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World Climate Research Programme

Summary of the 19th Session of the SPARC SSG

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The 19th Session of the SPARC SSG took place at ETH (Swiss Federal Institute for Technology) Zurich on 7-10 February 2012. It was preceded by a joint SPARC–Swiss Workshop on 6 and 7 February 2012. One highlight of the event was the celebration of the 20th anniversary of the project and the opening of the SPARC International Project Office (IPO) in Zurich under the sponsorship of the Swiss Federal Institute of Technology in Zurich, MeteoSwiss, Swiss Federal Office for Environment, and WCRP. All previous co-chairs, directors of IPO, project office managers, and WCRP Joint Planning Staff liaisons to SPARC attended that celebration. A report of the SSG Session will be published soon in the SPARC Newsletter.

SPARC's domain of activities is expanding to include the entire free troposphere, this will require closer ties with the International Global Atmospheric Chemistry (IGAC) project to tackle tropospheric chemistry issues and with WCRP/GEWEX to address a wide spectrum of atmospheric research. IGAC/SPARC collaboration should address the impact of stratospheric ozone on the tropospheric chemistry budget and the impact of the super-recovery of the ozone layer. CCMVal (Chemistry-Climate Model Validation) shares many of the same problems as the climate community in using performance metrics to rank models and model weighting based on model performance. Multi-model means have become an important component for decision-making processes. CCMVal, like SPARC, is moving into the free troposphere, and this move will benefit from healthy links to other groups such as IGAC, HTAP, and AeroCom. A key issue is

the impact of ozone depletion (and recovery) on climate change. A range of scenarios for GHGs is needed in order to study ozone recovery under different future climate projections. SPARC can (and has) play a role in promoting the development and use of process-oriented model evaluation. The future of the SPARC/IGAC Atmospheric Chemistry and Climate initiative (AC&C) will be a major focus at the upcoming CCMVal workshop in Davos. An emerging area for SPARC is the stratospheric aerosols, and IGAC has a strong history of this.

The ESA-SPARC Initiative is underway. A kick-off meeting was held and SPARC's measurement requirements were discussed at the SSG meeting. A key objective of SPIN is the development of ESA (and other) satellite data in order to produce climate data records. There are several ESA Climate Change Initiatives, where SPARC is well-positioned to take part (ESA Aerosol CCI, ESA Ozone CCI). The initial programme will be for two years: first to assess which Essential Climate Variables (ECV) are already available, and then to merge improved data sets with historical records and higher resolution products. The outputs are expected to be better data sets for aerosol, water vapour, SLS, ozone, temperatures, and merged/extended data sets. SPARC activities rely on measurements and there is a clear need to maintain long-term, stable and high-quality measurements of atmospheric data, including ozone, water vapour, temperature, etc. High-resolution vertical profiles will also be needed of many of these constituents in order to attribute changes (e.g. the change in water vapour at the TTL will require high-resolution measurements of water vapour, methane and temperature). Clear documentation, traceability and redundancy are also needed. SPARC is initiating a measurements requirements discussion to focus on data that the SPARC community would like to see, for example the ability to monitor the ozone layer through the recovery period, which is under threat, or to constrain model predictions and assess model performance.

Under the Temperature Trends group a reassessment of the SSU data has shown some differences in the temperature trends over the past 30 years. Changes in the meridional structure due to changes in atmospheric composition -not previously accounted for in the temperature retrievals- have been noted in some new studies.
SPARC Data Assimilation group is now working on two activities: the SPARC Reanalysis Intercomparison Project (SRIP) and SNAP, a comparison of 5-15 day forecasts with the aim of quantifying the impact of the stratosphere on the tropospheric forecasting. The SNAP activity designs and performs new inter-comparison of stratospheric forecasts, and leaves a legacy of dataset to be used by a broad community of researchers.
The SPARC activity on gravity waves has seen a lot of progress in both modelling studies and satellite observations, particularly on the problem of missing gravity wave drag in the Southern Hemisphere. A new ISSI initiative -focusing on GWD in models and how to better constrain existing climate model parameterizations– will look at the subset of CMIP5 models that output the GWD and using Data Assimilation (DA) techniques. The gravity wave group and the DA workshop group are working together on this topic. Moreover links to DynVar are open, and the gravity wave group will participate in the upcoming workshop on the Brewer-Dobson Circulation workshop in Grindelwald (Switzerland). The current focus of DynVar is on high-low top model intercomparison with the CMIP5 models. Many of the models are now raising their lids to 10hPa and following ozone recommendations from CCMVal. Two synthesis papers on climate and variability of the stratosphere, and the role of the stratosphere on surface and climate changes in the CMIP5 multi-model ensemble, are in preparation, along with work on stratosphere-troposphere coupling in the CMIP5 runs. However, there is a need to improve communications between analysers and modellers, and to link to Earth system modelling groups that include the effects of the stratosphere and solar influences on climate. Recent observations have created more uncertainty in our understanding of the solar impact on climate (SOLARIS, HEPPA) and need more studies. A future solar minimum in the next century (much like the Maunder Minimum of the past) may mask some of the anthropogenic climate change, and correct attribution is essential.

The geoengineering will need to study how robust the modelling results for Solar Radiation Management techniques really are. For reliable, realistic results good microphysical models of aerosols, an interactive ocean, realistic solar forcing and accurate chlorine loading is required. A new activity – SSiRC (Stratospheric Sulphur and its Role in Climate) will complement the GeoMIP activity.

The WCRP Polar Climate Predictability Initiative will hold a workshop (April 2-4 in Toronto, Canada) to develop an implementation plan. The plan will focus on specific activities where international coordination can add value to existing activities, with a lifetime of about 5 years. The main idea is to study the sources of predictive capability in the Polar Regions.

SPARC will look into potential for capacity building in Africa with initiatives like summer/winter schools, visiting scientist programmes/exchanges, mentoring programmes, and increase in regional human capital with possible ground-based observations. A challenge for SPARC will be making sure that its goals and expectations are well aligned with the goals of the sponsored countries and existing capacity.