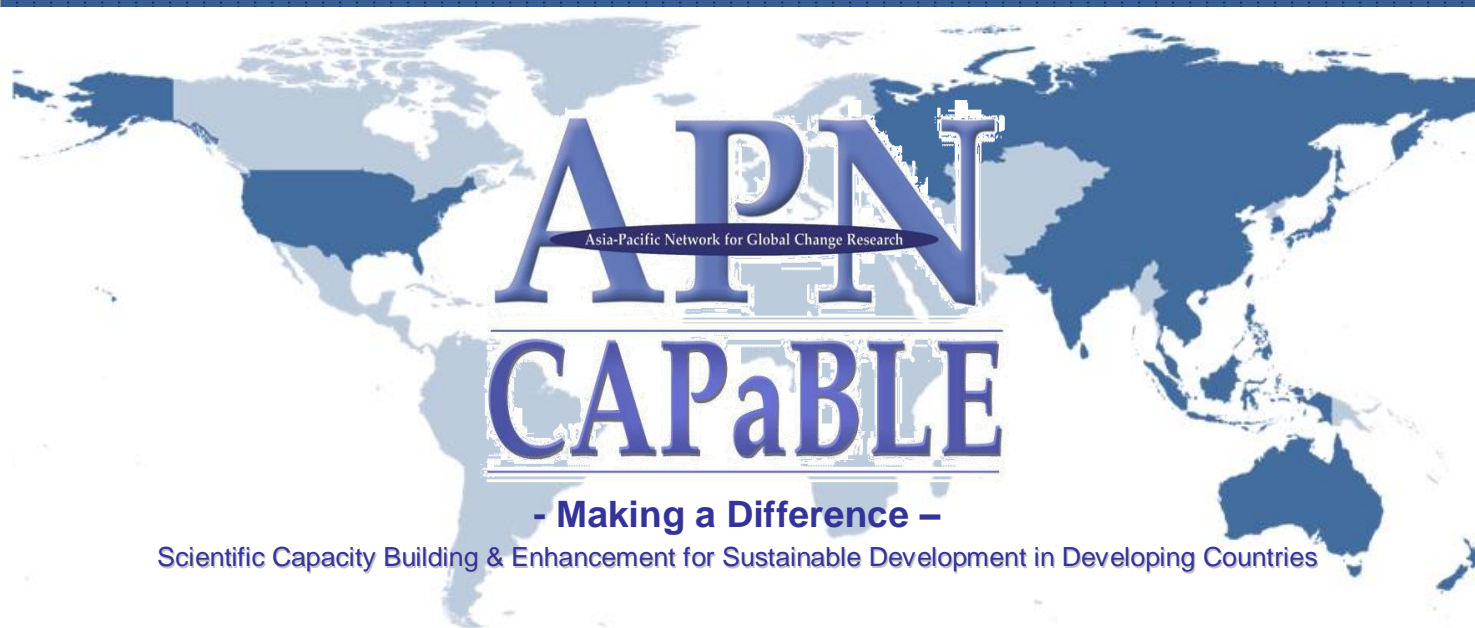


# FINAL REPORT FOR APN-FUNDED PROJECT

Project Reference Number: CBA2013-17NSY-Bodeker

## ***SPARC (Stratosphere-troposphere Processes And their Role in Climate) General Assembly 2014***



The following collaborators worked on this project:

Dr Greg Bodeker, Bodeker Scientific, New Zealand,  
[greg@bodekerscientific.com](mailto:greg@bodekerscientific.com)

Emma Scarlet, Bodeker Scientific, New Zealand,  
[emma@bodekerscientific.com](mailto:emma@bodekerscientific.com)





Project Reference Number: CBA2013-17NSY-Bodeker

***SPARC (Stratosphere-troposphere Processes And their Role in Climate) General Assembly 2014***

Final Technical Report Submitted to APN

# Overview of Project Work and Outcomes

## 1. Non-technical Summary

The SPARC (Stratosphere-troposphere Processes And their Role in Climate) 2014 General Assembly was held from 12 to 17 January 2014 in Queenstown, New Zealand. It was the fifth gathering of SPARC scientists from around the globe, and attracted nearly 300 delegates. General Assemblies are opportunities for SPARC to take stock of what has been achieved, where gaps in the portfolio of research undertaken by SPARC need to be filled, and to define where SPARC needs to be moving to remain responsive to the needs of both its members and the users of SPARC research products.

### Keywords (Five Maximum Keywords):

- Capacity development
- Stratosphere-troposphere
- Climate

## 2. Objectives

The main objectives of the project were to:

1. Support the attendance of PhD students and early career scientists from developing countries and countries with economies in transition in the Asia-Pacific region to the 5<sup>th</sup> SPARC General Assembly, and by doing so...
2. Entrain regional research capability,
3. Foster regional engagement in SPARC research (e.g. SPARC has a growing interest in processes linking tropospheric and stratospheric change in the tropical Western Pacific), and
4. Ensure that SPARC is cognizant of the research needs of communities in the Asia-Pacific region.

## 3. Grant Received and Number of Years Supported

The grant awarded to this project was: USD 20,000. This was to support the attendance of four scientists at the 5<sup>th</sup> SPARC General Assembly, i.e.: no ongoing financial support was requested.

## 4. Activities Undertaken

The 5<sup>th</sup> SPARC General Assembly was held in Queenstown, New Zealand from 12 to 17 January 2014.

## 5. Results

The proposal for APN funding was submitted by the applicants on 9 August 2013. On 30 August 2013 the applicants were told that the outcome of the application for APN funding would be made known on 1 or 2 October 2013. This was confirmed in an email on 27 September and the applicants proceeded, on the basis of that assurance, to make plans for

funding selected PhD students to attend the conference. On 2 October 2013 the applicants were asked to 'submit a full proposal' which was done within 24 hours. On 30 October the applicants were told that 'The results will be with us very soon'. On 11 November, two months prior to the conference, the applicants were told 'The money is waiting; we had to get official review done by our CDC. Is it possible for you to front 20,000USD until this process is complete?' On 19 November 2013 there applicants were told 'The contract document is almost ready to send, I only need to get APN director signature. Unfortunately, our director will be back on office in 29 November. Therefore your contract document will be sent to you on 29 November via FedEx'. It was also on this date that APN agreed to the list of recipients of funding that had been earlier proposed. The applicants were instructed by APN to proceed with informing the recipients, which was immediately actioned. On 1 December, 6 weeks prior to the start of the conference, the applicants were told 'I would like to inform you that APN have finished preparing the contractual documents for your CAPaBLE project entitled *SPARC (Stratosphere-troposphere Processes And their Role in Climate) General Assembly 2014* with the project reference number: CBA2013-17NSY-Bodeker'. The applicants finally received the contract on 12 December 2013, 1 month prior to the conference. The applicants immediately signed and returned the contract.

As a result of the delays in APN procedures documented above, and the resultant delay in the recipients of the APN funding applying for visas, one of the four recipients (Mizanur Rahman) was not able to attend the conference at all, while a second (Negar Banan) was able to attend only part of the conference. Non-refundable air tickets had already been purchased and so these expenses could not be reclaimed. Fortunately two of the recipients of this funding were able to attend the entire conference while a third was able to attend half of the conference. We believe that all three APN funded attendees benefitted significantly from their attendance.

## **6. Relevance to the APN Goals, Science Agenda and Policy Processes**

SPARC is one of four core projects of the World Climate Research Programme (WCRP) and this General Assembly was strongly supported and endorsed at the May 2013 meeting of the Joint Scientific Committee (JSC) of the WCRP in Brasilia.

In the prelude to the implementation of the Global Framework for Climate Services (GFCS), SPARC aimed to engage with scientists active in stratospheric and climate change research in the Asia-Pacific region, and in particular with those from developing countries in the region to ensure that GFCS serves regional communities.

Attendance of such scientists at the SPARC General Assembly provided an opportunity to strengthen regional and international working relationships and to develop regional capability in climate science. The conference profiled the latest research results on relevant areas of societal concern, including climate change and climate variability. One focus of this meeting was to also provide research that is tailored to address the needs of policymakers who, in turn, use this research to guide the development of international policy for the protection of the climate system and to ensure a sustainable global environment.

## **7. Self-evaluation**

The 5<sup>th</sup> SPARC General Assembly, by all accounts, was one of the most successful held to date. There were no major problems in the running of the meeting and all stated objectives were achieved. The applicants for this APN funding did everything in their power to ensure

that the recipients of the APN funding were fully supported in making their travel arrangements, applying for visas etc.

## **8. Potential for Further Work**

At the time of the SPARC General Assembly 2014, SPARC was in the process of defining its capacity development activities. Initial discussions at SPARC Scientific Steering Group meetings revealed that there is a need in different parts of the world to develop scientific expertise in SPARC-related ongoing and emerging activities, which are mostly linked to climate predictions and the roll-out of climate services.

The SPARC Scientific Steering Group together with the SPARC Office organised a lunchtime Capacity Building Workshop during the SPARC General Assembly 2014. This workshop was organised with the aim of shaping SPARC's strategy in capacity development. The workshop speakers, originating from different continents, presented their views on the following questions:

- What is your definition of capacity development with respect to your country or region?
- What activities are going on in your country or region that are SPARC related; if only little is going on what can SPARC do?
- Why should SPARC get involved in capacity development?
- What type of capacity development activities should SPARC support; and what would be the added values of these activities to national-level activities?
- How do you think SPARC could link with local/domestic structures?

One of the outcomes of the workshop was a clear indication of the need for capacity building in SPARC. The SPARC Project Office is now conducting an online survey amongst participants of the SPARC General Assembly to further develop this activity.

## **9. Publications**

A brief summary of the 5<sup>th</sup> SPARC General Assembly was published in the January 2014 edition of the SPARC Newsletter, which is available on the SPARC website at <http://www.sparc-climate.org/publications/newsletter>.

A more in-depth report was published in the July 2014 edition of the SPARC Newsletter which is also available via the SPARC Website.

## **10. References**

Not applicable.

## **11. Acknowledgments**

WCRP Joint Planning Staff

SPARC International Project Office

- J. Staehelin

- C. Arndt
- L. Revell
- F. Tummon
- A. Witten

Local Organising Committee:

- G. Bodeker
- E. Scarlet
- K. Kreher
- S. Kremser

Scientific Organising Committee:

- V. Eyring
- A. Scaife
- J. Arblaster
- D. Fahey
- J.-F. Lamarque
- M. Santee
- K. Sato
- P. Young

Our Sponsors:

- Platinum – WCRP
- Gold – WMO, WIGOS, GAW, WWRP, NSF, APN
- Silver – CSA, ARC, NIWA, ESA, SPARC Project Office
- Bronze – Antarctic New Zealand, COSPAR, Tofwerk, Aerodyne Research, Bodeker Scientific, Macquarie University, and the University of Otago

# TECHNICAL REPORT





## Preface

From 12-17 January 2014, nearly 300 scientists from around the world participated in the 5<sup>th</sup> SPARC General Assembly. Held in picturesque Queenstown, New Zealand, the conference provided a unique platform for interdisciplinary exchange of science related to 'Stratosphere-troposphere Processes And their Role in Climate'.

Thanks to generous sponsorship from APN, the following PhD students from the Asia-Pacific region received financial support to attend the General Assembly:

- Negar Banan, Malaysia
- Ete Krishna, India
- Yuli Zhang, China
- Mizanur Rahman, Bangladesh

Unfortunately, Mizanur Rahman was unable to obtain a visa in time, and was therefore not able to attend the conference.



## Table of Contents

Preface .....	1
Table of Contents.....	2
1. Introduction.....	3
2. Methodology .....	3
3. Results & Discussion .....	4
4. Conclusions .....	24
References .....	24
Appendix.....	25

## 1. Introduction

The SPARC 2014 General Assembly was a 5½ day international conference that was held in January 2014 in Queenstown, New Zealand. This conference provided an opportunity to improve SPARC engagement with researchers from developing countries in the Asia-Pacific region and foster links with the regional WCRP community. SPARC's growing interest in climate processes in the tropical Western Pacific and role in delivering action oriented research through the GFCS creates an imperative to establish research collaborations with scientists in the region.

SPARC aims to engage with scientists active in stratospheric and climate change research in the Asia-Pacific region, and in particular with those from developing countries in the region to ensure that GFCS serves regional communities. Attendance of such scientists at the SPARC General Assembly provided an opportunity to strengthen regional and international working relationships and to develop regional capability in climate science. The conference profiled the latest research results on relevant areas of societal concern, including climate change and climate variability. One focus of this meeting was to also provide research that is tailored to address the needs of policymakers who, in turn, use this research to guide the development of international policy for the protection of the climate system and to ensure a sustainable global environment.

The main objective of the APN funding application was to support the attendance of PhD students and early career scientists from developing countries and countries with economies in transition in the Asia-Pacific region to the 5<sup>th</sup> SPARC General Assembly. This was done with the goal of entraining regional research capability, fostering regional engagement in SPARC research (e.g. SPARC has a growing interest in processes linking tropospheric and stratospheric change in the tropical Western Pacific), and ensuring that SPARC is cognizant of the research needs of communities in the Asia-Pacific region.

Entraining PhD students and early career scientists from developing countries and countries with economies in transition in the Asia-Pacific and South Pacific regions in SPARC's core activities is not only highly motivating for such scientists, but also ensures that when SPARC conducts research in the region e.g. measurement campaigns, that these activities are not conducted in isolation but rather link to local communities of scientists who have the skills and expertise to make a material contribution to SPARC research.

Regional capacity development also ensures that as the WCRP delivers research through the GFCS, that research products can be appropriately assimilated by regional communities in decision making processes. By supporting the attendance of young and enthusiastic researchers from the Asia-Pacific and South Pacific regions to this conference, we have helped to ensure that the necessary links and collaborations are formed to produce these expected outcomes.

## 2. Methodology

Scientists from the Asia-Pacific and South Pacific regions were able to seek funding to attend the SPARC General Assembly at the time of abstract submission. The conference scientific organising committee, together with the General Assembly management team, determined acceptance of abstracts and rated the applications for travel support based on the following criteria:

1. Scientific excellence based on SPARC-set criteria that meet the objectives of the activity.

2. Candidate has a PhD preferably, masters minimum.
3. Early career scientist (preferably under 40, but if the scientist can demonstrate that he/she received his/her PhD/Masters after 2008 then they would be considered early-career).
4. From an APN developing member country and regional balance preferred: Bangladesh, Bhutan, Cambodia, China, Fiji, India, Indonesia, Lao PDR, Malaysia, Mongolia, Nepal, Pakistan, Philippines, Russia (far-east preferred), Sri Lanka, Thailand, Viet Nam. Partial funding may be considered for developed-country scientists who meet all the other criteria: Australia, USA, New Zealand, Republic of Korea and Japan.
5. Approved developing countries may also be considered: Myanmar, Maldives, Pacific Islands.
6. Developing country members must be considered first.

A set of selected attendees and their financial requests, matching the total funding commitment from APN, was then forwarded to APN for approval which occurred on 29 November 2013.

### 3. Results & Discussion

The three delegates supported by APN funding attended the following oral presentations:

#### Theme 1 - Atmospheric Chemistry, Aerosols and Climate

Surname	First Name	Presentation Title
Chao	Li	The hiatus in global surface warming over 1998-2011
Collins	William	Near-term Climate Forcing
English	Jason	Aerosol size distributions after large volcanic eruptions evolve in a complex manner
Keeble	James	The impact of polar stratospheric ozone loss on southern hemisphere stratospheric circulation and surface climate
Langematz	Ulrike	Pre-1980 Antarctic ozone depletion in chemistry-climate models and observations
Neely	Ryan	Recent anthropogenic increases in SO <sub>2</sub> from Asia have minimal impact on stratospheric aerosol
Neu	Jessica	Ozone response to variability in the stratospheric circulation: The role of ENSO and the QBO and relationship to long-term changes
Pyle	John	Atmospheric Halogens: Model simulations of VSLs and long-lived ODS
Reichler	Thomas	Chemical/dynamical interactions and consequences for climate
Schmidt	Hauke	Stratospheric implications of climate engineering through solar radiation management
Stephens	Graeme	Cloud/aerosol Interactions inferred from Satellite Observations
Tummon	Fiona	Separating the influences of climate and chemistry on future lifetimes of ozone-depleting substances: no indication of much shortened lifetimes

## Theme 2 - Stratosphere-Troposphere-Ocean Dynamics and Predictability of Regional Climate

Surname	First Name	Presentation Title
Baldwin	Mark	The Stratospheric Plunger
Bitz	Cecilia	Fast and slow response of sea ice and the Southern Ocean to ozone depletion
Butler	Amy	Reconsidering the traditional definition for stratospheric sudden warmings
Gerber	Ed	Understanding and Predicting the Brewer-Dobson circulation
Karpechko	Alexey	Modeling Tropospheric Impacts of the Arctic Ozone Depletion 2011
Krüger	Kirstin	Do Large Tropical Volcanic Eruptions influence the SAM?
Murphy	Damian	Inertial Gravity Waves in the Antarctic Stratosphere
Nishii	Kazuaki	Blockings and Upward Planetary-Wave Propagation into the Stratosphere
Shaw	Tiffany	Dynamical coupling between the stratosphere and troposphere
Smith	Doug	Role of the Stratosphere in Seasonal and Decadal prediction
Son	Seok-Woo	Interannual variation of the Antarctic ozone hole and its implication for seasonal prediction
Waugh	Darryn	Changes in the ventilation of the southern oceans due to stratospheric ozone depletion

## Theme 3 - Coupling to the mesosphere and upper atmosphere

Surname	First Name	Presentation Title
Funke	Bernd	Solar Impacts on Climate
Manney	Gloria	Satellite Observations of Extreme Events In the Polar Middle Atmosphere
McLandress	Charles	Constraining gravity wave drag parameterizations using a chemistry climate model nudged to reanalysis data
Smith	Anne	Dynamical Coupling Between the Middle Atmosphere and Lower Thermosphere
Vincent	Robert	Studies of Stratospheric Gravity Waves Using Superpressure Balloons

## Theme 4 - Observational datasets, reanalyses, and attribution studies

Surname	First Name	Presentation Title
Compo	Gilbert	Developing the 20th Century Reanalysis version 3 (1850-2013)
Fujiwara	Masatomo	Global Response to the Major Volcanic Eruptions in 9 Reanalysis Datasets
Karoly	David	Detection and Attribution Studies of the Role of the Stratosphere in Recent Climate Changes
Rosenlof	Karen	Long-Term Changes in Stratospheric Constituents
Stiller	Gabriele	The SPARC Water Vapor Assessment II -- Quality assessment of water vapor data records from satellites
Stolarski	Richard	The Search for Ozone Recovery Using 36 years of SBUV

		Satellite Data
Tarasick	David	A Re-Evaluated Canadian Ozonesonde Record: Changes in the Vertical Distribution of Ozone Over Canada from 1966 to 2012
Weber	Mark	Ozone Trends and Variability in a Changing Climate

### Theme 5 - Tropical Processes

Surname	First Name	Presentation Title
Bunzel	Felix	Long-term changes in the Brewer-Dobson Circulation: the role of the residual circulation and mixing
Fueglistaler	Stephan	The relation between water entering the stratosphere and the strength of the diabatic residual circulation
Gettelman	Andrew	Representation of Tropical Clouds, Dehydration and the Tropopause Layer in global models
Johansson	Erik	The Cloud Radiative Heating in the Upper Troposphere Lower Stratosphere over the Indian Subcontinent
Kim	Ji-Eun	Benefits of a New Wave Scheme for Trajectory Modeling of Stratospheric Water Vapor
Legras	Bernard	Transport across the TTL
Mohanakumar	Keasava	The Relationship of the Asian Summer Monsoon to the Tropical Upper Troposphere and Lower Stratosphere
Nath	Debashis	Decadal changes in PV intrusion events and its impact on deep convection over the tropics from climate change perspective
Schofield	Robyn	Mass Fluxes and Detrainment Rates Over the Maritime Continent: Implications for Stratospheric Composition
Taguchi	Masakazu	Tropical and extratropical connections associated with QBO and ENSO

### Theme 6 – Emerging and Outstanding Research of Relevance to SPARC

Surname	First Name	Presentation Title
Jakob	Christian	Long-Standing Errors in Climate Models
Meehl	Gerald	IPCC AR5: Projections, Predictions and Progress Since AR4
Sausen	Robert	Impact of Aviation on Atmospheric Composition and Climate
Seidel	Dian	Temperature Trends: Our Evolving Understanding
Shepherd	Ted	Polar Climate Predictability
Sherwood	Steven	Dynamical Cloud Feedback Mechanisms



In addition, they had the opportunity to view the following poster presentations:

### Poster Session A: Atmospheric Chemistry, Aerosols & Climate

<b>Surname</b> (of 1 <sup>st</sup> author)	<b>First Name</b>	<b>Title</b>	<b>Presented By</b>
Akiyoshi	Hideharu	A nudged CTM simulation for chemical constituent distribution during the stratospheric sudden warming observed by SMILES in 2010	
Belter	Christopher	A Bibliometric Analysis of Climate Engineering Research	Dian Seidel
Berthet	Gwenael	Effect of the 2009 Sarychev volcano eruption on chemistry of the lower stratosphere: balloon-borne observations and model calculations	
Bodeker	Greg	A semi-empirical model of the stratosphere in the Antarctic climate system	
Bozem	Heiko	Unaccounted ozone source in the upper troposphere	
Brühl	Christoph	Stratospheric aerosol including volcanoes simulated with the EMAC model: effects on radiation, dynamics and heterogeneous chemistry	
Butchart	Neal	The Chemistry-Climate Modelling Initiative: Evaluation and preliminary projections from HAdGEM3 simulations	
Cameron-Smith	Philip	The Impact of Methane Clathrate Emissions on the Earth System	
Coulon	Ancelin	What are the drivers of interannual fluctuations of atmospheric methane	
Dessler	Andrew	The stratospheric water vapor feedback	Karen Rosenlof
Eckman	Richard	Enhancing Integrated Earth Observations of the Composition of the Atmosphere: The Role of the CEOS Atmospheric Composition Constellation	
Engel	Ines	Heterogeneous Formation of Polar Stratospheric Clouds - Nucleation of Ice on Synoptic Scales	
Hansen	Ayoe Buus	Analysis of precipitation data from the NIWA-UKCA climate runs	
Hasebe	Fumio	Update on the Soundings of Ozone and Water in the Equatorial Region (SOWER) through the Year 2014	
Holmes	Christopher	Where is the equator? The geography of atmospheric chemistry	
Hoyle	Christopher	Heterogeneous Formation of Polar Stratospheric Clouds - Nucleation of Nitric Acid Trihydrate (NAT) in the Arctic Stratosphere	Ines Engel
Jaroslowski	Janusz	50 Years of Measurements of Tropospheric Ozone at Northern Midlatitude Site (51.83°N, 20.78°E) - Belsk, Poland; Dobson	



		Umkehr Data Recalculated by the Neural Networks Method	
Jégou	Fabrice	Volcanic SO <sub>2</sub> emissions in the stratosphere from 1979 to 2009	
Jiang	Zhe	Impacts of Model Errors on Global Estimates of CO and CH <sub>4</sub> inferred from MOPITT and TES datasets	
Kadowaki	Masanao	Relationship between Ozone Chemical Forcing and Wave Activities for the Period 1990-2011 using the MICROC3.2 nudged CTM	
Karpechko	Alexey	The Link between Springtime Total Ozone and Summer UV Radiation in Northern Hemisphere Extratropics	
Lenton	Andrew	Modulation of Southern Hemisphere climate drivers by large-scale geoengineering	Steven Phipps
Li	Qian	Distribution and variation of biomass burning tracers CO, HCN, and CH <sub>3</sub> CN in UTLS	
Lopez-Comi	Laura	Assessment of Short-Lived Unobserved Radicals at Lauder Using a Photochemical Steady-State Single-Column Model	
Mann	Graham	Whole-atmosphere aerosol microphysics simulations of the Mt. Pinatubo eruption: evaluation of simulated aerosol properties, assessment of radiative effects and uncertainty quantification via Gaussian emulation	
McLandress	Charles	Quantifying the radiative impacts of CFCs on past changes in temperature and dynamics in the UTLS using a chemistry-climate model	
Meul	Stefanie	Attribution of Ozone Changes: Nonlinear Interactions between Ozone Depleting Substances and Greenhouse Gases	
Nakajima	Hideaki	Relationship between PSC types and ozone destruction rate quantified from CALIPSO and MLS data	
Oberländer	Sophie	Unravelling impact factors for past changes of the Brewer-Dobson Circulation from simulations with the CCM EMAC	
Oman	Luke	The impact of new estimates of mixing ratio and flux- based halogen scenarios on ozone evolution	Darryn Waugh
Orbe	Clara	Seasonal Ventilation of the Stratosphere: Robust Diagnostics from One-Way Flux Distributions	
Osprey	Scott	The climate response following injection of aerosol into the tropical stratosphere: The role of a well-resolved stratosphere	
Park	Mijeong	Global Trends of CHClF <sub>2</sub> (HCFC-22) and CCl <sub>3</sub> F (CFC-11) estimated from ACE-FTS, HIPPO and WACCM4	
Patra	Prabir	Simulation of major GHGs and ODSs using chemistry-transport model	

Pitts	Michael	Radiative Forcing of Polar Stratospheric Clouds: Seasonal and Interannual Variability of PSC Optical Depth	
Portmann	Robert	Stratospheric water vapor in coupled models: assessing the feedback strength	
Reichler	Thomas	Stratosphere-Ocean Coupling	
Revell	Laura	How will air pollution and climate change impact global tropospheric ozone in the 21st century?	
Rex	Markus	Is There a Hole in the Global OH Shield Over the Tropical Western Pacific Warm Pool?	
Rex	Markus	The SPARC Stratospheric Sulfur and Its Role in Climate (SSiRC) Activity	
Ricaud	Philippe	Chemical Climate Evolution above the Mediterranean Basin	
Ricaud	Philippe	Variability of Tropospheric Methane above the Mediterranean Basin inferred from Satellite and Model Data	
Riese	Martin	On the relationship between age-of-air changes and changes in residual circulation and eddy mixing	
Sakazaki	Takatoshi	Diurnal variations in stratospheric O <sub>3</sub> and HCl as observed by the Superconducting Submillimeter-Wave Limb-Emission Sounder (SMILES)	
Schwartz	Michael	High water vapor and associated signatures from MLS in the mid-latitude summer lowermost stratosphere: Implications for posited ozone destruction	Michelle Santee
Seidel	Dian	Detection of Climate Engineering Activities by the Global Observing System Is Limited by Earth System Variability	
Sekiya	Takashi	ENSO variability and future change of ozone in troposphere and lower stratosphere	
Shang	Lin	Direct and Indirect Effects of Solar Variations on Stratospheric Ozone and Temperature	
Sheng	Jianxiong	Global Sulfur Budget and Sensitivity Studies of Anthropogenic SO <sub>2</sub> Emissions: Results from a Coupled Sulfate Aerosol-Chemistry-Climate-Model	Thomas Peter
Sheng	Jianxiong	Impact of Coagulation Efficiency in Simulations of Mt Pinatubo Eruption Using a Coupled Sulfate Aerosol-Chemistry-Climate-Model	Thomas Peter
Shiotani	Masato	Middle atmospheric sciences using data from the Superconducting Submillimeter-Wave Limb-Emission Sounder (SMILES)	Makoto Suzuki
Sugita	Takafumi	Lower stratospheric correlation between O <sub>3</sub> and HCl as observed by SMILES in the southern high latitudes	
Sukhodolov	Timofei	Representation of the solar signal by radiation codes of the ECHAM family	Thomas Peter

Sukhodolov	Timofei	Validation of the photolysis rate response to the solar irradiance variability	Thomas Peter
Suzuki	Makoto	VSLs BrO Estimation from JEM/SMILES BrO Observation	
Tegtmeier	Susann	The role of oceanic halogen and sulfur compounds for the middle atmosphere	
Thölix	Laura	FinROSE chemistry transport model simulations of the variability and trends of water vapour in the Arctic stratosphere	Alexey Karpechko
Toohey	Matthew	The dynamical response to volcanic aerosol: climate model sensitivity to prescribed volcanic forcing set	Kirstin Krueger
von Hobe	Marc	Polar Stratospheric Ozone in a Changing Climate: Closing the Knowledge Gaps	
Williams	Jason	Multi-model assessment of the sensitivity of the tropical upper troposphere ozone towards regional biogenic emissions estimates	Guang Zeng
Wohltmann	Ingo	How is chlorine activation affected by the composition of Polar Stratospheric Clouds and background aerosol particles?	Markus Rex
Woiwode	Wolfgang	Studies on mesoscale chemical and dynamical structures in the Arctic winter/spring 2010 UTLS region with MIPAS-STR	Hermann Oelhaf
Woodhouse	Matthew	Introduction and evaluation of the ACCESS-UKCA chemistry-climate model	
Xiang	Bin	Recent Global Emission Patterns of Refrigerants HCFC-22 and HFC-134a	Prabir Patra
Zeng	Guang	Multi-model assessment of the impact of biogenic emissions on the composition of the troposphere in the Southern Hemisphere	
Ziska	Franziska	Global VSLs Emission Estimates based on in-situ Measurements for the Past and Future	Kirstin Krueger

**Poster Session B: Stratosphere-Troposphere-Ocean Dynamics and Predictability of Regional Climate**

<b>Surname</b>	<b>First name</b>	<b>Title</b>	<b>Presented by</b>
Albers	John	Gravity Wave Effects on Polar Vortex Geometry During Split-Type Sudden Stratospheric Warmings	
Alexander	M. Joan	Missing Gravity Waves and Southern Hemisphere Wind Biases in Climate Models: What can observations tell us?	
Alexander	Simon	Sources, variability and wave mean-flow interactions of tropospheric gravity wave activity at Davis, Antarctica (69S, 78E)	
Anstey	James	Relations between tropospheric blocking and the stratospheric polar vortex in an ensemble of climate models	

Arblaster	Julie	Untangling the role of ozone versus GHGs in SH climate change	
Ayarzagüena	Blanca	The relevance of blocking highs for stratospheric variability in a changing climate	
Bal	Sourabh	Influence of Sudden Stratospheric Warmings on the Indian Summer Monsoon	
Barodka	Siarhei	Observational and Modelling Studies of the Short-Term Climate Influences of the Ozone Mechanism	Aliaksandr Krasouski
Bushell	Andrew	Representation of convectively forced gravity waves and their impact on the upper troposphere and stratosphere of the Met Office GCM	
Calvo	Natalia	Differences in Ozone Recovery and its Climate Impact under different	Anne Smith
Charlton-Perez	Andrew	The Stratospheric Network for the Assessment of Predictability (SNAP)	Greg Roff
Chen	Wen	Solar Cycle Modulation of the ENSO Impact on the Winter Climate of East Asia	
Choi	Wookap	Determining the Date of the Polar-Vortex Breakup in the Stratosphere	
Das	Siddarth Shankar	Responsible mechanisms behind the short scale Stratosphere- troposphere exchange associated with cyclonic weather conditions	
de la Torre	Aledjandro	Wave activity at ionospheric and tropospheric-stratospheric heights above the Andes Mountains detected from FORMOSAT-3/COSMIC GPS radio occultation data	Torsten Schmidt
Dennison	Fraser	Annular Modes and Stratosphere-Troposphere Coupling in Chemistry-Climate Models	
Dinh	Tra	Cirrus, transport, and mixing in the tropical upper troposphere	
Domeisen	Daniela	Assessing seasonal predictability from stratospheric variability in a seasonal prediction system	
Foust	William E.	Quantifying the Uncertainty in Simulated Trends in the Stratospheric Circulation	
Garfinkel	Chaim	Connections between the Spring Breakup of the Southern Hemisphere Polar Vortex, Stationary Waves, and Air-Sea Roughness	
Gray	Lesley	A Lagged Response to the 11-year Solar Cycle in Observed Winter Atlantic / European Weather Patterns	
Haase	Sabine	The Importance of the Stratosphere for Atlantic Climate Variability	Rémi Thiéblemont
Hansen	Felicitas	Quantifying the Effects of Natural and Anthropogenic Factors on the NH Polar Winter Stratosphere	Rémi Thiéblemont
Hardiman	Steven	The Interaction Between Stratospheric Sudden Warmings and Ozone	
Hitchcock	Peter	The deterministic tropospheric response to a zonally-symmetrically induced	

		stratospheric sudden warming	
Hoffman	Lars	Stratospheric Gravity Wave Climatologies from AIRS and IASI Observations	
Hood	Lon	The Surface Climate Response to 11-Yr Solar Forcing: Observational Analyses, Comparisons With GCM Simulations, and Tests of the Stratospheric (UV-Ozone) Forcing Mechanism	
Hu	Jinggao	The Boreal Spring Stratospheric Final Warming and Its Interannual and Interdecadal Variability	
Hu	Yongyun	Eastward phase-shift of Southern-Hemisphere planetary waves in the lower stratosphere	
Hung	Ho Yeung	An Improved Idealized General Circulation Model for the Study of Stratosphere-Troposphere Coupling and the Seasonal Cycle of Tropical Upwelling	Edwin Gerber
Hurwitz	Margaret	Extra-Tropical Atmospheric Response to ENSO in the CMIP5 Models	
Hurwitz	Margaret	Modelling the Impacts of HFCs on Climate and Stratospheric Ozone: First Results	
Jrrar	Amna	Leading modes of variability in Antarctic climate: Covariance of ozone and sea-ice in AO-UMUKCA control integration	
Jucker	Martin	Importance of the radiative base state for the dynamical variability of the stratosphere	
Kohma	Masashi	Simultaneous Occurrence of Polar Stratospheric Clouds and Upper-tropospheric Clouds Caused by Blocking Anticyclones in the Southern Hemisphere	
Kozubek	Michal	Long term trends of middle latitude stratospheric winds from NCEP/NCAR	
Kuroda	Yuhji	Modulation of the Southern Annular Mode through UV change -a chemistry climate model simulation-	
Li	Feng	Impacts of Ocean-Atmosphere Coupling on Southern Annular Mode	Clara Orbe
Lubis	Sandro	Investigation of Reflective and Absorptive Winters and Their Impact on Ozone Levels in CESM-WACCM	Rémi Thiéblemont
Mahmood	Sana	Impact of the representation of the stratosphere on tropospheric weather forecasts	Andrew Bushell
Manzini	Elisa	Northern winter Climate Change: Uncertainty in CMIP5 projections related to Stratosphere - Troposphere coupling	
Misios	Stergios	Mechanisms mediating the 11-yr solar cycle influence on climate in the CMIP5 historical simulations	Dann Mitchell
Mitchell	Dann	The Influence of Stratospheric Vortex Displacements and Splits on Surface Climate	
Morgenstern	Olaf	Recent Antarctic Climate Change and Its Relation to Stratospheric Ozone Depletion	

		and Increases on Long-lived Greenhouse Gases	
Negar	Banan	Comparison of Surface Ozone Concentrations at Two Different Population Density Areas in Malaysian Peninsula	
Oelhaf	Hermann	Probing the UTLS from 65°S to 80°N with GLORIA	
Omrani	Nour-Eddine	Stratosphere key for wintertime atmospheric response to warm Atlantic decadal conditions	Rémi Thiéblemont
Osman	Marisol	Impacts on SH tropospheric circulation predictability of incrementing stratosphere vertical resolution in climate models	
Otsuka	Shigenori	A Numerical Experiment on Formation of Tropopause Inversion Layer Associated with an Explosive Cyclogenesis: Possible Role of Inertia-Gravity Waves	Shigeo Yoden
Parimisetty	Vishnu Prasanth	A Climatological study on LiDAR observations of middle atmospheric	
Peevey	Tanya	An analysis of Double Tropopause formation and its relationship to the Tropopause Inversion Layer during Stratosphere-Troposphere Exchange	
Peters	Dieter	Stratospheric and tropospheric circulation changes in response to a zonally asymmetric ozone field (ERA40) of the boreal stratosphere	
Plumb	Alan	Using age to diagnose the stratospheric circulation and its trends	
Preusse	Peter	Characteristic of gravity waves resolved in ECMWF analysis data	Martin Riese
Renwick	James	Southern Hemisphere circulation variability and Antarctic sea ice	
Scaife	Adam	Solar Variability Effects on Extratropical Surface Climate	
Scott	Richard	A new interpretation of the relation between QBO phase and stratospheric sudden warming frequency	
Seviour	William	A practical method to identify stratospheric polar vortex displacement and splitting events	
Shaw	Tiffany	On the control of the residual circulation and stratospheric temperatures in the Arctic by planetary wave reflection	
Sheshadri	Aditi	Stratospheric Final Warming Events and their Impact on the Troposphere	
Simpson	Isla	Understanding Climate Model Biases in Southern Hemisphere Mid- latitude Variability	Peter Hitchcock
Simpson	Isla	Zonal and Seasonal Variations in Future Predictions of the Mid-Latitude Circulation	Tiffany Shaw
Sjoberg	Jeremiah	The role of the tropopause region in the wave forcing of sudden stratospheric warmings	
Stephan	Claudia	Investigating the stratospheric gravity wave	



		response to storm characteristics over the US using WRF with validation by radar and satellite data	
Thiéblemont	Rémi	The difference of different sensitivity factors on the 11-year solar signal representation in CESM-WACCM	
Thiéblemont	Rémi	Variability of tracer transport in spring/summer Arctic stratosphere simulated by CESM-WACCM	
Vargin	Pavel	A case study of Major Sudden Stratospheric Warming in January 2013	
Vera	Carolina	The multi-scale nature of SAM influence on South America climate	Marisol Osman
Wang	Ling	Characteristics of lower stratospheric gravity waves during stratospheric sudden warmings from ray-tracing experiments and GPS radio occultation data	
Watson	Peter	How does the quasi-biennial oscillation affect the polar vortex?	
Watson	Peter	The stratospheric response to applied extratropical torques	
Williams	Paul	The effect of climate change on transatlantic aviation turbulence in the UTLS region	Manoj Joshi
Xia	Yan	SST Forced Stratospheric Warming over Southern-Hemisphere High Latitudes	
Yao	Weiye	Idealized Simulations of Sudden Stratospheric Warmings with an Ensemble of Dry GCM Dynamical Cores	Christiane Jablonowski
Zhang	Yehui	The impact of the tropopause inversion layer on the gravity wave activity	
Zhang	Yuli	Stratospheric Thermodynamics during the Seasonal Transition between Winter and Summer	
Zhou	Wen	The Characteristics of Wintertime Tropospheric Blocking over Ural- Siberia and Its Implication for East Asia Winter Monsoon	
Zülicke	Christoph	Performance of a gravity wave parameterization with moist baroclinic wave life cycle simulations	

### Poster Session C: Observational datasets, reanalyses, and attribution studies

Surname	First Name	Title	Presented by
Alexander	Simon	Tropospheric cloud properties at Davis, Antarctica (69S) and at Hobart, Australia (43S) measured with Rayleigh lidar	
Berthet	Gwenaél	In situ measurements of stratospheric aerosols from a new light optical aerosol counter with particle characterization capabilities	
Bodeker	Greg	Science highlights from the GCOS Reference Upper Air Network (GRUAN)	

Bowman	Kevin	Attribution of direct ozone radiative forcing to spatially resolved emissions	Jessica Neu
Braathen	Geir	Long term changes in the polar vortices	
Braesicke	Peter	How well can we model polar spring ozone variability in a CCM?	James Keeble
Bumke	Karl	Validation of fresh water fluxes in HOAPS and ERA-Interim reanalysis data over sea	Remi Thieblemont
Burrows	John Philip	Observations of vertical profile of Ozone from SCIAMACHY	
Davis	Sean	The SPARC Reanalysis Intercomparison Project (S-RIP): Initial comparisons of water vapour and ozone	Masatomo Fujiwara
Dean	Sam	Changes in South Pacific Blocking and the Influence on New Zealand and Antarctica	
Dhomse	Sandip	Stratospheric O3 changes during 2001±2010: the small role of solar flux variations in a CTM and a CCM	Graham Mann
Duruiseau	Fabrice	On the accuracy of stratospheric meteorological reanalyses using wind measurements at high altitude in the stratosphere,	
Eckhert	Ellen		Gabriele Stiller
Fueglistaler	Stephan	On the consistency of the evolution of dynamics, temperatures and tracers in the TTL and lower stratosphere from the 1980's to the present in observations	
Fujiwara	Masatomo	SPARC Reanalysis Intercomparison Project (S-RIP)	
Garfinkel	Chaim	Connections between the TTL and sea surface temperatures: interannual variability and trends	
Geller	Marvin	A Proposed WCRP/SPARC Project on Fine-Scale Atmospheric Structures and Processes	
Gerber	Edwin	Quantifying the Summertime Austral Jet Stream and Hadley Cell Response to Stratospheric Ozone and Greenhouse Gases	
Griessbach	Sabine	Detection of Volcanic Aerosol with Envisat MIPAS	
Gruzdev	Aleksandr	Peak Anomalies in Stratospheric NO2 over Russia Related to the 2011 Ozone Hole in the Arctic	Pavel Vargin
Harris	Neil	Past Ozone Profile Changes analyzed by statistical modeling of suitable long-term measurements	Johannes Staehelin
Hassler	Birgit	Changes in the Polar Vortex: Effects on Antarctic Total Ozone Observations at Various Stations and Antarctic Surface Climate Characteristics	
Hassler	Birgit	SI2N Overview Paper - Measurements Or Where Do I Find the Perfect Ozone Profile Data?	
Hegglin	Michaela	Highlights of the SPARC Data Initiative:	



Part I			
Hegglin	Michaela	Solving the stratospheric water vapour entry puzzle	
Huret	Nathalie	On the dynamical characterization of the stratosphere using multi- scale analysis of N2O, CH4, O3 and HNO3 high resolution	
Igri	Moudi Pascal	Comparison of the Cameroon Weather Synoptic Stations Rainfall Data	
Jianyong	Jia	Spatio-temporal characteristics of convective gravity wave momentum flux derived from HIRDLS and SABER satellites in the stratosphere over Asian Summer Monsoon region	
Kasai	Yasuko	SMILES diurnal variation climatology of strato- and mesospheric trace gases: O3, HCl, HNO3, ClO, BrO, HOCl, HO2, and temperature	
Kizhathur Narasimhan	Uma	A climatological Perspective of Water Vapour at UTLS Region over Different Global Monsoon Regions: Observations Inferred from AURA-MLS and Reanalysis Data	
Klekociuk	Andrew	Quasi-Stationary Rossby Waves in the Southern Extratropics: An Examination of Meteorological Reanalyses and Climate Model Simulations	Simon Alexander
Kobayashi	Chiaki	Brewer-Dobson circulation diagnosed from JRA-55	
Kolonjari	Felicia	Understanding the Global Distribution of HCFC-22 in the Upper Troposphere and Lower Stratosphere	
Kremser	Stefanie	Climate data record of carbonyl sulfide (COS) in the Southern Hemisphere	
Krizan	Peter	Vertical dependence of breakpoint occurrence at the selected European ozonsonde stations	
Kunz	Anne	A climatology of potential vorticity filaments and related exchange between the tropics and extratropics in the lower stratosphere	
Legras	Bernard	Brewer-Dobson circulation in the ERA-Interim: increase or decrease?	
Liley	Ben	Global Dimming and Brightening in New Zealand	
Liley	Ben	Stratospheric Aerosol over Lauder, New Zealand	
Liu	Yi	Vertical ozone variability and decadal trend over Beijing from ozonsonde observation	Yuli Zhang
Livesey	Nathanial	Lagrangian "Match" chemical loss calculations and related diagnostics for Aura MLS	Michelle Santee
Long	Craig	SPARC Reanalysis Intercomparison Project (S-RIP): Climatology and Interannual Variability of Dynamical Variables	Masatomo Fujiwara
Lossow	Stefan	Variability and linear changes of stratospheric water vapour	

Lucas	Chris	A Critical Comparison of Tropical Expansion Metrics	
Lucas	Chris	What Drives Southern Hemisphere Tropical Expansion?	
Mcdonald	Adrian	Using trace gas measurements to quantify horizontal and vertical motion at the poles	
McKenzie	Richard	Long Term Changes in UV in New Zealand Due to Ozone Depletion: Comparison with Variability from Other Causes and at Other Places	Ben Liley
Metelka	Ladislav	Non-linear Statistical Model of Changes of Total Ozone with the	
Millan Valle	Luis	Latest BrO, HO <sub>2</sub> and HOCl Observations from the EOS Microwave Limb Sounder	
Min	Seungki	Multimodel attribution of the Southern Hemisphere Hadley cell widening: Major role of ozone depletion	Seok-Woo Son
Mitchell	Dann	The Impact of Stratospheric Resolution for Detection and Attribution of Atmospheric Temperature Trends	
Mitchell	Dann	The Morphology of the Polar Vortices on Mars and Earth from Atmospheric Reanalyses	
Neef	Lisa	Assimilation of Geodetic Monitoring Data as a Dynamical Constraint in Atmosphere Models	Remi Thieblemont
Neu	Jessica	High Altitude Airships as a Platform for Atmospheric Composition Observations	
Neu	Jessica	The SPARC Data Initiative: Comparison of upper troposphere / lower stratosphere ozone climatologies from limb-viewing instruments and the nadir-viewing Tropospheric Emission Spectrometer (TES)	
Oetjen	Hilke	Towards a combined IASI/TES record of ozone: validation and first results	
Penckwitt	Andreas	Splicing SAGE-II and GOMOS measurements to create a long-term stratospheric ozone climate data record	
Pendlebury	Diane	A comparison of the SPARC Data Initiative and the CMAM30 datasets	Michaela Hegglin
Peter	Thomas	Balloon-borne match measurements of mid-latitude cirrus clouds	
Raffalski	Uwe	A New Balloon-borne Submillimetre Limb Sounding Radiometer	
Rahpoe	Nabiz	Limb ozone profile intercomparison of ozone_cci data products	
Reddmann	Thomas	Evaluating transport in the middle atmosphere using ERA-Interim analyses	
Salvador	Jacobo	Study of Temperature Profiles Observed During An Unusual Depletion Of Ozone Over NDACC Station Of Río Gallegos (51° 55'S, 69° 14'W) - Argentina On November 2009	
Santee	Michelle	Observations of Methyl Chloride and	

		Methanol in the Upper Troposphere / Lower Stratosphere from the Aura Microwave Limb Sounder	
Sato	Kaoru	Program of the Antarctic Syowa MST/IS Radar (PANSY)	
Scherllin-Pirscher	Barbara	Geopotential Height and Geostrophic Wind from Radio Occultation Data	
Schmidt	Torsten	Temperature variability in the upper troposphere and lower stratosphere observed with GPS radio occultations	
Schwaerz	Marc	Validation of Thermodynamic Profiles from MIPAS, GOMOS, and Radiosondes against Radio Occultation Reference Datasets	
Shiotani	Masato	Comparison of ozone profiles between Superconducting Submillimeter- Wave Limb-Emission Sounder (SMILES) and worldwide ozonesonde measurements - some issues in ozonesonde measurements	Masatomo Fujiwara
Shrestha	Dibas	Spatial Patterns of Summer Precipitation around the Himalayas and the Mountainous Western Coast of India and Myanmar Revealed by TRMM	
Smith	Inga	Reanalysis versus reality: a case study of snow on Antarctic sea ice	
Son	Seok-Woo	The Fine-scale Structure of the Global Lapse-Rate Tropopause Derived from COSMIC GPS Radio Occultation Measurements	
Staufer	Johannes	Comparison of ozone concentrations in the UTLS as measured by ozone sondes and commercial airliners (MOZAIC)	Johannes Staehelin
Steiner	Andrea	Atmospheric temperature trends from GPS radio occultation records	
Stone	Kane	An Updated Retrieval of Ozone Profile Information from the Australian Dobson Observational Network	
Suzuki	Nao	Diurnal variation of HO <sub>2</sub> over wide vertical region, from stratosphere to thermosphere, observed by SMILES	
Tarasick	David	A Re-Evaluated Canadian Ozonesonde Record: Changes in the Vertical Distribution of Ozone Over Canada from 1966 to 2012	
Tegtmeier	Susann	Highlights of the SPARC Data Initiative: Part II	
Thomason	Larry	The SAGE III's mission aboard the International Space Station	
Thomason	Larry	Toward standardization of the SAGE-series data products: SAGE II 7.0	
Tian	Wenshou	Dynamical and Chemical Effects of Quasi-biennial Oscillation and Stratospheric Semiannual Oscillation on Tracer Transport in the upper Stratosphere	
Tully	Matt	Trends in Total Column Ozone from Australian and New Zealand Dobson Sites	
Urban	Jo	Study of stratospheric water vapour and	

		ozone time-series using data from Odin and other satellites	
Vernier	Jean-Paul	On the nature and origin of the Asian Tropopause Aerosol Layer	
von Clarmann	Thomas	MIPAS databases: the current status and future plans	Gabriele Stiller
Whaley	Cynthia	Using FTIR Measurements of Stratospheric Composition to Identify Mid- Latitude Polar Vortex Intrusions Over Toronto	
Wild	Jeanette	The Cohesive SBUV and SBUV/2 Climate Data Record (1978-2012) and the Current Status of the Ozone Profile	Birgit Hassler
Wolfram	Elian	Impact of polar vortex on ozone profiles in the Atmospheric Observatory of South Patagonia, RÃ-o Gallegos, Argentina	
Worden	Helen	Decadal Record of Satellite Carbon Monoxide Observations	
Worden	John	CH4 emissions estimates from tropical and subtropical fires using Aura TES CH4 and Terra MOPITT CO profiles	Zhe Jiang

**Poster Session D: Coupling to the mesosphere and upper atmosphere  
Tropical Processes**

<b>Surname</b>	<b>First Name</b>	<b>Title</b>	<b>Presented by</b>
Ajay Kumar	MC	Response of tropical cyclone NILAM on surface metrological parameters	
Akihiro	Masuda	A study of anomalous potential vorticity distribution frequently observed in the boreal winter mesosphere based on a gravity-wave resolving GCM simulation	Kota Okamoto
Andersson	Monika	Mesospheric ozone loss caused by energetic electron precipitation	
Bancala	Severin	How do Major SSWs Develop in Present and Future Climate	Kirstin Krueger
Bunzel	Felix	Tropical ascent rates derived from the water vapour tape recorder - a comparison study with SHARP models and observations	
Butchart	Neal	The response of quasi-biennial oscillation to climate change in HadGEM2-CC	
Carminati	Fabien	Impact of Tropical Land Convection and interplays between Water Vapor, Ice Water Cloud and Temperature in the TTL	
Chan	Ian	Balance model for equatorial planetary scale dynamics	
Chane Ming	Fabrice	Characteristics of Gravity Waves during Tropical Cyclone Events in ECMWF Analyses	
Chemel	Charles	Sampling unexplored regions of the tropical UTLS: planning for the next major field campaign in the tropical warm pool	
Chishtie	Farrukh	A study of cloud occurrences and properties in the UTLS region during summer	Fahim Khokhar

		monsoon seasons using CALIPSO and Cloudsat observations across Pakistan	
Dutta	Gopa	Long term trend of diurnal tide over a tropical station	
Eguchi	Nawo	Downward coupling process through TTL : a case study using a global non-hydrostatic model	
Ern	Manfred	Two examples of gravity-wave mean-flow interactions observed from satellite: The QBO and the summertime mesospheric jet	Martin Riese
Ette	Krishna	Effect of cyclone NILAM on atmospheric parameters and characteristics of Inertia Gravity Wave over Hyderabad (170°N, 78.40°E)	
Flannaghan	Thomas	The Potential Impacts of Vertical Mixing on the Tropical Tropopause Layer Temperature Structure	
Frey	Wiebke	Modelling of Hector overshooting convection and its implications on water vapour distribution in the TTL and lower stratosphere	
Gabriel	Axel	Interannual variability of the 3D residual circulation and tracer transport in the stratosphere and mesosphere	
Gabriel	Axel	Stratospheric and mesospheric wind fields derived from Aura/MLS temperatures and tracer distributions	
Geller	Marvin	Changing ENSO Influences on the QBO	
Gong	Jie	Systematic Inclination of Tropical Upper-troposphere Clouds Revealed from Satellite Observations and Model Simulations	
Gong	Yun	Atmospheric Tides in the Low Latitude Thermosphere and Their Response to a Sudden Stratospheric Warming in January 2010	
Hirooka	Toshihiko	Observed General Circulation Changes up to the Mesopause Level Associated with Sudden Warming Events	
Hitchcock	Peter	The Impact of Compositional Changes on Radiative Damping Rates in the Stratosphere	
Jablonowski	Christiane	Spontaneous QBO-like Oscillations in Atmospheric Model Dynamical Cores	
Kawatani	Yoshio	Weakening stratospheric quasibiennial oscillation and trends in tropical mean upwelling	
Khaykin	Sergey	Dehydration, Hydration and Horizontal Transport in the Tropical	
Kim	Joowan	Tropical Cold-Point Tropopause: Climatology, Seasonal Cycle, and Intraseasonal Variability Derived from COSMIC GPS Radio Occultation Measurements and CMIP5 models	Seok-Woo Son
Kinoshita	Takenari	A study of the tidal periodicity of mesospheric gravity waves observed with	

		MF radar at Poker Flat, Alaska	
Krismer	Thomas	Seasonal Aspects of the Quasi-Biennial oscillation in the Max Planck Institute Earth System Model and ERA-40	
Krismer	Thomas	The influence of spectral resolution on modeling the Quasi-Biennial Oscillation	
Krismer	Thomas	Wave forcing of the Quasi-Biennial Oscillation	
Krueger	Kirstin	Sulfur and Halogen Release from Large Tropical Volcanic Eruptions to the Stratosphere - a Potential Ozone Hole Scenario	
Kuribayashi	Kota	Cly chemistry in the mesosphere observed by SMILES	
Luo	Beiping	In situ measurements of UTLS humidity: Effects of small-scale temperature fluctuations and of data quality	
Mcdonald	Adrian	Patterns of Southern Hemisphere Climate Change and their Relationships	
Mohammad	Salauddin	Equatorial wave activity during 2007 over Gadanki, a tropical station	
Mohr	Viktoria	Present and Future changes of the TTL using a Lagrangian approach	Kirstin Krueger
Naja	Manish	Vertical profiling of ozone, RH and temperature from the central Himalayas: Influence of dynamical processes and biomass burning	
Nishimoto	Eriko	A diagnostic tool for the temperature structure around the tropical tropopause	
Ortland	David	The residual mean circulation in the tropical tropopause layer driven by tropical waves	Joan Alexander
Osprey	Scott	An assessment of tropical stratosphere variability within past and present global climate models	
Perot	Kristell	Odin/SMR's Contribution to a Better Understanding of Energetic Particle Precipitation Indirect Effect	
Peter	Thomas	Upper Tropospheric Humidity, Supersaturation and Cirrus Formation	
Peters	Dieter	Ground-based observation of the long-term variability in the extra-tropical mesosphere and the inter-annual coupling with the stratosphere/ troposphere	
Pommereau	Jean-Pierre	Evidence of much more convective troposphere to stratosphere transport in the Southern than in the Northern tropics and tentative explanation	
Pommrich	Robert	Carbon monoxide as a tracer for tropical troposphere to stratosphere transport in the Chemical Lagrangian Model of the Stratosphere (CLaMS)	Rolf Mueller
Quan	Gan	TIMED/SABER observations of lower mesospheric inversion layers at low and middle latitudes	
Radley	Claire	Cloud and radiative balance changes in	

		response to ENSO in observations and models	
Ramsay	Hamish	The Effects of Imposed Stratospheric Cooling on the Maximum Intensity of Tropical Cyclones in Axisymmetric Radiative-Convective Equilibrium	
Rao	Kusuma	Climate impact of Asian Monsoon Convection	
Rao	Kusuma	Deep cloud structure of the Mesoscale Convective Systems (MCS): Impact of MCS on the Atmospheric Boundary Layer (ABL) and the Tropical Tropopause Layer (TTL)	
Rao	Polisetty Venkateswara	Madden - Julian Oscillations over a Tropical Indian Station Using Radar and ERA data of winds	
Reddmann	Thomas	Evaluating NO <sub>y</sub> transport from the lower thermosphere in the KASIMA model	
Rollins	Andrew	Observational Evidence for Incomplete Dehydration in the TTL	David Fahey
Sakazaki	Takatoshi	Non-migrating tides appearing in a high vertical resolution GCM	
Scaife	Adam	Predictability of the Quasi-Biennial Oscillation	
Schirber	Sebastian	Effects of a Convection-based Gravity Wave Parameterization in a General Circulation Model: The Link from Variable Wave Sources to the QBO	
Schlager	Hans	In situ Measurements in the Outflow of the Asian Summer Monsoon during the HALO ESMVal Campaign	
Schmidt	Torsten	Long-term observations of gravity wave activity in the lower stratosphere with GPS radio occultation data	
Seppala	Annika	Geomagnetic activity signatures in wintertime stratosphere	
Sharma	Som Kumar	Middle Atmospheric Dynamics and Structure in Sub-tropical and Tropical Regions: Possible Interconnections	
Sharma	Som Kumar	Stratospheric Temperature Characteristics and its Association with Ozone over a High Altitude Location	
Sheese	Patrick	The possible effects of nitric oxide variations in the upper atmosphere on temperatures in the lower atmosphere	
Sinnhuber	Miriam	Solar variability impacts on the middle atmosphere - investigations using satellite observations and global models	
Smith	Madeleine	A Quantitative Measure of Polar Vortex Strength Using the Function M	
Smith	Ronald	The Deep-Propagating Gravity-Wave Experiment (DEEPWAVE) over New Zealand	
Son	Seok-Woo	Formation of the tropical cold-point tropopause by baroclinic eddies in a dynamic-core GCM	



Stiller	Gabriele P.	Can the MIPAS-observed pattern of mean age of air trends be explained by shifts of the subtropical mixing barriers?	
Stroh	Fred	The StratoClim Aircraft Field Campaign: Studying Processes Relevant to the Climate Impact of the Asian Monsoon Circulation	
Tissier	Ann'Sophie	Convective sources and transport in the TTL	
Tweedy	Olga	Nighttime Secondary Ozone Layer during Major Stratospheric Sudden Warmings in Specified-Dynamics WACCM	Anne Smith
Ueyama	Rei	Insights on TTL dehydration mechanisms from microphysical modelling of aircraft observations	
Vazhathottat hil	Madhu	A possible UT/LS coupling during dry and wet years of Indian summer monsoon circulation	
Verronen	Pekka T.	Comparison of Modeled and Observed Effects of Radiation Belt Electron Precipitation on Mesospheric Hydroxyl and Ozone	
von Hobe	Marc	Sulfur transport into and through the tropical gateway to the middle stratosphere	
Wang	Wuke	Recent UTLS Variability and Potential Climate Impacts	
Watanabe	Shingo	Vertical resolution dependence of gravity wave momentum flux	
Wright	Jonathon	Differences in Reanalysis Estimates of Diabatic Heating in the Tropical UTLS and Implications for Cross-Tropopause Transport	
Xu	Jiyao	Evidence for non-migrating tides produced by the interaction between tides and stationary planetary waves in the middle atmosphere	
Yuan	Wei	FPI observations of nighttime mesospheric and thermospheric winds in China and their comparisons with HWM07	
Zebaze	Sinclair	Interaction between moist Kelvin waves and synoptic variability of precipitation over Congo basin	
Zülicke	Christoph	Do split stratospheric vortices reach higher?	



## 4. Conclusions

As stated under the 'Overview of Project Work and Outcomes', the main objectives of this project were to:

1. Support the attendance of PhD students and early career scientists from developing countries and countries with economies in transition in the Asia-Pacific region to the 5<sup>th</sup> SPARC General Assembly, and by doing so...
2. Entrain regional research capability
3. Foster regional engagement in SPARC research (e.g. SPARC has a growing interest in processes linking tropospheric and stratospheric change in the tropical Western Pacific)
4. Ensure that SPARC is cognizant of the research needs of communities in the Asia-Pacific region.

As a result of generous sponsorship from APN, we were able to provide financial support for three PhD students from countries in the Asia-Pacific region, which enabled them to attend the 5<sup>th</sup> SPARC General Assembly in Queenstown, New Zealand. Additionally, funding was allocated to a fourth scientist, however due to last minute difficulties in obtaining his visa, this delegate was unfortunately unable to attend.

## References

Not applicable.

## Appendix

### Conference Programme Overview

5<sup>th</sup> SPARC General Assembly – 12<sup>th</sup>-17<sup>th</sup> January 2014  
Millennium Hotel, Queenstown, New Zealand

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
	09:00 – 10:00 Oral Presentations	09:00 – 10:00 Oral Presentations	09:00 – 10:00 Oral Presentations	09:00 – 11:00 Oral Presentations	09:00 – 10:30 Oral Presentations
	10:00 – 10:45 Poster Summaries	10:00 – 10:45 Poster Summaries	10:00 – 10:45 Poster Summaries		10:30 – 12:30 Poster Session D and Morning Tea
	10:45 – 12:00 Poster Session A and Morning Tea	10:45 – 12:00 Poster Session B and Morning Tea	10:45 – 12:00 Poster Session C and Morning Tea		
11:00 – 12:30 Registration Open				11:00 – 12:30 Poster Session C and Morning Tea	
	12:00 – 13:30 Lunch Optional lunch session	12:00 – 13:30 Lunch Optional lunch session	12:00 – 13:00 Oral Presentations	12:30 – 14:00 Lunch	12:30 – 14:00 Lunch
12:30 – 13:20 Official Opening					
Brief Break					
13:30 – 17:30 Invited keynote addresses with halftime tea/coffee break	13:30 – 15:30 Oral Presentations	13:30 – 15:30 Oral Presentations	Free Afternoon	14:00 – 15:30 Oral Presentations	14:00 – 16:00 Oral Presentations
	15:30 – 17:00 Poster Session A and Afternoon Tea	15:30 – 17:00 Poster Session B and Afternoon Tea		15:30 – 16:15 Poster Summaries	16:00 – 17:30 Afternoon Tea & Closing Address
	17:00 – 18:30 Oral Presentations	17:00 – 18:30 Oral Presentations		16:15 – 17:00 Poster Session D and Afternoon Tea	
17:30 – 19:30 Icebreaker				17:00 – Late Conference Dinner Please be at the Steamer Wharf by 17:45	

A full version of the programme can be found in the conference handbook, which is available online at:

[http://www.sparc-climate.org/fileadmin/customer/5\\_Meetings/GA5\\_PDF/Handbook\\_Total.pdf](http://www.sparc-climate.org/fileadmin/customer/5_Meetings/GA5_PDF/Handbook_Total.pdf)

### Participant List

It is not appropriate to provide a full list (including contact details) of the participants of the 5<sup>th</sup> SPARC General Assembly, as we have not obtained permission from the individual delegates to do so. However, a significant portion of the attendee names are listed in either the oral or poster programmes (see Section 3, *Results and Discussion*).

## ***Funding Sources Outside the APN***

In addition to the funding provided from APN, the SPARC General Assembly was grateful to receive sponsorship (to support the attendance of PhD students, early career scientists, scientists from developing countries or countries with economies in transition) or support in-kind from the following organisations:

### Platinum (NZ \$50,000 or over)

- World Climate Research Programme

### Gold (NZ \$20,000 or over)

- United States National Science Foundation
- World Meteorological Organization (including WIGOS, GAW and WWRP)

### Silver (NZ \$5,000 or over)

- Australian Research Council Centre of Excellence for Climate System Science
- Canadian Space Agency
- European Space Agency
- SPARC International Project Office
- New Zealand National Institute of Water and Atmospheric Research

### Bronze (Less than NZ \$5,000)

- Aerodyne Research
- Antarctica New Zealand
- Bodeker Scientific
- Committee on Space Research
- Macquarie University
- Tofwerk
- University of Otago

## ***List of Young Scientists***

The young scientists supported through the APN sponsorship (to facilitate their attendance at the 5<sup>th</sup> SPARC General Assembly) were:

### ***Negar Banan***

PhD Student, Universiti Kebangsaan Malaysia (UKM)  
Malaysia  
[artibanan@yahoo.com](mailto:artibanan@yahoo.com)

### *Message from Negar:*

*“One of the purposes of the SPARC in Queenstown, New Zealand from 12<sup>th</sup>-17<sup>th</sup> January 2014 is to encourage exchange of information between communities involved in scientific research. They address stratosphere-troposphere processes and their role in climate and related processes using observations, data analysis, modeling and numerical studies, and theories. This workshop is a good opportunity to aid my research field and add additional value to my department’s area of research, as well as develop any possible skills that I*

*can apply once I come back to Malaysia. I have better understanding of both relevant and current literature to assist in more scientifically sound climate related research. The new experience in the workshop helped me to provide my team members further motivation with knowledge of what the global community has achieved in climate-related field study.*

*This area of scientific research is relatively new to this country, and any unique effort on the part of individual scientists is obviously very beneficial for my group, department, and university and hopefully country. For my role in my group and department, I learned more efficient ways or even more challenging ways to approach the study of climate effects on surface ozone concentrations. Finally, I have some in depth understanding of adverse climate variability and change, processes related to ozone, atmospheric chemistry and aerosols and polar processes, possibly using this knowledge to add value to my study on ozone depletion and its role in climate.”*

**Yuli Zhang**

PhD Student, Institute of Atmospheric Physics, Chinese Academy of Sciences  
China

[zhangyuli@mail.iap.ac.cn](mailto:zhangyuli@mail.iap.ac.cn)

Message from Yuli:

*“I am glad to attend SPARC General Assembly (GA) which provides me an opportunity to show my scientific work and to learn more knowledge from so many scientists. I am very grateful to the GA for organizing this meeting and to APN (Asia-Pacific Network for Global Change Research) for the funding which makes this journey.*

*During the SPARC GA, scientists provide many excellent presentations which explore new frontiers. I have been inspired by their ideas and works. The posters provide even more informations about almost all hot topics in stratospheric research. Also, I was so close to these scientists that we could discuss face to face and create friendships. They gave me many precious comments for my research, and I think my opinions might help them too.*

*The schedule had been organized very well, and the trip to the island was very happy. At Queenstown, the most beautiful place I have ever seen, I got not only scientific knowledge but also many friends which I stay in touch with. And we still send emails to discuss scientific problems. I think the GA is one of the most important things in my scientific career, and I hope that I will be a good scientist in the further. So once more I want thank the GA and APN for their great help. I wish to see all these friends in next SPARC GA.”*

**Ette Krishna**

PhD Student, Vignana Bharathi Institute of Technology  
India

[krishna.ette555@gmail.com](mailto:krishna.ette555@gmail.com)

Message from Ette:

*“It's my pleasure to thanking once again to SPARC GA 2014 organizers and Asia-Pacific Network (APN) organization for given me full support to attend SPARC General Assembly. It*

*was a big opportunity for me to attend such big conference as a young scientist. I would like to congratulate for the big success of General Assembly.*

*Almost all the sessions (Oral and Poster) was very interesting. I have got a good knowledge which type of research is going on throughout the world. I met world top most scientist in my field. It was a very good platform to learn the new things from top minds. I have also attended a lunch time meeting. It was very knowledgeable discussion with John Alexander and my co-participants.*

*Actually I have concentrated most of the sessions which were related to Atmospheric Dynamics and Gravity Waves. My project is related to Gravity wave characteristics, Tropopause dynamics and stratosphere - troposphere exchange through observations of water vapor across the tropopause. I have collected a lot of information which is related to my project. Poster sessions were also very great. The better thing is, you have allotted a sufficient time for poster presentations. It could be better to collect more information from all the posters. I have given a poster presentation. It was a very wonderful experience to me as participant such type of a big conference.*

*Thanking you very much for once again for given this opportunity.”*

Allocated funding, but unable to attend:

**Md. Mizanur Rahman**

PhD Student, SAARC Meteorological Research Centre (SMRC)

Bangladesh

[mrahman426@yahoo.com](mailto:mrahman426@yahoo.com)

### **Glossary of Terms**

GAW	Global Atmosphere Watch
GFCS	Global Framework for Climate Services
JSC	Joint Scientific Committee
SPARC	Stratosphere-troposphere Processes And their Role in Climate
WCRP	World Climate Research Programme
WIGOS	WMO Integrated Global Observing System
WMO	World Meteorological Organization
WWRP	World Weather Research Programme

### **Abstracts and Power Point Slides of Conference Presentations**

The abstracts from all the poster presentations can be viewed on the SPARC website at <http://www.sparc-climate.org/meetings/general-assembly-2014/#c1120>

The slide shows in PDF format from the majority of the oral presentations (where permission was given to publish these) are available on the SPARC webpage as above.

### ***Conference Reports***

A brief summary of the 5<sup>th</sup> SPARC General Assembly was published in the January 2014 edition of the SPARC Newsletter, which is available on the SPARC website at <http://www.sparc-climate.org/publications/newsletter>.

A more in-depth report was published in the July 2014 edition of the SPARC Newsletter which is also available via the SPARC Website.