



FEDER



Açores



Madeira



Canárias

# CLIMAAT

(Clima e Meteorologia dos Arquipélagos Atlânticos)  
Climate and Meteorology of the Atlantic Archipelagos

INTERREG\_IIB – Açores Madeira e Canárias  
(MAC/2.3/A3)

[www.climaat.angra.uac.pt](http://www.climaat.angra.uac.pt)

seminário

“Instrumentos Financeiros Comunitários para Investigação”

Ponta Delgada - Setembro de 2010





## CLIMAAT (partners and stakeholders)

2004  2006 C\_CMMG 2010 

**OAA/ Direcção Regional da Ciência e Tecnologia (RAA)**

**Universidade dos Açores (RAA)**

**Universidade de La Laguna (RAC)**

**Universidade de Las Palmas de Gran Canaria (RAC)**

**Instituto Canário de Ciencias Marinas (RAC)**

**Secretaria Regional do Ambiente e Recursos Naturais (RAM)**

**Secretaria Regional da Economia da RAA (FR\_Coesão)**

**Administração dos Portos de S. Miguel e Santa Maria (RAA)**

**Administração dos Portos da Madeira (RAM)**

Secretaria Regional do Ambiente e do Mar (RAA)

Direcção Regional dos Transportes Aéreos e Marítimos da RAA

Administração dos Portos da Terceira e Graciosa

Administração dos Portos do Triângulo e Grupo Ocidental

Universidade de Lisboa, Centro de Geofísica

Centro de Investigação de Tecnologias Agrárias dos Açores

Instituto de Meteorologia de Portugal

Instituto de Meteorologia de Cabo Verde

Instituto Hidrográfico de Portugal

Laboratório Nacional de Engenharia Civil

Empreiteiros de Obras Marítimas

Protecção Civil

Marinha Portuguesa

Capitanias dos Portos dos Açores

Força Aérea de Portugal

Operadores Marítimos

INETI/LNEG

IFREMER

ARM Project

SPEA/PRIOLO

MACAIS/REDAIS

NTFRUTA

RTP/Açores



## Small archipelagos – common issues – climate everywhere!

### **Small islands, large territories:**

Limited natural resource base, high competition between land use, intensity of land-use, immediacy of interdependence in human and environment systems, spatial dispersion of productive assets, multiplication of infrastructure and services;

### **Insularity and remoteness:**

High external transport dependence, time delays and high costs in accessing external goods, delays and reduced quality in information flows;

### **Environmental factors**

Pressure over land, water resources and biodiversity, large coastal and oceanic zones to manage;

### **Disaster vulnerability and mitigation capability:**

High exposure to environmental hazards, limited hazard forecasting ability, territorial discontinuity and limited mobility;

### **Demographic factors:**

Limited human resource base, large asymmetries on the population concentration, pressure over coastal zone, high per capita costs for infrastructure and services

### **Economic factors:**

Small economies, dependence on external finance and goods, small internal market, dependence on natural resources, highly specialisation production, limited mobility;



## **CLIMAAT - Main Motivations:**

### **Operational:**

- specific needs and requirements on detailed climatic information, weather and sea state forecasting, with implications on the territory and resources management, economy, infrastructures and safety;
- operational data in real time.

### **Strategic:**

- planning with climate;
- climate as a resource;
- climate change, mitigation and adaptation.

### **Scientific:**

- peculiarities of climate and weather mechanisms of the islands that distinguish them from continents;
- specific needs on new methodologies to fit the requirements and scale of application to the different sectors of applied meteorology and climatology (environment, agriculture, hydrology, tourism, transports, fisheries, safety, etc.).
- a very good location for climatic and meteorological studies in the middle of an open space of utmost importance for the global climate;





# CLIMAAT

## Tasks:

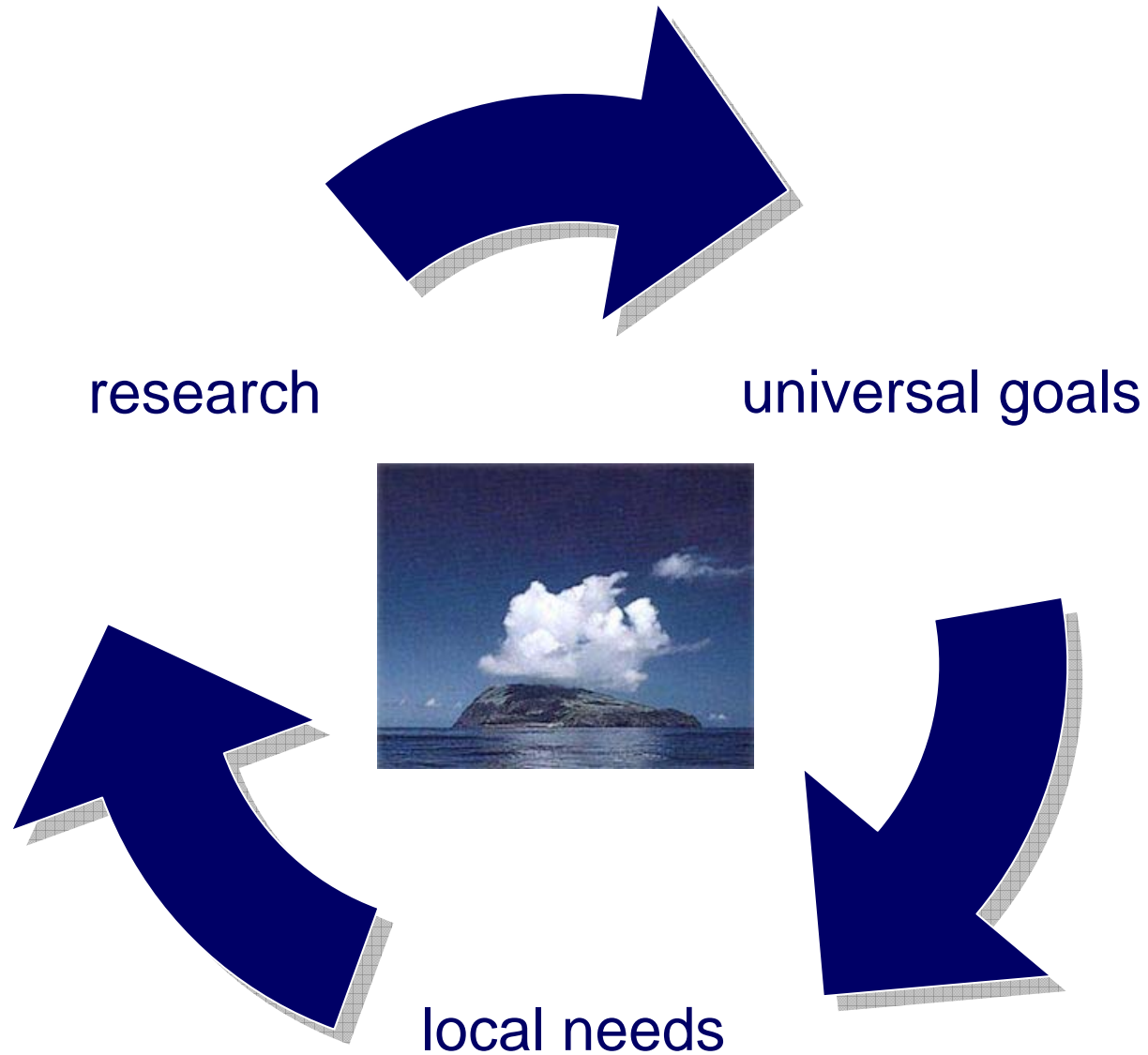
(improving methodologies better adapted to the reality and environment of the atlantic islands)

- T1 – Downscaling weather and sea state forecasting (numerical models);
- T2 - Islands Climatology & Hidrology (better physical models);
- T3 - Climate Change & Environment (mitigation and adaptation);
- T4 - Chemistry and Physics of the Atmosphere (transatlantic circulation);
- T5 - Instrumental Meteorology and Meteo-oceanography (operational needs)
- T6 - Public and free dissimulation of information (web page and media)



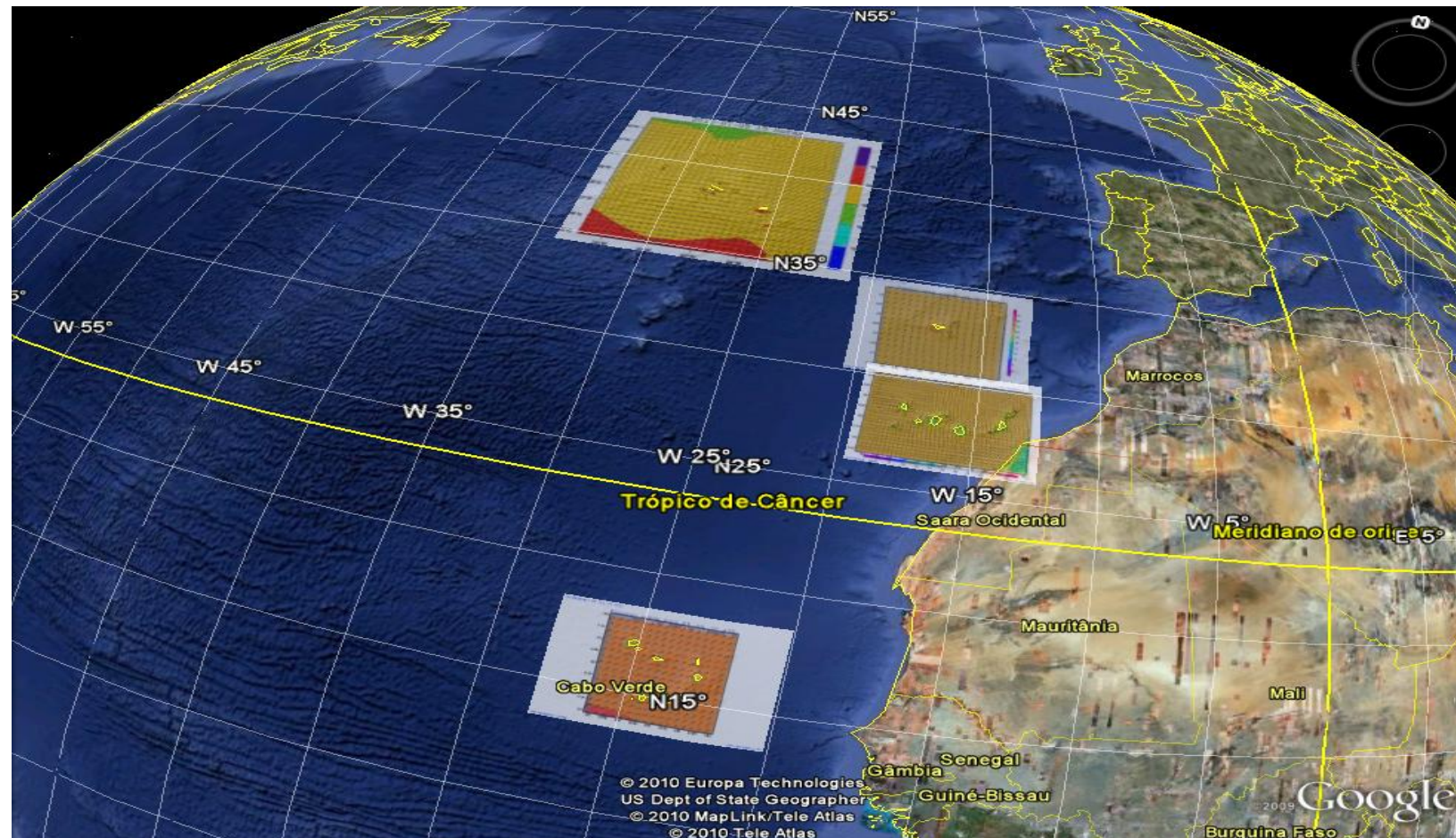
# CLIMAAT

strategy





## T1 - Downscaling weather and sea state forecasting (regional models);

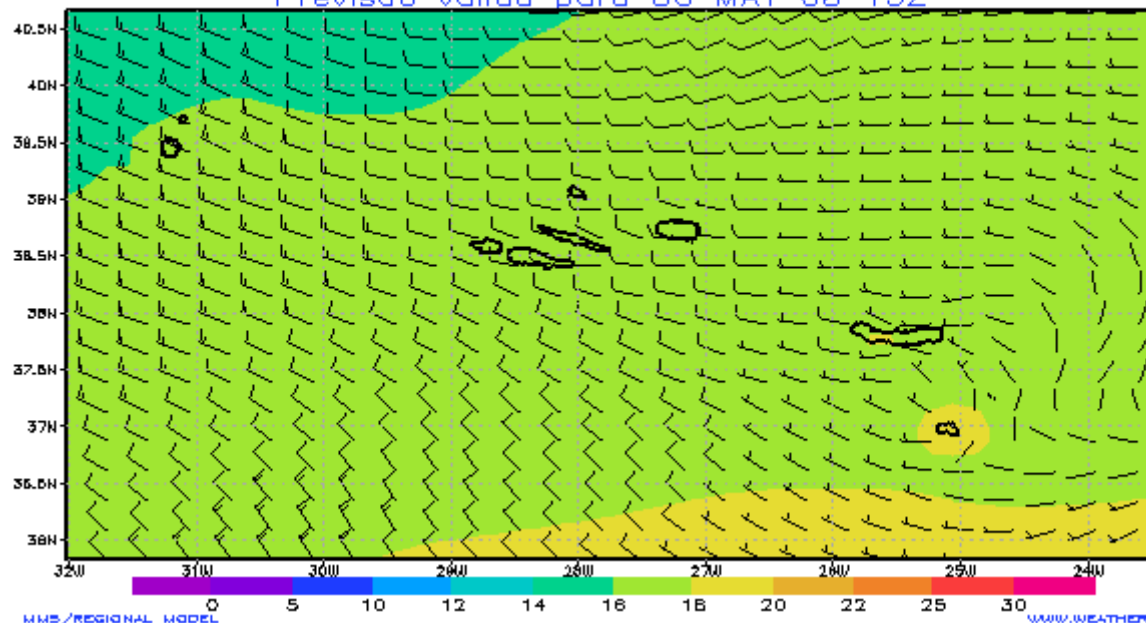




## Weather forecasting – Açores (MM5 and WRF, two times a day)

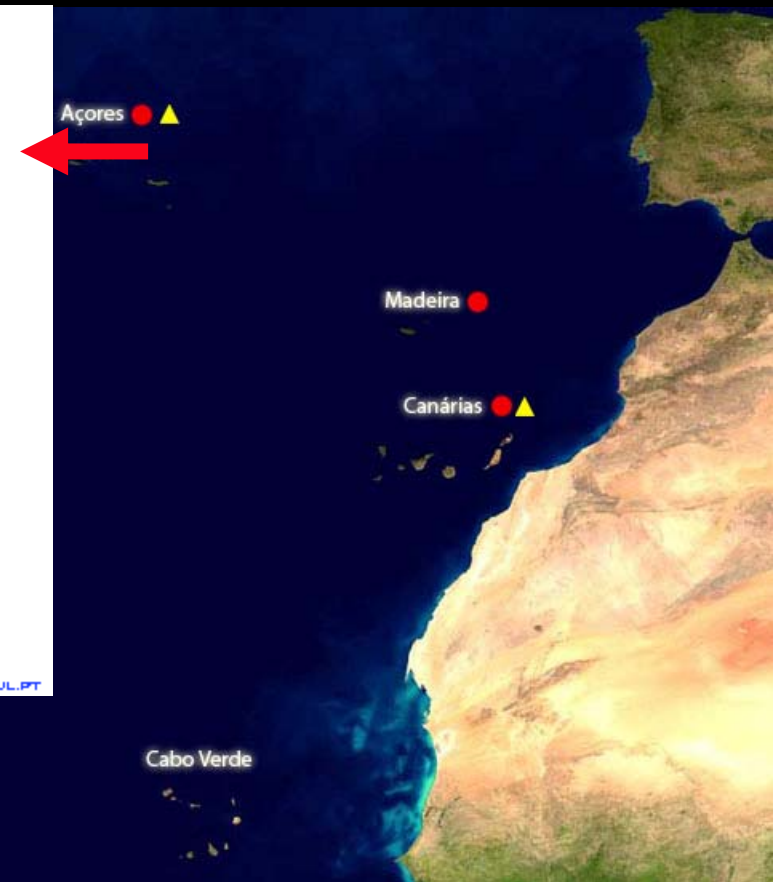
Inicialização: 06 MAY 08 12Z

Previsão válida para 06 MAY 08 15Z



MM5/REGIONAL MODEL

WWW.WEATHER.UL.PT





# CLIMAAT



MAC  
2.3/A3

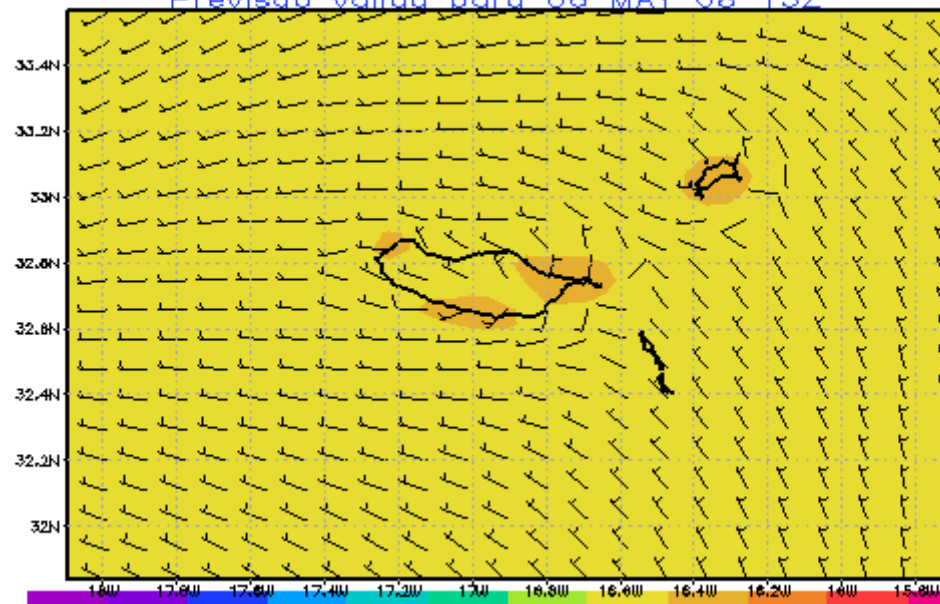
CLIMA E METEOROLOGIA DOS ARQUIPÉLAGOS ATLÂNTICOS



## Weather forecasting – Madeira (MM5, two times a day)

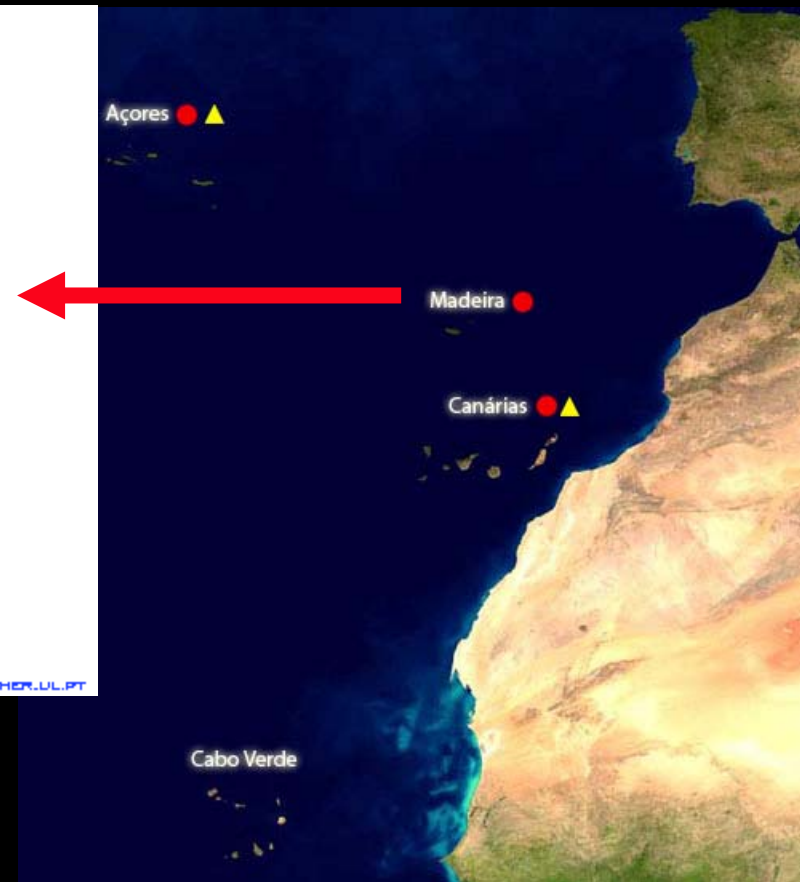
Inicialização: 06 MAY 08 12Z

Previsão válida para 06 MAY 08 15Z



MM5/REGIONAL MODEL

WWW.WEATHER.UL.PT



# CLIMAAT



MAC  
2.3/A3

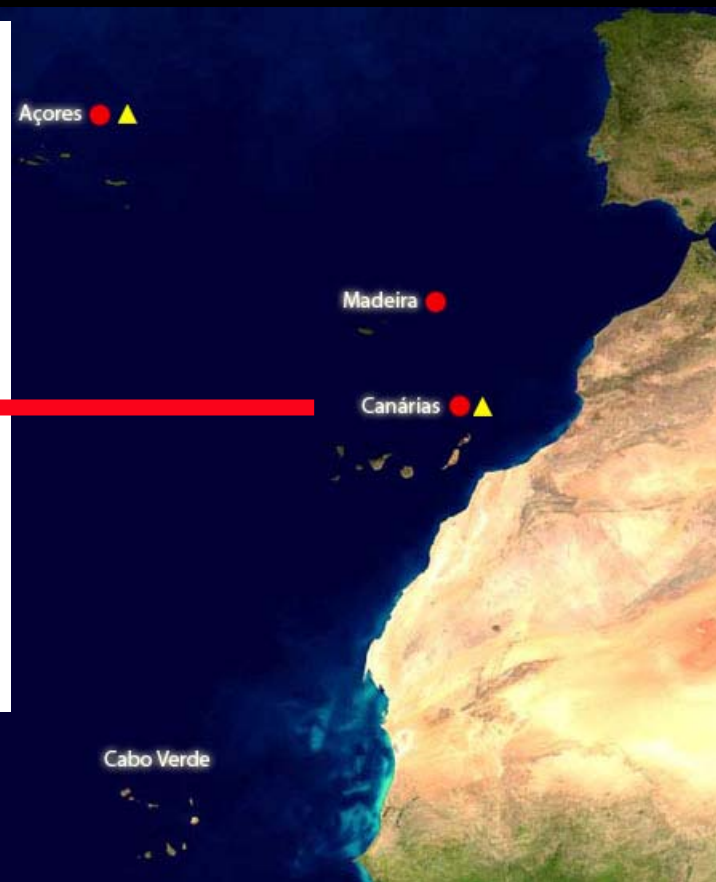
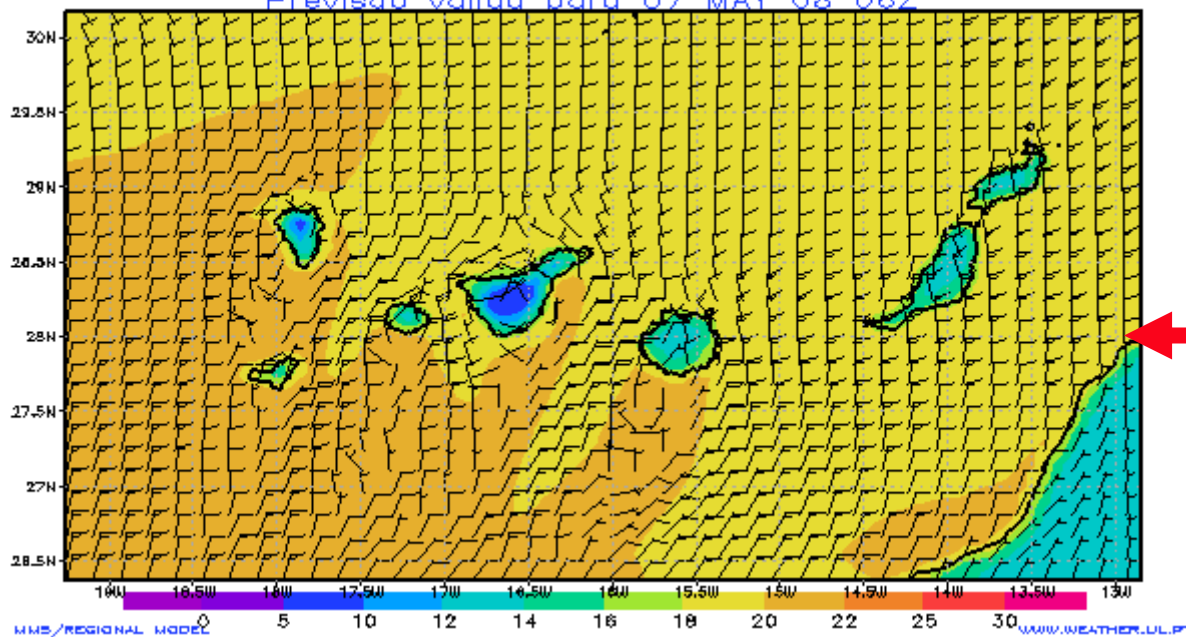
CLIMA E METEOROLOGIA DOS ARQUIPÉLAGOS ATLÂNTICOS



## Weather forecasting – Canarias (MM5, two times a day)

Inicialização: 06 MAY 08 00Z

Previsão válida para 07 MAY 08 06Z



# CLIMAAT



MAC  
2.3/A3

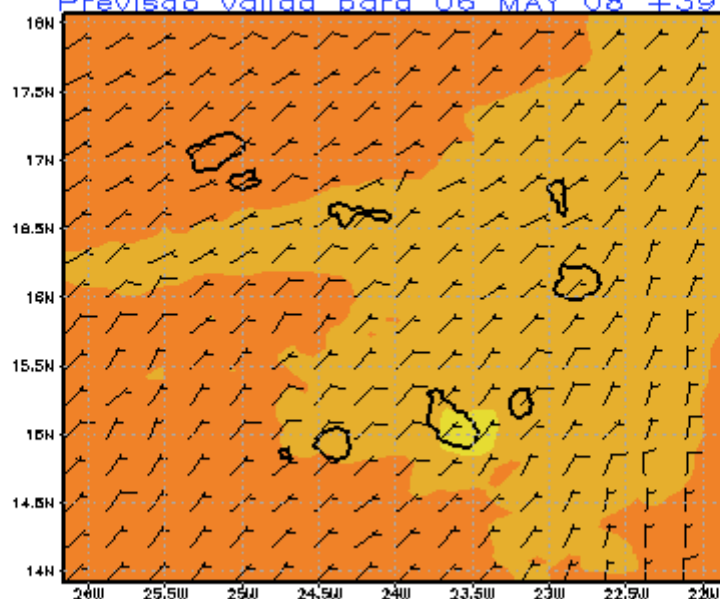
CLIMA E METEOROLOGIA DOS ARQUIPÉLAGOS ATLÂNTICOS



## Weather forecasting – Cabo Verde (MM5, validation process)

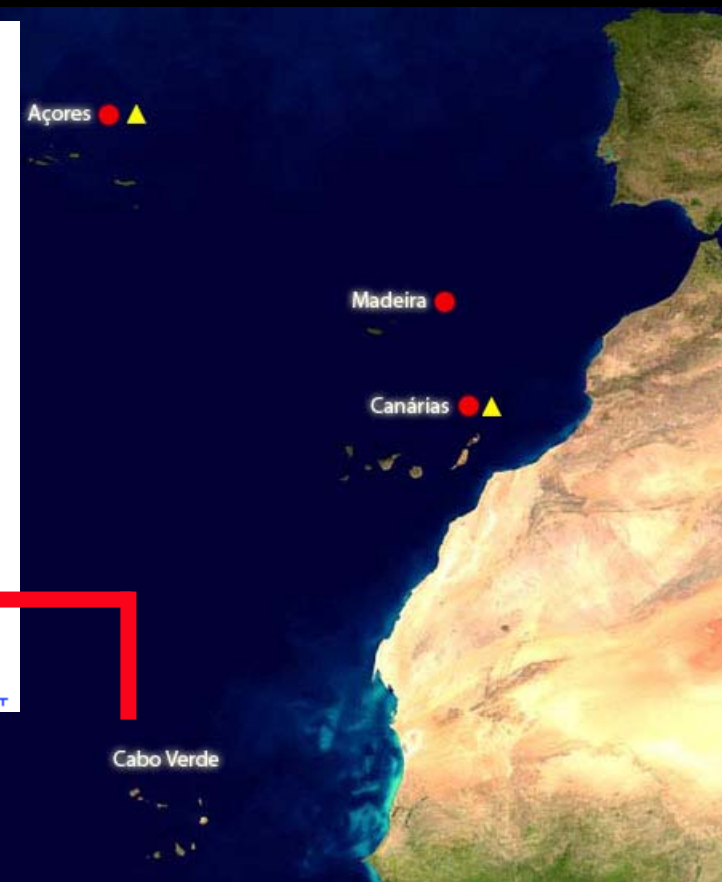
Inicialização: 06 MAY 08 12Z

Previsão válida para 06 MAY 08 +39h



WRF/REGIONAL MODEL

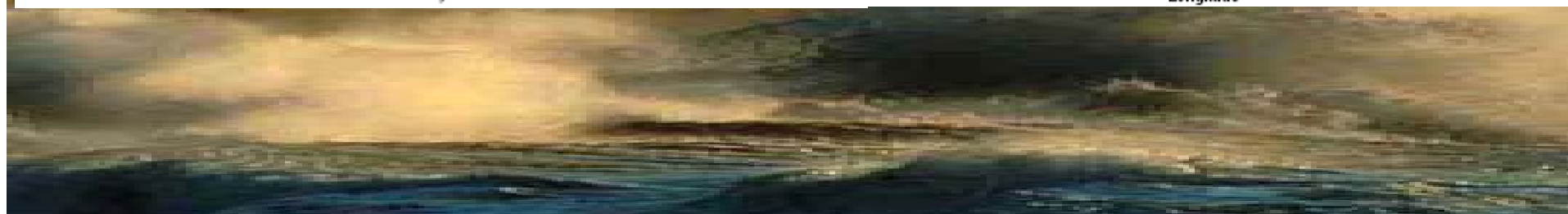
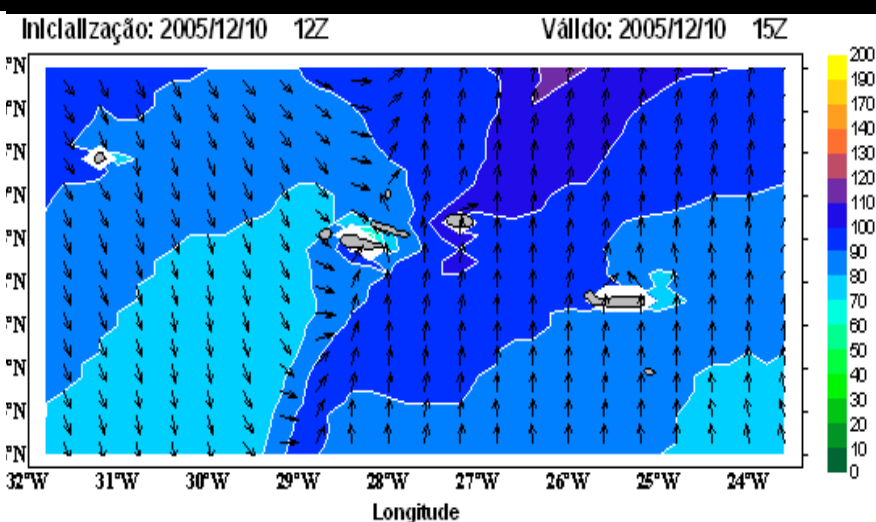
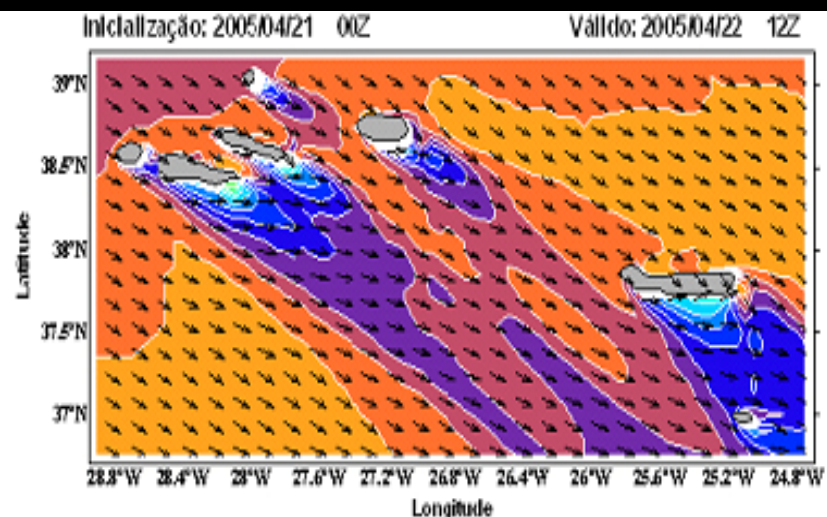
WWW.WEATHER.UL.PT







## Sea state forecasting – Açores (WaveWatch\_III model, one time a day)







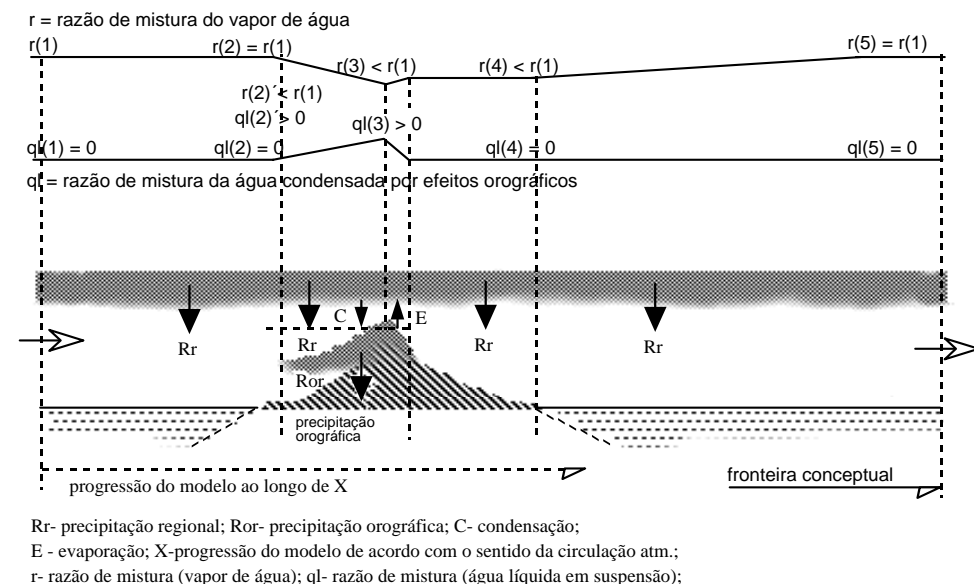
## T2 - Islands Climatology & Hidrology (detailed physical models);

Simulation of local climate in islands environments

CIELO model (Clima Insular à Escala Local)

(Azevedo, 1996; Azevedo *et al.* 1998; Azevedo *et al.* 1999,a,b; Azevedo *et al.* 2003; Santos *et al.*, 2004)

Some helpful contribution from numerical modelling is used in order to bridge the gap between local scale processes (which are in the origin of the local scale meteorology and spatial climate differentiation), and the external forcing regime, that is driven by the atmospheric synoptic conditions or by the regional scale climate.



# CLIMAAT

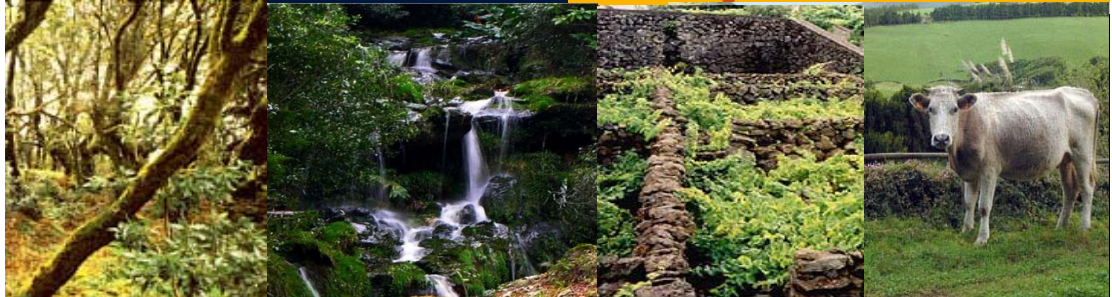
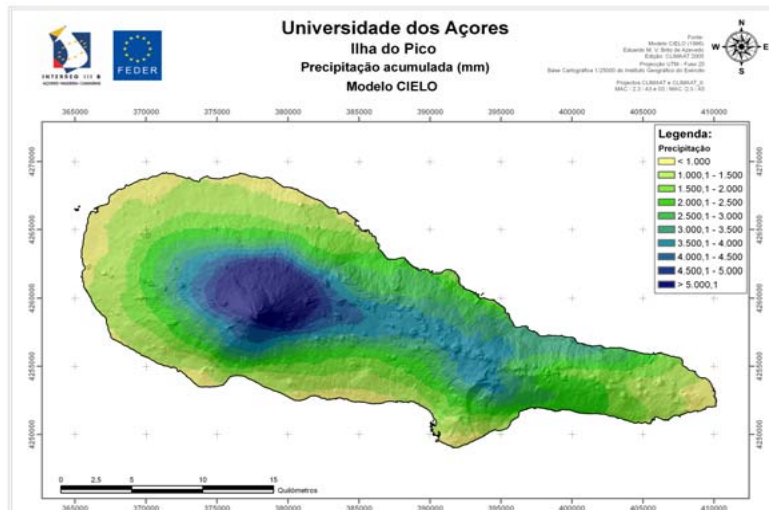
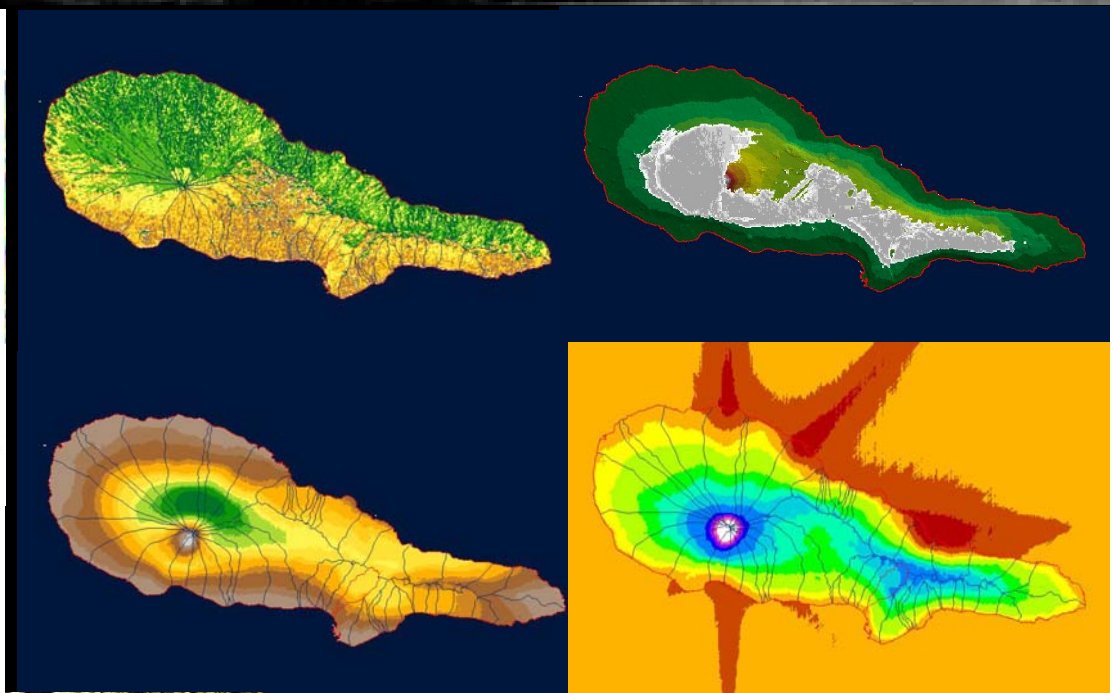
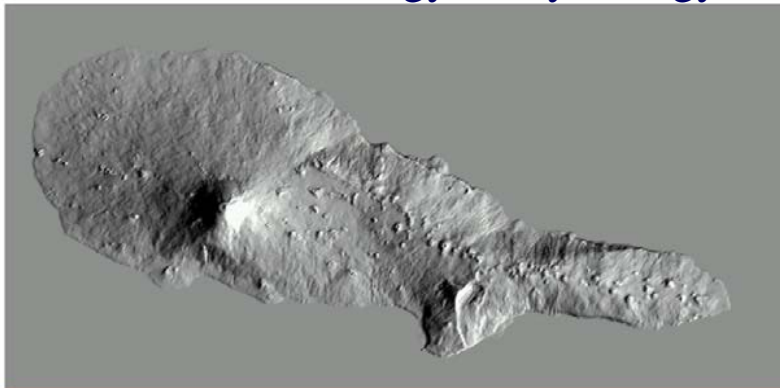


MAC  
2.3/A3

CLIMA E METEOROLOGIA DOS ARQUIPÉLAGOS ATLÂNTICOS



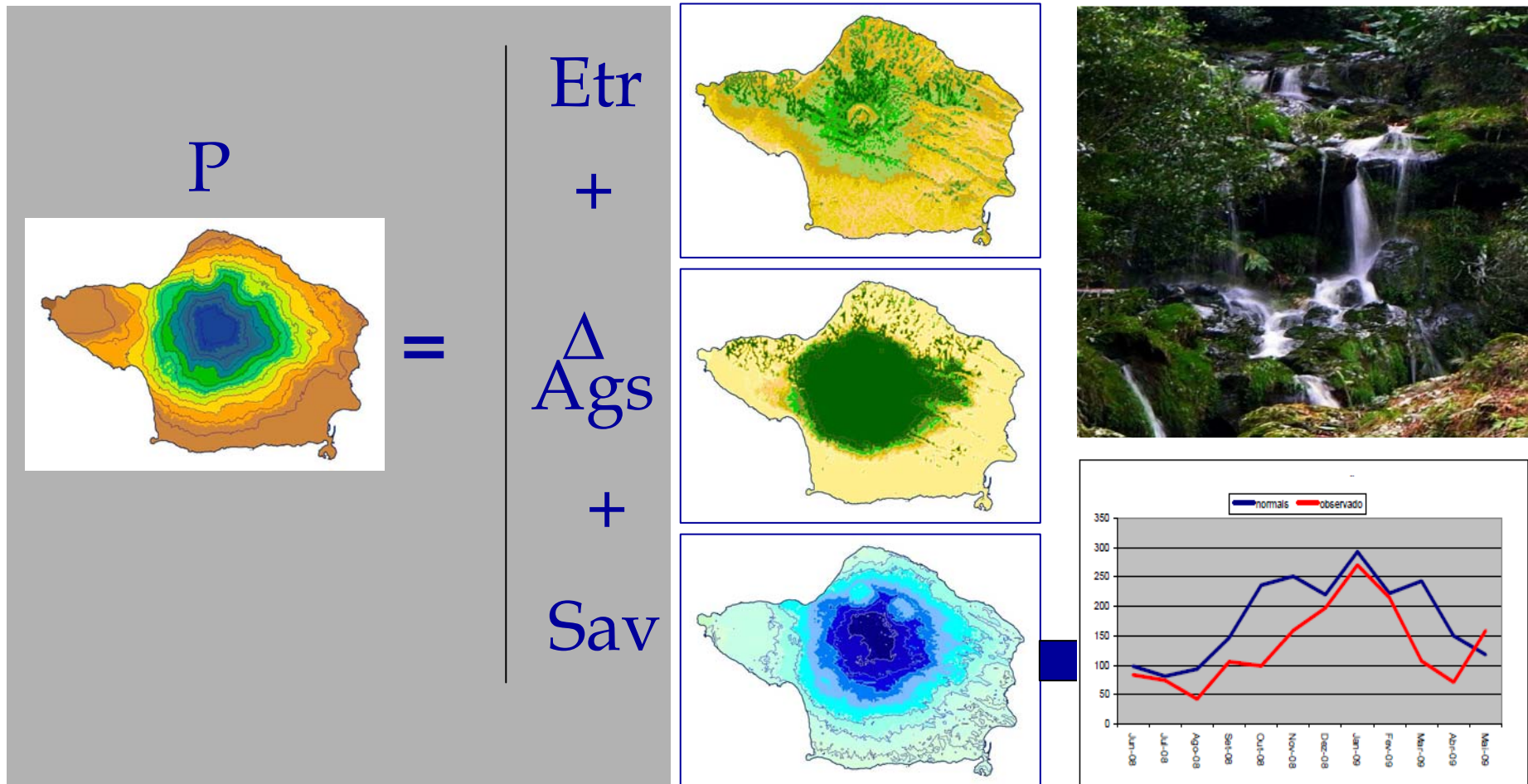
## Islands Climatology & Hydrology





## Climatology & Hydrology

### Water balances and water management





## Islands Climatology & Hydrology – on-line applications and data dissemination CIELO model (Clima Insular à Escala Local)

Modelo CIELO - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Refresh Print Mail Print Preview W Wordpad

Address http://www.climaat.angra.uac.pt/cielo/ Go Links

**CIELO**  
Clima Insular à Escala Local  
(Universidade dos Açores, Azevedo, 1996)

São Maria São Miguel Terceira Graciosa São Jorge Pico Faial Flores Corvo Início

**Temas**  
Activo  
☐ Janeiro  
☐ Fevereiro  
☐ Março  
☒ Abril  
☐ Maio  
☐ Junho  
☐ Julho  
☐ Agosto  
☐ Setembro  
☐ Outubro  
☐ Novembro  
☐ Dezembro  
☐ Freguesias

Base cartográfica gentilmente cedida pelo IGEOE

0 3 km

**Abril**

Registos	PREC(mm)	RH_MIN(%)	RH_MAX(%)	T_MIN(°C)	T_MAX(°C)	T_MED(°C)
1	131,2	85	97	11,8	16,2	14
2	130,2	91	97	10,5	14,9	12,7
3	131,2	93	99	10	14,4	12,2
4	134	80	94	13,9	18,2	16

Pesquisar

Internet

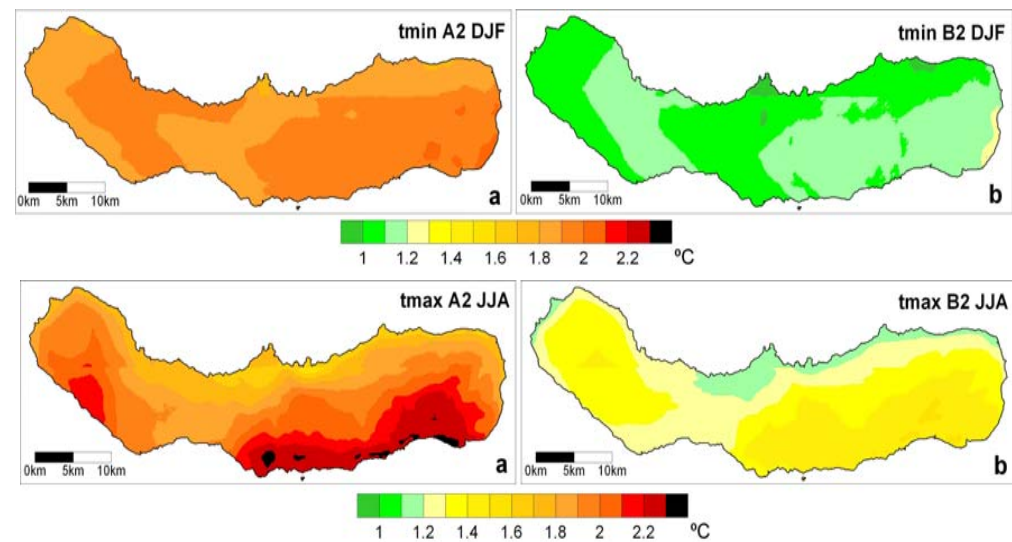
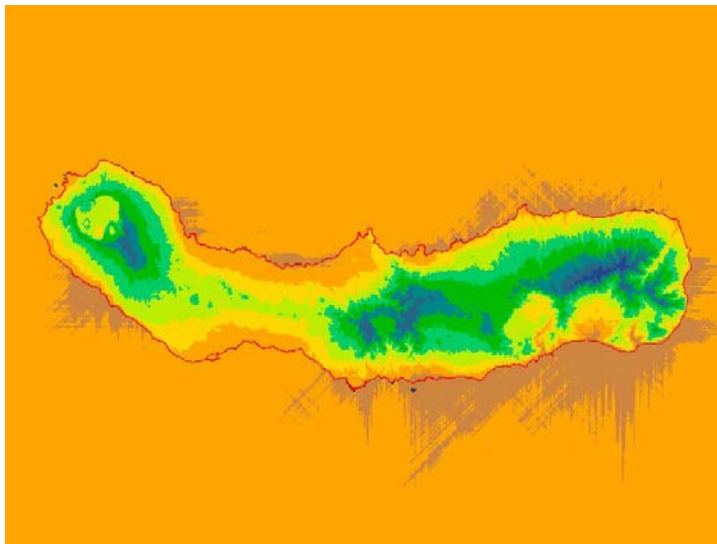




## T3 - Climate Change & Environment;

### CIELO Methodology applied to global change projects

Project SIAM - Climate Change in Portugal,  
Scenários, Impacts and Adaptation Measures

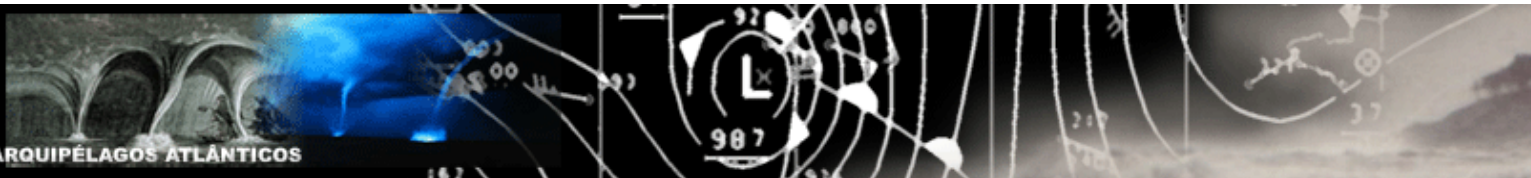


# CLIMAAT

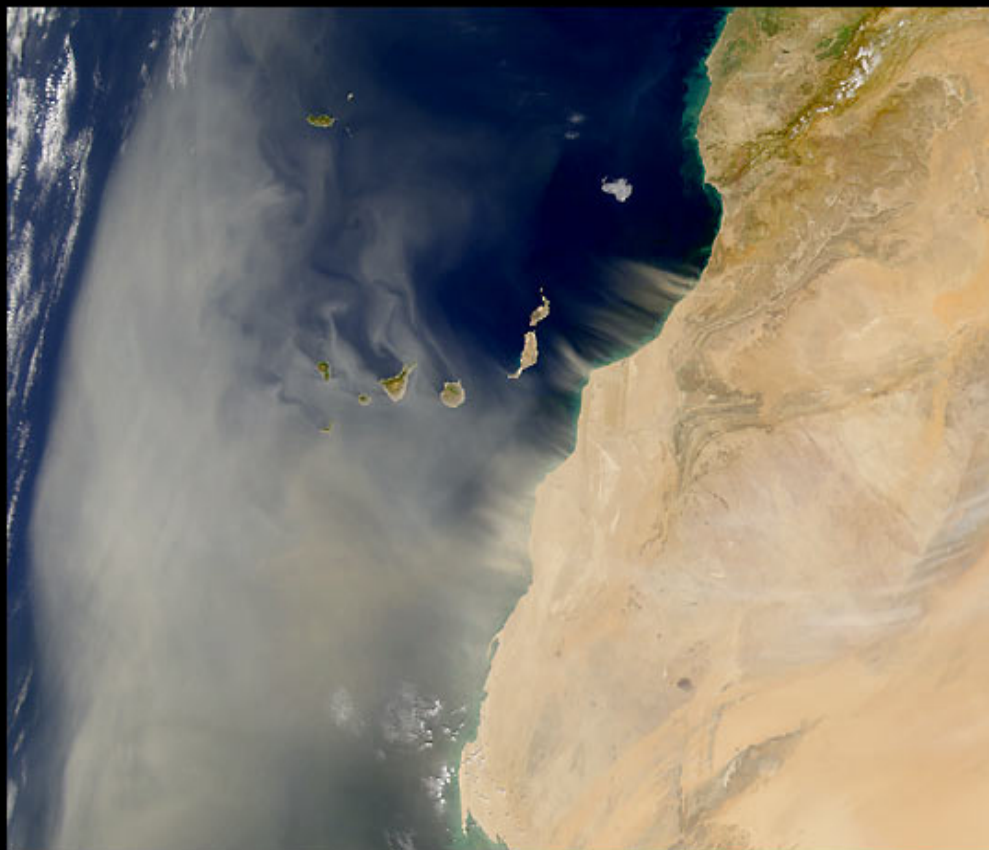


MAC  
2.3/A3

CLIMA E METEOROLOGIA DOS ARQUIPÉLAGOS ATLÂNTICOS



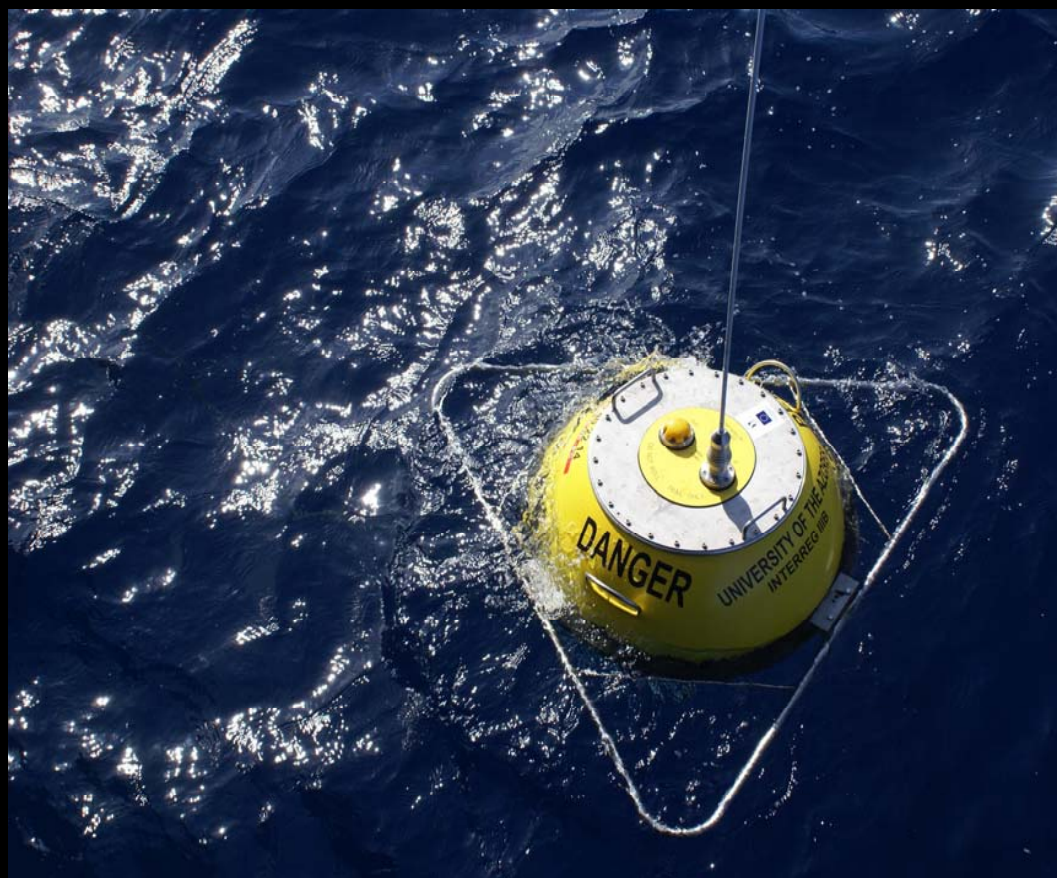
## T4 - Chemistry and Physics of the Atmosphere;



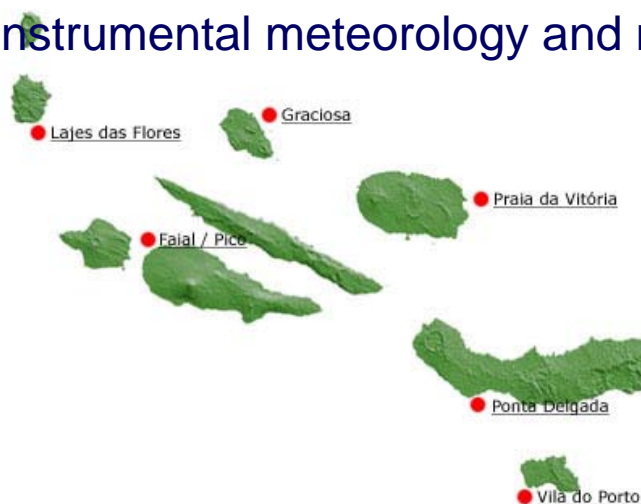




## T5 - Instrumental meteorology and meteo-oceanography



## T5 - Instrumental meteorology and meteo-oceanography - CLIMAATAzores network



Ver Arquipélago

### Dados da Estação

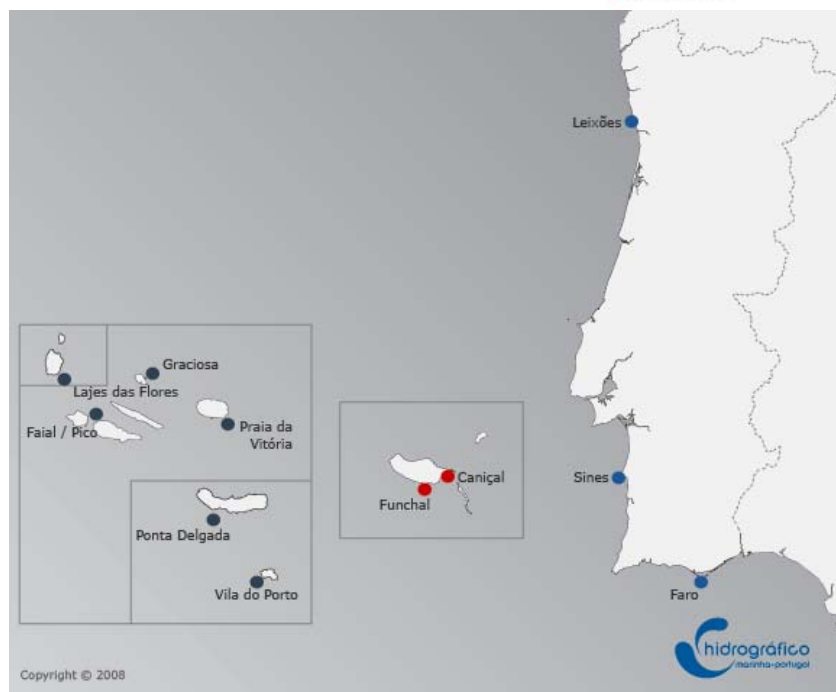
<b>Código:</b>	0002	<b>Localização</b> 
<b>Localização:</b>	Porto da Praia da Vitória	
<b>Entidade:</b>	CLIMAAT	
<b>Latitude:</b>	38° 42' 42"	
<b>Longitude:</b>	27° 03' 08"	
<b>Altitude(m):</b>	10	

### Dados em tempo real - Último registo

<b>Data do registo:</b>	<b>06/07/2010 00:07:30</b>
Temperatura do ar	20.5 °C
Direcção do vento	43 °
Radiação solar difusa	234.43 w/m2
Radiação solar global	234.43 w/m2

### Dados Horários - Última leitura horária:

<b>Data do registo:</b>	<b>05/07/2010 23:59:36</b>	<b>Grafico</b>
Temperatura média do ar	20.8 °C	<a href="#">Ver »</a>
Integral da radiação solar difusa	844 Kj/m2 hora	<a href="#">Ver »</a>
Integral da radiação solar global	844 Kj/m2 hora	<a href="#">Ver »</a>
Média vectorial da direcção do vento	47 °	







## Operational near real time data



CLIMAAT e CLIMACOST  
INTERREG IIB  
Açores, Madeira e Canárias  
MAC / 2.3 / A3  
03 / MAC / 2.3 / A5  
05 / MAC / 2.3 / A1



AZORES.GOV.PT  
Governo dos Açores

### Boías Ondógrafo - Açores



### Resumo de dados

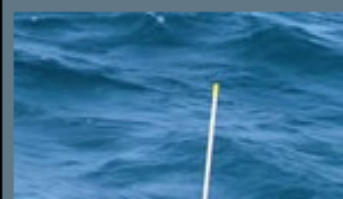
Escolha do Arquipélago

### Ponta Delgada - Bóia Bond 2



<b>Bóia:</b>	<b>Ponta Delgada</b>
<b>Posição:</b>	<b>37_43.53N/025_43.28W</b>
<b>Dia Hora Fuso 0(TU):</b>	<b>21-09-2010 23:19</b>
<b>Dia Hora Local:</b>	<b>21-09-2010 23:19</b>
<b>Altura Significativa (Hz):</b>	<b>1,21 m</b>
<b>Altura máxima (Hmax):</b>	<b>1,63 m</b>
<b>Período Médio:</b>	<b>7,6 s</b>
<b>Período Máximo Observado:</b>	<b>12,5 s</b>
<b>Período Onda de Altura Máx.:</b>	<b>9,4 s</b>
<b>Direcção da Agitação:</b>	<b>276 °</b>
<b>Temperatura da água à superfície:</b>	<b>22,7 °C</b>

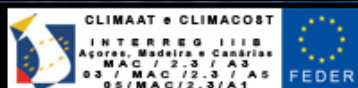
### Lajes das Flores - Bóia Bond 3



<b>Bóia:</b>	<b>FLORES</b>
<b>Posição:</b>	<b>39_21.86N/31_10.00W</b>
<b>Dia Hora Fuso 0(TU):</b>	<b>21-09-2010 22:59</b>
<b>Dia Hora Local:</b>	<b>21-09-2010 22:59</b>



## Operational near real time data



**AZORES.GOV.PT**  
Governo dos Açores

### Boias Ondógrafo - Açores



Resumo de dados

Escolha do Arquipélago

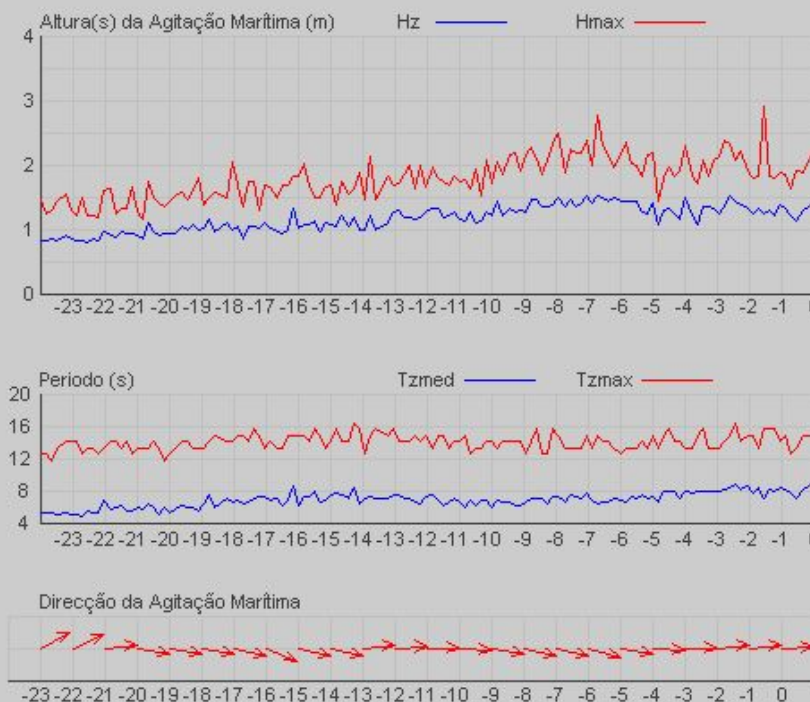
### São Miguel



### Último Registo

**Bóia:** Ponta Delgada  
**Posição:** 37\_43.53N/025\_43.28W  
**Dia Hora Fuso 0(TU):** 21-09-2010 23:19  
**Dia Hora Local:** 21-09-2010 23:19  
**Altura Significativa (Hz):** 1,21 m  
**Altura máxima (Hmax):** 1,63 m  
**Período Médio:** 7,6 s  
**Período Máximo Observado:** 12,5 s  
**Período Onda de Altura Máx.:** 9,4 s  
**Direcção da Agitação:** 276 °  
**Temperatura da água à superfície:** 22,7 °C

### Dados das últimas 24 horas



Início - Parceiros

Produtos CLIMAAT - Dados On-line - Equipamentos - Cooperação - Contactos - Notícias e Eventos - Ligações de Interesse

Internet

100%



INTERREG IIB  
Programa de Iniciativa Comunitária  
Região Autónoma dos Açores 2000-2006  
PROJECTO "CLIMAAT II"  
613640.3/05







## New technologies of information

Lajes das Flores

Graciosa

Faial / Pico

### Ponta Delgada

#### Dados

Última posição: 37° 43,482' N / 25° 43,338' W

Hora: 2010-07-05 16:33:00 (UTC)

Altura significativa: 0.96 m

Onda máxima: 1.39 m

Período: 5 s

Período da onda máxima: 7.8 s

Período máximo: 10.9 s

Temperatura da Água: 21 °C

Direcção: 125 °

[Visualizar dados](#)

Direcções: [Para aqui](#) - [A partir de aqui](#)

Ponta Delgada

Vila do Porto

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

©2009 Google

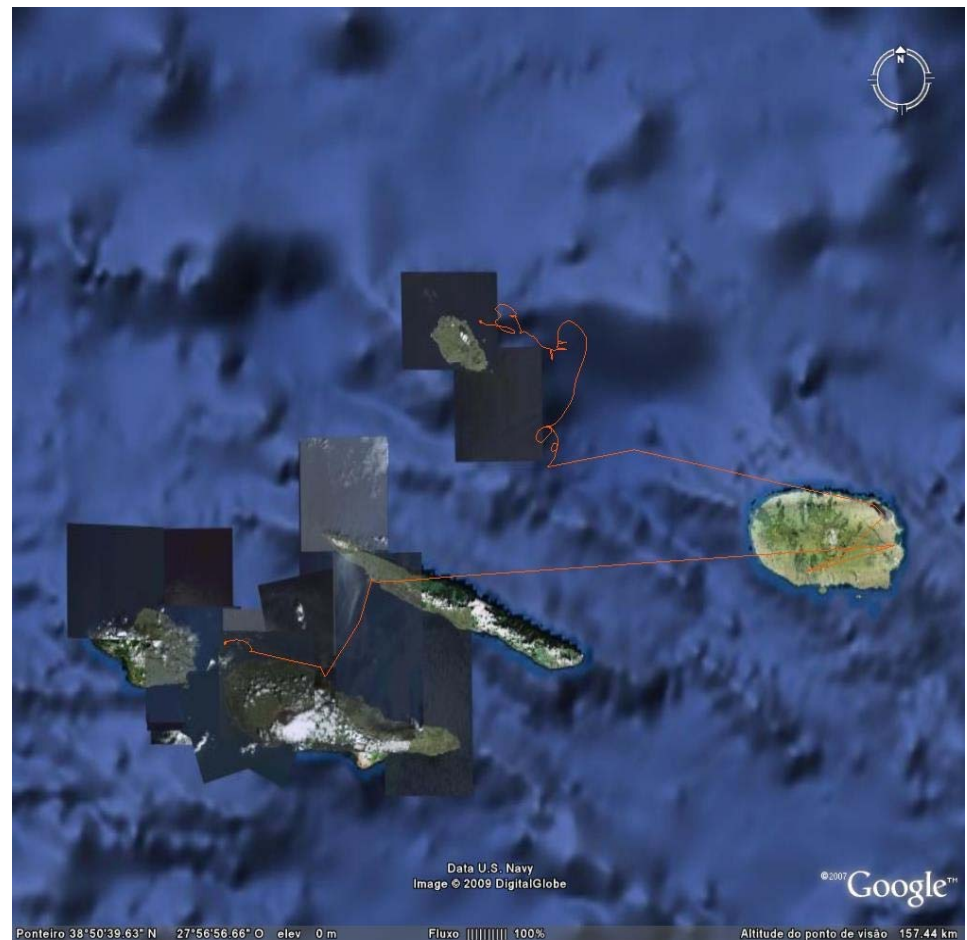
37°13'18.64" N 27°04'42.41" W elev 0 m

Altitude de visualização 636.29 km





## New technologies of information Monitoring the position of the equipment



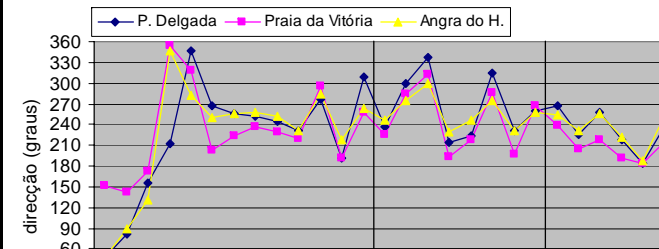




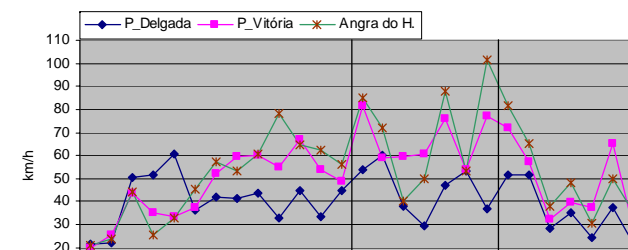
## Monitoring events of bad weather



### Direcção do Vento



### Velocidade do Vento

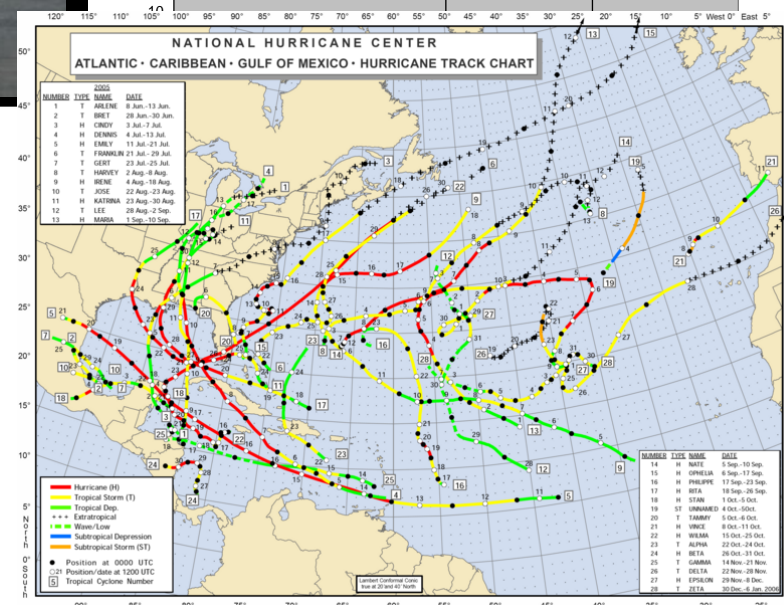
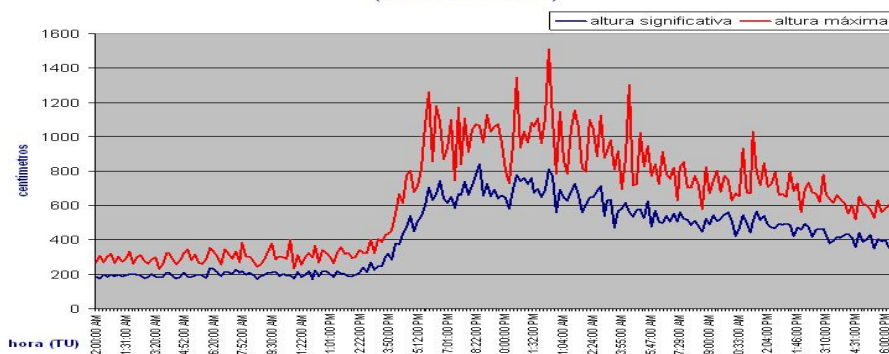


### Projecto CLIMAAT

#### Bóia da Praia da Vitória "CLIMAAT-BOND 1"

Ondulação 26/27 de Fevereiro de 2005

(blocos de 10 minutos)





## Monitoring events of bad weather

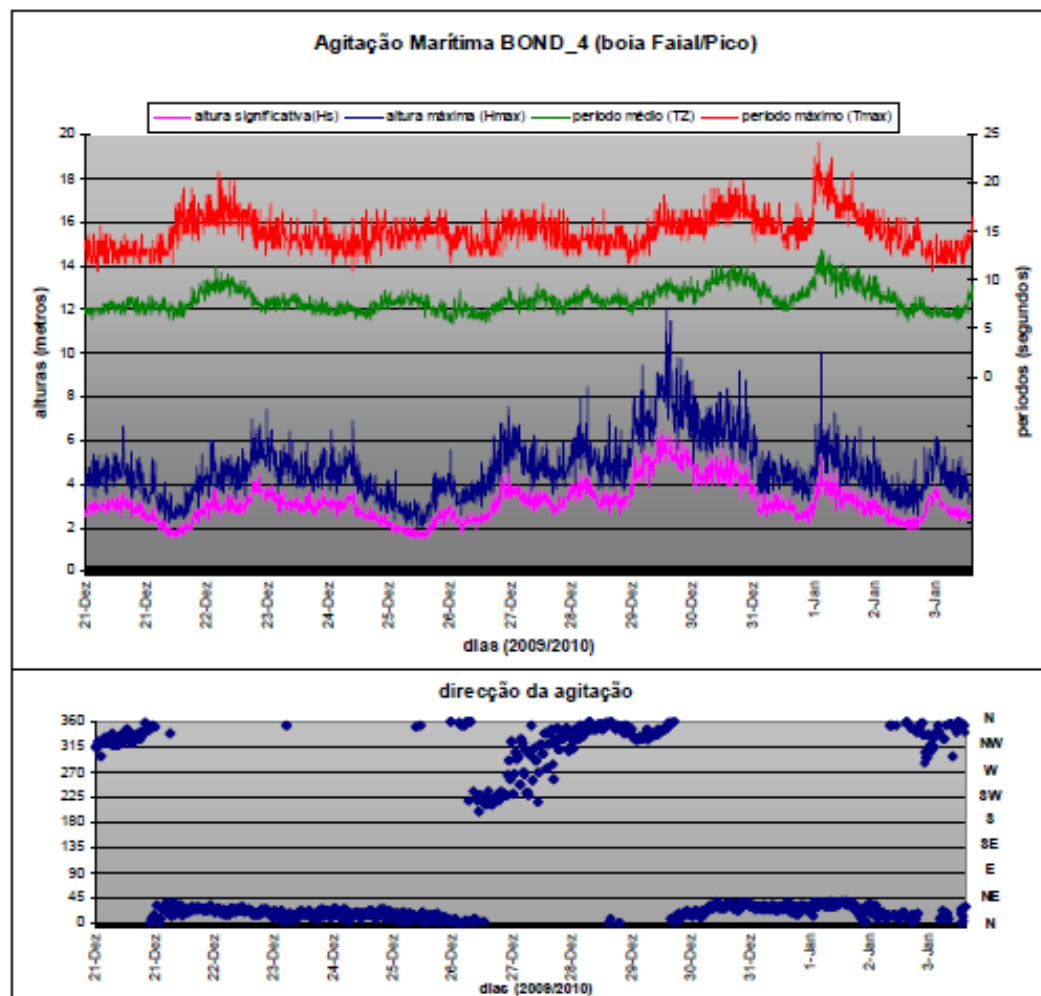
### AGITAÇÃO MARÍTIMA BOND\_4 (FAIAL/PICO) (APRECIAÇÃO GRÁFICA SUMÁRIA)

PERÍODO  
DE 21 DE DEZEMBRO DE 2009 A 3 DE JANEIRO DE 2010

ANGRA DO HEROÍSMO, 4 DE JANEIRO DE 2010

	HS	HMAX	TZ	TMAX	THMAX
Máximos observados	6.40	12.07	13.10	24.20	18.80
Médias	3.12	4.69	8.01	15.00	10.78

HS	altura significativa (metros) - média do terço mais elevado das alturas de onda de zero ascendente
HMAX	altura máxima (metros) - altura máxima ocorrida no registo
TZ	período (segundos)
TMAX	período (segundos) máximo ocorrido no registo
THMAX	período (segundos) da onda máxima
THTP	direcção da agitação (graus contados a partir do norte e no sentido dos ponteiros do relógio)



## First waves climatology for the ports of the Azores



6<sup>as</sup> Jornadas Portuguesas de Engenharia Costeira e Portuária  
Funchal, 8 e 9 de Outubro de 2009

### DADOS DIRECCIONAIS DE AGITAÇÃO MARÍTIMA NOS AÇORES (PROJECTO CLIMAAT-CLIMA E METEOROLOGIA DOS ARQUIPÉLAGOS ATLÂNTICOS)

Rita Esteves<sup>1</sup>, André Valente<sup>2</sup>, Mariana Costa<sup>1</sup>, Francisco Reis<sup>2</sup>, Eduardo Azevedo<sup>2</sup>

<sup>1</sup> Instituto Hidrográfico, Marinha Portuguesa

<sup>2</sup> Centro do Clima, Meteorologia e Mudanças Globais da Universidade dos Açores

[rita.esteves@hidrografico.pt](mailto:rita.esteves@hidrografico.pt); [mariana.costa@hidrografico.pt](mailto:mariana.costa@hidrografico.pt);

[avalente@uac.pt](mailto:avalente@uac.pt); [vieirareis@uac.pt](mailto:vieirareis@uac.pt); [edubrito@uac.pt](mailto:edubrito@uac.pt)

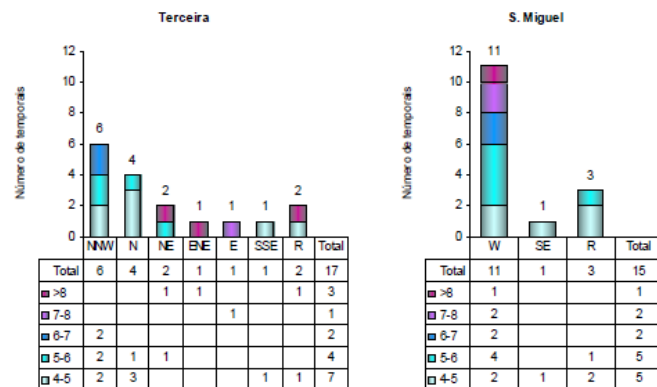


Figura 9 – Ocorrência de temporais por classes de direcção e altura significativa máxima.

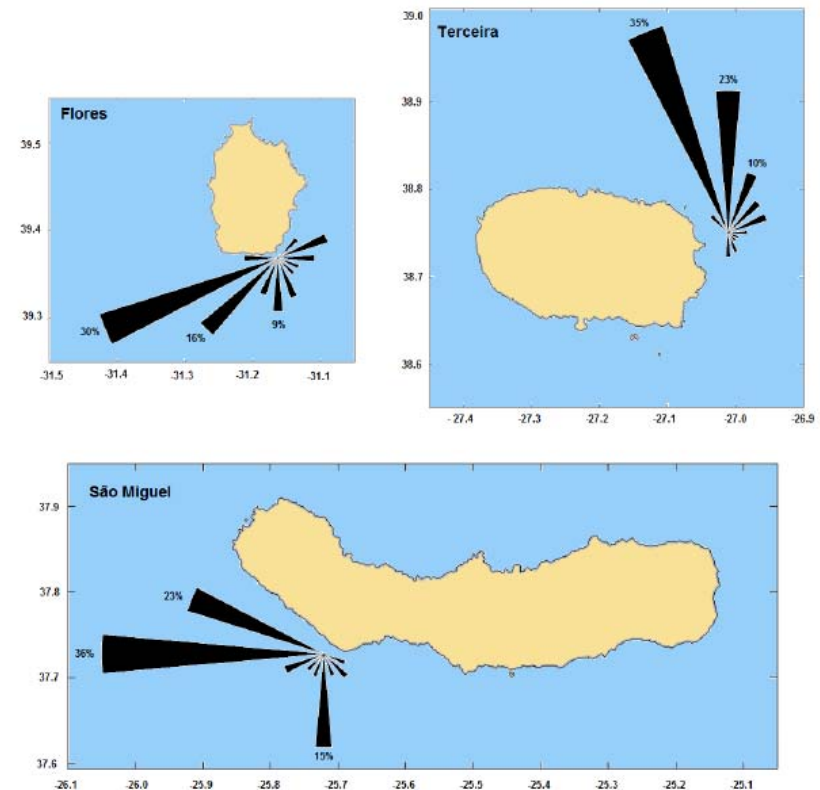


Figura 6 – Distribuição de frequência relativa de THTP nas Flores, Terceira e São Miguel





## Applied climatology to other projects

### Use of Spectral Remote Wave Data for Wave Energy Resource Characterization

M. T. Pontes (1), E. Azevedo (2), M. Bruck (3), S. Lehener(3)

(1) IDMEC- IST,Pav. Turbomáquinas, Av. Rovisco Pais 1000-049 Lisboa, Portugal, [teresa.pontes@ineti.pt](mailto:teresa.pontes@ineti.pt)

(2) Centro do Clima, Meteorologia e Mudanças Globais, Universidade dos Açores,Polo Universitário de Angra do Heroísmo, 9751-018 Angra do Heroísmo, Portugal

(3) DLR Oberpfaffenhofen Münchner Strasse 20 82234 Germany

#### Abstract:

Remote sensed wave data are obtained regularly by altimeters and SARs on board of satellites since 1991 and mid-1990s, respectively. In addition to accurate significant wave height  $H_s$  measured by altimeters, simple analytical models that compute zero-crossing period  $T_z$  from altimeter have been proposed. This is essential information for wave energy exploitation. In this paper a summary of the accuracy of  $H_s$  and period parameters obtained from altimeter data are presented. From ocean surface images obtained by Synthetic Aperture Radars (SARs) 2D wave spectra are obtained. In this paper wave spectral data obtained by ESA ENVISAT ASAR and by the TerraSAR-X SAR (TSX) are presented. The TSX SpotLight mode data are used to illustrate the high spatial variability of sea conditions in channels between islands of the central group of Azores archipelago.

**Key words:** waves, energy, resource, satellite, altimeter, SAR.



Fig. 1: Zoom of the TSX ScanSAR image overlaid on Google Earth map. Spotlight mode TSX data are framed by red boxes. Left: over directional Waverider deployed at the Faial – Pico channel, and right: off the Pico Plant.

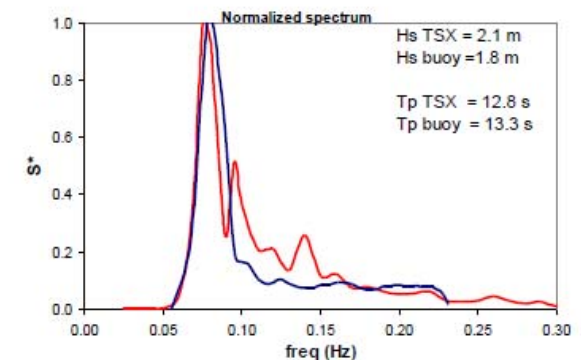


Fig 2 – Comparison of TSX 1D frequency normalized spectrum over the Faial-Pico buoy (blue) and buoy normalized spectrum (red) on average wave conditions

## Applied climatology to other projects



### Relevance of High Resolution Simulations In Orographic Precipitation Forecast: The Madeira Island Case



P.M.Miranda<sup>1</sup>, R.Tomé<sup>1,2</sup>, E.B.Azevedo<sup>2</sup>, M.Nogueira<sup>1</sup>, R.Cardoso<sup>1</sup>

<sup>1</sup> CGUL-IDL, Lisbon University, Lisbon, Portugal

<sup>2</sup> CCMMG, Azores University, Angra do Heroísmo, Terceira, Portugal

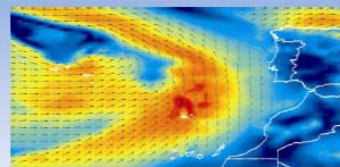
#### 1. Abstract

In the past years, we have kept working an MM5 operational 72h forecast for Madeira Island, using GFS forecasts as initial and boundary conditions. MM5 used a nested domain with an inner resolution of 2 km. The model was the only operational product that was able to predict, 36 hours in advance, the extreme precipitation event of the 20th February that led to extensive flooding, landslides and dozens of casualties. Unfortunately the forecast was not looked at by the forecast people.

Results for this event, using the operational run and other simulations with WRF 3 at resolutions down to 1 km, and with different parameterization options, will be analyzed. The climatological performance of the models (MM5 and WRF) in climate mode is also discussed, as a possible tool for regional downscaling in climate change studies.

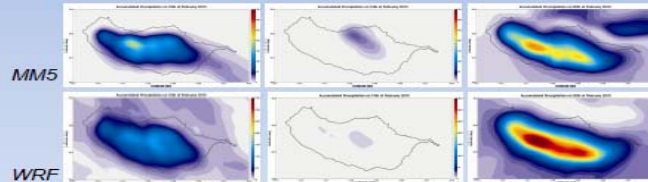
#### 3. Synoptic Winds

Exceptional synoptic winds, with a core around 20m/s, in the Madeira region, imposing SSW sustained winds across the island in a direction highly favorable for orographic rain enhancement.

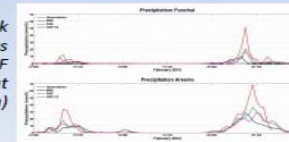


#### 2. The 20 February flash flood

The operational 2km MM5 forecast showed indications of intense accumulated precipitation, with more than 200mm/day in the Areeiro mountain, peaking at 30mm/hour in Areeiro and at 20mm/h in Funchal. Simulations and observations indicate that the rainstorm covered most of the island, specially in the high ground in the up slopes. However, MM5 underestimated observed rain rates and anticipated the peaks by 1 or 2 hours.



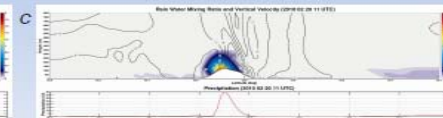
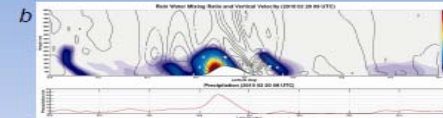
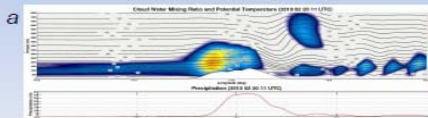
Precipitation at Funchal and Areeiro Peak before and during the rainstorm, as observed and simulated by MM5, WRF and WRF with climatological SSTs (all at 2km resolution)



#### 4. Structure of the precipitation field

The WRF (version 3.2) simulations at 2km presented some improvements on MM5, with a better match of the timing of the event and slightly higher, but still underestimated, rain rates. The simulation precipitation fields indicate that the event was highly localized on the topography but with interesting upstream and downstream (wake) effects.

- a) Cloud water distribution during the precipitation peak at Areeiro, in the EW section
- b) Rain water during the precipitation peak at Funchal (south coast), in SN section
- c) Rain water during the precipitation peak at Areeiro peak, in SN section







## Scientific publication and dissemination

### DISSEMINATION

#### Publications

"SeaMon-HC: A specific real-time moored buoy platform for fast oil detection".  
VERTIMAR 2007, National Congress. June 2007, Vigo, Spain.

"Experiences, results and new improvements concerning real-time monitoring systems in the Macaronesian Region: ACOMAR Network".  
The status of European coastal observing and forecasting systems. Workshop Internacional. October 2007, Pollença, Mallorca.

Red ACOMAR Canarias: Real-time tool for coastal ocean monitoring, surveillance and control.  
Proceedings of the Maritime Systems and Technology -MAST-. Genoa, Italy, October 2007.

"SeaMon-HC Buoy: a specific real-time lightweight moored platform for fast oil-spill detection".  
Ocean News and Technology, International Magazine. November 2007, USA.

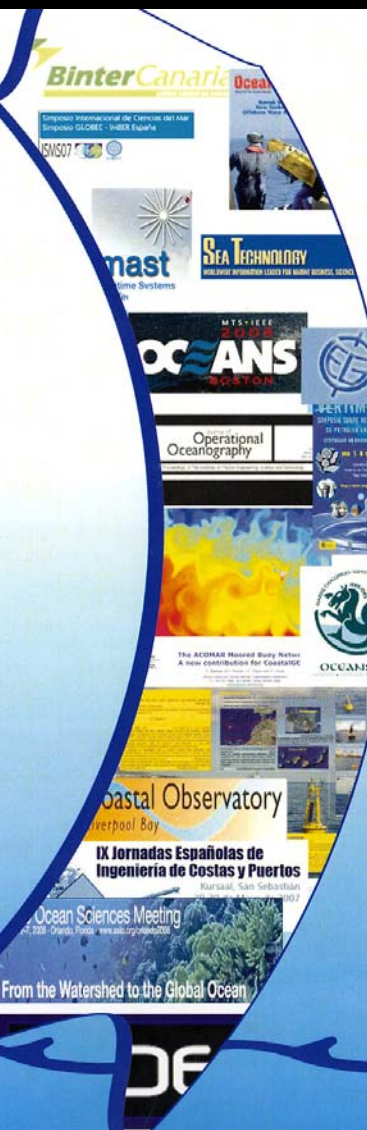
Real-Time Monitoring Network in the Macaronesian Region as a contribution to the coastal ocean observations panel (COOP).  
Journal Operational Oceanography. Vol. 1. Issue 1. March 2008.

"Characterisation of Metal Deposition Fluxes to Northeastern Subtropical Atlantic- Canary Islands Region".  
Oceans Sciences Meeting, International Congress. March 2008, Orlando, USA.

"ACOMAR Buoy Network: Real-Time coastal waters Monitoring in the Macaronesian Region".  
European Geophysical Union. EGU 2008, International Congress. April 2008, Vienna, Austria.

"Metal deposition fluxes to the Canary basin".  
European Geophysical Union. EGU 2008, International Congress. April 2008, Vienna, Austria.

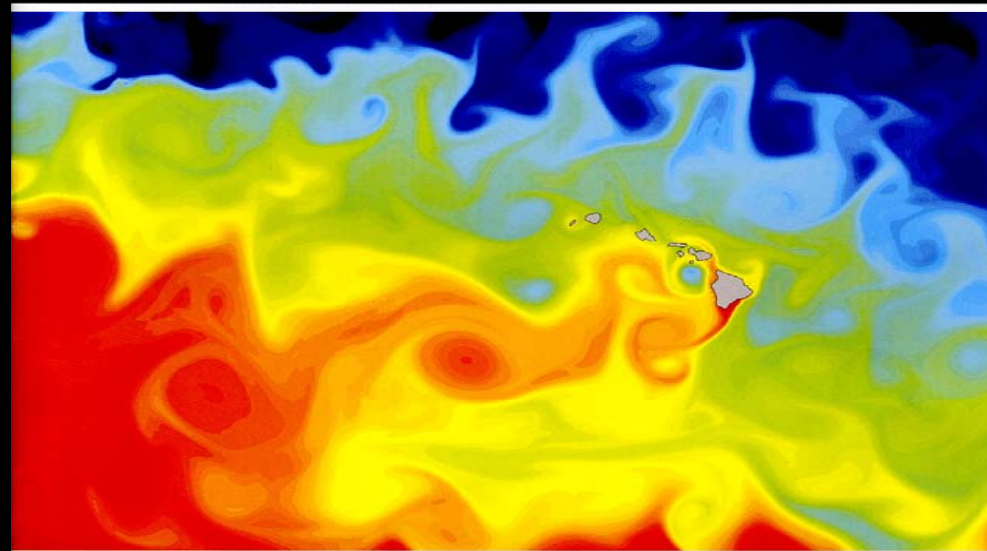
"Red ACOMAR Canarias: Real-Time Integrated System for coastal and open-ocean monitoring in the Macaronesian Region".  
Workshop Internacional sobre Clima e Recursos Naturais nos países de Língua Portuguesa. CRA'08. International Congress. April 2008, Ilha de São. Cape Verde.



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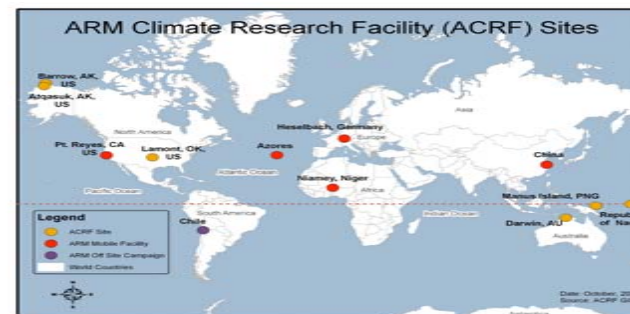
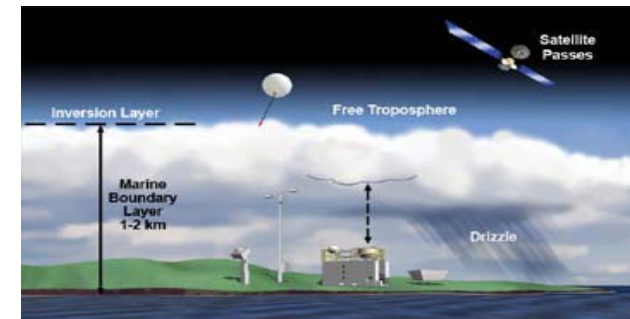
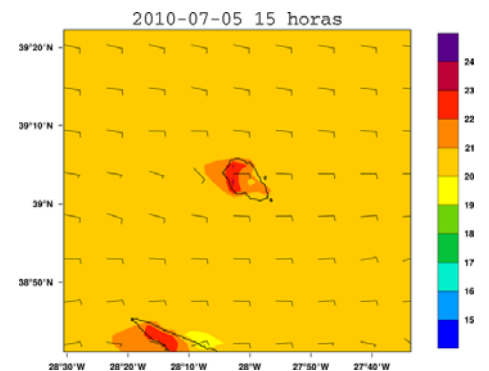
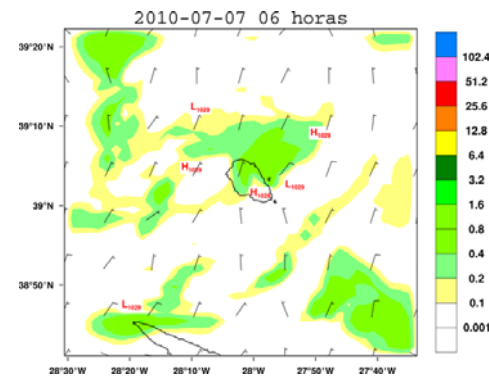
## Inter projects cooperation ARM project

### Projecto ARM

(Atmospheric Radiation  
Measurements\_Graciosa)

Melhoria dos modelos  
climáticos através da  
compreensão dos  
mecanismos radiativos e  
da interacção oceano  
atmosfera.  
(formação e física das  
nuvens ,aerosol  
etmosférico e mecanismos  
da precipitação)

(Projecto CLAP-  
MBL; Clouds, Aerosol and  
Precipitation in the Marine  
Boundary Layer)

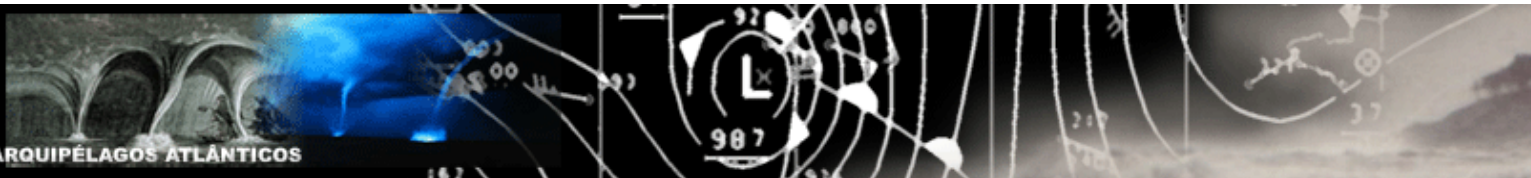


# CLIMAAT

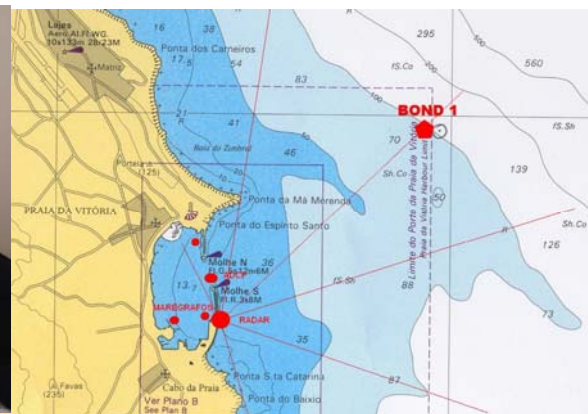
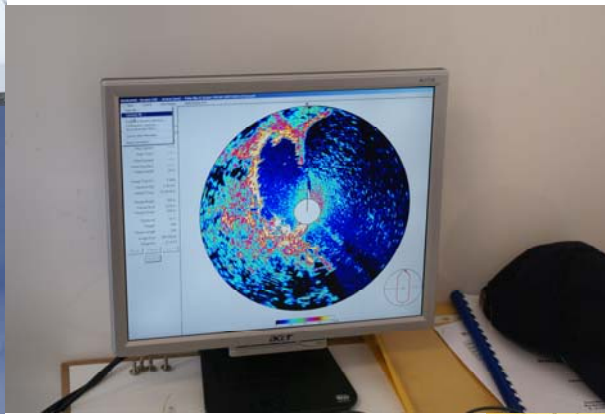


MAC  
2.3/A3

CLIMA E METEOROLOGIA DOS ARQUIPÉLAGOS ATLÂNTICOS



## Inter projects cooperation RADMAR project



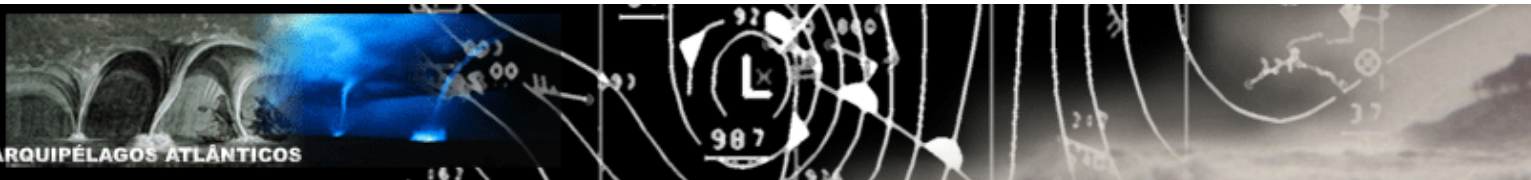


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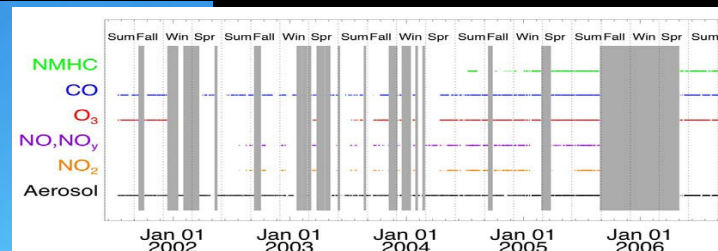


MAC  
2.3/A3

CLIMA E METEOROLOGIA DOS ARQUIPÉLAGOS ATLÂNTICOS



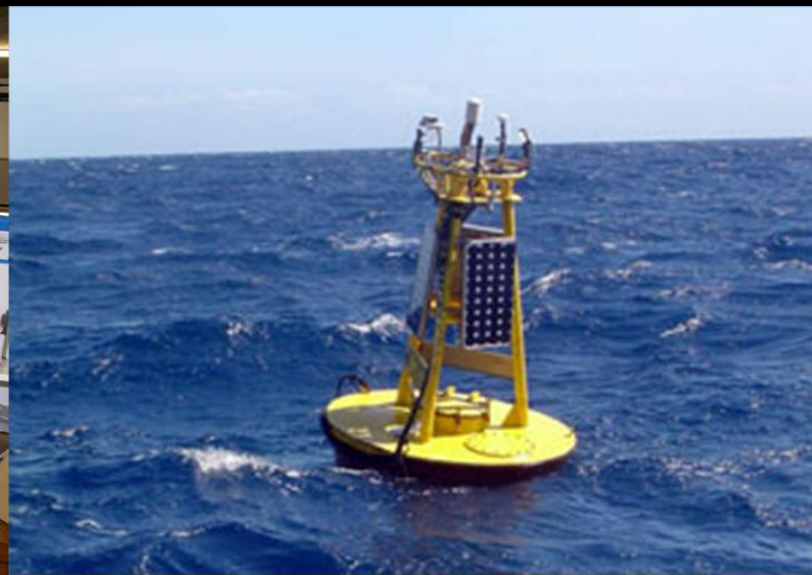
## Inter projects cooperation PICO-ONAIR project







## Exchange of knowledge and know how





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training and learning





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T6 - Public and free dissemination of information (web page and media)

[www.climaat.angra.uac.pt](http://www.climaat.angra.uac.pt)

Projecto CLIMAAT - Microsoft Internet Explorer

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Address: <http://www.climaat.angra.uac.pt/>

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(Projecto CLIMAAT e CLIMAAT II)  
INTERREG IIB  
Azores, Madeira e Canárias  
MAC 2.3/A3 - 03/MAC/2.3/A5  
CLIMA E METEOROLOGIA DOS ARQUIPÉLAGOS ATLÂNTICOS

Projectos **CLIMAAT** e **CLIMAAT II** (Interreg IIB MAC 2.3/A3 - 03/MAC/2.3/A5)  
Clima e Meteorologia dos Arquipélagos Atlânticos  
Rede de Informação, Divulgação e Cooperação Científica  
[RESUMO](#) > [FICHA DE PARCEIROS](#) >

**Acompanhe o furacão** \* LISA

**PARCEIROS / COLABORADORES**  
DOCUMENTOS  
PRODUTOS CLIMAAT  
DADOS ON-LINE  
EQUIPAMENTOS  
COOPERAÇÃO  
CONTACTOS  
NOTÍCIAS e EVENTOS  
GALERIA DE FOTOS  
LIGAÇÕES de INTERESSE

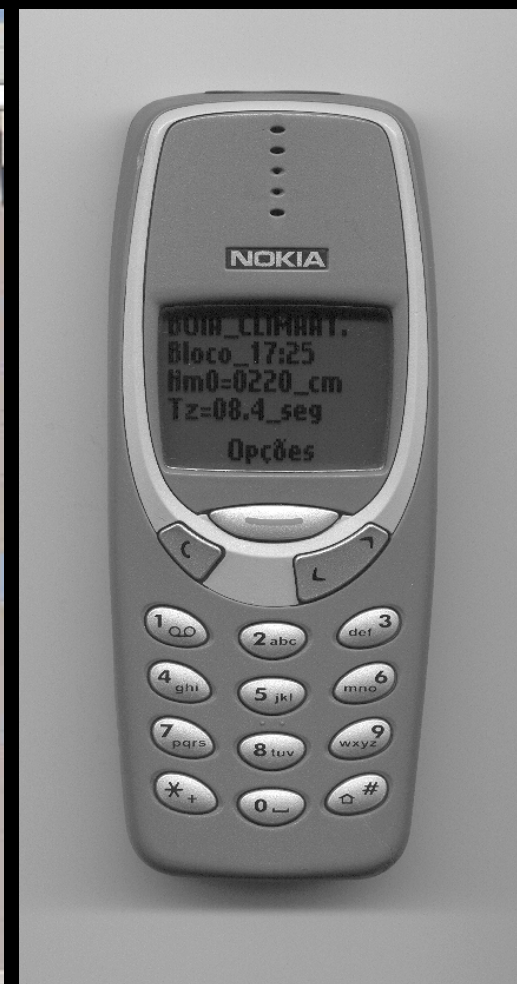
**INTERREG IIB**  
AZORES - MADEIRA - CANÁRIAS

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Governo dos Açores

<b>Agrupação Marítima (Ondógrafo) Açores</b> 	<b>Estações Meteorológicas Automáticas</b> 	<b>Previsão do Estado do Tempo</b> 
<b>Tabela de Marés - Instituto Hidrográfico</b> 	<b>Previsão do Estado do Mar (Açores)</b> 	<b>Weather Cam</b> 
<b>CIELO - Clima Insular à Escala Local</b> 	<b>CIELO - Hidrologia dos Açores</b> 	<b>CIELO - Cartografia Climática</b> 

Inicio - Parceiros - Documentos - Produtos CLIMAAT - Dados On-line - Equipamentos - Cooperação - Contactos - Notícias e Eventos - Ligações de Interesse







T6 - Public and free dissemination of information  
(daily information of weather as it can be seen – climaat/weathercams at TV)



Bom Dia  
Açores





## A fundamental cooperation from the local entities







A very friendly cooperation from the population and from the professionals of the sea







A very friendly and efficient cooperation from all the local  
INTERREG\_3B staff!

After all, proximity matter!













