
Overview of the SPARC Reanalysis Intercomparison Project (S-RIP) during 2013-2021

Masatomo Fujiwara*¹, Gloria Manney^{2,3}, Lesley Gray^{5,4}, Jonathon Wright⁶, James Anstey⁷, Thomas Birner^{8,9}, Sean Davis¹⁰, Edwin Gerber¹¹, V. Lynn Harvey¹², Michaela Hegglin¹³, Cameron Homeyer¹⁴, John Knox¹⁵, Kirstin Krüger¹⁶, Alyn Lambert¹⁷, Craig Long¹⁸, Patrick Martineau¹⁹, Beatriz Monge-Sanz⁴, Michelle Santee¹⁷, Susann Tegtmeier²⁰, Simon Chabrilat²¹, Gilbert P. Compo²², Rossana Dragani²³, Wesley Ebisuzaki²⁴, Yayoi Harada²⁵, Chiaki Kobayashi²⁵, Kazutoshi Onogi²⁵, Krzysztof Wargan²⁶, and Jeffrey S. Whitaker²⁷

¹Hokkaido University – Sapporo, Hokkaido, Japan

²New Mexico Institute of Mining and Technology – Socorro, United States

³NorthWest Research Associates – Socorro, United States

⁵NERC National Centre for Atmospheric Science – Leeds, United Kingdom

⁴University of Oxford (Oxford) – United Kingdom

⁶Tsinghua University, Beijing – Beijing, China

⁷Canadian Centre for Climate Modelling and Analysis, Environment and Climate Change Canada, University of Victoria – Victoria, Canada

⁸Ludwig-Maximilians-Universität München – München, Germany

⁹Deutsches Zentrum für Luft- und Raumfahrt Oberpfaffenhofen – Oberpfaffenhofen, Germany

¹⁰Chemical Sciences Laboratory, National Oceanic and Atmospheric Administration – Boulder, United States

¹¹New York University – New York, United States

¹²University of Colorado Boulder – Boulder, United States

¹³University of Reading – Reading, United Kingdom

¹⁴University of Oklahoma – Norman, United States

¹⁵University of Georgia – Athens, United States

¹⁶University of Oslo – Oslo, Norway

¹⁷Jet Propulsion Laboratory, California Institute of Technology – Pasadena, United States

¹⁸National Oceanic and Atmospheric Administration – College Park, United States

¹⁹Japan Agency for Marine-Earth Science and Technology – Kanagawa, Japan

²⁰University of Saskatchewan – Saskatchewan, Canada

²¹Royal Belgian Institute for Space Aeronomy – Brussels, Belgium

²²Cooperative Institute for Research in Environmental Sciences – Boulder, United States

²³European Centre for Medium-Range Weather Forecasts – Reading, United Kingdom

²⁴National Oceanic and Atmospheric Administration – Maryland, United States

²⁵Japan Meteorological Agency – Tsukuba - Ibaraki, Japan

²⁶National Aeronautics and Space Administration, USA; and Science Systems and Applications, Inc. – Greenbelt, United States

²⁷National Oceanic and Atmospheric Administration – Boulder, United States

*Speaker

Abstract

The Stratosphere-troposphere Processes And their Role in Climate (SPARC) project is one of the four core projects of the World Climate Research Programme (WCRP). Researchers interested in SPARC use global atmospheric reanalysis products to understand a wide range of processes and variability in the atmosphere, to validate chemistry climate models, and to investigate and identify climate change. The SPARC Reanalysis Intercomparison Project (S-RIP) was initiated in 2011 and officially started in 2013 to conduct a coordinated intercomparison of all major global atmospheric reanalysis data sets. The S-RIP has been aiming at writing up an assessment report in the SPARC report series (to be published by September 2021) (1) on overall quality of temperature, winds, ozone, and water vapor data, (2) on more process- and region-oriented evaluation of the Brewer–Dobson circulation, extratropical stratosphere-troposphere coupling, extratropical upper troposphere and lower stratosphere, the tropical tropopause layer, the quasi-biennial oscillation, polar processes, and the upper stratosphere and lower mesosphere, and (3) with a coordinated description of the reanalysis systems. We also have an inter-journal special issue on "The SPARC Reanalysis Intercomparison Project (S-RIP)" in Atmospheric Chemistry and Physics (ACP) and Earth System Science Data (ESSD). In the presentation, we will discuss key findings and recommendations as well as the evaluation of this first phase of the S-RIP activity.

Keywords: reanalysis intercomparison, stratosphere, troposphere, mesosphere