Philipps Universität Marburg

LCRS GPM Ground Validation

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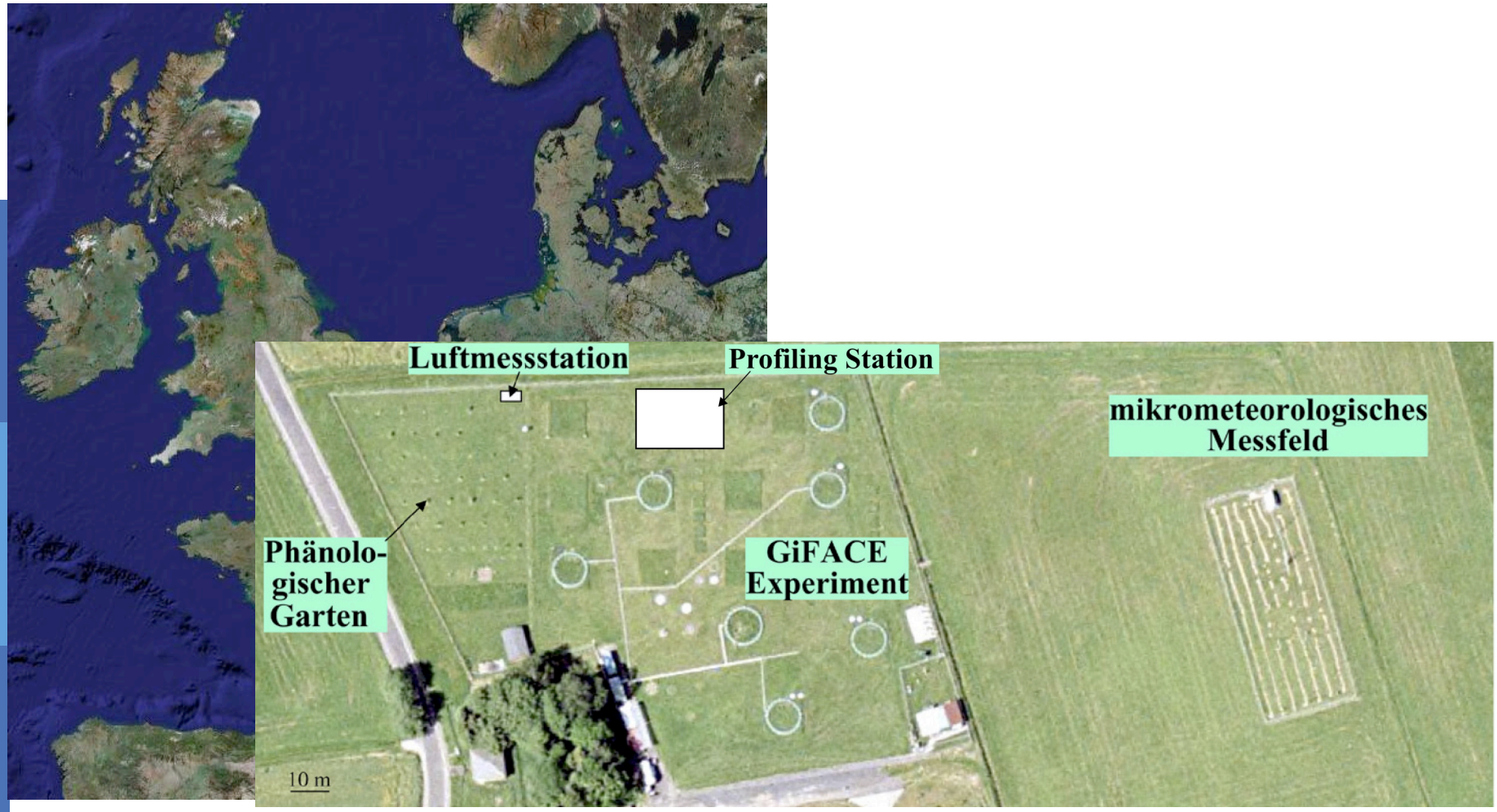
LCRS GPM Ground Validation

- Equipment:
  - Ground Validation station Linden, Germany
  - Ground Validation station in southern Ecuador

- Summary

Ground Validation station Linden, Germany

Ground Validation station Linden, Germany



Ground Validation station Linden, Germany

- Custom-built research container
- High speed internet

Ground Validation station Linden, Germany

RAL Cloud radar with radiometer
- Cloud boundaries
- Liquid water profile

Vaisala Lidar Ceilometer
- Cloud base height

SODAR
- Inversion height
- Stratus top height

Gerber PVM-100
- Droplet spectrum

Ground Validation station Linden, Germany

Metek MRR-3

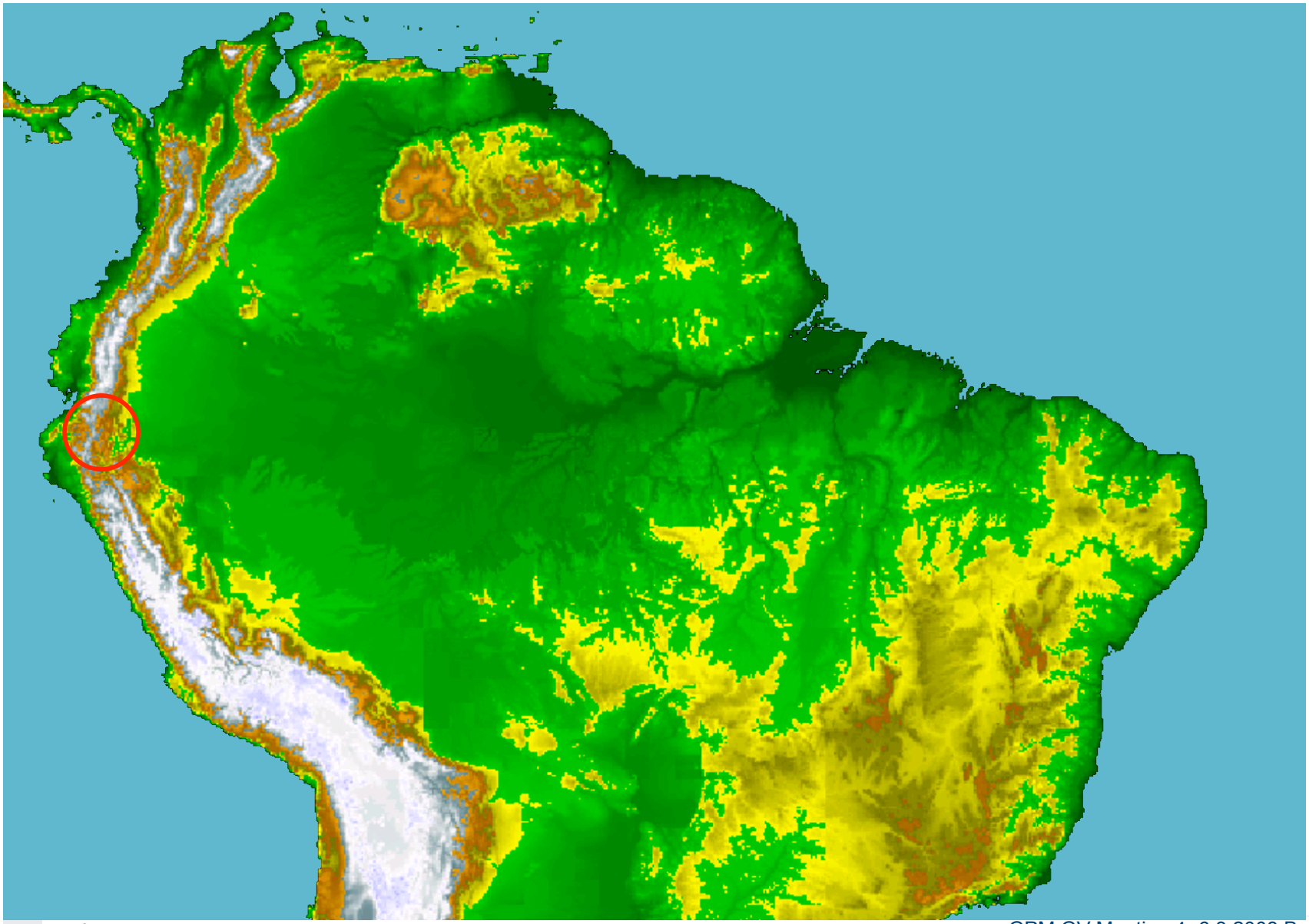
- Rain rate
- Vertical droplet distribution

Biral Present Weather Sensor (VPF 730)

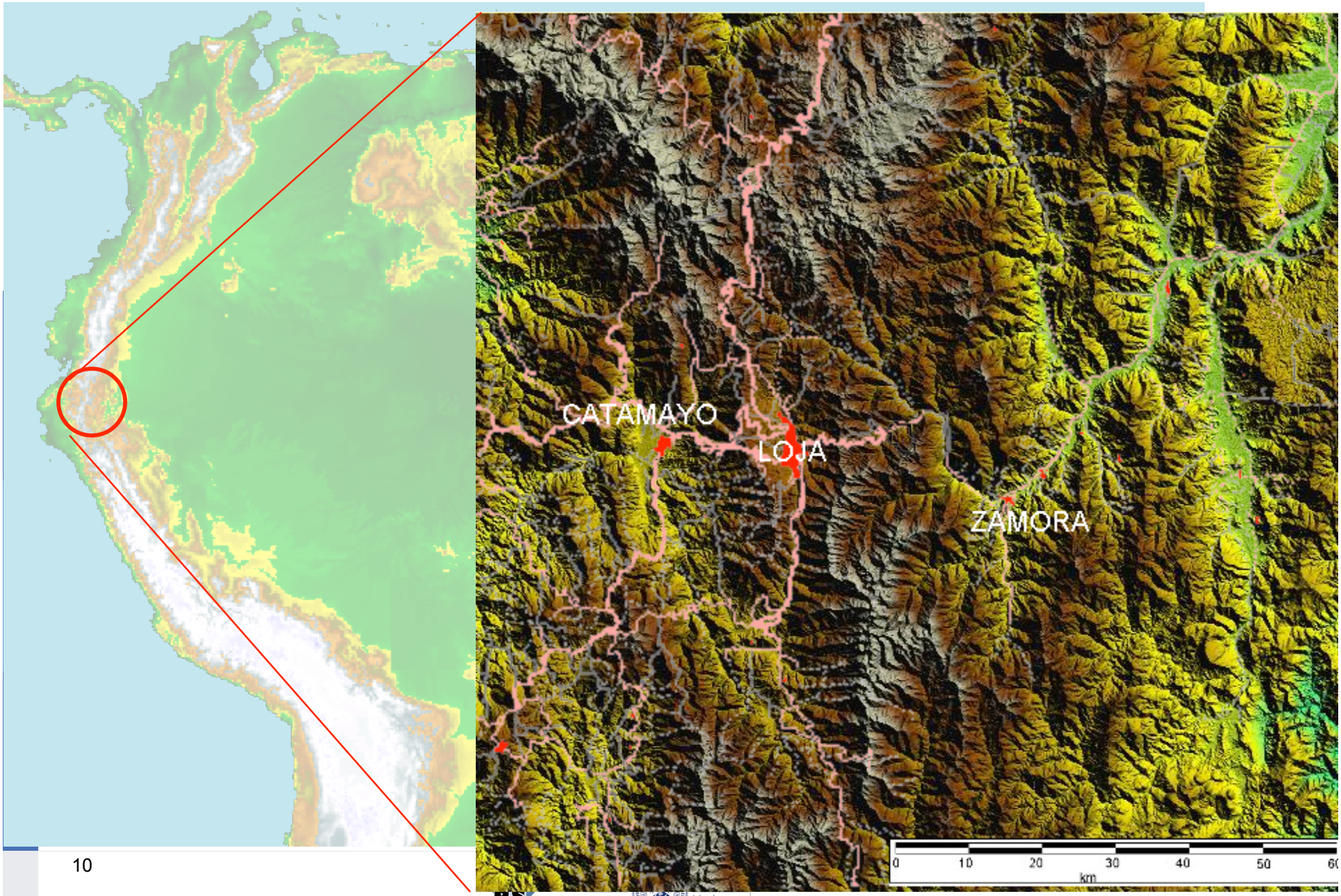
- Precipitation type
- Droplet matrix
- Visibility

Ground Validation station in southern Ecuador

Ground Validation station in southern Ecuador



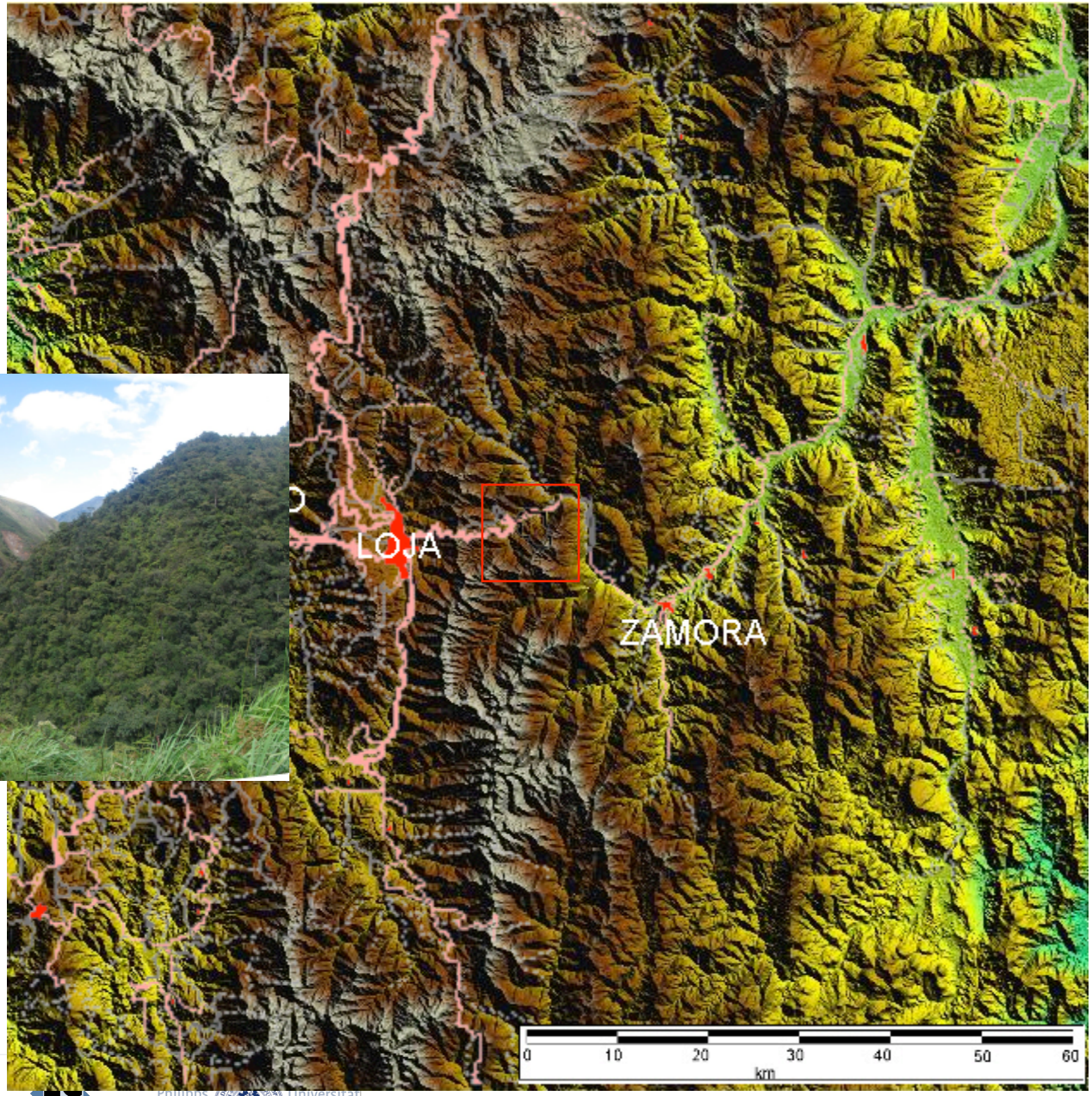
Ground Validation station in southern Ecuador



Ground Validation station in southern Ecuador

FOR 816

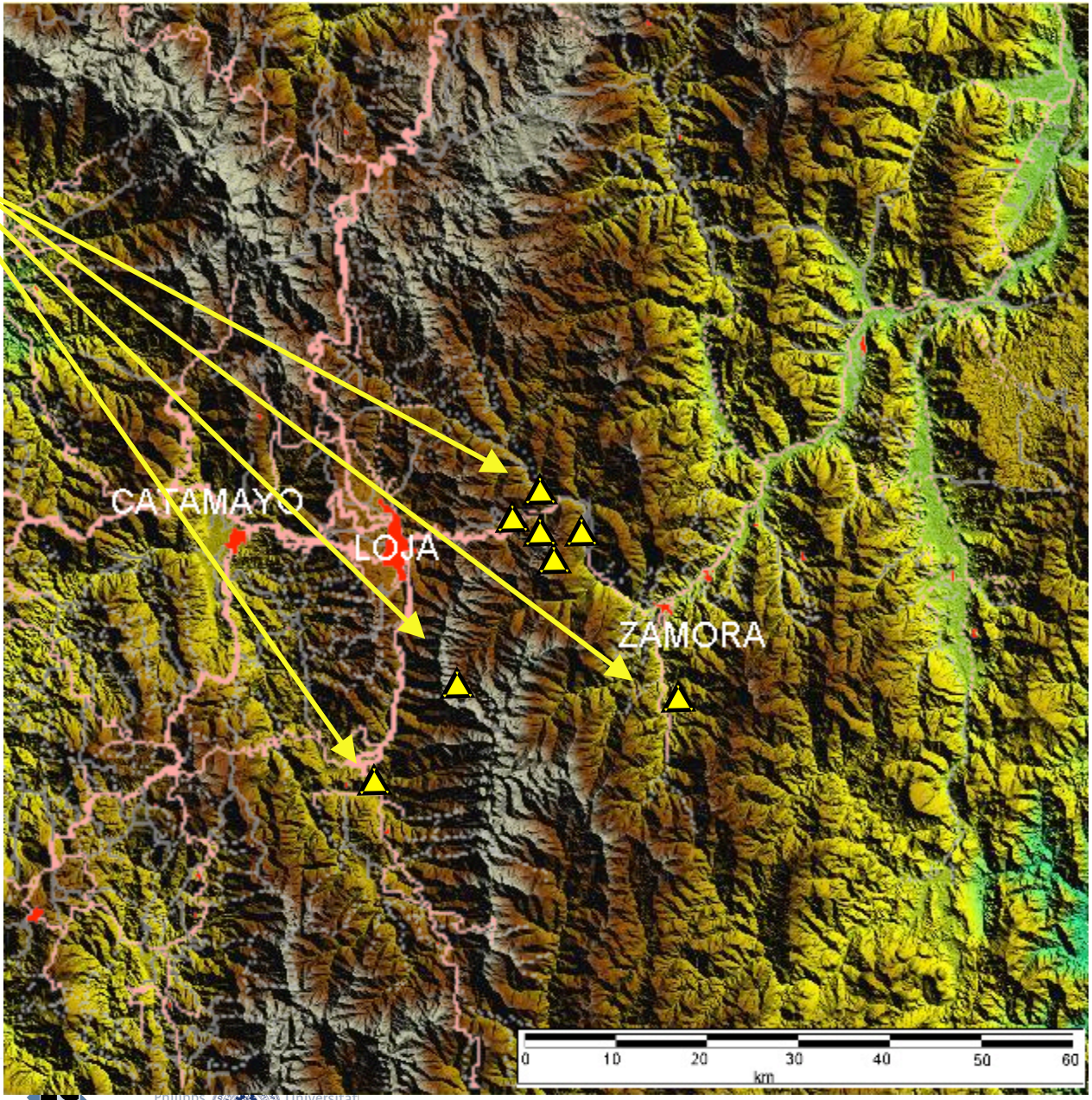
Biodiversity and sustainable management of a megadiverse Mountain ecosystem in south Ecuador



Ground Validation station in southern Ecuador

8 automatic climate stations
(1000... 3400 m asl)

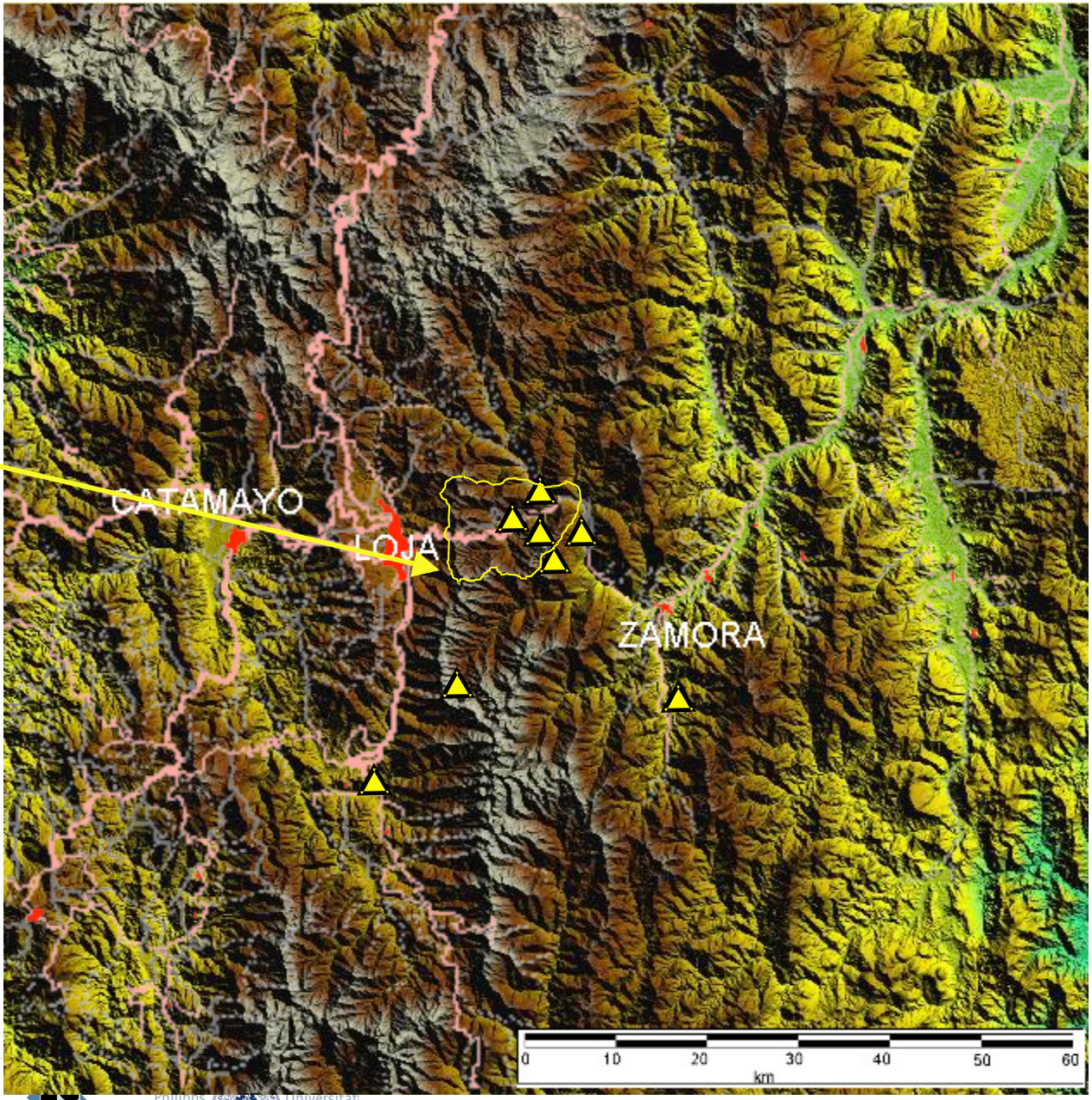
(some more from INAHMI)



Ground Validation station in southern Ecuador

Hydrological balance

(Coupled SVAT-Model)



Ground Validation station in southern Ecuador

Metek MRR-3

- Rain rate
- Vertical droplet distribution

NOAA-AVHRR

- Cloud amount
- Cloud phase
- LWP, a_{ef}, τ

Ground Validation station in southern Ecuador

LAWR X-band radar

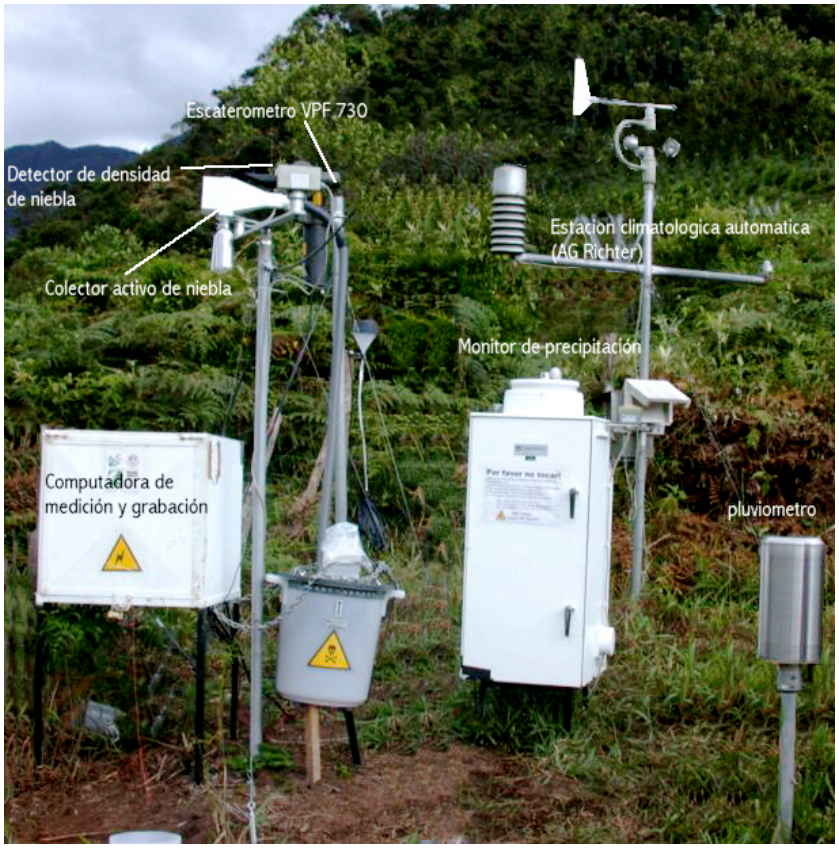
- raw values (to be related to reflectivity / rain rate)
- 60 km radius
- 500 x 500 m
- 5 min scan
- 3200 m asl

Rollenbeck R., Bendix J. (2006): Experimental calibration of a cost-effective X-band weather radar for climate ecological studies in southern Ecuador. Atmospheric Research 79: 296-316

Ground Validation station in southern Ecuador

Climate station

- 2 Tipping buckets
- fog collection
- T, rH, v, u, Q



Biral Present Weather Sensor (VPF 730)

- Precipitation type
- Droplet matrix
- Visibility

Ground Validation station in southern Ecuador

IR Cloud monitor (Nubiscan)

- Cloud cover
- Cloud type
- Cloud height

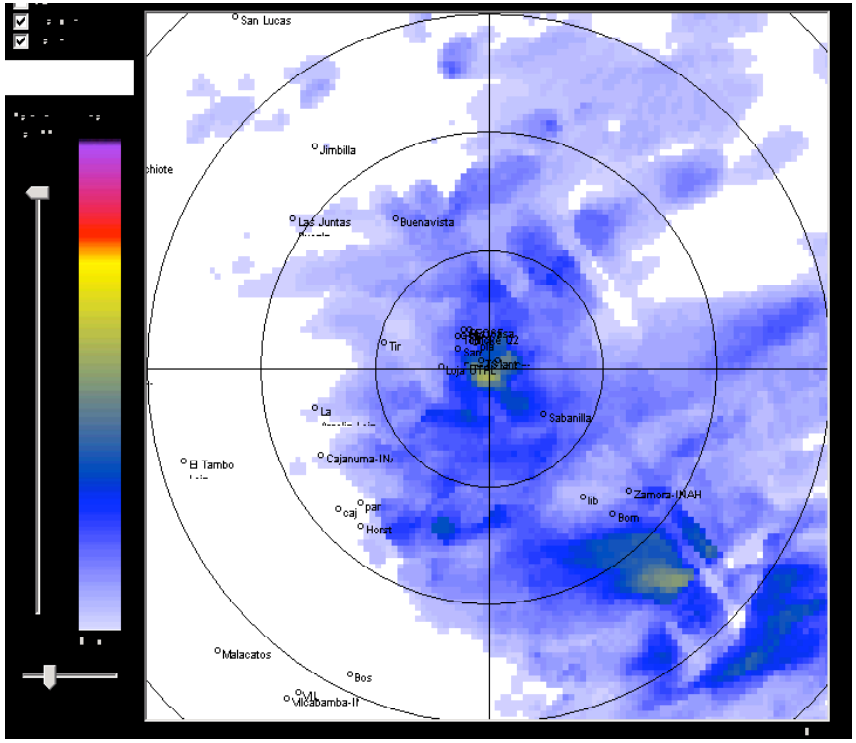
Summary

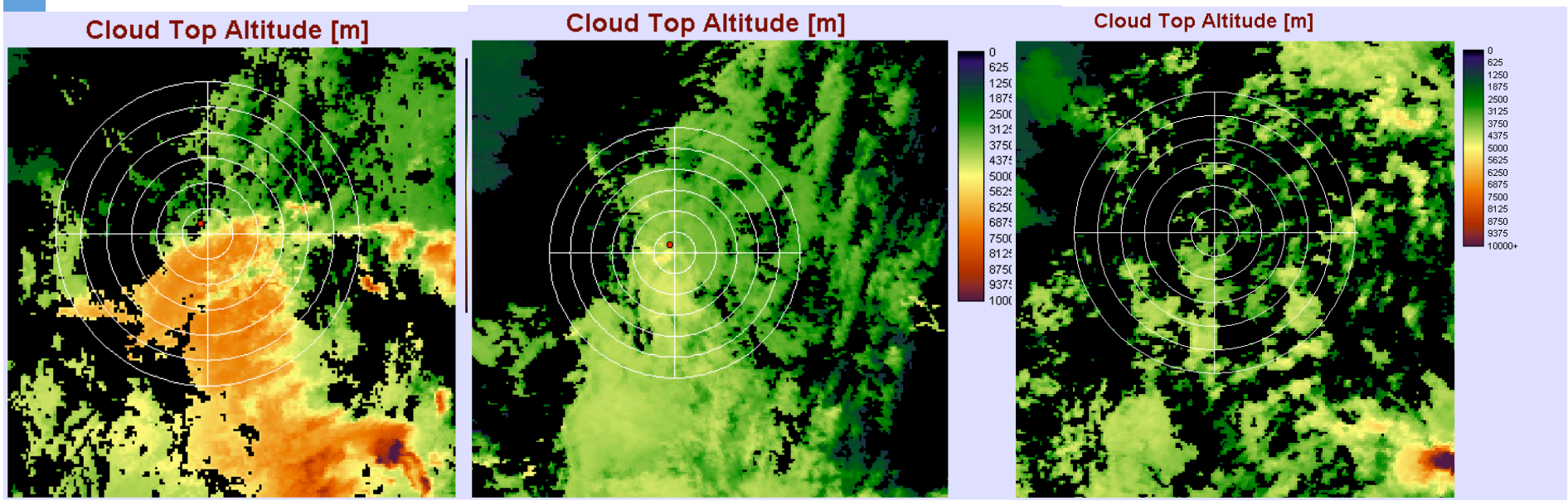
- Profiling site in Germany provides indepth cloud- and precipitation analysis
- Climatological site in Ecuador provides a combined dataset of
  - point measurements with high temporal resolution
  - Ground-based remote sensing data
  - AVHRR Cloud analysis
  - Nested modelling cascade (regCM or MM5 -> SVAT-CLM -> Hydrological balance) validated and parameterized by observation
- Current phase funded until 2013, further funding pending

Evaluation example

- LAWR vs. AVHRR-Cloudclassificiation

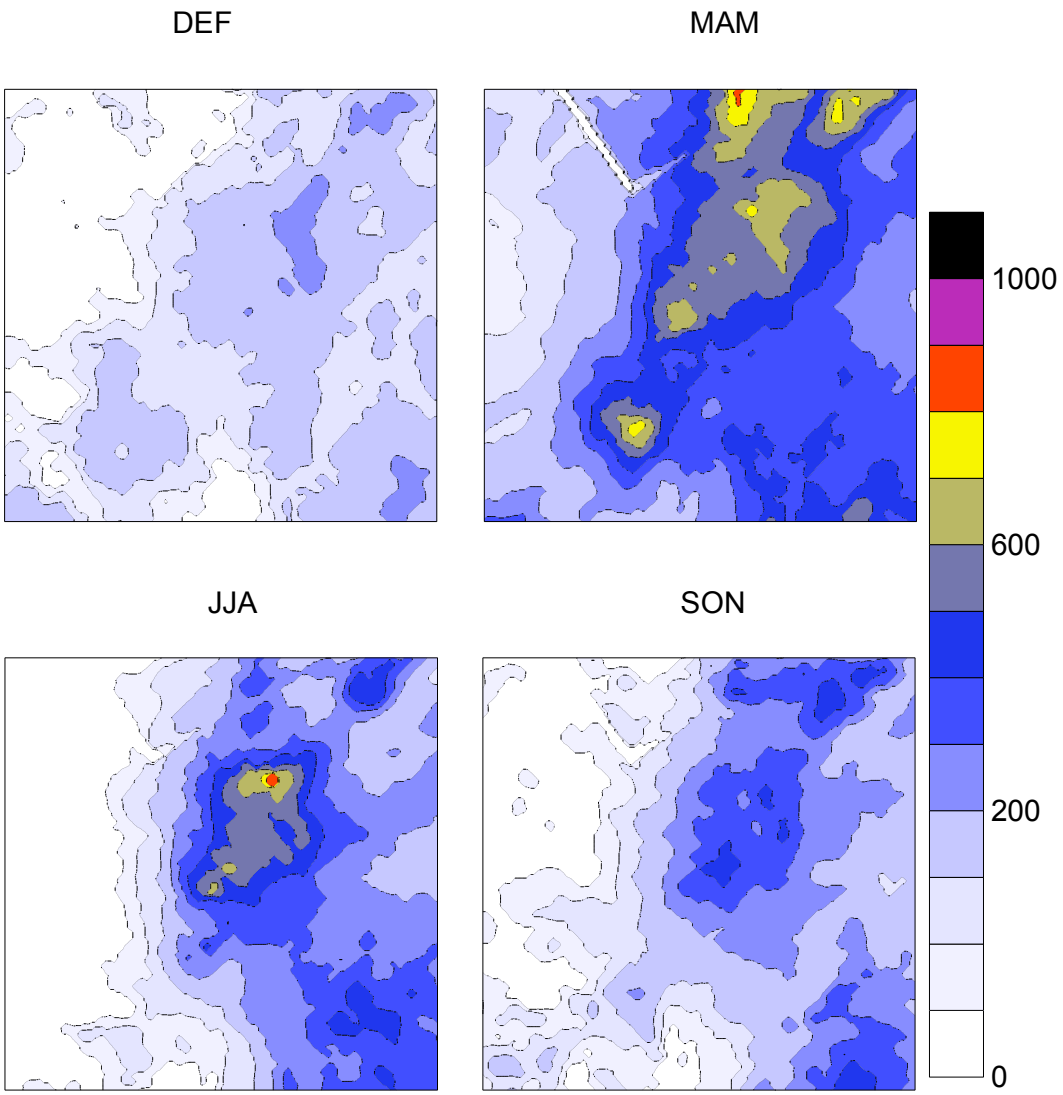
BENDIX J., ROLLENBECK R., PALACIOS E. (2004): Cloud detection in the Tropics - a suitable tool for climate-ecologicalstudies in the high mountains of Ecuador. Int. Journal Remote Sensing Vol 25, No.21: 4521-4540





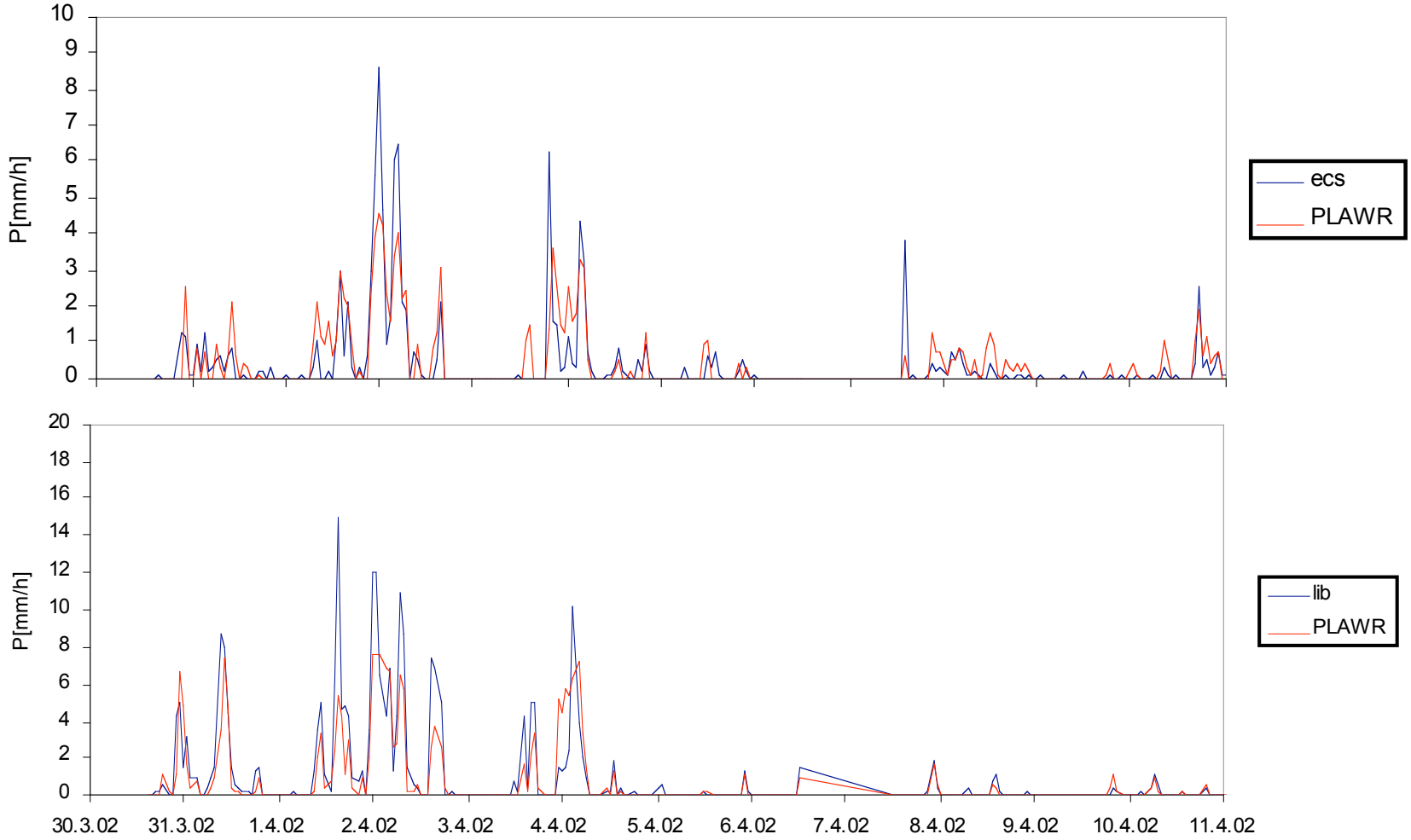
Validation examples

- LAWR vs. tipping buckets



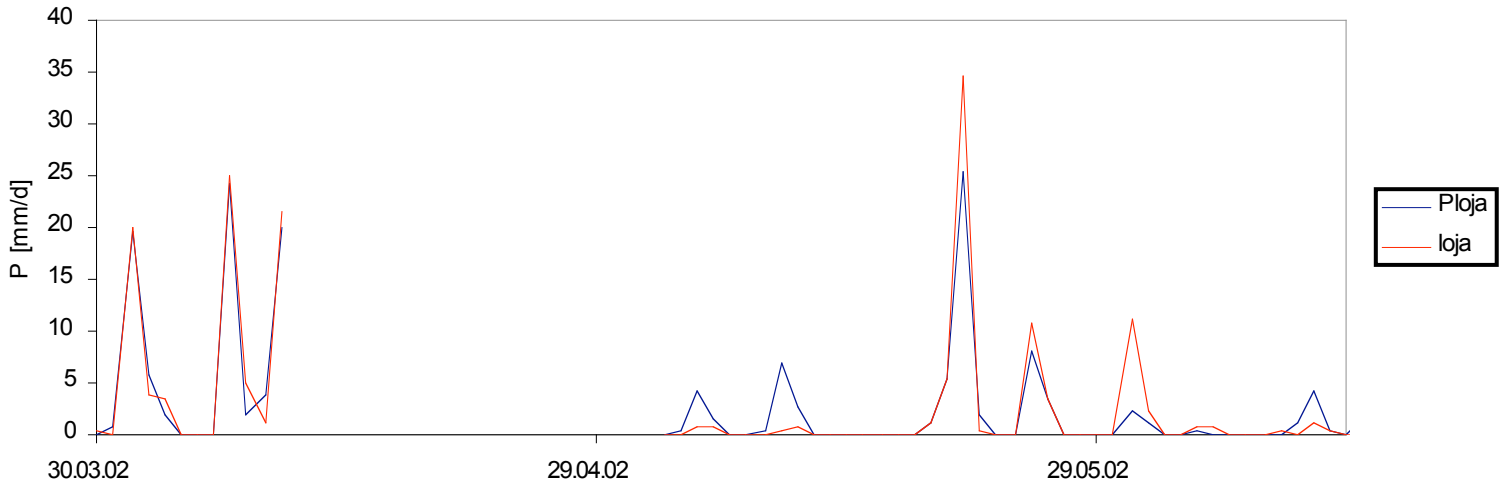
Validation examples

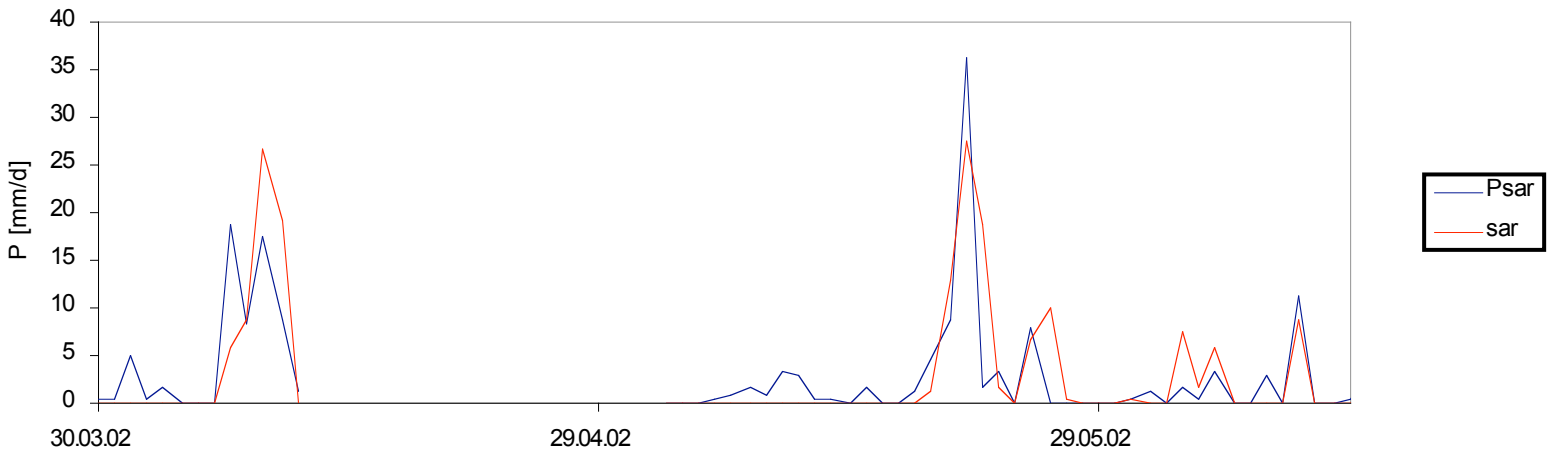
• Hourly totals



Validation examples

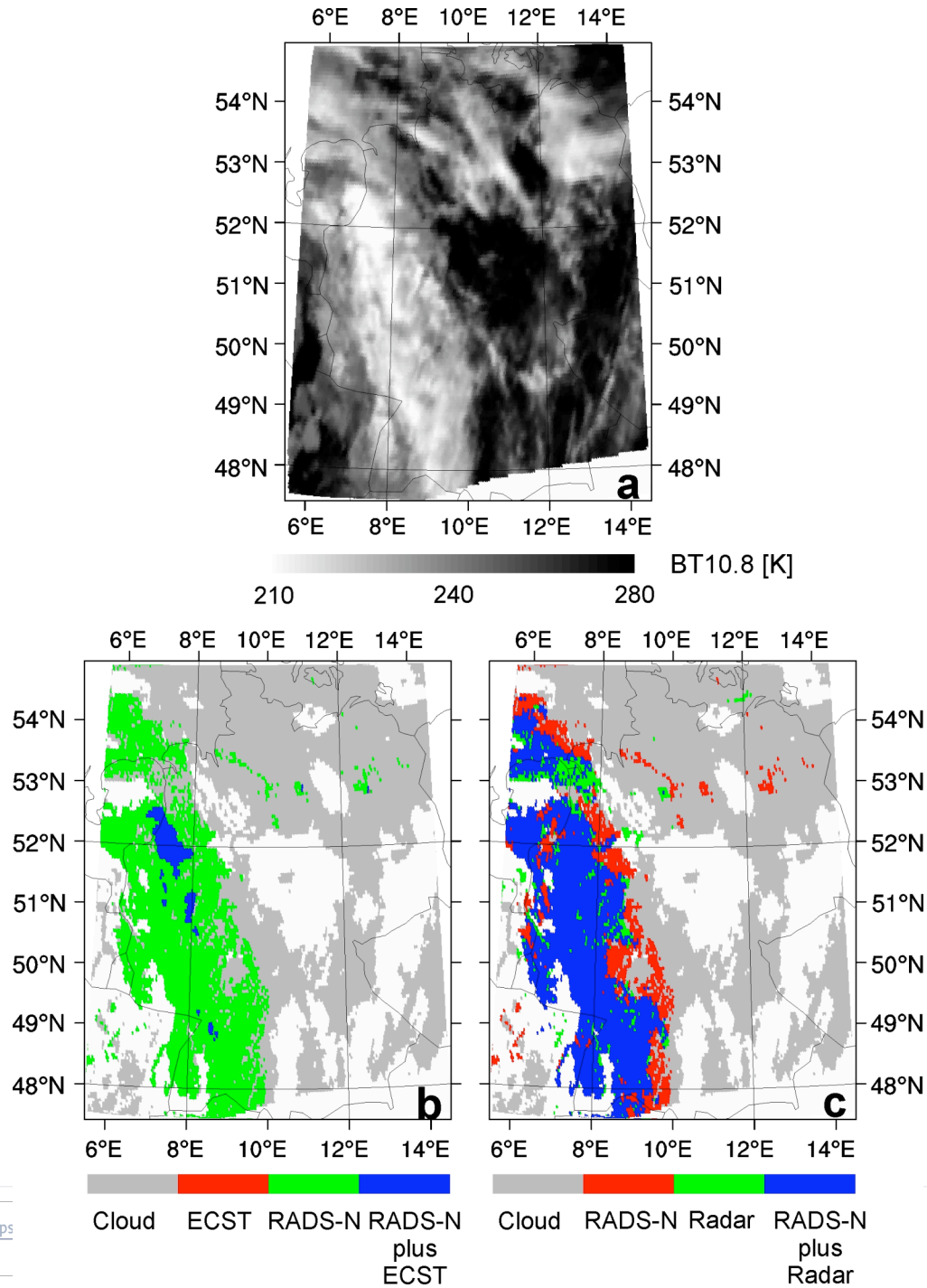
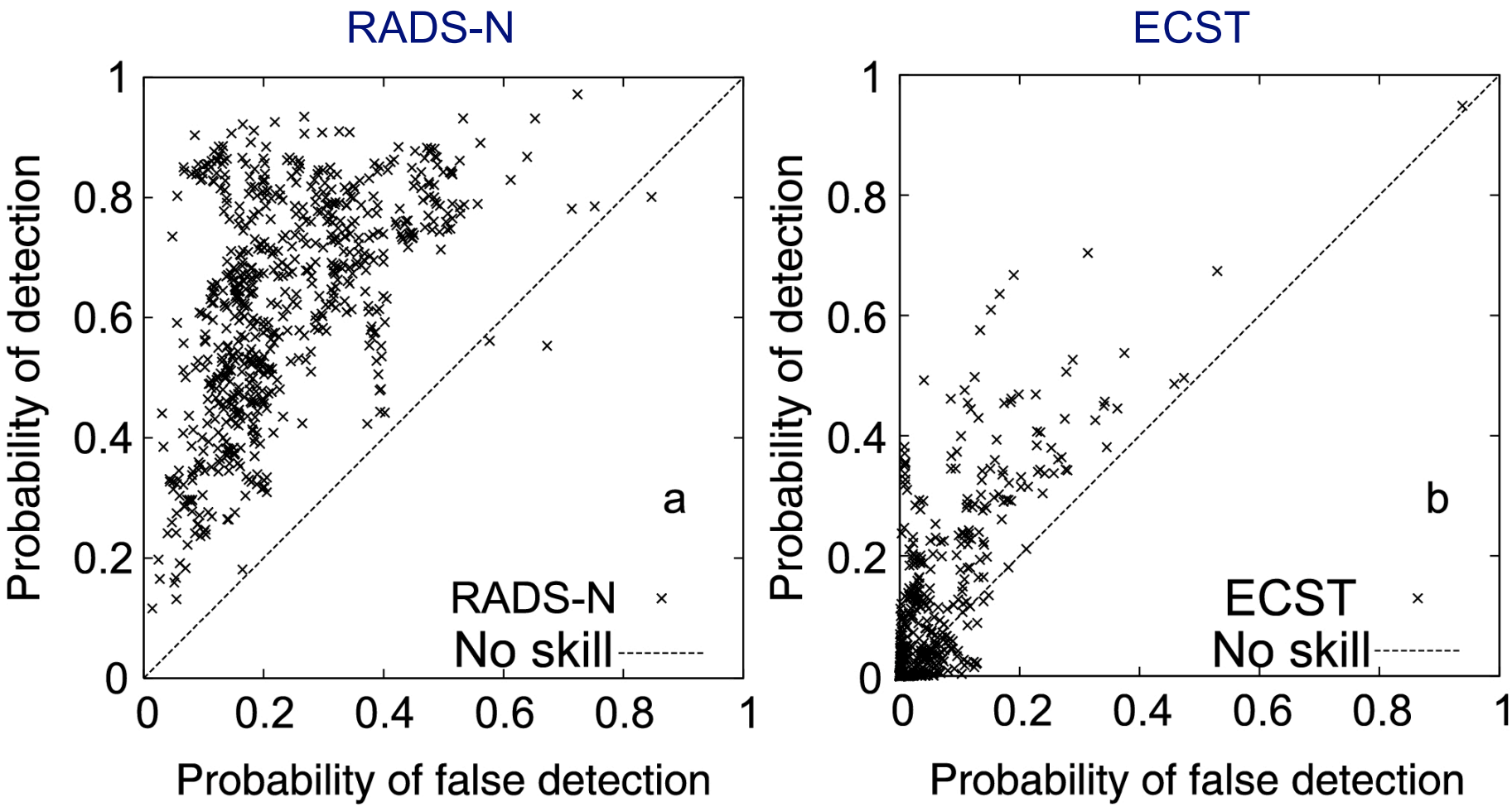
• Hourly totals





Validation examples

- RADS-N vs. ECST
- RADS-N vs. DWD radar



Validation examples