

Instructors: William Frank and Heidi Houston  
Office: ZHS 103 (William) and ZHS 101 (Heidi)  
Office Hours: Tu 8:30-9:30PM (William) and We 4-5PM (Heidi)  
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### Course Description

We will explore our modern understanding of subduction zones from an interdisciplinary perspective. The class will consist of a series of discussions on recent and classic scientific papers as well as lectures on outstanding scientific questions related to subduction zones. The class will emphasize the mechanics of how tectonic motion is accommodated by transient slip along the subducting plate interface. We will also discuss the dynamics of subduction volcanic arcs.

### Learning Objectives

At the end of the course, students will be able to:

- critically read, analyze and discuss scientific papers, the main currency of modern science
- provide an interdisciplinary perspective on subduction zones, which are sites of the largest and most devastating earthquakes globally
- understand the current scientific challenges in studying tectonic motion at subduction zones, including the megathrust earthquake cycle

### Required Reading

A selection of scientific papers outlined below in the weekly course schedule. Students will be expected to read 2 to 4 papers per week.

### Class format

Each 2-hour class will start with a 1-hour discussion of the scientific papers assigned for reading. Each discussion will be led by a pair of students. Following the discussion and a short break, we will then have a 50-minute lecture on the topic of the following week's reading.

### Evaluation

The students will be evaluated on their participation during discussions every week, the discussion that they will lead, and a presentation on a topic (and associated papers) of their choice. All students will then submit a short paper on their topic at the end of the course.

### Grade breakdown

- 15% — participation
- 42.5% — student-led discussion and presentation
- 42.5% — paper on research project

Rough draft

Doing well in the class

Students will be expected to critically read the scientific papers assigned every week and to participate in the discussions.

## Weekly Course Schedule

	Monday	Sampling of readings
Week 1	Jan 13: Discovering the hazard of a subduction zone	Heaton and Hartzell, Atwater
Week 2	Jan 20 (MLK day)	
Week 3	Jan 27: How to read a scientific paper	Mack
Week 4	Feb 3: How we observe plate motion	Métois et al.
Week 5	Feb 10: Subduction zone seismicity	Brudzinski et al.
Week 6	Feb 17 (Pres. Day)	
Week 7	Feb 24: Brittle-to-ductile transition	Byerlee, Gao and Wang
Week 8	Mar 2: Slow slip and tremor	Obara, Rogers and Dragert
Week 9	Mar 9: Friction on the plate interface	Fulton et al., Hardebeck
Week 10	Mar 16: Fluids in subduction zones	Audet et al.
Week 11	Mar 23: M9.1 Tohoku earthquake	Kato et al., Lay et al.
Week 12	Mar 30: Plate geometry, age and roughness	Wang and Bilek
Week 13	Apr 6: Mantle convection	Conrad and Lithogow-Bertelloni, Crameri et al.
Week 14	Apr 13: Volcano dynamics	John et al.
Week 15	Apr 20: Student presentations	
Week 16	Apr 27: Student presentations	

## Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

## Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call  
studenthealth.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call  
suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention and Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call  
studenthealth.usc.edu/sexual-assault

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED)- (213) 740-5086 | Title IX – (213) 821-8298  
equity.usc.edu, titleix.usc.edu

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations. The university also prohibits sexual assault, non-consensual sexual contact, sexual misconduct, intimate partner violence, stalking, malicious dissuasion, retaliation, and violation of interim measures.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298  
usc-advocate.symplicity.com/care\_report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776

[dsp.usc.edu](http://dsp.usc.edu)

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710

[uscsa.usc.edu](http://uscsa.usc.edu)

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101

[diversity.usc.edu](http://diversity.usc.edu)

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

[dsp.usc.edu](http://dsp.usc.edu), [emergency.usc.edu](http://emergency.usc.edu)

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call

[dsp.usc.edu](http://dsp.usc.edu)

Non-emergency assistance or information.