Extremes Grand Challenge - “Document”

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Workshop on Data Requirements to Address the WCRP GC on Weather and Climate Extremes
Sydney, Australia, 25th – 27th Feb 2015

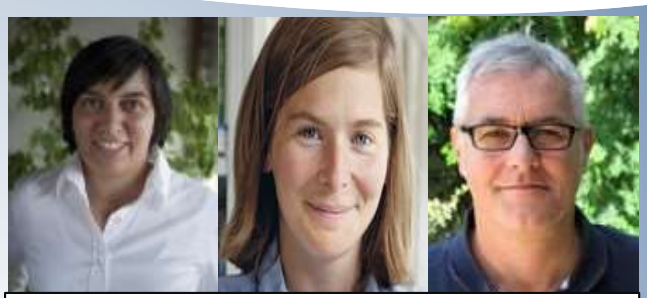
Extremes Grand Challenge

Document → Understand → Attribute → Simulate

Leadership roles

Lisa Alexander Ali Behrangi

Document



Sonia Seneviratne Olivia Martius Robert Vautard

Understand

Xuebin Zhang Fredi Otto

Attribute

Gabi Hegerl Erich Fischer Jana Sillmann

Simulate

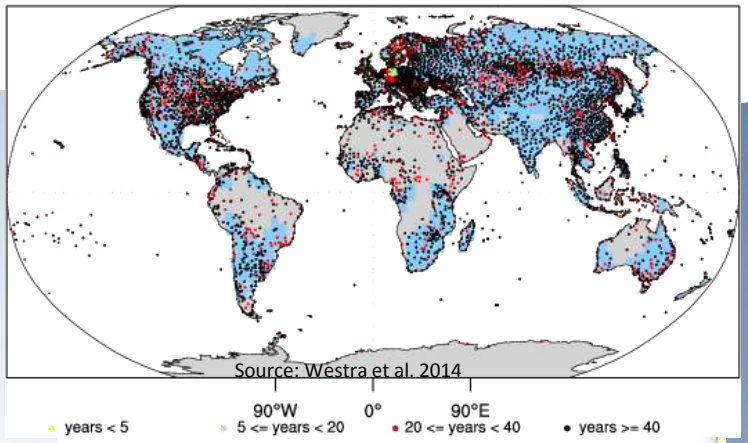
Climate Change Research Centre

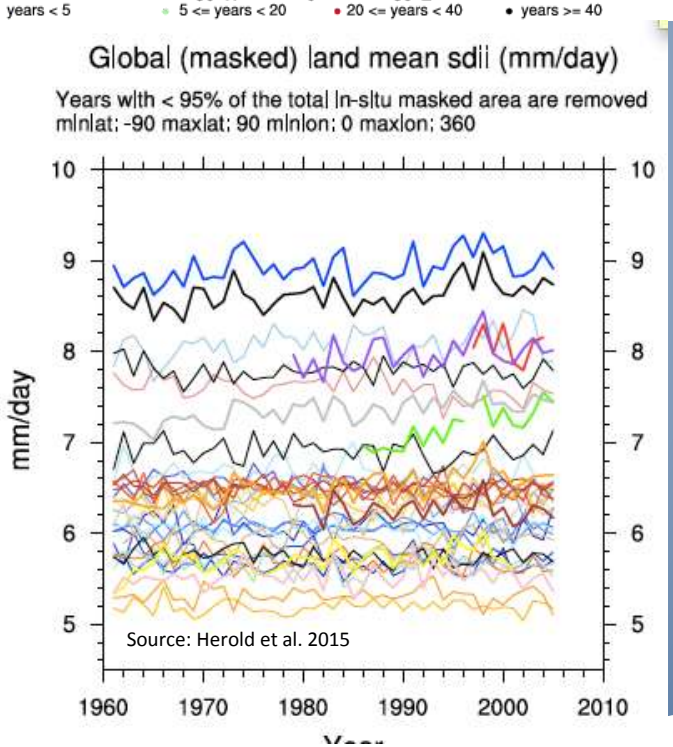
ARC CENTRE OF EXCELLENCE FOR CLIMATE SYSTEM SCIENCE

Document Theme

Observations provide crucial underpinning but are often not well-constrained and critical gaps exist in the amount, quality, consistency and availability, especially with respect to extremes

Sub-daily precip stations (HadISD) and SDII coverage (HadEX2)





A 2-pronged approach

- Coordination needs across and between existing activities
  - Who is already doing what
  - Enabling existing projects, avoiding duplication
  - What gaps still exist

- What new activities, research or data gathering needs to be undertaken?

Coordination activities

- Collation of all existing *in situ* daily data sources for temperature and precipitation (and sub-daily for precipitation)
  - e.g. GHCN-Daily, GPCC, HadISD, ECA&D etc., raw data collection from HydroMet services, researchers stored in central repository. Coordination with GHP, GDAP, and international projects e.g. EUSTACE, INTENSE, ACRE
- Collation of ETCCDI indices

Coordination activities – workshops and summer schools

- WCRP-ICTP summer school (Jul/Aug 2014)
- GDIS workshop (Dec 2014)
- Data issues workshop (Feb 2015)

New activities, research or data gathering (I)

- ETCCDI indices reviewed and new indices added that are more impacts-relevant
- Standardised software and an associated manual for intercomparison [coordinated with WGRC, GFCS [ET-CRSCI], GDIS]
- ‘Best practice’ guidance document on gridding data to best represent extremes and address scaling issues between observations and models

New activities, research or data gathering (II)

- Revised global climate extremes datasets with better spatial and temporal coverage and uncertainty estimates
- Coordinated intercomparison of existing and new datasets including the standard calculation of precipitation extremes from satellite retrievals
- Marine Heatwaves (targets feedback from CLIVAR - workshop already held Jan 2015 in Perth driven by marine ecology community)

Early Successes – WCRP-ICTP summer school

236 applications for 35 places. About half of the attendees from developing countries.

A special issue of "Weather and Climate Extremes" in progress

Cross-cutting activities

- Three to four focused workshops over the next 1-2 years with the objective to **bring the appropriate communities together to make significant progress in strategic areas of Grand Challenge Questions**
- **enhanced interactions between the statistical and climate communities**
- **Capacity building and data gathering activities**
- A **WCRP-wide open science conference on climate extremes** will be organized in 2017. This will review our achievements within the Grand Challenge and provide valuable input into the next IPCC Assessment.

Where can we improve?

- We don't have a single overarching question
- How will we measure 'success'?
- Integration, collaboration, communication
- We can't cover everything but where do cold extremes, high impact events fit?
- The Implementation Plan is a 'living document' so changes can be made as we progress

4 possible questions

- How can we improve the observations needed to assess extremes and underpin model evaluation?
- What is the respective contribution of atmospheric dynamics v land surface processes to extremes at regional scales?
- What is the contribution of anthropogenic climate change to historical trends in extremes?
- How do climate models perform in predicting extremes and how can they be improved?