

19th International EISCAT Symposium and 46th Annual European Meeting on Atmospheric Studies by Optical Methods

19th - 23rd August 2019 in Oulu, Finland

Programme, version 18th August

Monday, 19th August

0900-1000 Registration and coffee

Session 1: Novel instruments and methods: EISCAT_3D and optical instruments, other infrastructures and missions

Conveners: Ian McCrea and Anita Aikio

1000–1005 Welcome, Anita Aikio, Programme Committee chairperson

1005–1025 Welcome, Taina Pihlajaniemi, Research Rector of Oulu University

1025–1045 Practical information, Thomas Ulich, LOC chairperson

Chairperson: Ian McCrea

1045–1105 C. Heinselmann (invited): EISCAT_3D Status and Capabilities

1105–1120 E. Belova and J. Kero: EISCAT_3D for atmospheric dynamics research

1120–1135 I. I. Virtanen, H. Tesfaw, S. Lasanen, L. Roininen, A. Aikio: Temperature and composition fits in high-resolution incoherent scatter observations by means of Bayesian filtering

1135–1150 Z.H. Ding, L. D. Dai, S. Yang, Z. M. Tang, J. S. Miao and J. Wu: Progress of the Chinese Qujing incoherent scatter radar measurement and data analysis

1150–1205 J. Vierinen, J. Markkanen, D. Kastinen, J. Kero, H. Krag: Space debris observations using EISCAT

1205–1330 Lunch

1330-1350 M. G. Conde, J. Elliott, K. Branning (invited): Using Optical Doppler Spectroscopy to Infer 4D Resolved 3-Component Thermospheric Vector Wind Fields

1350–1405 H. Vanhamäki, S. Oyama, M. Conde, A. Aikio, L. Cai, I. Virtanen, S. Lasanen, L. Roininen: Estimating neutral wind patterns using line-of-sight data from multiple Scanning Doppler Imagers

1405–1425 S. Buchert (invited): Daedalus: A Low-Flying Spacecraft for the Exploration of the Lower Thermosphere - Ionosphere

1425–1440 B. V. Kozelov, A. G. Demekhov, A. S. Nikitenko, A. V. Rodugin, A. G. Yahnin, S.-I. Oyama: Conjugations of the ERG(ARASE) satellite and ground-based support at Kola Peninsula

1440–1455 L. Roininen, S. Lasanen: Large-scale Hierarchical Models for EISCAT_3D

1455–1530 Coffee break

Chairperson: Anita Aikio

- 1530–1550 F. Sigernes, M. B. Henriksen, M. Syrjäsuo, T. A. Johansen (invited): Hyper Spectral Imager for Drones and micro Satellites
- 1550–1605 U. Brändström, D Kastinen, J Kero and T Sergienko: ALIS_4D progress report
- 1605–1620 X. Yue, W. Wan, B. Ning, L. Zeng, B. Zhao, F. Ding: The status of SanYa Incoherent Scattering Radar (SYISR) Development
- 1620–1700 EISCAT_3D – ask and discuss
- 1900–2100 *Reception by City of Oulu / Ice Breaker in Tietomaa Science Museum*

Tuesday, 20th August

Session 2: Aurora, Magnetosphere-Ionosphere-Thermosphere studies and Space Weather

Conveners: Yasunobu Ogawa and Dan Whiter

Chairperson: Dan Whiter

- 0900–0915 A. Kozlovsky: Characteristics of the ground echoes detected by VHF meteor radar in the substorm growth phase
- 0915–0930 A. Workayehu, H. Vanhamäki and A. Aikio: Ionospheric currents in the two hemispheres during low and high magnetic activity by the Swarm satellite
- 0930–0945 L. Cai, S. Oyama, A. Aikio, H. Vanhamäki, I. Virtanen: High-latitude thermospheric wind responses to magnetospheric substorms
- 0945–1000 S.-I. Oyama et al.: Spatial distribution of the polar thermospheric wind acceleration and importance of the 2D measurement with SDIs
- 1000–1030 Coffee break
- 1030–1045 A.S. Reimer, R. H. Varney: Observation of a neutral wind jet driven by extreme plasma convection in the polar cap
- 1045–1105 R. H. Varney, A. S. Reimer, L. J. Lamarche, and R. Gillies (invited): Polar Cap Flows and Ion Heating: RISR Observations and Outstanding Questions
- 1105–1120 Y. Ogawa, K. Seki, K. Keika and Y. Ebihara: Characteristics of CME- and CIR-driven ion upflows in the polar ionosphere
- 1120–1135 D.-S. Han, Tong Xu, Yaqi Jin, K. Oksavik, X.-C. Chen, J.-J. Liu, Q. Zhang, L. Baddeley, and K. Herlingshaw: Meso-scale ionospheric flow cells, localized Joule heating, and ion upflow associated with throat aurora as observed by EISCAT
- 1135–1150 A. Aikio and I. Virtanen: Auroral precipitating power and Joule heating in the auroral ionosphere estimated from EISCAT data during a geomagnetic storm event
- 1150–1205 D. J. Price, D. K. Whiter, J. M. Chadney, B. S. Lanchester: High resolution optical observations of neutral heating associated with the electrodynamics of an auroral arc
- 1205–1330 Lunch

Chairperson: Yasunobu Ogawa

- 1330–1350 Y. Miyoshi, K. Hosokawa, S. Kurita, S.-I. Oyama, Y. Ogawa, A. Kero, E. Turunen (invited): Mesospheric ozone destruction during the pulsating aurora
- 1350–1405 F. Tesema, N. Partamies, H. Tyssøy: Particle precipitation energy spectrum during pulsating aurora
- 1405–1420 T. Miyamoto, S.-I. Oyama, Y. Ogawa, K. Hosokawa, S. Kurita, Y. Miyoshi, R. Kataoka, H. Miyaoka and T. Raita: Variations of cosmic noise absorption by energetic electron precipitation and changes of the auroral morphology
- 1420–1435 B. Gustavsson: Time-dependent electron-transport calculations of Alfvénic electron precipitation - with implications for flaming auroral rays and naturally enhanced ion-lines
- 1435–1450 A. J. Kavanagh and Y. Ogawa: Assessing the importance of variability in Electric field and conductance for the generation of GIC
- 1450–1505 M. van de Kamp, K. Kauristie, I. Sillanpää, T. Laitinen, S. Käksi, H. Vanhamäki, T. Raita, and Y. Ogawa: Analysing all-sky camera pictures and EISCAT data to derive ionospheric conductance
- 1505–1530 Coffee break
- 1530–1550 N. K. Kwagala, K. Oksavik, D. A. Lorentzen, M. G. Johnsen, K. M. Laundal (invited): Thermally excited 630.0 nm emissions in the polar ionosphere
- 1550–1605 T. Bag, T. I. Sergienko, U. Brändström: Modeling the response of vibrational redistribution in N₂ 1PG emission to the variation in auroral electron flux
- 1605–1620 B. Gustavsson, D. Whiter, B. Lanchester, N. Ivchenko, R. Fear: Phase-shift between rapidly varying auroral emission - in agreement with theoretical predictions?
- 1620–1635 J. Dreyer, N. Partamies, P. Ellingsen, D. Whiter: A detailed study of auroral fragments
- 1635–1650 D. K. Whiter et al.: Aurora Zoo - Auroral Physics Done by the Public

Wednesday, 21st August

Session 2: Aurora, Magnetosphere-Ionosphere-Thermosphere studies and Space Weather continues

Chairperson: Roger Varney

- 0900–0915 R. Yan, X. Shen, Z. Zhima, J. Huang, Y. Guan, C. Xiong, Xi. Zhu, C. Liu: Comparisons study of electron densities and temperatures measured on board CSES satellite by using ISR observations
- 0915–0930 V. V. Forsythe and R. A. Makarevich: Resolute Bay Incoherent Scatter Radar observations of electron density gradients: 3D estimates and implications for small-scale irregularity formation
- 0930–0945 P.A. Budnikov, V.V. Alpatov, M.V. Filatov: Aurora and ionosphere irregularities based on GNSS data in the polar region
- 0945–1000 L. M. Bjoland, Y. Ogawa, U.P. Løvhaug, D. Lorentzen: High-latitude electron density depletion regions and their dependence on geomagnetic activity

- 1000–1030 Coffee break
- 1030–1050 J. Moen (invited): Physics of the Grand Challenge Initiative Cusp Project
- 1050–1105 A. Spicher, K. Oksavik, Y. Jin, L. B. N. Clausen, M. D. Zettergren, K. B. Deshpande, J. I. Moen and L. Baddeley: A reverse flow event as the onset of ionospheric scintillation irregularities in the cusp
- 1105–1120 Y.-J. J. Wu, S. B. Mende, H. U. Frey: A statistical investigation of algorithm-identified poleward-moving auroral forms (PMAFs)
- 1120–1135 *Group photo*
- 1135–1300 Lunch
- 1300 *Excursion to Kierikki Stone Age Village (by coach)*
- 1800 *Return to Oulu*
- 1900 *Conference Dinner at Oulun Lasaretti*

Thursday, 22nd August

Session 3: Mesosphere, D-region, Airglow, Noctilucent clouds and Meteors

Conveners: Noora Partamies and Andrew Kavanagh

Chairperson: Andrew Kavanagh

- 0900–0920 P. T. Verronen, M. E. Szélag, N. Kalakoski, D. R. Marsh, T. Kovács, J. M. C. Plane (invited): WACCM-D: Global, Multi-Decadal Simulations of D-region Ionosphere for Particle Precipitation Studies
- 0920–0935 E. Turunen: The role of negative ions in the D region studied by the EISCAT_3D incoherent radar
- 0935–0950 E. L. Macotela, J. Manninen, M. Clilverd: Sporadic perturbations in the high latitude D-region ionosphere
- 0950–1030 Coffee break
- 1030–1050 Y.-J. J. Wu, Thomas J. Immel and Stephen Mende (invited): Exploring the Region where Earth Weather meets Space Weather: Ionospheric Connection Explorer (ICON)
- 1050–1110 C. Franzen, P. J. Espy, N. Hofmann, R. E. Hibbins, A. A. Djupvik (invited): Measurement of Q-branch Einstein coefficients for Meinel-bands with $\Delta v = 2$ and $\Delta v = 3$
- 1110–1125 Yu. Platov, S. Nikolayshvili and P. Budnikov: The structure of the atmosphere emission layers recording from the ISS in 2017
- 1125–1140 N. Pertsev, P. Dalin, V. Romejko, V. Perminov, V. Sukhodoev: Some local and global results on NLC ground-based monitoring

1140–1155 T. Takahashi, M. Tsutsumi, Y. Ogawa, S. Nozawa, Jøran Moen, Chris Hall, H. Miyaoka: Spatial-temporal distribution of anomalous enhancement of ambipolar diffusion coefficient

1155–1330 Lunch

Chairperson: Lisa Baddeley

1330–1350 J. L. Chau, J. M. Urco, J. Vierinen, R. Latteck, C. Schult, T. Renkwitz (invited): High spatiotemporal imaging of atmospheric structures at the polar mesosphere during summer using MAARSY in a MIMO configuration

1350–1405 T. Nishiyama, K. Sato, T. Nakamura, M. Tsutsumi, T. Sato, Y.-M. Tanaka, K. Nishimura, Y. Tomikawa, and M. Kohma: Simultaneous observations of polar mesosphere winter echoes and cosmic noise absorptions in a common volume by 47-MHz VHF radar, Antarctica (69.0°S, 39.6°E)

Session 5: Aerosols and clouds, Transient luminous events, and Atmospheric electricity

Convener: Oscar van der Velde

Chairperson: Oscar van der Velde

1410–1425 C.-L. Kuo, J. K. Chou, Y. J. Wu, E. Williams, B. C. Chen, H. T. Su, R. R. Hsu, and L. C. Lee: Boltzmann vibrational temperature from ISUAL Imager multi-band measurement of transient luminous events

1425–1440 J. Bór, Z. Zelkó, T. Hegedüs, Z. Jäger, J. Mlynarczyk, M. Popek, K. Szabóné-André, H-D. Betz: A possible production mechanism for dancing red sprites supported by optical and electromagnetic observations

1440–1455 O. van der Velde, J. Montanyà, J. López, F. Fabró, O. Chanrion, T. Neubert: The Colombia campaign for gigantic jets of 2018 and the Atmosphere-Space Interactions Monitor (ASIM) matched with ground-based observations of lightning

1500–1700 Coffee break and Posters, all sessions (list of posters below)

Friday, 23rd August

Session 4: Active experiments and plasma physics

Conveners: Björn Gustavsson and Mike Rietveld

Chairperson: Björn Gustavsson

0900–0920 J. Vierinen, B. Gustavsson, M. Floer, M. Rietveld, D. McKay, T. Grydeland, T. Leyser (Invited): Aperture synthesis imaging observations of stimulated electromagnetic emissions

0920–0935 N. F. Blagoveshchenskaya, T. D. Borisova, A.S. Kalishin, T. K. Yeoman, I. Häggström: Artificial plasma turbulence in the high latitude ionosphere F region induced by extraordinary polarized HF pump wave at EISCAT

0935–0950 T. Sergienko: Temporal variations of enhanced plasma line in aurora

0950–1005 A. Kero and I. Virtanen: Incoherent scatter radar measurement of ionospheric D-region heating and cooling times

1005–1030 Coffee break

Chairperson: Mike Rietveld

1030–1050 T. Rexer, B. Gustavsson, T. Leyser, M. Rietveld, T. Yeoman, T. Grydeland (Invited): Observations of systematically recurring topside ionline enhancements during multiple HF modification experiments near multiples of the electron gyro frequency

1050–1110 T. B. Leyser (Invited): Electron heating for HF-pumping near magnetic zenith by EISCAT Heating

1110–1125 B. Gustavsson, T. Rexer, J. Vierinen, D McKay, T Grydeland, M. Floor: Efficiency of HF-Heating at frequencies around the third electron gyro-frequency harmonic

1125–1140 E. D. Tereshchenko, R.Yu Yurik, S.M. Cherniakov, M.T. Rietveld, I. Häggström: Possible influence of small-scale artificial irregularities on the electron density determination by the methods of incoherent scattering and radio sounding

1140–1155 H. Sato, M. T. Rietveld, N. Jakowski: EISCAT and GLONASS observation of HF induced field aligned irregularities

1155–1210 M. T. Rietveld and A. Senior: Ducting of incoherent scatter radar signals by field-aligned irregularities: an explanation for wide-altitude extent ion line enhancements

1210–1220 Ending the meeting

1220–1330 Lunch

Poster session, Thursday 22nd August

Session 1

A.B. Chia-Hao Tu, C. Cheng-Yu Hsieh, D. Cheng-Ling Kuo, E. Chi-Kuang Chao, F. Loren Chang, G. Tang-Huang Lin, H. Jann-Yenq Liu: The development and the calibration of hyperspectral Imaging Systems

C.-F. Enell, I. Häggström, A. Tsaregorodtsev, A. Lytovchenko, A. Lukkarinen, V. Garonne, M. Wadenstein, J. White: EISCAT 3D data portal and data transfer development: The EOSC-CC and NelC support projects

A. Kvammen, B. Gustavsson, J. Vierinen: Capabilities of Auroral Tomography with the Auroral Large Imaging System

Y. C. Liu, Z. M. Yang, N. K. Yang, C. L. Kuo, C. K. Chang, W. H. Ip: Design of two-color cameras for brightness variability studies on stellar astrophysics

K. Nishimura: Spectral Observation Theory for Volumu Scatter Radar

J. Stamm, J. Vierinen, M. Urco: Investigation of spatial and temporal resolution of Eiscat 3D

H.W. Tesfaw, I. Virtanen, S. Lasanen, L. Roininen, A. Aikio: Bayesian Filtering in incoherent scatter radar analysis: Validation with simulated data

T. Tveito, J. Vierinen: 6-meter wavelength polarimetric inverse synthetic aperture radar mapping of the Moon

L. Zeng, X. Yue, W. Wan, B. Ning, B. Zhao, F. Ding: Introduction and experiments results of SYISR prototype system

Session 2

S. C. Buchert: Joule Heating by Thermospheric Winds

B. Dalipi, N. Syla: Statistical studies of morphological variations of power spectral density contained in EISCAT Svalbard radar data

Z. V. Dashkevich, B. V. Kozelov, V. E. Ivanov: Energetic spectra of auroral electrons in rayed aurora: deductions from triangulation and model simulation

D. Ecoffet, P.-L. Blelly, V. Fabbro, A. Marchaudon, S. Rougerie: Characterization and modeling of the ionosphere at high latitudes for the propagation of electromagnetic waves

N. Ellahouy, A. Aikio, M. Pedersen, H. Vanhamäki, I. Virtanen, J. Norberg, M. Grandin, Al. Kozlovsky, T. Raita, K. Kauristie, A. Marchaudon, P.-L. Blelly, S.-I. Oyama: Characteristics of an HSS-driven magnetic storm in the high-latitude ionosphere

E. Foucault, A. Marchaudon, P.-L. Blelly, S. Trilles: IONO-HF: HF wave propagation in realistic ionosphere

D.-S. Han: Recent studies on throat aurora

R. A. Makarevich: Advanced modular incoherent scatter radar studies of plasma structuring processes at high latitudes

T. Nishiyama, T. Sakanoi, M. Taguchi, M. Kagitani, P. Dalin, H. Suzuki: Spectral investigations of near infrared aurora and airglow in 1.0-1.6 microns using InGaAs imaging spectrograph: 1-year ground-based observation at Syowa station (69.0°S, 39.6°E)

M. N. Pedersen, H. Vanhamäki, A. Aikio, S. Käki, A. Viljanen, A. Workayehu: Impact of Solar Wind High Speed Streams on Ionospheric Current Systems and Associated Space Weather Effects

T. Rexer, B. Gustavsson, C. Fallen, A. Kvammen: Subauroral arc emissions and sunlit aurora

H. Sato, Y. Ogawa, J.S. Kim: Horizontal distribution of plasma density irregularities in auroral ionosphere

M. Voiculescu, E. Danila, S. Condurache-Bota, M. M. Echim: Analysis of magnetosheath jets observed by CLUSTER during minimum and maximum solar activity

J. Waters, D. Whiter, C. Jackman, J. Coxon, C. Forsyth: Auroral features and their duration following substorm onsets derived by SOPHIE

V.B. Belakhovsky, Y. Jin, W.J. Miloch, A.V. Koustov, A. Reimer: Influence of the substorm precipitations and polar cap patches on the GPS signals at high latitudes

Session 3

S.M. Cherniakov and V.A. Turyansky: Spectral characteristics of partially reflected radio signals as a tool for research of the atmosphere parameters

P. Dalin, N. Pertsev, V. Perminov, D. Efremov, V. Romejko: Balloon-borne observations of noctilucent clouds from the stratosphere: a new approach in studying large-scale mesospheric dynamics

T. Nishiyama, M. K. Ejiri, Takuo. T. Tsuda, K. Tsuno, T. Takahashi, M. Abo, T. D. Kawahara, T. Ogawa, S. Wada, T. Nakamura: Metallic atom/ion and temperature variability near the mesopause obtained with a frequency-tunable resonance scattering lidar at Syowa (69.0°S, 39.6°E), Antarctica in austral winter 2017-2018.

H. Suzuki, T. Takada, T. Tsuda, Y. Hozumi, K. Sakanoi, K. Sakaguchi, and MTI NLC research group: Observation plan for noctilucent clouds in midlatitude region from a geostationary satellite, airplanes, a balloon, and ground-based imagers

T. T. Tsuda, H. Suzuki, Y. Hozumi, K. Kawaura, Y. Ando, K. Hosokawa, T. Nakamura, and K. T. Murata: PMC observations utilizing full disk images obtained from the Japanese Geostationary Earth Orbit meteorological satellite Himawari-8

P. T. Verronen, M. E. Andersson, A. Kero, C.-F. Enell, J. M. Wissing, E. R. Talaat, K. Kauristie, M. Palmroth, T. E. Sarris, and E. Armandillo: Contribution of Proton and Electron Precipitation to the Observed Electron Concentration in October-November 2003 and September 2005

Session 4

Z. S. Bazilchuk, B. Gustavsson, J. Vierinen, M. Rietveld: Angular width of wide altitude ion line enhancements at the EISCAT Tromsø Facility

D. A. Kogogin, I. A. Nasyrov, A. V. Shindin, D. S. Maksimov, S. M. Grach, V. O. Dementiev, R. V. Zagretdinov: Joint Analysis Images of the Artificial Airglow Spots and TEC Maps in HF-Pumped Ionosphere at the Sura Facility

A. Kvammen, B. Gustavsson: Anisotropic Electron Fluxes – An Explanation of Flat Altitude Distributions of Radio-Induced Optical Emissions