

SIO 75 Earth History

T Th 10-11:50 Hubbs 4500

Instructors: Richard Norris & Emily Chin (Van Allen)

TA: Rials Christensen

Instructor & TA office location and office hours:

Dick - Wed 1 – 2 PM

Emily Thursdays 1:30 – 3 pm

Overall Goals: This class explores the processes that have built Earth, its life, and its environments. We emphasize the mechanisms that have made our planet as we see it. We also explore how Earth's systems have changed--as the solar system has evolved, as the Earth has cooled and differentiated, and as life has fundamentally altered virtually every aspect of how our planet works.

Learning Objectives:

1. Gain a broad understanding of the many processes – and how they have interacted together as a planetary system – that have led to the tectonic and mineralogical development of the modern Earth and how these have operated throughout geologic time.
2. Describe the ways biological evolution has altered Earth systems.
3. Have a basic appreciation for regional tectonic processes, basin formation, crustal differentiation, and processes happening in the crust and surficial sedimentary cover. We will use Western North American geology for case studies, but students are expected to apply concepts to any region.
4. Become familiar with the processes governing sea level, climate cycles, and glaciation.
5. Understand the processes that govern geomorphic evolution of the Earth surface, including the interplay of geology, biology and climatology.

Textbook (required):

Earth System History, 4th edition, Stanley and Luczaj

Class Structure:

The class features lectures, in-class demonstrations/discussions, and field trips.

Field trips and tentative dates:

All trips are half to full day trips.

April 9 Torrey Pines Beach Walk

May 7 San Diego Natural History Museum – Fossil Mysteries

May 21 La Brea Tar pits and Natural History Museum of LA County

Grading:

Midterm 20%

Final 20%

Quizzes 20%

In class labs/question sheets 30%
 Field trip participation/lab 10%

Lecture & in-class activity topics:

Week	Syllabus topic	Chapter	Lecture by	In-class discussion/demonstration	Date
1	Earth System in Deep Time	1	RN	Biosignatures for life on other worlds; borings in glass; stromatolites	3/29
	Fossils	3	RN	Fossils	3/31
2	Sedimentary Environments	5	RN	Sedimentary Facies: examples of rocks w/ characteristic environment	4/5
	Evolution	7	RN	Evolutionary Trends	4/7
3	Dating Earth Materials	6	EC	Radiometric dating: the U-Pb system Zircons	4/12
	Geochemical Cycles	10	EC	Isotopic systems: present C or O record, interpret	4/14
4	Crust formation and the Hadean Earth	2, 11	EC	Rocks of Early Earth - TTG, komatiites, cratonic peridotite xenoliths	4/19
	Assembly of North America (Proterozoic Supercontinents)	(8,9), 12	EC	Rocks from a crustal section: Grand Canyon	4/21
5	MIDTERM	–	–	NO LAB	4/26
	Proterozoic oxygenation & Snowball	12	RN	Oxygenation & Snowball Earth Evidence	4/28
6	Cambrian Explosion	13	RN	Marine animal life	5/3
	Colonization of Land	14	RN	Fossil Plants	5/5
7	Paleozoic Paleogeography	15-16	EC	Taconic Orogeny rocks	5/10
	Dinosaurs	16-17	RN	Dinosaurs & Marine reptiles	5/12
8	Cretaceous	16	EC	E-W transect thru CA	5/17
	Mass extinctions	5,17	RN	Lab tbd	5/19
9	The Paleogene - climates; glaciation	18	RN	The PETM	5/24
	Paleogene paleogeography **VIA ZOOM** Link tbd	18,19	Guest: J. Worthington	Laramide features- interpret a cross section from map **VIA ZOOM**	5/26
10	Neogene paleogeography/tectonics	19	EC	Lab tbd	5/31
	The Holocene to present	20	RN	Climate change indicators	6/2