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TAG meeting, October 2016

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Situation overview of EM-DAT products and future directions

The georeferencing activity

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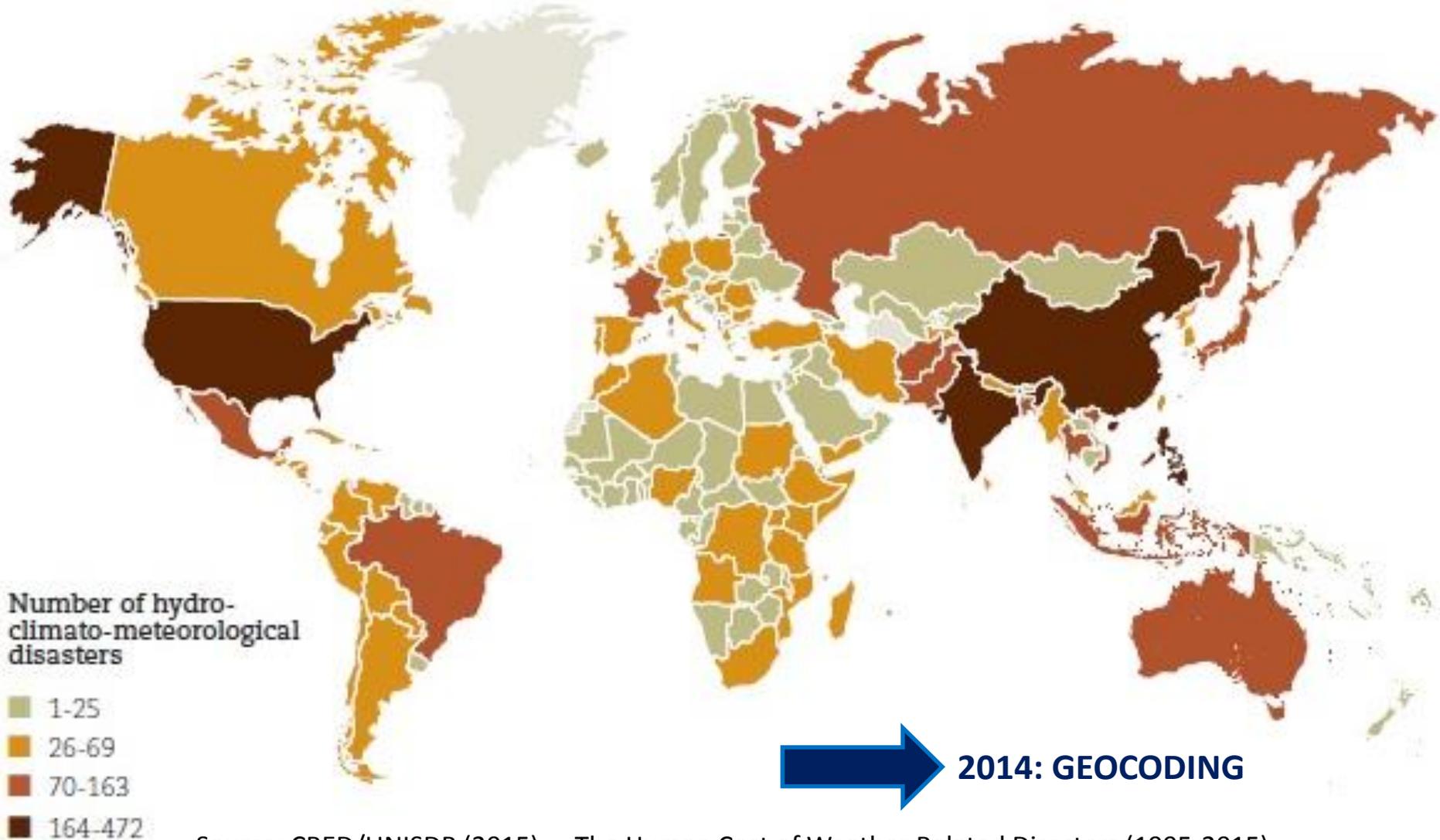
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EM-DAT: country level data

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Source: CRED/UNISDR (2015). « The Human Cost of Weather Related Disasters (1995-2015) »



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Georeferencing activity

State of the activity

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State of the activity:

- Earthquakes, volcanic activities, mass movements (dry), floods, landslides, storms, extreme temperatures, droughts and wildfires
- From 2000 to 2015
- Worldwide
- At ADM 2 AND/OR ADM1 level



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Georeferencing activity

Methodology

Standardized methodology:

- Location of affected areas: text → GIS format (GAUL 2015 codes (FAO, 2015)), up to the 2nd administrative unit level.

Edit Country

Disaster No: 2014 - 9404 Disaster type: Drought Glide: Enter date: 10-15-2014 By: Regina Below Modify date: 08-02-2016 By: Alizée Vanderve

Country:* Kenya Region: Eastern Africa Continent: Africa

Start date:* January 2014 d-m-y: must select the year at least

End date:* May 2015 d-m-y: must select the year at least

Origin:

Associated disaster: --

Associated disaster2: --

Dis. magnitude value: Km2

River basin:

Epicenter:

Latitude: ex: 66.77/-65.88 : positive for North, negative for South

Longitude: ex: 66.77/-65.88 : positive for East, negative for West

Local time: hh:mm (hh in [00-23], m)

Aid contribution:

OFDA Response

Appeal for Int'l assistance Appeal date

Declaration of disaster Declaration date

PPA: 4520358

APA: 233352.42

Location

Mandera, Wajir districts (North Eastern province) Turkana, Baringo, Samburu districts (Rift Valley province), Marsabit district (Eastern province)

Georeferencing

Locations Shapefiles

Gaul version: 2015

Insert ADM1/2: ma

ADM1_CODE	ADM1_NAME	ADM2_CODE	ADM2_NAME	Delete
51327	Eastern	51352	Marsabit	⊖
51329	North Eastern	51363	Mandera	⊖
51329	North Eastern	51364	Wajir	⊖
51331	Rift Valley	51377	Baringo	⊖
51331	Rift Valley	51389	Samburu	⊖
51331	Rift Valley	51392	Turkana	⊖

Partial Georef. .shp to update Details Srcs consulted

Comments:

Cancel Save



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Georeferencing activity

Outputs

Standardized methodology:

- Creation of a shapefile and its centroid for each disaster based on the selected GAUL2015 codes, automatized procedure in R.

Kenyan drought, 2014

X	Y
2.5432	37.8681

Start Date: Jan 2014

End Date: May 2015

Total victims: 1,600,000





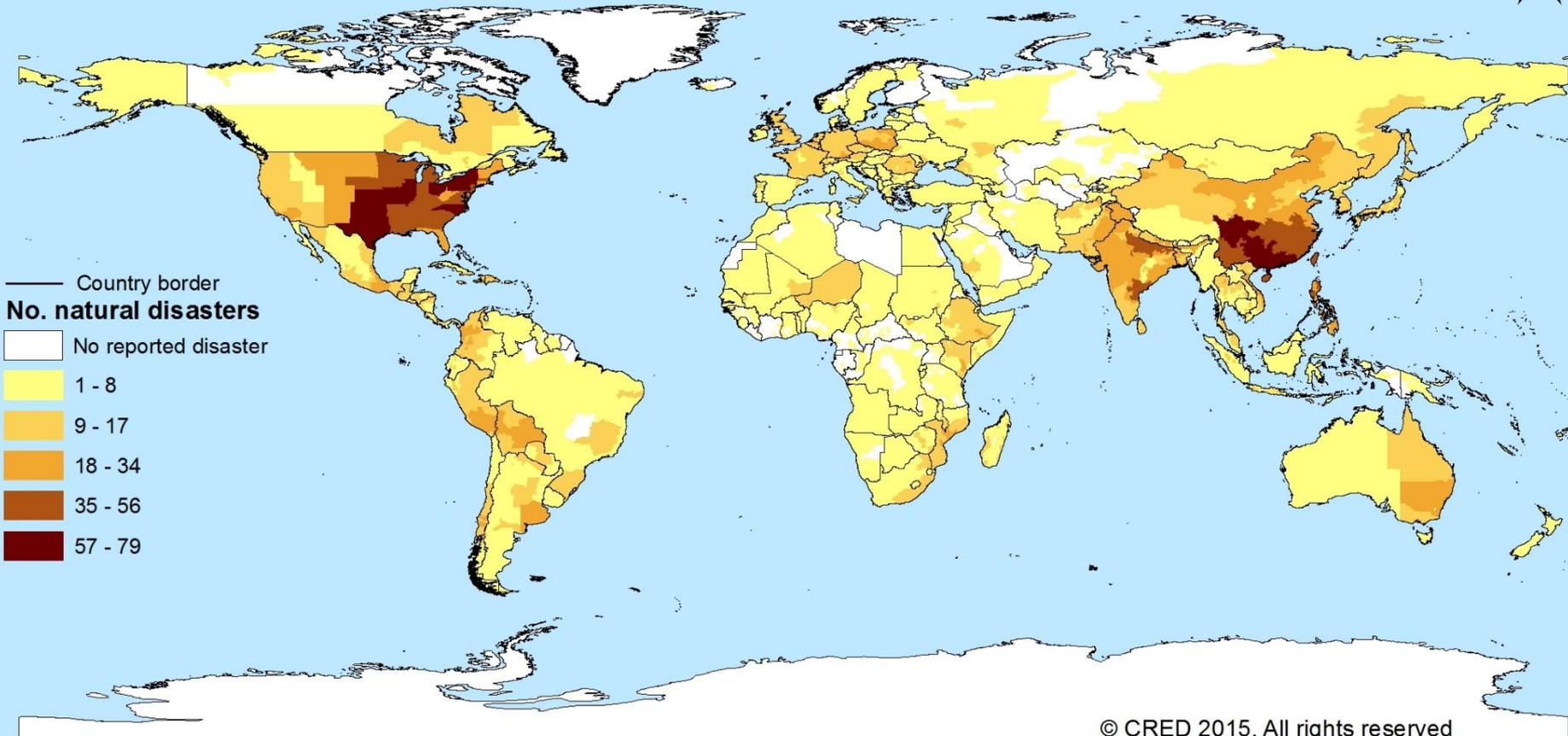
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First results

Sub-national Hazard Frequency

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Number of reported natural disasters by administrative unit (level 2), 2000-2015.



Author: Alizée Vanderveken
Source: EM-DAT, 2016
Projection: WGS84

0 5,000 10,000
Kilometers



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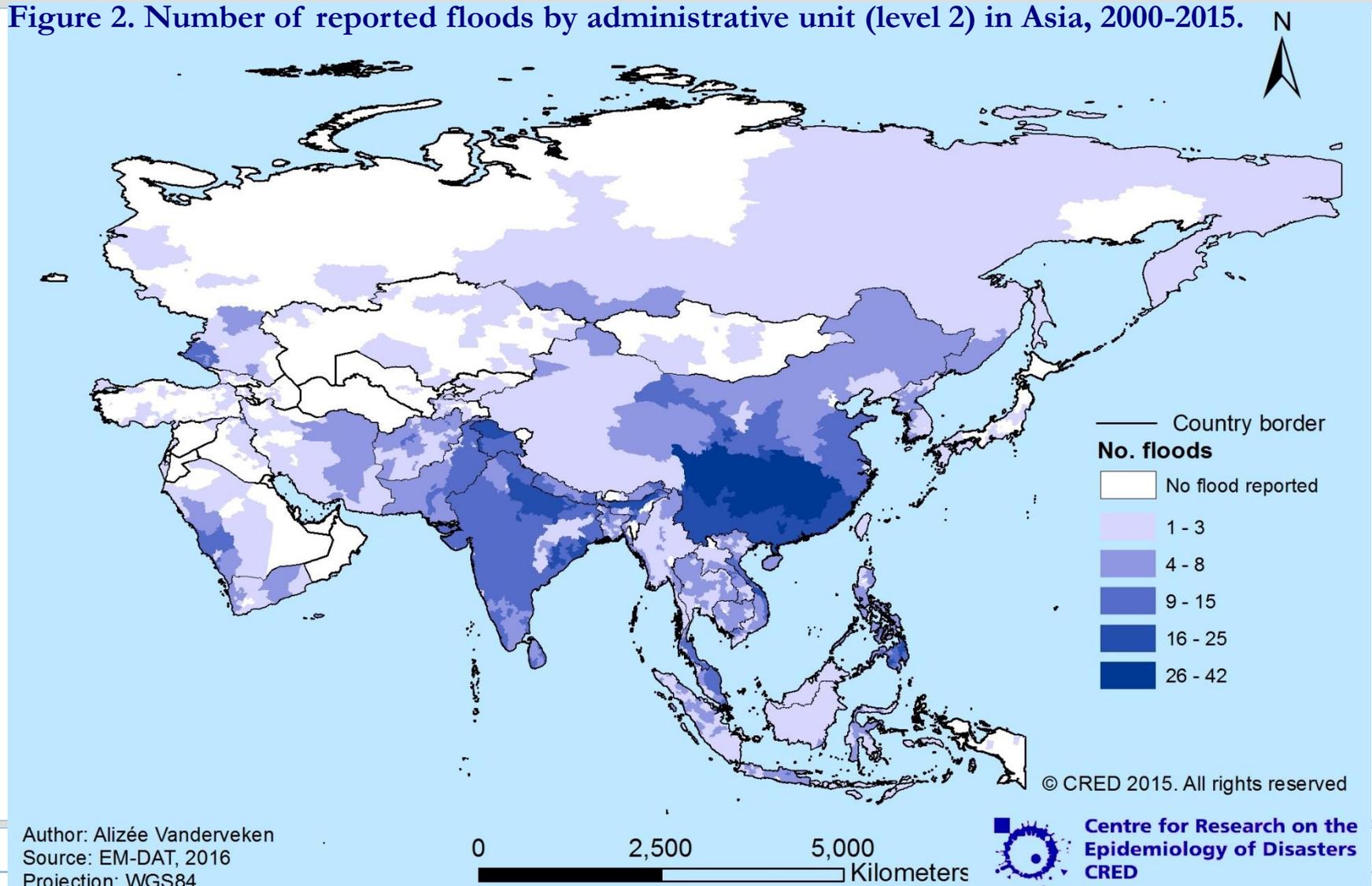
First results

Sub-national Hazard Frequency

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Figure 2. Number of reported floods by administrative unit (level 2) in Asia, 2000-2015.





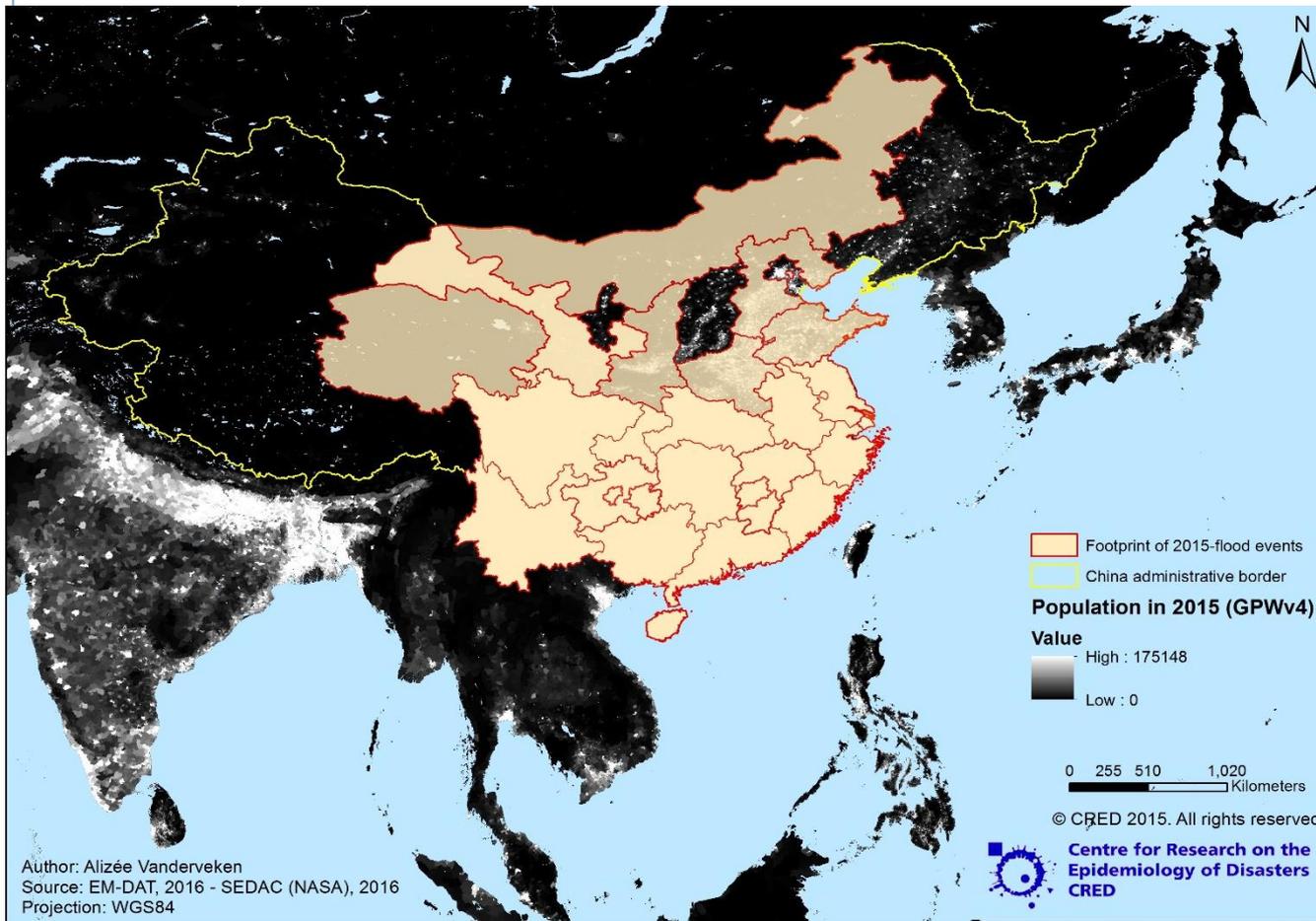
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First results

Combination EM-DAT with GPWv4 For calculation of population exposure

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China, 2015-flood events



Author: Alizée Vanderveken
Source: EM-DAT, 2016 - SEDAC (NASA), 2016
Projection: WGS84

Start	No. deaths	PPA
13-May	58	690,511,744
13-May	20	622,318,386
28-May	17	178,825,764
16-Jun	15	506,988,922
01-Jun	9	380,271,317
07-Jun	16	490,224,019
26-Jun	35	218,651,269
20-Jul	28	263,901,591
02-Aug	19	686,886,001
16-Aug	41	189,273,640
15-Sep	14	525,918,424
10-Nov	38	66,418,965

$$\Rightarrow \frac{\text{No. deaths}}{\text{PPA}}$$

**Degree of importance of
a disaster:**

- At the time of the event
- Future: based on population forecast



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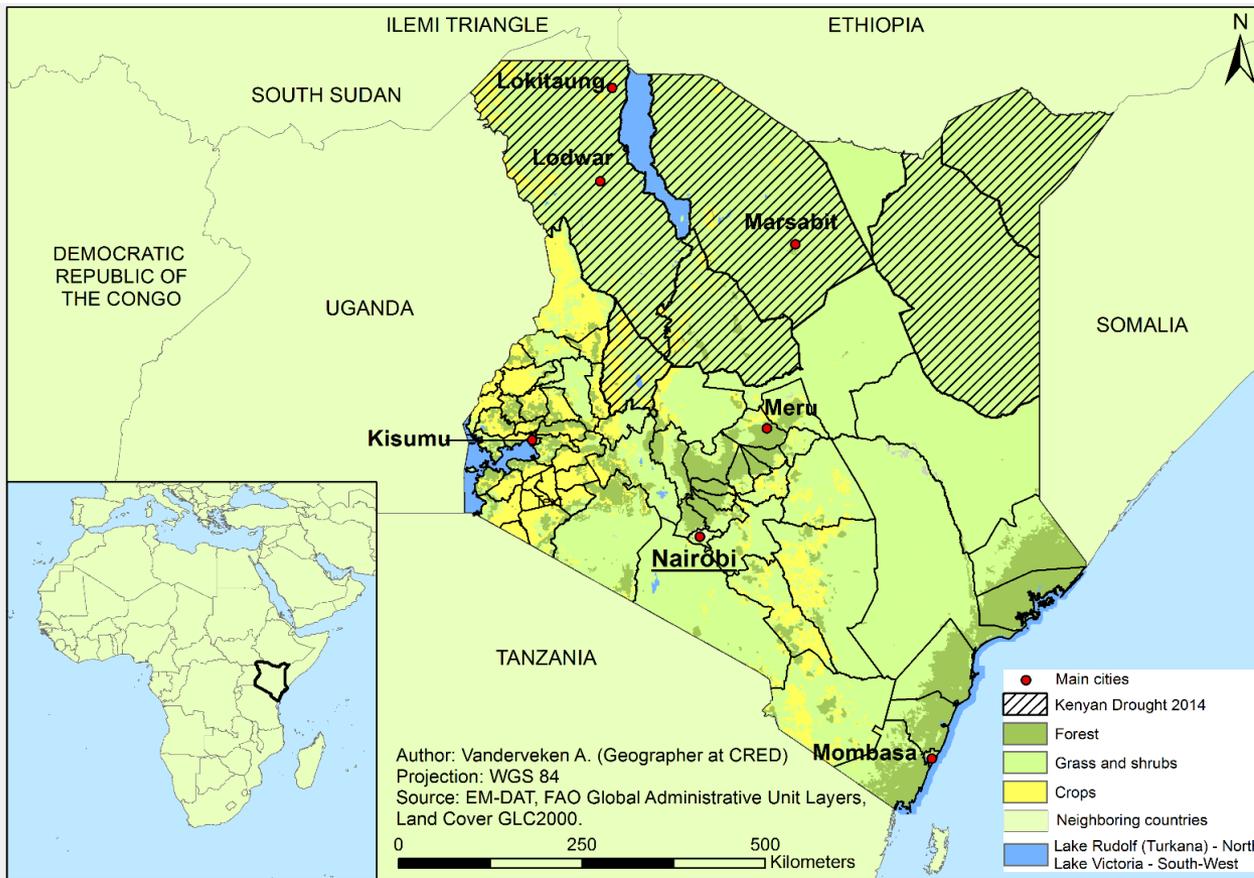
First results

Importance of the right denominator

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The case of Kenyan drought, 2014



Start Date: Jan 2014
Total victims: 1,600,000

Tot. Pop. Kenya
(AfriPop, 2016):
44,863,583

➔ SIDI* (%): 3.6

Tot. Pop.

≠

Pop. Pot. Affected (PPA)

PPA Kenya
(Drought-2014) :
4,520,358

➔ Adj. SIDI (%): 35.4

*SIDI = Proportion of victims (deaths, missing, affected) over the **total population** (%) of a country



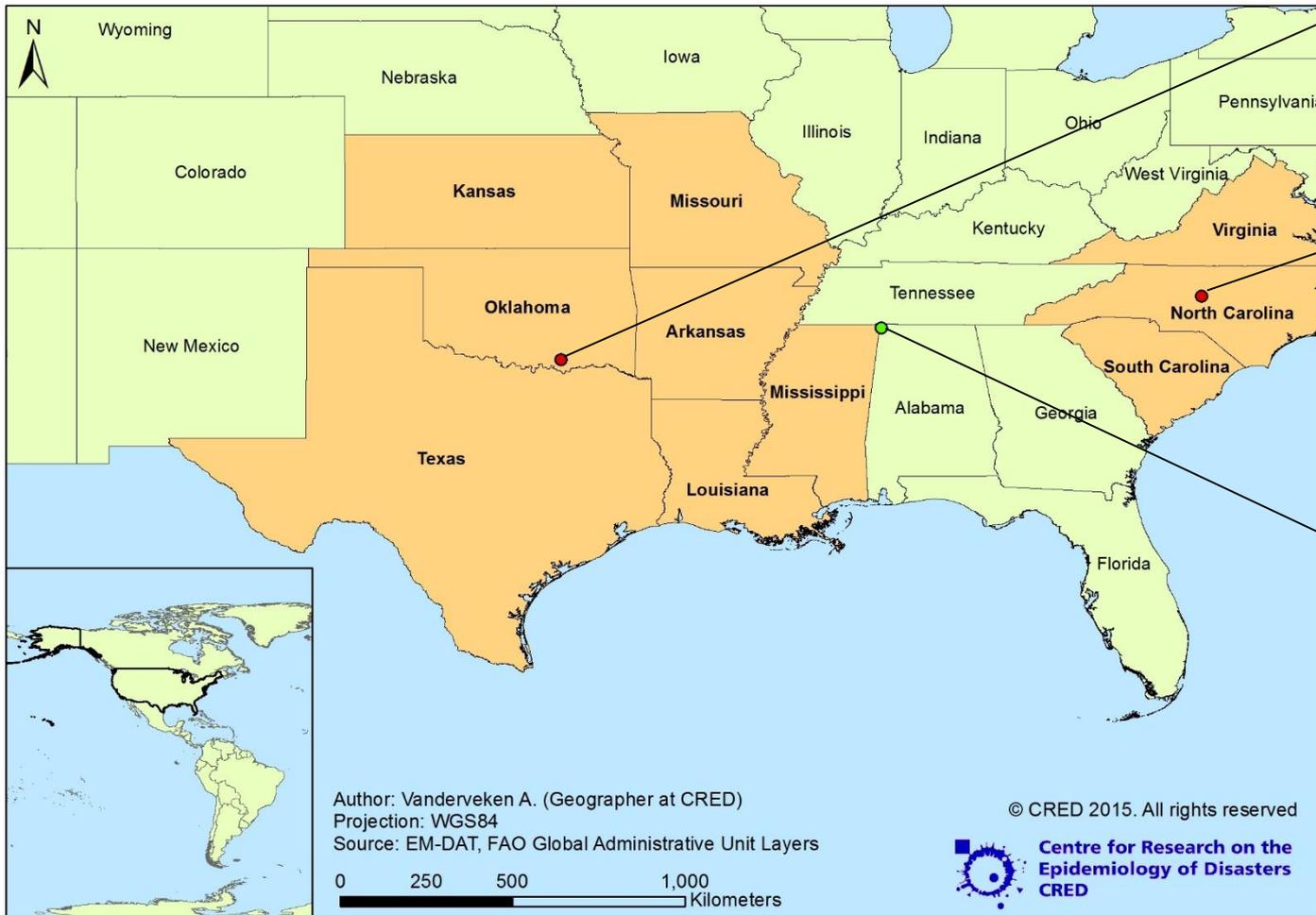
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Georeferencing activity

Challenges

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➤ Centroids? USA storm, 2004 – 9 deaths, 1749 affected – \$300,000 USD losses



X	Y
34.0723	-96.4099

X	Y
35.7382	-79.6947



X	Y
34.9053	-88.0523



Georeferencing activity

Challenges

➤ Challenges:

- Creation of centroids
- Impact data stays at the event-scale
 - Possibilities for modelling?
- Quality of georeferencing depends on:
 - Data reporting
 - Other data sources?
 - Standardization in data collection would be an added value
 - GAUL dataset
 - Reviewed each year
 - Available resources: possibility to automatize?



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Georeferencing activity

Conclusion

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- Georeferencing activity improves EM-DAT
- Useful material to serve as evidence-based
- Can be combined with a wide range of other data (population, landuse, ...)
- Future steps:
 - Assess the level of completeness and precision of georeferenced data
 - Improve the georeferenced data
 - Georeference 2016 events onwards
 - In-depths studies & analyses (e.g. joint paper with P. Rowhani, Z. Mehrabi, N. Ramkuty – What is the effect of disasters on crop yield and price?)
 - Integration of outputs on our website – online mapping tool



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Future tasks: Development of an online mapping tool

EM-DAT

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1. Advanced mapping tool



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1. Advanced mapping tool

Query options:

Reference Maps

• Lists in **Location** section: you can use only one list at a time; selecting from one will reset the others.

• **Display by Admin1/Admin2:** This option is currently available for earthquakes, landslides, volcanic activities, mass movements (dry), floods, storms, extreme temperatures, droughts, and wildfires.

Notes:

The screenshot displays the user interface of the advanced mapping tool, divided into two main sections: Search Criteria and Map Display options.

Search Criteria:

- Period:** From: 1900 To: 2015
- Location:** Continent (selected), Region, Country
- Available:** Africa, Americas, Asia, Europe, Oceania
- Selected:** (Empty)
- Disasters classification:** Group/Subgroup/Type/Subtype
 - Complex Disasters
 - Natural
 - Biological
 - Climatological
 - Extra-terrestrial
 - Geophysical
 - Hydrological
 - Flood
 - Landslide
 - Meteorological
 - Technological
 - Industrial accident
 - Miscellaneous accident
 - Transport accident

Map Display options:

- Variable to display:** Number of events, Total deaths, Total affected, Total damage
- Display by:** Country, Admin1, Admin2
- Background layer:** Imagery, Imagery with labels, Topographic, Streets, OpenStreetMap
- Symbology:** Graduated colors, Graduated symbols
- Classification type:** Natural breaks (Jenks), Quantile
- Classes:** 3, 5, 7
- Actions:** Show results table, Save map as PDF, Save map as JPEG



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1. Advanced mapping tool

Output 1.1

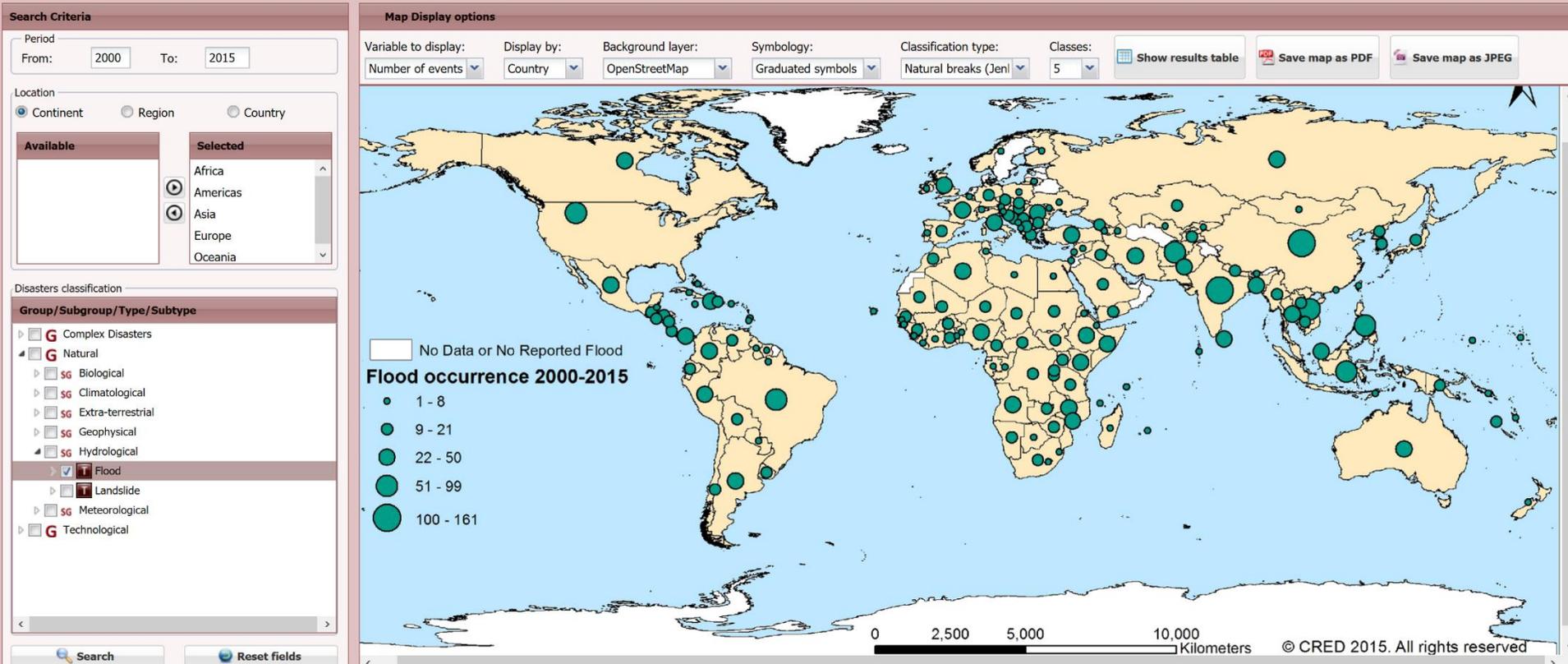
+ Add transparency

Reference Maps

- Lists in **Location** section: you can use only one list at a time; selecting from one will reset the others.

Notes:

- **Display by Admin1/Admin2:** This option is currently available for earthquakes, landslides, volcanic activities, mass movements (dry), floods, storms, extreme temperatures, droughts, and wildfires.





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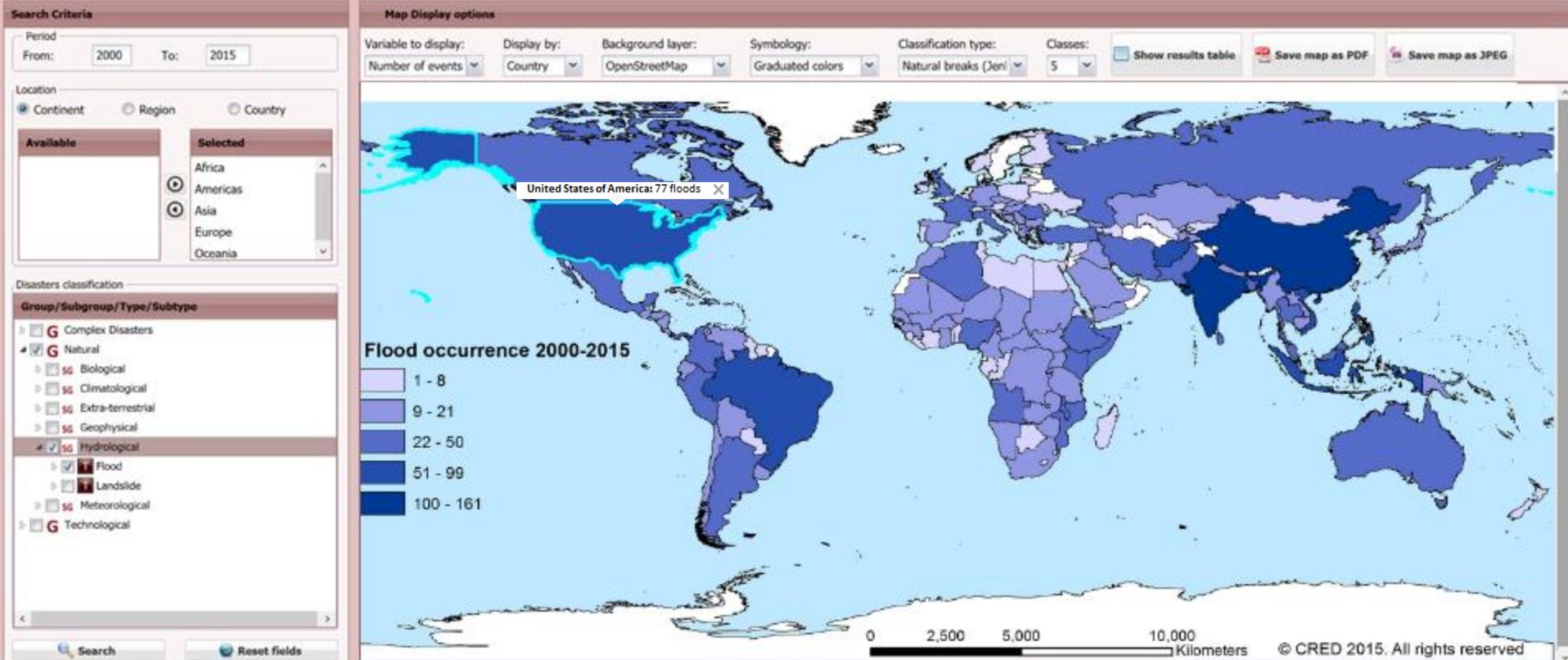
Output 1.2

Reference Maps

• Lists in **Location** section: you can use only one list at a time; selecting from one will reset the others.

• **Display by Admin1/Admin2:** This option is currently available for earthquakes, landslides, volcanic activities, mass movements (dry), floods, storms, extreme temperatures, droughts, and wildfires.

Notes:





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1. Advanced mapping tool

Output 1.2

Reference Maps

• Lists in **Location** section: you can use only one list at a time; selecting from one will reset the others.

• **Display by Admin1/Admin2:** This option is currently available for earthquakes, landslides, volcanic activities, mass movements (dry), floods, storms, extreme temperatures, droughts, and wildfires.

Notes:

Search Criteria

Period
From: 2000 To: 2015

Location
 Continent Region Country

Available Selected
Africa
Americas
Asia
Europe
Oceania

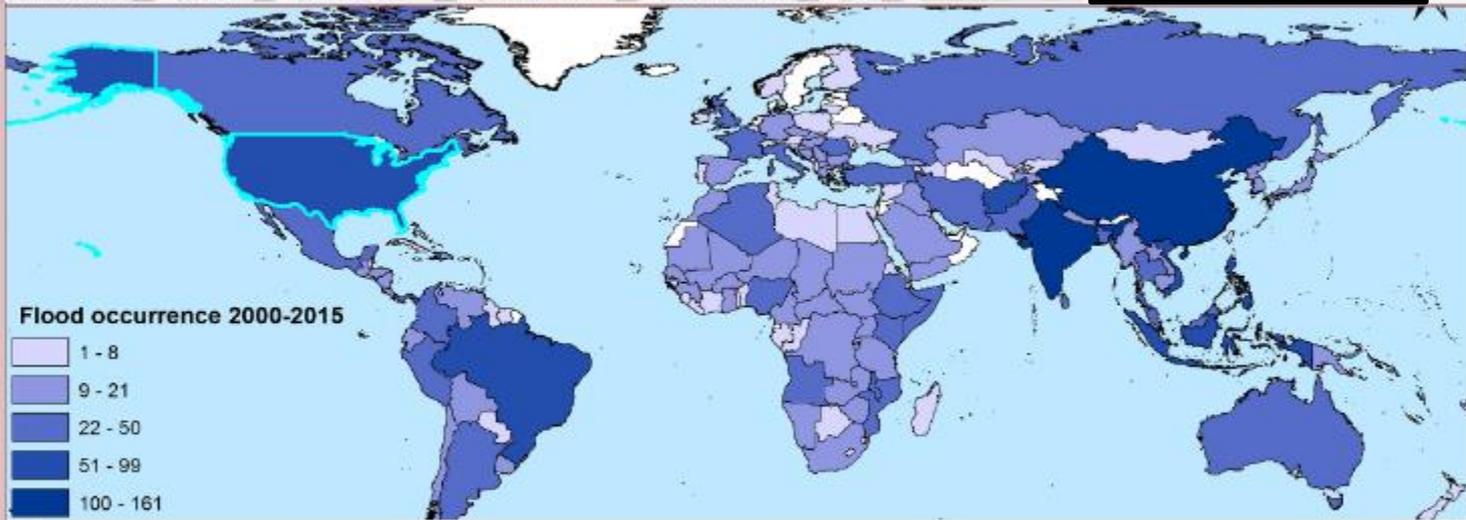
Disasters classification

Group/Subgroup/Type/Subtype

G Complex Disasters
 G Natural
 36 Biological
 36 Climatological
 36 Extra-terrestrial
 36 Geophysical
 36 Hydrological
 Flood
 Landslide
 36 Meteorological
 G Technological

Map Display options

Variable to display: Number of events
Display by: Country
Background layer: OpenStreetMap
Symbology: Graduated colors
Classification type: Natural breaks (Jen)
Classes: 5
 Show results table Save map as PDF Save map as JPEG



Year	Occurrence
2000	8
2001	5
2002	4



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2. Region profile tool



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2. Region profile tool

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Output 2.1

Region Profile

Search Criteria

Period
From: To:

Location
Search: Country Admin1 Admin2

Locations

Country	Admin1	Admin2
United States of America		

Disasters classification

Group/Subgroup/Type/Subtype

- Natural
- Technological
- Complex Disasters

Group results by (maximum three)

Available	Selected
Disaster group	Year
Disaster subgroup	
Disaster type	
Disaster subtype	
Disaster subsubtype	
Continent	

Show disasters data Save map as PDF



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2. Region profile tool

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Output 2.1

Region Profile

Search Criteria

Period
From: 1900 To: 2016

Location
Search: Country Admin1 Admin2

Locations

Country	Admin1	Admin2
United States of America		

Disasters classification

Group/Subgroup/Type/Subtype

- Natural
- Technological
- Complex Disasters

Group results by (maximum three)

Available

- Disaster group
- Disaster subgroup
- Disaster type
- Disaster subtype
- Disaster subsubtype
- Continent

Selected

Year

Disasters data

Data table **Data charts**

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2. Region profile tool

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Output 2.2

Region Profile

Search Criteria

Period
From: To:

Location
Search: Country Admin1 Admin2

Locations

Country	Admin1	Admin2
United States of America		
United States of America	Florida	
United States of America	Florida	Miami-Dade

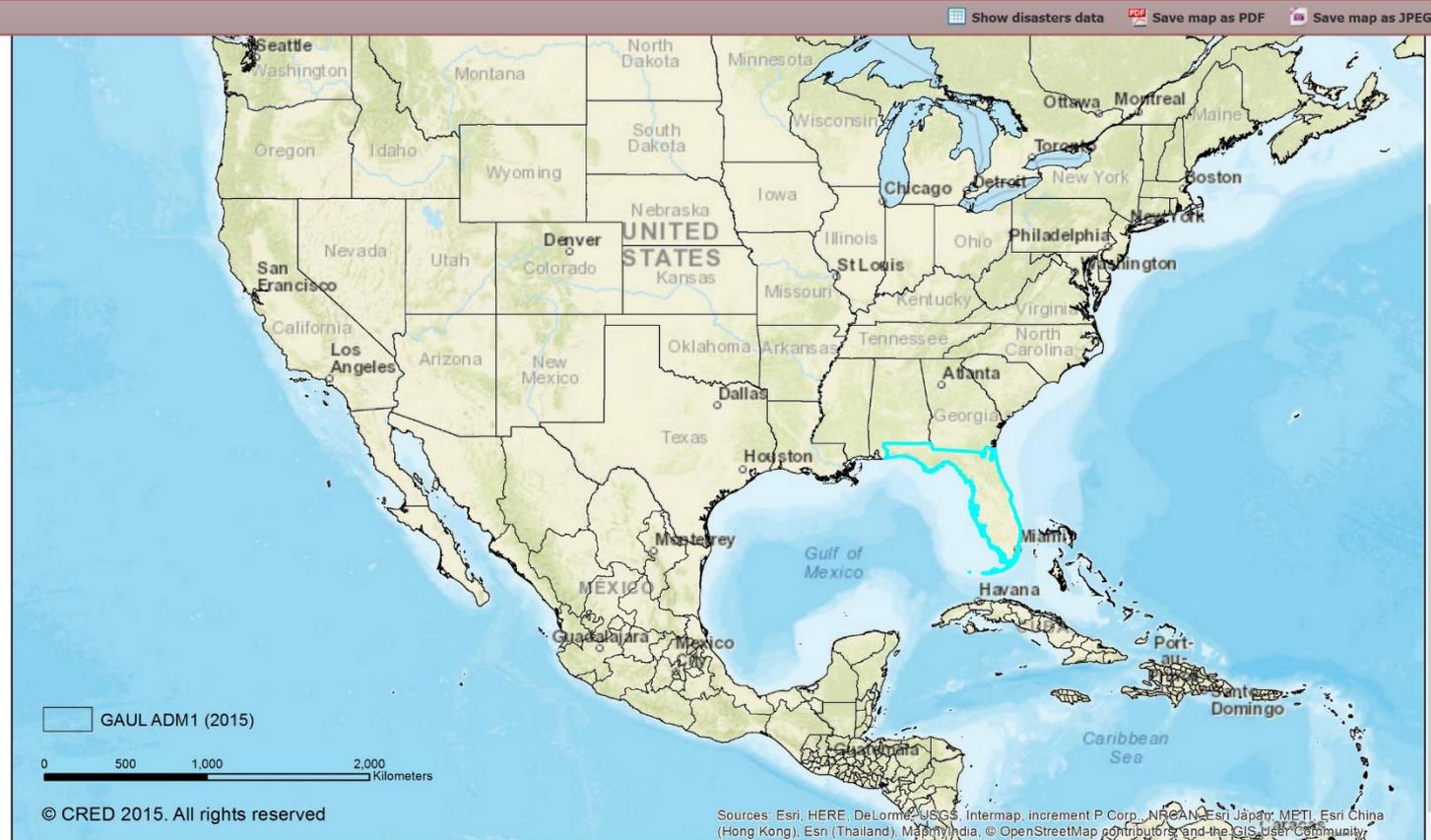
Disasters classification

Group/Subgroup/Type/Subtype

- Natural
- Technological
- Complex Disasters

Group results by (maximum three)

Available	Selected
Disaster group	Year
Disaster subgroup	
Disaster type	
Disaster subtype	
Disaster subsubtype	
Continent	





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2. Region profile tool

Output 2.3

Region Profile

Search Criteria

Period
From: To:

Location
Search: Country Admin1 Admin2

Locations		
Country	Admin1	Admin2
United States of America		
United States of America	Florida	
United States of America	Florida	Miami-Dade

Disasters classification

Group/Subgroup/Type/Subtype

- Natural
- Technological
- Complex Disasters

Group results by (maximum three)

Available	Selected
Disaster group	Year
Disaster subgroup	
Disaster type	
Disaster subtype	
Disaster subsubtype	
Continent	

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Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



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3. Disaster maps



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3. Disaster maps tool

Linked with the disaster list tool

Disaster Map

Search criteria

Period
From: 2000 To: 2016

Location
 Continent Region Country

Available

- United Kingdom of Great Britain and Northern Ireland
- Uruguay
- Uzbekistan

Selected

- United States of America (the)

Natural/Technological Disasters: Subgroup/Type

- Biological
- Climatological
- Geophysical
- Hydrological
- Storm
- Extreme temperature
- Technological

Include in search results

Available

- Associated disaster
- Associated disaster2

Selected

- Total deaths
- Total affected
- Total damage
- Insured losses

Search Results

Total entries: 224

Start date	End date	Country name	ISO	Location	Disaster Type	Disaster subtype	Total deaths	Total affected	Total damage ('000 US\$)
07/04/2015	10/04/2015	United States of America (the)	USA	Mississippi, Kentucky, Georgia, Florida provinces Fairdale area (DeKalb district, Illinois province), Rochelle town (Ogle district, Illinois province), Missouri, North Carolina, Indiana, Ohio, Kentucky, Texas, Iowa, Arkansas, Michigan, West Virginia, Wisconsin, Pennsylvania, Oklahoma, Kansas, Tennessee provinces	Storm	Convective storm	3	12	1400000
25/03/2015	26/03/2015	United States of America (the)	USA	Moore area (Cleveland district, Oklahoma province), Osage, Tulsa districts (Oklahoma province), Kansas, Missouri, Arkansas provinces	Storm	Convective storm	1	3312	500000
03/03/2015	05/03/2015	United States of America (the)	USA	New York, Pennsylvania, Kentucky, West Virginia, Arkansas provinces	Storm	Convective storm	13		170000
16/02/2015	22/02/2015	United States of America (the)	USA	Massachusetts, New York, Tennessee, Maryland, Virginia, Pennsylvania, Kentucky, North Carolina, Michigan, Rhode Island, New Hampshire, Ohio, South Carolina, Illinois, District of Columbia, Maine, Vermont provinces	Storm	Convective storm	30		3000000
31/01/2015	04/02/2015	United States of America (the)	USA	Illinois, Michigan, Massachusetts, New York, Connecticut, Indiana provinces	Storm	Convective storm	22		150000
16/02/2015	22/02/2015	United States of America (the)	USA	Tennessee, Kansas, District of Columbia, Boston, Ohio, Virginia, Georgia, North Carolina, South Carolina provinces	Storm	Convective storm	10		100000
26/01/2015	28/01/2015	United States of America (the)	USA	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island	Storm	Convective storm	2		80000
06/01/2015	11/01/2015	United States of America (the)	USA	Illinois, Wisconsin, Pennsylvania provinces	Storm	Convective storm	15		100000
03/06/2014	06/06/2014	United States of America (the)	USA	Blair area (Washington district, Nebraska province), Iowa, Kansas	Storm	Convective storm	2	36	1600000



3. Disaster maps tool

Output 3.1

Disaster Map

Search Results

Total entries: 224 Request Raw data only Request Shapefiles + raw

Start date	End date	Country name	ISO	Location
07/04/2015	10/04/2015	United States of America (the)	USA	Fairdale area (DeKalb district, Illinois province), Rochelle town (Ogle district, Illinois province), Missouri, North Carolina, Indiana, Ohio, Kentucky, Texas, Iowa, Arkansas, Michigan, West Virginia, Wisconsin, Pennsylvania, Oklahoma, Kansas, Tennessee provinces
25/03/2015	26/03/2015	United States of America (the)	USA	Moore area (Cleveland district, Oklahoma province), Osage, Tulsa districts (Oklahoma province), Kansas, Missouri, Arkansas provinces
03/03/2015	05/03/2015	United States of America (the)	USA	New York, Pennsylvania, Kentucky, West Virginia, Arkansas provinces
16/02/2015	22/02/2015	United States of America (the)	USA	Massachusetts, New York, Tennessee, Maryland, Virginia, Pennsylvania, Kentucky, North Carolina, Michigan, Rhode Island, New Hampshire, Ohio, South Carolina, Illinois, District of Columbia, Maine, Vermont provinces
31/01/2015	04/02/2015	United States of America (the)	USA	Illinois, Michigan, Massachusetts, New York, Connecticut, Indiana provinces
16/02/2015	22/02/2015	United States of America (the)	USA	Tennessee, Kansas, District of Columbia, Boston, Ohio, Virginia, Georgia, North Carolina, South Carolina provinces
26/01/2015	28/01/2015	United States of America (the)	USA	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island
06/01/2015	11/01/2015	United States of America (the)	USA	Illinois, Wisconsin, Pennsylvania provinces
03/06/2014	06/06/2014	United States of America (the)	USA	Blair area (Washington district, Nebraska province), Iowa, Kansas

Disaster Map

Background layer: OpenStreetMap Save map as PDF Save map as JPEG



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Online mapping tool

Conclusion

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- Will be developed in the next 4 years
- Increase EM-DAT value
- Facilitate user visualization

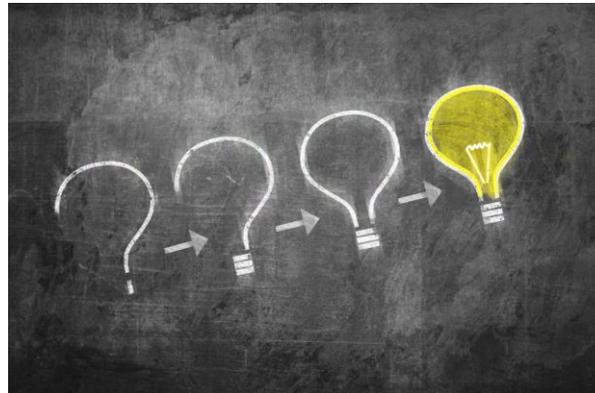


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THANK YOU!

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Time for discussion



Contacts

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