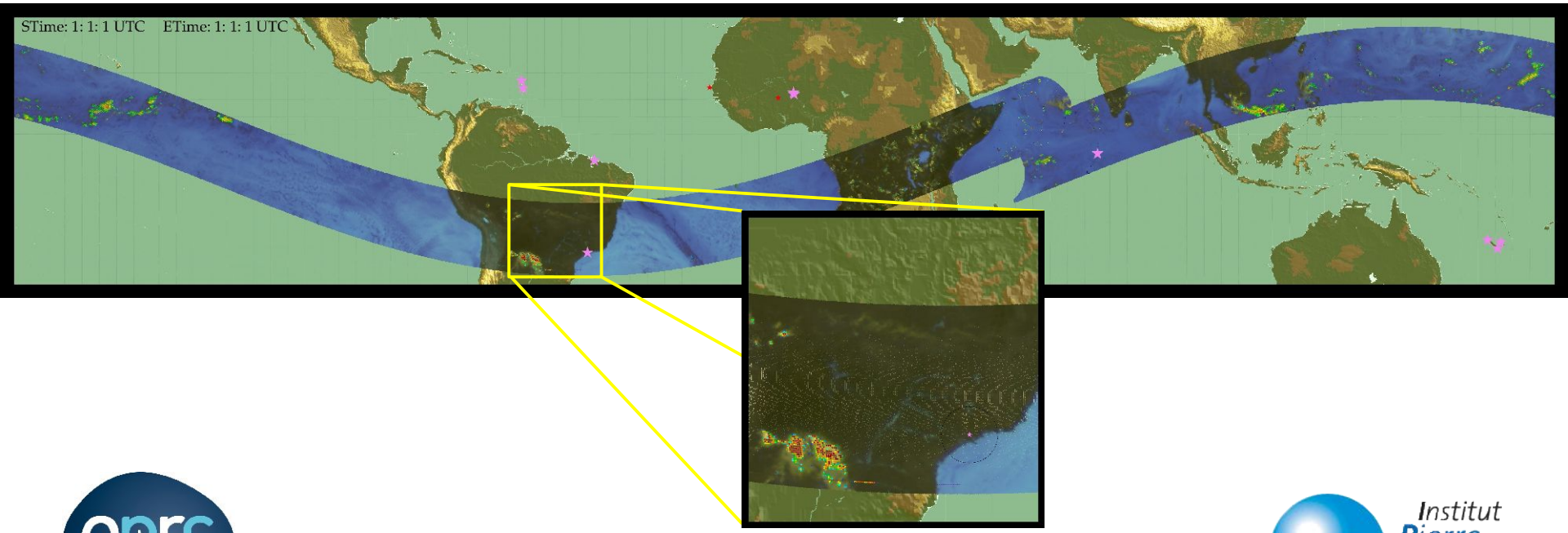
CENTRE NATIONAL D'ÉTUDES SPATIALES

ISRO-CNES

megha-tropiques

Use of CHUVA data to improve and validate the BRAIN Retrieval Algorithm



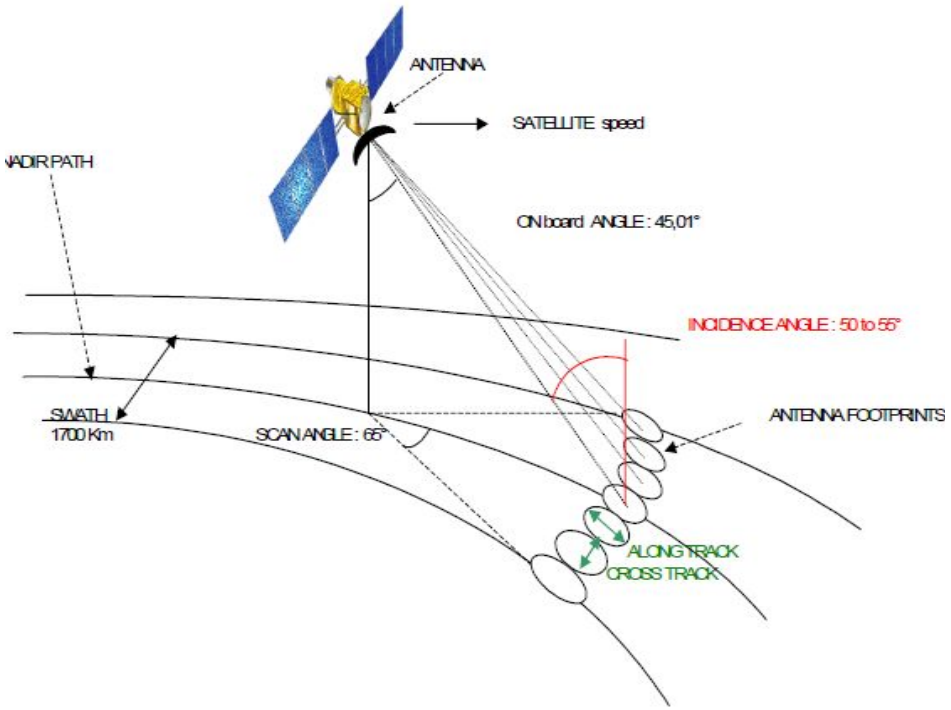
N. Viltard, L. Machado, D. Vila

Institut Pierre Simon Laplace

MADRAS on Megha-Tropiques mission

Source: N. Karouche, CNES

•**MADRAS** : microwave imager for precipitation : channels at 18, 23, 37, 89 and 157 GHz, H and V polarisations. (conical swath, <10 km to 40 km)



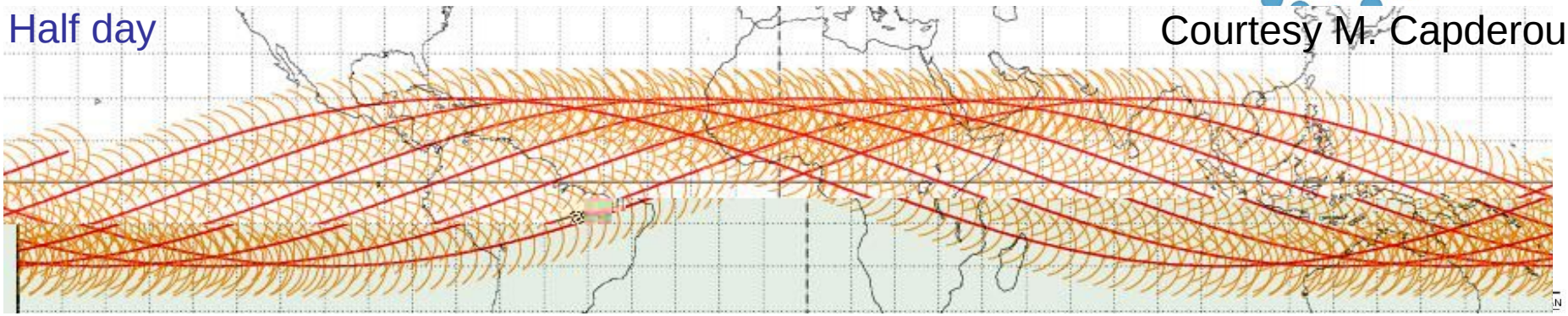
Source: N. Karouche, CNES

Megha-Tropiques

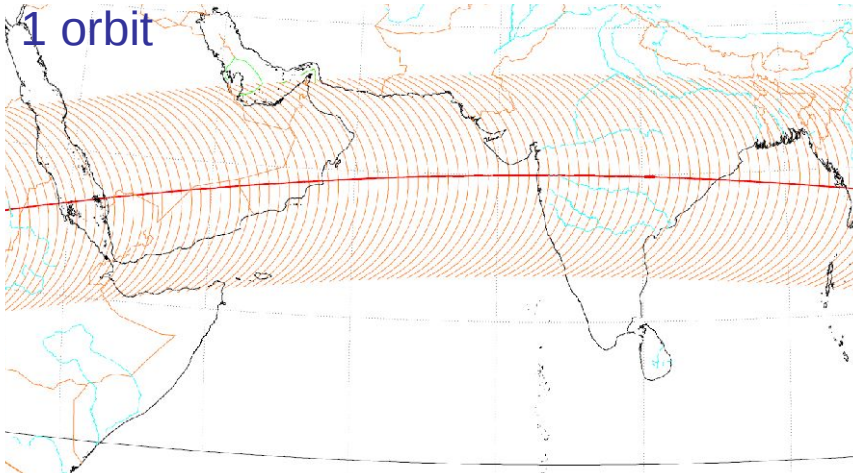
An equatorial orbit

Half day

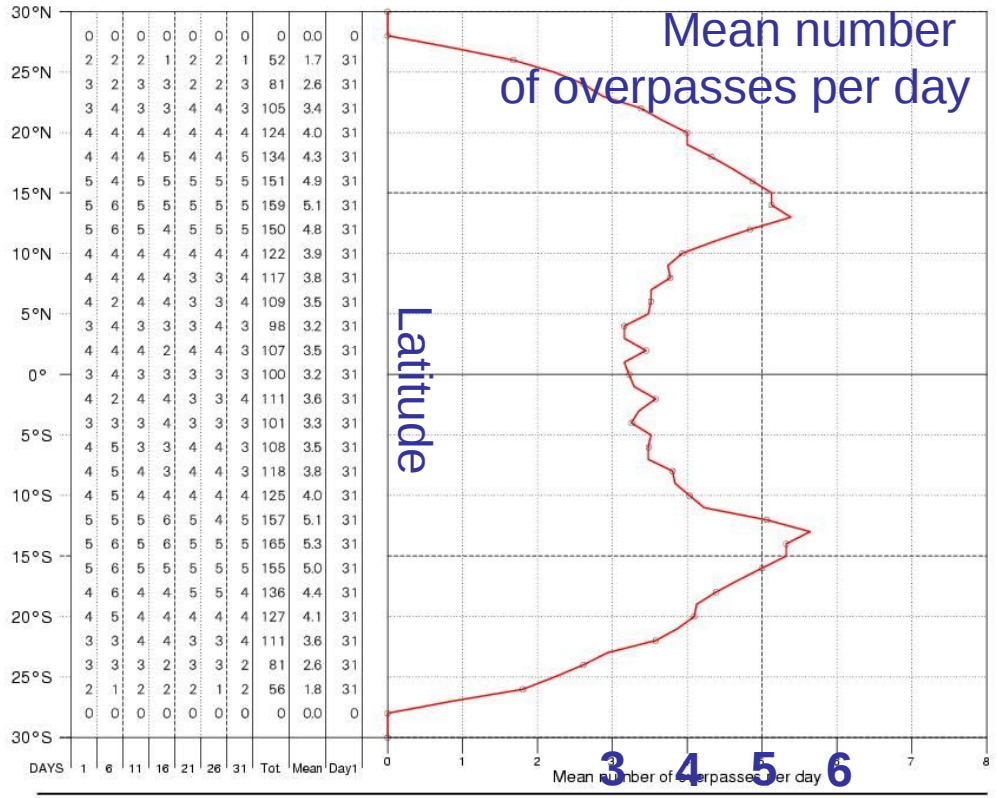
Courtesy M. Capderou



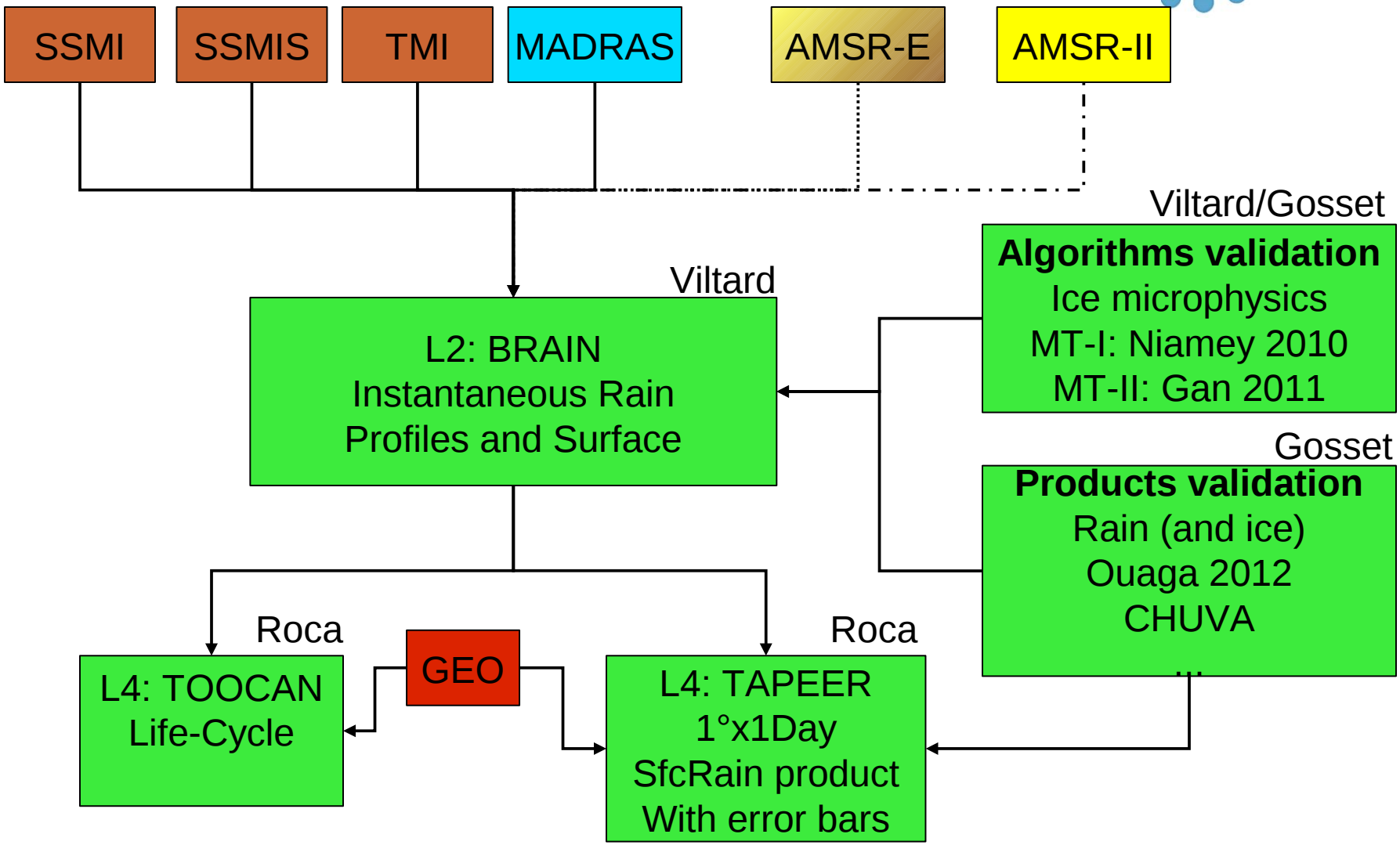
1 orbit

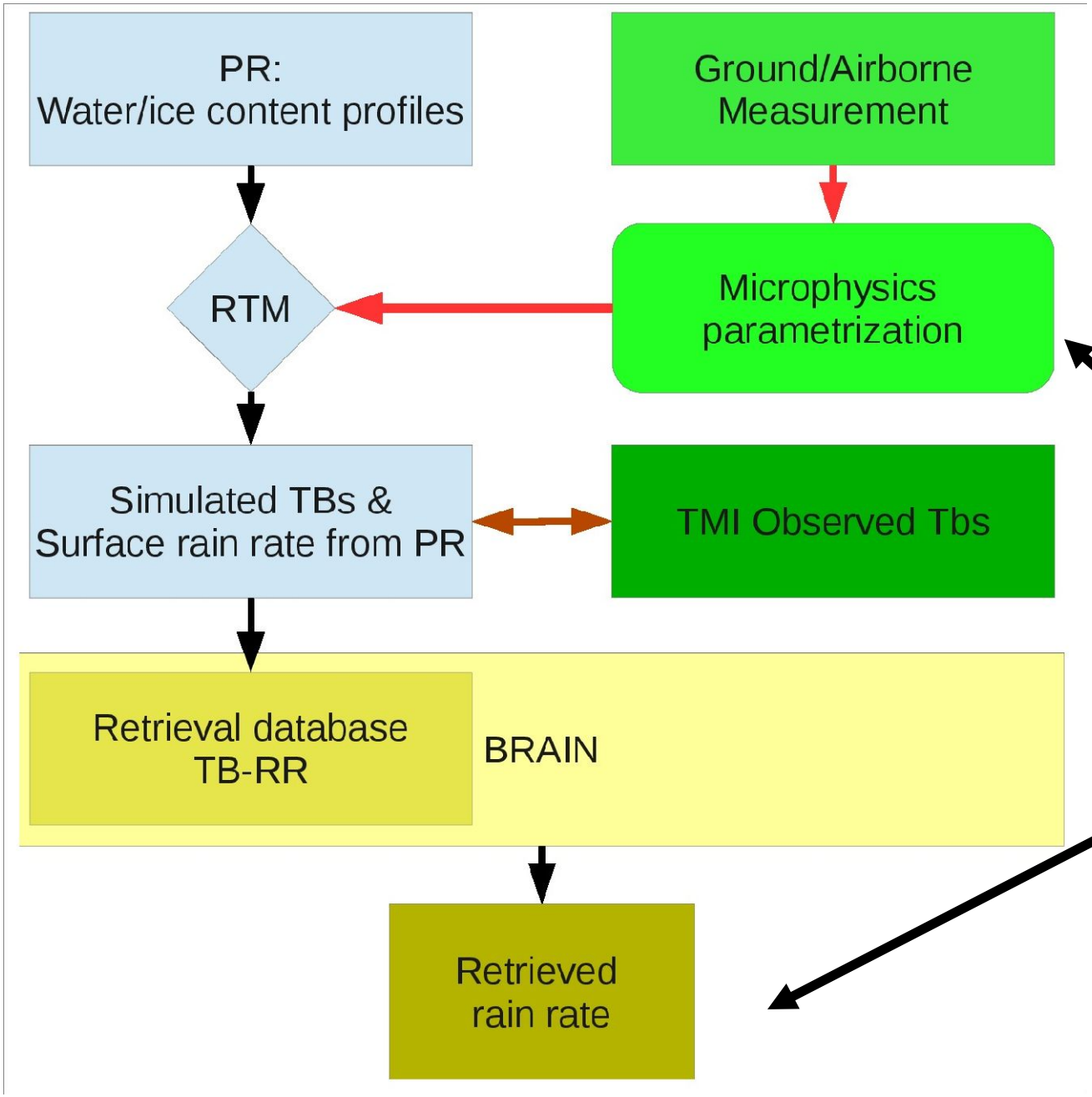


MADRAS sampling over 20°S-20°n
Min 3 per day
Max 5 per day



French L2 and above Products



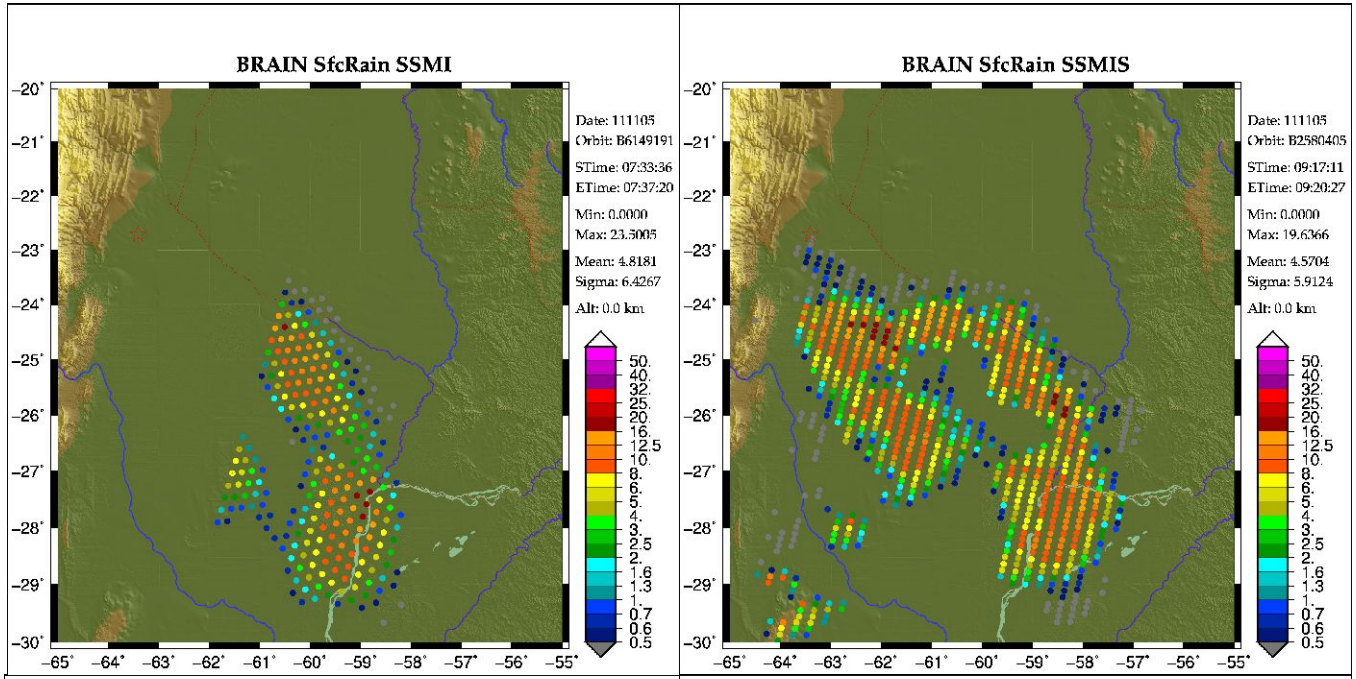

PR:
Water/ice content profiles
Ground/Airborne
Measurement
RTM
Microphysics
parametrization
Simulated TBs &
Surface rain rate from PR
TMI Observed Tbs
Retrieval database
TB-RR
BRAIN
Retrieved
rain rate
Validations

Why is rain so difficult to retrieve and to validate ?

It is intermittent spatially (R=0)

It is intermittent temporally

It is very multi-scale (fractal ?)



Cross platform coherence:

-Intensity
-Structure
-Rain/no Rain

Comparison with TRMM-PR

Knowing that PR might underestimate rain over land in v6...

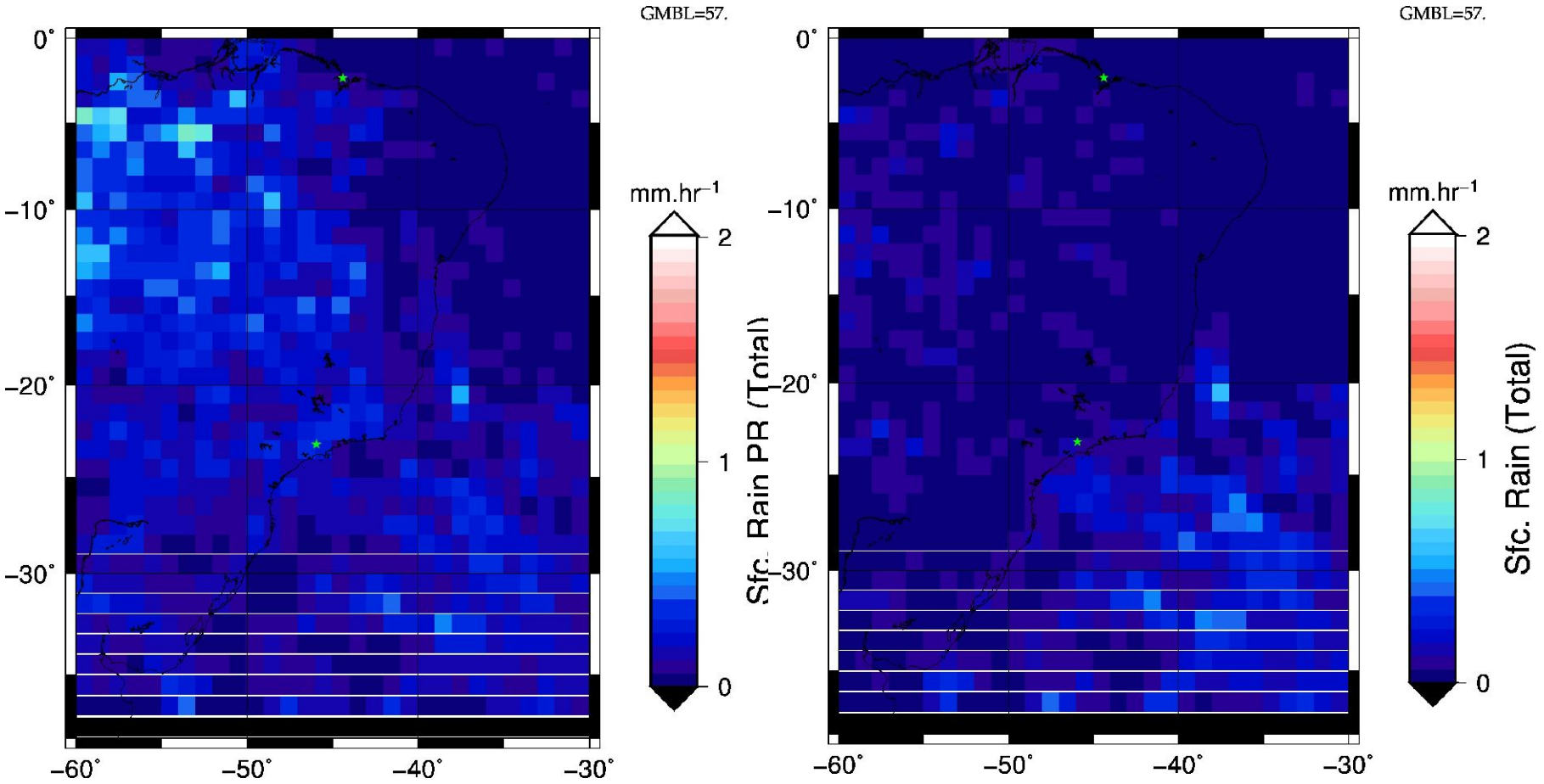
Comparison at pixel scale (12 km)

Threshold	Hits	Total
57.	-0.21 (-15 %)	$-3.12\ 10^{-3}$ (-36 %)
65.	-0.38 (-29.9 %)	$-2.91\ 10^{-2}$ (-34 %)

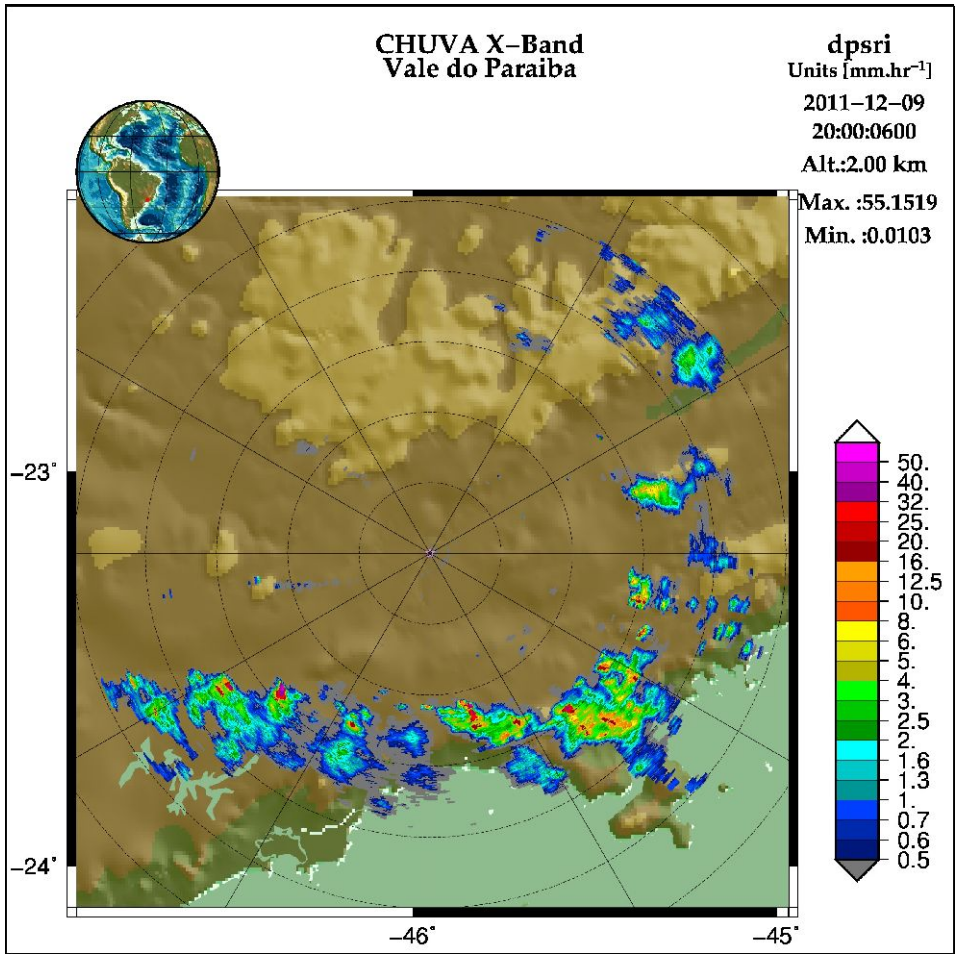
Comparison at 1°x1° scale

Threshold	Total Land
57.	$-7.39\ 10^{-3}$ (-21 %)
65.	$-6.82\ 10^{-3}$ (-22 %)

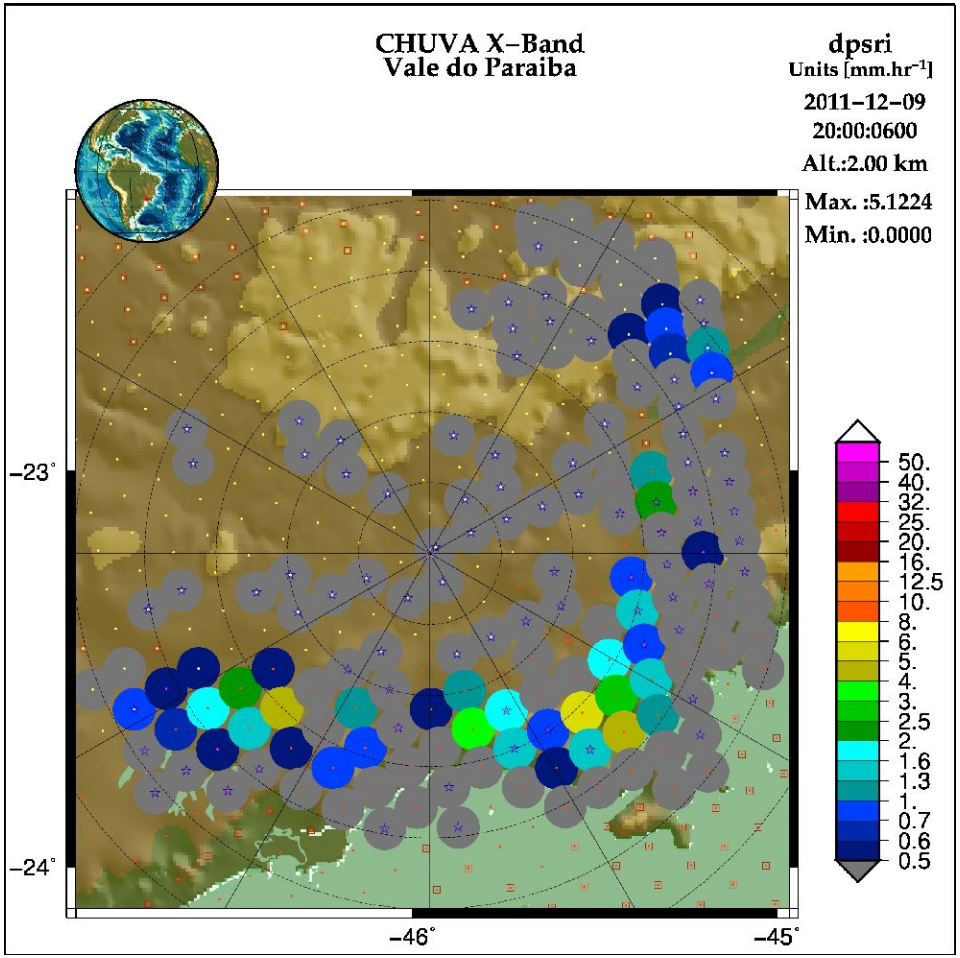
Instantaneous Rainfall Validation



Instantaneous Rainfall Validation

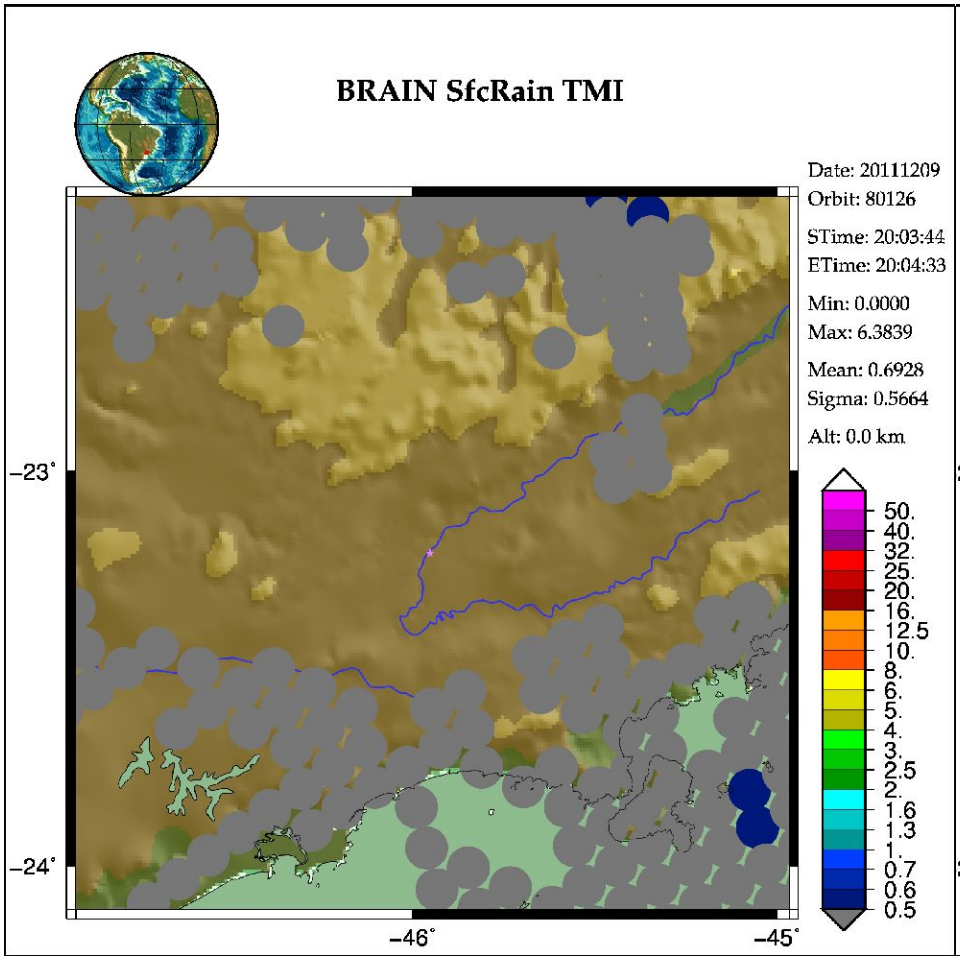


X-Band rain cappi 20:00

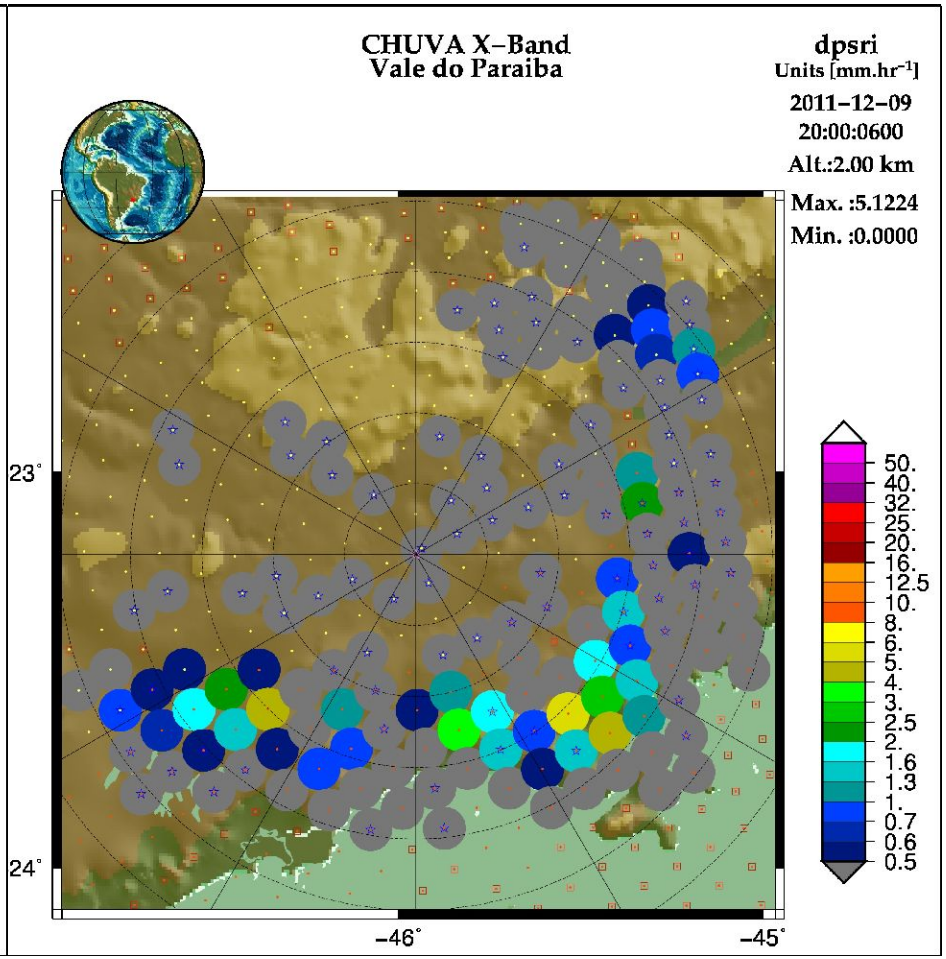


X-Band rain averaged 12 km 20:00

Instantaneous Rainfall Validation

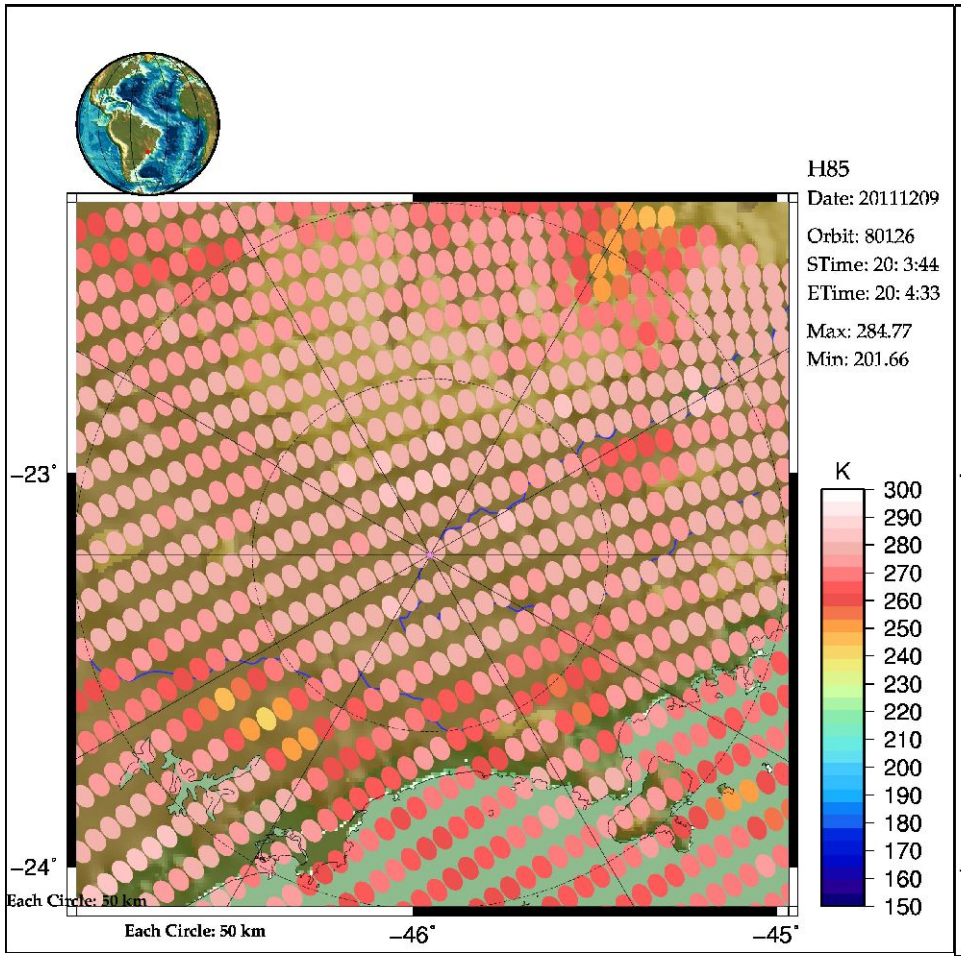


TMI 20:00

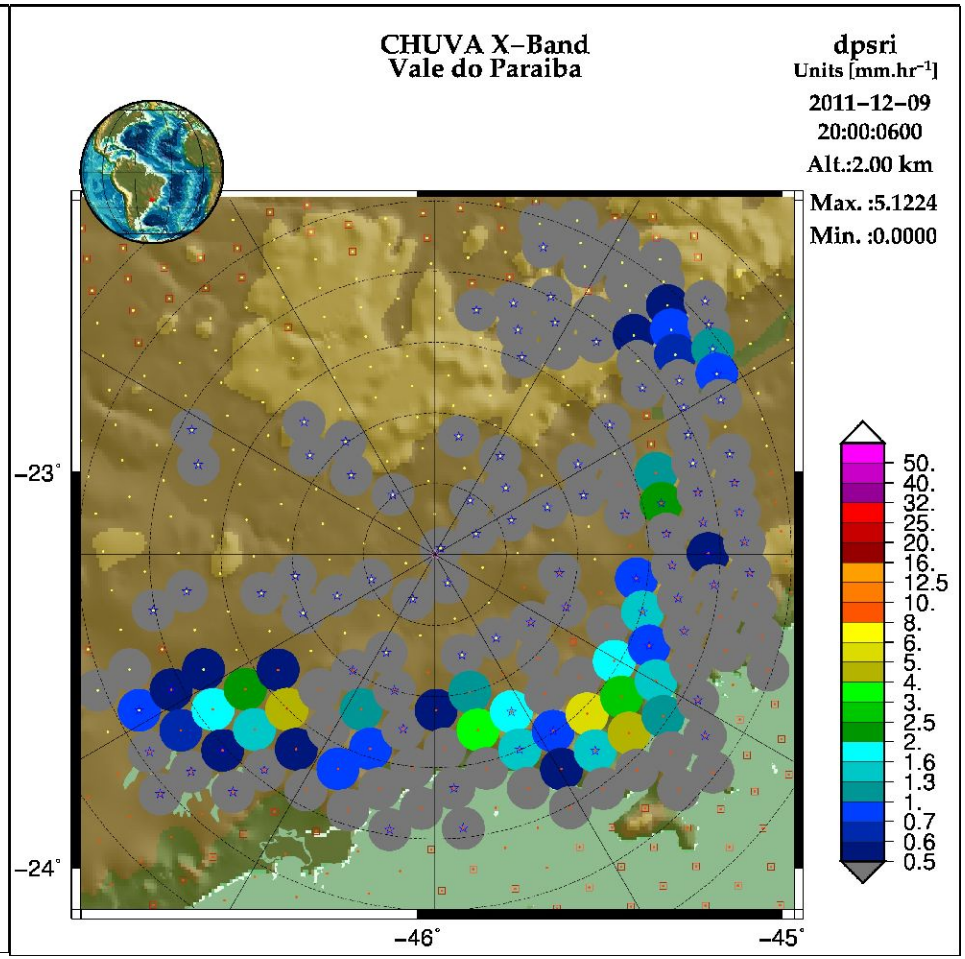


X-Band rain averaged 12 km 20:00

Instantaneous Rainfall Validation



TMI 85 H 20:00



X-Band rain averaged 12 km 20:00

Some conclusions/perspectives

-**algorithm** validation activities will continue

-**product** validation will continue for L2 and L4 with CHUVA data (X-band)

-particular emphasis on rain-no rain detection

-computation of probabilities of rain is already done

-computation of probability of intensity and/or distribution of intensity is on going. How to validate that ?

When comparing ground and satellite rain estimates...

-Expect differences between ground and satellite !

-Pixel by pixel correlation will be low and it is expected !

-Transition regions will be even worse (coast, mountains)

-DO NOT complain to algorithm developers, they know already !!

-Instead DO try to tell them, why is your region so special (microphysics, rain regime, topography...)