

# ***A Nowcasting System for Harbor Operations***

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***WSN12***

***Bolsa de Valores – Rio de Janeiro***

***09/08/2012***

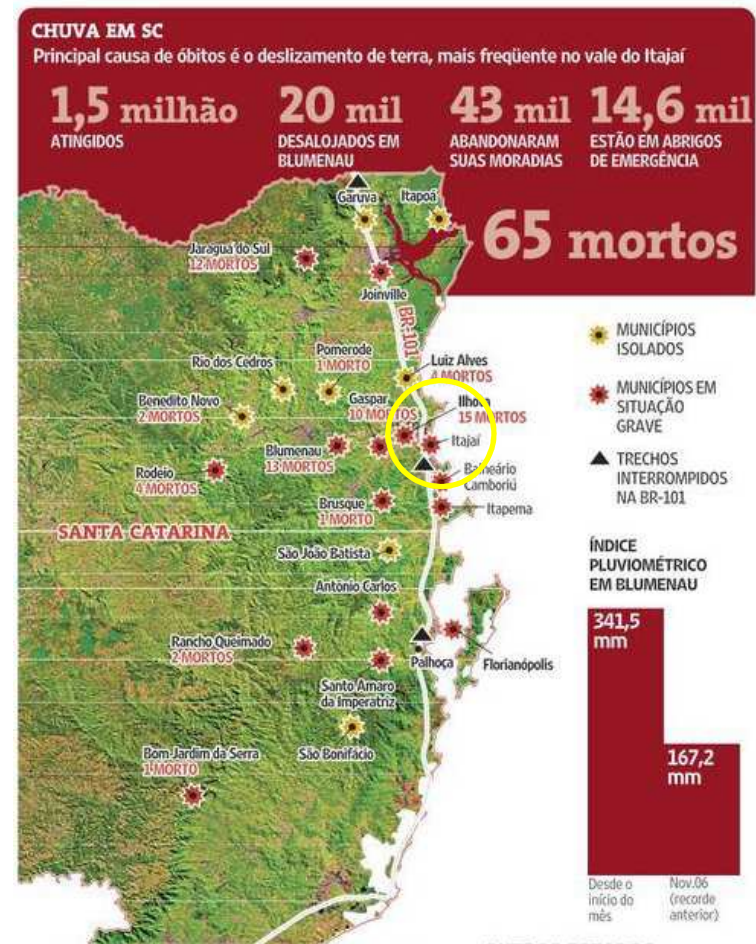
***Extreme Events***  
***Rain and Wind***

# **Floods and Mood Slides**

## **Blumenau 22/11/2008**



# Damages and Deaths



Source: Folha SP 25/11/2008

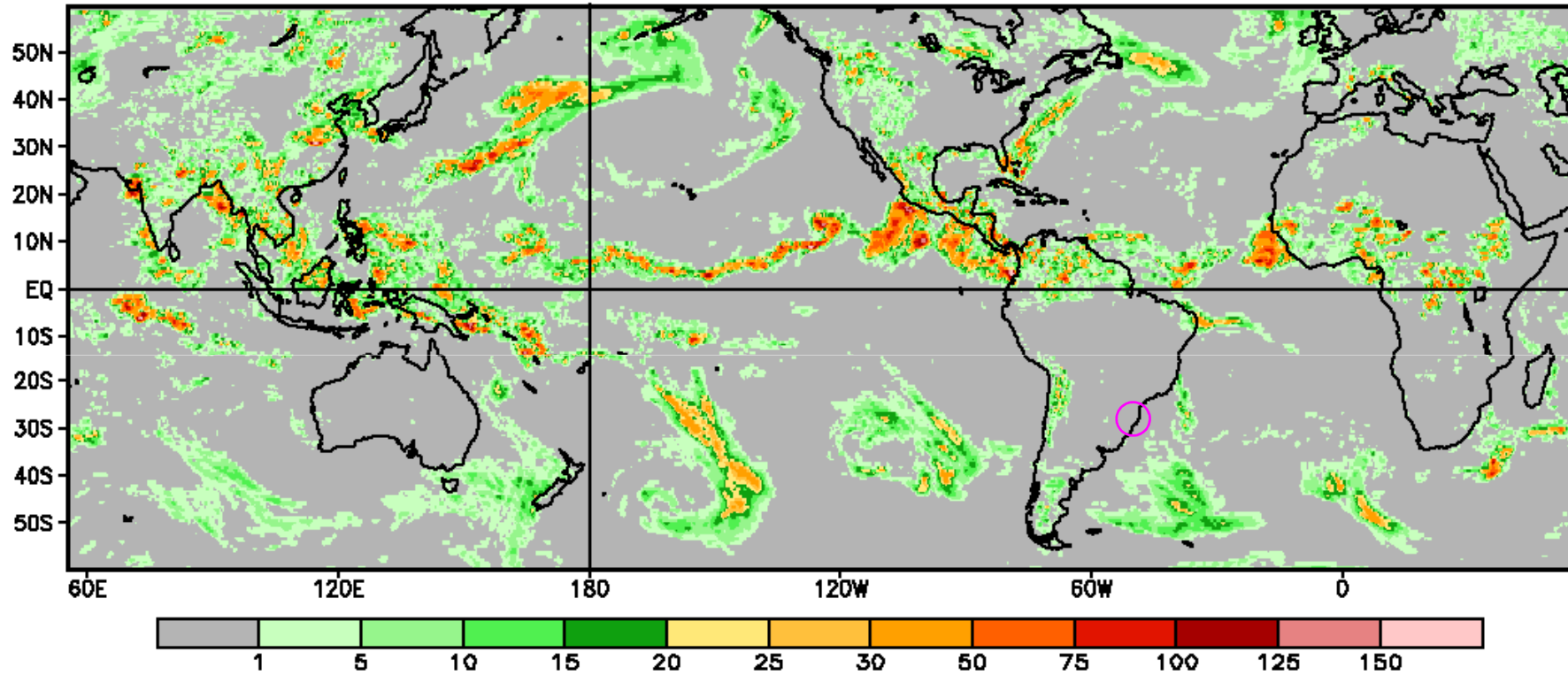
# Itajuba Harbor

## 26 November 2008

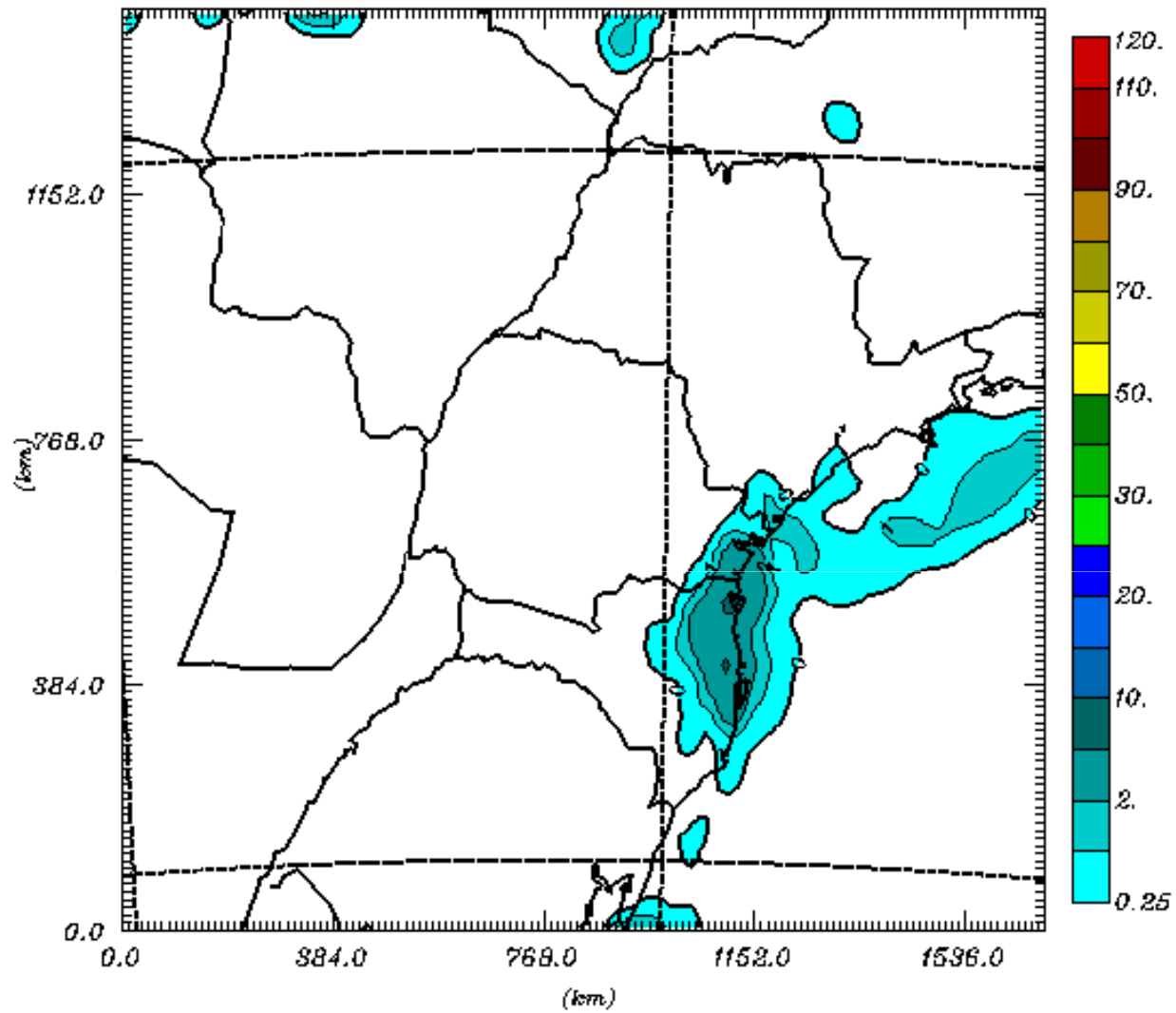


Daily Precipitation for: 01 Jul 2008 (00Z-00Z)  
Data on .25 x .25 deg grid; UNITS are mm/day

## CMORPH Precipitation Estimates



23:00h Sab 22 Nov 2008



7200.0 s Accumulated Rainfall (mm, SHADED/CONTOUR)

MIN=0.00 MAX=5.31

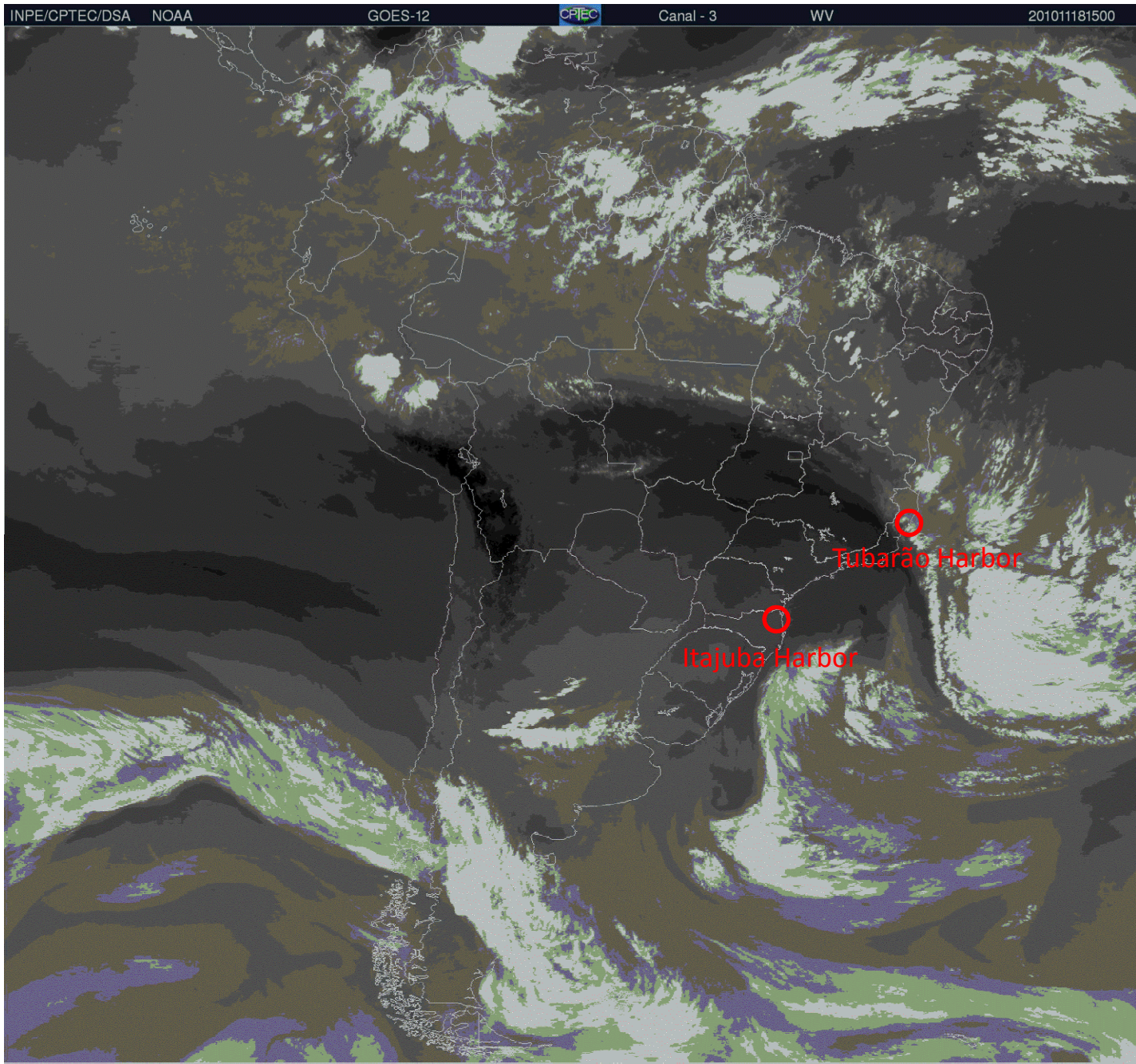


**DNs Vale - Vitória**  
**8/11/2010**

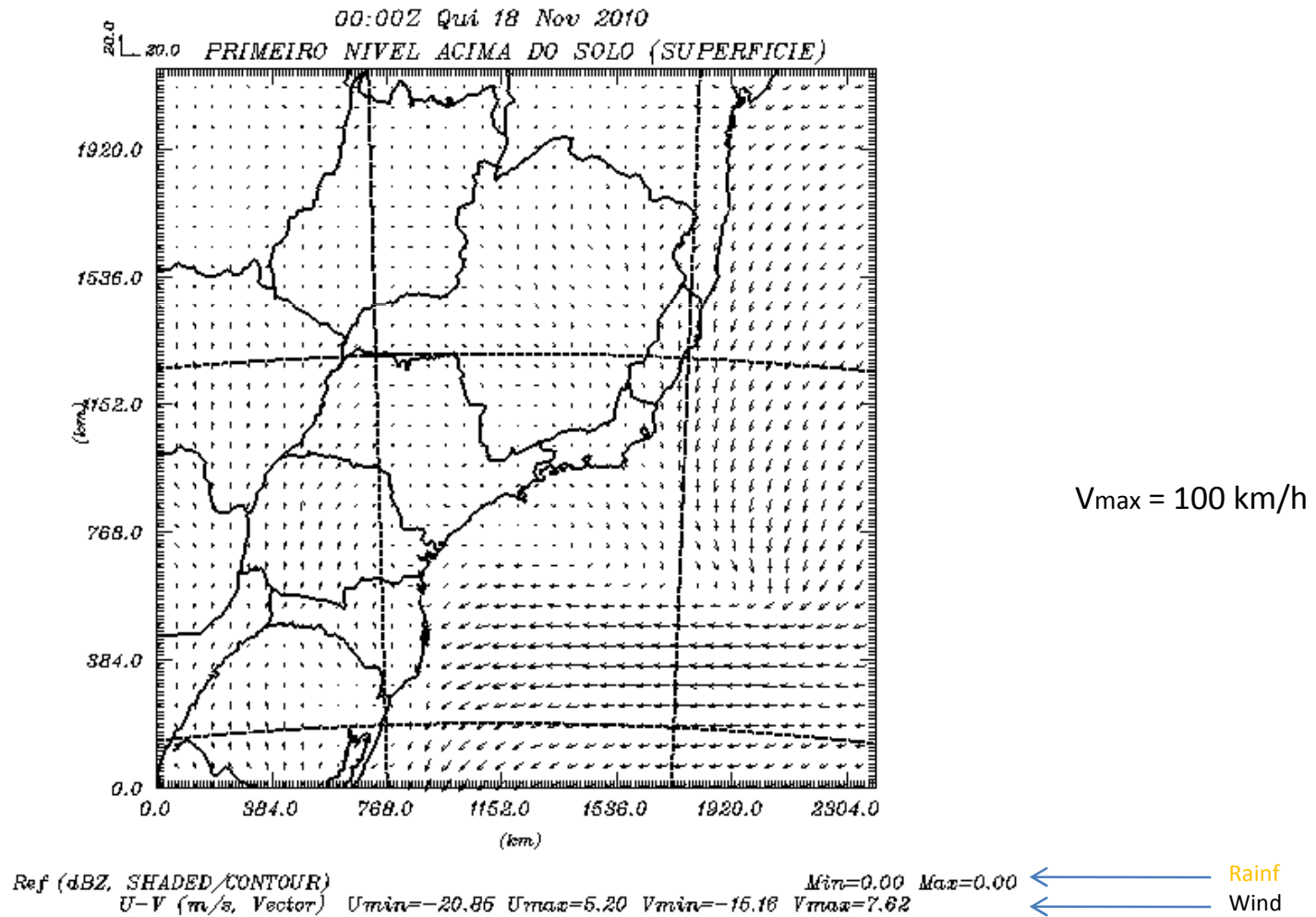
# Tubarão Harbor

## 8-11-2010

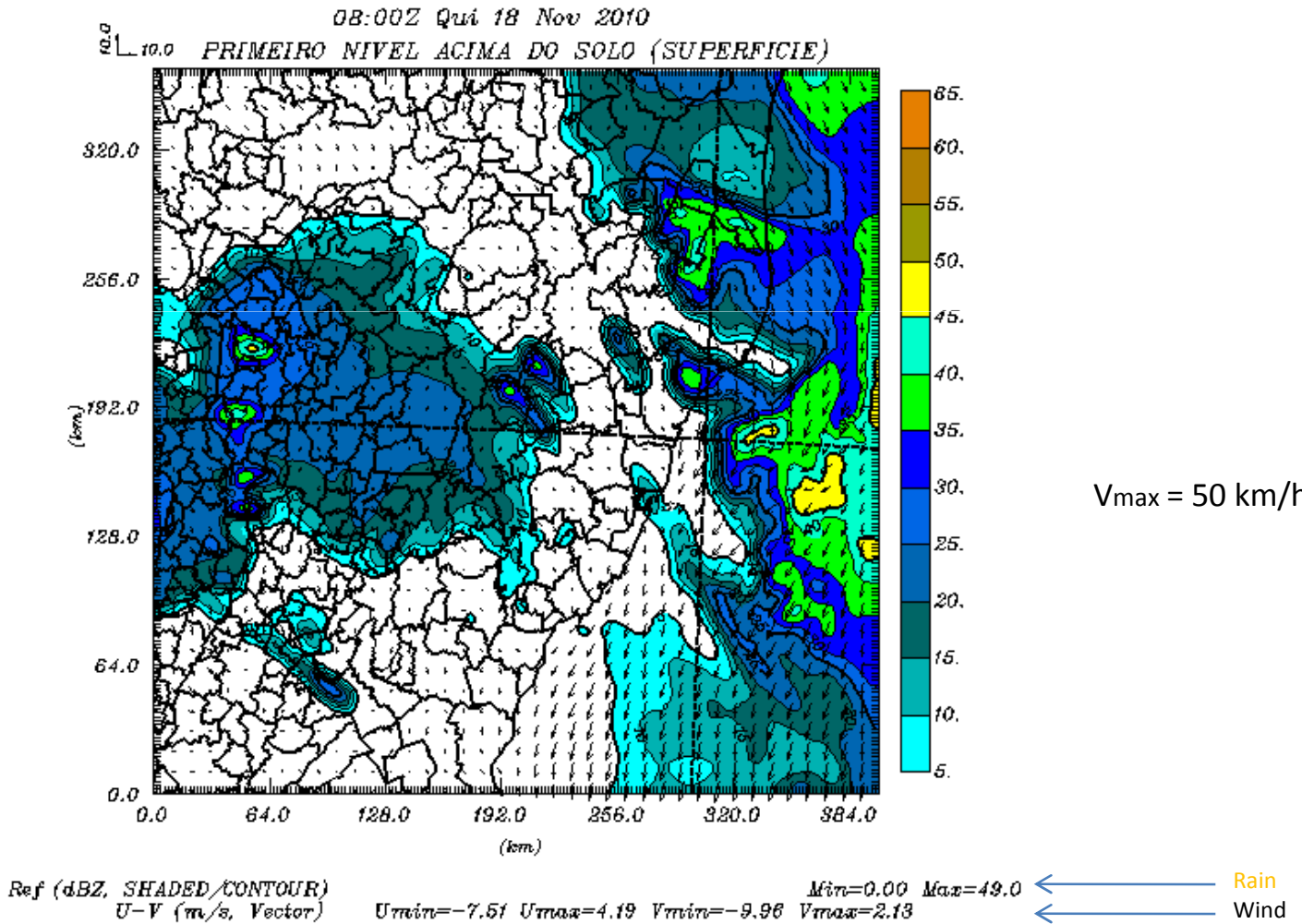


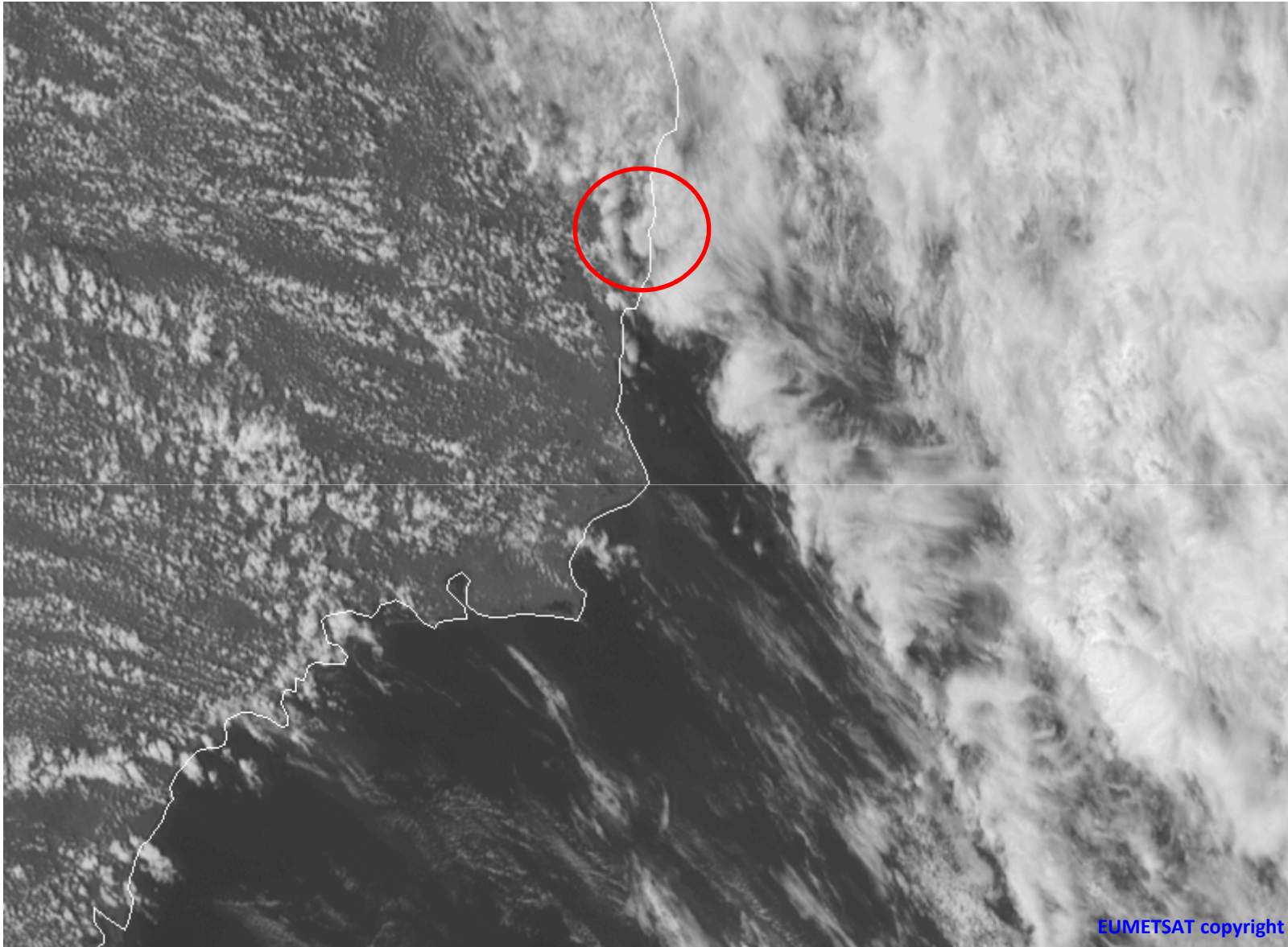


# Wind and Rainfall Forecasts 12 km Horizontal Resolution



# Wind and Rainfall Forecasts 2 km Horizontal Resolution



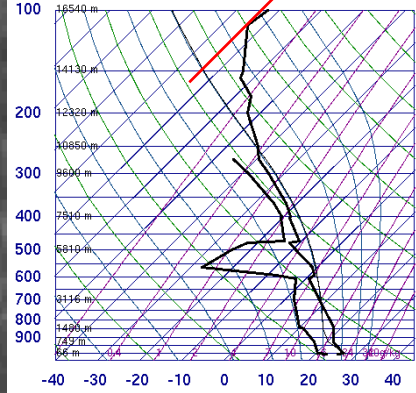


18 NOV 2010 1600 UTC BAND HRV

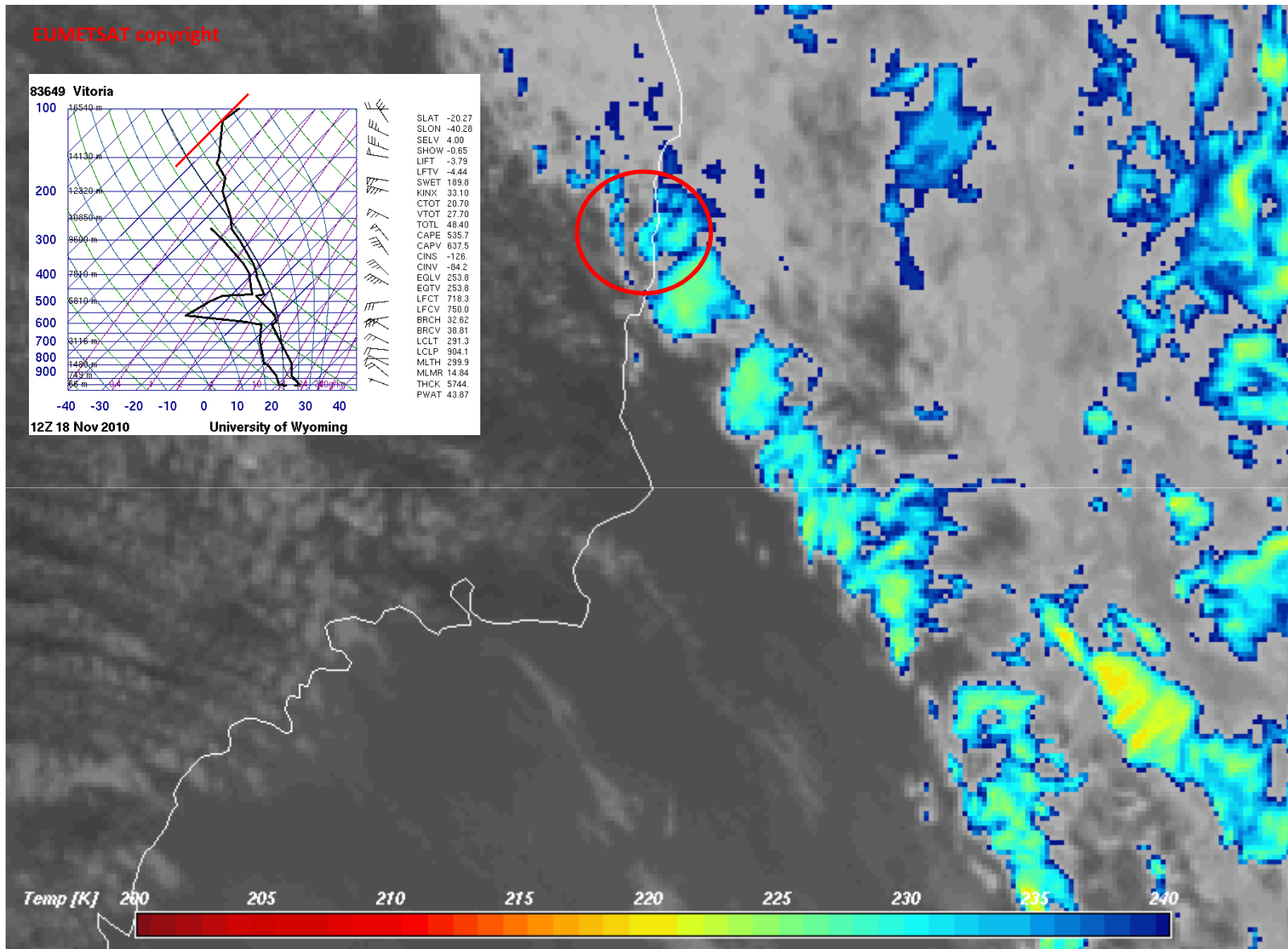
EUMETSAT copyright

EUMETSAT copyright

83649 Vitoria

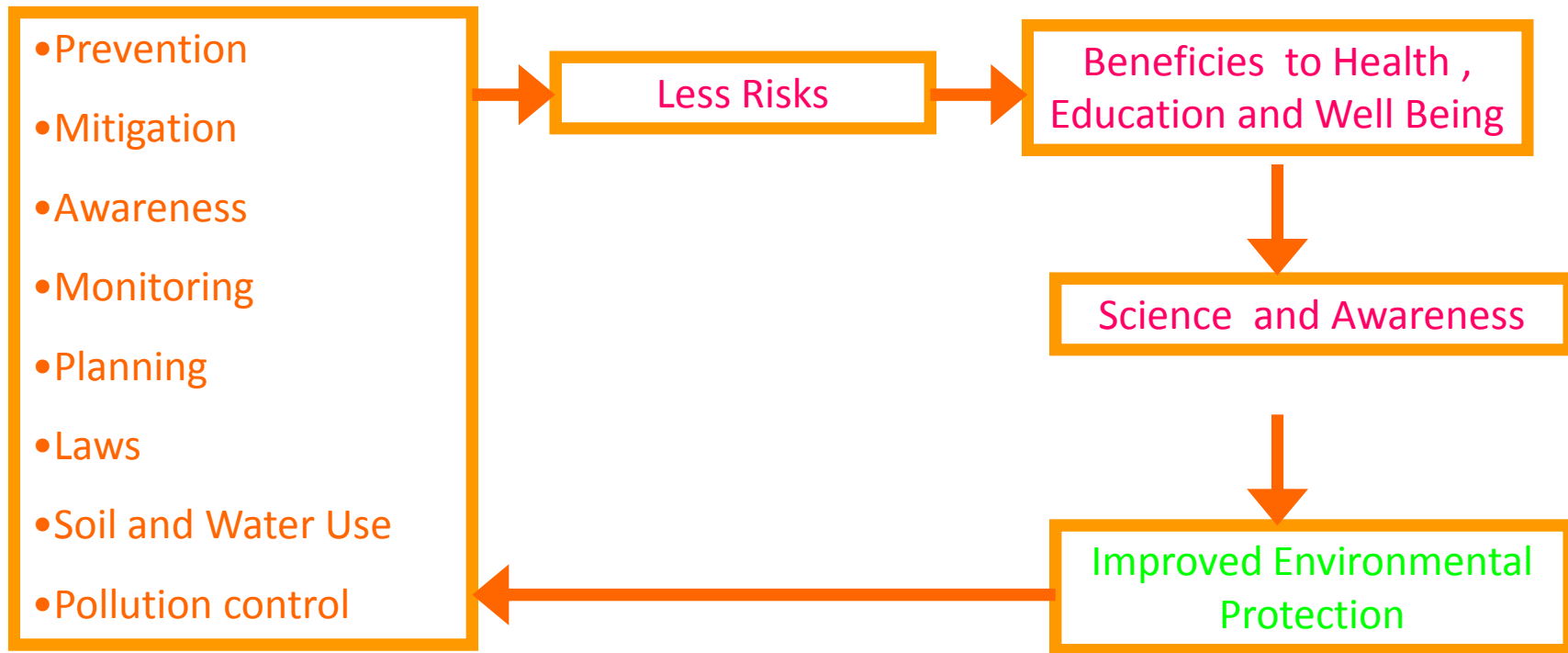


SLAT -20.27  
SLON -40.28  
SELV 4.00  
SHOW -0.65  
LIFT -3.79  
LFTV -4.44  
SWET 189.8  
KINK 33.10  
CTOT 20.70  
VTOT 27.70  
TOTL 48.40  
CAPE 535.7  
CAPV 637.5  
CINS -126  
CINV -64.2  
EQLV 253.8  
EGTV 253.8  
LFCT 718.3  
LFCV 750.0  
BRCH 32.62  
BRCV 38.81  
LCLT 291.3  
LCLP 904.1  
MLTH 299.9  
MLMR 14.84  
THCK 5744  
PWAT 43.87



18 NOV 2010 1600 UTC

# Environment Management – Sustainability





# OBSERVING THE EARTH AND ATMOSPHERE

(Essential to sustainability )



**Forecasting Tools**

**Warning Systems**

**Weather and Climate Science**

**Information**



Risk Reduction

Simple monitoring and warning systems

Risk reduction of disasters and pre-warnings based on social-economics of vulnerability

Risk Management

Long Term Sustainable Planning

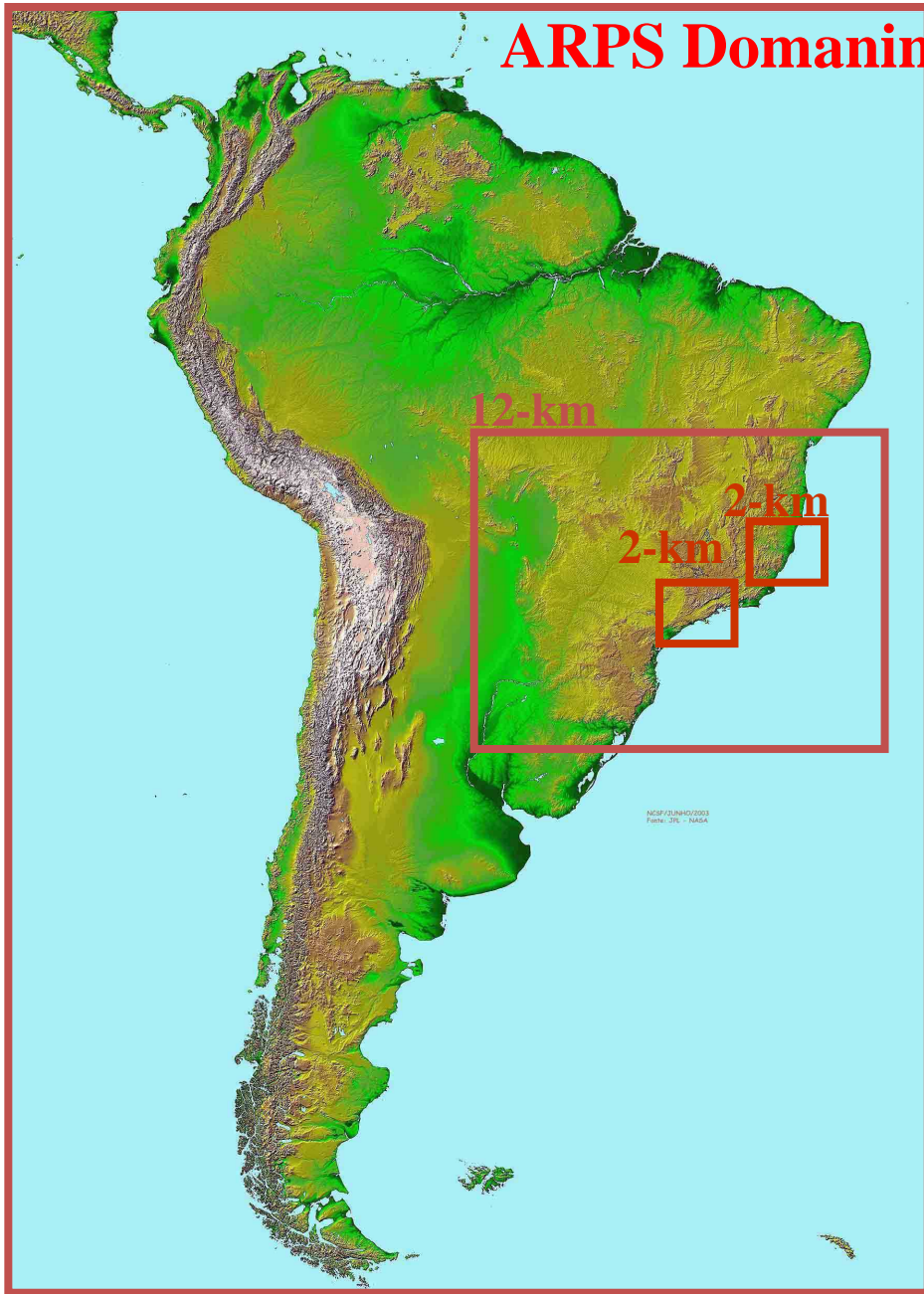
+

Expert Information Centers

# *Preliminary Nowcasting System*

# **Testing and Training Webpage and Team**

Meteorologists (6)  
Computer Analysts (2)  
Modeller (2)

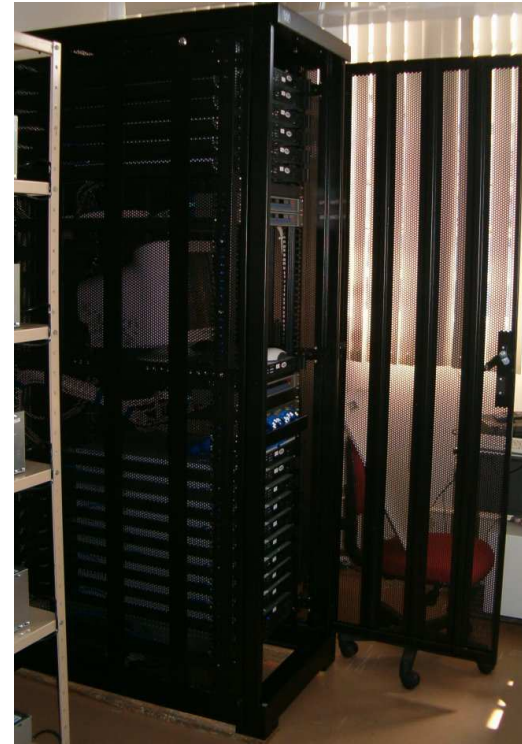


(123x123x35) 48 hr ~ 10 min.

(147x123x35) 48 hr ~1 hr

# CLUSTER 2005-2010

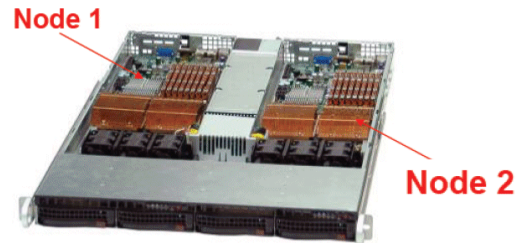
- Server (Dual Xeon ) 3.4 Ghz, 01 GB DDR ECC;
- 16 Nots P4 3.6 GHz, 512MB DDR 400MHz ECC, 512K cache;
- Clic Mandrake 10.1 com kernel 2.6.12;
- Libraries MPICH, PVM ATLAS, LAPACK, ScaLAPACK;
- 105 Gflops with Linpack;
- 38 Gflops with the ARPS



# SUPERCLUSTER 10/2010

2 compute nodes contidos em 1 servidor Altix XE 340 sendo cada node configurado com:

- 8 Cores compostos por 2 sockets Intel Xeon Quad-Core 5530 de 2.26-GHz, com 8MB cachê, 5.86 GT/s;
- 24-GB de memória DDR3 1333 MHz;
- 2 (dois) discos de 750-GB SATA2;
- 2 (dois) ports Gigabit Ethernet;
- 1 (um) port Infiniband QDR 4x 40 Gbit/s



1 x Cabo Infiniband e 1 x Cabo Gigabit

SUSE Linux Enterprise Server 11 com atualização por 1 ano;

SGI ProPack6 com atualização por 1 ano;

# Monitoring and Forecasting 24x7



CENTRO DE MONITORAMENTO CLIMÁTICO VALE  
LABORATÓRIO DE HIDROMETEOROLOGIA IAG-USP

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Condição Atual | [Previsão para 15 dias](#) | [Satélite Brasil](#) | [Satélite E.S.](#) | [Chuva e Umidade](#) | [Vento e Temperatura](#) | [Meteograma](#)

**SEXTA-FEIRA (02):** MANHÃ: MUITAS DE NUVENS, CHUVISCOS (08H) E VENTOS FRACOS - R1;  
TARDE: CHUVISCO/CHUVA FRACA (13-15H E 17-18H), E VENTOS FRACOS - R1;  
NOITE: CHUVISCO/CHUVA FRACA E VENTOS FRACOS - R1;  
MADRUGADA: VARIAÇÃO DE NUVENS E VENTOS FRACOS - R1;  
ONDAS: 1,9 m - ESE.

**Manhã**

26 °C  
18 °C

Vento: 10 km/h  
Vmax: 25 km/h  
Direção: WSW

0%

1,9 m

0,0 m as 09h51

1 mm

**Tarde**

27 °C  
21 °C

Vento: 15 km/h  
Vmax: 30 km/h  
Direção: S

0%

1,9 m

1,4 m as 16h02

1 mm

**Noite**

20 °C  
19 °C

Vento: 15 km/h  
Vmax: 30 km/h  
Direção: ENE

0%

1,9 m

0,3 m as 22h02

10 mm

**Madrugada**

19 °C  
17 °C

Vento: 15 km/h  
Vmax: 30 km/h  
Direção: ENE

0%

1,9 m

1,5 m as 03h56

0 mm

Condição Atual:

2/8/2012 - 17:03:40

TEMPERATURA: 24 °C  
VENTO: 13 km/h - ESE  
Vmax: 17 km/h - ESE  
CONDIÇÃO ATUAL: Poucas nuvens.  
PRÓXIMAS HORAS: Poucas nuvens.  
Ondas de 2,0 m - ESE.

2/8/2012 - 16:09:00

TEMPERATURA: 26 °C  
VENTO: 9 km/h - ESE  
Vmax: 15 km/h - ESE  
CONDIÇÃO ATUAL: Poucas nuvens.  
PRÓXIMAS HORAS: Muitas nuvens.  
Ondas de 2,0 m - ESE.

2/8/2012 - 12:56:52

TEMPERATURA: 25 °C  
VENTO: 10 km/h - ESE  
Vmax: 16 km/h - ESE  
CONDIÇÃO ATUAL: Poucas nuvens.  
PRÓXIMAS HORAS: Poucas nuvens.  
Ondas de 2,1 m - SE.

Bem-vindo ao CMCV.

<b>Operacional Risk Thresholds</b>					
	<b>R1</b>	<b>R2</b>	<b>R3</b>	<b>R4</b>	<b>Duration (h)</b>
<b>Rainfall (mm)</b>	<b>05 - 10</b>	<b>10 - 30</b>	<b>30 - 50</b>	<b>&gt; 50</b>	<b>24</b>
<b>Lightning Strikes</b>	<b>Few</b>	<b>Many</b>	<b>Plenty</b>	<b>Plenty</b>	<b>24</b>
<b>Wind (km h<sup>-1</sup>)</b>	<b>&lt; 50</b>	<b>50 - 60</b>	<b>&gt; 60</b>	<b>&gt; 100</b>	<b>24</b>
<b>Frost</b>	<b>weak</b>	<b>light</b>	<b>intense</b>	<b>intense</b>	<b>24</b>
<b>RH (%)</b>	<b>35 - 45</b>	<b>35 - 20</b>	<b>30 - 20</b>	<b>&lt; 20</b>	<b>24</b>
<b>T air (°C)</b>	<b>13 - 37</b>	<b>12 - 38</b>	<b>11 - 39</b>	<b>&lt; 10 &gt; 40</b>	<b>24</b>
<b>Fire Sources</b>	<b>1</b>	<b>2 - 5</b>	<b>5 - 7</b>	<b>&gt; 8</b>	<b>6</b>
<b>Flash Flood</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>occurrence</b>	<b>6</b>





# 15 Day Forecast

CENTRO DE MONITORAMENTO CLIMÁTICO VALE LABORATÓRIO DE HIDROMETEOROLOGIA IAG-USP		Olá ValeSA! <a href="#">Abrir</a>													
Condição Atual	Previsão para 15 dias														
	Satélite Brasil	Satélite E.S.	Chuva e Umidade	Vento e Temperatura	Meteograma										
02/08/2012 Quinta	03/08/2012 Sexta	04/08/2012 Sábado	05/08/2012 Domingo	06/08/2012 Segunda	07/08/2012 Terça	08/08/2012 Quarta	09/08/2012 Quinta	10/08/2012 Sexta	11/08/2012 Sábado	12/08/2012 Domingo	13/08/2012 Segunda	14/08/2012 Terça	15/08/2012 Quarta	16/08/2012 Quinta	
27°C 18°C	27°C 19°C	29°C 17°C	31°C 17°C	28°C 17°C	27°C 17°C	27°C 18°C	28°C 18°C	28°C 18°C	27°C 18°C	28°C 18°C	29°C 19°C	29°C 19°C	28°C 19°C	28°C 18°C	
4 mm	12 mm	0 mm	1 mm	0 mm	0 mm	1 mm	0 mm	0 mm	2 mm	0 mm	0 mm	0 mm	2 mm	1 mm	
Vento: 20 km/h	Vento: 15 km/h	Vento: 30 km/h	Vento: 35 km/h	Vento: 35 km/h	Vento: 30 km/h	Vento: 30 km/h	Vento: 35 km/h	Vento: 35 km/h	Vento: 35 km/h	Vento: 35 km/h	Vento: 25 km/h	Vento: 35 km/h	Vento: 35 km/h	Vento: 35 km/h	
Vmax: 30 km/h	Vmax: 30 km/h	Vmax: 45 km/h	Vmax: 55 km/h	Vmax: 50 km/h	Vmax: 45 km/h	Vmax: 50 km/h	Vmax: 50 km/h	Vmax: 50 km/h	Vmax: 50 km/h	Vmax: 50 km/h	Vmax: 45 km/h	Vmax: 50 km/h	Vmax: 50 km/h	Vmax: 50 km/h	
SSE	ENE	NW	SE	NE	SE	SE	NNE	NNE	NW	NNW	NE	NE	SE	NE	
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Bem-vindo ao CMCV.

# Real Time Satellite Loops

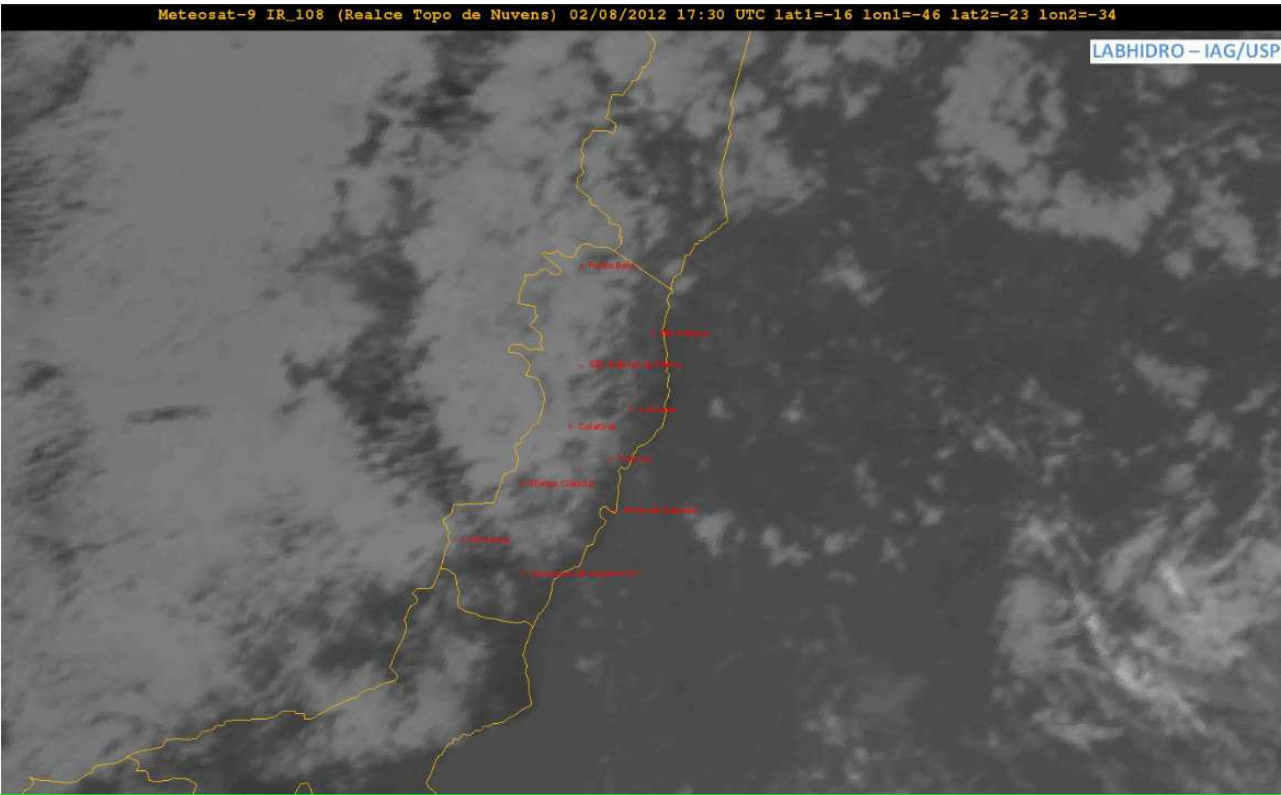
 **CENTRO DE MONITORAMENTO CLIMÁTICO VALE**  
LABORATÓRIO DE HIDROMETEOROLOGIA IAG-USP

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Condição Atual | Previsão para 15 dias | **Satélite Brasil** | Satélite E.S. | Chuva e Umidade | Vento e Temperatura | Meteograma

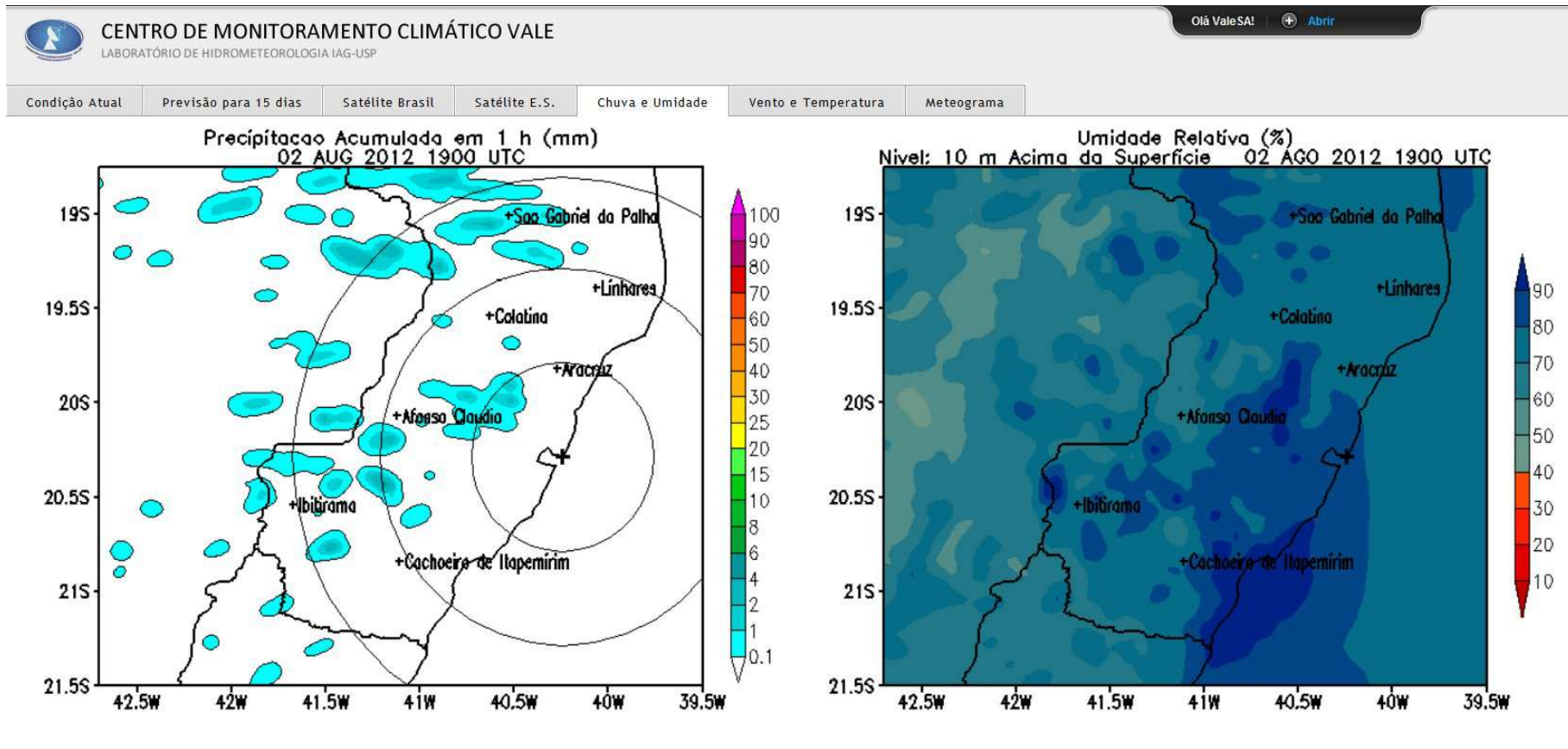
Meteosat-9 IR\_108 (Realce Topo de Nuvens) 02/08/2012 17:30 UTC lat1=-16 lon1=-46 lat2=-23 lon2=-34

LABHIDRO - IAG/USP



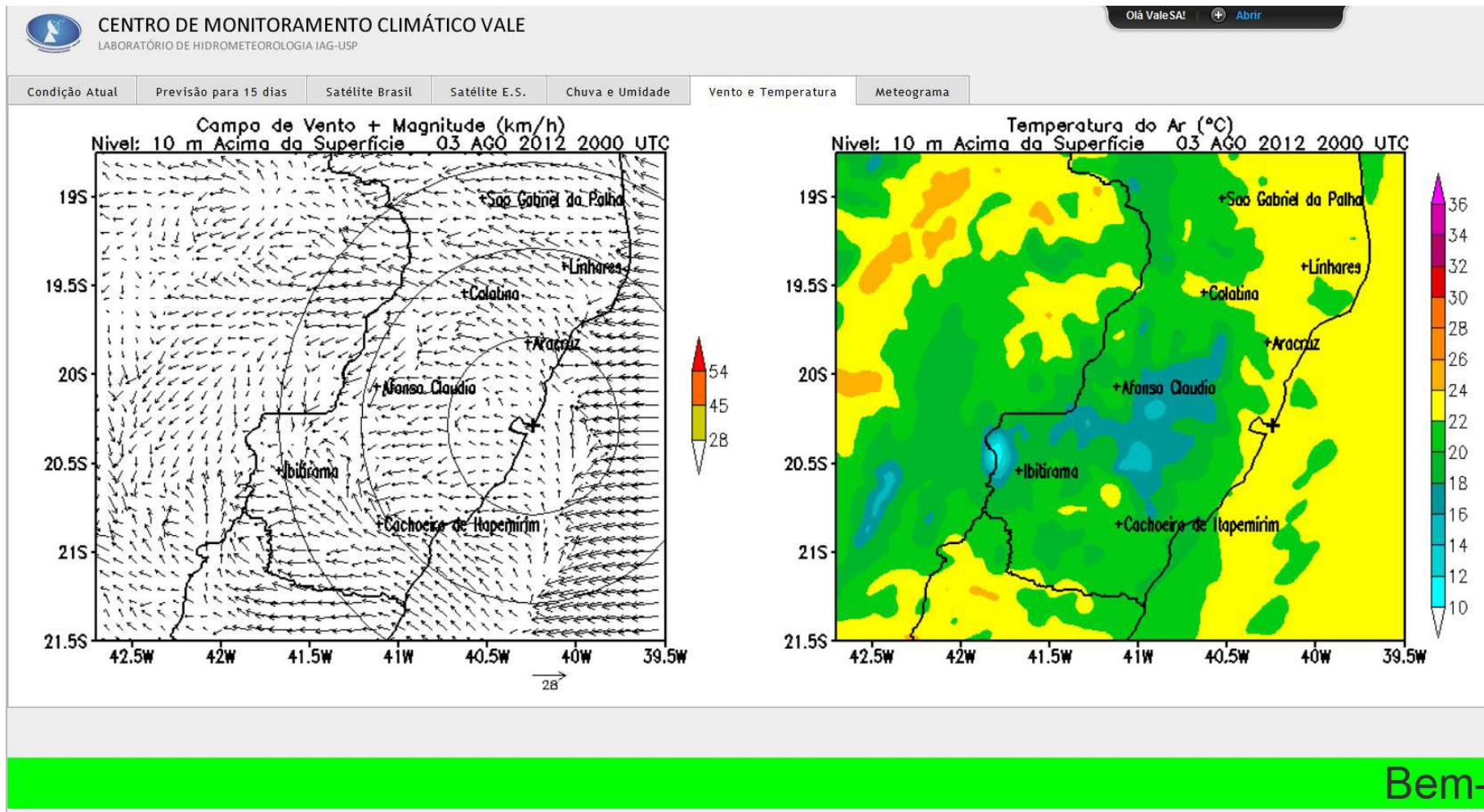
Bem-vindo ao CMCV.

# NWP 48 h Loops – Rain and RU

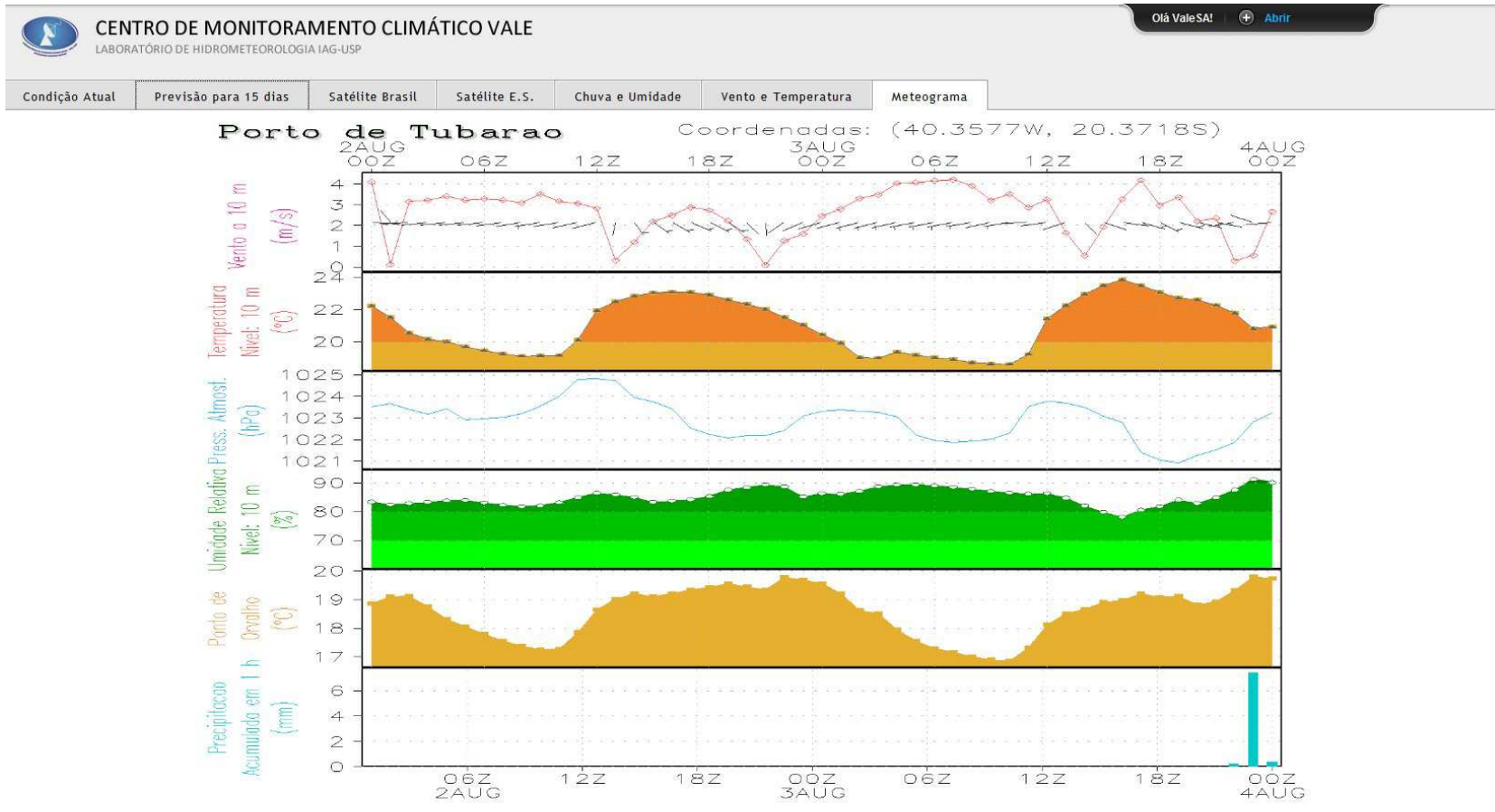


Bem-vindo ao CMCV.

# NWP 48 h Loops – Wind and Temp

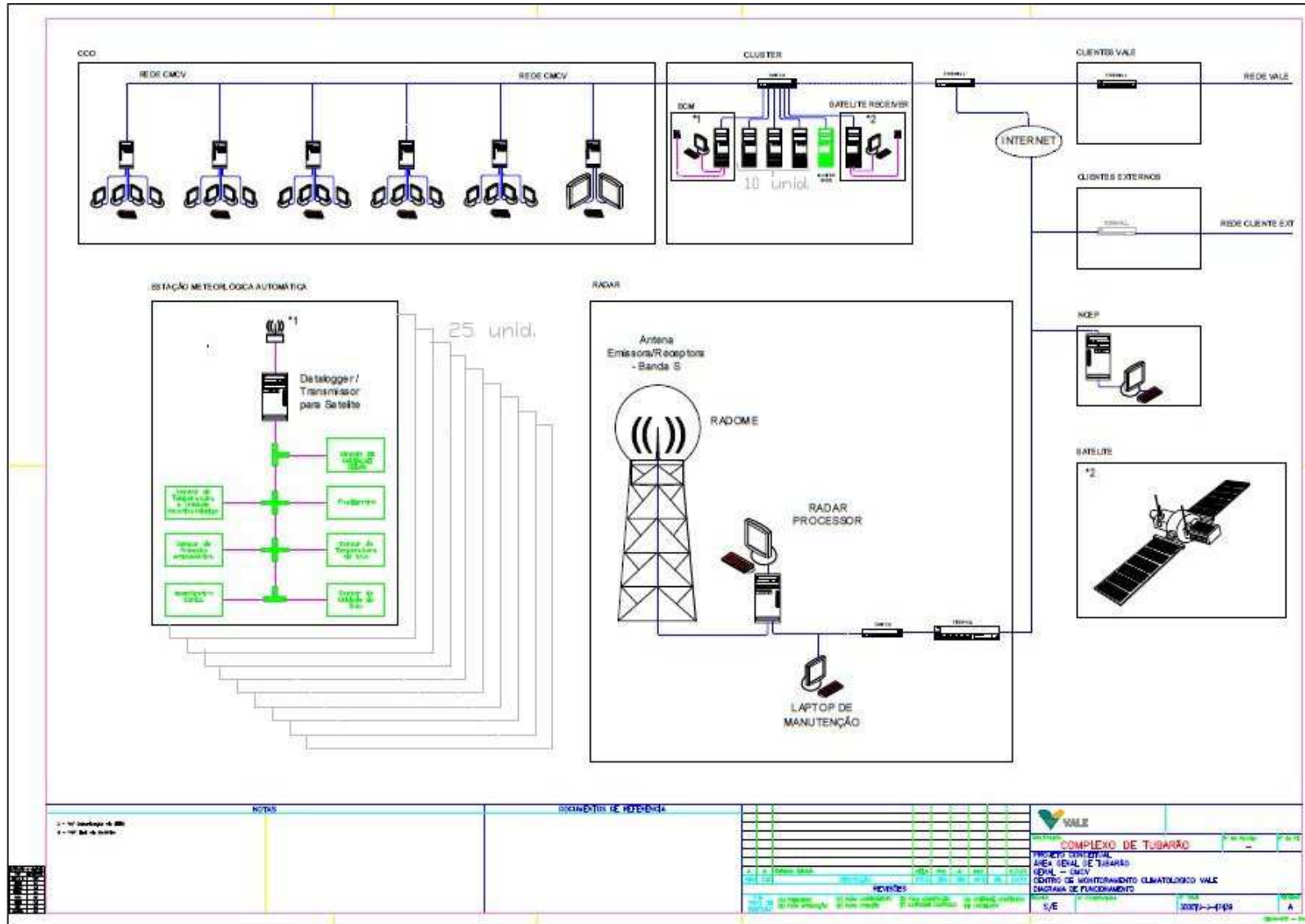


# Meteograma – Tubarão Harbor

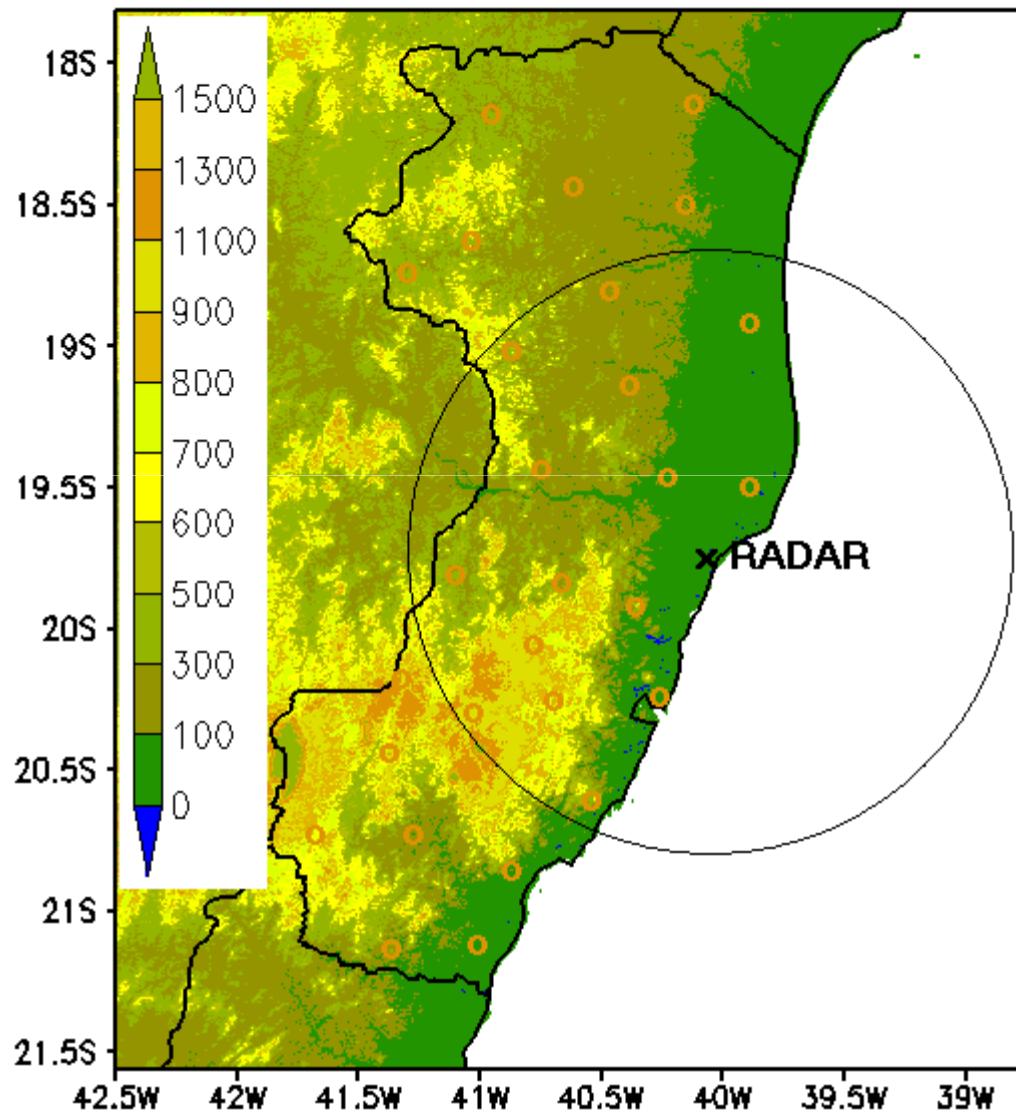


***Nowcasting System for  
Harbor Operations – V***

# V-CMC Main Components



# V-CMC





# NOWCASTING CENTER

Human Resources

Science

Cooperation

Technology

Innovation

To allow Vale and the State Government to respond to the increasing demand for accurate weather information.



Thank you