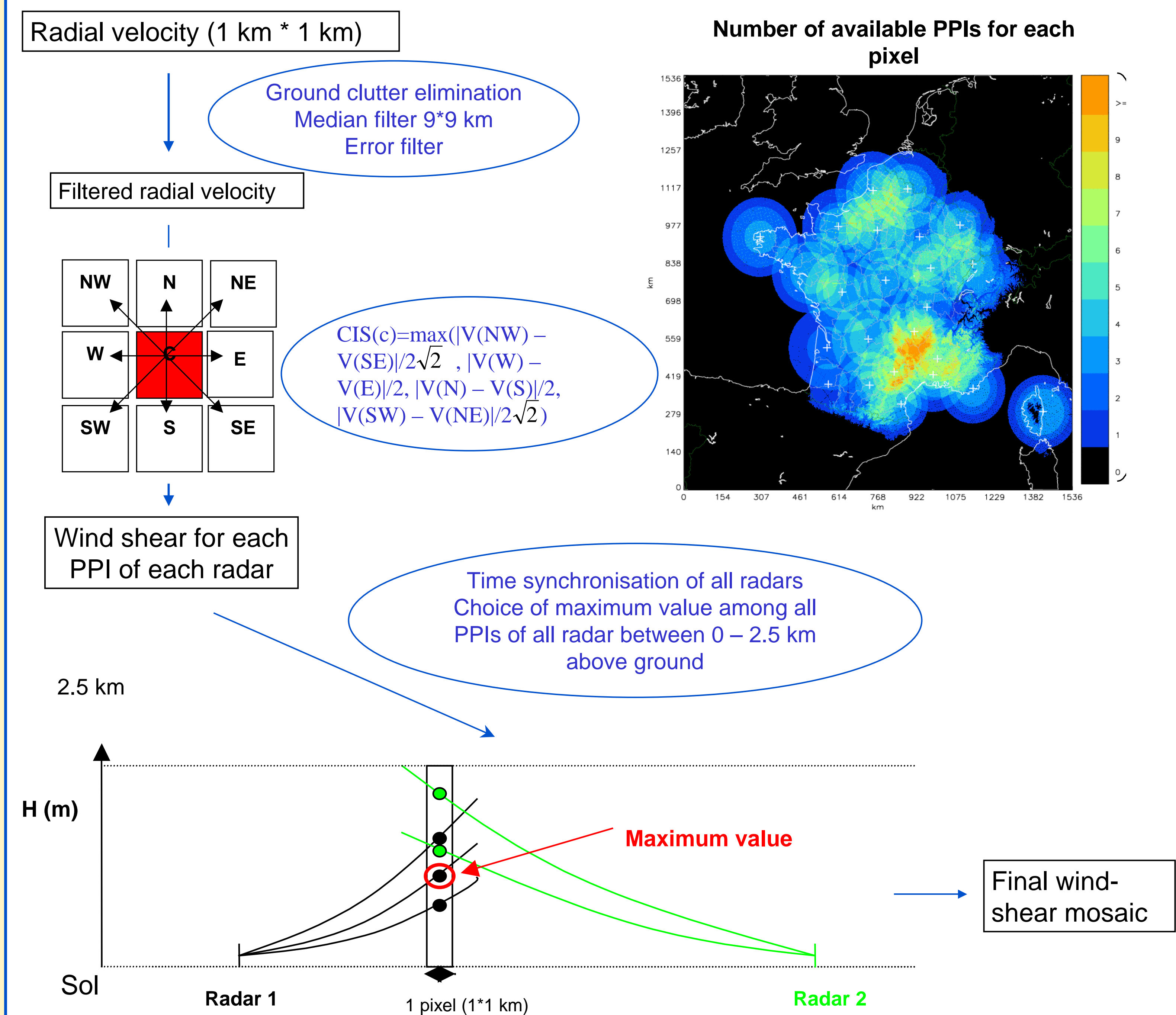


Development of a nation-wide low-level wind shear mosaic in France

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Météo France

Methodology



Comparison between wind-shear and gusts inside the area defined by CONOs¹

CONO : « OPIC radar »

- meteorological object defined by the contour of reflectivity over **35 dBZ** (available every 5 minutes)
- The lifetime of the object is estimated (a matching is done from one time step to the other)
- Contains attributes : size, **maximum gust in 10 min recorded under its track...**
- The **98th percentile of shear** recorded under its track

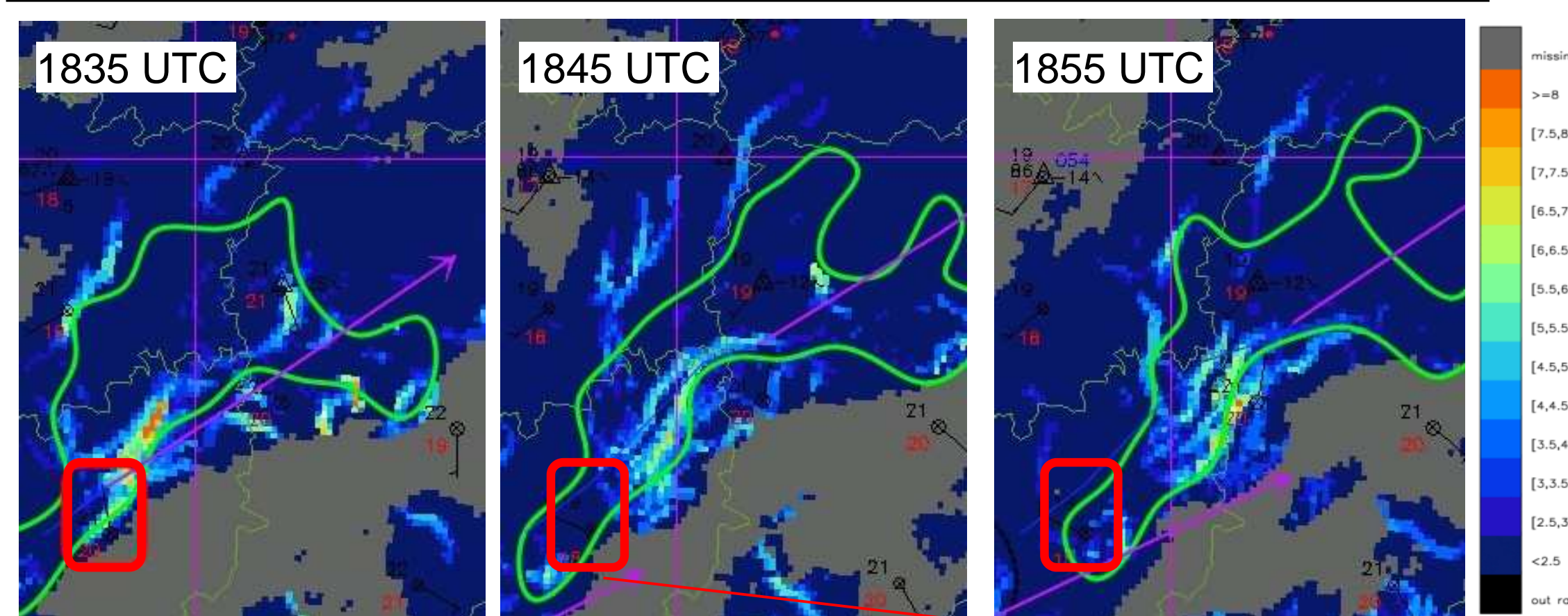
Aim of this statistical comparison :

To evaluate the strength of the link between the values of wind shear and the occurrence of strong gusts to see if the shear could be added as an additional information inside the CONO to predict the risk of strong gusts.

Methodology of comparison

- for each CONO, we select during its complete life cycle : the maximum value of the 98th percentile of shear and the maximum gust recorded under its track
- Only the CONOs associated with a gust over 60 km/h are selected
- 17 meteorological events from 2008 to 2011 (thunderstorms, meso-cyclones, front lines...)
- 1643 CONO

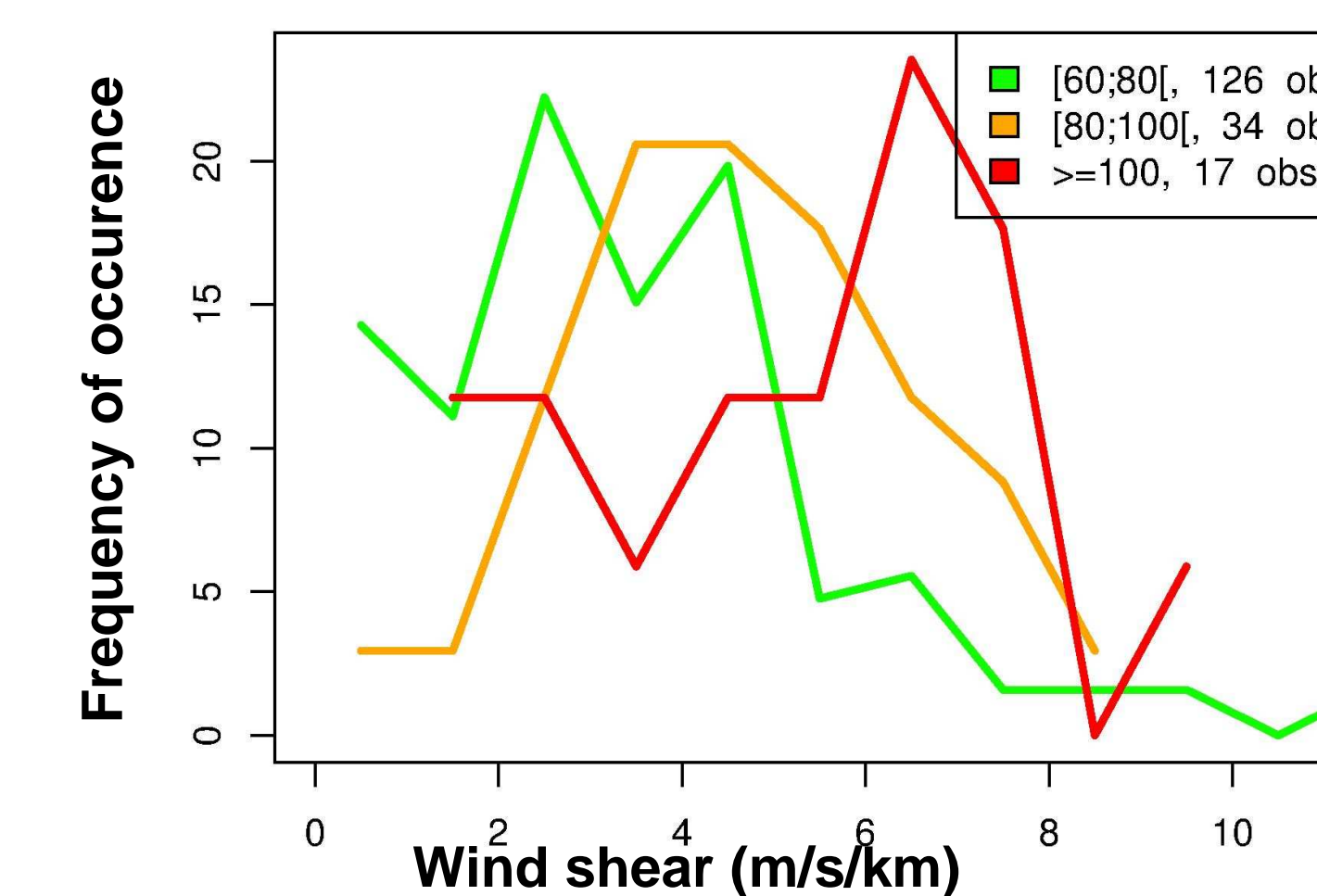
35 dBZ CONO contour superimposed to the wind shear – 26/08/2010



Indicatif	Date	Nom	Altitude	Lat	Lon	RR 60min	RR 6min	ff	Gust
60382001	26/08 1835:05	MARGNYCOMPIE	92 m	49.43	2.80		7,7 mm	28 km/h	100 km/h
60382001	26/08 1845:00	MARGNYCOMPIE	92 m	49.43	2.80	15,4 mm		28 km/h	100 km/h
60382001	26/08 1855:4	MARGNYCOMPIE	92 m	49.43	2.80		7,5 mm	38 km/h	100 km/h

Associated with this CONO, the ground station in the red rectangle recorded 2 strong gusts (100 km/h) but at the rear of the maximum shear signature

Frequency of occurrence of the maximum 98th percentile of shear for each CONO according to the class of 3 gust (km/h)



The peak of the shear distribution are shifted towards the stronger values when the gust class is increased

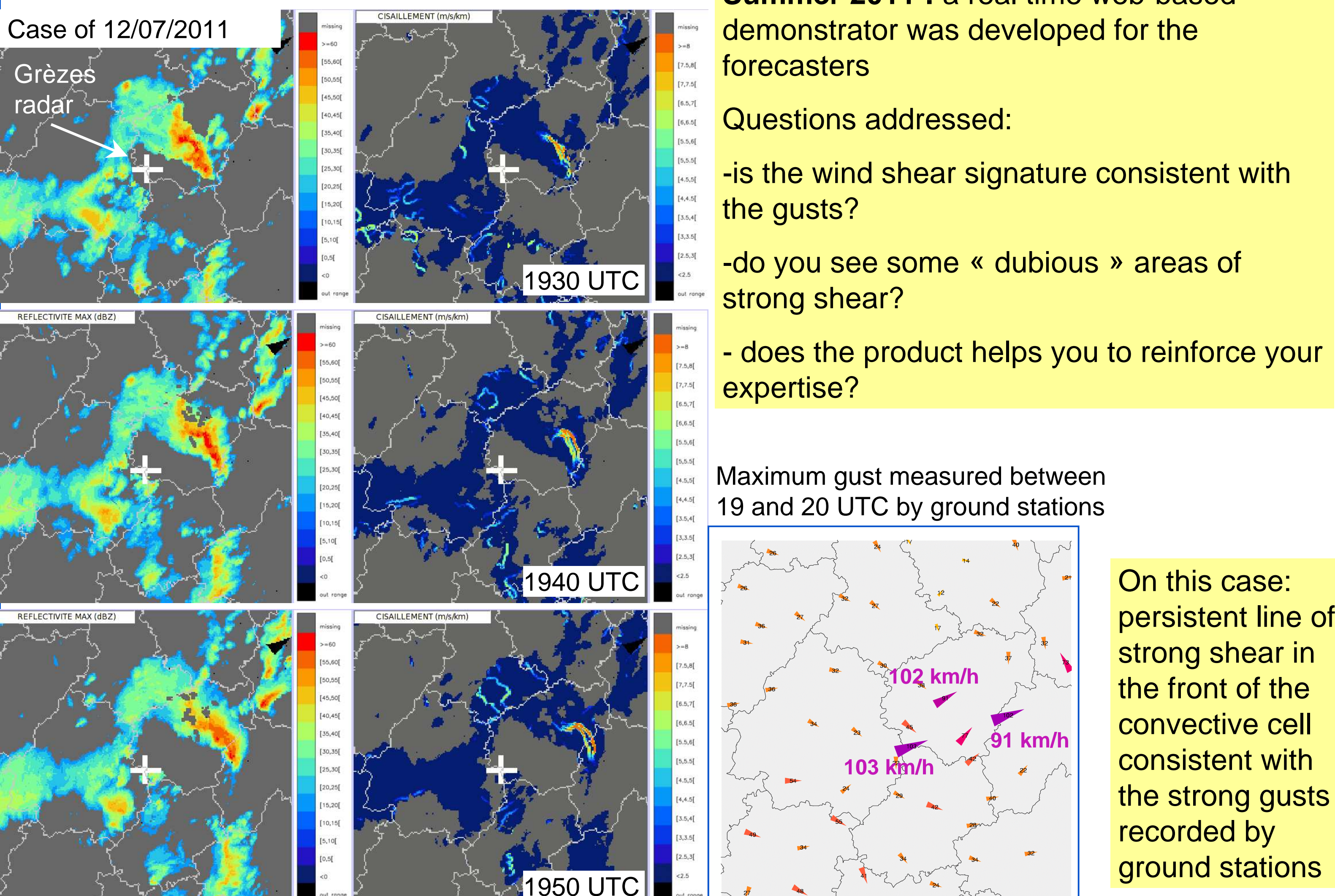
→ Assess the link between high shear values and strong gusts

Result of contingency table and Chi-2 test :

Moderate link between gust and wind shear

¹ Convective Now-casting Object

Real time experimentation



Outlook

- ❖ Although we have seen in many cases lines of strong shear ahead of convective lines associated with strong gust, this is not always the case. The number of false alarms is high :
 - sometimes because the algorithm detects vertical wind shear
 - sometimes because it detects shear in altitude that is not associated with gusts at the ground
 - or because strong shear (change of wind value or of wind direction) does not necessary generate strong gusts?
- ❖ Ideas for improvement :
 - The maximum height will be lowered to 1.5 km
 - Tests of coherence between different PPIs will be done
 - The comparison between gusts and shear measured under the track of CONO will be done once again with more cases and with a CONO defined by a 41 dBZ threshold to select only the most intense cells

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