Graduate course: ***Exploring the dynamics of soil organic matter through process-based modeling***

Location: Swedish University of Agricultural Sciences, Dept. of Ecology

Day 1: Thursday, June 1 – Room (Morning - ***Ladan***; Afternoon – ***Kurslab***)

9:00-9:30 Greeting and Introduction (Instructors and Class)

9:30-10:00 Course overview and objectives

10:00-10:20 **Break**

10:20-11:10 Basics of soil organic matter as a dynamic entity (SOM) – Paustian

**11:10-12:15 Overview and timeline of the development of SOM models used in agricultural systems (compare and contrast several different models) – Menichetti**

12:15-1:20 **Lunch**

1:20-2:20 Process-based modeling theory I – System elements (i.e., state variable, flows, controls, driving variables, formulating differential/difference equations) – Paustian

2:20-2:40 **Break**

2:40-3:50 Process-based modeling theory II – Model implementation (Integration, Parameterization, Validation) – Paustian

Day 2: Friday, June 2 – Room (Morning – ***Kurslab***; Afternoon – ***Ladan***)

**9:00-11:50 Introduction to ICBM (description, major assumptions, driving variable and other input files, generating and plotting/printing outputs) – Kätterer & Menichetti**

11:50-1:10 **Lunch**

1:10-4:00 Introduction to DayCent (description, major assumptions, driving variable and other input files, generating and plotting/printing outputs) – Paustian

4:00-7:00 “Icebreaker” – get together for beverages and hors d'oeuvres – Keith Paustian’s house (Drejargatan 5, Uppsala)

*Saturday, June 3* (Optional) team-building activities – e.g., Linneaus gardens and Botanical gardens tour, Gamla Uppsala, boat to Skokloster & tour (possible group dinner)

*Sunday, Monday, Tuesday, June 4-6* – Long-weekend and Swedish national day

Day 3: Wed, June 7

9:00-9:00 Presentation with overview of the treatments, results and data from long-term sites being modeled – Kätterer

Field trip to local long-term experimental sites (Ultuna (Ramf.), Kungängen, Säby) for observation and discussion on decadal scale changes in SOM in these systems

*The plan is to take bicycles to the field site – one of which is on campus and the other two are adjacent and about 10 km from campus (Inst. Ecology) – a car option for those not wanting to cycle will be available*

9:00-9:30 Coffee and transport

9:30-10:15 Frame trial (Ramförsöket)

Transport to Kungsängen

11:00 – 11:45 Kungsängen experiment

11:45 – 12:15 Säby experiment

Transport to Linnés Hammarby (Linneus’s summer house)

Lunch until 14, thereafter guided tour 45 min

15:00 biking to Ultuna/home

**Day 4: Thur, June 8, Room (*Ladan*)**

**9:00-10:30 Instruction on setup of weather files and other input files needed to run ICBM – Menichetti & Kätterer**

**10:30-10:50 Break**

**10:50-12:00 Instruction on setup of weather files and other input files needed to run DayCent – Paustian**

**12:00-1:10 Lunch**

**1:10 – 4:00 Organize as student teams of 2-3 persons, and begin working on model set up, runs and analyses**

**Day 5: Fri, June 9 (Need two work rooms)**

**9:00-4:00 Student group lab work – Continued model setup, runs, experimentation, debugging (as student teams of 2-3; instructors are present to answer questions, help troubleshoot, etc)**

***Saturday-Sunday, June 10-11* – Free**

**Day 6: Mon, June 12 (Need two work rooms)**

**9:00-4:00 Student group lab work – Continued work with the models (student teams of 2-3)**

**Day 7: Tue, June 9 (Need two work rooms)**

**9:00-12:00 Student group lab work – Complete model analyses, prepare presentations**

**1:00-4:00 Presentation of results and conclusions by student teams and oral examination by course instructors**

Data needs for the models