AMOS

Advanced Meteo-Oceanografic Forecasting Services for Sea

HIDROMOD
modelação em engenharia

ICELAND LIECHTENSTEIN NORWAY
eea grants

AQUASAFE

GOVERNO DE PORTUGAL
MINISTÉRIO DA AGRICULTURA E DO MAR

dgpm
Direção-Geral de Política do Mar

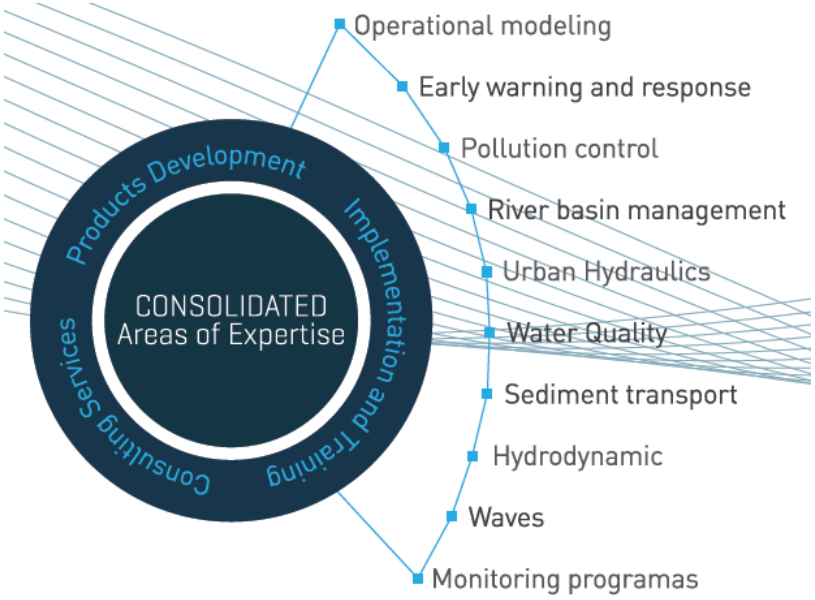
HIDROMOD's profile

HIDROMOD is an international company acting in the areas of:

- ✓ Consultancy: Whole water cycle and information technologies
- ✓ Products: Real time data and modeling integration
- ✓ Services: Forecast systems, Early warning systems, Professional support (e.g. *Portugal*, *Spain, France, Brazil, Argentina, Colombia, Malaysia, Oman*)

Main characteristics:

- ✓ High qualified staff with several Ph.D. and Ms.C.
- ✓ Over 450 projects in the last 24 years
- ✓ 1/3 – R&D Projects

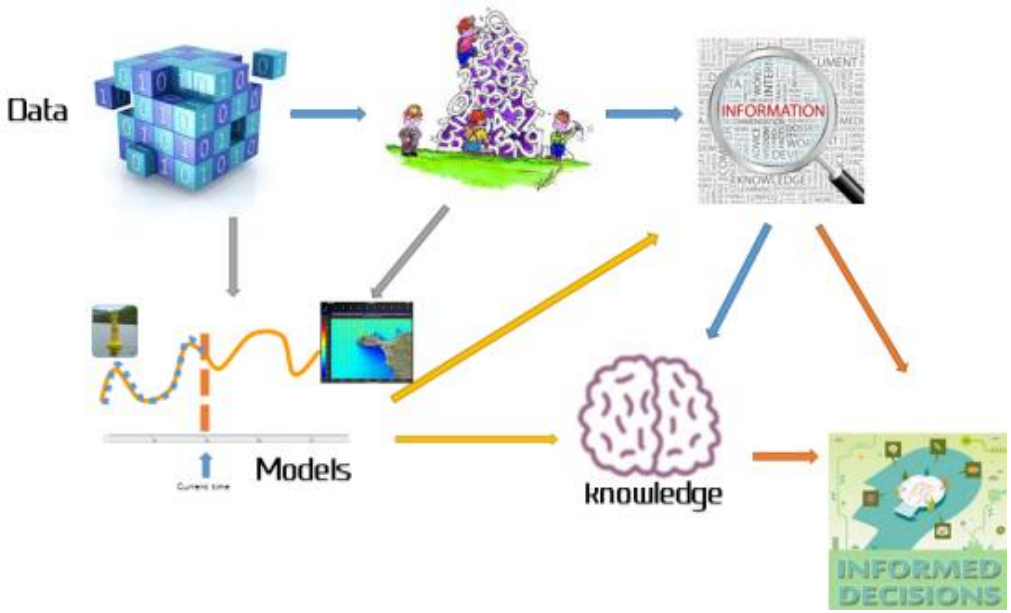


AMOS Project

- AMOS is focused in the implementation of *New Service Capabilities for Integrated and Advanced Meteo-Oceanographic forecasts*
- AMOS provides new tools which enable to fully exploit the synergies between forecasts and data acquired through different sources, different platforms and at different scales
- AMOS is built upon IWA awarded AQUASAFE platform which integrates modelling tools, advanced data analysis systems and automatic reporting capabilities

AMOS benefits

AMOS promotes the focus on **prevention** making use of advanced **data mining** and **modelling** tools;

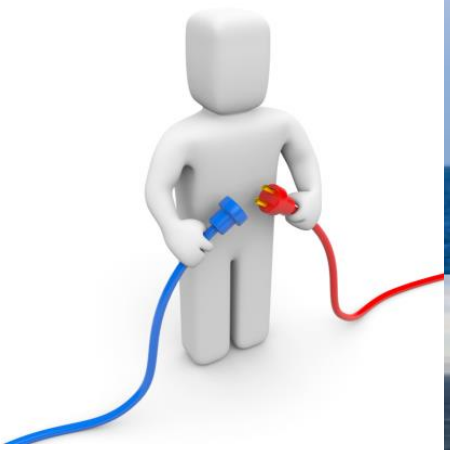


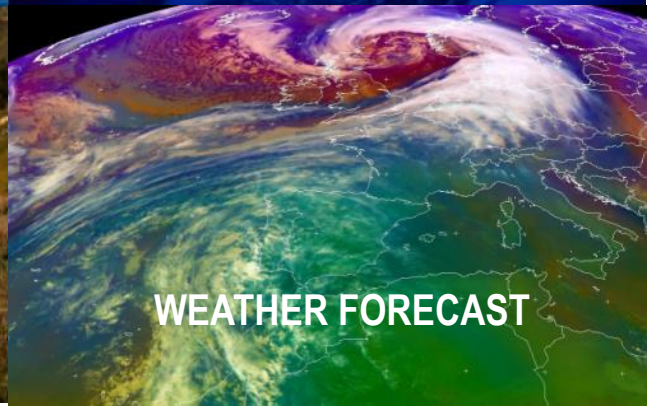
➥ Use of intelligence in order to **improve knowledge**, **optimize operations**, **anticipate problematic situations** and provide **early warning**

a full integrated service

Linking together meteo-oceanographic data

To provide operational services to diferente users

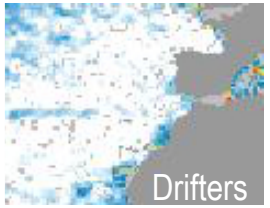




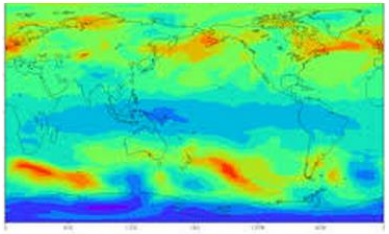
From global to regional to local

ICELAND LIECHTENSTEIN NORWAY eea grants

Real time data

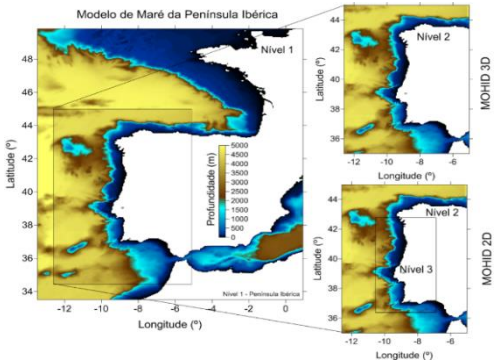


Global Models



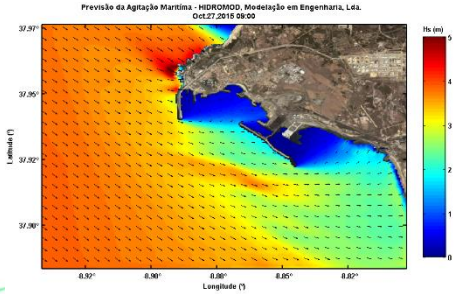
- GFS (50 & 25 km)
- My Ocean (8 km)
- WWIII (50 km)

Coastal Models



- MOHID (6 & 1 km)
- SWAN (1 km)
- WWIII (5 - 25 km)
- WRF (36 km)

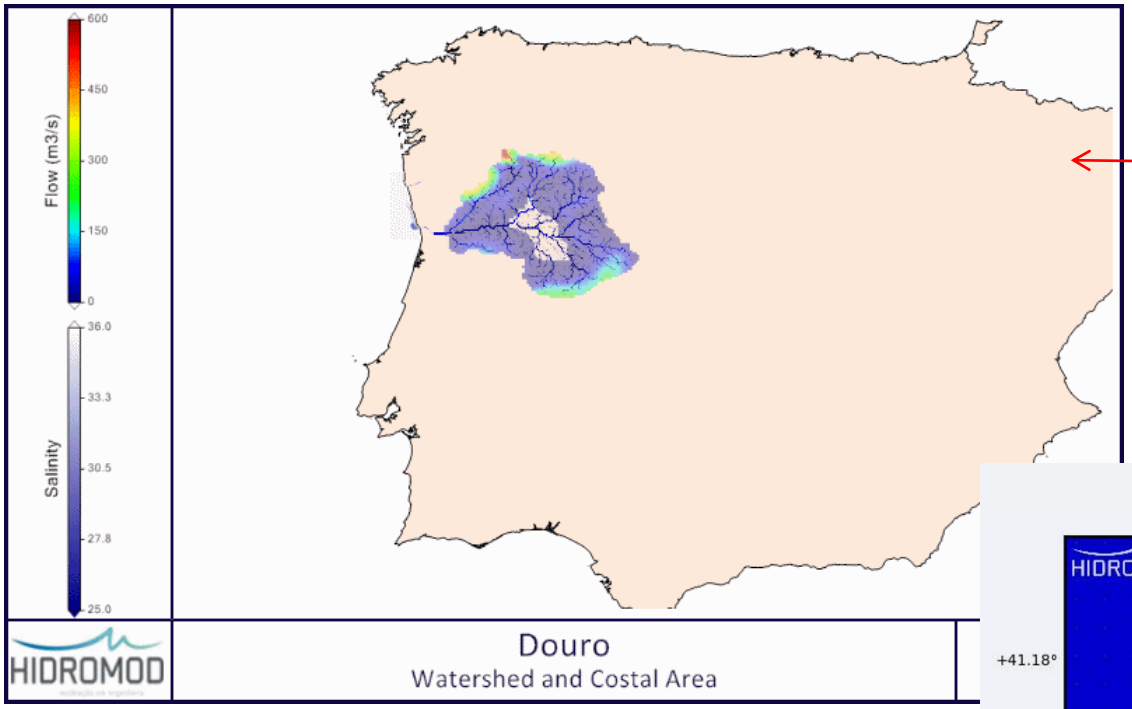
Local Models

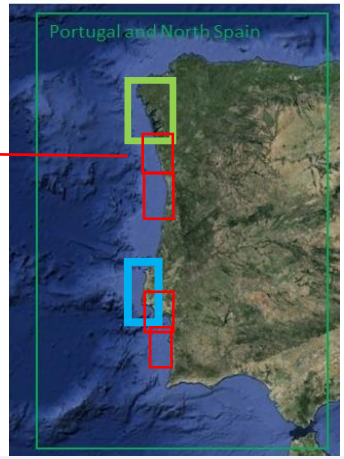


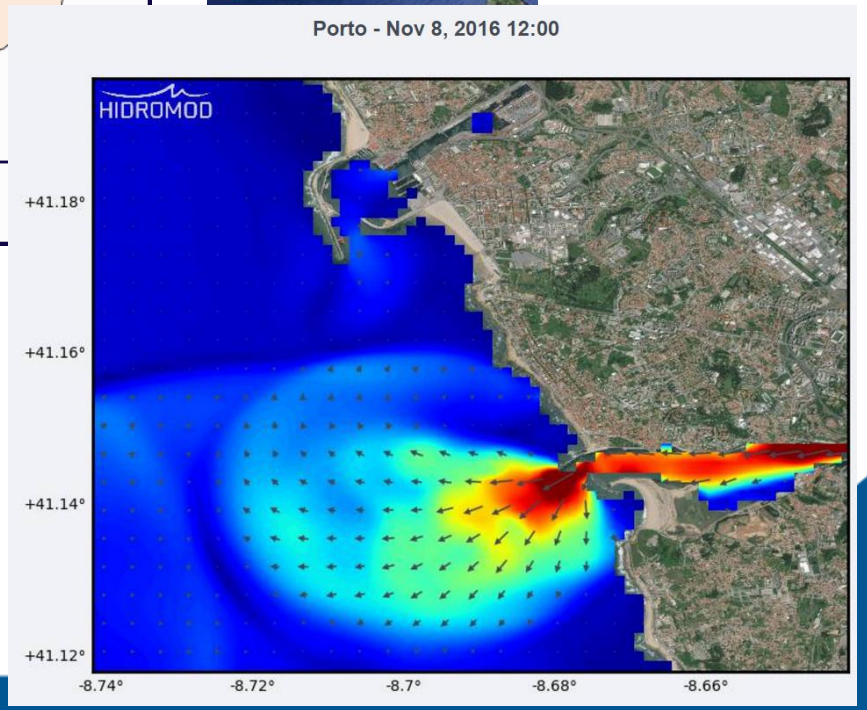
- MOHID (~10m-~100m)
- SWAN (~10m-~100m)
- WRF (4 - 12 km)

HIDROMOD
modelação em engenharia

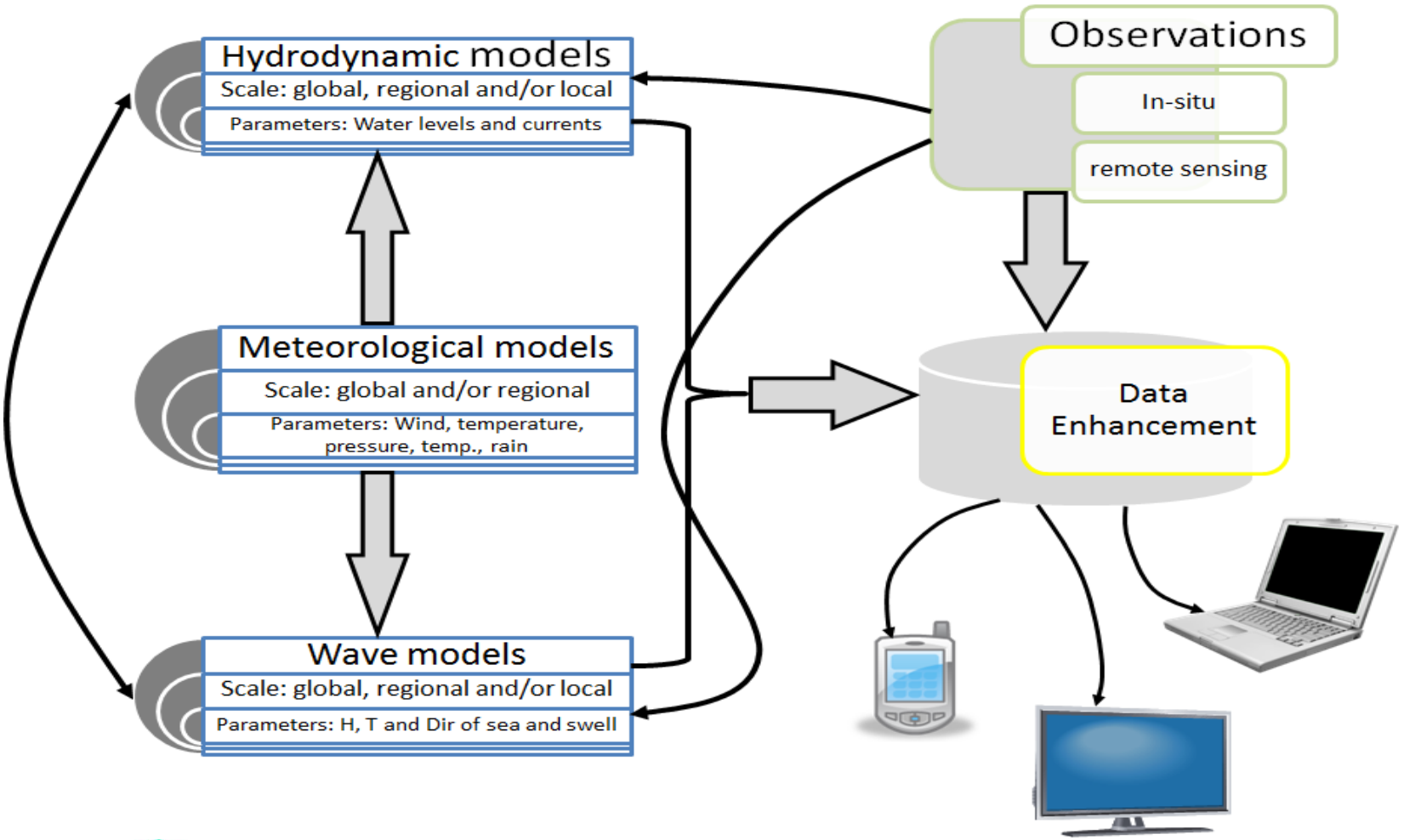
Integration with hydrologic forecasts







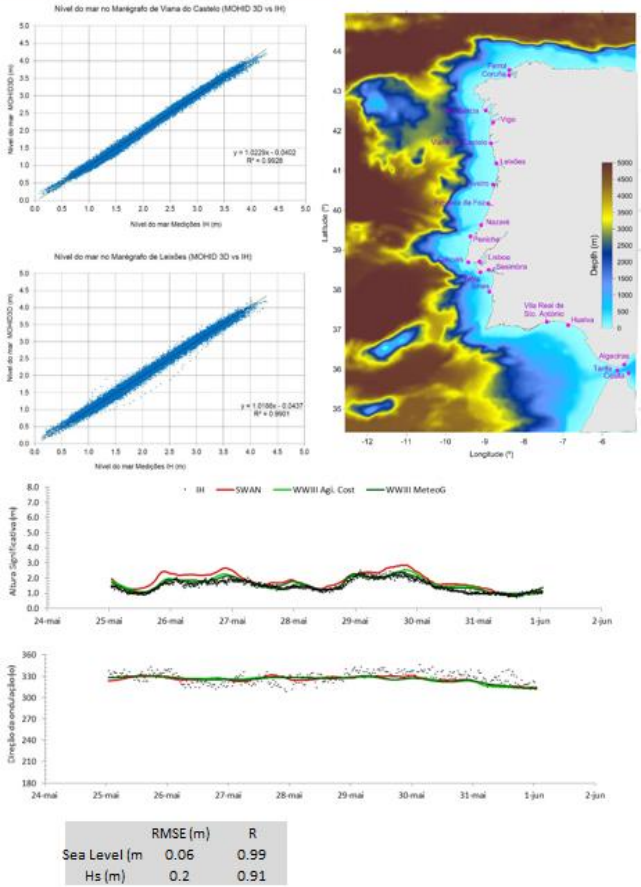
Information flux



Models validation

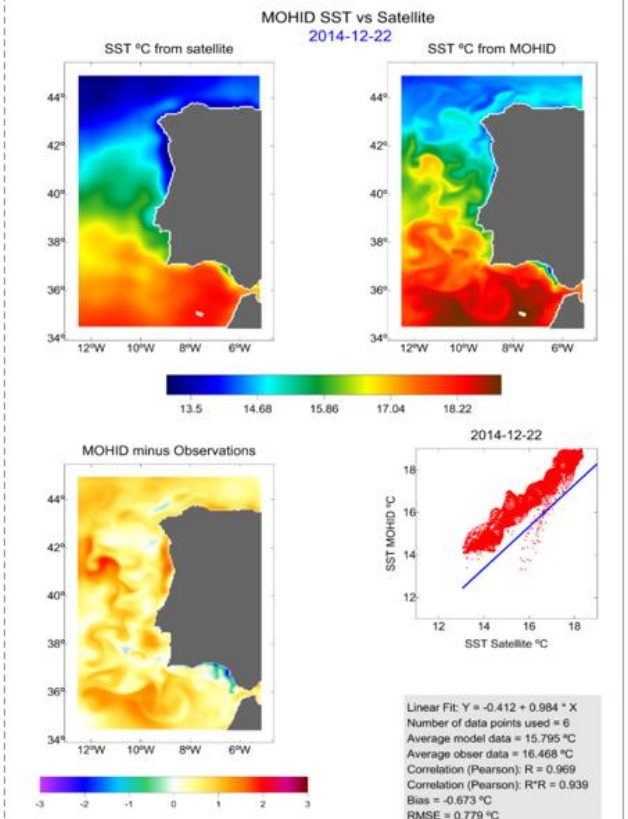
ICELAND LIECHTENSTEIN NORWAY
eea grants

AQUASAFE **VALIDATION REPORT** PORTUGAL HIDROMOD

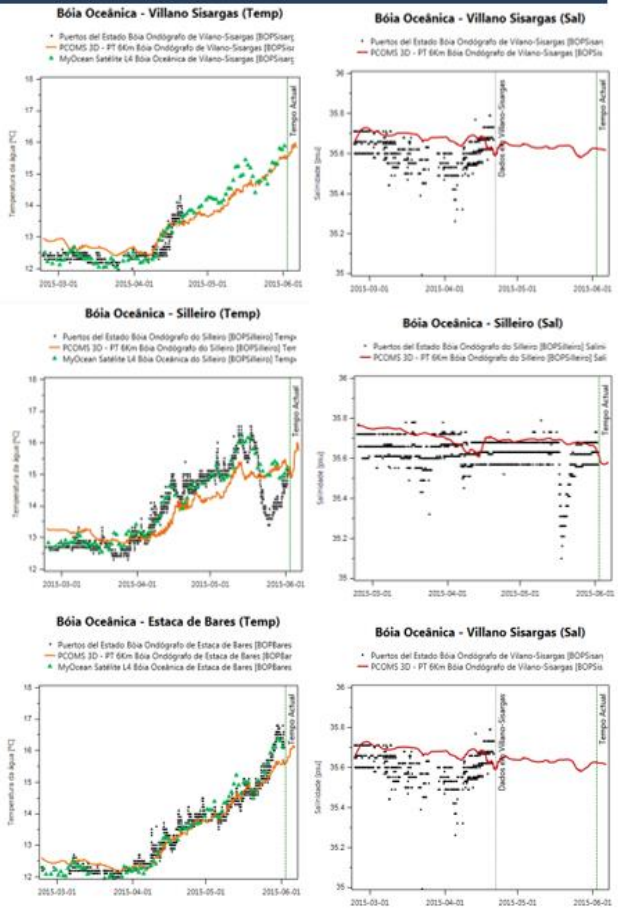


	RMSE (m)	R
Sea Level (m	0.06	0.99
Hs (m)	0.2	0.91

AQUASAFE **VALIDATION REPORT** PORTUGAL HIDROMOD



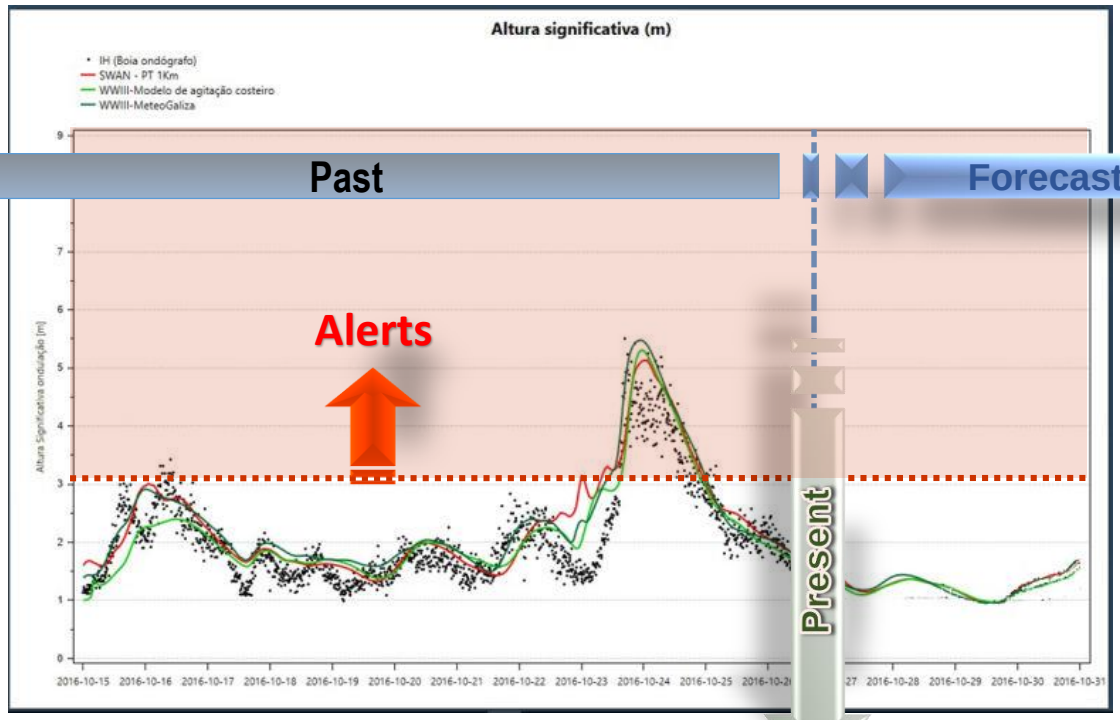
AQUASAFE **VALIDATION REPORT** PORTUGAL HIDROMOD



HIDROMOD
modelação em engenharia

Learn with the past to prevent the future

ICELAND LIECHTENSTEIN NORWAY
eea grants



Analyze

Compare

Characterize

Understand

Risk assessment

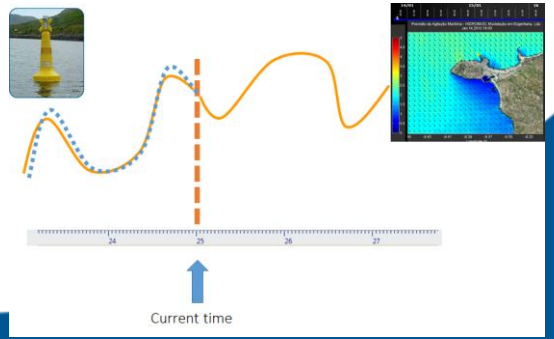
Planning

Decision support

Information dissemination

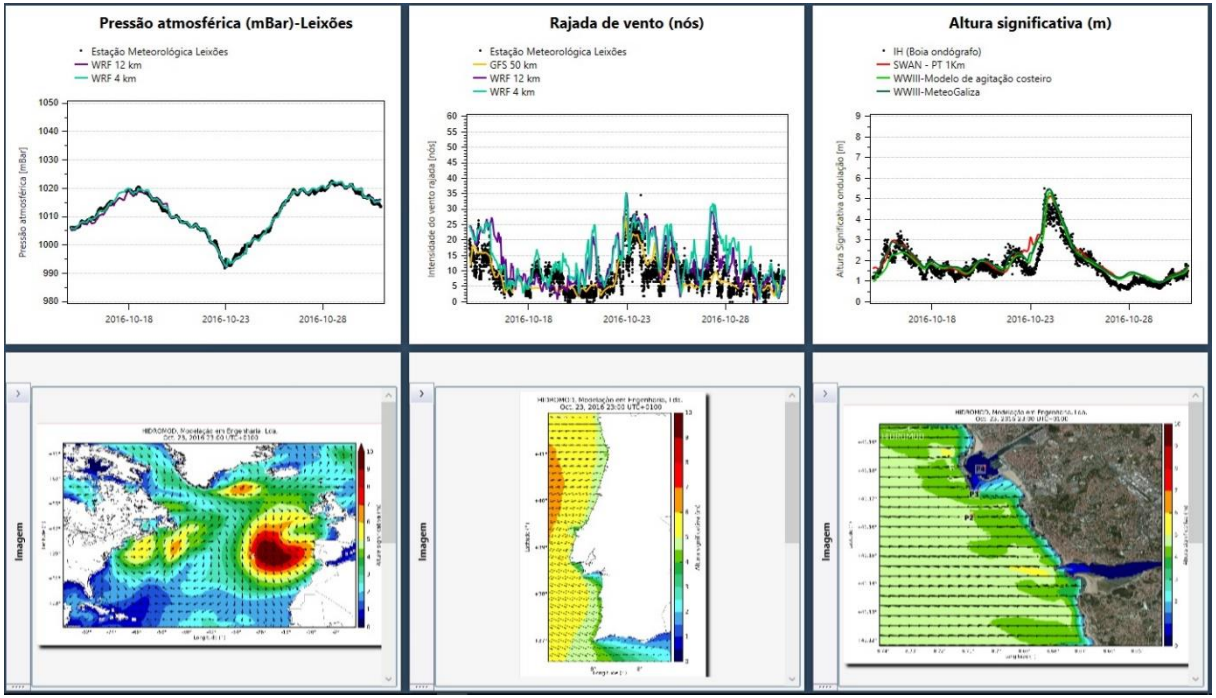
Observe

Act

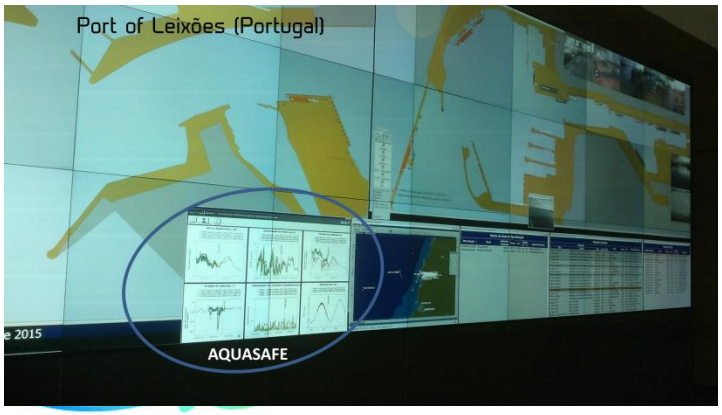


HIDROMOD
modelação em engenharia

Real time operation

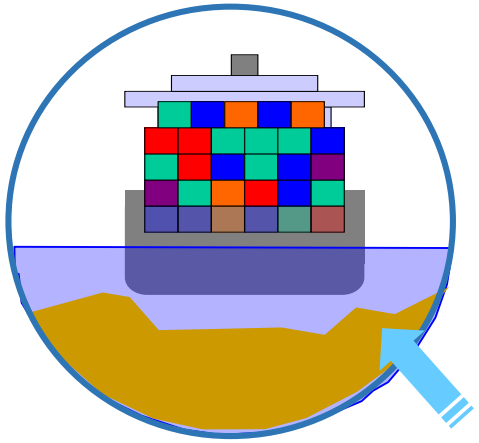


Focus on critical points
and
keep watching for critical situations



HIDROMOD
modelação em engenharia

Dredging optimization

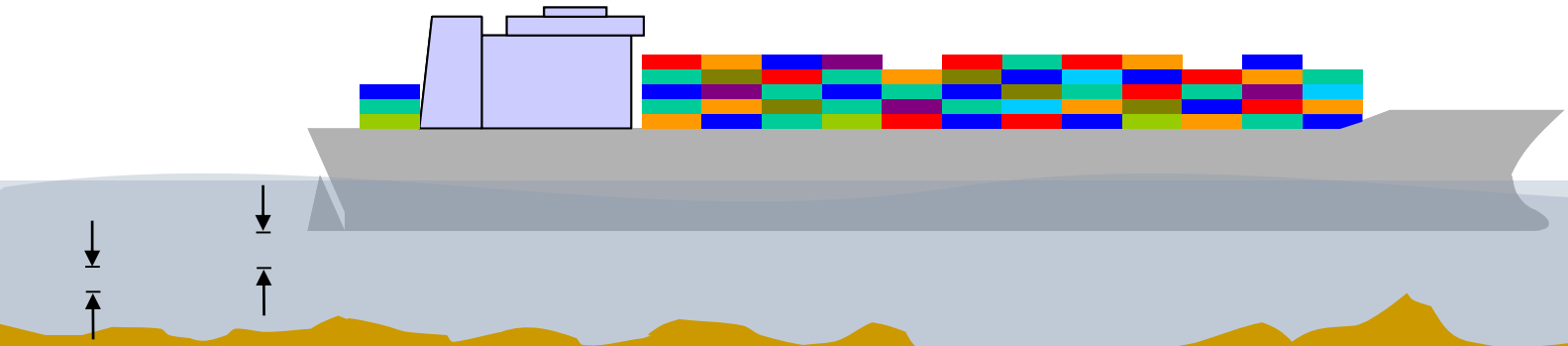


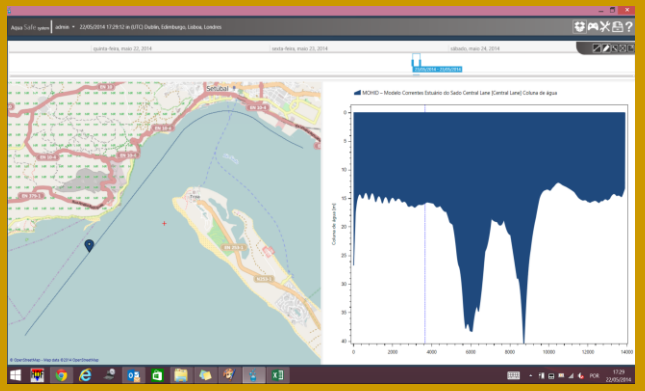
Use real time data and forecasts of

- Wind
- Waves
- Water level
- Currents
- Up to date bathymetry

To provide

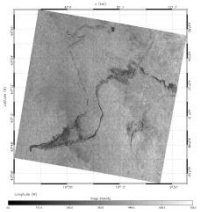
Dynamic Under Keel Clearance Information

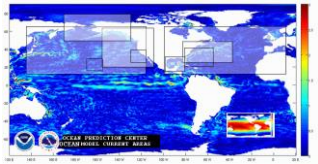




Credits: Rui Cunha, APDL

Marine pollution prevention and response

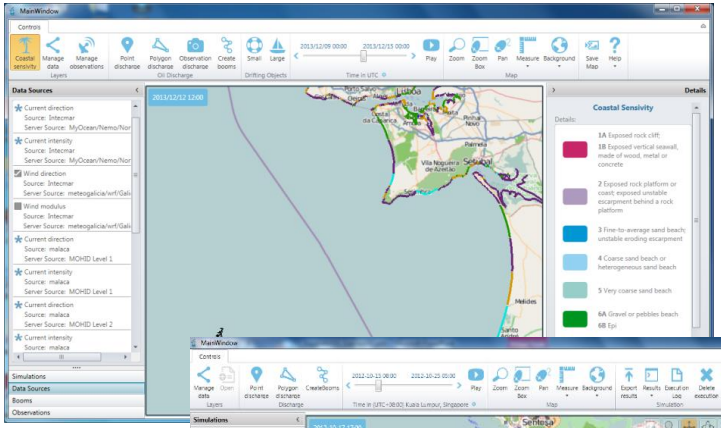


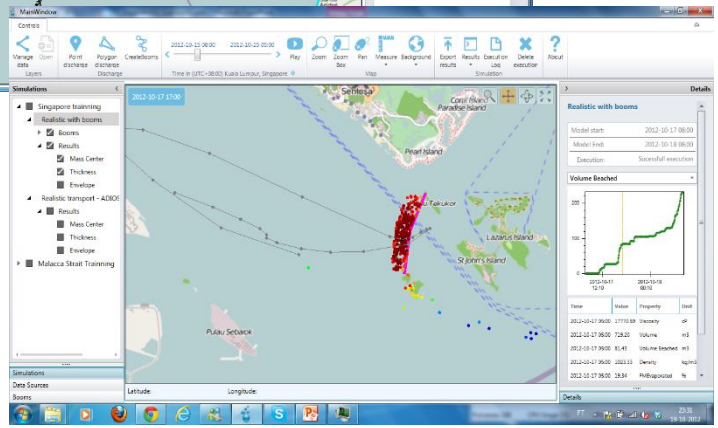


Observations (e.g. SAR/EMSA)

Forecasts (wind, currents, waves)

Coastal sensitivity





Shp
kml
WFS

Daily Reports

TABELA DE PREVISÕES

08/11/2016

Previsões oceanográficas e meteorológicas para Lisboa

1. GENERALIDADES

Tabela de previsões para o Porto de Lisboa do dia 08-11-2016 para o período de 08-11-2016 06:00 a 10-11-2016 23:00.

2. ÂMBITO

A seguinte tabela apresenta previsões de agitação marítima para locais de controlo para a navegação no Porto de Lisboa, previsões meteorológicas na margem Norte e Sul do Tejo, previsões de maré no local do marégrafo de Lisboa (Terreiro do Paço) e as horas de nascer e pôr do sol para os próximos três dias.

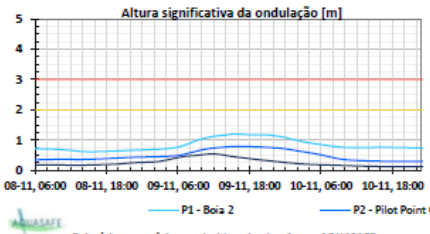
3. AGITAÇÃO MARÍTIMA

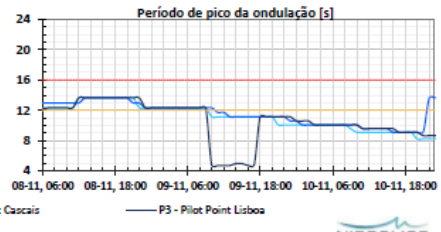
Propriedade	Nível de alerta	ID
Altura significativa da ondulação (m)	2	
Período de pico da ondulação (s)	12 (para Hs>=1 m)	
Altura significativa da ondulação (m)	3	
Período de pico da ondulação (s)	16 (para Hs>=1 m)	

Local	terça-feira, 08-11-2016																								quarta-feira, 09-11-2016																	
Data/Hora	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
P1 Dir	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
P1 Hs	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.9	1.0	1.0	1.1	1.1	1.1	1.2
P1 Tp	12.3	12.3	12.3	12.3	12.3	12.3	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	11.1	11.1	11.1	11.1	11.1
P2 Dir	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗
P2 Hs	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.8	0.8
P2 Tp	13.0	13.0	13.0	13.0	13.0	13.0	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.0	13.0	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	11.7	11.7	11.1	11.1
P3 Dir	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗
P3 Hs	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
P3 Tp	12.3	12.3	12.3	12.3	12.3	12.3	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	13.6	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	4.7	4.7	4.7	4.7	4.7	5.0

Local	quarta-feira, 09-11-2016									quinta-feira, 10-11-2016																																	
Data/Hora	15	16	17	18	19	20	21	22	23	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
P1 Dir	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
P1 Hs	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
P1 Tp	11.1	11.1	11.1	11.1	11.1	11.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	9.6	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	8.2	8.2	8.2	8.2
P2 Dir	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗
P2 Hs	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
P2 Tp	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	10.6	10.6	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	9.6	9.6	9.6	9.6	9.6	9.6	9.1	9.1	9.1	9.1	9.1	13.6	13.6
P3 Dir	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗
P3 Hs	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
P3 Tp	5.0	4.7	4.7	11.1	11.1	11.1	11.1	11.1	11.1	10.6	10.6	10.6	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1	9.6	9.6	9.6	9.6	9.6	9.6	9.1	9.1	9.1	9.1	8.7	8.7	8.7

Previsões da direção média (Dir), altura significativa (Hs, em metros) e período de pico (Tp, em segundos) da ondulação do modelo de agitação marítima SWAN (200 m de resolução) no local P1 (38°37'17.40" N / 9°23'17.32"W); P2 (38°40'59.41"N / 9°24'28.82"W) e P3 (38°41'30.00"N / 9°13'60.00"W)





AQUASAFE

Relatório automático produzido pela plataforma AQUASAFE

Desenvolvido por: HIDROMOD

AQUASAFE

Tabela de níveis de alerta nos pontos de referência para a navegação no Porto de Sines

Criado a: 08-11-2016 07:25
Início: 08-11-2016 06:00
Fim: 09-11-2016 05:00
Hora legal

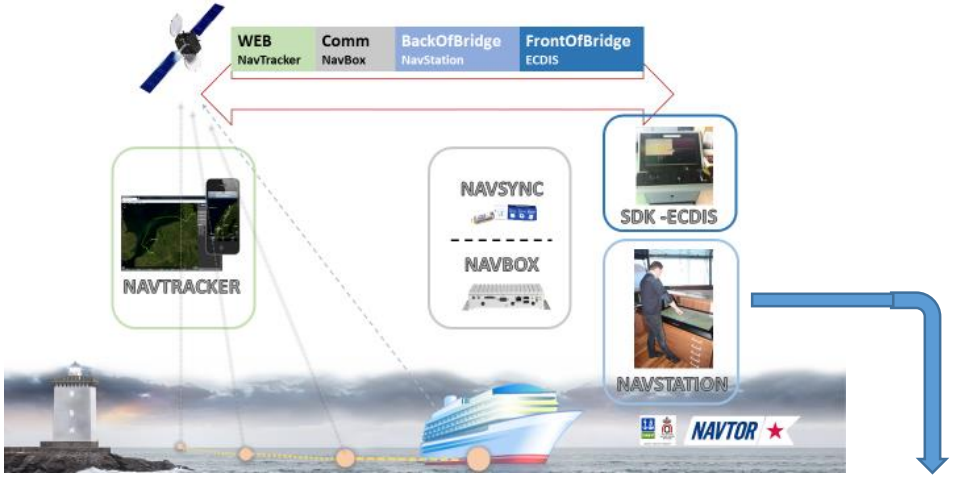
		Dia:	ter	ter	ter	ter	ter	ter	ter	ter	ter	ter	ter	ter	ter	ter	ter	ter	ter	ter	qua	qua	qua	qua	qua	qua
			8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	9	9	9	9	9	9
		Hora:	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	00	01	02	03	04	05
WRF 12 km (Sines)	Vel. Vento (nós)		15	13	12	11	9	8	7	5	5	6	8	7	7	7	8	7	8	10	12	13	13	14	15	17
	Dir. Vento (°)		↓	↓	↓	↓	↓	↓	↓	↓	↘	↘	↘	→	→	→	↘	→	→	→	→	→	→	→	→	→
WRF 36 km (Sines)	Vel. Vento (nós)		10	9	9	8	8	7	5	3	3	4	5	5	6	6	7	6	7	7	8	10	11	12	13	14
	Dir. Vento (°)		↓	↓	↓	↙	↙	↙	↙	↓	↘	↘	→	→	→	→	→	→	→	→	→	→	→	→	→	→
GFS 50 km (Sines)	Vel. Vento (nós)		12	12	12	10	10	10	8	8	8	9	9	9	12	12	12	10	10	10	9	9	9	11	11	11
	Dir. Vento (°)		←	←	←	←	←	←	↓	↓	↓	↘	↘	↘	↘	→	→	→	→	→	→	→	→	→	→	→
Tabela de maré* (Marégrafo)	Nível do mar (m)		2.31	2.55	2.68	2.64	2.46	2.17	1.84	1.56	1.38	1.34	1.43	1.65	1.95	2.24	2.47	2.57	2.52	2.33	2.05	1.76	1.54	1.43	1.46	1.63
MOHID (Marégrafo)	Nível do mar (m)		2.48	2.74	2.89	2.88	2.71	2.41	2.04	1.70	1.46	1.39	1.48	1.69	2.00	2.34	2.58	2.72	2.70	2.53	2.23	1.88	1.63	1.49	1.52	1.70
WWIII (Boia ondógrafo)	Hs (m)		1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1
	Dir. Ondas (°)		↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘
	Tp (s)		8	8	8	8	8	8	8	8	8	8	13	13	13	13	13	13	13	12	12	12	12	12	12	12
	Pw (kw/m)		5	5	5	4	4	4	4	4	3	3	5	5	5	6	6	6	6	6	6	6	6	6	6	6
SWAN (Boia ondógrafo)	Hs (m)		1.4	1.3	1.3	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.5
	Dir. Ondas (°)		↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘
	Tp (s)		9	9	9	9	8	8	8	8	8	8	14	14	14	14	14	14	14	12	12	12	12	12	12	12
	Pw (kw/m)		7	7	6	5	5	4	4	4	4	4	6	6	6	6	6	6	6	6	7	8	9	10	11	11
SWAN (P1 - Aproximação de Sines)	Hs (m)		1.3	1.3	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.4	1.4
	Dir. Ondas (°)		↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘	↘
	Tp (s)		9	8	8	8	8	8	8	8	8	14	14	14	14	14	14	14	14	12	12	12	12	12	12	12
	Pw (kw/m)		7	6	5	5	4	4	4	4	3	5	5	5	6	6	6	6	6	6	7	7	8	9	10	11
SWAN (P2 - Entrada Baía de Sines)	Hs (m)		0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.9	0.9
	Dir. Ondas (°)		→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
	Tp (s)		12	12	12	12	12	12	12	12	14	14	14	14	14	14	14	14	12	12	12	12	12	12	12	12
	Pw (kw/m)		1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	4	4	5	
SWAN (P3 - Molhe Sul de Sines)	Hs (m)		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.8	
	Dir. Ondas (°)		↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	↗	
	Tp (s)		12	12	12	12	12	12	12	12	14	14	14	14	14	14	14	14	14	12	12	12	12	12	12	
	Pw (kw/m)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	3	

Vel. e Dir. Vento - Velocidade e direção do vento
Hs - Altura significativa da ondulação
Tp - Período de pico da ondulação
Dir. Ondas - Direção da ondulação
Pw - Potência da ondulação

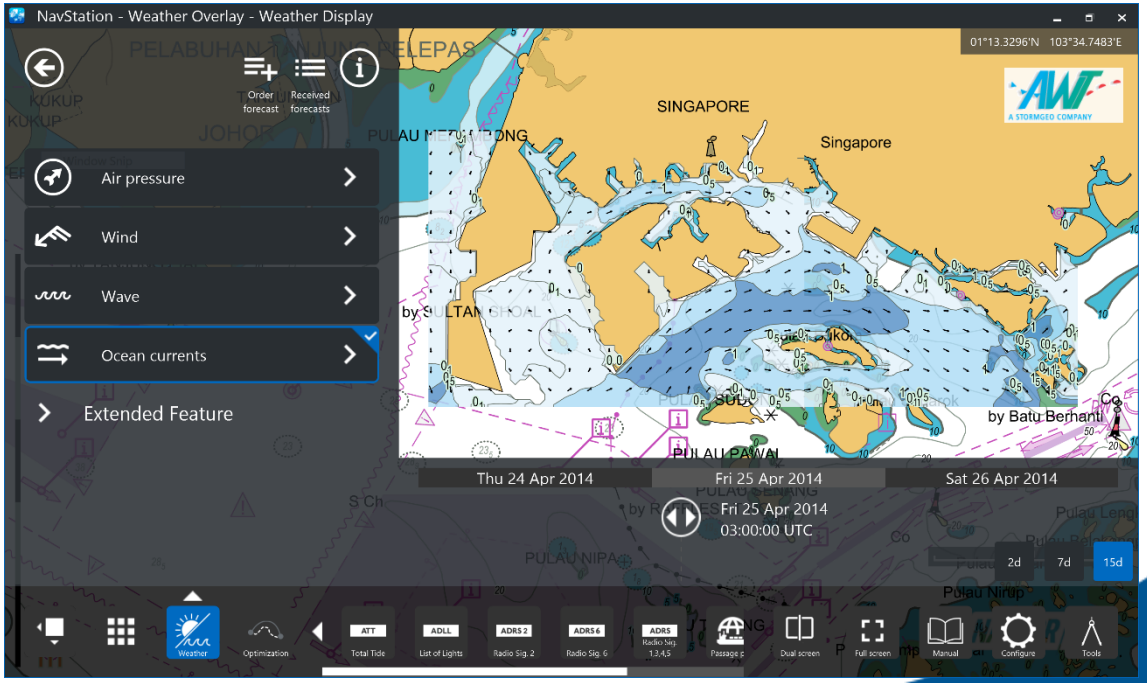
* Valores fornecidos pelo Instituto Hidrográfico para 2016 no marégrafo de Sines localizado no molhe W no cais nº 3: Latitude 37.951° N; Longitude 8.887° W (WGS84)

HIDRO

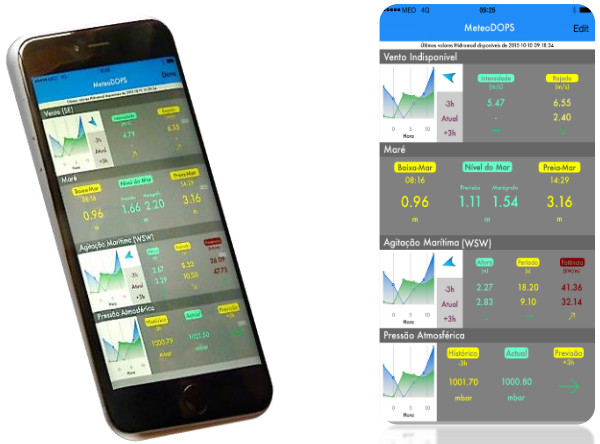
On board high resolution information



Navstation



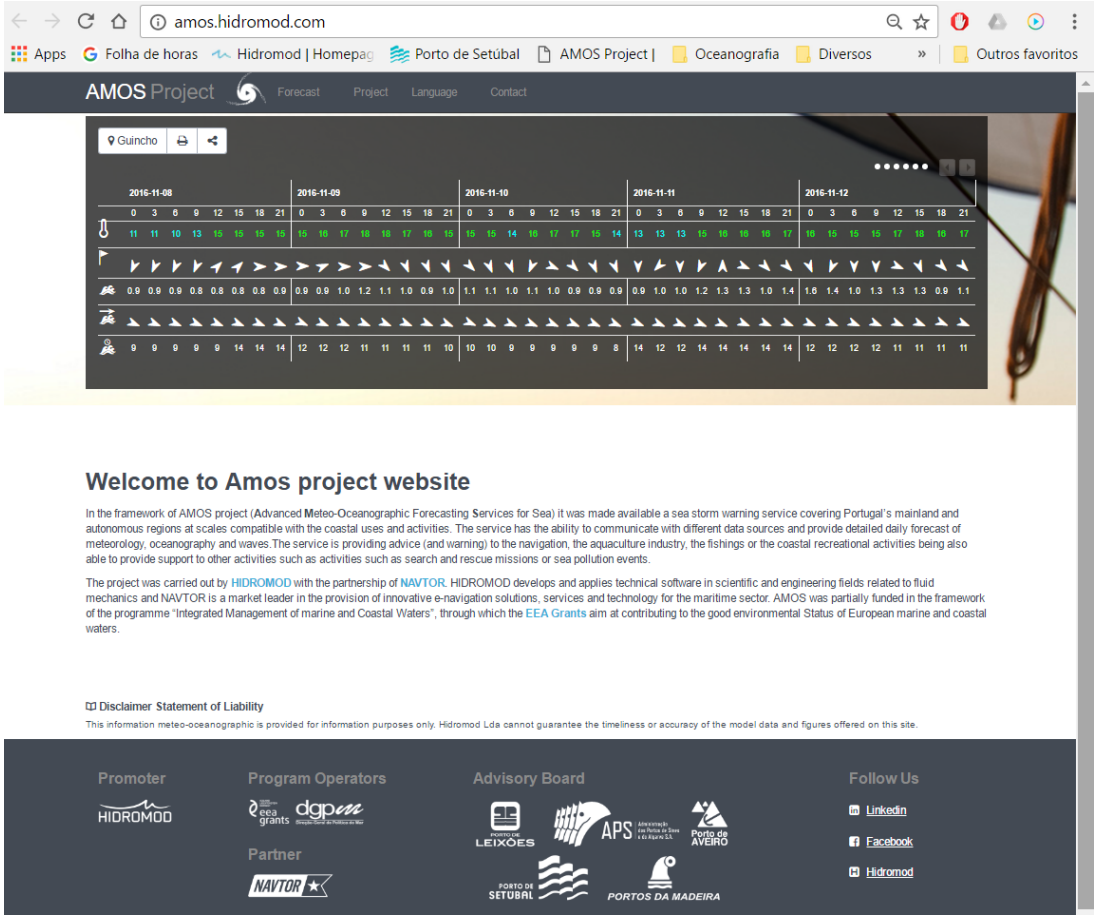
Information any time any where



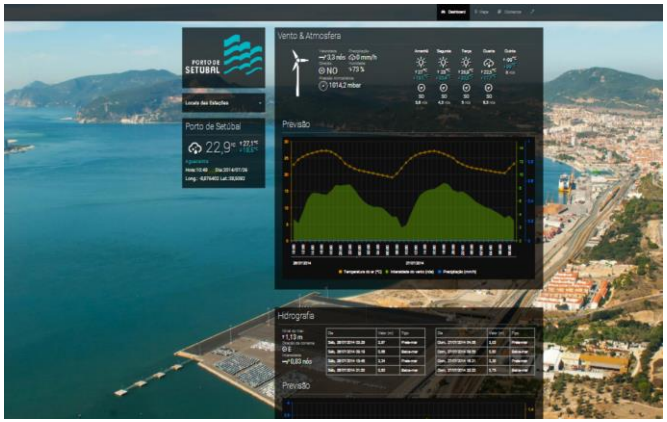
App desenvolvida pelo Porto de Leixões

com base na plataforma AQUASAFE

Web clients



http://amos.hidromod.com/



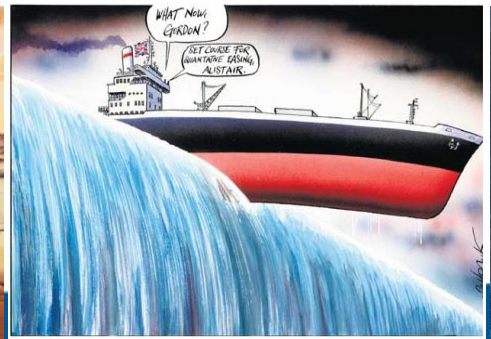
http://portosetubal.azurewebsites.net

To conclude…

AMOS provides:

- A versatile service capable to adapt to specific requests of **different users**
- A **unique access point** to different meteorological and oceanographic **data sources** and **forecasts**
- High resolution meteorological and oceanographic forecasts providing reliable information on the required locations and with the **required time and space scales**
- **Automatic reports** and **alerts** personalized according the users requests
- Support to **marine pollution** prevention and response actions and **search and rescue** missions
- Continuous models validation results (check of forecasts level of confidence)





Aditional Information

adelio@hidromod.com

www.hidromod.com

http://amos.hidromod.com/