

Sector topic presentation

Environmental sustainability: how is EURAMET contributing?

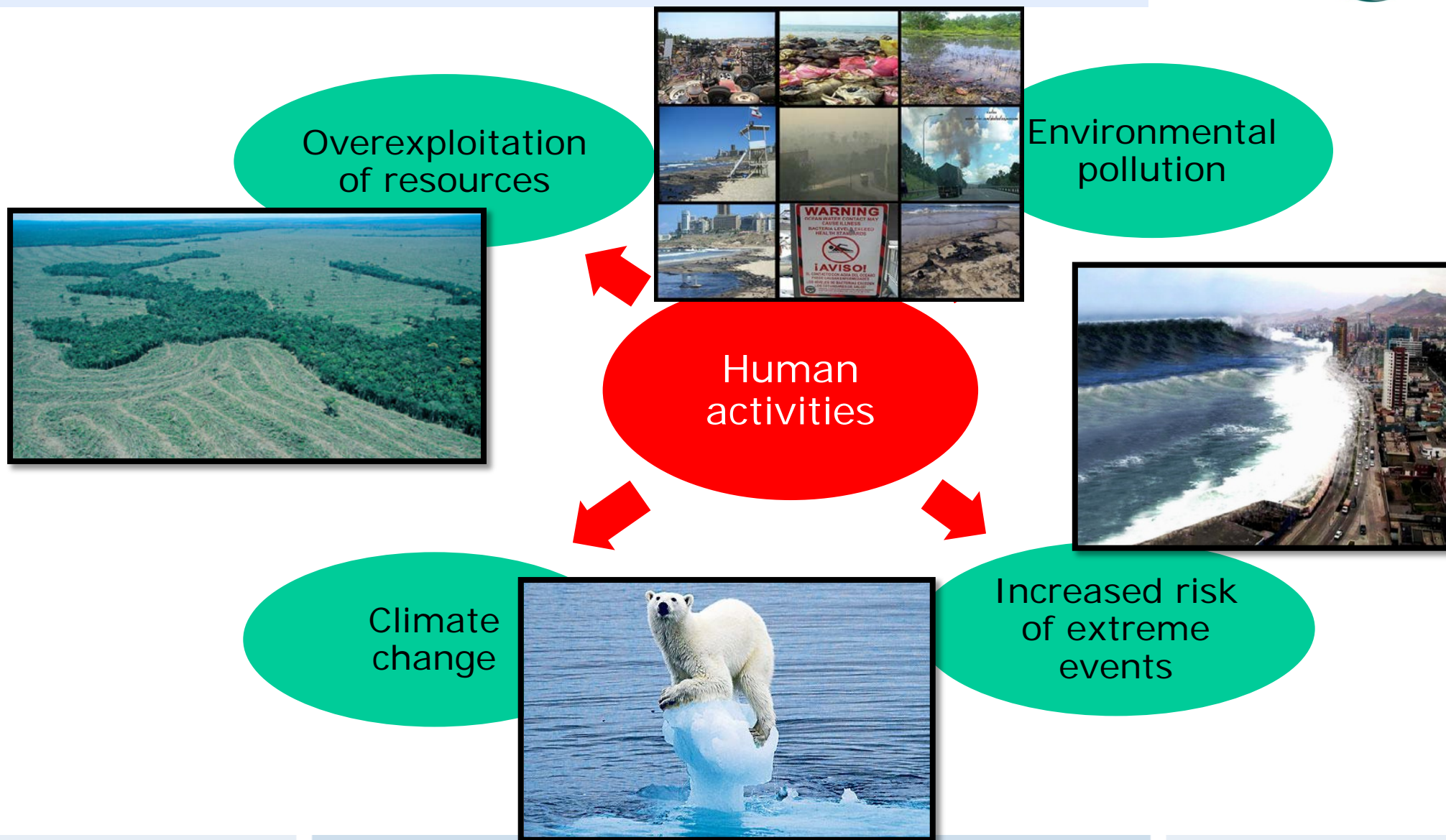
TC-MC, TC-IR, TC-PR

7th EURAMET General Assembly

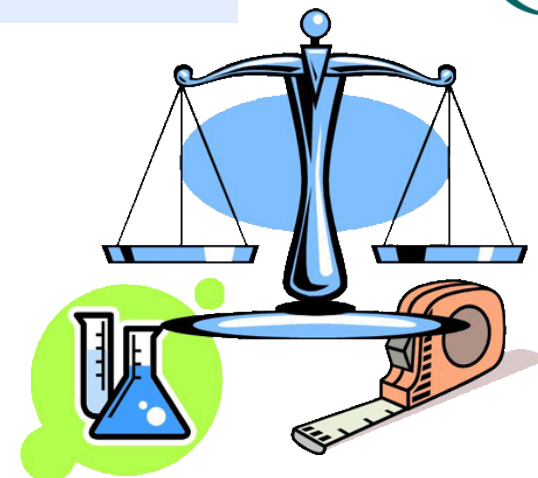
Reykjavik, Iceland, 27 to 31 May 2013

- ❑ **Background**
- ❑ **Comparison and research projects in TC-MC, TC-IR, TC-PR**
- ❑ **Example from TC-MC**
- ❑ **Example from TC-IR**
- ❑ **Example from TC-PR**

Background



- Studies on climate change (Directive 2003/87/EC)
- Monitoring pollution and its effects (Directive 2004/107/EC and Directive 2008/50/EC on ambient air, Water Framework Directive 2000/60 EC)
- Support of safe and economic exploitations of natural resources
- Management of waste streams (Directive 2001/80/EC and Directive 1999/13/EC on the limitation of emissions of certain pollutants, Directive 2000/76/EC on the incineration of waste)
- Impact on the eco-system from renewable energy sources



- Providing **reliable and traceable measurement standards** to ensure long-term comparability of the measurement results and the stability of these data to assess trends over time and location till the end user level
- Developing more accurate, more comparable and more rigorously validated measurement methods and technologies in **physical and chemical disciplines** as well as in emerging technologies arenas such as biotechnologies and nanotechnologies
- Supporting the **decision-makers** and the **development of policy** to mitigate the effects of climate change and environmental degradation
- Developing standards (national and international) to **support regulations** and **ensure compliance** with current legislations

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EURAMET projects on environmental topics:

Some statistics

TC-MC

- 3 Regional Key Comparisons
- 4 Supplementary Comparisons
- About 10 EURAMET comparisons (since 2007)
- 3 JRPs in the call Environment I (ENV01 MACPoll, ENV05 OCEAN, ENV08 WFD)



TC-IR

- About 3 EURAMET comparisons (since 2007)
- JRPs in the call Environment I (JRP MetroRWM) and Industry (JRP MetroNORM)

TC-PR

- 7 EURAMET Key Comparisons, 8 BIPM comparisons with < 7 NMI EURAMET participating
- 4 Supplementary Comparisons
- About 10 EURAMET comparisons (since 2007)
- 2 JRPs in the Call Environment I (ENV03-SolarUV, ENV04/MetEOC)

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Traceable measurements for monitoring critical pollutants under the European Water Framework Directive (WFD) 2000/60/EC

ENV08 WFD

<http://www.emrp-waterframeworkdirective.bam.de>



- 11 institutes + 2 REGs from 9 EU Member States and EC
- duration: October 2011 to September 2014

WFD requires

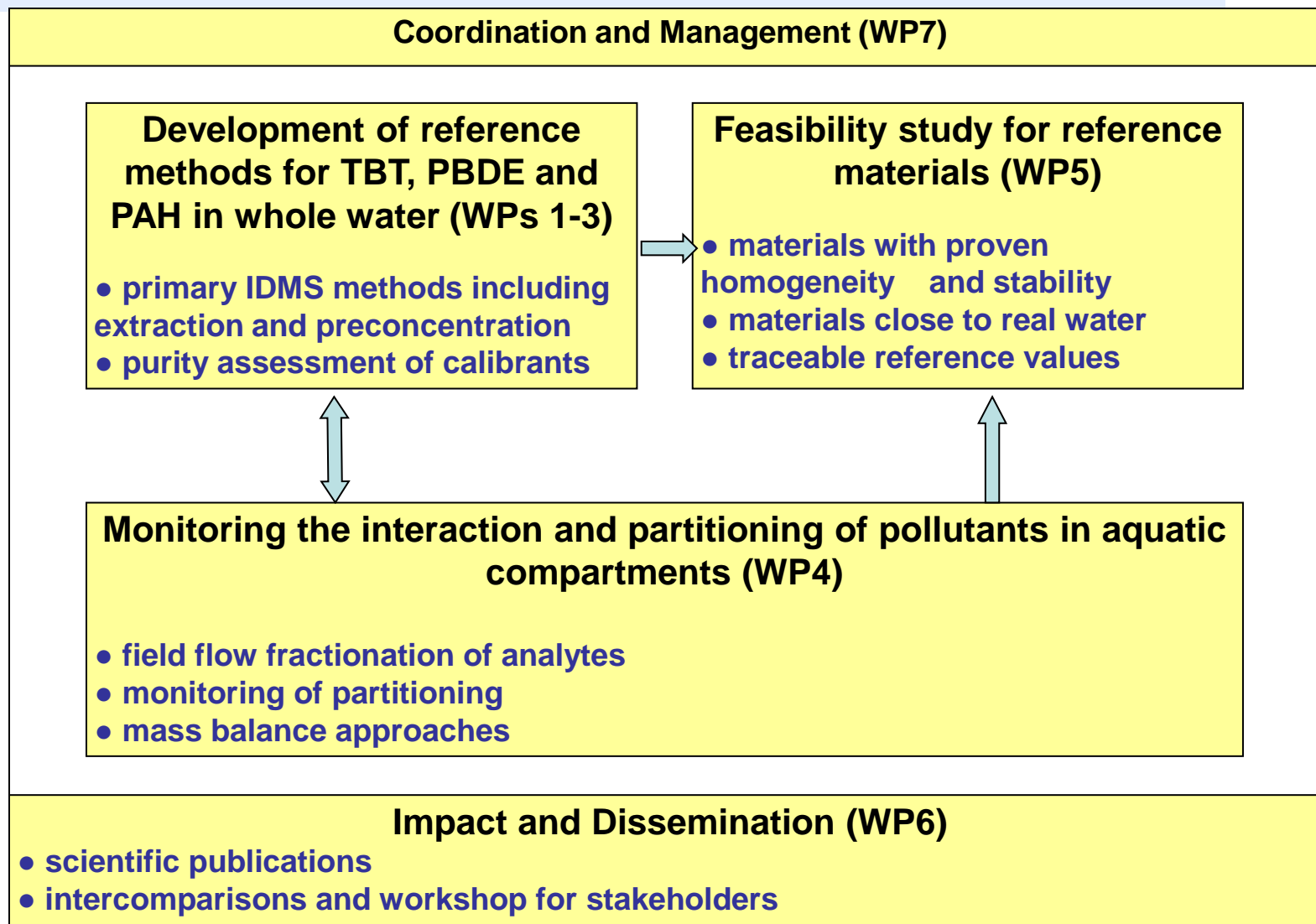
- Comparable measurement results in monitoring of coastal, ground and surface waters
- For priority substances at Environmental Quality Standards (EQS) levels
- In whole water samples including suspended particulate matter



but

- Primary methods of measurement and primary materials necessary for traceability and comparability are not available

Project structure and objectives



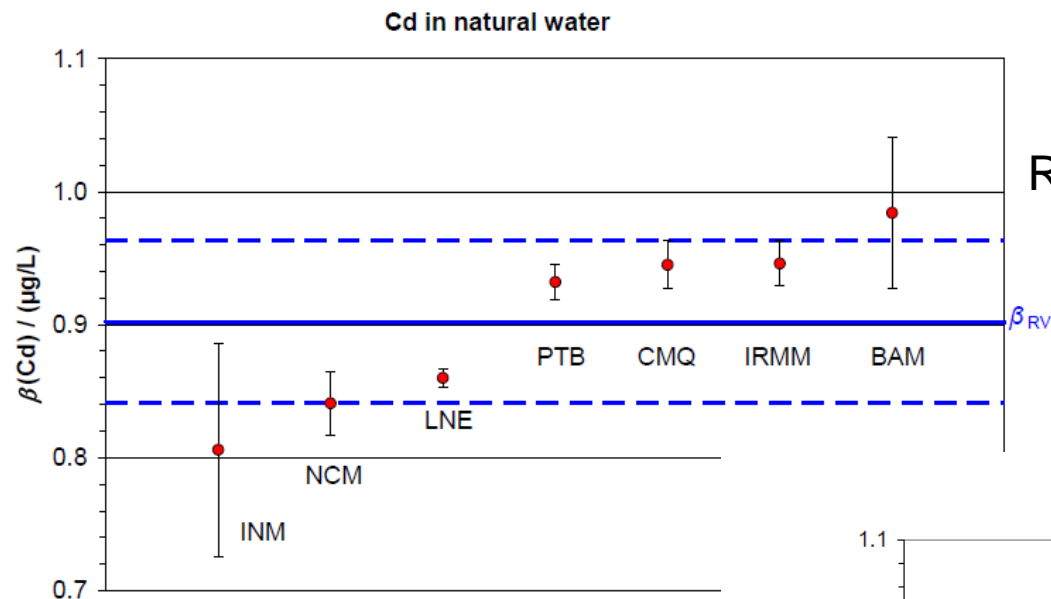
Determination of Hg, Cd, Pb and Ni in pure and natural water at concentration level required by the European Water Framework Directive.

Organisers: PTB (coordinating laboratory), BAM, EC-JRC-IRMM, LNE

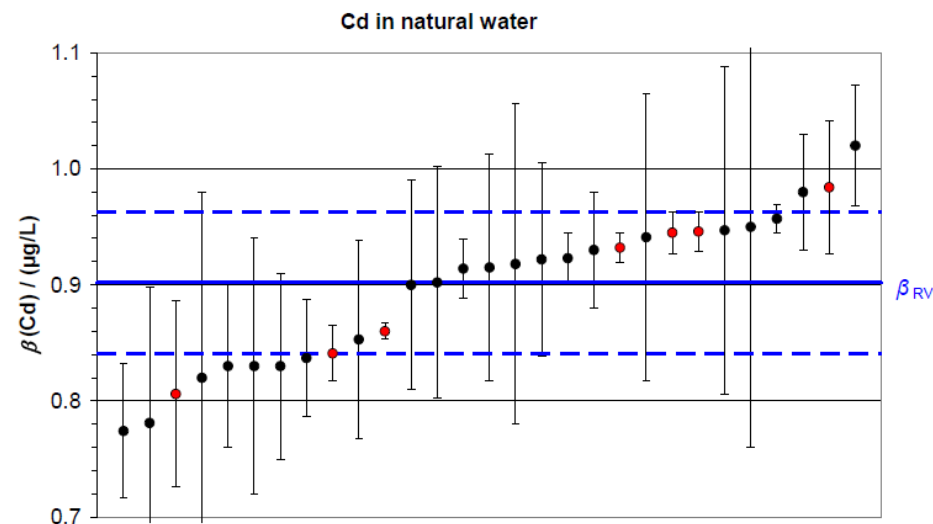
This project was aiming at supporting the implementation of the European Water Framework Directive. A European network of NMIs and potential calibration laboratories was set up and tested. It served to link the measurement results of testing laboratories all over Europe to national standards in order to assure their comparability which is a requirement of the directive.



Organisers: PTB (DE, coordinating laboratory), BAM (DE), EC-JRC-IRMM (EU), LNE (FR)



Results from all participants



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Motivation:

Industries working with raw materials containing naturally occurring radioactive materials (NORM industries) produce large amounts of waste. These waste materials, generated from current and past activities, constitute a huge economic and ecological burden if they are not properly disposed of or re-used as input materials for the industry. The recycling and re-use of waste material is support the use of “cleaner technologies” and results in cost savings.

Traceable, accurate, and standardised measurement methods and systems, in particular for in-situ applications, are needed to inform the decision to re-use waste materials without increasing costs and thus avoiding regulatory permit breach leading to contamination of the environment and exposure of the public.

Industries concerned:

- Extraction of rare earths and Niobium/tantalum ore processing
- TiO_2 pigment production
- Phosphate industry – thermal phosphorous production, phosphoric acid production, production of phosphate fertilizers
- Building material industry, cement production
- Tin foundries, tin/lead/copper smelting
- Waterworks, ground water filtration, drinking water production



IMPACT

- Supports **innovative processing technologies** for the re-use and recycling of NORM by-products and waste
- Supports the **cost-effective implementation of EU directive** (new in 2013) and
 - The EU Radiation Protection Basic Safety Standards revision concerning NORM and building materials industry and water industry
 - European Construction Products Directive concerning NORM in building materials
 - European Directive on Radioactivity in Drinking Water
- Supports the **global competitiveness of the European NORM industry**
- **Improves** so far poorly developed **end-user measuring systems and methods**, in particular for on-site use
- Provides reliable **instrumentation for raw material selection**
- Eliminates technical trade barriers and prevents trade disputes between EU member states

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Motivation:

Current uncertainties of METEOROLOGICAL measurements based on optical radiometry and remote sensing **provide the real barrier for further improvement of climate forecast model reliability**

Methods:


To develop transfers standards and methodologies to shorten traceability chain from NMI to end-user to enable traceable “climate quality” uncertainties to be measured for optical and “remotely sensed” Earth observation data

Target :

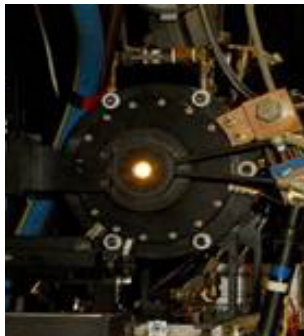
To establish the means to provide measurands of sufficient accuracy to test and constrain climate forecast models on only a decadal time base such that they have an uncertainty of ± 2 deg C

EMRP-ENV03: Traceability for surface spectral solar ultraviolet radiation"

<http://projects.pmodwrc.ch/env03/>

- **Project Coordination:** Dr. Julian Gröbner, PMOD WRC Davos 
- **8 Partners** EU-NMI; **2 Industry**; **2 Universities**; **> 3 Collaborators** (Stakeholders)

- Enhance the reliability of spectral solar UV radiation measured at the Earth surface
- Develop new techniques and devices for traceability **better than 2% (now 5%)** and for cost-effective array-spectroradiometer in UV monitoring networks
- Disseminate: Intercomparison Campaigns and Workshops



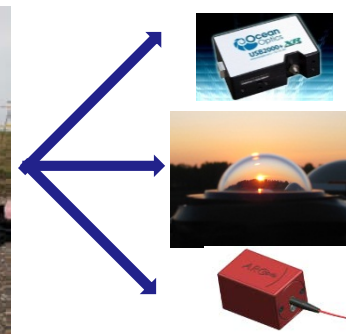
Primary Irradiance Standard



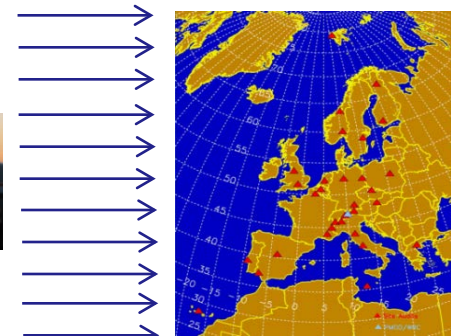
Transfer Standard



Reference Spectroradiometer



End-User Devices



Calibrated UV Network



ENV04 **MetEOC (Metrology for Earth Observation and Climate):** towards establishing a European Metrology Centre for Earth Observation and Climate (EMCEOC). www.emceoc.org

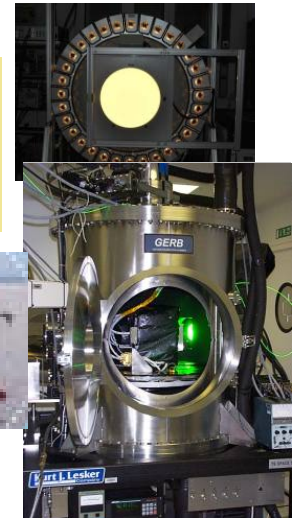
Project coordinator: Nigel.Fox@npl.co.uk



To provide globally sampled data of the Earth system with trustable accuracies sufficient to detect small signal changes over decadal timescales from a background of natural variability

Methods:

- **Pre-flight calibration of imaging spectrometers: stray-light, in vacuum ...**
- **In-flight standards to maintain traceability: plate black body radiators**
- **Post-launch Calibration/Validation to validate/recover traceability**
- **Prototype techniques to establish SI traceability in orbit – TRUTHS**
- **Training on uncertainty analysis**
- **Focal point for European EO metrology to support: ESA, EUMETSAT, EC & international organisations: WMO, CEOS, GEO, GCOS ...**



INPUTS FOR DISCUSSION...