



Supplement of

Wikimpacts 1.0: a new global climate impact database based on automated information extraction from Wikipedia

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S1 2021 European Floods

S1.1 2021 European Floods deaths

Table S1. Deaths from the 2021 European Floods as recorded in Wikimpacts 1.0.

	Administrative Areas	Total Deaths	
L1 Total deaths for the event	Austria, Belgium, Czech Republic, Croatia, France, Germany, Italy, Luxembourg, Netherlands, Romania, Switzerland, United Kingdom	243	
L2 Deaths per country	Administrative Areas		
	Germany	196	
	Belgium	43	
	Romania	2	
	Italy	1	
	Austria	1	
L3 Deaths per sub-national location	Administrative Area	Locations	
	Germany	Rhineland-Palatinate, Ahrweiler	135
	Germany	North Rhine-Westphalia, Euskirchen	27
	Germany	Bavaria	2
	Germany	Saxony	1
	Germany	Bavaria, Berchtesgadener Ache	1
	Austria	Saalbach-Hinterglemm	1
	Belgium	Pepinster	23
	Italy	Veneto	1
	Romania	Satu Mare	1
	Romania	Iași	1

S1.2 2021 European Floods info_box in Wikipedia

5 Listing S1. 2021 European Floods Info_Box

```

1:
2: {
3:   "Info_Box " : "Date :_12-25_July_2021\n" +
4:                 "Location :_Austria ,_Belgium ,_Czech_Republic ,_Croatia ,_" +
10:                "France ,_Germany ,_Italy ,_Luxembourg ,_Netherlands ,_" +
6:                "Romania ,_Switzerland ,_United_Kingdom\n" +
7:                "Deaths :_243\n" +
8:                "196_in_Germany\n" +
9:                "43_in_Belgium\n" +
15: 10:                "two_in_Romania\n" +
11:                "one_in_Italy\n" +
12:                "one_in_Austria\n" +
13:                "Property_damage :_EUR54_billion_(2021_Euro)\n" +
20: 14:                "200,000_properties_left_without_power"
15: }
```

S2 Keywords for document selection

Table S2. Keywords for document selection by main event category. The category Storm subsumes the more specific categories Tornado, Tropical Storm/Cyclone, and Extratropical Storm/Cyclone in the database schema.

Category	Keywords
Drought	drought, droughts, dryness, dry spell, dry spells, rain scarcity, rain scarcities, rainfall deficit, rainfall deficits, water stress, water shortage, water shortages, water insecurity, water insecurities, limited water availability, limited water availabilities, scarce water resources, groundwater depletion, groundwater depletions, reservoir depletion, reservoir depletions
Extreme Temperature	heatwave, heatwaves, heat wave, heat waves, extreme heat, hot weather, high temperature, high temperatures cold wave, cold waves, coldwave, coldwaves, cold snap, cold spell, arctic snap, low temperature, low temperatures, extreme cold, cold weather
Flood	floodwater, floodwaters, flood, floods, inundation, inundations, storm surge, storm surges, storm tide, storm tides
Wildfire	wildfire, forest fire, bushfire, wildland fire, rural fire, desert fire, grass fire, hill fire, peat fire, prairie fire, vegetation fire, veld fire
Storm	windstorm, windstorms, storm, storms, cyclone, cyclones, typhoon, typhoons, hurricane, hurricanes, blizzard, strong winds, low pressure, gale, gales, wind gust, wind gusts, tornado, tornadoes, wind, winds, lighting, lightings, thunderstorm, thunderstorms, hail, hails extreme rain, extreme rains, heavy rain, heavy rains, hard rain, hard rains, torrential rain, torrential rains, extreme precipitation, extreme precipitations, heavy precipitation, heavy precipitations, torrential precipitation, torrential precipitations, cloudburst, cloudbursts

S3 F1 score, precision and recall definition

In the statistical analysis of binary classification and information retrieval systems, the F-score (or F-measure) serves as a metric for evaluating predictive performance (Sasaki, 2007). It is derived from precision and recall, where precision (also known as positive predictive value) is defined as the ratio of true positive results to the total number of positive predictions (inclusive of incorrectly classified ones). Recall (or sensitivity) is calculated as the ratio of true positive results to the total number of instances that should have been classified as positive.

The F1 score represents the harmonic mean of precision and recall, providing a balanced metric of both. This can be expressed mathematically as:

$$F_1 = \frac{2}{\text{recall}^{-1} + \text{precision}^{-1}} = 2 \cdot \frac{\text{precision} \cdot \text{recall}}{\text{precision} + \text{recall}} = \frac{2TP}{2TP + FP + FN}$$

where:

- TP is the number of true positives,
- FP is the number of false positives,
- FN is the number of false negatives.

The formulas for precision and recall are as follows:

$$\text{Precision} = \frac{\text{Relevant retrieved instances}}{\text{All retrieved instances}} = \frac{TP}{TP + FP}$$

$$\text{Recall} = \frac{\text{Relevant retrieved instances}}{\text{All relevant instances}} = \frac{TP}{TP + FN}$$

The F-score ranges from 0 to 1. A value of 1.0 indicates perfect precision and recall, while a value of 0 indicates that both precision and recall are zero.

S4 Prompt design and selection

We develop multiple versions of prompts, and evaluate each against our gold standard data. For all cases, we set the temperature of the GPT4o model to zero. Tables S4 and S5 present the error rates for L1, L2, and L3 across various prompt versions within the development set. As shown in Table S4, the model accurately captures L1 information using both V3.1 and V3.3. Basic details like time, show error rates below 0.03 for year and month and below 0.05 for day. The error rate for the Main Event field is also less than 0.05, while for hazards it approaches 0.2. Regarding location information, prompt V3.1 yields a 0.5041 error rate in L1, while V3.2 shows an improved error rate of 0.2866. This suggests that extracting countries directly from the text outperforms retrieving affected countries from a pre-defined list. For the direct impact categories, prompt V3.1 performs well for Total Deaths and Total Insured Damage at L1, with error rates between 0.0143 and 0.0602. However, categories such as Total Buildings Damaged and Total Displaced show higher error rates, reaching 0.281 to 0.285. Categories including Total Damage, Total Injuries, Total Homeless, and Total Affected also achieve acceptable error rates at L1, ranging from 0.1184 to 0.2066. Comparative evaluation with V3.3 shows that this prompt setting has slightly lower error rates than V3.1 for certain categories, such as Main Event, Total Deaths, and Total Damage, but that it exhibits higher error rates for other impact categories. V4 maintains similar error rates to V3.1 for Total Deaths, Total Insured Damage, and Total Damage, while demonstrating marginal improvements in other categories. For V5, aside from achieving slightly lower error rates for Total Deaths and Total Damage relative to V3.1, V3.3, and V4, performance decreases across the remaining impact categories.

Table S3. Description of different prompt versions tested in this study. V3.1 and V3.2 are selected for use in Wikimpacts 1.0.

Prompt version	Description
V3.1	Contains all information fields (e.g. time, location, impacts). For the impact categories, all questions are combined into a single prompt. In L1, the location information is prompted to capture all affected locations. The infobox and the entire article are provided at the beginning of each prompt.
V3.2	Only contains the prompt of location information in L1, which is prompted to capture all affected countries. The infobox and the entire article are provided at the beginning of each prompt.
V3.3	Contains all information fields. For the impact categories, all questions are combined into a single prompt as in V3.1. The prompt of location information in L1, is prompted to capture all affected countries as in V3.2. The infobox and the entire article are provided at the end of each prompt.
V4	Only contains the impact categories. L1 and L2-related questions are included in a single prompt, while L3-related questions are addressed in a separate prompt. The infobox and the entire article are provided at the beginning of each prompt.
V5	Only contains the impact categories. L1, L2, and L3-related questions are addressed in three separate prompts. The infobox and the entire article are provided at the beginning of each prompt.

Further, Table S5 illustrates that, on average, prompt V3.1 performs better for L2 and L3 information extraction than other prompt versions. Comparative analysis across L1, L2, and L3 evaluations reveals that placing questions prior to the article text does not optimize extraction performance for this type of data. Instead, prompts combining L1, L2, and L3-related questions provide more balanced extraction quality across impact categories. The full text of the V3.1 and V3.2 prompts used to construct the Wikimpacts 1.0 database are shown in Listings S2 and S3.

Table S4. Mean score of each field in L1 across the different versions of the prompts. The weighted score is the average score when assigning the same weight to all the fields.

	V3.1	V3.2	V3.3	V4	V5
Weighted Score	0.1204	NA	0.1417	0.1236	0.1563
Main Event	0.0429	NA	0.0286	NA	NA
Hazards	0.1833	NA	0.1238	NA	NA
Start Date Day	0.0286	NA	0.0402	NA	NA
Start Date Month	0.0143	NA	0.0264	NA	NA
Start Date Year	0.0143	NA	0.0143	NA	NA
End Date Day	0.0448	NA	0.0448	NA	NA
End Date Month	0.0008	NA	0.0008	NA	NA
End Date Year	0.0000	NA	0.0000	NA	NA
Administrative_Areas_Norm	0.5041	0.2866	0.4441	NA	NA
Total Deaths Min	0.0602	NA	0.0385	0.0602	0.0332
Total Deaths Max	0.0592	NA	0.0388	0.0592	0.0318
Total Injuries Max	0.1186	NA	0.1581	0.1033	0.2900
Total Injuries Min	0.1184	NA	0.1580	0.1033	0.2899
Total Buildings Damaged Min	0.2810	NA	0.2841	0.2311	0.2450
Total Buildings Damaged Max	0.2838	NA	0.2837	0.2265	0.2477
Total Affected Min	0.2002	NA	0.3041	0.2002	0.3389
Total Affected Max	0.2066	NA	0.3114	0.2066	0.3464
Total Homeless Min	0.1438	NA	0.2338	0.1300	0.1761
Total Homeless Max	0.1473	NA	0.2376	0.1335	0.1760
Total Displaced Min	0.2850	NA	0.4152	0.2707	0.3736
Total Displaced Max	0.2818	NA	0.4059	0.2675	0.3643
Total Damage Min	0.1244	NA	0.1115	0.1244	0.0958
Total Damage Max	0.1163	NA	0.1022	0.1164	0.0878
Total Damage Unit	0.0857	NA	0.0857	0.0857	0.0714
Total Damage Inflation Adjusted	0.1571	NA	0.1429	0.1571	0.1000
Total Damage Inflation Adjusted Year	0.0286	NA	0.0143	0.0429	0.0286
Total Insured Damage Min	0.0429	NA	0.0714	0.0429	0.0286
Total Insured Damage Max	0.0429	NA	0.0714	0.0429	0.0286
Total Insured Damage Unit	0.0286	NA	0.0714	0.0286	0.0143
Total Insured Damage Inflation Adjusted	0.0714	NA	0.1143	0.0714	0.0571
Total Insured Damage Inflation Adjusted Year	0.0143	NA	0.0143	0.0143	0.0143

Table S5. Weighted scores for each impact category in L2 and L3 across different versions of the prompts. V3.2 is not included since the impact prompts are the same as in V3.1. “Average” is the mean value of all weighted scores in each column.

	V3.1		V3.3		V4		V5	
	L2	L3	L2	L3	L2	L3	L2	L3
Deaths	0.5283	0.6438	0.581671	0.6115	0.5094	0.5835	0.5433	0.6026
Injuries	0.3141	0.4718	0.395199	0.5134	0.3904	0.6098	0.4661	0.5900
Homeless	0.3743	0.4849	0.372344	0.4561	0.4944	0.5583	0.5230	0.5420
Displaced	0.3632	0.4494	0.395024	0.5121	0.3739	0.4902	0.5164	0.4699
Affected	0.4641	0.5297	0.519331	0.5123	0.5997	0.5284	0.6828	0.5540
Buildings_Damaged	0.5410	0.5956	0.539552	0.5498	0.6669	0.5572	0.6890	0.6113
Insured_Damage	NA	0.5052	NA	0.5944	NA	0.5200	NA	0.5267
Damage	0.4537	0.4964	0.436760	0.4553	0.5340	0.5862	0.5759	0.5227
Average	0.4341	0.5221	0.4628	0.5256	0.5098	0.5542	0.5709	0.5524

Listing S2. The full text of V3.1 prompts

```
1:
2:
65 3: V3.1 prompts = {
4: "affected": [
5:     ""Based on information box {Info_Box} and header-content pair article {Whole_Text},
6:     extract the number of affected people associated with the {Event_Name}, along with supporting annotations from the article.
7:     The affected people information can be splited into 3 parts,
70 8:     the first is the total number of affected people caused by the {Event_Name}, and organize this information in JSON format as
9:     follows:
10:     - "Total_Summary_Affected":{ {
11:     - "Total_Affected": "The total number of people who were affected, impacted, or influenced in the {Event_Name}.
12:     Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,'
75 13:     'at least 200', '300-500 people').
14:     Do not sum the number of affected people in the article to present the total number of affected people,
15:     and if no total number of affected people explicitly mentioned or the information is missing, assign 'NULL'."
16:     - "Total_Affected_Annotation": "Cite "Info_Box" or the header name from the article provided where you find the information
80 17:     about the total affected people. The output should only include "Info_Box" or the header name."
18:     } }
19:     the second is the total number of affected people in the country level caused by the {Event_Name}, and organize this information
20:     in JSON format as follows:
21:     - "Instance_Per_Administrative_Areas_Affected":{ {
22:     - "Administrative_Areas": "Name of the country where the affected people located, and no matter the affected people are in one
85 23:     or several countries, please order them in a list like [Country1, Country2, Country3]."
24:     - "Start_Date": "The start date when the people were affected, if mentioned."
25:     - "End_Date": "The end date when the people were affected, if mentioned."
26:     - "Num": "The total number of people who were affected, impacted, or influenced in this level related to the {Event_Name}.
90 27:     Do not sum the number of affected people in specific locations from the country to present the total number of affected people
28:     for this level information.
29:     Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,'
30:     'at least 200', '300-500 people').
31:     If the information is missing or if no total number of affected people in this level is mentioned, assign 'NULL'."
32:     - "Annotation": "Cite the header name from the article provided where you find the information about the total affected people in
95 33:     this level. The output should only include the header name."
34:     } } }
35:     the third is the specific instance of affected people in the sub-national level caused by the {Event_Name}, make sure to capture all
36:     locations with affected people information and organize this information in JSON format as follows:
37:     - "Specific_Instance_Per_Administrative_Area_Affected":{ {
100 38:     - "Administrative_Area": "Name of the country."
39:     - "Locations": "The specific place within the country where the affected people located, and no matter the affected people are in
40:     one or several places, order them in a list like ["Location1";"Location2";"Location3"]."
41:     - "Start_Date": "The start date when the people were affected, if mentioned."
42:     - "End_Date": "The end date when the people were affected, if mentioned."
105 43:     - "Num": "The number of people who were affected, impacted, or influenced in the specific location/locations related to the
44:     {Event_Name}.
45:     Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,'
46:     'at least 200', '300-500 people').
47:     If the information is missing, assign 'NULL'."
110 48:     - "Annotation": "Cite the header name from the article provided where you find the information about the affected people in this
49:     location. The output should only include the header name."
50:     } } }
51:     Ensure to capture all instances of affected people mentioned in the article, including direct and indirect causes. Only Give Json
52:     output, no extra explanation needed. ""
```

115 39:],

40: "buildings_damaged": [
41: ""Based on information box {Info_Box} and header-content pair article {Whole_Text},
42: extract the number of damaged buildings associated with the {Event_Name},
43: covering a wide range of building types such as structures, homes, houses, households, apartments, office buildings, retail stores,
120 44: hotels, schools, hospitals, and more,
45: along with supporting annotations from the article. The number of damaged buildings information can be split into 3 parts,
the first is the total number of damaged buildings caused by the {Event_Name}, and organize this information in JSON format as
follows:
46: – "Total_Summary_Buildings_Damaged":{ {
125 47: – "Total_Buildings_Damaged": "The total number of damaged buildings in the {Event_Name}.
48: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., "hundreds of", "few houses",
"several homes").
49: Do not sum the number of damaged buildings in the article to present the total number of damaged buildings,
50: and if no total number of damaged buildings explicitly mentioned or the information is missing, assign 'NULL'.
130 51: – "Total_Buildings_Damaged_Annotation": "Cite "Info_Box" or the header name from the article provided where you find the
information about the total number of damaged buildings. The output should only include "Info_Box" or the header name."
52: } }
53: the second is the total number of damaged buildings in the country level caused by the {Event_Name}, and organize this
information in JSON format as follows:
135 54: – "Instance_Per_Administrative_Areas_Buildings_Damaged":{ { {
55: – "Administrative_Areas": "Name of the country where the building damage occurred, and no matter the building damage is in one
or several countries, please order them in a list like [Country1, Country2, Country3].."
56: – "Start_Date": "The start date when the damaged buildings occurred, if mentioned."
57: – "End_Date": "The end date when the damaged buildings occurred, if mentioned."
140 58: – "Num": ""The total number of damaged buildings in this level related to the {Event_Name}.
59: Do not sum the number of damaged buildings in specific locations from the country to present the total number of damaged
buildings for this level information.
60: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., "hundreds of", "few houses",
"several homes").
145 61: If the information is missing or if no total number of damaged buildings in this level is mentioned, assign 'NULL'.
62: – "Annotation": "Cite the header name from the article provided where you find the information about the total building damage
in this level. The output should only include the header name."
63: } } }
64: the third is the specific instance of damaged buildings within each country caused by the {Event_Name}, make sure to capture all
150 65: locations with damaged buildings information and organize this information in JSON format as follows:
66: – "Specific_Instance_Per_Administrative_Area_Buildings_Damaged":{ { {
67: – "Administrative_Area": "Name of the country."
68: – "Locations": "The specific place/places within the country where the damaged buildings occurred, and no matter the building
damage is in one or several places, order it/them in a list like ["city1";"city2";"city3"]."
155 68: – "Start_Date": "The start date when the damaged buildings occurred, if mentioned."
69: – "End_Date": "The end date when the damaged buildings occurred, if mentioned."
70: – "Num": "The number of damaged buildings in the specific location/locations related to the {Event_Name}.
71: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., "hundreds of", "few houses",
"several homes"). If the information is missing, assign 'NULL'.
160 72: – "Annotation": "Cite the header name from the article provided where you find the information about the building damage in this
location. The output should only include the header name."
73: } } }
74: Ensure to capture all instances of damaged buildings mentioned in the article, including direct and indirect causes. Only Give Json
output, no extra explanation needed. """"

165 75:],

76: "deaths": [

77: ""Based on information box {Info_Box} and header-content pair article {Whole_Text}, extract the number of deaths associated with the {Event_Name},

78: along with supporting annotations from the article. The death information can be split into 3 parts,

170 79: the first is the total number of deaths caused by the {Event_Name}, and organize this information in JSON format as follows:

80: – "Total_Summary_Deaths":{ {

81: – "Total_Deaths": "The total number of people who died in the {Event_Name}.

82: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,' 'at least 200', '300–500 people').

175 83: Do not sum the number of death in the article to present the total number of death, and if no total number of death explicitly mentioned or the information is missing, assign 'NULL'."

84: – "Total_Deaths_Annotation": "Cite "Info_Box" or the header name from the article provided where you find the information about the total death. The output should only include "Info_Box" or the header name."

85: } }

180 86: the second is the total number of deaths in the country level caused by the {Event_Name}, and organize this information in JSON format as follows:

87: – "Instance_Per_Administrative_Areas_Deaths":{ { {

88: – "Administrative_Areas": "Name of the country where the death occurred, and no matter the deaths are in one or several countries, please order them in a list like [Country1, Country2, Country3]."

185 89: – "Start_Date": "The start date when the deaths occurred, if mentioned."

90: – "End_Date": "The end date when the deaths occurred, if mentioned."

91: – "Num": "The total number of people who died in this level related to the {Event_Name}.

92: Do not sum the number of death in specific locations from the country to present the total number of death for this level information.

190 93: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,' 'at least 200', '300–500 people').

94: If the information is missing or if no total number of death in this level is mentioned, assign 'NULL'."

95: – "Annotation": "Cite the header name from the article provided where you find the information about the total death in this level. The output should only include the header name."

195 96: } } }

97: the third is the specific instance of deaths in the sub-national level caused by the {Event_Name}, make sure to capture all locations with death information and organize this information in JSON format as follows:

98: – "Specific_Instance_Per_Administrative_Area_Deaths":{ { {

99: – "Administrative_Area": "Name of the country."

200 100: – "Locations": "The specific place within the country where the deaths occurred, and no matter the deaths are in one or several places, order them in a list like ["Location1";"Location2";"Location3"]."

101: – "Start_Date": "The start date when the deaths occurred, if mentioned."

102: – "End_Date": "The end date when the deaths occurred, if mentioned."

103: – "Num": "The number of people who died in the specific location/locations related to the {Event_Name}.

205 104: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,' 'at least 200', '300–500 people'). If the information is missing, assign 'NULL'."

105: – "Annotation": "Cite the header name from the article provided where you find the information about the death in this location. The output should only include the header name."

106: } } }

210 107: Ensure to capture all instances of death mentioned in the article, including direct and indirect causes. Only Give Json output, no extra explanation needed. ""

108:],

109: "displaced": [

110: ""Based on information box {Info_Box} and header-content pair article {Whole_Text},

215 111: extract the number of displacement associated with the {Event_Name}, along with supporting annotations from the article. The displacement information can be split into 3 parts,

112: The displacement information can be split into 3 parts,

113: the first is the total number of displacement caused by the {Event_Name}, and organize this information in JSON format as follows:

114: – "Total_Summary_Displaced":{ {

220 115: – "Total_Displaced": "The total number of people who were displaced, evacuated, transferred/moved to the shelter, relocated or
116: fled in the {Event_Name}.
117: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,'
225 118: 'at least 200', '300–500 people').
119: Do not sum the number of displacement in the article to present the total number of displacement,
120: and if no total number of displacement explicitly mentioned or the information is missing, assign 'NULL'.
121: – "Total_Displaced_Annotation": "Cite "Info_Box" or the header name from the article provided where you find the information
122: about the total displacement. The output should only include "Info_Box" or the header name."
123: }}
230 124: the second is the total number of displacement in the country level caused by the {Event_Name}, and organize this information in
125: JSON format as follows:
126: – "Instance_Per_Administrative_Areas_Displaced":{{{
127: – "Administrative_Areas": "Name of the country where the displacement occurred, and no matter the displacement is in one or
128: several countries, please order them in a list like [Country1, Country2, Country3]."
129: – "Start_Date": "The start date when the displacement occurred, if mentioned."
235 130: – "End_Date": "The end date when the displacement occurred, if mentioned."
131: – "Num": "The total number of people who were displaced, evacuated, transferred/moved to the shelter, relocated or fled in this
132: level related to the {Event_Name}.
133: Do not sum the number of displacement in specific locations from the country to present the total number of displacement for
134: this level information.
240 135: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,'
136: 'at least 200', '300–500 people').
137: If the information is missing or if no total number of displacement in this level is mentioned, assign 'NULL'.
138: – "Annotation": "Cite the header name from the article provided where you find the information about the total displacement in
139: this level. The output should only include the header name."
245 140: }
141: the third is the specific instance of displacement in the sub-national level caused by the {Event_Name}, make sure to capture all
142: locations with displacement information and organize this information in JSON format as follows:
143: – "Specific_Instance_Per_Administrative_Area_Displaced":{{{
144: – "Administrative_Area": "Name of the country."
250 145: – "Locations": "The specific place within the country where the displacement occurred, and no matter the displacement is in one
146: or several places, order them in a list like ["Location1";"Location2";"Location3"]."
147: – "Start_Date": "The start date when the displacement occurred, if mentioned."
148: – "End_Date": "The end date when the displacement occurred, if mentioned."
255 149: – "Num": "The number of people who were displaced, evacuated, transferred/moved to the shelter, relocated or fled in the specific
150: location/locations related to the {Event_Name}.
151: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,'
152: 'at least 200', '300–500 people'). If the information is missing, assign 'NULL'.
153: – "Annotation": "Cite the header name from the article provided where you find the information about the displacement in this
154: location. The output should only include the header name."
260 155: }
156: }
157: Ensure to capture all instances of displacement mentioned in the article, including direct and indirect causes. Only Give Json
158: output, no extra explanation needed. ""
159:],
160: "homeless": [
265 161: ""Based on information box {Info_Box} and header-content pair article {Whole_Text},
162: extract the number of homelessness associated with the {Event_Name}, along with supporting annotations from the article.
163: The homelessness information can be splited into 3 parts,
164: the first is the total number of homelessness caused by the {Event_Name}, and organize this information in JSON format as
165: follows:
270 166: – "Total_Summary_Homeless":{
167: – "Total_Homeless": "The total number of people who were homeless, lost their homes, experienced house damage, had their
168: homes destroyed, were unhoused, without shelter, houseless, or shelterless in the {Event_Name}.

151: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,' 'at least 200', '300–500 people').

275 152: Do not sum the number of homelessness in the article to present the total number of homelessness,
153: and if no total number of homelessness explicitly mentioned or the information is missing, assign 'NULL'.
154: – "Total_Homeless_Annotation": "Cite "Info_Box" or the header name from the article provided where you find the information
about the total homelessness. The output should only include "Info_Box" or the header name."
155: } }

280 156: the second is the total number of homelessness in the country level caused by the {Event_Name}, and organize this information in
JSON format as follows:
157: – "Instance_Per_Administrative_Areas_Homeless":{ {
158: – "Administrative_Areas": "Name of the country where the homelessness occurred, and no matter the homelessness is in one or
several countries, please order them in a list like [Country1, Country2, Country3]."
285 159: – "Start_Date": "The start date when the homelessness occurred, if mentioned."
160: – "End_Date": "The end date when the homelessness occurred, if mentioned."
161: – "Num": "The total number of people who were homeless, lost their homes, experienced house damage, had their homes
destroyed, were unhoused, without shelter, houseless, or shelterless in this level related to the {Event_Name}.

162: Do not sum the number of homelessness in specific locations from the country to present the total number of homelessness for
this level information.
290 163: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,'
'at least 200', '300–500 people').
164: If the information is missing or if no total number of homelessness in this level is mentioned, assign 'NULL'.
165: – "Annotation": "Cite the header name from the article provided where you find the information about the total homelessness in
this level. The output should only include the header name."
295 166: } } }

167: the third is the specific instance of homelessness in the sub–national level caused by the {Event_Name}, make sure to capture all
locations with homelessness information and organize this information in JSON format as follows:
168: – "Specific_Instance_Per_Administrative_Area_Homeless":{ { {
300 169: – "Administrative_Area": "Name of the country."
170: – "Locations": "The specific place within the country where the homelessness occurred, and no matter the homelessness is in one
or several places, order them in a list like ["Location1";"Location2";"Location3"]."
171: – "Start_Date": "The start date when the homelessness occurred, if mentioned."
172: – "End_Date": "The end date when the homelessness occurred, if mentioned."
305 173: – "Num": "The number of people who were homeless, lost their homes, experienced house damage, had their homes destroyed,
were unhoused, without shelter, houseless, or shelterless in the specific location/locations related to the {Event_Name}.

174: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,'
'at least 200', '300–500 people'). If the information is missing, assign 'NULL'.
175: – "Annotation": "Cite the header name from the article provided where you find the information about the homelessness in this
310 176: location. The output should only include the header name."
177: } } }

178:],
315 179: "injuries": [
180: ""Based on information box {Info_Box} and header–content pair article {Whole_Text},
181: extract the number of non–fatal injuries associated with the {Event_Name}, along with supporting annotations from the article.
182: The non–fatal injuries information can be split into 3 parts,
183: the first is the total number of non–fatal injuries caused by the {Event_Name}, and organize this information in JSON format as
320 follows:
184: – "Total_Summary_Injuries":{ {
185: – "Total_Injuries": "The total number of people who got injured, hurt, wound, or hospitalized (excluding death) in the
{Event_Name}.

186: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,'
325 'at least 200', '300–500 people').

187: Do not sum the number of non–fatal injuries in the article to present the total number of non–fatal injuries,
188: and if no total number of non–fatal injuries explicitly mentioned or the information is missing, assign 'NULL'.
189: – "Total_Injuries_Annotation": "Cite "Info_Box" or the header name from the article provided where you find the information
about the total non–fatal injuries. The output should only include "Info_Box" or the header name."
330 190: }}
191: the second is the total number of non–fatal injuries in the country level caused by the {Event_Name}, and organize this
information in JSON format as follows:
192: – "Instance_Per_Administrative_Areas_Injuries":[{{
193: – "Administrative_Areas": "Name of the country where the non–fatal injuries occurred, and no matter the non–fatal injuries are in
335 one or several countries, please order them in a list like [Country1, Country2, Country3]."
194: – "Start_Date": "The start date when the non–fatal injuries occurred, if mentioned."
195: – "End_Date": "The end date when the non–fatal injuries occurred, if mentioned."
196: – "Num": "The total number of people who got injured, hurt, wound, or hospitalized (excluding death) in this level related to the
{Event_Name}.

340 197: Do not sum the number of non–fatal injuries in specific locations from the country to present the total number of non–fatal
injuries for this level information.
198: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,'
'at least 200', '300–500 people').
199: If the information is missing or if no total number of non–fatal injuries in this level is mentioned, assign 'NULL'.
345 200: – "Annotation": "Cite the header name from the article provided where you find the information about the total non–fatal injuries
in this level. The output should only include the header name."
201: }}]
202: the third is the specific instance of non–fatal injuries in the sub–national level caused by the {Event_Name}, make sure to capture
all locations with non–fatal injuries information and organize this information in JSON format as follows:

350 203: – "Specific_Instance_Per_Administrative_Area_Injuries":[{{
204: – "Administrative_Area": "Name of the country."
205: – "Locations": "The specific place within the country where the non–fatal injuries occurred, and no matter the non–fatal injuries
are in one or several places, order them in a list like ["Location1";"Location2";"Location3"]."
206: – "Start_Date": "The start date when the non–fatal injuries occurred, if mentioned."
355 207: – "End_Date": "The end date when the non–fatal injuries occurred, if mentioned."
208: – "Num": "The number of people who got injured, hurt, wound, or hospitalized (excluding death) in the specific location/locations
related to the {Event_Name}.

209: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundreds of,' '500 families,'
'at least 200', '300–500 people'). If the information is missing, assign 'NULL'.
360 210: – "Annotation": "Cite the header name from the article provided where you find the information about the non–fatal injuries in
this location. The output should only include the header name."
211: }}]
212: Ensure to capture all instances of non–fatal injuries mentioned in the article, including direct and indirect causes. Only Give Json
output, no extra explanation needed. ""

365 213:],
214: "insured_damage": [
215: ""
216: Based on information box {Info_Box} and header–content pair article {Whole_Text},
217: extract the insured damage information associated with the {Event_Name}, along with supporting annotations from the article.
370 218: The insured damage information can be splitted into 3 parts,
219: the first is the total insured damage caused by the {Event_Name}, including damage or loss to property, belongings, or
persons covered under the terms of an insurance policy,
220: and organize this information in JSON format as follows:
221: – "Total_Summary_Insured_Damage": {{
375 222: – "Total_Insured_Damage": "The total amount of insured damage and make sure the information extracted for this containing
the keyword "insured" or "insurance".
223: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundred million,' 'several
billion', 'minimal').

224: Do not sum the number of insured damage in the article to present the total number of insured damage,
380 225: and if no total number of insured damage explicitly mentioned or the information is missing, assign 'NULL'.
226: – "Total_Insured_Damage_Unit": "The currency of the total insured damage, like USD, EUR; If Total_Insured_Damage is
missing from the previous step, assign 'NULL'."
227: – "Total_Insured_Damage_Inflation_Adjusted": "Indicate 'Yes' if the total insured damage amount has been adjusted for
inflation; otherwise "No", If Total_Insured_Damage is missing from the previous step, assign 'NULL'.
385 228: – "Total_Insured_Damage_Inflation_Adjusted_Year": "The year of inflation adjustment for the total insured damage, if
applicable; If Total_Insured_Damage is missing from the previous step, assign 'NULL'.
229: – "Total_Insured_Damage_Annotation": "Cite "Info_Box" or the header name from the article provided where you find the
information about the total insured damage. The output should only include "Info_Box" or the header name."
230: }}
390 231: the second is the total insured damage in the country level caused by the {Event_Name}, and organize this information in
JSON format as follows:
232: – "Instance_Per_Administrative_Areas_Insured_Damage":{{{
233: – "Administrative_Areas": "Name of the country where the insured damage occurred, and no matter the total insured damage
is in one or several countries, please order them in a list like [Country1, Country2, Country3]."
395 234: – "Start_Date": "The start date when the insured damage occurred, if mentioned."
235: – "End_Date": "The end date when the insured damage occurred, if mentioned."
236: – "Num": "The total amount of insured damage in this level related to the {Event_Name} and make sure the information
extracted for this containing the keyword "insured" or "insurance".
237: Do not sum the insured damage in specific locations from the country to present the total insured damage for this level
400 information.
238: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundred
million,'several billion').
239: If the information is missing or if no total insured damage in this level is mentioned, assign 'NULL'.
240: – "Num_Unit": "The currency of the total insured damage, like USD, EUR; If Total_Insured_Damage is missing from the
405 previous step, assign 'NULL'.
241: – "Num_Inflation_Adjusted": "Indicate 'Yes' if the total insured damage amount has been adjusted for inflation; otherwise
"No", and if Total_Insured_Damage is missing from the previous step, assign 'NULL'.
242: – "Num_Inflation_Adjusted_Year": "The year of inflation adjustment for the total insured damage, if applicable; If
Total_Insured_Damage is missing from the previous step, assign 'NULL'.
410 243: – "Annotation": "Cite the header name from the article provided where you find the information about the total insured
damage in this level. The output should only include the header name."
244: }}}
245: the third is the specific instance of insured damage in the sub-national level caused by the {Event_Name}, make sure to
capture all locations with insured damage information and organize this information in JSON format as follows:
415 246: – "Specific_Instance_Per_Administrative_Area_Insured_Damage":{{{
247: – "Administrative_Area": "Name of the country."
248: – "Locations": "The specific place/places within the country where the insured damage occurred, and no matter the insured
damage is in one or several places, order it/them in a list like ["Location1";"Location2";"Location3"]."
249: – "Start_Date": "The start date when the insured damage occurred, if mentioned."
420 250: – "End_Date": "The end date when the insured damage occurred, if mentioned."
251: – "Num": "The amount of insured damage in the specific location/locations related to the {Event_Name} and make sure the
information extracted for this containing the keyword "insured" or "insurance".
252: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundred
million,'several billion'). If the information is missing, assign 'NULL'.
425 253: – "Num_Unit": "The currency of the insured damage, like USD, EUR. If Insured_Damage is missing from the previous step,
assign 'NULL'.
254: – "Num_Inflation_Adjusted": "Indicate 'Yes' if the insured damage amount has been adjusted for inflation; otherwise "No", If
Insured_Damage is missing from the previous step, assign 'NULL'.
255: – "Num_Inflation_Adjusted_Year": "The year of inflation adjustment for the insured damage, if applicable; If
430 Insured_Damage is missing from the previous step, assign 'NULL'."

256: – "Annotation": "Cite the header name from the article provided where you find the information about the insured damage in this location. The output should only include the header name."

257:

258: }}]

435 259: Ensure to capture all instances of insured damage mentioned in the article, including direct and indirect causes. Only Give Json output, no extra explanation needed. ""

260:],

261: "damage": [

262: ""

440 263: Based on information box {Info_Box} and header–content pair article {Whole_Text},

264: extract the economic damage information associated with the {Event_Name}, along with supporting annotations from the article.

265: The economic damage information can be splited into 3 parts,

266: the first is the total economic damage caused by the {Event_Name},

445 267: and organize this information in JSON format as follows:

268: – "Total_Summary_Damage": {{

269: – "Total_Damage": "The total amount of economic damage.

270: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundred million,'several billion', 'minimal').

450 271: Do not sum the number of economic damage in the article to present the total number of economic damage,

272: and if no total number of economic damage explicitly mentioned or the information is missing, assign 'NULL'."

273: – "Total_Damage_Unit": "The currency of the total economic damage, like USD, EUR; If Total_Economic_Damage is missing from the previous step, assign 'NULL'."

274: – "Total_Damage_Inflation_Adjusted": "Indicate 'Yes' if the total economic damage amount has been adjusted for inflation; otherwise 'No', If Total_Economic_Damage is missing from the previous step, assign 'NULL'."

455 275: – "Total_Damage_Inflation_Adjusted_Year": "The year of inflation adjustment for the total economic damage, if applicable; If Total_Economic_Damage is missing from the previous step, assign 'NULL'."

276: – "Total_Damage_Annotation": "Cite "Info_Box" or the header name from the article provided where you find the information about the total economic damage. The output should only include "Info_Box" or the header name."

460 277: }}]

278: the second is the total economic damage in the country level caused by the {Event_Name}, and organize this information in JSON format as follows:

279: – "Instance_Per_Administrative_Areas_Damage":[{{

280: – "Administrative_Areas": "Name of the country where the economic damage ocured, and no matter the total economic damage is in one or several countries, please order them in a list like [Country1, Country2, Country3]."

465 281: – "Start_Date": "The start date when the economic damage occurred, if mentioned."

282: – "End_Date": "The end date when the economic damage occurred, if mentioned."

283: – "Num": "The total amount of economic damage in this level related to the {Event_Name}.

284: Do not sum the economic damage in specific locations from the country to present the total economic damage for this level information.

470 285: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundred million,'several billion').

286: If the information is missing or if no total economic damage in this level is mentioned, assign 'NULL'."

287: – "Num_Unit": "The currency of the total economic damage, like USD, EUR; If Total_Economic_Damage is missing from the previous step, assign 'NULL'."

475 288: – "Num_Inflation_Adjusted": "Indicate 'Yes' if the total economic damage amount has been adjusted for inflation; otherwise 'No", and if Total_Economic_Damage is missing from the previous step, assign 'NULL'."

289: – "Num_Inflation_Adjusted_Year": "The year of inflation adjustment for the total economic damage, if applicable; If Total_Economic_Damage is missing from the previous step, assign 'NULL'."

480 290: – "Annotation": "Cite the header name from the article provided where you find the information about the total economic damage in this level. The output should only include the header name."

291: }}]

292: the third is the specific instance of economic damage in the sub-national level caused by the {Event_Name}, make sure to capture all locations with economic damage information and organize this information in JSON format as follows:

485 293: - "Specific_Instance_Per_Administrative_Area_Damage":[{{

294: - "Administrative_Area": "Name of the country."

295: - "Locations": "The specific place/places within the country where the economic damage occurred, and no matter the economic damage is in one or several places, order it/them in a list like ["Location1";"Location2";"Location3"]."

296: - "Start_Date": "The start date when the economic damage occurred, if mentioned."

490 297: - "End_Date": "The end date when the economic damage occurred, if mentioned."

298: - "Num": "The amount of economic damage in the specific location/locations related to the {Event_Name}.

299: Use the exact number if mentioned, or retain the text or range as provided for vague numbers (e.g., 'hundred million,'several billion'). If the information is missing, assign 'NULL'."

300: - "Num_Unit": "The currency of the economic damage, like USD, EUR. If Economic_Damage is missing from the previous

495 301: step, assign 'NULL'."

302: - "Num_Inflation_Adjusted": "Indicate 'Yes' if the economic damage amount has been adjusted for inflation; otherwise "No", If Economic_Damage is missing from the previous step, assign 'NULL'."

303: - "Num_Inflation_Adjusted_Year": "The year of inflation adjustment for the economic damage, if applicable; If Economic_Damage is missing from the previous step, assign 'NULL'."

500 303: - "Annotation": "Cite the header name from the article provided where you find the information about the economic damage in this location. The output should only include the header name."

304:

305: }}}

306: Ensure to capture all instances of economic damage mentioned in the article, including direct and indirect causes. Only Give

505 307:],

308: "main_event_hazard": [

309: ""

310: Based on information box {Info_Box} and header-content pair article {Whole_Text},

510 311: extract main_event category and hazard information associated with the {Event_Name}, along with supporting annotations from the article.

312: Below is the Main_Event--Hazard association table,

313: Main Event: Flood; Hazard: Flood

314: Main Event: Extratropical Storm/Cyclone; Hazards: Wind; Flood; Blizzard; Hail

515 315: Main Event: Tropical Storm/Cyclone; Hazards: Wind; Flood; Lightning

316: Main Event: Extreme Temperature; Hazards: Heatwave; Cold Spell

317: Main Event: Drought; Hazard: Drought

318: Main Event: Wildfire; Hazard: Wildfire

319: Main Event: Tornado; Hazard: Wind

520 320: first identify the Main_Event category information from the text, and organize this information in JSON format as follows:

321: - "Main_Event": "identify the event category of the {Event_Name} referring the Main_Event--Hazard table, and only one Main_Event category should be assigned."

322: - "Main_Event_Annotation": "Cite "Info_Box" or the header name from the article provided where you find the information about the Main_Event category. The output should only include "Info_Box" or the header name."

525 323: based on the result of the Main_Event category from the previous step and the Main_Event--Hazard table, identify the hazard information and organize this information in JSON format as follows:

324: - "Hazards": "Identify the hazards of the {Event_Name}, make sure the hazards are associated with the Main_Event category from the table, and if more than one hazard is detected from the text, separate them with '!'."

325: - "Hazards_Annotation": "Cite "Info_Box" or the header name from the article provided where you find the information about the hazard information. The output should only include "Info_Box" or the header name."

530 326: Only Give Json output, no extra explanation needed."""

327:]

328:

535 329: }

Listing S3. The full text of V3.2 prompt

```
1: V3.2 prompt={
2:   "location_time": [
3:     ""
540 4:     Based on information box {Info_Box} and header-content pair article {Whole_Text}, extract time and location information
        associated with the {Event_Name}, along with supporting annotations from the article.
5:     the first is to identify the time information of the event {Event_Name}, and organize this information in JSON format as follows:
6:     - "Start_Date": "The start date of the event. If the specific day or month is not known, include at least the year if it's available. If
545     no time information is available, enter 'NULL'. If the exact date is not clear (e.g., "summer of 2021", "June 2020"), please retain
        the text as mentioned."
7:     - "End_Date": "The end date of the event. If the specific day or month is not known, include at least the year if it's available. If
        no time information is available, enter 'NULL'. If the exact date is not clear (e.g., "summer of 2021", "June 2020"), please retain
        the text as mentioned."
8:     - "Time_Annotation": "Cite "Info_Box" or the header name from the article provided where you find the information about the
550     time. The output should only include "Info_Box" or the header name."
9:     the second is to identify all countries affected by {Event_Name} and organize this information in JSON format as follows:
10:    - "Administrative_Areas": "List all countries mentioned in the text affected by {Event_Name}. The list should be formatted as
        ["country1", "country2"]."
11:    - "Administrative_Areas_Annotation": "Cite "Info_Box" or the header name from the article provided where you find the
555    information about the affected countries. The output should only include "Info_Box" or the header name."
12:    Only Give Json output, no extra explanation needed.""
13:  ]
14:
560 15: }
```

S5 Evaluation of the Pipeline**S5.1 Annotation data****Table S6.** Main Event category distribution in the gold standard development set and test set.

Event Category	Development set	Test set
Tropical Storm/Cyclone	46	123
Wildfire	10	1
Flood	7	14
Drought	1	1
Tornado	1	0
Extratropical Storm/Cyclone	3	16
Extreme Temperature	2	1

S5.2 Inter-annotator agreement in the gold standard data

Table S7. Inter-annotator evaluation results (L1).

Field	Score
Weighted_Score	0.0
Main_Event	0.0
Event_Names	0.0
Hazards	0.0
Start_Date_Day	0.0
Start_Date_Month	0.0
Start_Date_Year	0.0
End_Date_Day	0.0
End_Date_Month	0.0
End_Date_Year	0.0
Administrative_Areas_Norm	0.0
Total_Deaths_Min	0.0
Total_Deaths_Max	0.0
Total_Injuries_Max	0.0
Total_Injuries_Min	0.0
Total_Buildings_Damaged_Min	0.0
Total_Buildings_Damaged_Max	0.0
Total_Affected_Min	0.0
Total_Affected_Max	0.0
Total_Homeless_Min	0.0
Total_Homeless_Max	0.0
Total_Displaced_Min	0.0
Total_Displaced_Max	0.0
Total_Damage_Min	0.0
Total_Damage_Max	0.0
Total_Damage_Unit	0.0
Total_Damage_Inflation_Adjusted	0.0
Total_Damage_Inflation_Adjusted_Year	0.0
Total_Insured_Damage_Min	0.0
Total_Insured_Damage_Max	0.0
Total_Insured_Damage_Unit	0.0
Total_Insured_Damage_Inflation_Adjusted	0.0
Total_Insured_Damage_Inflation_Adjusted_Year	0.0

Table S8. Inter-annotator evaluation results (L2 and L3). “Average” is the mean value of all scores in each column.

Category	L2	L3
Deaths	0.5312	0.5630
Injuries	0.4462	0.6605
Homeless	NA	NA
Displaced	NA	0.8750
Affected	0.5019	NA
Buildings Damaged	0.4852	0.8056
Insured Damage	NA	NA
Damage	0.5606	0.5462
Average	0.5050	0.6900

Table S9. Mean number of entries per impact category (L2 and L3) in the articles that were double-blind annotated.

	L2		L3	
	Annotation 1	Annotation 2	Annotation 1	Annotation 2
Deaths	1.00	1.50	1.90	2.10
Injuries	0.30	0.80	0.50	0.60
Homeless	NA	0.20	0.10	NA
Displaced	NA	0.10	0.80	0.20
Affected	0.10	0.20	0.10	NA
Buildings Damaged	0.20	1.20	1.80	1.00
Insured Damage	NA	NA	NA	NA
Damage	0.60	1.00	0.50	0.40

S5.3 Matching algorithm selection in L2 and L3

565 To test the matching algorithm, we design five sets of experiments (Table S10). As default, we set the weights for all fields used
when matching to 1, the similarity threshold (see similarity definition in main text, Section 4.2) to 0.6, and the null penalty to
0.5. Notably, the matching algorithm uses the same metrics as the evaluation; the results in Table S11 use default settings. In
570 settings 1–4, we assign some items which are mandatory like Num_Min, Num_Max, Administrative_Areas_Norm to weight 1,
and we select weight 0.125 for nullable items. This enables us to elucidate the contribution of the mandatory fields to the results
of the matching algorithm. The evaluation results (Table S11) indicate that this adjustment has a better matching performance
than the default setting in L2, but slightly worse in L3 (cf. Default with Setting 1). In the rest of the settings, we adopt the
weights from Setting 1, and consider different similarity thresholds and null penalty values. For setting 2, we increase the null
penalty to achieve a closer match between entries. Settings 3 and 4 are used to test if the algorithm performs as designed and
to check the algorithm’s consistency. In Setting 3, the null penalty is changed to 0 during the matching stage. This means that
575 when the LLM output is “NULL” yet the gold standard records an entry, the matching score for that item is “0” instead of
“1”, which increases similarity between NULL-heavy LLM entries and all “NULL” gold entries (added to balance the larger
number of LLM outputs). Consequently, NULL-heavy LLM entries are more likely to be matched to these all “NULL” gold
entries, while real-value LLM entries may be matched to relatively dissimilar gold standard entries. This distortion in matching
leads to a higher error rate in the L2 and L3 evaluation results. In contrast, Setting 2 (null penalty = 1 in matching) penalizes
580 heavily NULL values during matching, forcing closer matches between real-value LLM entries and gold standard entries, thus
resulting in a lower error rate. For instance, when the LLM output Num_Min is “NULL” and the gold standard is “12”, in
Setting 3 this entry may be matched to an all “NULL” gold entry, whereas in Setting 2 such matching would be less likely. In
setting 4, the similarity threshold is set to 0, meaning that even if all fields in the LLM output entry are “NULL” it will still be
matched with a gold entry. This is because the LLM outputs include some compulsory information, such as location-related
585 information, and so the similarity is always greater than 0. For each setting, we compute the mean scores of each field for
different impact categories in the development set. In this step, all impact categories are given equal weight. In setting 2, we
note that increasing the null penalty from 0.5 to 1 improves the L3 matching process compared to setting 1. Setting 3 produces
the highest error rate, as expected from its algorithmic design. In setting 4, we observe that the average L2 and L3 scores match
setting 2. Also, we see that the L3 error rate is generally higher than L2 (Table S11), highlighting the challenge for the model to
590 accurately capture more granular, sub-national impacts compared to national impacts. Across impact categories, performance
is notably stronger in injuries, homeless, displaced categories than in others.

Table S10. Parameter settings in the matching process used for L2 and L3 evaluation.

Experiment	Weight	Similarity Threshold	NULL Penalty
Default	1.0 for all	0.6	0.5
Setting 1	1.0 for non-nullable items, 0.125 for nullable items	0.6	0.5
Setting 2	1.0 for non-nullable items, 0.125 for nullable items	0.6	1.0
Setting 3	1.0 for non-nullable items, 0.125 for nullable items	0.6	0.0
Setting 4	1.0 for non-nullable items, 0.125 for nullable items	0.0	1.0

Table S11. Evaluation results with precision to four decimal places for 55 events in the development set, showing weighted scores for each impact category in L2 and L3 under different matching algorithm settings. For example, in the homeless category at L2 under the default setting, a value of 0.3792 indicates that when considering all items with the same weight, the weighted score for the homeless category is 0.3792. This represents a 0.3792 error rate of the LLM compared to the gold standard.

	Default		Setting 1		Setting 2		Setting 3		Setting 4	
	L2	L3	L2	L3	L2	L3	L2	L3	L2	L3
Deaths	0.5270	0.6283	0.5283	0.6464	0.5283	0.6438	0.5283	0.6498	0.5283	0.6438
Injuries	0.3125	0.4709	0.3141	0.4737	0.3141	0.4718	0.3141	0.4844	0.3141	0.4718
Homeless	0.3792	0.4832	0.3743	0.4849	0.3743	0.4849	0.3743	0.4965	0.3743	0.4849
Displaced	0.3667	0.4490	0.3632	0.4496	0.3632	0.4494	0.3913	0.4924	0.3632	0.4494
Affected	0.4652	0.5325	0.4641	0.5324	0.4641	0.5297	0.4678	0.5500	0.4641	0.5297
Buildings_Damaged	0.5433	0.5983	0.5410	0.6068	0.5410	0.5956	0.5570	0.6479	0.5410	0.5956
Insured_Damage	NA	0.5052	NA	0.5052	NA	0.5052	NA	0.5052	NA	0.5052
Damage	0.4553	0.4960	0.4537	0.4964	0.4537	0.4964	0.4537	0.4964	0.4537	0.4964
Average	0.4356	0.5204	0.4341	0.5244	0.4341	0.5221	0.4409	0.5403	0.4341	0.5221

S6 EM-DAT disaster type mapping

Table S12. Mapping of EM-DAT disaster subtypes to Wikimpacts 1.0 main event categories

EM-DAT disaster subtype	Wikimpacts 1.0 main event category
Riverine Flood	Flood
Tropical Cyclone	Tropical Storm/Cyclone
Flood (General)	Flood
Storm (General)	Storm
Flash Flood	Flood
Drought	Drought
Forest Fire	Wildfire
Wildfire (General)	Wildfire
Cold Wave	Extreme Temperature
Tornado	Tornado
Severe Weather	Storm
Heat Wave	Extreme Temperature
Blizzard/Winter Storm	Storm
Lightning/Thunderstorms	Storm
Extra-Tropical Storm	Extratropical Storm/Cyclone
Hail	Storm
Land Fire (Brush, Bush, Pasture)	Wildfire
Coastal Flood	Flood
Severe Winter Conditions	Extreme Temperature
Storm Surge	Flood
Glacial Lake Outburst Flood	Flood

S7 Normalization rules

In some cases, the quantitative information in the Wikipedia articles may be expressed as comparative adjectives or quantifiers. The following rules only suit the cases where a single number is presented. If the text already mentions two numbers, we automatically assign a range without applying the rules below. In these cases, we first, define the scale of the numbers:

Proposition 0: The scale of a number N is the power of ten corresponding to the last non-zero digit, where:

$$N = a \times 10^n,$$

where

- a : a is an integer with all the non-zero digits to the left of the decimal point
- n : n is an integer
- scale: scale = 10^n

Note: This is a modification of the scientific notation of a number, in which case a is an integer with a non-zero digit to the left of the decimal point. According to our definition, the scale of

- 500 = 5×10^2 corresponds to $10^2 = 100$
- 560 = 56×10^1 corresponds to $10^1 = 10$

– $543 = 543 \times 10^0$ corresponds to $10^0 = 1$

This scale is then used to convert expressions such as “at least 560”, “over 560”, “less than 560” into ranges, according to the following proposition.

610 **Proposition 1:** As a general rule, the length of an interval estimated to the left or to the right of a given number must be equal to the scale of the number. In other words, all departures or shifted departures to each side of the number must be at a distance equal to the scale of the number. Therefore, the length of a range (the absolute difference between the range’s boundaries) is equal to:

615 – The scale of the number, in the case of “more than”, “less than” and “at least” and all the synonyms of these expressions.
For a given number N , and its scale:

1. At least $N \rightarrow N \in [N, N + \text{scale}]$, # over, inclusive
2. Over $N \rightarrow N \in [N + 1, N + 1 + \text{scale}]$ # over, exclusive
3. Less than $N \rightarrow N \in [N - 1 - \text{scale}, N - 1]$. # under, exclusive
4. At most $N \rightarrow N \in [N - \text{scale}, N]$ # under, inclusive

620 – Twice the scale, in the case of “about” and all the synonyms of this word

– About $N \rightarrow N \in [N - \text{scale}, N + \text{scale}]$

– In the case of “about N ” and “less than N ”, the lower boundary of the estimated interval does not include zero, but stops at 1. If an impact is reported, it is not zero, even if the exact value is uncertain.

Examples, range estimations:

	500	560	543	3.54e3
625 At least	[500,600]	[560,570]	[543,544]	[3540,3550]
Over	[501,601]	[561,571]	[544,545]	[3541,3551]
Less than	[399,499]	[549,559]	[541,542]	[3529,3539]
At most	[400,500]	[550,560]	[542,543]	[3530,3540]
About	[400,600]	[550,570]	[542,544]	[3530,3550]

Rules for equivalent expressions and additional expressions are indicated below, through some examples:

1. Greater than/more than/exceed/over/+ 700: 701-801 ($700 + 1, 700+1+\text{scale}$), scale = 100
2. Less/lower/fewer than 700: 599-699 ($700-1-\text{scale}, 700 - 1$), scale = 100
- 630 3. At least/a minimum of 630: 630-640 ($630, 630 + \text{scale}$), scale = 10
4. Up to 270: 260-270 ($270-\text{scale}, 270$)
5. Approximately/around/nearly/about/almost/roughly/ / estimated 700: 600-800 ($700-\text{scale}, 700+\text{scale}$), scale = 100
6. Dozens of, tens of, hundreds of, thousands of, etc: $2*\text{scale} - 9*\text{scale}$; so, “thousands of injuries” becomes 2000-9000 injuries.

- 635
- Tens: scale = 10
 - Dozens: scale = 12
 - Hundreds: scale = 100
 - Thousands: scale = 1000

7. A number of/a group of/a few/several/numerous: 2-6

- 640 8. A few dozen: 24-72 (12*2, 12*6)
9. A dozen hundreds (if it ever appears!): 2400-7200 (12*2*scale, 12*6*scale)
10. A few/several hundred/thousand/million, etc: 2*scale-6*scale; so “several millions” becomes 2000000-6000000.
11. Many: 20-60
- 645 12. SPECIAL CASE: A couple/a couple hundred/thousand, etc...: 2*scale – 3*scale; so “a couple of deaths” becomes 2-3 deaths
13. SPECIAL CASE: If the number of human victims is reported as “family/families/household”, multiply by [3,5] to determine the number of human victims. For example, “several families were evacuated” =2*3*-6*5 = [6,30] people displaced.
- 650 14. SPECIAL CASE: "minimal", “inconsequential”, "negligible", "minor", and "limited", put “NULL” in the validation table.
15. SPECIAL CASE: no causalities, no fatalities, no injuries, none, none reported, and similar expressions must be annotated as 0. If the information is missing, the annotator must enter NULL instead.

S8 Consolidation rules

S8.1 Administrative Areas

- 655 If the joint set of L2/L3 is larger than the one obtained in L1, the extra areas need to be filled in L1 automatically.

S8.2 Impact Categories

If L1 is NULL, but impact information is found in L2 or L3, there are several cases to consider:

1. L2 is not NULL, L3 is NULL:
 - Sum up the numbers from L2 and fill in L1.
- 660 2. L2 is NULL, and L3 is not NULL:
 - (a) For the same `admin_area`, and impact category in different locations, sum up the numbers and fill a new entry in L2.
 - (b) Next, sum up the numbers from L2 to fill in L1.
3. L2 and L3 are not NULL:
 - 665 (a) For the same `admin_area`, and impact category in different locations, sum up the numbers in L3 and compare with the number in L2. If the L3 number is smaller, revise the L2 `Num_Min` to this L3 number. If the L3 number is larger, then revise the `Num_Max` in L2 (ideally, this would not happen, because we ask the model to retrieve the total in L2).
 - (b) If the `admin_area` in L3 is not in L2, sum up the numbers and create a new entry in L2.
 - 670 (c) Next, sum up all numbers from L2, and fill in L1 with the range.

S8.3 Time

Often, the time information in L2 and L3 is missing. For any case without a year, fill the year in L2 and L3 using the same year as in L1.

S8.4 Currency conversion and inflation adjustment

675 S8.4.1 Currency Conversion: Non-USD to USD

To convert a non-USD currency to USD, we utilize the table `Currency_conversion_yearly_averages.xlsx`. Each sheet within this table contains the yearly mean conversion rate of Non-USD to USD. For instance, consider the EUR-USD conversion:

In the table, the conversion rate for 2024 is 0.92. Therefore, 10 euros in 2024 is equivalent to:

$$680 \quad Y = \frac{X}{\text{rate}}$$

where Y is the amount in USD, X is the original currency amount, and rate is the yearly mean conversion rate. In our example, 10 euros in 2024 is:

$$Y = \frac{10}{0.92} = 10.87 \text{ USD}$$

S8.4.2 Inflation Adjustment

685 To adjust for inflation, use the table `Database/data/inflation_Index_2024.csv`. For example, to convert \$100 in 2023 USD to 2024 USD:

$$Y = X \times \left(\frac{100}{X_{\text{index}}} \right)$$

where Y is the price in 2024, X is the price in the original year, and X_{index} is the inflation index for the original year. For \$100 in 2023 USD:

$$690 \quad Y = 100 \times \left(\frac{100}{96.9} \right) = 103.2 \text{ USD}$$

S8.4.3 USD to EUR Conversion

After the database consolidation process in damage and insured damage fields, storing it in a database file, we convert 2024 USD to 2024 EUR using the 2024 yearly mean rate, which is 0.919601:

$$Y = X \times 0.919601$$

695 where Y is the amount in 2024 EUR and X is the amount in 2024 USD.

S9 L3 visualization

Listing S4. Excluded Geojson shapes in L3 visualization process

```
1: excluded_values = [  
2:   "arabian-sea---bhr-l-rb--central-",  
700 3:   "arabian-sea---bhr-l-rb",  
4:   "arabian-sea",
```

705 5: "bay-of-bengal--northern-",
6: "bay-of-bengal--central-",
7: "bay-of-bengal--west-",
8: "bay-of-bengal",
9: "nonafot-nunavut",
10: "greenland",
11:]

710 **References**

Sasaki, Y.: The truth of the F-measure. Teach tutor mater, 1 (5), 1–5, 2007.