

SPARC Activity Report 2018

(SPARC Reanalysis Intercomparison Project (S-RIP))

I. Achievements and Plans

* *What has your activity achieved over the past year? Have you completed any major deliverables e.g. reports or reviews or reached any major milestones? (This material will be incorporated into the Annual Report).*

The following three papers on the S-RIP basic chapters (Chapters 1-4) have been published in Atmospheric Chemistry and Physics (ACP) as contributions to the S-RIP inter-journal special issue in ACP/Earth System Science Data (ESSD) (https://www.atmos-chem-phys.net/special_issue829.html; https://www.earth-system-science-data.net/about/aims_and_scope.html).

Chapters 1 and 2:

Fujiwara, M., J. S. Wright, G. L. Manney, L. J. Gray, J. Anstey, T. Birner, S. Davis, E. P. Gerber, V. L. Harvey, M. I. Hegglin, C. R. Homeyer, J. A. Knox, K. Krüger, A. Lambert, C. S. Long, P. Martineau, A. Molod, B. M. Monge-Sanz, M. L. Santee, S. Tegtmeier, S. Chabrillat, D. G. H. Tan, D. R. Jackson, S. Polavarapu, G. P. Compo, R. Dragani, W. Ebisuzaki, Y. Harada, C. Kobayashi, W. McCarty, K. Onogi, S. Pawson, A. Simmons, K. Wargan, J. S. Whitaker, and C.-Z. Zou: Introduction to the SPARC Reanalysis Intercomparison Project (S-RIP) and overview of the reanalysis systems, *Atmos. Chem. Phys.*, 17, 1417-1452, <https://doi.org/10.5194/acp-17-1417-2017>, 2017.

Chapter 3:

Long, C. S., M. Fujiwara, S. Davis, D. M. Mitchell, and C. J. Wright: Climatology and interannual variability of dynamic variables in multiple reanalyses evaluated by the SPARC Reanalysis Intercomparison Project (S-RIP), *Atmos. Chem. Phys.*, 17, 14593-14629, <https://doi.org/10.5194/acp-17-14593-2017>, 2017.

Chapter 4:

Davis, S. M., M. I. Hegglin, M. Fujiwara, R. Dragani, Y. Harada, C. Kobayashi, C. Long, G. L. Manney, E. R. Nash, G. L. Potter, S. Tegtmeier, T. Wang, K. Wargan, and J. S. Wright: Assessment of upper tropospheric and stratospheric water vapour and ozone in reanalyses as part of S-RIP, *Atmos. Chem. Phys.*, 17, 12743-12778, <https://doi.org/10.5194/acp-17-12743-2017>, 2017.

After discussing with the SPARC co-chairs, external (review handling) editors, S-RIP chapter leads and reanalysis centre contacts, and SPARC Office, we decided to cancel the S-RIP "Interim" Report (for Chapters 1-4). This is because we now have the above three ACP papers, which can be regarded as an interim report of the S-RIP activities.

There are several other S-RIP related papers published in the S-RIP inter-journal special issue in ACP/ESSD. The deadline of this special issue has been extended (from 31/12/2018) to 31/12/2019, i.e., the end of NEXT year.

During 25-27 June 2018, we had a successful S-RIP Chapter-lead Meeting at NorthWest Research Associates (NWRA), Boulder, USA, where we discussed the details of the planned S-RIP Report. See <https://s-rip.ees.hokudai.ac.jp/events/meeting2018/index.html> for more information.

- *What does your activity plan to do over the coming year? What deliverables (e.g. reports, review papers) do you plan to complete? (This material may also be incorporated into the Annual Report).*

During the SPARC General Assembly at Kyoto, Japan in October 2018, we will have a side meeting on the S-RIP. There, we will discuss whether we will have an S-RIP meeting in 2019.

We will complete the S-RIP Report as a SPARC report series.

II. Resources

* *What workshops have you planned for the coming year and what level of WCRP/SPARC funding do you require to support those workshops? For what do you intend to use any allocated funding? (This information will guide the allocation of SPARC travel support over the coming year).*

At the side meeting on the S-RIP during the SPARC General Assembly (GA), we will discuss whether we will have an S-RIP meeting in 2019. We will report the result at the SSG meeting right after the GA.

- *What funding proposals does your activity have in the works? What resource issues is your activity facing? Is there anything that the SSG can do to help? What funding opportunities could SPARC be pursuing? (The information you provide here will guide the discussion at the SPARC SSG meeting).*

Individual researchers have sought for research funding. The maintenance of the S-RIP website (<https://s-rip.ees.hokudai.ac.jp/>) was and will be covered by Masatomo Fujiwara's funding and voluntary work by Jonathon Wright. The editorial work for the S-RIP reports is being done at the SPARC Office.

III. WCRP Communications[†]

** What are the data issues/needs for your activity? (This information will be communicated to the WCRP Data Advisory Council).*

Reanalysis data are provided by reanalysis centres and the NCAR/RDA (see <https://s-rip.ees.hokudai.ac.jp/resources/links.html> for the links). The UK Centre for Environmental Data Analysis (CEDA) provided a disk space for the S-RIP to share derived diagnostic products and for public data archives (see <http://s-rip.ees.hokudai.ac.jp/resources/data.html>).

Observational data including those coming from WCRP/SPARC activities are used in some of the various chapters as the key elements for validation.

As always noted, there is a need for more reference-quality observational data for current and historical periods; the amount currently available is still rather limited in spatio-temporal coverage, which makes reanalysis intercomparison (especially interpretation of differences) challenging.

** What are the modelling issues/needs for your activity? (This information will be communicated to the WCRP Modelling Advisory Council).*

Some researchers are analysing CMIP and/or CCM data together with the reanalysis data for comparison.

As always noted, that there is a need for SPARC scientists to become more familiar with the modelling aspects of reanalysis systems, covering both forecast models and data assimilation techniques. S-RIP workshops (and writing of the papers and report manuscripts) have provided opportunities for reanalysis centres to share their knowledge, but more widespread education and training is also required.

IV. SPARC Programmatic Issues

** To which other SPARC or WCRP activities does your activity connect? Should you be thinking about joint workshops? Can the SSG do anything to help foster better connections between your activity and other SPARC/WCRP activities? (This will also guide the discussion at the SPARC SSG meeting).*

S-RIP has developed links to several other SPARC projects. It is closely related to the SPARC Data Assimilation Working Group (DAWG) and SPARC Network on Assessment of Predictability (SNAP) due to the common focus on stratospheric analyses. S-RIP held its annual meeting jointly with DAWG between 2014 and 2017.

There is direct interaction with QBOi, DynVAR and the emerging activity OCTAV-UTLS. S-RIP co-leads and chapter leads are involved in leadership of those activities.

Since the reanalyses evaluated and compared by S-RIP are widely used to validate climate models, there is a direct connection between the activities of S-RIP and those of the Chemistry-Climate Model Initiative (CCMI).

There is also scope for interaction with other SPARC activities such as the Temperature Changes activity, the SPARC Data Initiative (SDI) and the Gravity Waves activity. For example, SPARC Data Initiative fields of ozone and water vapor have been used in S-RIP chapter 4 for reanalysis comparisons with data.

Leaders of these activities are also in the S-RIP Working Group, chapter leads, and/or contributors, thus enhancing opportunities for coordination and collaboration.

In October 2016, a new WCRP task team, WCRP Task Team for Intercomparison of ReAnalyses (TIRA), was formed, and one of the S-RIP co-leads (Masatomo Fujiwara) became a member of this team as the SPARC liaison. In February 2018, Fujiwara became one of the co-leads of TIRA. The team covers not only global atmospheric reanalyses but also ocean and regional reanalyses. The team has regular (~1.5 monthly) teleconferences.

** Has your activity contributed in any way to SPARC's capacity development effort? Is there any way the SSG capacity development group can help you to do more?*

We are afraid that we may have no clear contribution to the capacity development effort, although the SPARC reanalysis data users have learned many things from the reanalysis centres through the S-RIP activities, and scientists from developing countries have participated in past S-RIP workshops.

** Is there anything else that the SSG can do to assist your activity in any way? (This will also guide the discussion at the SPARC SSG meeting).*

The publication of the S-RIP Report in next year would be the end of the "first phase of S-RIP." We would like to get comments and suggestions for the future of the SPARC related reanalysis intercomparison activities. (This will be the main discussion item for the S-RIP side meeting during the SPARC General Assembly.)

** Please also take this opportunity to revisit the material published for your activity on the SPARC web page. (Please communicate any required changes to the SPARC Project Office).*

Some additions and minor revisions are necessary. We will communicate with the SPARC Office after the General Assembly.

[†] Issues/needs in this context refers especially to those that may require WCRP engagement beyond SPARC.