An overview of the Analysis of Precipitation Processes in the Eastern Ebro Subbasin (WISE-PreP) Project

Joan Bech[1], Mireia Udina[1], Bernat Codina[1], Sergi Gonzalez[2], Albert Garcia[1,3], Patricia Altube[4], Jordi Mercader[4], Alfons Callado[2], Joan Arús[2], Oriol Rodríguez[1], Enric Casellas[1], Francesc Roura-Adserias[1], Àngela Rosell[1], Francesc Polls[1], Branko Kosovic[5], Àlex Montornès[6], Pau Escribà[2], Laura Trapero[7], Alexandre Paci[8], Brice Boudevillain[9], Ali Tokay[10]

(1) Universitat de Barcelona, Spain; (2) AEMET, Spain; (3) Universitat Politècnica de Catalunya, Spain; (4) Servei Meteorològic de Catalunya, Spain; (5) NCAR/UCAR, USA; (6) Vortex, SL, Spain; (7) CENMA/IEA, Andorra; (8) Centre National de Recherches Météorologiques (CNRM), Université de Toulouse, METEO-FRANCE, CNRS, France; (9) Université Grenoble Alpes, France; (10) NASA/GSFC, USA

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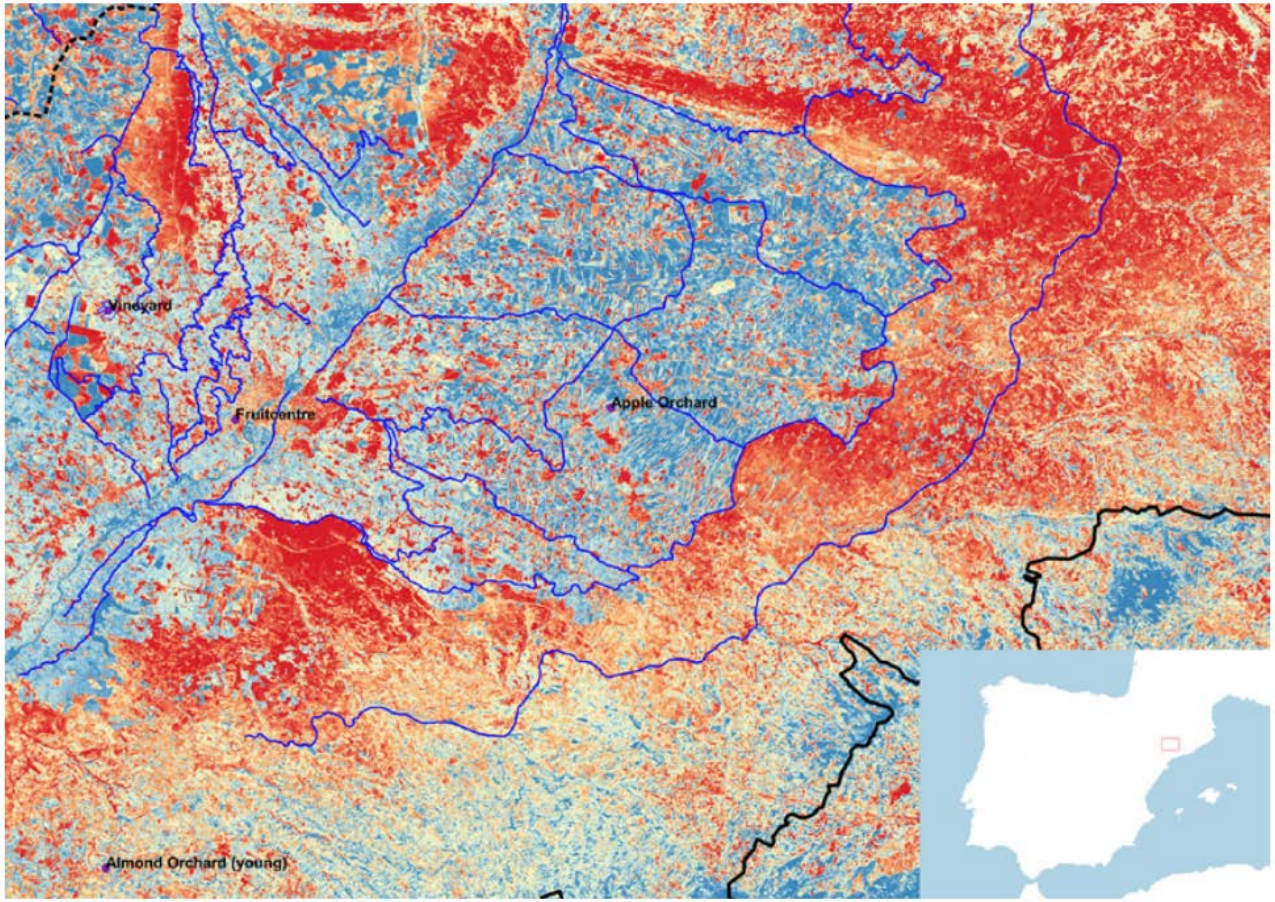
Outline

- Introduction
- WISE-PreP objectives
- Preliminary studies
- Field Campaign
- Final Remarks

Introduction

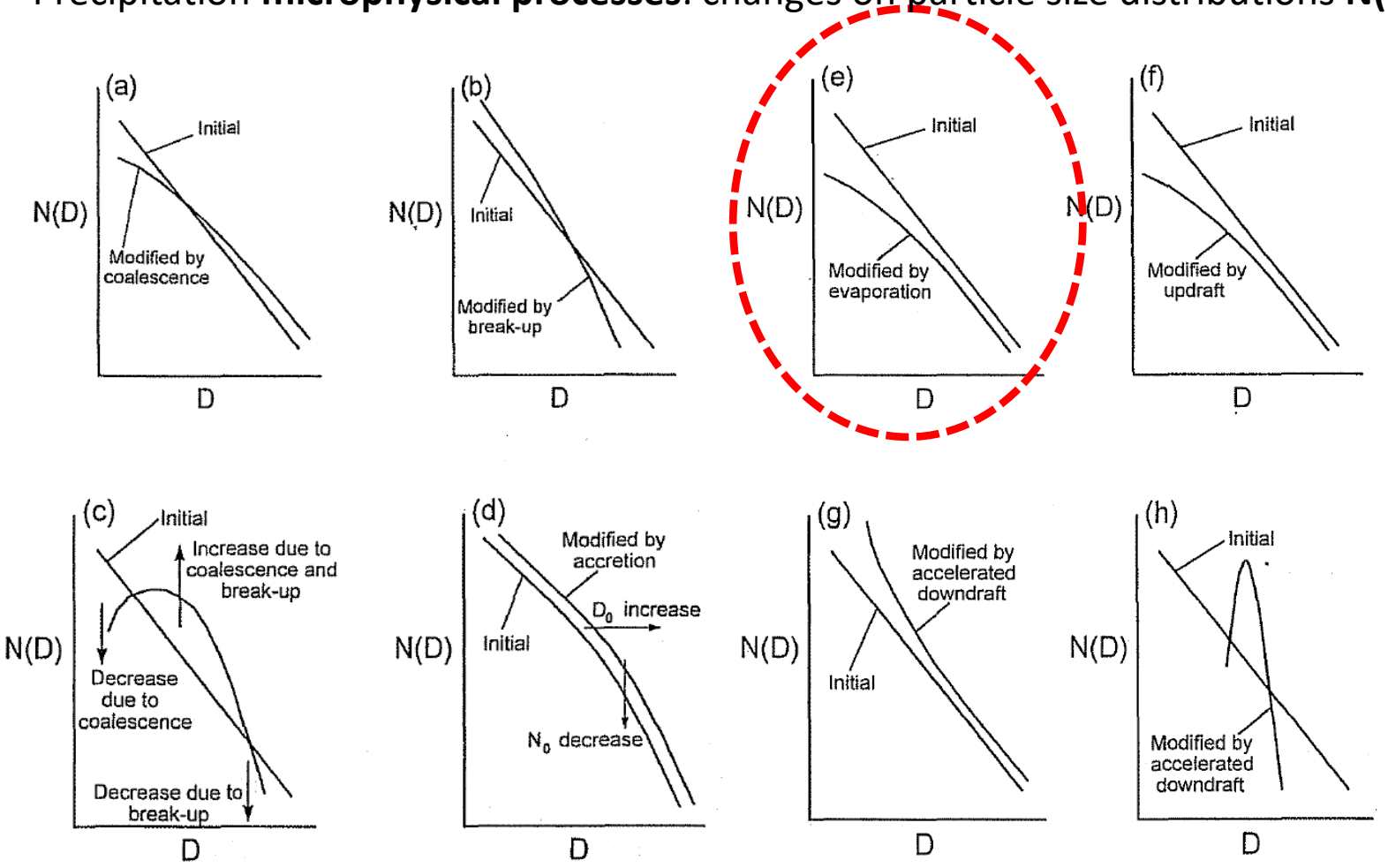
Land Surface Interactions with the Atmosphere over the Iberian Semi-Arid Environment (**LIAISE**) Field Campaign (**LOP** spring-fall; **SOP**)



Boone et al (2019)

Introduction

Precipitation **microphysical processes**: changes on particle size distributions **N(D)**



Rosenfeld & Ulbrich (2003)

WISE-PreP Objectives

- What is the impact of surface (**irrigated** vs **rainfed** only **areas**) and susbsequent low level atmospheric conditions upon precipitation processes (**frequency**, **intensity**, **stratiform** vs **convective** regime, precipitation microphysics dominant processes, etc.)?

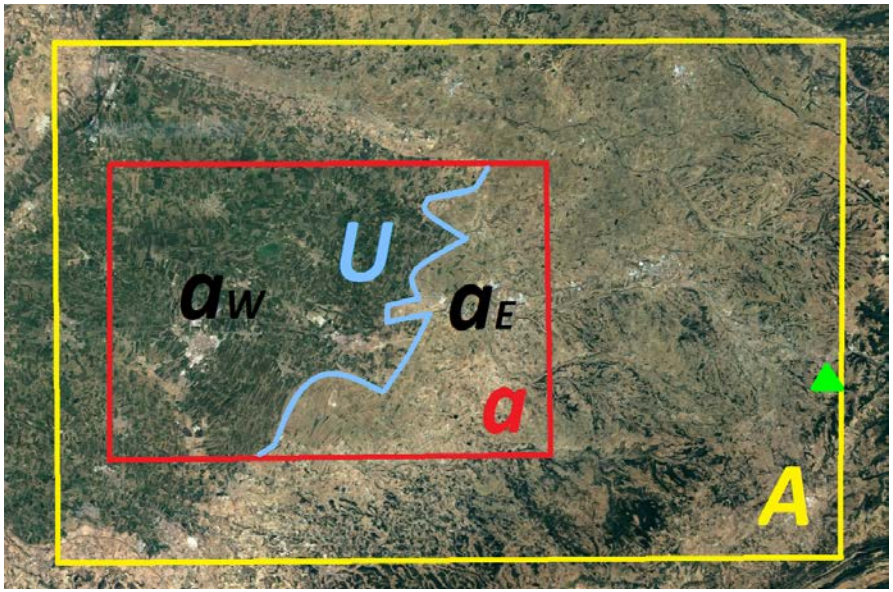
  - *Impact at **seasonal** temporal scale (**subdaily** patterns at $\Delta t \sim 1h$, $\Delta x \sim 1$ km over the **LIAISE** region of study) – **existing** data sets.*

  - *Impact at individual **event scale** - analysis of high resolution precipitation profiles ($\Delta t \sim 1min$, $\Delta z \sim 100$ m, 3 to 6 km AGL) – **LIAISE campaign***

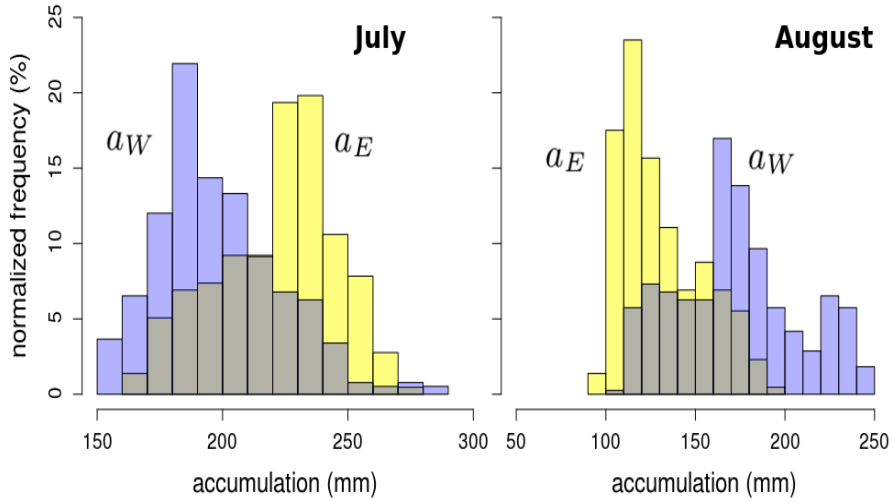
- Importance for process studies and remote sensing of precipitation, both ground-based (C-band Doppler **weather radar**, **MRR profiler**, **disdrometer, raingauge**) and spaceborne precipitation estimates.

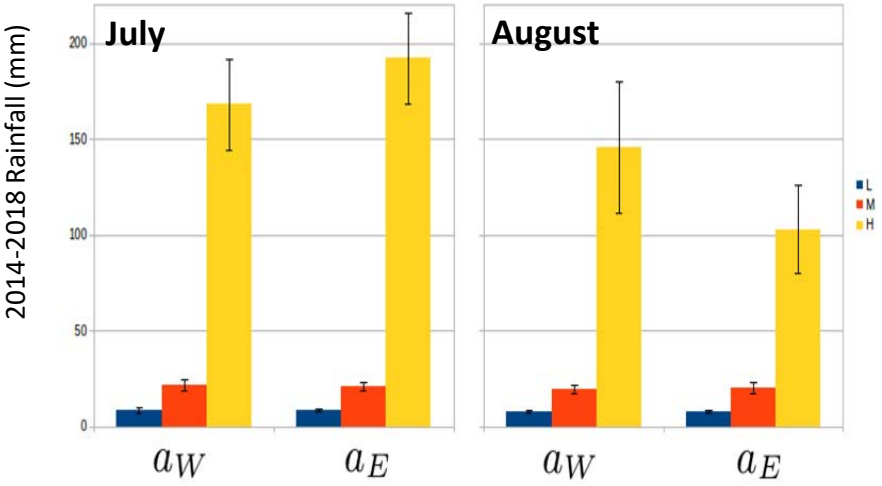
- **Case studies** with **WRF-ARW** ($\Delta x \sim 1$ km) and **AEMET γ-SREPS (EPS)**

Preliminary studies



Preliminary analysis 2013-2019 SMC weather radar precipitation estimates (**hourly, 1 km x 1km**)



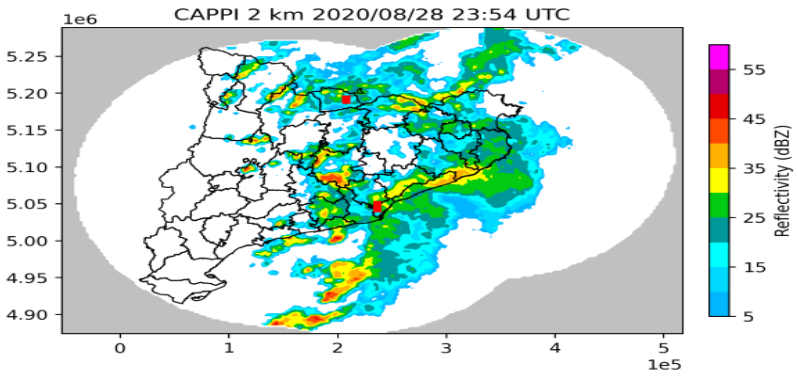


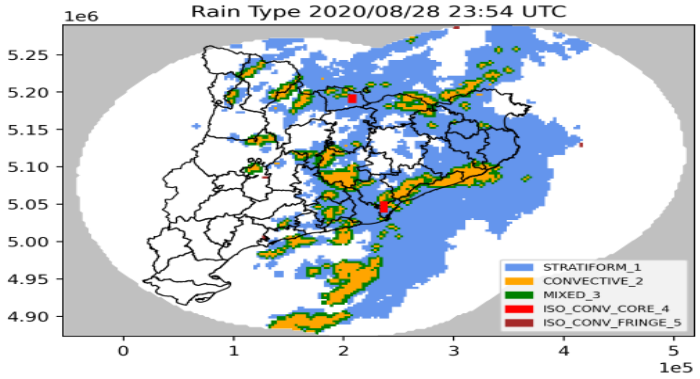
Contribution to total monthly precipitation from different hourly intensities.

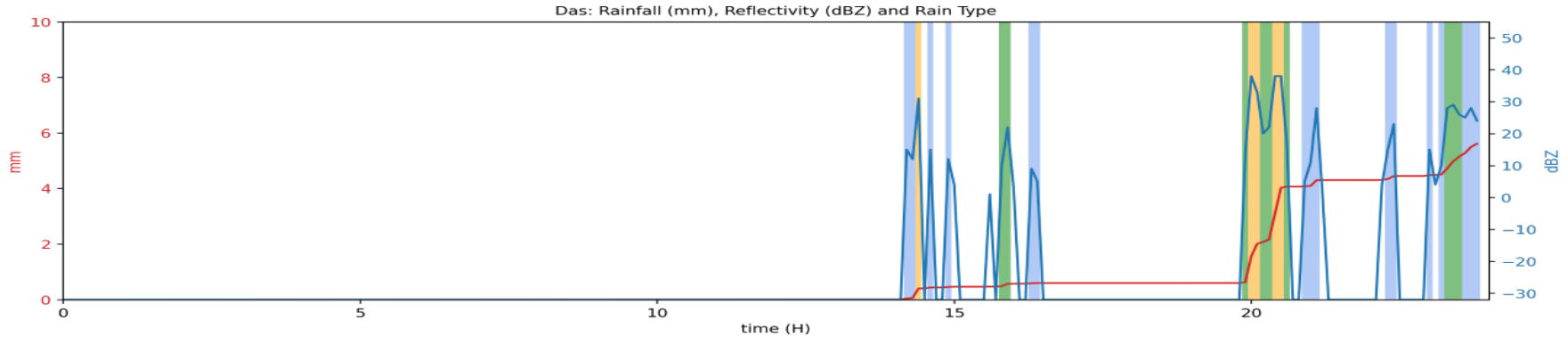
Low < 0.3 mm/h 0.3 < Moderate < 0.8 mm/h High > 0.8 mm/h

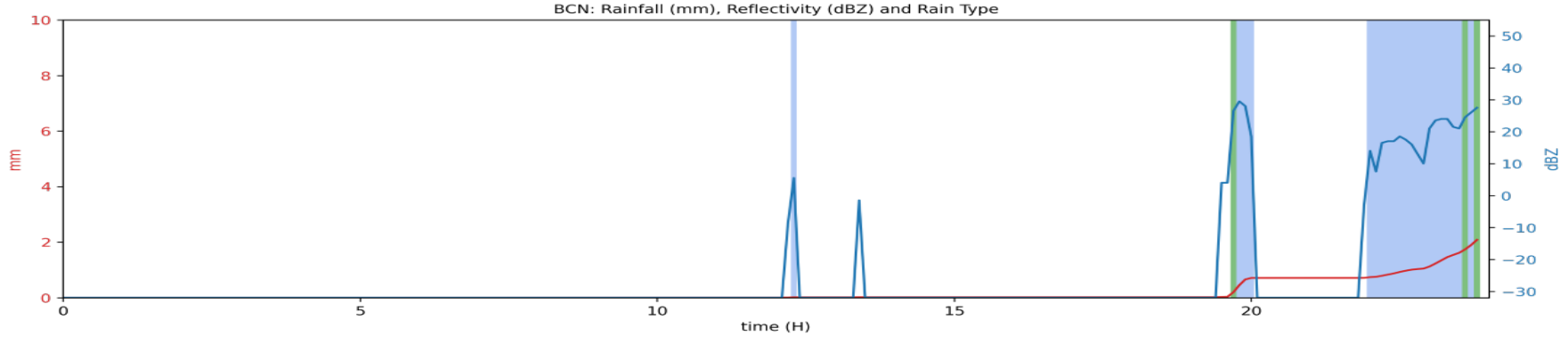
Preliminary studies

Rain Type classification (Powell et al 2016)



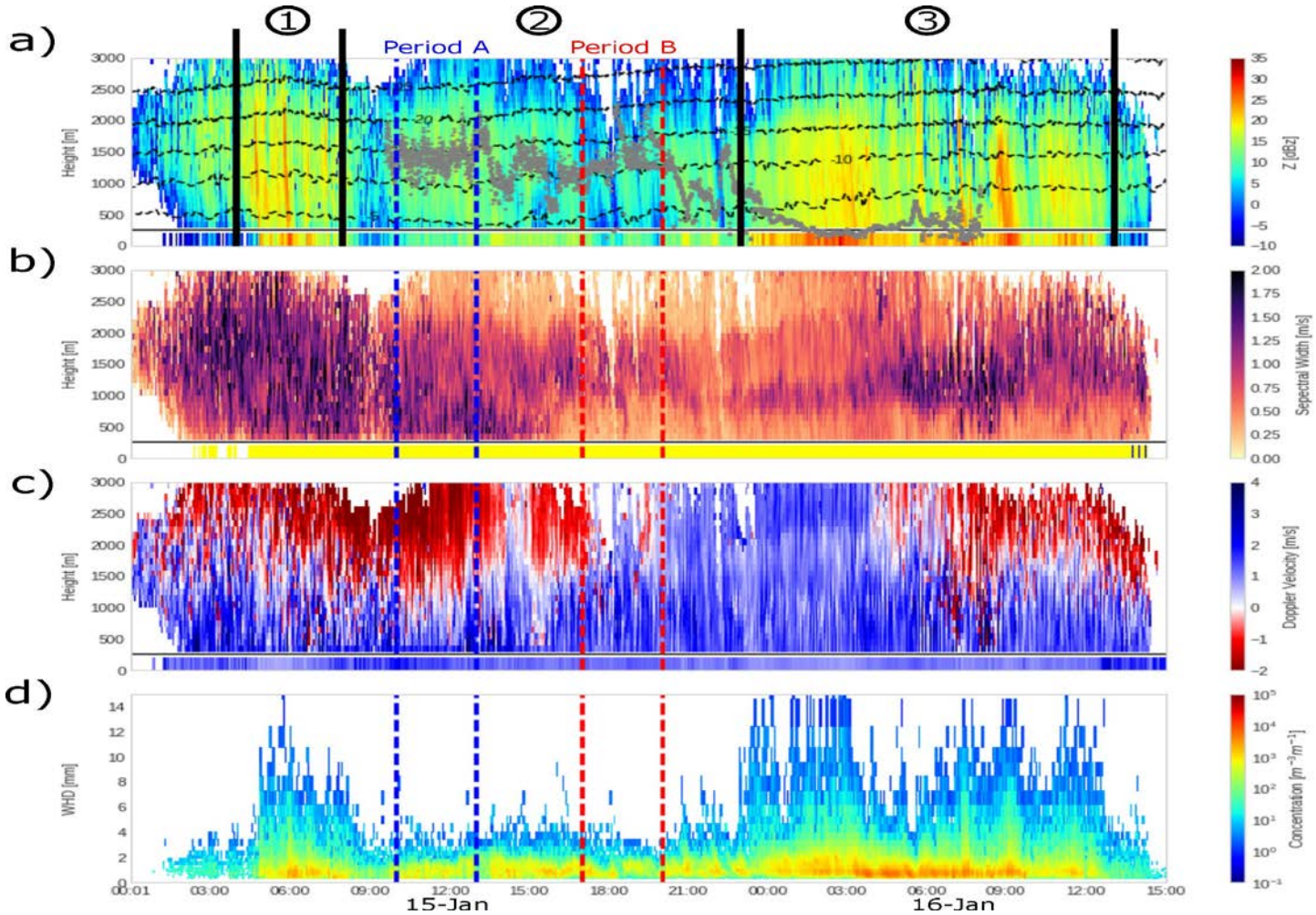






Preliminary studies

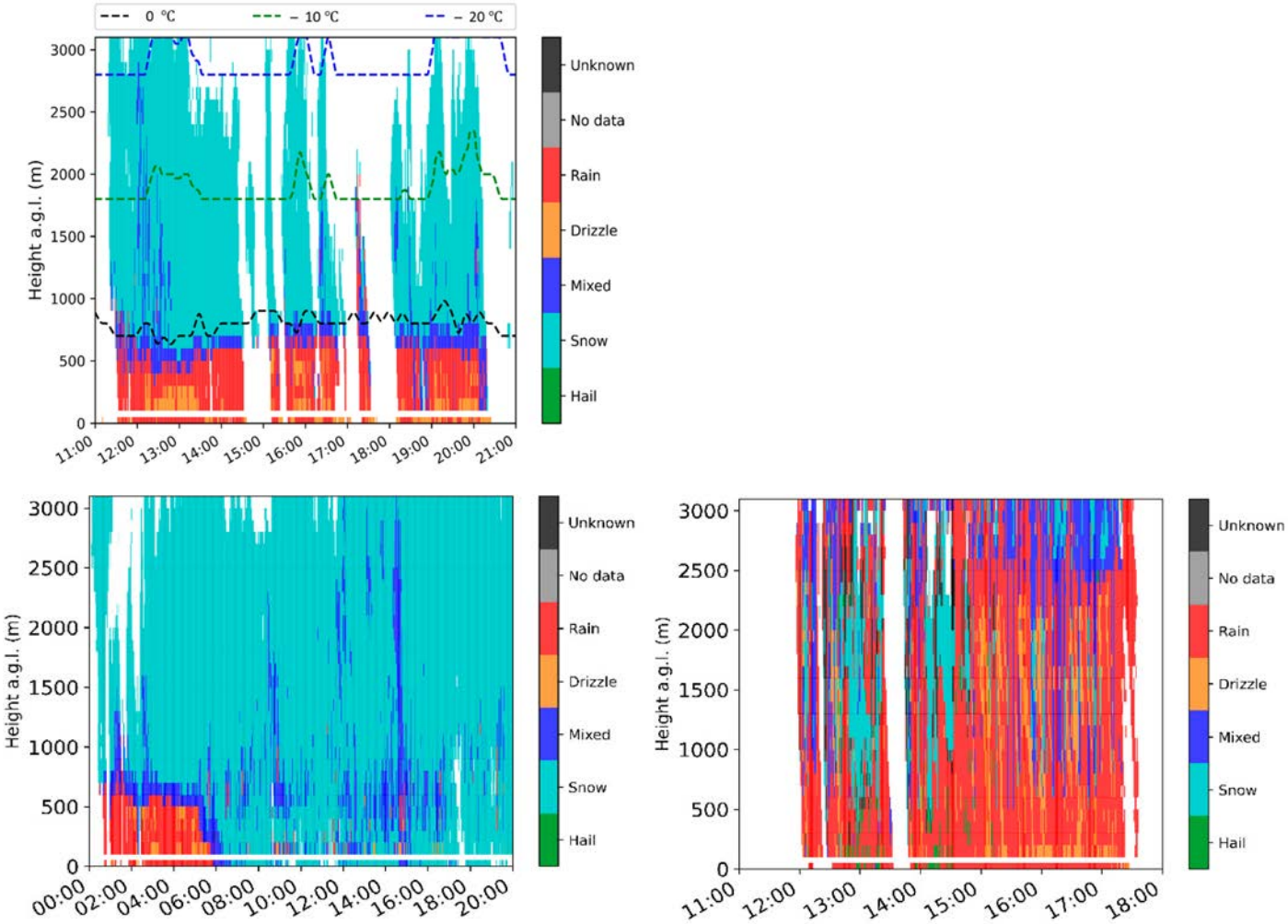
Analysis based on Micro Rain Radar (Vertically Doppler K band radar) & disdrometer (PARSIVEL2).



15-16 Jan 2017 **Cerdanya-2017** case study Gonzalez et al (2019), Udina et al (2020), similar to Soula et al (2021).

Preliminary studies

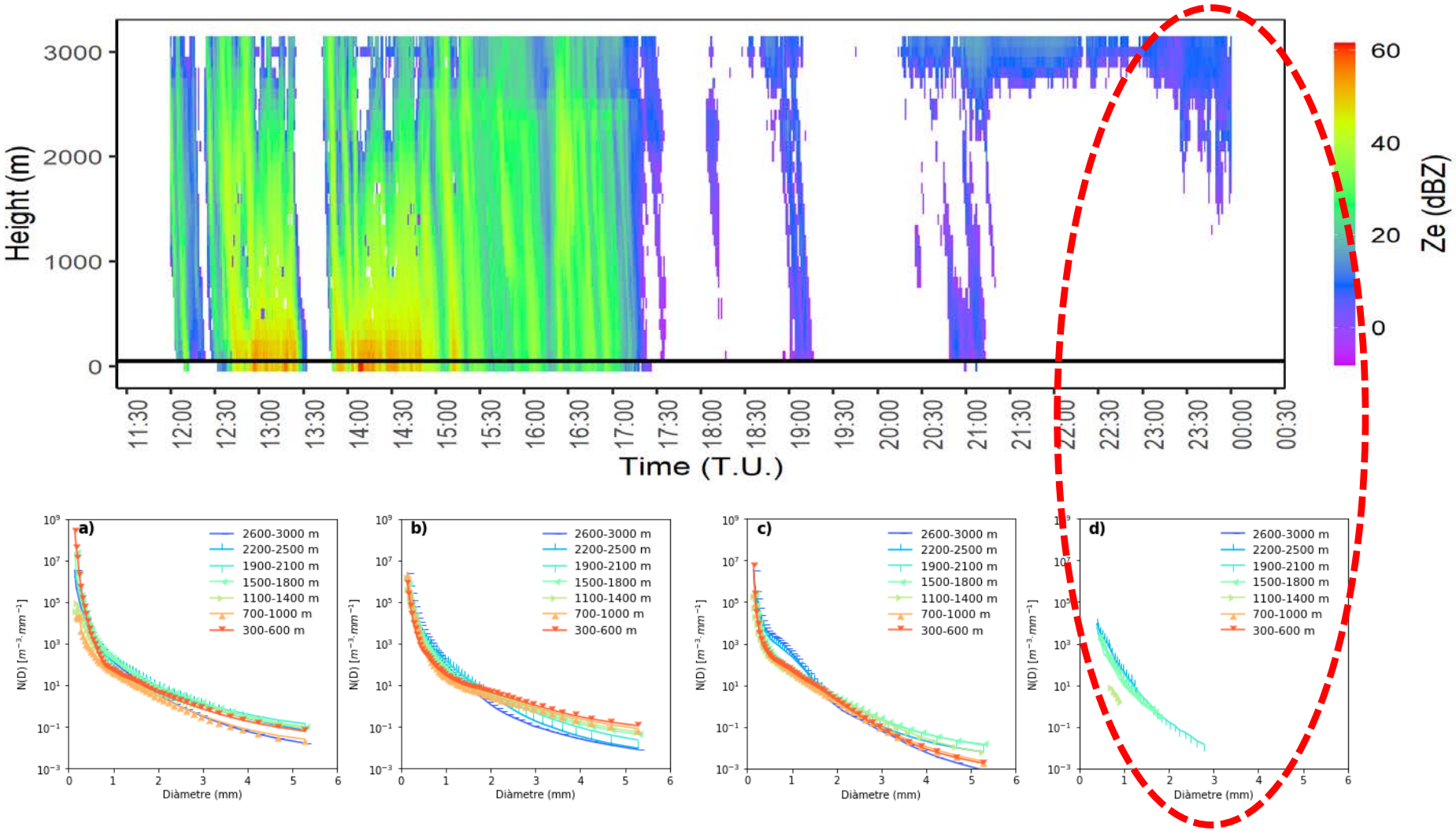
Hydrometeor type & Conv. vs Strat.



Hydrometeor type profiles (HTP) and rainfall type (27 March 2017, Cerdanya-2017 field campaign, top), and HTP for 24 March 2018 and 28 June 2018 (bottom). García-Benadí et al (2020).

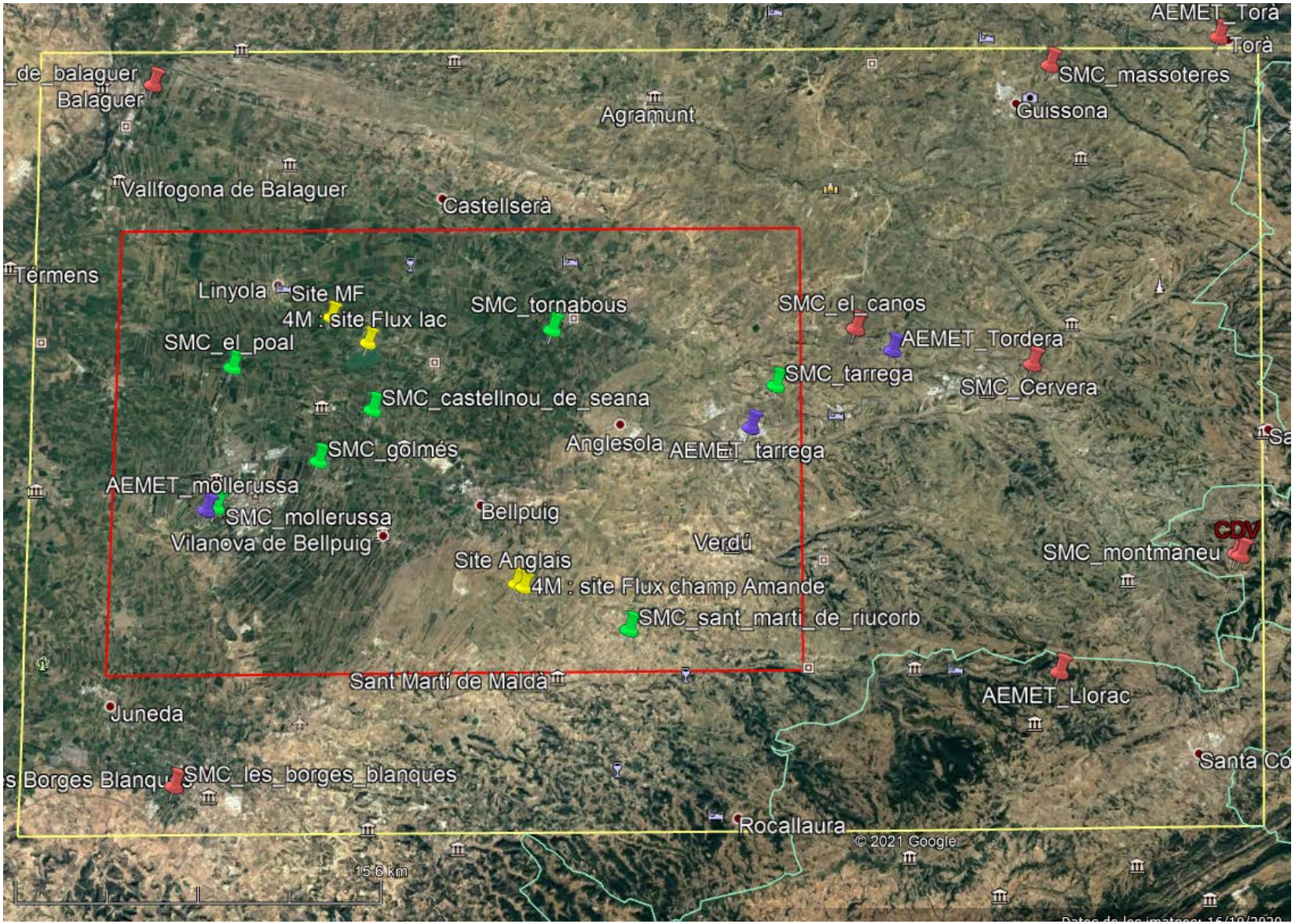
Preliminary studies

Virga Case



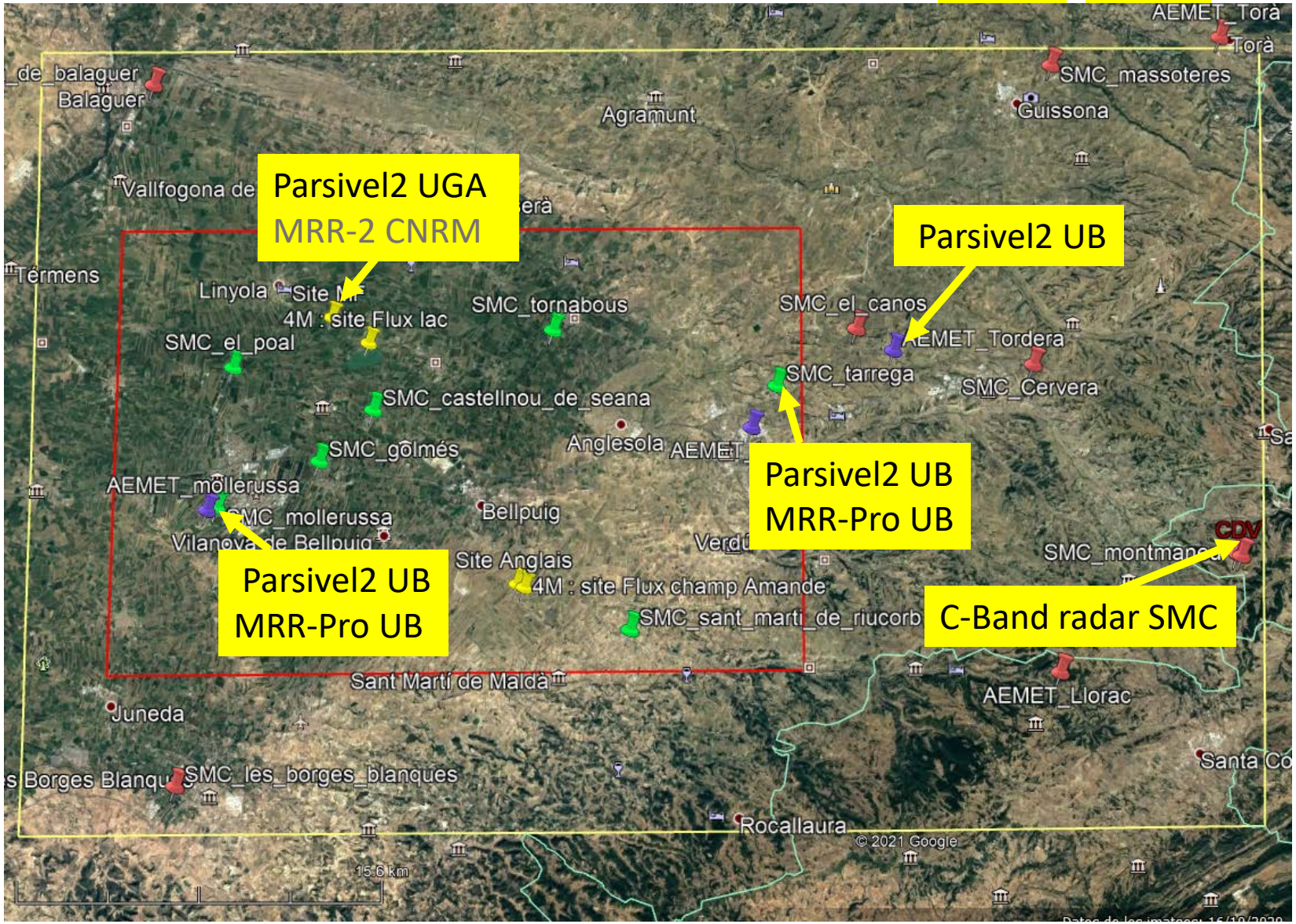
a) 12.30 – 13.30Z; b). 13.45 – 15.00Z; c). 15.30 – 17.00Z; d) 23.00 – 23 59Z 2018-06-28 virga case (TFM A. Aparicio)

Field Campaign

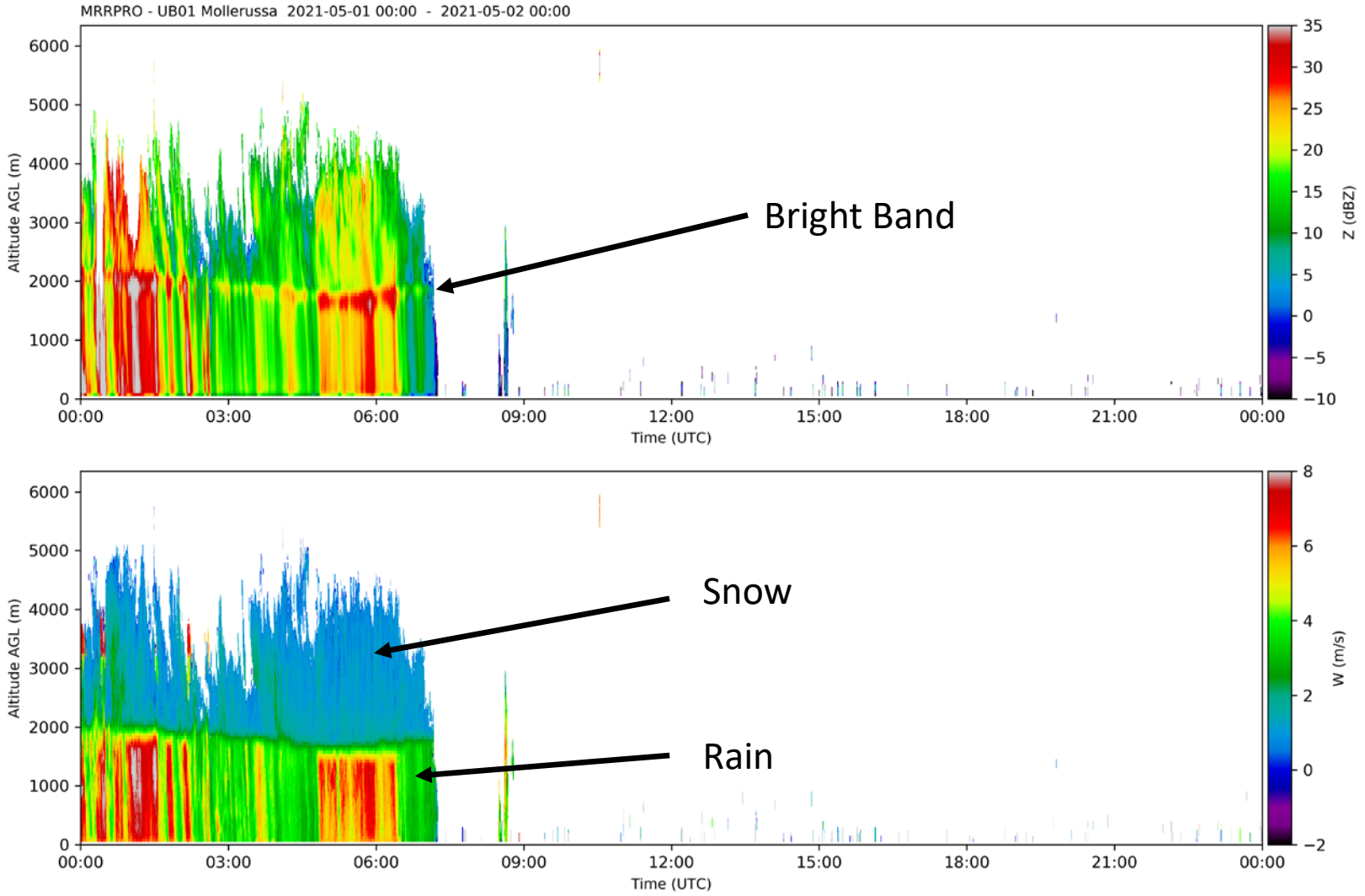


Field Campaign

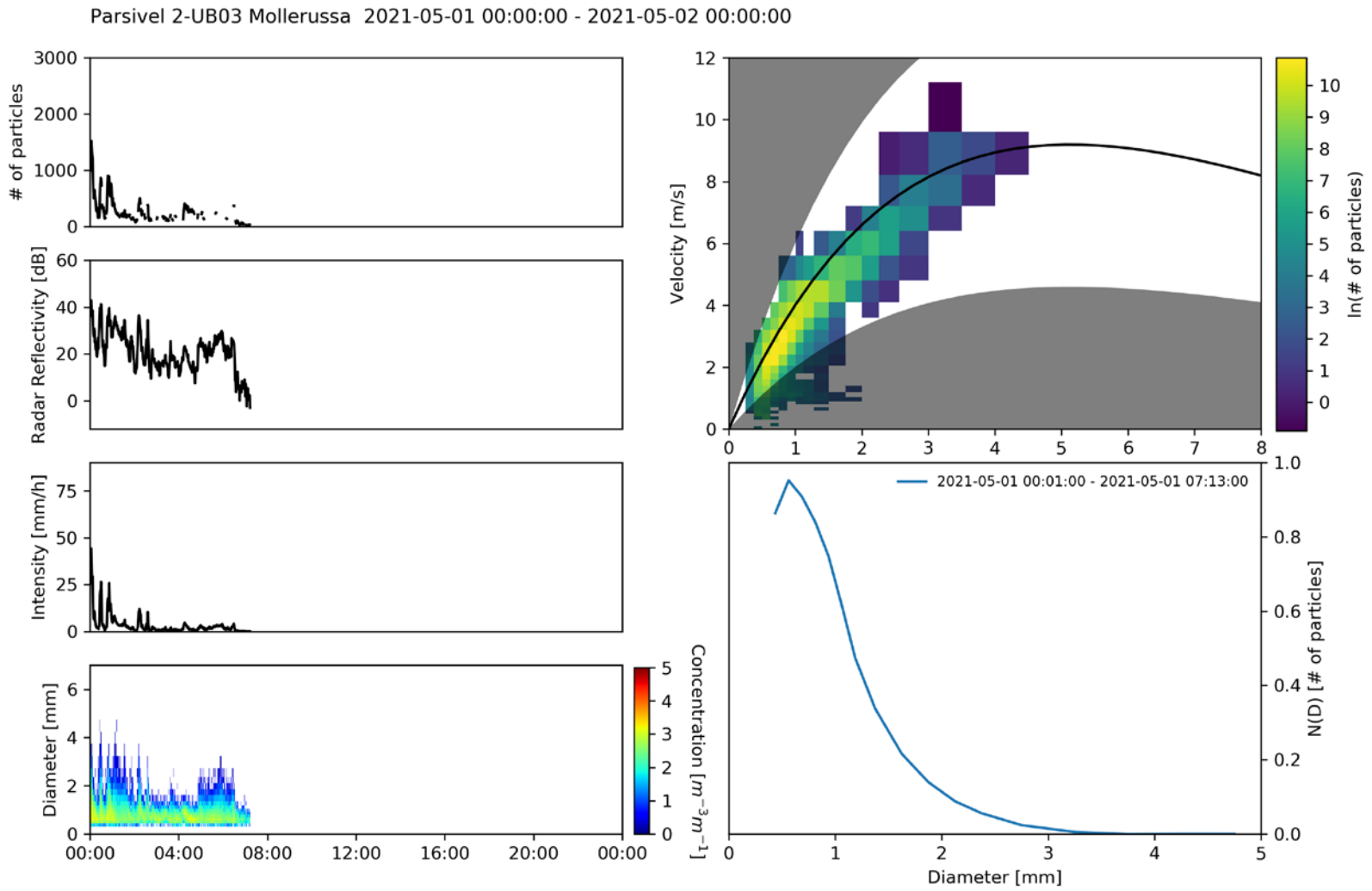
Status as of May 2021: Working/planned



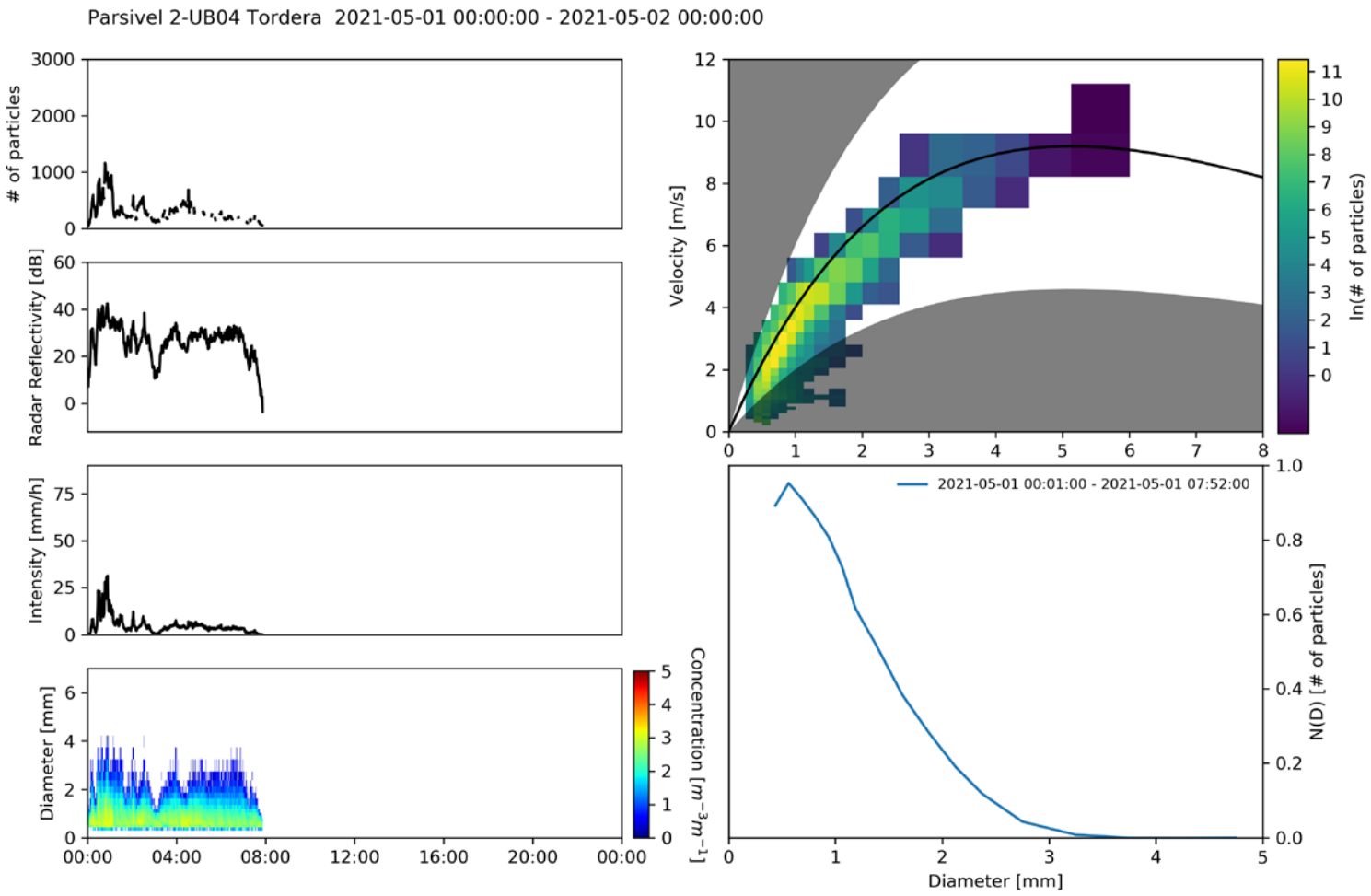
Field Campaign



Field Campaign



Field Campaign



Final Remarks

- Preliminary studies on LIAISE region using weather radar QPE (***Δt ~1h, Δx ~1 km***): data base built and first results indicate monthly differences between target areas.

- Reflectivity based rainfall type (6 min. res**.) methodology implemented** and data base currently under construction.

- MRR precipitation type and rainfall regime **methodology developed** for MRR-Pro.

- Main **instruments** (2 MRR-Pro, 4 Parsivel2) **deployed** and additional expected.

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Thank you!