Wissenschaftsetage im Bildungsforum

Potsdam, Germany | October 7 – 9, 2024

www.ggos.org/event/ggos-topical-meeting-atmosphere/

Bringing together science excellence to integrate geodetic and geophysical technologies for comprehensive monitoring of the atmosphere (troposphere, stratosphere, mesosphere, thermosphere, ionosphere/plasmasphere) and the magnetosphere.

Supported by

IUGG – International Union of Geodesy and Geophysics
IAG – International Association of Geodesy
IAGA – International Association of Geomagnetism and Aeronomy
Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences
BEV – Federal Office of Metrology and Surveying, Austria
DGFI-TUM – Deutsches Geodätisches Forschungsinstitut, Technische Universität München

May 15, 2024

Contents

Presentation

Since measurements from all space geodetic observation techniques (GNSS, DORIS, satellite altimetry, SLR, VLBI) propagate through the atmosphere, geodesy not only determines the time-varying shape of the Earth, its gravity field and rotation, but is also able to detect spatio-temporal variations of the atmosphere. The analysis of geodetic data provides important information about physical processes in the lower atmosphere (troposphere), middle atmosphere (stratosphere, mesosphere) and upper atmosphere (thermosphere, ionosphere/plasmasphere, magnetosphere; hereafter abbreviated as MIT). Understanding these processes is essential, for example, to identify risks of extreme space weather events on critical infrastructure for daily life. The effect of natural and man-made hazards in the upper atmosphere also requires additional research to deepen our understanding of coupling processes and to enhance warning systems. In order to take full advantage of the technological developments in sensor systems and observation techniques, a parallel and consistent further development of data analysis and combination methods is required. It is crucial to incorporate cross-cutting expertise through the use of advanced geophysical modelling and new observation concepts, as well as the application of data assimilation and machine learning methods. For example, the intra- and inter-technique comparison and combination of atmospheric delays and gradients at VLBI/GNSS/DORIS co-location sites opens the possibility for a robust assessment that not only exploits the individual strengths of the different observation techniques, but also sheds light on the instrumental errors that manifest themselves in atmospheric delay estimates. This integrated analysis leads to more reliable conclusions when studying geodesy-derived integrated water vapour in the context of climate change. In the case of the upper (ionised) atmosphere, a current main objective is to investigate relevant processes in the solar-terrestrial environment necessary to understand the spatial and temporal variations of MIT key parameters such as electron density and vertical total electron content (VTEC) within the ionosphere/plasmasphere as well as neutral density in the thermosphere. Furthermore, leveraging novel geodetic observation techniques such as GNSS reflectometry, recently onboard small satellites and CubeSats, enables us to capture a wide variety of lower atmospheric and Earth surface data previously inaccessible to conventional geodetic techniques. Integration of these developments enhances our ability to monitor changes in the lower atmosphere over a broader spectrum of parameters and spatial and temporal scales, while also improving our understanding of its coupling with the Earth's surface.

In this context, the Global Geodetic Observing System (GGOS) of the International Association of Geodesy (IAG) invites the geodetic and geophysical communities to participate in the GGOS Topical Meeting on the Atmosphere. The main objective is to establish a multidisciplinary network of scientists to integrate geodetic and geophysical technologies for comprehensive monitoring of the lower, middle, and upper atmosphere and to identify existing and potential new related applications that contribute to the dissemination and societal use of research results in this important field.

Topics

Contributions on the following topics are welcome:

- **Integration/combination of geodetic and geophysical technologies** for comprehensive monitoring of the lower (neutral) and upper (ionised) atmosphere.
- **Application of machine learning techniques** to the analysis of geodetic and geophysical observations relevant for the atmosphere.
- **Intra- and inter-technique comparison and combination of atmospheric delays** and evaluation against numerical weather models.
- **Atmospheric ties to improve reference frames** and coordinate solutions.
- **Analysis of ionospheric disturbances** and their contribution to tsunami early warning systems or other geohazard monitoring.
- **Recent progress, current understanding, and future challenges in MIT research**, with a particular focus on the coupling processes.
- **Combination of measurements from space geodetic observation techniques including radio occultations with observations from solar missions**, such as ACE, DSCVR and SOHO, to produce global and regional high-resolution and high-precision models of MIT key parameters such as VTEC, electron density and neutral density.
- **Atmospheric data using newly developed geodetic observation methods** and deployed satellites, such as those involved in GNSS reflectometry missions, and validating the results.
- **Modelling approaches for nowcasting and forecasting of MIT key parameters**; e.g., by applying suitable assimilation methods and machine learning algorithms.
- **Definition of potential essential variables** to characterise the lower, middle, and upper atmosphere.

Important dates

- Travel Award application deadline **July 15**
- Travel Award notification **July 31**
- Abstract submission deadline **July 31**
- Abstract acceptance notification **August 15**
- Schedule and conference program **August 31**
- Pre-registration deadline **August 31**
- List of participants **September 5**
- GGOS Topical Meeting **October 7 – 9**
- GGOS Days 2024 **October 10 – 11**

Participation and pre-registration

The meeting will take place in person only; online participation is not possible. All colleagues working on the topics of the meeting or related themes are invited to submit an abstract before 31 July. Attendance is free (no registration fee), but pre-registration is required to ensure room capacity. By pre-registering, the participants agree that their data will be stored internally in the GGOS records. The data will only be used for meeting-related organisational issues. Acceptance of abstracts will be confirmed by 15 August and registration will be confirmed before 5 September. If any pre-registered

participant is not able to attend the meeting, they are asked to withdraw their pre-registration as soon as possible (by contacting co@ggos.org). Abstract and pre-registration forms are available at https://ggos.org/event/ggos-topical-meeting-atmosphere/#registration.

Format of the meeting

The GGOS Topical Meeting on the Atmosphere will be held from 7 to 9 October 2024 at the *Wissenschaftsetage im Bildungsforum* in Potsdam, Germany. Daily sessions are scheduled between 8:30 and 17:00 with a lunch break between 12:30 and 14:00. The morning sessions will be dedicated to oral presentations, while the afternoon sessions will be dedicated to posters and panel discussions. In the two days following the GGOS Topical Meeting, the GGOS Days 2024 will take place (www.ggos.org/event/ggos-days-2024/). Participants of the GGOS Topical Meeting are also welcome to attend the GGOS Days 2024.

Abstract submission and paper publication

Abstracts must be submitted before 31 July using the online form available at https://ggos.org/event/ggos-topical-meeting-atmosphere/#abstract. Abstracts received after the deadline will not be accepted and will not be included in the final programme of the meeting. Authors will be informed of the acceptance/rejection of their abstract by email by 15 August. By submitting an abstract, the author or one of the authors of a joint work is required to complete the online pre-registration before 15 August. If no pre-registration has been received by that date for one of the authors of the abstract, it will not be included in the meeting programme. If authors know that their presentation will not be presented, they are asked to withdraw their abstract as soon as possible (by contacting co@ggos.org).

Participants are invited to submit their papers to

Journal: Advances in Space Research (ASR),
https://cosparhq.cnes.fr/publications/advances-in-space-research-asr/
Special Issue: Ionospheric Imaging: Recent Advances and Future Directions
Deadline: 15 January 2025
Guest Editors: Marcio Muella, Fabricio Prol
More details at:
https://cosparhq.cnes.fr/assets/uploads/2024/04/Ionospheric-Imaging.pdf

Submissions will be subject to peer review before publication.

License and copyright

The following licence and copyright agreement is valid for any abstract submitted to the GGOS Topical Meeting on the Atmosphere:

In submitting the abstract, the authors certify that (1) they are authorized by their co-authors to submit the abstract; (2) they secure the right to reproduce any material that has already been published or copyrighted elsewhere; (3) they agree to the following license and copyright agreement:

Science team

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- **Robert Heinkelmann**, Analysis Coordinator of the *International Earth Rotation and Reference Systems Service (IERS)*, Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences, Germany
- **Roman Leonhardt**, *IAGA Division V "Geomagnetic Observatories, Surveys and Analyses"*, GeoSphere Austria, CONRAD Observatorium, Austria
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- **Luciano Mendoza**, Laboratorio de *Meteorología espacial, Atmósfera terrestre, Geodesia, Geodinámica, diseño de Instrumental y Astrometría* (MAGGIA), Universidad Nacional de la Plata, Argentina
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- **Ningbo Wang**, President of *IAG Sub-Commission 4.3 "Atmospheric Remote Sensing"*, Aerospace Information Research Institute (AIR), Chinese Academy of Sciences (CAS), China
- **Marcio Muella**, University of Vale do Paraiba (UNIVAP), *Advances in Space Research, Guest Editor, Special Issue Ionospheric Imaging: Recent Advances and Future Directions*, Brazil

- **Fabricio S. Prol**, Finnish Geospatial Research Institute (FGI), *Advances in Space Research, Guest Editor, Special Issue Ionospheric Imaging: Recent Advances and Future Directions*, Finland
- **Harald Schuh**, Professor and *Chair of Satellite Geodesy*, Institute of Geodesy and Geoinformation Science, Technische Universität Berlin, Germany

Coordination team

- **Laura Sánchez**, *GGOS President*, Technische Universität München, Deutsches Geodätisches Forschungsinstitut (DGFI-TUM), Germany
- **Martin Sehnal**, *Director of the GGOS Coordinating Office*, BEV – Federal Office of Metrology and Surveying, Austria
- **Robert Heinkelmann**, *Analysis Coordinator of the International Earth Rotation and Reference systems Service (IERS)*, Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences, Germany

Travel awards for early carrier scientists and colleagues from developing countries

Thanks to the support of IUGG, IAGA and IAG, we will be able to provide some financial support to early career scientists and colleagues from developing countries who wish to present their research at the meeting. Applicants should send their application to the GGOS Coordination Office co@ggos.org before 15 July. The application must include

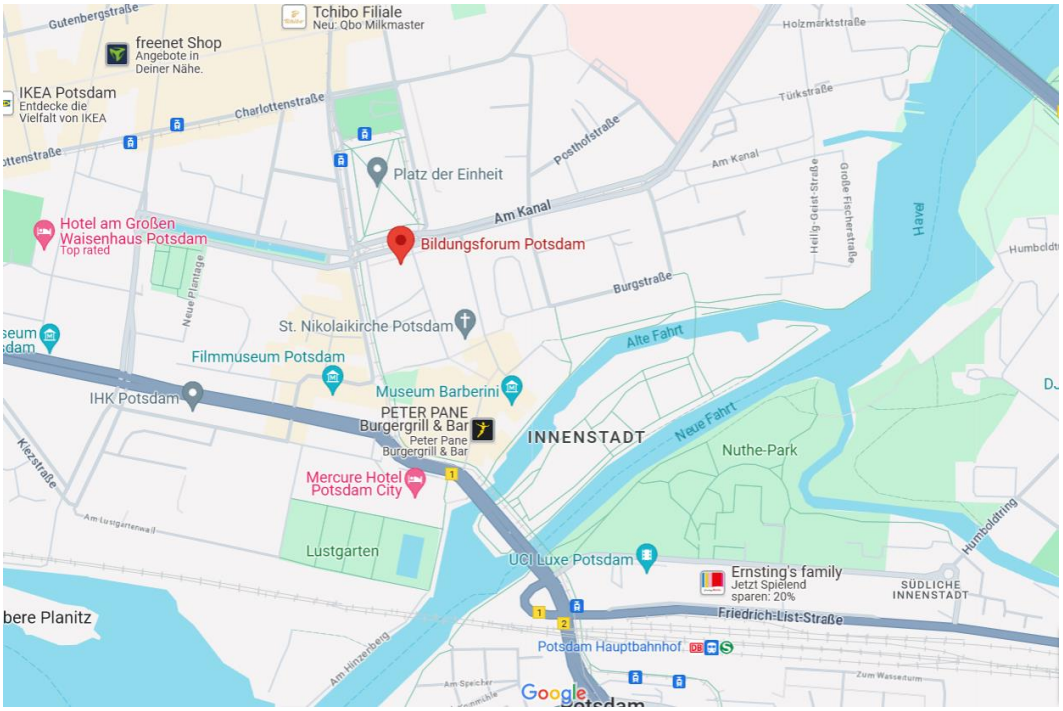
- Applicant's full name, address, email address, and date of birth
- Institution and degree/position of the applicant (e.g. University, MSc or PhD student)
- Title, authors and abstract of the paper to be presented (abstract should already be submitted at https://ggos.org/event/ggos-topical-meeting-atmosphere/#abstract)
- Amount requested in Euro
- Estimated travel costs (travel, accommodation, per diem, etc.) and sources of additional funding

By submitting the application, the applicant agrees that his/her data will be stored internally in the GGOS records. The data will only be used for award related purposes. Applicants will be informed of the acceptance/rejection of their application by email by 31 July. The money will be handed over during the meeting.

Venue and travel information

The GGOS Topical Meeting on the Atmosphere will be hosted in the ***Wissenschaftsetage im Bildungsforum*** (https://www.wis-potsdam.de/de/wis-wissenschaftsetage-im-bildungsforum) located in (https://www.wis-potsdam.de/en/contact-find-us-0):

proWissen Potsdam e. V.
WIS im Bildungsforum
Am Kanal 47
14467 Potsdam
Germany



Courtesy of Google maps

By air

Berlin has one airport that provides international connections: Airport Berlin Brandenburg (IATA code: BER). This airport is well connected to the Berlin/Brandenburg public transport system, and you can easily reach the city of Potsdam in about 1 hour.

From Berlin Airport BER to Potsdam railway station

Ticket: Berlin BC

Route: follow the signs to S Flughafen Berlin Brandenburg Bhf. Take train RB 22 from Flughafen Berlin Brandenburg (at Terminal 1-2 in direction to Potsdam Hbf or S Griebnitzsee Bhf). Leave the train at Potsdam railway station (Potsdam Hbf).

Tickets for the public transport can be bought at railway stations (ticket machines or sales outlets), inside buses (ticket machines or from the driver), or via BVG Mobile App "Fahrinfo" for individuals with a smartphone and data connection. For ticket fares see the latest information of BVG or of VBB.

Please make sure to validate your ticket before you enter any public means of transport if there is no date-stamp on your ticket. You will normally find ticket validators on the platforms or at the stops.

From Potsdam Hbf take the tram to the station "Platz der Einheit/ Bildungsforum"
Tram 93 (with direction to Potsdam, Glienicker Brücke)
Tram 98 (with direction to Potsdam, Platz der Einheit/Nord)

By train

There are several national and international train connections via Berlin or directly to Potsdam railway station (Potsdam Hbf). You can get train tickets for instance from Deutsche Bahn AG.

By car

Cars can be rented at many places in Berlin and Potsdam as well as directly from the airport. Via A115: From Berlin take the B1 from Berlin-Wannsee or motorway "Autobahn" A115 to Hannover/Leipzig, exit Potsdam-Babelsberg in direction of Potsdam Zentrum, Nuthestraße, Berliner Straße, Am Kanal.

Parking areas

Am Kanal 17
Monday to Friday 8:00-20:00
Saturday 8:00-16:00
Sunday 8:00-16:00

Am Kanal Joliot-Corie-Straße
Monday to Friday 8:00-20:00
Saturday 8:00-16:00
Sunday 8:00-16:00

Alter Markt
Monday to Friday 8:00-20:00
Saturday 8:00-16:00

Wilhelm Galerie
Monday to Thursday 7:30-01:30
Friday 6:30-3:30
Saturday 6:30-3:30
Sunday 8:00-1:30

Accommodation

Participants are expected to book their accommodation individually. Potsdam offers a wide variety of hotels in terms of price and location. More information about the city of Potsdam can be found at https://www.potsdam-tourism.com/en/home. The following hotels are within walking distance of the venue:

Holiday Inn Express & Suites : Potsdam
Am Kanal 15
14467 Potsdam
www.ihg.com/holidayinnexpress/hotels/gb/en/reservation

B&B Hotel Potsdam
Babelsbergerstr. 24
14473 Potsdam
www.hotelbb.de/en/potsdam

Kongresshotel Potsdam
Am Templiner See 1
14471 Potsdam
www.kongresshotel-potsdam.de

Hotel Am Havelufer Potsdam
(New: Vienna House, former: Arcona)
Zeppelinstr. 136
14471 Potsdam
www.viennahouse.com

Mercure Hotel Potsdam City
Lange Brücke
14467 Potsdam
www.mercure.com

the niu Amity
Leipziger Straße 1 (Block J)
14473 Potsdam
https://the.niu.de/

Visa

Germany is a member of the European Union and part of the Schengen Agreement (https://www.auswaertiges-amt.de/en/visa-service/-/231202). As such, EU citizens and visa holders from Schengen countries do not require a visa. Colleagues from other nationalities may need an entry visa for Germany. Please check visa requirements at https://www.auswaertiges-amt.de/en/visa-service/-/231148 and contact their nearest German embassy or consulate for further information (see https://www.auswaertiges-amt.de/de/ReiseUndSicherheit/deutsche-auslandsvertretungen). This information is provided by the German Federal Foreign Office (https://www.auswaertiges-amt.de/en).

Letters of invitation can be obtained from the GGOS Coordinating Office (co@ggos.org). It is recommended that all guests start the visa process at least three months before the meeting. Travel and medical insurance, if required, are the sole responsibility of the participant.

Contact

www.ggos.org/event/ggos-topical-meeting-atmosphere/

GGOS Coordinating Office, co@ggos.org