

42nd Session of the WCRP Joint Scientific Committee

28th June – 2nd July

SPARC has been working on its new strategy for the next 5-10 years. A task team with 22 members has been assembled by considering scientific expertise, geographical representation, gender balance, and career stage. Members with strong links to YESS, IGAC, and GAW are encouraged to join. This team has discussed the current SPARC structure and possible future science topics for SPARC, and is formulating a new structure of SPARC and an implementation plan. Tentative outcomes have been shared and discussed with the SPARC Scientific Steering Group (SSG) and activity leads during our SSG meeting in March, 2021.

The whole year 2020, and also the current year have been impacted by the global COVID-19 pandemic, which has led to a number of larger SPARC conferences being postponed to the year 2022. This includes the QBO@60, conference originally planned for July 2020, to celebrate 60 years of the QBO discovery, as well as the Gravity Wave Symposium (now planned for early 2022) and science workshops organised by the temperature trends activity, the solar influence activity, and the stratospheric sulfur activity. Our activities are still actively engaged, constantly producing new results and input to assessment reports, as shown below.

1. Highlights for JSC

- The 4th [ACAM](#) training school has been prepared and will be conducted on-line from 22 June until 01 July 2021 with 30 selected participants from 15 countries. The training school will provide lectures and tutorials on using the latest global datasets on atmospheric composition from satellite remote sensing and model simulations.
- A [community paper](#) by the [Temperature Trends activity](#) has been published, describing the current state of atmospheric temperature trends over the past 40 years from the latest available observational records. This is a contribution to the IPCC AR6 WG I Chapter 2 on the changing state of the climate system. In connection, another community paper examining the [consistency and structural uncertainty of GPS RO records](#) has been published.
- A number of studies on [sudden stratospheric warmings](#) have been published, including one [addressing future changes in sudden stratospheric warmings](#).
- Two community papers have been published in connection to the S2S project by the [Dynamical Variability activity](#): one on [predictability of the stratosphere](#), and the other on the [predictability arising from stratosphere-troposphere coupling](#).
- The [Chemistry-Climate Model Initiative](#) has [defined a set of simulations](#) to be performed and analysed as input to the 2022 Ozone Assessment. The [LOTUS activity](#) is also preparing contributions to the 2022 Ozone Assessment.
- [S-RIP](#) is currently finishing its report of their phase 1. The report has been submitted to the SPARC Office in the end of 2019, and has been revised during 2020. The final, revised version is currently in type-setting, and an early-online release is planned in July. Results from the activity are collected in a [special issue](#) with >40 papers already published.
- The Stratospheric Network for the Assessment of Predictability (SNAP) has two community collaborative projects underway, focusing on 1) stratosphere-troposphere coupling biases in S2S prediction systems and 2) [Stratospheric Nudging And Predictable Surface Impacts \(SNAPSI\)](#). The experimental protocol will be submitted within the next few weeks.
- The main [review paper on polar stratospheric clouds](#) has been published. This will be a seminal paper in the field, adding to the series of SPARC reports and reviews.
- Phase-I of the [QBO initiative](#) has been finished, with key publications collected in a [special issue](#). A review paper is currently under revision.
- A virtual seminar series has been set up jointly by the Gravity Wave and QBOi activities. The events attract 60-70 participants, and each consist of two talks.
- The [SATIO-TCS](#) activity has published three review papers: one on [the influence of the QBO on the tropical and subtropical UTLS](#), one on [the QBO downward coupling](#), and a third on the [influence of the QBO on the Madden-Julian oscillation](#).
- New [solar forcing recommendations](#) for the planned [CCMi](#) experiments in support of the 2022 Ozone Assessment has been generated by the [SOLARIS-HEPPA](#) activity.
- A new version of the [Global Space-based Stratospheric Aerosol Climatology](#) has been archived at NASA's Atmospheric Sciences Data Center by the [SSiRC activity](#).

- Further SPARC-related special issues include:
 - [Chemistry-Climate Modelling Initiative](#) - Joint Special Issue in ACP/AMT/ESSD/GMT (>35 published papers)
 - [Water Vapour Intercomparison II \(WAVAS-II\)](#) - Joint Special Issue in ACP/AMT/ESSD (15 published papers)
 - [Towards Unified Error Reporting \(TUNER\)](#) - Special Issue in AMT (8 published papers)
 - [The Exceptional Arctic Stratospheric Polar Vortex in 2019/2020: Causes and Consequences](#) in JGR:Atmosphere/GRL (> 10 published papers)

2. Primary science issues (next 3-5 years)

- Broaden SPARC's expertise to include more tropospheric topics (moving towards the whole-atmosphere approach), described in the [Jan 2021 SPARC newsletter](#)

- SPARC's thematic expertise is seen in:

- Atmospheric Circulation
 - Rossby wave dynamics, Dynamical coupling, Feedback mechanisms, Understanding variability, Extreme/compound events, Local impacts of climate change, Role in predictability
- Atmospheric Composition
 - Long-term records, Cloud processes, Air quality
- Model assessment
 - Consistency checks (btw. Models; time scales; time-variations of parameters, etc.), Understanding model bias & internal variability, Understanding prediction skill (windows of opportunity; signal-to-noise paradox)

Thematic expertise	Methodologies	Implementation
Atmospheric Circulation <ul style="list-style-type: none"> • Rossby wave dynamics • Dynamical coupling • Feedback mechanisms • Understanding variability • Extreme events/ compound events • Local impacts of climate change • Role in predictability 	Observations <ul style="list-style-type: none"> • Support for observation missions • Long-term record analysis • Produce climatologies • Data assimilation • Uncertainty reporting • Identify needs in global observation networks 	Longer-term activities <ul style="list-style-type: none"> • Networking-focus (e.g. DynVar) • Sustaining long-term assessments of data records or model developments Short-term activities <ul style="list-style-type: none"> • On specific topics (e.g. LOTUS) • Rapid assessments • Workshops (knowledge assessment & connecting communities)
Atmospheric Composition <ul style="list-style-type: none"> • Long-term records • Cloud processes • Air quality 	Model simulations <ul style="list-style-type: none"> • Provide input data sets (e.g. aerosol) • Impact studies • Model expansion (higher altitudes) • Assessment studies (e.g. after extreme events/season) 	Scientific exchange & collaboration <ul style="list-style-type: none"> • Summer schools & technical training • ECS forums • Informal community events (e.g. journal clubs) • (Online) Seminar series
Model assessment <ul style="list-style-type: none"> • Consistency checks (btw. Models; time scales; time-variations of parameters...) • Understanding model bias & internal variability • Understanding prediction skill (windows of opportunity; signal-to-noise paradox) 	Intercomparison studies <ul style="list-style-type: none"> • Large ensemble studies • Consistency checks New: Machine learning & Data Science	SPARC deliverables: <ul style="list-style-type: none"> • „Best practice“ guidelines • White papers • Reviews • Assessment Reports/ special issues • Set of dynamical analysis tools
		SPARC outreach <ul style="list-style-type: none"> • "Regional ambassadors" • Advocacy towards funding agencies; mission planning

Those are all connected...

3. Issues and challenges

- Outline any proposed changes to the Core Project
 - Co-chair Neil Harris is finishing his last term as a SPARC SSG co-chair. SPARC is nominating Amanda Maycock (Univ. Leeds, UK) as a new co-chair for the Europe/Africa time-zone. SPARC is also nominating current SSG member Karen Rosenlof (NOAA, USA) to fill the currently vacant co-chair spot for the Americas.
 - SPARC is nominating Sophie Szopa (Laboratoire des Sciences du Climat et de l'Environnement, France) and Wenshou Tian (Lanzhou University, China) as new SSG members
 - Two current SPARC activities are set to terminate in 2022.
 - The activity structure of the core project is to be kept under the new strategy, but ways to form clusters are investigated → This should facilitate representing SPARC to other projects and start collaborations.
- How you work with the new "Core Projects"?
 - SPARC would like to have representatives in the new homes' panels/activities to facilitate collaboration. Many SPARC activities work on related topics, and collaborations are welcome.
- How do you plan to work with the Lighthouse activities?
 - SPARC is looking to contribute to the Lighthouse activities by providing input through the SPARC activities' work.
 - Good communication through representatives and the Project offices is necessary to ensure well-working and fruitful collaboration
- Are there additional elements you would like to see in the new WCRP?
 - (none)
- How do you see your community evolving e.g. new activities or activities coming to an end?
 - Two current SPARC activities are set to terminate in 2022 (PSCI; WAVAS II).
 - New activities will evolve through the new strategy, with more tropospheric-related topics. WAVAS II also recommends picking up a few topics they have not been able to examine. The topic of short-lived climate forcers has been of interest for a while, and might be sparking a new activity.
 - SPARC is planning to use its network to connect existing research communities on a number of topics (e.g., extremes; climate intervention).
 - Early Career Scientists are encouraged to take on leading roles in SPARC, e.g. in new community formats such as webinars or journal clubs.
 - SPARC is planning its next General Assembly in October 2022, as a multi-hub in-person meeting.