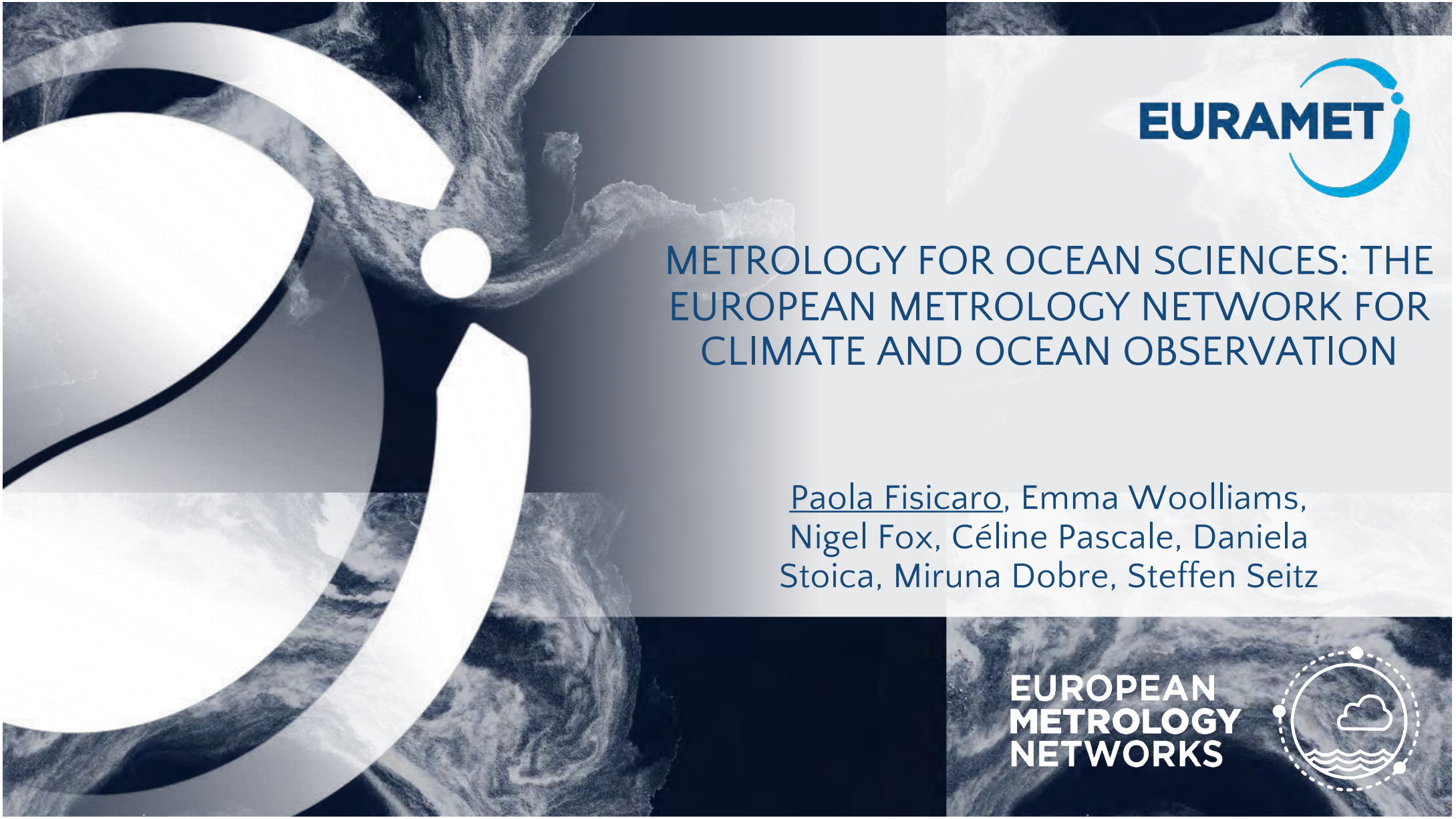
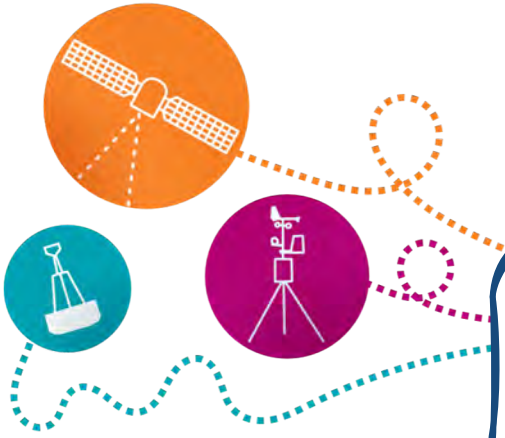
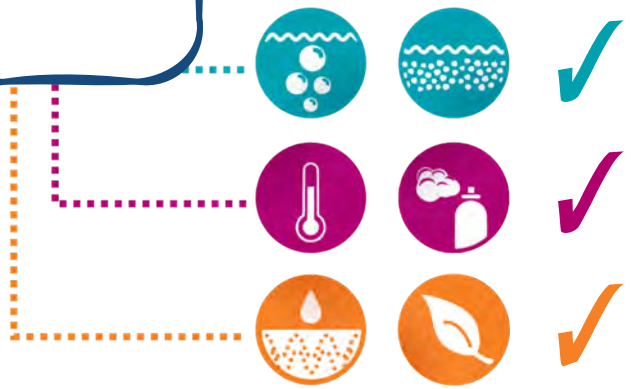


METROLOGY FOR OCEAN SCIENCES: THE EUROPEAN METROLOGY NETWORK FOR CLIMATE AND OCEAN OBSERVATION

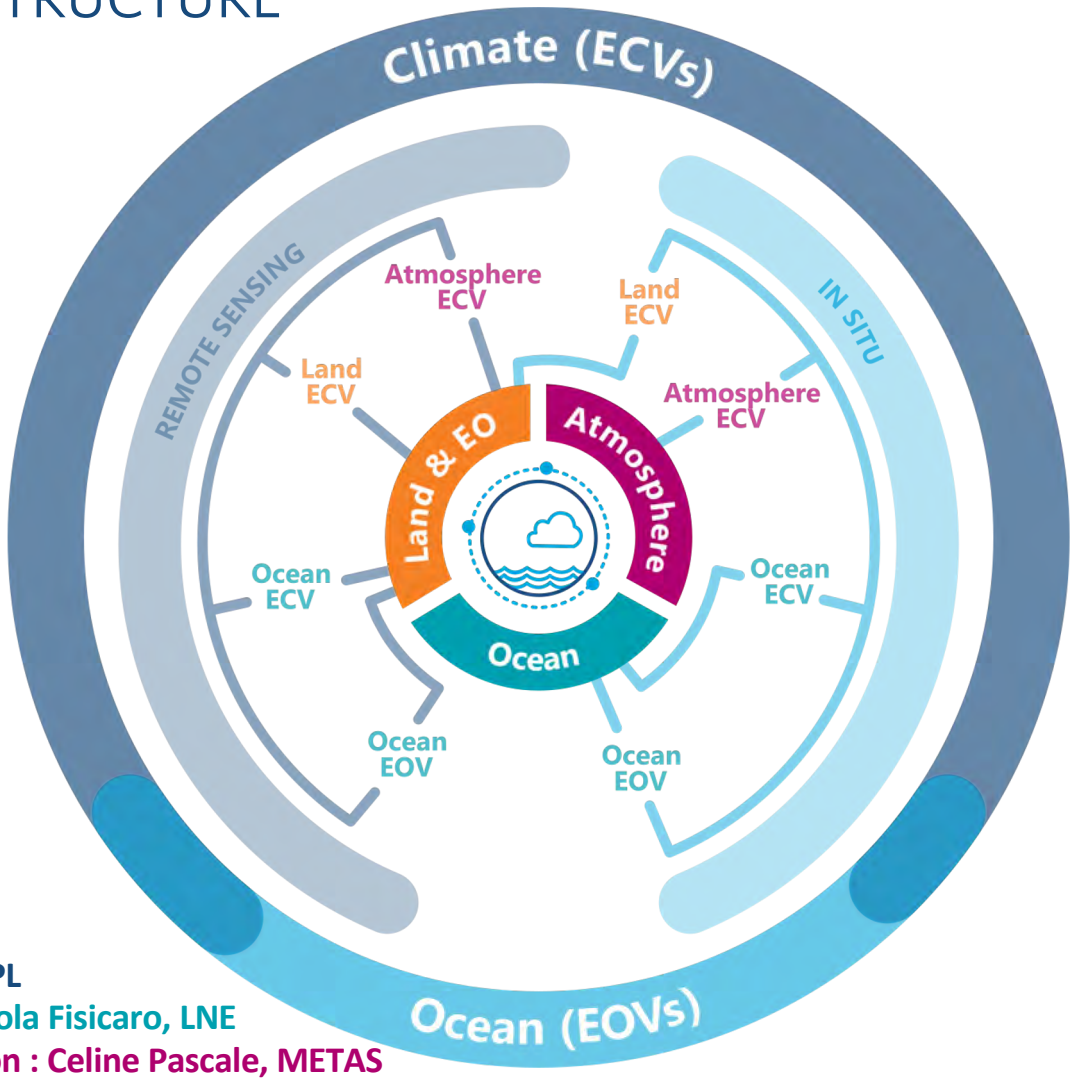
Paola Fisicaro, Emma Woolliams, Nigel Fox, Céline Pascale, Daniela Stoica, Miruna Dobre, Steffen Seitz



The European Metrology network for Climate and Ocean Observation is a sustainable EURAMET structure in an area of strategic importance for the future of European metrology.



EMN STRUCTURE



Chair: Emma Woolliams, NPL
Co-chair Ocean section : Paola Fisicaro, LNE
Co-chair Atmosphere section : Celine Pascale, METAS
Co-chair Hearth and satellite observation section: Nigel Fox, NPL

EMN GENERAL OBJECTIVES

Strengthen existing partnerships with climate and ocean observation community, and create new links

Coordinate European metrology to meet community needs

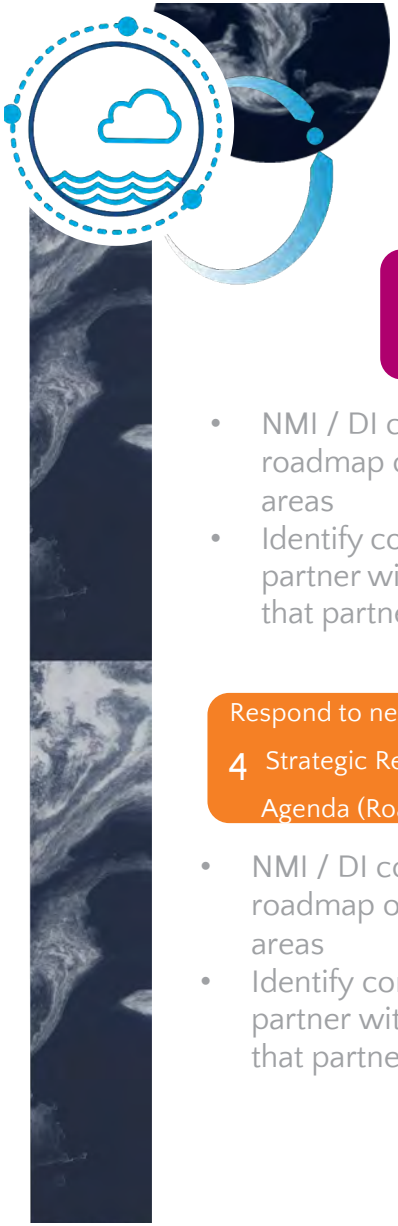
→ Guide research priorities through interaction with community

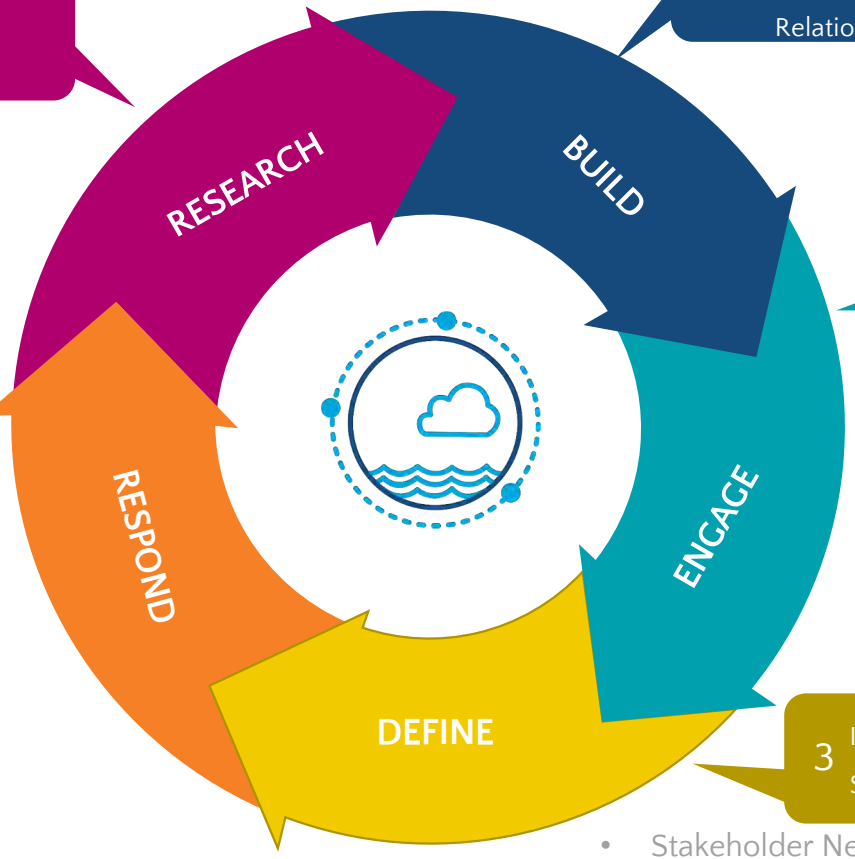
→ Create a single focal point for metrology services

Showcase what metrology can do

Put metrology at the core of climate and ocean observation

CYCLICAL PROCESS





1 Build Stakeholder Relationships

- Build partnerships as an EMN (not just as individual NMIs/DIs)
- Get ourselves known (brand / identity / comms programme / website)

2 Engage with stakeholders

- Participate in their committees / workshops / meetings
- Read their reports
- Invite them to our workshops
- Create big events (e.g. BIPM meeting)
- Surveys / Interviews

3 Identify and Define Stakeholder Needs

- Stakeholder Needs Report
- Iteration and development

4 Respond to needs with a Strategic Research Agenda (Roadmap)

- NMI / DI community creates roadmap of priority research areas
- Identify core stakeholders to partner with and define how that partnership will work

5 Perform collaborative research with stakeholders

- NMI / DI community creates roadmap of priority research areas
- Identify core stakeholders to partner with and define how that partnership will work

EURAMET

Metrology Challenges for Observations of the Ocean

Definition of proper measurands and fit-for-purpose high order and working standards that ensure unbroken SI-traceable calibration chains. Currently, some of the ocean ECVs and EOVs are not defined in term of SI units (e.g. pH, salinity). This makes it difficult to compare results obtained in different time and places, particularly when technology breaks occur.
Certified reference materials are essential tools to ensure the metrological traceability of results via the calibration of instruments, or to validate analytical measurement methods. Currently very few reference materials exist for some of the ocean ECVs and EOVs (e.g. inorganic carbon variables, pCO2, TA, pH) and most of them are not certified by NMIs/DIs.
Development of a metrologically based QA/QC framework and associated tools to facilitate field measurement reliability and consistent uncertainties. Currently, few oceanographic institutions are familiar with ISO 17025 accreditation. A scheme could be created on the example of QA4EO, establishing guidelines written in collaboration between the oceanography and metrology communities.
Organisation of interlaboratory comparisons for in-situ measurements following metrological best practice to establish 'degrees of equivalence' and biases to enable international interoperability and harmonisation for long term comparability.
Fit-for-purpose uncertainties for in situ measurements, including training courses**:** GCOS requirements set stringent target uncertainties for many of the ECVs which are close to the level of primary standards. In contrast to this demand, assignment of uncertainties according to metrological concepts is not well established in oceanography.
Moving beyond best practice guidance documents and standard measurement procedures to international documentary standards, which can provide longer stability of measurement procedures over time.
On-board calibration for underwater instruments mounted on research vessels continuously measuring oceanographic parameters such as temperature, salinity, pressure, sound speed and bathymetry to ensure traceability and accuracy of measurements over instruments' lifetimes and to account for environmental conditions and for their operation in dynamic mode.

NEXT STEPS OF THE OCEAN SECTION

Engagement with stakeholders

Build a metrological framework with oceanographic research institutes and their calibration laboratories

See the next presentation:
"Building the oceanographic European metrology system: the MINKE H2020 project"
Jaume Piera

Organise joint workshops and debates

SPECIAL SESSION #15: BUILDING A METROLOGY FRAMEWORK FOR OCEAN OBSERVATION

SPECIAL SESSION #17: THE SYNERGY BETWEEN OCEAN STANDARDS AND BEST PRACTICES

https://www.metrosea.org/index.php/

Abstract submission deadline: 30 May 2021

THANKS AND ACKNOWLEDGEMENTS

Thank you for your attention

For more information contact

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www.euramet.org/climate-ocean

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