CNR-ISMAR IN SITU OBSERVATIONS NETWORK: NEW APPROACHES FOR AN INTERACTIVE, HIGH PERFORMANCE, INTEROPERABLE SYSTEM

Stefano Menegon, Pierluigi Penna, Mauro Bastianini, Giuseppe Stanghellini, Francesco Riminucci, Tiziano Minuzzo, **Alessandro Sarretta**

alessandro.sarretta at ismar.cnr.it

CNR - INSTITUTE OF MARINE SCIENCES

IMDIS 2016 - Gdansk, October 12, 2016

INDEX

- Context: fragmentation, RITMARE, SDI, SOS, Data Policy
- Objectives
- Architecture
- Implementation: InfluxDB, Grafana (also as quick quality check for data), app, script to export and synchronize SOS, kapacitor
- Advantages

ISMAR

ISMAR conducts research in polar, oceanic and Mediterranean regions, focusing on the following themes:

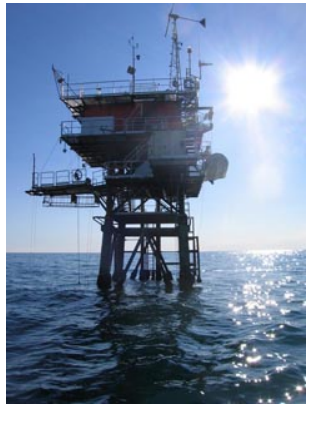
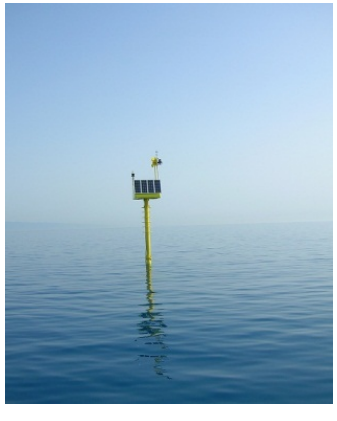
- the evolution of oceans and their continental margins, studying submarine volcanoes, faults and landslides and their potential impacts onshore
- the influence of climate change on oceanic circulation, acidification, bio-geochemical cycles and marine productivity
- submarine habitats and ecology, and the increasing pollution of coastal and deep-sea environments
- the evolution of fish stocks with a view to keeping commercial fishing within sustainable limits and improving mariculture and aquaculture practices
- natural and anthropogenic factors producing economic and social impacts on coastal systems from pre-history to the industrial epoc

ISMAR RITMARE IN-SITU OBSERVATIONS NETWORK

ISMAR ADRIATIC IN SITU OBSERVATIONS NETWORK

CNR-ISMAR IN SITU OBSERVATIONS NETWORK

- Meteo marine stations
  - Acqua Alta oceanographic tower (Gulf of Venice)
  - S1 mast and E1 buoy (Emilia Romagna coast)
  - Telesenigaglia mast (Marche coast)
  - Meda Gargano (Puglia coast, Manfredonia gulf)
- Meteo stations
  - Riva sette martiri (Venice)
  - Ismar (Ancona)
  - Ismar (Lesina (FG)

BACKGROUND: UNHARMONIZED NETWORK

- various levels of (or no) funding
- different managing system
- separated databases
- different validation procedure
- non-standard publishing of data
- non-common (or non existent) data policies

GOALS

- Unique visible access point for the ISMAR observational network
- Archiving and storing historical data
- real-time data streams for efficient operational model
- Interactive and efficient system
- Interoperability
- Open data

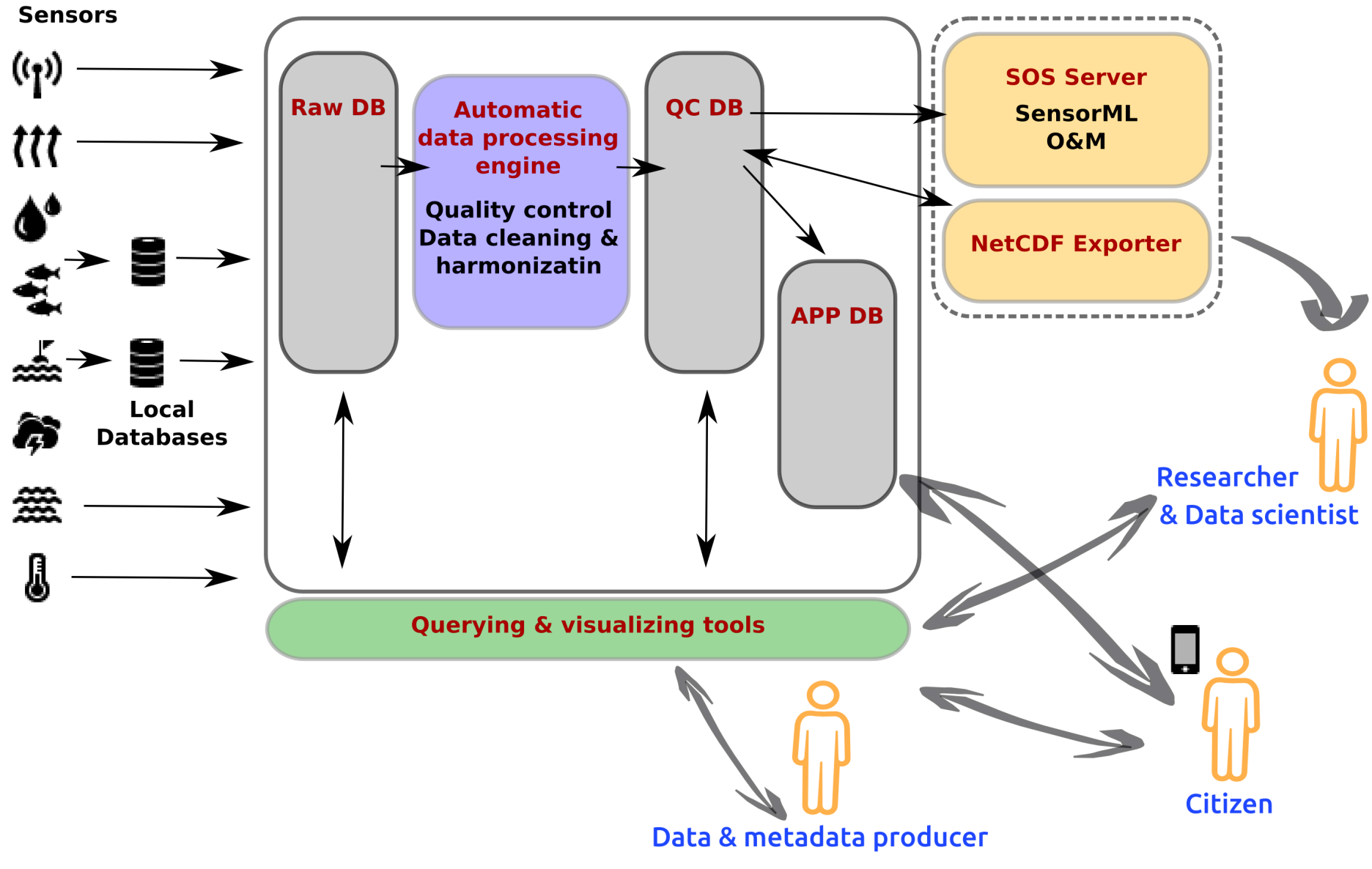
RITMARE PROJECT

www.ritmare.it

"Italian Research for the Sea" national flagship project

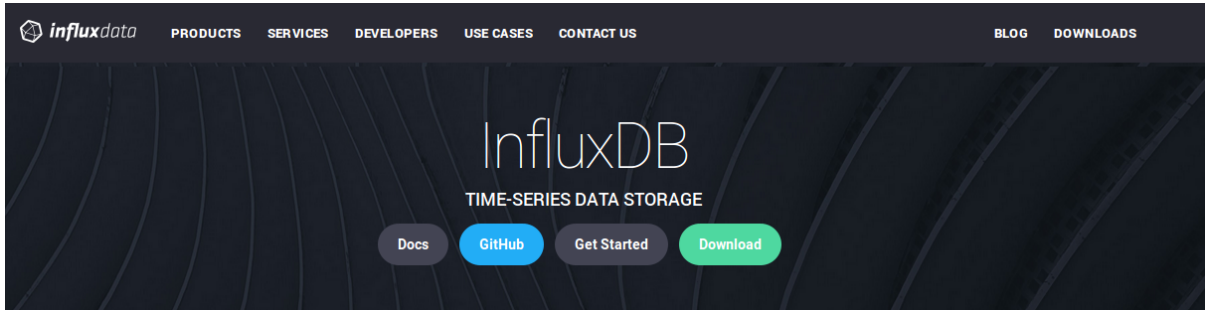
- 7 sub-programs:
  - SP1 - Maritime Technologies
  - SP2 - Technologies for Sustainable Fishing
  - SP3 - Planning of the Maritime Space in Coastal Waters
  - SP4 - Planning of the Deep Marine Environment and the Open Sea
  - SP5 - Observation System for the Marine Mediterranean Environment
  - SP6 - Research, Training and Dissemination Structures
  - SP7 - Interoperable Infrastructure for the Observation Network and Marine Data

ARCHITECTURE

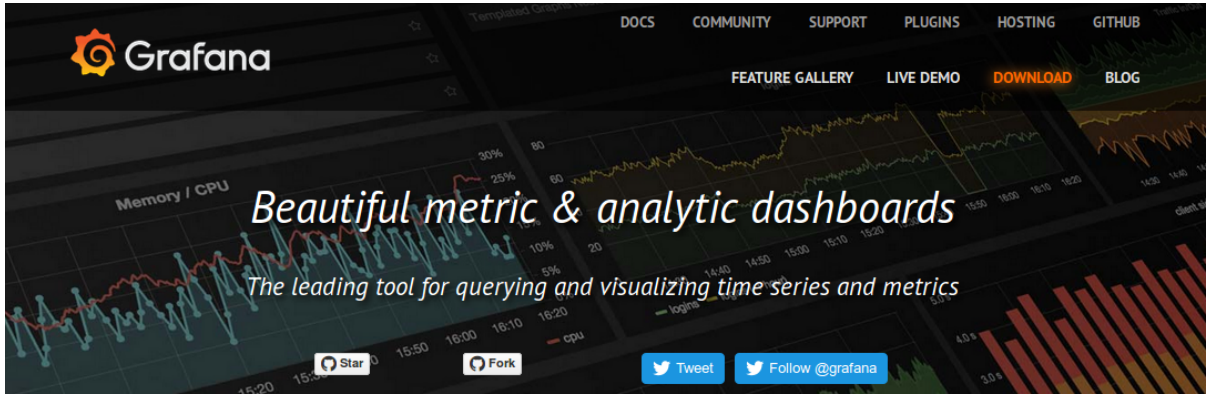


IMPLEMENTATION

- InfluxDB: open source time-series data storage

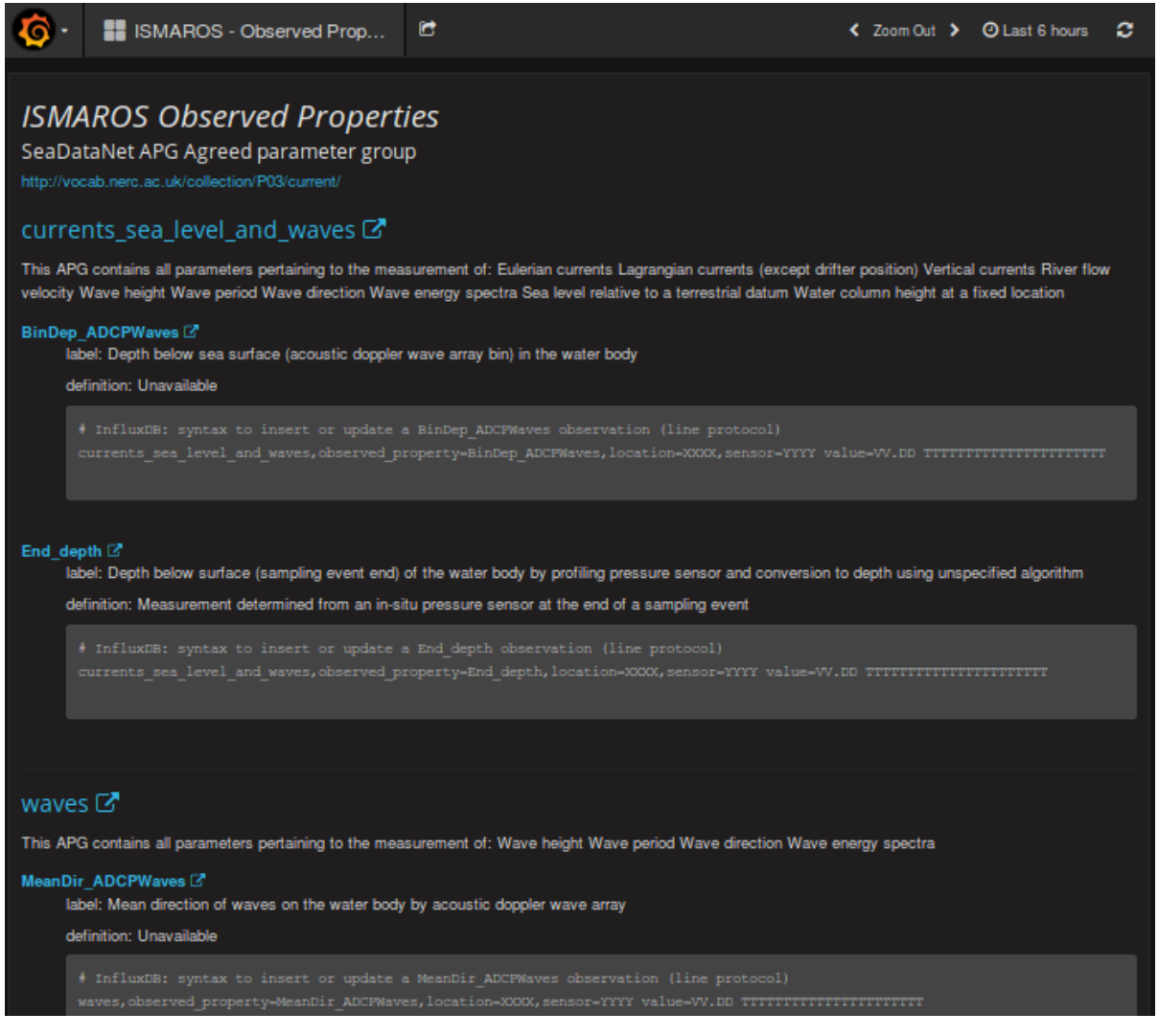


- Grafana: open source dashboards for querying and visualizing time series and metrics



PARAMETERS AND VARIABLES ACQUIRED

Use of SeaDataNet vocabularies for the Observed properties



OPEN SCIENCE APPROACH

- Open access to data
- Standard open licences for access and reuse:

  Creative Commons Attribution 4.0 (CC-BY) 

- Publication of yearly datasets on Zenodo with DOI
- Publication of a Data Paper with relevant aggregation of data

A QUICK HANDS-ON

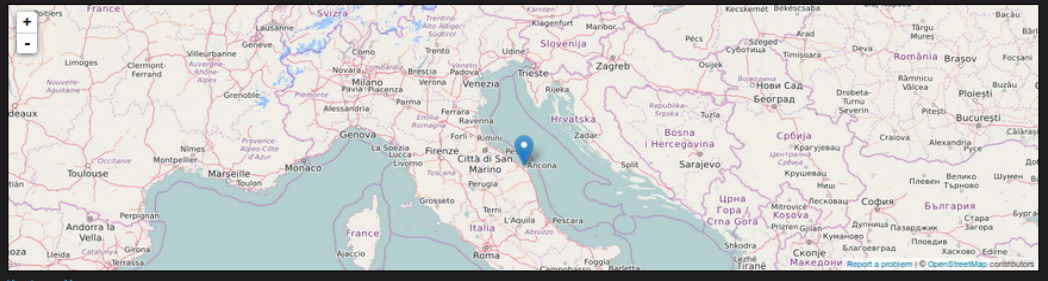
HTTP://RMM.DATI.ISMAR.CNR.IT

ISMAR Siti Osservativi- Rete Meteo Marina

Zoom Out | Last 7 days

database: ismar_app

Panel Title



View Larger Map

Stations

AN-LSN-GAR : Ismar Lesina-Ancona- Meda Gargano
AN-LSN-MTO : Ismar Lesina-Ancona- Stazione Meteo
AN-MTO : Stazione Meteo Ismar Ancona
AN-SNG : Meda TeleSenigallia
Buoy E1 : Boa E1 (Rimini)
Meda S1 : Meda S1-GB (foce del PO)
VE-PFT : Piattaforma Acqua Alta Ismar Venezia
VE-R7M : Stazione Meteo Ismar Venezia

Last values - meteorology

Metric	Current
AN-LSN-GAR CS100@-10m - Air_Press	1.01 K
AN-LSN-GAR CS215 - Air_Temp	18.65
AN-LSN-GAR CS215 - Air_humid	79.82
AN-LSN-GAR Windsonic Gill - RelWindDirFrom	246.83
AN-LSN-GAR Windsonic Gill - RelWindSpd	4.77
AN-LSN-GAR Windsonic Gill - WDIR	274.13
AN-LSN-GAR Windsonic Gill - WSPD	2.09
AN-MTO CS100@-10m - Air_Press	1.02 K

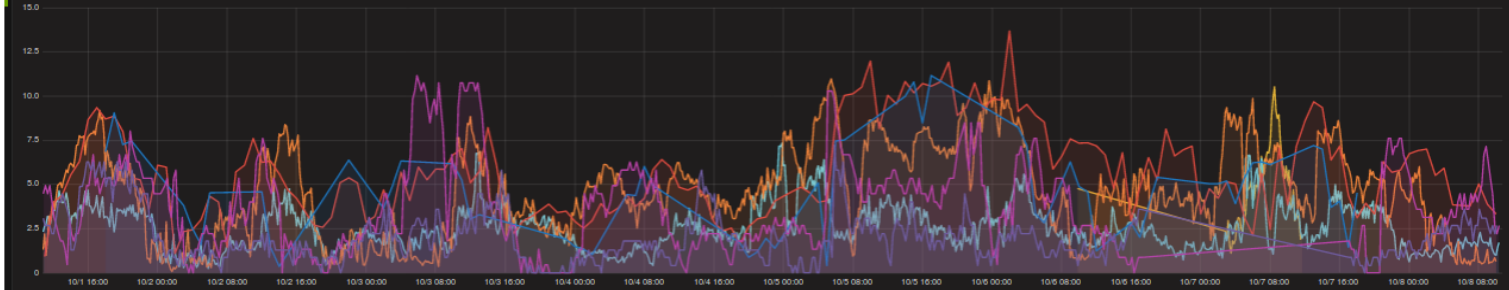
Last values - water_column_temperature_and_salinity

Metric	Current
AN-LSN-GAR Sbe39@2m - WC_Temp	22.11
AN-LSN-GAR Sontek@17.5m - WC_Temp	21.79
AN-SNG CS450@2m - WC_Temp	18.36
AN-SNG OBS500@5m - WC_Temp	20.21
BUOY-E1 SBE37 - WC_Sal	36.79
BUOY-E1 SBE37 - WC_Temp	20.96
LSN-LAG SBE39 - WC_Temp	18.54
MEDA-S1 SBE37 - WC_Sal	0

Last values - currents_sea_level_and_waves

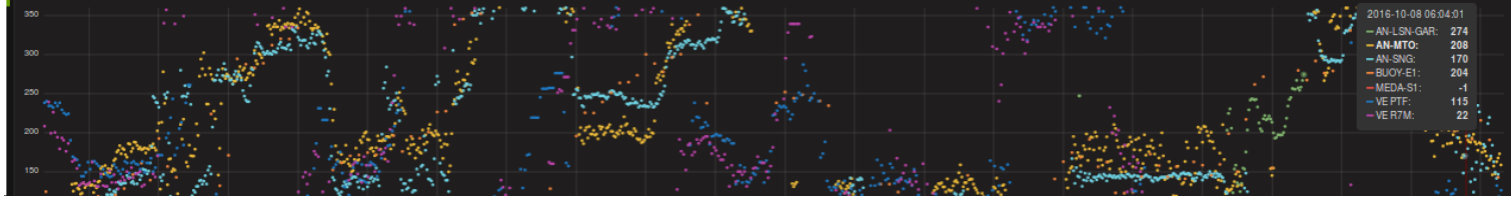
Metric	Current
AN-LSN-GAR Sontek@17.5m - BinDep_ADCPWaves	17.61
AN-SNG CS450 - BinDep_ADCPWaves	16.07
AN-SNG Sontek@12.5m - BinDep_ADCPWaves	12.54
LSN-LAG SBE39 - BinDep_ADCPWaves	0.52
LSN-LAG SBE39 - BinDep_ADCPWavesSdev	0.00
VE PTF NortekAWAC - BinDep_ADCPWaves	16.52
VE PTF NortekAWAC - End_depth	16.02

Wind Speed [m/s]



	min	max	avg	current
AN-LSN-GAR	4.77	4.77	4.77	4.77
AN-LSN-GAR	1.11	10.52	4.75	2.09
AN-MTO	0.24	7.33	2.53	1.72
AN-SNG	0.07	10.98	4.59	0.65
BUOY-E1	0.92	13.68	5.71	3.33
MEDA-S1	0.36	11.16	4.63	4.53
VE PTF	0	11.16	3.77	2.67
VE R7M	0	7.20	1.98	2.67

Wind Direction [N°]



ADDITIONAL BONUS: ISMAR DATA APP

Still in Beta!

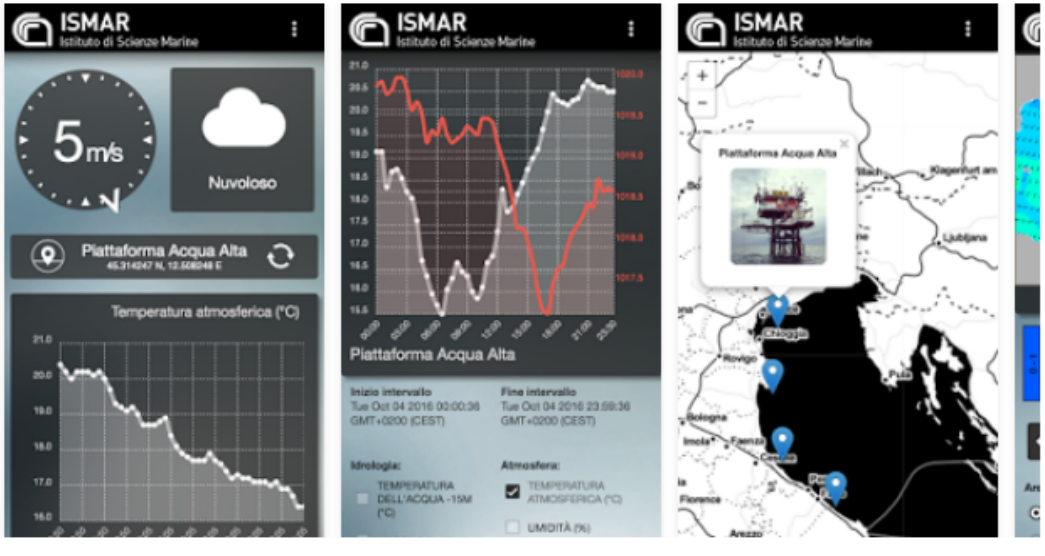
ISMAR Data

CNR-ISMAR Istituto di Scienze Marine Education 0

PEGI 3

This app is compatible with some of your devices.

Installed



CONCLUSIONS

- From a series of unconnected systems to a real network
- Optimization of quality controlled data flows
- Use of open source technologies and international standards
- Vision towards open data access and sharing

CNR-ISMAR IN SITU OBSERVATIONS NETWORK: NEW APPROACHES FOR AN INTERACTIVE, HIGH PERFORMANCE, INTEROPERABLE SYSTEM

by Menegon S., Penna P., Bastianini M., Stanghellini G., Riminucci F., Minuzzo T., Sarretta A.

It can be viewed online here and downloaded here.

To cite this work please refer to:

"Stefano Menegon, Pierluigi Penna, Mauro Bastianini, Giuseppe Stanghellini, Francesco Riminucci, Tiziano Minuzzo, Alessandro Sarretta (2016). CNR-ISMAR in situ observations network: new approaches for an interactive, high performance, interoperable system. DOI: 10.6084/m9.figshare.4001448
