Met Office, FitzRoy Road, Exeter EX1 3PB
Tel: +44-3301-350322
Email: brian.golding@metoffice.gov.uk

October 2020

Dear Colleagues,

The big news this month is progress in planning our HIWeather Workshop. As a fully virtual workshop, we can structure it differently from past workshops, so we have a full month of informative online seminars to bring participants up to speed on progress in the HIWeather task teams before we get to the main working sessions in December. As HIWeather is such an interdisciplinary project, the characters of the online seminars will be vary, one from another. As HIWeather is a globe-spanning activity, the time zones of the online seminars will also vary. However, all sessions will be recorded and made available after the event to those who have registered.

So please make sure you register in time for us to send you the connection details ahead of the first online seminar starting at 8pm UTC on October 26th, by sending an email with your name, affiliation and contact details to Martin Wegmann at WMO (MWegmann@wmo.int) as soon as possible. This seminar will be on Communicating about High Impact Weather, with a focus on Uncertainty, Trust & Beliefs, and will consist of four 10-minute presentations by eminent speakers followed by a panel discussion with plenty of time for audience participation.

We are still working on details of the second seminar on November 5th, currently scheduled to start at 2pm UTC, which will focus on weather impacts and the challenge of assessing impact from hazard in real time. The third seminar is joint with the 2020 International Verification Methods Workshop starting at 8pm UTC on 11th November. The fourth and fifth seminars will be on succeeding weeks at times to be decided.

These seminars are the appetisers, setting out the key questions and research in preparation for three intensive workshop days on December 1st - 3rd, each running round the clock so that all time zones have an opportunity to contribute. Each will consist of one-hour presentation/discussion sessions interspersed with one-hour break-out / working periods, so that by the end of each day we have a concrete set of outputs to share.

The first day will focus on **citizen science**. If you have used citizen science in any project related to forecasting and warning of natural hazards and their impacts, we want to hear your experience. Contributions will be used to develop our draft guide on the use of Citizen Science, which will be available for discussion during the session.

The second day will focus on **case studies of end-to-end warning chain performance**. If you have completed a report on performance of forecasts and warnings in a weather event that caused loss of life or damage, please submit an abstract to this session. We want to hear about these studies so as to build up a catalogue of evidence on the real performance of warning systems. You will be invited to provide a link to your report or published paper and to give a 10-minute introduction to the findings.

Finally the third day will look at the **ingredients of the perfect warning**, as we understand them today, with a particular emphasis on the role of partnerships in facilitating the communication of requirements up the chain from end-user to forecaster, and of real-time information back down the chain when a warning is issued. If you have been involved in a partnership that contributes to a warning chain, or if you have carried out research demonstrating an important ingredient that would help produce more effective warnings, we want to hear from you. All contributions will help to refine our draft book on the perfect weather warning.

If you can contribute to any of these workshop sessions, please send a brief abstract with your contact details and your preferred session and presentation time (UTC) to Martin Wegmann at WMO (MWegmann@wmo.int) **as soon as possible** so that we have time to schedule the talks.

Best wishes,

Brian Golding

HIWeather Co-chair

CONTENTS

CALLS AND REQUESTS

Citizen Science for Understanding and Improving the Warnings Value Chain: Citizen science is a broad term, which encompasses a variety of different types of projects where the public (citizens) work with agencies and academic researchers to undertake scientific research. A special issue of the Australasian Journal of Disaster and Trauma Studies will bring together accounts of the research, policy and practice initiatives from researchers, practitioners and the wider HIWeather and DRR community. Submission details are available at: http://trauma.massey.ac.nz/

HIWeather Endorsement: The Steering Group (SG) of the High Impact Weather (HIWeather) Project provides endorsement for projects, programs and initiatives that plan to contribute to the goals of HIWeather as outlined in the HIWeather Implementation Plan. Projects seeking endorsement through HIWeather may either be funded or in the process of seeking funding. (More information: http://hiweather.net/article/17/27.html)

General Call: We would like to invite those who use Twitter to communicate about HIWeather relevant topics to add their Twitter name to the database that Emily Campbell has compiled:
https://docs.google.com/spreadsheets/d/1Aw1B2FjW66T_yoLCWSb6KzvDZR_e2wTBqYOsFFYRU5M/edit?usp=sharing

HIWeather 2020 online workshop: Registration is now open at http://hiweather.net. The programme consists of:

- 26th October 20:00 – 21:30 UTC: Online seminar on warning communication
- 5th November 14:00 – 16:00 UTC: Online seminar on impact-based warnings
- 11th November 20:00 – 22:00 UTC: Online seminar on warning evaluation joint with 2020-IVMW-O (https://jwgfvr.univie.ac.at)
- 19th November 21:00 – 23:00 UTC: Online seminar on forecasting hazards
- 25th November 14:00 – 16:00 UTC: Online seminar on hazardous weather processes
- 1st December: Workshop on "Successful citizen science"
- 2nd December: Workshop on "Warnings value chain"
- 3rd December: Workshop on "Towards the perfect warning"

The workshop is aimed at anyone interested in improving weather-related warnings, whether as a research scientist, operational forecaster or any manager responsible for weather-related risks to health, property, environment and economy. Register by emailing MWegmann@wmo.int with your name and affiliation.

We invite abstracts for the three one-day workshops on core topics of HIWeather:

- "Successful citizen science": Submissions are invited on any application of citizen science related to forecasting and warning of natural hazards and their impacts. Information on HIWeather Citizen Science is at http://hiweather.net/Uploads/ue/file/20200225/1582617584722968.pdf
- "Warnings value chain": Submissions are invited on studies of the end-to-end performance of forecasting & warning systems. Information on the HIWeather warning value chain is at https://hiweathercomms.net/projects/internal-projects/weather-information-value-chain/
- "Towards the perfect warning": Submissions are invited on the role of partnerships in facilitating effective creation and communication of warning information. Information on plans for a HIWeather book of this title is at http://hiweather.net/Lists/21.html

Further information about the workshop:

- Each of the three one-day workshops will consist of one-hour plenary sessions separated by one-hour breaks during which participants may join break-out groups to continue the discussion of a particular presentation or to prepare workshop outputs.
- Each day will start at noon, New Zealand time, and conclude at noon, US Mountain time, so as to accommodate participation across time zones. We encourage participants to join at least two one-hour sessions and preferably more.
- Presenters will provide their paper/presentation in advance, give a 10-minute overview during the session, and be available to discuss their paper later in the session and in the succeeding break period.
- Remote participation in the workshop will use **MS Teams** and **BlueJeans**.
- Only registered participants will have access to the online seminars and workshop sessions during the workshop.
- **For access to the first webinar, please register by 20th October.**

RELEVANT MEETINGS

- **FESSTVal Summer School** (Germany) was cancelled due to COVID-19. The current plans envision a Spring School 2021, if circumstances allow. Keep posted at: https://fesstval.de/en/
- **AMS Washington Forum Virtual Meeting**: 26-28 October 2020. Online

  Registration has closed.

  Website: https://www.ametsoc.org/index.cfm/ams/meetings-events/ams-meetings/2020-ams-washington-forum/
- **AGU Fall Meeting**: 1-17 December 2020. Online.

  Abstract submission has closed

  Registration is open

  Website: https://www.agu.org/fall-meeting
- **AMS Annual Meeting**: 10-14 January 2021, New Orleans, USA and Online

  Abstract submission has closed

  Registration is open

  Website: https://annual.ametsoc.org/2021/
- **International Conference on Monsoons, IWM-7**: March 2021. New Delhi, India
- **AMS 34th Conference on Hurricanes and Tropical Meteorology**: 9-14 May 2021, New Orleans.

  Abstract Deadline: 15 November, 2020

  Pre-registration deadline: 1 April 2021

  Website: https://www.ametsoc.org/index.cfm/ams/meetings-events/ams-meetings/34th-conference-on-hurricanes-and-tropical-meteorology/
- **AOGS Annual Meeting**: 1-6 August 2021, Singapore.

  Session submission closes: 10 November 2020

  Abstract submission closes: 23 February 2021

  Early registration closes: 18 May 2021

  Website: https://www.asiaoceania.org/aogs2021/
- **AOGS-EGU Joint Conference NatHazards2021**: 19-22 September 2021, Yogyakarta, Indonesia.

  Abstract Deadline: 1 June, 2021

  Registration deadline: 10 August 2021

  Website: http://nathazards.org/
- **AMS 30th Conference on Severe Local Storms**: 18-22 October 2021, Santa Fe, NM.

  Abstract Deadline: 14 June, 2021

  Website: https://www.ametsoc.org/30th-conference-on-severe-local-storms1/

FLAGSHIP ACTIVITIES

HIWEATHER CITIZEN SCIENCE PROJECT

With many new and on-going citizen projects planned or underway within the High Impact Weather community, this project is designed to share information and to provide tools to help groups and agencies develop new activities. There are five initial activities in year 1 and the first three have started in Q1 of 2020. See concept note for more overall details. http://hiweather.net/Uploads/keditor/file/20200703/20200703100938_33524.pdf

Activity 1: Develop a guidance note for including citizen science in weather, climate and water projects. This activity involves the development of a "A guidance note for including citizen science in weather, climate and water projects", outlining the definition, a typology of Citizen Science projects, illustrative case studies, bibliography of both theoretical and practice guidance papers/reports and some "how to develop a Citizen Science project" worksheets. A first draft will be available for circulation to contributors by the end of August.

Activity 2: Citizen Science Projects survey. A range of citizen science activities can serve as demonstration projects. These may include existing or new HIWeather projects or other projects that illustrate citizen science methods. An initial phase of this activity is the development of the selection criteria for projects. An online survey has been sent out to capture details of existing projects and ideas for new ones. It can be found at : https://massey.au1.qualtrics.com/jfe/form/SV_aaWCTHai8RFzBqJ

Activity 3 Special Issue of the Australasian Journal of Disaster and Trauma Studies on citizen science. Kindly send your expression of interest by 1 September. Papers will be due in January. For more details see: https://www.massey.ac.nz/~trauma/issues/call4papers/AJDTS_Citizen_Science-Special_Issue_call_for_papers_reader-form.pdf

Activity 4 Online seminars. We are planning to host an online seminar series with YESS (Young Earth System Scientists) Community towards the latter part of the year with six sessions starting September.

HIWEATHER END-TO-END WARNING CHAIN PROJECT

HIWeather aims to gather reviews of end-to-end warning chain case studies to support analysis and evaluation. The aims are outlined in http://hiweather.net/Uploads/keditor/file/20200805/20200805235336_39484.pdf. The proposal is being combined with a related proposal from the WWRP SERA (Societal and Economic Research Applications) working group that will provide an overview and meta-analysis, based on the literature, of how the value chain is applied in different fields.

The Weather Information Value Chain is a process for understanding the end-to-end flow of information and value from weather to community benefit, including: what constitutes "value"; what an end-to-end user-driven value chain looks like; how value is added/subtracted as information flows along the chain; ways to measure value; using the value chain to guide investment. HIWeather held two workshops in 2017, participated in the 2019 AMS Washington Forum discussing the importance of routine measurement of the value of weather services, and published a paper on the value chain in the Global Assessment Report on Disaster Risk Reduction 2019.

This project will apply the value chain framework to examine case studies of high impact weather events and warning systems linking weather to decision making to discern what works well and where improvements may lead to the greatest benefits.

The activity will generate an easily accessible means for scientists involved in researching, designing and evaluating weather-related warning systems to review relevant previous experience. To achieve this we will catalogue and analyse information from case studies of the performance of warning chains, review the information available about the organisation and performance of warning chains, and perform detailed evaluations of warning chains in selected case studies, noting that catalogued case studies should capture both successes and failures. The collected information will be organised in a database with an intuitive web-based user interface designed to enable warning events and warning systems to be interrogated and compared easily. The database will provide a valuable source of evidence for what constitutes an effective warning system: one that is *useful, usable and used*; from which to identify and promote best practice in warning for and reporting on high impact weather so as to support the development of improved warning services.

Outcomes from the project will also include a high-level value chain framework tool for decision makers, and guidance and tools for more specific usage according to the value chain applications areas and sectors involved.

THE HIWEATHER BOOK: "TOWARDS THE PERFECT WEATHER WARNING"

HIWeather is working with Springer publishers to bring out a book that summarises current and emerging good practice in the production and communication of weather-related warnings. The book is aimed primarily at disaster management professionals, including those in weather services and related environmental protection bodies who contribute to the production of warnings. It will also provide a valuable pedagogical resource for those studying or training in disaster risk reduction. The book will consist of an Introduction, followed by a section that places warnings in the context of disaster risk management, then 5 chapters dealing with the five "valleys of death" in the HIWeather warning chain concept (see Zhang et al, 2019, Increasing the value of weather-related warnings, Science bulletin, 64, 647-649 http://hiweather.net/Uploads/ue/file/20190723/1563869466819765.pdf), followed by a summary. A large writing team has been assembled and is currently writing the first draft.

TASK TEAM ACTIVITIES

P&P	NAWDEX (North Atlantic Waveguide and Downstream Impacts Experiment)
	Multi-scale, multi-leadtime predictability of high-impact weather
	RELAMPAGO-CACTI (Remote sensing of Electrification, Lightning, And Meso-scale/micro-scale Processes with Adaptive Ground Observations - Cloud Aerosols and Complex Terrain Interactions)
	SCMREX (Southern China Monsoon Rainfall Experiment)
	FESSTVaL (Field Experiment on submesoscale spatio-temporal variability in Lindenberg)
	PRECIP (Prediction of Rainfall Extremes Campaign in the Pacific)

NAWDEX (NORTH ATLANTIC WAVEGUIDE AND DOWNSTREAM IMPACTS EXPERIMENT)

Lead: Andreas Schäfler

ECMWF workshop on "Observational campaign for better weather forecasts":

In June 2019 ECMWF organized a workshop aimed to increase the interactions between observation campaigns and numerical weather prediction (NWP) centers. The workshop involved contributions from NWP centers, past and future campaigns and operational activities that provide "special" observations. From the HIWeather community, for example the NAWDEX and FESSTVal campaigns were represented. The workshop led to great discussions how to increase the interactions, and how NWP centers can help to motivate future campaigns.

Read more about the workshop here: https://www.ecmwf.int/en/about/media-centre/news/2019/experts-explore-how-observational-campaigns-can-improve-weather

On 10-12 March 2020 ECMWF organized a workshop focused on warm conveyor belts (WCB). Due to COVID-19, all workshop was reorganized to be an online event. This fact did not hinder the workshop from being a success with a lot of interesting talks, break-out working groups and also poster sessions. Several of the talks presented results from the NAWDEX campaign for example. The key questions for the workshop tackled predictability, observations, modeling and impacts of WCB and also the closely related atmospheric rivers.

MULTI-SCALE, MULTI-LEADTIME PREDICTABILITY OF HIGH-IMPACT WEATHER

Leads: Shira Raveh-Rubin, Linus Magnusson, Michael Riemer

Objectives: Assess the predictability of different ingredients to HIW events as a function of lead time and identify the physical processes that limit predictability (see *Di Muzio et al, 2019* for tropical-cyclone-like Mediterranean cyclones). In collaboration with the Multiscale Forecasting theme, assess the role of assimilating high-resolution data to capture the mesoscale dynamics and improve short-term prediction. Starting with high-impact weather related to dry intrusions (*Catto and Ravel-Rubin, 2019*; *Ravel-Rubin and Catto, 2019*), develop general recommendations how to assess this insight for other types of high-impact weather.

Linus Magnusson finalized his report: ECMWF Severe Event Catalogue for Evaluation of Multi-scale Prediction of Extreme Weather, which can be found here: *https://www.ecmwf.int/en/elibrary/19230-ecmwf-severe-event-catalogue-evaluation-multi-scale-prediction-extreme-weather*

In the spring issue of ECMWF Newsletter, an article about the February storms in north-western Europe highlighted new forecast products for extreme weather on various time scales: https://www.ecmwf.int/en/newsletter/163/news/forecasting-februarys-wet-and-stormy-weather-parts-europe

RELAMPAGO-CACTI

Remote sensing of Electrification, Lightning, And Meso-scale/micro-scale Processes with Adaptive Ground Observations - Cloud Aerosols and Complex Terrain Interactions

Linked to HIWeather through the Working Group on Nowcasting and Mesoscale Research (WGNMR)

RELAMPAGO was funded by the US National Science Foundation to observe convective storms that produce high impact weather in the lee of the Andes in Argentina. It also involves contributions from NASA, NOAA, Argentina (MINyCT), Brazil (CNPq and FAPESP), Chile (CONICYT), universities across the region, Argentina's national meteorological service (SMN) and Brazil's space agency (INPE). Observations during the main observing period, Nov-Dec 2018, successfully captured many storms. See press report at: https://www.abc.net.au/news/2019-01-23/weather-scientists-find-one-of-worlds-largest-hail-stones/10735666

SCMREX (SOUTHERN CHINA MONSOON RAINFALL EXPERIMENT)

Lead: Yali Luo

Two review papers on the science and prediction of heavy rainfall are published in 2020. One focuses on the early-summer heavy rainfall over southern China during 2008-2019 (Luo et al., 2020 JMSJ) and the other more broadly summarizes the studies on heavy rainfall over China during the past four decades (Luo et al., 2020 JMR). Despite some impacts of the COVID-19, the 2020 field campaign of the Southern China Monsoon Rainfall Experiment (SCMREX) was successfully carried out, with the IOP running continuously from 1 May to 30 June, 2020. The most recent research progresses of SCMREX were reported at the virtual meeting of WMO/WWRP Working Group on Tropical Meteorological Research (WGTMR) on 14 July 2020. It was planned that during the Third Phase of SCMREX (2021-2024), field campaigns, physical mechanism studies and NWP studies will continue with the improved observing capability and adjusted research focuses. The physical mechanism studies will make more efforts to unravel the interactions of aerosol-convection-precipitation and the independent/interactive influences of complicated surface (i.e., cities, topography, and water), and also to examine the research results in a broader context by comparing with other regions. The NWP studies will further the polarization radar data assimilation, improving model physics schemes, and developing perturbation methods for ensemble forecast at the convection-permitting resolutions.

1. Luo, Y., J. Sun, Y. Li, and Coauthors, 2020: Science and Prediction of Heavy Rainfall over China: Research Progress since the Reform and Opening-Up of New China. J. Meteor. Res., 34(3): 427-459. https://doi.org/10.1007/s13351-020-0006-x
2. Luo, Y., R. Xia, J. C. L. Chan, 2020: Characteristics, Physical Mechanisms, and Prediction of Pre-summer Rainfall over South China: Research Progress during 2008-2019. J. Meteor. Soc. Japan, 98, 19-42, doi:10.2151/jmsj.2020-002.

FESSTVAL (FIELD EXPERIMENT ON SUBMESOSCALE SPATIO-TEMPORAL VARIABILITY IN LINDENBERG)

Lead: Linda Schlemmer

FESSTVaL has been initiated by the Hans-Ertel-Center for Weather Research and was planned to take place in the summer months of the year 2020 at the Meteorological Observatory Lindenberg - Richard-Aßmann-Observatorium (MOL-RAO) of the German Weatherservice (DWD) near Berlin. To identify the sources of sub-mesoscale variability, the measurement campaign focuses on three main aspects: atmospheric boundary layer structures, cold pools, and gusts of wind. In order to capture phenomena at the submesoscale (500 m – 5 km), a hierarchical measurement strategy will be realized. This includes wind profiling stations with several coordinated Doppler Lidars, two mobile thermodynamic profilers, more than 100 stations with near-surface measurements, more than 20 automatic weather stations, an X-Band radar, and a number of energy balance stations. This equipment is supplemented by the extensive ground-based remote sensing array at the MOL-RAO. Complementing to this, the added value of a citizen-science measurement network is investigated during the campaign with "Internet-of-things" based technology and low-cost sensors build and maintained by citizens. The FESSTVaL measurements will be complemented by high-resolution large-eddy simulations (ICON-LES).

Due to COVID-19, FESSTVaL had to be postponed to 2021. This summer, preparatory measurements will be taken "at home". "At home" means that the combined effort was split, and the different groups involved in FESSTVaL execute their measurements close to their respective home universities to circumvent travel restrictions. This preparatory effort will allow to collect as much data and experience as possible, which will then support a hopefully successful campaign in summer 2021. More information about FESST@HOME at https://fesstval.de/en/

PRECIP

Lead: Rob Rogers

The U.S. NSF has recently funded a project entitled **Prediction of Rainfall Extremes Campaign in the Pacific (PRECIP)**, led by Michael Bell and Kristen Rasmussen (Colorado State University), which seeks to improve the fundamental understanding and predictability of the processes that produce extreme precipitation through an ingredients-based physical framework. Research observations will be collected during four event types that meet a global definition of 'extreme' rainfall across the spectrum of rainfall intensity and duration: (1) deep convective cores, (2) wide convective cores, (3) broad stratiform regions, and (4) tropical cyclones (TCs; termed "typhoons" in the West Pacific).

PRECIP will be conducted in collaboration with the Taiwan-area Atmospheric and Hydrological Observation and Prediction Experiment (TAHOPE) and Japanese Tropical cyclones-Pacific Asian Research Campaign for Improvement of Intensity estimations/forecasts (T-PARCII). Due to Covid-19, the field phase of this joint field campaign was postponed until the spring and summer of next year (2021). Ground-based assets involved in data collection include dual-frequency/dual-polarization radar, disdrometers, and profilers, while airborne assets include the Taiwanese Dotstar and Japanese G-II aircraft. The NOAA P-3 aircraft will not be available for airborne missions in support of this campaign next year. The extreme rainfall and typhoon reconnaissance effort during the period leading up to the 2021 Tokyo Olympics will provide a focal point for an education and outreach effort promoting the positive role of international science collaboration to address global problems such as extreme weather.

MSF	MOUNTAOM (RDP alongside the 2022 Winter Olympic Games in Beijing)
	Review the current state of nowcasting & forecasting high impact weather
	Intercomparison of km-scale DA & nowcast/forecast systems
	SURF (Study of Urban Rainfall and fog/haze)
	ICE-POP2018 (RDP/FDP alongside the Pyeongchang Winter Olympic Games in South Korea)
	UK Environmental Prediction (UKEP) project

MOUNTAOM (RDP ALONGSIDE THE 2022 WINTER OLYMPIC GAMES IN BEIJING)

China will be hosting the 2022 Winter Olympic Games in the mountains to the northwest of Beijing. A research activity is underway in the Chinese Meteorological Administration to develop capability in forecasting the relevant weather parameters in this area. The project has six research themes. It is planned to mount an annual field programme, the first of which was held in winter 2017. LES modelling experiments are being conducted with nested grids from 1km down to 37m. The project has an International Advisory Committee, the chair of which is Prof Joe Fernando.

REVIEW THE CURRENT STATE OF NOWCASTING & FORECASTING HIGH IMPACT WEATHER

Lead: Sharan Majumdar

Objectives: Document current state of high impact weather nowcasting/forecasting with an emphasis on flood and high wind warnings; Identify gaps

The review was submitted to BAMS in early 2020 and received generally favourable reviews. A revised version is about to be submitted.

INTERCOMPARISON OF KM-SCALE DA & NOWCAST/FORECAST SYSTEMS

Lead: Jenny Sun

Objectives: Demonstrate state-of-the-art of km-scale DA & nowcast/NWP systems for HIW warning with an emphasis on floods & high winds.

Had an email discussion with the co-chairs of the Data Assimilation and Observations System (DAOS) working group regarding the possible collaboration on a high-resolution HIW forecasting system intercomparison project. The next is to have a small group meeting call to discuss the scope and how to proceed.

SURF (STUDY OF URBAN RAINFALL AND FOG/HAZE)

Lead: Miao Shiguang (CMA/IUM). Linked to HIWeather through GURME and the MSF task team

The Institute of Urban Meteorology is carrying out the SURF field experiment to study urban pollution and extreme precipitation in Beijing. 2017 was the third season of field data collection. Case study results were presented in the Conference on Predictability & Multi-Scale Prediction of High Impact Weather in October 2017.

ICE-POP2018 (RDP/FDP ALONGSIDE THE PYEONGCHANG WINTER OLYMPIC GAMES IN SOUTH KOREA)

Led by KMA and linked to HIWeather through the WGNMR and MSF task team the IOP period is complete. See the science plan at *https://gpm.nasa.gov/sites/default/files/document_files/08%20ICEPOP2018_plan.pdf*

UK ENVIRONMENTAL PREDICTION (UKEP) PROJECT

Lead: Huw Lewis

The *UK Environmental Prediction* initiative is a national collaboration led by the Met Office, *Centre for Ecology & Hydrology*, *National Oceanography Centre* and *Plymouth Marine Laboratory*. It develops and evaluates the UK's first fully coupled regional prediction system at kilometre scale, encompassing atmosphere, ocean, wave, land surface, and biogeochemistry model components and their interactions. The aim of the initiative is to enable multi-disciplinary research on Earth system processes at high resolution and to improve future operational applications. One of the exciting aspects of working with coupled systems, illustrated during a workshop held in June 2019, is the need to join together and share different perspectives and expertise from across weather and climate, marine and hydrological science disciplines. For further information on the UK Environmental Prediction collaboration, contact *huw.lewis@metoffice.gov.uk* or visit *https://www.metoffice.gov.uk/research/approach/collaboration/ukenvironmentalprediction*

HIVR	Formal (statistical) impact model intercomparison
	Impact data collection
	Review & classification of impact modelling

FORMAL (STATISTICAL) IMPACT MODEL INTERCOMPARISON

Lead: Martin Goeber

Develop Masters student module to examine simple and physically-based impact models

IMPACT DATA COLLECTION

Leads: Joanne Robbins and Rainer Kaltenberger

A review paper is being prepared on how met services collect and use impact data.

REVIEW & CLASSIFICATION OF IMPACT MODELLING

Leads: Brian Mills & HIVR task team

An outline has been agreed and writing of the chapter on disruptive winter weather is well advanced. It is anticipated that the hazard-specific chapters may be published separately as they are completed.

COMM	Unconventional data sources for impact modelling, evaluation & communication
	Review of approaches to communicating high impact weather
	Training Materials
	Review of the role of trust, salience and beliefs on people's responses to weather warnings
	Communicating uncertainty

	Post-event case studies
	Communication platform
	HIGHWAY (Lake Victoria Basin Nowcasting project)
	GCRF African Science for Weather Information and Forecasting Techniques (GCRF African SWIFT)

UNCONVENTIONAL DATA SOURCES FOR IMPACT MODELLING, EVALUATION & COMMUNICATION

Leads: Sara Harrison and Amber Silver

An unconventional data research network has been formed. Several activities are underway to investigate tools for gathering social media data from the public, and on the use of weather warnings by the public using data from social media. Activities include:

- Twitter data analysis: Hywel Williams (U. Exeter, UK)
- Use and interpretation of warnings on social media by the public: Amber Silver (U. at Albany, US), Shannon Panchuk (BoM, Australia)
- Citizen science: Lisa McLaren (JCDR, New Zealand)
- Role of conventional and unconventional (e.g., social media, crowdsourcing) data for impact models & warnings: Sara Harrison, Sally Potter (New Zealand). Sara has published a paper on Volunteered Geographic Information for severe weather early warning: *http://trauma.massey.ac.nz/issues/2020-1/AJDTS_24_1_Harrison.pdf*
- Thomas Kox and colleagues have a new citizen science project in Munich on weather impacts and weather observations with school children. Review of approaches to communicating high impact weather.

Lead: Andrea Taylor, Communication task team.

A special issue of the *International Journal of Disaster Risk Reduction* under the title, "Communicating High Impact Weather: Improving warnings and decision-making processes" is available at *https://www.sciencedirect.com/journal/international-journal-of-disaster-risk-reduction/vol/30/part/PA*

TRAINING MATERIALS

Lead: Andrea Taylor, Communication task team

Julie Demuth has circulated UCAR COMET training module on communicating impact-based warnings. *https://www.meted.ucar.edu/training_module.php?id=1597#.XqDuVP8za71*. See also the NOAA training module on communicating risk: the impact-based forecast and warning services approach: *https://www.meted.ucar.edu/training_module.php?id=1597#.XyxmEyhKhaQ*

We are continuing to collate existing training materials for weather communication. Links can be shared with Andrea Taylor (a.l.taylor@leeds.ac.uk).

COMMUNICATING UNCERTAINTY

Lead: Sally Potter

The aim of this project is to review and publish the implications of uncertainty in weather forecasts and warnings across the whole spectrum of HIWeather.

A publication on communicating model uncertainty, associated with HIWeather, has been published: *https://www.sciencedirect.com/science/article/pii/S2212420918306630?via%3Dihub*

Collated essays on uncertainty from an AMS special session have been shared by Julie Demuth: *https://items.ssrc.org/category/chancing-the-storm/*

The role of uncertainty will also be discussed at the communication webinar on UTC 26 October.

INFLUENCE OF TRUST, SALIENCE AND BELIEFS ON WARNING RESPONSE

Lead: Amisha Mehta, Communication Task Team

Amisha has joined the Communication Task Team to lead a review into the influence of trust, salience and beliefs on warning response. The role of trust, uncertainty and beliefs on people's perceptions and responses to weather warnings is the focus of a webinar on UTC 26 Oct 8pm (see webinar section of this newsletter for more details).

Anyone interested in being part of this activity is encouraged to contact Amisha at a.mehta@qut.edu.au.

A research study is underway to examine how participants trust weather forecasts and agency warnings in the context of flood events. This work is part of a program funded by the Bushfire and Natural Hazards Cooperative Research Centre and co-designed with Victoria State Emergency Services and the Australian Government Bureau of Meteorology.

HIGHWAY (LAKE VICTORIA BASIN NOWCASTING PROJECT)

Link: Andrea Taylor

The "HIGH impact Weather lAke sYstem" project is part of the UKAid WISER programme. HIGHWAY aimed to increase access to and use of co-designed and sustainable early warning systems in the Lake Victoria area. Reports on the development and implementation of forecasting and warning systems by the project are available at https://www.metoffice.gov.uk/about-us/what/working-with-other-organisations/international/projects/wiser/highway. In 2019 HIGHWAY supported a field campaign over the Lake Victoria Basin, coordinated by NCAR, which collected surface observations, radar and forecasts from both National Meteorological Services and private networks. The results of this campaign are available at http://catalog.eol.ucar.edu/highway. Analysis of these excellent datasets should enable future improvements in weather forecasting capability in the region.

GCRF AFRICAN SCIENCE FOR WEATHER INFORMATION AND FORECASTING TECHNIQUES (AFRICAN SWIFT)

Link: Andrea Taylor (Communication TT)

A 4-year Global Challenges Research Fund (GCRF) project to improve African hourly to seasonal forecasting capabilities, funding 80 scientists in 5 UK and 10 African institutions, with WMO as an advisory member.

African SWIFT made international news in May with press coverage highlighting the project's successful implementation of nowcasting. Media highlighted how SWIFT uses EUMETSAT satellites and NWCSAF software to produce accurate, hour-by-hour forecasts as severe weather approaches. In addition to saving lives, nowcasting will also help direct rescue and clear-up operations following high-impact events and will be essential in protecting the economy. Read the full story published by the University of Leeds.

Across the month of June, African SWIFT hosted SWIFT Progress: Transforming Weather Forecasting Science in Africa, a month-long series of virtual meetings and knowledge-sharing webinars. The programme included a keynote event featuring lead researchers from the CINSERE, ForPAc and HIGHWAY projects. During the hour-long session, Dr. Issa Ouedraogo, Emmah Mwangi and Jim Wilson each shared key insights in forecasting and climate resilience, including lessons, achievements and pathways forward. Visit the SWIFT website for the webinar recording and guest speaker slides. https://africanswift.org/

EVAL	Warning response
	Global Hazard Map
	Probabilistic forecasting and evaluation of tropical cyclones flooding
	Fire weather evaluation
	Societal and Economic Research Applications (SERA) Workshop
	Verification Challenge
	Method(s) to measure avoided losses due to improved warnings

WARNING RESPONSE

Lead: Anna Scolobig

Dr. Philippe Weyrich was awarded the ETH Zurich 2020 Medal for his PhD Thesis, "To act or not to act: Warning communication and decision-making in response to weather-related hazard" advised by Professor Anthony Patt and Dr. Anna Scolobig. The Thesis received this prestigious award because it presents: "a multi-faceted investigation of how severe weather warnings should be communicated in order to save live and reduce economic damage". Philippe's

work has been inspired by interactions with HIW colleagues (Task Teams “User oriented Evaluation”, “Vulnerability" and “Communication”). The PhD Thesis is open access and available at:

Weyrich, P., 2020. To act or not to act: Warning communication and decision-making in response to weather-related hazards. Doctoral thesis, ETH Zurich, Diss. ETH No. 26533 https://www.researchcollection.ethz.ch/handle/20.500.11850/404058

GLOBAL HAZARD MAP

Leads : Helen Titley and Joanne Robbins

The Global Hazard Map (GHM) summarises the risk of high-impact weather across the globe over the coming week using forecasts from the Met Office and ECMWF global ensembles. It includes forecast layers for tropical cyclones (strike probability and tracks), 24-hour precipitation accumulation, maximum wind gust in a 24-hour period, 24-hour snowfall accumulation, as well as severe heat waves and cold waves. We are working with the University of Exeter to investigate if social media data could be used to evaluate the ability of GHM to identify events which cause community impacts.

PROBABILISTIC FORECASTING AND EVALUATION OF TROPICAL CYCLONES FLOODING

Leads: Helen Titley

Ensemble forecasting of tropical cyclones (TCs) is vital in capturing the situation-dependent uncertainty in the track and intensity forecasts for existing storms, and in providing probabilistic information about tropical cyclone genesis, but there is huge potential to increase the pull through of ensemble-based uncertainty and probabilistic data in to operational TC forecasts and warnings.

A new study is underway to investigate ensemble-based predictability of flooding in TCs using the Global Flood Awareness System (GloFAS).

FIRE WEATHER EVALUATION

Lead: Amanda Anderson

This NCAR project evaluated coupled fire-weather modelling, and wrapped up in June 2020. Recent work explored the forecast sensitivity to fuel moisture, terrain and ignition location, and spotting capability in the model. The assessment also explored how the sensitivity information can be conveyed to the user.

SOCIETAL AND ECONOMIC RESEARCH APPLICATIONS (SERA) WORKSHOP

Lead: Martin Goeber

This workshop will be held in Offenbach, Germany in 2021, hosted by DWD's Hans Ertel Centre. It will have SERA themes similar to the NCAR's earlier WAS*IS (Weather and Society*Integrated Studies) workshops. The format will include a tutorial for students from weather services, etc., followed by a scientific conference.

VERIFICATION CHALLENGE

Leads: Beth Ebert

A second competition for evaluation metrics using non-traditional observations (e.g. sensor networks, social media, citizen science, impact data, etc.) was launched at the European Meteorological Society Conference in September 2019, run by the Joint Working Group on Forecast Verification Research (JWGFVR). The contest is aimed to encourage the development and demonstration of verification approaches targeted to use new and non-traditional observations. New verification metrics and visualisations are encouraged.

The challenge is open to individuals and teams. Entries are due 30 April 2021. The winner will receive an all-expense paid attendance and keynote talk at 8th International Verification Methods Workshop to be held in 2021. The challenge supports the WWRP's HIWeather, Sub-seasonal to Seasonal Prediction (S2S), and Polar Prediction (PPP) projects.

METHOD(S) TO MEASURE AVOIDED LOSSES DUE TO IMPROVED WARNINGS

Leads: Masa Haraguchi and Michael Kunz

This study will write a review paper that categorizes methods to estimate avoided losses. It will focus on heatwave and tropical cyclones, connecting to loss data from disaster reports from the World Bank.

US CONTRIBUTIONS

A joint committee is formulating a US response to the three post-THORPEX projects and will shortly complete an inventory of existing relevant work. Prof. Michael Morgan leads this activity for HIWeather. The US has a wide range of relevant work underway including the Hydrometeorology Testbed (HMT), focusing on rainfall and flood forecasting, and the Hazardous Weather Testbed, focusing on tornado, wind and hail forecasting. CAPS is running 3-km CONUS-domain cycled EnKF data assimilation, including radar data, for selected periods and discussing coupling with hydrology/river stream models for HMT. The National Weather Service FACETS project (*http://www.nssl.noaa.gov/projects/facets/*) is closely aligned with several aspects of HIWeather. The related Weather Ready Nations initiative is particularly relevant and Dr Jennifer Sprague-Hilderbrand is a member of the HIWeather Advisory Group.

UK CONTRIBUTIONS

Relevant areas of work include unconventional data sources, km-scale data assimilation and ensemble prediction, km-scale coupled modelling, hazard impact modelling and risk communication. The Met Office recently completed implementation of its new hourly lagged convection-permitting ensemble. Trial results showed a substantial gain in performance (*https://www.metoffice.gov.uk/research/news/2019/mogreps-uk-hourly-cycling-updates*). Impacts work is largely carried out in the Natural Hazard Partnership (http://www.naturalhazardspartnership.org.uk/). The recently completed NERC/Met Office Flooding from Intense Rainfall project delivered new radar capability, advances in km-scale data assimilation & coupling with inundation models (*http://www.met.reading.ac.uk/flooding/*). UKRI funds two networks in its "Decision Making Under Uncertainty" theme. NERC/UKAid fund four research projects through the Science for Humanitarian Emergencies And Resilience (SHEAR) programme focusing on co-production of knowledge using a multi-disciplinary and problem-centred approach in sub-Saharan Africa and south Asia (http://www.nerc.ac.uk/research/funded/programmes/shear/). See also SWIFT and HIGHWAY, above. The UKRI Global Challenges Research Fund Urban Disaster Risk Hub, which is endorsed by HIWeather, is developing its plans for building resilience to natural hazards in Kathmandu, Nairobi, Istanbul and Quito (*https://www.de.ed.ac.uk/project/gcrf-urban-disaster-risk-hub*).

GERMAN CONTRIBUTIONS

W2W (Waves to Weather) is a Collaborative Research Center delivering the underpinning science needed to identify the limits of predictability in different weather situations so as to pave the way towards a new generation of weather forecasting systems. See http://w2w.meteo.physik.uni-muenchen.de/. The research programme is listed under the headings of Upscale Error Growth, Cloud-Scale Uncertainties and Predictability of local Weather. The second 4-year phase has started July 2019. Results of the project are available in a QJRMS and an AMS journal special collection and on the W2W website (*https://www.wavestoweather.de/*).

WEXICOM **(**Weather warnings: from EXtreme event Information to COMunication and action) is an interdisciplinary collaborative research project aimed at facilitating transparent and effective communication of risks and uncertainties for individual user groups. See *http://www.geo.fu-berlin.de/en/met/wexicom/index.html*.

Developed pre-operational impact forecasts in partnership with the fire brigade; Collecting citizen science measurements as part of a field experiment, to be used in forecast verification. (Martin Goeber, DWD).

In addition, Waves to Weather scientists are going to participate in an international field campaign on the Cape Verde islands in summer 2021, called ASKOS (*http://askos.space.noa.gr*). This project is built around planned calibration/validation aircraft measurements conducted during the same period. Cape Verde during boreal summer is ideal for a study of tropical wave phenomena. The midlevel African easterly jet allows for the formation of synoptic-scale African easterly waves (AEWs) that typically reach their maximum intensity close to the coast of West Africa. AEWs interact with convection and its mesoscale organization through modifications in humidity, temperature and vertical wind shear, and often serve as initial disturbances for tropical cyclogenesis. In addition, the tropical atmosphere sustains different types of planetary waves that frequently interact with the monsoon and AEWs. To support our research in this area, we plan frequent radiosonde ascents from Cape Verde to complement the measurements from space and aircraft.

AUSTRALIAN CONTRIBUTIONS

An Australian HIWeather community was established at the annual Australian Meteorological and Oceanographic Society (AMOS) meeting. The goal is to foster collaboration within Australia of physical and social scientists, forecasters, and users of forecasts of high impact weather. Anyone who is interested can contact HIWeather@bom.gov.au to join this community.

The Bureau of Meteorology and Geoscience Australia are conducting a small project on **impact prediction**, currently looking at impacts of wind on infrastructure. Partners include forecasters and State Emergency Services. High resolution ensemble NWP is coupled to a wind damage function to derive probabilistic spatial maps of damage severity, using East Coast Lows as demonstration events.

Future Warning Services (FWS) framework: In February 2018 the Australian Fire and Emergency Services Authority Council (AFAC) Warning Group commissioned social research to build a sound evidence base for a national three-level warning framework for all hazards. The Australian Bureau of Meteorology has embarked on a three-year Public Services Transformation to improve the impact and value of our services. The includes new and enhanced impact-based warning services that provides warnings that are clear, accurate, location specific, relevant and contextual. We are developing a framework to guide the preparation of a product roadmap that systematically priorities the future development of services. People can get a copy of the PST business case by emailing public-services@bom.gov.au. Phase one included a product and service audit, which highlighted opportunities for improvement. The Future Warning Framework outlines four key goals:

Goal 1. Adopt Australia's Total Warning System

Goal 2. Issue Best Practice Warnings

Goal 3. Implement Scaled Three Level Warnings

Goal 4. Develop Impact-based Warnings

The Framework adopts the principles developed by the Australian Institute for Disaster Resilience to ensure alignment with national and international best practice in warning service.

The 'Reducing Illness and Lives Lost from Heatwaves' (RILLH) is a multi-agency collaboration between the Australian Bureau of Meteorology (BOM), Australian Bureau of Statistics (ABS), Department of Health (DOH), and Geoscience Australia (GA). The RILLH is a data-integration partnership project and asks three questions; 'who is most at risk?', 'where are they?', and 'how can services to vulnerable groups be improved through heat-health warnings and targeted interventions?'. This project seeks to answer these questions by mapping vulnerability against Excess Heat Factor (EHF), the scale used to define heatwave intensity by the Bureau of Meteorology and many Australian States and Territories. Through the utilisation and analysis of health and health service data, weather observations, neighbourhood community and environmental characteristics, the project is building a national 'map' of heat health vulnerability which will be underpinned by a Heat Vulnerability Index. It is anticipated that the core methodology of multi-agency collaboration and integration of data used in this project can be applied to other natural hazards as well. The results will support emergency response and planning in the immediate term and will inform and shape spatially target intervention strategies including impact forecast warning systems, social registries and community outreach, social media targeting, and urban planning. For more information contact Shannon Panchuk (shannon.panchuk@bom.gov.au)

NEW ZEALAND CONTRIBUTIONS

Within New Zealand, Resilience to Nature's Challenges (https://resiliencechallenge.nz/), is a five-year Government-funded research programme that has recently started mid-2019. The Weather & Wildfire theme, co-led by Richard Turner (NIWA) and Sally Potter (GNS Science), is aiming to improve our understanding of extreme weather and wildfire impacts on communities and infrastructure, and co-design mitigation solutions (including improving impact-based warnings) with key stakeholders. We are using three scenarios – an ex-tropical cyclone, severe winter storm, and wildfire on a rural-urban interface. The programme has been aligned to support the goals of the WMO HIWeather programme. The Weather & Wildfire theme is linked to other themes within the programme, that will also contribute to HIWeather, notably the Resilience in Practice Model, co-led by Julia Becker (Massey University) and the Urban theme co-led by David Johnston (Massey University). The New Zealand Meteorological Society conference will be held on 23-27 November 2020 in Christchurch.

ARGENTINE CONTRIBUTIONS

The Alert.AR project finished in May 2018, having delivered a new warning system. A Health & Heatwave Early Warning System (https://www.smn.gob.ar/smn_alertas/olas_de_calor) was inaugurated in 2019 as a result of a joint research between the National Ministry of Health and the National Meteorological Service of Argentina. The warning system is based on mortality data and climatological information from the last 40 years for 57 cities of Argentina. A WMO regional workshop on Impact-Based Forecasting & Warning is being hosted in September.

SMN is developing a new Early Warning Service in partnership with emergency managers and citizens. A training day/workshop with all the provincial directors of emergency agencies and their technical teams will be held in June to inform them about how the new EWS will work well in advance of its launch. An event in July in conjunction with the National Secretariat of Science and Technology will include a workshop with all technical scientific bodies that "depend" on the information of warnings and forecasts to issue other types of warnings, announcements or bulletins so they will be able to adjust their own systems. (Julia Chasco, SMN)

EUROPEAN CONTRIBUTIONS

Joint initiative towards a International Fujita scale to assess tornado and wind damage (with European Severe Storms Lab) is still growing. Recently, there was a poster presentation at EMS Annual Meeting in Copenhagen, 9-13.9.2019. Information and first IF-scale draft document (v 0.1) can be found at https://www.essl.org/cms/international-fujita-scale/, there is also an internal forum for experts to discuss case studies and further refinements, experts who are working in this field are welcome to join our initiative. Next face-to-face meeting of the IF-Scale steering committee is planned along with the ESSL Tornado and Windstorm Damage Assessment Workshop in August 2020 in Wr. Neustadt, Austria. https://www.essl.org/cms/upcoming-events/workshop-damage-assessment/. Spread the message!

The EUMETNET EMMA/Meteoalarm PM carried out a survey on implementation of impact-oriented warnings among Meteoalarm members in Europe in August 2018 – May 2019. 79 questions covered topics from warning format, production process of warnings, dissemination of warnings, verification of warnings, warning strategy, crowdsourcing and cross-border collaboration 32/37 of European NMHSs replied, making it a valuable dataset for potential initiatives on the regional / global scale in the field of IoW. Results were presented at the EMS Annual Meeting in Copenhagen, 9-13.9.2019. Publication is planned for 2020.

European Weather Observer –ZAMG and ESSL are in contact with a number of European NMHSs to work on and refine a pan-European, standardized set of human-assessed (hydro, meteo, geo) crowdsourcing reporting parameters and enable exchange through a standardized API. In 2018 a first set of reporting parameters was defined by DHMZ, FMI, KNMI, ESSL, ZAMG and other ESSL collaborators (i.e. European spotter groups). Our common proposal is, that European NMHSs shall act as national data hubs for weather- and impact observations enabling exchange of data between NMHS level and European level. Currently a consortium of participating NMHSs is formed. A standardized API between all partners will enable real time data exchange using the MQTT protocol. NMHSs are invited to provide API to subnational collaborators (e.g. spotter groups, emergency authorities). The API can be easily implemented in existing web pages and apps, e.g. https://wettermelden.at . Recently a presentation was held at EMS Annual Meeting in Copenhagen, 9-13.9.2019. https://meetingorganizer.copernicus.org/EMS2019/EMS2019-887-2.pdf

CHINESE CONTRIBUTIONS

Recently, four projects lead by researchers from Chinese Academy of Meteorological Sciences (CAMS) have been approved as *National Key Technology Research and Development Plan*:

1) "Development of High Resolution Data Assimilation Techniques and East Asia Atmospheric Reanalysis Datasets" (Xudong LIANG). The aim is for a 3km grid, decade long reanalysis for East Asia.
2) "*Research on Thunderstorm Electrification-discharge Processes and Lightning Effects*" (Weitao LYU). This project will include basic observational and theoretical approaches to understanding lighting and will use AI approaches to develop a lightning forecasting and warning platform.
3) "*Aerosol-Convective Cloud Interaction Mechanism and Its Model Application Demonstration over Beijing-Tianjin-Hebei Region*" (Jianping GUO https://www.researchgate.net/profile/Jianping_Guo6). This project aims to improve 24-hour precipitation scores in the Beijing-Tianjing-Hebei region by developing improved mixed-phase parametrization scheme that incorporate aerosol effects. The parametrizations will be developed on the basis of field campaigns.
4) "*Development of Seamless Weather-Climate Model Dynamic Core on Unstructured Grid*" (Jian LI). The aim is to develop a core that gives more accurate solutions and is suitable for future supercomputing architectures.

A five-year Project, named as "*Key Dynamic and Thermodynamic Processes and Prediction for the Evolution of Typhoon Intensity and Structure*" of the Ministry of Science and Technology is led by Prof. Zhemin Tan from Nanjing University and aims to deliver forecast products of track, intensity and structure of typhoon 3-7 days in advance, see: *http://meso.nju.edu.cn/web/typhoon/*.

RELATED ACTIVITIES

GHHIN (GLOBAL HEAT HEALTH INFORMATION NETWORK).

A professional network of academics, government representative at all levels, professional organisations, international organisations, donor organisations, private sector and non-governmental organisations eager to share and engage in issues around heat and health. See http://www.ghhin.org/

VORTEX-SE (VERIFICATION OF THE ORIGINS OF ROTATION IN TORNADOES EXPERIMENT – SOUTHEAST)

A research program to understand how environmental factors characteristic of the southeastern United States affect the formation, intensity, structure, and path of tornadoes and to determine the best methods for communicating forecast uncertainty related to these events. See http://www.nssl.noaa.gov/projects/vortexse/

I-REACT

EU Horizon2020 project on Improving Resilience to Emergencies through Advanced Cyber Technologies (I-REACT), involving 20 partners, will integrate existing systems to facilitate early planning of weather-related disaster risk reduction activities. I-REACT will co-operate with the European Flood Awareness System (EFAS), European Forest Fire Information System (EFFIS), European Global Navigation Satellite System (E-GNSS), Copernicus, etc. See http://www.i-react.eu/

ANYWHERE

An EU Innovation action designed to bridge the gap between R&D in forecasting and warning high impact weather and climate so as to enhance response by emergency managers and first responders across Europe http://www.anywhere-h2020.eu/. The project catalogue contains forecasting algorithms for hazards and their impacts, many developed in previous EU actions. http://anywhere-h2020.eu/catalogue/

ARISTOTL-EHNSP

Aristotle will deliver multi-hazard capability to the EU Emergency Response Coordination Centre (ERCC), which is responsible for the coordination of human aid upon request of the government of a country affected by natural (and other) hazards. It offers a scalable scientific network including new hazard related services and a pool of experts in the field of Hydro-Meteorology and Geophysics that can support ERCC in crisis situations worldwide. See http://aristotle.ingv.it/

EUROPEAN DISASTER RISK MANAGEMENT KNOWLEDGE CENTRE

The centre works at the science-policy interface to help EU Member States respond to emergencies; prevent and reduce the impact of disasters. See http://drmkc.jrc.ec.europa.eu/. The Risk Data Hub at https://drmkc.jrc.ec.europa.eu/risk-data-hub/#/ may be of particular interest to HIWeather researchers.

S2S (SUB-SEASONAL-TO-SEASONAL PREDICTION)

Latest news is available at http://www.s2sprediction.net/static/news

PPP (POLAR PREDICTION PROJECT)

Latest news is available at http://www.polarprediction.net/news.html

TIGGE (THORPEX INTERACTIVE GRAND GLOBAL ENSEMBLE) AND TIGGE-LAM (-LIMITED AREA MODEL)

The TIGGE dataset *(*https://www.ecmwf.int/en/research/projects/tigge*)* is one of the major achievements of THORPEX. It now contains over 10 years of global data. On a smaller scale, the TIGGE-LAM dataset provides 5 years of multi-model ensemble data at mesoscale resolution for limited areas. These datasets have been used to investigate a variety of atmospheric processes and there is scope for more use in the context of HIWeather. Opportunities may be driven by analysis of weather phenomena or weather variable thresholds associated with high impact. Within the S2S project, activities related to specific weather phenomena are brought together at http://s2sprediction.net/ under topic wiki pages. There may be opportunities to do something similar for phenomena relevant to HIWeather. If you are interested, please contact John Methven at Reading University.

CODATA: THE COMMITTEE ON DATA OF ICSU

CODATA promotes global collaboration to improve the availability and usability of data on the principle that data produced by research and susceptible to be used for research should be as open as possible and as closed as necessary. CODATA works to advance interoperability and usability of such data: research data should be intelligently open or FAIR. The group is working particularly in three important global challenges: **infectious disease**, **sustainable cities**, and **disaster risk reduction**: *www.codata.org/task-groups/linked-open-data-for-global-disaster-risk-research*

THE YOUNG EARTH SYSTEM SCIENTISTS (YESS) COMMUNITY

The YESS Community is an international multidisciplinary Early Career Researcher (ECR) network with more than 1000 members from over 80 countries. It brings together early career scientists, from both natural and social sciences, working in a field of Earth system science. It is a bottom-up initiative run by its members. YESS works closely with WWRP, GAW and WCRP to get ECRs involved and to provide them with a collective voice. YESS invites interested HIWeather master students, Ph.D. students and postdocs (within 5 years after their last degree) to join and engage in the community. See *www.yess-community.org* and follow YESS on Facebook: *www.facebook.com/yesscommunity*, Twitter: *twitter.com/YESSCommunity* or LinkedIn: *www.linkedin.com/company/yess-community*.

JOURNAL OF INTERNATIONAL CRISIS AND RISK COMMUNICATION RESEARCH

open access journal dedicated to human and mediated communication issues associated with crises, risks, and emergencies. It has an international editorial board and invites manuscripts of a philosophical, theoretical, methodological, critical, applied, pedagogical or empirical nature. Its includes community or regionally based events and risks, such as hurricanes, floods, wildfires, infectious disease outbreaks or similar threats. See *www.jicrcr.com*.

THE PROJECT

STEERING GROUP AND TASK TEAMS

***Co-chairs**:*

Brian Golding, UK, brian.golding@metoffice.gov.uk

David Johnston, New Zealand, D.M.Johnston@massey.ac.nz

***ICO**: Qinghong Zhang,Huiyi Fan, China,* hiwico@cma.gov.cn

Processes & Predictability (P&P) theme

Lead: Michael Riemer, Germany, mriemer@uni-mainz.de

Members: John Knox, Peter Knippertz, Andreas Schäfler, Juan Fang, Shira Rabeh-Ruvin, Linus Magnusson, Deanna Hence, Yali Luo, Linda Schlemmer, Robert Rogers

Multi-Scale coupled Forecasting (MSF) theme

Lead: Jenny Sun, USA, sunj@ucar.edu

Members: Olivier Caumont, Paul Joe, Peter Steinle, Sharan Majumdar, Jianjie Wang, Jim Dudhia, Krushna Chandra Gouda, Nusrat Yussouf.

Human Impacts, Vulnerability & Risk (HIVR) theme

Lead: Brian Mills, Canada, bmills@uwaterloo.ca

Members: Joanne Robbins, Michael Kunz, Isabelle Ruin, Melanie Gall, Sara Harrison, Craig Arthur, Linda Anderson-Berry, Urbano Fra. Paleo, Harald Richter.

Communication theme

Co-leads: Andrea Taylor, UK, a.l.taylor@leeds.ac.uk *& Sally Potter, New Zealand* s.potter@gns.cri.nz

Members: Sara Harrison, Brenda Mackie, Julie Demuth, Amber Silver, Thomas Kox, Bob Goldhammer, Philippe Weyrich, Emily Campbell, Amisha Mehta, Faye Wyatt, Rutger Dankers, Gina Eosco, Marion Tan.

Evaluation theme

Lead: Beth Ebert, Australia, beth.ebert@bom.gov.au

Members: Amanda Anderson, Barb Brown, Julia Chasco, Martin Goeber, Masa Haraguchi, Rainer Kaltenberger, Chiara Marsigli, Marion Mittermaier, Anna Scolobig, Helen Titley.

***Link to SURF project**: Xudong Liang,* liangxd@cma.gov.cn

***Representatives of WGNE (**Working Group on Numerical Experimentation under WCRP)*

Ariane Frassoni, Brazil, ariane.frassoni@inpe.br

Ron McTaggart, Canada, ron.mctaggart-cowan@canada.ca

ADVISORY BOARD

John Rees, British Geological Survey, UK, representing funding agencies

Jan Polcher, Laboratoire de Meteorologie Dynamique of Centre National de la Recherche Scientifique, France, representing Climate Science

Jennifer Sprague-Hilderbrand, National Oceanic and Atmospheric Administration, USA, representing users

Virginia Murray, Public Health England and UNISDR, UK, representing the UN family

Funding: The Trust Fund can support HIWeather conference attendance by delegates from developing countries. New contributions are needed to develop and facilitate the work of the project.

International Coordination Office: The ICO is hosted by Chinese Academy of Meteorological Sciences, and responsible for the organisation of Steering Group, Advisory Board and Task Team teleconferences and maintenance of HIWeather web site: *http://hiweather.net/Index*

Secretariat: Estelle de Coning and Martin Wegmann provide the link to the World Weather Research Programme.

Communication: The HIWeather web site can be reached at *http://hiweather.net/Index*. It contains the Implementation Plan, Steering Group and Task team membership and HIWeather presentations. It is available for task teams to post meetings and progress. A communications web platform for the project has been set up at Massey University, New Zealand and has recently become live at *http://hiweathercomms.net/*. It is currently being updated. A HIWeather twitter account is also now available to follow at *https://twitter.com/WMO_HIWeather*.

Meetings: The Steering Group meets quarterly, usually by teleconference. The latest physical annual SG meeting was held on 14-16 October 2019 in Geneva, with attendance of WWRD, Co-chairs, Task team leaders, and ICO. Task teams meet by teleconference at intervals to suit their work. The Advisory Board aims to meet at least once a year by teleconference.

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