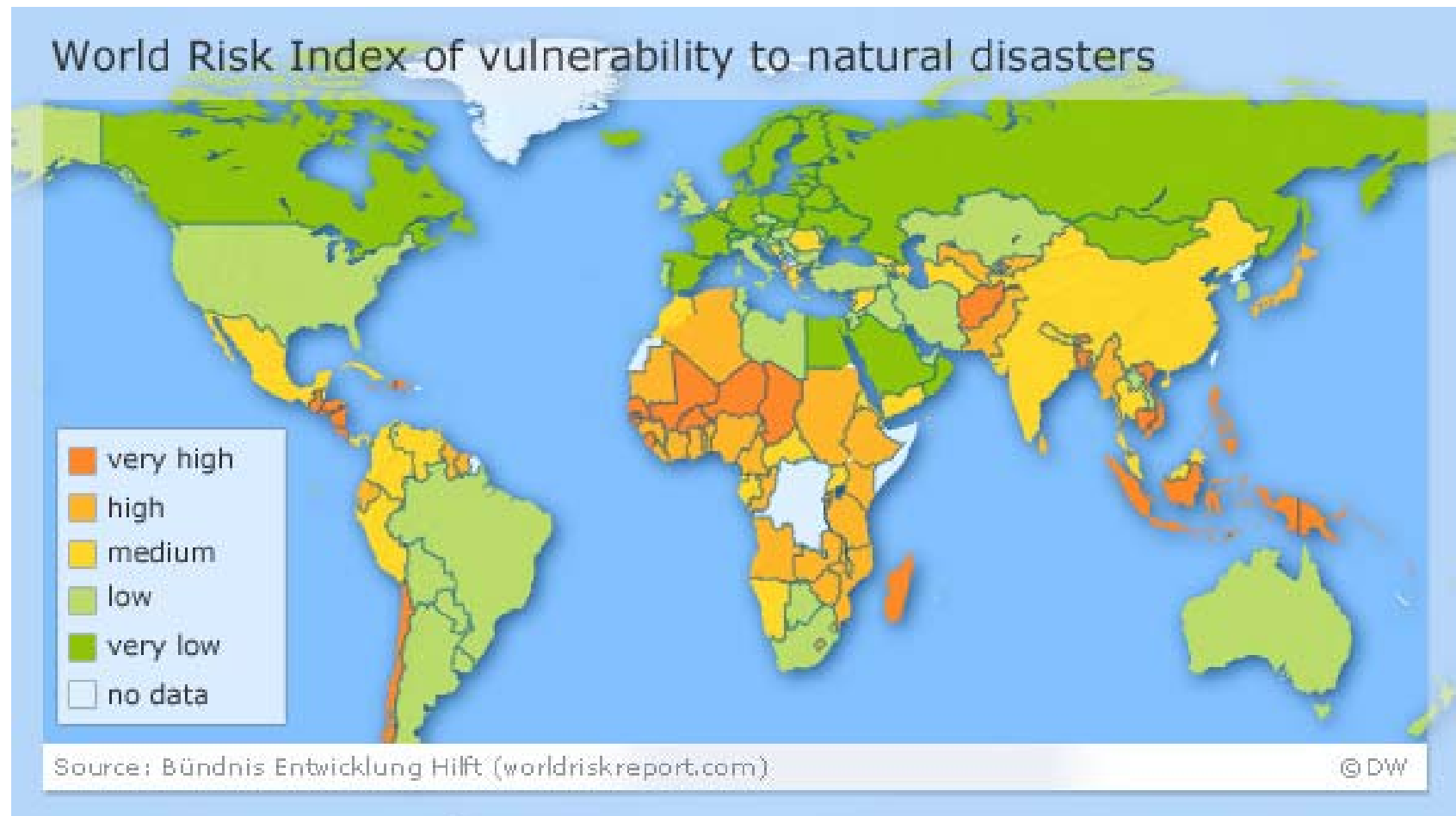


Fragile System Part Deux



Lecture 3 - Risk!

Final Exam

Wednesday December 11th 3:30pm, SRC Gym

~100 multiple choice questions, covering all topics, slight emphasis on Impacts

1.5 hours Individual, 1 hour Group

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Learning Goals

- Estimate your risk of death for various disasters
- Describe what a micromort is and what it is used for
- List what belongs in a disaster kit
- Determine what to do in the event of a disaster – your disaster plan
- Figure out where your Final Exam is

Estimating Risk

What things would you need to know in order to estimate the risk of a particular activity?

Estimating Risk

What would you need to know?

Estimating Risk

Discuss what do you think your lifetime odds are of :

- a) Dying in an earthquake
- b) Dying in a car
- c) Dying of any cause

<https://www.youtube.com/watch?v=rHk261gXnxc&t=56s>

What might improve your odds?

Canadian Motor Vehicle Fatalities

	2020	2021
Number of fatalities	1,745	1,768
Fatalities per 100,000 population	4.6	4.7
Fatalities per billion vehicle km travelled	4.7	4.8
Fatalities per 10,000 motor vehicles registered	0.68	0.67

Depending on your 'sample population' the numbers can change

<https://tc.canada.ca/en/road-transportation/statistics-data/canadian-motor-vehicle-traffic-collision-statistics-2021>

Estimating Risk

In Groups. By area. What is the risk of.....

Your chance
seeing Mt.
Baker erupt if
you live in
Vancouver

- or being killed
by it

Left

Your chance of
being in a
hurricane
living in Florida

- or being killed
by one

Middle

Your chance
of seeing a
Tsunami if you
live in Hawaii

– or being
killed by one

Right

Estimating Risk

In Groups. By area. What is the risk of.....

Your chance
seeing Mt. Baker
erupt if you live
in Vancouver

- or being killed
by it

Your chance of
being in a hurricane
living in Florida

- or being killed by
one

Your chance of
seeing a
Tsunami if you
live in Hawaii

– or being killed
by one

What things increase the chance of survival?

Estimating Risk

What is your chance being in a megathrust earthquake if you live your whole life in Metro Vancouver?

Your chance of dying in one?

<https://globalnews.ca/news/3981536/tsunami-earthquake-canada-the-big-one/>

Who cares about the risk?

Why do we want to estimate the risk of things?

Insurance

Risk Management

Disaster management

<http://www.livescience.com/3780-odds-dying.html>

<http://rms.ubc.ca/>

Micromort

Unit of risk

1 in 1 million chance of death

Why use the micromort?

Micromort - Baseline

In Canada (2022) – 323,220 deaths in population of 39,566,248

Average lifespan is 80

Micromorts/year = 8,200

Micromorts/day = 23

Micromorts/hour = 0.82

Value placed on risk – or willingness to pay
For example, in North America

1 Micromort =(approx) \$50

<https://www.statista.com/statistics/443061/number-of-deaths-in-canada/>

<https://www150.statcan.gc.ca/n1/daily-quotidien/230322/dq230322f-eng.htm>

Activities that increase your micromorts

Activity – acute risk	Micromorts	per
Car travel	1	370 km
Plane travel	1	1600 km
Scuba diving	5-10	dive
Marathon Running	7	marathon
Skiing	0.7	day
Base-jumping	430	jump
Activity – chronic risk		
Smoking	1	1.4 cigarettes
Drinking	1	0.5 litres of wine

If I drive to Whistler, enjoy a day of skiing, have 2 glasses of red wine in the après ski, then my friend drives me home....whats my total micromort count for the day?

<https://en.wikipedia.org/wiki/Micromort>

Micromort

Useful Comparisons

https://www.youtube.com/watch?v=VLmBJ4_5eG4&t=6s

Remember – there are lots of things that change the risk!

Risk

It all comes back to risk

We need to consider it and think of better ways to visualize and understand it

How to reduce your risk?

Risk of dying in a megathrust earthquake

What can you do to reduce your risk?

What goes in a preparedness kit?



Your list?

What goes in a preparedness kit?

- Food (ready to eat, non perishable) for at least 3 days / 1 week
- Water – 4 litres per person per day – at least 3 days
- Flashlight and batteries
- AM/FM radio – hand crank or battery powered
- Medications
- Seasonal clothing
- Blanket
- Cell phone charger
- Pen and notepad
- Personal toiletries
- Small First-Aid kit
- Extra pair of glasses or contacts
- Cash in small bills
- Local map with your family meeting place identified
- Whistle

Think of children in your care and pets!

A kit at home, work, in the car???

British Columbia

EmergencyManagementBC

PEP - Provincial Emergency Program

<https://www2.gov.bc.ca/gov/content/safety/emergency-management>



<https://alpha.gov.bc.ca/gov/content/safety/emergency-management/preparedbc/build-an-emergency-kit-and-grab-and-go-bag>



PreparedBC

BASIC EMERGENCY KIT SUPPLIES

[gov.bc.ca/PreparedBC](https://www2.gov.bc.ca/gov/content/safety/emergency-management/preparedbc)



First aid kit, prescriptions and other personal items



Emergency plan, copies of important documents and cash



Garbage bags, moist towelettes and plastic ties



Battery-powered or hand-crank radio



Phone charger and battery bank



Blanket, seasonal clothing and footwear



Battery-powered or hand-crank flashlight



Non-perishable food for at least three days



Water for at least three days; four litres per person per day



Whistle

<https://www2.gov.bc.ca/gov/content/safety/emergency-management/preparedbc>

Your Disaster Plan

At home consider where your safe places in your house/apartment are

Where are the exits?

Where is your emergency kit?

Who do you need to check on (friends/family)

Where would you go to get help?

It never hurts to have a plan.....and update it as your circumstances change!

Did you like this course?

We have more!

- 1st year survey courses Open to ALL
- 2nd year Courses open to Science students
- Some 3rd year courses open to NON-Science students
- Major or Minor in EOSC, ATSC, or ENSC

First-Year Courses

(Open to all. No prerequisites. 3 Credits.)

- EOSC 110: The Solid Earth - A Dynamic Planet
- EOSC 112: The Fluid Earth - Atmos. & Oceans
- EOSC 116: Mesozoic Earth - Time of Dinosaurs
- EOSC 118: Earth's Treasures - Gold and Gems

- EOSC 111: **Laboratory** Exploration of Earth
(1 credit. When combined with any of the other 1st Year EOSC courses, it counts as a lab-based science course.)

2nd-Year Courses

Sci. Students (3 cr.)

For all:

ENVR 200: Environmental Studies I

Science only:

ATSC 201 - Meteorology of Storms

EOSC 220 - Intro to Mineralogy

EOSC 221 - Intro to Petrology

EOSC 222 - Geological Time

EOSC 223 - Field Techniques

EOSC 250 - Geophysical Fields & Fluxes

EOSC 270 Marine Ecosystems

Third-Year Courses

(Open to non-science students. No prerequisites. 3 cr.)

- EOSC 310: The Earth & the Solar System
- EOSC 311: The Earth & Its Resources
- EOSC 314: The Ocean Environment (physical)
- EOSC 315: The Ocean Ecosystem (biological)

Degree Programs

Majors Programs in EOAS

Atmospheric Science (B.Sc.)

Earth & Ocean Sciences (B.Sc.)

Environmental Sciences (B.Sc.)

Geology (B.Sc.)

Geophysics (B.Sc.)

Geological Engineering (B.A.Sc.)

Oceanography and Biology (Combined B.Sc.)

Honors Programs

Atmospheric / Computer Science (Combined)

Environmental Sciences

Geological Sciences

Geophysics

Oceanography (Fisheries)

Combined - Joint Honors

Many of our courses are geared towards professional registration (e.g. P.Geo. for APEG BC)

Great training for specific career goals or higher degrees

Want to learn more about the Earth?

For questions on any of our EOSC courses
or degrees visit:

<http://www.eoas.ubc.ca/>

Tab for Undergrads

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along if you can and ask your questions!

Final Exam

Starting Procedure: Wait outside the room until we let you in. After you are all seated, we will hand out the exams.

Put your bags and packs under your desk. Keep all bags closed. Keep pens, pencils, & eraser **and STUDENT ID** with you. Closed book. No cell phone, no calculators, no other electronics (E-watches, I'm looking at you),
Equations on last page

Ending Procedure: We will check your student IDs while you are taking the individual exam. If you finish before the time is up stay put – we have the Group exam!

The End

Thank you for being part of the class!

Good Luck with all of your exams!

