

Program

2018 joint
14th iCACGP Quadrennial Symposium
and
15th IGAC Science Conference

Atmospheric Chemistry:
From molecules to global impacts



25-29 September 2018
Takamatsu, Kagawa, Japan

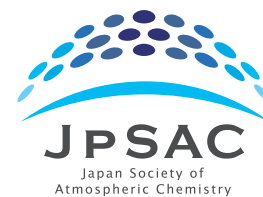
icacgp-igac2018.org



Conference Schedule

Day 1 Tuesday 25 Sep.	Day 2 Wednesday 26 Sep.	Day 3 Thursday 27 Sep.	Day 4 Friday 28 Sep.	Day 5 Saturday 29 Sep.
9:00–10:00 Opening Ceremony	9:00–9:30 Keynote: Maggie Tolbert	9:00–9:30 Keynote: Ian Galbally	9:00–10:30 Session 4: AC & Climate/Weather	9:00–9:30 Keynote: Hajime Akimoto
10:00–10:30 Guest Speaker: Yuan Tseh Lee	9:30–10:30 Session 2: AC & Fundamentals	9:30–10:30 Session 3: AC & Ecosystems		9:30–10:30 Session 5: Challenging the Future
10:30–11:15 Coffee Break/Posters	10:30–11:15 Coffee Break/Posters	10:30–11:15 Coffee Break/Posters	10:30–11:15 Coffee Break/Posters	10:30–11:15 Coffee Break/Posters
11:15–12:30 Session 1: AC & People	11:15–12:30 Session 2: AC & Fundamentals	11:15–12:45 Session 3: AC & Ecosystems	11:15–12:30 Session 4: AC & Climate/Weather	11:15–12:30 Session 5: Challenging the Future
12:30–14:00 Lunch	12:30–14:00 Lunch	Group Photo/ Free Afternoon/ Optional Expedition	12:30–14:00 Lunch	12:30–13:00 Closing Ceremony
14:00–15:30 Session 1: AC & People	14:00–15:30 Session 2: AC & Fundamentals		14:00–15:30 Session 4: AC & Climate/Weather	Coffee Breaks at Poster Rooms of Sunport Takamatsu Convention Center Lunch at Tent Area
15:30–16:15 Coffee Break/Posters	15:30–16:00 Coffee Break/Posters		15:30–16:00 Coffee Break/Posters	
16:15–17:30 Session 1: AC & People	16:00–18:00 Poster Session Session 1: AC & People Session 2: AC & Fundamentals		16:00–18:00 Poster Session Session 3: AC & Ecosystems Session 4: AC & Climate/Weather Session 5: Challenging the Future	
17:30–19:00 Welcome Social Hour	18:00–19:00 Social Hour/Posters	18:00–19:00 Social Hour/Posters		
		18:30–23:00 Conference Banquet & Dance Party		

Title of the Side Meeting	Day	Time	Room No.
4th International Workshop on Heterogeneous Kinetics Related to Atmospheric Aerosols	Sep. 24 (Mon)	9:00–18:00	Room 61
Chemistry Climate Model Initiative (CCMI)	Sep. 25 (Tue)	18:30–19:30	Room 54
IGAC Southern Hemisphere Working Group	Sep. 25 (Tue)	18:30–19:30	Room 61
AMIGO/IGAC project	Sep. 25 (Tue)	18:30–19:15	Room 62
COALA	Sep. 25 (Tue)	19:30–20:30	Room 61
IGAC Americas Working Group (Latin America and the Caribbean)	Sep. 25 (Tue)	19:30–20:30	Room 62
ANGA: AfricaN Group of Atmospheric sciences	Sep. 25 (Tue)	19:30–20:30	Room 63
Global Emissions Initiative (GEIA)	Sep. 26 (Wed)	18:30–19:15	Room 54
PACES Town Hall	Sep. 26 (Wed)	18:30–19:30	Room 61
CSPP-China Project	Sep. 26 (Wed)	18:30–19:30	Room 63
TROPOMI Data User Workshop	Sep. 26 (Wed)	18:45–20:00	Room 62
Monitoring, Analysis and Prediction of Air Quality (MAP-AQ)	Sep. 26 (Wed)	19:30–20:30	Room 54
Cryosphere and Atmospheric Chemistry (CATCH)	Sep. 26 (Wed)	19:30–20:30	Room 61
Effect of Megacities on the transport and transformation of pollutants on the Regional and Global scales (EMERGE)	Sep. 28 (Fri)	18:00–21:00	Room 54
IGAC-MANGO	Sep. 28 (Fri)	18:00–19:00	Room 61
Atmospheric Composition and the Asian Monsoon (ACAM)	Sep. 28 (Fri)	19:00–20:00	Room 61
Future Earth – China Working Group	Sep. 28 (Fri)	19:00–19:50	Room 62
Pollution in the Arctic: Climate, Environment and Societies – Working Group 1	Sep. 29 (Sat)	13:00–16:00	Room 54
Future Earth – who we are	Sep. 29 (Sat)	13:30–14:00	Room 61



Welcome to the 2018 joint 14th iCACGP Quadrennial Symposium and 15th IGAC Science Conference!

On behalf of the iCACGP-IGAC 2018 Local Organizing Committee (LOC), the IGAC-Japan National Committee (IGAC-Japan NC), and the Japan Society of Atmospheric Chemistry (JpSAC), we welcome all of you to Takamatsu, Kagawa, Japan for the 2018 joint 14th iCACGP Quadrennial Symposium and 15th IGAC Science Conference.

Together with the international launch of IGAC, under the Science Council of Japan, the IGAC-Japan National Committee was created in 1989 to oversee IGAC-related activities in Japan. The first epoch of the Japanese atmospheric chemistry activities in the early 1990s began with the organization of the "Joint Meeting on Global Atmospheric Chemistry (8th CACGP Symposium / 2nd IGAC Scientific Conference)" in Fuji Yoshida in September 1994. Through the evolution of the atmospheric chemistry community in Japan, JpSAC was officially established in 1999 in order to effectively address global environmental issues as well as to draw together scientists belonging to traditionally separate academic societies and offer them a forum for mutual exchange and discussions. Today, the IGAC-Japan NC and JpSAC have formed a cohesive Japanese atmospheric chemistry community that is strengthening its connections with the international community.

The Japan atmospheric chemistry community is delighted to be hosting the joint iCACGP Quadrennial Symposium and IGAC Science Conference 24 years later in Takamatsu, Kagawa, Japan. Since the 1994 joint CACGP Symposium and IGAC Science Conference, the Japan atmospheric chemistry community has grown both in the number of scientists as well as in the quality of its research. We are excited to welcome the international atmospheric chemistry community to Japan and share our strong science and culture with you.

We hope you enjoy the science while taking advantage of Takamatsu, an entrance city to Shikoku Island, one of Japan's foremost tourist destinations.

Sincerely,

Handwritten signature of Hiroshi Tanimoto in black ink.

Dr. Hiroshi Tanimoto
Chair of the LOC
IGAC Co-Chair
IGAC-Japan NC Chair
JpSAC Chair

Handwritten signature of Tatsuya Nagashima in black ink.

Dr. Tatsuya Nagashima
LOC Member
JpSAC Secretary

Handwritten signature of Satoshi Inomata in black ink.

Dr. Satoshi Inomata
LOC Member
IGAC-Japan NC Secretary

Handwritten signature of Nobuyuki Takegawa in black ink.

Dr. Nobuyuki Takegawa
LOC Member
iCACGP Member

Handwritten signature of Michihiro Mochida in black ink.

Dr. Michihiro Mochida
JpSAC Vice-Chair

Handwritten signature of Toshinobu Machida in black ink.

Dr. Toshinobu Machida
JpSAC Secretary



Our Welcome to the participants attending the 2018 joint 14th iCACGP Quadrennial Symposium and 15th IGAC Science Conference



On behalf of the international Committee on Atmospheric Chemistry and Global Pollution (iCACGP) and the International Atmospheric Chemistry (IGAC) Project, it is our great pleasure to welcome all of you to the 2018 joint 14th iCACGP Quadrennial Symposium and 15th IGAC Science Conference, 25th to 29th of September 2018 in Takamatsu, Kagawa, Japan.

For the past sixty years, iCACGP has been supporting atmospheric chemistry research that contributes to solving the societal issues of air quality, water quality, food production, and human/ecosystem health and maintains the necessary disciplinary expertise in the natural sciences. Since 1990, IGAC has been fostering an international community, building scientific capacity, and providing intellectual leadership to deepen our understanding of atmospheric chemistry and address the most pressing global change and sustainability issues. Combined, iCACGP and IGAC have nearly nine decades of experience bringing together the international scientific community to address societal issues through scientific research, as the Anthropocene has evolved.

Since 1994, the iCACGP Quadrennial Symposium and the biennial IGAC Science Conference have been held jointly every four years. This joint international symposium and science conference is the primary way iCACGP and IGAC build cooperation and disseminate scientific information across its combined international community.

The 2018 joint 14th iCACGP Quadrennial Symposium and 15th IGAC Science Conference aims to:

- Bring together a broad representation of the international community of atmospheric scientists, from developed and developing countries.
- Spotlight cutting-edge scientific research related to atmospheric chemistry and its broader impacts.
- Foster and stimulate international scientific collaborations that will contribute towards solutions for the most pressing global change and sustainability issues.
- Cultivate the next generation of atmospheric scientists through its early career program.
- Celebrate the 60th anniversary of iCACGP.

We thank especially the Local Organizing, Scientific Program, and Early Career Program Organizing Committees for designing and organizing this ambitious and exciting week for the international atmospheric chemistry community.

We look forward to your participation in, and contributions to, the 2018 joint 14th iCACGP Quadrennial Symposium and 15th IGAC Science Conference.

With kind regards,

Prof. John P. Burrows FRS
iCACGP President

Dr. Melita Keywood
iCACGP Vice President

Prof. James R. Drummond FRSC
iCACGP Scientific Secretary

Dr. Mark Lawrence
IGAC Co-Chair

Dr. Hiroshi Tanimoto
IGAC Co-Chair

Dr. Megan L. Melamed
IGAC Executive Officer



Welcome to the 2018 joint 14th iCACGP Quadrennial Symposium and 15th IGAC Science Conference!



On behalf of the Scientific Program Committee (SPC) and the Early Career Program Organizing Committee (ECPOC), we welcome all of you to the 2018 joint 14th iCACGP Quadrennial Symposium and 15th IGAC Science Conference with the theme "Atmospheric Chemistry: From molecules to global impacts".

The conference includes five plenary sessions on Atmospheric Chemistry as it pertains to Human Activities, Ecosystems, Climate/Weather, Fundamental Understanding, and Future Challenges:

1. Atmospheric Chemistry & People
2. Atmospheric Chemistry & Fundamentals
3. Atmospheric Chemistry & Ecosystems
4. Atmospheric Chemistry & Climate/Weather
5. Challenging the Future

In addition to the scientific focus, throughout the week there will be many events for early career scientists to attend. The Early Career Program aims to foster professional relationships and collaborations among the next generation of researchers. The events will include:

- Special talk by Prof. Y.T. Lee entitled "Dare to be Different"
- Early career mixer
- Soft skills talks
- Early career excursion
- Lunch with established scientists
- Best early career oral and poster presentation competition

We welcome all of you to the plenary oral presentations and invite you to interact with over 700 participants, 290 of which are early career scientists, from 46 countries during the poster sessions and social events. We hope you enjoy the science and networking opportunities at the 2018 joint 14th iCACGP Quadrennial Symposium and 15th IGAC Science Conference.

We look forward to meeting all of you in Japan.

Sincerely,

Handwritten signature of Colette Heald in black ink.

Prof. Colette Heald
Co-Chair of the SPC

Handwritten signature of Melita Keywood in black ink.

Dr. Melita Keywood
Co-Chair of the SPC

Handwritten signature of Kohei Sakata in black ink.

Dr. Kohei Sakata
Co-Chair of the ECPOC

Handwritten signature of Sakiko Ishino in black ink.

Sakiko Ishino
Co-Chair of the ECPOC



Local Organizing Committee

Hiroshi Tanimoto (Chair), *National Institute for Environmental Studies, Japan*
Tatsuya Nagashima, *National Institute for Environmental Studies, Japan*
Satoshi Inomata, *National Institute for Environmental Studies, Japan*
Nobuyuki Takegawa, *Tokyo Metropolitan University, Japan*

Outreach Team: **Thomas Sekiyama**, *JMA/MRI, Japan*

Masahide Ishizuka, Toru Terao, *Kagawa University, Japan*

Social Events Team: **Sachiko Okamoto, Kohei Ikeda**, *NIES, Japan*

Website/Editing Team: **Kimiko Suto, Edit Nagy-Tanaka**, *NIES, Japan*

Administration Team: **Naoko Sasaki, Norie Yamamoto, Mayu Kure, Mariko Ohashi**, *NIES, Japan*

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Tatsuya Nagashima (Secretary of JpSAC), *National Institute for Environmental Studies*
Satoshi Inomata (Secretary of IGAC-Japan NC), *National Institute for Environmental Studies*
Tomoki Nakayama, *Nagasaki University*
Hitoshi Irie, *Chiba University*
Toshinobu Machida (Secretary of JpSAC), *National Institute for Environmental Studies*
Nawo Eguchi, *Kyushu University*
Atsushi Matsuki, *Kanazawa University*
Yasuko Kasai, *National Institute of Information and Communications Technology*
Kazuhide Matsuda, *Tokyo University of Agriculture and Technology*
Yugo Kanaya, *Japan Agency for Marine-Earth Science and Technology*
Jun Matsumoto, *Waseda University*
Yuzo Miyazaki, *Hokkaido University*
Jun-ichi Kurokawa, *Asia Center for Air Pollution Research*
Michihiro Mochida (Vice-Chair of JpSAC), *Nagoya University*
Naoko Saitoh, *Chiba University*
Yu Morino, *National Institute for Environmental Studies*
Thomas Sekiyama, *Meteorological Research Institute, Japan Meteorological Agency*
Shinji Morimoto, *Tohoku University*
Kenshi Takahashi, *Kyoto University*
Akihiro Yabushita, *Kyushu University*
Nobuyuki Takegawa, *Tokyo Metropolitan University*
Seiichiro Yonemura, *National Institute for Agro-Environmental Sciences*
Jing Zhang, *Toyama University*
Yoko Iwamoto, *Hiroshima University*
Sinichi Enami, *National Institute for Environmental Studies*
Sakae Toyoda, *Tokyo Institute of Technology*
Jun Hirokawa, *Hokkaido University*

Scientific Program Committee

Melita Keyword (Co-Chair), *Commonwealth Scientific and Industrial Research Organisation, Australia*
Colette Heald (Co-Chair), *Massachusetts Institute of Technology, USA*
Mary Barth, *National Center for Atmospheric Research, USA*
Paul Beukes, *North-West University, South Africa*
Gregory Frost, *National Oceanic and Atmospheric Administration, USA*
Michael Gauss, *Norwegian Meteorological Institute, Norway*
Sachiko Hayashida, *Nara Women's University, Japan*
Nicolas Huneeus, *University of Chile, Chile*
Astrid Kiendler-Scharr, *Forschungszentrum Jülich, Germany*
Jesse Kroll, *Massachusetts Institute of Technology, USA*
Manish Naja, *Aryabhata Research Institute of Observational Sciences, India*
Xuemei Wang, *Sun Yat-sen University, China*

Early Career Program Organizing Committee

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Sakiko Ishino (Co-Chair), *Tokyo Institute of Technology, Japan*
Maximilien Desservettaz, *Commonwealth Scientific and Industrial Research Organisation, Australia*
Manish Kumar, *Banaras Hindu University, India*
Andriannah Mbandi, *University of York/SEI, UK*
Zitely Tzompa-Sosa, *Colorado State University, USA*
Megan Willis, *University of Toronto, Canada*

2018 iCACGP Members

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Melita Keyword (Vice-President), *Commonwealth Scientific and Industrial Research Organisation, Australia*
James R. Drummond FRSC (Secretary), *Dalhousie University, Canada*
Maria de Fatima Andrade, *University of Sao Paulo, Brazil*
Mary Barth, *National Center for Atmospheric Research, USA*
Lucy Carpenter, *University of York, UK*
Franciscus J. Dentener, *European Commission, and Joint Research Centre, Italy*
Russell R. Dickerson, *The University of Maryland, USA*
Maria Cristina Facchini, *Institute of Atmospheric Sciences and Climate, National Research Council, Italy*
David W. Fahey, *NOAA Earth System Research Laboratory, USA*
Laura Gallardo Klenner, *Center for Climate and Resilience Research, Chile*
Michael Gauss, *Norwegian Meteorological Institute, Norway*
Christian George, *IRCELYON, CNRS, France*
Sergey Gromov, *Institute of Global Climate and Ecology, Russia*
Sachiko Hayashida, *Nara Women's University, Japan*
Shaw-Chen Liu, *Jinan University, China, and Academia Sinica, Taiwan*
Olga L. Mayol-Bracero, *University of Puerto Rico, Puerto Rico*
Paul S. Monks, *University of Leicester, UK*
Manish Naja, *Aryabhata Research Institute of Observational Sciences, India*
Stuart J. Piketh, *North-West University Potchefstroom, South Africa*
Nobuyuki Takegawa, *Tokyo Metropolitan University, Japan*
Geoffrey S. Tyndall, *National Center for Atmospheric Research, USA*
Clare Murphy (Paton-Walsh), *University of Wollongong, Australia*
J. Jason West, *The University of North Carolina at Chapel Hill, USA*
Caradee Y. Wright, *South African Medical Research Council, South Africa*
Renyi Zhang, *Texas A&M University, USA*
Yuanhang Zhang, *Peking University, China*
Mark Lawrence, *Institute for Advanced Sustainability Studies, Germany*
Oksana Tarasova, *World Meteorological Organization, Switzerland*
Xuemei Wang, *Sun Yat-sen University, China*

2018 IGAC SSC Members

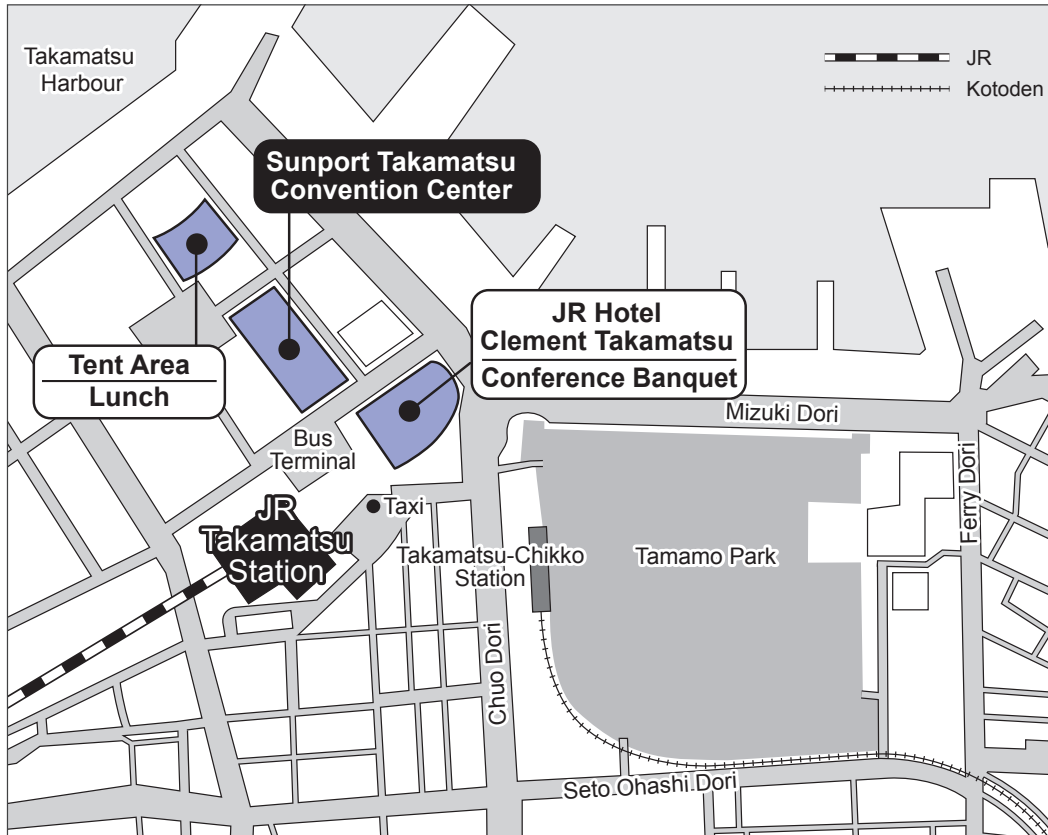
Mark Lawrence (Co-Chair), *Institute for Advanced Sustainability Studies, Germany*
Hiroshi Tanimoto (Co-Chair), *National Institute for Environmental Studies, Japan*
Paul Beukes, *North-West University, South Africa*
James Crawford, *National Aeronautics and Space Administration, USA*
Gregory Frost, *National Oceanic and Atmospheric Administration, USA*
Christian George, *IRCELYON, CNRS, France*
Michel Grutter, *Universidad Nacional Autónoma de México, Mexico*
Colette Heald, *Massachusetts Institute of Technology, USA*
Judith Hoelzemann, *Federal University of Rio Grande do Norte, Brazil*
Alastair Lewis, *University of York, UK*
Clare Murphy (Paton-Walsh), *University of Wollongong, Australia*
Jennifer Murphy, *University of Toronto, Canada*
Manish Naja, *Aryabhata Research Institute of Observational Sciences, India*
Kim Oanh, *Asian Institute of Technology, Thailand*
Noureddine Yassa, *Centre de Développement des Energies Renouvelables, Algeria*
Mei Zheng, *Peking University, China*



Access

Sunport Takamatsu Convention Center
2-1 Sunport, Takamatsu, Kagawa 760-0019, Japan

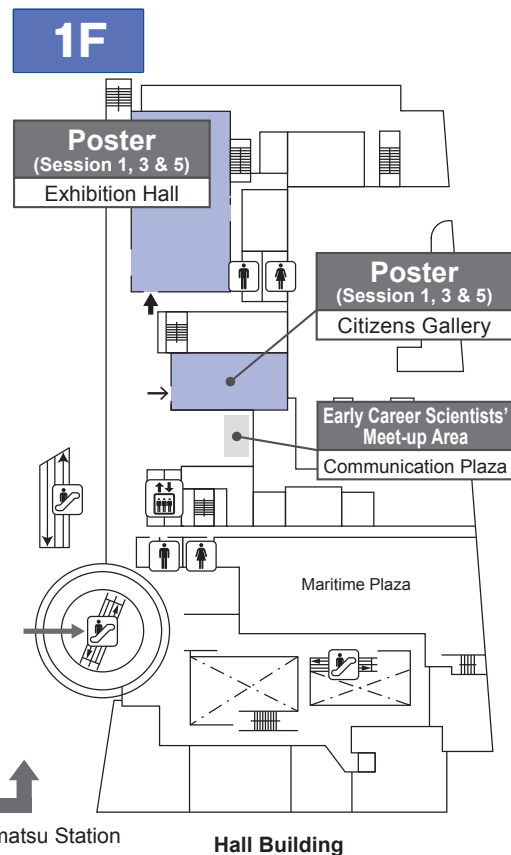
JR Hotel Clement Takamatsu
1-1 Hamano-cho, Takamatsu, Kagawa 760-0011, Japan



Floor Map

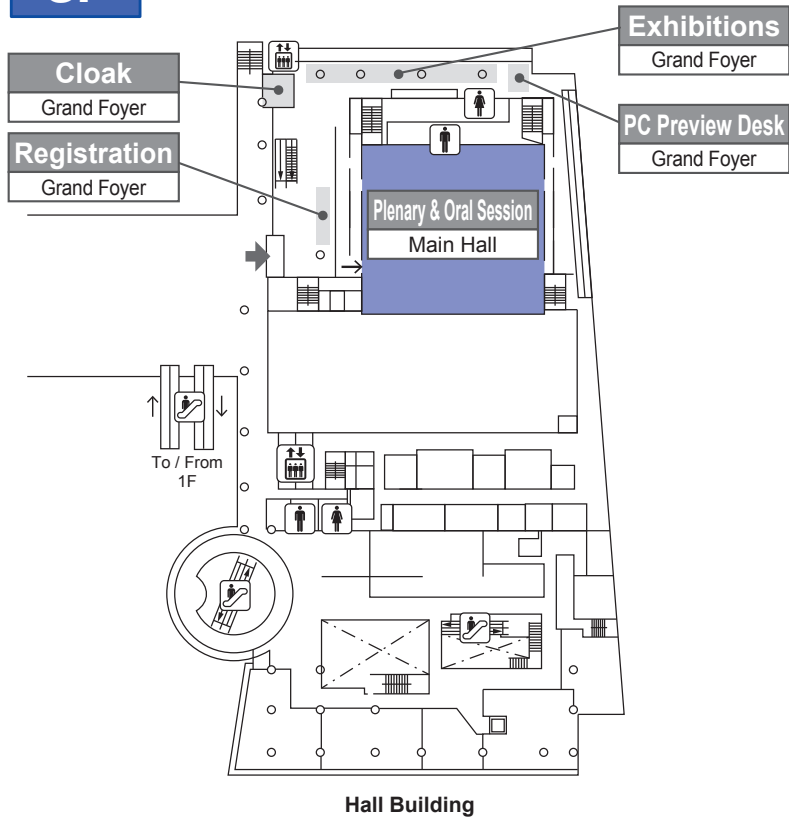
Sunport Hall Takamatsu Convention Center

6F	Room 61	Side Meeting
	Room 62	Side Meeting
	Room 63	Side Meeting
5F	Room 54	Side Meeting
	Backstage Room 14	Kids' Activities Room
	Backstage Room 15	Rest Room
	Backstage Room 16	Pray Room
Small Hall 2		Poster (Session 2 & 4)
3F	Grand Foyer	Registration Cloak PC Preview Desk Exhibitions
	Main Hall	Plenary & Oral Session
1F	Exhibition Hall	Poster (Session 1, 3 & 5)
	Citizens Gallery	Poster (Session 1, 3 & 5)
	Communication Plaza	Rest Area

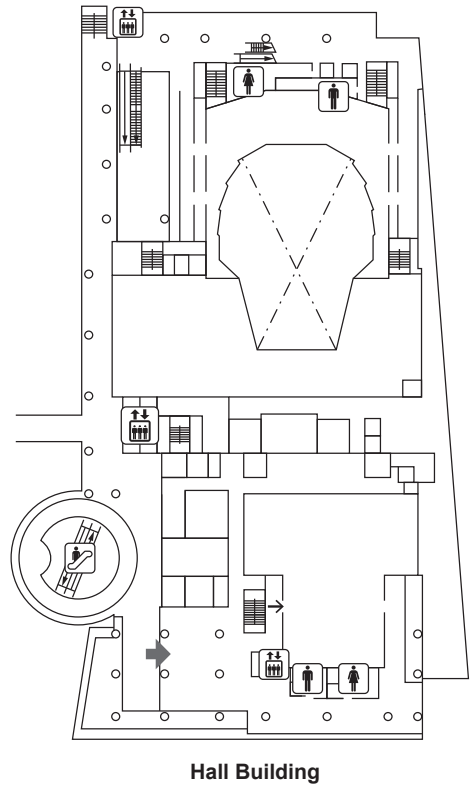


Floor Map

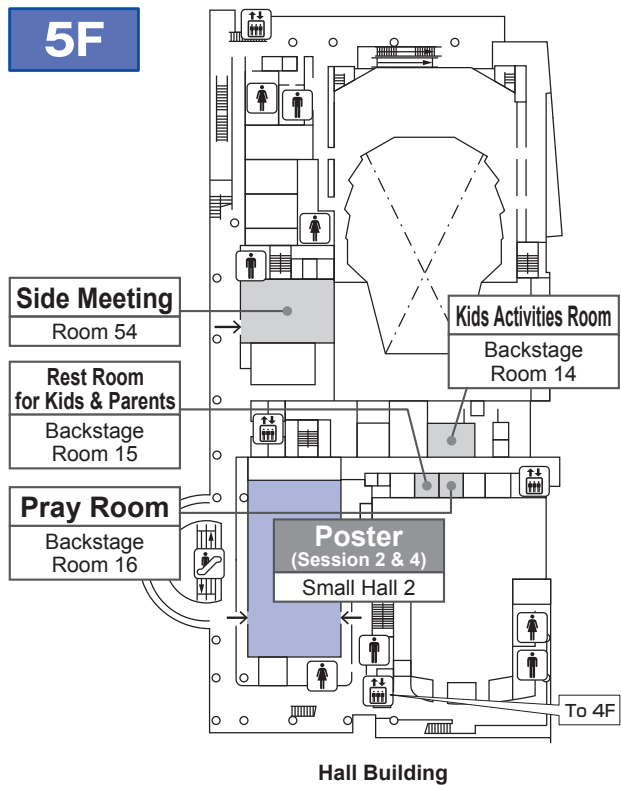
3F



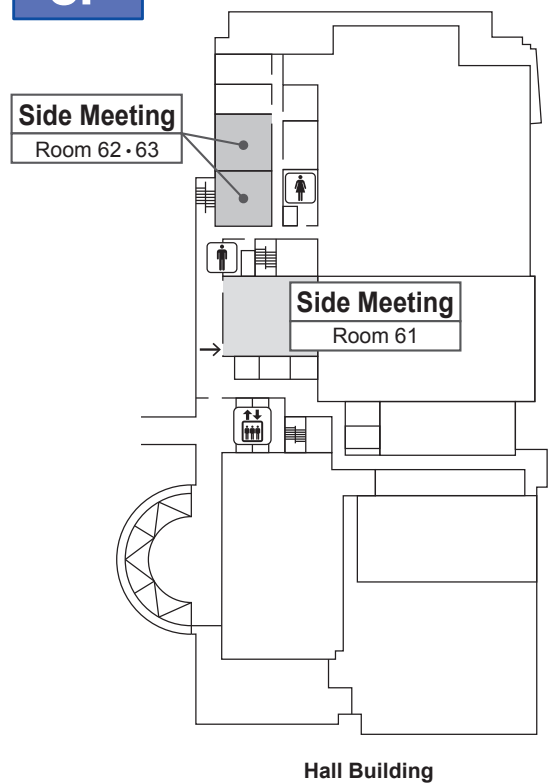
4F



5F



6F





Information for Participants

1. General Information and Registration Desk

Date	Time	Place
September 24	16:00–18:00	JR Hotel Clement Takamatsu 1F Lobby
September 25	8:00–17:00	3F Grand Foyer
September 26	8:00–17:00	
September 27	8:00–11:30	
September 28	8:00–17:00	
September 29	8:00–11:30	

- ♦ Please wear your name badge in a visible way whenever you are at the venue.
- ♦ You will not be allowed to enter the presentation room without your name badge.

2. Lunch & Coffee Break

- ♦ Lunch will be provided at Tent Area behind Sunport Takamatsu Convention Center from 12:30–14:00 on September 25, 26 and 28.
- ♦ Drink service will be provided during coffee break time at Poster Rooms of Sunport Takamatsu Convention Center.

3. Social Events

Welcome Social Hour

Date & Time: Tuesday, September 25 17:30–19:00
Place: 1F Poster Rooms, Sunport Takamatsu Convention Center

Social Hour

Date & Time: Wednesday, September 26 18:00–19:00
Friday, September 28 18:00–19:00
Place: 1F Poster Rooms, Sunport Takamatsu Convention Center

Conference Banquet & Dance Party

Date & Time: Thursday, September 27 18:30–23:00
Place: 3F Hiten & Tamamo Banquet Room, JR Hotel Clement Takamatsu
Special Features:

- 18:15–18:30 Welcome Live Music
- 18:30–18:45 “Shodo” Performance by Kagawa Pref. Takamatsu Commercial High School Calligraphy Club
- 21:00–23:00 Dance and Music Party with Swingin’ Wonderland JAZZ Orchestra

Excursion & Tours

Special Conference Excursion
Date & Time: Thursday, September 27 13:30–17:45
Ritsurin Garden & Seto Ohashi Memorial Park

Optional Tours

Date & Time: Saturday, September 29
Tour #1: Yashima & Shikoku Mura Museum (13:30–17:10)
Tour #2: Kotohira-gu Shrine (13:30–18:00)
Tour #3: Zentsu-ji Shrine & Chichibugahama Beach (15:00–19:30)

Outreach Program for Future Scientists

(Jointly supported by Kagawa Prefectural Government, Takamatsu City, Kagawa Prefectural Board of Education, and Takamatsu Preparatory School-Takayobi)

iCACGP-IGAC 2018 is committed to disseminating Atmospheric Chemistry to junior high- to high-school students and their teachers, and public sectors working on a variety of environmental issues. The following activities are offered.

- Listen to the Nobel Lecture!
- Meet the Earth Scientists!
- Scientists’ School Visit
- Science Café

4. Early Career Program

(Jointly sponsored by iCACGP, IGAC, JpSAC, Nagoya University / ISEE, NIES and APN)

- ♦ Early Career Scientists have the opportunity to attend the following events throughout the week of iCACGP-IGAC 2018.
- ♦ Please note that some events (4-2, 4-4, and 4-5) required pre-registration. If you would like to attend those events, please ask at the Registration Desk.

4-1. Special Talk by Prof. Yuan Tseh Lee (Tuesday, Sep. 25 12:45-13:45 at 3F Main Hall)

A special talk for early career scientists entitled "Dare to be Different" by Nobel Laureate Prof. Lee. Prof. Lee received a Nobel Prize for Chemistry in 1986 for his contributions to the dynamics of chemical elementary processes. He is currently serving as the President Emeritus and Distinguished Research Fellow at Academia Sinica, Taiwan. His talk will definitely be a source of inspiration for the younger generation of scientists. Don't miss this wonderful opportunity.

4-2. Early Career Mixer (Tuesday, Sep. 25 19:30-21:00 at Tent Area)

An Early Career Mixer is planned as a get-together for all early career scientists. This mixer will serve as an excellent opportunity for meeting and networking with other early career scientists attending iCACGP-IGAC 2018.

4-3. Soft Skill Talk (Wednesday, Sep. 26 12:45-13:45 at 3F Main Hall)

Soft skills including such topics as time management, leadership skills, and social media are integral parts of science. You will experience some exciting talks on developing soft skills by some recognized leaders. These talks are intended to help early career scientists develop essential skills for their work and daily life.

4-4. Early Career Excursion (Thursday, Sep. 27 13:30-18:00)

Take advantage of the free afternoon with an excursion along with other early career scientists. An excursion to the Konpira Shrine and Tamamo Park has been arranged for early career scientists.

4-5. Lunch with Established Scientists (Friday, Sep. 28 12:45-13:45 at Tent Area)

The early career program at iCACGP-IGAC 2018 provides a lunch to provide an opportunity for early career scientists to connect with established scientists. This lunch will facilitate closer interactions between early career and established scientists.

4-6. Early Career Presentation Awards

Throughout the week, early career scientists' poster and oral presentations will be judged. Awards for early career scientists' poster and oral presentations will be given out at **the Closing Ceremony on Saturday, Sep. 29.**

5. Health & Safety

Medical Care

Around the conference venue there are general hospitals as well as clinics. In case of health problems, participants can see a medical doctor without an appointment. There are many pharmacies where visitors can consult with a pharmacist and buy medicine. Should participants have emergency health issues at night or on the weekends, they can visit emergency hospitals that are open 24 hours 7 days.

Emergency Phone Numbers

- ♦ Ambulance & Fire: 119
- ♦ Police: 110

Useful Website

- ♦ Safety tips for travelers: www.jnto.go.jp/safety-tips/eng/index.html
- ♦ "Safety tips" (a push-enabled information alert app for foreign tourists): www.rcsc.co.jp/safety-tips-en
- ♦ "Safety tips" notifies a user with Earthquake Early Warnings, Tsunami Warnings, Eruption Alert and other special Weather Warnings issued in Japan.
- ♦ Emergencies: www.japan.travel/en/plan/emergencies/

Travel Insurance

LOC strongly recommends buying travel insurance. Please be sure to get a policy that is valid in Japan which also covers full medical coverage and evacuation coverage should you become sick or have an accident while in Japan as they cannot be covered by the iCACGP-IGAC 2018 LOC.

Information for Presenters

Oral Presentation

1. Time Allotted for Presentations

- ◆ Keynote presentation is 25 minutes in length, with 5 minutes for Q & A.
 - ◆ Invited oral presentation is 12 minutes in length, with 3 minutes for Q & A.
 - ◆ Oral presentation is 12 minutes in length, with 3 minutes for Q & A.
 - ◆ All oral presenters are required to be seated around the Next Speaker's Seat during their session.
- * Your punctuality would be highly appreciated.

2. PC Preview Desk

- ◆ All oral presenters should check in at PC Preview Desk at least 3 hours before their presentation time. They need to bring their presentation file with USB or laptop.
- ◆ Oral presenters can use their own laptop for the presentation. After the preview at PC Preview Desk, please bring your laptop to the Computer Operation Desk at least 30 minutes before your presentation. The Computer Operation Desk is located at the front left side of the Plenary Room.
- ◆ Macintosh users are encouraged to bring your own laptop.
- ◆ PowerPoint and Adobe PDF are the only applications accepted.
- ◆ Video projector's aspect ratio is 4:3.

[Precautions When Bringing Media]

- ◆ OS: Windows10.
MS Windows PowerPoint: 2010/2013/2016 are acceptable.
- ◆ Please use standard fonts such as Arial, Century, Times New Roman, etc.
- ◆ If you are using video data, please bring your own laptop.
- ◆ Video data for PowerPoint presentations should be able to run in codec with default state of Windows10(OS) and Windows Media Player 12. To have it linked with PowerPoint, please save your data in the same folder.
- ◆ Please check your data with Virus Scanner.
- ◆ Please be sure to bring your back-up data with you.

[Precautions When Bringing Your Own Laptop]

- ◆ Please cancel the password, screensaver, and power-saving settings in advance.
- ◆ The connection for the output connector is "Mini D-sub 15 pin."
- ◆ If you have a different output connector, please bring an appropriate conversion connector. Also, please remember to bring your computer's AC adapter.
- ◆ Please make sure to prepare a back-up data on USB drive with you.



Poster Presentation

1. Place

Session 1, 3 & 5: 1F, Exhibition Hall and Citizens Gallery
Session 2 & 4: 5F, Small Hall 2

2. Schedule

	Sep. 25	Sep. 26	Sep. 27	Sep. 28	Sep. 29
Poster set-up	9:00-13:00	-	-	-	-
Poster viewing	13:00-17:30	9:00-16:00	9:00-13:00	9:00-16:00	9:00-11:15
Presentation	-	16:00-18:00 (Session 1&2)	-	16:00-18:00 (Session 3,4&5)	-
Poster removal	-	-	-	-	11:15-12:30

- ◆ Poster presenters should be at their posters from 16:00-18:00 on the day of their poster presentation.
- ◆ It is your responsibility to remove your posters. The Secretariat will recycle any posters that are left behind after the poster removal time.

Program



Tuesday, September 25

9:00-10:00 | **Opening Ceremony**

10:00-10:30 | **Special Guest Speaker**

10:00 Achievement and Challenges of Atmospheric Chemists

G.001

Yuan Tseh Lee

*President Emeritus and Distinguished Research Fellow, Academia Sinica, Taiwan
Former President of the International Council of Science (ICSU)
Nobel Laureate in Chemistry, 1986*

Prof. Yuan T. Lee received his B.S. degree from National Taiwan University and Doctorate from UC Berkeley. He is the first Taiwanese to win a Nobel Prize, which he was awarded jointly with Hungarian-Canadian John C. Polanyi and American Dudley R. Herschbach in Chemistry in 1986 "for their contributions concerning the dynamics of chemical elementary processes". Prof. Lee's work was related to the use of advanced chemical kinetics techniques to investigate and manipulate the behavior of chemical reactions using crossed molecular beams. He has also been honored with several other international awards in addition to the Nobel Prize for his invaluable contributions to the field of chemistry.

Prof. Lee holds Honorary Doctorates from 41 universities worldwide, and is an elected member of various academies throughout the world. He is President Emeritus and Distinguished Research Fellow of Academia Sinica in Taiwan and is the former President of the International Council for Science (ICSU) in 2011-2014.

Aside from his scientific interests, he also directed much of his attention to the advancement of international scientific developments and to the promotion of general public affairs. He has served as advisory board member on numerous national and international organizations. He is passionate about global sustainability, and in 2015, he signed the 2015 Mainau Declaration expressing concern about anthropogenic climate change.



10:30-11:15 | **Coffee Break / Posters**

11:15-17:30 | **Session 1 Atmospheric Chemistry & People**

Conveners: Paul Beukes (South Africa)
Manish Naja (India)

11:15 Emissions, air pollution, health and society in Africa

1.044

Cathy Liousse (Invited)

Laboratoire d'Aérodologie, Université Paul Sabatier Toulouse III-CNRS, France

11:30 Surface ozone variability in continental South Africa

1.146

Pieter Gideon van Zyl

North-West University, South Africa

11:45 What level of air quality monitoring data is needed to support effective policy action to reduce pollution?

1.112

Aderiana Mbandi

South Eastern Kenya University, Kenya (Early Career Scientist)

12:00 Trends of PM pollution and health effects in Europe during the 1990s and 2000s:
Multi-model and observational assessment

1.157

Svetlana Tsyro

Norwegian Meteorological Institute, Norway

12:15 Establishing connections between aerosol chemical composition and possible health effects

1.055

Yinon Rudich

Weizmann Institute, Israel

12:30-14:00 | **Lunch at Tent Area**

- 14:00
1.066 Atmospheric chemistry: A quiet revolution helping people mitigate risks of air pollution
Rajesh Kumar (Invited)
National Center for Atmospheric Research, USA
- 14:15
1.093 Decadal changes of ozone–NO_x–VOC sensitivity over Japan estimated using satellite data and their impact on the effectiveness of surface ozone mitigation policies inferred from air quality simulations
Kazuya Inoue
National Institute of Advanced Industrial Science and Technology, Japan
- 14:30
1.208 Effect of Megacities on the transport and transformation of pollutants on the Regional to Global scales (EMERGe): An overview of the HALO airborne campaigns in Europe and Asia
Maria Dolores Andrés Hernández
University of Bremen, Germany
- 14:45
1.218 Source apportionment of particulate matter using a low-cost multi-pollutant air quality sensor in an Indian megacity
David Hagan
Massachusetts Institute of Technology, USA (Early Career Scientist)
- 15:00
1.095 Forecast the shipping emissions and impacts in China
Huan Liu
Tsinghua University, China
- 15:15
1.124 Recent changes of trans-boundary air pollution over northeast Asia: Implications for future air quality in South Korea
Piyush Bhardwaj
Gwangju Institute of Science and Technology, Korea (Early Career Scientist)

15:30-16:15 | **Coffee Break / Posters**

- 16:15
1.205 The tropospheric ozone assessment report (TOAR): A community-wide effort to quantify tropospheric ozone in a rapidly changing world
Owen Cooper
University of Colorado / NOAA Earth System Research Laboratory, USA
- 16:30
1.031 A new top-down approach to quantifying the spatial, temporal, and vertical distribution of urban and biomass burning regions using decadal measurements from MOPITT and AERONET
Chuyong Lin
Sun Yat-Sen University, China (Early Career Scientist)
- 16:45
1.185 Air quality in Puerto Rico in the aftermath of Hurricane Maria
Olga L Mayol-Bracero
University of Puerto Rico, Puerto Rico
- 17:00
1.197 Detecting human emissions of volatile chemical products in urban atmospheres
Brian McDonald
University of Colorado / NOAA Earth System Research Laboratory, USA
- 17:15
1.167 Towards improved quantification of Russian oil and gas extraction emissions based on analysis of YAK–AEROSIB aircraft data
Kathy Law
Laboratoire Atmosphères, Milieux, Observations Spatiales (LATMOS)-CNRS, France

17:30-19:00 | **Welcome Social Hour at Poster Room**



Wednesday, September 26

9:00-9:30 | Keynote Lecture 1

9:00
K.001 Going through a phase: Particulate water in atmospheric aerosol
Margaret Tolbert
Department of Chemistry and CIRES, University of Colorado, USA

The water content of atmospheric aerosols controls many properties including their ability to catalyze heterogeneous chemical reactions, their impact on climate and visibility, and their ability to form clouds. In the atmosphere, the water content of the particles depends on their composition as well as the relative humidity and temperature. As crystalline salt particles are exposed to increasing relative humidity, the deliquescence phase transition results in rapid formation of aqueous droplets at the deliquescence relative humidity (DRH). The DRH values of atmospheric salts are generally well predicted by theory. In contrast, decreasing relative humidity results in particle morphologies and water content that are difficult to predict theoretically, and must be measured in the laboratory. At sufficiently low relative humidity, the droplets may undergo efflorescence (at the ERH), resulting in recrystallization of the salt particles. Hysteresis in water uptake and loss is often observed and the DRH can be very much higher than the ERH. Thus atmospheric salt particles are often assumed to be aqueous throughout much of their atmospheric lifetime. Here we use a long working distance optical trap to measure the deliquescence and efflorescence phase transitions of individual levitated salt particles. In addition, we probe how efflorescence is influenced by collisions of the salt droplet with other particles and by immersion of solids within the droplet. We find that while both contact and immersion can promote efflorescence, contact-induced efflorescence is by far more effective. These laboratory experiments challenge our theoretical understanding of nucleation in microscopic salt particles. In addition, the experiments have implications for particle phase and water content of aerosols in the global atmosphere.



9:30-15:30 | Session 2 Atmospheric Chemistry & Fundamentals

Conveners: Astrid Kiendler-Scharr (Germany)
Jesse Kroll (USA)

9:30
2.113 Air/sea interfacial photochemistry is a global source of organic vapors and aerosol particles
Christian George
University of Lyon, Université Claude Bernard Lyon 1, CNRS, IRCELYON, France

9:45
2.152 A comprehensive test of the recent proposed HONO sources in field measurements at rural North China Plain
Yuhan Liu
Peking University, China (Early Career Scientist)

10:00
2.038 Aerosol formation and aging under atmospheric conditions in China: Application of a quasi-atmospheric aerosol evolution study (QUALITY) chamber
Min Hu
Peking University, China

10:15
2.119 Impact of temperature on molecular composition of secondary organic aerosols from anthropogenic and biogenic sources: From lab to field
Cheng Wu
University of Stockholm, Sweden (Early Career Scientist)

10:30-11:15 | Coffee Break / Posters

11:15
2.145 First steps to uncovering molecular level interactions of organic aerosol and cloud droplets from direct observation using synchrotron radiation
Nonne Prisle (Invited)
University of Oulu, Finland

11:30
2.051 Insight into the in-cloud formation of oxalate based on in situ measurement by single particle mass spectrometry
Guohua Zhang
Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, China

- 11:45
2.141 The significant role of cloud chemistry in tropospheric NO_x and oxidant cycles
Christopher Holmes
Florida State University, USA
- 12:00
2.085 Role of sulfate radical anion chemistry in heterogeneous OH oxidation of organosulfates
Man Nin Chan
The Chinese University of Hong Kong, Hong Kong
- 12:15
2.159 Influence of relative humidity on the heterogeneous oxidation of secondary organic aerosol
Christopher Cappa
University of California, Davis, USA

12:30-14:00 | Lunch at Tent Area

- 14:00
2.126 Linking theoretical kinetic studies with laboratory and chamber experiments
Luc Vereecken (Invited)
Institute for Energy and Climate Research, IEK-8: Troposphere, Forschungszentrum Jülich GmbH, Germany
- 14:15
2.003 An updated isoprene oxidation and deposition scheme in the IMAGES model
Jean-François Müller
Royal Belgian Institute for Space Aeronomy, Belgium
- 14:30
2.028 Kinetics of Criegee intermediates
Jim Lin
Institute of Atomic and Molecular Sciences, Academia Sinica, Taiwan
- 14:45
2.104 ROOOH: The missing piece of the puzzle for OH measurements in low NO environments
Christa Fittschen
University Lille / CNRS, France
- 15:00
2.100 OH, HO₂ and RO₂ radical and OH reactivity observations during wintertime and summertime in Beijing, and comparison with both steady state calculations and box model simulations
Eloise Slater
University of Leeds, UK (Early Career Scientist)
- 15:15
2.010 Reconciling organic auto-oxidation, new-particle formation, and chamber secondary organic aerosol formation
Neil Donahue
Carnegie Mellon University, USA

15:30-16:00 | Coffee Break / Posters

- 16:00-19:00 | Poster Session**
Session 1: Atmospheric Chemistry & People
Session 2: Atmospheric Chemistry & Fundamentals

18:00-19:00 | Social Hour at Poster Room



Thursday, September 27

9:00-9:30 | Keynote Lecture 2 (iCACGP 60th Anniversary Keynote)

9:00 The science of atmospheric composition and chemistry: Past, present and future
K.002 **Ian Galbally**
CSIRO Oceans and Atmosphere, Aspendale / University of Wollongong, Australia

The science of atmospheric composition and chemistry is based on three essentials: fundamental knowledge, observations and modelling. The study of this has passed from mainstream physical research in the 18th century to an adjunct of meteorology in the 19th and early 20th century, and then to a recognised field of chemistry in the late 20th century. Today, in the 21st century, it is a core component of Earth systems science, the multidisciplinary study of the Earth in all its facets.

In the 18th century, eminent scientists investigated the composition of air identifying nitrogen, oxygen, carbon dioxide, hydrogen and other atmospheric gases. In the late 19th century William Ramsay identified Argon from the distillation of air.

The broader development of the science of atmospheric composition and chemistry included: the need for understanding of the nutrition of plants and the production of food by de Saussure, Liebig and others in the 19th century, the coupling of urban air pollution and health concerns by RA Smith in the 19th century and Haagen-Smit in the 20th century, the desire to probe the then inaccessible upper atmosphere by remote sensing and modelling by Dobson and Chapman in the early 20th century, and concerns about continental scale and global pollution including global warming and ozone layer depletion by Callendar, Keeling, Oden, Johnston, Crutzen, Rowland and Molina in the 20th century. This history will be reviewed and then a perspective on several questions relevant to the 20th and 21st Century will be presented:

- How has the study of atmospheric composition and chemistry changed in the last 60 years?
- What are the key features of atmospheric composition and chemistry science today?
- How has the global distribution and gender balance of scientists in this area changed?
- How will the future of atmospheric composition and chemistry science be realised?



9:30-12:45 | Session 3 Atmospheric Chemistry & Ecosystems

Conveners: Sachiko Hayashida (Japan)
Nicolas Huneeus (Chile)

9:30 Biogenic modelling activities in eucalypt-rich southeast Australia
3.038 **Kathryn Emmerson (Invited)**
CSIRO, Australia

9:45 Stress-induced biogenic organic emissions and atmospheric chemistry interactions
3.102 **Alex Guenther**
University of California, Irvine, USA

10:00 Direct OH reactivity measurements show agricultural crop residue fires fuel large missing
3.127 OH reactivity associated with rapid photochemical formation of reactive nitrogen organics
Vinayak Sinha
Indian Institute of Science Education and Research, India

10:15 Characterization of carbonaceous aerosols emitted from peatland burning in central
3.092 Kalimantan Indonesia
Puji Lestari
Institute of Technology Bandung, Indonesia

10:30-11:15 | Coffee Break / Posters

11:15 Summertime observations of ultrafine particles and their growth to CCN sizes in the high
3.059 arctic marine boundary layer
Jonathan Abbatt
University of Toronto, Canada

11:30 Organic matter in marine aerosol particles: Chemical characterization, transfer and
3.066 sources
Nadja Triesch
Leibniz Institute for Tropospheric Research (TROPOS), Germany (Early Career Scientist)

- 11:45
3.044 Development of an aerosol reanalysis product – JRAero
Keiya Yumimoto
Kyushu University, Japan
- 12:00
3.071 Ammonia revealed from space: From industrial and agricultural point sources to global trends
Martin Van Damme
Université libre de Bruxelles (ULB), Belgium (Early Career Scientist)
- 12:15
3.145 The mysterious global methane budget
Lori Bruhwiler
NOAA Earth System Research Laboratory, USA
- 12:30
3.104 Contributions of commercial aircraft for researching atmospheric greenhouse gases
Toshinobu Machida (Invited)
National Institute for Environmental Studies, Japan
- 12:45- | **Group Photo / Free Afternoon / Optional Expedition**
- 18:30-23:00 | **Conference Banquet & Dance Party**
3F Hiten Banquet Room, JR Hotel Clement Takamatsu

History of IGAC

The International Global Atmospheric Chemistry (IGAC) Project was formed in 1990, and it has been, since then, continuously developing. Currently, the IGAC's mission is to facilitate atmospheric chemistry research towards a sustainable world. This is achieved through IGAC's three focal activities: fostering community, building capacity, and providing leadership.

History of IGAC Science Conference

- 2018 Takamatsu, Kagawa, Japan (joint with iCACGP)
- 2016 Breckenridge, CO, USA
- 2014 Natal, Brazil (joint with iCACGP)
- 2012 Beijing, China
- 2010 Halifax, Canada (joint with iCACGP)
- 2008 Annecy, France
- 2006 Cape Town, South Africa (joint with iCACGP/WMO)
- 2004 Christchurch, New Zealand
- 2002 Crete, Greece (joint with iCACGP)
- 1999 Bologna, Italy
- 1998 Seattle, WA, USA (joint with iCACGP)
- 1997 Melbourne, Australia (joint with iCACGP, IAPSO)
- 1995 Beijing, China
- 1994 Fuji-Yoshida, Japan (Joint with iCACGP)
- 1993 Eilat, Israel



Friday, September 28

9:00-15:30 | Session 4 Atmospheric Chemistry & Climate/Weather

Conveners: Mary Barth (USA)
Michael Gauss (Norway)

- 9:00
4.084 Spatial and temporal variation of haze in the Yangtze River Delta region from 1961 to 2015
Rui Han
China Meteorological Administration, China
- 9:15
4.021 The impact of climate variability on volatile organic compounds emissions assessed using spaceborne formaldehyde data from SCIAMACHY and OMI
Jenny Stavrakou
Royal Belgian Institute for Space Aeronomy (BIRA-IASB), Belgium
- 9:30
4.059 Persistent La Niña-like climate in 2010s reduced export from China and suppressed ozone trend in the lower troposphere over Japan
Sachiko Okamoto
National Institute for Environmental Studies, Japan
- 9:45
4.163 Global scale variability of the mineral dust shortwave and longwave refractive index: A new dataset of in situ measurements for climate modelling and remote sensing
Claudia Di Biagio
LISA, CNRS, UPEC and UPD, IPSL, France
- 10:00
4.054 Dust induced changes on the West African summer monsoon features
N'Datchoh Evelyne Toure
University Felix Houphouet Boigny, Cote d'Ivoire (Early Career Scientist)
- 10:15
4.203 Deep convective transport, lightning NO_x production, and wet-scavenging in mid-latitude deep convection: Combining modeling and observations from DC3
Kenneth Pickering
University of Maryland, USA

10:30-11:15 | Coffee Break / Posters

- 11:15
4.028 Characterizing the climatological composition and intraseasonal and interannual variability of the Asian summer monsoon anticyclone using Aura Microwave Limb Sounder measurements
Michelle Santee
Jet Propulsion Laboratory, California Institute of Technology, USA
- 11:30
4.007 The influence of dimethyl sulfide produced by global coral reefs on the climate
Sonya Fiddes
University of Melbourne, Australia (Early Career Scientist)
- 11:45
4.052 Changing conditions in the Arctic: An analysis of trends in observed surface ozone conditions
Audra McClure-Begley
University of Colorado / NOAA Earth System Research Laboratory, USA (Early Career Scientist)
- 12:00
4.018 Enhanced surface ozone during the heat wave of 2013 in Yangtze River Delta region, China
Tijian Wang
Nanjing University, China
- 12:15
4.023 Unraveling the influences of pollution and climate trends on radiation fog frequency using generalized additive models
Ellyn Gray
University of California, Berkeley, USA (Early Career Scientist)

12:30-14:00 | Lunch at Tent Area

14:00 How do short-lived climate forcers affect climate?

4.062 **William Collins (Invited)**
University of Reading, UK

14:15 Impacts of drought on air quality

4.189 **Yuxuan Wang**
University of Houston, USA

14:30 Impact of particle size and mixing state diversity on estimates of black carbon mitigation

4.179 **Hitoshi Matsui**
Nagoya University, Japan

14:45 Equilibrium climate and air pollution responses to greenhouse gases, anthropogenic emissions and ozone changes from 1970 to 2010 under different EDGAR emission scenarios

4.098 **Alcide Zhao**
University of Edinburgh, UK (Early Career Scientist)

15:00 Impacts of climatic and land-use changes on global aerosol burden

4.185 **Alan Lim**
The Chinese University of Hong Kong, Hong Kong (Early Career Scientist)

15:15 Impact of reduction of ship-induced sulphur emission on climate and health

4.246 **Mikhail Sofiev**
Finnish Meteorological Institute, Finland

15:30-16:00 | Coffee Break / Posters

16:00-18:00 | Poster Session

Session 3: Atmospheric Chemistry & Ecosystems
Session 4: Atmospheric Chemistry & Climate / Weather
Session 5: Challenging the Future

18:00-19:00 | Social Hour at Poster Room



Saturday, September 29

9:00-9:30 | Keynote Lecture 3

9:00 Atmospheric Chemistry research from fundamentals to policy relevance – Recent research experience –
K.003

Hajime Akimoto

National Institute for Environmental Studies, Japan

The three-leg view on atmospheric chemistry research is widely accepted in the IGAC community (Melamed et al., Anthropocene 2015). I will propose an alternative slightly modified four-element view including “policy relevance” explicitly. In my talk, I will cover the following three topics based on our recent research experience referring to the policy relevance in the above scheme.

- Ozone prediction and control strategy based on chemical transport models: Tropospheric ozone chemistry mainly based on the homogeneous gas-phase chemical kinetics is thought to be matured in general. However, our recent studies in MICS-Asia III revealed that there exists substantial disagreement among the CTMs and between model simulation and observation, which may affect policy proposal.
- Chemistry and physics of secondary organic aerosols: In contrast to O₃, which has been investigated for more than 40 years, atmospheric chemistry on tropospheric fine particles typified by PM_{2.5} is still pre-matured, and the studies are going on most actively now. In order to obtain reliable source apportionment of PM_{2.5}, which is more policy relevant, studies to quantify atmospheric processes have to be established incorporating fundamental research.
- Air quality-climate interaction and SLCP co-control strategy: In order to mitigate extreme events induced by global warming in the next 30 years, co-control of SLCPs is the only way to achieve this goal. Climate sensitivities of O₃, CH₄, BC and white aerosols per unit RF_{TOA} have to be evaluated more precisely in order to propose more solid co-control measures. Quantification of CCN activities of aerosols based on chemical structures has to be studied fundamentally also.



9:30-12:30 | Session 5 Challenging the Future

Conveners: Greg Frost (USA)

Xuemei Wang (China)

9:30 Moving the full complexity of the ocean-atmosphere system into the laboratory for
5.011 fundamental chemistry studies

Kimberly Prather (Invited)

University of California, San Diego, Scripps Institution of Oceanography, USA

9:45 Global, in situ measurements of new particle formation and growth to CCN sizes

5.025 **Charles Brock**

NOAA Earth System Research Laboratory, USA

10:00 Spatial and temporal optimisation of variable density/capability air quality networks.
5.022 Improving returns from emerging low-cost air quality monitoring networks

Mohammed Iqbal Mead

Cranfield University, UK

10:15 Replacing the integrator: Modelling atmospheric chemistry with machine learning

5.005 **Mathew Evans**

University of York, UK

10:30-11:15 | Coffee Break / Posters

11:15 Observing air quality from geostationary constellation

5.029 **Jhoon Kim (Invited)**

Yonsei University, Korea

11:30 New perspectives on atmospheric chemistry from the Sentinel-5p TROPOMI sensor and
5.033 the 23-year QA4ECV climate data record

Klaas Folkert Boersma

KNMI / Wageningen University, The Netherlands

11:45 Challenging the future of air pollution in Southern Africa

5.074 **Roelof Burger**
North-West University, South Africa

12:00 Challenges in identifying sources of PM_{2.5} in China

5.078 **Mei Zheng**
Peking University, China

12:15 Atmospheric Chemistry: Future directions

5.062 **Guy Brasseur (Invited)**
National Center for Atmospheric Research, USA

12:30-13:00 | **Closing Ceremony**

In Celebration of the 60th Anniversary of iCACGP

The international Commission on Atmospheric Chemistry and Global Change (iCACGP) was founded in 1957 as the Commission on Atmospheric Chemistry and Radioactivity. In 1971 the name was changed to the Commission on Atmospheric Chemistry and Global Pollution (CACGP), then to iCACGP in 2006. iCACGP is one of the Commissions in IAMAS (International Association of Meteorology and Atmospheric Sciences), which is one of the associations within the IUGG (International Union of Geodesy and Geophysics) and part of the International Science Council. iCACGP has played a key role in the creation of both IGAC and SOLAS and continues to provide oversight and support by sponsoring scientifically these successful projects. Throughout its evolving history, iCACGP has striven to bring the international scientific community undertaking research into global pollution and atmospheric chemistry together to facilitate, optimise and evolve its research. The overarching driver motivating iCACGP is the facilitation of the research needed to improve our understanding and knowledge of the physical, chemical and or biological processes, which determine the conditions within the earth system, in particular atmospheric composition. Scientific curiosity is harnessed by this community to address issues of societal importance and separate the impact of anthropogenic activity from that of natural phenomena in the Earth System. This multidisciplinary science relies on disciplinary excellence to achieve its goals. Our research community provides knowledge and an evidence base of critical importance for the evolution of our science and that needed by international policymakers, attempting to achieve sustainable development.

In addition to the presentation of the latest scientific results within the iCACGP research fields, this 14th iCACGP Quadrennial Symposium, which takes place jointly with the 15th IGAC Science Conference, celebrates the successes of our scientific community over the past six decades of the Anthropocene. We also take the opportunity to recognise the scientific contributions and service made by our iCACGP honorary members: Hajime Akimoto, National Institute for Environmental Studies, Japan, Bert R. J. Bolin, MISU, Sweden (15th of May 1925 – 30th of December 2007), Paul J. Crutzen, Max Planck Institute for Chemistry, Germany, Robert A. Duce, Texas A&M University, USA, Ian Galbally, CSIRO, Australia, Phillip Goldsmith, Met Office UK and ESA, Maria Kanakidou, University of Crete, Greece, Mario J. Molina, University of California San Diego, USA and the Mario Molina Center for Strategic Studies on Energy and the Environment Mexico, Henning Rodhe, MISU, Sweden, F. Sherwood Rowland, UC Irvine, USA (28th of June, 1927 – 10th of March, 2012), Anne M. Thompson, NASA/GSFC, USA.



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RESTEC, as the core organization of satellite remote sensing in Japan, aspires to build remote sensing technologies through comprehensive research and development and capacity building. Using these technologies, RESTEC obtains data from different platforms, and processes and analyzes them. RESTEC also calibrates and validates those data, develops software, and provides policy makers, researchers and other users with remote sensing solutions. By distributing the obtained information to users, RESTEC contributes to the resolution of environmental and climate change issues.

Center for Global Environmental Research (CGER), National Institute for Environmental Studies (NIES)



The Center for Global Environmental Research (CGER) is the center for climate change research at the National Institute for Environmental Studies (NIES) and the focal point of environmental research in Japan. CGER aims to scientifically clarify the impact humankind has on the global environment, and to build the foundation for environmental protection measures. CGER monitoring activities encompass the atmosphere and ocean, forest ecosystems and carbon balance, using ground-based methods, ships, aircraft and satellite. Furthermore, CGER promotes research on low-carbon societies and supports global environmental research by developing environmental monitoring databases.

KIMOTO ELECTRIC Co., Ltd.



Kimoto Electric Co., Ltd is a pioneer in manufacturing ambient air monitoring instruments. Founded in 1953, we were the first developers of continuous SO₂ and Smoke analyzers. This spirit of innovation has continued for over 65 years. We specialize in designing continuous automated monitoring instruments for ambient air quality, water and ocean environments, and overall global health. Our commitment to the environment, quality of our products, and the needs of our end users is second to none.

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Toyofuji Shipping Co., Ltd. is the Toyota Group's sole marine transport company. We mainly deliver vehicles to major ports both in Japan and overseas. Since 2002, we are cooperating with the National Institute for Environmental Studies (NIES) in conducting atmospheric and oceanographic monitoring studies. Currently, we are helping NIES with monitoring greenhouse gases along its North America, Oceania and Southeast Asia routes. The air and seawater samples are analyzed at NIES, contributing to the clarification of the global carbon cycle.

Shoreline Science Research, Inc.



Our name, "Shoreline" Science Research, Inc. represents the border of land, sea and air, suggesting heterogeneous atmospheric chemistry, and also implies our orientation to niche markets. Adopting the motto "1 s detection, 1 s response time, and ppt level sensitivity", we specialize in real-time measurements, and provide unique state-of-the-art analytical instruments and related solutions from physicochemical, kinetic and chemical engineering points of view.

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Japan Meteorological Corporation



Japan Meteorological Corporation (JMC) is a meteorological service provider headquartered in Osaka, Japan. JMC carries out a range of services, including weather prediction, meteorological measurements, energy-related forecasts, IoT technology services, and data-science analyses. JMC conducts business activities nation-wide throughout Japan, applying their extensive meteorological knowledge and capabilities. Recent developments include atmospheric wind measurement by Doppler LIDAR for wind-turbine electricity generation, environmental assessment, and urban meteorology.

Earth Observation Research Center (EORC), Japan Aerospace Exploration Agency (JAXA)



The Japan Aerospace Exploration Agency (JAXA) was born through the merger of three institutions, namely the Institute of Space and Astronautical Science (ISAS), the National Aerospace Laboratory of Japan (NAL) and the National Space Development Agency of Japan (NASDA). The Earth Observation Research Center (EORC) was established under JAXA in April 1995 as Japan’s core organization for Earth observation satellite data processing, analyzing, calibration/validation, and archiving. By continuing to carry out these activities using space-based Earth observation technology, we hope to assist humankind in its adaptation to climate change.

World Meteorological Organization



The Global Atmosphere Watch Programme (GAW) is the research programme of the World Meteorological Organization (WMO) that provides a long-term international framework for integrated observations, analysis and assessment of atmospheric chemical composition. The programme is a collaboration of more than 100 countries and it relies fundamentally on the contributions of its Members to help build a single, coordinated global understanding of atmospheric composition and its change. The vision for the next decade of GAW is to grow the international network of high-quality atmospheric observations across local to global scales to drive high quality and impact science while co-producing a new generation of research-enabled products and services. GAW focal areas are GHGs, ozone, UV, aerosols, selected reactive gases, and total atmospheric deposition.



Nippon Thermo Co., Ltd.

We started 38 years ago as a joint company with the American Thermo Electron Co., concentrating on gas analyzers. We not only deal with import, marketing and maintenance of analyzers, but we also adjust and improve them for use in Japan, manufacture other equipment in relation to analyzers and sell them as a comprehensive analytical system. Furthermore, we act as an agent for import and maintenance of overseas analyzing equipment. We will continue our efforts to provide a full supply and support service of goods to our customers.



Panasonic Corporation Eco Solutions Company

Since the founding of our company in 1918, we at Panasonic have been providing better living for our customers, always making “people” central to our activities, and thus focusing on “people’s lives.” Going forward as well, based on our innovative electronics technology, we will provide a wide variety of products, systems, and services, ranging from consumer electronics products to industrial devices, building products, and housing. In various spaces and areas, such as homes, communities, businesses, journeys and automobiles, we will continue to work hard to offer new value for better living, and help realize “A Better Life, A Better World” for each individual customer.



Asia Center for Air Pollution Research (ACAP), Japan Environmental Sanitation Center

Asia Center for Air Pollution Research (ACAP) handles scientific and technical matters of the Acid Deposition Monitoring Network in East Asia (EANET), a regional initiative for promoting cooperation in addressing acid deposition issues in East Asia, and is one of the hubs of the research on air pollution in East Asia including acid deposition and oxidant.



Acid Deposition Monitoring Network in East Asia (EANET)

EANET started in 1998 as an intergovernmental initiative to create a common understanding on the state of acid deposition problems in East Asia, provide useful inputs for decision making at various levels with the aim of preventing or reducing the adverse impacts on the environment, and promote cooperation among countries. Thirteen countries in East Asia are participating in EANET at present. UN Environment Asia Pacific is the Secretariat and the Asia Center for Air Pollution Research (ACAP) located in Japan is the Network Center for EANET.



Droplet Measurement Technologies, Inc.

Droplet Measurement Technologies creates, manufactures, and services leading cloud and aerosol instruments that propel breakthroughs in environmental science and engineering. With a legacy of fostering invention and a renewed commitment to science and innovation, we help champion discovery in support of people and planet.



Markes International Ltd

Markes International is a specialist manufacturer of instrumentation for detection of trace-level volatile and semi-volatile organic compounds (VOCs and SVOCs). Markes has a well-deserved reputation for its application expertise in the field of thermal desorption, supplying a comprehensive range of instruments, sampling equipment and consumables that enhance the analytical capability of GC-MS. Markes has also gained recognition for its innovative, high-performance time-of-flight mass spectrometers for GC. New for 2018 is Centri®, an automated multi-mode sampling platform for pre-concentration of analytes from liquid, solid and gaseous samples.



Fujitsu Limited

We provide innovative IT services and digital technologies to businesses, deliver positive business solutions and build a unique partnership with our customers.

Through co-creation and innovation, we continue to work towards realizing a safe and sustainable society, thus providing a bright future to all people in the whole world.

Bronze Sponsors



Medical Supplements and Services (MSS)

We live in a world of steadily progressing medical development. There are today more than 2000 medical institutions in Japan that incorporate ozone therapy in their regular treatment methods. Our mission is to offer new possibilities in medical treatment by providing systematic and practical theoretical knowledge and up-to-date information in biochemistry and molecular nutrition sciences, high-quality and high-precision products, and a large variety of continuous services to doctors and medical staff engaged in ozone molecular treatment methods.

Takamatsu Preparatory School



Takamatsu Preparatory School, or Takayobi, is committed to helping students achieve their dreams and enter the college of their first choice. Every year, over 1,000 students come to Takayobi from 39 prefectures across the nation. Takayobi is the only school that offers: a dormitory network to support both the academic and personal growth of the students; lectures by professional instructors; placement according to the level of each student; learning materials fine-tuned to each grade; guidance; and study rooms open to all students. With this ideal learning and living environment, Takayobi successfully continues to send young talents to prestigious universities and medical schools in Japan.

Atmosphere, MDPI



MDPI is a pioneer in scholarly open access publishing who has supported academic communities since 1996. Sponsor Journals include Atmosphere (launched in 2010; Impact Factor 1.487), IJERPH (launched in 2004; Impact Factor 2.101), Climate (launched in 2013; indexed by ESCI, Scopus), Environments (launched in 2014; indexed by ESCI), Geosciences (launched in 2011; indexed by ESCI, Scopus). Atmosphere (ISSN 2073-4433) is an international and cross-disciplinary scholarly journal of scientific studies related to the atmosphere, with a strong emphasis on aerosols, air quality, biometeorology, biosphere/hydrosphere/land-atmosphere interactions, climatology and meteorology.

Japan Environmental Sanitation Center



As a nonprofit organization geared towards the improvement of the living environment, JESC actively pursues environmental protection and conservation through the whole range of its activities, and thereby contributes to create a healthier global environment for the future.

It's specific activities are as follow: (1) Activities to Promote Proper Management of Waste, (2) Activities to Help Advance Environmental Protection and Conservation, (3) Activities to Control Vectors and Nuisances, and (4) Activities to Foster Specialists, etc.

Sayama Corporation



Sayama Trading Co., Ltd. is specialized in import and sale of pressure sensors and flow sensors. Most of these high-quality products come from our overseas suppliers. Particularly, we supply high-pressure transducers and transmitters from Setra Systems (USA) and Keller AG (Switzerland) to our Japanese customers. These products can handle different measurement modes to measure atmospheric pressure. Furthermore, we supply digital manometers, low-pressure hand pumps and flow meter sensors for liquids and gases.

Sayama Trading Co., Ltd. has a broad product portfolio that allows customers to select the best product to match their requirements.

Global Environmental Forum



The Global Environmental Forum (GEF) is a non-profit organization located in Tokyo, Japan. Our missions are to conduct and support scientific research on global environmental issues and to disseminate those research findings to the public. Since its foundation in May 1990, we have actively engaged in many research projects of environmental monitoring, in raising public awareness of environmental issues, and in developing guidelines for environmental management of businesses.

MEIWAFOFOSIS Co., Ltd.



One of our main businesses is to introduce LI-COR (USA) instruments to the Japanese market. LI-COR has been manufacturing high performance and highly reliable gas analyzers for many years as a world-leading company. We are going to release LI-COR trace gas analyzers using the latest technology in the near future. We will continue to provide world-class instruments and contribute to the development of the atmospheric chemistry field together with LI-COR.

Taiyo Corporation



Solar Measurement Corporation – Being innovative and meeting the needs of tomorrow – The Solar Measurement Corporation markets electronic measuring instruments, signal measuring devices, control equipment, field instruments and process analyzers, including the products of the Yokogawa Electric Group, and offers a total solution to customers by also providing service and maintenance of measuring equipment and computing network.

iTEC Science Co., Ltd.



Our company, iTEC Science Co. Ltd., has been, for 10 years, marketing research equipment used in the physical, chemical and medical sciences. Our target area is mainly Tsukuba in Ibaraki Prefecture, but we serve the entire Kanto area. We deal with a large array of products, such as analysis equipment, instruments, consumable goods, reagents and chemicals for research, from over 300 suppliers. In addition, we also offer services such as reparation, modification and installation of research laboratories as well as homepage design. We handle any business promptly and with great flexibility.



SUURI-KEIKAKU Co., Ltd.

SUURI-KEIKAKU Co., Ltd. (SUR) established in 1967, is a pioneer consultant in the field of environmental issues and software development in Japan. SUR has 180 experienced specialists / consultants and a lot of clients such as national/ local governments, and private companies. SUR has also completed many consultations for governments outside of Japan. SUR is one of the most reliable consulting companies in Japan to solve environmental issues in various fields.



Springer

Springer Nature is one of the world's leading global research, educational and professional publishers, home to an array of respected and trusted brands providing quality content through a range of innovative products and services. Springer Nature is also the world's largest academic book publisher, publisher of the world's most influential journals and a pioneer in the field of open research.



JAPAN AIRLINES Co., Ltd.

JAL has since 1993 continuously measured atmospheric CO₂ concentrations using its commercial flights and gathered atmospheric samplings from skies around the world. Since 2005, JAL is participating in the CONTRAIL project which is a cooperative research among the National Institute for Environmental Studies (NIES), Japan's Meteorological Research Institute, JAMCO Corporation, JAL Foundation and Japan Airlines. Currently, JAL uses its Boeing 777 aircraft on regular routes to measure atmospheric CO₂ concentrations in the upper air, thus contributing to research on continuous long-term monitoring of global climate change.

Early Career Program Sponsors



Asia-Pacific Network for Global Change Research (APN)

Our mission is to enable investigations of changes in the Earth's life support systems and their implications for sustainable development in the Asia-Pacific region through support for research and science-based response strategies and measures, effective linkages between science and policy, and scientific capacity development. This we do through supporting regional cooperation in research, enhancing capabilities, strengthening interactions among scientists and policy makers and providing scientific input to policy decision making and scientific knowledge to the public.



U.S. National Science Foundation (NSF)

NSF's goals – discovery, learning, research infrastructure and stewardship – provide an integrated strategy to advance the frontiers of knowledge, cultivate a world-class, broadly inclusive science and engineering workforce and expand the scientific literacy of all citizens, build the nation's research capability through investments in advanced instrumentation and facilities, and support excellence in science and engineering research and education through a capable and responsive organization.



U.S. National Aeronautics and Space Administration (NASA)

NASA's mission is to pioneer the future in space exploration, scientific discovery and aeronautics research. To do that, thousands of people have been working around the world and in space for more than 50 years, trying to answer some basic questions. What's out there in space? How do we get there? What will we find? What can we learn there – or learn just by trying to get there – that will make life better here on Earth?



U.S. National Oceanic and Atmospheric Administration (NOAA)

NOAA is an agency that enriches life through science. NOAA's reach goes from the surface of the sun to the depths of the ocean floor as they work to keep citizens informed of the changing environment around them. From daily weather forecasts, severe storm warnings, and climate monitoring to fisheries management, coastal restoration and supporting marine commerce, NOAA's products and services support economic vitality and affect more than one-third of America's gross domestic product. NOAA's dedicated scientists use cutting-edge research and high-tech instrumentation to provide citizens, planners, emergency managers and other decision makers with reliable information they need when they need it.



World Meteorological Organization (WMO), Global Atmosphere Watch (GAW)

The Global Atmosphere Watch Programme (GAW) is the research programme of the World Meteorological Organization (WMO) that provides a long-term international framework for integrated observations, analysis and assessment of atmospheric chemical composition. The programme is a collaboration of more than 100 countries and it relies fundamentally on the contributions of its Members to help build a single, coordinated global understanding of atmospheric composition and its change. The vision for the next decade of GAW is to grow the international network of high-quality atmospheric observations across local to global scales to drive high quality and impact science while co-producing a new generation of research-enabled products and services. GAW focal areas are GHGs, ozone, UV, aerosols, selected reactive gases, and total atmospheric deposition.



European Space Agency (ESA)

The ESA is Europe's gateway to space. Its mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world. ESA is an international organization with 22 Member States. By coordinating the financial and intellectual resources of its members, it can undertake programs and activities far beyond the scope of any single European country.



International Union of Geodesy and Geophysics (IUGG)

IUGG is dedicated to the international promotion and coordination of scientific studies of Earth, such as the shape and dynamics of the Earth, gravitational and magnetic fields, earthquakes and elastic wave propagation, generation of magmas, volcanism and rock formation, hydrological cycle including snow and ice, and all aspects of the oceans, the atmosphere, ionosphere, magnetosphere and solar-terrestrial relations. IUGG encourages the application of this knowledge to societal needs, such as management of mineral resources, mitigation of natural hazards and environmental preservation.



International Association of Meteorology and Atmospheric Sciences (IAMAS)

We promote research in all atmospheric sciences, especially programs requiring international co-operation. We lead the Alliance for Capacity Transfer – a joint activity of IUGG, the World Meteorological Organization, and the U.S. University Corporation for Atmospheric Research. IAMAS is composed of 10 International Commissions on the following topics: Atmospheric Chemistry and Global Pollution, Atmospheric Electricity, Climate, Clouds and Precipitation, Dynamic Meteorology, Middle Atmosphere, Planetary Atmospheres and their Evolution, Polar Meteorology, Ozone, and Radiation.



IGAC Monsoon Asia and Oceania Networking Group (MANGO)

Our objective is to form a cohesive network of atmospheric scientists in the Asian monsoon region, facilitate collaboration between Asian and international scientists, and foster the next generation of scientists in this region. More concretely, we enhance communication between scientists in Monsoon Asia and the international community on issues such as changes in atmospheric composition, biomass burning, biogenic and anthropogenic emissions, air quality, and mitigation options. We also explore opportunities for funding and infrastructure needed to foster scientific research, capacity building, and regional collaborations.



IGAC China Working Group

Chinese atmospheric chemists have been conducting frontier research for forty years on urban and regional air pollution and its impacts on climate and health. To integrate Chinese research experience in IGAC research, a national WG was established. Its aim is to encourage leadership of Chinese atmospheric scientists in international research programs, strengthen ties with IGAC to facilitate the implementation of research projects in China, provide advice/consultation on major research plans in atmospheric chemistry in China to promote funding support, and to provide a platform in China to facilitate the academic growth of young researchers in atmospheric chemistry.



International Science Council, Regional Office for Asia and the Pacific

The International Science Council (ISC) is a non-governmental organization that brings together 40 international scientific unions and associations and over 140 national and regional scientific organizations. Our vision is to advance science and make it public. We help evidence-informed decision-making; stimulate and support international scientific research; promote the advancement of scientific creativity and relevance in all parts of the world; and defend the free and responsible practice of science. With co-sponsored international research programs and networks, our activities encompass a broad range of issues, from global sustainability, poverty, urban health and well-being, and disaster risk reduction, to data, observing systems and science advice to governments.





Institute for Space-Earth Environmental Research (ISEE), Nagoya University

Institute for Space–Earth Environmental Research, Nagoya University is a Joint Usage/Research Center in Japan that uniquely combines two fields of research: space science and Earth science. ISEE investigates a variety of phenomena in the system of the Earth, the Sun, and the universe, and aims to contribute to solutions for global environmental issues and development of human society spreading out into space.



Institute for Advanced Sustainability Studies (IASS)

The IASS conducts research with the goal of identifying, advancing, and guiding processes of social change towards sustainable development in Germany and abroad. Its research practice is transdisciplinary, transformative, and co-creative. The IASS cooperates with partners in academia, political institutions, administrations, civil society, and the business community to understand sustainability challenges and generate potential solutions. A strong network of national and international partners supports the work of the institute. Among its central research topics are the energy transition, emerging technologies, climate change, air quality, systemic risks, governance and participation, and cultures of transformation. The institute is funded by the research ministries of the Federal Government of Germany and the State of Brandenburg.



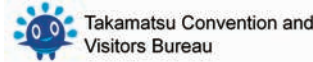
National Institute for Environmental Studies (NIES)

The National Institute for Environmental Studies (NIES) is Japan’s only research institute that undertakes a broad range of environmental research in an interdisciplinary and comprehensive manner. Since its inception in 1974, NIES has played a vital role in solving a variety of environmental problems. In order to produce scientific findings on environmental protection, NIES carries out research projects that include consolidating the institute’s research foundation through basic research, data acquisition and analysis, preservation and provision of environmental samples, and other efforts. NIES conducts broad-based research that covers the environmental science field in its entirety, promote comprehensive research that seeks to cover everything from the basics to social implementation, further advance and enhance research networks domestically and globally, and carry out research of a high level that contributes to broadly understanding and solving environmental problems, thereby appropriately disseminating our store of scientific knowledge.

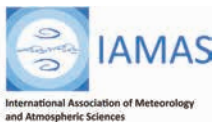
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