

GC-Extremes Report

1. Highlights for JSC

- Several new activities have been conducted associated with this Grand Challenge, as laid out in the [2016 Implementation Plan](#). They are focused on data issues, process understanding, compound events and marine heatwaves.
- The planned [Open Science Conference in April 2018](#) will feature key scientific questions around the GC-Extremes and GC-Water for Food Baskets. This event will provide a major milestone for two GCs to review achievement and revise the timeline and scientific foci.

2. Early success and/or planned activities in 2017/2018

([see the GC web page](#), as well as the GC-Extreme factsheet version 1)

- Out of many achievements, the GC-Extremes has initiated and facilitated the following major early success:
 - WCRP Summer School on Climate Extremes (July 2014, Trieste), and associated [Special Issue](#) in the Weather and Climate Extremes Journal (Vol.9, September 2015)
 - Advancement in “[document](#)” theme at the [Extremes data requirements workshop](#) (February 2015, Sydney)
 - Advancement in “[understanding](#)” and “[simulate](#)” themes at the [M-CIIX workshop](#) (October 2015, Oslo)
- Specific activities conducted since April 2016 include:
 - Blocking workshop jointly with SPARC (April 2016, Reading)
 - Advancement in “[attribute](#)” and all other themes at the [13th IMSC](#) (June 2016, Canmore), [Uncertainty modelling workshop](#) (June 2016, Banff) and Event Attribution workshop (June 2016, Canmore)
 - Marine heatwaves workshops (February 2015, Australia; February 2017, Thailand) combining atmosphere, ocean and ecology communities along with regional dissemination activities
- Development of concept for compound event and planning of a workshop on compound extremes (April 2017, Zurich) to scope questions
- High impact perspective paper on extremes is under preparation for submission to Natural Geoscience
- Preliminary discussions regarding an activity on predictability (initiated by KNMI and ECMWF)
- A planned multi-model experiment on the role of ocean vs atmospheric circulation and land surface for the occurrence of extremes (“Extremex”)
- Many GC-coordinated publications (see below)

3. Partners for GC implementation

- GEWEX and CLIVAR provide the main frameworks for developing and implementing science questions
- Close and integrated implementation with ETCCDI and other WMO Expert Teams particularly for data, model experiments, model evaluation and attribution, as well as capacity development

- Joint activities with international associations such as IUGG (particularly through IAMAS), Future Earth through E3S
- Aiming for close partnership between weather and climate research community, for example, WWRP High Impact Weather (HIWeather)

4. Overall GC timeline (See Relevant section of the [Implementation Plan](#))

- The GC implementation is being progressed according to the Implementation Plan.
- The OSC (April 2018) will be the nearest major milestone to review achievements so far, and revise key scientific questions and timeline where appropriate.

Timeline		2014	2015	2016	2017
Document	Data issues workshop				
	Review of extremes indices & software development				
	Best practice guidance documents – datasets and gridding				
	Data repository & dataset intercomparison				
Understand	Plan CMIP6 land experiments				
	EUCLEIA meetings and MCLiX workshop session				
	LandMIP workshop				
	Blocking workshop				
	Coordinated experiments & software				
Simulate	IDAG/EUCLEIA meetings				
	MCLiX workshop				
	Guidance paper on evaluation				
	NCAS Postdoc/evaluation				
Attribute	Summer school & special issue				
	Workshop on hydrological extremes				
	Review paper on attribution methodology				
	IDAG/EUCLEIA meetings				
	Framing workshop				
Cross-cuts	White Paper				
	Implementation Plan				
	WCRP-ICTP summer school and special issue publication				
	GDIS workshop				
	IDAG/EUCLEIA meetings				
	Heatwaves workshops & publications				
	M-CliX workshop				
	Nature Geoscience perspective paper				
	Seasonal-to-subseasonal prediction of extremes (WWRP-led)				
	Compound events				
	Open Science Conference planning				

5. Issues and challenges

- Given that many groups have a major focus on “extremes” (including e.g. WMO/WWRP and many regional initiatives) our challenge is to coordinate, complement and advance existing activities while not being duplicative. This is particularly hard to do because of limited resources (especially given the recent budget evolution at WCRP).
- It should be noted that, in addition to WCRP’s financial support, substantial monetary and in-kind contributions have been mobilized through this GC, facilitating cross-cutting and cross-programme collaboration. WCRP resources have been providing the minimum level of seed funding to initiate activities and attract external supports. The latest development resulted in sharp decrease of financial support, facing serious difficulties to enable international coordination for such a broad cross-cutting activities. It is essential to secure the WCRP umbrella for GCs both financially and programmatically, to continue a community-wide effort.

6. References

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