

## **Minerals in soils and sediments and their X-ray identification and quantification, 5.0 credits**

In May 2020, the Department of Soil and Environment, SLU, will give a graduate course, "Minerals in soils and sediments and their X-ray identification and quantification", 5.0 credits. The course consists of lectures and exercises by Stephen Hillier from The James Hutton Institute in Aberdeen, Scotland. Steve is a highly qualified scientist in mineralogy in sediments and has held a guest professorship at our department at SLU. With his team at James Hutton he has won first (2008, 2018) and second (2006, 2012, 2014) place in The Reynolds Cup competition in quantitative mineralogy (see <http://www.clays.org/Reynolds.html> ).

### **Contents**

- Introduction to minerals in soils and sediments
- Lectures on mineral groups, clay minerals, mineral characterization techniques etc.
- Hands-on exercises in X-ray diffraction (XRD), scanning electron microscopy (SEM) and Fourier transform infrared spectroscopy (FTIR)
- Applications of mineralogy in soils and sediments
- Literature assignments handed in after the scheduled part of the course

### **Course set-up**

- Scheduled week at SLU, Uppsala during 11–15 May 2020 (see schedule below)
- Literature assignments handed in no later than 20 June 2020

### **Prerequisites and access**

The course is open to any interested PhD student with basic knowledge in an earth science or chemistry. The course is given in English. A maximum of 20 participants will be accepted; members of the SLU PhD school "Focus on Soils and Water" will be prioritized in case of overbooking.

### **Application**

Potential participants should send an e-mail to [jon-petter.gustafsson@slu.se](mailto:jon-petter.gustafsson@slu.se) no later than 2020-03-01. In the subject line, please give the course code PNS0134, and in the text body, include the following details: your name, affiliation, and the title of your PhD project!

### **Home page**

The syllabus for the course is found at: <https://www.slu.se/en/education/programmes-courses/courses/?sprak=en&anmkod=P0066.1920>. During the course, the Canvas platform will be used for messages, distribution of course literature etc.

### **Questions**

For contact and addition information, contact:

- Jon Petter Gustafsson at the Department of Soil and Environment: [jon-petter.gustafsson@slu.se](mailto:jon-petter.gustafsson@slu.se) 018-67 12 84, for practical questions.
- Steve Hillier at the James Hutton Institute: [Stephen.Hillier@hutton.ac.uk](mailto:Stephen.Hillier@hutton.ac.uk) for questions on topics, literature etc.

## Schedule

Venue for all activities: SLU campus, Uppsala. Details on rooms will be given later.

### Monday 11 May

- 9.15-10 Introduction
- 10-12 Minerals – what are they?
- 12-13 Lunch
- 13-15 Soil and sediment mineralogy
- 15-17 **Exercise:** Mineral examination

### Tuesday 12 May

- 9.15-12 Mineral groups and occurrences
- 12-13 Lunch
- 13-15 Clay minerals
- 15-17 X-ray diffraction: theory and desk-based exercises

### Wednesday 13 May

- 9.15-12 **Exercise:** X-ray diffraction – hands-on
- 12-13 Lunch
- 13-17 X-ray diffraction: theory and desk-based exercises (continued)

### Thursday 14 May

- 9.15-12 **Other** Mineral characterization techniques
- 12-13 Lunch
- 13.15-17 **Exercise:** SEM and FTIR hands on

### Friday 15 May

- 9.15-12 Practical applications