

# CSSP China

Professor Adam Scaife, Met Office  
Dr Zhang Peiqun, CMA

Developing the science needed to build climate services that support climate-resilient economic development and social welfare

In its 6<sup>th</sup> year

**Strategic partnership between Met Office,  
China Meteorological Administration and  
Institute of Atmospheric Physics**

**Accelerated and enhanced collaborative  
scientific research**

**Climate Services developed in  
collaboration**

1. Monitoring, attribution and reanalysis

2. Global dynamics of climate variability and change

3. East Asian climate variability and extremes

4. Development of models and climate projection systems

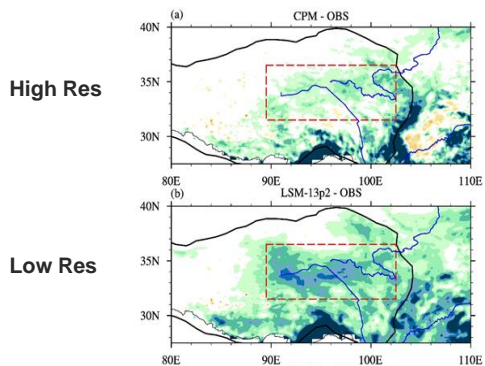
5. Climate services

**Effects of resolution on climate predictions**

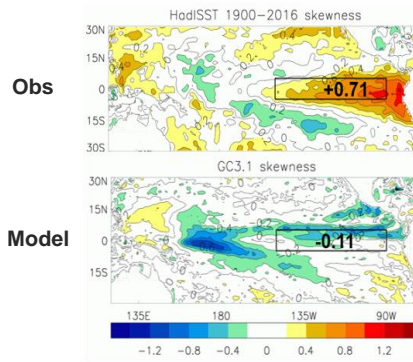
**Climate model development**

**Mechanisms for onset of monsoons**

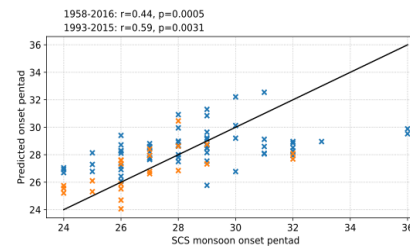
Higher resolution models show less bias



Climate models don't represent weak La Niña/strong El Niño



New insights into the monsoon onset



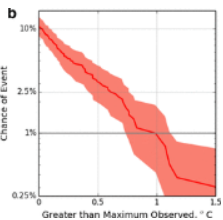
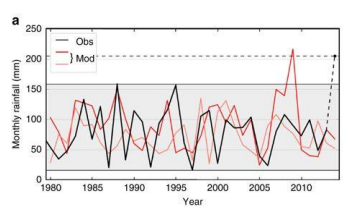
# Understanding Extreme Events

**New techniques for risk of climate extremes**

**Growing effects of climate change on extremes**

**From meteorological extremes to sectorial impacts**

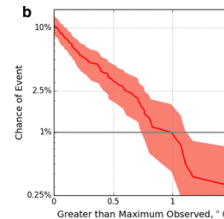
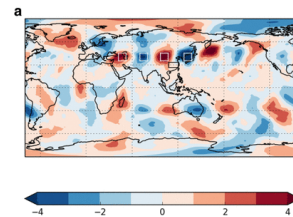
UK Flooding



**ARTICLE**  
**High risk of unprecedented UK rainfall in the current climate**  
 W.M. Thompson<sup>1</sup>, N.S.J. Davison<sup>2</sup>, Adam A. Scaife<sup>1</sup>, David M. Smith<sup>1</sup>, Julia M. Slingo<sup>1</sup>, Simon Brown<sup>1</sup> & Stephen L. Brier<sup>1\*</sup>



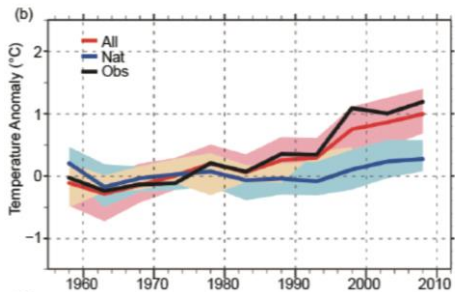
Chinese Heatwaves



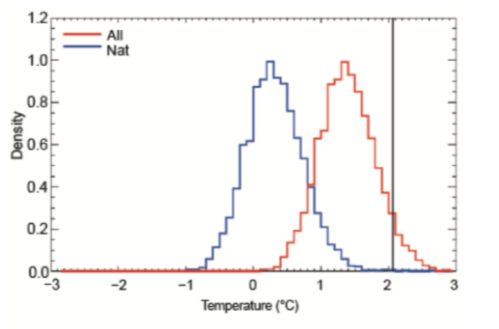
# Understanding Extreme Events

**New techniques for risk of climate extremes**  
**Growing effects of climate change on extremes**  
**From meteorological extremes to sectorial impacts**

Growing climate change in China



Change in temperature



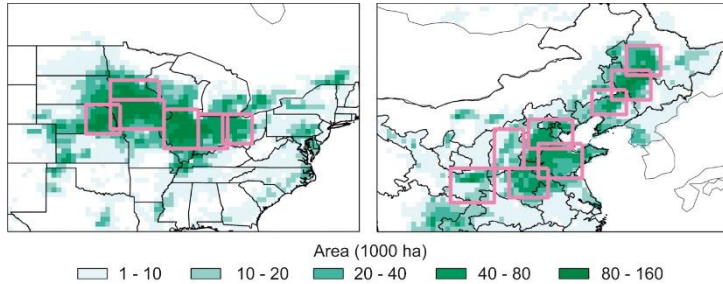
Workshops in attribution techniques



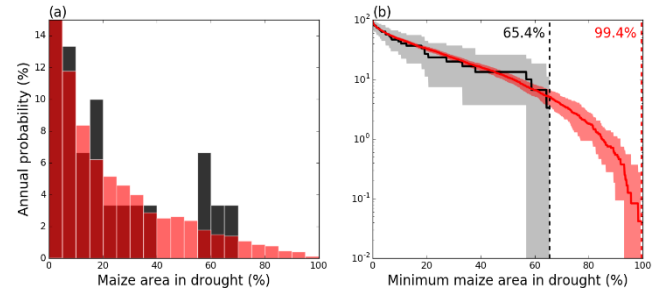
# Understanding Extreme Events

New techniques for risk of climate extremes  
Growing effects of climate change on extremes  
**From meteorological extremes to sectorial impacts**

Most of the world's maize is grown in the U.S.A. and China



Significant chance of unprecedented drought





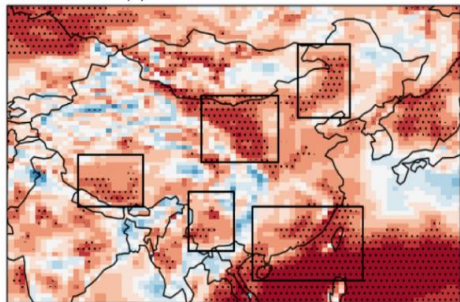
# Understanding Predictability

**Predictability of Chinese winter winds**

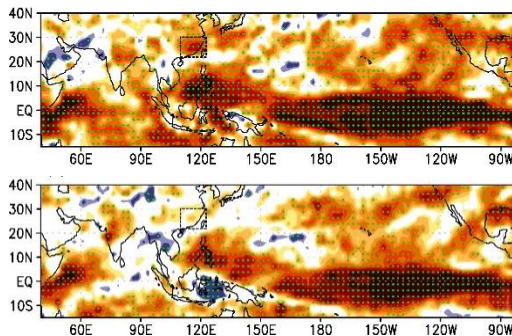
**Predictability of Chinese winter rainfall**

**Predictability of Chinese summer temperatures**

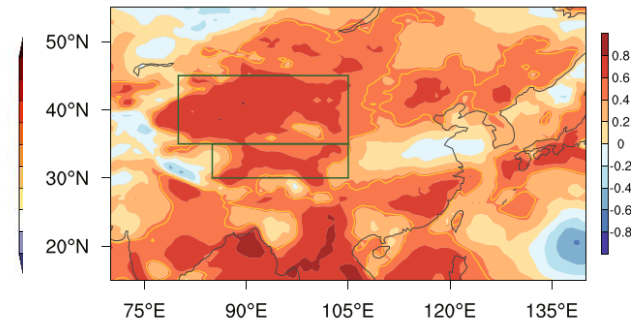
Seasonal prediction skill – winter windspeed



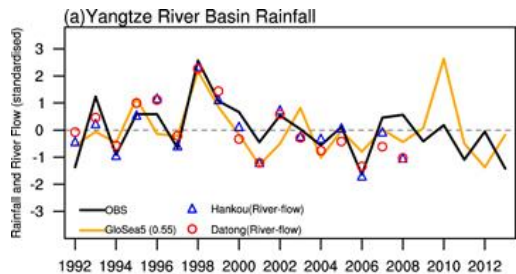
Seasonal prediction skill – winter rainfall



Seasonal prediction skill – summer temperature



**Climate prediction service for Yangtze river valley**  
**Climate prediction service for Pacific Typhoon risk**  
**Research on engagement and uncertainty**



**Met Office Hadley Centre**

**INTERNAL USE ONLY**

**2019 Yangtze River Seasonal Forecasts**

05 May 2019  
© Crown Copyright 2019 Met Office

This document provides forecasts for the Yangtze river region in 2019, based on the Met Office's seasonal forecast system. Forecasts are for area-averaged seasonal mean precipitation rate.

The map on the right shows the **basin average** region we are forecasting for. The location of the Three Gorges Dam is marked with a star.

The current headline results for this region are:

For JJA:

- There is a 45% chance of above-average rainfall for the basin average.
- There is a 55% chance of below-average rainfall for the basin average.



**Met Office Hadley Centre**

**INTERNAL USE ONLY**

This page shows forecasts for the Upper Reaches of the Yangtze River basin, shown in the map on the right. The current headline results for this region are:

For JJA:

- There is a 50% chance of above-average rainfall for the Upper Reaches.
- There is a 50% chance of below-average rainfall for the Upper Reaches.

**Met Office Hadley Centre**

**INTERNAL USE ONLY**

This page shows forecasts for the Middle & Lower Reaches of the Yangtze River basin, shown in the map on the right. The current headline results for this region are:

For JJA:

- There is a 50% chance of above-average rainfall.
- There is a 50% chance of below-average rainfall.

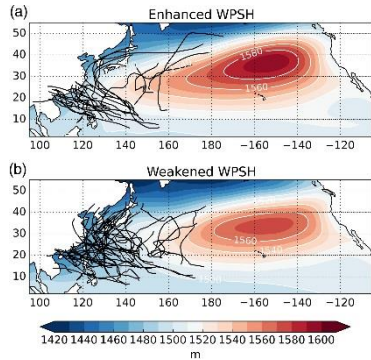




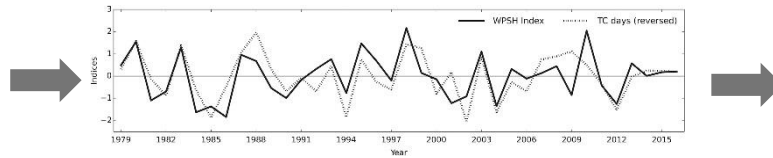
Climate prediction service for Yangtze river valley

**Climate prediction service for Pacific Typhoon risk**

Research on engagement and uncertainty



## Typhoons and the Subtropical High



INTERNAL USE ONLY

**2019 Tropical Cyclone Landfall Seasonal Forecast for East Asia**

1 May 2019

© Crown Copyright 2019 Met Office

This document provides a seasonal forecast of tropical cyclone landfall risk for East Asia during June-August 2019, based on the Met Office Global Seasonal forecast system.

The map on the right shows the East Asia landfall region we are forecasting for. The location of Shanghai is marked with a star.

The current headline results are:

For June-August 2019:

- There is a 50% chance of above-average tropical cyclone landfalls in East Asia.
- There is a 50% chance of below-average tropical cyclone landfalls in East Asia.

**Climate prediction service for Yangtze river valley**  
**Climate prediction service for Pacific Typhoon risk**  
**Research on engagement and uncertainty**

**Identify user needs in priority sectors in China to develop prototype services:**

**Air quality climate information and services (University of Edinburgh, BCC, IAP)**

**User needs for urban services (University of Reading, SOAS, Met Office, )**

**Strong network with over 75 scientific exchanges/workshops**  
**~220 papers published in peer reviewed journals**  
**Mutual benefits to UK and Chinese partners**

International Journal of Climatology



RESEARCH ARTICLE Full Access

### Summertime surface energy balance fluxes at two Beijing sites

Jianxi Dou, Xue Gengrui, Zhigang Cheng, Shiguang Miao... See all authors

### Regime Change Behavior during Asian Monsoon Onset

RUTH GLEN, F. H. LAMBERT, AND G. K. VALLIS

College of Engineering, Mathematical and Physical Sciences, University of Exeter, Exeter, United Kingdom

### Moisture Sources for East Asian Precipitation: Mean Seasonal Cycle and Interannual Variability

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National Centre for Atmospheric Science, Department of Meteorology, University of Reading, Reading, United Kingdom

RUUD J. VAN DER ENT

Department of Water Management, Faculty of Civil Engineering and Geosciences, Delft University of Technology, Delft, and Department of Physical Geography, Faculty of Geosciences, Utrecht University, Utrecht, Netherlands

NICHOLAS P. KLINGAMAN, MAHE-ESTELLE DEMORY, AND PIER-LUC VIGNALE  
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ANDREW G. TURNER

National Centre for Atmospheric Science, Department of Meteorology, and Department of Meteorology, University of Reading, Reading, United Kingdom

CLAUDIA C. STEPHAN AND AMÉLIA A. CHEVREUIRE

National Centre for Atmospheric Science, Department of Meteorology, University of Reading, Reading, United Kingdom

### Improving user engagement and uptake of climate services in China

Huixi Gao, Jiahui Chen, Feng Peng, Peng Wang, Hong Wang, Jinghui Hu, Shaojun Lu



ARTICLE

Open Access

OPEN

### High risk of unprecedented UK rainfall in the current climate

Vivi Thomps<sup>1</sup>, Neil J. Dunne<sup>1</sup>, Adam A. Scafe<sup>1</sup>, Doug M. Sear<sup>1</sup>, Julia M. Strat<sup>1</sup>, Simon P. King<sup>1</sup>, and Gordon L. Stott<sup>1</sup>

Met Office, Exeter, UK

### ANTHROPOGENIC WARMING HAS SUBSTANTIALLY INCREASED THE LIKELIHOOD OF JULY 2017-LIKE HEAT WAVES OVER CENTRAL EASTERN CHINA

YANG CHEN, WU CHEN, QIN SU, FEIJI LUO, SHAN SHIHOUE, FANGDING TAN, BUNYON DOG, SIMON F. B. TETT, FRANK C. LOTT, AND DAVID WALLON

## JGR Atmospheres

### RESEARCH ARTICLE

10.1029/2018JD29303

Key Points:

• JJ is mainly determined by

### Diagnosing Ocean Feedbacks to the BSISO: SST-Modulated Surface Fluxes and the Moist Static Energy Budget

Yingxia Gao<sup>1</sup>, Nicholas P. Klingaman<sup>1</sup>, Charlotte A. DeMott<sup>1</sup>, and Fang-Chi Hou<sup>1</sup>

## Atmospheric Science Letters



Research Article Open Access

### Added value of high resolution models in simulating global precipitation characteristics

Lixia Zhang<sup>1</sup>, Peili Wu, Tianjun Zhou, Malcolm J. Roberts, Reinhard Schiemann

ADVANCES IN ATMOSPHERIC SCIENCES, VOL. 35, AUGUST 2018, 981-1004

Original Paper

### On Northern Hemisphere Wave Patterns Associated with Winter Rainfall Events in China

Christa Christine STEPHAN<sup>1</sup>, Xue He-ND<sup>1</sup>, and Nicholas P. KLINGAMAN<sup>1</sup>

<sup>1</sup>National Centre for Atmospheric Science - Climate, Department of Meteorology, University of Reading

Clin Dyn

DOI: 10.1007/s00382-017-3988-2

BR, United Kingdom

### An extreme negative Indian Ocean Dipole event in 2016: dynamics and predictability

Bo Lu<sup>1,2</sup>, Hong-Ji Hsu<sup>1,4,5</sup>, Adam A. Scafe<sup>1,6</sup>, Jie Wu<sup>1,2</sup>, Nick Dunstone<sup>1</sup>, Dong Smith<sup>1</sup>, Junghun Wan<sup>1,2</sup>, Rosie Eade<sup>1</sup>, Craig MacLachlan<sup>1</sup>, Margaret Gortun<sup>1</sup>

Advances in Atmospheric Sciences

August 2018, Volume 35, Issue 8, pp994-1002 | Citations

### Impacts of Anthropogenic Forcings and El Niño on Chinese Extreme Temperatures

Authors Authors and affiliations

N. Hyeoncheol, S. Sparrow, S. F. B. Tett, M. J. Minster, G. C. Heeger, D. C. H. Walton



## Advances in Atmospheric Sciences

ADVANCES IN ATMOSPHERIC SCIENCES, VOL. 35, AUGUST 2018, 918-928

Original Paper

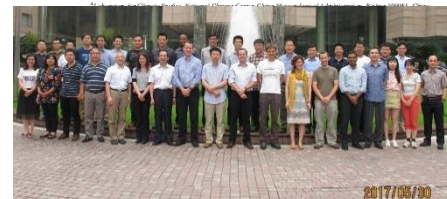
### Seasonal Forecasts of the Summer 2016 Yangtze River Basin Rainfall

Philip E. BRETHERTON<sup>1</sup>, Adam A. SCAFE<sup>1,2</sup>, Chuanxin LI<sup>1</sup>, Chris HEWITT<sup>1</sup>, Nicola GÖRDLING<sup>1</sup>, Pengfei ZHANG<sup>1</sup>, Nick HUNTERSON<sup>1</sup>, Doug M. SEAR<sup>1</sup>, Heide E. THORNTON<sup>1</sup>, Wojciech S. and Hong-Ji HEN<sup>1</sup>

<sup>1</sup>Met Office, Exeter, UK

<sup>2</sup>College of Engineering, Mathematics and Physical Sciences, University of Exeter, Exeter EX4 4QF, UK

<sup>3</sup>Centre for Monsoon System Research, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing 100029, China



2017/05/30

**Understanding basic mechanisms and chances of extreme climate events**

**Transfer of expertise between Chinese and UK scientists**

**Forging a genuine network of regular collaborators**

**Increasing capability in observations, modelling and climate prediction**

**Finding unprecedented new climate prediction skill for China**

**Bridging the gap between academic understanding and practical services**



