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Submitted by: SPARC Co-Chairs and Director/IPO
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SPARC Report

1. Highlights for JSC

- SPARC contributed significantly to CMIP6, through development of several forcing data sets (e.g. solar, volcanic aerosol, ozone) as well as developing several of the CMIP6-Endorsed MIPs (e.g. DynVarMIP, AerChemMIP, DAMIP, VolMIP). See SPARC newsletter article by Eyring and Carlson, 2017, page 11.
- Publication of the SPARC Report on "Solving the Mystery of Carbon Tetrachloride". This report provides an in-depth and new understanding of CCl4 emissions estimates and addresses the major discrepancy between emissions estimates of this important species controlled by the Montreal Protocol.
- SPARC aided the organisation of several thematic international workshops (e.g. Blocking workshop in 2016, Storm Tracks workshop in 2015), beyond the large number of SPARC activity workshops/meetings.
- SPARC held a workshop ("Challenges for Climate Science - Synergies between SPARC and the WCRP Grand Challenges") focused on establishing where SPARC could most effectively contribute to the WCRP Grand Challenges.
- SPARC continues to increase its emphasis on climate-related aspects of tropospheric composition and dynamics.

2. Primary science issues (ahead, 3 to 5 years)

- Provide guidance for next-generation reanalysis systems with the S-RIP report.
- Assess data sets for model validation, with careful quantification of uncertainties (e.g., Second Water Vapour Assessment, Observed Composition Trends And Variability in the Upper Troposphere and Lower Stratosphere).
- Enhance understanding of troposphere-stratosphere coupling in the tropics and effects on convection through the activity "Stratospheric And Tropospheric Influences On Tropical Convective Systems".
- To better understand the impact of the monsoon convection systems on the composition, radiation, and dynamics of the troposphere.
- Promote research in preparation of various assessment reports (IPCC AR6, WMO/UNEP 2018 Ozone Assessment) through focussed activities (e.g. DynVar, LOTUS, Temperature Changes and their Drivers, OCTAV-UTLS, PSCi) and participation in CMIP6-endorsed MIPs.
- Contribute to model development by identifying model requirements to resolve stratospheric teleconnection pathways, to simulate the QBO, to resolve gravity wave effects on circulation, and to represent chemistry-climate coupling.
- Help facilitate the new Grand Challenge on Carbon and Climate and develop a parallel SPARC initiative on the short-lived climate forcers.
- Lead the new focus on "How will storm tracks change in a future climate?" within the Grand Challenge on Clouds, Circulation, and Climate Sensitivity.
- Enhance understanding on the role of the stratosphere in tropospheric prediction on the S2S time scale.

3. Issues and challenges

- How you work with other CPs:
  - Currently no joint activities (besides for with Future Earth project IGAC), but discussions with GEWEX in terms of Monsoons and upper tropospheric convection/cirrus;
  - Work well between the project offices;
  - SPARC representative attended the CliC SSG this January, and the GEWEX SSG January 2016.
  - Periodic telecons with co-chairs of other CPs.
- How do you work with CMIP and the modelling groups (vis-à-vis WMAC):
  - One of the SPARC Co-Chairs serves as a member of the WCRP Modelling Advisory Council (J. Perlwitz), and attended the 2016 meeting and participated in the WMAC conference call on 9 March 2017;
  - Outcomes of the 2016 meeting were reported to the SPARC SSG at its annual meeting in November 2016.
- How do you address observations/data requirements (vis-a-vis WDAC):
  - Ensure a designated representative (Susann Tegtmeier) on WDAC.
  - Contribute to international (e.g. GCOS) reports detailing future data requirements.
  - Maintain dialogue with observing networks such as GRUAN, WMO/GAW, and satellite groups through many of our activities.
  - Initiate activities addressing how uncertainties resulting from merging different climate data sets should be propagated and reflected in assessments of trends and changes in variability.
- How do you work with the Grand Challenges:
  - Organised a successful one-day workshop in Berlin on “Challenges for Climate Science - Synergies between SPARC and the WCRP Grand Challenges” that brought together scientists active in Grand Challenge research, in different SPARC activities, and scientists that so far have had fewer links with WCRP;
  - Very active in GC on Near Term Prediction with SPARC Co-chair attending regular telecons, promoting this GC at the regional SPARC workshop, giving a presentation on potential SPARC-GC connections, contributed to White Paper.
  - Effective communication with the GC on Carbon and Climate, including discussion of possible proposals.
- How do you see your community evolving:
  - SPARC would like to grow the community to involve more tropospheric-oriented researchers and topics;
  - The SPARC community evolves naturally as activities start/end or as they change, e.g. more weather-focused researchers becoming involved in the Gravity Wave activity.
- How do you work with WCRP:
  - So far this has been working very well. Good connections with Boram and Guy attending the GC workshop last year. Boram has recently been attending our regular co-chair telecons.
  - We appreciate more regular communication with WCRP.
- How will the current funding affect your community, your activities, your service:
  - SPARC uses its funding only to cover travel to activity workshops (and training schools), with the aim of providing support for early career researchers and researchers from developing countries mainly. The reduced funding means a reduced ability to get these people to our activity workshops.
  - A further major issue in terms of the reduced funding is support of the 2018 SPARC general assembly.