

# G410/510 Paleoclimate

*Spring 2019 – Geology Department*

**Description:** Overview of techniques used in paleoclimate and environmental reconstruction. We will discuss paleoclimate on multiple temporal and spatial scales. The class will highlight both fundamentals and the latest developments using data from oceans, rivers, ice, lakes, soils, and fossils. Includes a multi-day field trip.



**Lecture:** Mon/Wed 12:45-1:50 PM, Cramer Hall (CH) S59

**Lab:** Thu 12:45-1:50 PM, Cramer Hall (CH) 1

**Prerequisites:** Sedimentology/Stratigraphy (G435), Geochemistry (G445), or equivalent

**Instructor:** John Bershaw

Office: Cramer Hall 17G (Lab 17D)

Email: [bershaw@pdx.edu](mailto:bershaw@pdx.edu)

Tel: 503-725-3378

Office Hours: Mon/Wed 2-3 PM or by appointment

**Grading:** There be a number of assignments, labs, two exams, and a project.

**Textbooks:** [Paleoclimates](#), 2010, by Thomas Cronin

[Environmental isotopes in hydrogeology](#), 1997, by Clark & Fritz

**Field Trip:** 3 Day/2 Night camping near Summer Lake, Oregon, May 24-26<sup>th</sup>

## Topics / Tentative Reading List:

**Course Introduction – Sedimentology** (*Chan and Dott, 1983; Zheng et al., 2003*)

**Oceans / Benthic Foraminifera** (*Zachos et al., 2001; Miller et al., 2005*)

**Meteoric Water** (*Rozanski et al., 1993; Dansgaard, 1964*)

**Ice Records** (*Petit et al., 1999*)

**C3-C4 Photosynthesis** (*Ehleringer and Cerling, 2002*)

### Paleowater Proxies

**Soil Carbonates / Paleosols** (*Cerling and Quade, 1993; Retallack, 2005*)

**Lacustrine Carbonates** (*Talbot, 1990*)

**Mammal Teeth** (*Kohn and Cerling, 2002*)

### Paleoclimate

**Palynology** (*Sun et al., 2014; Tang et al., 2011*)

**C3-C4 Transition** (*Cerling et al., 1997*)

**Leaf Physiognomy** (*Peppe et al., 2011; Royer, 2012; Johnson et al., 1989*)

**Caves** (*Wang et al., 2001; Dayem et al., 2010*)

**Erosion Rates** (*Zhang et al., 2001, Molnar, 2004*)

**Climate and Tectonics** (*Molnar et al., 2010*)

### Paleoaltimetry

**Isotopes and Elevation** (*Poage, 2001; Gonfiantini et al., 2001*)

**Case Studies** (*Garzzone et al., 2006; Bershaw et al., 2010*)

**Case Studies** (*Wang et al., 2006; Kohn et al., 2002*)

**Clumped Isotopes** (*Garzzone et al., 2014*)

**Volcanic Glass** (*Mulch et al., 2008; Saylor and Horton, 2014; Fan et al., 2014*)

**Lipid Biomarkers** (*Sachse et al., 2012; Polissar et al., 2009*)

**Clay** (*Mulch et al., 2006; Stern et al., 1997*)