



# A one-year multi-target project to communicate natural risks in Friuli Venezia Giulia (NE Italy)

Angela Saraò, **Giulia Massolino**, and the TemaRisk working  
group at OGS



National Institute of Oceanography and Applied Geophysics, Trieste  
ITALY





INTERNATIONAL CONFERENCE  
**LIFE FRANCA**  
Trento 21-22 October 2019

FRANCA - Flood Risk Anticipation and Communication in the Alps

# Who are we?

[www.inogs.it](http://www.inogs.it)



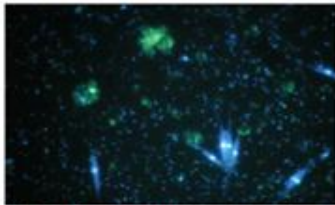
ISTITUTO NAZIONALE  
DI OCEANOGRAFIA E DI GEOFISICA SPERIMENTALE

HOME | THE INSTITUTE | RESEARCH | PEOPLE | FACILITIES | TECHNOLOGY TRANSFER | OPPORTUNITIES



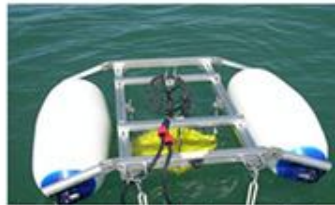
## Earth Sustainability Research

### Oceanography



Biological, chemical, physical and  
operational oceanography  
[Read more](#)

### Geophysics



Geosciences, borehole geophysics,  
modeling and inversion  
[Read more](#)

### Seismology



Seismic networks, Seismogenesis,  
engineering seismology, GPS RTK  
[Read more](#)

### Infrastructures



Research vessel, airborne geophysics,  
onshore geophysics, data management  
[Read more](#)



**Personnel:** 276

Researchers: 90

Engineers: 48

Technicians: 63

Administration: 40

Postdoc (variable number) 35

✓EC recognition of “HR excellence in Research”

✓Strong collaborations with Universities and public and private research centers







# TemaRisk FVG

**TEMARisk FVG - Sai cosa rischi in Terra e in Mare ? OGS e FVG per la tutela del nostro pianeta.**

was a one year project that aimed to disseminate knowledge about the **natural hazards** that most afflict the territory of Friuli Venezia Giulia, in North Eastern Italy.



TEMARISK FVG was funded  
by



REGIONE AUTONOMA  
FRIULI VENEZIA GIULIA

**A communication project on  
natural hazards**

<https://temarisk.wordpress.com>





Why this project

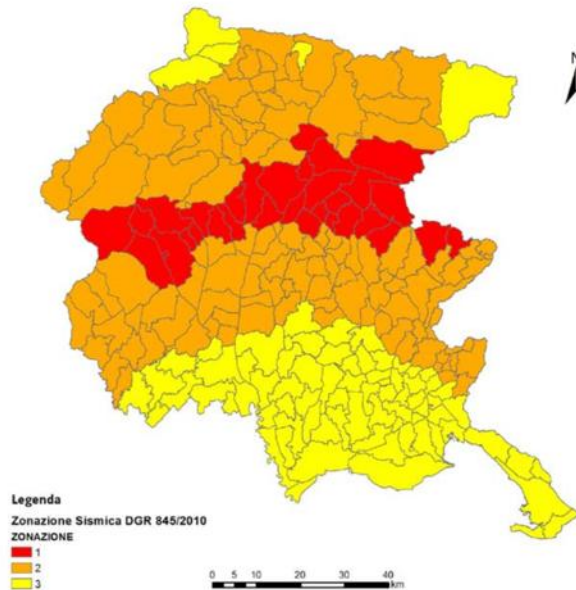
Friuli Venezia Giulia, due to its particular conformation, is exposed to various natural hazards.

- Earthquakes
- Landslides
- Sinkholes
- Avalanches
- Floods and Flooding
- Coastal erosion
- Subsidence

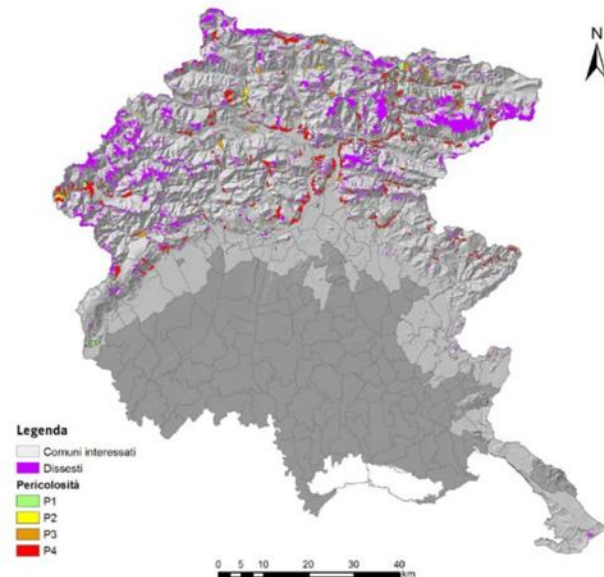




Natural events, even if not extreme, can have serious consequences for the population and infrastructure. Knowledge of hazardous areas is necessary for risk mitigation actions.



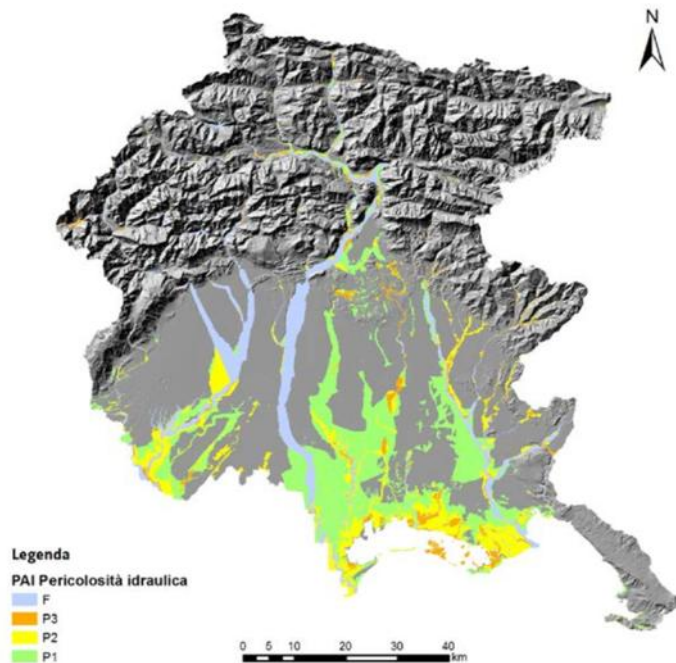
## Seismic Hazard



## Landslide Hazard

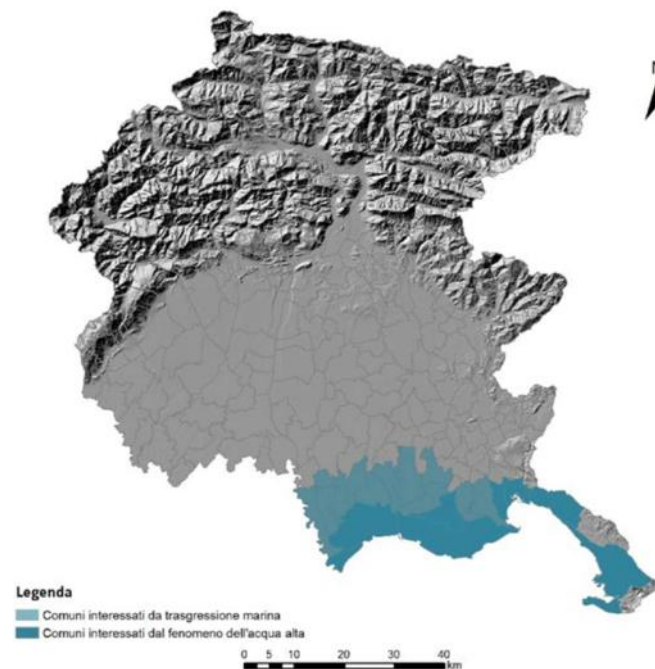
Regione Autonoma Friuli Venezia Giulia; 2015: *Vulnerabilità naturale del Friuli Venezia Giulia*. Direzione Centrale Ambiente ed Energia, Trieste, Italy, 29 pp., <http://bit.ly/2BINMpS>.





## Hydrological Hazard

Regione Autonoma Friuli Venezia Giulia; 2015: *Vulnerabilità naturale del Friuli Venezia Giulia*. Direzione Centrale Ambiente ed Energia, Trieste, Italy, 29 pp., <http://bit.ly/2BINMpS>.

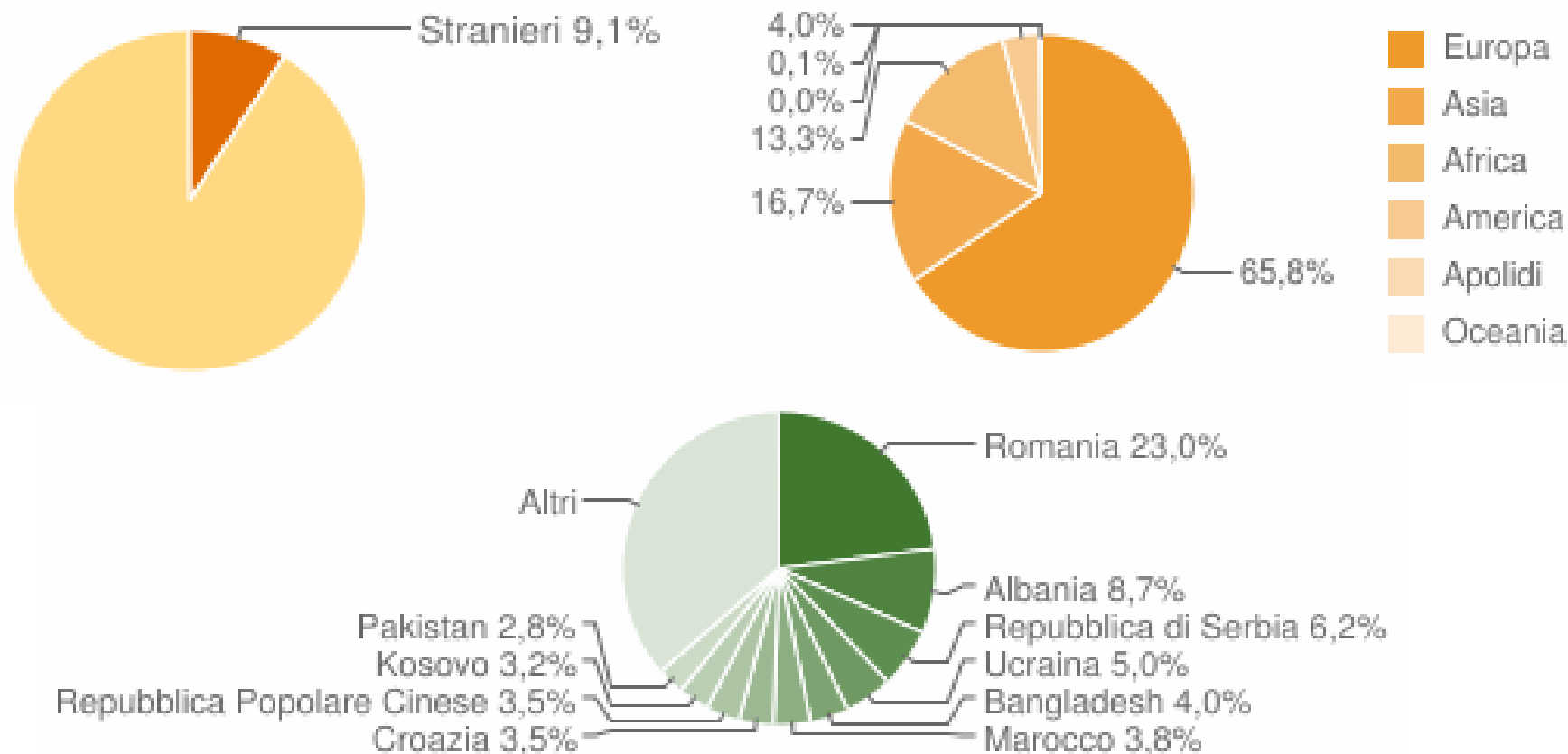


## Marine Flooding





# The new communities of FVG



<https://www.tuttitalia.it/friuli-venezia-giulia/statistiche/cittadini-stranieri-2019/>





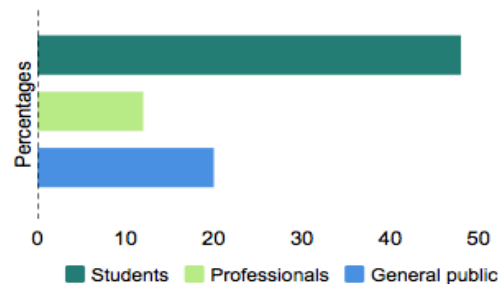


## Our public



- Students
- Professionals
- General public

## Special events



## Numbers



**25 k**

Budget



**50**

Scientists  
involved



**25**

Events



**60**

Press review



**2500**

People present at  
the events

## Partners

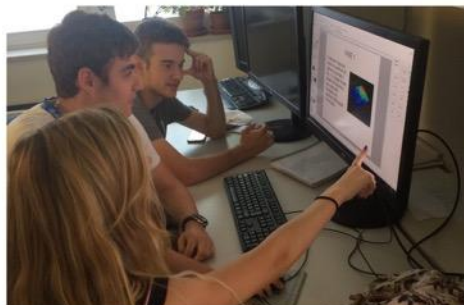


- ARSO SEISMO – Slovenian Environment Agency, Slovenia
- University of Trieste, Italy - University of Udine, Italy
- Scienza Under 18, Isontina, Italy
- Grotta Gigante, Società Alpina delle Giulie, Trieste, Italy
- Scuola Internazionale Superiore di Studi Avanzati. SISSA, Italy



# TEMARisk FVG for schools

Frontal lectures, visits to our laboratories, experimental activities, workshops, exhibits







# TEMARisk FVG for public

Visit to a geodetic station, public lectures, exhibits.





# TemaRisk for professionals

Workshops for teachers, journalists, geologists, architects, and engineers.













Multilingual brochures about the major natural hazards were prepared for distribution to the public. Virtual reality video and special giveaway were also produced to spread our messages.

### Earthquakes

Earth surface shaking due to seismic waves, caused by the sudden fracture and displacement of large masses of rock in the subsoil. In FVG the seismic hazard is high. The earthquakes mainly occurring along the Alps and the foothills area. The strongest earthquake recorded in the area, followed by a seismic sequence that lasted more than one year, was the Friuli earthquake of 6 May 1976 (694-K), where Friulan villages were destroyed and about a thousand were the victims. OGS has been involved since 1977 in the seismic monitoring of North Eastern Italy with alarm purposes for the Civil Protection of the FVG and to understand the seismotectonics and geodynamics of the area. OGS manages a Global Position System network (GPS) for monitoring deformations and characterizing the regional tectonic processes. It also offers instrument calibration services useful to professionals. Real-time earthquake information is available on the website <http://ris.sisnag.it>






### ABOUT OGS

The National Institute of Oceanography and Experimental Geophysics - OGS is a public research institution that deals with Earth and Sea Sciences, Oceanography, Geophysics and Seismology, to contribute to the protection and enhancement of natural and environmental resources. As far as natural risks are concerned, OGS evaluates and, when possible, contributes to the prevention of geological, environmental and climatic risks, in order to spread knowledge and scientific culture.

### Avalanches

They are caused by sudden releases of masses of snow or ice from a slope towards the valley. Avalanches affect the entire Alpine region. OGS has carried out experimental studies for avalanche monitoring in the North East of Italy using its mobile seismometric network.



To learn more:

**Istituto Nazionale di Oceanografia e di Geofisica Sperimentale**  
[www.ogs.it](http://www.ogs.it)

**Regione Autonoma Friuli Venezia Giulia**  
[www.regione.fvg.it](http://www.regione.fvg.it)

**Protezione Civile della Regione Autonoma Friuli Venezia Giulia**  
[www.protezionecivile.fvg.it](http://www.protezionecivile.fvg.it)

## TemaRisk FVG



[temarisk.wordpress.com](http://temarisk.wordpress.com)

Istituto Nazionale di Oceanografia e di Geofisica Sperimentale

REGIONE AUTONOMA FRIULI VENEZIA GIULIA

### Do you know the natural risks of Friuli Venezia Giulia?

Friuli Venezia Giulia, due to its particular conformation, is exposed to various natural risks. A natural Risk is defined by the combination of the hazard - i.e. the probability that a natural phenomenon of a certain magnitude occurs in a certain area, within a certain interval of time - of the vulnerability - i.e. the propensity to suffer damage as a result of the phenomenon - the exposure i.e. the economic value of the assets exposed in the territory itself. Natural events, even if not extreme, can have serious consequences for the population and infrastructure. Knowledge of hazardous areas is therefore important to implement risk mitigation actions.

The National Institute of Oceanography and Experimental Geophysics (OGS), thanks to its technical and scientific expertise, carries out soil and subsoil analysis as well as long- term and short-term monitoring, to study the phenomena responsible for the main natural risks of the Friuli Venezia Giulia region (FVG), phenomena which are listed below.

### Landslides

They are mass movement of soil, mud and/or rocks down a slope. They can be caused by natural or man-made phenomena. In FVG they are particularly common in the mountainous, foothills and karst areas. OGS carries out soil analysis and monitoring in landslide areas as a service for local administrations; it is currently involved in the environmental monitoring of the Cazzoso landslide slope in Tolmezzo village (UD).



### Floods and flooding

Inundation of a circumscribed area by overflowing watercourses (e.g. mountain streams or rivers) or hydraulic works (dams and marshes). When flooding is caused by the overflowing of large watercourses caused by heavy rainfall, it can be associated with erosion. OGS conducts research activities and technological developments to verify the integrity of river embankments through non-invasive geophysical surveys, which allow to plan maintenance operations and to prevent embankments from collapsing during flood events. Still, through the application of remote sensing techniques it is possible to obtain extensive mapping of the territory, which is essential for the definition of the water flow, for the reconstruction of the flow rate along the watercourses and therefore for the definition of the areas at greatest risk.



### Subsidence

It is a slow process of soil subsidence in lagoon and plain areas, of natural or man-made origin. This phenomenon mainly affects the lagoon area from Grotta to Lignano. OGS conducts research activities through geophysical exploration of the subsoil, to identify geological formations that can induce subsidence phenomena linked to the excessive extraction or drainage of groundwater.




### Sinkholes (Dolines)

They are wide and deep circular depressions due to the collapse or sinking of the limestone rock, peculiar to karst landscapes. They are very common in FVG, so that a census has been launched to define the regional cadastre of the most affected areas. OGS has carried out seismic surveys to contribute to the geological and geotechnical characterisation of the subsoil in the upper Tagliamento Valley to study the dolines of the village of Quinz, in the municipality of Ermonengo (UD).



### Marine or coastal flooding

It is a temporary advancement of the sea waters caused by exceptional high tide phenomena, violent storms and occasional unusual winds. In addition to coastal areas, the low plains of Friuli are also affected. OGS, in collaboration with the Civil Protection of the FVG, has developed a coastal marine observatory in the Gulf of Trieste that uses high frequency coastal radar and weather-oceanographic and oceanometric buoys to identify the presence of anomalies in water circulation that may have an impact on the coastal area. In addition, the application of remote sensing techniques allows us to obtain information on the morphological characteristics of the territory useful for assessing possible scenarios of marine flooding.



### Coastal erosion

Reduction of sandy coasts due to changes in the natural balance between river sedimentary inputs (sand and silt) and the action of currents and waves that remove these materials. OGS conducts monitoring activities of the coastal evolution both through remote sensing and mapping of the seabed with the technique of multi-beam echosounders and numerically models the velocity of currents and waves that cause the coastal erosion.



<https://temarisk.wordpress.com>





<https://temarisk.wordpress.com>

### Vademecum in caso di contatto con le specie urticanti:

1. rimuovere delicatamente con le mani eventuali frammenti di medusa rimasti attaccati alla pelle (possibilmente indossando dei guanti)
2. tamponare delicatamente la zona interessata con acqua di mare
3. non usare acqua dolce perché potrebbe favorire il rilascio di veleno dalle cellule epiteliali della medusa
4. non sfregare la parte con sabbia e non grattarsi
5. rivolgersi al medico o al pronto soccorso in caso di necessità e complicazioni per medicazioni adeguate

### Vademecum in case of contact

### CHI È OGS

L'Istituto Nazionale di Oceanografia e di Geofisica Sperimentale - OGS è un Ente pubblico di ricerca che si occupa di Scienze della Terra e del Mare, di Oceanografia, di Geofisica e di Sismologia, per contribuire alla salvaguardia e alla valorizzazione delle risorse naturali e dell'ambiente. Per quanto riguarda i rischi naturali, OGS si occupa di valutare e, quando possibile, contribuire alla prevenzione dei rischi geologici, ambientali e climatici, per diffondere la conoscenza e la cultura scientifica.

### ABOUT OGS

The National Institute of Oceanography and Applied Geophysics - OGS is a public Italian research institution that studies Earth and Sea Sciences, Oceanography, Geophysics and Seismology. OGS aim is to contribute to the protection and enhancement of living natural resources and the environment. As far as natural risks are concerned, OGS evaluates and, when possible, contributes to the prevention of geological, environmental and climatic risks, in order to spread scientific knowledge and culture.



Sono tante e tutte bellissime. Nel nostro mare e in tutto il Mediterraneo stanno aumentando. Non è un indice di acque pulite e non è colpa dell'inquinamento. Una serie di cause legate al cambiamento climatico (innalzamento delle temperature, modificazione delle correnti), alla pesca eccessiva (diminuzione dei predatori) e all'aumento delle prede (riduzione dei competitori alimentari) favoriscono il loro proliferare.

There are many jellyfish in the sea, all beautiful and fascinating. Lately, in our sea and in the Mediterranean area the number of jellyfish is increasing. However, this is not an indicator of clean water nor is related to pollution. A series of causes linked to climate change (rising temperatures, changes in currents), overfishing (decrease of jellyfish predators) and the increase in prey (reduction of food competitors) is favouring their proliferation.

Queste meduse fortunatamente sono poco tossiche e solitamente provocano effetti locali a livello cutaneo. Tra loro soltanto *P. noctiluca*, *C. hysoecella*, *C. marsupialis*, *A. aurita* possono darsi urticanti. Non si devono trascurare comunque le reazioni individuali.

Fortunately, these jellyfish aren't very toxic and usually don't cause systemic effects but mostly only local effects. Among them, *P. noctiluca*, *C. hysoecella*, *C. marsupialis*, *A. aurita* are stinging jellyfish. However, individual-based reactions must not be neglected and underestimated.



Quali sono le specie più comuni  
nel nostro mare?

What are the most common species  
in our sea?



Istituto Nazionale di Oceanografia  
e di Geofisica Sperimentale



REGIONE AUTONOMA  
FRIULI VENEZIA GIULIA







# Exposed in the resorts

## Conosci le meduse del tuo mare

*Know the jellyfish of our sea*

Sono tante e tutte bellissime. Nel nostro mare e in tutto il Mediterraneo stanno aumentando. Non è un indice di acque pulite e non è colpa dell'inquinamento. Una serie di cause legate al cambiamento climatico (innalzamento delle temperature, modificazione delle correnti), alla sovrappesca (diminuzione dei predatori) e all'aumento delle prede (riduzione dei competitori alimentari) favoriscono il loro proliferare.

There are many jellyfish in the sea, all of them are beautiful and fascinating. In our sea and throughout the Mediterranean area the number of jellyfish is increasing. However, it is not an indicator of clean water and it is not related to pollution. A series of causes linked to climate change (rising temperatures, changes in currents), overfishing (decrease in predators) and the increase in prey (reduction of food competitors) is favouring their proliferation.

### Vademecum in caso di contatto

- uscire rapidamente dall'acqua
- rimuovere delicatamente con le mani eventuali frammenti di medusa rimasti attaccati alla pelle
- tamponare delicatamente la zona interessata con acqua di mare
- non usare acqua dolce perché potrebbe favorire il rilascio di veleno dalle nematocisti che non hanno ancora scaricato il veleno
- non sfregare la parte con sabbia e non grattarsi
- rivolgersi al medico o al pronto soccorso per medicazioni adeguate

### Vademecum in case of contact

- quickly exit from the water
- gently remove any jellyfish fragments attached to the skin with your hands
- gently dab the affected area with sea water
- do not use fresh water as it may promote the release of venom from nematocysts who have not yet exhausted the poison
- do not rub the part with sand and do not scratch
- contact your doctor or emergency room for appropriate medications

### Quali sono le specie più comuni nel nostro mare?

*What are the most common species in our sea?*

Queste meduse fortunatamente sono poco urticanti e non provocano effetti sistemici ma soltanto locali. Tra loro soltanto *C. hyacinthina* può dirsi urticante. Non si possono trascurare comunque le reazioni individuali. Fortunately, these jellyfish are not very stinging and do not cause systemic but only local effects. Among them only *C. hyacinthina* can be said to be stinging. However, individual reactions cannot be neglected.

temarisk.wordpress.com

<https://temarisk.wordpress.com>



TemaRisk FVG - Sai cosa rischi in terra e in mare? OGS e FVG per la tutela del nostro Pianeta  
Progetto di divulgazione scientifica coordinato da Istituto Nazionale di Oceanografia e di Geofisica Sperimentale - OGS  
e finanziato dalla Regione Autonoma Friuli Venezia Giulia

Istituto Nazionale di Oceanografia  
e di Geofisica Sperimentale

REGIONE AUTONOMA  
FRIULI VENEZIA GIULIA





2

#### INTRODUZIONE

La Giornata mondiale dell'acqua, una ricorrenza che cade ogni anno il 22 marzo, si focalizza nel 2018 sul tema "Nature for Water", esplora cioè le Soluzioni Basate sulla Natura (SBN) per le sfide idriche che affrontiamo nel XXI secolo.

La campagna si chiama "La risposta è nella natura" e il messaggio centrale è che la Soluzione Basata sulla Natura, come piantare alberi per ricostituire le foreste, ricollegare i fiumi alle pianure alluvionali e ripristinare zone umide, è un modo

<https://temarisk.wordpress.com>

sostenibile ed economico per aiutare a riequilibrare il ciclo dell'acqua, mitigare gli effetti dei cambiamenti climatici e migliorare la salute umana e i mezzi di sussistenza.

Usando SBN per aiutare a soddisfare il fabbisogno idrico di una popolazione in crescita e adottandoci per proteggere l'ambiente naturale e per ridurre l'inquinamento, contribuiremo alla creazione di un'economia circolare. Tali traguardi sono fondamentali per garantire nel mondo disponibilità e gestione sostenibile dell'acqua e servizi igienico-sanitari per tutti entro il 2030.





## Antartide 360° - Reaction Trailer





GRAZIE  
*Giulia Massolino*  
*[gmassolino@inogs.it](mailto:gmassolino@inogs.it)*

