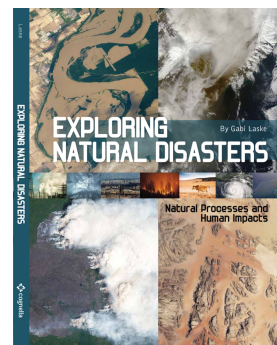


# FQ 2023



## SIO15

Natural Disasters



Course Book

## Description and Learning Goal:

This course is a general-education (GE) course on natural disasters and how they may impact our everyday lives. We explore natural disasters and the reasons why some occur more often in some areas but not in others.

Students will learn how geologically driven disasters such as earthquakes and volcanic eruptions work, how they change our environment, and why some are more catastrophic than others. The course will illuminate what it takes for an earthquake to generate a devastating tsunami, and which other processes can cause these sea waves.

Students will learn the principal mechanisms of meteorological processes, and the conditions under which extreme weather such as major storms, tornadoes and hurricanes form. What makes Tornado Alley in the middle of the U.S. so treacherous? Despite technological and scientific advances, and tornado shelters, tornadoes in this area have not become less deadly. Why is this? A different type of storm is the hurricane which forms and sustains itself under very different conditions than tornadoes. What are these? How big is a hurricane, when is hurricane season? How long in advance can we forecast a hurricane? Why do people in the U.S. still lose their lives in a hurricane? All these questions will be addressed in SIO15.

The discussion of extreme weather also includes the causes and consequences of floods, droughts, heat waves and the conditions that lead to devastating wildfires. In the last two decades, heat waves in the U.S. have often claimed more lives than tornadoes and hurricanes in the same year. Why are heat waves so deadly? Why do wildfires in California seem to grow larger and fiercer in recent years? What triggers these fires? When and how do they blast out of control? Why do some of them become so deadly?

Changes in climate also have a large impact on the biosphere. These can be short-term events such as El Niño, or long-term such as major ice ages. Climate changes, if severe enough, can cause mass extinctions. We discuss causes of climate change and mass extinctions throughout Earth's history. Are we really in the middle of Earth's 6<sup>th</sup> mass extinction, and why is this?

Finally, we explore the involvement of human activity that sometimes leads to great calamities from natural disasters, sometimes despite our collective knowledge. In fact, human activity can contribute, and sometimes even cause natural disasters. In the final lectures, we will discuss Earth's precious resources, how long it takes to build them, and how long they will last, and why it is so important to recycle and reuse.

The course has no pre-requisites. We will, however, introduce some basic principles that may look familiar from an old school physics class. Definitely not required are tough-math skills, but an interest in geography and the environment come in handy.

## Text Book:

“Exploring Natural Disasters: Natural Processes and Human Impacts” by Gabi Laske (preliminary edition). The course material presented on the class website follows the book but the book is much more comprehensive. It should be considered mandatory and is particularly helpful for freshmen and non-science students. The book is written in a simple general style that uses the same jargon scientists use, without getting too technical. The book is also useful for anyone looking for informative reading.

## Class Website, Lecture Schedule and Lecture Resources:

<https://geowiki.ucsd.edu/sio15>

The class website provides all the materials needed for this course: students will find the lecture schedule, short lecture notes that are categorized by topics, handouts for in-class note-taking, short videos on principal mechanisms relevant to each topic that may not be taught during the lectures but are nevertheless covered by the weekly for-credit tests. For each topic, the class website provides links to not-for-credit self-test quizzes for learning purposes, and to prepare for the weekly for-credit tests.

The lectures, on the other hand, will often discuss current events to relate the sometimes rather dry material on mechanisms to real-world example that happen ‘now and here’. Before each lecture is given, the most up-to-date version of the lecture slides can be downloaded from the class website.

The class website is open to anyone who looks for a bit of information on natural disasters, even long after the formal teaching at UCSD is over. Because of this open access, we do not store any information on students other than voluntary contributions to the SIO15 student ‘eyewitness story’ page.

And finally, the class website provides homework files and videos to help complete the homework assignments.

## Lectures – Canvas:

Lectures are held by Prof. Gabi Laske  
MWF 3:00 – 3:50 pm  
Lecture Hall: York 2722



Logistical info, announcements and access to restricted items (such as homework submission, for-credit tests and grades) will be given be through the UCSD Canvas course site. The lectures will be recorded via UCSD podcast for asynchronous/remote learning.

## Contact Information:

Gabi Laske (858) 534-8774, [glaske@ucsd.edu](mailto:glaske@ucsd.edu), Canvas

Email is the best way to communicate. Please add “SIO15” to your subject lines, using your UCSD email account and sign with your full name. Please do not use your private email addresses.

## Teaching Assistants:

Six teaching assistants will help us navigate through the quarter. They will help moderate the lectures. They will also be responsible for grading the homeworks.

TBD

TBD

TBD

TBD

TBD

## Homeworks and Tests – Student Assessment:

Cumulative grades are based on **weekly homeworks** and tests. Homeworks are due on Tuesdays. The homeworks will include an assignment completed during a virtual field trip to the SIO beach in November. No late homework will be accepted.

**Weekly for-credit tests** will be taken through **Canvas** and to be completed every Monday. Tests cover material of the previous week, including book chapters, lecture notes, short videos and homeworks (from the most recently released answersheet).

**Not-for-credit** self-test quizzes are accessible through the class website. They will not be monitored and are for studying purposes only. These quizzes can be taken as often as desired. It is highly recommended to use these quizzes to prepare for the for-credit tests on Canvas.

Random in-class polling may be done via Zoom or similar. These may or may not provide the opportunity for extra credits.

## Grading:

Each homework and for-credit test will contribute equally to the total cumulative of 100 points. Please consult the **grade scale** page on the class website (“Grades” tab on the navigation bar) for the letter grade map.

## Gradescope:

Please register at Gradescope.com using your full name, UCSD student ID and UCSD email address. Use the course entry code is posted on the geowiki class website under the “Grades” tab. Registration will ensure that your assignments are properly graded, that you receive the credit and that you can check your graded homeworks.

## Field Trips:

There will be a virtual field trip to the SIO Beach. Alternatively, we will offer a few in-person trips. Please check the class website for info. This trip is a MANDATORY homework assignment.

## Academic Integrity:

Students are encouraged to work together on homeworks but each student must write a unique homework, i.e. no copying allowed. Tests are open-book but must be taken in by each student in isolation. Homeworks and tests in violation of UCSD policy on academic integrity will receive 0 points.

## **Submit your personal experience:**

Natural disasters may have affected many of us. You are encouraged to discuss these in the weekly discussion sessions. In addition, you can submit stories and photos to the SIO15 student 'eyewitness story' page on the class website (submit to Prof. Laske by email).