



FRM4SOC - Laboratory Calibration Exercise 1 Verification of Reference Irradiance and Radiance Sources

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Participants

- The philosophy behind the laboratory comparison
- Irradiance results
- Radiance results
- Next steps and conclusions



Why we (NMIs) do comparison?

- We have to!
- To establish the degree of equivalence between the realisation of the scales and measurements using them
- To validate uncertainty evaluation



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measurements for
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Why we (OC community) do comparison?

- We want to! To define Fiducial Reference Measurements for Satellite Ocean Colour Radiometry
- To establish the extend to which measurements are consistent
- To embed the principles of uncertainty evaluation

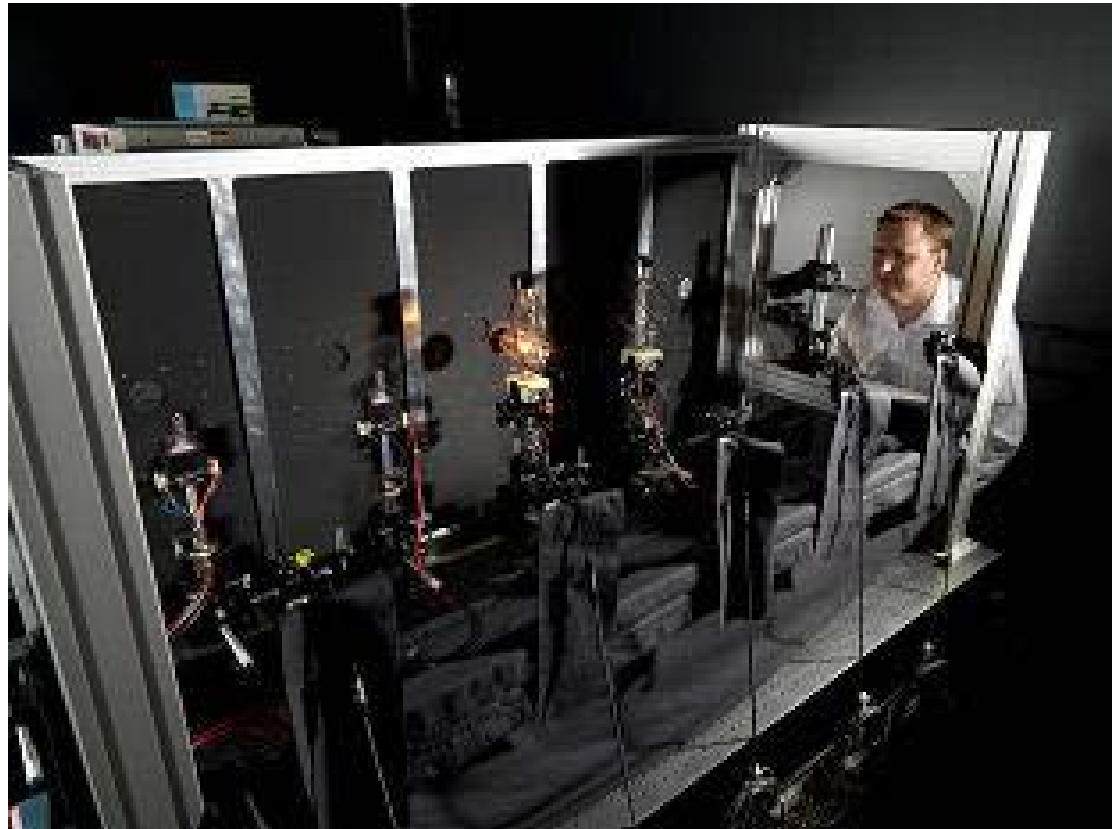


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Organisation of the comparison irradiance

- All lamps measured at NPL facilities within one week of April 2017



- Uncertainty training provided at the time of measurements



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Three types of standard lamps



Photo courtesy of Gamma Scientific

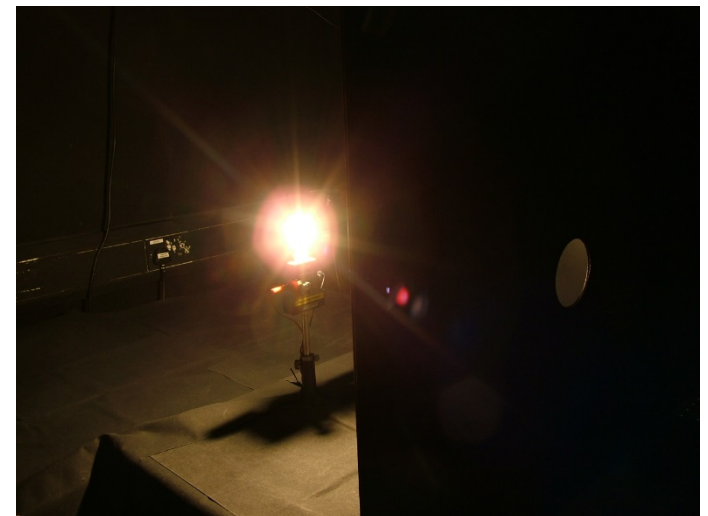
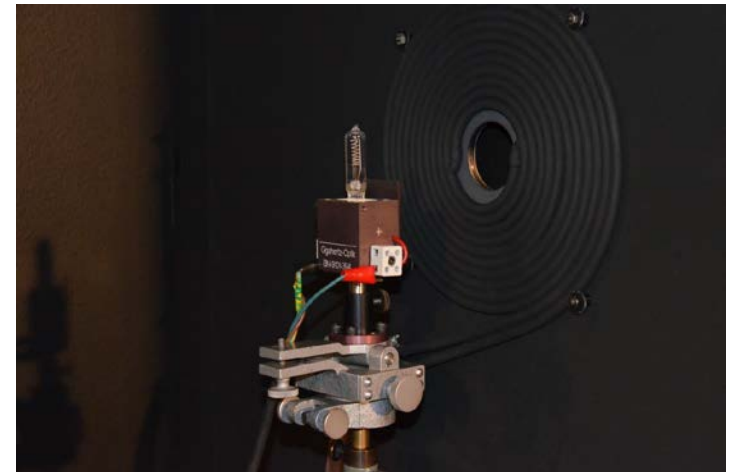


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Irradiance comparison

Participant		Country
TO	Tartu Observatory	Estonia
Seabird	Seabird Scientific	Canada
CSIRO	Commonwealth Scientific and Industrial Research Organisation	Australia
NERC-FSF	Natural Environment Research Council's Field Spectroscopy Facility	UK
LOV	Laboratoire d'Océanographie de Villefranche	France
NOAA	National Oceanic and Atmospheric Administration	USA



14 lamps is total



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Organisation of the comparison radiance

- Round Robin – participants measure radiance in house using a set of transfer radiometers
- RR started Many 2017 finished April 2018



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Radiance Comparison Radiometers



Channel	OCR-051 Wavelength nm	OCR-110 Wavelength nm
1	412.0	413.0
2	443.7	443.0
3	491.0	491.4
4	510.7	510.4
5	556.4	556.2
6	667.1	666.3
7	684.9	684.1

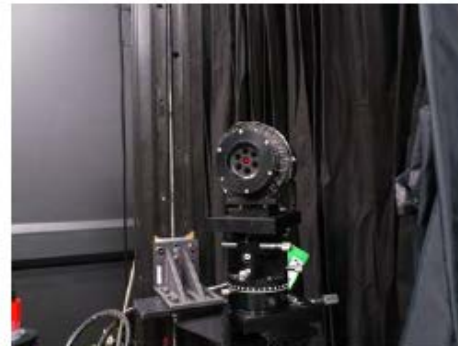
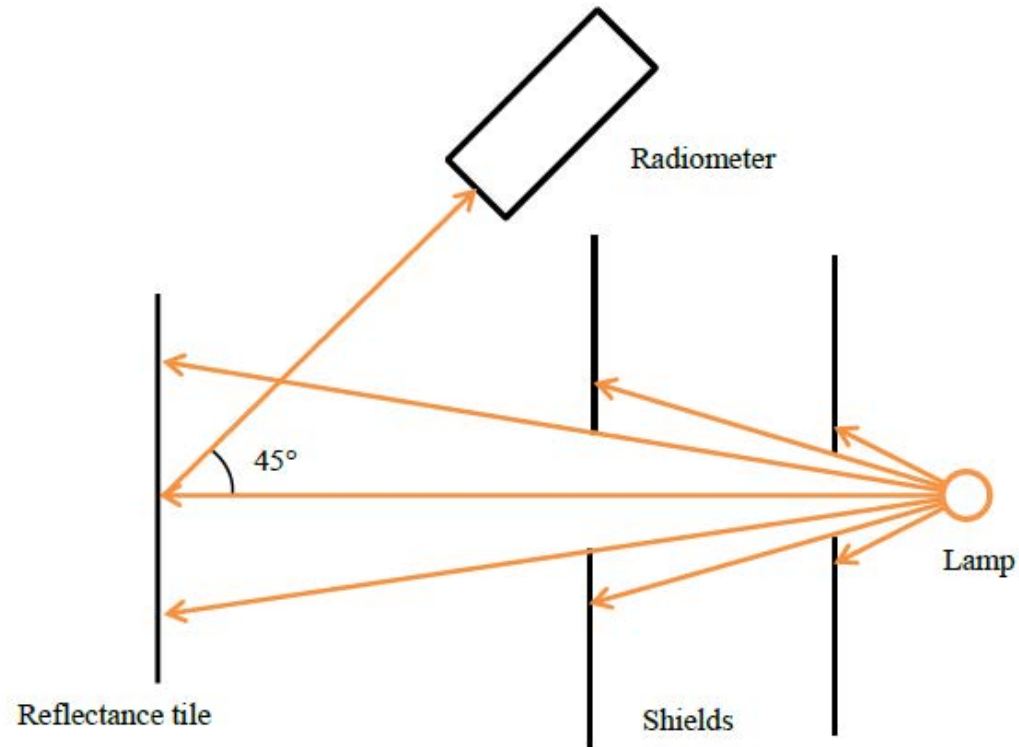
Measurements made at different distances (500 mm, 750 mm 1000 mm and 1300 mm) and alignments

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Radiance set up

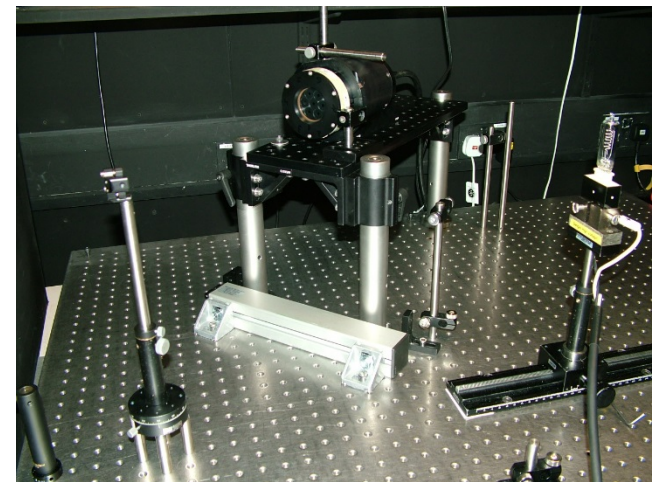


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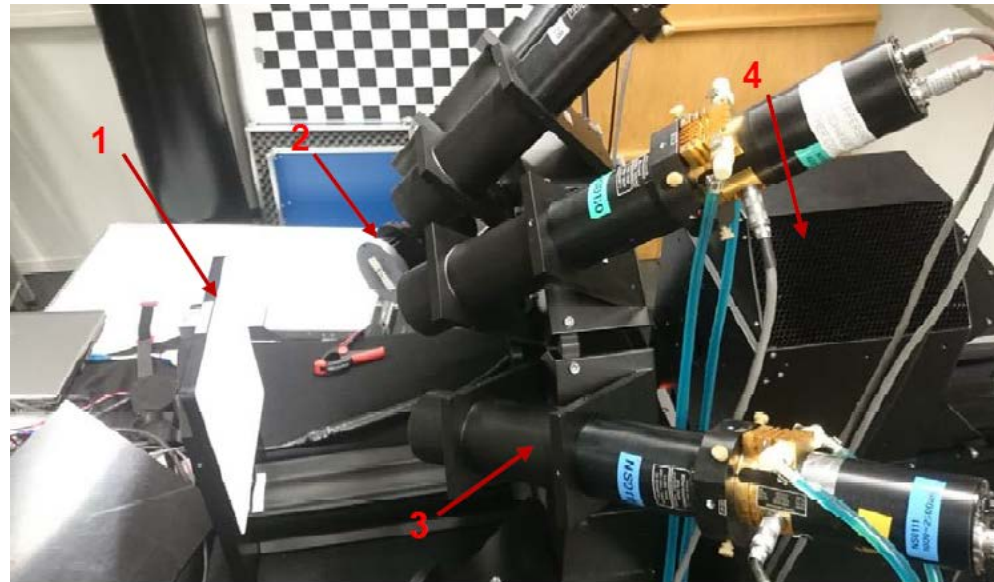
Participant		Country
NPL	National Physical Laboratory	UK
TO	Tartu Observatory	Estonia
JRC	Joint Research Centre	European Commission
Satlantic	Seabird Scientific	Canada
CSIRO	Commonwealth Scientific and Industrial Research Organisation	Australia
NIVA	Norsk Institutt for Vannforskning	Norway
NERC-FSF	Natural Environment Research Council's Field Spectroscopy Facility	UK
DLR-IMF	Remote Sensing Technology Institute, Deutsches Zentrum für Luft und Raumfahrt	Germany
LOV	Laboratoire d'Océanographie de Villefranche	France
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Examples of lab settings



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Next steps

- Overall irradiance comparison uncertainty budget evaluation
- Individual participant radiance uncertainty evaluation confirmation
- Definition of the Radiance mean comparison value
- Overall radiance comparison uncertainty budget evaluation



Conclusion

- Irradiance sources - 1% (for wavelengths above 400 nm) degree to which the individual measurements agree with one another
- Radiance – two distinguished levels of good agreements. Further investigation is to be conducted by NPL to fully understand this difference
- Scientific Roadmap

How often we want to repeat these exercises?



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Thank you

Please remember about Special Issue
"Fiducial Reference Measurements for Satellite Ocean Colour"
Deadline 31 March 2019



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