Session 1: Natural disasters

Session 1 is an introduction to the *Natural disasters: earthquakes resource*. It sets the scene by introducing the topic of natural disasters alongside general ideas of risk and hazard. Students should be made aware of the differences between hazard events and those which are classed as natural disasters.

While the resource as a whole uses the 2015 Nepal earthquake to contextualize learning this first session provides a useful set of activities for those wanting to explore the nature of risk associated with any type of natural disaster.

Contents

Introductory activities (all ages)

1. Silent starter
2. Think-Pair-Share
3. Hazard or disaster?
4. Locating hazards and disasters

Activities for Key Stages 3-5

KS3: Natural disasters washing line
KS4: Hazard classification
KS5: Defining disaster hotspots

Learning objectives

Young people are able to:

> Locate and contextualize specific places in regional and wider scales.

> Recognise the interconnections between processes which operate in specific places, to produce a hazard risk or natural disaster.

> Start to identify the humanitarian impacts of natural hazards and disasters.

Key questions

> What do we mean by natural hazards and disasters and how can they be classified?

> Which natural hazards are the most common?

> What impacts will different natural disasters have on individuals and communities?

Key vocabulary

Hazard: a natural phenomenon which has the *potential* to cause loss of life, injury or damage to property and infrastructure.

Event: the occurrence of a hazard.

Disaster: a major event that causes widespread disruption on a significant scale.

Minamisanriku, Miyagi Prefecture, Japan
March 2011

Introductory activities

You will need:

> Natural hazard silent starter (PDF)
> Hazard classification guide (PPT)
> Hazard or disaster? (PPT)
> Let's ask Nathan teacher guidance sheet (PDF)
> Let's ask Nathan student introduction (PDF)
> Blank world maps (PDF)

1. Silent starter

Before students arrive, place printed copies of the Natural hazard silent starter (PDF) face down in the middle of each desk, along with marker pens and sticky notes.

Once all students have arrived, ask them to turn the piece of paper over and to spend a few minutes writing down words which they associate with this phrase in silence.

They can write their words around the outside of the central image or by adding sticky notes to the desk.

2. Think-Pair-Share

After a few minutes ask them to pair with a neighbour, and identify the words which they have in common. Ask them to underline these and then share them with the group, or with another pair.

Try to collate words which crop up lots of times, and highlight those in a separate colour.

Classification activity

Students should spend a little time classifying the resulting word list into words which are:

> adjectives describing natural hazards
> actual examples of natural hazards
> impacts of natural hazards
> places which are prone to natural hazards
> connected with the humanitarian response to disasters.

The actual examples of natural hazards can then be classified into the following categories:

> meteorological
> hydrological
> climatological
> geophysical (tectonic).

You can display the Hazard classification guide (PPT) on the screen to help students categorise their examples.

3. Hazard or disaster?

A discussion can be had on the differences between natural hazards and disasters.

The discussion should focus on the scale, nature and severity, and length of time over which the impacts of the hazard event last. These factors will make the difference when it comes to defining the event.

Students should be asked to use the word lists which they have produced to come up with their own **definitions** of a natural hazard and a natural disaster.

The definitions on the Hazard or disaster? (PPT) can support with this.

Discussion questions

> What are the key differences between a hazard and disaster?
> Which events might be hazardous but not be classified as natural disasters?
> At what point does a hazard event become a natural disaster?

Explain that having thought about the **what**, students are going to move on to the **where** of natural hazards and disasters.

In terms of natural disasters, where the dangerous places are in the world and how dangerous is the place where your school is located?

4. Locating hazards and disasters

The **'Let's ask Nathan' teacher guidance sheet (PDF)** *will help you prepare the activity.*

The **'Let's ask Nathan' student introduction sheet (PDF)** *also supports this activity.*

To locate hazard events, including natural disasters, requires a map. This activity uses Munich Re's interactive mapping "Ask Nathan" resource: **http://nathanlight.munichre.com/**.

Nathan stands for the National Hazards Assessment Network. Munich Re is one of the world's leading reinsurers, and therefore need to know a lot about risk if their insurance is going to be effective and their policies set appropriately. They employ geographers to help them keep track of natural hazard trends.

In this activity you will demonstrate the mapping tool, encourage students to explore the resource and complete a number of tasks to develop their competence in locating hazards.

Demonstrating the 'Ask Nathan' resource

You may demonstrate this tool at the front of the class but students would also benefit from access to an ICT room, or perhaps a class set of tablets to explore it themselves.

There are also opportunities to ask students who are confident in the use of this technology to model its use with others within the group as a way to develop confidence in these skills, which are of increasing importance.

You could also use an **atlas** if required (or preferred) to work with students to revisit some basic geographical locations, e.g. continents and oceans, and countries involved if necessary as they work through this unit.

Identifying countries at risk of hazards

Ask students to identify countries which are currently experiencing, or have recently experienced hazards or natural disasters. Students could identify countries using print or digital news stories from the last few weeks or months.

The International Federation of the Red Cross and Red Crescent Societies website may also be a good source of information for students: **http://www.ifrc.org/**.

Alternatively, you could place recent hazard stories into an app such as Flipboard to curate these events for students to view digitally during the lesson.

Hand out the **'Let's Ask Nathan' student task sheet (PDF)**.

Provide around 30 minutes for students to complete the task, which could also be continued as homework. An extension activity is also provided within the task sheet.

While using the tool and noting their responses encourage students to mark and identify countries which have significant vulnerability to natural hazards using one of the **blank world maps (PDF)** *provided.*

There may be a focus just on earthquakes at this stage, or students could take the opportunity to look at other natural hazards as well.

Explain that there are many factors which can interconnect to create other hazards or indeed a natural disaster. At the end of this task students should have a good idea of where vulnerable places are if they have multiple vulnerabilities.

The **Events** tool in NATHAN allows students to plot significant events around the world dating from 1980 to the present day, and identify these according to the categories as well.

Activities for key stages 3-5

Students should now be asked to complete an age-appropriate activity from the following list.

NB: Elements of younger (or older) age group activities may still be used with particular age groups. Don't feel confined to the age bracket. You are welcome to adopt or adapt these ideas.

KS3: Natural disasters washing line

In this activity: students will consider the nature of hazardous events and the relative importance of earthquakes in a hierarchy of such events.

You will need:

> Natural hazard silent starter (PDF)
> Washing line questions (PPT)
> Rachel Hay - account of the days after the earthquake (PDF)

Print out examples of some of the significant events from the last three years from the Natural hazards cards (PDF) *in advance of the lesson or provide them in another format.*

Teachers could also add further examples to these cards based on previous case studies taught at the school, or by adding in more recent events that have happened since this resource was created.

1. The impacts of a natural disaster

First, ask students to discuss or write down some of the potential impacts of a natural disaster on the people affected.

Examples might include:

> loss of life or limb

> need for shelter

> lack of food or water

> need for medical care

> loss of income

> disruption to education.

Encourage students to share their ideas with the wider group.

2. Washing line activity

Ask students to organise the events from the cards into a sequence or continuum of which they feel would have had the greatest impact on people.

Ask students to pin, peg or tie labels onto an actual washing line (or piece of string) stretched across the classroom to show the relative positions of events.

Alternatively, the software accompanying most interactive whiteboards also provides the option to create labels, which can be dragged and dropped into place or classified into groups.

3. Discuss and debate

During the activity, encourage students to discuss the placement of labels with at least one other person as they put them on the line.

> What are their main reasons for choosing a placement on the line?

> How important is the impact on people in influencing the event's position on the line?

Questions to assist with this are available on the Washing line questions (PPT).

Discussion could be had about any alterations to the placement of particular events.

Teachers could also encourage consideration of man-made hazards, with some initial discussion about the nature of hazards and how far people are involved in 'creating' them.

Have earthquakes ever been triggered by human activity, for example?

4. Extension: an account of the Nepal earthquake

Rachel Hay is a geographer who was in Nepal when the 2015 earthquake struck. We shall come back to learn more about Rachel's experience in Nepal in later sessions.

Rachel wrote an article about the first few days after the earthquake had struck. She was fortunate to survive, but we will discover more about that later too.

Hand out, or display and read the resource: **Account of the days after the earthquake (PDF)**.

Discussion questions

> If you were in a place that was at risk of earthquakes, how might the need to be constantly alert affect you?

> Think about how you might feel if you were caught up in a natural disaster – how might you have been affected? How might you want to help others?

Remember that everyone reacts differently to stressful situations. In later sessions we will look at how a humanitarian organisation like the Red Cross supports people before, during and after natural disasters – helping them to cope with the practical and emotional impact of the event.

Photo © Mirva Helenius/Finnish Red Cross.

KS4: Hazard classification

In this activity: students will begin to locate and classify some recent hazards.

You will need:

> Natural hazards cards (PDF)
> Natural hazards list (PDF)
> Hazard classification Venn (PDF)
> Blank world map (PDF)

Print out examples of some of the significant events from the last three years from the Natural hazards cards (PDF) in advance of the lesson (or provide them in another format).

Ask students to classify these events into three main types of natural hazards:

1. hydro-meteorological,
2. climatological
3. geophysical.

Definitions

> Hydro-meteorological refers to short-term weather hazards, particularly those relating to water.

> Climatological hazards are longer term, such as drought.

> Geophysical refers to natural process involving the earth's surface.

Hand out the list of hazards shown on the Natural hazards list (PDF).

Students could be asked to enter these hazards onto an A3 copy of the Hazard classification Venn (PDF) to check that they are aware of the main categories of natural hazard that can affect places around the world.

Ask students to research some of the different impacts of the events and then organise the events on the cards into a sequence of significance. They can also plot them onto a blank world map to reinforce the location aspect of the work.

The sequence of significance could be based on the:

> scale of the event (geographical area)

> nature of disruption

> severity of the disruption

> number of people involved

> amount of property and infrastructure affected

> scale of assistance required by humanitarian agencies and others.

Let students know that the British Red Cross was involved in providing humanitarian aid following some of these events, and that they can find out more about their work by visiting http://www.redcross.org.uk/Where-we-work/Overseas

A Red Cross volunteer talks with firefighters taking a break from battling the Harris Fire, which covered approximately 75,000 acres. San Diego County.
July 2008

KS5: Defining disaster hotspots

In this activity: students will explore the idea of places as 'disaster hotspots' and will have the chance to research one of these in some detail.

You will need:

> Benjamin Hennig's earthquake risk map (PDF)
> Disaster hotspots (PDF)
> Multiple hazards ID card (PDF)
> Nepal factsheet (PDF)

1. Introduction to disaster hotspots

Some places in the world can be described as a **'disaster hotspot'**.

Introduce students to Benjamin Hennig's earthquake risk map (PDF) by displaying it on screen or handing out a printed copy.

What can students identify from this map with respect to the factors leading to risk in particular areas of the world?

These are places, which may be regions, states or entire countries, which have a vulnerability to two or more types of natural hazard. They may also be referred to as **multiple hazard zones** (MHZs).

The hazards they are exposed to may include **a combination** of hydro-meteorological, climatic and geomorphic events. The combination of these events provides additional problems for local residents, meaning they may require additional support from humanitarian agencies.

This idea is included in many of the new specifications for first teaching from September 2016.

Identification of these hotspot areas or MHZs involves looking at data on previous events, combined with an assessment of vulnerability based on population size and also the level of economic development.

2. Exploring disaster hotspots

Explore disaster hotspots with students using the Disaster hotspots (PPT), which could be a basis for discussion, and a resource for the tasks that follow.

The following **three** places are amongst those that have been suggested as possible **disaster hotspots**:

> Nepal
> California, USA
> The Philippines

Using appropriate research, can students suggest which particular **combinations** of natural hazards may be present in these locations?

As part of this activity, encourage students to consider some of the possible connections that could exist between hazards. Examples might be that:

> earthquakes weaken the structure of slopes, leading to landslides
> earthquakes can dislodge large volumes of snow leading to avalanches
> volcanic eruptions can cause nearby ice caps to melt, causing floods
> drought can lead to dry vegetation, which increases the risk of wildfires
> tropical cyclones can bring strong winds, but also storm surges which cause coastal flooding.

Work with students to identify other possible connections.

Discuss the challenges and impacts combining events might present for local residents and humanitarian agencies.

3. Multiple hazards ID cards

Ask students to fill in a copy of the **Multiple hazards ID card (PDF)** *for one disaster hotspot, using appropriate information from the available resources.*

Students should provide text and images of at least three hazards which may interact in these areas. This could be completed with respect to the Nepal earthquake in the first instance. The Nepal ID card can be completed using information from the **Nepal factsheet (PDF)**.

A good ID card will include:

> three related hazards for the chosen area

> suggestions for connections between the hazards

> some data to quantify the scale or nature of the hazard

> a link to a striking image or useful video clip sourced online.

Discussion questions

> What might the impact on the people who live in there hotspots be?

> Are humanitarian agencies particularly active in these hotspot zones?

> Could an awareness of the vulnerability of these areas mean that more resources are focused on them?

The town of Chautara was hit by the first earthquake on 25th April. It was then devastated by the May 12th earthquake as the epicentre was very close by.
Sindhupalchok province, Nepal
May 2015

Photo © Mithila Jariwala/IFRC.

Supporting resources for Session 1

Natural hazards

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Hazard classification guide

Meteorological Events	Hydrological Events	Climatological Events	Geophysical (Tectonic) Events
Storms, including tropical storms, mid latitude depressions	Flooding, including flash floods, river flooding and storm surge	Drought	Earthquake
Tornado	Mass movement, including landslide and avalanche	Extreme heat	Volcanic eruption
Lightning strike, or local hailstorm associated with convection	Subsidence	Wildfire, triggered by lightning	Mass movement e.g. landslide or rockfall
			Tsunami

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Hazard or disaster?

- **Event:** the occurrence of a hazard.
- **Hazard:** a natural phenomenon which has the potential to cause loss of life, injury or damage to property and infrastructure.
- **Disaster:** a major event that causes widespread disruption on a significant scale.

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"Let's ask Nathan" – teacher guidance sheet

NATHAN stands for National Hazards Assessment Network.

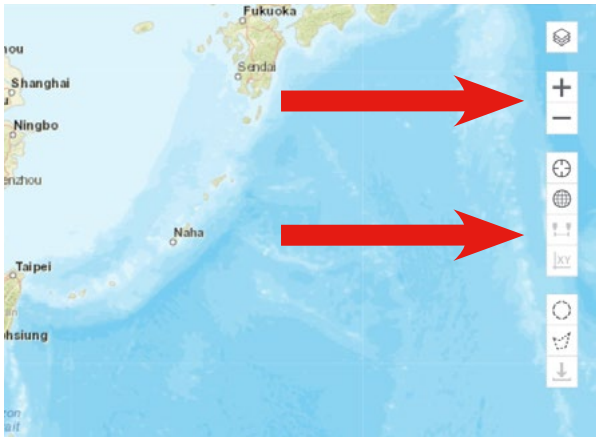
You can access this demonstration version of a full suite of tools on the Munich Re website here: **http://nathanlight.munichre.com/**

Munich Re need to be aware of global risks, so that they can set their policies appropriately for different businesses around the world. This tool is used to assess the vulnerability of areas to particular hazards.

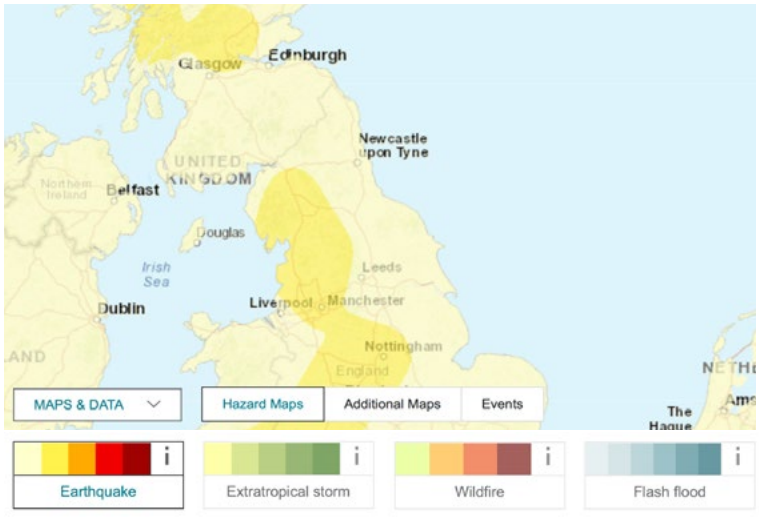
This tool will display the risk of particular hazards around the world, using interactive mapping.

Direct students to _. They will need to accept the terms and conditions to gain access.

A world map is displayed.



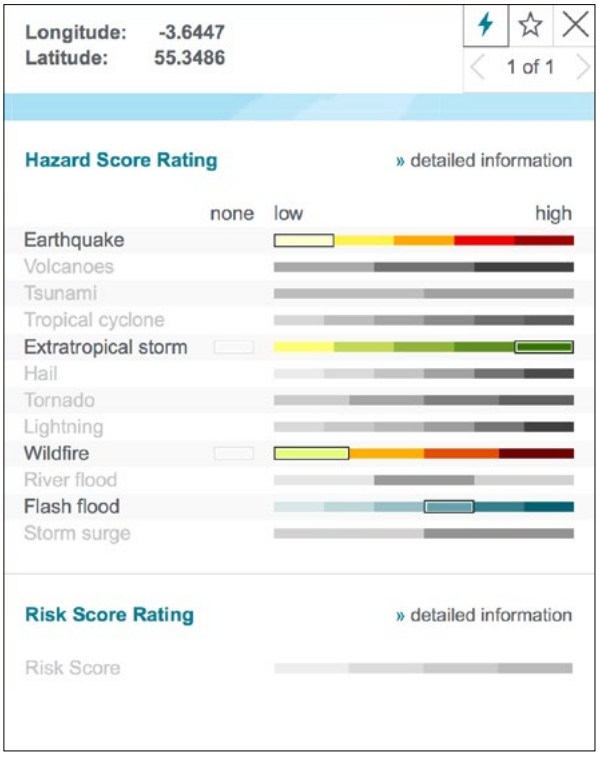
Use the Zoom + / - in the top right (or the mouse scroll wheel), and the 'zoom to full extent' icon to navigate. You may want to direct students to find particular countries to check that they are comfortable with the tools.



There are **four options** displayed along the bottom of the map (from a wider choice in the full version) of **hazard maps** available to display. You can select from:

> Earthquake
> Extratropical storm
> Wildfire
> Flash flood

Clicking on a location also generates a simplified version of the reports that are available in the full version.



Here is the report for the UK for example: low risk of earthquakes you'll be glad to know.

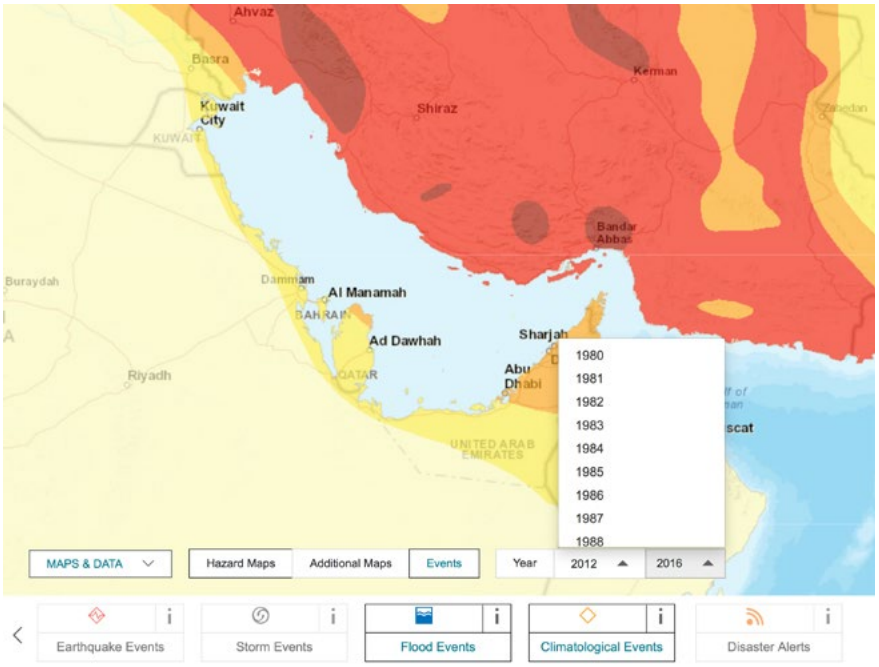
Explore the level of risk for these different hazards in locations around the world.

> Which locations have a high risk of more than one hazard?

> Which countries or regions have the highest earthquake risk (can students compare this to work they may have done on the location of tectonic plate margins?)

Extension

You may want to ask students to investigate the potential risks of those natural hazards which are not included in this demo version, such as tropical cyclones, volcanoes or tornadoes.



You can also choose to display a number of events:

> Earthquake events

> Climatological events

> Flood events

> Hazard alerts

These date from 1980 to the present day.

Use the maps and events to explore the hazard risk faced by a number of countries.

> Investigate whether some places appear to be subject to more risks than they were in 1980, or 2000?

You may want to allocate countries to individuals or pairs of students, but ensure that Nepal is included on the list (along with other locations of recent earthquakes or other hazards – see the KS3 disaster line activity for some suggestions).

As a final activity, you may want to ask students to suggest four strategic locations around the globe where humanitarian aid agencies could position warehouses of aid so that supplies can be sent to 'at risk' areas quickly. Should one of them be in the UK?

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"Let's ask Nathan" – student introduction

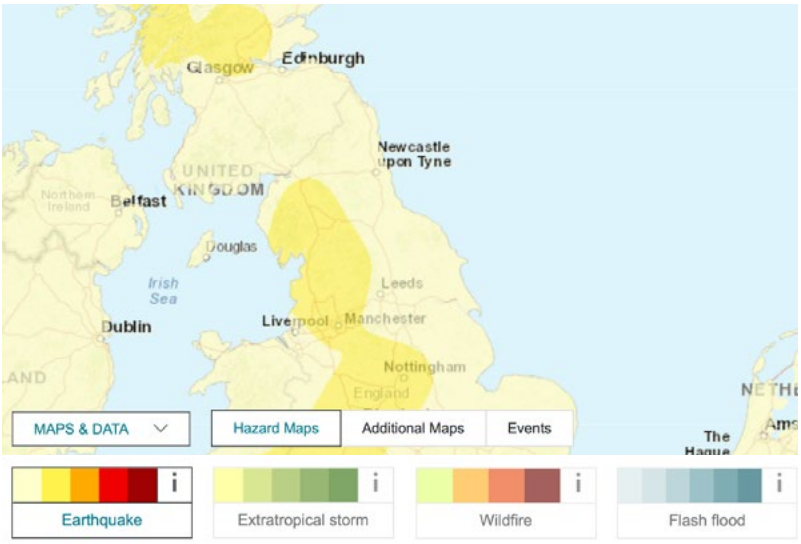
NATHAN stands for National Hazards Assessment Network.

You can access this demonstration version of a full suite of tools on the Munich Re website here: **http://nathanlight.munichre.com/**

Munich Re need to be aware of global risks, so that they can set their policies appropriately for different businesses around the world. This tool is used to assess the vulnerability of areas to particular hazards.

This tool will display the risk of particular hazards around the world, using interactive mapping.

Go to the website above, and accept the terms and conditions.



A world map is displayed. There are **four options** of **hazard maps** to display. Select from:

> Earthquake

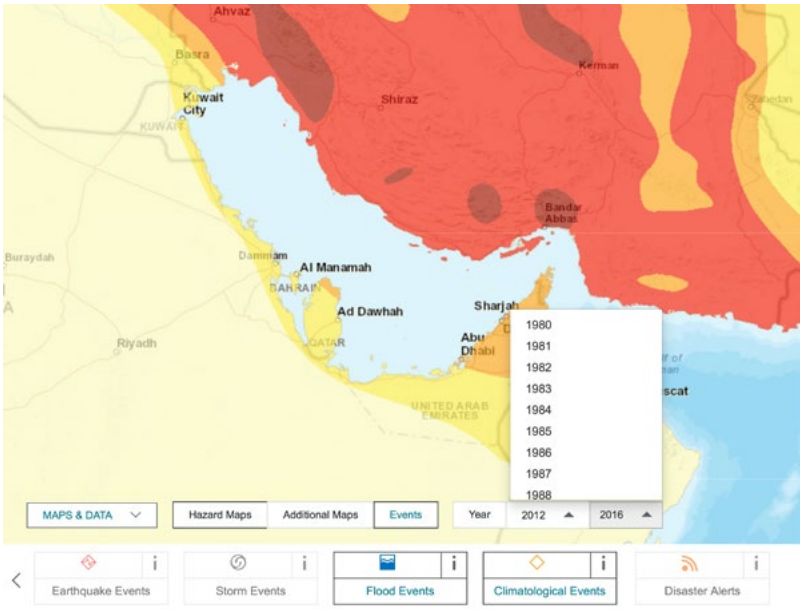
> Extratropical storm

> Wildfire

> Flash flood

Explore the level of risk for these different hazards in different locations around the world.

Which locations have a high risk of more than one hazard?



You can also choose to display a number of **events**:

> Earthquake events

> Climatological events

> Flood events

> Hazard alerts

These date from 1980 to the present day.

Record your findings and the responses to the tasks that you are set in the spaces overleaf.

Which locations have a high risk of more than one hazard?

Which countries or regions have the highest earthquake risk *(can you compare this to work you may have done on the location of tectonic plate margins?)*

Investigate whether some places appear to be subject to more risks than they were in 1980, or 2000?

Extension

Suggest the other potential risks of those natural hazards which are not included in this demo version, such as tropical cyclones, volcanoes or tornadoes.

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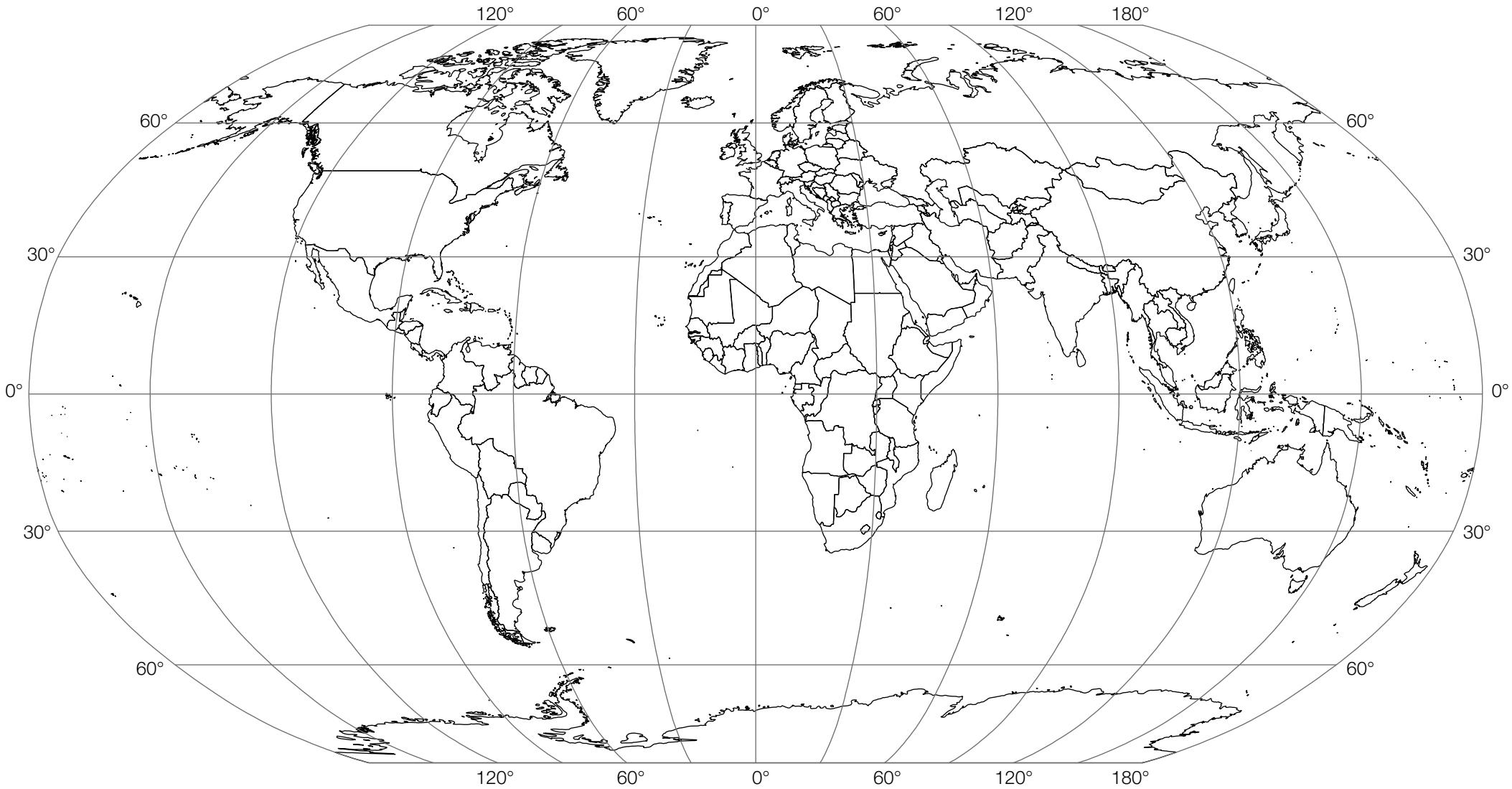

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April 2015

Nepal earthquake

A major earthquake causes damage in a region near the capital. Buildings collapse, over 8,000 people are killed and more than 22,000 are injured.

2014-16

California drought

Record breaking drought causes problems with water supply, and wildfires break out.

October 2015

Drought in Ethiopia

Crop failures are the result of below average rainfall, and over 8 million people need food assistance. Children suffer severe malnutrition.

January 2015

North American blizzard

Snow emergency declared in six states and thousands of cancelled flights, also known as winter storm Juno.

November 2013

Typhoon Haiyan

Over 6,000 people were killed, and more than 4 million people were made homeless by a strong storm which hit the Philippines. Recovery is still ongoing.

May 2015

Heatwave in India

Record breaking temperatures of almost 120 degrees Fahrenheit affect the city of Hyderabad. 2,000 people die as a result of problems caused by heat.

April 2014

Chile earthquake

A huge earthquake of 8.2 magnitude hits Chile, triggering a tsunami, but only a handful of fatalities are recorded.

May 2014

Afghanistan landslide

A huge landslide hits the village of Abi Barik in NE Afghanistan, killing hundreds of people.

September 2014

Iceland volcano

The Bardarbunga volcano starts erupting in Iceland. Unlike the Eyjafjallajokull volcano in 2010, there is no disruption to flights. The eruption lasts several months.

October 2014

Eruption in Japan

A sudden eruption of Mount Ontake in central Japan occurs as a group of walkers are near the summit. 54 people were confirmed as being killed by the localised eruption.

November 2015

Indian rainfall

The ‘rains of the century’ flood the city of Chennai in India. Around 400 people are killed, and crops are damaged. Humanitarian aid is provided in large quantities.

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Washing line questions

Some questions to consider on the placement of events

- How much did the scale of the event influence your decision?
- How important was the impact on people on your decision?
- Did you think about whether events were short or long term?
- Did you think about how difficult it might be for communities to recover from the event?
- Which events do you think might mean people need more urgent humanitarian aid, or longer term support?
- How difficult might it be for humanitarian aid to reach the area affected?
- Which events could potentially affect you during your life?

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We slept in our clothes for several nights after the earthquake. I was wary when taking a shower or going to the loo! I was on edge all the time! A quick rinse in the shower and clothes nearby to grab, and get dressed quickly, all the time saying in your head, 'please don't start shaking now…' and then a sense of utter relief when you're dressed again and feeling ready to run! Utterly exhausting, and I quickly went down with a cold.

In the days following the earthquake it was hard to know what to do with ourselves. We felt pretty useless, and the growing pile of plastic water bottles and rubbish in our room became a visible reminder of this, and the fact that we were draining resources. I had a bad cold, and as much as I wanted to help load rice and lentils on to trucks to take into Gorkha and neighbouring districts with Paddle Nepal and co. I wasn't strong enough to lift most of the sacks, and I didn't want to pass the cold on to those who were going to be heading out to do physically and emotionally demanding emergency relief work. My way of helping became writing blogs, and answering questions from a few teachers back home.

It made me fully appreciate how trained personnel are so valuable in managing relief response, and how everyone involved needs to 'bring something to the table. I could imagine that many people might flock to Nepal to help in the aid operation, and, although well-meaning, may actually start to be a drain on resources rather than being an asset. It's a tricky one to explain, given that local businesses were crying out for tourists now that most of Pokhara had cleared out!

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Earthquake, Volcanic eruption, Rock fall, Landslide, Subsidence (including sink-holes), Tropical storm,Extratropical storm, Tornado, River flood, Flash flood, Storm surge, Avalanche, Heatwave, Freeze, Ice storm, Drought, Wildfire, Hailstorm

Natural hazards

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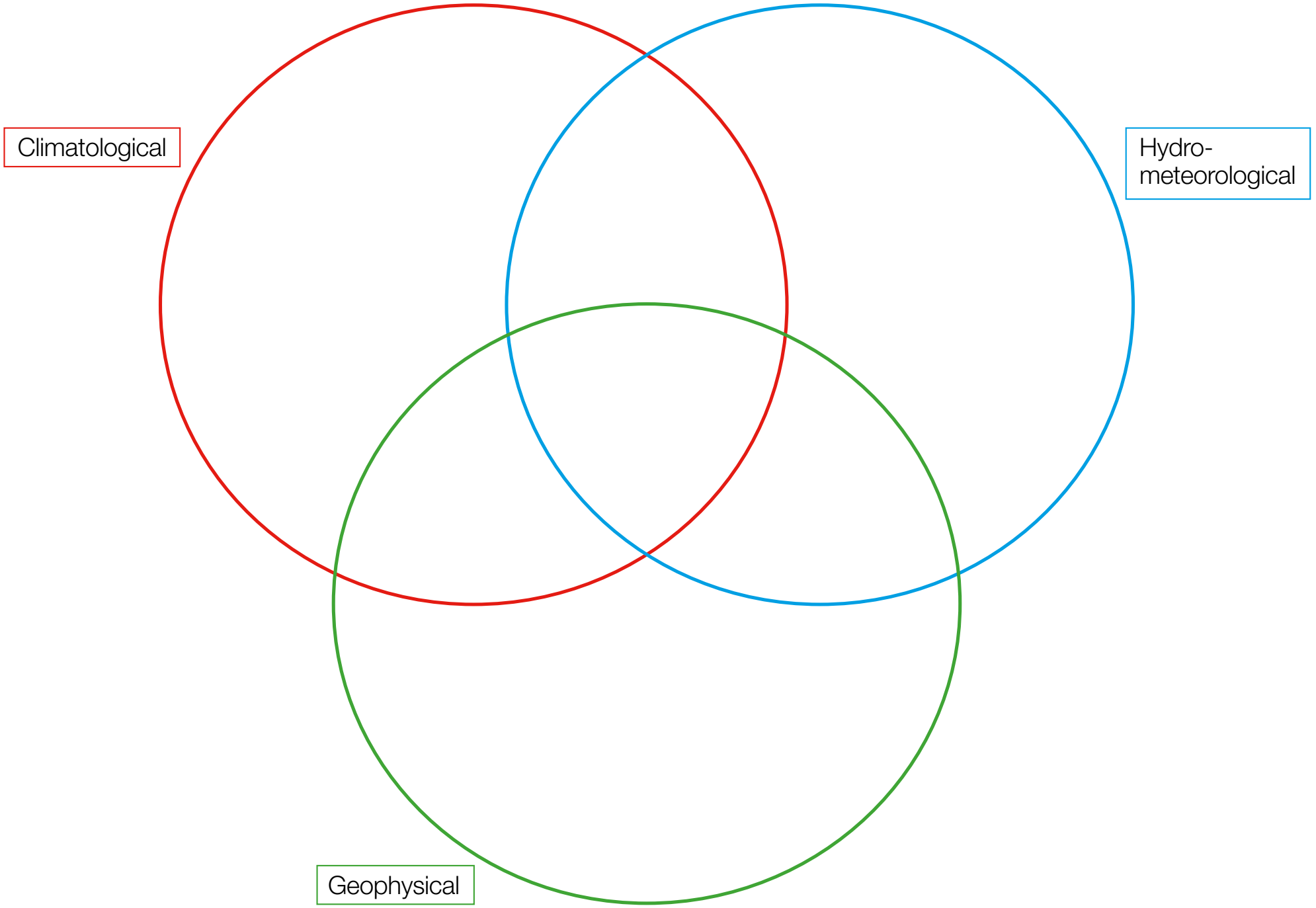

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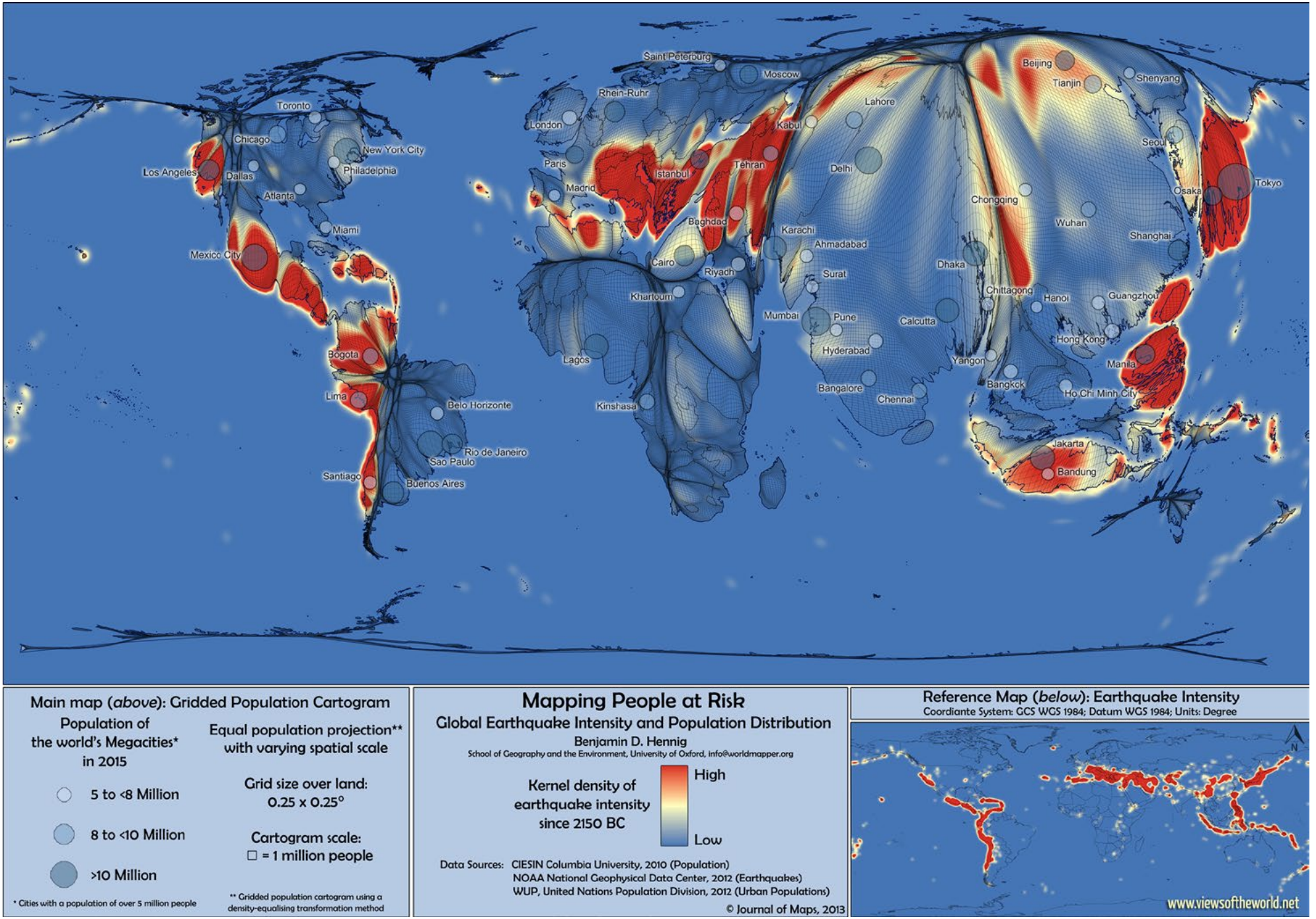

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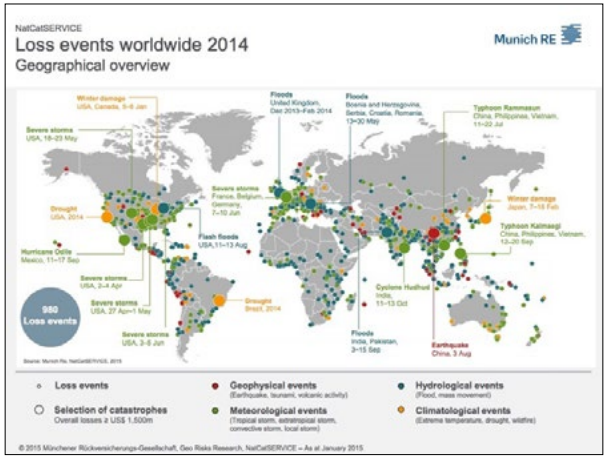
Disaster hotspots



Defining disaster hotspots

Nepal is becoming a disaster hotspot, with natural hazards increasing over the past two decades, according to aid agencies.
Floods, landslides, fire, cyclonic winds, hailstorms, drought and famine are among the disasters gripping the Himalayan nation with increasing ferocity.
In addition, there is a serious threat of an earthquake, particularly in the capital, Kathmandu. Records show that a quake occurs every 75 years in the city, with the last one in 1934 when 3,400 people died.

IRIN Report, 2008

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IRIN Report, 2008

Why do you think this is a disaster hotspot?

Disaster hotspots are places (which may be regions, states or entire countries) which have a vulnerability to two or more types of natural hazard. They may also be referred to as **multiple hazard zones** (MHZs). The hazards they are exposed to may include **a combination** of hydro-meteorological, climatic and geomorphic.

Identification involves looking at data on previous events, combined with **an assessment of vulnerability** based on population size and also the level of economic development.

Following a disaster, there is a need for humanitarian aid, which is where the International Red Cross and Red Crescent movement would act to support individuals and communities affected.

[Download full PPT here]

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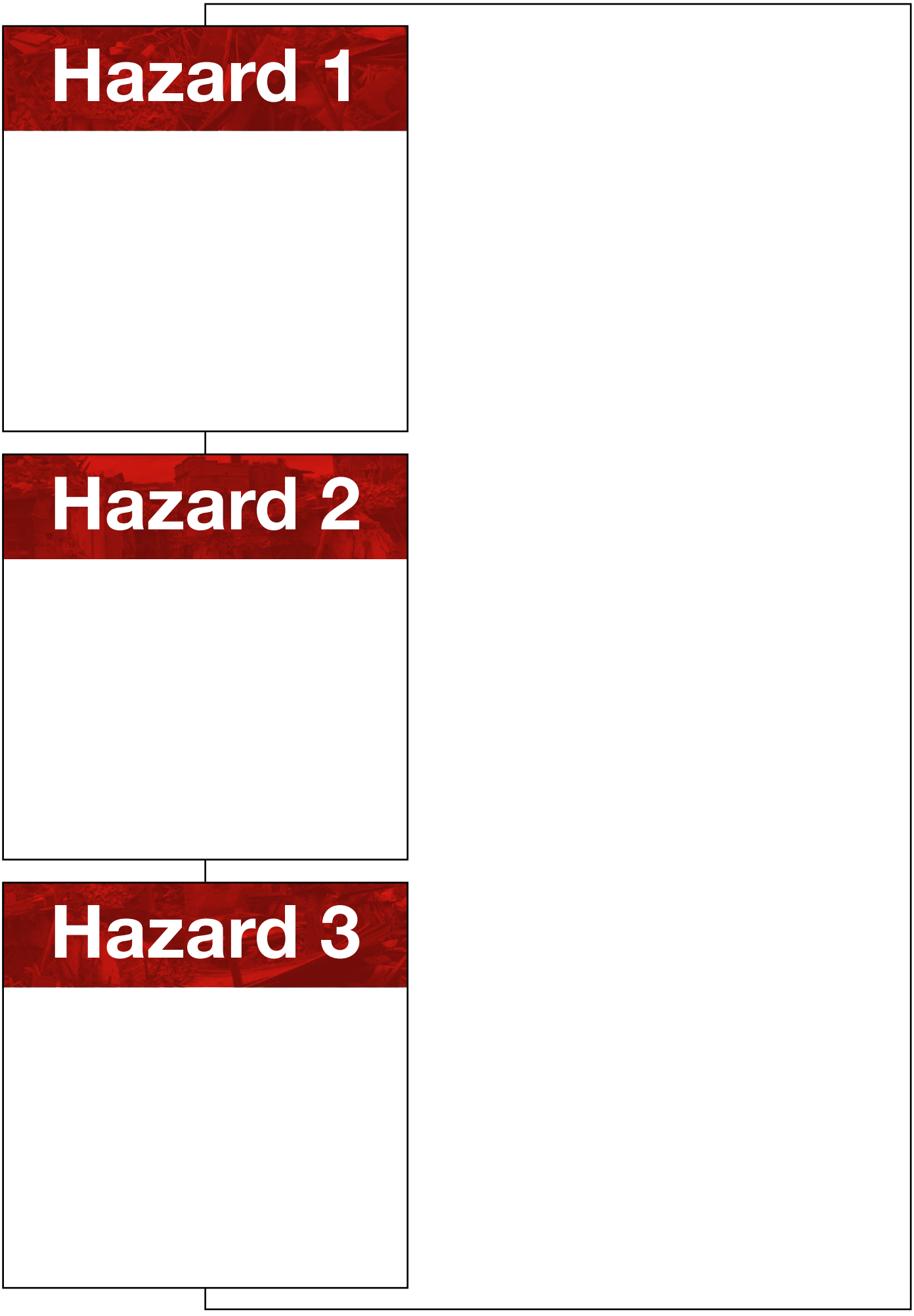

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