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Shared Science priorities when meeting the challenge

Professor Simon Vosper, Met Office

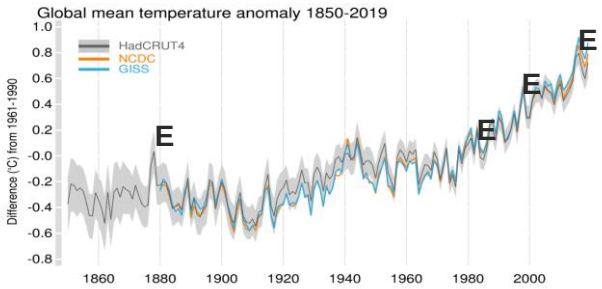
'A Growing Community Around a Shared Challenge'

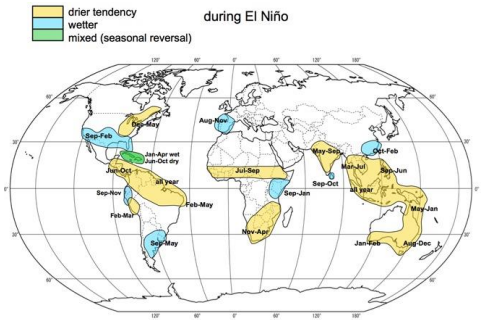
To bring together partners from across the Weather and Climate Science for Service Programme (WCSSP) to share **scientific highlights**, facilitate **knowledge sharing** and explore ways to **maximise the benefits and scientific advances** across the whole programme.

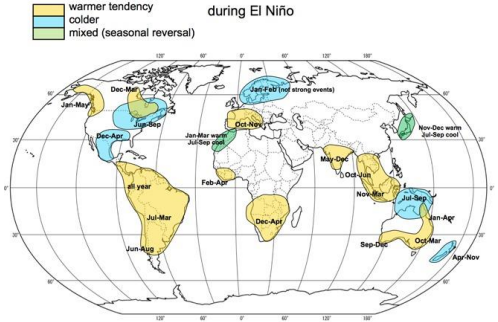
Contents

1. Cross-cutting theme ideas
    - The Global Hazard of Extreme El Niño's
    - UNSEEN
    - High Resolution Modelling
    - Madden-Julian Oscillation
    - Impacts-Based Forecasting
    - Climate Attribution
2. Group discussions

The Global Hazard of Extreme El Niño's





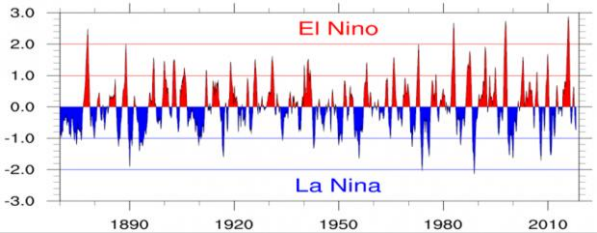


Each 1 degree of El Niño => around 0.1 degree globally

Determines the record year; currently 2016

More extreme local impacts…

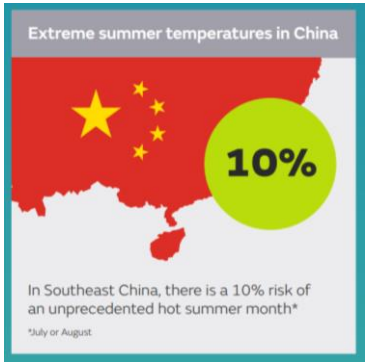
Rainfall and hence drought/flood impacts



Temperature and hence heatwave/cold snaps

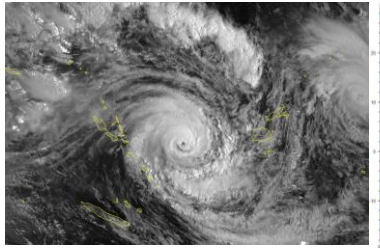
UNSEEN Unprecedented Simulated Extremes with ENsemble

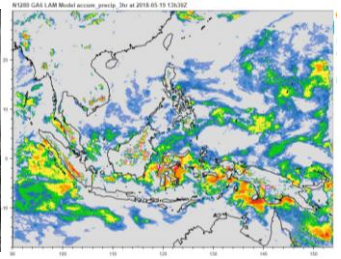
- UNSEEN is a method for assessing the current climate risk to extreme events developed under CSSP China.
- The method can be applied to different weather and climate events including temperature and rainfall.
- Method used in UK's National Flood Resilience Review (2017).
- New opportunities to apply method in CSSP Brazil.

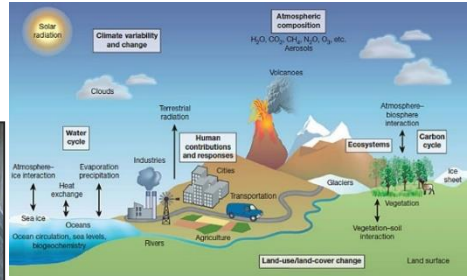


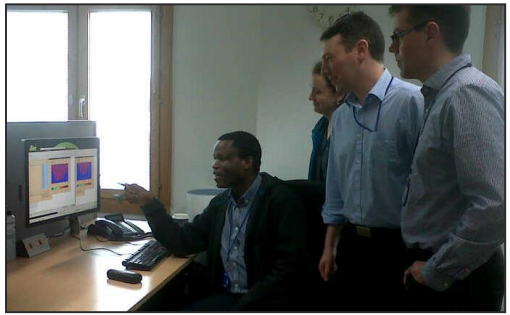
High Resolution Modelling

- Southeast Asia focusing on tropical cyclones, maritime continent and precipitation forecasting.
- India focusing on extreme precipitation, winds and coastal inundation in a coupled atmosphere-ocean-land model.
- Potential for large domain high resolution models covering Indian Ocean and Southeast Asia.
- South Africa pulling science through to operations and running high resolution models.
- Complementary projects, ensuring no duplication of effort.



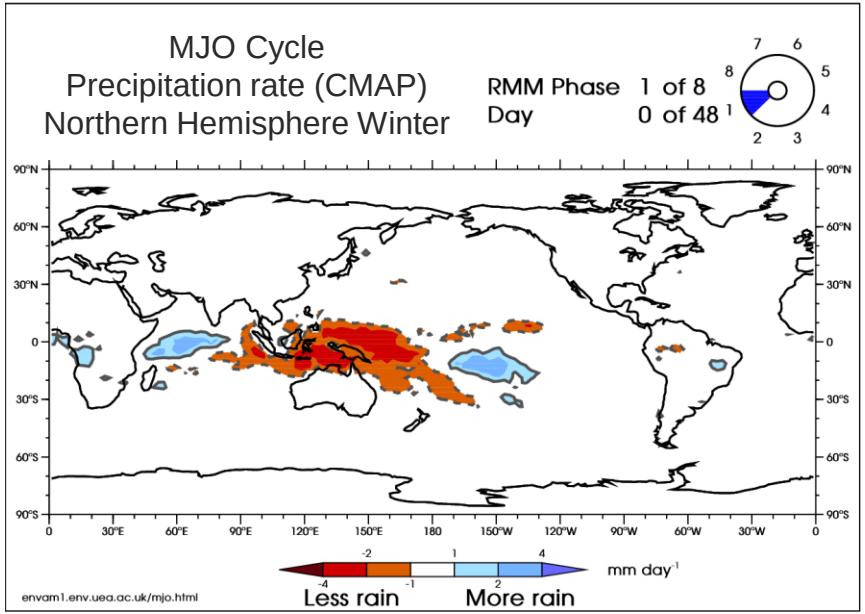




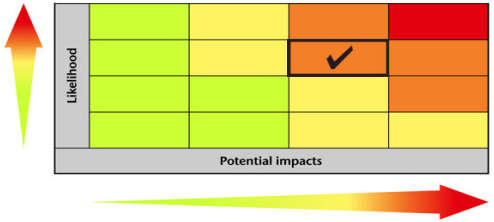


Madden-Julian Oscillation (MJO)

- The MJO is a 30 to 60 day cycle affecting many areas the world. It impacts precipitation amounts and other meteorological and ocean variables.
- Regional features, e.g. cold surges, can interact with the MJO and substantially amplify rainfall amounts.
- Working in partnership enhances understanding of local and regional features and processes leading to improved global and regional models and improved prediction of severe weather events.

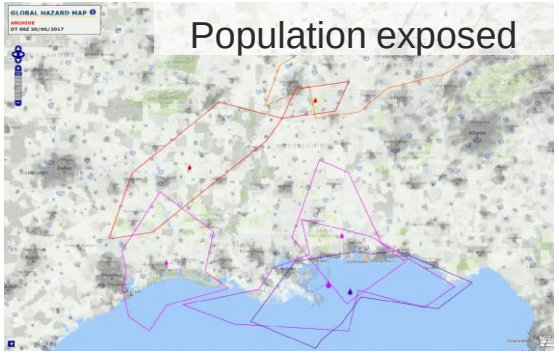


Impact-Based Forecasting (IBF)



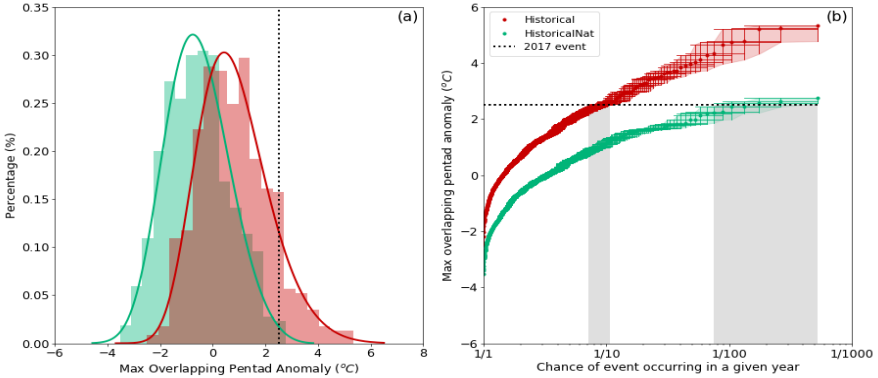
'What the weather will **DO**' not 'what the weather will BE'

- IBF workshops and visits – **knowledge sharing** and support from UK experience.
- Methodologies and lessons are **shared between countries** to benefit all.
- **Global Hazard Map** tool – developed in UK – displays populations and assets exposed to high impact weather – feedback used to improve tool.
- IBF on weather and potentially seasonal timescales.
- Ultimate aim in-country is for weather forecasts to become more impact based and therefore **provide more useful information** to everyone.



Climate attribution

- Joint CSSP China-CSSP Brazil venture with University of Edinburgh (lead) and University of Oxford (host).
- Provided learning and hands-on experience for early career researchers in the field of climate attribution.
- Found that the 2017 heatwave in China would be extremely rare in a world without anthropogenic forcing, but became a 1 in 15 year event in the real world with man-made emissions.
- Joint paper in preparation for submission to BAMS.



Introductions - Group Facilitators

1. Huw Lewis
2. Kalli Furtado
3. Stuart Webster
4. Chris Jones
5. Adam Scaife
6. Rosa Barciela

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What benefits do we want to achieve through collaboration?

1. Write individual ideas on post-it notes (5 minutes)
2. Collate post-it notes and see which ideas are most popular.

   Write the top 3 benefits on the flipchart. (25 minutes)

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

1. Write individual ideas on post-it notes (5 minutes)
2. Collate post-it notes and see which ideas are most popular.

   Write the top 3 benefits on the flipchart. (25 minutes)

How can we overcome the challenges?

1. Write individual ideas on post-it notes (5 minutes)
2. Collate post-it notes and see which ideas are most popular. Write the top ideas on the flipchart. (25 minutes)

What can the WCSSP projects learn from each other?

1. Write individual ideas on post-it notes (5 minutes)
2. Discuss on ideas and write list on flipchart (25 minutes)