

**Study of cosmic ray influence upon  
atmospheric processes**

**Goal:**

**Identification of a specific mechanism of cosmic ray influence upon climate**

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**List of confirmed participants:**

**ISSI members:**

- Dr. Karen L. Aplin
- Prof. Dr. Frank Arnold
- Prof. Galina A. Bazilevskaya
- Prof. R. Giles Harrison
- Dr. Alexei Krivolutsky
- Dr. Irina A. Mironova
- Dr. Eugene Rozanov
- Dr. Esa Turunen
- Dr. Ilya G. Usoskin

**Young Scientists:**

- Dr. Ilona Riipinen
- Dr. Keri Nicoll
- Mr. Julien Gérard Anet

**Invited expert:**

- Dr. Miikka Dal Maso
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**Useful Information:**

**Location of Hotel Astoria**

Zieglerstrasse 66  
CH-3000 Bern 14  
Tel. +41 31 378 66 66  
Fax +41 31 378 66 00  
<http://www.astoria-bern.ch/en/welcome>  
<http://www.astoria-bern.ch/en/location>

**Location of ISSI**

Hallerstrasse 6  
CH-3012 Bern  
Tel. +41 31 631 48 96  
Fax +41 31 631 48 97  
<http://www.issibern.ch>  
<http://www.issibern.ch/localguide/location.html>

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**Program:**

**MONDAY 17 January 2011**

**9:30 Welcome and Introduction**

**Maurizio Falanga**

"Opening Meeting and Introduction to the International Space Science Institute (ISSI)"

**Irina A. Mironova**

"Introduction: Goals of our ISSI project"

**10:15 Coffee Break**

**10:30 Role of cosmic rays in the Earth atmosphere**

**Galina A. Bazilevskaya**

"Main features of energetic charged particle fluxes in the Earth's atmosphere"

**Ilya G. Usoskin**

"Cosmic ray induced ionization in the atmosphere: advances and pitfalls in numerical modelling"

12:30 **Lunch**

14:30 **Discussion** "Role of cosmic rays in the Earth atmosphere"

**Ilya G. Usoskin and Galina A. Bazilevskaya**

**Open questions:**

- Possible role of Cosmic Ray Induced Ionization (CRII) in atmospheric processes?
- Effect of SEPs, GLEs upon atmospheric processes (altitudes/longitudes)?
- Short-term and long-term atmospheric effect of CRII?
- etc.

17:00 **Ice Breaker party**

"Welcome to ISSI by ISSI"

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## **TUESDAY 18 January 2011**

9:30 **Identification of specific mechanisms of cosmic ray influence upon atmospheric processes**

**Ilona Riipinen**

"Atmospheric nucleation and some studies on it's potential connection to cosmic rays"

**Frank Arnold** and H. Schlager

"Atmospheric aerosol formation at altitudes between 1 and 100 km: Airborne mass spectrometric measurements of ionic and neutral aerosol precursors"

**Irina Mironova**

"Effect of extreme solar energetic particles events on polar stratospheric aerosol"

12:30 **Lunch**

13:30 **Identification of specific mechanisms of cosmic ray influence upon atmospheric processes**

**Karen L. Aplin** and R. Giles Harrison

"Ion-induced aerosol variations in the atmosphere of Neptune"

**R. Giles Harrison** and M.H.P. Ambaum, K.A. Nikoll, M.Lockwood

"Measurement of cosmic ray effects on clouds"

15:00 **Coffee Break**

15:15 **Discussion** "Identification of specific mechanisms of cosmic ray influence upon atmospheric processes"

**Frank Arnold, Karen L. Aplin, R. Giles Harrison and Ilona Riipinen**

**Open questions:**

- Estimation of a role cosmic ray in aerosol formation by ion-induction nucleation (time / altitudes / longitudes)?
  - Estimation of a role cosmic ray in the global electric circuit and clouds (time / altitudes / longitudes)?
  - Distinction between different proposed physical mechanisms?
  - etc.
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### WENSDAY 19 January 2011

#### 9:30 **Identification of specific mechanisms of cosmic ray influence upon atmospheric processes**

**Keri Nicoll**

"Coupling between the global atmospheric electric circuit and clouds"

**Karen L. Aplin**

"Infra-red absorption by molecular cluster-ions in the lower atmosphere"

**Miikka Dal Maso**

"The importance of natural plant emissions on atmospheric nanoparticle formation and growth"

#### 12:30 **Lunch**

#### 14:30 **Identification of specific mechanisms of cosmic ray influence upon atmospheric processes**

**Ilya G. Usoskin**

"Cosmogenic isotopes as tracers of atmospheric transport"

**Esa Turunen**

"EISCAT and EISCAT\_3D, possibilities of the current and future incoherent scatter facilities in measuring the atmospheric effects by cosmic rays"

#### 16:00 **Coffee Break**

#### 16:15 **Discussion** "Future experiments for testing influence of cosmic rays upon atmospheric processes"

**Esa Turunen and Frank Arnold**

**Open questions:**

- Needed experimental data?
  - Possibly recommendations for future experiments?
  - etc.
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### THUESDAY 20 January 2011

#### 9:30 **Using models for testing mechanisms of cosmic rays influence on atmospheric processes and climate**

**Esa Turunen** "The use of Sodankyla Ion Chemistry model in studying effect of excess ionisation events in middle Atmosphere"

**Alexei Krivolutsky** "Simulated effects of energetic particles in atmospheric chemistry and dynamics"

**Eugene Rozanov** "Energetic particles and their influence on atmospheric chemistry and dynamics"

**Julien Anet** "Parameterization of the Energetic Particles influence in the SOCOL-GCM for the past and future climate"

12:30 **Lunch**

15:00 **Discussion** "Using models for testing mechanisms of cosmic rays influence on atmospheric processes and climate"

**Eugene Rozanov, Esa Turunen and Irina A. Mironova**

**Open questions:**

- Needed and/or missing "model blocks"?
  - Parameterization needed for models?
  - etc.
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## FRIDAY 21 January 2011

9:30 **Plans for future work**

**Irina A. Mironova** "Summary results of the first ISSI meeting"

**Discussion** "Plans for future work"

**Open questions:**

- What we need to do for realizations goals of the ISSI Project?
- Publishing results of ISSI project in a Volume of Space Science Reviews?
- Data of the next ISSI meeting?
- etc.

12:30 **Lunch**

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