SPARC

40th Session of the WCRP Joint Scientific Committee

Neil Harris & Judith Perlwitz
May 2019
Geneva, Switzerland

WORLD METEOROLOGICAL ORGANIZATION
United Nations Educational, Scientific and Cultural Organization
Intergovernmental Oceanographic Commission
International Science Council
WCRP World Climate Research Programme

Progress and achievements

SPARC General Assembly, 1-5 October 2018, Kyoto, Japan

Miyako Messe

382 participants
from 31 countries,
120 ECS
60 participants received travel support
> 400 poster presentations
(traditional focus of SPARC GAs)

Roundtable discussion on: "The future of SPARC"

Jointly organised with Belmont Forum / JPI Climate projects

back-to-back with:

14th Quadrennial Symposium iCACGP 15th Science Conference IGAC
TAKAMATSU KAGAWA JAPAN 2018

LOC co-chairs:

- Kaoru Sato (U Tokyo)
- Masato Shiotani (Kyoto U)
- Shigeo Yoden (Kyoto U)

Typhoon "Trami"

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Feedback from General Assembly

Lessons

- Strong community support for SPARC and its activities
- Focus of (still basic) research is naturally moving toward being more societally relevant
- Attendees baffled by WMO/WCRP reorganisation (not by need for new strategy)
  - *Why is it needed? Why break up something that's working? Why so long?*
  - *Aim should be to support better research, not necessarily have a new structure*
  - *How best to encourage collaborative research is critical*
- Critically important to keep composition integrated with atmospheric dynamics & transport

SPARC's concerns

- WMO & WCRP reorganisation is wasting precious time:
  - *Two years for WCRP and counting - WMO reorganisation making it harder*
  - *Keep composition and dynamics in WCRP - biogeochemical cycles have to be 'covered'*
- Build on our strengths (communities) to produce continuing, valuable results
- Aim should be to encourage better research, not have a better structure
- Don't alienate– 90% of WCRP folk from universities or research institutes, not met agencies
  - Survey of 14 SSG members and 47 activity leaders: **> 1.6 MCHF per year total cost**

How SPARC works – and who with

Topic	Co-sponsor	Collaboration	Broader impacts
Asian monsoon composition	FE/IGAC	National agencies & projects	Regional network development
Predictability		S2S	Improved forecast models
Model comparison	FE/iCACGP/IGAC	MIP	Input for WMO and IPCC reports
UTLS processes	GAW	EU/IAGOS, …	new
Using DA for science		WGCM, WGNE	Spawned SNAP and S-RIP
Atmospheric dynamics		MIP, WWRP, GCs Clouds & Carbon Feedbacks	Spawned several activities
Fine-scale processes		Met agencies/ radiosondes	new
Gravity Waves			Improved parameterisations in met & climate models
Ozone trends	GAW, IO3C	Space & met agencies	Ozone recovery, radiative forcing
Polar stratospheric clouds		Space and ground-based measurement providers	Improved parametisations in climate models
QBO understanding		BF / GOTHAM	Impact of teleconnections (e.g. MJO)
Reanalysis comparison		Reanalysis centres	
Solar influence		EU/COST, SCOSTEP, MIP	Radiative forcing and responses
Stratospheric aerosols		MIP, national research proj.	Volcano quick response – relevant for SRM
Temperature trends		GCOS/GRUAN, data providers	Better vertical T trends for O_3 assessments (constraints) and IPCC (attribution).
Satellite measurement error			New
Tropical strat-trop links		S2S, CLIVAR/GEWEX monsoon, GCs, YMC, CORDEX	Improved tropical weather prediction
Stratospheric H_2O trends		Data providers	Stratospheric O3 recovery, radiative forcing
CFC-11 emissions	UNEP, GAW	Mont. Prot.l panel co-chairs	Information to Parties to Montreal Protocol

Themes: composition, dynamics and long-term observations

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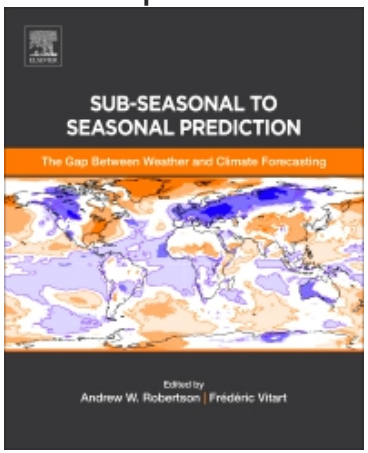
Progress and achievements

Atmospheric dynamics and predictability

Stratospheric Network for the Assessment of Predictability (SNAP):

Chapter on Sub-seasonal Predictability and the Stratosphere for S2S book



SNAP is now a full sub-project of the S2S project

Jt. planning of NCAR summer school proposal in 2020

Gravity waves:

2-year ISSI project: "New Quantitative Constraints on Orographic Gravity Wave Stress and Drag".

QBOi: successful 'hindcast' of the 2016 QBO disruption. Working with Belmont Forum project GOTHAM on teleconnections

Long-term activities on gravity waves, QBO, etc are now provide a solid basis for SPARC-related work in the WCRP/WWRP S2S project as well as on turbulent mixing in the tropopause region.

Stratospheric Sulphur and its Role in Climate (SSiRC):

Integrated measurement and modelling activities

Prepared to monitor /advise on future large volcanic eruptions, e.g. Agung or Aoba in 2018

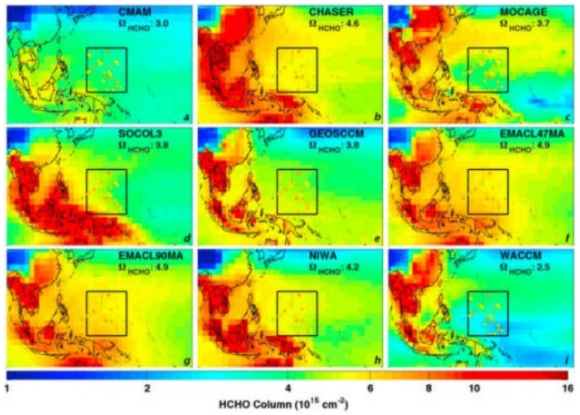
Active discussion forum through a wikipage

160 scientists from 20 countries

Progress and achievements

Chemistry and climate

CCMi:



Anderson et al. (2017)

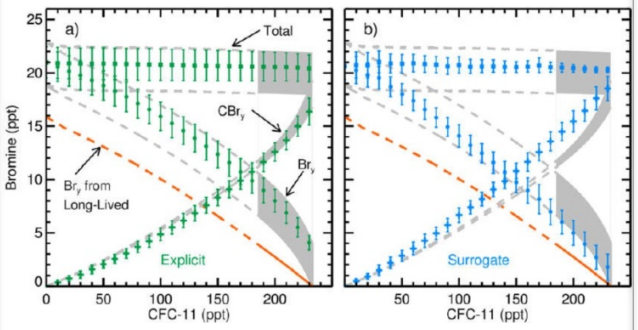
Comparison of CCMI models to HCHO aircraft observations

→ *missing sources of NOx and oceanic acetaldehyde*

→ *Helps model tropos. O_3.*

Joint with FE/IGAC, iCACGP

14 models compared with observations of short-lived organic and inorganic bromine species in the tropical UTLS



Wales et al. (2018)

→ *Information increases confidence in scenarios of stratospheric Br loading*

Updated temperature trend analysis of CCMi and updated observational record – emerging agreement

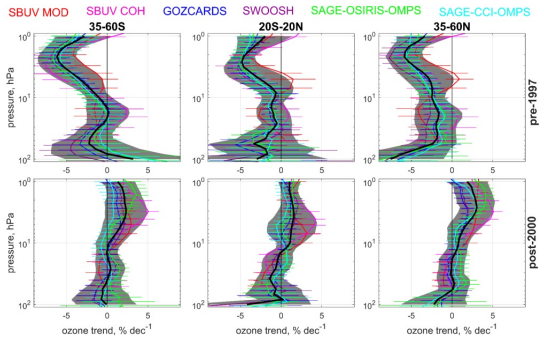
→ *Used in WMO 2018 and important for attribution studies*

The joint ACAM activity with Future Earth's IGAC on the transport of pollutants in the Asian Monsoon is now looking to coordinate more with the CLIVAR-GEWEX Monsoon panel – in addition it has built a vibrant research community across SE Asia.

Progress and achievements

Long-term records for climate understanding

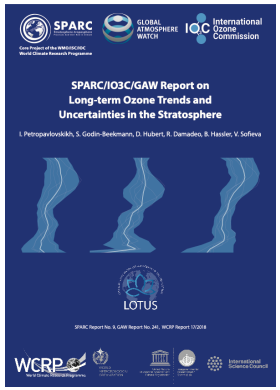
LOTUS



Uncertainties must be carefully considered when merging data sets & trends

Significant (+)ve trends in upper strat at NH mid-lat; almost signif. in SH & tropics

Important input for WMO-UNEP Scientific Assessment of Ozone Depletion



Report on Long-Term Ozone Trends and Uncertainties in the Stratosphere published in Feb. 2019

SPARC's basic research includes evaluation of trends in O_3, aerosols, H_2O and temperature in the upper troposphere and stratosphere, as well as datasets of their radiative forcing required for past climate change attribution studies as input to the IPCC assessment reports

Symposium on:

The Unexpected Increase of Emissions of Ozone-Depleting CFC-11

25-27 March 2019, Vienna

Joint with UNEP, GAW

Joint with GAW, IO_3C

Agile response

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Future plans

SPARC plans for 2019:

General

- 7 overview papers drafted/planned
- SPARC Reanalysis Intercomparison Project (S-RIP) report ready for review soon
- 14 workshops and meetings in planning
- 3 summer schools
  - 3rd ACAM Training School (w. ACAM 2019), Kuala Lumpur, June 24-25
  - CCMI Summer School: Earth system modelling and observations to study Earth in a changing climate, Hong Kong, Aug 2-6
  - 2nd GOTHAM/QBOi International Summer School on teleconnections, Beijing, Sept 9-13
- prop. WCRP-sponsored sessions at AGU Fall Meeting (inc. Unexpected CFC-11 Emissions)

Future plans

SPARC plans for 2019, cont.:

End-of-cycle assessment of DynVAR to renew priorities for atmospheric dynamics

- joint DynVar/CMIP6/SNAP Workshop on Atmospheric Circulation in a Changing Climate
- input from a wide range of possible partners
- how best to work with WCRP co-projects, CORDEX, WWRP, S2S, etc.

Develop links with other projects (WCRP and non-WCRP)

- CLIVAR/GEWEX monsoon panel (*Andy Turner / TianJun Zhou initiative)*
- strengthen links with S2S, looking at strat-trop links in Tropics (e.g. influence on MJO)
- closer collaborations with IGAC and GAW – *constructive but on hold*
- Third Pole Environment (TPE) – *how to formalise in WCRP?*

Future plans

SPARC strategy 2021-2025

- Just started developing SPARC implementation plan for 2021-2025
- Keep in line with WCRP Implementation plan and WMO plans
  - *needs to be framed consistently*
  - *may mean rethinking current SPARC themes*
- Re-structure the SPARC activities for
  - *greater organisational clarity*
  - *enable / encourage collaborations*
  - *stay in line with broader WCRP and SPARC goals*
- Keep in line with current SPARC plans for coming years to allow evolution
- Have solicited and received input - inc. integrated summary from YESS
- Maintain atmospheric community

WCRP Strategic and Implementation Plans

General points ahead of time

- clearly link the new basic research programme goals with critical societal concerns about near-term prediction and response to climate change. ?
- define WCRP's role in promoting basic research alongside partners (international, national and local government; industry; finance; individuals). ✓
- identify areas of research for joint science/social science research ?
- identify focussed scientific reports and papers with WCRP leadership which can help IPCC. This is an on-going activity and topics should be identified ahead of time. ✓
- maintain the vibrancy and strength of existing communities within the Core projects ✓

  'Our communities provide the energy and enthusiasm that are foundational to a successful WCRP.' Letter from CP co-chairs to WMO DG, 2/3/17
- ensure the communities can continue to evolve and provide new homes ✓

  Requires cooperative input from all of WCRP – use incentives to encourage this
- assess progress after 3-5 years ✓

✓ : progress

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Urgent issues

- Clarity on outlook for WCRP (and WMO)
  - need not be crystal clear, but we do need a broad target to work towards
  - develop an encouraging environment supportive
- Clear structure for core WCRP funding channels (preferably increasing!!)
- SPARC is still missing formal links to African & South American science communities despite some progress in identifying individuals
- Need to reduce carbon footprint
  - WCRP initiative? WMO? UN?
  - major risk for reputational loss
  - travel allowing for low CO_2 ….. improved infrastructure ….. better teleconference infrastructure ….. *submission to WMO Congress from WCRP??*

Final thought

"Isn't the responsibility of scientists, if you believe that you have found something that can affect the environment, isn't it your responsibility to do something about it, enough so that action actually takes place?" F.S. Rowland

Can WCRP provide the necessary base of basic research and meet this challenge?

SPM of IPCC Special Report on Global Warming of 1.5ºC approved at end of SPARC GA 2018

- urgency of rapid and deep reductions in the emissions of GHGs, & need for climate information to support strategies for adaptation and mitigation
- results since then are bleaker if anything

New WCRP strategic plan is a great opportunity:

- make a real contribution to achieving these needs while promoting the critical need for a fundamental research base.
- ***make it count***