

Geology 9556 – Winter 2018

Course Title: Advanced Stable Isotope Science I: Low Temperature Earth Systems (*Light Stable Isotopes in Earth Systems Science*)

Description: Each year we tune the content of this course to the special interests of the students enrolled. The emphasis in any particular year is determined once we know the class membership. The general direction we take is described below:

Examination of paleo-ecosystem reconstruction methods and water-rock interaction based on the stable isotope behaviour of elements within the atmosphere, biosphere, hydrosphere, and lithosphere. Topics may include: atmospheric gases, fresh and marine water, soil and sediments, biomineralization, food webs, stable isotope proxies for climate, environments, diet and migration, hydrothermal systems, marine systems. Applications may include (but are not restricted to) bioarchaeology, geology, ecology, environmental science, hydrology, limnology, mineral deposits, paleoclimatology and paleontology.

The course material is delivered through a combination of lectures, discussions, student mini-lectures, and assignments.

Prerequisites: Earth Sciences 4431a or Geology 9506a or permission of instructor

Weight: 0.5 credits

Instructor: Fred Longstaffe: B&G 1023, email: flongsta@uwo.ca

Graduate Teaching Associate: *tba*

Location: *tba*

Time: 2.5 hour class weekly – to be arranged. Once we know who will be enrolled (***e-mail me your intention as soon as possible***), we will find a time that works for everyone.

~Eleven (11) sessions (tentative schedule on next page)

Grading:

Assignments (2 in total): 30% (15% each)

Mini-lecture: 15%

Participation: 25%

Final examination (take home): 30%

Mini-lectures: Each student will be assigned a 30-minute mini-lecture.

Discussions: About every other week, the strengths and weaknesses of one to three published papers will be discussed (~20 minutes) by the group in terms of the papers' strengths and weaknesses. Lead discussant will be appointed at the start of each discussion.

Field Trip: TBA (one-day local excursion) – optional.

Take-home examination: Distributed: *tba*

Due:

Submit by e-mail to F.J. Longstaffe flongsta@uwo.ca

Reference Texts:

The following texts may be useful (none specifically required):

- Clark, I. And Fritz, P. (1997) Environmental Isotopes in Hydrogeology. Lewis Publishers, 328 p.
Faure G. and Mensing T.M. (2005) Isotopes: Principles and Applications. John Wiley and Sons Inc., 897 p.
Fry, B. (2006) Stable Isotope Ecology. Springer, 308 p.
Griffiths, H. Ed. (1998) Stable Isotopes – Integration of Biological, Ecological and Geochemical Processes. BIOS Scientific Publishers, Ltd., 438 p.
Hoefs, J. (2004) Stable Isotope Geochemistry. Fifth Edition. Springer, 239 p.
Kendall, C. and McDonnell, Eds. (1998) Isotope Tracers in Catchment Hydrology. Elsevier, 839 p.
Michener, R. and Lajtha, K., Eds. (2007) Stable Isotopes in Ecology and Environmental Science – 2nd Edition. Blackwell Publishing, 566 p.
Mook, W.G. (2006) Introduction to Isotope Hydrology – Stable and Radioactive Isotopes of Hydrogen, Oxygen and Carbon. Taylor & Francis Group, 226 p.
Ohkouchi, N., Tayasu, I. and Koba, K., eds. (2010) Earth, Life, and Isotopes. Kyoto University Press, 415 p.
Sharp, Z. (2017) Principles of Stable Isotope Geochemistry. Free e-edition.

Schedule for 2017:

There will be eleven 2.5 hour sessions.

Session 1 – tba

Session 2 – tba

Literature discussion
Assignment #1 posted

Session 3 – tba

Session 4 – tba

Literature Discussion
Student mini-lecture

Session 5 – tba

student mini-lecture

Session 6 – tba

Literature Discussion
Student mini-lecture

Session 7 – tba

Student mini-lecture

Session 8 – tba

Literature Discussion

Session 9 – tba

Student mini-lecture
Assignment #2 posted

Session 10 – tba

Literature Discussion
Student mini-lecture

Session 11 – tba

Literature Discussion
Two Student mini-lectures

University Statements:

Illness and Other Circumstances: If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Dean's office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. For further information see:

[Accommodation for Illness](#)

www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf

A UWO Student Medical Certificate (SMC) is required where a student is seeking academic accommodation. This documentation should be obtained at the time of the initial consultation with the physician or walk-in clinic. An SMC can be downloaded at:

www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Accessibility: Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x.82147 for any specific question regarding an accommodation. For more information see:

[Accommodation for Students with Disabilities](#)

www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_disabilities.pdf

Emotional/mental Health Distress: Students who are in emotional/mental distress should refer to Mental Health@Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.

Academic Offences: Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Use of plagiarism-checking software: All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com

(<http://www.turnitin.com>).

Religious Holidays: For the policy on Accommodation for Religious Holidays, see:

[Accommodation for Religious Holidays](#)

www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

Electronic devices: Scientific calculators are mandatory for all exams. No other electronic devices will be permitted.

Support Services:

Registrarial Services

<http://www.registrar.uwo.ca/>

Student Development Center:

<http://www.sdc.uwo.ca/>