TF2 – 2° Coordination Meeting

Enhanced simulation models for oil spills and other marine hazards

PP11 - ARPA FVG - Dario Giaiotti, Massimo Bagnarol and Simone Martini

FIRESPILL| WP4 TF2

8th OCTOBER 2021

European Regional Development Fund

Act 4.3 OIL SPILLS AND OTHER MARINE HAZARDS PILOTS DEPLOYMENT **(from Application Form)**

Activity number	3
Title	OIL SPILLS AND OTHER MARINE HAZARDS PILOTS DEPLOYMENT
Description	Activities refer to the development of methodology for risk assessment for oil spills in the Adriatic Sea providing data collection on maritime traffic, possible sources of pollution, exposure, environmental sensitivity, impacts on human life, environment, and economy etc. Simulation of oil spill scenarios using oil spill trajectory models for tracking the movement of the oil slick, and oil spill dispersion model for predicting possible impacts to the environment are foreseen. Capitalization of existing simulation models for oils spills and its upgrade with new functionalities will be available to all partners though web interface and interoperable services and development of oil spill operational prototype and hazard mapping capacities relevant for all partners. Equipment to act in case of oil spills and other marine hazards will be improved, as well as specialized exercises and simulations for coast guards and civil protection units, with at least one exercise having a CBC dimension.
Start date	01/02/2021
End date	30/06/2022
Activity deliverables	D.4.3.1 - n° 1 Pilot deployment of "Oil spills and other marine hazards" (4 separate activities) that will consist of: - n° 1 Methodology/guidelines for risk assessment for oil spills in the Adriatic Sea developed (PP4) - n° 1 Oil spill operational prototype and hazard mapping capacities developed (PP9) - n° 2 Enhanced simulation models for oils spills and other marine hazards (PP9, PP11) - n° 5 Specialized exercises implemented (with usage of personal protective equipment and specialized equipment-floating booms, boats, drones,) (1 exercise per PP) All TF2 PPs will contribute to the achievement of pilot deployment deliverables.
Activity budget	€ 2.011.652,70

Deliverables refer to:

N° 1 Methodology/guidelines for risk assessment for oil spills in the Adriatic Sea developed (PP4)
N° 1 Oil spill operational prototype and hazard mapping capacities developed (PP9)
N° 2 Enhanced simulation models for oils spills and other marine hazards (PP9, PP11)
N° 5 Specialized exercises implemented (with usage of personal protective equipment and specialized equipment floating booms, boats, drones,..) (1 exercise per PP)

Activities refer to:

- the development of **methodology for risk assessment** for oil spills in the Adriatic Sea
- the use of **oil spill trajectory models** for tracking the movement of the oil slick and oil spill dispersion model for predicting possible impacts to the environment
- the **specialized exercises and simulations**, with at least one having a CBC dimension

The contribution of PP11 – ARPA FVG to the D.4.3.1

PP11 planned the contribution to the Pilot following the PPFP guidelines

Phases of pilot training
List of the various phases and their brief description (max 2500 chars)

GNOME, pyGNOME, MEDSLIK

- Oil-spill numerical model identification and implementation
- Development and implementation of computational fluxes for numerical model runs
- Oil-spill response numerical models test and validation
- Exposure and vulnerability data retrieval on selected environmental and anthropic stakeholders
- Massive oil-spill scenarios simulations
- Risk assessment and risk maps summary

According to project action 4.3 objectives and deliverables, during the pilot, modeling activities are distinguished in two complementary classes of oil-spill response, namely:

a) pollutant dispersion evolution forecast ***(tactic approach)***;
b) oil-spill impacts risk assessment (***strategic approach***).

The first (a) foresees the implementation of numerical workflows and oil-spill model run procedures to simulate the pollutant dispersion future evolution according to meteo-marine environmental condition and the oil-spill source features.

The second (b) class of simulations is voted to evaluate the risk of damaging impacts of oil spill in the gulf of Trieste area. That will be achieved running a large number of oil-spill scenarios using oil spill trajectory models for tracking the movement of the oil slick. High probability sources of accidental releases of pollutant are going to be identified and modelled according to maritime traffic data, while meteo-marine environmental condition will cover at least one year. Information on the exposure and the vulnerability of ecosystem and human activities will be downloaded from on line public data. According to the large number of simulated cases, scenarios of impacts will be defined and ranked according to the risk, for a limited sets of stakeholders. Maps of risk will summarize the simulation results.

Oil-Spill modelling approach for Pilot

According to project action 4.3 objectives and deliverables, during the pilot, modeling activities are distinguished in two complementary classes of oil-spill response, namely:

a) pollutant dispersion evolution forecast

Emergency response and restoration support (**tactic** approach)

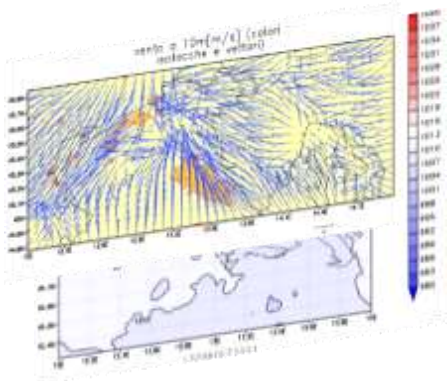
b) oil-spill impacts risk assessment

Risk reduction plans information support (**strategic** approach)

Oil-spill forecasting during emergencies – tactic approach - **Local generated service**

Computational fluxes retrieve required forecasts and they prepare model inputs
(daily updated + 72h forecasts)
(service available 24/24 7/7)

ARPA FVG HPC structure



Currents fields
Winds fields
Coastlines
.....

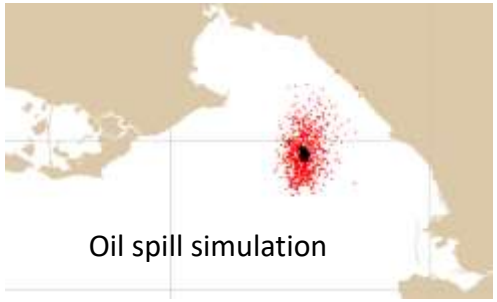
ZIP

http://www

1) Download the zip file

NOAA Gnome Model

2) Input source features
3) Run the model on your PC (Local generated service)



Oil spill simulation

Requested support

Environmental pressure

Response

Support supplied

The service is implemented pre-operationally, for the whole Adriatic sea, and it is already accessible to the Project Partners. The official, operational, release will follow the verification and validation period. **01 January 2022**

http://interreg.c3hpc.exact-lab.it/FIRESPILL/

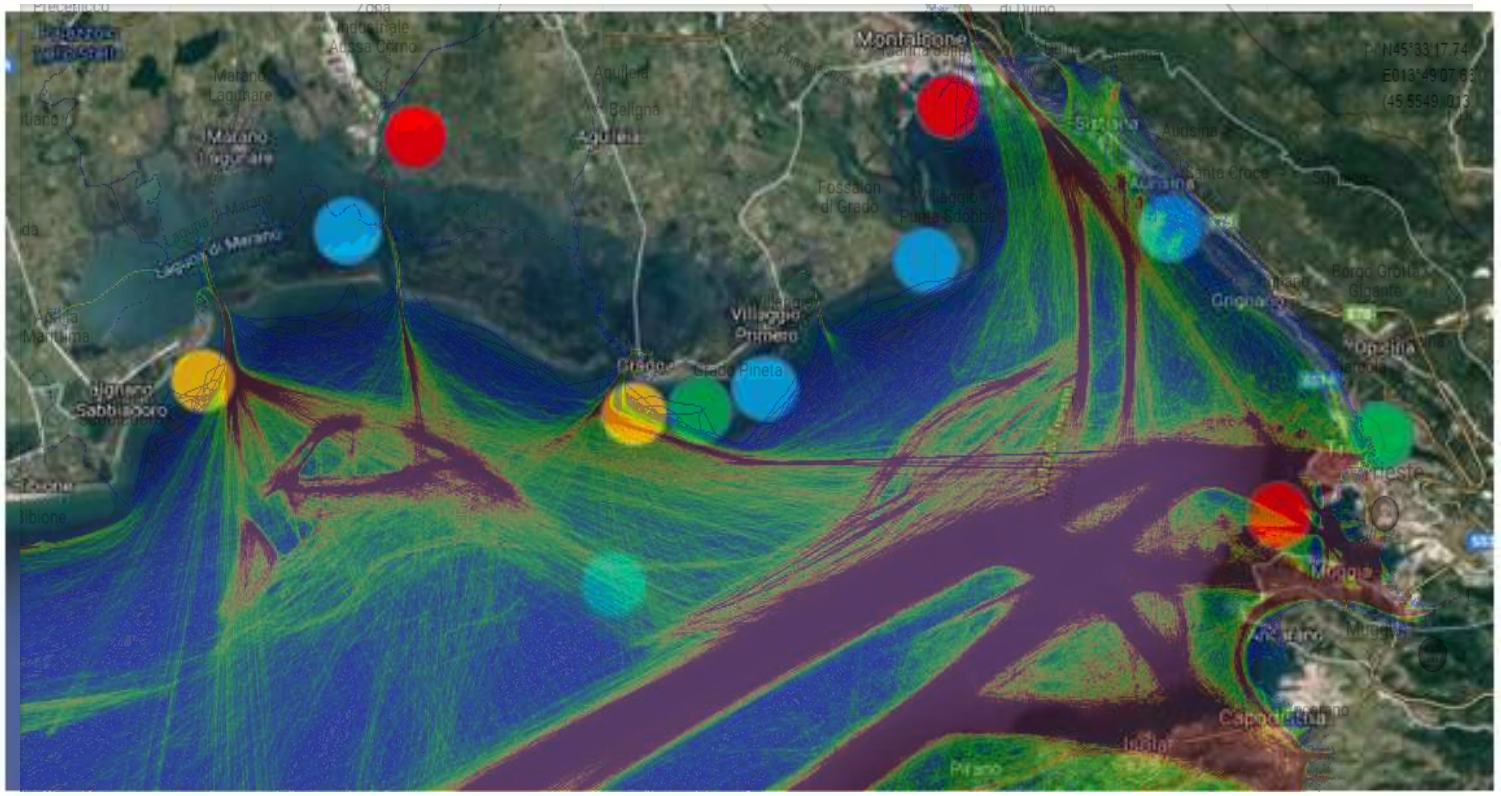
Interreg Italy - Croatia FIRESPILL
European Regional Development Fund

EUROPEAN UNION

ARPA FVG
AGENZIA REGIONALE PER LA PROTEZIONE DELL'AMBIENTE DEL FRIULI VENEZIA GIULIA

Oil-spill simulations for impact risk mapping - **strategic** approach

Risk = hazard x exposure x vulnerability



Oil-spill simulations for impact risk mapping - **ensembles and uncertainties**

Meteo-Marine inputs
At least 365 x 24

Input for day 001 - 00 UTC
Input for day 001 - 01 UTC
Input for day 001 - 02 UTC
Input for day 001 - 03 UTC
Input for day 001 - ….. UTC
Input for day 002 - 00 UTC
Input for day 002 - 01 UTC
Input for day …… - ….. UTC
……
……

Input for day 365 - 22 UTC
Input for day 365 - 23 UTC

X

Pollution source inputs

Oil-spill scenario 001
Oil-spill scenario 002
Oil-spill scenario 003
……
……

Hazard simulation

Oil-spill model

Oil spill simulation outputs

Large number of simulations

Output 0001
Output 0002
Output 0003
Output 0004
……
……
Output 0999
……

Risk scenario maps

- Generated the first set of 1 year of Meteo-Marine inputs over the whole Adriatic sea.
- Generated the 1st set of dispersion simulations of point source (ships collision in Trieste harbor)
- Hazard computation in progress

Further steps towards the Activity 4.3 deliverables

Emergency response and restoration support (**tactic** approach)

a) pollutant dispersion evolution forecast

- Enhanced simulation models for oils spills and other marine hazards. Development of a on server generated service for emergency response. MEDSLIK model implementation (in collaboration with CMCC and PP9)

Risk reduction plans information support (**strategic** approach)

b) oil-spill impacts risk assessment

- Apply the Methodology/guidelines for risk assessment for oil spills in the Adriatic Sea (in collaboration with TF2 PPs)
- Oil spill operational prototype and hazard mapping capacities (in collaboration with TF2 PPs)

CONTACT INFORMATION

Partner Name **PP11: ENVIRONMENTAL PROTECTION AGENCY OF FRIULI VENEZIA GIULIA (ARPA FVG)**

Dario Giaiotti

Via Cairoli, 14 I-33057 Palmanova (UD) - ITALY

dario.giaiotti@arpa.fvg.it

0432 191 8048

www.italy-croatia.eu/firespill