

# Building the oceanographic European metrology system:

# the MINKE H2020 project



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MINKE: Metrology for Integrated Marine Management and Knowledge-Transfer Network

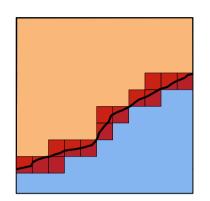
Project funded by the European Commission (call: H2020-INFRAIA-2020-1)



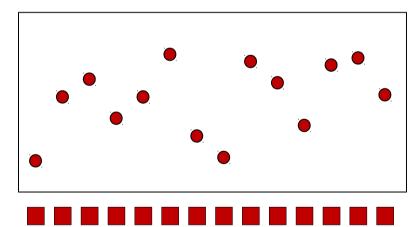
### **OBSERVATIONAL CHALLENGES: ACCURACY vs COMPLETENESS**

### **EXAMPLE: COSTAL MONITORING**

### **IDEAL CASE**



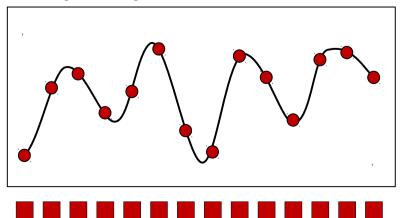
#### Accurate measurements in all stations



### Spatial pattern of reference

stations

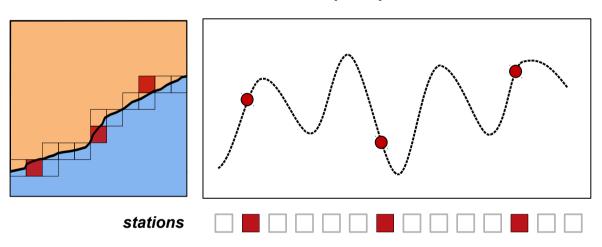
stations



### **REAL OPTIONS**

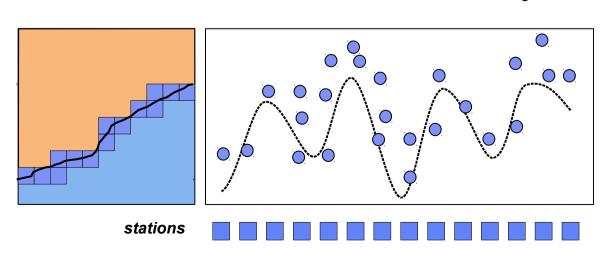
### Accuracy-based approach

### Accurate measurements in (few) selected stations



### Completeness-based approach

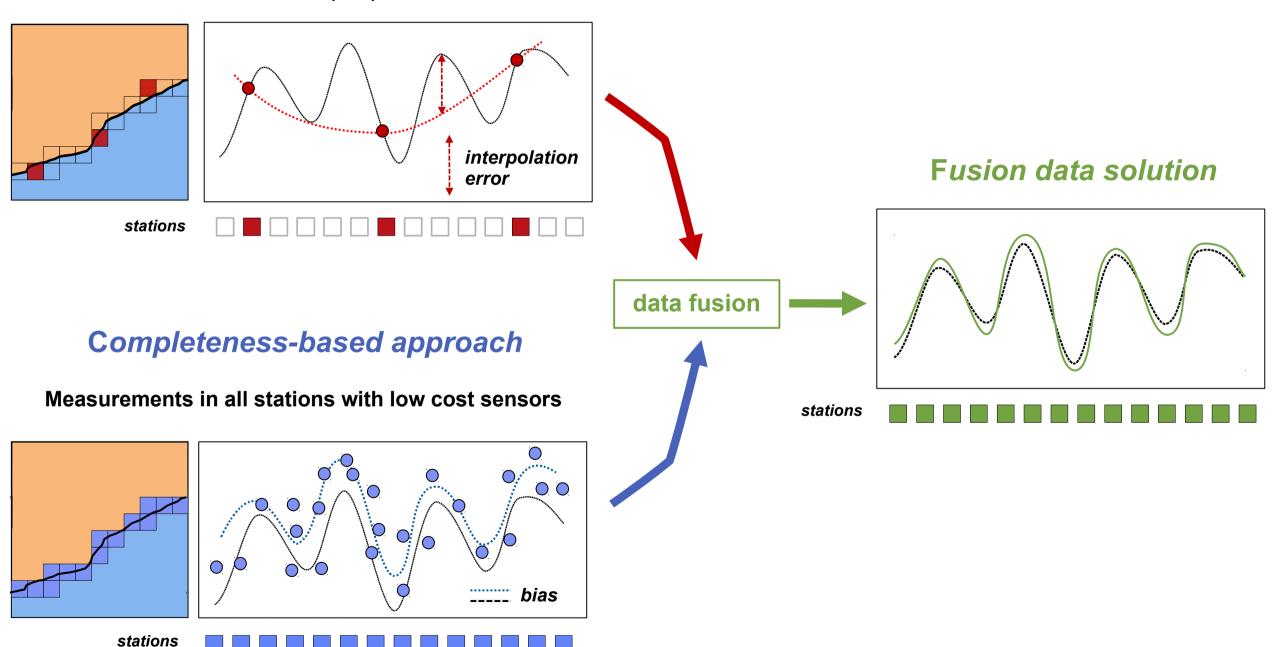
### Measurements in all stations with low cost systems



## **ACCURACY & COMPLETENESS**

### Accuracy-based approach

#### Accurate measurements in (few) selected stations



### Sampling requirements: "We need to be everywhere at all times"

### **Complementary observational networks**

Advanced technologies
Including Metrology Infrastructures





Citizen observatories



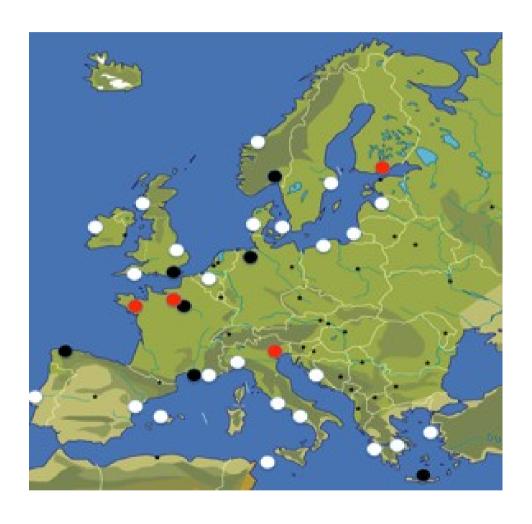




Requirements for "Good data": Accuracy, Timeliness, Completeness, ...

# MINKE's VISION

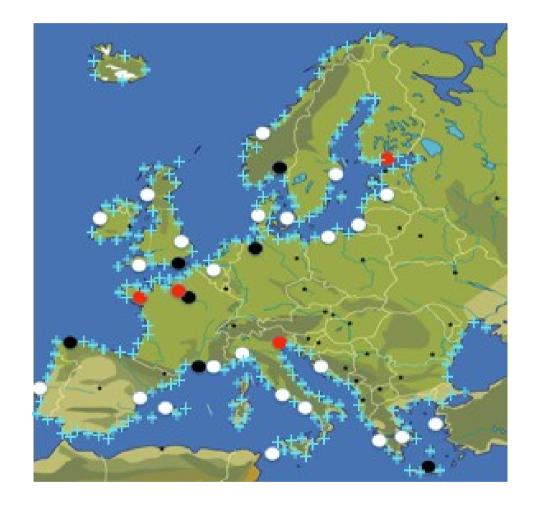
# **Accuracy**







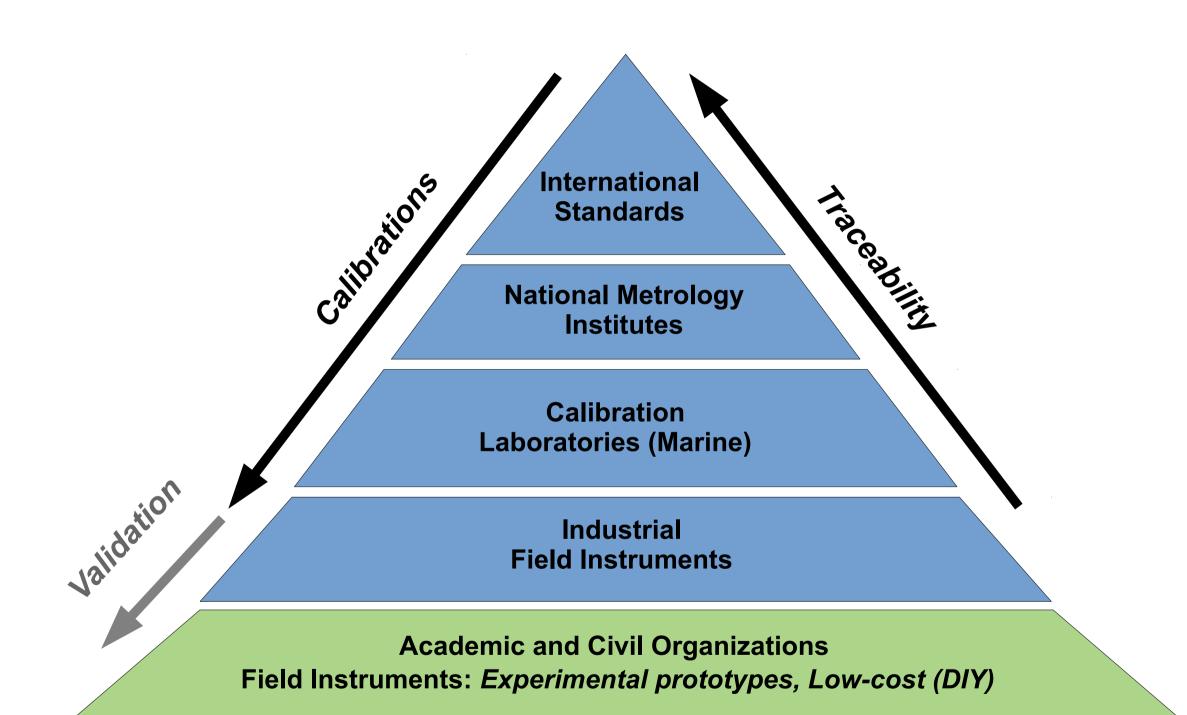
## **Accuracy + Completeness**



- Primary reference nodes
- Secondary reference nodes
- Scientific users Operators

Citizen ScientistLow-cost based solutions

# Expanding the measurement traceability 'pyramid'

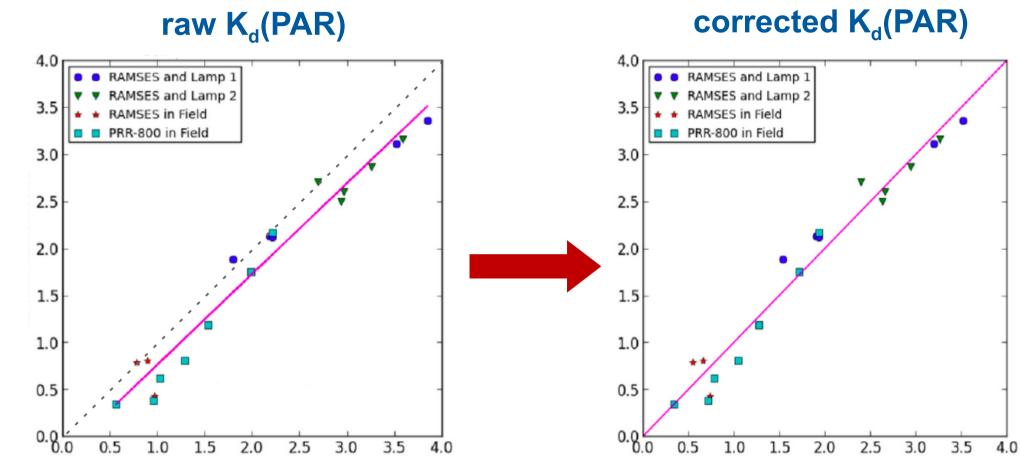


# Expanding the measurement traceability 'pyramid'

Example: Monitoring water transparency -light extinction coefficient  $K_d(PAR)$ -

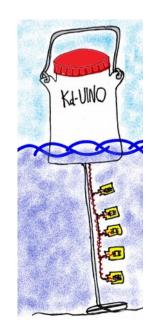






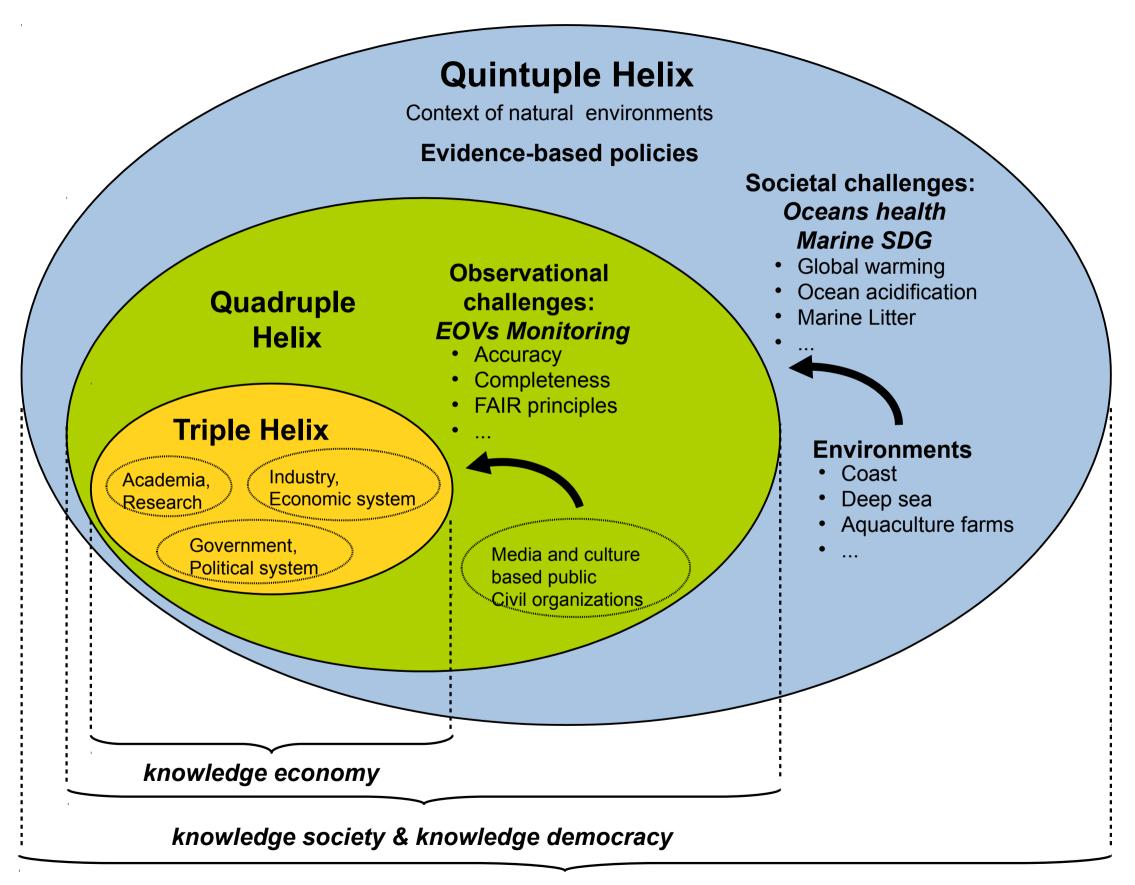
Low-cost DIY Instrument (KdUINO) Cost < 150 €







### MINKE innovation framework: Quintuple Helix Model



socio-ecological transition: Blue growth

### **Quintuple Helix Model of Innovation**

Context of natural environments **Quintuple Helix** Oceans Health **Quadruple Helix** Media and culture based public, Civil organizations **Triple Helix** Academia, Industry, Research Economic system Government. Political system

**Environmental** monitoring challenges

> Oceans Health EOVs

## **Transnational & Virtual** Access (TNA-VA)

Provide access to state-ofthe-art RIs to address environmental monitoring challenges (Thematic pilots)

### Thematic monitoring pilots

- Global warming
- Coastal erosion
- Marine Litter
- Non-indigenous species
- Air & Water quality

**Networking Activities** (NA)

- Research institutions
- NMIs
- Environmental agencies
- Sensor industry

- Citizen science programs
- FabLabs
- Environmental organizations
- Living Labs

Optimised transnational access to state-of-the-art RIS

research projects

**Improved** observations (quantitatively & qualitatively)

Coordinate the basis for synergistic

# Harmonisation of protocols and definition of

common guidelines for research methods, data recording, ethics, ...

- Innovative sensors
- Best practices
- FAIR principles
- EOSC compliance

# **Joint Research Activities** (JRA)

Evaluate and refine state of the art of marine monitoring methods. Produce innovative monitoring data products

# WP10 COORDINATION

Networking Activities (NA)

WP1
Building
the
Community

WP2
Harmonizing
Procedures

WP4 Networking Engagement WP3 Harmonizing Data Optimised transnational access to state-of-the-art RIs

**Coordinate the** 

basis for synergistic

research projects

# Transnational & Virtual Access (TNA-VA)

WP5
TNA
Metrological
&
Cal. Facilities

WP6 VA Low-Cost Instrument.

WP7 VA Cloud-based Services

Improved observations (quantitatively & qualitatively)

Joint Research Activities (JRA)

WP8 JRA EOV Global WP9 JRA Improving Quality



# Thank you!













































