

Environment-Climate-Health Programme

Using satellite data for Vibrio and Environment

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La Télésanté

L'Espace au service de la santé

1 - Improving access to healthcare

Treating patients at remote and mobile sites

2 - Environment / Climate / Health

Monitor, predict and prevent epidemics

Tele-epidemiology consists in monitoring and studying the propagation of human and animal diseases (water, air and vector borne diseases) which are closely linked to climate and environmental changes, based on space technology. The French Spatial Agency (CNES) has thus developed a concept based on a deterministic approach of the climate-environment-health relationships and on an original and really adapted space offer.

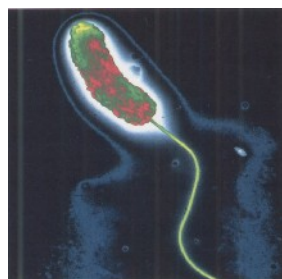
“Tele-epidemiology” Conceptual approach

Multidisciplinary approach linking disciplines

Environment
Climate



HSS



Microbiology



Entomology



Veterinarian

1- UNDERSTANDING the MECHANISMS favoring EMERGENCE and PROPAGATION

Diagnostic: extract and identify the main physical and biological mechanisms at stake

Observing strategy: monitoring and assembling multidisciplinary in-situ datasets

2- DEVELOPING well ADAPTED PRODUCTS integrating Space tools

Remote-sensing monitoring of environment, linking epidemics with confounding factors

Remote-sensing from space: use of products, fully adapted to spatio-temporal scales of variability

3- INNOVATIVE Risk Maps using SPACE TOOLS

Satellites / Parameters

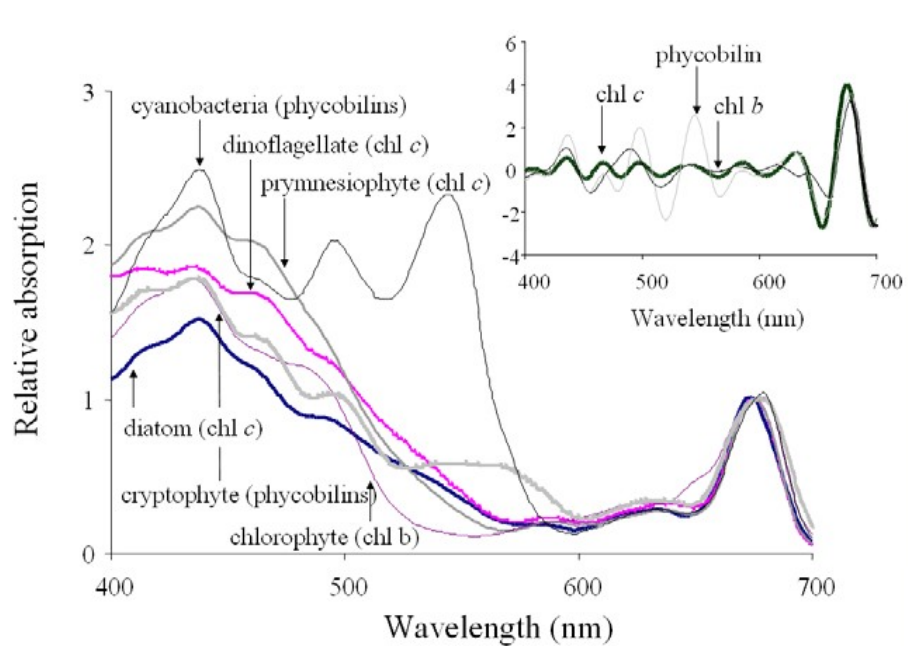
Altimetry => sea level, lakes
=> tides, wind ...

Water colour => SST (day/night), chlorophyl, turbidity, ...
=> alga blooms

EO optics => urbanization, land&landuse, and evolution
EO radar => no cloud pb

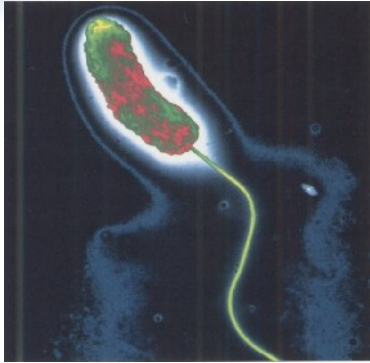
Data collecting
Localization/positioning

Alga blooms monitoring using satellite

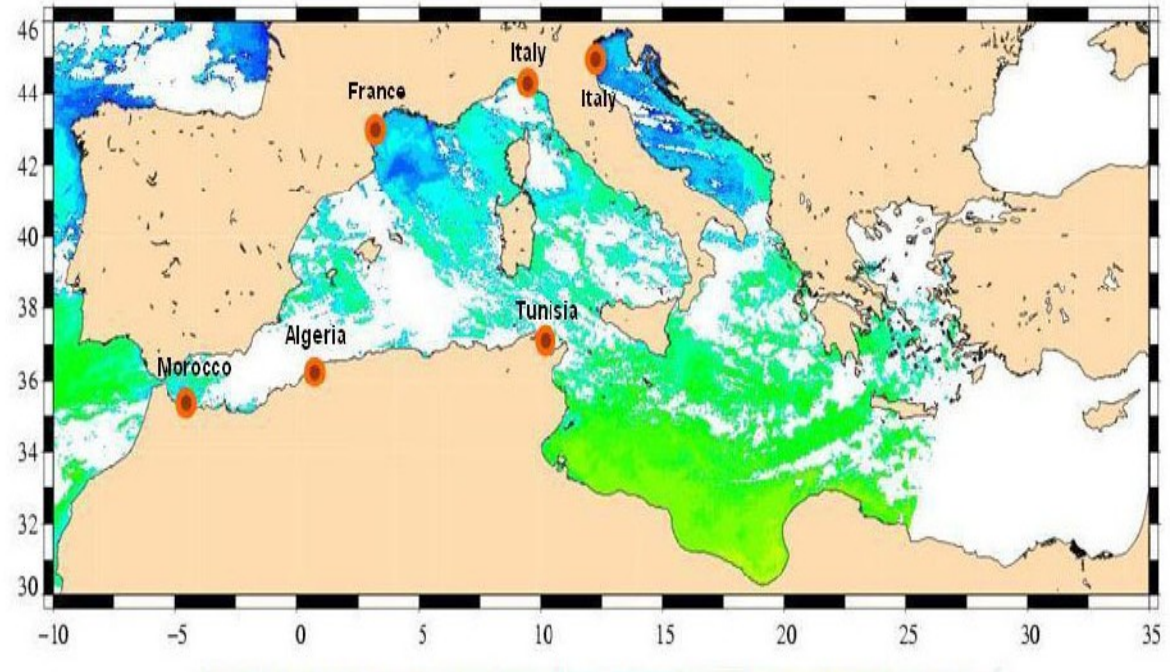


VibrioSea: Vibriion in the Mediterranean Sea

Correlation between in-situ and satellite measurement



VIBRIOSea consortium
 CNES
 CLS
 IFREMER
 Institut Pasteur Paris
 University of Genova
 University of Verona
 Institut Pasteur Marocco
 Institut Pasteur Algeria
 Institut Pasteur Tunisia
 Institut Agronomique et Vétérinaire Hassan II



SST rises => Chlorophyll/Plancton increase => Zooplankton/Vibriion increase
 Altimetry from space => Tides => Vibriion move towards urbanized areas

Possible contacts between host-vibriions

ADAPTED products for Vibrios monitoring in Mediterranean Sea

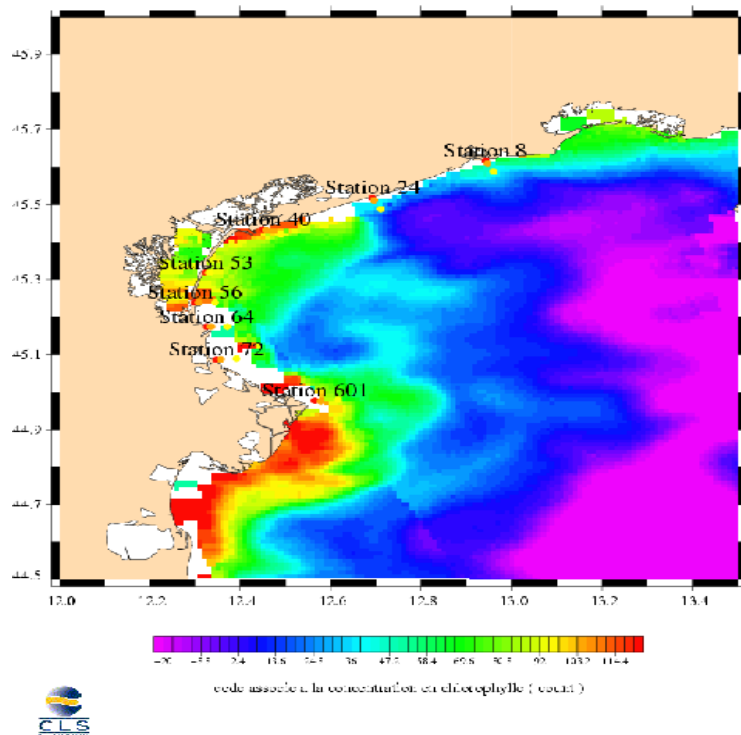
Environmental parameters monitored by satellite:

- Sea Surface Temperature (SST),
- Chlorophyl
- salinité,y
- turbidity

Remote sensing data
MODIS
MERIS

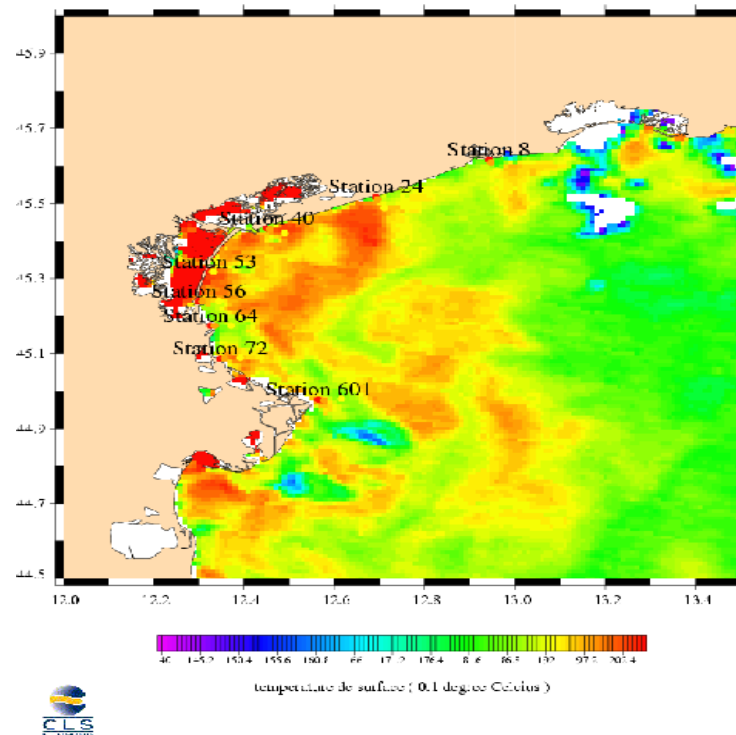
Chlorophyl

Couleur de l'eau MODIS sur la zone Adriatic et donnees in situ



SST

Temperature MODIS sur la zone Adriatic et donnees in situ



Data access

■ Websites

NOAA, CNES,...space agencies

Scientific laboratories

■ GEO

- ◆ **Portal—data sharing agreement, 81 countries**
- ◆ **Health and Environment Community of Practice**
- ◆ **New Tasking: Global Early Warning System for Cholera (and other vibrio-related diseases)—network of regional systems**
- ◆ **Working with CNES, JAXA, NOAA, NASA, WHO, other countries... and you?**

■ CEOS

■ Points of contact