

# Mediterranean orographic rainfall: observation during HyMeX SOP1

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## Abstract

During the HyMeX SOP of Autumn 2012, EPFL-LTE collected rainfall information using a network of disdrometers, a radar and a 2D video disdrometer. We present examples of two different rainfall events and outline future work using these data.

## Introduction

The Hydrological Cycle in the Mediterranean Experiment (HyMeX) is an international research effort formed to investigate the complex dynamics of the hydrological system in the Mediterranean. A Special Observation Period (SOP) for this experiment ran from 1 September to 30 November 2012. During this period, the Environmental Remote Sensing Laboratory from the École Polytechnique Fédérale de Lausanne (EPFL-LTE) collected rainfall measurements using a network of OTT Parsivel-1 disdrometers, an X-band radar, and a 2D video disdrometer (2DVD) deployed in the Ardèche region of Southern France.

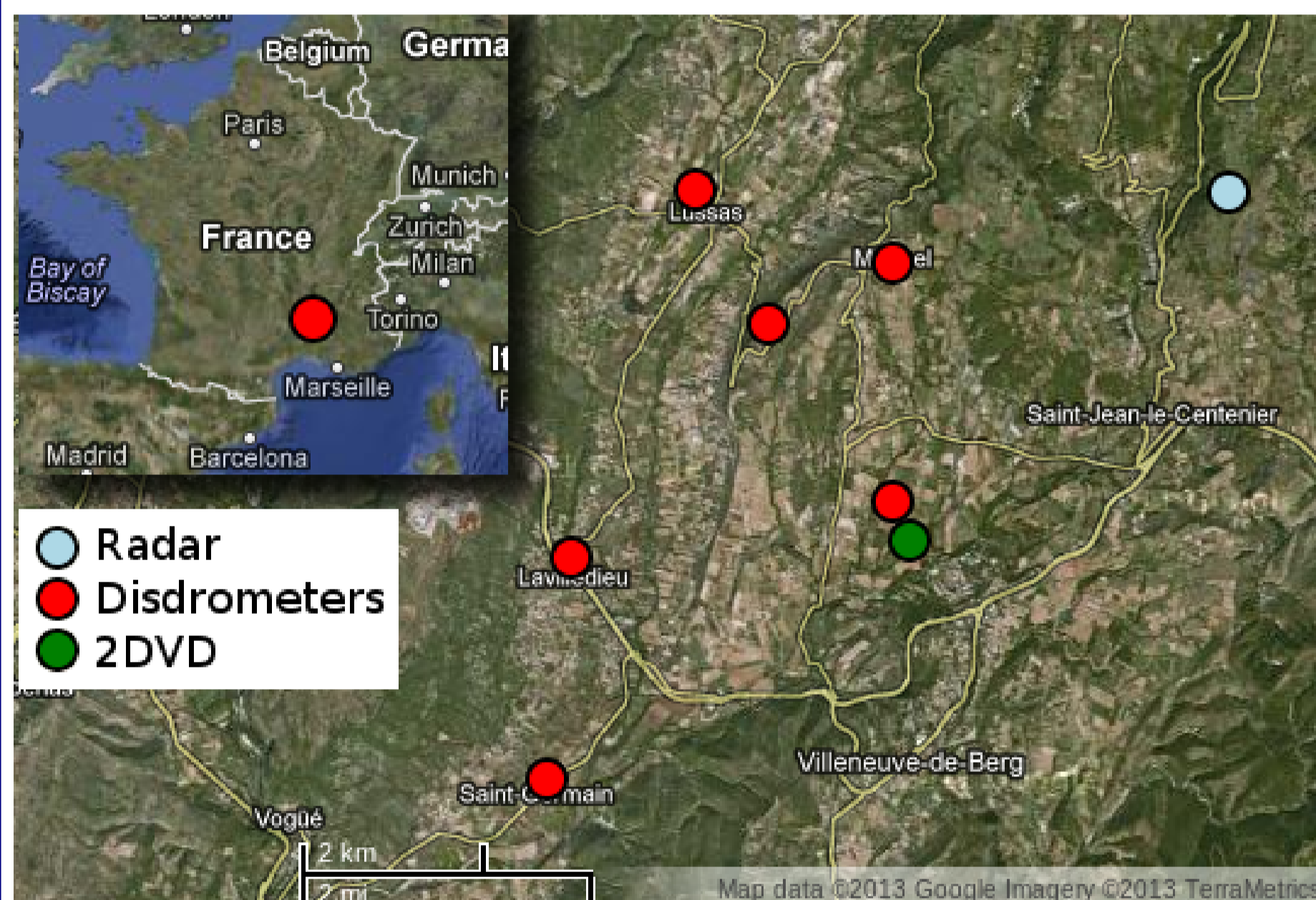


Figure 1: Map of LTE instrument locations



Figure 2: LTE's X-Band radar (MXPol)



Figure 3: A disdrometer (L) and the 2DVD (R)

## Data collected during SOP

- About 10 significant events recorded
- More than 100 hours of precipitation

### STRATEGY

- **Radar:** series of PPIs, RHIs and vertical Doppler profiles

**Disdrometers:** drop size distributions (DSDs) of each event at temporal resolution of 30 seconds.

## Convective rain event

High intensity convective rainfall event between 02:00 and 05:30 on the 24<sup>th</sup> September 2012.

- Strong wind and lightning activity.
- Mean per-station rain amount of 15.4 mm.
- Peak 30-s recorded rain rate: 152.8 mm/h.

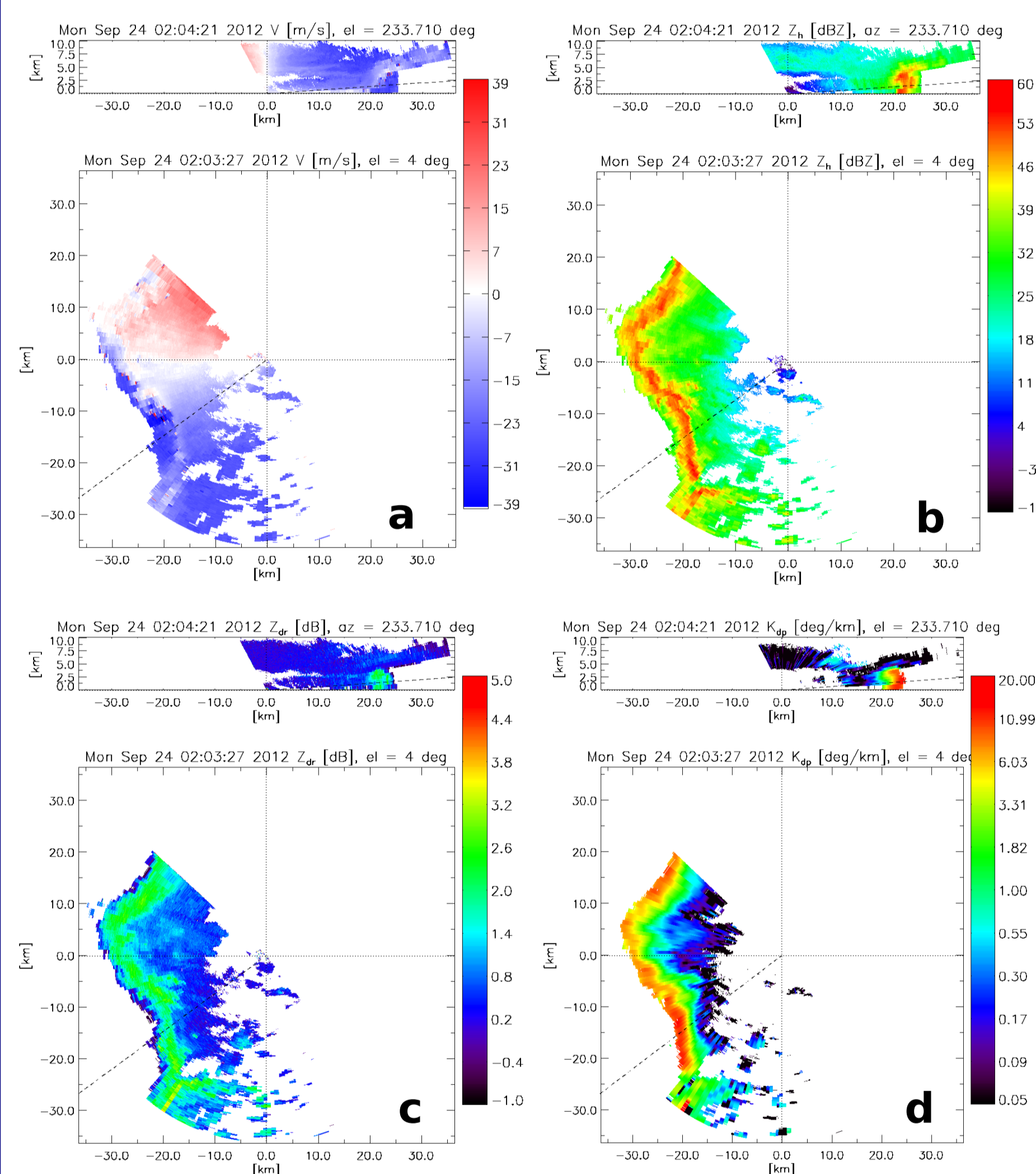


Figure 4: Radar observations, convective event. Radial velocity (a),  $Z_H$  (b),  $Z_{DR}$  (c),  $K_{DP}$  (d)

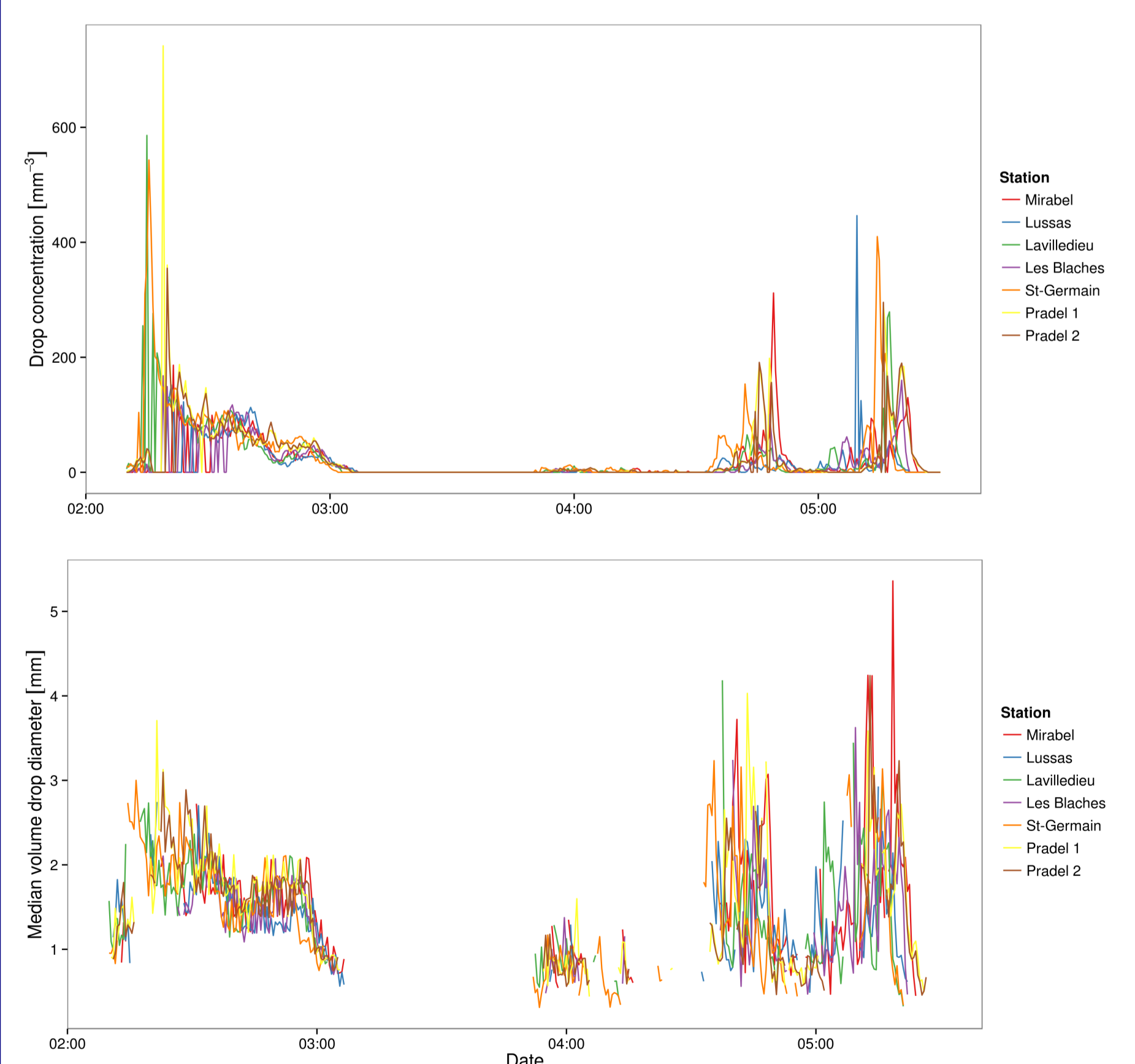


Figure 5: Drop concentration (liquid precipitation) for convective event

## Stratiform rain event

Stable stratiform rain event between 21:30 on the 25<sup>th</sup> October and 04:00 on the 27<sup>th</sup> October 2012.

- Medium-intensity rainfall widespread over the observed domain.
- Mean per-station rain amount of 47.53 mm.
- Peak 30-second rain rate: 104.3 mm/h.

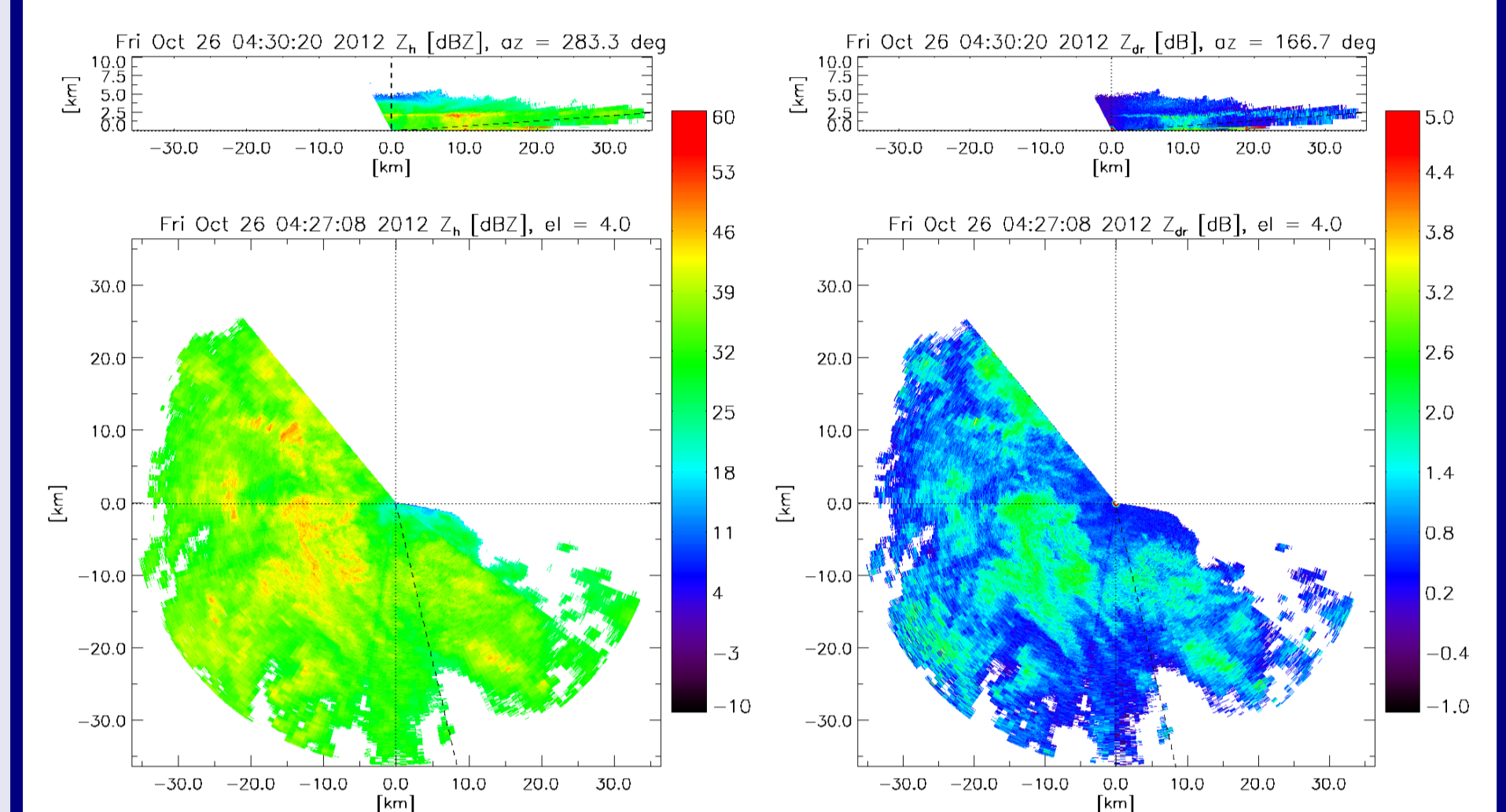


Figure 6: Radar observations, stratiform event.  $Z_H$  (a),  $Z_{DR}$  (b).

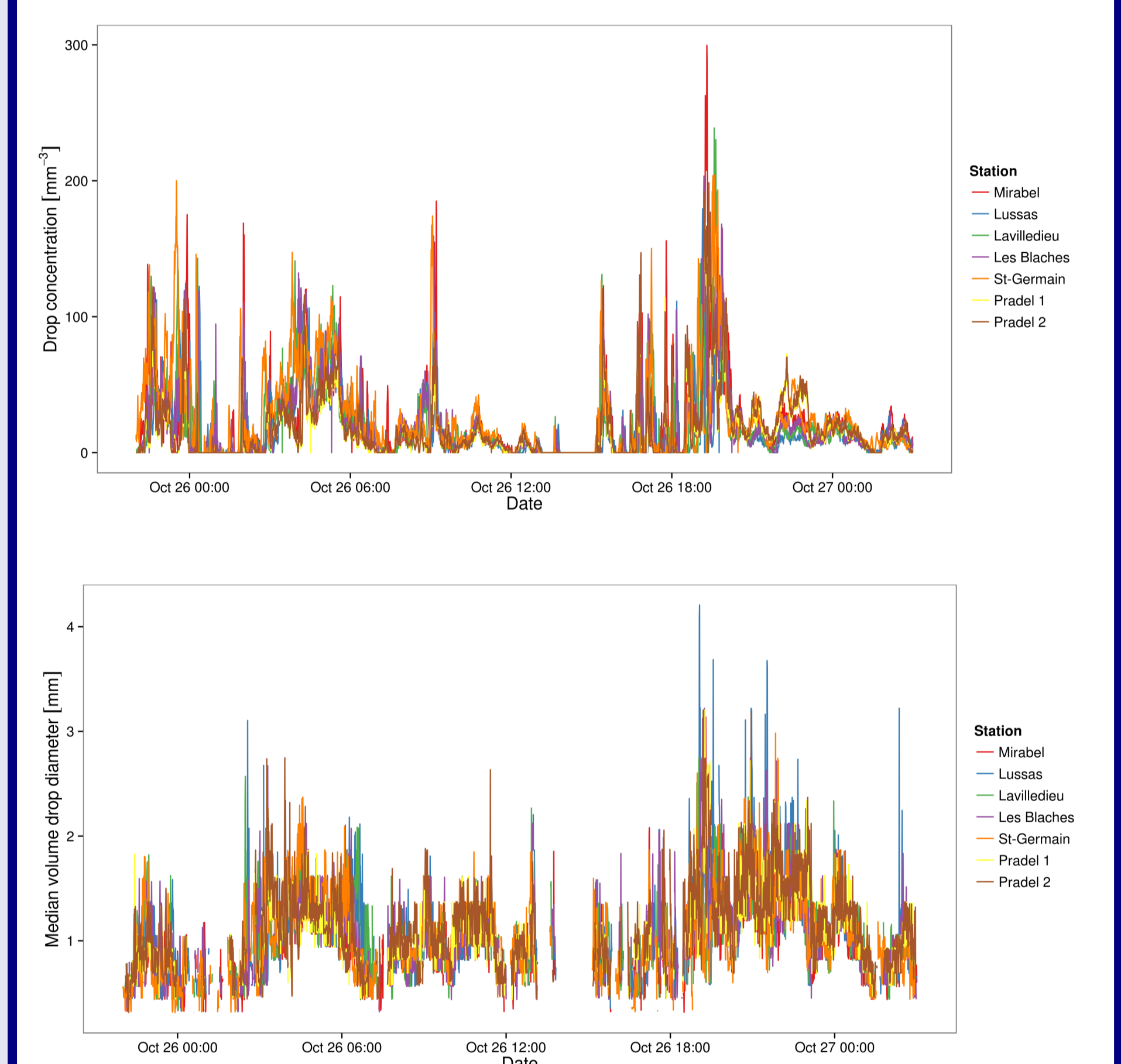


Figure 7: Drop concentration (liquid precipitation) for stratiform event

## Future work

Focus on the small-scale variability and microphysics of orographic rainfall in the Mediterranean.

- Variability of the DSD, at the scale of a Numerical Weather Model pixel.
- Variability of the DSD with altitude.
- Radar-based hydrometeor classification.
- DSD retrieval using polarimetric observations.