2020 WMO HIWeather WORKSHOP WEBINAR SERIES

USER–ORIENTED EVALUATION OF HIGH IMPACT WEATHER:

Meaningful information on forecast quality

Join an international network of scientists to discuss how focusing on the users' needs can lead to better decisions in response to high impact weather

11 November 20-22 UTC

TODAY! 20.00-22.00 UTC

This is the third webi… series being run by… Meteorologic… HIWeather…

The… …ute … …ed by a panel … …plenty of time … …for you to ask the speakers … …ns using the chat function.

SPEAKERS

Beth Ebert,
Bureau of Meteorology, Australia
User-oriented evaluation – overview of the task team's activities

Barbara Brown,
National Center for Atmospheric Research, USA
User-driven evaluation of tropical cyclone predictions

Julia Chasco,
National Meteorological Service of Argentina
Incorporating the perspective of user evaluation into the creation of a new early warning system

Amanda Siems-Anderson,
National Center for Atmospheric Research, USA
Verifying the performance of a coupled fire-atmosphere model

Register for free by 20 October
Email your details including professional affiliation to Mwegmann@wmo.int

Check your local time

WWRP WORLD WEATHER RESEARCH PROGRAMME HIWeather

Visit the HIWeather website for more information

COMMUNICATING ABOUT HIGH IMPACT WEATHER:

Uncertainty, trust, and beliefs

Join an international network of scientists to discuss the role of uncertainty, trust and beliefs in communicating about High Impact Weather.

UTC 26 October 8 - 9:30pm

26 OCT 20.00-21.30 UTC
(Recording available soon)

throughout for you to ask the panellists questions using the chat function.

SPEAKERS

Dr Sally Potter,
GNS Science, NZ
Dr Andrea Taylor,
University of Leeds, UK
Overview of HIWeather and Communication Task Team activities

Dr Susan Joslyn,
University of Washington, USA
Uncertainty information and non-expert decisions

Dr Thomas Kox,
Ludwig Maximilian University of Munich, Germany

Register for free by 20 October
Email your details in… Mwegmann@wmo.…

Check…

WWRP

Visit the HIWeather website (…

UNDERSTANDING, MONITORING AND ESTIMATING WEATHER–RELATED RISK AND IMPACT:

A basis for better warnings, decisions, and outcomes

Join an international network of *High Impact Weather* scientists to discuss perspectives on risk and impact estimation and impact-based warnings

05 NOV 14.00-16.00 UTC
(Recording available soon)

Credit: David Sills, Northern Tornadoes Project (EF3 tornado damage near Ottawa CA, 21 Sep 2018)

function of MS Teams.

SPEAKERS

Brian Mills
Environment & Climate Change Canada
Overview of HIWeather IVR task team research

Dr Isabelle Ruin
Institut des Géosciences de l'Environnement (IGE), France
Integrating dynamic human exposure and vulnerability in flood impact-based forecasts

Sara Harrison
Massey University, New Zealand
Developing an integrated impact, vulnerability and exposure knowledge base for New Zealand

This is the second in a series of five seminars organized by the World Meteorological Organization's *HIWeather* research project.

Register for free by 29 October
Email your details including professional affiliation to Mwegmann@wmo.int

Check your local time

19 NOV 21.00-23.00 UTC

As part of the 2020 HIWeather workshop (http://www.hiweather.net/article/18/1.html), a webinar series will be run by the HIWeather research project of the World Meteorological Organization. This is the fourth webinar focusing on the topic of multiscale hazard prediction.

The webinar consists of six 15-minutes presentations and discussions following each presentation. You are cordially invited to join an international network of scientists to discuss progress and challenges related to hazard prediction and warning.

Registration info can be found by clicking the workshop link above. Register before ***5 November.***

Time (UTC)	Speaker	Title
21:00-21:15	Jenny Sun[1]	Overview of HIWeather's hazard forecasting task team activities
21:20-21:35	Francois Bouttier[2]	Seamless ensemble nowcasting of thunderstorms and flash floods
21:40-21:55	Tammy Weckwerth[1]	New observations of water vapor MPDs (Micropulse Differential absorption lidar) and their impact on convective weather forecasting in an OSSE (Observing System Simulation Experiment)
22:00-22:15	Nusrat Yussouf[3]	Data Assimilation and High-Resolution Modeling: Key to Skillful Storm-scale Forecasting
22:20-22:35	Glen Romine[1]	Convective-scale hazard prediction and predictability
22:40-22:55	Mika Peace[4]	New tools and techniques for understanding and predicting the impacts of fire-atmosphere interactions

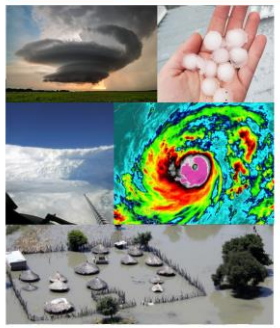
1 National Center for Atmospheric Research, Boulder, CO, USA
2 Meteo France, Toulouse, France
3. National Severe Storm Laboratory, Norman, OK, USA
4. Bureau of Meteorology, Melbourne, Australia

HIWeather WWRP

HAZARDOUS WEATHER PROCESSES:

Observations and case studies

25 NOV 14.00-16.00 UTC



This is the fifth online seminar in a series being run by the World Meteorological Organization's HIWeather research project.

After an introduction to the theme there will be four 15-min presentations (plus Q&A) and a general discussion.

SPEAKERS

Michael Riemer,
Johannes Gutenberg University Mainz, Germany
Overview of HIWeather's Predictability and Processes Theme

Calvin M. Elkins,
University of Illinois at Urbana-Champaign, USA
Using social media to identify hail-producing storms

Robert Rogers,
Hurricane Research Division, Miami, USA
Improving the understanding and prediction of tropical cyclones with aircraft observations

Peter Knippertz,
Karlsruhe Institute of Technology, Germany
How can we improve the prediction of rainfall over tropical Africa?

Linus Magnusson,
European Center of Medium-Range Weather Forecast, Reading, UK
How can we use case studies to evaluate predictability of high-impact weather?

Register for free by 18 November
Email your details including professional affiliation to Mwegmann@wmo.int

Check your local time

WWRP HIWeather

Visit the HIWeather website for more information

USER-ORIENTED EVALUATION OF HIGH IMPACT WEATHER:

Meaningful information on forecast quality

Your Hosts: **Martin Wegmann** *WMO* & **Beth Ebert** *Bureau of Meteorology, Australia*

Beth Ebert (beth.ebert@bom.gov.au)
Bureau of Meteorology, Australia
User-oriented evaluation – overview of the task team's activities

Barbara Brown (bgb@ucar.edu)
National Center for Atmospheric Research, USA
User-driven evaluation of tropical cyclone predictions

Julia Chasco (jchasco@smn.gov.ar)
National Meteorological Service of Argentina
Incorporating the perspective of user evaluation into the creation of a new early warning system

Amanda Siems-Anderson (aander@ucar.edu)
National Center for Atmospheric Research, USA
Verifying the performance of a coupled fire-atmosphere model

Evaluating the warning information value chain

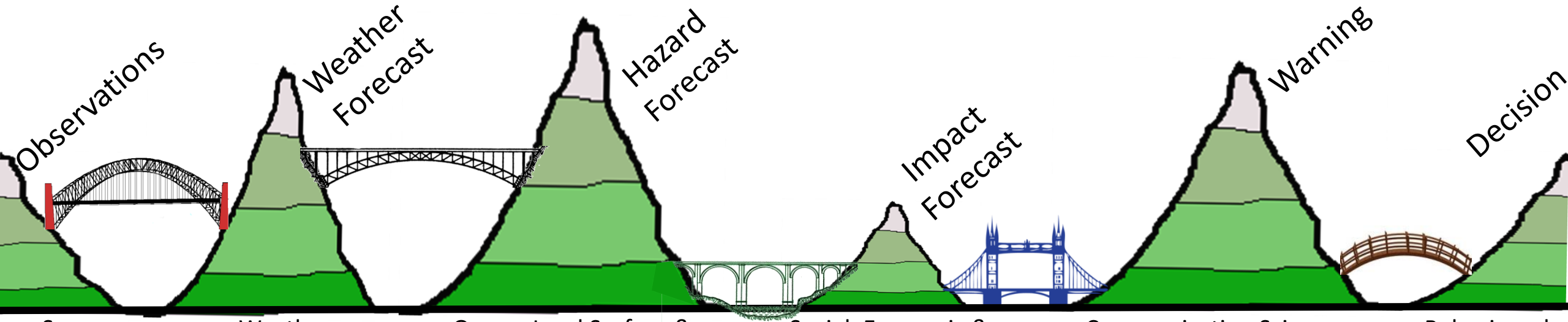
Develop appropriate **verification methods** for new kinds of temporal and spatial high impact weather forecasts

Build users' trust by giving information about how good the forecasts were, reasons for incorrect forecasts, and **user-focused verification**

Use **social media and non-standard data** to evaluate hazards, impacts and response, and improve collection of these data

Apply social science to help **understand decisions** made in response to high impact weather and hazards

Develop and apply **methods to describe and measure the effectiveness** of the warning information value chain



Sensor Technology | Weather Modelling | Ocean, Land Surface & Pollution Modelling | Social, Economic & Health Modelling | Communication Science: Messages & Media | Behavioural Psychology

Courtesy Brian Golding

Verification methods for new kinds of forecasts

Spatial verification of high-res ensemble forecasts

MesoVICT – Mesoscale Verification in Complex Terrain

- Focus on precipitation & wind in mountains

→ *Spatial verification methods developed for determ. forecasts adapted to verify ensemble forecasts*

→ *Observation uncertainty (represented by ensemble of gridded analyses) can change the verification results considerably*

EUMETNET SRNWP-EPS II

- Focus on phenomena: thunderstorms and fog
- Extent and timing are important
- Observations include lightning, visibility, *impacts, crowdsourcing…*

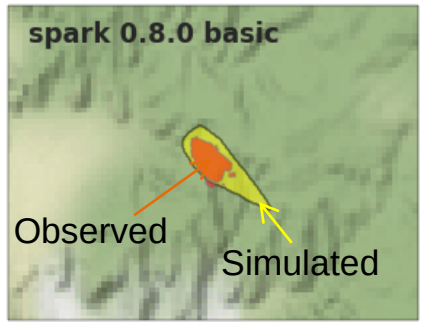
Courtesy Manfred Dorninger and Chiara Marsigli

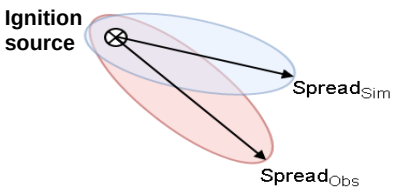
Fire spread evaluation

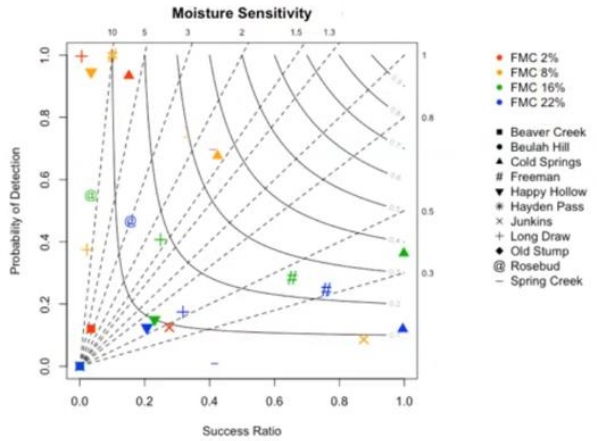
- NWP coupled with fire behaviour models

→ *Simple metrics used in meteorology (e.g. threat score) can be adapted* to verify

  - fire area, rate of spread, bearing
  - sensitivity to variations in weather, fuel, ignition location/time







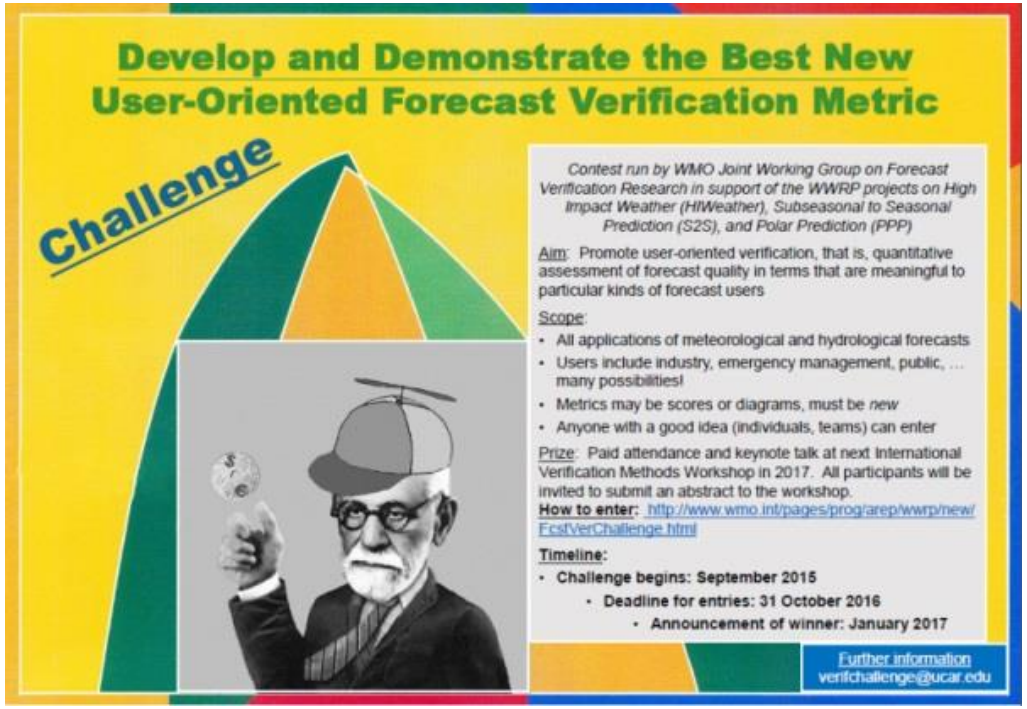
Courtesy Chris Bridge and Amanda Anderson

User-focused forecast verification

1st International Verification Challenge

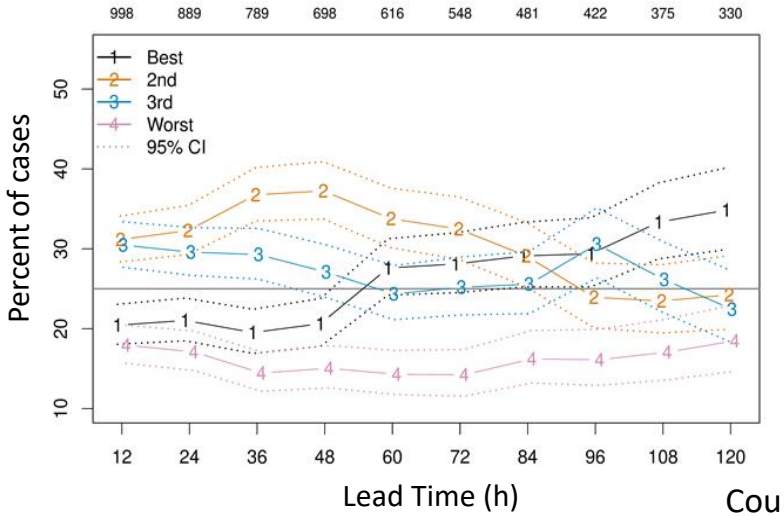
- 17 entries from 11 countries

→ *Winner: Helge Goessling, "Integrated Ice Edge Error (IIEE) & Spatial Probability Score"*



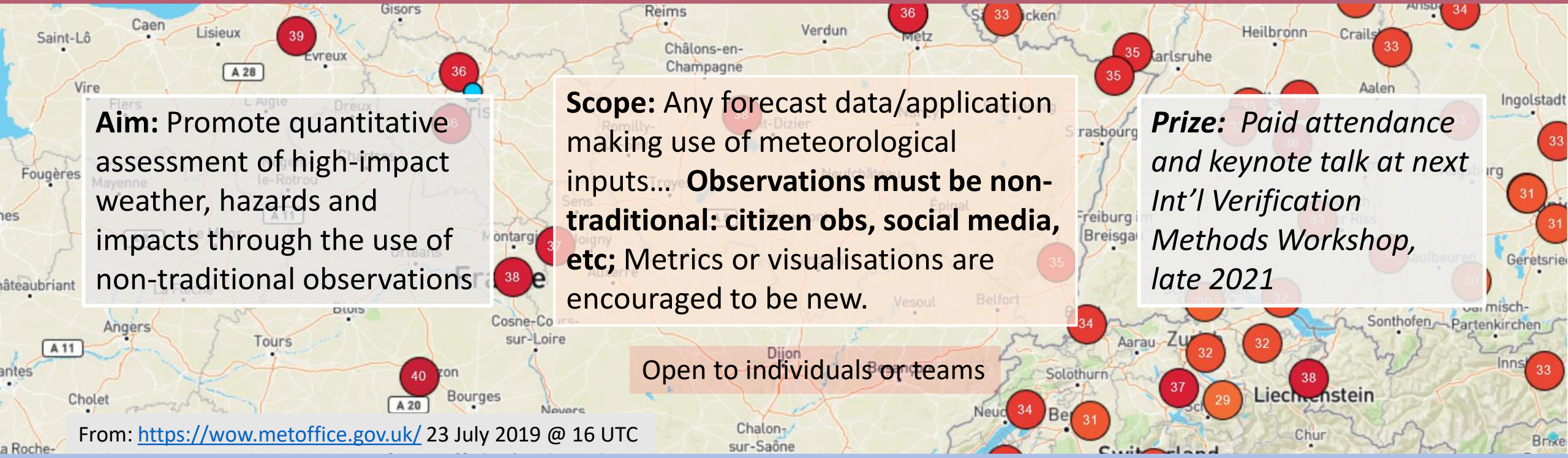
User-driven verification of tropical cyclone predictions

- Info to help National Hurricane Center (NHC) to select experimental NWP models to demonstrate to operational forecasters during each TC season
- Q: *How did the experimental model errors rank in comparison to the errors associated with three baseline models?*



Courtesy Barb Brown

2nd Challenge to develop and demonstrate the best new forecast verification metric *using non-traditional observations*



From: https://wow.metoffice.gov.uk/ 23 July 2019 @ 16 UTC

Aim: Promote quantitative assessment of high-impact weather, hazards and impacts through the use of non-traditional observations

Scope: Any forecast data/application making use of meteorological inputs… **Observations must be non-traditional: citizen obs, social media, etc;** Metrics or visualisations are encouraged to be new.

Open to individuals or teams

Prize: *Paid attendance and keynote talk at next Int'l Verification Methods Workshop, late 2021*

Timeline:

- Deadline for entries: 30 April 2021
- Announcement of winner: end May 2021
- More info: https://community.wmo.int/news/2nd-international-verification-challenge

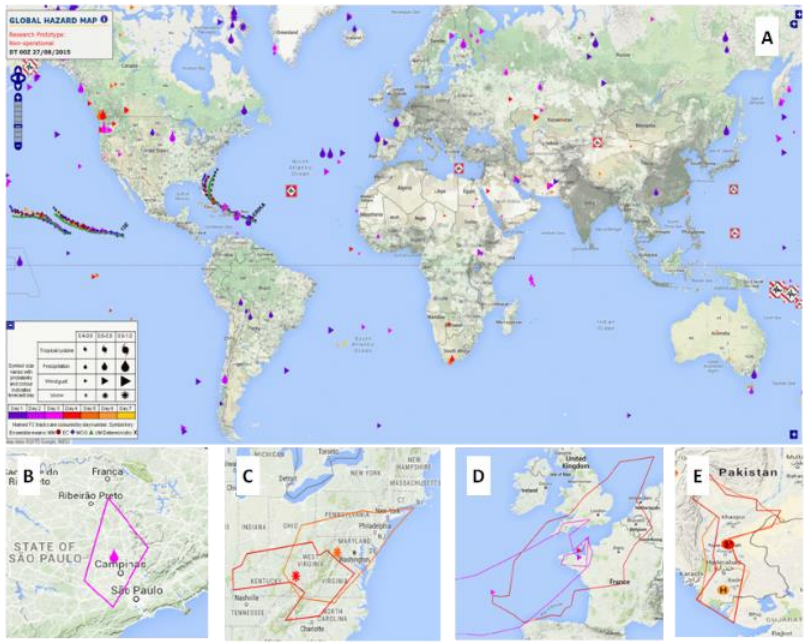
Run by WMO HIWeather Project and Joint Working Group on Forecast Verification Research

Using non-standard data

Global Hazard Map evaluation

- Traditional verification – Did the forecast weather at a certain level of severity occur?

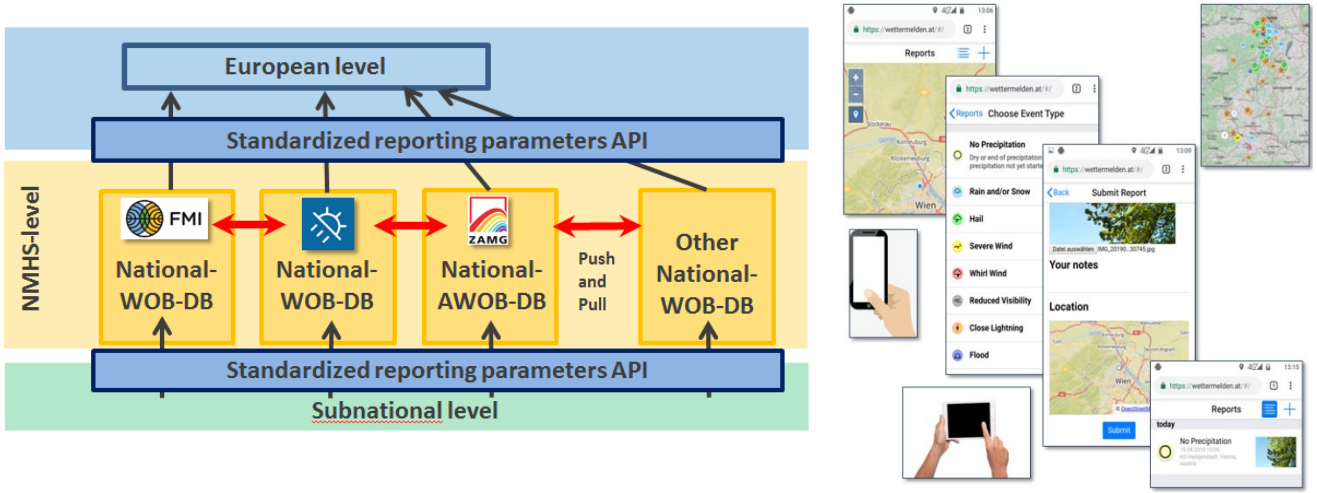
→ *Impact-based evaluation – Did the forecast weather result in a high-impact event? (using database of community impacts)*



Joanne Robbins & Helen Titley, *Meteorol Appl*. 2018; **25**: 548– 560.

European Weather Observer (EWOB)

- Pan-European, standardized set of human-assessed (hydro, meteo, geo) reporting parameters
- Propose European NMHSs act as national data hubs for weather- and impact observations, exchange of data between NMHS level and European level



ZAMG contributions: Thomas Krennert, Rainer Kaltenberger, Andreas Schaffhauser

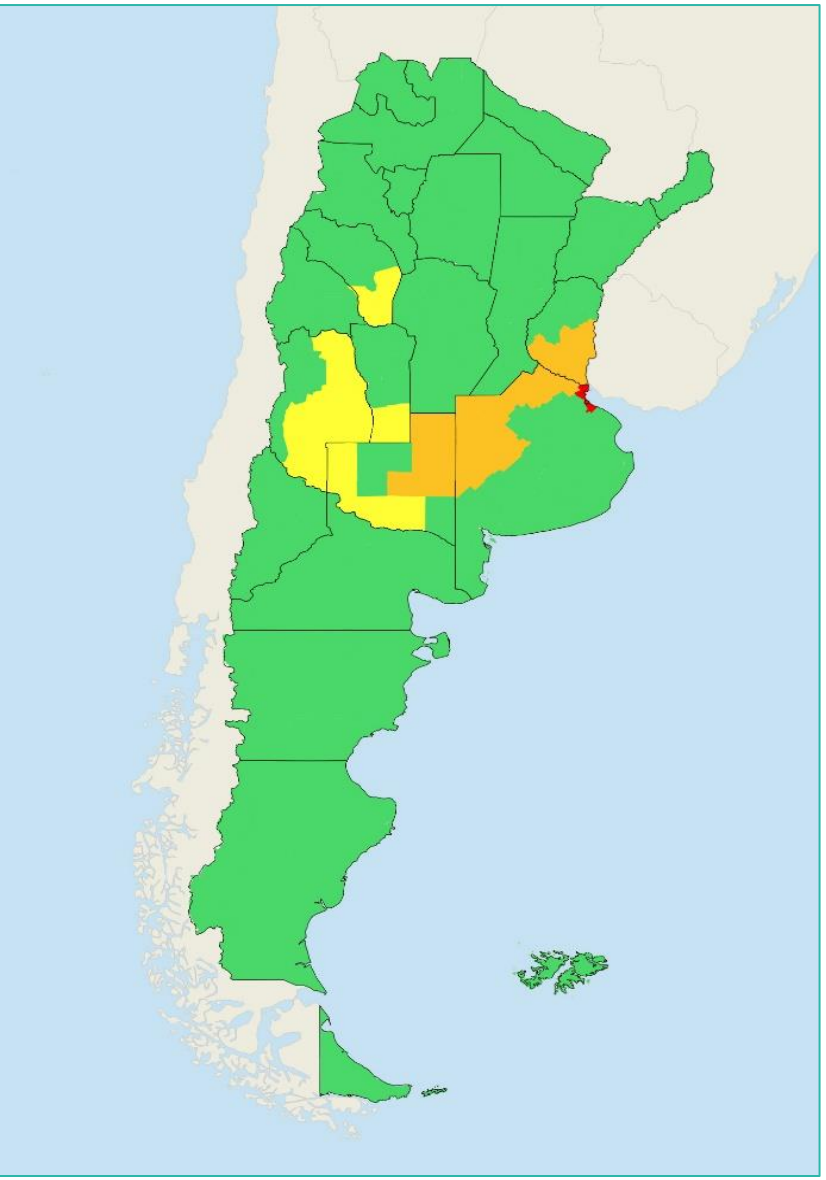
Understanding user decisions

Effectiveness of impact-based warnings for extreme weather events	• Impact-based warnings and behavioural recommendations both **increase warning perception and understanding** and **improve intended behavioural response**
How do people deal with inconsistent warnings?	• Inconsistent warnings have a **severe negative effect on warning quality and intended behavioural response**.
Evaluating the potential of social media information in warning decision-making	• Using serious games, we observe that **information from the crowd disseminated on social media leads to better decisions** and increases associated confidence levels among practitioners.
Dynamic protection motivation framework to explain risk reduction behaviours	• **People are motivated by different factors** in prompting risk reduction behaviour **based on their type of protective measures undertaken**.
Comparative analysis of policy and social science units in weather services	• Highlights the characteristics, advantages, challenges and potential risks of **different models of social science/policy units**

Courtesy Philippe Weyrich, Anthony Patt, Anna Scolobig

New EWS

→ *Interdisciplinary co-design and co-creation of new forecast and early warning system oriented to risk-informed decision making*

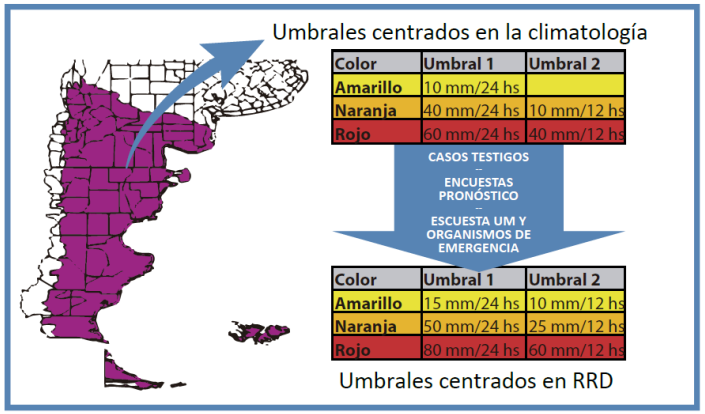


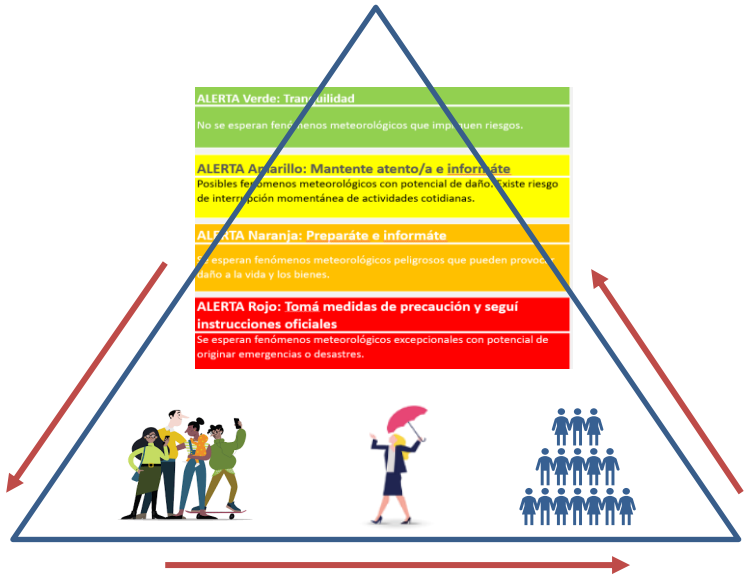
Warning system

RAIN	
THUNDERSTORMS	
WINDS	
ZONDA WIND (ANDES)	
SNOW	

Advisory system

LOW VISIBILITY:	
FOG	
DUST	
VOLCANIC ASH	
SMOKE	
LOW /HIGH TEMPERATURES	





DRR semantic | ***User oriented***

CAP format | ***Recommendations***

Three-day warning monitoring

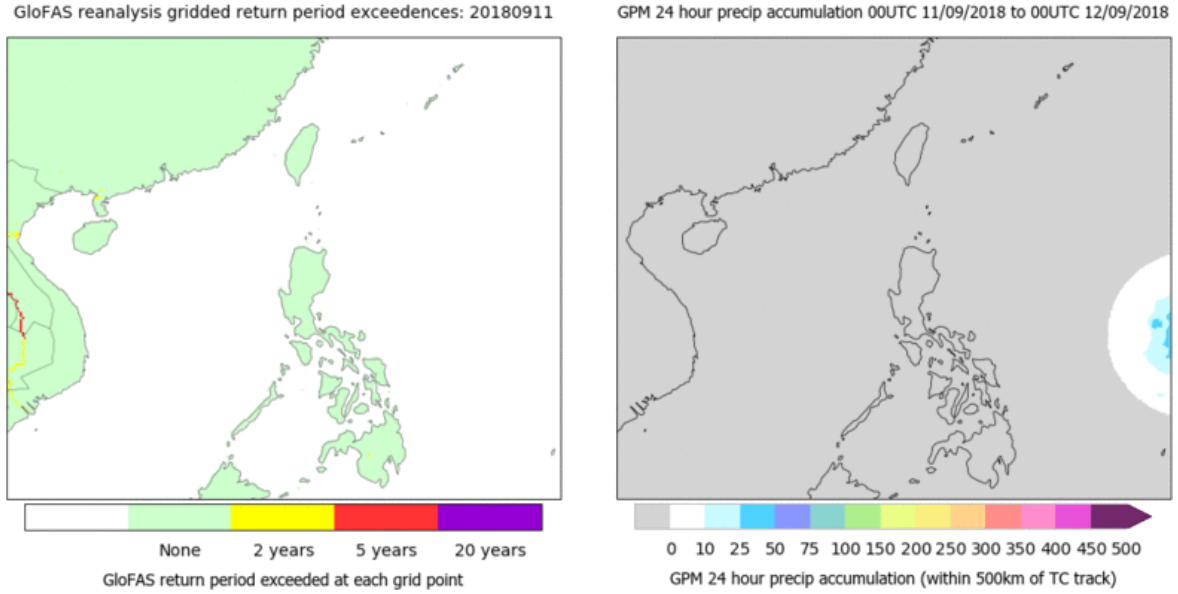
- Importance of social sciences in developing the future system and testing, thresholds, colors, forms of communication, and understanding of alerts on a range of users
- Threshold-based rather than impact-based at present

Courtesy Julia Chasco

Evaluating the warning value chain

Exploring the predictability of fluvial flooding from tropical cyclones

- Investigate key factors influencing severity of flood hazard in tropical cyclones (TCs)
- How do these factors impact predictability of fluvial flooding from TCs in the Global Flood Awareness System (GloFAS)



Courtesy Helen Titley

Survey on impact-oriented warnings in Europe

- 32/37 of European NMHSs replied to EUMETNET EMMA/Meteoalarm survey on implementation of impact-oriented warnings
- 79 questions covered topics from warning format, production process of warnings, dissemination of warnings, verification of warnings, warning strategy, crowdsourcing and cross-border collaboration.
- Valuable dataset for potential impact-oriented warning initiatives on regional / global scale

Kaltenberger, R., Schaffhauser, A., & Staudinger, M. (2020). *Adv. Sci. Research*, **17**, 29-38.

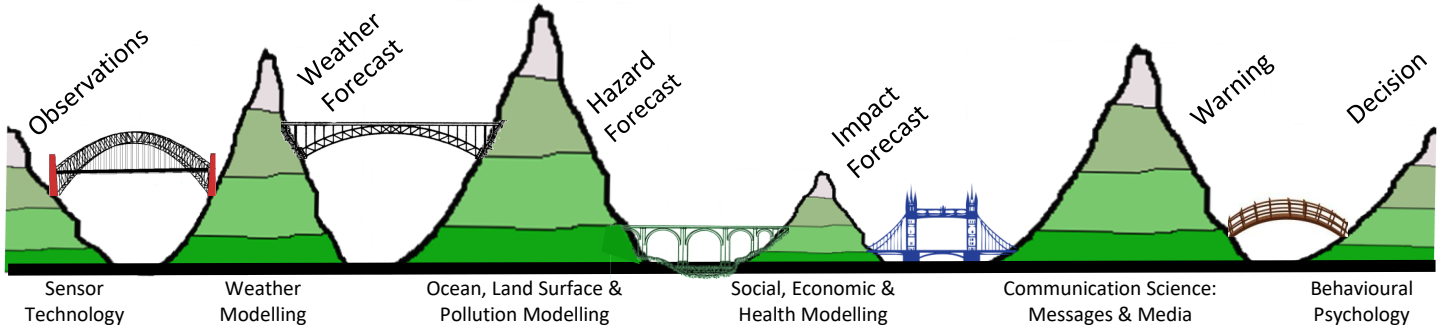
Measuring socio-economic benefits

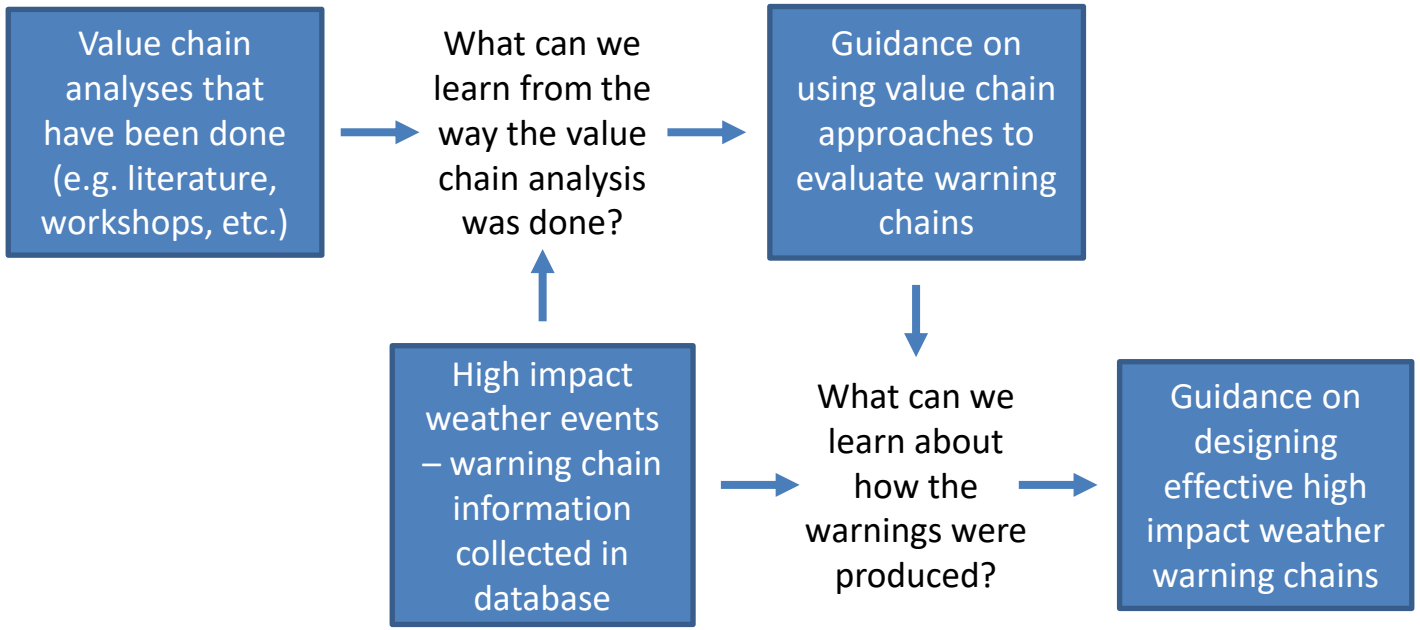
Societal and Economic Research Applications (SERA) workshop

- To be held in 2021 in Offenbach, Germany, hosted and run by the Hans Ertel Centre
- The format will include a tutorial on social science methods, impact prediction, etc. followed by a scientific conference.
- Topics:
  - Estimation of the economic (social) value of weather information
  - Understanding the use of weather information in decision making
  - Understanding the communication of weather forecast uncertainty
  - User-relevant verification methods
  - Decision support systems and tools
  - Impact modeling
  - Citizen observations/science

Courtesy Martin Göber

Value chain approaches to evaluate the end-to-end warning chain





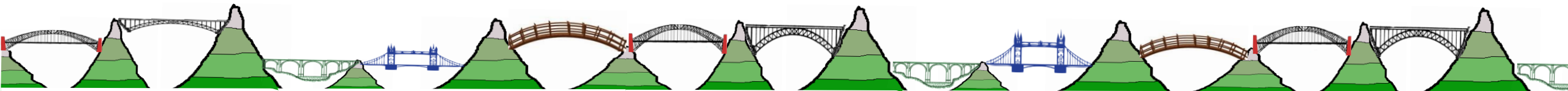
- *New* HIWeather flagship project joint with WWRP Societal & Economic Research Applications WG
- **Overall aim:** Describe, measure and improve effectiveness of the end-to-end warning chain
- *Value chain* provides framework for characterising stakeholder relationships, processes, inputs, contributions, and operational contexts
- Use VC to describe *actual high impact weather events* collected in a database
- Living database supports research
- Future link with WMO Catalogue of Hazardous Events (WMO-CHE)

Join our HIWeather activities!

- 2nd Verification Challenge to use new and novel observations
- Global Hazard Map evaluation
- European Weather Observer (EWOB)
- Societal and Economic Research Applications (SERA) workshop
- Value Chain project
- **2020 HIWeather Workshops:**
  1. **Dec 1 – Successful Citizen Science**
  2. **Dec 2 – Warnings Value Chain**
  3. **Dec 3 – Toward the Perfect Warning**

  Abstracts for presentations due 19 November

  More info: http://hiweather.net



Publications

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- Ebert, E., B. Brown, M. Goeber, T. Haiden, M. Mittermaier, P. Nurmi, L. Wilson, S. Jackson, P. Johnston, and D. Schuster, 2018: The WMO challenge to develop and demonstrate the best new user-oriented forecast verification metric. *Meteorolog. Zeit.*, **6**, 435-440.
- Golding, B., M. Mittermaier, C. Ross, B. Ebert, S. Panchuk, A. Scolobig, D. Johnston (2019). A value chain approach to optimizing early warning systems. *Global Assessment Report on Disaster Risk Reduction*, 30 pp.
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- Weyrich P., Scolobig A., Patt A. (2019), Dealing with inconsistent weather warnings: Effects on warning quality and intended actions, *Meteorological Applications* https://rmets.onlinelibrary.wiley.com/doi/abs/10.1002/met.1785
- Weyrich P., Scolobig A., Patt A. (2019), Impacts of inconsistent weather warnings on public behaviour, in World Bank, *Weathering the Change: How to Improve Hydromet Services in Developing Countries?* Washington, DC: World Bank. https://www.gfdrr.org/en/publication/weathering-change-how-improve-hydromet-services-developing-countries
- Weyrich P., Ruin I., Terti G., Scolobig A., Using serious games to evaluate the potential of social media information in warning decision-making, submitted 5th of July 2019 to *International Journal of Disaster Risk Reduction* (in review)
- Weyrich, P., Mondino, E., Borga, M., Di Baldassarre, G., Patt, A., and Scolobig, A. (2020). A flood risk oriented dynamic protection motivation framework to explain risk reduction behaviours, *Nat. Hazards Earth Syst. Sci. Discuss*., https://doi.org/10.5194/nhess-2019-120 , 287-298.