National Institute of Meteorology
Brazil - INMET

The NWP System at INMET
COSMO Model

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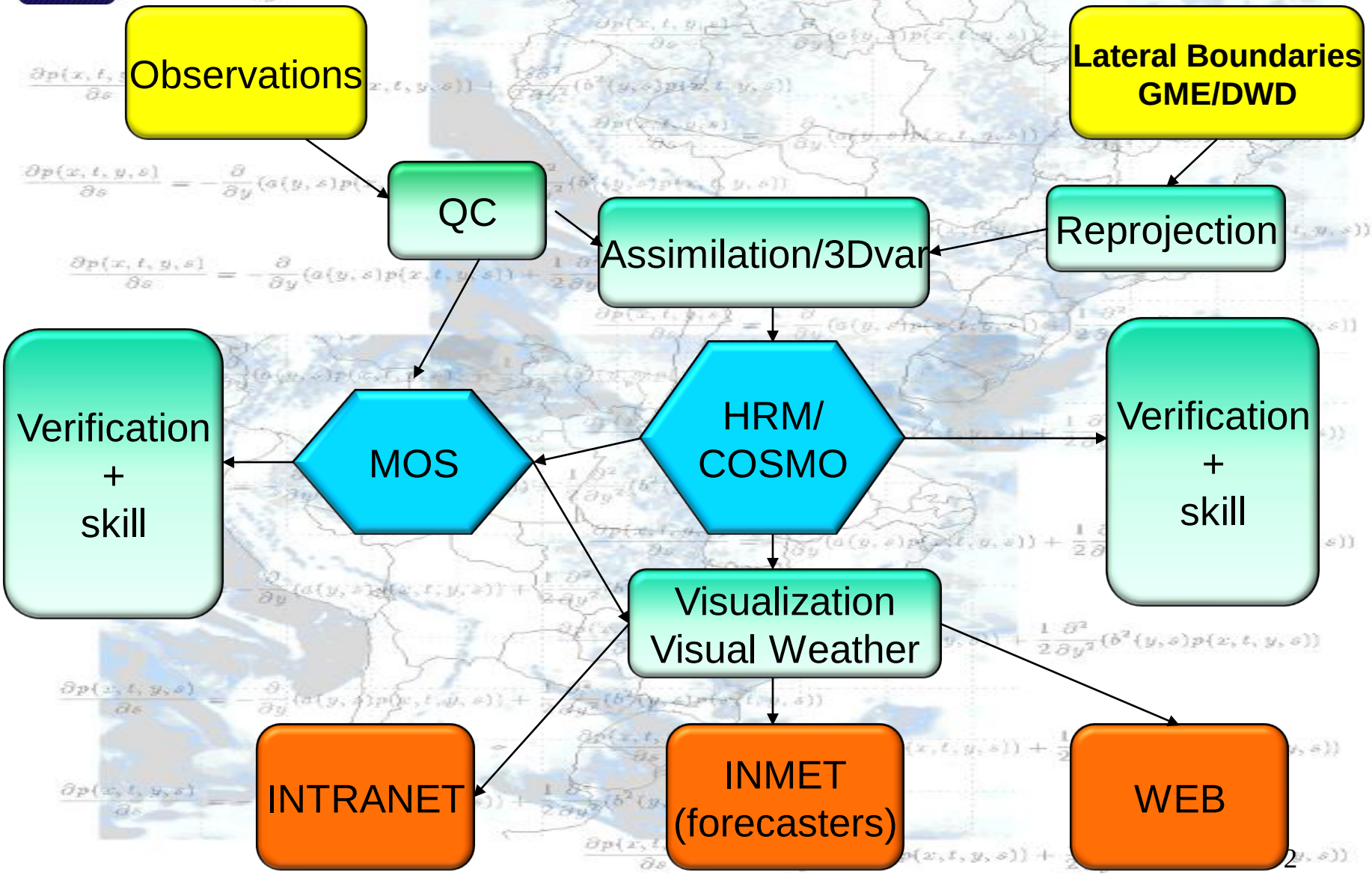
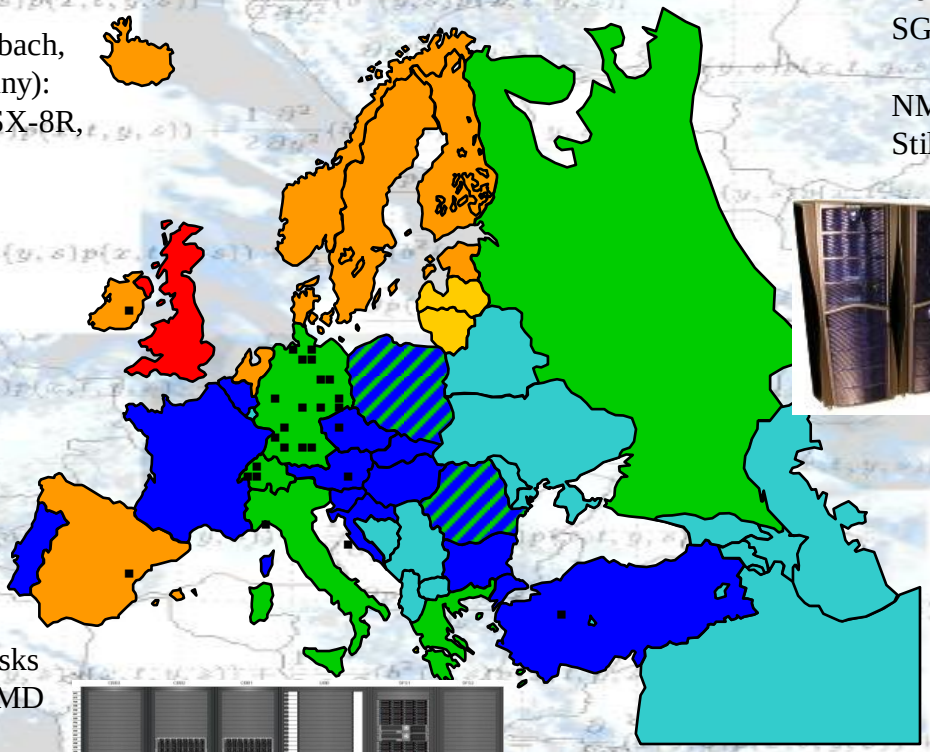
REUNIÓN DE EXPERTOS SOBRE LA PREDICCIÓN DE CRECIDAS REPENTINAS
01 – 04/10/11 Santiago - Chile

The NWP system at INMET



COSMO – COnsortium for Small-scale MOdeling

DWD (Offenbach, Germany): NEC SX-8R, SX-9



Roshydromet (Moscow, Russia), SGI

NMA (Bucharest, Romania): Still in planning / procurement phase

IMGW (Warsawa, Poland): SGI Origin 3800: uses 88 of 100 nodes

MeteoSwiss: Cray XT4: COSMO-7 and COSMO-2 use 800+4 MPI-Tasks on 402 out of 448 dual core AMD nodes

ARPA-SIM (Bologna, Italy): IBM pwr5: up to 160 of 512 nodes at CINECA

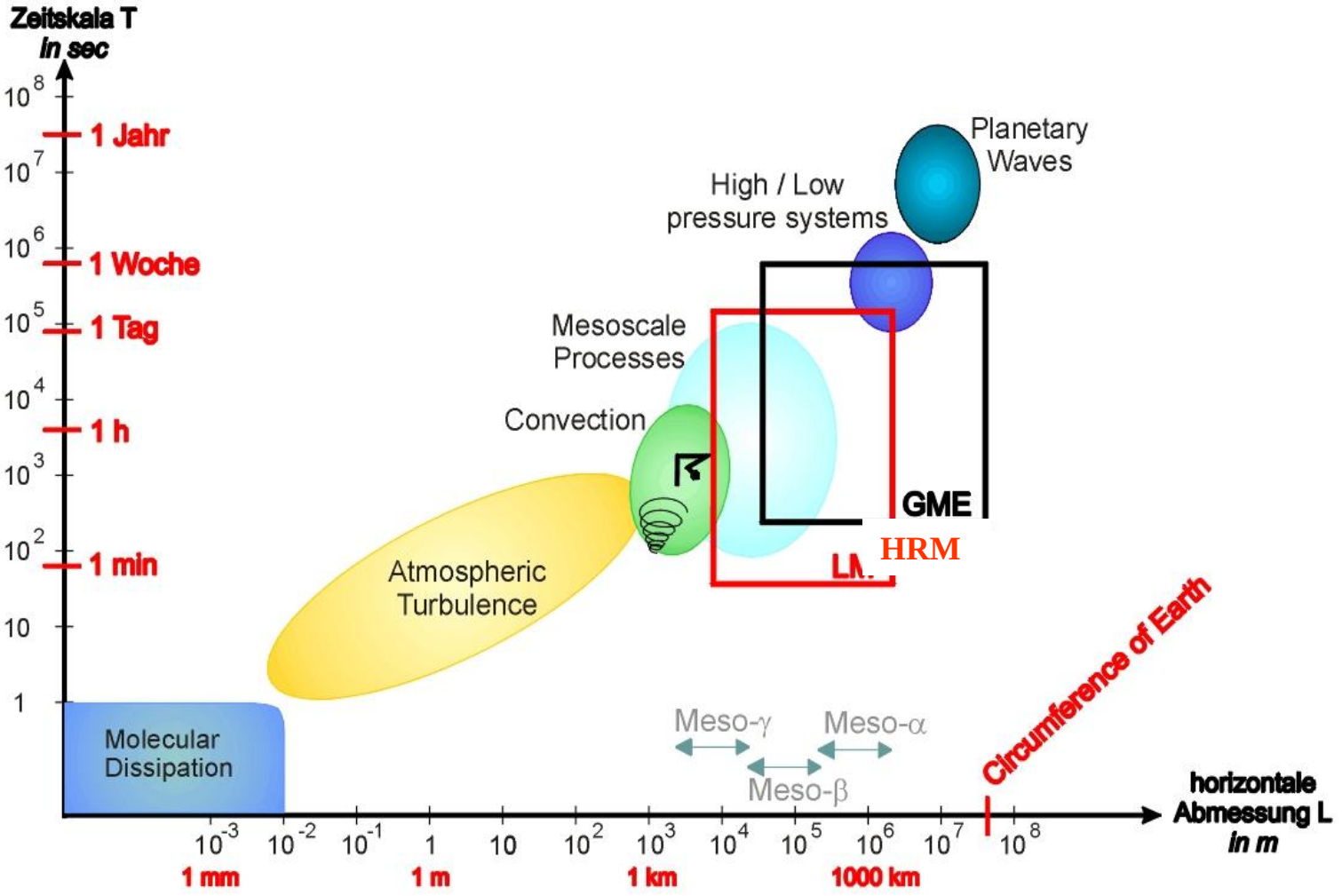
USAM (Rome, Italy): HP Linux Cluster XEON biproc quadcore System in preparation

COSMO-LEPS (at ECMWF): running on ECMWF pwr6 as member-state time-critical application

ARPA-SIM (Bologna, Italy): Linux-Intel x86-64 Cluster for testing (uses 56 of 120 cores)

HNMS (Athens, Greece): IBM pwr4: 120 of 256 nodes

Scales of atmospheric phenomena for **GME, HRM e COSMO**



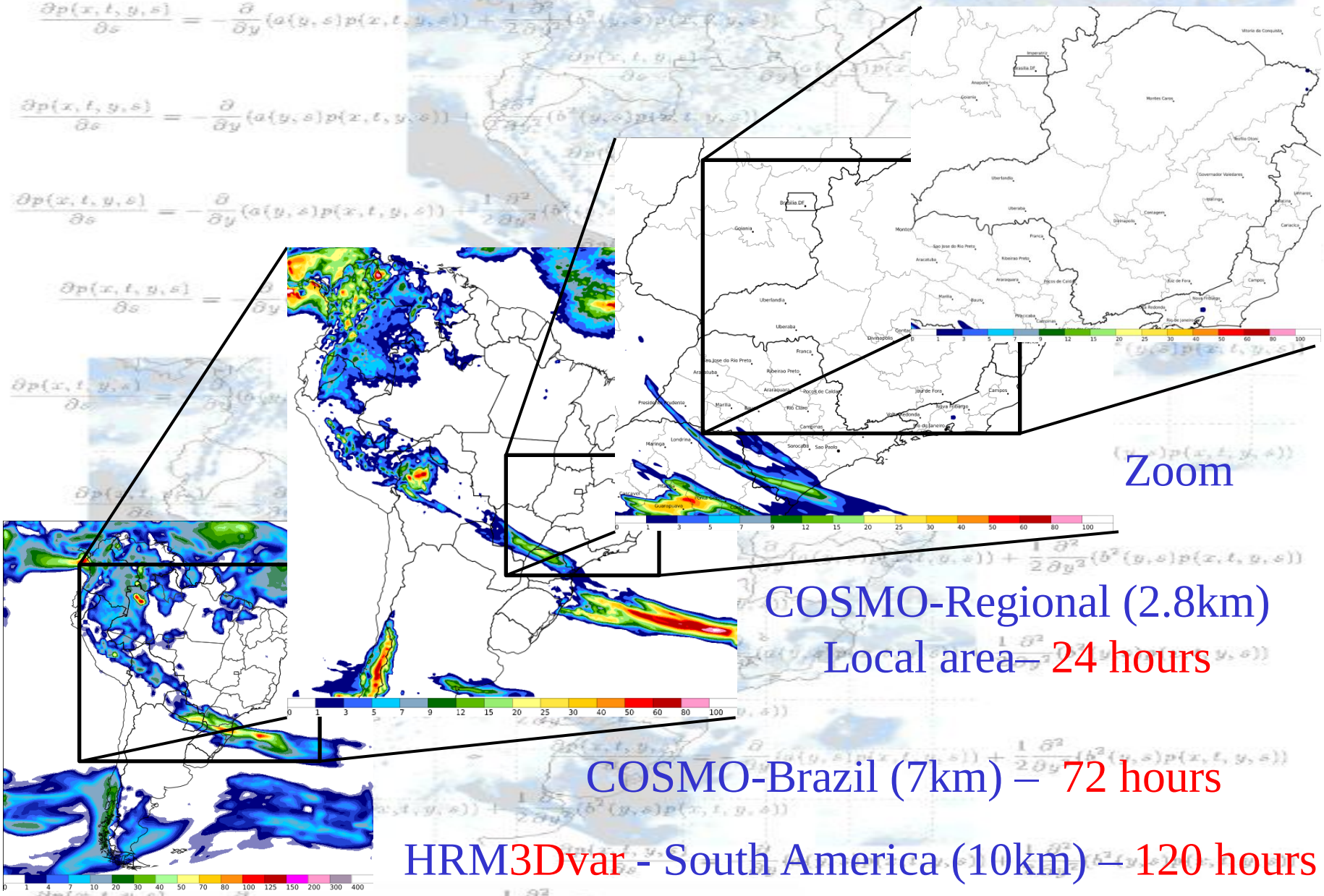
GME:
Δx = 30 km
655.362*60 points
Área= 778 km^2
Δt = 100 sec.
T_{ges} = 7 days

HRM:
Δx = 10 km
751*751*60 points
Área= 100 km^2
Δt = 30 sec.
T_{ges} = 5 days

COSMO-7:
Δx = 7 km
856*856*60 points
Área= 80 km^2
Δt = 20 sec.
T_{ges} = 3 days

COSMO-2.8:
Δx = 2.8 km
601*601*50 points
Área= 50 km^2
Δt = 15 sec.
T_{ges} = 1 day

HRM x COSMO



Zoom

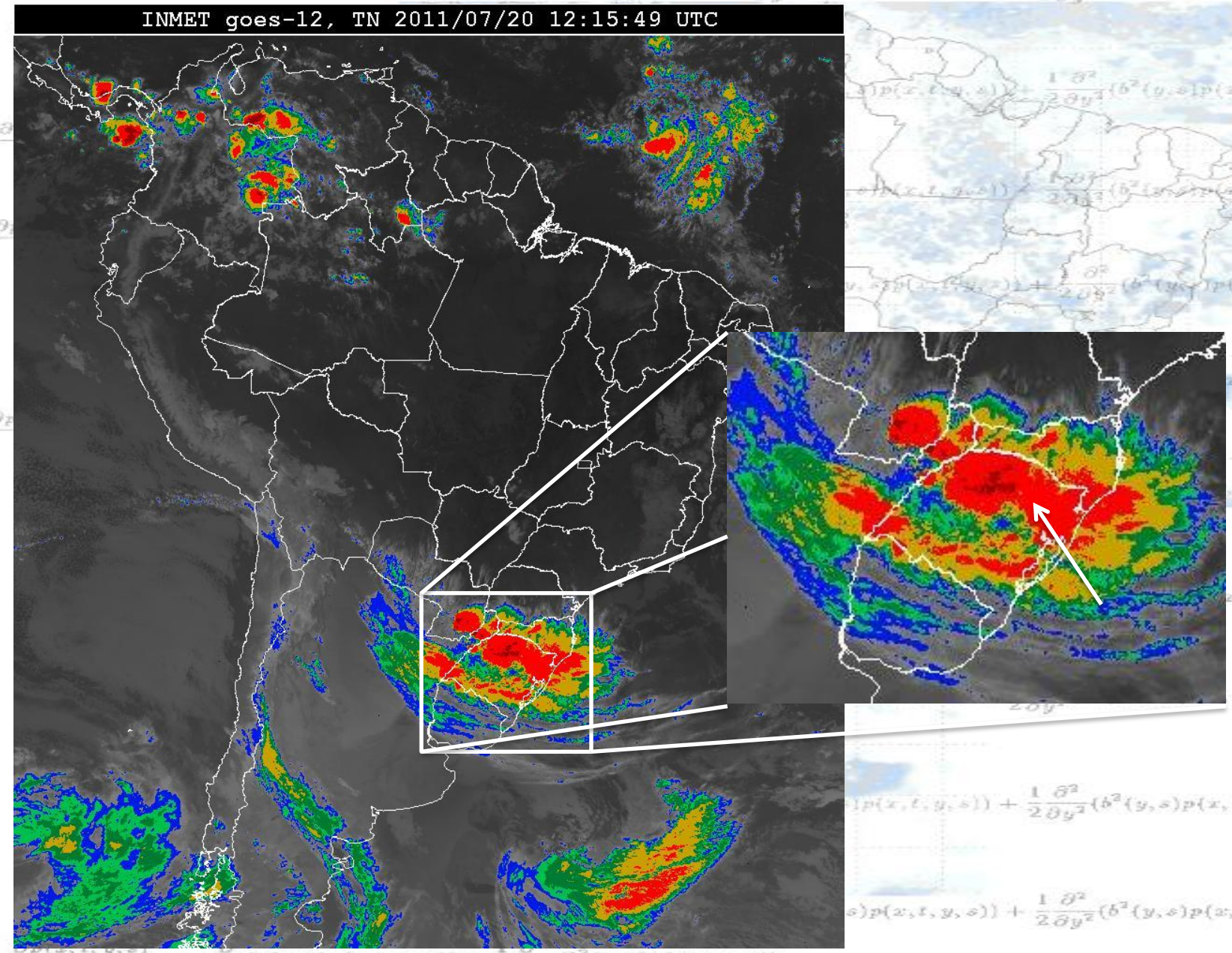
COSMO-Regional (2.8km)

Local area – 24 hours

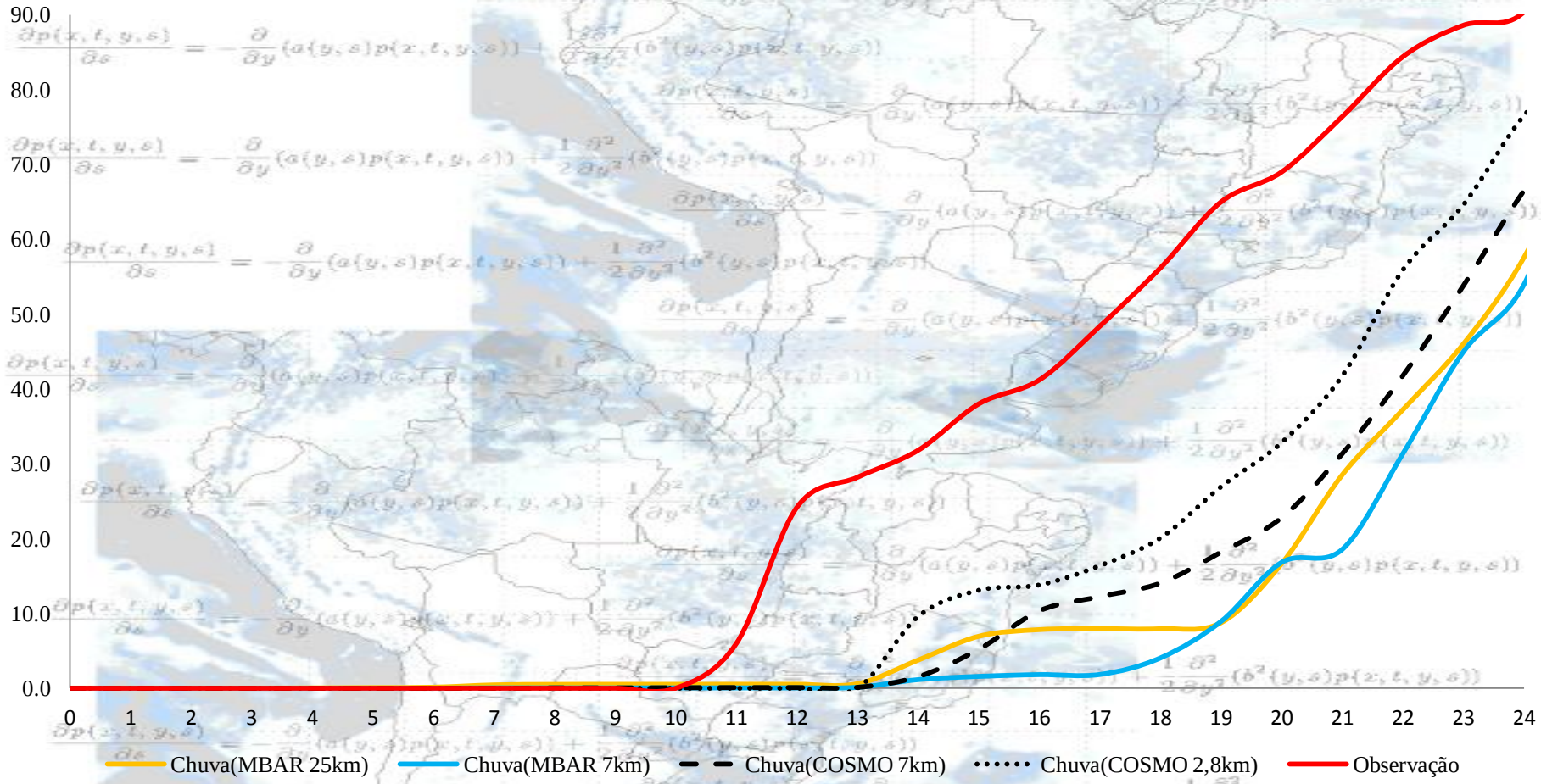
COSMO-Brazil (7km) – 72 hours

HRM3Dvar - South America (10km) – 120 hours

Flooding in RS (South of Brazil) – 20/07/2011 -12UTC

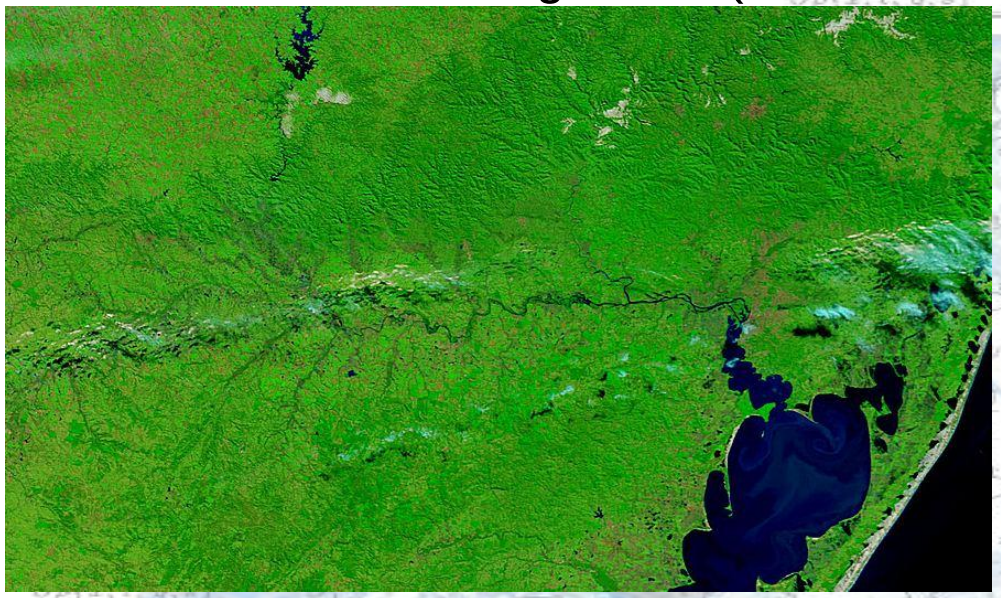


Flooding in RS (South of Brazil) – 20/07/2011-12UTC



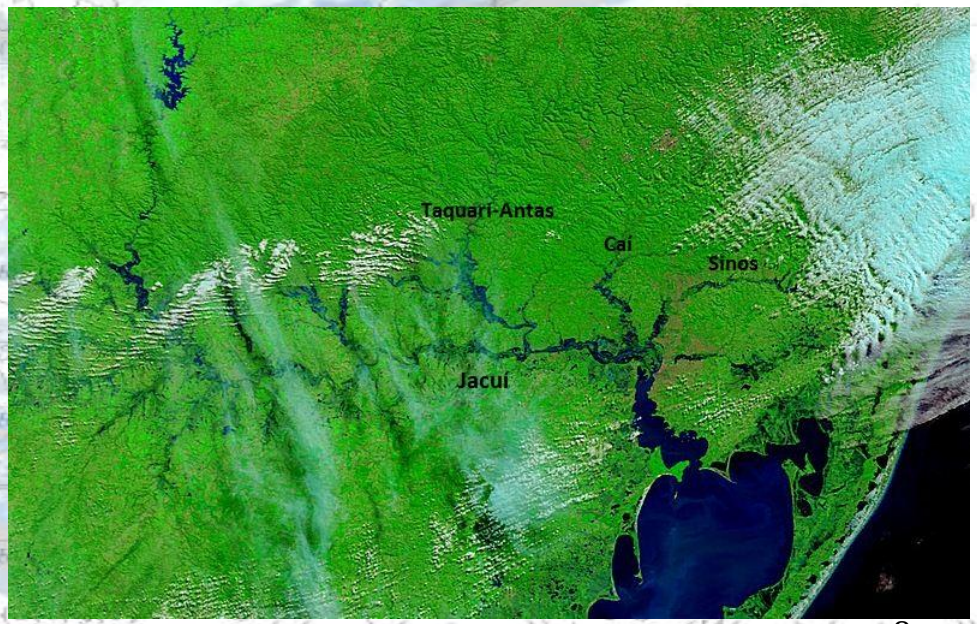
Model initialization – 20/07/2011 - 00UTC

Flooding in RS (South of Brazil) – 20/07/2011-12UTC



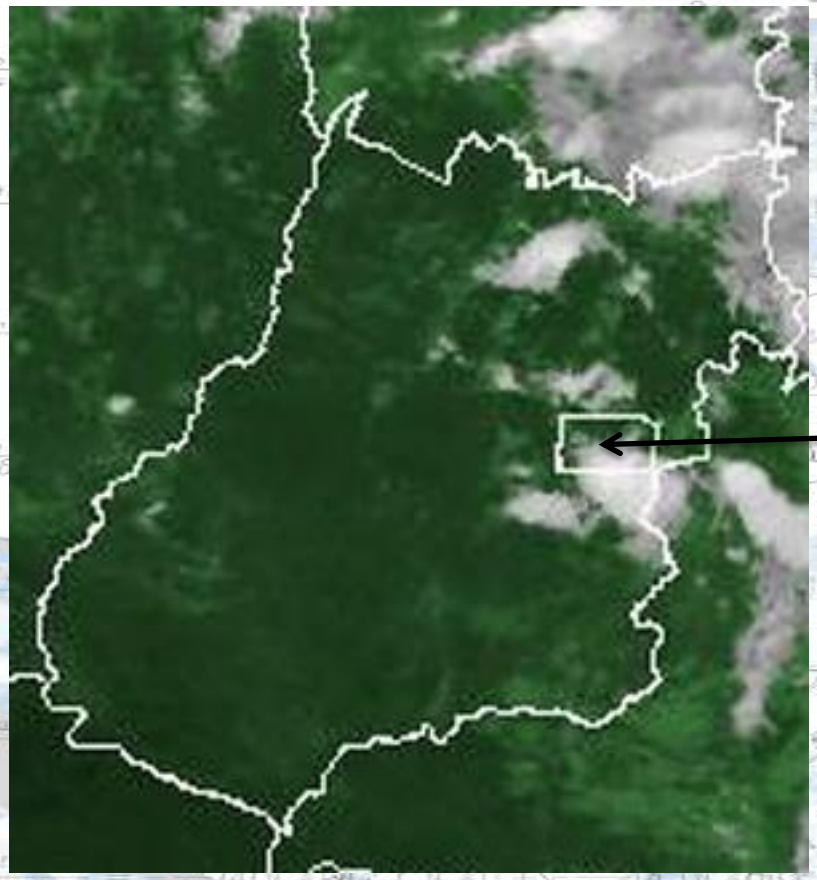
Before

After



Flooding in RS (South of Brazil) – 20/07/2011-12UTC

Flooding at the University of Brasilia-DF - 10/04/2011



Model initialization – 10/04/2011 - 00UTC

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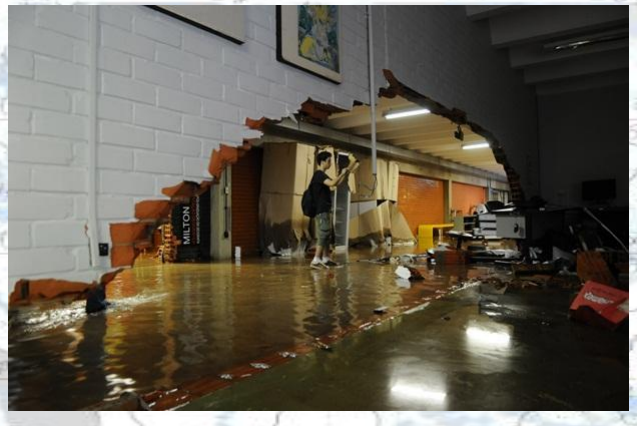
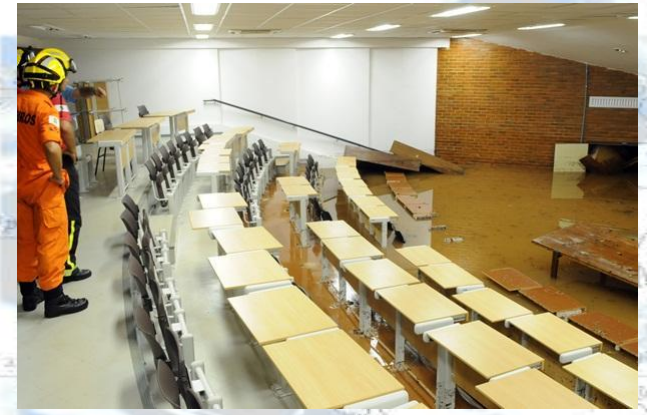
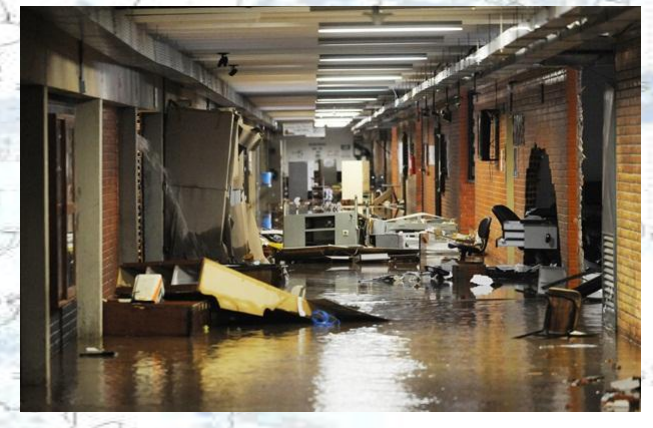
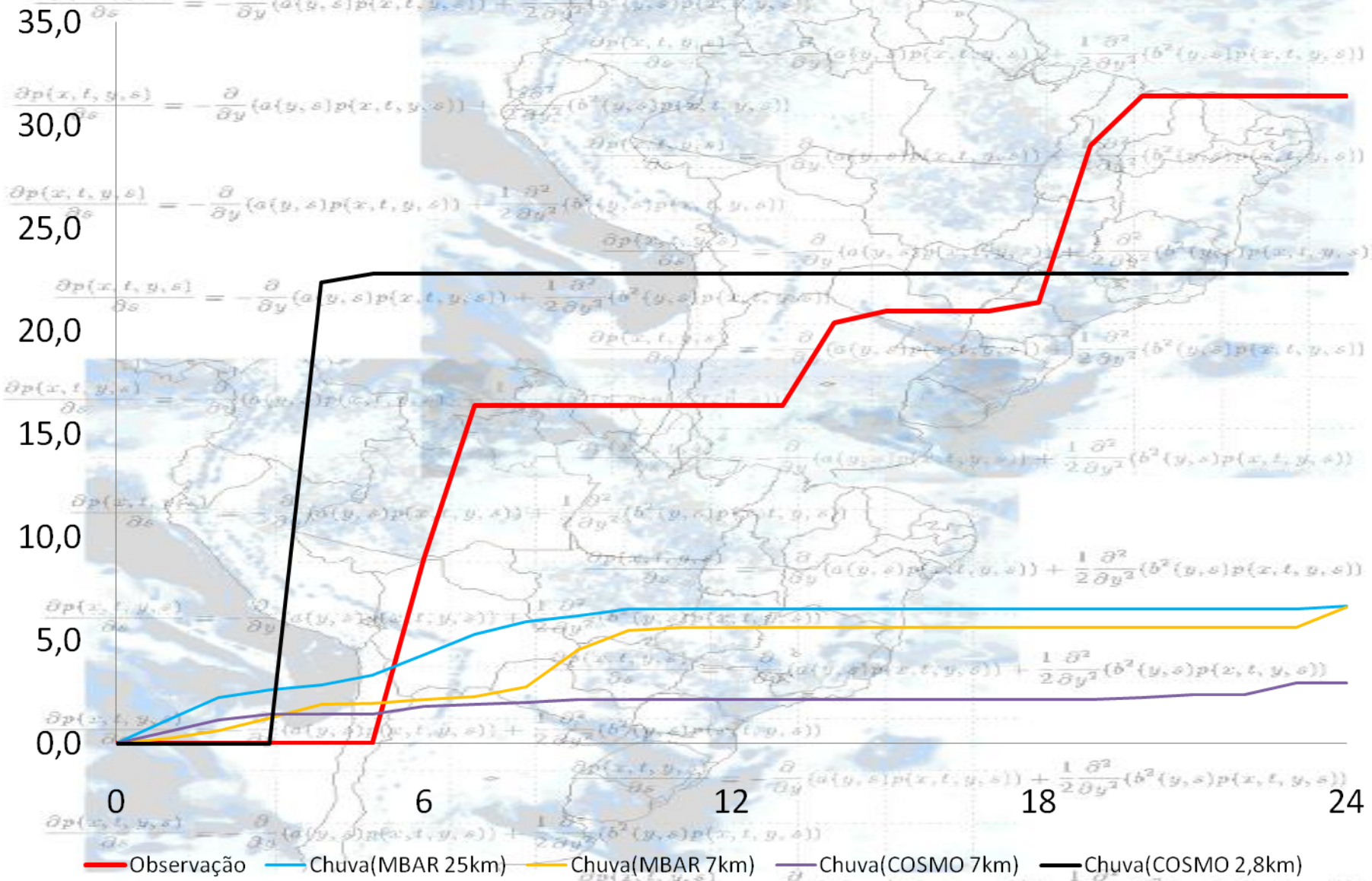


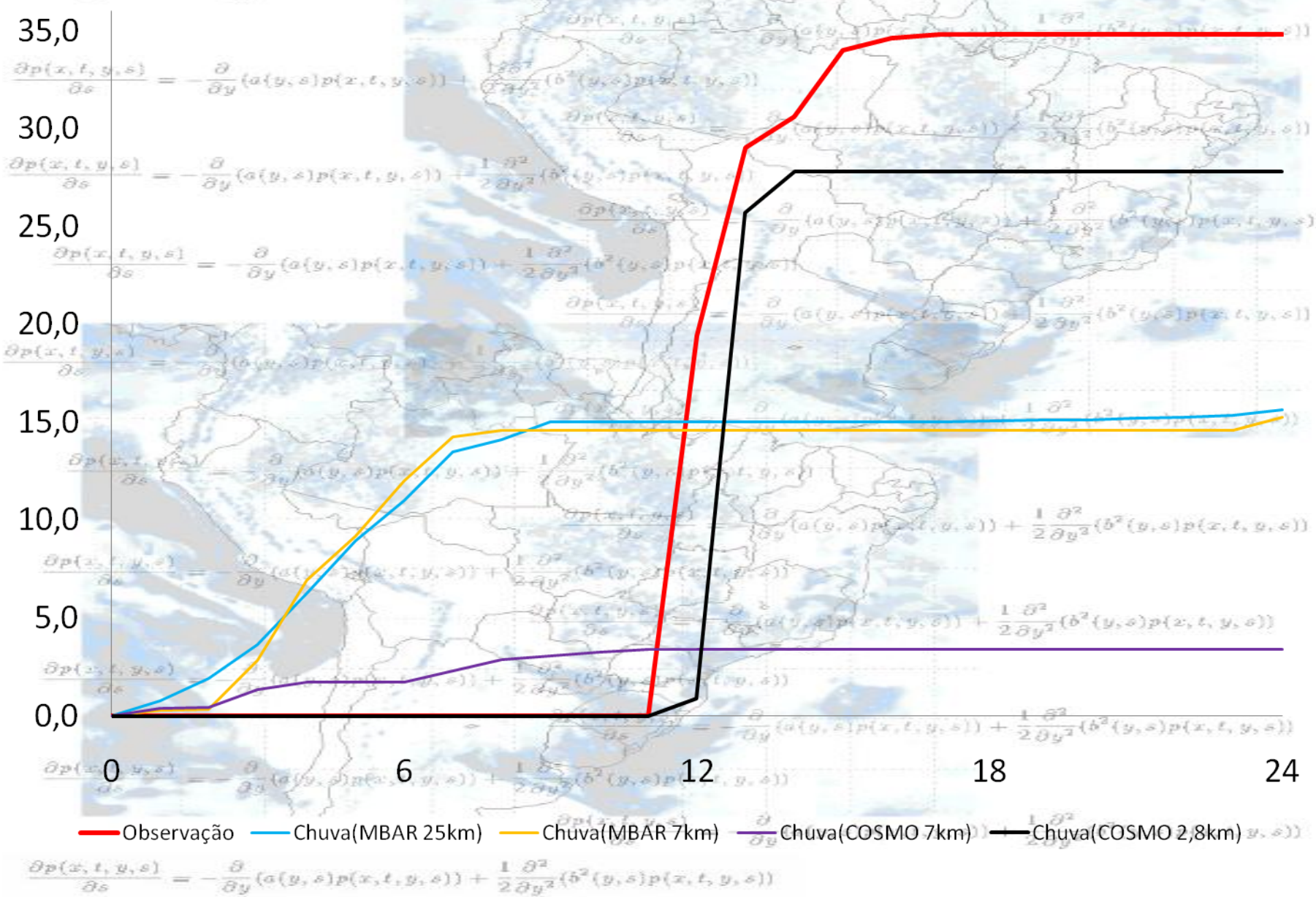




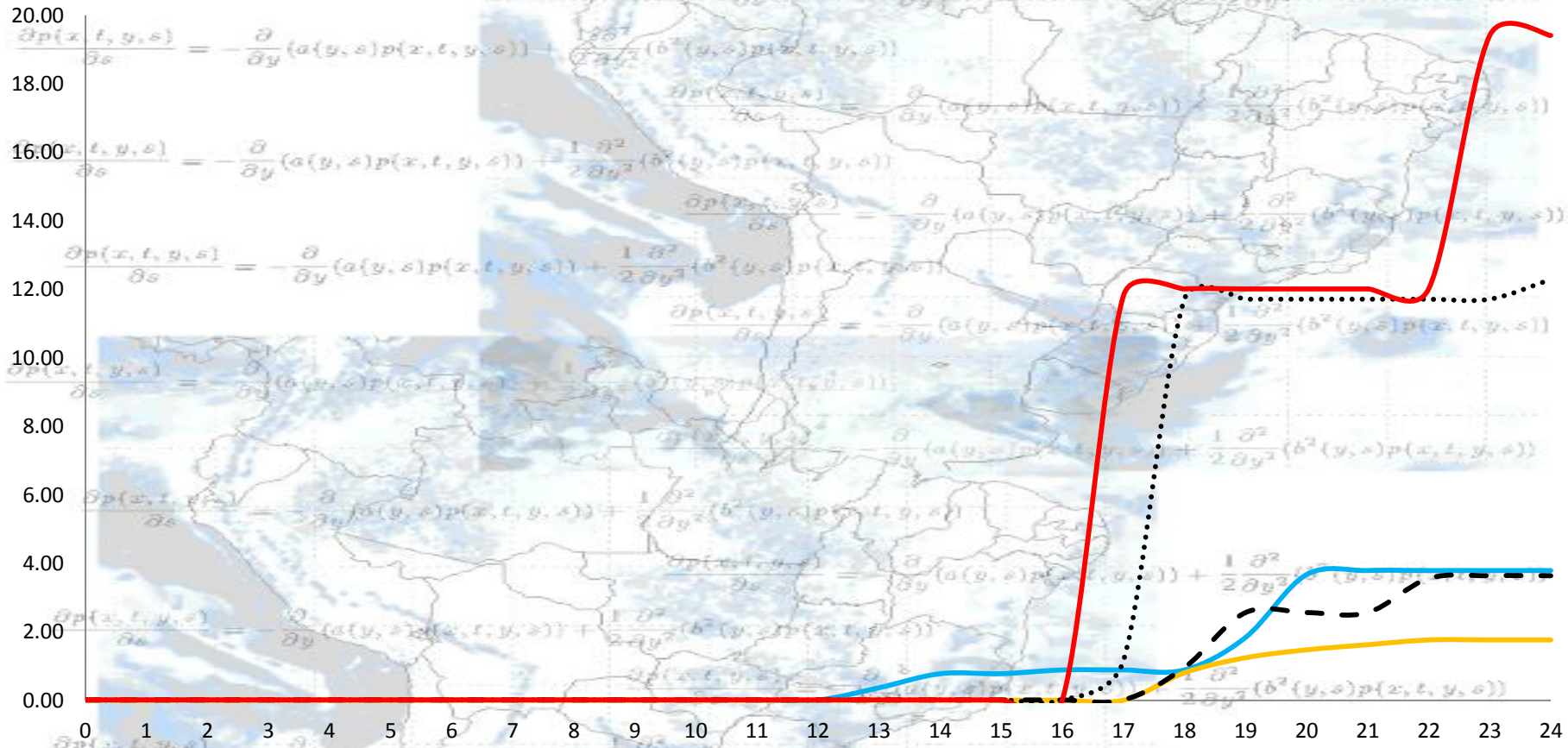
Precipitacion (mm) – Foz do Iguaçu – PR (19/02/11)



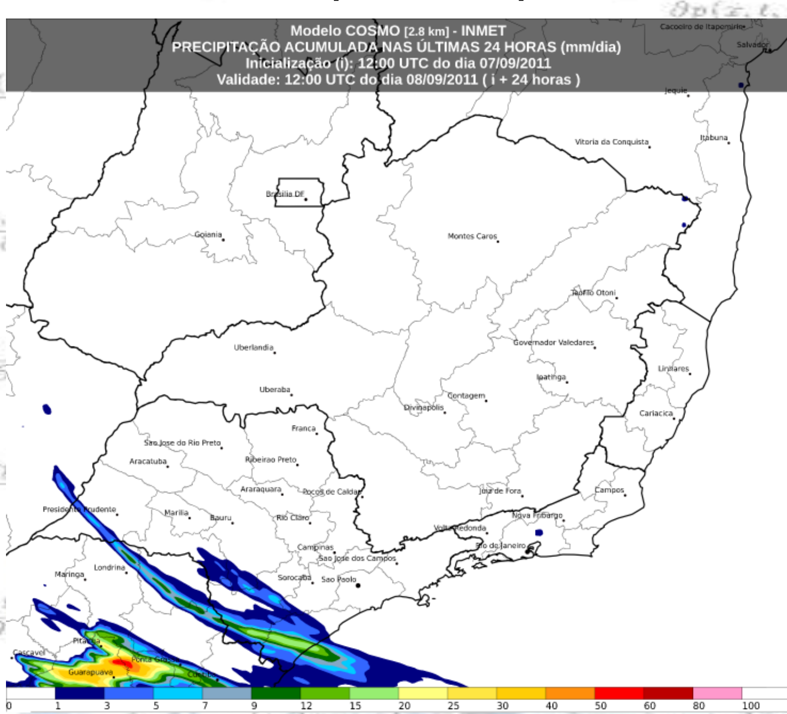
Precipitacion (mm)– Itaberá – SP (31/01/11)

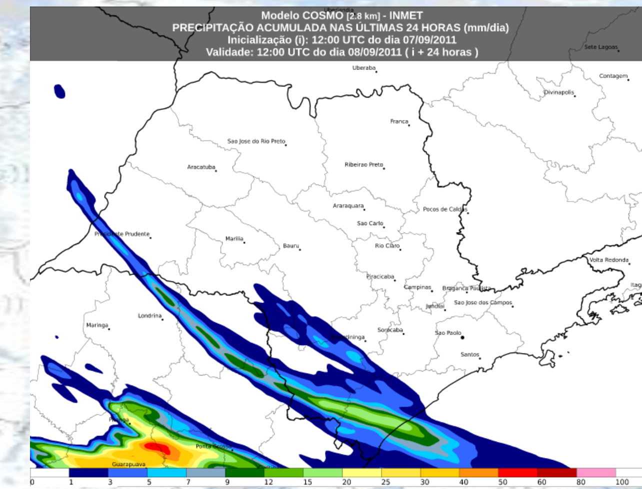


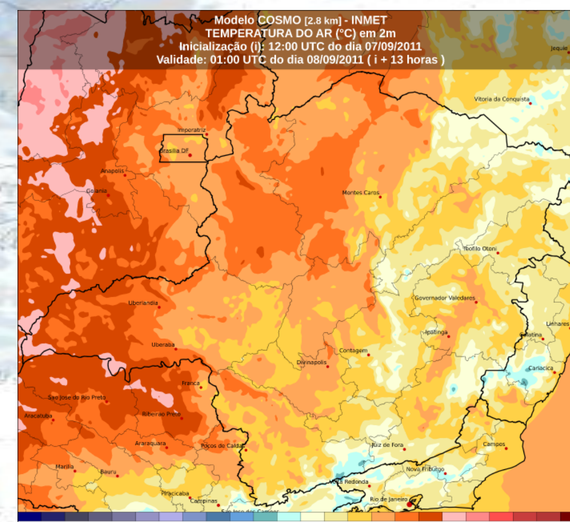
Precipitacion (mm)– Itapeva – SP (16/12/09)

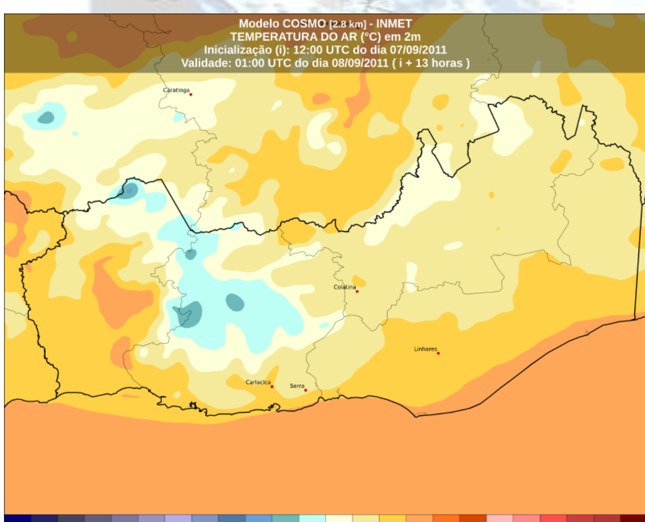


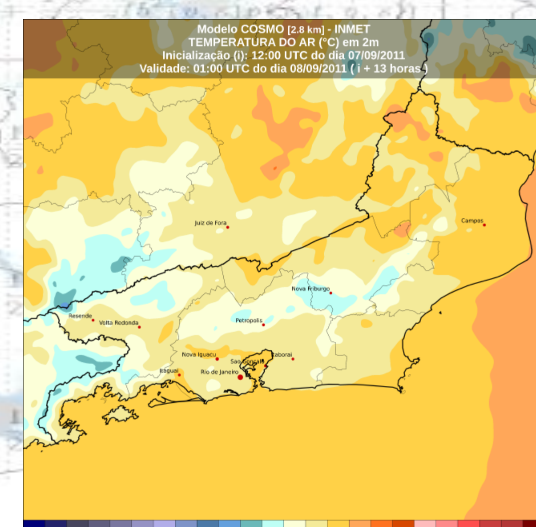
Examples outputs COSMO 2.8km – Southeast Brazil



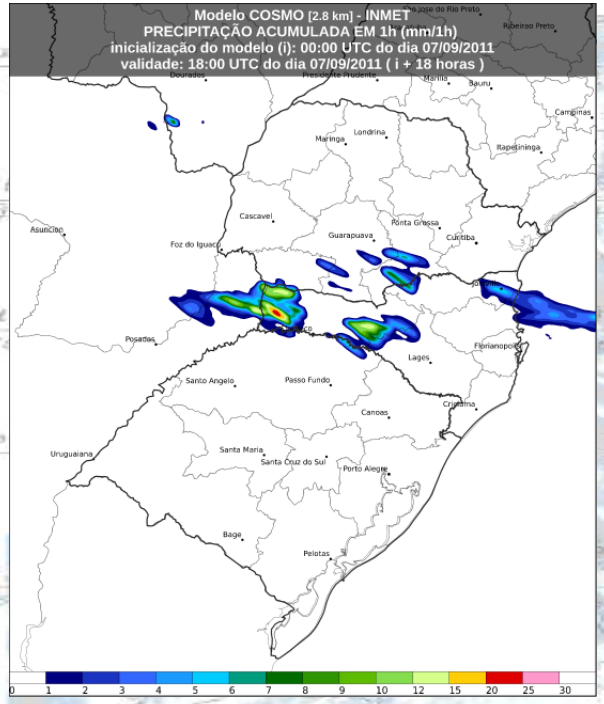


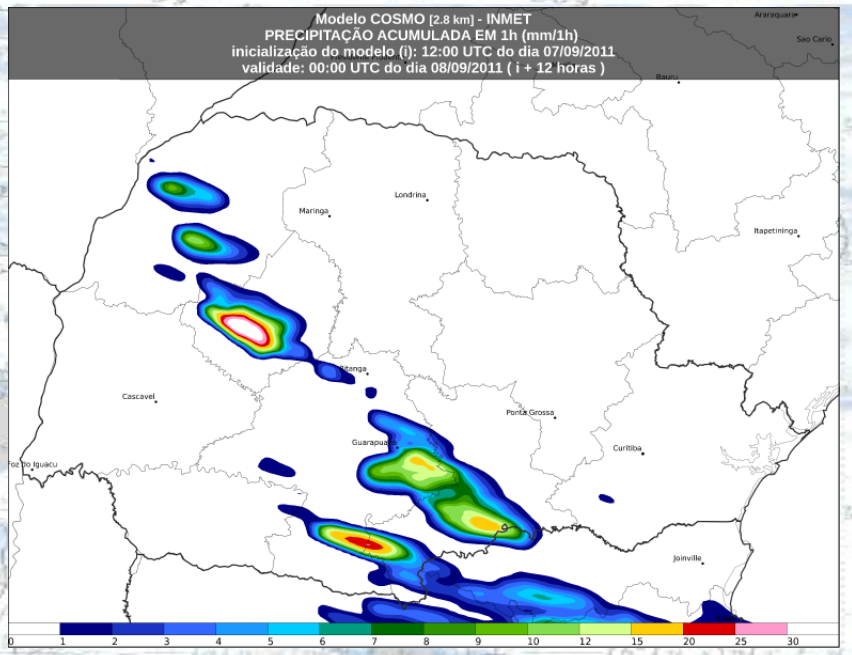


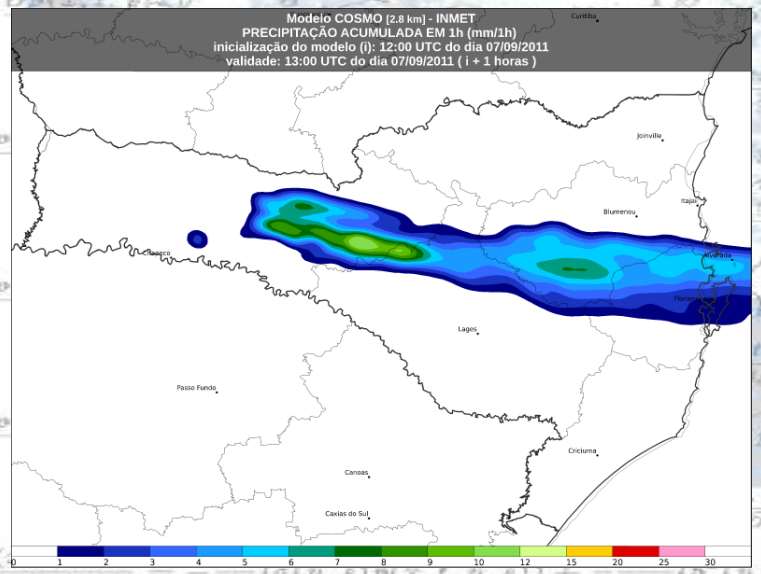


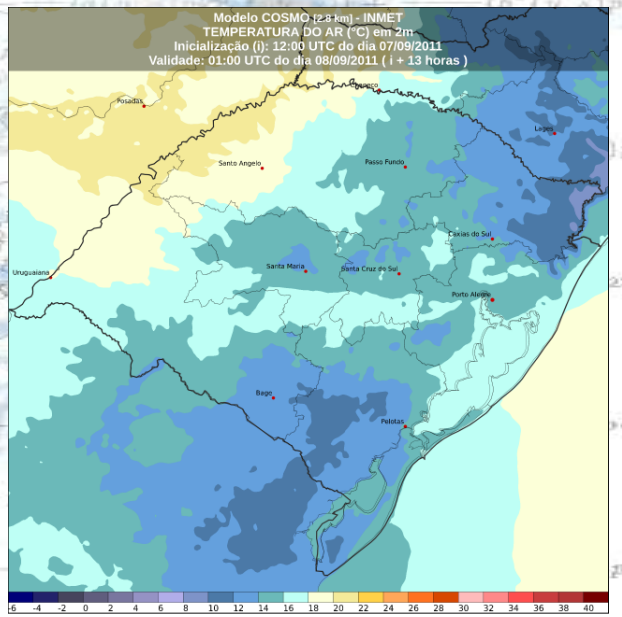


Examples outputs COSMO 2.8km - Southern Brazilian

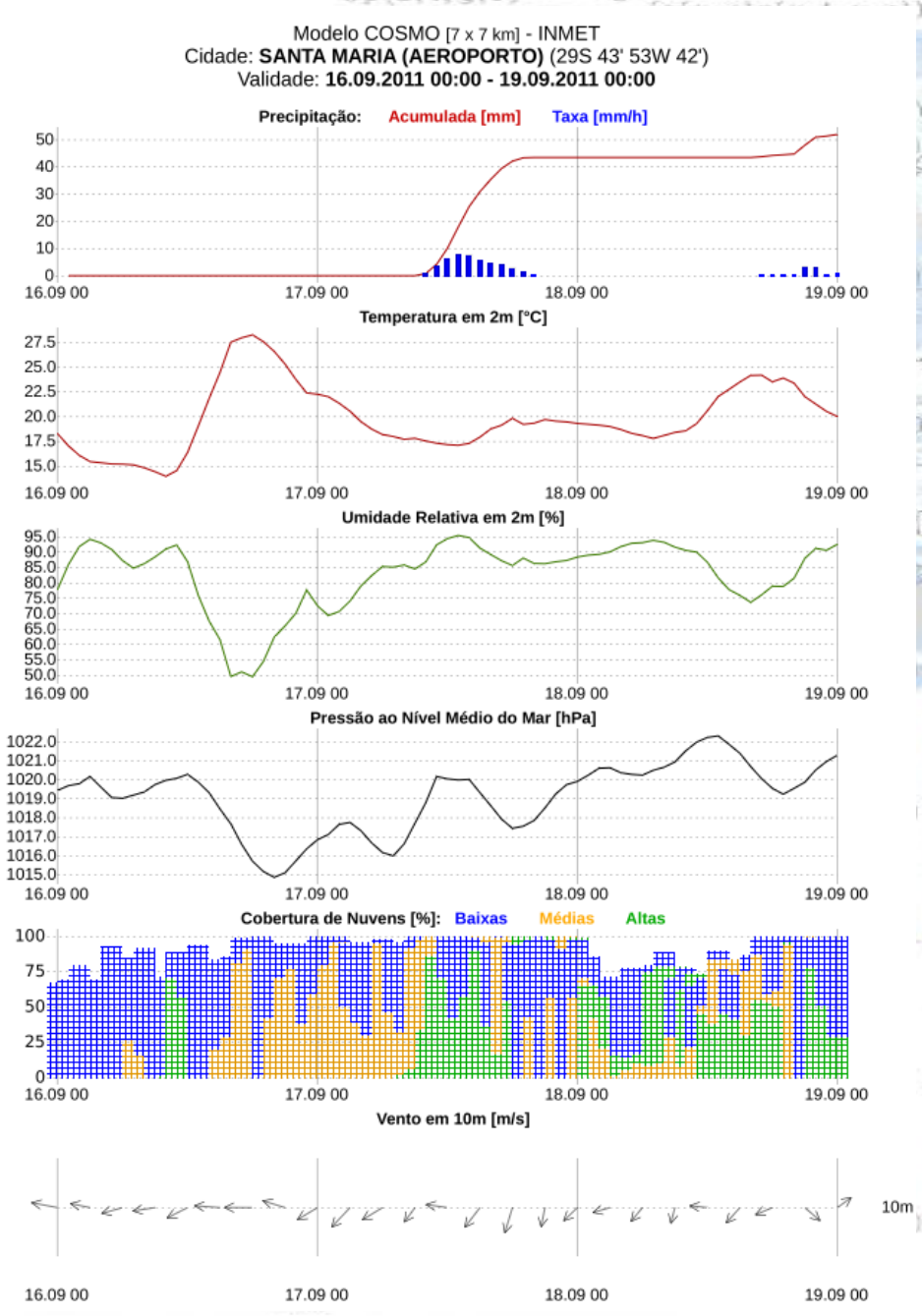








Meteogram


Modelo COSMO [7 x 7 km] - INMET
Cidade: SANTA MARIA (AEROPORTO) (29S 43' 53W 42')
Validade: 16.09.2011 00:00 - 19.09.2011 00:00
Precipitação: Acumulada [mm] Taxa [mm/h]
50
40
30
20
10
0
16.09 00
17.09 00
18.09 00
19.09 00
Temperatura em 2m [°C]
27.5
25.0
22.5
20.0
17.5
15.0
Umidade Relativa em 2m [%]
95.0
90.0
85.0
80.0
75.0
70.0
65.0
60.0
55.0
50.0
Pressão ao Nível Médio do Mar [hPa]
1022.0
1021.0
1020.0
1019.0
1018.0
1017.0
1016.0
1015.0
Cobertura de Nuvens [%]: Baixas Médias Altas
100
75
50
25
0
Vento em 10m [m/s]
10m

Considerations

- COSMO 2.8km operational end of 2011;
- INMET is acquiring a new supercomputer with capacity of ~20 TFLOPS;
- COSMO 2.8km will be processed four times per day (0, 6, 12 and 18 UTC);
- Region South, Southeast and Northeast of Brazil;
- Good answer to identify rain (storms, cumulonimbus clouds 2 – 10km);
- Local Data Assimilation (automatic stations (500 - 800), satellite, radar) - 2014;
- From 2013 HRM users use the COSMO model (Africa);
- **Identification and monitoring risk areas (partnership INMET/ANA - National Water Agency).**

for your attention