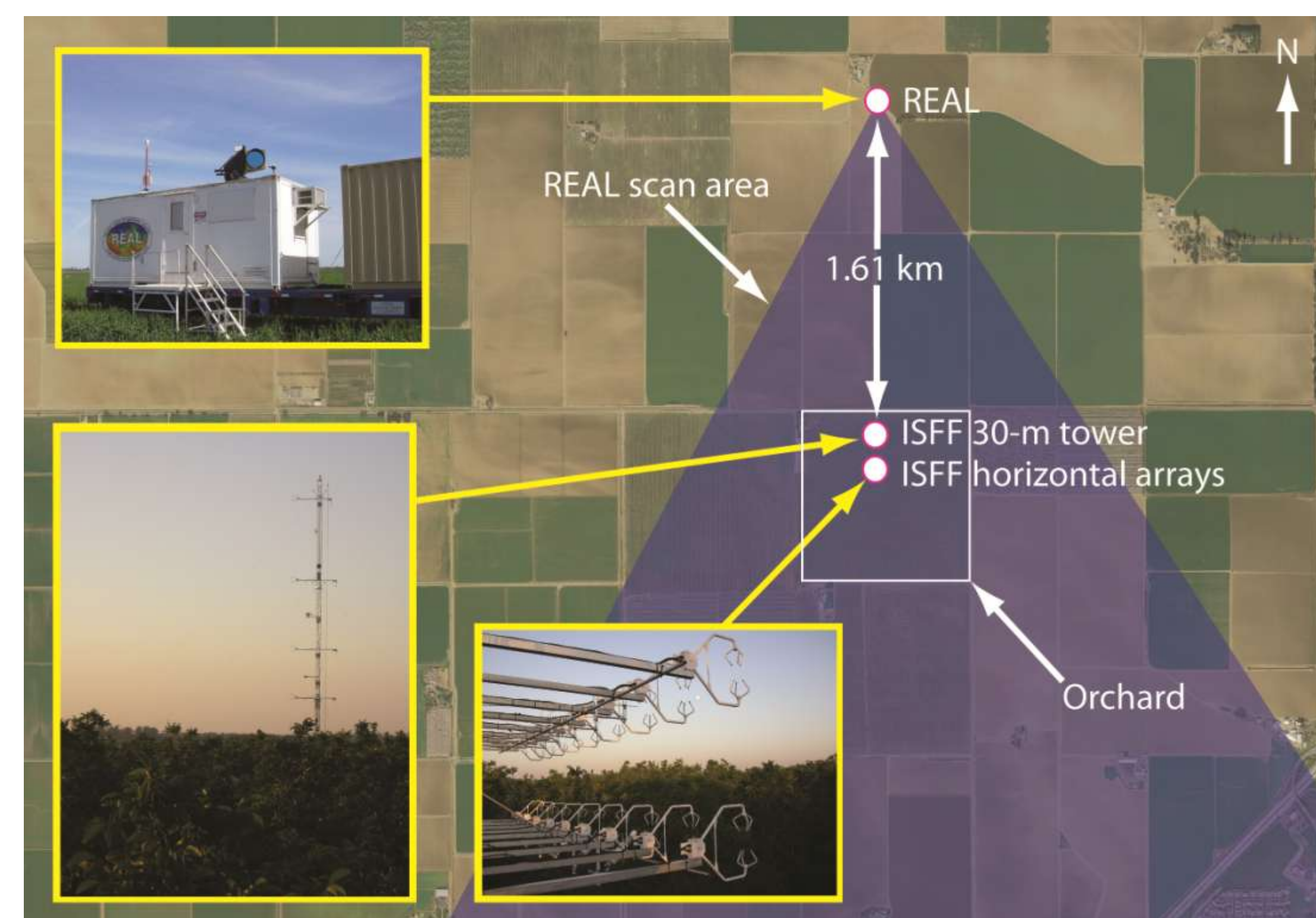


# Wind Measurement Capability of the Raman-shifted Eye-safe Aerosol Lidar (REAL)

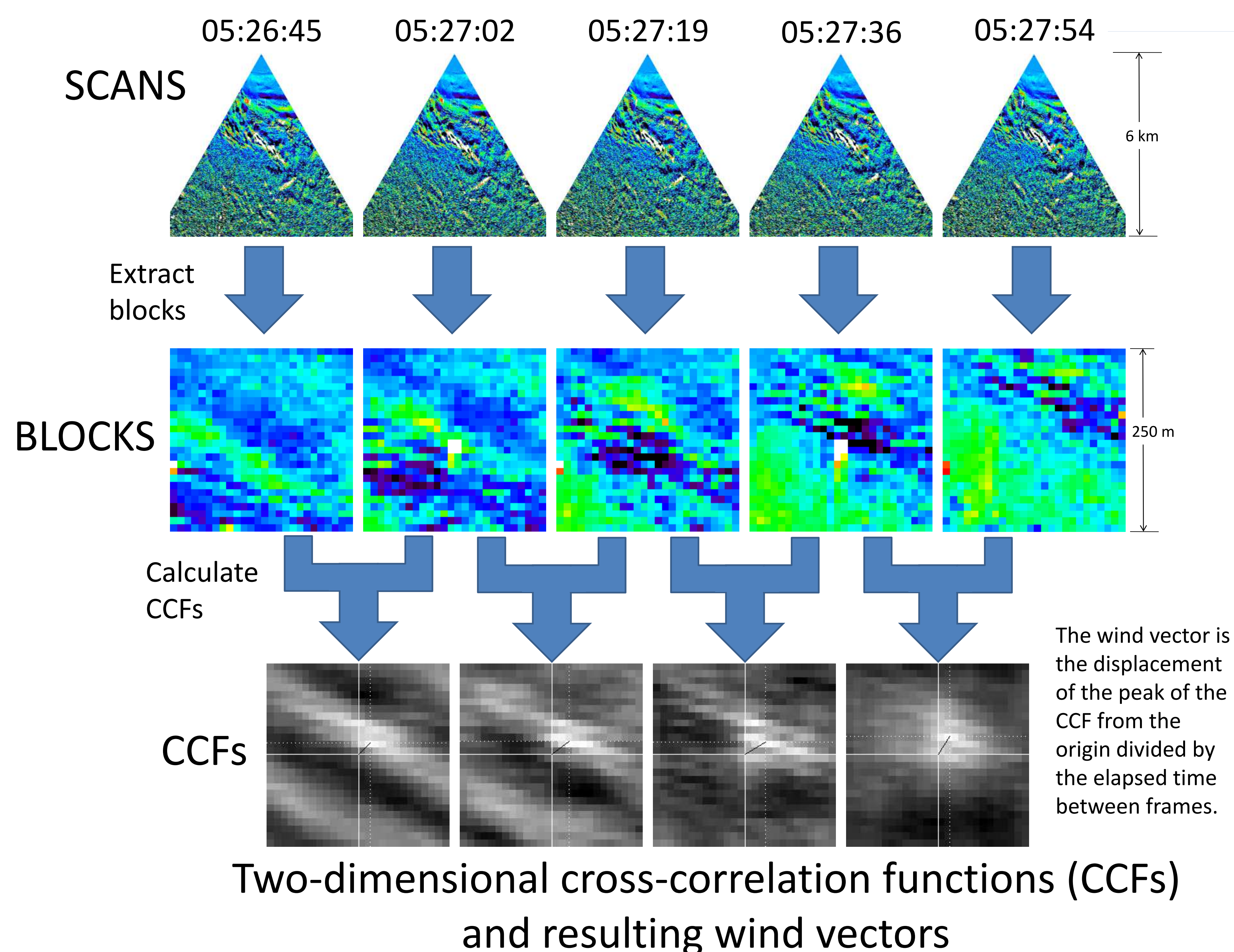
First Results of NSF Award 0924407

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1. EXPERIMENT: Data was collected during the CHATS Field Campaign March-June 2007, Dixon, CA



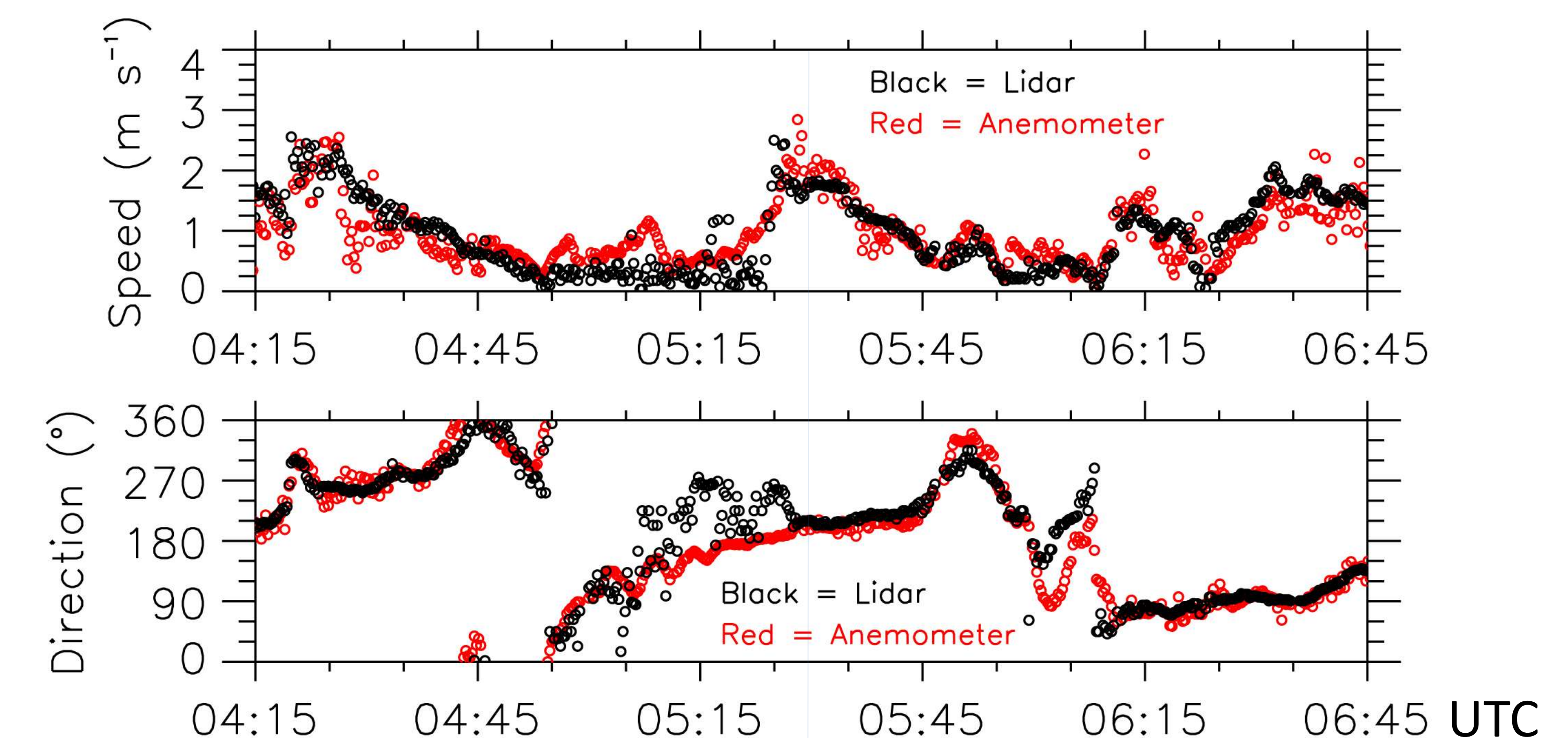
2. DATA PROCESSING: Wind vectors were calculated from the REAL scans by image processing and cross-correlation. Below: An example of 5 scans from 21 March 2007:



3. RESULTS: Wind vectors from the REAL data were compared with anemometer data for two very different cases:

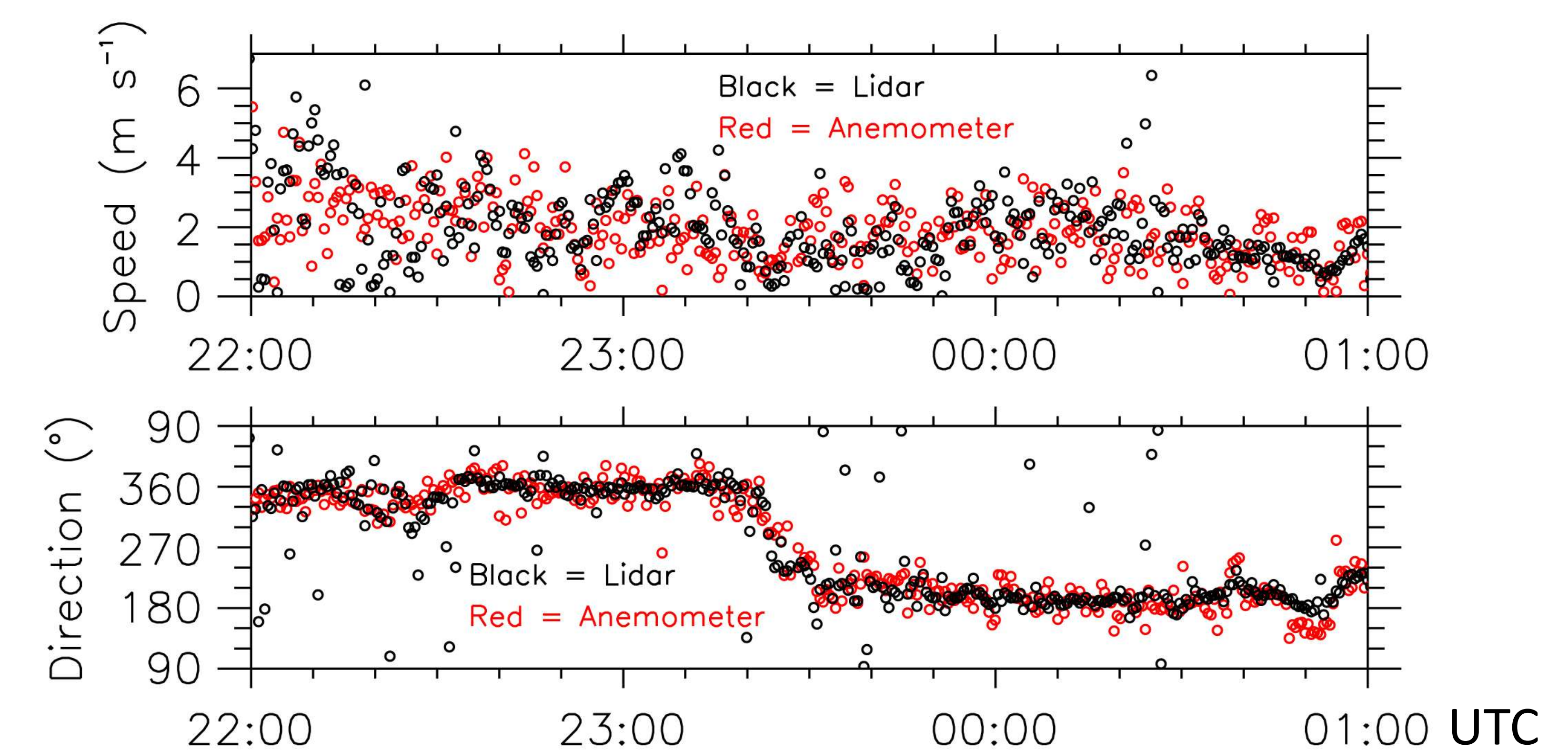
Case 1. Weakly stable, nearly-quiet, evening atmosphere.

21 March 2007  
One scan per 17 s  
250 m x 250 m block  
Weakly stable  
Wind speeds: < 2.5 m/s



Case 2. Unstable, turbulent, daytime boundary layer with frontal passage.

26-27 April 2007  
One scan per 30 s  
500 m x 500 m block  
Unstable, turbulent  
Wind speeds: < 5 m/s



## 4. CONCLUSIONS

Turbulence (or the absence of it) has a significant impact on the comparisons. The vectors from the lidar data are the result of significantly more spatial averaging than the vectors from the anemometer. Agreement between lidar and anemometer winds appears much better in the weakly stable case because the wind field is likely more uniform over the area. Although poor agreement exists for wind speed in the unstable case, the means are in reasonable agreement. The wind direction from the lidar in the unstable case is good with the exception of a few outliers. These preliminary results suggest that more temporal averaging of the anemometer data be done to compensate for the large spatial averaging of the lidar image block size.