

*'A Growing Community Around a Shared Challenge'*

## Weather and Climate Science for Service Partnership (WCSSP)

Programme Science Workshop Report  
23<sup>rd</sup> - 24<sup>th</sup> September 2019

*'A Growing Community Around a Shared Challenge'*

Author: Jemma Gornall, Julian Menadue & Jamie Mitchell  
Date: 11<sup>th</sup> December 2019  
Version: Final

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### 1 Executive Summary

The inaugural Weather and Climate Science for Service Partnership (WCSSP) Programme Science Workshop was held successfully in late September in London. The workshop represented a unique opportunity to bring together a global community of practice focused around increasing adaptation and resilience to weather and climate. Over the course of the event, three clear recommendations to accelerate the delivery of impactful science and services in the programme emerged from the WCSSP community:

1. WCSSP should develop global cross-cutting themes enabling partners in multiple countries to work collaboratively on shared challenges.
2. To ensure legacy, the WCSSP should nurture its international alumni of early career researchers in weather and climate science for services.
3. To enable the international community to work collaboratively WCSSP should develop practical mechanisms for multi-national collaboration and communication.

During the workshop the WCSSP community identified cross-cutting themes that improve estimation of hazards, extremes and impacts and the translation needed to support risk-based decision-making, for example El Niño, which has impacts across the WCSSP community. This thematic approach alongside the established country and regional projects would bring enhanced benefit within countries and create a mechanism to collectively target global development impact e.g. the UN Sustainable Development Goals within WCSSP. The diagram below outlines the proposed structure of a future WCSSP. Additionally, to facilitate international collaboration, the WCSSP community made it clear that practical mechanisms for multi-national collaboration and communication need to be established, including for example further cross-WCSSP workshops, a cross-WCSSP seminar series or a cross-WCSSP workspace to share and exchange content.



Figure 1. Proposed future structure of WCSSP

In addition, delegates at the workshop were clear that partners want to maximise the legacy of WCSSP by building capacity for example through nurturing early career scientists and enhancing existing exchange programmes. The WCSSP community highly value the 'two way' visits by scientists, of which there have been over 100 to date. It was recommended

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that this activity should be expanded across the programme targeting early career researchers and creating an international alumni emanating from the growing WCSSP community. Increasing capacity across the WCSSP community by incorporating formal post graduate training into the programme could also be expanded, benefitting early career researchers, as well as strengthening the links between senior researchers across organisations and countries.

Following these recommendations, the next step is to further develop these ideas with the WCSSP community alongside the Newton Country Strategy refresh, in order to crystallise partner priorities and align future WCSSP plans. It is also key that WCSSP continues to track and demonstrate impact against Newton objectives (science for service to society and related socio-economic benefits) and the Sustainable Development Goals.

Thank you once again to all the delegates for your attendance and participation at the WCSSP Programme Science Workshop. We look forward to the continued work and growth of the WCSSP science community under the Newton Fund.

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## 2 Introduction

### 2.1 Workshop aim

As per the description in the invitation and the WCSSP Programme Science Workshop webpage, the aim of the workshop was:

*To bring together partners from across the Weather and Climate Science for Service Programme (WCSSP) to share scientific highlights, facilitate knowledge sharing and explore ways to maximise the benefits and scientific advances across the whole programme.*

*This is a welcomed opportunity to draw together the common strands across the WCSSP programme for the benefit of all.*

### 2.2 Workshop delivery overview and reflection

On the 23<sup>rd</sup> and 24<sup>th</sup> of September, the first WCSSP Programme Science workshop took place at Church House in London. The event was successful in celebrating the network of partnerships formed under the Programme. Attendees included senior delegates from the UK Government, WCSSP partners from China, South Africa, Brazil, Southeast Asia (Philippines, Malaysia, Indonesia & Vietnam), India, UK partners (e.g. Reading University, HSE, CEH, University of Leeds), other Newton Fund Delivery Partners (e.g. STFC & NERC), the Met Office and observers who have an interest in joining the Programme.

The keynote speech was delivered by Sir Patrick Vallance, Chief Scientific Advisor to the UK Government, who shared positive words about the WCSSP Programme and how it is responding to the challenges of a changing climate and the frequency of high impact weather events. Professor Stephen Belcher, Met Office Chief Scientist expanded on the global threat of climate change and how the science community is harnessing expertise to build resilience, delivering science to services. Tom Child, Deputy Director of Global Research & Innovation at BEIS, introduced the UK government's Newton Fund and the goal to address global challenges. Senior representatives from each country partner presented on the weather and climate challenges they are facing; the expertise their institutes have and the achievements made through collaborative working in the WCSSP Programme.

On Day 2, WCSSP partners from across the Programme reflected on shared weather and climate science priorities and considered ways to work together across the five WCSSP projects, building on the success of the WCSSP Programme and harnessing scientific expertise through collaboration. This led to discussions on how the Programme can translate science to services and reduce the global impact of a changing climate together.

Some memorable quotes from the workshop emphasise the spirit in which it was conducted, one of community with a purpose:

- Tom Child – WCSSP is ‘relatively new (5 years) but still achieving significant research outputs’, and he described WCSSP as an ‘outstanding example’ thanking Kirstine Dale for her support.
- Osvaldo Moraes – described WCSSP as a ‘friendly community’
- On Day 2 Stephen Belcher echoed the comments made by the UN’s Secretary-General Antonio Guterras at the UN Climate Summit, stating that the partnership is committed to making ‘plans and not speeches. The WCSSP Programme is

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committed to developing professional relationships across the partnerships and explore more cross-cutting weather and climate themes such as the 'El Niño' project which involves more than one WCSSP'.

For more information presentations and photographs from the event, please see the [WCSSP Programme Science Workshop webpage](#).

### **2.3 Workshop feedback**

General qualitative perception is that the aim of the workshop was achieved from delegate feedback, during and post event verbally and via emails. This sentiment has since been verified more quantitatively having reviewed the questionnaire data. See Section 6 Monitoring, Evaluation and Learning for detail.

### **2.4 Purpose of this document**

This document reviews the Programme Science Workshop in detail under two sections:

- Section 3. Output
- Section 4. Structure

The 'output' focuses on the discussions surrounding future and current science priorities, whilst the 'structure' relates to feedback from delegates on event purpose, agenda, presentations, format, logistics and usefulness. The document is primarily intended as a report back to the participating delegates, though it is recommended that the findings can and should be considered and applied to any future WCSSP strategic planning and delivery, as highlighted in the Executive Summary.

## **3 Output**

### **3.1 Approach - Aims, process and how information fed back.**

On the morning of Day 2 delegates split into six breakout groups to explore ways to maximise the benefits and scientific advances across the whole WCSSP Programme.

Simon Vosper, Director of Meteorological Science at the Met Office, provided an overview of potential cross-cutting theme ideas to stimulate discussion. These included:

- The global hazard of extreme El Niño's
- Using the UNSEEN (Unprecedented Simulation of Extremes with Ensembles) methodology
- High resolution modelling
- Impact-based Forecasting (IbF)
- Climate attribution
- Madden-Julian Oscillation

Then breakout groups each spent 30 minutes discussing the following four questions:

- I. [What benefits do we want to achieve through collaboration?](#)
- II. [What are the outstanding science to service challenges for improved weather, climate, hazard and impact prediction?](#)

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- III. How can we overcome the challenges?
- IV. What can the WCSSP projects learn from each other?

The group facilitators then reported back a summary of their discussions to the room. These discussions, and the resultant recommendations, have been collated and the detail is shared in Section 3.3 and summarised below in Section 3.2.

In order to provide some clarity and prioritisation, we have grouped responses into the following categories:



KNOWLEDGE EXCHANGE

**Knowledge exchange** is a process which brings together scientists, users of scientific research and wider groups and communities to exchange ideas, evidence and expertise.



CAPACITY BUILDING

**Capacity building** refers to investment in people, institutions and practices that will together enable countries/regions to achieve their development objectives.



RESEARCH AND DEVELOPMENT

**Research and development** refer to innovative activities undertaken by institutions/collaborations in developing new services or products, or improving existing services or products.

USER ENGAGEMENT  
AND CO-PRODUCTION

**User engagement** is an assessment of an individual's response to some type of offering, such as a product or a service or a website. An individual's degree of engagement may be determined directly through interaction, or may be assessed through observation of the user's behaviours. Whilst **co-production** refers to the delivery of a service in which the recipients are involved in its creation and development.



TECHNICAL INFRASTRUCTURE

**Technical Infrastructure** refers to an enterprise's entire collection of hardware, software, networks, datacentres, facilities and related information technology (IT) equipment used to develop, test, operate, monitor, manage and/or support IT based services.

Within this context this includes all observation equipment, systems and processes.

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Questions	Emerging themes				
I.What benefits do we want to achieve through collaboration?	 KNOWLEDGE EXCHANGE		 CAPACITY BUILDING		<ul style="list-style-type: none"> <li>Sharing and transferring knowledge, expertise and best practice across WCSSP programme</li> <li>Capacity building and training for early career scientists &amp; forecasters</li> <li>Tackling common weather and climate challenges through a diversity of thinking</li> </ul>
II.What are the outstanding science to service challenges for improved weather, climate, hazard and impact prediction?	 RESEARCH AND DEVELOPMENT	 USER ENGAGEMENT AND CO-PRODUCTION	 TECHNICAL INFRASTRUCTURE	<ul style="list-style-type: none"> <li>Improving predictions and forecasts of weather and climate extremes from hours to a century ahead</li> <li>Effective communication of science to users and decision makers</li> <li>Bridging the gap between science and emerging technology</li> </ul>	
III.How can we overcome the challenges?	 CAPACITY BUILDING	 USER ENGAGEMENT AND CO-PRODUCTION	 RESEARCH AND DEVELOPMENT	 KNOWLEDGE EXCHANGE	 TECHNICAL INFRASTRUCTURE

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	<ul style="list-style-type: none"> <li>• Accelerating capacity building and training with a focus on early career development</li> <li>• Improving the way we communicate our science</li> <li>• Continue to advance our science and break boundaries</li> <li>• Encouraging cross-WCSSP collaboration and ways of working</li> </ul>
IV.What can the WCSSP projects learn from each other?	 <ul style="list-style-type: none"> <li>• Knowledge exchange and integration across WCSSP</li> </ul>

### 3.2 Summary of recommendations

The emerging themes drawn from each of the questions posed, resulted in three high-level recommendations being agreed:

1. ***Encourage working thematically across WCSSP to accelerate the development of the science and maximise benefits across the programme.***

Themes that emerged during the workshop included:

- ✓ Impact-based forecasting (IbF)
- ✓ Extremes and attribution
- ✓ Moving beyond hazard to risk
- ✓ Convective-permitting modelling
- ✓ The hazard of extreme El Niño events

2. ***Continue to focus on early career development, science exchange and training,***

For a legacy of the WCSSP programme. For example, activities could include:

- ✓ More Masters and PhDs funded via WCSSP
- ✓ Training on communicating uncertainty
- ✓ Training on using the Unified Model

To facilitate this, cross-WCSSP workshops on these themes could be delivered.

3. ***Knowledge exchange and integration.***

For example, activities could include:

- ✓ Developing a cross-WCSSP SharePoint site.
- ✓ Setting up a cross-WCSSP seminar series.
- ✓ Sharing best practice on user engagement and co-producing weather and climate services.

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### 3.3 Detailed Science Priorities

The following section provides more detail of the suggestions captured for each question:

#### I. *What benefits do we want to achieve through collaboration?*



- ✓ Better forecasts and predictions from hours to a century ahead to help provide improved weather and climate advice, save more lives and protect more livelihoods.
- ✓ Collaborative modelling: Common diagnostics, metrics, best practice in model evaluation, joint regional modelling with shared domains.
- ✓ Improved understanding of the impact of climate change on extreme events and different sectors across all regions.



- ✓ Translating hazards to impacts and risks.
- ✓ Effectively communicating uncertainty to users to reduce uncertainty in flow of information from scientist to user.
- ✓ Understanding of best approaches to Ibf.
- ✓ Engaging and communicating with users and collating their needs.
- ✓ Strengthened weather and climate services that help make and influence decisions.
- ✓ Ability to devise weather and climate adaptation and mitigation strategies.



- ✓ Common tools, technical infrastructure and data (open source if possible).
- ✓ Increased awareness and use of observations across the community.
- ✓ More access to High Performance Computing (HPC) resources and subsequent upgrading of technology and infrastructure in-country.



- ✓ Training in-country: Ibf, climate change impacts.
- ✓ Visiting scientist exchange programmes.
- ✓ Joint PhD programmes.

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- ✓ Joint publications.

### *II. What are the outstanding science to service challenges for improved weather, climate, hazard and impact prediction?*



- ✓ Improving forecasts and predictions in coastal, mountainous and urban regions.
- ✓ Lack of understanding on teleconnections associated with El Niño Southern Oscillation (ENSO), Madden-Julian Oscillation (MJO), Indian Ocean Dipole (IOD), equatorial waves etc. How do these mechanisms work and can we predict them?
- ✓ Making better use of large ensembles.
- ✓ Ensuring uncertainty is quantified in full i.e. ensemble spread is not a full measure of uncertainty.
- ✓ Improve understanding of importance of non-climatic factors (urban development, natural variability) on future climate changes.
- ✓ Understanding where benefits lie for resolution vs complexity vs ensembles. What's the correct priority of these factors?
- ✓ Is high resolution modelling e.g. convective-permitting modelling (CPM) actually an improvement and when/how do we know?
- ✓ Quantifying the role of short-term variability on long-term trends i.e. risks of global warming slow-down or accelerated periods on top of temperature projections to end of century?



- ✓ Moving from single to multi-hazard warnings e.g. from flooding to flooding & landslide warnings.
- ✓ Translating hazards to impact and risk for users i.e. exposure and vulnerability. Need economic/social data such as demographics, vulnerability etc and more engagement with social science community. Applicable for a range of phenomena such as Asian summer monsoon, ENSO.
- ✓ Making better use of large ensembles in decision-making.
- ✓ How should scientists communicate risk, impacts and uncertainty to users?
- ✓ Ensuring that users choose the right tool for a particular decision – users need support to know which model is best for certain situations.

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- ✓ How to overcome local perceptions of extreme weather and combine and integrate indigenous knowledge with scientific expertise.



- ✓ Lack of observations to interrogate and improve models.
- ✓ Tapping into big data and utilising Artificial Intelligence and machine learning techniques.



- ✓ How should scientists communicate risk, impacts and uncertainty to users?

### III. *How can we overcome the challenges?*



- ✓ Facilitating more PhDs on priority topics in partner countries and in UK.
- ✓ Train WCSSP partners in using the Unified Model (UM) and involve them regularly in UM workshops.
- ✓ Training and sharing of best practice on using and exploiting large ensembles.
- ✓ Training in-country scientists and forecasters to ensure they have the skills and expertise to utilise HPC resources.
- ✓ Training on how to effectively communicate uncertainty to users e.g. sharing of best practice from deliverable in CSSP China. Establish a common framework that can be used across WCSSP programme i.e. using storylines in climate change projections (best and worst case scenarios).
- ✓ Training WCSSP scientists in the translation of science for decision making i.e. knowledge integration. Focus on engaging Governments and sectors in emerging WCSSP science and services. Potential activity could bring together science translators from different WCSSP countries to accelerate WCSSP science into decision-making.
- ✓ Leadership: Encouraging early career researchers to lead cross-disciplinary workshops on common themes important to all WCSSP countries. Outputs could be a special issue in journal (e.g. BAMS) led by early career scientists. Would build capacity, develop leadership

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skills and cement long-term collaborations, ensuring a lasting legacy for WCSSP.



- ✓ Deliver pan-WCSSP workshops to plan and develop cross-cutting packages of work important to all countries e.g. The hazard of extreme El Niño's, maximising the use of ensembles, teleconnections, UNSEEN, approaches to IbF.
- ✓ Sharing science outputs from one project across the whole programme on a collaborative platform such as SharePoint. This could include sharing common model domains (e.g. pan-WCSSP nesting within global model), performance (e.g. prediction skill on different timescales in different regions), diagnostics, metrics, tools, common frameworks (e.g. IbF approaches).
- ✓ Build and share regional coupled prediction systems across the Programme.
- ✓ Ensuring science and collaborations are inter-disciplinary including e.g. social, ecological and behavioural sciences.
- ✓ Develop national-scale climate scenarios and risk assessments in WCSSP countries, similar to UKCP18 in UK.



- ✓ Making data more open and accessible if we can e.g. more Memorandum of Understanding's (MoU's) between institutions.
- ✓ Extending observational records by:
  - Continuing to recover old data e.g. ACRE.
  - Investing in new observational campaigns to help tackle model biases.
- ✓ Continue investing in technical infrastructure and explore areas for innovation e.g. utilising Amazon cloud computing.



- ✓ Training on how to effectively communicate uncertainty to users e.g. sharing of best practice from deliverable in CSSP China. Establish a common framework that can be used across WCSSP programme i.e. using storylines in climate change projections (best and worst case scenarios).
- ✓ Training WCSSP scientists in the translation of science for decision making i.e. knowledge integration. Focus on engaging Governments and sectors in emerging WCSSP science and services. Potential activity could bring together science translators from different WCSSP countries to accelerate WCSSP science into decision-making.
- ✓ Ensuring weather and climate services are co-developed with users and forecasters so they have ownership of the service.

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- ✓ Extending observational records by:
- ✓ Continuing to recover old data e.g. ACRE and investing in new observational campaigns to help tackle model biases.
- ✓ Continue developing and exploiting large ensembles.
- ✓ Building and sharing regional coupled prediction systems.
- ✓ Ensuring science and collaborations are inter-disciplinary including e.g. social, ecological and behavioural sciences.
- ✓ Utilising Earth system models where possible ensuring that land use, hydrology, oceans are considered.
- ✓ Can we extend the UNSEEN methodology to consider risks on longer timescales (i.e. climate change)? This could help with communication of climate change impacts.
- ✓ Develop national-scale climate scenarios and risk assessments in WCSSP countries, similar to UKCP18 in UK.

## IV. What can the WCSSP projects learn from each other?



- ✓ Open up communication channels e.g. WCSSP-wide SharePoint page with deliverables, papers, model output etc. available to all projects and partners.
- ✓ WCSSP seminar series on cross-cutting topics.
- ✓ Sharing lessons learned across programme (both successes and failures).
- ✓ Sharing best practice on:
  - a) engaging with users and working to understand their needs.
  - b) co-developing prototype services with users.
  - c) Best practice in IbF i.e. sharing across the community how the "impact" is defined in one country.
  - d) data assimilation techniques.
- ✓ Adapting training courses e.g. FORTIS training on tropical meteorology for early career forecasters in Southeast Asia could be applied to other WCSSP countries such as India and Brazil.
- ✓ Sharing observations among WCSSP countries for model evaluation.



- ✓ Best practice in IbF i.e. sharing across the community how the "impact" is defined in one country.

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## 4 Structure

### 4.1 Venue

**Church House Westminster, 23<sup>rd</sup> and 24<sup>th</sup> September 2019.**

Deans Yard

Westminster

London SW1P 3NZ

<https://www.churchhouseconf.co.uk/>



*Photo 1: The entire delegation at the WCSSP Programme Science Workshop 2019.*

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Programme Science Workshop | 23-24 September 2019

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Photo 2: View of the Assembly Hall within Church House.



Photo 3: Sir Patrick Vallance, Chief Scientific Advisor to the UK Government delivering the keynote speech.

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Feedback on the event location from the questionnaire was overwhelmingly positive, with 76% of respondents stating it was 'excellent' and 24% stating 'very good'.

### **4.2 Networking Dinner – House of Commons**

<https://www.parliament.uk/visiting/venue-hire/commons/hire-your-venue/churchill-room/>



Photo 4: The Churchill Room.



Photo 5: View from the Terrace.



Photo 6: The Churchill Room entrance.

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Feedback during the event and from the questionnaire suggested that the networking dinner venue was of great interest, and well received due to its historic nature. However, it was highlighted that more consideration should have been taken into account regarding delegates suffering from jet lag. Suggestions included shortening the duration of the dinner, and/or extending the workshop to enable the networking dinner not to be on the first evening.

### **4.3 Hotel**

#### **Double Tree Hilton Westminster**

30 John Islip St, Westminster, London SW1P 4DD

Phone: 020 7630 1000

[https://doubletree3.hilton.com/en/hotels/united-kingdom/doubletree-by-hilton-hotel-london-westminster-LONWMDI/index.html?WT.mc\\_id=zELWAKN0EMEA1DT2DMH3LocalSearch4DGGenericx6LONWMDI](https://doubletree3.hilton.com/en/hotels/united-kingdom/doubletree-by-hilton-hotel-london-westminster-LONWMDI/index.html?WT.mc_id=zELWAKN0EMEA1DT2DMH3LocalSearch4DGGenericx6LONWMDI)

### **4.4 Logistics**

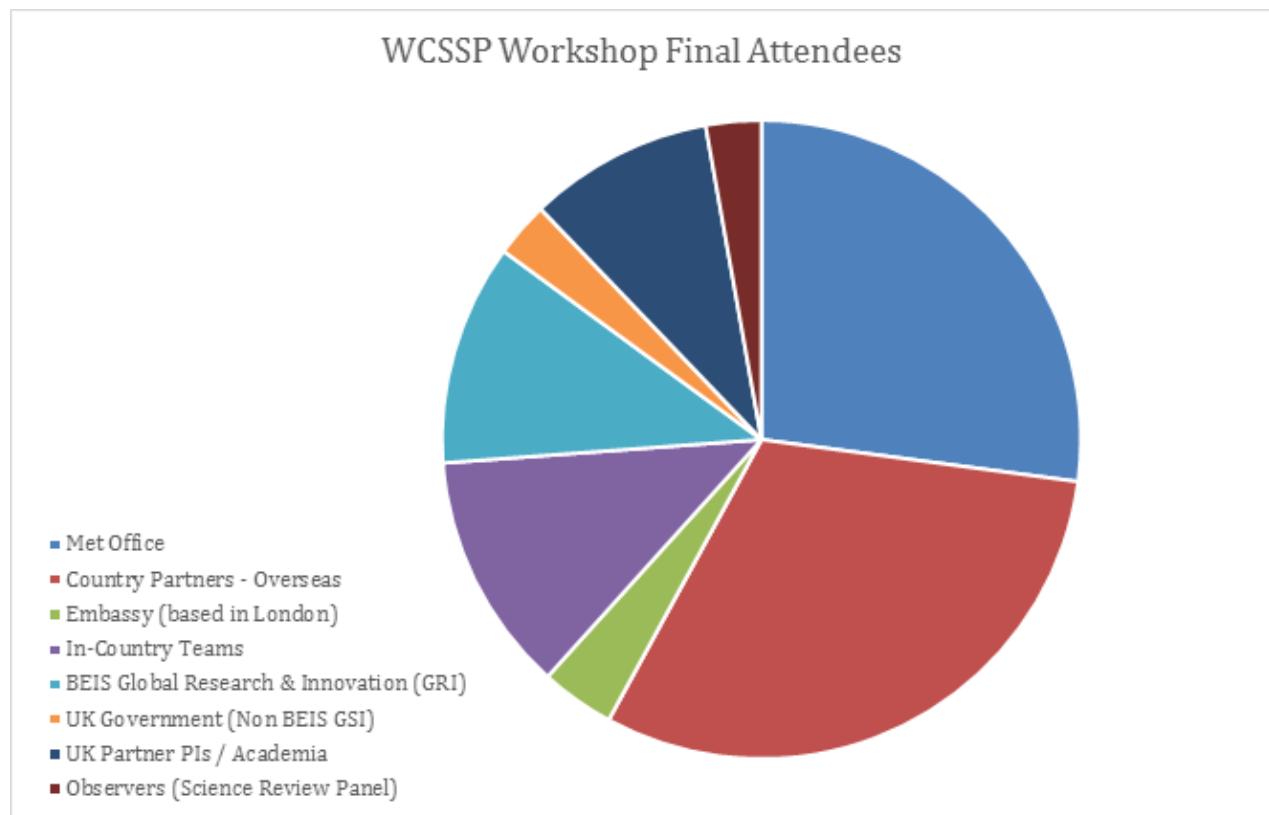
Overall feedback on logistics suggested that the event was very well planned and executed. However, some logistical suggestions were made that shall be considered for future events:

- ✓ Taking more consideration of delegates jet lag (tiredness) for the networking dinner.
- ✓ More substantial food for lunch.
- ✓ Balance more time for presentations rather than breakout sessions, or mix across the two days.
- ✓ Have more time to enable each WCSSP country to present.
- ✓ Extend the workshop across 3 days to allow more aspects of science to be shared.
- ✓ There could be an annual workshop for 3 days having different science themes useful to the community.
- ✓ Provide more details on delegates attending (noting GDPR rules need to be observed).

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### 5 Attendee Overview

The following number of delegates attended from the listed partners.



Breakdown of attendees in pie chart and summary table:

Affiliation	Number of Attendees
Met Office	29
Country Partners	33
Embassy (based in London)	4
Newton Fund In- Country Teams	13
BEIS (GRI & ODA RMT)	12
UK Government (Non BEIS)	3
UK Partner PIs / Academia	10
Observers (Non-Exec Directors, Science Review Personnel)	3
<b>TOTAL</b>	<b>107</b>

There were 115 accepted invites, but due to some unforeseen circumstances, 107 attended in person during the event. The Met Office is incredibly grateful to all Overseas Partners who attended, in which we had 100% attendance.



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## 6 Monitoring, Evaluation and Learning (MEL)

A pre-event questionnaire was issued to provide a baseline view on WCSSP knowledge and collaboration aspirations. Following the workshop, another questionnaire was issued to all delegates for comparison. From that, interviews will be arranged with delegates to explore and understand their observations/suggestions in more detail. This will then feed into informing the content of any future WCSSP Programme Science Workshops.

In addition, feedback was offered by delegates following the event, a sample of which is as follows:

*First of all, I would like to congratulate you for the well organised Workshop in London. It was a great opportunity to meet many scientists from many countries and connect with the right people for further collaboration.*

- Madam Bibi, NADMA

*I very much enjoyed the chance to attend the recent WCSSP. It is certainly appropriate for international relationships, Science diplomacy and potential trade. I also felt there were a few lessons for COP 26 planning even though this event next year will be more that weather and climate services.*

- Mike Short, Dept of Int'l Trade

*It was so happy to meet you in London last week. And thank you so much for your hard work for this successful meeting.*

- Chan Xiao, CMA

*Had a wonderful time in meeting you and participating the WCSSP workshop. Everything was arranged so perfect that we can never forget!*

- Prof Guoxiong Wu, IAP

*Congratulations to you and to your colleagues for an excellent event last week. It was fantastic to see how the different WCSSP programmes can start to interrelate and how knowledge acquired in one programme can benefit others.*

- Nicola Willey, FCO

*Well done to you and all the team for such a great event.*

- Tom Child

*Thank you very much for inviting me to your very well-organised workshop. It was great to meet so many people – I think everyone found it extremely interesting and useful.*

- Ute Lynch, BEIS

*Just a quick note to say well done on the event this week. I wasn't able to spend much of the second day there, but it was very impressive to see countries joined up like that under a Newton programme, and it certainly generated food for thought at our end. Furthermore, bringing people together for all of those conversations at the side lines will undoubtedly also be hugely beneficial.*

- Piers Purdy, BEIS

*Thanks for all your help in organising a very productive and well run event.*

- Steven Cole, Group Leader, Hydrological Forecasting, Centre for Ecology & Hydrology

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*From India our Thanks for the excellent workshop.*

*It was a good opportunity for me to see what other WCSSP partners are doing.*

*I am sure, through this mechanism we will gradually interact across WCSSP partners on common science issues.*

- Ashis Mitra, NCMRWF

The primary purpose of the MEL activity is to investigate the effectiveness of the inaugural WCSSP Programme Science Workshop, consider whether it is value for money, and thereby determine the desire and usefulness of holding future workshops with all WCSSP partners once again in attendance.

Questionnaire findings and unsolicited feedback (as above) can be summarised as follows:

- The event overall was viewed as 'extremely' or 'very' useful.
- Although the majority of delegates were aware of all 5 WCSSP projects, a smaller number were confident in referencing an example of science research per project.
- The vast majority of reactions at the workshop and questionnaire respondents expressed a view that collaboration across WCSSP projects is either 'essential' or 'very important'.
- However, the majority of views on current levels of WCSSP collaboration ranged from 'fairly good' to 'neither good nor bad', with some in the 'fairly bad' to 'don't know' range. There were no suggestions of current collaboration across WCSSP being 'excellent'
- Regarding the regularity of future WCSSP Programme Science Workshops, the preferences were expressed in the following order:
  - 1) Every two years
  - 2) Annually
  - 3) Every 5 years
- There was an even divide over the usefulness of day 1 presentations over the day 2 workshop, with a slight preference towards day 1. This was a little surprising as the expectation would have been that discussing science research developments, rather than more general presenting, would be of more interest to delegates. It is felt that perhaps the leaning towards day 1 is a result of the content of the keynote presentations and partner case studies, as these scored highly. The content of any future WCSSP Programme Science Workshop therefore requires more investigation and delegate involvement.

**Conclusion and next step -** the Met Office WCSSP Stakeholder Engagement Team to follow up with delegate interviews to validate the above findings, and plan for a future event.

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**Appendix**

## A. Agenda

The high-level themes for the two days were:

### **Day 1 = Value**

Showcasing and reflecting on successes of the Newton Fund WCSSP Programme to date.

### **Day 2 = Growth**

Building on the foundations of the Newton Fund WCSSP Programme: Leveraging the WCSSP science community with collaborative research, resulting in an expansion of global benefits and impact of the programme over future years.

SEPTEMBER 23 <sup>rd</sup> 2019 - Day 1	
08:30- 09:25	<b>Registration and morning tea &amp; coffee in main Assembly Hall</b>
<b>THE CHALLENGE</b>	
09:25- 09:35	Delegates seated and Brief housekeeping information
09:35	<b>Words of Welcome</b> Professor Penny Endersby Chief Executive of the Met Office
09:45	<b>KEYNOTE SPEECH: The Challenge</b> Sir Patrick Vallance Chief Scientific Adviser to the Government of the UK
10:20	<b>Responding to The Challenge</b> Professor Stephen Belcher Chief Scientist, Met Office
10:45	<b>Newton Fund &amp; the Weather &amp; Climate Science for Service Partnership</b> <i>Newton Fund – Tom Child</i> Deputy Director for Science & Innovation, Department for Business, Energy & Industrial Strategy (BEIS) <i>Weather &amp; Climate Science for Service Partnership (WCSSP) – Dr Kirstine Dale</i> Head of Science Partnerships, Met Office
11:30	<b>Entire group photo, front steps of event venue</b> <b>Tea Break in Expo Area / Harvey Goodwin Suite</b>
12:15	<b>WCSSP Country Partner Messages</b> <i>Keynote messages reflecting the international community's scientific focus on the impacts of climate change and extreme weather events.</i> Professor Guoxiong Wu – Academician and Life Tenure Professor of Chinese Academy of Sciences (CAS), IAP, China Dr Osvaldo Moraes - Director, CEMADEN, Brazil Professor Ravi Nanjundiah - Director, IITM, India
13:15	<b>Lunch in Expo Area / Harvey Goodwin Suite</b>
<b>RESPONDING TO THE CHALLENGE</b>	
14:30	<b>Building a community to address the challenge</b> Introduced by Professor Albert Klein Tank Director of Met Office Hadley Centre Examples of work in: <ul style="list-style-type: none"> <li>• CSSP China - Dr. Zhang Peiqun, CMA &amp; Professor Adam Scaife, Met Office</li> </ul>

## 'A Growing Community Around a Shared Challenge'

	<ul style="list-style-type: none"> <li>WCSSP South Africa - Stephanie Landman, SAWS &amp; Professor Rosa Barciela, Met Office</li> <li>CSSP Brazil – Dr Gilvan Sampaio de Oliveria, INPE &amp; Dr Chris Jones, Met Office</li> </ul>
15:30	<b>Tea Break in Expo area / Harvey Goodwin Suite</b>
16:00	<b>Building a community to address the challenge (continued)</b> Examples of work in: <ul style="list-style-type: none"> <li>WCSSP Southeast Asia – Muhammad Helmi bin Abdullah, Met Malaysia, Dwikorita Karnawati, BMKG Indonesia &amp; Dr Andy Hartley, Met Office</li> <li>WCSSP India - Dr Ashis K Mitra &amp; Professor Sean Milton, Met Office</li> <li>Examples of activities spanning the WCSSP projects: Hazard of Great El Niño's – Professor Adam Scaife, Met Office</li> </ul>
17:00	<b>Summary of Day 1 and preview of Day 2</b> Professor Stephen Belcher Chief Scientist, Met Office
17:15	<b>Close of Day 1</b>
	<b>NETWORKING</b>
Evening	<b>Evening Networking Dinner</b>

## SEPTEMBER 24<sup>th</sup> 2019 - Day 2

08:30- 09:30	<b>Additional Registrations and morning tea &amp; coffee in main Assembly Hall</b>
<b>SHARED SCIENCE PRIORITIES WHEN MEETING THE CHALLENGE</b>	
09:30	Introduced by Professor Simon Vosper (15 mins) Director of Meteorological Science, Met Office  <i>An opportunity to identify science priorities for collaborations across the programme partnerships. Delegates will split into six groups to discuss:</i>  Section one (30 mins) <ul style="list-style-type: none"> <li><b>What benefits do we want to achieve through collaboration?</b></li> </ul> Section two (30 mins) <ul style="list-style-type: none"> <li><b>What are the outstanding science to service challenges for improved weather and climate, hazard and impact prediction?</b></li> </ul>
<b>Tea Break in Harvey Goodwin Suite</b>	
11:15	Group Presentation on sections one & two (30 mins) <i>Workshop groups present back to the forum on findings.</i>  Questions and answers (15 mins)
12:00	<b>Lunch in Harvey Goodwin Suite</b>
<b>OUR PLAN TO WORK TOGETHER TO ADDRESS THE CHALLENGE</b>	
13:00	Section three (30 mins) <ul style="list-style-type: none"> <li><b>How can we overcome the challenges?</b>  <i>Consider balance of: Resolution, complexity, ensemble size and design, forecast duration and impact-based forecasting.</i></li> </ul> Section four (30 mins) <ul style="list-style-type: none"> <li><b>What can the WCSSP projects learn from each other?</b></li> </ul>
14:00	<b>Tea Break in Harvey Goodwin Suite</b>

# Weather and Climate Science for Service Partnership

Programme Science Workshop | 23-24 September 2019



## 'A Growing Community Around a Shared Challenge'

14:30	<p>Group Presentation on sections three &amp; four (30 mins) <i>Workshop groups present back to the forum on findings. This informs future discussions on weather &amp; climate priorities for the WCSSP projects and programme.</i></p> <p>Questions and answers (15 mins)</p> <p><b>Summary and recommendations</b> (15 mins) Professor Stephen Belcher Chief Scientist, Met Office</p>
15:30	<b>Close of Day 2 and Depart</b>