

SORBETTO:

SOLarRadiation Based Established Techniques for aTmosphericObservations

Summer School-Conference, Rome 2-6 July 2018,

CNR Headquarters (Sala Bisogno, via dei Ramni 19, 1st floor) ,

Sapienza University(Aula Calcolo and Aula Cortini, Piazzale Aldo Moro 3)

Topics

- ✓ Radiometry (theory, networks, calibration)
- ✓ Photometry (theory, networks, calibration)
- ✓ Intercomparison campaigns
- ✓ Spectrometry (theory, networks, calibration)
- ✓ Calibration and Validation of satellite Missions
- ✓ laboratories

List of Teachers:

Radiometry	Photometry	Intercomparisons	Spectroscopy	CAL/VAL
A. diSarra (Enea, IT)	T. Nakajima (Jaxa, JP)	M. Campanelli (ISAC-CNR, IT)	M. Tiefengraber (Luftblick, AT)	A.M. Iannarelli (SERCO, Italy)
D. Meloni (Enea, IT)	O. Dubovik (LOA, FR)	S. Kazadzis (PMOD, ch)	F. Wittrock (Uni Bremen, DE)	Claus Zehner (ESA)
	P. Goloub (LOA, FR)	P. Goloub (LOA, FR)	N.Kouremeti (PMOD, CH)	S. Federico (ISAC-CNR, IT)
	B. Torres (LOA, FR)	A. di Sarra (Enea, IT)	A.M. Siani (Uni Sapienza, IT)	Cristiana Bassani (IIA-CNR, IT)
	M. Campanelli (ISAC-CNR, IT)		H. Diemoz (ARPA – VDA, IT)	TijlVerhoelst (BIRA-IASB, BE)
	S. Kazadzis (PMOD, CH)			

PROGRAMME

5 min for questions are included in the time of each talk

Monday, July 2:

Morning: CNR Headquarter

8:00 – 8:30: Pick up of electronic badge , Piazzale Aldo Moro 5

8:30 – 9:00: Registration, Sala Bisogno, Via dei Ramni 19, 1stfloor

9:00 – 9:15: Presentation of the school (M.Campanelli, S. Casadio, S Dietrich)

Section1: Radiometry, theory

9:30 – 9:55: “Broadband solar irradiance measurements” (D. Meloni)

9:55 – 10:15: “The Multi Filter Rotating Shadowband Radiometer” (A. di Sarra)

Break 10:15- 11:00

Section 1a: Radiometry, networks and calibration

11:00 – 11:45: Intercalibration of pyranometers and pyrhemometers (D. Meloni)

11:45 – 12:30: MFRSR calibration and determination of aerosol optical properties (A. di Sarra)

Lunch Icebreaker 13:00 – 14:00 Sapienza, Aula Cortini

Afternoon: Sapienza University

Laboratory 1:

Instruments available for test in the Aula Cortini:

- SPN1 Sunshine Pyranometer , DELTA-T, by Lombard Marozzini
- RaZON, Kipp&Zonen, by Eurelettronicalcas
- CM6 and Black and White Pyranometers
- MFRSR

Instruments installed on the roof

- Skycam

14:30- 16:00: First group: *Aula Calcolo*, Sapienza: exercises program in Appendix 1

Second group: *Aula Cortini*, Sapienza: laboratory on available radiometry equipment

- how they work and how to manage them; Visit to the BAQUNIN supersite.

16:00-17:30: Exchange of groups

Tuesday, July 3:

Morning: CNR Headquarter

Section 2: Photometry, theory

8:00 – 8:30: The beginning (T. Nakajima)

8:30 – 9:00: On problematics of aerosol retrieval from sun/sky radiometers (O. Dubovik)

9:00 – 9:30: Inversion methods (O. Dubovik)

9:30 – 10:00: Sensitivity tendencies in light scattering and AOD inversions (B. Torres)

Break 10:00 – 10:30

Section 2a: Photometry, networks

10:30 – 11:10: AERONET/PHOTONS-CIMEL and mobile photometers on board various supports
(P. Goloub)

11:10 – 11:35: SKYNET network and the European branch ESR (M. Campanelli)

11:35 – 12:00: GAW-PFR aerosol network (S. Kazadzis)

Section 2b: Photometry, calibrations

12:00 – 12:30: AERONET/PHOTONS calibrations (P. Goloub)

12:30 – 13:00: SKYNET/ESR “on site” calibrations (M. Campanelli)

13:00 – 13:30: GAW-PFR reference triad and Langley calibration activities (S. Kazadzis)

Lunch 13:30 – 14:15 free

Afternoon: Sapienza University and CNR

Laboratory 2:

Instruments available for test in the Aula Cortini:

- PREDE – POM01
- Lunar CIMEL, by Cimel
- Calitoo aerosol photometer

Instruments installed on the roof

- PFR

14:15 – 15:45: First group: Beginners, *Sala Bisogno*, CNR; Advanced, *Aula Calcolo* Sapienza
Exercises program in Appendix 1

Second group: *Aula Cortini*, Sapienza, laboratory on available photometry
equipment – how they work and how to manage them; Visit to the BAQUININ
supersite.

16:15 – 17:45: exchange of groups

Wednesday, July 4:

Morning: CNR Headquarter

Section 3: Spectrometry, theory

8:30 – 9:00: Differential Optical Absorption Spectroscopy – History and theoretical background (F. Wittrock)

9:00 – 9:30: Optical characteristics of the Pandora spectrometer system (M. Tiefengraber)

9:30 – 10:00: The Brewer spectrophotometer to retrieve total ozone column (A. Siani)

10:00 – 10:30: The Precision SpectroRadiometer (PSR) and Qasume reference spectroradiometer, description, spectral measurements and application (N. Kouremeti)

Break 10:30 – 11:10

Section 3a: Spectrometry networks

11:10 – 11:30: Long-term UV/Vis observations using DOAS instruments (F. Wittrock)

11:30 – 11:50: Pandonia Global Network (M. Tiefengraber)

11:50 – 12:10: The Brewer networks (H. Diemoz)

Section 3b: Spectrometry, calibrations

12:10 – 12:30: New developments in the DOAS technique (F. Wittrock)

12:30 – 12:50: Laboratory and Field Calibration for Pandora spectrometer systems (M. Tiefengraber)

12:50 – 13:10: Brewer (H. Diemoz)

13:10 – 13:30: The Precision SpectroRadiometer (PSR) calibration procedure (N. Kouremeti)

Lunch 13:30 – 14:15 free

Afternoon: Sapienza University and CNR

Laboratory 3:

Instruments available for test in the Aula Cortini:

- Brewer
- Pandora Field CalibrationTool

Instruments installed on the roof

- Pandora
- Brewer

14:15 – 15:45: First group: Sala Bisogno, CNR, Exercises program in Appendix 1

Second group: Aula Cortini, Sapienza, laboratory on available spectrometry equipment - how they work and how to manage them; Visit to the BAQUNIN supersite.

16:15 – 17:45: Exchange of groups.

Thursday, July 5:

Morning: CNR Headquarter

Section4: Intercomparisons Campaigns

8:30 – 9:00: Fourth WMO Filter Radiometer Comparison (FRC-IV) (S. Kazadzis)

9:00 – 9:30: long-term intercomparisons with MFRSR data (A. di Sarra)

9:30 – 10:00: AERONET intercomparison field campaigns (F. Goloub)

10:00 – 10:30: the QUATRAM Campaign and other intercomparisons (M. Campanelli)

Break 10:30 – 11:15

11:15 – 11:45: DOAS intercomparison campaigns (Wittrock)

11:45 – 12:15: Pandora intercomparison studies(M. Tiefengraber)

12:15 – 12:45: Brewer intercomparisons (H. Diemoz)

13:00 Photo of the group in Sala Bisogno, CNR Headquarter

Lunch 13:10 – 16:00 free

16:00 Leaving from Piazzale Aldo Moro with bus for Agriturismo Casale di Martignano:
Happy Hour, Social Dinner and music/dance performance

Friday, July 6:

Morning: CNR Headquarter

Section 5: Use of solar radiation based instrumentation at ground level for Calibration and Validation of satellite Missions

9:00 – 9:30: CAL/VAL activities: the BAQUNIN super site (A. Iannarelli)

9:30 – 10:00: Recent and future satellite validation campaigns with DOAS instruments (F. Wittrock)

10:00 – 10:30: Validating satellite measurements and their uncertainties with ground-based data:
Best practices and the challenge that is co-location mismatch (T.Verhoelst)

Break 10:30 – 11:10

11:10 – 11:30: S5p Mission Status/First Results and planned Cal/Val activities (C. Zehner)

11:30 – 11:50: Vicarious calibration of multi-mission data by simulation of solar radiation over water target (C.Bassani)

11:50 – 12:10: Comparison of hourly surface downwelling solar radiation estimated from MSG-SEVIRI and forecast by the RAMS model with pyranometers over Italy (S. Federico)

Appendix 1: program of exercises

Monday, July 2 (Aula Calcolo, Sapienza)

Radiometry: exercises on database

Tuesday, July 3

Group beginners (Aula Bisogno, CNR)

Lecturer: Terry Nakajima

Duration: 60 min lecture plus 30 min exercise using excel

Abstracts: The lecture introduces the basic concepts of radiative transfer in the earth's atmosphere useful for surface and satellite radiation measurements and remote sensing. We try a rough estimate of aerosol and cloud radiative forcing and some retrieval of aerosol and cloud optical parameters, based on first order approximation formulae and with excel sheet, to get a feeling about the more elaborated treatments.

Contents

Definition of radiative parameters

Single scattering phenomena

Radiative transfer in the optically thin atmosphere

Rough estimate of aerosol radiative forcing and aerosol optical thickness inversion

Radiative transfer in the optically thick atmosphere

Rough estimate of cloud radiative forcing and cloud optical thickness and particle radius

Implication of the aerosol and cloud radiative effects in the earth's climate change problems

A basic course for atmospheric radiative transfer useful for surface and satellite solar radiation measurements and remote sensing

Group advanced(Aula Calcolo, Sapienza)

Lecturer: Oleg Dubovik

Exercises on GRASP model

Wednesday, July 4:

Lecturer: Folkard Wittrock

Duration: 45 min lecture

Exercises on DOAS database

Lecturer: Henri Diémoz

Duration: 45 min lecture

Exercises on EUBREWNET/WOUDC database