WWRP Warning Value Chain Project

## Guide for the Warning Chain Database Questionnaire

This guide provides detailed descriptions of the information requested in the Warning Chain Database Questionnaire for high impact natural events. The questionnaire was originally designed for weather events and some guidance may reflect that, but its use is encouraged for other relevant events such as hydrological or geohazard events. It contains advice and examples to help contributors provide consistent, high-quality data and information that will enable researchers and practitioners to make effective use of the database.

The [Warning Chain Database Questionnaire](https://docs.google.com/document/d/11I1-WwVCsF5a8NNYqu-XYUW51_4OYaWw/edit?usp=sharing&ouid=114820395644101181147&rtpof=true&sd=true)[[1]](#footnote-2) can be downloaded from Google Drive. The [Value Chain Glossary](http://hiweather.net/Uploads/keditor/file/20211108/20211108120611_16170.pdf) provides a common terminology.

More information about the WWRP Warning Value Chain Project can be found at <http://hiweather.net/Lists/130.html>.

1. **Detailed guidance for essential information table**
	1. **Hazardous weather event**
		1. *Unique identifier*

This is a number/letter code to identify each event in the database and will be generated automatically by the WMO’s Catalogue of Hazardous Events (CHE). No actions needed.

* + 1. *Name of event*

Provide a name for the event that characterises it sufficiently, for example, named after the location, time of year, and weather/hazard type of occurrence (Flooding NSW East Coast March 2021, Cold Snap Texas February 2021) or named systems (Tropical Cyclone Debbie March 2017, Hurricane Harvey 2017)

* + 1. *When did it happen?*

Provide the date(s) of when the event happened, either just the month and year or, preferred, the complete start and end dates, especially if it’s a short and sharp event such as a tornado. Please also provide the approximate duration of the event in number of days. This is typically the timing of the major impacts on the population or environment, which is in the range of a day (e.g., tornado) to about a week (e.g., heat wave).

* + 1. *Where did it happen?*

Give the location where the event occurred. If the event is non-stationary, list locations that were impacted in chronological order. The location(s) should be specified according to the size of the event. For example, impacted town/municipalities for highly localised events such as tornados (e.g., Sartinville, Mississippi, USA), and impacted states/regions for large scale events such as tropical cyclones (e.g., east/south-east QLD and northern NSW, AUS). Specification of the country impacted should follow the [ISO 3166-1 alpha-3 three-letter country codes](https://countrycode.org/). Using the boxes, indicate whether the event impacted rural and/or urbanised areas.

* + 1. *Links/UIDs to other databases*

Paste links and unique identifier numbers (UIDs) to other databases that have an entry for the particular event. It’s best to write out the URL since hyperlinks do not always work. Such databases can be [EM-DAT](https://www.emdat.be/), [ECMWF Catalogue of Severe Events](https://confluence.ecmwf.int/display/FCST/Severe%2BEvent%2BCatalogue), [GLIDE](https://glidenumber.net/glide/public/search/search.jsp), [Sheldus](https://cemhs.asu.edu/sheldus) or [DesInventar](https://www.desinventar.net/).

* 1. **What happened – weather, hazards, impacts, warnings, responses**
		1. *Event type/system that caused hazards*

The meteorological or geophysical source of the hazard, e.g., the causal weather posing hazardssuch as tropical cyclone, convective storm, etc. Refer to Annex 1 which lists weather and hazard types. List more than one weather type if the event you’re describing is a compound event.

* + 1. *Were any hazards forecast?*

Using the boxes, indicate whether a hazard forecast was performed.

* + 1. *Hazards that cased the main impacts*

The hazards created by the weather event (above) that cause the main impacts, e.g., flood, wildfire, landslide, etc. Refer to Annex 1 which lists weather and hazard types. List more than one hazard if applicable.

* + 1. *Classify hazard according to the location's climatology*Provide an indicator of the hazard severity such as return period (e.g., frequency of occurrence such as 1 in 100-year event) or relative magnitude (e.g., highest ever recorded).
		2. *Were any impacts forecast?*

Using the boxes, indicate whether an impact forecast was performed.

* + 1. *Main direct impacts*

List the main impacts caused by the severe weather event that were most disruptive/costly. Direct impacts are those directly associated with the action of the hazard event where it strikes. Indirect impacts should be added in the supplementary material.

* + 1. *Economic damage in USD*

Estimated economic impact of the event in US Dollars. Please specify whether the amount you entered accounts for insured losses only or insured and uninsured losses combined. Convert to USD if necessary to allow users of the database to filter effectively on damage.

* + 1. *Fatalities*

The number of people killed because of the event. This number is updated regularly shortly after an event has happened and often even later so, please use the most up to date source and consider revising later.

* + 1. *Were any warnings issued?*

Using the boxes, indicate whether any warnings were issued.

* + 1. *Main warnings issued*

Messages produced and disseminated to raise awareness or warn the general public of the anticipated severe weather event. For brevity, limit to one warning of each hazard that occurred. For example, just list ‘flood and wind warning’ even though several different levels of flood warnings for different locations were issued during the event.

* + 1. *Who issued the warnings?*

The institution or service that issued the warnings listed above. This is often the national weather service but can also come from other national or local agencies including emergency management/civil defence.

* + 1. *Main responses to warnings*

Provide information about the main response actions taken based on the warnings issued for the particular event. This might include filling and distributing sandbags, people leaving their homes (voluntarily or enforced through evacuation order), bringing livestock to safer grounds, etc.

1. **Detailed guidance for supplementary information**
	1. **Source of hazard**
		1. *Situational overview*

Describe the development of the event, starting with the larger scale situation and moving to finer scales as the hazard evolved and the impact got closer in time. For example, what were the dominant processes governing the evolution of the event and its predictability? A paragraph or two is usually enough, especially if a reference for more information is also provided.

* + 1. *Special / non-traditional observational data used in the weather forecast or assimilated into NWP*

Describe the nature and source of special observations that were used in this event to assist with forecasting or assimilated into numerical weather prediction models. Examples might include hurricane aircraft reconnaissance data, portable AWS data, or observations from research satellite platforms.

* + 1. *Comment on the adequacy of observations available for the hazard forecast*Describe specific gaps in the observation network or availability that may have contributed to errors in the numerical modelling and/or weather forecasts. For example, automatic weather stations in key locations might have been destroyed by damaging winds or fire associated with the event, or loss of power may have affected the transmission of critical weather data.
		2. *Weather models (short- and long-range)*

Provide information about the numerical models that were used in forecasting this event. Ideally this includes models used at different stages of the event: the seasonal modelling system, medium range global NWP, and high resolution regional models. Information on operational NWP systems can be found at <http://wgne.meteoinfo.ru/nwp-systems-wgne-table/wgne-table/>.

* + 1. *Post-processing / calibration applied to weather model output*

If the model output was post-processed or calibrated to improve the forecast accuracy, briefly describe the approach (e.g., bias correction against AWS data, empirical correction of ensemble-based probabilities).

* + 1. *Weather forecast outputs and examples*

Provide charts, time series or tables from deterministic and ensemble/probabilistic forecasts that highlight important aspects of this event. For example, for a flood event it would be useful to show rainfall anomaly charts from the long-range forecasts, and probabilities of rainfall accumulation exceeding critical thresholds at the shorter range. Diagnostics like Extreme Forecast Index (EFI), Shift of Tail (SOT), or climatological percentiles may also be useful.

* + 1. *Interpretation / guidance for forecast users*

Give a brief summary of interpretative guidance on uncertainty and trends in the model forecasts for this event. This could be drawn from met notes, chart discussions, public forecast videos, etc. A few sentences are enough, especially if a reference for more information is also provided.

* + 1. *What was the level of agreement between the different forecasts?*

The level of agreement often suggests whether the weather was "easy" or "hard" to predict. This analysis could discuss whether a particular model or forecast told a consistent story across time as the event unfolded, and whether different models or ensemble members told similar or different stories about the forecast weather.

* + 1. *How reliable and accurate were weather forecasts at different lead times?*

More accurate and reliable weather forecasts should support better warnings and response. However, there is always a trade-off between accuracy and lead time, and accuracy on the large scale versus precision in space and time. This analysis could show how forecast accuracy varied for different lead times and different temporal or spatial aggregations.

* + 1. *When was the potential event first detected in the models?*

Likelihood of large-scale events may be signalled in multi-week forecasts while smaller scale events like severe convection may be forecast only hours or days ahead of time. This analysis could discuss the first indications of the event in the models that led to closer monitoring or taking some action, and what threshold of probability provided enough trust to begin to act.

* + 1. *Weather observations and analysis*

Provide charts, tables, time series or other summary graphics or text that describe important aspects of the observed weather. For example, if the event is a heat wave, then it would be useful to show daily mean or maximum temperature on a map and as time series at one or more affected population centres. Unofficial observations (e.g. from third party networks) are also of interest.

* + 1. *How did the observed weather relate to climatology and/or previous extreme events?*

Provide context for the extremeness of this event. Storylines or anecdotes that compare this event to past events (e.g. the greatest 3-day rainfall accumulation since the great storm of 1989) are also useful.

* + 1. *Additional analysis*

Provide any other information or analysis that would be useful for understanding the weather forecasting aspects of this event. For example, what were possible reasons for good or poor weather forecast performance?

* + 1. *Successes, issues and/or challenges experienced*

Note any experiences that distinguished this weather forecast. This could include things that were done especially well or things that went particularly wrong.

* 1. **Hazards**

If the hazard is identical to the weather (for example, strong winds) then most of this section can be skipped.

* + 1. *Brief overview of the hazard event(s)*

Describe the evolution of the hazard(s) associated with this event. If the event produced more than one hazard (for example, a tropical cyclone that caused heavy rain and flooding, damaging winds, and storm surge) briefly describe as many of the hazards as possible, including whether the hazards occurred simultaneously, as a cascade, or cumulatively over time.

* + 1. *Observational data used in the hazard forecast or assimilated into the hazard model*

Describe the nature and source of observations that were used in this event to assist with hazard forecasting or assimilated into hazard models. Examples include streamflow measurements, air quality measurements, Sentinel satellite data, etc.

* + 1. *Comment on the adequacy of observations available for the hazard forecast*Describe specific gaps in the observation network or availability that may have contributed to errors in the hazard modelling and/or hazard forecasts. For example, river gauges might have been destroyed by flood waters, or hazard observation networks might have been absent or immature.
		2. *Hazard prediction models/tools*

Provide information about hazard models or tools that were used in forecasting this event, including any post-processing or calibration that may have been applied to the model output. Since hazard models may be less mature than operational weather prediction models, include a reference to the model/tool if possible.

* + 1. *Hazard forecast outputs and examples*

Provide charts, time series or tables from deterministic and ensemble hazard forecasts that highlight important aspects of this event. If possible, try to include information that can be directly compared to the hazard observations. Information on multiple hazards that were forecast to occur simultaneously, as a cascade, or cumulatively over time are of interest.

* + 1. *How reliable and accurate were the hazard forecasts?*

Provide information on the quality of the hazard forecasts. Due to the difficulty of obtaining good hazard observations, objective verification of the forecasts may not be possible, in which case a subjective assessment would be appropriate.

* + 1. *What process or trigger(s) identified the event as hazardous and started the warning process?*

Describe the process or procedure that indicated that the hazard was serious enough to provide warning advice. In many cases this is the forecast exceedance of a critical threshold, or it could be a consistent "story" in successive forecasts or similarity of the forecast to a past hazardous event. Also include discussions/interactions with partner agencies/practitioners/experts if appropriate.

* + 1. *Hazard observations and analysis*

Provide charts, tables, time series or other summary graphics or text that describe important aspects of the observed hazard(s) such as its spatial extent, duration and intensity. For example, if the event is a flood, then it would be useful to show observed flood extent on a map and flood height as a time series at one or more key locations. Data from unofficial sources are also of interest.

* + 1. *What crowdsourcing/citizen science was used for impact observations?*

Any hazard observations received from citizens as part of a citizen science project or a dedicated app. This can also include social media resources such as Twitter, Facebook, etc.

* + 1. *How did the hazard(s) relate to climatology?*

Provide context for the extremeness of this event. This could include climatological percentiles or comparisons to past events (e.g., the most extensive fire since the great fire of 1989).

* + 1. *How was the hazard(s) made worse by pre-existing environmental conditions?*

Describe how any pre-existing conditions such as extended drought, saturated soil, burnt landscape, etc. may have caused the hazard to be more extreme than normal.

* + 1. *Additional analysis*

Provide any other information or analysis that would be useful for understanding the hazard forecasting aspects of this event. For example, what else may have contributed to good or poor hazard forecasts?

* + 1. *Successes/issues/challenges experienced*

Note any experiences that distinguished this hazard forecast. This could include things that were done especially well or things that went particularly wrong.

* 1. **Impacts**
		1. *Brief overview of the impact(s)*

Describe the development of the impact(s) associated with this event. You can do this in chronological order or by impact severity. Describe both direct and indirect impacts, including cascading impacts. An example might be enhanced flooding and landslides with heavy rain that occurs after wildfires. Try to differentiate between immediate and delayed impacts.

* + 1. *Data used in the impact forecast or model*List the types of data used to predict the impacts of this event, such as vulnerability datasets, exposure maps, and other auxiliary information that enabled the weather and hazard information to be translated into impact information. Indicate whether the input data are static or dynamic (change with time).
		2. *Impact prediction models/tools (if used)*

Provide information about impact prediction models or tools that were used in forecasting impacts. Include a reference to the model/tool if possible.

* + 1. *Informal rules/tools used to identify impacts*

The expected impacts of hazardous events are often predicted from past experience and may include rules-of thumb (for example, 30mm rain in 6 hours = urban flood of area x-y-z). Briefly describe heuristic or informal approaches that were used to predict the impacts. This can include discussions/interactions with partner agencies/ practitioners/ experts.

* + 1. *Impact forecast outputs and examples*

Provide charts, time series, probabilities, tables, or text from impact forecasts. If possible, try to include information that can be directly compared to the impact observations.

* + 1. *Comparison of predicted and actual impacts*

Briefly describe how well the impacts were predicted compared to what was observed. For example, were as many areas flooded as forecast? Were as many people impacted as anticipated?

* + 1. *Observed impacts*

*Health and social impacts:* Provide information about impacts on the human health, such as deaths, injuries, disease, and their primary causes. If applicable, briefly describe long-lasting impacts such as mental illness and community hardship.

*Property and business impacts:* Describe the nature and extent of damages to properties (for example, damaged houses) and businesses (loss of goods and customers). Information on insured losses can often provide a lower bound on the economic impact of an event.

*Critical infrastructure damage and service disruption:* List services losses due to impact on critical infrastructure such as water supply, wastewater treatment, electricity, fuels, transportation, emergency response, health care, etc. If possible, note how long services were disrupted, both immediately as a direct result of the hazard and longer term if major repairs were required.

*Environmental damage:* Provide information about environmental damages such as coastal erosion, water or air pollution, loss of vegetation or habitat, loss of wildlife, etc.

* + 1. *What crowdsourcing/citizen science was used for impact observations?*

Any impact observations received from citizens as part of a citizen science project or a dedicated app. This can also include social media resources such as Twitter, Facebook, etc.

* + 1. *Who and what were exposed to the hazards, when, for how long?*

Provide information on people and assets that were exposed to the hazard. Note any unusual exposure that may have influenced the impact of the event, for example, people exposed to the elements while participating in a sporting event.

* + 1. *Of those exposed, who and what were vulnerable to the hazards and why?*

Describe the vulnerabilities that contributed to this event having a high impact. Quantitative information might include pre-hazard social resilience indicators (age structure, share of immobile people, share of inhabitants below poverty line, access to warning media, practical literacy) and pre-hazard physical resilience indicators (e.g. age or condition of homes and infrastructure).

* + 1. *Additional analysis*

Provide any other information or analysis that would be useful for understanding the impact forecasting aspects of this event. For example, what else may have contributed to good or poor impact forecasts?

* + 1. *Successes/issues/challenges experienced*

Note any experiences that distinguished this impact forecast. This could include things that were done especially well or things that went particularly wrong.

* 1. **Warning communication**
		1. *Brief overview of the communication “story”*

Briefly describe the warning communication for the event, ideally in chronological order. This can include the progression from public forecast through to official warning and the channels used including the media briefings, official warnings, social media, etc. If known, also mention any decision-making in the process and when and how stakeholders were notified, whether through standard or exceptional procedures.

* + 1. *What information was provided to emergency responders, government and other stakeholders about the hazard and its possible impact, and by whom?*

Describe the information provided to help partner agencies, emergency managers, government, industry, etc. to prepare for the event. Note who communicated it and what approaches were used (e.g. briefings, phone calls, etc.). If possible, comment on how the information differed from public warning information. For example, did it assume a greater level of knowledge, was it shared earlier, etc.

* + 1. *Public warnings*

*Name*: List the different types, for example, warnings, watches, advisories and the frequency of issue. For example, list ‘minor flood warning’ only once even if multiple minor flood warnings have been issued.

*Icon/colour*: Icon or colour used to specify the warning severity, e.g., red for highest warning level issued.

*Forecast lead time*: The time period between warning issued and expected impact. For example, 8 hours.

*Warning frequency*: How often the warning was repeated ahead of the event.*Issued by*: The institution who issued the warning. For example, the national weather service, i.e., UK Met Office.

*Warning area*: Was the warning issued for a specific region or local area?

*Type of warning*: Was the warning based on a meteorological threshold, impact or other criteria?

*Did it include safety advice*?: Was the public told what preventative actions to take?

*Scaled*: Did the warning have different levels of severity?

*Channels used*: The channels used to disseminate the warning. For example, website, warning app, TV, radio, text message to smart phone, social media, briefings, text to talk, etc.

* + 1. *How was warning information communicated by other organizations including media?*Describe warnings that were made in addition to the official public warnings. This might include tailored information from private weather providers to their customers, reinforcement of warning information by media, etc.
		2. *Warning outputs and examples*Provide examples of different types of warnings issued for this event. This could include graphical warnings, text messages, links to videos, etc. If possible, include examples corresponding to longer and shorter lead times.
		3. *Comment on the use of uncertainty information in the warnings*

Describe how uncertainty was communicated in the warnings. For example, were probabilities used to express the likelihood event of a certain level? How were words, numbers or other visuals used to communicate uncertainty?

* + 1. *To what extent were communication systems in place and operating effectively?*Which communication technologies, guidelines and systems were used in this event (for example, sirens, automated text messages to mobile phone, internet, door-knocking, etc.)? Describe any issues that prevented them from working as intended. An example might be storm damage to a mobile phone tower which prevented SMS alerts from being received.
		2. *To what extent were warning messages received and understood by the public?*How did the public access information about the hazard and its impacts? Include formal and informal channels i.e. apps, alerts, shared through social media, family and friends. Comment on levels of confidence or confusion that may have occurred in response to the warnings.
		3. *To what extent was crowdsourcing/citizen science used for warning dissemination?*

For example, warning dissemination done by citizens as part of a citizen science project.

* + 1. *Comment on how the needs of specific groups and populations were addressed*

Include information about how warnings were produced or adapted to meet the needs of exposed/vulnerable people, non-native language speakers, using accessible formats, and so on.

* + 1. *Additional analysis*Provide any other information or analysis that would be useful for understanding the warning communication for this event. Possible topics could include trust, risk perception, message receipt, latency in delivery, rumours, beliefs, policies, practices, etc.
		2. *Communication success/issues/challenges experienced*

Note any experiences that distinguished the warning communication process. This could include things that were done especially well or things that went particularly wrong.

* 1. **Responses**
		1. *Brief overview of the response to the hazard by emergency services and other partners*

Provide an overview of the emergency responses in a chronological order to build a story line and to identify timely responses. Also mention if no responses were taken, e.g., business-as-usual. Distinguish exceptional and/or additive responses from routine operational responses.

* + 1. *What were the main response actions by the public to the warnings?*

Describe any actions taken by the public based on the warnings issued for this event. This can include people leaving their homes (voluntarily or enforced through evacuation), panic, following personal safety plans, etc.

* + 1. *Institutional responses*
		Provide information about significant hazard mitigation actions taken by governments and other institutions and industries in response to the warnings. Examples might include evacuation of at-risk communities, total fire bans or suspension of transport networks. Note who took the action and when, what information triggered the action, what were the benefits and if known, the economic or other cost.
		2. *How did the overall response to this event compare to similar previous events?*

Describe how the response to this event is different to a similar event that has happened before. For example, earlier evacuations compared to the previous event.

* + 1. *Comment on the existence and use of disaster preparedness and response plans*
		Summarize the existence and utility of preparedness and response plans. For example, were they empowered by law, were they targeted to the individual needs of vulnerable communities, were they tested and drilled? Note whether these plans were followed in this event, and whether they were effective.
		2. *How knowledgeable was the community about the hazard* *and its associated risks?*
		Comment on levels of public awareness of the hazard prior to the event that occurred. Were programs in place to support community education and relevant training of the public to recognise signals and respond to warnings?
		3. *How did the key decision makers and institutions interact before, during and after the event?*

Comment on the interactions between key decision makers such as managers of emergency services and national weather services over the course of the event.

* + 1. *What capacity did the community have to respond to warnings?*

Describe any factors that influenced the capacity or ability of the community to respond to the warning. Examples could include access to transport, language difficulties, and demographic factors such as age profile. Had any long-term preparedness and mitigation actions (for example, engineering works or fuel reduction burns) been taken to reduce potential damage to property and infrastructure and loss of life?

* + 1. *Additional analysis*

Provide any other information or analysis that would be useful for understanding responses to warnings of this event. For example, what else may have contributed to good or poor responses, such as trust, risk perception?

* + 1. *Success/issues/challenges experienced*

Note any experiences that distinguished these warning responses. This could include things that were especially successful or things that were of no value. What were the reasons for success (or failure)?

* 1. **Analysis of the warning chain**
		1. *Information flow through the warning chain*

The table captures issues with the flow of data and information between the parts of the warning chain, starting with the hazard source (e.g., weather) and ending with the response. If some data and information were not, or only partially, available to the downstream part of the warning chain, describe the nature of this information and, if possible, who was responsible for providing it.

* + 1. *Tools and operational workflows for sharing information between partners*Briefly describe common tools, systems and operational workflows that facilitated situational awareness and collaborative decision amongst key partners in the warning chain (for example, the European MeteoAlarm system). If known, comment on whether these systems were co-designed and co-developed.
		2. *How useful were social media/crowdsourcing/citizen science in the warning chain??*

Briefly describe how social media assisted in the warning chain for this event. Examples might include disseminating warnings, posting information on hazards and impacts, enhancing situational awareness through greater activity, and organising warning responses.

* + 1. *Evidence that the warning chain was effective in reducing fatalities, injuries, damage, and/or disruption*

Describe evidence from studies, testimonies and other sources that support conclusions that the warning reduced the impact of this event. Examples could include a decreased death toll compared to other similar events, or statements from officials.

* + 1. *What were the strongest links (information flow) in the warning chain?*

Considering the flow of information *between* players or capabilities in the warning chain, note which aspects worked quite well and why. An example could be the automated flow of weather data from the meteorological agency to the flood agency to support flood prediction, based on a strong partnership between agencies.

* + 1. *What were the weakest links (information flow) in the warning chain?*

Considering the flow of information *between* players or capabilities in the warning chain, note which aspects worked poorly and why. Factors might include poor timeliness, irrelevance of information, technological incompatibilities, lack of data, failure in communication, inadequate staffing, etc. Did any part of the warning chain fail to operate altogether? If so, how was this dealt with? An example of a weak link could be a lack of sharing of impact observations with the meteorological and hazard agencies to reinforce and update warnings.

* + 1. *What procedures were used to identify lessons learned from the event?*

If possible, provide information on how the warning performance and lessons learned from this event have been assessed, documented, and acted on, including who was involved. Comment on whether this was part of a regular post-event review process or more ad-hoc.

* + 1. *Comment on lessons learnt from previous events and their contributions to greater warning success for this event*

Describe any key improvement(s) implemented in the warning chain, based on lessons learnt from past events, that may have produced a better outcome for this event. Since warnings evolve over many years, focus on just one or a few changes that were particularly relevant for this event.

* + 1. *Additional analysis*

Provide any other information or analysis that would be useful for understanding or evaluating the information flow in the warning chain.

1. **Assessment of the end-to-end warning chain**
	1. **Level of expertise with high-impact weather events**
		1. *Your profession*Indicate your occupation. If you are retired, please indicate your profession before retiring. This information will assist the WWRP Value Chain project team to understand more about the contributors to the warning chain database.
		2. *Please rate your level of expertise with hazard source (e.g., weather), hazard, impact, warning/communication, response and high-impact weather event evaluation*

The purpose of this question is to assist the WWRP Value Chain project team to understand more about the contributors to the warning chain database. When multiple contributors have assessed the same event, this information may be useful in interpreting variations in the subjective ratings. The intent is *not* to judge the quality of the information provided in this report.

* 1. **Performance of the warning chain**

This section asks you to assess the performance of the various parts of the value chain.

* *Ratings:* Rate how well you think the event was observed, forecast, warnings issued/communicated and responded to. If available, consider the supplementary information section (Part 2).
* *Reasons:* Briefly describe the reasons for your rating. Note any successes and/or issues that led to your rating.

*How well did the entire warning chain perform overall?*

Rate how well you think the entire warning chain performed overall for this event. Consider your previous ratings of the individual parts of the warning chain. The overall rating can be the average score or weighted towards a specific section that you think was particularly important for the success/failure of the warning chain.

Annex 1: *List of hazards adapted from the* [*UNDRR-ISC Hazard Information*](https://www.undrr.org/publication/hazard-information-profiles-supplement-undrr-isc-hazard-definition-classification) *Profiles*

\* = not in UNDRR-ISC list of hazardous events

1. Convective-related
* Downburst
* Lightning (Electrical Storm) Thunderstorm
1. Flood
* Coastal Flood
* Estuarine (Coastal) Flood
* Flash Flood
* Fluvial (Riverine) Flood
* Groundwater Flood
* Ice-Jam Flood Including Debris Ponding (Drainage)
* Snowmelt Flood
* Surface Water Flooding
* Glacial Lake Outburst Flood
1. Lithometeors
* Black Carbon (Brown Clouds)
* Dust storm or Sandstorm
* Fog
* Haze
* Polluted Air
* Sand haze
* Smoke
* Volcanic gases and aerosols
1. Marine
* Ocean Acidification
* Rogue Wave
* Sea Water Intrusion
* Sea Ice (Ice Bergs)
* Ice Flow
* Seiche
* Storm Surge
* Storm Tides
* Tsunami
* Pumice\*
1. Pressure-related
* Depression or Cyclone (Low Pressure Area)
* Extra-tropical Cyclone
* Sub-Tropical Cyclone
1. Precipitation-related
* Acid Rain
* Rain\*
* Blizzard
* Drought
* Hail
* Ice Storm
* Snow
* Snow Storm
* Ash/Tephra Fall
1. Temperature-related
* Cold Wave
* Dzud
* Freeze
* Frost (Hoar Frost)
* Freezing Rain (Supercooled Rain)
* Glaze
* Ground Frost
* Heatwave
* Icing (Including Ice)
* Thaw
1. Terrestrial
* Avalanche
* Mud Flow
* Rockslide
* Landslide
* Lahar
* Lava Flows
* Ballistics
* Pyroclastic Density Current
* Ground Shaking
1. Wind-related
* Derecho
* Gale (Strong Gale)
* Squall
* Subtropical Storm
* Tropical Cyclone (Cyclonic Wind, Rain [Storm] Surge)
* Tropical Storm
* Tornado
* Wind
1. Environmental
* Wildfires
* Crown fire\*
* Surface fire\*
* Ground fire\*
* Coastal Erosion
1. <https://docs.google.com/document/d/1H5H9NTYtfSGE74kF6Qeu8FHZMhEpu5TX/edit?usp=sharing&ouid=106255653981108702821&rtpof=true&sd=true> [↑](#footnote-ref-2)