Commission G Report

April 26, 2019

1. Meeting announcement/report

- **International Shool on Equatorial Atmosphere 2019** was held at National Institute for Space and Aeronautics (LAPAN) at Bandung, Indonesia on March 18-22, 2019. The event was aimed to benefit young scientists and researcher who are interested in this field. We invited ten lectures from Japan, India and Indonesia who gave lectures on basics and research topics on wide area of studies of the equatorial atmosphere. The lectures also covered measurement techniques of the equatorial atmosphere including atmospheric radars. The event was successful with in total 170 participants (109 at the site, and 61 from remote sites) from Indonesia, Malaysia, Philippines. India, Poland and Japan.
- **The 20th International Beacon Satellite Symposium** is a triennial event organized by the Beacon Satellite Studies Group of URSI Commission G, an interdisciplinary group, servicing science, research applications and engineering aspects of satellite signals observed from the ground and in space. The Beacon Symposia provide distinctive opportunities for ionospheric scientists from all over the world to meet and collaborate on topics relevant to ionospheric effects on radio propagation. Abstract submission is open until April 30, 2019. Web site of the symposium is http://bss2019.uwm.edu.pl/
- **MU radar /Equatorial Atmosphere Radar Symposium** will be held at RISH, Kyoto University in September 2019. This is the annual meeting for the cooperative use of the facilities. Commission G of Japanese URSI co-sponsors this symposium.

2. Masterplan 2020

Research Institute for Sustainable Humanosphere (RISH), Kyoto University, National Institute of Polar Research (NIPR), Institute for Space-Earth Environmental Research (ISEE), Nagoya University, and International Center for Space Weather Science and Education (ICSWSE), Kyushu University proposed the research project “Coupling process in the solar-terrestrial system” Masterplan 2020 of Science Council of Japan. This is a project to study the solar energy inputs into the Earth, and the response of Geospace (magnetosphere, ionosphere and atmosphere) to the energy input, which follows success of the same project in Masterplan 2014/2017. We plan to install large atmospheric radars with active phased array antenna at the equator and the Arctic regions. One is Equatorial MU (EMU) radar by RISH in Sumatera Island, Indonesia, and the other is EISCAT_3D by NIPR in northern Scandinavia under international collaborations. We develop the global observation network is planned (ISEE, ICSWSE with other institutions). The joining institutions are requesting budget of their facilities.

3. Research Report

3.1. Report from National Institute for Polar Research (NIPR)
(Yasunobu Ogawa, NIPR)

=== Recent papers related to PANSY ===

Minamihara, Y., Sato, K., Tsutsumi, M., & Sato, T. (2018). Statistical characteristics of gravity waves with near-inertial frequencies in the Antarctic troposphere and lower stratosphere observed by the PANSY radar. Journal of Geophysical Research: Atmospheres, 123, 8993-9010. https://doi.org/10.1029/2017JD028128

Kataoka, R., T. Nishiyama, Y. -M. Tanaka, A. Kadokura, H. A. Uchida, Y. Ebihara, M. K. Ejiri, Y. Tomikawa, M. Tsutsumi, K. Sato, Y. Miyoshi, K. Shiokawa, S. Kurita, Y. Kasahara, M. Ozaki, K. Hosokawa, S. Matsuda, I. Shinohara, T. Takashima, and T. Sato, Transient ionization of the mesosphere during auroral breakup: Arase satellite and ground-based conjugate observations at Syowa Station, Earth, Planet and Space, 71:9, 2019.

Kohma, M., K. Sato, K. Nishimura, Y. Tomikawa, and T. Sato, Estimate of turbulent energy dissipation rate from the VHF radar and radiosonde observations in the Antarctic, J. Geophys. Res., 124, 2019.

Shibuya, R., and K. Sato, A study of the dynamical characteristics of inertia?gravity waves in the Antarctic mesosphere combining the PANSY radar and a non-hydrostatic general circulation model, Atmos. Chem. Phys., 19, 3395-3415, 2019.

=== Recent papers related to EISCAT ===

Nozawa, S., T. Kawabata, K. Hosokawa, Y. Ogawa, T. Tsuda, A. Mizuno, R. Fujii, and C. Hall, A new five-wavelength photometer operated in Tromso (69.6°N, 19.2°E), Earth, Planets and Space, EPSP-D-18-00228R1, 70:193, December, 2018.

Virtanen, I., B. Gustavsson, A. Aikio, A. Kero, K. Asamura and Y. Ogawa, Electron energy spectrum and auroral power estimation from incoherent scatter radar measurements, J. Geophys. Res., DOI: 10.1029/2018JA025636, August, 2018.

Takahashi, T., I. Virtanen, K. Hosokawa, Y. Ogawa, A. Aikio, H. Miyaoka, A. Kero, Polarization electric field inside auroral patches: Simultaneous experiment of EISCAT radars and KAIRA, J. Geophys. Res., DOI: 10.1029/2018JA026254, in press, 2019.

Ogawa Y., K. Seki, K. Keika, and Y. Ebihara, Characteristics of CME- and CIR-driven ion upflows in the polar ionosphere, J. Geophys. Res., DOI: 10.1029/2018JA025636, in press, 2019.

3.2. Report from Institute for Space-Earth Environmental Research (ISEE), Nagoya University
(Satonori Nozawa, Nagoya University)

== Recent papers ===

Narayanan, V. L., K. Shiokawa, Y. Otsuka, D. Neudegg, On the role of thermospheric winds and sporadic E layers in the formation and evolution of Electrified Medium-Scale Traveling Ionospheric Disturbances (EMSTIDs) in geomagnetic conjugate regions, J. Geophys. Res., 123, doi: 10.0002/2018JA025261, 2018.

Tsuchiya, S., K. Shiokawa, H. Fujinami, Y. Otsuka, T. Nakamura, and M. Yamamoto, Statistical analysis of the phase velocity distribution of mesospheric and ionospheric waves observed in airglow images over a 16-year period: comparison between Rikubetsu and Shigaraki, Japan, J. Geophys. Res., 123, doi:10.0002/2018JA025585, 2018.

Kim, H., J. Hwang, J. Park, Y. Miyashita, K. Shiokawa, I. R. Mann, T, Raita, and J. Lee, Large scale ducting of Pc1 pulsations observed by Swarm satellites and multiple ground networks, Geophys. Res. Lett., 45, doi:10.1029/2018GL080693, 2018.

Hirai A., F. Tsuchiya, T. Obara, Y. Kasaba, Y. Katoh, H. Misawa, K. Shiokawa, Y. Miyoshi, S. Kurita, S. Matsuda, M. Connors, T. Nagatsuma, K. Sakaguchi, Y. Kasahara, A. Kumamoto, A. Matsuoka, M. Shoji, I. Shinohara and J. M. Albert, Temporal and Spatial Correspondence of Pc1/EMIC Waves and Relativistic Electron Precipitations Observed with Ground-Based Multi-Instruments on 27 March 2017, Geophys. Res. Lett., 45, doi:10.1029/2018GL080126, 2018.

Tsuchiya, F., A. Hirai, T. Obara, H. Misawa, S. Kurita, Y. Miyoshi, K. Shiokawa, M. Connors, M. Ozaki, Y. Kasahara, A. Kumamoto, Y. Kasaba, A. Matsuoka, M. Shoji, I. Shinohara, Energetic electron precipitation associated with pulsating aurora observed by VLF radio propagation during the recovery phase of a substorm on 27 March 2017, Geophys. Res. Lett., 45, doi:10.1029/2018GL080222, 2018.

Nishitani, N. J.M. Ruohoniemi, M. Lester, J.B.H. Baker, A.V. Koustov, G. Shepherd, G. Chisham, T. Hori, E.G. Thomas, R.A. Makarevich, A. Marchaudon, P. Ponomarenko, J.A. Wild, S.E. Milan, W.A. Bristow, J. Devlin, E. Miller, R.A. Greenwald, T. Ogawa, and T. Kikuchi, Review of the accomplishments of Mid-latitude Super Dual Auroral Radar Network (SuperDARN) HF Radars, Progress in Earth and Planetary Science, https://doi.org/10.1186/s40645-019-0270-5, 6:27, 2019.

3.3. Kyushu University
(Huixin Liu, Kyushu University)

=== Award ===

Japan Geoscience Union (JpGU) announced on April 10, 2019 that they awarded Dr. Huixin Liu at Kyushu University the 3rd Nishida Prize for Promotion of Geo- and Planetary Science. The award ceremony will be held on May 28, 2019. (http://www.jpgu.org/en/nishidaprize/)

Nishida Prize: JpGU has created the "Nishida Prize for Promotion of Geo- and Planetary Science" to honor internationally recognized mid-career researchers under the age of 45 in 2014.

=== Recent papers ===

Huixin Liu, M. Tsutsumi, Hanli Liu, Vertical structure of terdiurnal tides in the Antarctic MLT region: 15-year observation over Syowa (69S, 39E), Geophys. Res. Lett., 46, doi: 10.1002/2019GL082155, 2019.

A. C. Moral, K. Shiokawa, S. Suzuki, Huixin Liu, Y. Otsuka, C. Y. Yatini, Observations of low-latitude travelling ionospheric disturbances by a 630.0-nm airglow imager and the CHAMP satellite over Indonesia, J. Geophys. Res., 124, doi: 10.1002/2018JA025634, 2019.

K. Oyama, C. H. Chen, L. Bankov, D. Minakshi, K. Ryu, J.Y. Liu, Huixin Liu, Precursor effect of March 11 2011 off the coast of Tohoku earthquake on high and low latitude ionospheres and its possible disturbing mechanism, Advances in Space Research, doi:10.1016/j.asr.2018.12.042, 2019.

3.4. Report from Electronic Navigation Research Institute (ENRI)
(Susumu Saito, ENRI)

=== Research activities ===

HF trans-equatorial propagation (TEP) measurement technique by using a sophisticated HF direction finder and digital radio-based propagation time measurements are developed and new insights on HF-TEP path in the presence of plasma bubbles are presented (Saito et al., Radio Sci., 2018). One of the figures of this paper was adopted for the cover page of the issue. Budtho et al. (2018) analyzed spatial gradients of quiet-time ionospheric delay (total electron contents) in Bangkok, Thailand. Bumrungkit et al. (2018) utilized a GPS receiver network in Bangkok and analyzed characteristic separation distances between plasma bubbles. Saito and Yoshihara (2018) analyzed ionospheric scintillation and a ground-based augmentation system (GBAS) to model the impacts of scintillation on four integrity monitors of Category-II/III GBAS (GAST-D).

=== Recent papers===

S. Saito, M. Yamamoto, and T. Maruyama, Arrival Angle and Travel Time Measurements of HF Transequatorial Propagation for Plasma Bubble Monitoring, Radio Science, 53, doi:10.1029/2017RS006518, 2018.

J. Budtho, P. Supnithi, and S. Saito, Abstract: Analysis of quiet time vertical ionospheric delay gradients around Suvarnabhumi airport, Thailand. Radio Science, 53, doi:10.1029/ 2018RS006606, 2018.

A. Bumrungkit, P. Supnithi, and S. Saito, Statistical Analysis of Separation Distance Between Equatorial Plasma Bubbles Near Suvarnabhumi International Airport, Thailand, Journal of Geophysical Research: Space Physics, 123, doi:10.1029/2018JA025612, 2018.

S. Saito and T. Yoshihara, Impact assessment of ionospheric scintillation associated with plasma bubbles on GAST-D ground integrity monitors, Proc. ION GNSS+ 2018, 2186-2194, 2018. (peer-reviewed)

3.5. Report from Research Institute for Sustainable Humanosphere (RISH), Kyoto University
(Mamoru Yamamoto, RISH)

=== Recent papers===

<Atmospheric studies>

L. Kantha, H. Luce, and H. Hashiguchi, Mid-level Cloud-base Turbulence: Radar Observations and Models, J. Geophys. Res.: Atmosphere, 124, doi:10.1029/2018JD029479, 2019.

H. Luce, L. Kantha, H. Hashiguchi, D. Lawrence, and A. Doddi, Turbulence Kinetic Energy Dissipation Rates Estimated from Concurrent UAV and MU Radar Measurements, Earth and Planetary Science, 70, 207, doi:10.1186/s40623-018-0979-1, 2018.

L. Kantha, H. Luce, and H. Hashiguchi, On a Numerical Model for Extracting TKE D issipation Rate from Very High Frequency (VHF) Radar Spectral Width, Earth and P lanetary Science, 70, 205, doi:10.1186/s40623-018-0957-7, 2018.

R. Wilson, H. Hashiguchi, and M. Yabuki, Vertical spectra of temperature in the free troposphere at meso-and-small scales according to the flow regime: Observat ions and interpretation, Atmosphere, 9, 415, doi:10.3390/atmos9110415, 2018.

Marzuki, Hashiguchi Hiroyuki, Vonnisa Mutya, Harmadi, Katsumata Masaki, Determination of Intraseasonal Variation of Precipitation Microphysics in the Southern Indian Ocean from Joss-Waldvogel Disdrometer Observation during the CINDY Field Campaign, ADVANCES IN ATMOSPHERIC SCIENCES, 35, 11, 1415-1427, 2018.

H. Luce, L. Kantha, M. Yabuki, and H. Hashiguchi, Atmospheric Kelvin-Helmholtz b illows captured by the MU radar, lidars and a fish-eye camera, Earth and Planeta ry Science, 70, 162, doi:10.1186/s40623-018-0935-0 2018.

Chen, J.-S., C.-Y. Wang, Y.-H. Chu, C.-L. Su, and H. Hashiguchi, 3-D radar imaging of E-region field-aligned plasma irregularities by using multireceiver and mu ltifrequency techniques IEEE Transact. Geosci. Remote Sens., 56, 10, 5591-5599, 2018.

Kantha Lakshmi, Lawrence Dale, Luce Hubert, Hashiguchi Hiroyuki, Tsuda Toshitaka, Wilson Richard, Mixa Tyler, Yabuki Masanori, Shigaraki UAV-Radar Experiment (ShUREX): overview of the campaign with some preliminary results (vol 4, 19, 2017), PROGRESS IN EARTH AND PLANETARY SCIENCE, 5, 2018.

S. Mori, J-I Hamada, M. Hattori, P.-M. Wu, M. Katsumata, N. Endo, K. Ichiyanagi, H. Hashiguchi, A.A. Arbain, R. Sulistyowati, S. Lestari, F. Syamsudin, T. Manik , and M.D. Yamanaka, Meridional march of diurnal rainfall over Jakarta, Indonesi a, observed with a C-band Doppler radar: An overview of the HARIMAU2010 campaign, Progress in Earth and Planetary Science, 5, doi:10.1186/s40645-018-0202-9m 2018.

H. Luce, L. Kantha, H. Hashiguchi, D. Lawrence, T. Mixa, M. Yabuki, and T. Tsuda, Vertical structure of the lower troposphere derived from MU radar, Unmanned Aerial Vehicle and balloon measurements during ShUREX2015, Progress in Earth and Planetary Science, 5, 2018.

Ina Juaeni, Hiraku Tabata, Noersomadi, Halimurrahman, Hiroyuki Hashiguchi, and Toshitaka Tsuda, Retrieval of Temperature Profiles using Radio Acoustic Sounding System (RASS) with the Equatorial Atmosphere Radar (EAR) in West Sumatra, Earth, Planets and Space, 70, 22, doi:10.1186/s40623-018-0784-x, 2018.

Sinha, S., M. Lourde R., T.V.C. Sarma, H. Hashiguchi, K.R. Tuckley, Doppler Profile Tracing Using MPCF on MU Radar and Sodar: Performance Analysis, IEEE Geosci. Remote Sens. Lett., 15, doi:10.1109/LGRS.2018.2797071 2018.

Marzuki, H. Hashiguchi, M. Vonnisa, and H. Abubakar, Determination of Intraseaso nal Variation of Precipitation Microphysics in the Southern Indian Ocean from Jo ss-Waldvogel Disdrometer Observation during CINDY Field Campaign, Advances in At mospheric Sciences, doi:10.1007/s00376-018-8026-5, 2018.

H. Luce, H. Hashiguchi, L. Kantha, D. Lawrence, T. Tsuda, T. Mixa, and M. Yabuki, On the performance of the range imaging technique using UAVs during the ShURE X 2015 campaign, IEEE Transact. Geosci. Remote Sens., 99, doi:10.1109/TGRS.2017. 2772351, 2018.

H. Hashiguchi, T. Manjo, and M. Yamamoto, Development of Middle and Upper atmosphere radar real-time processing system with adaptive clutter rejection, Radio Sci., 53, doi:10.1002/2017RS006417, 2018.

<Ionospheric studies>

Charles Rino, Charles Carrano, Keith Groves, Tatsuhiro Yokoyama, A Configuration Space Model for Intermediate-Scale Ionospheric Structure, Radio Science, 53, 12, 1472-1480, 2018.

Charles Rino, Tatsuhiro Yokoyama, Charles Carrano, Dynamic spectral characteristics of high-resolution simulated equatorial plasma bubbles, Progress in Earth and Planetary Science, 5, 2018.

Barsha Dutta, Bitap Raj Kalita, P. K. Bhuyan, S. Sarmah, R. C. Tiwari, K. Wang, K. Hozumi, T. Tsugawa, T. Yokoyama, M. Le Huy, T. T. H. Pham, Spatial Features of L-Band Equinoctial Scintillations From Equator to Low Midlatitude at Around 95°E During 2015-2016, Journal of Geophysical Research: Space Physics, 123, 9, 7767 2918.

P. Pavan Chaitanya, A. K. Patra, Y. Otsuka, T. Yokoyama, M. Yamamoto, On the Solstice Maxima and Azimuth-Dependent Characteristics of the 150-km Echoes Observed Using the Equatorial Atmosphere Radar, Journal of Geophysical Research: Space Physics, 123, 8, 6752-6759, 2018.

Shinagawa Hiroyuki, Jin Hidekatsu, Miyoshi Yasunobu, Fujiwara Hitoshi, Yokoyama Tatsuhiro, Otsuka Yuichi, Daily and seasonal variations in the linear growth rate of the Rayleigh-Taylor instability in the ionosphere obtained with GAIA, PROGRESS IN EARTH AND PLANETARY SCIENCE, 5, 1, 2018.

Carter Brett A., Ram S. Tulasi, Yizengaw Endawoke, Pradipta Rezy, Retterer John, Norman Robert, Currie Julie, Groves Keith, Caton Ronald, Terkildsen Michael, Yokoyama Tatsuhiro, Zhang Kefei, Unseasonal development of post-sunset F-region irregularities over Southeast Asia on 28 July 2014: 1. Forcing from above?, PROGRESS IN EARTH AND PLANETARY SCIENCE, 5, 1, 2018.

Saito Susumu, Yamamoto Mamoru, Maruyama Takashi, Arrival Angle and Travel Time Measurements of HF Transequatorial Propagation for Plasma Bubble Monitoring, RADIO SCIENCE, 53, 11, 1304-1315, 2018.

Tsuchiya Satoshi, Shiokawa Kazuo, Fujinami Hatsuki, Otsuka Yuichi, Nakamura Takuji, Yamamoto Mamoru, Statistical Analysis of the Phase Velocity Distribution of Mesospheric and Ionospheric Waves Observed in Airglow Images Over a 16-Year Period: Comparison Between Rikubetsu and Shigaraki, Japan, JOURNAL OF GEOPHYSICAL RESEARCH-SPACE PHYSICS, 123, 8, 6930-6947, 2018.

Yamamoto, M., Y. Otsuka, H. Jin, Y. Miyoshi, Relationship between day-to-day variability of equatorial plasma bubble activity from GPS scintillation and atmospheric properties from GAIA assimilation, Progress in Earth and Planetary Science, 5, 1, 26, 2018.

Ajith, K. K., S. Tulasi Ram, B. A. Carter, S. Sathish Kumar, M. Yamamoto, T. Yokoyama, S. Gurubaran, S. Sripathi, K. Hozumi, K. Groves, R. G. Caton, Unseasonal development of post-sunset F-region irregularities over Southeast Asia on 28 July 2014: 2. Forcing from below?, Progress in Earth and Planetary Science, 5, 60, 2018.

3.6. Report from Tohoku University
(Takeshi Sakanoi, Tohoku University)

=== Awards ===

- AOGS2018 Best Student Poster Award

  Asuka HIRAI, Fuminori TSUCHIYA, Takahiro OBARA, Hiroaki MISAWA, Kazuo SHIOKAWA, Yoshizumi MIYOSHI, Satoshi KURITA, Martin CONNORS, Temporal and Spatial Correspondence of Pc1/EMIC Waves and Energetic Electron Precipitation with Ground-Based Observation on 27 March, 2017

■ 2018 SGEPSS Aurora Medal

Yuki Nakamura, Axisymmetric conductivities of Jupiter's middle- and low-latitude ionosphere

Haruna Watanabe, Fine structure of Jovian infrared aurora observed by Subaru Telescope and its temporal variation (Original title is in Japanese)

Mizuki Fukizawa, Electrostatic electron cyclotron harmonic waves as a candidate to cause pulsating aurora

=== Research activity ===

The 20th symposium on planetary science 2019 was held in Sendai on February 18-21, 2019. The goal of this symposium is to extend present researches, and also to create new researches, fields for the future, through reviews and discussions on planetary sciences of not only solar-planetary plasmas/atmospheres but also interaction with the surface of planetary bodies and environment of exoplanets. (See the website at http://pparc.tohoku.ac.jp/sympo/sps/.)

=== Recent papers ===

Aizawa, S., Delcout, D., and Terada, N. (2018), Sodium ion dynamics in the magnetospheric flanks of Mercury, Geophys. Res. Lett., 45, 595-601, doi:10.1002/2017GL076586.

Aoki, S., M. J. Richter, C. DeWitt, A. Boogert, T. Encrenaz, H. Sagawa, H. Nakagawa, A. C. Vandaele, M. Giuranna, T. K. Greathouse, T. Fouchet, A. Geminale, G. Sindoni, M. McKelvey, M. Case, Y. Kasaba (2018), Stringent upper limit of CH4 on Mars based on SOFIA/EXES observation, Astron. Astrophys., 610, id:A78, 9, doi:10.1051/0004-6361/201730903.

Aoki, S., Y. Sato, M. Giuranna, P. Wolkenberg, T. Sato, H. nakagawa, Y. Kasaba (2018), Mesospheric CO2 ice clouds on Mars observed by the Planetary Fourier Spectrometer onboard Mars Express, Icarus, 302, 175-190. DOI:10.1016/j.icarus.2017.10.047.

Berdyugin, A., Piirola, V., Sakanoi, T., Kagitani, M., Yoneda, M.(2018), High-precision broad-band linear polarimetry of early-type binaries: II. Variable, phase-locked polarization in triple Algol- type system TauriAstronomy and Astrophysics, Astronomy and Astrophysics, vol. 611 (A69), doi:10.1051/0004-6361/201732163.

Clark, G., C. Tao, B. Mauk, J. Nichols, J. Saur, E. Bunce, F. Allegrini ,R. Gladstone, F. Bagenal, S. Bolton, B. Bonfond, J. Connerney, R. Ebert, D. Gershman, D. Haggerty, T. Kimura, P. Kollmann, S. Kotsiaros, W. Kurs, S. Levin, D. McComas, G. Murakami, C. Paranicas, A. Rymer, and P. Valek (2018), Precipitating electron energy flux and characteristic energies in Jupiter's main auroral region as measured by Jun o/JEDI, J. Geophys. Res. Space Physics, 123, doi:10.1029/2018JA25639.

Fukizawa, M., T. Sakanoi Y. Miyoshi K. Hosokawa K. Shiokawa Y. Katoh Y. Kazama A. Kumamoto F. Tsuchiya Y. Miyashita Y. Tanaka Y. Kasahara M. Ozaki A. Matsuoka S. Matsuda M. Hikishima S. Oyama Y. Ogawa S. Kurita R. Fujii (2018). Electrostatic electron cyclotron harmonic waves as a candidate to cause pulsating auroras. Geophysical Research Letters, 45. https://doi.org/10.1029/2018GL08145.

Ge, H., X. Zhang, L.N. Fletcher, G.S. Orton, J. Sinclair, J. Fernandes, T. Momary, Y. Kasaba, T.M. Sato, T. Fujiyoshi (2019) Rotational light curves of Jupiter from UV to mid-infrared and implications for brown dwarfs and exoplanets, Astron. J., 157:89, doi:10.3847/1538-3881/aafba7.

Grodent, D., B. Bonfond, Z. Yao, J.-C. Gerard, A. Radioti, M. Dumont, B. Palmaerts, A. Adriani, S. V. Badman, E. J. Bunce, J. T. Clarke, J. E. P. Connerney, G. R. Gladstone, T. Greathouse, T. Kimura, W. S. Kurth, B. H. Mauk, D. J. McComas, J. D. Nichols, G. S. Orton, L. Roth, J. Saur, and P. Valek (2018), Jupiter's aurora observed with HST during Juno orbits 3 to 7, J. Geophys. Res. Space Physics, 123, doi:10.1002/2017JA025046.

Han, S., G. Murakami H. Kita F. Tsuchiya C. Tao H. Misawa A. Yamazaki M. Nakamura (2018). Investigating solar wind-driven electric field influence on long-term dynamics of Jovian synchrotron radiation. Journal of Geophysical Research: Space Physics, 123, 9508-9516. https://doi.org/10.1029/2018JA025849.

Hashimoto, K., A. Kumamoto, F. Tsuchiya, Y. Kasahara, and A. Matsuoka (2018), Hectometric Line Spectra detected by the Arase (ERG) satellite, Geophysical Research Letters, 45, 11,555- 11,561, doi:10.1029/2018GL080133

Hikida, R., K. Yoshioka, G. Murakami, T. Kimura, F. Tsuchiya, A. Yamazaki, I. Yoshikawa, and N. Iwagami (2018), Identification of Extreme Ultraviolet Emission Lines of the Io Plasma Torus Observed by Hisaki/EXCEED, J. Geophys. Res. Planet, doi:10.1029/2018JE005629.

Hikishima, M., H. Kojima, Y. Katoh, Y. Kasahara, S. Kasahara, T. Mitani, N. Higashio, A. Matsuoka, Y. Miyoshi, K. Asamura, T. Takashima, S. Yokota, S. Matsuda, M. Kitahara, Data processing in the Software-type wave-particle interaction analyzer on board the Arase satellite, Earth Planets Space, 70:80, doi:10.1186/s40623-018-0856-y,2018.

Hirai, A., F. Tsuchiya T. Obara Y. Kasaba Y. Katoh H. Misawa K. Shiokawa Y. Miyoshi S. Kurita S. Matsuda M. Connors T. Nagatsuma K. Sakaguchi Y. Kasahara A. Kumamoto A. Matsuoka M. Shoji I. Shinohara J. M. Albert (2018). Temporal and Spatial Correspondence of Pc1/EMIC Waves and Relativistic Electron Precipitations Observed with Ground-Based Multi-Instruments on 27 March 2017. Geophys. Res. Lett., 45, 24, 13,182-13,191. https://doi.org/10.1029/2018GL080126.

Hirai, K., Y. Katoh, N. Terada, and S. Kawai (2018), Study of the transition from MRI to magnetic turbulence via parasitic instability by a high-order MHD simulation code, The Astrophysical Journal, 853, 174, 15pp., doi:10.3847/1538-4357/aaa5b2.

Ishi, D., K. Ishikawa, M. Numazawa, Y. Miyoshi, N. Terada, K. Mitsuda, T. Ohashi, and Y. Ezoe (2018), Suzaku detection of enigmatic geocoronal solar wind charge exchange event associated with coronal mass ejection, Publications of the Astronomical Society of Japan (PASJ), in press.

Iwagami, N., T. Sakanoi, G. L. Hashimoto, K. Sawai, S. Ohtsuki, S. Takagi, K. Uemizu, M. Ueno, S. Kameda, S. Murakami, M. Nakamura, N. Ishii, T. Abe, T. Satoh, T. Imamura, C. Hirose, M. Suzuki, N. Hirata, A. Yamazaki, T. M. Sato, M. Yamada, Y. Yamamoto, T. Fukuhara, K. Ogohara, H. Ando, K. Sugiyama, H. Kashimura, T. Kouyama (2018) Initial products of Akatsuki 1-um camera, Earth, Planets and Space, 70:6, doi:10 .1186/s40623-017-077-35

JJakosky, B. M., D. Brain, M. Chaffin, S. Curry, J. Deighan, J. Grebowsky, J. Halekas, F. Leblanc, R. Lillis, J. G. Luhmann, L. Andersson, N. Andre, D. Andrews, D. Baird, D. Baker, J. Bell, M. Benna, D. Bhattacharyya, S. Bougher, C. Bowers, P. Chamberlin, J.-Y. Chaufray, J. Clarke, G. Collinson, M. Combi, J. Connerney, K. Connour, J. Correira, K. Crabb, F. Crary, T. Cravens, M. Crismani, G. Delory, R. Dewey, G. DiBraccio, C. Dong, Y. Dong, P. Dunn, H. Egan, M. Elrod, S. England, F. Eparvier, R. Ergun, A. Eriksson, T. Esman, J. Espley, S. Evans, K. Fallows, X. Fang, M. Fillingim, C. Flynn, A. Fogle, C. Fowler, J. Fox, M. Fujimoto, P. Garnier, Z. Girazian, H. Groeller, J. Gruesbeck, O. Hamil, K. G. Hanley, T. Hara, Y. Harada, J. Hermann, M. Holmberg, G. Holsclaw, S. Houston, S. Inui, S. Jain, R. Jolitz, A. Kotova, T. Kuroda, D. Larson, Y. Lee, C. Lee, F. Lefevre, C. Lentz, D. Lo, R. Lugo, Y.-J. Ma, P. Mahaffy, M. L. Marquette, Y. Matsumoto, M. Mayyasi, C. Mazelle, W. McClintock, J. McFadden, A. Medvedev, M. Mendillo, K. Meziane, Z. Milby, D. Mitchell, R. Modolo, F. Montmessin, A. Nagy, H. Nakagawa, C. Narvaez, K. Olsen, D. Pawlowski, W. Peterson, A. Rahmati, K. Roeten, N. Romanelli, S. Ruhunusiri, C. Russell, S. Sakai, N. Schneider, K. Seki, R. Sharrar, S. Shaver, D. E. Siskind, M. Slipski, Y. Soobiah, M. Steckiewicz, M. H. Stevens, I. Stewart, A. Stiepen, S. Stone, V. Tenishev, N. Terada, K. Terada, E. Thiemann, R. Tolson, G. Toth, J. Trovato, M. Vogt, T. Weber, P. Withers, S. Xu, R. Yelle, E. Yigit, and R. Zurek (2018), Loss of the Martian atmosphere to space: Present-day loss rates determined from MAVEN observations and integrated loss through time, Icarus, 315, pp.146-157, doi:10.1016/j.icarus.2018.05.030.

Kaneda, K., H. Misawa, K. Iwai, S. Masuda, F. Tsuchiya, Y. Katoh, and T. Obara (2018), Detection of Propagating Fast Sausage Waves through Detailed Analysis of a Zebra-pattern Fine Structure in a Solar Radio Burst, Astrophys. J. Lett. 855, 2, https://doi.org/10.3847/2041-8213/aab2a5.

Kasaba, Y., T. Takashima, M. N. Nishino, M. Fujimoto (2019), Science operation concept of BepiColombo/MMO based on the MDP scheme, Proc. International Sympo. Planetary Science 2011, ed. S. Okano, Y. Kasaba, H. Misawa, pp.1-11. TERRAPUB, Tokyo, doi:10.5047/pisps.001.

Kasahara Y, Kasaba Y, Kojima H, Yagitani S, Ishisaka K, Kumamoto A, Tsuchiya F, Ozaki M, Matsuda S, Imachi T, Miyoshi Y, Hikishima M, Katoh Y, Ota M, Shoji M, Matsuoka A, Shinohara I

(2018), The Plasma Wave Experiment (PWE) on board the Arase (ERG) satellite, Earth Planets Space, 70:86, doi:10.1186/s40623-018-0842-4.

Kazama, Y., H. Kojima, Y. Miyoshi, Y. Kasahara, H. Usui, B.-J. Wang, S.-Y. Wang, S.W.Y. Tam, T.-F. Chang, P. T. P. Ho, K. Asamura, A. Kumamoto, F. Tsuchiya, Y. Kasaba, S. Matsuda, M. Shoji, A. Matsuoka, M. Teramoto, T. Takashima, I. Shinohara (2018). Density depletions associated with enhancements of electron cyclotron harmonic emissions: An ERG observation. Geophys. Res. Lett. 45, 10,075-10,083, doi:10.1029/2018GL080117

Kimura, T., A. Yamazaki, K. Yoshioka, G. Murakami, F. Tsuchiya, H. Kita, C. Tao, I. Yoshikawa, and C. Yamauchi (2019), Development of ground pipeline system for high-level scientific data products of the Hisaki satellite mission and its application to planetary space weather, J. Space Weather Space Clim., 9, A8, doi:10.1051/swsc/2019005

Kimura, T., Y. Hiraki, C. Tao, F. Tsuchiya, P. Delamere, K. Yoshioka, G. Murakami, A. Yamazaki, H. Kita, S. V. Badman, K. Fukazawa, I. Yoshikawa, and M. Fujimoto, Response of Jupiter's Aurora to Plasma Mass Loading Rate Monitored by the Hisaki Satellite During Volcanic Eruptions at Io, J. Geophys. Res. Space Physics, 123, 1885-1899, doi: 10.1002/ 2017JA025029, 2018.

Kita, H,. H. Misawa, A. Bhardwaj, F. Tsuchiya, G. Murakami, C. Tao, T. Kimura, K. Yoshioka, A. Yamazaki, Y. Kasaba, I. Yoshikawa, M. Fujimoto (2019) Short-term variation in the dawn-dusk asymmetry of the Jovian radiation belt obtained from GMRT and Hisaki EXCEED observations, Astrophys. J. Lett., 872:L24, doi:10.3847/2041-8213/ab0427.

Kita, H., S. Fujisawa, C. Tao, M. Kagitani, T. Sakanoi, Y. Kasaba (2018), Horizontal and vertical structures of Jovian infrared aurora: Observation using Subaru IRCS with adaptive optics, Icarus 313, 93-106, doi:10.1016/j.icarus.2018.05.002.

Kitamura, N., M. Kitahara, M. Shoji, Y. Miyoshi, H. Hasegawa, S. Nakamura, Y. Katoh, Y. Saito, S. Yokota, D. J. Gershman, A. F. Vinas, B. L. Giles, T. E. Moore, W. R. Paterson, C. J. Pollock, C. T. Russell, R. J. Strangeway, S. A. Fuselier, and J. L. Burch, Direct measurements of two-way wave-particle energy transfer in a collisionless space plasma, Science, 361, 1000-1003, doi:10.1126/science.aap8730, 2018.

Koga, R., F. Tsuchiya, M. Kagitani, T. Sakanoi, M. Yoneda, K. Yoshioka, I. Yoshikawa, T. Kimura, G. Murakami, A. Yamazaki, H. T. Smith, F. Bagenal (2018), Spatial Distribution of Io's Neutral Oxygen Cloud Observed by Hisaki, J. Geophys. Res., 123, https://doi.org/10.1029/2018JA025328.

Kumamoto A, Tsuchiya F, Kasahara Y, Kasaba Y, Kojima H, Yagitani S, Ishisaka K, Imachi T, Ozaki M, Matsuda S, Shoji M, Matsuoka A, Katoh Y, Miyoshi Y, Obara T (2018), High Frequency Analyzer (HFA) of Plasma Wave Experiment (PWE) onboard the Arase spacecraft. Earth Planets Space, 70:82, doi:10.1186/s40623-018-0854-0.

Matsuda S, Kasahara Y, Kojima H, Kasaba Y, Yagitani S, Ozaki M, Imachi T, Ishisaka K, Kumamoto A, Tsuchiya F, Ota M, Kurita S, Miyoshi Y, Hikishima M, Matsuoka A, Shinohara I (2018), Onboard software of plasma wave experiment aboard Arase: instrument management and signal processing of waveform capture/onboard frequency analyzer. Earth Planets Space. 70:75, doi:10.1186/

Matsuda, S., Y. Kasahara, H. Kojima, Y. Kasaba, S. Yagitani, M. Ozaki, T. Imachi, K. Ishisaka, A. Kumamoto, F. Tsuchiya, M. Ota, S. Kurita, Y. Miyoshi, M. Hikishima, A. Matsuoka, and I. Shinohara, Onboard software of plasma wave experiment aboard Arase: instrument management and signal processing of waveform capture/onboard frequency analyzer, Earth Planets Space, 70:75, doi:10.1186/s40623-018-0838-0218

Matsuda, S.; Kasahara, Y.; Miyoshi, Y.; Nomura, R.; Shoji, M.; Matsuoka, A.; Kasaba, Y.; Kurita, S.; Teramoto, M.; Ishisaka, K. (2018). Spatial distribution of fine-structured and unstructured EMIC waves observed by the Arase satellite, Geophys. Res. Lett. 45, 21, 11,530-11,538, DOI:10.1029/2018GL080109.

Miyoshi Y, Shinohara I, Takashima T, Asamura K, Higashio N, Mitani T, Kasahara S, Yokota S, Kazama Y, Wang S.-Y, Ho P, Kasahara Y, Kasaba Y, Yagitani S, Matsuoka A, Kojima H, Katoh Y, Shiokawa K, Seki K (2018), Geospace Exploration Project ERG: overview, Earth Planets Space, 70:101, doi:10.1186/s40623-018-0862-0.

Nakata, H., A. Takahashi, T. Takano, A. Saito, T. Sakanoi (2018), Observation of equatorial plasma bubbles by the airglow imager on ISS-IMAP, Prog. Earth and Planet. Sci. (PEPS), vol 5, pp6, doi: 10.1186/s40645-018-0227-0.

Nara, Y. , Ichiro Yoshikawa, Kazuo Yoshioka, Go Murakami, Tomoki Kimura, Atsushi Yamazaki, Fuminori Tsuchiya, Masaki Kuwabara and Naomoto Iwagami (2018), Extreme Ultraviolet Spectra of Venusian Airglow Observed by EXCEED, ICARUS, https://doi.org/10.1016/j.icarus.2017.10.028.

Narita, T., E. Wanke, M. Sato, T. Sakanoi, A. Kumada, M. Kamogawa, H. Ishikawa, S. Hamaa, T. Kamada, F. Tsuchiya, and E. Kaneko (2018), A study of lightning location system (Blitz) based on VLF sferics, Proc. 34th International Conference on Lightning Protection, https://doi.org/10.1109/ICLP.2018.8503311.

Nose, M., A. Matsuoka, A. Kumamoto, Y. Kasahara, J. Goldstein, M. Teramoto ,F. Tsuchiya, S. Matsuda, M. Shoji, S. Imajo, S. Oimatsu, K. Yamamoto, Y. Obana ,R. Nomura, A. Fujimoto, I. Shinohara, Y. Miyoshi, W. S. Kurth, C. A. Kletzing ,C. W. Smith, and R. J. MacDowall (2018), Longitudinal Structure of Oxygen Torus in the Inner Magnetosphere: Simultaneous Observations by Arase and Van Allen Probe A, Geophys. Res. Lett. 45, 10,177-10,184, doi:10.1029/2018GL080122.

Ohya, H., F. Tsuchiya, Y. Takishita, H. Shinagawa, K. Nozaki, and K. Shiokawa (2018), Periodic oscillations in the D-region ionosphere after the 2011 Tohoku Earthquake using LF standard radio waves, J. Geophys. Res.: Space Phys., doi:10.1029/2018JA025289.

Ozaki, M., K. Shiokawa Y. Miyoshi K. Hosokawa S. Oyama S. Yagitani Y. Kasahara Y. Kasaba S. Matsuda R. Kataoka Y. Ebihara Y. Ogawa Y. Otsuka S. Kurita R. C. Moore Y.-M. Tanaka M. Nose T. Nagatsuma M. Connors N. Nishitani Y. Katoh M. Hikishima A. Kumamoto F. Tsuchiya A. Kadokura T. Nishiyama T. Inoue K. Imamura A. Matsuoka I. Shinohara (2018). Microscopic observations of pulsating aurora associated with chorus element structures: Coordinated Arase satellite-PWING observations. Geophysical Research Letters, 45, 12,125-12,134. https://doi.org/10.1029/2018GL079812.

Ozaki, M., S. Yagitani, H. Kojima, Y. Kasahara, Y. Kasaba, A. Kumamoto, F. Tsuchiya, S. Matsuda, A. Matsuoka, T. Sasaki, and T. Yumoto, Magnetic search coil (MSC) of plasma wave experiment (PWE) aboard the Arase (ERG) satellite, Earth Planets Space, 70:76, doi:10.1186/s40623-018-0837-1, 2018.

Ozaki, M., Y. Miyoshi, K. Shiokawa, K. Hosokawa, S. Oyama, R. Kataoka, Y. Ebihara, Y. Ogawa, Y. Kasahara, S. Yagitani, Y. Kasaba, A. Kumamoto, F. Tsuchiya, S. Matsuda, Y. Katoh, M. Hikishima, S. Kurita, Y. Otsuka, R.C. Moore, Y. Tanaka, M. Nos, T. Nagatsuma, N. Nishitani, A. Kadokura, M. Connors, T. Inoue, A. Matsuoka, I. Shinohara (2019) Visualization of rapid electron precipitation via chorus element wave-particle interactions. Nature Comm. 10:257, doi:100.138/s41-46718-7-996z.

Sakai, S., K. Seki, N. Terada, H. Shinagawa, T. Tanaka, and Y. Ebihara (2018), Effects of a weak intrinsic magnetic field on atmospheric escape from Mars, Geophys. Res. Lett. 45, 9336-9343, doi:10.1029/2018GL079972.

Sakanoi, T., J. Kuhn, S. Berdyugina, M. Emilio, M. Kagitani, Y. Hirahara, H. Nakagawa, Y. Kasaba, T. Obara, S. Okano, I. Scholl, A. Berdyugin, and V. Piirola (2018), Development of PLANETS telescope and visible-infrared spectrometer for monitoring of planetary and exoplanetary atmospheres, Proc. SPIE 10700, Ground-based and Airborne Telescopes VII, 107004J, doi:10.1117/12.2312363.

Shinbori, Atsuki, Yuichi Otsuka, Takuya Tsugawa, Michi Nishioka, Atsushi Kumamoto, Fuminori Tsuchiya, Shoya Matsuda, Yoshiya Kasahara, Ayako Matsuoka, J. Michael Ruohoniemi, Simon G. Shepherd, and Nozomu Nishitani (2018), Temporal and spatial variations of storm-time mid-latitude ionospheric trough based on global GNSS-TEC and Arase satellite observations, Geophys. Res. Lett., 45, 7362-7370, doi:10.129/2018GL78723.

Shiokawa, K., M. Ozaki, A. Kadokura, Y. Endo, T. Sakanoi, S. Kurita, Y. Miyoshi, S.-I. Oyama, M. Connors, I. Schofield, J. Michael Ruohoniemi, M. Nose, T. Nagatsuma, K. Sakaguchi, D. G. Baishev, A. Pashinin, R. Rakhmatulin, B. Shevtsov, I. Poddelsky, M. Engebretson, Tero Raita, Y.-M. Tanaka, M. Shinohara, M. Teramoto, R. Nomura, A. Fujimoto, A. Matsuoka, N. Higashio, T. Takashima , I. Shinohara, and Jay M. Albert (2018), Purple aurora and global Pc1 pulsations observed at the CIR-associated solar wind density enhancement on March 21, 2017, Geophys. Res. Lett., 45, 181, doi:100.1029/2018GL7913.

Shoji, M., Y. Miyoshi Y. Omura L. M. Kistler Y. Kasaba S. Matsuda Y. Kasahara A. Matsuoka R. Nomura K. Ishisaka A. Kumamoto F. Tsuchiya S. Yagitani M. Teramoto K. Asamura T. Takashima I. Shinohara (2018), Instantaneous frequency analysis on nonlinear EMIC emissions: Arase observation, Geophys. Res. Lett., 45, 13,199-13,205, https://doi.org/10.1029/2018GL079765.

Sinclair, J.A., G.S. Orton, J. Fernandes, Y. Kasaba, T.M. Sato, T. Fujiyoshi, C. Tao, M.F. Vogt, D. Grodent, B. Bonfond, J.I. Moses, T.K. Greathouse, W. Dunn, R.S. Giles, F. Tabataba-Vakili, L.N. Fletcher, P.G.J. Irwin (2019) A brightening of Jupiter's auroral 7.8-micron CH4 emission during a solar-wind compression. Nature Astronomy, doi:10.1038/s41550-019-0743-x.

Suzuki, F., K. Yoshioka, R. Hikida, G. Murakami, F. Tsuchiya, T. Kimura, and I. Yoshikawa, Corotation of bright features in the Io plasma torus, J. Geophys. Res. Space Physics, 123,9420-9429, doi:10.1029/2018JA025363, 2018.

Takahashi, K., Denton, R.E., Motoba, T., Matsuoka, A., Kasaba, Y., Kasahara, Y., Teramoto, M., Shoji, M., Takahashi, N., Miyoshi, Y., Nos, M., Kumamoto, A., Tsuchiya, F., Redmon, R.J., and Rodriguez, J.V. (2018), Impulsively excited nightside ultralow frequency waves simultaneously observed on and off the magnetic equator. Geophys. Res. Lett. 45, 7918-7926, doi:10.1029/2018GL078731.

Takahashi, K., R.E. Denton, T. Motoba, A. Matsuoka, Y. Kasaba, Y. Kasahara, M. Teramoto, M. Shoji, N. Takahashi, Y. Miyoshi, M. Nos, A. Kumamoto, F. Tsuchiya, R.J. Redmon, J.V. Rodriguez (2018), Impulsively excited nightside ultralow frequency waves simultaneously observed on and off the magnetic equator, Geophys. Res. Lett., 45, 7918-7926, doi:10.1029/2018GL078731.

Tao, C., T. Kimura, F. Tsuchiya, G. Murakami, K. Yoshioka, A. Yamazaki, S. V. Badman, H. Misawa, H. Kita, Y. Kasaba, I. Yoshikawa, and M. Fujimoto (2018), Variation of Jupiter's aurora observed by Hisaki/EXCEED: 3. Volcanic control of Jupiter's aurora, Geophys. Res. Lett. 45, 71-79, doi:10.1002/2017GL075814.

Tsuchiya, F., A. Hirai T. Obara H. Misawa S. Kurita Y. Miyoshi K. Shiokawa M. Connors M. Ozaki Y. Kasahara A. Kumamoto Y. Kasaba A. Matsuoka M. Shoji I. Shinohara (2018). Energetic electron precipitation associated with pulsating aurora observed by VLF radio propagation during the recovery phase of a substorm on 27 March 2017. Geophysical Research Letters, 45. https://doi.org/10.1029/2018GL080222.

Tsuchiya, F., H. Misawa, H. Kita, A. Morioka, and T. Kondo, Two-element radio interferometer for the observation of Jupiter's synchrotron radiation, Proc. International Sympo. Planetary Science 2011, ed. S. Okano, Y. Kasaba, H. Misawa, pp.47-58. TERRAPUB, Tokyo, doi:10.5047/pisps.047.

Tsuchiya, F., K. Yoshioka, T. Kimura, R. Koga, G. Murakami, A. Yamazaki, M. Kagitani, C. Tao, F. Suzuki, R. Hikida, I. Yoshikawa, Y. Kasaba, H. Kita, H. Misawa, and T. Sakanoi (2018), Enhancement of the Jovian Magnetospheric Plasma Circulation Caused by the Change in Plasma Supply from the Satellite Io, J. Geophys. Res: Space Phys., 123, doi:10.1029/2018JA025316.

Tsurushima, D., N. Honma, F. Tsuchiya, M. Sato, Y. Takahashi (2018), Matching algorithms of ELF-LEMPs and lightning geo-location data, IEEJ Transactions, 138(5), 339-345, doi:10.1541/ieejpes.138.339.

Watanabe, H.; Kita, H.; Tao, C.; Kagitani, M.; Sakanoi, T.; Kasaba, Y. (2018). Pulsation characteristics of Jovian infrared northern aurora observed by the Subaru IRCS with adaptive optics, Geophys. Res. Lett. 45, 21, 11,547-11,554, doi:10.1029/2018GL079411.

Yoshioka, K., F. Tsuchiya, M. Kagitani, T. Kimura, G. Murakami, D. Fukuyama, A. Yamazaki, I. Yoshikawa, and M. Fujimoto (2018), The influence of Io's 2015 volcanic activity on Jupiter's magnetospheric dynamics, Geophys. Res. Lett., 45, 10,193-10,199, doi:10.1029/2018GL079264

3.7. Chiba University
(Hiroyuki Nakata, Chiba University)

=== Recent papers ===

Hiroyuki Nakata, Akira Takahashi, Toshiaki Takano, Akinori Saito and Takeshi Sakanoi, Observation of equatorial plasma bubbles by the airglow imager on ISS-IMAP, Progress in Earth and Planetary Science 5, 66, https://doi.org/10.1186/s40645-018-0227-0, 2018.

3.8. Report from National Institute for Information and Communications Technology (NICT)
(Hidekatsu Jin, NICT)

=== Recent papers===

Nozomu Nishitani, John Michael Ruohoniemi, Mark Lester, Joseph Benjamin, Harold Baker, Alexandre Vasilyevich Koustov, Simon G. Shepherd, Gareth, Chisham, Tomoaki Hori, Evan G. Thomas, Roman A. Makarevich, Aurélie, Marchaudon, Pavlo Ponomarenko, James A. Wild, Stephen E. Milan, William, A. Bristow, John Devlin, Ethan Miller, Raymond A. Greenwald, Tadahiko Ogawa and Takashi Kikuchi, Review of the accomplishments of mid-latitude Super Dual Auroral Radar Network (SuperDARN) HF radars, Progress in Earth and Planetary Science, 6:27, https://doi.org/10.1186/s40645-019-0270-5, 2019.

K. K. Ajith, S. Tulasi Ram, B. A. Carter, S. Sathish Kumar, M. Yamamoto, T. Yokoyama, S. Gurubaran, S. Sripathi, K. Hozumi, K. Groves, and R. G. Caton, Unseasonal development of post-sunset F-region irregularities over Southeast Asia on 28 July 2014: 2. Forcing from below?, Progress in Earth and Planetary Science, 5:60, doi: 10.1186/s40645-018-0218-1, 2018.

B. Dutta, B. R. Kalita, P. K. Bhuyan, S. Sarmah, R.C. Tiwari, K. Wang, K. Hozumi, T. Tsugawa, T. Yokoyama, M. Le. Huy and T. T. H. Pham, Spatial features of L– band equinoctial scintillations from equator to low mid latitude at around 95^{O} E during 2015–16, J. Geophys. Res. Space Physics, Vol. 123, doi: 10.1029/2018JA025533, 2018.

Shinbori, A., Y. Otsuka, T. Tsugawa, M. Nishioka, A. Kumamoto, F. Tsuchia, S. Matsuda, Y. Kasahara, A. Matsuoka, J. M. Ruohoniemi, S. G. Shepherd, and N. Nishitani (2018), Temporal and spatial variations of storm-time mid-latitude ionospheric trough based on global GNSS-TEC and Arase satellite observations, Geophys. Res. Lett., 45, 2018GL078723.