

# **GEOG 306: Human Dimensions of Natural Hazards**

(Winter 2017)

Department of Geography, University of Waterloo

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Class Hours: 11:30-12:50 T/Th

Classroom: B1 271

Office Hours: Tuesdays 1:30-3:30

## **COURSE DESCRIPTION**

### **Calendar Description**

This course will investigate the human dimensions of the global experience with natural hazards and associated disasters. The physical nature of a wide range of geophysical and biophysical hazards will be explored, paying particular attention to: the ways in which hazards become dangerous to humans, and the pathways by which humans can either increase or decrease their vulnerability in the face of natural hazards.

### **Overview**

Natural hazards and associated disasters are, in part, a product of inappropriate human modifications or management of the natural landscape. In a decade in which the human dimensions of natural hazards are becoming increasingly recognized, (e.g. Both Haiti's 2010 and Nepal's 2015 earthquake saw heavy casualties due in large part to poor building standards, and damages from both the 2011 Japan earthquake/tsunami and the 2013 Typhoon Haiyan disaster in the Philippines have been linked to inadequate coastal zone planning), it is appropriate that this course focus on the ways in which humans increase or decrease the risks posed by natural hazards.

This course investigates the human dimensions of the global experience with natural hazards and associated disasters. The physical nature of a wide range of geophysical and biophysical hazards are first explored, paying particular attention to: the ways in which hazards become dangerous to humans, and the pathways by which humans can either increase or decrease their vulnerability in the face of natural hazards. The course will then examine how humans adjust to the presence of hazard and disaster, with a particular concentration on disaster preparedness, disaster risk reduction and hazard mitigation. Throughout the course, case studies and examples drawn from countries and regions around the world will be used to clarify conceptual and methodological issues. Through assignments and in-class participation, students are encouraged to explore hazards and world regions of personal interest.

### **Course Learning Objectives:**

1. To understand conceptual & methodological frameworks for the examination of natural hazards
2. To explore and understand common human dimensions of natural hazards, disasters & disaster risk reduction
3. To clarify the relative risks posed by different types of natural hazards
4. To appreciate newly-emerging trends in natural hazards knowledge, planning & disaster risk reduction
5. To illuminate & contrast natural hazards & disaster risk reduction theory with real-world case studies & applied risk reduction planning exercises.

## Texts:

1. Smith, K. 2013. Environmental Hazards: Assessing Risk and Reducing Disaster. 6th edition, Routledge: New York, ISBN 978-0-415-68106-3. <https://www.routledge.com/products/9780415681063>

### **Where to buy:**

- UW Bookstore (South Campus Hall): Soft cover copy (\$88)
  - Amazon.ca (\$65 used)
  - FESD Used Bookstore (\$70)
  - Kindle edition (\$72)
2. Clinton, W.J. 2006. Key propositions for Building Back Better. Office of the UN Secretary General's Special Envoy for Tsunami Recovery. (PDF file posted on LEARN or download from: [www.preventionweb.net/files/2054\\_VL108301.pdf](http://www.preventionweb.net/files/2054_VL108301.pdf) )

## Course Evaluation

Your final mark will be determined on the basis of 2 tests + 2 assignments. There is no final exam.

1. **Test #1** (25%): Feb. 7th – short answer format
2. **Assignment #1** (25%): Feb. 28<sup>th</sup>
3. **Test #2 (25%)**: Mar.30th – M/C + documentary-based short answer questions
4. **Assignment #2:** (25%) Apr. 3

## Grading

Numeric grades on a scale from 0-100 are used in grading all tests and assignments at the University of Waterloo. The following list will give you an idea of the basis upon which numeric grades are assigned:

<b>90-100%:</b>	Work that shows a high level of initiative and is clearly above and beyond what is expected at a third year level. Referencing, style, grammar/spelling, content and the development of ideas are all superior.
<b>80-89%:</b>	Work that shows good initiative and is above what is expected at a third year level. Referencing, style, grammar/spelling, content and the development of ideas are all good.
<b>70-79%:</b>	Work that shows initiative and is about what is expected at a third year level, but one or more problems are evident in referencing, style, grammar/spelling, content and/or the development of ideas.
<b>60-69%:</b>	Work that does not demonstrate initiative, has a series of problems in referencing, style, grammar/spelling, content and/or the development of ideas, and overall, does not fully convince the reader that the topic has been well considered
<b>50-59%:</b>	Work that is substandard/sloppy in places, has many problems in referencing, style, grammar/spelling, content and/or the development of ideas, and overall, raises more questions in a reader's mind than the work answers.
<b>40-49%:</b>	Work that is of consistently poor quality, demonstrates gaps in comprehension of the assigned material, and/or indicates that not enough time was taken to properly address the assignment
<b>&lt;40:</b>	Work that is clearly of poor quality, demonstrates a lack of comprehension of the assigned material, shows little attempts at a personal development of ideas or efforts to back up arguments with suitable evidence, and/or indicates that the work was completed 'at the last minute'. Possibly contains plagiarized material.

## Assignment #1 (25%): Analysis of Hazard Mitigation/Disaster Risk Reduction (due Feb. 24<sup>th</sup>)

**Summary:** 6-10page (excluding diagrams, photos, maps, etc) “short report” which could be delivered to elected officials who will make decisions on hazard mitigation & disaster risk reduction.

### Length:

Individual (6 pages maximum + bibliography) **OR**, “Pair/team” (10 pages maximum + bibliography). 1.5 space, 12 font

You will choose a “region” (e.g. city, island, portion of a country) which has been hit by one or more major hazards producing an associated disaster(s). After outlining the major hazard(s) facing that region, you will outline efforts at hazard mitigation/disaster risk reduction. Make sure you choose a region for which there is enough information to complete the assignment (for example, there are many regions that have been hit by disaster yet have carried out little to no hazard mitigation/DRR).

The report should be understandable to someone with no prior knowledge of your specific hazard(s) & region and should be written in clear, concise language and using appropriate headings and sub-headings to guide the reader. By the end of your report you should identify possible ways that hazard mitigation/DRR can be strengthened in your region.

## Components

- 1. Introduction/overview of paper** \_\_\_\_\_ /10
  - provides succinct introduction & identifies the region you are studying
  - a brief overview of the structure of your paper (basically, a ‘road map’ for the reader so they know what to expect first, second, third, etc).
  
- 2. Main hazards affecting the region** \_\_\_\_\_ /20
  - most damaging 1-3 natural hazard(s) affecting the region identified?
    - appropriate evidence?
  
- 3. Description of ‘hazard mitigation/disaster risk reduction’ efforts in community/region** \_\_\_\_\_ /25
  - what forms of mitigation/DRR have been attempted?
  - how successful has mitigation/DRR been in reducing hazard risks?
  
- 4. Recommendations** \_\_\_\_\_ /25
  - Gaps in current mitigation/DRR efforts
  - Plausible recommendations (using information for GEOG 306/textbook, how should government officials & mitigation planners proceed)?
  
- 5. Bibliography + Citations** \_\_\_\_\_ /10
  - minimum 10 sources & balance of materials (i.e. online sources, books, reports, journal articles, etc)
  
- 6. Style** \_\_\_\_\_ /10
  - sentence construction
  - grammar
  - logic
  - overall appearance (including ‘readability/accessibility’) of paper
  - heading & subheadings
  - appropriate length
  
- 7. Team Report Statement (not needed for individual reports):** a brief explanation of “who did what” (team reports only)

## **Assignment #2: Briefing Note: Building Back Better after disaster (Due: April 3rd)**

**SUMMARY:** Research-based short summary of how the build back better concept was applied to post-disaster reconstruction.

**Length:**

Individual (6 pages maximum + bibliography) **OR** “Pair/team” (10 pages maximum + bibliography) 1.5 space, 12 font

Imagine you have been hired to brief a senior government official (e.g. Minister or even Prime Minister) on post-disaster reconstruction for a particular disaster. This individual does not have time to read through an extended report, so is depending on you to both do rigorous research and then communicate your results in a clear, brief format. In short, a “briefing note”! Each piece of evidence you provide in your briefing note must be referenced with a bracketed number (e.g. “(2)”) which connects to your bibliography.

This assignment requires you to carry out online, library and journal-based research on the use of the ‘build back better’ concept applied to a single disaster. You will gather evidence on a number of required themes (see below) and then present these as an extended table (i.e. a referenced, bullet point listing comparing various aspects of the build back better concept applied to a case study). You will write a brief introduction which outlines both your disaster and your overall ‘thesis’ or ‘argument’, and after the table you will write a brief summary analysis of your table followed by a conclusion.

**NOTE: You must also fill out, sign and attach an “Assignment Checklist” (attached to this syllabus)**

### **Components**

**1. Introduction & overview of briefing note (paragraph form)** \_\_\_\_\_ /10

-including overall ‘thesis/main argument’ (i.e. a statement which somehow connects the build back better concept and ‘your disaster’.

-a brief overview of the structure of your briefing note (basically, a ‘road map’ for the reader so they know what to expect first, second, third, etc).

**2. Build back better (paragraph form):** \_\_\_\_\_ /10

-explain to the reader what the ‘build back better’ concept refers to (i.e. in a post-disaster reconstruction context)

**3. Description of the disaster** \_\_\_\_\_ /20

3a. Description of the hazard event (10 marks):

E.g.: intensity, magnitude, duration, geographic extent, complexity, secondary hazards, etc

3b. Summary of Impacts (10 marks)

E.g.: deaths, injuries, displacements, infrastructure damages, economic damages, etc

**4. Post-disaster reconstruction which is guided by the “build back better” concept** \_\_\_\_\_ /30

This may include, but is not necessarily limited to:

- Physical reconstruction (e.g. roads, housing, infrastructure, protective structures, neighbourhoods, etc)
- Socioeconomic ‘reconstruction’ (e.g. hazard awareness & education programs, community initiatives, businesses & livelihoods restoration, participatory planning, new governance mechanisms, etc)
- Ecological reconstruction (e.g. reforestation, wetlands rehabilitation, dune reconstruction)
- Other (there are many, many other possibilities!)

**6. Conclusion:** speculate on the extent to which the BBB initiatives reduce risks of future disaster\_\_ /10

**7. Style & Professionalism** \_\_\_\_\_ /10

**8. Bibliography:** minimum 10 sources & balance of materials \_\_\_\_\_ /10

(i.e. online sources, books, reports, journal articles, etc)

**9. Assignment Checklist** \_\_\_\_\_ 5 marks deducted if not included

**10. Team Report Statement (not needed for individual reports):** a brief explanation of “who did what” (team reports only)

### Assignment Checklist – Individual submissions

The following student signed Checklist was developed by the Secretariat as a means of emphasizing the importance of attribution of referenced work and reducing plagiarism. It is not official, but you are free to use it if you wish. It appeared in a publication from the CTE office.

#### Assignment Checklist

Please read the checklist below following the completion of your assignment. Once you have verified these points, hand in this signed checklist with your assignment.

1. I have referenced and footnoted all ideas, words or other intellectual property from other sources used in the completion of this assignment.
2. I have included a proper bibliography, which includes acknowledgement of all sources used to complete this assignment.
3. This assignment was completed by my own efforts and I did not collaborate with any other person for ideas or answers.
4. This is the first time I have submitted this assignment or essay (either partially or entirely) for academic evaluation.

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Print Name: \_\_\_\_\_ UW-ID# \_\_\_\_\_

## COURSE AND UNIVERSITY POLICIES

### **Attendance**

Attendance in class is at your discretion. However, there is often extra content in the notes displayed in class vs. the notes posted on the course webpage (E.g. discussion points or questions asked of the class, graphics-heavy images such as maps or diagrams), and all in-class discussions are valid “testable” materials. Also, all A/V materials (e.g. DVDs screened in class) are valid, “testable” materials, so complete notes should be taken for each DVD screened. For these reasons, attendance at each lecture is HIGHLY RECOMMENDED.

### **Missed Test:**

All tests are mandatory, and thus, every effort should be made to attend each test. The only exceptions to this are those students who have a valid medical reason, personal or family emergency, etc:

1. Valid medical reason such as illness or accident (appropriate proof such as a Doctor’s note is required);
2. Personal or family emergency, death in the family, etc (with suitable proof where possible);
3. Other valid reasons beyond the control of the student (to be approved on a case-by-case basis at the discretion of the instructor). If you know in advance that you will not be able to make a test, please contact the instructor as far in advance as possible to discuss alternatives.

### **If you miss a test for any reason:**

- 1) Communicate to the instructor the reason you missed the quiz.
- 2) IMPORTANT! As soon as possible, please obtain a valid medical, counselor’s or other ‘proof of absence’ note explaining the reason for your absence, degree of incapacitation, dates covered by the note, etc. Please make a copy of this note and give the copy to your instructor by hand or scanned and sent by email (email to [bdoberst@uwaterloo.ca](mailto:bdoberst@uwaterloo.ca) ).

**If you miss a test but do NOT have a doctor’s/counselor’s note or other valid explanation for your absence:** Explain the reason for your absence to the instructor (ideally during a help session or by email). The instructor will determine on a case-by-case basis whether an alternative arrangement can be made, or whether to assign a ‘zero’ on the test.

### **Note for students with disabilities:**

The student AccessAbility Services (AAS) office, located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AAS at the beginning of each academic term.

### **Religious Observances:**

Please inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and tests.

### **Academic Integrity:**

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [www.uwaterloo.ca/academicintegrity/](http://www.uwaterloo.ca/academicintegrity/). Students who are unsure what constitutes an academic offence are requested to visit the on-line tutorial at: <http://www.lib.uwaterloo.ca/ait/>

A student is expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about “rules” for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline, <http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm>

Within The Faculty of Environment, those committing academic offences (e.g. cheating, plagiarism) will be placed on disciplinary probation and will be subject to penalties which may include a grade of 0 on affected course elements, 0 on the course, suspension, and expulsion.

Students who believe that they have been wrongfully or unjustly penalized have the right to grieve; refer to Policy #70, Student Grievance, <http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm>

### **Appeals:**

A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 – (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals) [www.adm.uwaterloo.ca/infosec/Policies/policy72.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm)

### **Consequences of Academic Offences:**

ENV students are strongly encouraged to review the material provided by the university’s Academic Integrity office (see: <http://uwaterloo.ca/academicintegrity/Students/index.html> ).

### **University Policies: Plagiarism**

Please familiarize yourself with the University of Waterloo’s policy dealing with plagiarism. Be especially careful when using materials obtained from the internet, and be aware that software available to instructors can be used to check student submissions for plagiarism (e.g. www.Turnitin.com). Plagiarism offences are normally treated quite seriously by the University and can result in significant penalties being assessed (e.g. failing grade on an assignment, repeating a course, suspension or expulsion).

#### ***Definition of Plagiarism***

*“The act of presenting the ideas, words or other intellectual property of another as one's own.”*

- Source: University of Waterloo, Policy 71.

#### **To Avoid Plagiarism**

The use of other people’s work **must** be properly acknowledged and referenced in all written material such as take-home examinations, essays, laboratory reports, work-term reports, design projects, statistical data, computer programs and research results. The properly acknowledged use of sources is an accepted and important part of scholarship. Use of such material without complete and unambiguous acknowledgement, however, is an offence under policy 71.

### **Group Work**

All tests in GEOG 306 are to be completed individually. Group work/collaboration is allowed on both assignments.

### **Unclaimed Assignments**

Unclaimed assignments will be retained until one month after term grades become official in quest. After that time, they will be destroyed in compliance with UW's [confidential shredding procedures](#).

### **Course Notes: Information for Students Using Desire to Learn (course webpage for Geog 306)**

Desire to Learn or LEARN is a web-based course management system that enables instructors to manage course materials (posting of lecture notes etc.), interact with their students (drop boxes for student submissions, on-line quizzes, discussion boards, course e-mail etc.), and provide feedback (grades, assignment comments etc.). The degree to which LEARN is utilized in a particular course is left to the discretion of the instructor and therefore, you may find a large variance in how LEARN is being used from course to another.

### **Logging Into LEARN**

Users can login to LEARN via:

<http://learn.uwaterloo.ca/> (using your WatIAM/Quest username and password)

### **Checking Your Userid and Password**

Your password can be checked by going to: <https://watiam.uwaterloo.ca/idm/user/login.jsp>

If you still can not get on after checking your password, please confirm with your instructor that you are on the class roster. Only students with courses using LEARN will have access to the site.

### **Getting Help**

A LEARN student guide can be found at:

[http://av.uwaterloo.ca/uwace/training\\_documentation/student\\_index.html](http://av.uwaterloo.ca/uwace/training_documentation/student_index.html)



## Lecture Schedule:

(Note: the dates topics are covered are approximate and are subject to minor changes)

Week	Topics Covered	READINGS
WEEK 1 (Jan 3, 5)	INTRODUCTION -Introduction & course overview -Definitions, hazard/risk/disaster, hazard research -Hazard typology	Ch. 1 (pgs. 3-14)
WEEK 2 (Jan 10, 12)	CONTEXT: HAZARDS & DISASTER RISK REDUCTION -From Hazard to Disaster -Protection vs. Mitigation vs. Adaptation (p.98/Fig. 5.3) -DRR Toolkit Part 1 & 2	Ch. 2 Ch. 5
WEEK 3 (Jan 17, 19)	THE PHYSICAL NATURE OF TECTONIC HAZARDS: -Earthquakes -Tsunamis	Ch. 6
WEEK 4 (Jan 24, 26)	THE PHYSICAL NATURE OF TECTONIC HAZARDS (CONTINUED) -Volcanoes -Mt. Merapi, Indonesia case study	Ch. 7
WEEK 5 (Jan. 31, Feb.2)	THE PHYSICAL NATURE OF MASS MOVEMENT HAZARDS -Documentary #1: "Where Heaven meets Hell" -Mass Movement Hazards : part 1(Landslides)	Ch. 8
WEEK 6 (Feb 7, 9)	<b>Test #1 (Mon. Feb. 8) short answer format</b> -Documentary #2: <i>Sandy - Anatomy of a Superstorm</i>	
WEEK 7 (Feb 14, 16)	-Mass Movement Hazards: part 2 (Avalanches, Erosion) THE PHYSICAL NATURE OF SEVERE WEATHER HAZARDS -Cyclonic storms	Ch. 9
<b>WEEK 7 READING WEEK</b>	<b>Reading Week (Feb. 20<sup>th</sup>-24<sup>th</sup>)</b> <b>No Classes</b>	
WEEK 8 (Feb.28, Mar 2)	- <b>Assignment #1 due: Feb. 28 (via LEARN Dropbox)</b> THE PHYSICAL NATURE OF SEVERE WEATHER HAZARDS -Extreme Weather (e.g. winds, heat, lightning, etc) THE PHYSICAL NATURE OF BIOPHYSICAL HAZARDS -Wildfire	Ch. 10 (p. 268-272 & p.286-298)
WEEK 9 (Mar 7, 9):	THE PHYSICAL NATURE OF HYDROLOGICAL HAZARDS -Hydrological hazards (Floods) - <i>Documentary #3: "Water's Edge"</i>	Ch. 11
WEEK 10 (Mar 14, 16):	-Hydrological hazards (Drought) - <i>Documentary #4: "God's Tears"</i>	Ch. 12
WEEK 11 (Mar 21, 23)	BEFORE & AFTER DISASTER -Paradigms of hazard (incl. "Unnatural Hazard" and "Build Back better") -After a disaster: the cycle of response	Ch. 1 (pgs. 14-22) Ch. 2 (review)
WEEK 12 (Mar 28, Mar 30)	-Climate change & hazards connections -Disasters and displacement - <b>Test #2 (Wed Mar.30th) MC format + Documentary-based short answer questions</b>	Ch. 14
April 4	- <b>Assignment #2 due: Wed Apr.6<sup>th</sup> (online submission via LEARN dropbox)</b>	

## Useful Hazard & Disaster links

### **Realtime Disaster Monitoring & Event Reporting:**

<http://reliefweb.int/disasters>  
<http://earthobservatory.nasa.gov/NaturalHazards/>  
<http://www.emdat.be/disaster-week>  
<http://www.usgs.gov/hazards/>  
<http://earthquake.usgs.gov/earthquakes/map/>  
<http://www.disastercenter.com>

### **Hazards/Disasters Journals (NOTE: must be connected as a UW user for free access)**

Disasters <http://www.blackwellpublishing.com/journal.asp?ref=0361-3666&site=1>  
Disaster Management and Response [www.sciencedirect.com/science/journal/15402487](http://www.sciencedirect.com/science/journal/15402487)  
Disaster Prevention & Management  
<http://www.emeraldinsight.com/Insight/viewContainer.do?containerType=Journal&containerId=10806>  
Environmental Hazards [http://elsevier.net/wps/find/journaldescription.cws\\_home/706537/description](http://elsevier.net/wps/find/journaldescription.cws_home/706537/description)  
Int. Jour. Of Mass Emer. And Disasters <http://www.usc.edu/schools/sppd/ijmed/cumulative.php>  
Jour. Of Emergency Management <http://www.pnpco.com/pn06001.html>  
Natural Hazards <http://www.springerlink.com/content/0921-030X>  
Natural Hazards and Earth Systems Sciences  
[http://www.nat-hazards-earth-syst-sci.net/volumes\\_and\\_issues.html](http://www.nat-hazards-earth-syst-sci.net/volumes_and_issues.html)  
Natural Hazards Observer <http://www.colorado.edu/hazards/o/>  
Natural Hazards Review <http://scitation.aip.org/nho>  
Global Environmental Change  
[http://www.elsevier.com/wps/find/journaldescription.cws\\_home/30425/description#description](http://www.elsevier.com/wps/find/journaldescription.cws_home/30425/description#description)

### **Hazards Research Centres**

<http://www.colorado.edu/hazards/>  
<http://www.benfieldhrc.org/>  
<http://www.cas.sc.edu/geog/hrl/>  
<http://www.aoml.noaa.gov/hrd/>  
<http://www.ihc.fiu.edu/>

### **Latin America/Caribbean**

[http://www.disaster-info.net/socios\\_eng.htm](http://www.disaster-info.net/socios_eng.htm)  
<http://www.cdema.org/>  
<http://www.eird.org/index-eng.htm>

### **Asia/Pacific**

<http://www.adpc.net/>  
<http://www.pdc.org/iweb/pdchome.html>  
<http://www.unisdr.org/asiapacific/asiapacific-index.htm>  
<http://www.adrc.or.jp/top.php>

### **Africa**

<http://www.unisdr.org/africa/africa-index.htm>  
<http://www.irinnews.org/webspecials/DR/ISDR-Map-African-Natural-Hazards.pdf>

**Canada**

<http://www.publicsafety.gc.ca/prg/em/cdd/index-eng.aspx>

[http://ess.nrcan.gc.ca/2002\\_2006/nher/index\\_e.php](http://ess.nrcan.gc.ca/2002_2006/nher/index_e.php)

**USA**

<http://www.fema.gov/>

<http://www.bt.cdc.gov/disasters/>

**Hazard Mitigation & Disaster Reduction**

<http://www.fema.gov/plan/mitplanning/index.shtm>

<http://www.unisdr.org/>

<http://www.ibhs.org/>

<http://www.iclr.org/>

<http://www.gdrc.org/uem/disasters/disenvi/index.html>

**Other links**

<http://www.disasterlinks.net/>

<http://www.intute.ac.uk/sciences/hazards/>

**Disaster simulation games**

<http://www.stopdisastersgame.org/en/>

<http://insidedisaster.com/haiti/experience>

<http://environment.nationalgeographic.com/environment/natural-disasters/forces-of-nature/>