Global Seminar Application for Geneva, Switzerland
Summer Session I 2018

Faculty
Geoffrey Cook, Associate Teaching Professor, Scripps Institution of Oceanography
   Contact: gwcook@ucsd.edu / 858 534 3406

Overview and Rationale
I am incredibly enthusiastic about proposing this Global Seminar program, based in Geneva, Switzerland during Summer Session I, 2018. My understanding is that the majority of GS programs have traditionally been focused in the arts and humanities; as an SIO Teaching Professor I am thrilled at the prospect of teaching a Global Seminar focusing entirely on Earth Science/STEM in an inspiring locale that showcases a wide variety of scientific and natural beauty. The program will concentrate on geology and volcanology using two new courses: SIO 47GS Volcanoes of the World; and, SIO 121GS Geology of the Alps). These courses will provide student participants with an outstanding learning experience that will cover a wide breadth of topics in Earth Science, but the courses will be eminently accessible to a wide range of UCSD students as the prerequisites will be either none (no prerequisites for SIO 47GS) or fairly basic (SIO 10, OR SIO 50, OR instructor’s permission for SIO 121GS). I am currently working with the colleges and their advising staff to ensure that SIO 47GS be considered as a general education elective in natural sciences (several colleges, including Marshall, ERC, and Muir already accept SIO 45 as such). SIO 121GS will count as an upper-division elective course and will count towards the major and minor in Earth Sciences and the Environmental Systems-Earth Sciences Major.

From a teaching perspective the city of Geneva is an ideal setting for studying geology and environmental science. I envision a variety of local excursions around the city, ones that are possible with little effort, and there is an enormous amount of geology to study in the immediate vicinity. Possible field subjects include (but are not limited to) glacial geology, tectonics, mountain-building (orogenesis), metamorphism, petrology (the study of rocks), minerals, weathering and sedimentary processes, and current environmental issues such as climate change. Several longer excursions (e.g. Chamonix, Zermatt and Sicily/Stromboli) will enrich the experience and give students a true field-based education in the geology of Europe. I have reached out to several connections at the Université de Genève and I am hopeful that the conversations will yield meaningful benefits for the program and potential excursions.

With respect to the SIO 47GS class, I am excited to propose to lead students south from Geneva to Sicily and the island of Stromboli as the major excursion for the course. Stromboli, nicknamed “the lighthouse of the Mediterranean” is the type locality for
Strombolian eruptive activity, and is in constant and continuous eruption. Despite the ominous sound to this, the eruptions are on the passive end of the spectrum and are safe to observe by climbing to a viewpoint along the summit crater rim and watching from a safe distance (see example below, also https://www.youtube.com/watch?v=ZnEjsDzx2Gc)

The ability to teach a class on volcanoes and to then actually take students to see one of the most beautiful and spectacular ongoing eruptions on the planet is incredibly motivating to me as an instructor and as a volcanologist. I mention this option because I believe (after checking with the Global Seminars office and several providers) that it is a very feasible opportunity—one that I feel most students would consider intriguing and one that they would strongly consider signing up for.

As an aside, even if the Sicily/Stromboli excursion is not feasible, I want to make it abundantly clear that I am more than happy to teach the program without it, as the geology around Geneva is spectacular and we can substitute a more reasonable excursion to see volcanic rocks.

The Courses

SIO 47GS: Volcanoes of the World

SIO 47 GS is a global seminar-specific course that will focus specifically on volcanism of a world region—for this program, activity and volcanoes of Europe. In the future, it could be utilized in proposals for other regions as well. The course will provide a broad scientific understanding of volcanology and students will receive enough background to ensure that they can put global volcanic activity into a meaningful geologic context. In contrast to SIO 45 however, this SIO 47GS course will focus much more specifically on the regional volcanology of the European continent. Notable volcanoes and eruptions (i.e. Vesuvius and Pompeii, Mt. Etna, Stromboli and the Aeolian Islands, Santorini, Campi Flegrei) will be discussed in great detail. An especially important part of the class will be in-depth analysis of the impact that volcanism has on the people, cultures and societies of this heavily populated region.
**SIO 121GS: Geology of the Alps**

SIO 121Gs will focus on the geology of the Alps, with an emphasis on its geologic formation and evolution over the past 65 million years since the range was created during the late Mesozoic Alpine Orogeny. The course will examine the tectonics of the region and subsequent geologic processes that have shaped it (e.g. glaciation). Classroom study will be strongly augmented with local field excursions. Overall, students will develop a strong understanding of the geology, tectonics, glaciology, and geomorphology of the Alps region.

**Class format, weekly schedule, assessment.**

Similar to the Auckland Global Seminar scheduled in summer 2017, each class will be presented daily, and classes will be scheduled three days each week: Monday, Tuesday, and Thursday, 9-1pm, plus excursions to local geologic features in the afternoons and on Wednesday. I am willing to be highly flexible and I can adjust this based on the excursion schedule and program needs. In the classroom all I need is a projector, and, if possible, internet access. I have taught field geology in a lot of remote places, however, and if need be I can effectively teach with just a map or a chalkboard.

**SIO 47GS:** Participation, homework and presentations (50%), Field exercises (25%), Final exam (25%).

**SIO 121GS:** Participation, homework and field exercises (75%), Final exam (25%)  

**SIO 47GS prerequisites:** No prerequisites. All necessary aspects of geology and volcanology will be taught early in the course, and subsequently there will be a special focus on the volcanology of Europe and its impact on the populations of the region. SIO 45 is not a prerequisite, but students who have taken SIO 45 may find the SIO 47GS class to be a worthwhile and highly stimulating experience as it will expand on their knowledge base, particularly with the focus on volcanology of a specific region (Europe).

**SIO 121GS prerequisites:** SIO 10 (The Earth) OR SIO 50 (Introduction to Earth and Environmental Science) OR permission by the instructor/department. Students need only a rudimentary background in geology and it is envisioned that a wide array of backgrounds will be sufficient to allow participation in the class (for example, any classes in environmental science or geology will provide enough background about the Earth, it’s makeup, and the processes that shape it).

**Course Texts:** *Volcanoes 3rd ed. by Oppenheimer and Francis* is required for SIO 47GS. Selected field guides and scientific papers (mainly as .pdf and e-documents) focusing on the geology of Switzerland and the Alps will be the primary course materials for the SIO 121GS course. I will consider using *Geology of the Alps*, by O. Adrian Pfiffner, but I need to
weigh student cost and the fact that students need space to pack for a 5-week excursion.

**Sites and their academic relevance**

Excursions will showcase the geological and environmental themes of the program. Suggested excursions (subject to change depending upon feasibility):

1. Geologic excursions around Geneva (day trips)
   a. Lake Geneva (lacustrine sedimentation, glacial influences on lacustrine environments)
   b. Arve River (an alpine river and alluvial plain).
   c. The Bois de la Bâtie (Pleistocene glacial deposits).
   d. Various outcrops around the city highlighting a variety of rock types.
2. Zermatt (overnight)
   a. The Matterhorn, glacial geology (a wide variety of features such as cirques, horns, aretes, hanging valleys)
   b. Alluvial deposits, evidence of erosion and glaciation.
   c. Outstanding examples of metamorphism and alpine mineralization
3. Chamonix, France (day trip)
   a. Glacial geology; highest mountain in the Alps (Mt. Blanc)
4. Catania, Sicily, Italy and Stromboli Island, Italy (2 nights)
   a. Active volcanism, up close (but SAFELY)
   b. Mt. Etna, a unique and frequently active stratovolcano
   c. A wide variety of volcanic rocks, products and features