



## International School on Satellite Meteorology (ISSM) *Theory, retrieval methods, sensor technology and future missions*

Villa Doria d'Angri, Naples, Italy

**2 – 6 September 2024**

ISSM website: <https://issm2024.isac.cnr.it>

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The Institute of Atmospheric Sciences and Climate of the National Research Council of Italy (CNR-ISAC) and the University of Naples “Parthenope” are delighted to announce the organization of the International School on Satellite Meteorology (ISSM).

### **School goals and topics**

The school will be focused on Satellite Meteorology as the study of the atmospheric, land, and oceanic systems using remotely sensed data from different sensors onboard meteorological satellites. The basic principles of satellite remote sensing of weather features connected to microphysics of clouds and precipitation will be treated, as well as the fundamentals of retrieval methods, satellite imagery interpretation and products for science and operational meteorology. A special focus will be dedicated to the sensor technology and satellite development, launch, and in-orbit management.

*ISSM 2024 will cover the following main topics:*

- Radiative Transfer in atmosphere and remote sensing principles.
- Satellite remote sensing of cloud and precipitation: current missions, sensors, spectral ranges.
- Microphysics of clouds and precipitation.
- Thunderstorms, Terrestrial Gamma-ray Flashes (TGF), gamma-ray glows, and related high-energy atmospheric phenomena.
- Satellite Image interpretation and retrieval methods for science and operational meteorology.
- Satellite data in support to the warning/alert systems for severe weather.
- Future satellite missions, sensor technology and satellite development, launch, in-orbit management.

The detailed program is available on the school's website: <https://issm2024.isac.cnr.it>

### Applicants

The ISSM aims to train Ph.D. students in physical, environmental, atmospheric, or related sciences. Early career operational meteorologists and researchers are invited to apply as well. Applications will also be accepted from talented students working toward their MSc. in the same fields as above. Young Electronics, Aerospace and Astronautical Engineers who want to enrich their CVs are welcome.

All participants will receive the **ISSM Certificate** of successful completion of training program.

### Registration and Costs

The **school fee is 500€** and includes teaching material, icebreaker, coffee breaks, lunches, traditional cuisine social dinner paired with volcanic wines. The school's fee also includes a special visit to the historical Vesuvius Observatory, the oldest volcanology institute in the world, and an unusual walking on the lava deposit of the last eruption in 1944.

Participants are responsible for their own laptop, transport, accommodation, health insurance.

### Dates

**Registration deadline: 30 June 2024**

### Info & contacts

All information can be found on the school's website: <https://issm2024.isac.cnr.it>

Organizing Committee: [issm2024@isac.cnr.it](mailto:issm2024@isac.cnr.it)

Sante Laviola: [s.laviola@isac.cnr.it](mailto:s.laviola@isac.cnr.it)

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## Draft program

### Monday 2<sup>nd</sup> – Theoretical basis of the satellite meteorology

- 09:00 – 09:15 *Welcome to the International School on Satellite Meteorology*
- 09:15 – 11:00 *Fundamentals of satellite remote sensing* (C. Kidd)
- 11:00 – 11:30 Coffee break
- 11:30 – 13:00 *Radiative Transfer in the Earth atmosphere* (T. Maestri)
- 13:00 – 14:00 Lunch
- 14:15 – 14:30 *Students introduce themselves, their background and motivation.*
- 14:30 – 16:00 *Microphysics of clouds and precipitation* (A. Nicosia)
- 16:00 – 17:30 *In-depth lab on theoretical basis of satellite meteorology* (practical application and exercise)

### Tuesday 3<sup>rd</sup> – Retrieval methods for clouds, precipitation and ocean

- 08:30 – 10:00 *Satellite retrieval methods of precipitation* (C. Kidd)
- 10:00 – 11:00 *Lightning from space* (E. Arnone)
- 11:00 – 11:30 Coffee break
- 11:30 – 13:00 *Active satellite sensors for sea surface wind measurement* (M. Migliaccio)
- 13:00 – 14:00 Lunch
- 14:00 – 15:30 *Gamma-ray emission (TGF) from thunderstorms* (M. Marisaldi)
- 15:30 – 17:30 *In-depth joint lab on lighting and gamma-ray emission* (Marisaldi/Arnone)

### Wednesday 4<sup>th</sup> – Satellite meteorology for science and operational forecaster

- 08:30 – 09:30 *Meteorological applications of Sentinel data for the Italian National System for Environmental Protection* (G. Onorati)
- 09:30 – 10:30 *Tracking hailstorms in the Mediterranean - a new perspective for early-warning systems* (S. Laviola)
- 10:30 – 11:00 Coffee break
- 11:00 – 12:00 *The role of satellites in the Copernicus Climate Change Service* (C. Buontempo)
- 12:00 – 13:00 *Satellite-based ECVs for climate monitoring – part 1* (J. M. Sabater)
- 13:00 – 14:00 Lunch
- 14:00 – 15:00 *Satellite-based ECVs for climate monitoring – part 2* (J. M. Sabater)
- 15:00 – 16:00 *Satellite monitoring of extreme meteorological phenomena* (Italian Air Force)
- 16:00 – Special visit to the historical Vesuvius Observatory and excursion on the Vesuvius crater (excursion dresses needed)

### Thursday 5<sup>th</sup> – Satellite sensor technology, data analysis and space mission specifications

- 08:30 – 10:00 *Microwave receivers for small satellite* CNR-IEIIT (G. Virone)
- 10:00 – 11:00 *Spatial resolution enhancement of microwave radiometer measurements* (F. Nunziata)

- 11:00 – 11:30 Coffee break
- 11:30 – 13:00 *End to End system modelling for Earth Observation satellite instruments: the case of microwave imager on board MetOpSG-B* (W. Di Nicolantonio)
- 13:00 – 14:00 Lunch
- 14:00 – 15:00 *Satellite data in support to the warning/alert systems for severe weather* (S. Puca)
- 15:00 – 16:00 *In-depth lab on the enhancement methods for the spatial resolution of MW satellite radiometers* (F. Nunziata)
- 16:00 – 17:00 *Supervised free-time for student groups to organize their presentation for the competition.*
- 20:00 – Social Dinner

**Friday 6<sup>th</sup> – The future of satellite meteorology**

- 08:30 – 10:00 *EUMETSAT EPS-SG Polar Orbiting microwave radiometer instruments: mission overview and applications* (EPS-SG) (V. Mattioli)
- 10:00 – 11:30 *Wivern, the wind velocity radar nephoscope* (A. Battaglia)
- 11:30 – 13:00 *FORUM, a new eye to observe the spectrum of the Earth's far-infrared emission* (L. Palchetti)
- 13:00 – 14:00 Lunch
- 14:00 – 15:30 *Competition of student groups* (12+3 min)