Welcome to ATMOS2024

Ed Malina, ESA/ESRIN, 01/05/2024

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ATMOS 2024 Program

- 24 Oral Sessions over 5 days, 2 poster sessions

- Nearly 300 contributions! An almost 50% increase on ATMOS2021

- For the first time at ATMOS, four parallel sessions, to be held on Thursday

- 3 keynote speakers
  - MariLiza Koukouli (Aristotle University of Thessaloniki)
  - Hartmut Boesch (University of Bremen)
  - Vassilis Amiridis (National Observatory of Athens)

- 42 session chairs – MANY THANKS!

- 5 students funded by the ESA Academy

Logistics

- Plenary sessions will be held in this room everyday

- Side sessions on Thursday to be held in room 216 upstairs

- All session have a Webex link to allow for passive viewing

- We are not allowed to use the CNR canteen or bar, food trucks will be outside for lunch, or local restaurants are available. Coffee breaks will be outside the plenary in the main foyer

- Posters will remain up all week, and displayed in the main foyer, on the first floor and in the library

ATMOS 2024 Conference Themes

Day 1 – ESA Missions
- Current Missions
- Future and candidate Missions
- EarthCARE
- ALTIUS and the Stratosphere

Day 2 – GHGs
- S5P, CO2M, GOSAT
- PRIMSA, ENMAP, GHGSat, MethaneSAT
- High resolution GHG imaging capabilities
- CO2, CH4, NO2

Day 3 – Air Quality
- S5P, OMI, GEMS, PRISMA
- SO2, OCLO, WV, CO, NH3, HONO, NOx
- Urban emissions, wildfires

Day 4 – Clouds/Aerosols
- EarthCARE, S5P, OMI, Aeolus, FORUM

Day 4 – Dynamics
- System assimilation

Day 4 – Methods & Datasets
- Calibration and retrievals

Day 5 – Ozone
- Ozone recovery and trends
- Long term datasets
- Precursors

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- **Science talks are 12 minutes** (10 minutes + 2 mins questions), **please keep to time!**

- Keynotes (Today, Tuesday and Thursday) are 30 minutes (25 minutes + 5 mins questions)

- Poster sessions, today starting at 18:15 (with icebreaker) and Wednesday starting at 16:30

- Wednesday starting at 16:30, opportunity to **formulate upcoming Sentinel User Preparation Activity**

- **Chairs to capture most important and relevant aspects** of talks and discussions. Wrap up sessions at the end of each day, with open discussion to **form recommendations for ESA!**

- ESA will wrap up session contributions, discussions and recommendations into a report after the conference, to be used to form the **ESA scientific agenda for Atmosphere**

ATMOS 2024 Science Objectives

Provide a platform for **scientific exchange and to assess the state of the art of atmospheric** applications;

• Foster the scientific community in atmospheric research, and **foster bonds with international organisations**;

• Present mission status, algorithms, and products for **Copernicus Sentinel-5p and EarthCARE**;

• Provide updates on development and science activities regarding future missions, e.g. Sentinels 4 & 5, ALTIUS;

• Provide updates on activities **regarding ESA Third Party missions**;

• Present large scale international initiatives to support the **R&D activities** relevant to atmosphere satellite missions;

• Present scientific results related to **the Copernicus Services CAMS & C3S;**

• **Discuss novel atmospheric missions.**

Critically, provide a forum for the scientific community to provide recommendations to ESA
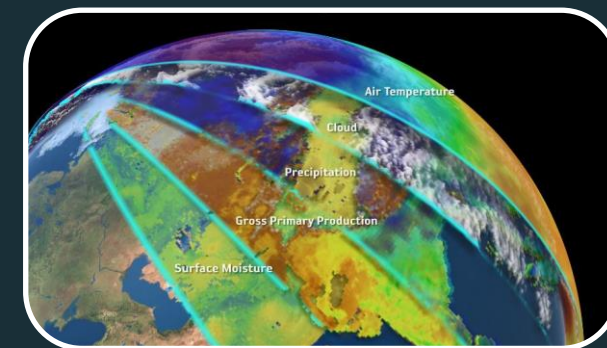
Strategic Activities

Joint ESA-EC Earth System Science initiative strategic partnership with DG-RTD fostering an ambitious European and international scientific collaboration between FutureEO and Horizon Europe

ESA Science Clusters fostering a community open science approach to scientific exploitation bringing together different teams and projects to work together towards common ambitious goals addressing all major scientific domains

ESA Science Hub a new facility in ESA fostering partnerships with academia and collaborative research with centres of excellence in MSs focusing on EO and Earth system science priorities

Developing the "content" of DTE (HPC demonstrators): building a (prototype) advanced digital reconstruction of the Earth system based on the integration of the latest ESA data sets, numerical simulations and science results

ATMOS 2024 Review of Actions from ATMOS 2021

esa

https://atmos2021.esa.int/wp-content/uploads/2022/11/Atmos_2021_conference_report_FINAL_VERSION-1.pdf

43 recommendations derived from ATMOS2021, numerous have been addressed in projects, others to be addressed

- R1 – Explore potential of AI in relation to Air Quality, new Air Quality products, advancing AQ from space
  - **EOPlumes, DINAR, GLANCE, NOODLESALAD**
- R7 – Investigate CH4 Point Sources
  - **HiResCH4, MethaneCAMP, AI4CH4, SMART-CH4**
- R8 – Automatic CH4 plume detection using AI methods
  - **AI4CH4**
- R10 – Further studies to investigate CH4 from high latitudes with respect to freeze/thaw
  - **MethEO, MethaneCAMP, upcoming polar science cluster project**
- R13 – Advance GHG products alongside operational products
  - **Methane+, SMART-CH4**

- R15 – Develop XCO2 retrieval algorithm from Sentinel-5
  - **OPERA-S5**

- R20-26 – Advance aerosol science, through synergistic activities and advanced products
  - **AIRSENSE, SYREMIS, L2A+**

- R30 – Study Cloud 3D effects
  - **3DCTRL, MIT3D**

- R31 – Advance knowledge of clouds and their impact, e.g. cloud microphysics, cloud height
  - **AIRSENSE**

- R39-41 – Advance and make use of data products from Earth Explorer missions e.g. AEOLUS
  - **Aeolus+ Processes, L2A+**

Other ATMOS2021 recommendations have been implemented outside of the Atmospheric Sciences Cluster, e.g. support for calibration and validation campaigns for upcoming missions

ATMOS 2024 Science Organisation – Many Thanks!!

- **The Organisation Committee**

  Edward Malina, Thorsten Fehr, Simon Pinnock, Claus Zehner, Diego Fernandez Prieto, Christian Retscher

- **The Scientific Committee (many also acting as session chairs)**

  Ilse Aben, Vassilis Amiridis, Alessandro Battaglia, Angela Benedetti, Antoine Berchet, Hartmut Boesch, Dominik Brunner, Andre Butz, Alessandra Cacciari, Alexander Cede, Ugo Cortesi, Cyril Crevoisier, Doug Degenstein, Bianca Dinelli, Oleg Dubovik, Federico Fierli, Luis Guanter, Michela Hegglin, Sander Houweling, MariLiza Koukouli, Akihiko Kuze, Barry L. Lefer, Rasmus Lindstrot, Diego Loyola, Tiziano Maestri, Doina Nicolae, Paul Palmer, Mark Parrington, Rene Preusker, Richard Siddans, Oliver Reitebuch, Kerstin Stebel, Johanna Tamminen, Tim Trent, Michel Van Roozendael, Pepijn Veefkind, Thomas Wagner, Kaley Walker, Ulla Wandinger, John Worden

- **The ESA Scientific Committee**

  Thomas August, Antony Delavois, Elody Fluck, Björn Frommknecht, Daniele Gasbarra, Timon Hummel, Yasjka Meijer, Hilke Oetjen, Tommaso Parrinello, Ben Veihelmann, Laura Warwick

- **Organisation Support**

  Kimberly Mazzilli, Francesca Romana Cupellini, Isabella Houghton, Lorenza Versace, Matteo Corona, Riccardo Sonnino

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Thank you for contributing towards a great conference, we wish you success for ATMOS2024!