

**Final Report**  
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**International Global Atmospheric Chemistry (IGAC) Project  
International Program Office (IPO)**

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## 1 Goals

The atmosphere is the integrator of the Earth system. Human emissions of pollutants and long-lived greenhouse gases into the atmosphere have caused dramatic transformations of the planet, altering air quality, climate and nutrient flows in every ecosystem. Understanding the global atmosphere requires an international network of scientists providing intellectual leadership in areas of atmospheric chemistry that need to be addressed, promoted and would benefit from research across disciplines and geographical boundaries. Acknowledgement of this need led to the formation of the International Global Atmospheric Chemistry (IGAC) Project in 1990.

IGAC's mission is to "facilitate atmospheric chemistry research towards a sustainable world". This is achieved through IGAC's three focal areas: fostering community, building capacity, and providing leadership.

- **Fostering Community**

IGAC is an open international community of scientists researching topics related to atmospheric chemistry (air quality, climate change, carbon and nitrogen cycles, impacts on human health and ecosystems, etc.) that is actively collaborating across geographical boundaries and disciplines in order to contribute to addressing the most pressing global change and sustainability issues through scientific research. The IGAC biennial science conference and the facilitation of numerous thematic workshop every year provides opportunities to build cooperation and disseminate scientific information across the IGAC international community.

- **Building Capacity**

IGAC builds scientific capacity through its early career program and national and regional working groups. The IGAC early career program allows scientists to join an international network early in their career, which puts the cogs in motion to further facilitate atmospheric chemistry research at an international level for years to come. The IGAC national and regional working groups create a strong cohesive community of atmospheric scientists in emerging countries/regions that together have a sum greater than their parts and connects these scientists to the larger IGAC community to foster international collaboration.

- **Providing Leadership**

IGAC provides intellectual leadership by identifying and fostering activities on current and future areas within atmospheric chemistry that would benefit from research across geographical boundaries and/or disciplines. IGAC's vision is to link fundamental scientific research on emissions, atmospheric processes and atmospheric composition to global change and sustainability issues such as human health, climate, ecosystems and how individual and societal responses feedback onto the core research-led foci of IGAC.

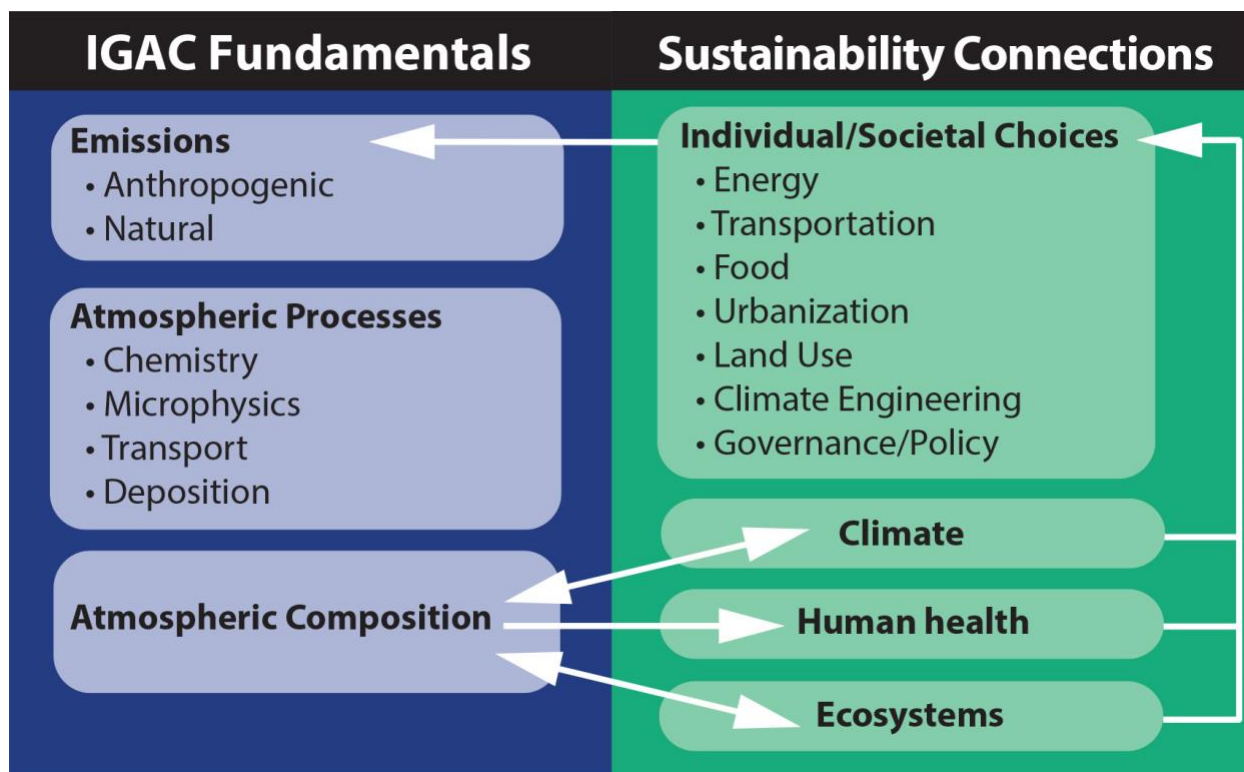


Figure 1. IGAC Vision diagram.

IGAC’s priorities and activities are determined and guided by an international volunteer Scientific Steering Committee (SSC). Table 1 is the current composition of IGAC SSC for 2018, Table 2 shows the IGAC SSC composition for 2017, Table 3 shows the IGAC SSC composition for 2016, and Table 4 shows the IGAC SSC composition for 2015.

Table 1. 2018 IGAC SSC

Last Name	First Name	Institution	Country
Lawrence	Mark (Co-chair)	IASS	Germany
Tanimoto	Hiroshi (Co-chair)	NIES	Japan
Beukes	Paul	North-West University	South Africa
Crawford	James	NASA	USA
Frost	Gregory	NOAA	USA
George	Christian	CNRS	France
Grutter	Michel	UNAM	Mexico
Heald	Colette	MIT	USA
Hoelzemann	Judith	URFN	Brazil
Lewis	Alistar	University of York	UK
Murphy	Clare	University of Wollongong	Australia
Murphy	Jennifer	University of Toronto	Canada
Naja	Manish	AIRES	India
Oahn	Kim	Asian Institute of Technology	Thailand
Yassa	Nouredine	CDER	Algeria
Zheng	Mei	Peking University	China

**Table 2. 2017 IGAC SSC**

<b>Last Name</b>	<b>First Name</b>	<b>Institution</b>	<b>Country</b>
Lawrence	Mark (Co-chair)	IASS	Germany
Tanimoto	Hiroshi (Co-chair)	NIES	Japan
Beukes	Paul	North-West University	South Africa
Crawford	James	NASA	USA
Frost	Gregory	NOAA	USA
George	Christian	CNRS	France
Grutter	Michel	UNAM	Mexico
Heald	Colette	MIT	USA
Hoelzemann	Judith	URFN	Brazil
Lewis	Alistar	University of York	UK
Murphy	Clare	University of Wollongong	Australia
Murphy	Jennifer	University of Toronto	Canada
Naja	Manish	AIRES	India
Oahn	Kim	Asian Institute of Technology	Thailand
Pandis	Spyros	University of Patras	Greece
Wang	Tao	Hong Kong Polytechnic University	China
Yassa	Nouredine	CDER	Algeria

**Table 3. 2016 IGAC SSC**

<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>	<b>Country</b>
Goldstein	Allen (Co-Chair)	University of California-Berkeley	USA
Lawrence	Mark (Co-Chair)	Institute for Advanced Sustainability Studies	Germany
Beukes	Paul	North West University	South Africa
Crawford	James	NASA	USA
Granier	Claire	LATMOS	France
Grutter	Michel	UNAM	Mexico
Heald	Colette	MIT	USA
Hoelzemann	Judith	Federal University of Rio Grande do Norte	Brazil
Keywood	Melita	CSIRO	Australi
Lewis	Alastair	Univeristy of York	UK
Murphy	Jennifer	University of Toronto	Canada
Naja	Manish	ARIES	India
Oahn	Kim	Asian Institute of Technology	Thailand
Pandis	Spyros	University of Patras	Greece
Rudich	Yinon	Weizmann Institute	Israel
Tanimoto	Hiroshi	National Institute for Environmental Studies	Japan
Wang	Tao	Hong Kong Polytechnic University	China
Yassa	Nouredinne	CDER	Algeria

**Table 4. 2015 IGAC SSC**

<b>Last Name</b>	<b>First Name</b>	<b>Institution</b>	<b>Country</b>
Goldstein	Allen (Co-chair)	University of California-Berkeley	USA
Lawrence	Mark (Co-chair)	IASS	Germany
Barth	Mary	NCAR	USA
Beukes	Paul	North-West University	South Africa
Crawford	James	NASA	USA
Granier	Claire	LATMOS	France
Grutter	Michel	UNAM	Mexico
Heald	Colette	MIT	USA

Hoelzemann	Judith	URFN	Brazil
Keywood	Melita	CSIRO	Australia
Kim Oahn	Nguyen Thi	Asian Institute of Technology	Thailand
Lewis	Alistar	University of York	UK
Lung	Candice	Academia Sinica	Taiwan
Pandis	Spyros	University of Patras	Greece
Rudich	Yinon	Weizmann Institute	Israel
Sharma	Chhemendra	National Physical Laboratory	India
Tanimoto	Hiroshi	NIES	Japan
Wang	Tao	Hong Kong Polytechnic University	China
Yassa	Nouredine	CDER	Algeria

## 2. Outcomes

### 2.1 Fostering Community

IGAC fosters community through its biennial science conferences, sponsorship or endorsement of events, and communication/networking activities.

IGAC's Science Conference is a primary mechanism for IGAC to build cooperation and disseminate scientific information across its international community. The first IGAC Science Conference was held in 1993 in Eilat, Israel. Since then, IGAC has successfully held fourteen science conferences, consistently becoming a biennial conference starting in 2002 (see Table 2). The conference is jointly held with the iCACGP Symposium every four years. The biennial IGAC Science Conference is regarded as the international conference on atmospheric chemistry and participation in the conference is typically in the range of 350-650 participants.

**Table 2. Scientific Conferences**

Conference	Location	Conference	Location
1993 IGAC	Eilat, Israel	2004 IGAC	Cristchurch, NZ
1994 IGAC/iCACGP	Fuji-Yoshida, Japan	2006 IGAC/IGACGP/WMO	Cape Town, SA
1995 IGAC	Beijing, China	2008 IGAC	Annecy, France
1997 IGAC/SPARC/GAW	Toronto, Canada	2010 IGAC/IGACGP	Halifax, Canada
1997 IGAC/iCACGP/IAPSO	Melbourne, AUS	2012 IGAC	Beijing, China
1998 IGAC/iCACGP	Seattle, WA, USA	2014 IGAC/iCACGP	Natal, Brazil
1999 IGAC	Bologna, Italy	2016 IGAC	Breckenridge, USA
2002 IGAC/iCACGP	Crete, Greece	2018 IGAC/iCACGP	Takamatsu, Japan

The next IGAC Science Conference will take place 25-29 September 2018 in Takamatsu, Kagawa, Japan with a local organizing committee from the National Institute for Environmental Studies, Tokyo Metropolitan University, Chiba University, Hokkaido University, and the National Institute of Information and Communication Technology. An Early Career Scientists Program will be a key part of the conference and the second IGAC Early Career Short Course will take place prior to the conference.

IGAC also provides financial sponsorship of events (workshops, meetings, conferences, school, and short courses) related to IGAC activities and working groups and non-financial endorsement for events that support IGAC's mission and vision. The events bring together hundreds of scientists from across the world to foster international scientific collaborations and foster an international community of atmospheric scientists.

**Table 5. Workshops Sponsored by IGAC from July 2015 – June 2018**

Workshop Title	Location	Date
Nitrate Radicals and Biogenic VOCs Workshop	Atlanta, GA, USA	20-23 July 2015
CCMI Workshop	Rome, Italy	7-9 October 2015
PACES Workshop	Helsinki, Finland	29 Sep – 1 Oct 2015

17 <sup>th</sup> GEIA Conference	Beijing, China	18-20 November 2015
Course on Remote Sensing Techniques and their Application to Atmospheric Chemistry	Mexico City, Mexico	7-11 December 2015
TOAR Workshop III	Beijing, China	25-27 January 2016
TOAR Data Workshop	Jülich, Germany	25-29 April 2016
Workshop on Forecasting Emissions from Vegetation Fires and their Impacts on Human Health and Security in Southeast Asia	Jakarta, Indonesia	29 August – 1 September 2016
IGAC Americas Working Group Meeting	Santiago, Chile	30-31 March 2017
First CATCH Workshop	Guyancourt, France	19-20 April 2017
3 <sup>rd</sup> ACAM Workshop	Guangzhou, China	5-9 June 2017
2 <sup>nd</sup> ACAM Training School	Guangzhou, China	10-12 June 2017
IGAC Africa Science Activity: Scoping Workshop	Pretoria, South Africa	7-9 June 2017
CCMI Science Workshop 2017	Toulouse, France	13-15 June 2017
3 <sup>rd</sup> PACES Workshop	Victoria, BC, Canada	27-29 June 2017
2017 IBBI Workshop	Boulder, CO, USA	10-11 July 2017
AI-SOCD Training School: Air Pollution, Sensors, and Big Data	Taipei, Taiwan	10-13 July 2017
JpSAC Annual Conference 2017/ IGAC Japan National Committee Annual Meeting	Takamatsu, Japan	2-4 October 2017
Career Development Short Course for Early Career Scientists in Atmospheric Chemistry	Takamatsu, Japan	4-6 October 2017
2018 ACPC Workshop	Boulder, CO, USA	4-6 April 2018
AMIGO Workshop	Toulouse, France	4-6 April 2018
PACES WG2 ALPACA Meeting	Fairbanks, AK, USA	14-16 May 2018

**Table 5. Workshops Endorsed by IGAC from July 2015 – June 2018**

Workshop Title	Location	Date
Composition and Transport in the TTLS	Boulder, CO, USA	20-23 July 2015
International Workshop on Heterogeneous Kinetics Related to Atmospheric Aerosols	Beijing, China	9-10 August 2015
DEBITS Workshop	Rochester, NY, USA	19 October 2015
IGAC Japan National Committee Meeting	Tokyo, Japan	21 October 2015
Arctic Air Pollution: A Collaborative Framework for Natural and Social Sciences	Fairbanks, AK, USA	14 March 2016
24 <sup>th</sup> International Symposium on Gas Kinetics and Related Phenomena	York, UK	17-21 July 2016
AAAR Special Symposium: Effects of NOX and SO2 on BVOC Oxidation and Organic Aerosol Formation	Portland, OR, USA	20 October 2016
2 <sup>nd</sup> International Workshop on Heterogeneous Atmospheric Chemistry	Tsukuba, Japan	12-13 November 2016
Towards a First Emission Inventory in South America Workshop	Santiago, Chile	27-29 March 2017
2017 ACPC Workshop	Bad Honnef, Germany	2-6 April 2017
8 <sup>th</sup> International DOAS Workshop	Yokohama, Japan	4-6 September 2017
3 <sup>rd</sup> International Workshop on Heterogeneous Kinetics Related to Atmospheric Aerosols	Shanghai, China	10-12 October 2017
2017 Conference on Fire Prediction Across Scales	New York, NY, USA	23-25 October 2017
3 <sup>rd</sup> International SPARTAN Meeting	Baltimore, MD, USA	19-20 April 2018

The importance of science communication can clearly be seen in the increase in training courses and books on communicating science effectively. The IGAC IPO spends a significant amount of time on its communication strategy in order to better communicate IGAC activities to scientists, students, policy makers, stakeholders and the general public. IGAC's communication strategy currently includes:

- **IGACnews**  
IGAC continues to produce the thrice yearly IGACnews that is distributed internationally to ~1,500 members of the IGAC community.
- **IGAC Website**  
The website highlights activities, working groups, and conferences. The website is kept up to date with recent publications, mailing announcements and upcoming events.
- **IGAC Mailing List**  
Updates, reminders and information about conferences and activities are emailed to ~1,500 subscribers via MailChimp.
- **eBulletin**  
IGAC also publishes a monthly eBulletin that informs the international atmospheric chemistry community about upcoming deadlines, events, and community news related to IGAC and the wider global change and sustainability community.
- **Social Media**  
IGAC is also found on social media outlets such as Facebook, Twitter and LinkedIn
- **Visualizations**  
IGAC continuously works with a graphic designer to create logos for its activities as well as communicate science more effectively through diagrams, figures, and graphs.
- **Presentations**  
The IGAC EO and members of the IGAC SSC give presentations on a regular basis on IGAC.

## 2.2 Building Capacity

IGAC builds capacity through its early career program and its national/regional working groups.

Since 2004, IGAC has included an Early Career Scientists Program as part of its biennial Science Conference to foster the next generation of scientists. For the first time in 2016, IGAC hosted the first IGAC Early Career Short Course, which was an intensive three-day course prior to the IGAC Science Conference. The short course was modelled after the very successful Atmospheric Chemistry Colloquium for Emerging Senior Scientists (ACCESS) with the goal of broadening that model to reach a more international base. IGAC believes, and has seen, that by allowing early career scientists to form an international network of colleagues that future international collaborations in atmospheric chemistry are enhanced.

In addition to the Early Career Short Course prior to, and the Early Career Program during, the biennial Science Conferences, IGAC's early career program also includes providing travel grants to early career scientists to attend IGAC sponsored events, featuring an early career scientist in every issue of IGACnews, a dedicated webpage to early career scientists, and announcements specific to early career scientist in the monthly eBulletin.

In 2010, IGAC started a new capacity building effort through national and regional working groups. There are many regions of the world with excellent scientists whose research is conducted very independently, thus limiting their impact in the international community. As atmospheric chemistry research questions and their connections to societal issues are often global, there is a strong desire to engage these scientists in order to incorporate their research and local knowledge of these regions of the world. Therefore, the goal of IGAC national/regional working groups is two-fold; 1) create a strong cohesive community of atmospheric scientists in a specific nation/region that together would have a sum greater than its parts, and 2) connect the regional/national working groups to the larger IGAC community in order to foster international collaboration.

IGAC currently is fostering the following working groups:

### **2.2.1 IGAC China Working Group**

Chair: Tong Zhu, Peking University China

The sheer magnitude of China's landmass coupled with its growing and economically advancing population makes it critical to understand its role in air quality and climate on both regional and global scales. Chinese atmospheric chemists have been conducting frontier research for forty years in areas such as urban and regional air pollution and the climate effects and health impacts of air pollution. IGAC, through multilateral sponsorship, intends to more fully integrate Chinese research experience through its first national working group in China.

### **2.2.2 IGAC Americas Working Group**

Co-Chairs: Olga Mayol-Bracero, Universidad de Puerto Rico, Puerto Rico  
Marcos Andrade, Universidad Mayor de San Andrés, Bolivia

The IGAC Americas Working Group aims to build a cohesive network and foster the next generation of atmospheric scientists with the ultimate goal of contributing to development of a scientific community focused on building collective knowledge in/for the Americas

### **2.2.3 Japan National Committee**

Chair: Hiroshi Tanimoto, National Institute for Environmental Studies, Japan

The Japan National Committee differs from the other two IGAC national/regional working groups in that its origins are from the Science Council of Japan's Environmental Division, which implemented Japan National Committees for each of the core projects of IGBP in the mid-1990s. However, with the new focus on national/regional working groups within IGAC, the IGAC Japan National Committee has been revitalized and aims to function like and collaborate with the other IGAC national/regional working groups.

### **2.2.4 IGAC Monsoon Asian and Oceania Networking Group (MANGO)**

Co-Chairs: Hiroshi Tanimoto, NIES, Japan  
Kim Oanh, Asian Institute of Technology, Thailand  
Manish Naja, AIRE, India

The main objective of IGAC-MANGO 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.

### **2.2.5 IGAC Africa Group on Atmospheric Sciences (ANGA)**

Implementation committee led by Rebecca Garland, CSIR, South Africa

With the view that improving the understanding of atmospheric science in Africa would have large impacts on key societal issues for the continent (e.g. air quality, human health, agriculture, climate change), the **African Group on Atmospheric Sciences (ANGA)** working group has been established and is under development. ANGA, which means "atmosphere" in Kiswahili, proposes to focus on uniting atmospheric expertise across Africa and fostering the next generation of atmospheric scientists.

### **2.2.6 IGAC Southern Hemisphere Working Group**

Implementation committee is led by Clare Murphy (Paton-Walsh), University of Wollongong, Australia

The newest IGAC working group in development is the IGAC Southern Hemisphere Working Group, which aims to provide a forum for scientists to discuss particular challenges in understanding the Southern Hemisphere atmosphere and to foster stronger collaborations between Southern Hemisphere research groups.



### **2.3 Providing Leadership**

IGAC provides intellectual leadership by identifying current and future areas within atmospheric chemistry that need to be addressed, promoted and would benefit from research across disciplines and/or geographical boundaries. IGAC then fosters scientific collaborations through its activities to promote atmospheric chemistry research in the identified areas and achieve its vision. The IGAC SSC or members of the IGAC community are encouraged to identify such areas in atmospheric chemistry that would benefit from such international scientific collaborations. Identification of a potential IGAC activity is first presented to the IGAC SSC as an emerging activity, which allows the activity to be fostered for one to two years under the guidance of the IGAC SSC. After this period, the IGAC SSC votes on whether the emerging activity has developed sufficiently to become of a full IGAC activity. Although a full IGAC activity is expected to have strong leadership and encourage participants to obtain funding to carry out its goals, the IGAC SSC continues to provide guidance to the activity throughout its lifetime. IGAC activities provide the intellectual leadership and international networks that foster scientific collaboration to promote atmospheric chemistry research towards a sustainable world.

IGAC also endorses developing, new or existing activities that will help IGAC achieve its mission and implement its vision. Endorsed activities receive less oversight by the IGAC SSC and no financial support from IGAC.

Following is a list of IGAC sponsored and endorsed activities.

#### **2.3.1 air Pollution in the Arctic: Climate, Environment, and Societies (PACES)**

IGAC Sponsored

Co-Chairs: Steve Arnold, University of Leeds, UK  
Chuck Brock, NOAA, USA  
Kathy Law, LATMOS, France

PACES aims to tackle key gaps in our knowledge on air pollution in the Arctic, including poor observational constraints and deficiencies in model representation of key chemical and physical processes. PACES will create new collaborative efforts between observational and modeling groups, social science researchers and local Arctic communities to address these issues.

#### **2.3.2 Analysis of eMissions usinG Observations (AMIGO)**

Emerging IGAC Activity

Co-Chairs: Claire Granier, Universite de Toulouse, France & NOAA/ESRL & CU/CIRES, USA  
Avelino Arellano, University of Arizona, USA  
Jenny Stavrakou, BIRA-IASB, Belgium

AMIGO aims to s to organize the international scientific community around a synthesis of research using observations-based analysis techniques that aim to better quantify emissions. The synthesis will consider chemically active compounds and greenhouse gases and will evaluate the consistency of their inferred emissions. AMIGO will assess the ability of different analysis techniques to provide consistent quantification of the emissions of multiple species across a range of spatial and temporal scales. Criteria to establish the accuracy of emissions data and their uncertainties will also be defined.

#### **2.3.3 Atmospheric Composition and the Asian Summer Monsoon (ACAM)**

IGAC Sponsored

Jointly Sponsored by WCRP-SPARC

Co-Chairs: Laura Pan, National Center for Atmospheric Research, USA  
Jim Crawford, NASA Langley Research Center, USA

ACAM focuses on four themes, each representing a key aspect of the connection between atmospheric composition and Asian monsoon dynamics: 1) Emissions and air quality; 2) Aerosols and clouds; 3) Convection and chemistry; and 4) Upper Troposphere Lower Stratosphere (UTLS) response to the Asian Monsoon.

#### 2.3.4 Chemistry-Climate Model Initiative (CCMI)

IGAC Sponsored

Jointly sponsored by WCRP-SPARC.

Co-Chairs: Michaela Hegglin, University of Redding, UK

Bryan Duncan, NASA, USA

David Plummer, Environment and Climate Change Canada, Canada

The CCMI project brings together researchers with expertise in modeling, observations, and data analysis to collaboratively design, carry out, and analyse experiments that further our knowledge of the role of chemistry in the Earth System.

#### 2.3.5 Global Emissions Initiative (GEIA)

IGAC Sponsored

Jointly sponsored by iLEAPS

Co-Chairs: Greg Frost, CU/CIRES and NOAA/ESRL/CSD, USA

Leonor Tarrason, NILU, Norway

GEIA is a community effort that builds bridges between environmental science and policy, by bringing together people, data, and tools to *create* and *communicate* the highest quality information about **emissions**.

#### 2.3.6 Interdisciplinary Biomass Burning Initiative (IBBI)

IGAC Sponsored

Jointly sponsored by iLEAPS and WMO

Co-Chairs: Johannes Kaiser, DWD, Germany

Robert Field, Columbia University, USA

The primary goal of IBBI is to improve scientific understanding of the various processes associated with open biomass burning in order to make atmospheric composition prediction and air quality monitoring and forecasting better. The initiative aims to achieve this by instigating new interdisciplinary research on biomass burning in a series of workshops. IBBI is thus science-driven and application-oriented.

#### 2.3.7 the Cryosphere and Atmospheric Chemistry (CATCH)

Emerging IGAC Activity

Jointly sponsored by SOLAS

Co-Chairs: Jennie Thomas, LATMOS, France

Thorsten Bartels-Rausch, PSI, Switzerland

Markus Frey, British Antarctic Survey, UK

CATCH aims to facilitate atmospheric chemistry research within the international community, with a focus on natural processes specific to cold regions of the Earth. Cold regions include areas which are seasonally or permanently covered by snow and ice, from the high mountains to the polar ice sheets and sea ice zones as well as regions where ice clouds that undergo chemistry are found.

#### 2.3.8 Tropospheric Ozone Assessment Report (TOAR)

IGAC Sponsored

Chair: Owen Cooper, NOAA/ERSL, CU/CIRES, Boulder, CO USA

TOAR aims to provide the research community with an up-to-date scientific assessment of tropospheric ozone's global distribution and trends from the surface to the tropopause. The assessment report is being published as a series of papers in the peer-reviewed journal, *Elementa – Science of the Anthropocene*. Papers published so far are available through a **Special Feature** of Elementa.

### **2.3.9 Aerosols, Clouds, Precipitation, and Climate (ACPC)**

IGAC Endorsed

Jointly endorsed by iLEAPS and GEWEX

Co-Chairs: Daniel Rosenfeld, The Hebrew University of Jerusalem, Israel  
Johannes Quaas, University of Leipzig, Germany

The ACPC initiative aims at a better scientific understanding of these interactions at a fundamental level. The goal is to identify, disentangle and quantify signals of impacts of aerosol perturbations on clouds, precipitation and radiation, taking into account adjustments and feedback processes, by synergistically exploiting observations and models across scales.

### **2.3.10 Deposition of Biogeochemically Important Trace Species (DEBITS)**

IGAC Endorsed

Jointly endorsed by WMO

Chair: Corinne Glay-Lacaux, CNRS/Universite de Toulouse, France

The core basis of the DEBITS activity remains establishing, developing and improving coherent networks of high quality that address atmospheric chemical composition with a focus on deposition processes. The main objective is to determine and understand global and regional changes in atmospheric deposition characteristics and atmospheric chemistry due to the changing conditions the planet is finding itself.

### **2.3.11 Surface PARTiculate mAtter Network (SPARTAN)**

IGAC Endorsed

Chair: Randall Martin, Dalhousie University, Canada

SPARTAN is a targeted network of ground-based measurements of fine particle concentrations and limited compositional features. The primary focus is on PM<sub>2.5</sub> mass, since it is a robust indicator of mortality and other adverse health impacts in epidemiologic cohort studies of long-term exposure.

## **3 Impacts**

The role of the IGAC Project is to continue to foster and respond to the international atmospheric chemistry research community, and to represent the atmospheric chemistry community at an international level to the broader global change and sustainability community. Over the last 28 years, IGAC has fostered an international community of a couple thousand scientists working on topics related to atmospheric chemistry. IGAC continues to build its community by engaging with scientists from around the world, sponsoring or endorsing numerous events, and hosting an international science conference on a biennial basis. Through its early career scientists program and its national/regional working groups, IGAC is both engaging the next generation of scientists and elevating scientists and their research in underrepresented regions of the world. IGAC is also providing scientific leadership by working with its community to identifying and sponsor/endorse activities that reach across geographical and disciplinary boundaries to contribute to addressing the most pressing global change and sustainability issues through scientific research.

IGAC's second role is to represent the atmospheric chemistry research community in the broader global change and sustainability community. As Global Research Project of Future Earth, IGAC will contribute to understanding the current state of knowledge of and identifying the most pressing issues in global change and sustainability research. IGAC facilitates integrative research and synthesis efforts that leverage atmospheric chemistry research to address larger global change and sustainability issue, e.g. air Pollution in the Arctic: Climate, Environment, and Societies (PACES). In addition, IGAC is working with international organizations, such as the United Nations Environmental (UNEP) and WMO to involve scientists from its national/regional working groups to be lead and contributing authors on high-level reports. Through its activities, IGAC provides an invaluable service to the international atmospheric chemistry community, the wider global change and sustainability community, and to stakeholders both by advancing atmospheric chemistry research and contributing to understanding global change.

## 4 Products

### 4.1 Publications (only includes publications with IGAC EO as an author)

Burkholder, J., Abbatt, J., Barnes, I., Roberts, J., **Melamed, M. L.**, Ammann, M., Bertram, A., Cappa, C., Carlton, A., Carpenter, L. J., Crowley, J., Dubowski, Y., George, C., Heard, D. E., Hermann, H., Keutsch, F., Kroll, J., McNiell, V. F., Ng, N. L., Nizkorodov, S., Orlando, J. J., Percival, C., Picquett-Varrault, B., Rudich, Y., Seakins, P., Surratt, J., Tanimoto, H., Thornton, J., Zhu, T., Tyndall, G., Wahner, A., Weschler, C. J., Wilson, K. and Ziemann, P.: The Essential Role for Laboratory Studies in Atmospheric Chemistry, *Environ. Sci. Technol.*, 2017.

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Monks, P. S., **Melamed, M.** and Seitzinger, S.: The IGBP Synthesis: Celebrating three decades of Earth system science, *Anthropocene*, 12, 1–2, doi:10.1016/j.ancene.2016.03.001, 2015.

### 4.2 IGACnews

IGACnews, **Melamed, M.L. (ed)**. Issues 55-61, 2015-2018.

### 4.3 Website

[igacproject.org](http://igacproject.org)