

**First Circular – Workshop of the International Space Science Institute (ISSI)**

**November 20, 2023**

## **Physical Links Between Weather and Climate in Space and the Lower Atmosphere**

**January 22 to 26, 2024**

### **Conveners:**

Michel Blanc (Inst. de Recherche en Astrophysique et Planétologie, Toulouse, FR)

Rune Floberghagen (ESA-ESRIN)

Maxime Grandin (University of Helsinki, FI)

Noora Partamies (University Centre Svalbard, NO)

Claudia Stolle (IAP Kühlungsborn, DE)

Anja Strømme (ESA-ESRIN)

Matthew Taylor (ESA-ESTEC)

Michael Rast (ISSI Bern, CH)

**Local organisation:** D. Fuchs & J.Fankhauser, ISSI, [secretary@issibern.ch](mailto:secretary@issibern.ch)

### **Context:**

The Earth's predominantly neutral atmosphere interfaces with the “sea of plasmas” surrounding it via its ionosphere and the upper and middle Atmosphere, providing an interface layer through which a broad diversity of energy transfer processes takes place in this comingled plasma-neutral domain. Developing an integrative understanding of global geospace energy and momentum transfer processes acting within and across this layer is a major scientific challenge with important societal implications.

### **Objectives of the Workshop:**

This workshop will support a deeper understanding of the solar and terrestrial interactions through energy and momentum transfer processes between the ionosphere and the upper- and middle atmosphere, thus possibly enabling the detection of signatures by natural and anthropogenic hazards. The results of this analysis should be based on the existing worldwide capability in the related fields and should support the conceptual design of a future space-borne and ground-based observing capability.

An ISSI Forum addressing this subject in the fall of 2022 noted good progress in the scientific field and showed results demonstrating the value of studying space weather

<sup>1</sup> <https://public.wmo.int/en/programmes/global-climate-observing-system/essential-climate-variables>

forcing from above and atmospheric weather forcing from below. The Forum's recommended to continue and extend the scientific framework by addressing a wider range of scientific sub-disciplines and involving a larger number of scientists, thus attaining a broader perspective.

Central to the Workshop would be the establishment of a framework where all related observations can be combined for assimilation and visualisation (including data from ground-and space-based systems). This would necessitate an interoperable 'working' environment with homogeneity in data formats. etc. and the improvement of the discoverability and interoperability of ground and space-based data. As a result the concept development of an Ionosphere-Thermosphere-Mesosphere Observatory could be enabled, using existing and planned missions as focal points, towards an "International Solar-Terrestrial Physics Programme-Next".

The Workshop will aim to:

- Provide a scientifically unified view in the area of Space and Atmospheric weather and climate, in light of the plans of the involved disciplines
- Act as focus for discussion of the scientific interests of these communities, including the European ground-based community and data archiving activities
- Assess potential synergies and provide inputs and recommendations as relevant
- Receive inputs from the scientific community cutting across Space and other Agency Programmes to encourage inter-agency activities to improve communication

### **Expected results from the Workshop:**

The outcome of the Workshop will be summarised in peer-reviewed papers to be published as individual papers in Surveys in Geophysics and subsequently as Book in the Space Sciences Series of ISSI. This book will describe the state of the art of our current understanding of the physical processes within and across this region, identify the main observational gaps both in space and on the ground, and the gaps in scientific understanding and modelling capabilities in this still underexplored region. The book will further address observational infrastructure- and ground segment topics, enabling data sharing and combination. ISSI aims for all papers to have open access status.

### **Preparation of abstracts and seed questions for Panel Discussions**

In order to prepare the presentations at the Workshop and due to the fact that some draft inputs/elements to the papers may exist already, we expect presentations on these recent/exciting developments, and many discussions. All attendees are expected to contribute to one or more articles of the collection to be produced.

**It is specifically requested to send a one-paragraph abstract together with the title of planned presentations by 22 December (end of business) to [michael.rast@issibern.ch](mailto:michael.rast@issibern.ch)**

We encourage researchers not only to present their current research, but also to illuminate the path ahead by sharing their upcoming and planned research and fostering a dynamic exchange of ideas during the workshop.

### **Product of the Workshop**

The product of the workshop are scientific papers, collected in a volume of the *Space Sciences Series of ISSI* by Springer Verlag (see [www.issibern.ch/publications](http://www.issibern.ch/publications)). Besides the published volume, articles will also individually be published in a special issue in *Surveys in Geophysics* (IF 7.965, <https://www.springer.com/journal/10712>). Papers are expected to be submitted 3 to 6 months after the workshop. The volume is NOT intended to be the proceedings of the workshop, but a collection of in-depth papers inspired by the contributions, discussions and ideas of the workshop, with emphasis on interdisciplinarity (a total of about 12 to 16 high-quality topical papers is expected). All papers will be peer reviewed, and the volume is expected to appear about 12 months after the workshop. ISSI is committed to ensuring open access for all articles produced as part of the Workshop, based on Springer's Transformative Agreement.

**Posters:** ISSI has the possibility to accept up to 10 posters, which can be displayed at ISSI during the workshop. **Participants planning to present a poster are encouraged to inform the ISSI Secretariat 4 weeks prior to the workshop.**

### **Location and Travelling to Bern**

The Workshop will be held at the International Space Science Institute, Hallerstrasse 6, 3012 Bern, Switzerland. Bern is connected to many European cities by fast intercity trains (e.g. TGV Paris-Bern in 4.5 hours, or Frankfurt-Bern 5 hours). Bern can also be reached easily from three international airports: Zurich (ZRH), Basel (BSL/MLH) and Geneva (GVA). We encourage participants to travel by train, whenever possible. Timetable information of trains within and around Switzerland can be found at [www.rail.ch](http://www.rail.ch). Also check out our website [www.issibern.ch](http://www.issibern.ch) for a few more travel tips such as links to city maps of Bern, weather forecasts, tourist information and so on.

### **Hotel reservations**

A block booking has been made in city centre hotels for the Workshop. All participants of the workshop are **requested to contact the workshop secretary, Dominique Fuchs** (email: [secretary@issibern.ch](mailto:secretary@issibern.ch) or Tel. +41-31-684-4896), **to indicate their arrival and departure dates**, as well as any special requests they may have (e.g. double room). Please note that all hotel reservations have to be made by the ISSI Secretariat. Workshop participants are asked to submit their hotel booking request to the ISSI Secretariat by **December 20**, at the latest.

Invitation letters for, e.g., visas can be requested by the ISSI Secretariat (same address) and will be sent within a few days.

**Workshop Webpage:**

<https://workshops.issibern.ch/spaceandtheloweratmosphere/>

**Location:** The workshop will be held at the International Space Science Institute, Hallerstrasse 6, 3012 Bern, Switzerland.

**Attendance:** by invitation only, ~ 40-45 participants maximum.

**Young scientists:** Under its special program of supporting young scientists, ISSI will invite (in addition) 4 to 6 early career scientists, within 2 years of their PhD, to take a full part in the workshop.

**Funding:** ISSI will provide the subsistence costs (hotel and a per diem) to all participants. Travel costs are not refunded. There is no registration fee.

**Schedule:**

Formal invitations:	July 12, 2023
Registration deadline:	September 30, 2023
First Circular and draft final programme:	November, 20 2023
Hotel deadline:	December 20, 2023
Abstract submission	December 22, 2023
Workshop:	January 22 to 26, 2024