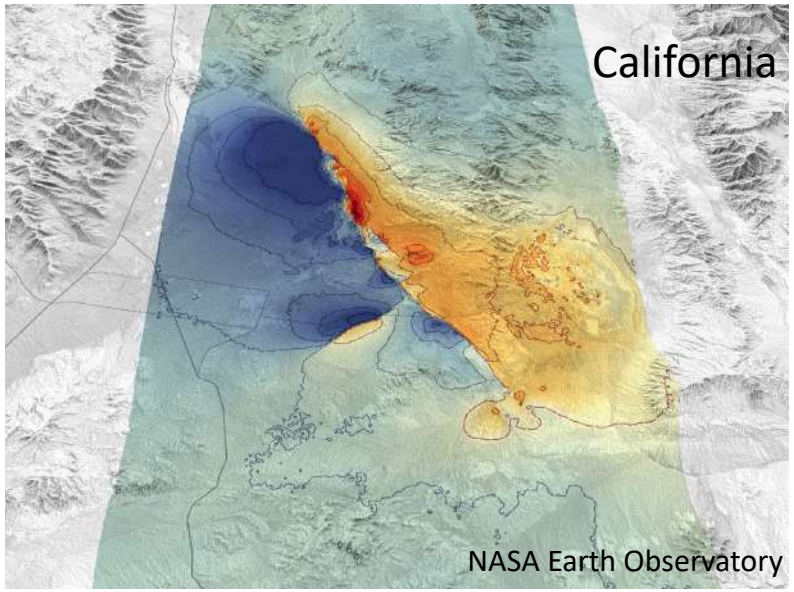
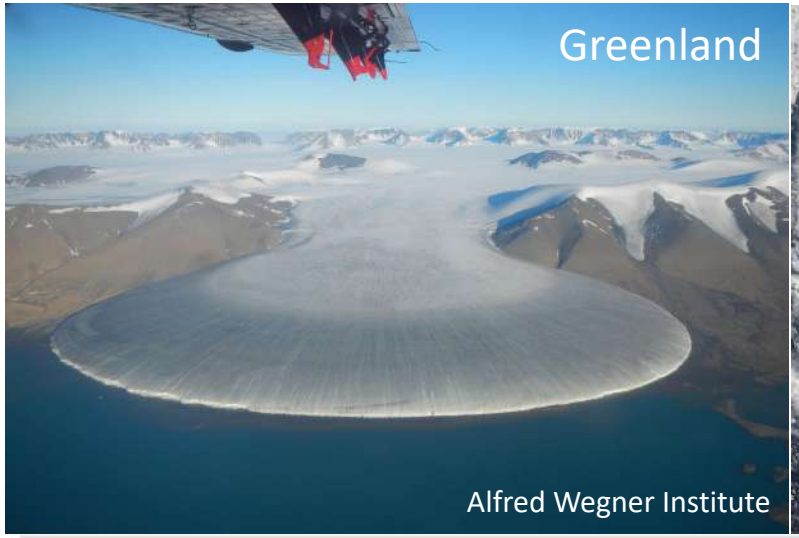
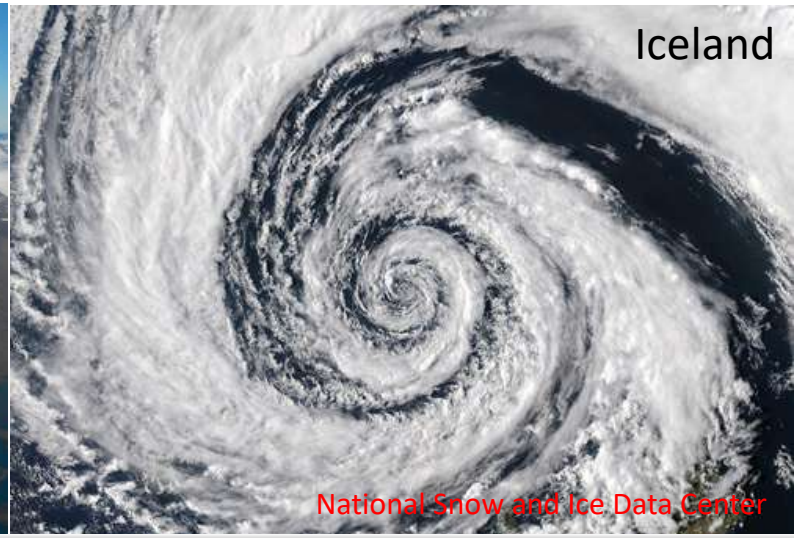
GEO 325C/398C Continuum Mechanics

Taught hybrid if needed!







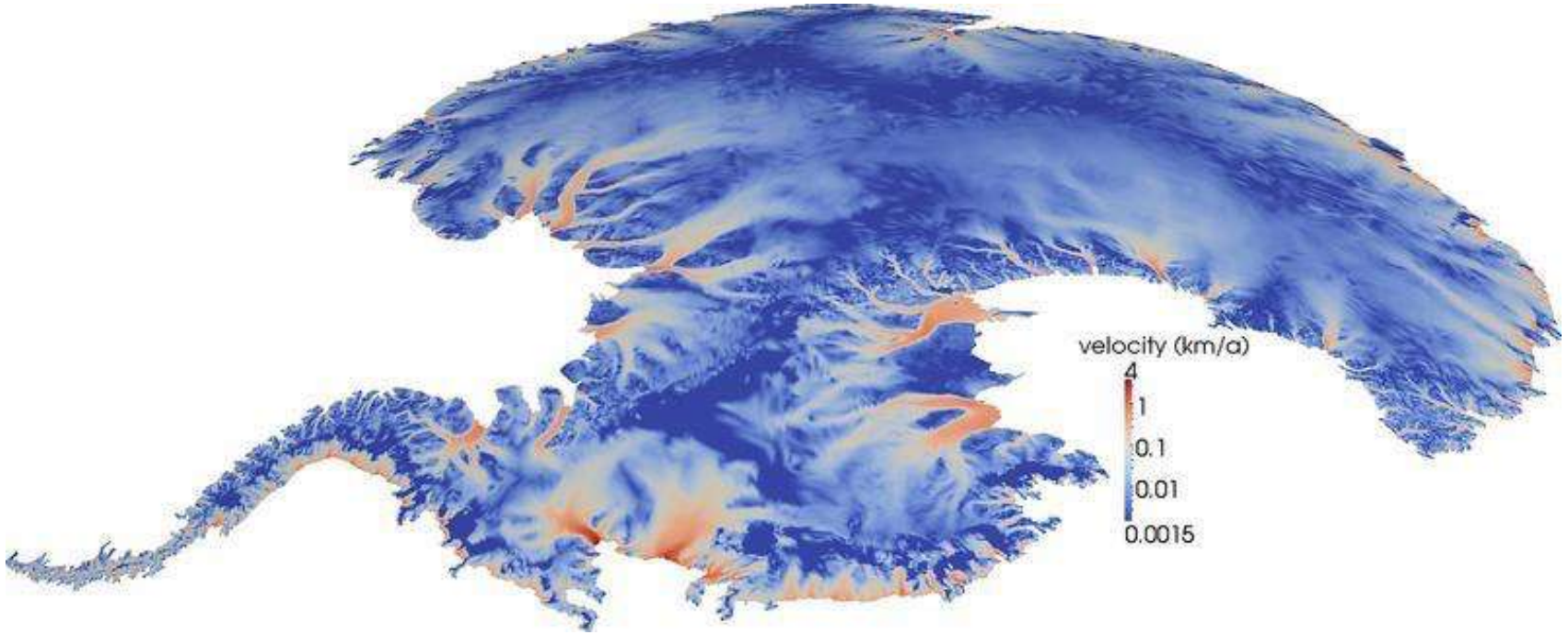
GEO 325C CONTINUUM MECHANICS						
27780	TTH	2:00 p.m.-3:30 p.m.	EPS 1.126	Face-to-face	HESSE, MARC A	open
GEO 398C CONTINUUM MECHANICS						
28120	TTH	2:00 p.m.-3:30 p.m.	EPS 1.126	Face-to-face	HESSE, MARC A	open

Why take this class?

This class provides the foundation for the modeling of all* dynamical processes in the Earth Sciences. It is excellent preparation for higher division classes in geodynamics, seismology, geomechanics, glaciology, atmospheric and ocean modeling.

Numerical model of the Antarctic ice sheet by former UT graduate student Tobin Isaac, taken from the website of the ODEN Institute.

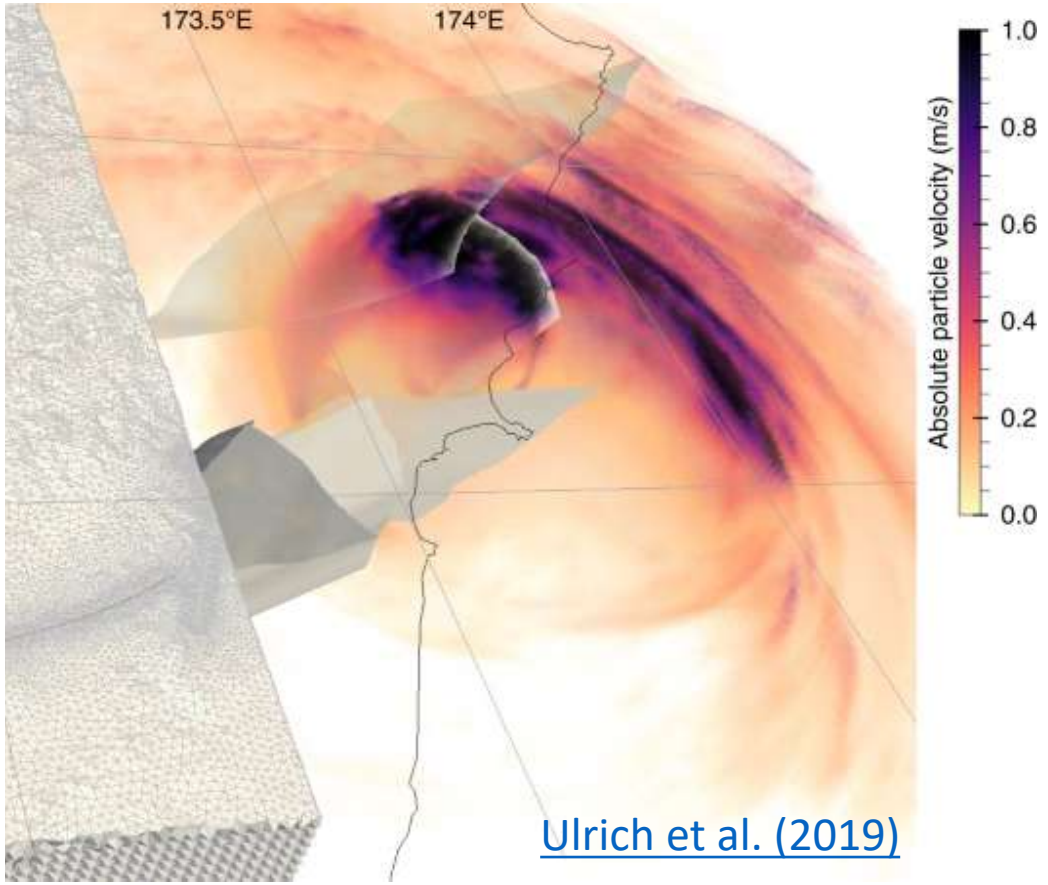
*almost all



What you will learn:

In this course we will take concepts such a mass, force and deformation that are familiar from point systems or simple spring and dash-pot models and extend them to continuum bodies such as solids and fluids.

This will allow you to understand the governing and constitutive equations of modern computational models and enable you to use and interpret them correctly.

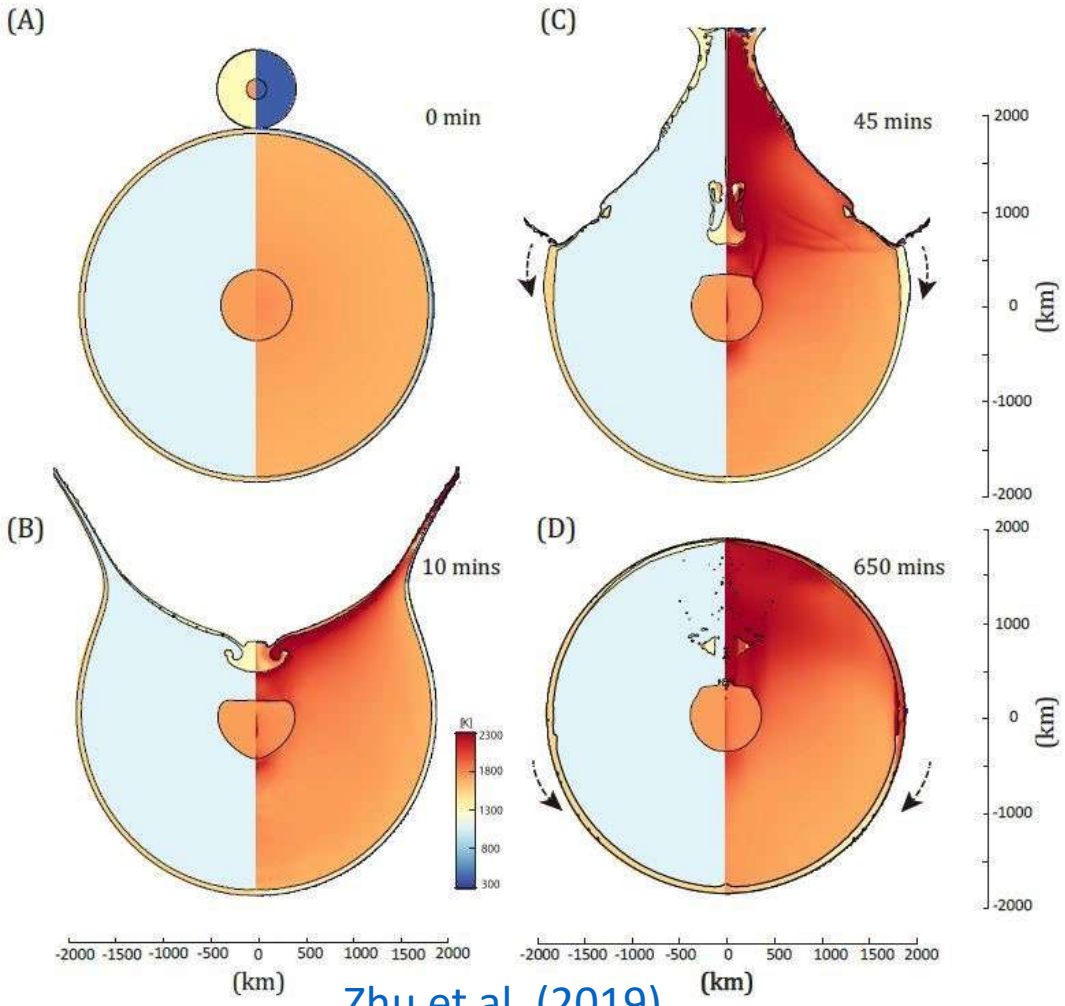


Ulrich et al. (2019)

What you will be doing:

Topics:

- Tensor algebra and calculus: 3 weeks
- Forces and stress: 2 weeks
- Deformation & strain: 3 weeks
- Balance laws: 3 weeks
- Fluid mechanics: 1.5 weeks
- Solid mechanics: 1.5 weeks



Zhu et al. (2019)

Course website(s)

- Class website: https://mhesse.github.io/continuum_mechanics/
  Post all notes, lecture, and recordings (main resource)

- Canvas: https://utexas.instructure.com/courses/1343273
  (Post and submit homeworks, post grades)

- Piazza: https://piazza.com/class/l73vccyyvk96km/
  (class discussion, has latex editing!)

Assessment

- Regular (weekly) homeworks (HW)
- No exams!
- Only for graduate students:
  Class Project (CP): Generate a homework problem for class that applies concepts from class to a/your research problem!
- Complete class evaluation (CE)!
- Grade breakdown:

Undergraduates: HW 95% + CE 5%

Graduate students: HW 75% + CE 5% + CP 20%

Submitting Homework

- Homework is mostly paper and pencil work.
- Homework needs to be submitted electronically as PDF files. (please don't submit photos of paper sheets)
- If your PDF is very large (MB's), please compress it before submitting (https://www.ilovepdf.com/compress_pdf)
- Look at it before you submit to check your HW is readable ☺.

Collaboration policy

My assumption is:

- Nobody is taking this class for an easy A.
- Everybody is interested in learning continuum mechanics

As such …

- I am happy for people to work together on homeworks! You can learn a lot from each other.
- Please, write up your own solution
- You get out of it what you put in!

Graduate class project.

- Aim is to generate interesting up-to-date homework problems that apply class concepts for future classes!
- It is a HW problem so it should not be too complicated!
- Should apply some concept learned in class.
- Short individual meetings weeks 6-8 to discuss potential topics
- Decide on topic in weeks 16-18.
- Projects due before Thanksgiving
- Present/Discuss/Work through Last day of class