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

July 2021

Dear Colleagues,

We are taking the opportunity, this issue, to change the structure of our newsletter. In future we shall be focussing the content on specific pieces of work. However, our website at http://hiweather.net will continue to provide comprehensive information on the project as a whole.

One highlight, this month, has been the successful completion of the HIWeather book, which has now been passed to Springer for production. A huge thank you to all contributors who have made this possible. The plan is to launch the book at AGU in December.

Progress on the end-to-end value chain project has been gathering momentum under the leadership of Beth Ebert and facilitated by David Hoffman. The description on the website has recently been updated, together with a project plan and draft glossary. Do take a look at http://hiweather.net/Lists/130.html and contact Beth if you want to be involved.

The citizen science project, led by Marion Tan and David Johnston, ran a very interesting workshop looking at how citizen science can contribute throughout the value chain for high impact weather. They have also begun to share demonstration projects of citizen science projects on the HIWeather website and through social media.

Our connection with the Risk-KAN (Knowledge Action Network) became more visible last month as the Early Warning Working Group launched its series of webinars, organised by Faith Taylor (KCL) and Marleen de Ruiter (VU-Amsterdam). The next one will be in September. Visit https://www.risk-kan.org/webinars/ to find out more about this and other Risk-KAN events.

Finally, I was delighted to join people from across the world at the (virtual) launch of the new Warnings Research Centre at UCL London, which I hope we can establish a working relationship with. The centre is led by Dr. Carina Fearnley and already has connections to several members of HIWeather, including my co-chair, Sally Potter.

Best Wishes

Brian Golding

Co-Chair

CONTENTS

CALLS & REQUESTS

Citizen Science project:
Submissions for the special issue of the Australasian Journal of Disaster and Trauma Studies are now due. Submission details are available at: http://trauma.massey.ac.nz/.
The survey of citizen science projects is open at https://massey.au1.qualtrics.com/jfe/form/SV_aaWCTHai8RFzBqJ. Please add details of your project.

Warning Value Chain project:
We are developing an inventory of existing examples of where the value chain has been applied, based on a systematic review of academic and grey literature and workshops. If you know of relevant reports in peer reviewed journals or in the grey literature, please could you forward them to the project office at hiwico@cma.gov.cn

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/Lists/16.html)

Twitter users:
We would like to invite those who use Twitter to communicate about HIWeather relevant topics to use the hashtag #hiweather. Follow and interact with our official account @WMO_HIWeather.

Facebook users:
We would like to invite Facebook users to like, follow, and interact with our HIWeather page at https://www.facebook.com/HIWeather

WeChat users:

We are also on WeChat. Add us on WeChat by using the app to scan this QR Code:

RELEVANT MEETINGS

- **European Meteorological Society**: 3-10 September, online
  Website: https://www.ems2021.eu/. Abstract submission closed. Registration open.
- **International Conference on Southern Hemisphere Meteorology and Oceanography:** 8-12 February 2022, Christchurch, New Zealand and online
  Website: https://confer.eventsair.com/icshmo-2022/.
  Abstract deadline: 19 September 2021.
- **AOGS-EGU Joint Conference NatHazards2021**: 20-22 September 2021, online.
  Abstract deadline: 26 August 2021
  Registration is open and is free
  Website: http://nathazards.org/
- **AGU Fall Meeting**: 13-17 December 2021, New Orleans, LA, United States and online.
  Abstract submission closed
  Registration opens 23 August 2021
  Website: https://fallmeeting.agu.org/
- **AMS Annual Meeting**: 23-27 January 2022, Houston, Texas, United States and online.
  Abstract submission deadline: 1 September 2021
  Registration opens in October
  Website: https://fallmeeting.agu.org/

HIWEATHER CITIZEN SCIENCE PROJECT

Citizen science is a broad term that encompasses various types of projects where the public (citizens) work with agencies and academic researchers to undertake scientific research. Citizen science has its beginnings in the physical sciences but has expanded to other areas, including natural hazard research. The motivations, design, and outputs of citizen science projects vary widely. Some projects are highly participatory, where the citizens are involved in the project design, data collection, and analysis. In others, citizens only provide data to projects designed and coordinated solely by the science agencies. Both ends of this spectrum are useful for creating new scientific outputs and enhancing citizen involvement in science. With many new and ongoing citizen projects planned or underway within the High Impact Weather community, this project is designed to share information and provide tools to help groups and agencies develop new activities.

PLANNED ACTIVITIES FOR 2021

DEMONSTRATION PROJECTS

The survey from 2020 provided insights of many citizen science projects currently happening in the HIWeather space. Not all citizen science projects have formal websites or have been officially published. Some projects may not necessarily have the chance to share their research outputs and their innovative methods. This activity aims to provide a platform for citizen science projects to be showcased through HIWeather supported web platforms. Starting mid-year, HIWeather web platforms will showcase citizen science projects regularly. Projects will be scoped out by the team highlighting innovative citizen science initiatives. An open call for groups to submit content, as part of a grand challenge, may also be administered. The demonstration projects will be part of an inventory collection featured in the HIWeather website.

From the HIWeather 2020 Workshop, several participants have expressed their interest to hear from the citizens of citizen science. Part of this demonstration projects activity will look at ways to also highlight citizen's contributions and stories. An aspect that can be included will be features on citizens and their experiences in participating in projects through compilation of stories that can be published online as written or video features.

PUBLICATION OF GUIDANCE NOTE

We plan to publish the guidance note by the end of 2021.

PUBLICATION OF JOURNAL SPECIAL ISSUE

We plan to publish the special issue by the end of 2021.

WEBINARS AND WORKSHOPS

HIWeather Citizen Science Working Group will maintain the partnership with YESS-Community to deliver webinars or workshops. The group will continue to explore a range of workshops/ conferences/ training opportunities through 2021 on citizen science, aimed at sharing practice, creating new networks for knowledge sharing and collaboration.

RELATED LINKS

Concept note of the webinar series with YESS Community on 'Exploring the role of citizen science in weather, climate, and related projects. https://www.yess-community.org/yesscomm_wp/wp-content/uploads/2020/11/YESSHIW-webinar-series.pdf

Compilation of the video recordings of the five sessions of the webinar series with YESS Community on 'Exploring the role of citizen science in weather, climate, and related projects. https://www.yess-community.org/yess-hiweather-webinar-series/

Compilation of the video recording of the 'Successful Citizen Science' presentations during the 2020 HIWeather Workshop. https://www.youtube.com/playlist?list=PL3z777DAr7XJm6T4shlmxJAMdHHEo7a8V

HIWEATHER VALUE CHAIN PROJECT

This project, which is joint with the WWRP Societal and Economic Research Applications Working Group (SERA), will investigate value chain approaches and apply them to analyse the forecast and warning chain for case studies of actual high impact weather events to discern better practice in warning chains.

Recently, progress has been made on a number of fronts:

- A project plan (see link below) is available to inform interested researchers and stakeholders and support funding applications for research relevant to the Value Chain project, accompanied by a draft glossary of terminology used in value chains (see link below).

- A Value Chain Framework and guidelines is being developed that will include a high level value chain framework tool for decision makers as well as user-friendly guidance and tools for more specific uses of the value chain: forecast and warning service design, characterising existing service chains, evaluation of strengths and weaknesses in the chain, assessing the value of improvements, and resource prioritisation.

- A template/questionnaire is being developed for collecting relevant data on high impact weather events and associated warning chains into a Warning Chain Database, including information on observations, weather and hazard models, forecasts and warnings, short-term and long-term impacts, responses, benefits, lessons learned, and other relevant information that describes what happened in the event. It aims be consistent with, and augment with greater breadth and detail, data to be collected in the WMO Catalogue of Hazardous Events.

- To help understand what data are needed and test our ability to collect information about high impact events and warning chains in near real time, the project focuses its attention on current high impact weather events such as the severe cold snap that occurred in February 2021 in Texas, USA, the severe heavy rain and flooding event in eastern Australia in March 2021, the extreme heat wave in the Pacific Northwest in July 2021 and the severe Central European flooding in July 2021. Information on these events will continue to be added over coming months and beyond.

- A severe heavy rain and flooding event in eastern Australia in March 2021 will be the focus of a multi-disciplinary Australian value chain workshop hosted by the Bureau of Meteorology in September this year.

- On 27 July 2021 the Value Chain and Citizen Science flagship projects met to consider the role of the citizens in the high impact weather warning chain.

- We welcome three new project members: Rachel Albrecht from the University of Sao Paolo, Brazil, Paola Salio from the University of Buenos Aires, Argentina, and Sara Harrison from Massey University, New Zealand.

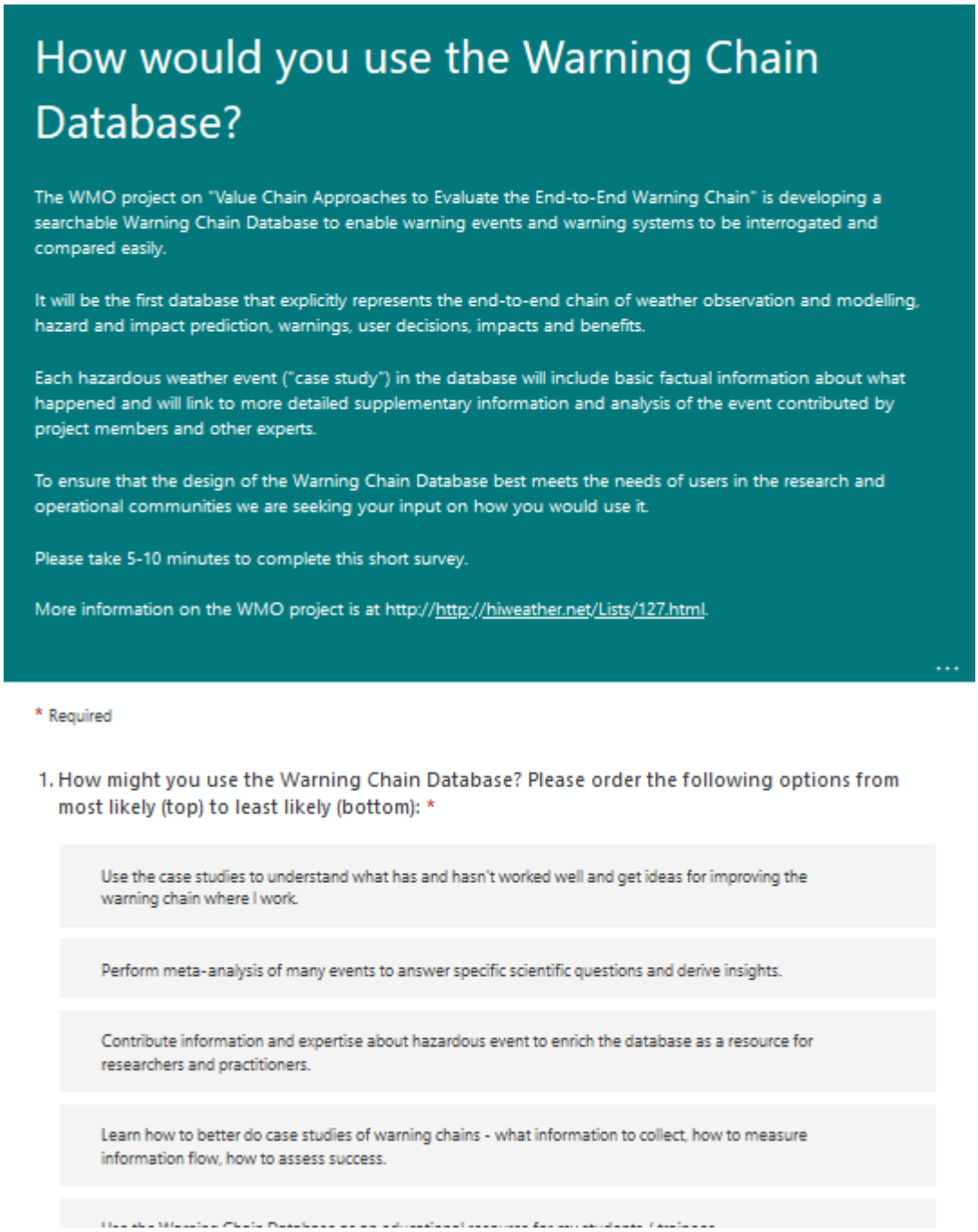
Details of the project are at http://hiweather.net/Uploads/keditor/file/20210716/20210716145754_58652.pdf (Project Plan v1.1), or visit the project web page at http://hiweather.net/Lists/130.html. Glossary v0.1: http://hiweather.net/Uploads/keditor/file/20210617/20210617173719_79065.pdf.

Participate in the Warning Chain Database Survey

To help understand how users of the Warning Chain Database would like to use the information, and what data are most needed, we have created a short survey that takes ~5 minutes to complete.

If you think you might like to use the Warning Chain Database, we invite you to complete the survey by September 30, 2021. Results will be reported in the next HIWeather newsletter.

Warning Chain Database Survey link: https://forms.office.com/r/fF2pKq9XEn



How would you use the Warning Chain Database?

The WMO project on "Value Chain Approaches to Evaluate the End-to-End Warning Chain" is developing a searchable Warning Chain Database to enable warning events and warning systems to be interrogated and compared easily.

It will be the first database that explicitly represents the end-to-end chain of weather observation and modelling, hazard and impact prediction, warnings, user decisions, impacts and benefits.

Each hazardous weather event ("case study") in the database will include basic factual information about what happened and will link to more detailed supplementary information and analysis of the event contributed by project members and other experts.

To ensure that the design of the Warning Chain Database best meets the needs of users in the research and operational communities we are seeking your input on how you would use it.

Please take 5-10 minutes to complete this short survey.

More information on the WMO project is at http://http://hiweather.net/Lists/127.html.

* Required

1. How might you use the Warning Chain Database? Please order the following options from most likely (top) to least likely (bottom): *

Use the case studies to understand what has and hasn't worked well and get ideas for improving the warning chain where I work.

Perform meta-analysis of many events to answer specific scientific questions and derive insights.

Contribute information and expertise about hazardous event to enrich the database as a resource for researchers and practitioners.

Learn how to better do case studies of warning chains - what information to collect, how to measure information flow, how to assess success.

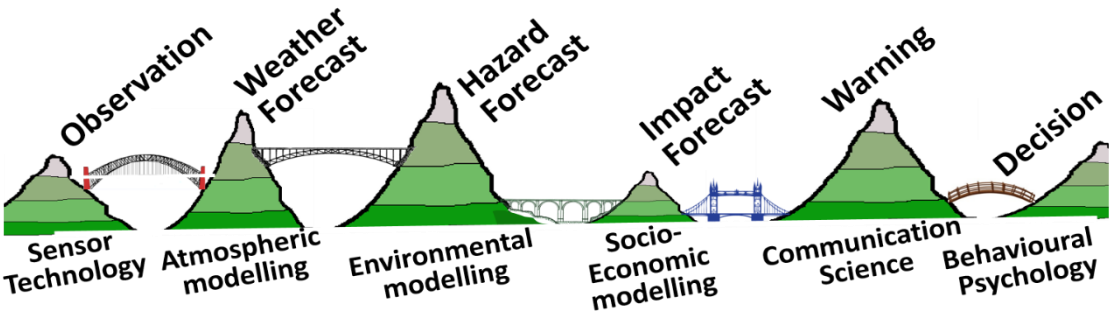
HIWEATHER BOOK: "TOWARDS THE PERFECT WARNING"

HIWeather has brought together an unparalleled body of expertise in the end-to-end warning chain, with the aim of building greater resilience to natural hazards through the application of this expertise in the design and implementation of warning systems. To this end, 49 co-authors, mostly from the HIWeather task teams, have worked over the past 18 months to write a book that describes the practices that will contribute to making an effective warning system: "Towards the "Perfect" Weather Warning: Bridging disciplinary gaps through partnership and communication". The book is being published by Springer, with Open Access in electronic form thanks to the contributors to the HIWeather Trust Fund, and we hope to launch it before the end of the year.

In numbers, the book is almost 200 pages long, with nearly 100,000 words in 8 chapters, illustrated by 41 figures and over 800 references.

The foreword by Ms Mami Mizutori, the UN Secretary General's special representative for disaster risk reduction, emphasises the need for this book to help nations respond effectively to the Sendai Framework for Disaster Risk Reduction, so as to protect citizens and property from weather-related hazards that are increasingly evident.

Following an introductory overview, the book opens with a chapter on governance of disaster risk, and of warning systems in particular, making the point that a framework for funding and responsibility for risk management is a pre-requisite for an effective warning system. Subsequent chapters take the "valleys of death" one at a time starting from the end user/decision maker and ending with atmospheric observation. Each chapter focuses on the bridge that crosses that particular valley, starting with a detailed exposition of the methods used by the receiver of the data and their requirements for data input, continuing with a review of the ability of the provider to meet those requirements, and bringing those together with an analysis of how partnership can facilitate the two communities working together to meet the needs of the end user. Each chapter also provides examples of working partnerships and a bullet-point summary of good practice. Chapter 3 focuses on the needs of the decision maker, be they a professional or member of the public, and how those needs can be met with appropriate forms of warning. Chapter 4 looks at the formulation of the warning and the sources and types of information required, particularly with regard to the expected impact of the hazard. Chapter 5 is at the centre of the warning chain and describes how the information about the physical hazard can be converted into knowledge of how it will affect people and their property. Chapter 6 reviews the range of hazard prediction models and how they use weather information. Chapter 7 then looks at weather prediction and its dependence on observations. A final chapter draws the whole end-to-end system together and looks at how a wider partnership can facilitate effective working together.



The Valleys of Death concept of a Warnings Value Chain. © Crown Copyright 2020, Met Office

NEWS FROM THE TASK TEAMS

PROCESSES & PREDICTABILITY

AEOLUS CAMPAIGN WILL TAKE PLACE IN SEPTEMBER 2021

Preparing equipment for an Aeolus overpass in Mindelo

After two postponements, the Aeolus Tropical Campaign will finally take place in September 2021 on the Cape Verde Islands, off the coast of West Africa. The German (German Aerospace Center, DLR) and French (Service des Avions Français Instrumentés pour la Recherche en Environnement, SAFIRE) Falcon aircraft will fly out of Sal airport, while the US American DC-8 (National Aeronautics and Space Administration, NASA) will be stationed on the US Virgin Islands and visit Cape Verde for intensive measurement periods. The research flights will be accompanied by radiosonde launches operated by the Karlsruhe Institute of Technology and by ground-based dust remote sensing measurements from the island of Mindelo (ASKOS: https://askos.space.noa.gr). In addition to Cal/Val activities for the space-borne wind and aerosol lidar on the Aeolus satellite, scientific investigations will target African Easterly and other Equatorial Waves, tropical cyclogenesis, dust outbreaks from the Sahara and mesoscale convective systems.

MULTI-SCALE HAZARD FORECASTING

NEW MEMBERS

Yi Wang (CMA, China) and Glen Romine (NCAR, USA)

CONNECTED WITH THE PARIS 2024

The team has connected with Paris 2024 RDP participants through emails and online meetings. Some of the objectives of the 100m model intercomparison effort for the Paris 2024 RDP are closely related to the HIWeather goal to improve hazard warning, especially for the hazards of urban flood, and heat and air pollution in megacities.

NEW PAPER ON THE ULTRAMARATHON DISASTER

Yellow river stone forest, Baiyin, Gansu Province, China
Source: Tracylxh - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=89531679

On 22 May 2021 twenty-one runners died of hypothermia during the 100 km Ultramarathon Mountain race in Baiyin, Gansu Province, China. The hypothermia was caused by a combination of low temperatures, precipitation, and high winds associated with a typical large-scale cold front passing by the race site that morning. In order to better understand the characteristics of this tragedy-causing weather event, a team led by Dr. Qinghong Zhang from Peking University analyzed historical hourly records of nearby 13 meteorological surface stations in the month of May over the past six years, temperature (3.0°C) and apparent temperature (−5.1°C) at 1200 LST as well as gust wind speed (11.2 ms^{-1}) an hour earlier on the day of the tragedy and found these meteorological values were within the top or bottom 5th percentile at the race site. The precipitation during the event was only moderate, but when temperature lower than 3.0°C and gust wind speed

greater than 11.2 ms^{-1} were combined, 1200 LST 22 May fell within the top 0.1% of all records examined. The study also found that the European Centre for Medium-range Weather Forecasting model produced reasonably good forecasts of the low temperature and high wind one day and seven days before the event, respectfully. Based on this study, lessons that can be learned from this tragedy are summarized from an academic perspective: Hazard and impact forecasts of high-impact weather events should be developed to increase the value of weather forecasts. Probability forecasts should be issued by government weather agencies and communicated well to the public. And more importantly, knowledge of how to evaluate the impact of weather should be delivered to the public in the future.

The paper has been accepted by Advances in Atmosphere Sciences and released online at
http://link.springer.com/article/10.1007/s00376-021-1246-0

HUMAN IMPACTS, VULNERABILITY & RISK

NEW CO-CHAIR

Joanne Robbins has been appointed co-chair of the Human Impacts, Vulnerability and Risk task team along with Brian Mills. Joanne manages the Weather Impacts Team at the Met Office and has 13 years' experience working on risk and impact modelling for improved forecasting and warning of hydro-meteorological hazards. Her research is focussed on 3 key themes: developing impact models for hydrometeorological hazards and methods to integrate metrological data with vulnerability and exposure datasets; impact-based evaluation using novel, non-standard observations (e.g. using social sensing methods); landslide forecasting and warning. She is currently leading the 'Risk-based forecasting and High-Impact weather/Seasonal events' work package of the Weather and Climate Science for Service Partnership India (WCSSP India), as well as Activity 3.3 'Comparison of approaches for impact assessment and communication across timescales' under the WCSSP South Africa project. Joanne is an active member of several working groups, including the Subseasonal to Seasonal Prediction Project, where she leads the S2S Real Time Pilot Initiative, and the UK's Natural Hazards Partnership (NHP).

COMMUNICATION

LINK WITH PARIS 2024

Julie Demuth has joined the Paris 2024 Research Development Project (RDP) Scientific Steering Committee (SSC) to represent HIWeather. Julie is a research scientist at the National Center for Atmospheric Research (NCAR) in the Mesoscale and Microscale Meteorology (MMM) Lab with the Weather Risks and Decisions in Society (WRaDS) research group. She has been working for more than 15 years on integrating social science research with the meteorological research and practitioner communities. With a hybrid background in atmospheric science and in communication, Julie conducts research on hazardous weather risk communication, risk perceptions, and responses; her work is with both experts, such as weather forecasters, and members of the public. Her work centres on understanding how forecast information, in conjunction with other factors, influences what people think and feel and how they respond.

The Paris 2024 RDP aims to address five key science questions:

1. Nowcasting & Numerical Weather Prediction in cities at ~100m of resolution
2. High resolution thunderstorm nowcasting (probabilistic and deterministic) in the urban environment, urban heat islands and cool areas, air quality in cities
3. Nowcasting and forecast in coastal cities (for the Marseilles site)
4. Big data, non-conventional data and their uses
5. How to deliver tailored weather, climate, environmental information at infra-urban resolution?

On the Paris 2024 RDP SSC, Julie will facilitate connection of the Impacts and Communication aspects of HIWeather into the Paris 2024 research on the last of these questions, as well as reflecting the HIWeather focus on connecting the whole end-to-end warning chain.

EVALUATION

VERIFICATION CHALLENGE

A second competition for evaluation metrics using non-traditional observations (e.g. sensor networks, social media, citizen science, impact data, etc.) is being 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.

The deadline for entries was extended to 31 May 2021 with four entries being received on this challenging topic. Judging of the entries is now underway by a panel from JWGFVR, HIWeather, the Data Assimilation and Observing Systems (DAOS) Working Group, and the South African Weather Service. The winner will be announced in September 2021 and will receive an all-expense paid attendance and keynote talk at 8th International Verification Methods Workshop in 2022. The challenge supports the WWRP's HIWeather, Sub-seasonal to Seasonal Prediction (S2S), and Polar Prediction (PPP) projects.