A QGIS plugin for MOHID Lagrangian Model.

Context and MyCOAST contribution on Interoperability

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MEDIO MARIÑO DE GALICIA

Interreg Atlantic Area
European Regional Development Fund
EUROPEAN UNION
MyCoast

MyCoast Project: Coastal Observatories

Ocean European Innitiatives: 3 Agregators

SeaDataNet

Copernicus Marine Service

EMODnet

SeaDataNet:

- Focus on High-quality archive
- Standards for metadata and catalog
- REP
- Since +100 years

CMEMS:

- EU Operational service
- Real-time QA/QC and dissemination
- NRT+REP

EMODNET physics:

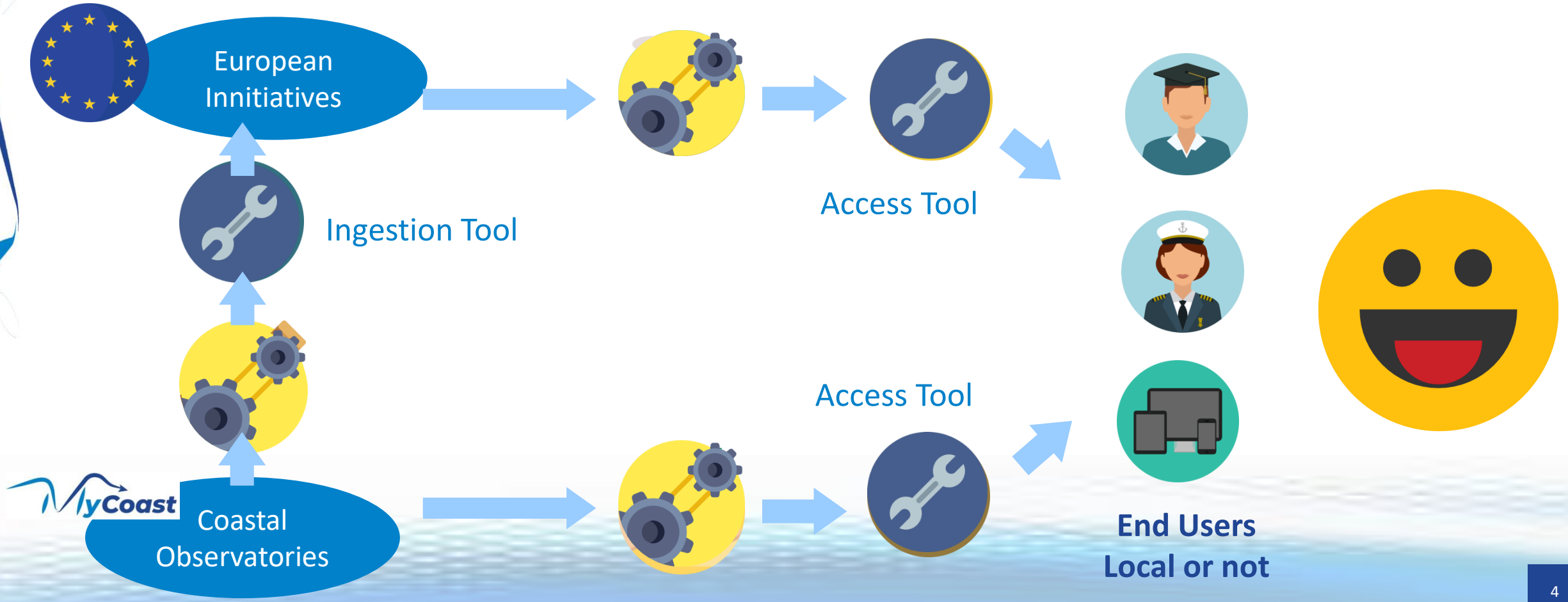
- Unlock data access
- Ocean Data portal
- NRT+REP

Complying with Data Interoparibility Standards

MAIN GOAL:

Harmonize datasets, model outputs and services.

End users, machines and tools should used them regardless of the provider.



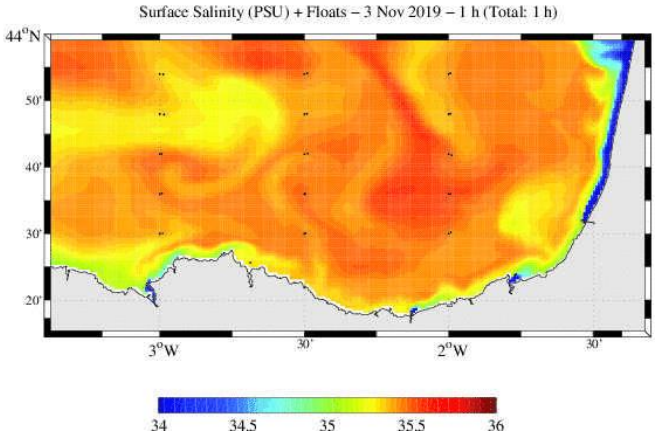
Chosen types of datasets

Mooring Platforms

Radar HF

CTD Profiles

Numerical Models



Outputs: Time Series

- Review standards
- Adopt standards
- Create tools

2D+1 Grids

- Review standards
- Adopt standards
- Create tools

Profiles

- Review standards
- Adopt standards
- Create tools

3D+1 Grids

- Review standards
- Adopt standards
- Create tools

Models Outputs

Model outputs standardization became a critical point

Model providers currently use:

- NetCDF CF as format
- THREDDS as dissemination service

But

meteogalicia has looked over the THREDDS of several providers

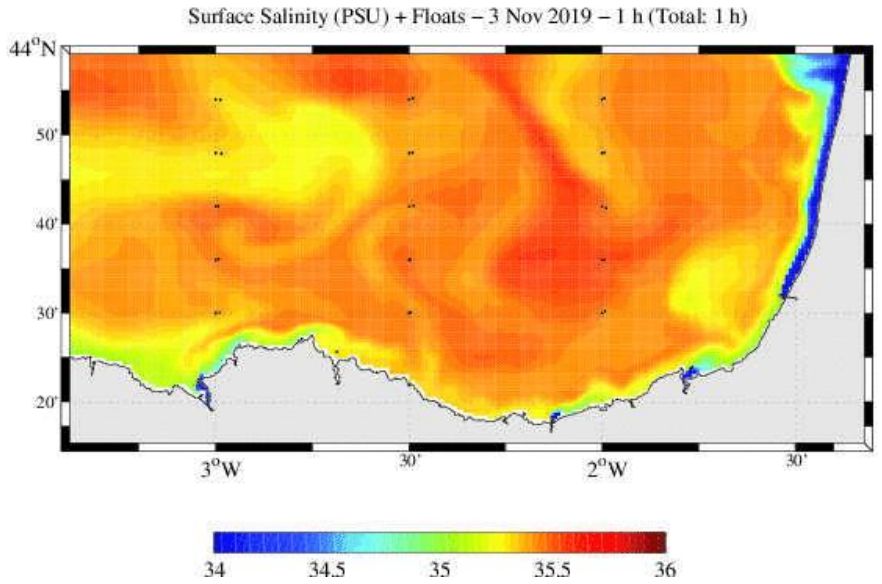
Models Outputs

		VARIABLES ATTRIBUTES			AL COORI	TIME COVERAGE		File features			
INSTITUTION	MODELS or NetCDF NAME (source)	VARIABLE NAME	RIABLE UN	VARIABLE DEFINITION (long name or standard name)	VERTICA L	TEMPORAL RESOLUTION (MEAN)	CALENDAR	CONVENTIONS	FILE FORMAT	THREDDS url	THREDDS directory structure
METEOGALICIA	WW3	dirm	radian	mean wave direction	1	HOURLY	standard	CF-1.0	NetCDF	http://mandeo.meteogalicia.es/thredds/catalogos/WW3/catalog.html	<Model>/<resolution>/<frequency>/[filename]
		dirp	radian	peak wave direction	1						
		hs	m	significant wave height	1						
		hswell	m	swell associated significant wave height	1						
		hswind	m	wind associated significant wave height	1						
		tpp	s	relative peak period	1						
	SWAN	depth	m	depth below mean sea level	1	HOURLY	standard	CF-1.0	NetCDF4 classic zip	http://mandeo.meteogalicia.es/thredds/catalogos/SWAN/swan_catalog.html	<Model>/<resolution>/<frequency>/[filename]
		dirm	degrees	sea_surface_wave_to_direction	1						
		dirp	degrees	thetap	1						
		hs	m	Sea surface wave significant height	1						
		hswell	m	wave height of swell part	1						
	ROMS	salt	psu	Salinity	15	HOURLY	gregorian	CF-1.0	netCDF-3 classic file	http://mandeo-02.meteogalicia.es/thredds/catalogos/ROMS/catalog.html	<Model>/<frequency>/[filename]
		temp	Celsius	Potential temperature	15						
		u	m/s	u-momentum component	15						
		v	m/s	v-momentum component	15						
		zeta	m	free-surface	1						
	MOHID	bathymetry	m	bathymetry below minum sea level	25	HOURLY	standard	CF-1.0	NetCDF	http://mandeo.meteogalicia.es/thredds/catalogos/MOHID/catalog.html	<Model>/<resolution>/<frequency>/[filename]
		salt	psu	sea water salinity	15						
		temp	Celsius	sea water temperature	15						
		u	m/s	velocity u	25						
		v	m/s	velocity v	25						
		water_level	m	sea surface height	1						
CMEMS	LOBAL_ANALYSIS_FORECAST_PHY_001_02	thetao	Celsius	Sea water potential temperature	50	ONTHLY/DAILY/HOUR	gregorian	CF-1.4	NetCDF	http://marine.copernicus.eu/services-portfolio/access-to-products/	
		bottomT	Celsius	Sea floor potential temperature	1						
		uo	m/s	Eastward sea water velocity	1						
		vo	m/s	Northward sea water velocity	1						
		so	psu(1e-3)	Sea water salinity							
		siconc	1	Ice concentration							
		usi	m/s	Sea ice eastward velocity							
		vsi	m/s	Sea ice northward velocity							
		zos	m	Sea surface height above geoid	1						
	GLOBAL_ANALYSIS_FORECAST_WAV_001_02	VHM0	m	sea_surface_wave_significant_height	1	3HOURLY	standard	CF-1.6	NetCDF	http://marine.copernicus.eu/services-portfolio/access-to-products/	
		VTM10	s	surface_wave_mean_period_from_variance_spectral_density_inverse_frequency_moment							
		VMDR	degree	Mean wave direction from (Mdir)							
	GLOBAL_ANALYSIS_FORECAST_BIO_001_01	CHL	mg/m^3	Mass Concentration of Chlorophyll in Sea Water	1	MONTHLY/DAILY	gregorian	CF-1.4	NetCDF	http://marine.copernicus.eu/services-portfolio/access-to-products/	
		PHYC	mmol/m^3	Mole Concentration of Phytoplankton expressed as carbon in sea water							
		NO3	mmol/m^3	Mole Concentration of Nitrate in Sea Water							
		PP	g/m^3/day	Net Primary Productivity of Carbon Per Unit Volume							
		O2	mmol/m^3	Mole Concentration of Dissolved Oxygen in Sea Water							
		PO4	mmol/m^3	Mole Concentration of Phosphate in Sea Water							
	IBI_ANALYSIS_FORECAST_PHYS_005_001	thetao	Celsius	Sea water potential temperature	1	ONTHLY/DAILY/HOUR	gregorian	CF-1.0	NetCDF	http://marine.copernicus.eu/services-portfolio/access-to-products/	
		bottomT	Celsius	Sea floor potential temperature	1						
		uo	m/s	Eastward sea water velocity	1						
		vo	m/s	Northward sea water velocity	1						
		so	psu(1e-3)	Sea water salinity							
		siconc	m	Ice concentration							
MARETEC-IST	IST MOHID BIO model - BIOPCOMS_v1	ssh	m	sea water level / sea surface height	50	3HOURLY	standard	CF-1.0	NetCDF 3.5.1	http://opendap.mohid.com:8080/thredds/catalog/IST_MOHID_BIO_DATA/PORTUGAL_0.06DEG_50L_3H/	
		salinity	1.00E-03	Sea water salinity	50						
		temperature	degC	Sea water temperature	50						
		u	m/s	east-west current velocity	1						
		v	m/s	north-south current velocity	1						
		vm	m/s	sea water speed							
		ammonia	mol/m3	mole concentration of ammonium in sea water							
		cohesive_sediment	mg/l	mass concentration of suspended matter in sea water							
		dissolved_oxygen	mg/l	mass concentration of oxygen in sea water							
		inorganic_phosphorus	mol/m3	mole concentration of phosphate in sea water							
		nitrate	mol/m3	mole concentration of nitrate in sea water							
		particulate_organic_nitrogen	mol/m3	mole concentration of particulate organic matter expressed as nitrogen in sea water							
		particulate_organic_phosphorus	mol/m3	mole concentration of particulate organic matter expressed as phosphorus in sea water							
		phytoplankton	mol/m3	mole concentration of phytoplankton expressed as carbon in sea water							
UA – UNIVERSIDADE DE AVEIRO	ROMS-AGRIF (wrf forcing)	h	m	bathymetry	14	--	gregorian	CF-1.4	NetCDF	http://thredds.marnaraia.org/thredds/remoteCatalogService?catalog=http://gmo.web.ua.pt/thredds/catalog/LD/catalog.xml?dataset=romsLD	
		u	m/s	baroclinic eastward sea water velocity							
		v	m/s	baroclinic northward sea water velocity							
		temp	Celsius	sea water potential temperature							
		salt	psu	salinity							
		CHLA	mg Chla m-3	Chlorophyll A concentration							
SOCIB	ROMS-WMOP (roms_wmop_3d_yyyymmdd.nc	temp	Celsius	Potential temperature	13	3HOURLY	standard	--	NetCDF	http://thredds.socib.es/thredds/catalog.html	
		salt	psu	salinity							
		u	m/s	eastward_velocity							
		v	m/s	northward_velocity							
		zeta	meter	sea_surface_height							
	SAPO	average_wave_direction	degree	Average wave direction	1	HOURLY	standard	CF-1.6	NetCDF4	http://thredds.socib.es/thredds/catalog.html	

Model Outputs

The main problem is:

- Historical outputs transformation to a new structure
- External clients feeding by current output data.



NCML homogenization of THREDDS

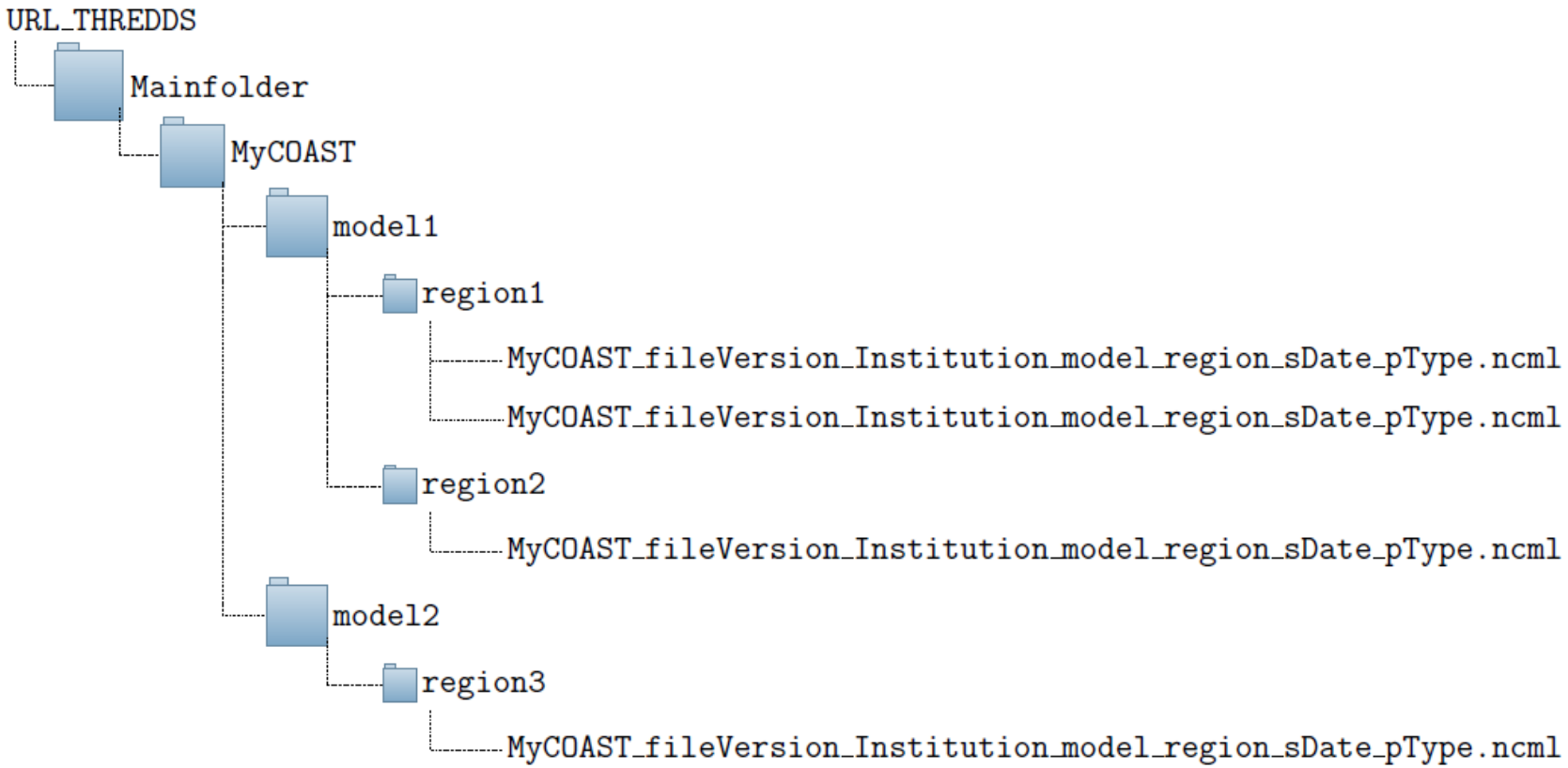
- A similar structure of folders with homogeneous file names and variables using NCML will be used by MyCoast partners

Current status:

- Proof of concept was tested in MeteoGalicia with good results.

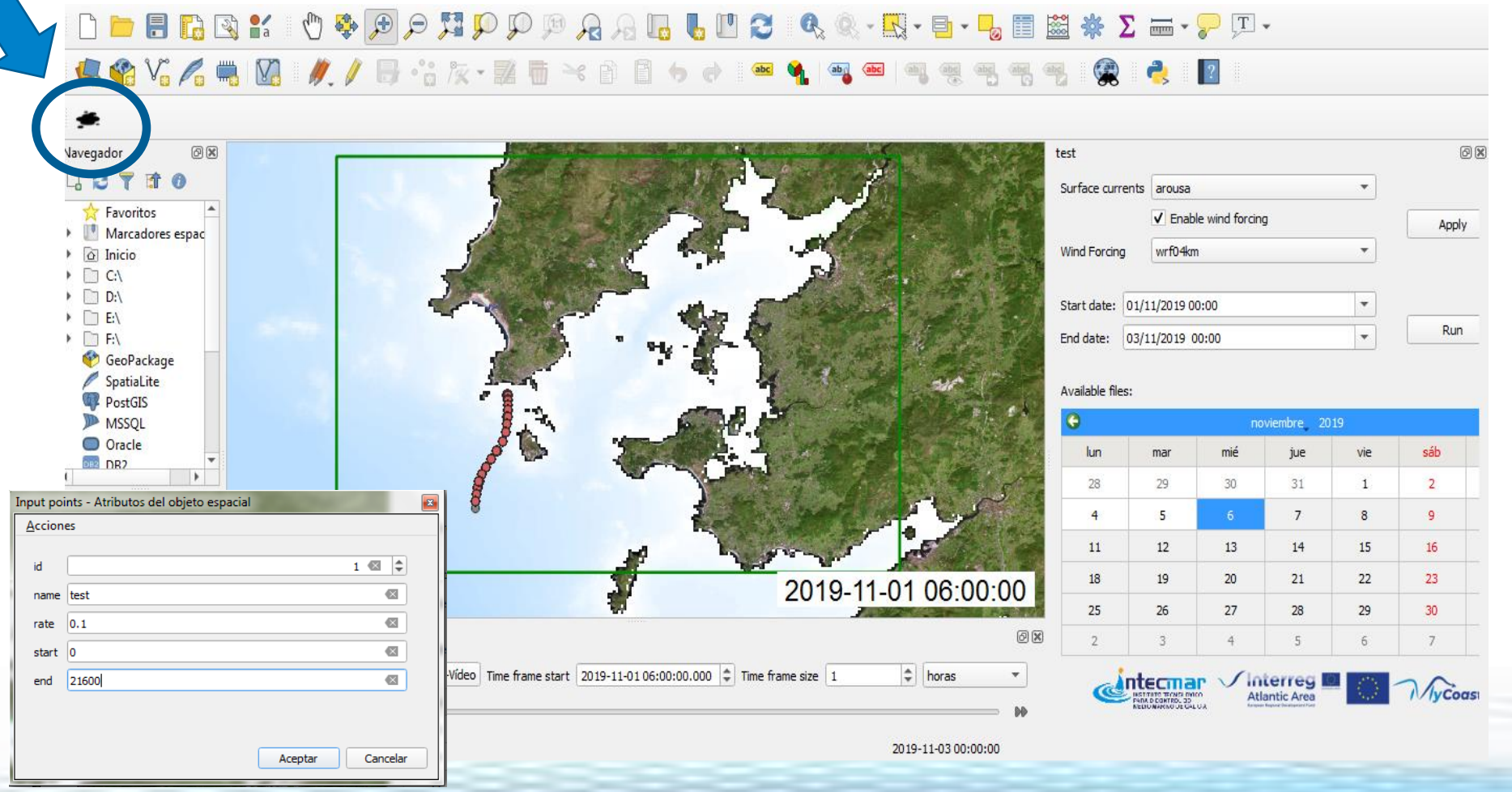
Proof of concept

http://193.144.35.143/thredds/catalog.html

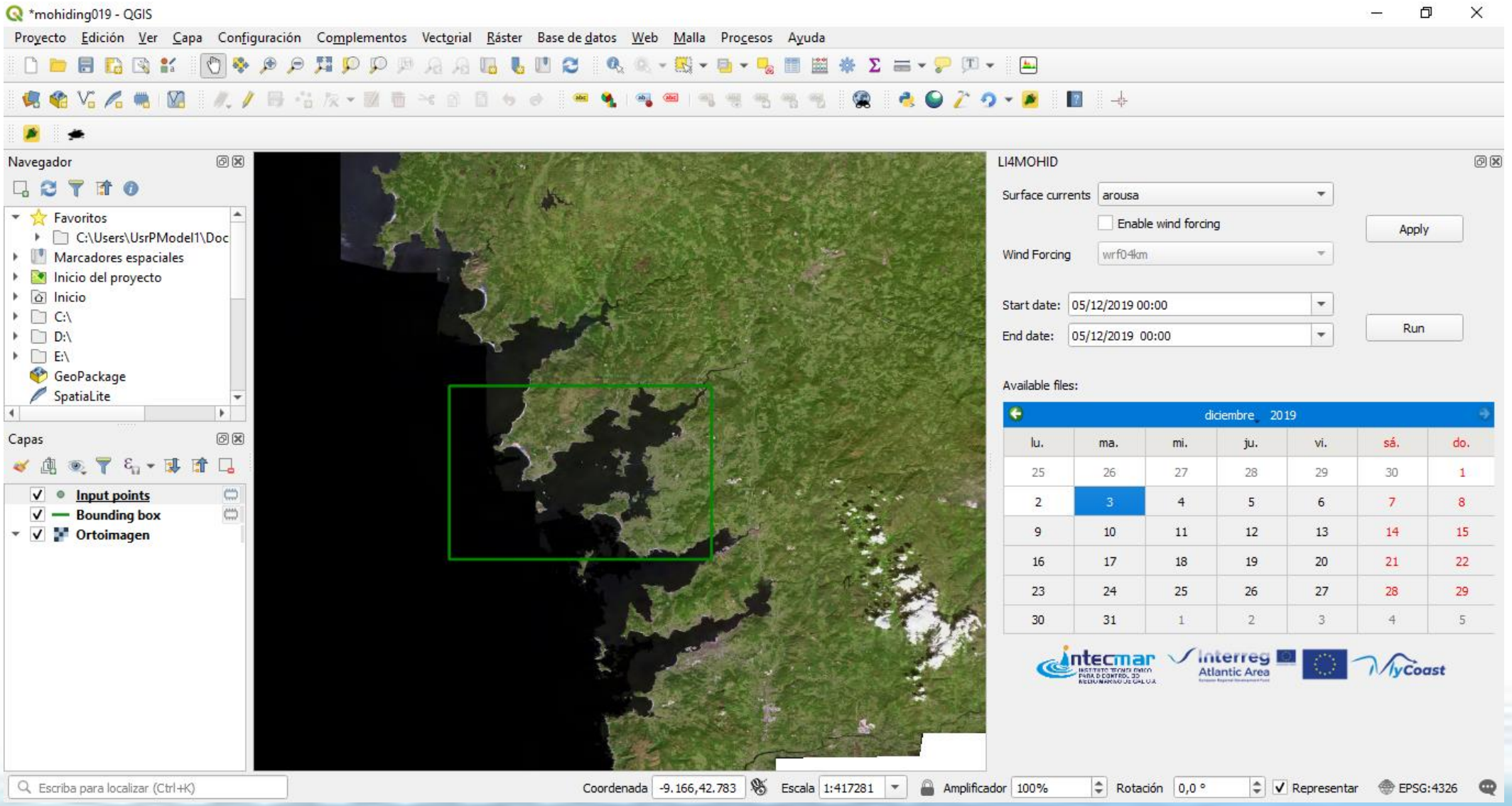


Oil Spill & HNS forecast tool

Lagrangian Interface for MOHID (LI4MOHID)



QGis Plug-in to execute and visualize MOHID lagrangian model


*mohiding019 - QGIS
Proyecto Edición Ver Capa Configuración Complementos Vectorial Ráster Base de datos Web Malla Procesos Ayuda
Navegador
Favoritos
C:\Users\UsrPModel1\Doc
Marcadores espaciales
Inicio del proyecto
Inicio
C:\
D:\
E:\
GeoPackage
SpatiaLite
Capas
Input points
Bounding box
Ortoimagen
LI4MOHID
Surface currents
arousa
Enable wind forcing
Apply
Wind Forcing
wrf04km
Start date:
05/12/2019 00:00
End date:
05/12/2019 00:00
Run
Available files:
diciembre 2019
lu. ma. mi. ju. vi. sá. do.
25 26 27 28 29 30 1
2 3 4 5 6 7 8
9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31 1 2 3 4 5
Escriba para localizar (Ctrl+K)
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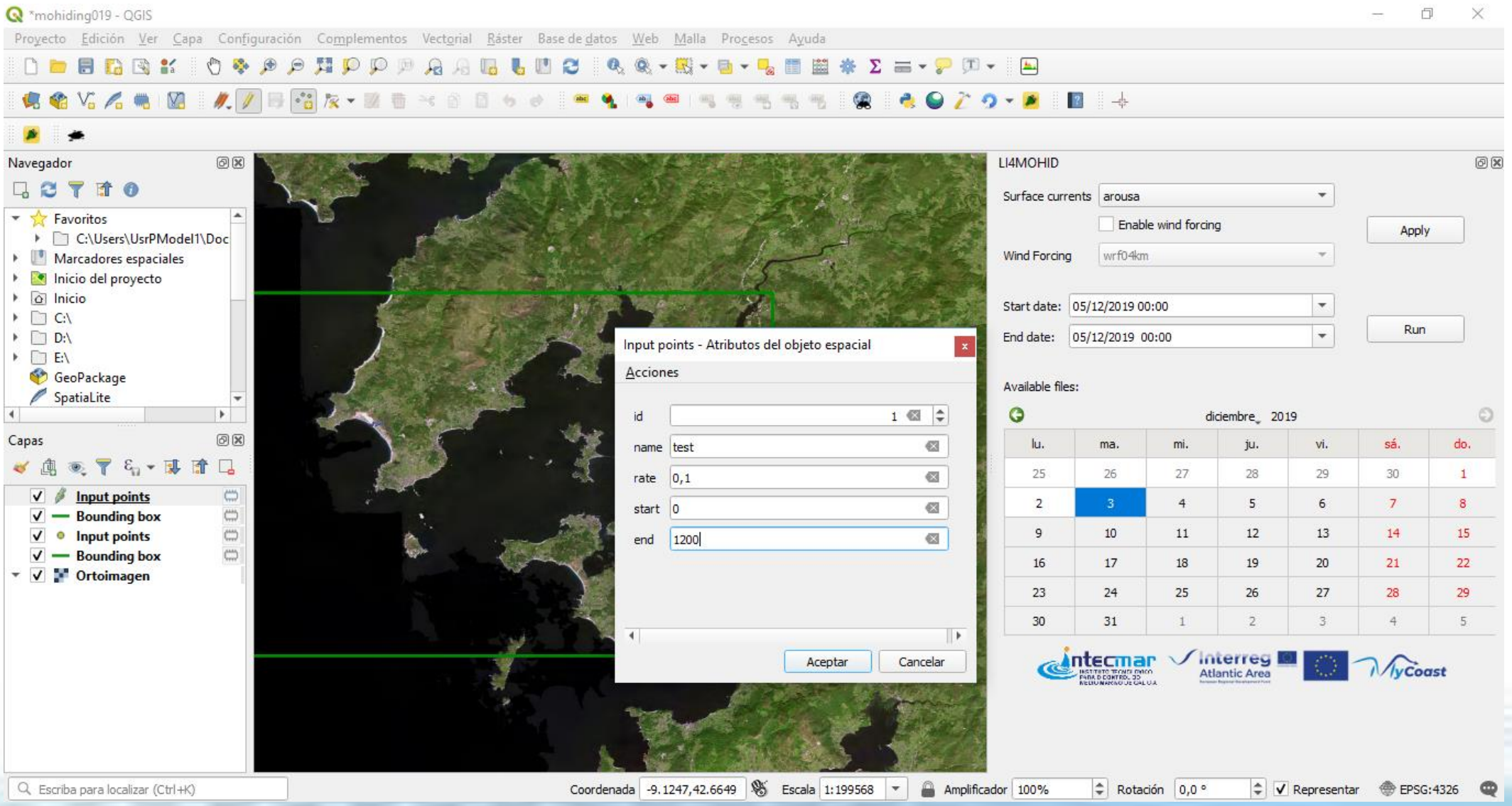
Escala 1:417281
Amplificador 100%
Rotación 0,0 °
Representar
EPSG:4326


*mohiding019 - QGIS
Proyecto Edición Ver Capa Configuración Complementos Vectorial Ráster Base de datos Web Malla Procesos Ayuda
Navegador
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C:\Users\UsrPModel1\Doc
Marcadores espaciales
Inicio del proyecto
Inicio
C:\
D:\
E:\
GeoPackage
SpatiaLite
Capas
Input points
Bounding box
Input points
Bounding box
Ortoimagen
Input points - Atributos del objeto espacial
Acciones
id 1
name test
rate 0,1
start 0
end 1200
Aceptar
Cancelar
LI4MOHID
Surface currents arousa
Enable wind forcing
Apply
Wind Forcing wrf04km
Start date: 05/12/2019 00:00
End date: 05/12/2019 00:00
Run
Available files:
diciembre 2019
lu. ma. mi. ju. vi. sá. do.
25 26 27 28 29 30 1
2 3 4 5 6 7 8
9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31 1 2 3 4 5
Escriba para localizar (Ctrl+K)
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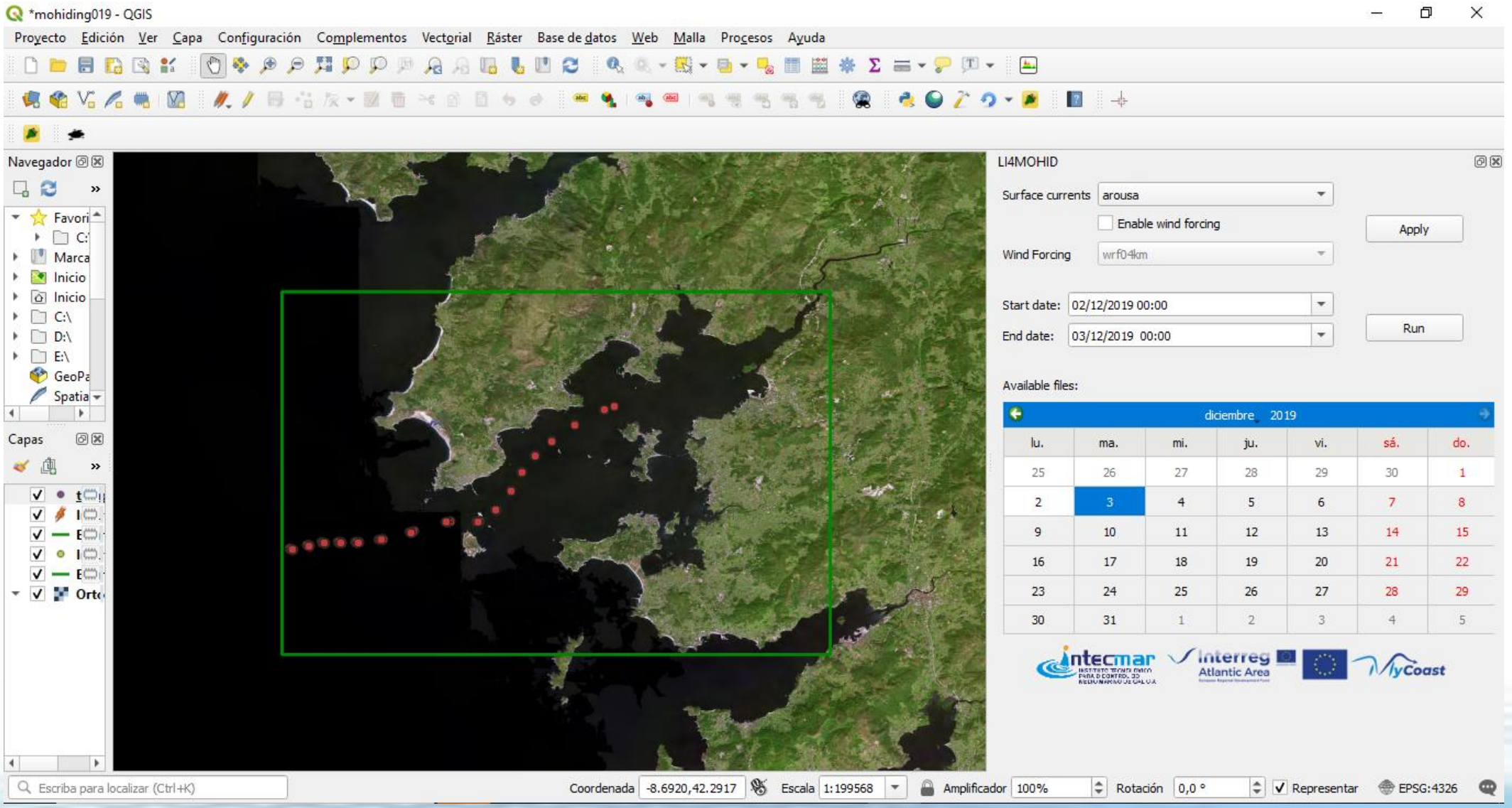
Rotación 0,0 °
Representar
EPSG:4326


*mohiding019 - QGIS
Proyecto Edición Ver Capa Configuración Complementos Vectorial Ráster Base de datos Web Malla Procesos Ayuda
Navegador
Capas
LI4MOHID
Surface currents
arousa
Enable wind forcing
Apply
Wind Forcing
wrf04km
Start date:
02/12/2019 00:00
End date:
03/12/2019 00:00
Run
Available files:
diciembre 2019
lu. ma. mi. ju. vi. sá. do.
25 26 27 28 29 30 1
2 3 4 5 6 7 8
9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31 1 2 3 4 5
Escriba para localizar (Ctrl+K)
Coordenada -8.6920,42.2917
Escala 1:199568
Amplificador 100%
Rotación 0,0 °
Representar
EPSG:4326

Obrigado

Interreg Atlantic Area
European Regional Development Fund
EUROPEAN UNION
MyCoast