INTERNATIONAL ADVANCED SCHOOL IN AGRICULTURAL METEOROLOGY
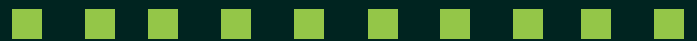
THIRD EDITION

Bratislava, Slovakia 11-15 December 2023

AGRICULTURAL METEOROLOGY
FOR SUPPORTING CROP PRODUCTION

VENUE

Slovak Academy Campus
Dúbravská cesta 9
84005 Bratislava, Slovakia
https://www.sav.sk/

ORGANIZERS

Associazione Italiana di Agrometeorologia

WORLD METEOROLOGICAL ORGANIZATION

EARTH SCIENCE INSTITUTE
SLOVAK ACADEMY OF SCIENCES

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In line with its mission, the Italian Association of Agrometeorology, AIAM, in collaboration with CNR-IBE, designated as WMO Regional Training Center in Italy, WMO-RTC, and the Earth Science Institute of the Slovak Academy of Sciences, ESI-SAS is proud to announce the Third Edition of the International Advanced School in Agricultural Meteorology "Agricultural Meteorology for supporting crop production". The school is organized with the support of COST-CA20108, and the technical cooperation of the UN Food and Agriculture Organization FAO, and its main aim is to provide young researchers and professionals with up-to-date knowledge on the most advanced methods and innovative technologies applied to crop production.

COURSE CONTENT

Crop production and natural resource management need innovative approaches to cope with climate challenges and geopolitical crises that increasingly threaten agriculture. Agrometeorology, through the development of new information, knowledge, and innovative tools, can mainstream science into operational agriculture. The aim of the school is to facilitate participants in increasing their knowledge of scientific results and advanced technologies for agrometeorological analysis and monitoring, as well as the application of innovative tools for crop production in a climate crisis.

The active participation of the trainees will facilitate interdisciplinary networking with experts.

COURSE TOPICS

→ Crop risk information and monitoring system
→ Crop modelling: the APSIM solution
→ Biogeochemical modelling, climate and microclimate
→ Precision farming solutions: the Ploovium experience

→ Monitoring soil moisture from space, a key variable for hydrological and agricultural applications: background and practical exercises
→ Open access of Remotely sensed derived data for monitoring water productivity: the FAO WaPOR platform

COURSE FORMAT

One-week classroom school with lectures, group discussions, and practical training sessions.
Students and teachers of the course will benefit from the Moodle platform through which educational material will be shared and assessment procedures conducted.

TRAINERS

Trainers are world-class experts from the Institute of Meteorology and Climatology (BOKU-Met) of the University of Natural Resources and Life Sciences - Wien, Austria; the Earth Science Institute of the Slovak Academy of Sciences; the National Research Council of Italy; Ploovium by Soonapse - Italy; International Agencies: UN FAO, and European Cooperation in Science and Technology, COST.

DATE

From Monday 11 December 2023
h 9:00 am
To Friday 15 December 2023
h 5:00 pm

VENUE

Slovak Academy Campus
Dúbravská cesta 9
84005 Bratislava,
Slovakia (SK)

PARTNERS

- Council for Agricultural Research and Economics (CREA-PB)
- University of Florence - DAGRI
- National Research Council, Institute of Bioeconomy (CNR-IBE)
- COST-CA20108
- Accademia dei Georgofili
- Foundation for Climate and Sustainability (FCS)
- Rete Rurale Nazionale

SCIENTIFIC COMMITTEE

- Filiberto Altobelli, CREA-PB and AIAM
- Marina Baldi, WMO-RTC and CNR-IBE
- Anna Dalla Marta, University of Florence-DAGRI and AIAM
- Federica Matteoli, FAO
- Pavol Nejedlik, ESI-SAS
- Federica Rossi, CNR-IBE and AIAM
- Francesca Ventura, University of Bologna-DISTAL and AIAM

TARGET AUDIENCE

The School is designed primarily for professionals, young researchers and scientists, PhD and graduate students, engaged and interested in the application of advanced agrometeorological methodologies and techniques.

TUITION FEE

A registration fee of 400€ will be charged to all selected participants. The tuition fee include Access to the School, Course material, Coffee breaks, Field trip. Participants will cover the costs of their travel, accommodation, and daily subsistence.

ITALIAN ASSOCIATION OF AGROMETEOROLOGY

The mission of AIAM (www.agrometeorologia.it/), the Italian Association of Agrometeorology, is the promotion of agrometeorological research through conferences, seminars, and training. AIAM also acts as a link between the services and research activities, and this connection favours the promotion of research on relevant agrometeorological themes, internationally disseminated through the Italian Journal of Agrometeorology, published by the Association.
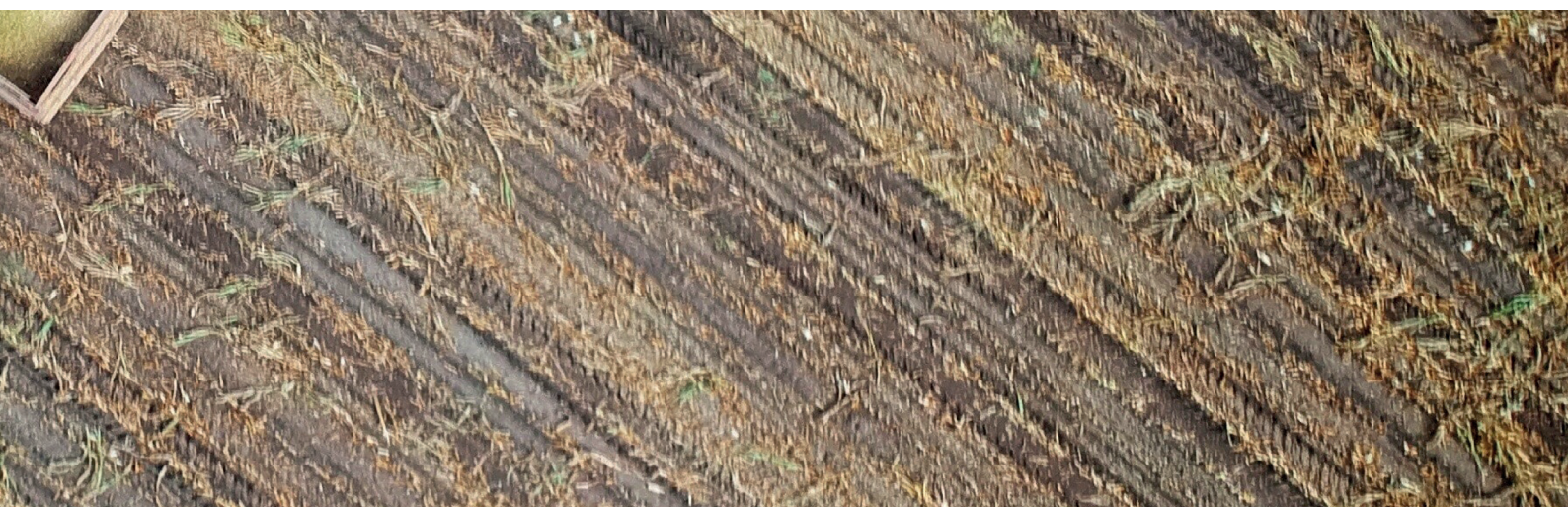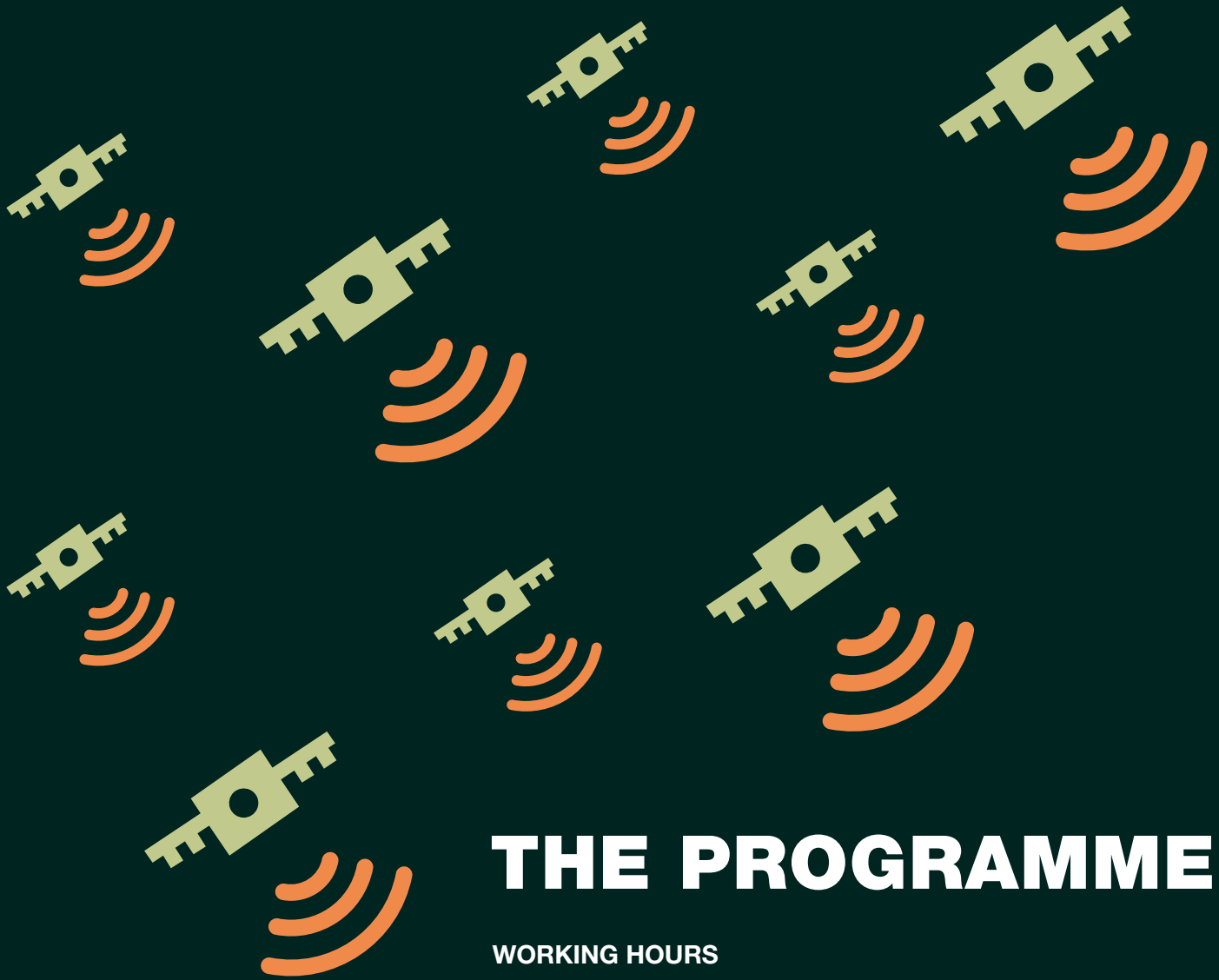
THE PROGRAMME
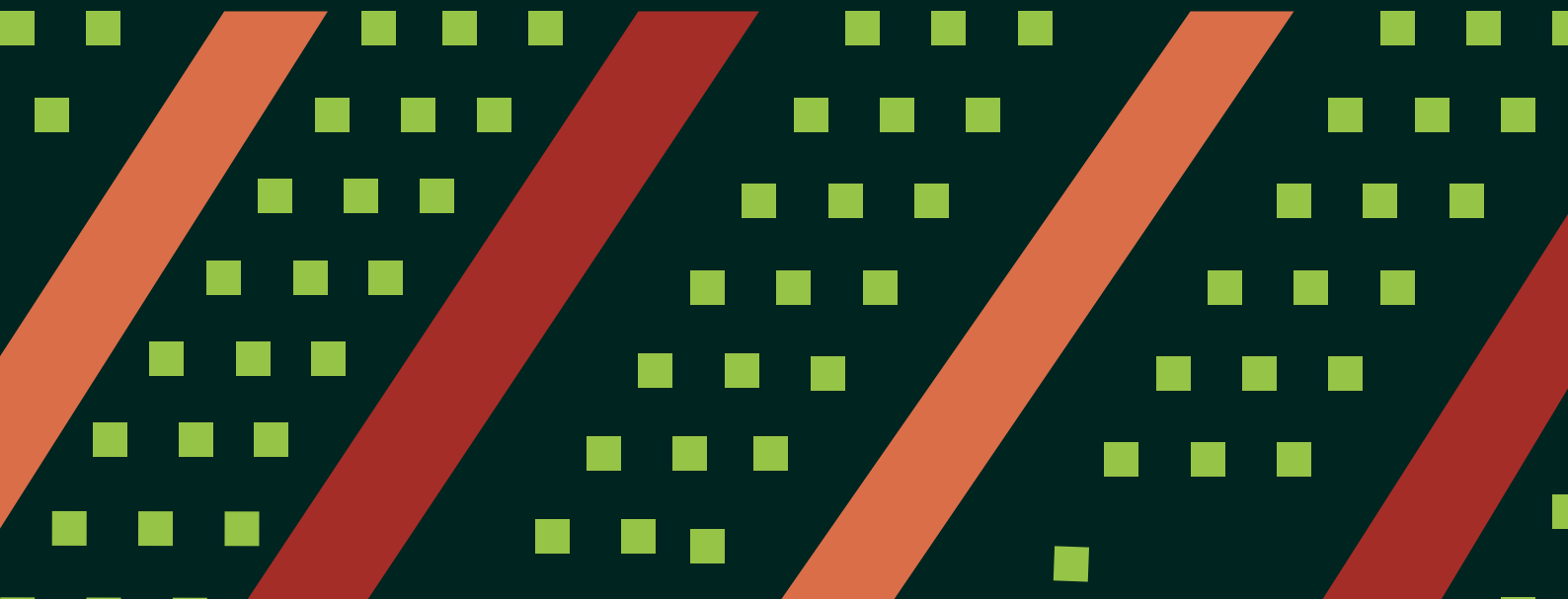
WORKING HOURS

Morning 09:00-12:30
Afternoon 14:00-17:30

Lectures   Hands-On   Field-Trip

9:00 am

OPENING
Welcome
Course introduction and overview

1hh

Introduction to the COST-CA20108
Joseph Eitzinger, BOKU & Filiberto Altobelli, CREA

COST Action "FAIR NEtwork of micrometeorological measurements" (FAIRNESS) CA20108

2hh

Monitoring and forecasting system of cropping conditions and risks by agrometeorological indicators in Austria
Joseph Eitzinger, BOKU

ARIS (Agricultural Risk Information System) is a GIS-based monitoring system (applicable for past- now- and forecasting as well as climate scenarios) for several weather-related abiotic and biotic cropping risks, crop management and growing conditions. ARIS allows the combined assessment of various risks during crop growing seasons and thus provides a whole set of potential risks for various stakeholder needs.

2hh

Application of Crop Models in Tactical and Strategic Decision-making in Farming Systems
Ahmad M. Manschadi, BOKU

The Agricultural Production Systems sIMulator (APSIM) is internationally recognised as one of the most advanced and comprehensive crop/cropping system models for simulating the effects of genetic factors, environmental variables, and management decisions on production (crops, pasture, trees, livestock), profits, and the environmental variables (e.g. soil erosion, nitrate leaching) http://www.apsim.info/.
This hands on session's aim is to introduce trainees to APSIM with a mix of short presentation and tutorials on the following topics: APSIM User Interface: How to build, run, and graph a simulation; Principals of modelling crop growth and development; Modelling plant available soil water content; Modelling nitrogen dynamics.

FURTHER INFORMATION

→ School Secretariat AgroMetSchool@gmail.com

→ WMO-RTC contact point wmortc.italy@gmail.com

→ Description of the School https://tinyurl.com/2utz238y

12 DECEMBER Tuesday

1d **Monitoring soil moisture from space, a key variable for hydrological and agricultural applications: background and real-world practical exercises**

Luca Brocca, Luca Ciabatta and Sara Modanesi - CNR-IRPI

Soil moisture plays a key role in the partitioning of water and energy fluxes at the atmosphere-soil interface. An accurate knowledge of this variable is of paramount importance for natural hazards forecast and mitigation and agriculture applications as yield and drought analysis. Currently, soil moisture is obtained through the use of hydrological modelling, that often requires large computational resources. Satellite observations can be a valid alternative as they are now available with suitable spatial and temporal resolutions allowing to be used in such contexts. The seminar provides attendees with a basic introduction to the remote sensing of soil moisture, an overview of state-of-the-art applications related to the use of satellite soil moisture for hydrological and agricultural applications. By taking advantages of ad-hoc exercises, the participants will get familiar with the use of this key variable for their own activities.

THE HANDS-ON SESSION WILL BE FACILITATED BY FILIBERTO ALTOBELLI (CREA)

13 DECEMBER Wednesday

1/2 d **Biogeochemical modeling, climate and microclimate**

Bernard Siska, Slovak University of Agriculture

Biogeochemical modeling, climate, and microclimate are interconnected aspects of agriculture that play crucial roles in understanding and managing agricultural systems. Biogeochemical modeling helps understand nutrient cycling and its effects on agricultural systems, climate influences overall agricultural productivity and poses challenges due to climate change, and microclimate focuses on the localized climate conditions that directly impact crop growth and management decisions. Integrating knowledge and analysis of these interconnected aspects can improve agricultural practices, enhance sustainability, and support effective decision-making for farmers.

Searchable Micrometeorological Knowledge Share Platform - create FAIR data

Anna Firanj Sremac, University of Novi Sad

COST FAIRNESS aims to establish a FAIR knowledge share portal for scientific data management. The portal captures micrometeorological metadata, aligning with WMO

standards. Metadata details are locally stored, and data is transmitted to Zenodo. A DOI creates a permanent link between the portal and Zenodo, ensuring sustained connectivity. Users navigate the portal for detailed metadata and direct links to data on Zenodo, offering FAIR-compliant micrometeorological knowledge experience.

1/2 d **Field trip organized by Pavol Nejedlik**

TRANSFER TO KRAKOVANY FARM 1 hour time
  → Guided Krakovany Farm Tour
  → Lecture on microclimate - Filiberto Altobelli, CREA

TRANSFER TO SAS CONGRESS CENTRE
  → Lecture on Regenerative Agriculture, Krakovany farm expert
  → Congress Centre Visit

18:00 *SOCIAL DINNER*

19:30 *TRANSFER TO BRATISLAVA*

14 DECEMBER Thursday

1d WaPOR: The FAO portal to monitor WAter Productivity through Open access of Remotely sensed derived data

Bert Coerver, FAO-NSLD

The FAO database WaPOR is openly accessible online since 2017 and contains spatial information on water productivity, water consumption, weather conditions derived from remote sensing at global level, with higher resolution data available for Africa and the Near East. More information on WaPOR data and methodologies and the activities supported in several countries can be found at:
https://www.fao.org/in-action/remote-sensing-for-water-productivity/en.
The 1-day seminar introduces water productivity concepts, methodologies, and the func¬-tionalities of the database. Through several presentations and hands-on

THE HANDS-ON SESSION WILL BE FACILITATED BY FILIBERTO ALTOBELLI (CREA)

1/2 d

Influence of weather forecasts on predictive water balance calculation in AI systems for Smart Irrigation

Marco Ciarletti and Matteo Causio, Soonapse

AI systems for producing the predictive irrigation advice are data-driven, relying on data collected in the field in real time from sensors.However, to generate predictions about the water balance in the following days, they must consider a variant that is itself predictive: weather forecasts. According to the providers' own admission, this variant claims 80%-90% reliability for the first day, which gradually declines to about 40% by the fifth day. Soonapse will present research on the behavior of weather forecasts over one year, where the results, average deviations, and behavior related to extreme and unexpected events, which now characterize the global Climate Change scenario of this period, were studied. The Ploovium tool will then be used to illustrate the methods used to decrease the impact of weather forecast deviations in the AI model that produces the irrigation advice, keeping the reliability of water balance predictions as close to 100 percent as possible, and still above 95 percent.

Wrap-up session and closing remarks

Pavol Nejedlik, Filiberto Altobelli, Marina Baldi

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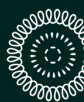delle Ricerche** | **Istituto
per la BioEconomia**

cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

FAIRNESS

crea
Consiglio per la ricerca in agricoltura
e l'analisi dell'economia agraria

FONDAZIONE
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ACCADEMIA DEI GEORGOFILI

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