

# Stratosphere-troposphere Processes And their Role in Climate (SPARC)

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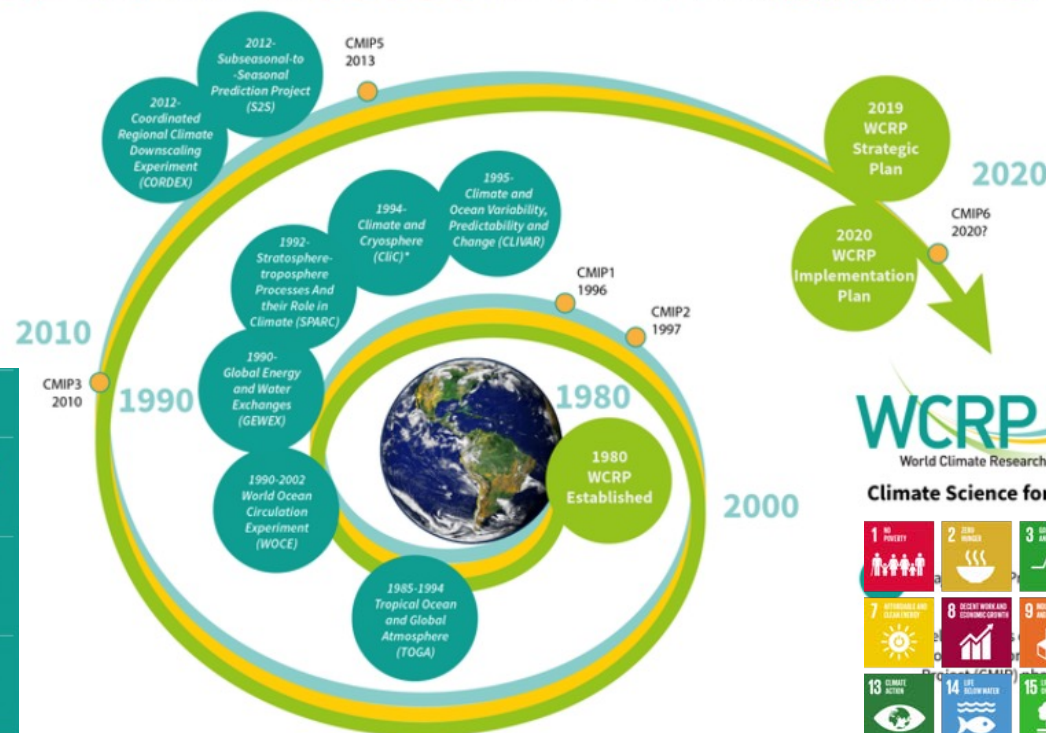
**SPARC**  
Stratosphere-troposphere  
Processes And their Role in Climate

# SPARC: A core project of WCRP



International  
Science Council

**WCRP**  
World Climate Research Programme



Climate and Cryosphere (CIC)

Climate and Ocean Variability, Predictability and Change (CLIVAR)

Earth System Modelling and Observations (ESMO)

Global Energy and Water Exchanges (GEWEX)

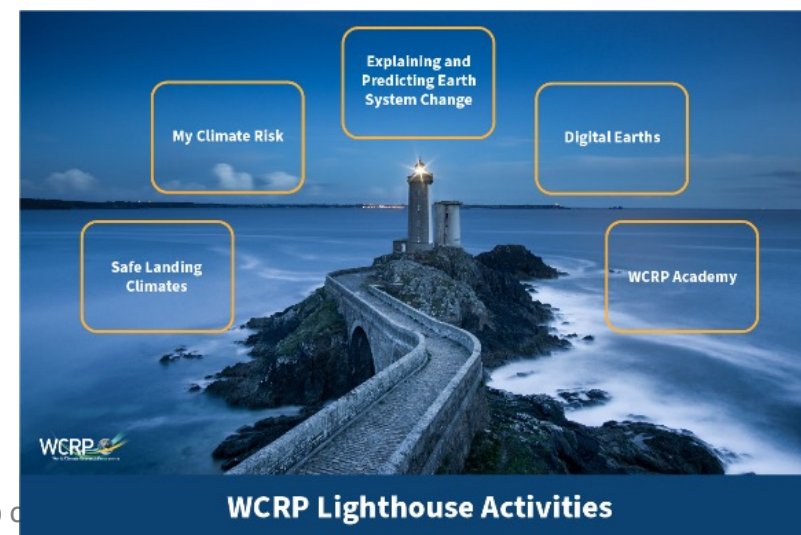
Regional Information for Society (RIFS)

Stratosphere-troposphere Processes And their Role in Climate (SPARC)

Atmospheric processes  
(composition, coupling,  
transport for the whole  
atmosphere)



Climate Science for Society





**SPARC**  
Stratosphere-troposphere  
Processes And their Role in Climate

# SPARC Scientific Steering Group 2022



## SPARC SSG co-chairs



Amanda Maycock (UK)



Gufran Beig (IND)



Karen Rosenlof (USA)



Harry Hendon (AUS)



Seok-Woo Son (KOR)



Viktoria Sofieva (FIN)



Andrea Carril (ARG)



Takeshi Horinouchi (JPN)



Sophie Szopa (FRA)



Wen Chen (CHN)



Nathaniel Livesey (USA)



Wenshou Tian (CHN)



Nili Harnik (ISR)



Michael Prather (USA)



Don Wuebbles (USA)

## SPARC SSG members

### Designated SPARC SSG members

(from January 2023): Marc von Hobe (GER), Martin Jucker (AUS)  
Some other changes expected in 2023





**We are celebrating our  
30<sup>th</sup> anniversary**

## **Anniversary Webinar Series**

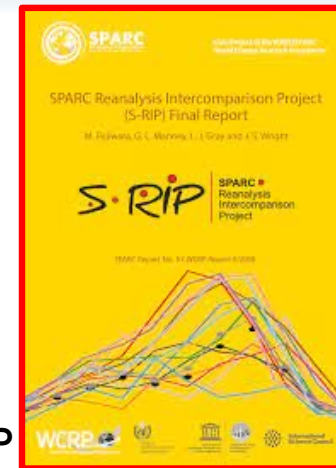
21 April 2022: **Susan Solomon**,  
Evolving Challenges in  
Stratospheric Processes and their  
Role in Climate

13 June 2022: **Ted Shepherd**,  
Understanding the role of  
atmospheric circulation in climate  
variability and change

7 October 2022: **Thomas Peter**,  
Research on climate intervention  
by stratospheric aerosol injection  
(SAI) – should SPARC engage?”

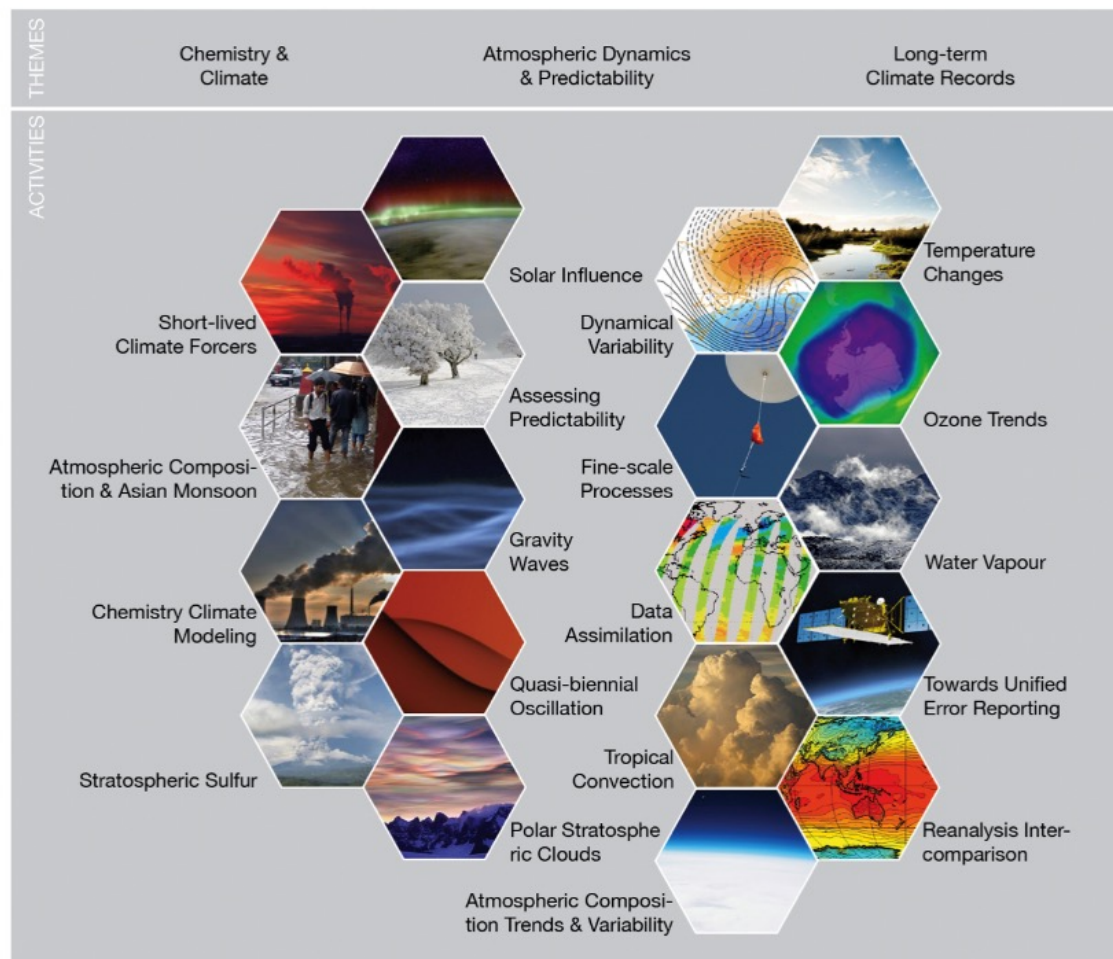
Talks on line at <https://www.sparc-climate.org/meetings/sparcs-30th-anniversary-webinar-series/>

- 15 SPARC activities – this is where the science happens.
- SPARC activities formed when new science questions arise.
- SPARC activities
  - develop reports (published by SPARC)
    - latest: S-RIP report (**SPARC Report No. 10**).
  - generate community papers and special journal issues.
  - contribute to assessment panels such as IPCC and the UNEP WMO Ozone assessments.



- Most SPARC activities are self-organised with ideas coming from the research community, and provide network opportunities centred on topical research.
- Capacity building through involvement of ECRs in activity leadership, organisation of training schools, travel support opportunities for ECRs.
- SPARC has established collaborations with other communities, e.g., other WCRP core projects, WWRP (in particular with S2S), GAW, IGAC, Future Earth.

- 15 SPARC activities – this is where the science happens.



- **Atmospheric Composition and the Asian Summer Monsoon (ACAM)\***
- **Assessing predictability (SNAP) \***
- **CCM initiative (CCMI) \***
- **Composition Trends And Variability in the UTLS (OCTV-UTLS) \***
- **Dynamical variability (DynVar) \***
- **Fine-scale Processes (FISAPS)**
- **Gravity waves \***
- **Ozone Trends (LOTUS)**
- **Quasi-biennial oscillation (QBOi) \***
- **Reanalysis intercomparison (S-RIP)\***
- **Solar influence (SOLARIS-HEPPA)**
- **Stratospheric sulfur (SSiRC) \***
- **Temperature changes (ATC)**
- **Towards Unified Error Reporting (TUNER)**
- **Tropical Convection (SATIO-TCS) \***

\* **Activities with modelling expertise and/or interest**

(note, this does not include all SPARC science activities)

- ACAM: held a summer school geared towards educating early career scientists.
- ATC: homogenized temperature records (from radiosonde) RICH and RAOBCORE, collaborative effort on updating the Earth heat inventory.
- CCMI: coordinating model runs for use in the WMO ozone assessment 2026.
- LOTUS: O3 trend results contributed to WMO ozone assessment 2022.
- DYNVAR & SNAP & SATIO-TCS: 3 activities that study different aspects of Strat/Trop coupling over a range of scales.
- Gravity waves: Hunga Tonga wave study (Wright et al, Nature, June 2022)
- SRIP: completed a comprehensive assessment of reanalysis that include the stratosphere
- OCTAV-UTLS: mapping UTLS constituent data onto dynamical and thermodynamical coordinates to better understand reasons for variability and trends
- Solaris-Heppa: Solar influences on climate, just started a new study using CMIP runs to assess the contribution of solar forcing to decadal climate variability and decadal climate prediction skill.

- SPARC is in the process of formalizing a new strategy/5 year plan. Discussions are ongoing this week and next with the Scientific Steering Group to assess how to best organize for this new strategy. The region of interest has expanded from beyond the stratosphere, and the new strategy and possibly new name will reflect this.



## 7<sup>th</sup> SPARC General Assembly

**SPARC 2022**  
**7<sup>th</sup> General Assembly**  
24<sup>th</sup> to 28<sup>th</sup> October, at three locations  
Boulder, USA · Reading, UK · Qingdao, China  
Multi-hub for a lower carbon footprint

[www.sparc-climate.org](http://www.sparc-climate.org)



- Three Hubs to lower carbon footprint.
- >300 submitted abstracts
- 6 scientific themes
- 16 confirmed invited speakers



*To continue building our scientific understanding of the atmosphere, illuminating the dynamical, physical, chemical and radiative processes, and their connections to the climate system and the health of our planet. SPARC recognizes the need to demonstrate societal benefits from science.*

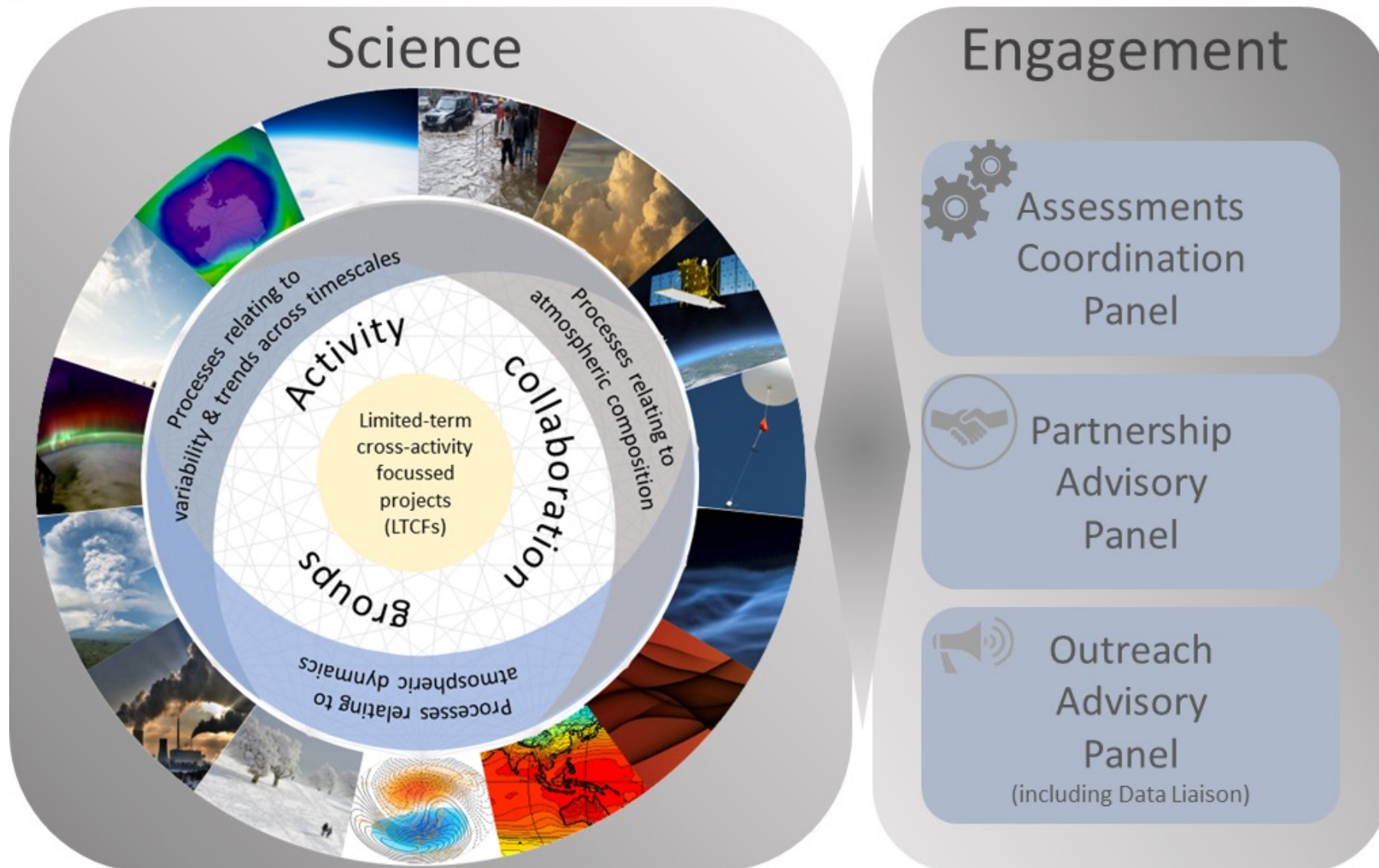




*Atmospheric and climate sciences are increasingly becoming a focus of decision-making across policy, research, and industry, and of interest to the public. SPARC supports the scientific and user/policy communities in addressing science questions relevant to our changing planet. SPARC takes on the mission of building the atmospheric science community's strengths in four key areas:*

- (i) critical analyses and reviews of emerging scientific topics for international assessments;*
- (ii) cross/transdisciplinary science projects that connects researchers across borders and domains, linking atmospheric science to other Earth system science;*
- (iii) community development and capacity building of international and early/mid-career scientists with development opportunities to participate in and lead projects;*
- (iv) publicity and outreach for the atmospheric sciences to building an informed public and inspiring a new generation of climate scientists.*

## SPARC co-chairs & Steering group





- SPARC in the past has contributed to international assessments  
*in particular IPCC and WMO Ozone, those will continue in the future*
- SPARC has also done independent assessments; to date there are 10 covering atmospheric constituents and processes.
- SPARC is moving away from a sole focus on stratospheric expertise with activities including stratosphere and mesospheric processes.
- SPARC is trying to move towards a panel-structure to facilitate collaborations, manage output for assessments and enhance outreach activities.
- Changes may include having fewer long term individual activities and will continue short-term initiatives to work on specific timely topic.

*Past examples include the Carbon Tetrachloride report, the ClO dimer report, and the ODS Lifetimes report.*

*Currently under consideration, an organized study on the atmospheric impacts of the Hunga-Tonga eruption (Jan 2022)*