

Training Workshop 4 (TW4) Brief Description

Title: C-CASCADES Training Workshop 4 - Diagenic models and earth system models of intermediate complexity

Date(s): 3rd – 7th July 2017

Location: Penryn Campus, Penryn (Cornwall), UK

Lead institution: ULB

Type: Training Workshop

Contact name: Leo de Sousa

Contact email : l.de-sousa-webb@exeter.ac.uk

Local Contact: Sandra Arndt

Local contact email: Sandra.Arndt@ulb.ac.be

Description:

This TW provides an introduction to and practical hands-on learning in Earth System Modelling (ESM). It will provide a chance to explore the dynamics of the Earth's climate system, global carbon cycling and the biogeochemical impacts of CO₂ emissions in the context of past (and future) climate events.

The TW will foster a critical appreciation of the nature and limitations of climate and Earth system models in trying to understand and predicting carbon cycle climate interactions. You will also see how to design numerical models and how they can be utilized to address scientific questions, test hypotheses, and quantify the past and future relationship between global carbon cycling and climate and associated feedbacks. In addition, you will learn new computer skills and gain experience with data analysis and visualization software and techniques. The cumulating objectives of the TW are to develop a deeper understanding of the role and nature of feedbacks in the Earth system and provide context to the impacts of current human activities; and importantly, foster a critical appreciation of the nature and limitations of climate and Earth system modelling in understanding and predicting global change.

The TW includes 1) short lectures that provide an overview of carbon cycle perturbations; 2) expert seminars that illustrate how researchers combine information stored in climate archives and ESM to understand past climate events; 3) computer labs.

Participants will run a series of ESM simulations and record their results and reflections in form of a modelling lab diary.

Outcome for all participants: ECTS credit certificate

The participants are expected to acquire the following skills and knowledge during this workshop:

- 1) introduction to and practical hands-on learning in Earth System Modelling (ESM);
- 2) overview of the past dynamics of the Earth's climate system;
- 3) appreciation of the nature and limitations of climate and Earth system models in trying to understand and predicting global change;
- 4) understand how models can be utilized to address scientific questions, test hypotheses, and quantify relationship between global carbon cycling and climate and associated feedbacks;
- 5) new computer skills and gain experience with data analysis and visualization software and techniques.

Assessment criteria:

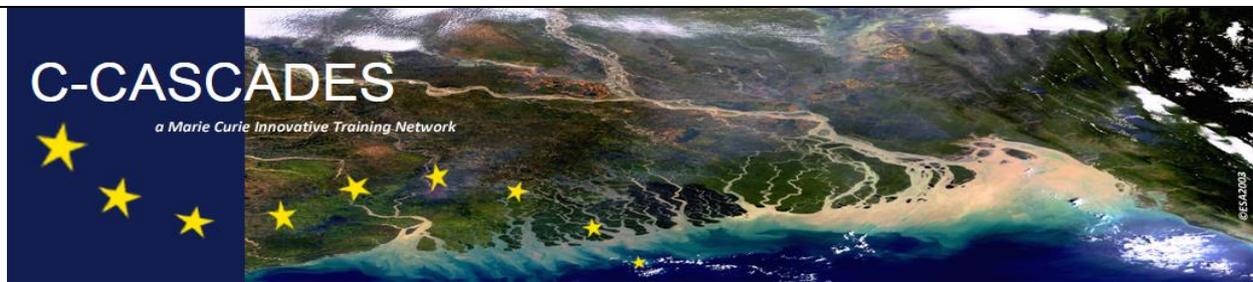
- 1 – Modelling lab diary
- 2 – Overall engagement in the workshop

ECTS awarded: 3

Awarding institution: ULB - Université Libre de Bruxelles

Registration:

If you wish to register for this event, please send an email (including a CV and a motivation letter for non-C-CASCADES students), before 26 May 2017 to the "Contact email" above and add to the subject line "C-CASCADES Training Workshop 4 external application". *Maximum participants: 20.*



Indicative Timetable

Monday, 3rd July, 2017

10:00-10:30 Welcome, brief presentation of participants
 10:30-11:00 **Sarah Greene** (Birmingham)/**Sandra Arndt** (ULB): *How to read the rock/sedimentary record*
 11:00-12:00 **Sandra Arndt** (ULB): Introduction to Paleoclimate Modelling
 12:00-13:00 Lunch
 13:00-14:00 **Markus Adloff** (University of Bristol): *Introduction to cGENIE*
 14:00-18:00 **Modelling Lab: Introduction to GENIE**
 19:00 Dinner

Tuesday, 4th July, 2017

09:00-10:00 **Jamie Wilson** (University of Bristol): *The biological carbon pump in ESM*
 10:00-10:30 Coffee break
 10:30-11:30 **Sarah Greene** (University of Birmingham): *The response of the CCD to slow and fast carbon cycle perturbations*
 11:30-12:00 **Sandra Arndt** (ULB): Introduction to Abrupt Climate Change and Climate Hysteresis
 12:00-13:00 Lunch
 13:00-18:00 **Modelling Lab: Snowball Earth and AMOC Hysteresis**
 19:00 Dinner

Wednesday, 5th July, 2017

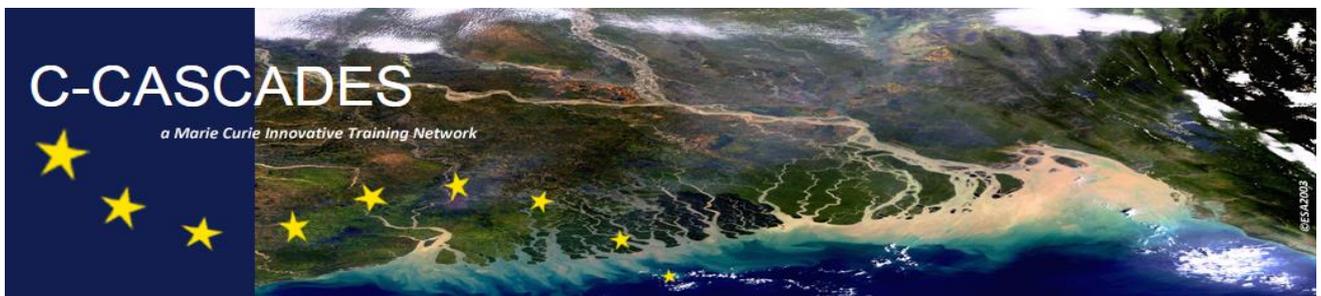
09:00-10:00 **Stephen Hesselbo** (University of Exeter): *The JET project – Understanding the Early Jurassic Earth system from re-drilling of the Mochras borehole in North Wales*
 10:00-10:30 Coffee break
 10:30-11:00 **Nathalie Lord** (University of Bristol): *The longtail of C release*
 11:30-12:00 **Jamie Wilson** or **Sarah Green** (University of Bristol): *introduction to CO₂ emissions and Ocean Acidification*
 12:00-13:00 Lunch
 13:00-18:00 **Modelling Lab: CO₂ emissions and Ocean Acidification**
 19:00 Dinner

Thursday, 6th July, 2017

09:00-10:00 **Ros De'ath** (University of Bristol): *The role of land plants in climate evolution*
 10:00-10:30 **Jamie Wilson** (University of Bristol): *Introduction to Geoengineering*
 10:30-12:00 **Modelling Lab: Geoengineering**
 12:00-13:00 Lunch
 13:00-18:00 **Modelling Lab: Geoengineering**
 19:00 Dinner

Friday, 7th July, 2017

09:00-12:00 Wrap-up
 12:00-13:00 Lunch



Logistics brief

Important note: Although the training event itself is free to attend for external participants, any other costs, such as accommodation, travel and subsistence, are to be covered by them. Further information will be provided once an offer to attend is firmly accepted.

Location

[Daphne du Maurier building - Exeter IT Training Suite \(number 3 on the Map, below\)](#)

University of Exeter
 Penryn Campus
 Penryn
 Cornwall TR10 9FE
 UK

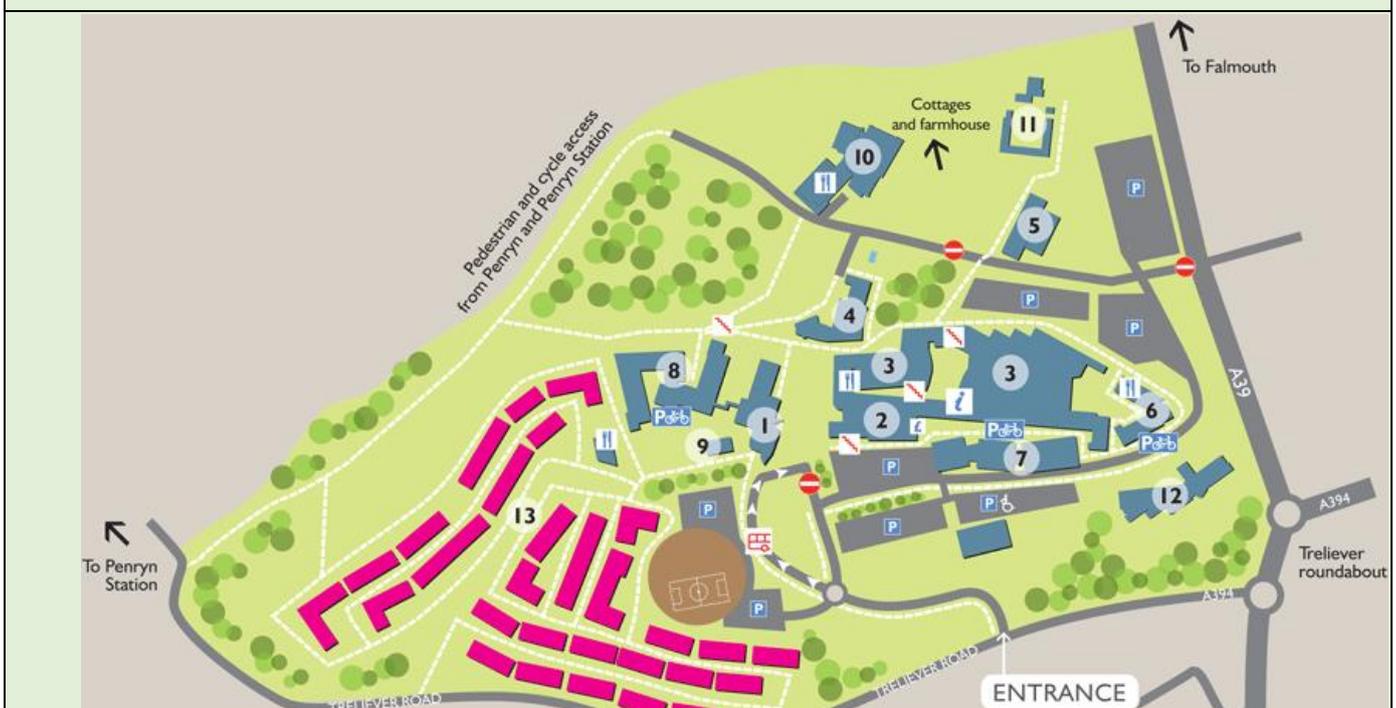
Access by public transport

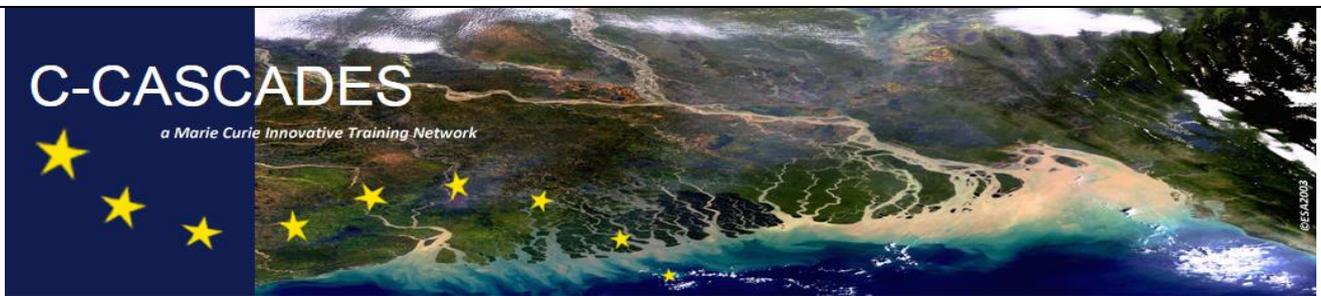
1 - From [Newquay airport](#): Take the [56 bus to 'Newquay Bus Station'](#), then the [M6 bus to 'Falmouth'](#) and stop at 'Penryn Campus'. For public transport connections visit the [Traveline website](#) or [National Express](#).

2 – From [Bristol airport](#): Take the [Airport Flyer Express Bus](#) to 'Bristol Bus Station' and stop at 'Bristol Temple Meads', then take the [train to 'Truro' or 'Penzance'](#) and stop at 'Truro', then see 3. For timetabling, visit the [National Rail Enquiries website](#).

3 - From [Truro train station](#): Take the train to 'Falmouth Docks' and stop at 'Penryn', then the [U1/U2 bus to 'Redruth' or 'Truro'](#) and stop at 'Penryn Campus' or walk for 15 minutes.

Map





Indicative Syllabus

Block 1: Modelling labs

Length: 20.5 hrs contact time + 58.5 hrs preparation time (79 hrs)

Time slot: various

Trainer: Sandra Arndt, Philip Pika + various support

Requirement: laptop, reading

Description:

- (i) Practical computer exercises will be performed to understand, download, compile, run and analyse the ESM cGENIE
- (ii) explore C-cycle Climate interactions and understand limitations of ESM
- (iii) modelling lab diary

Block 2: Expert lectures

Length: 7 hrs contact time (7 hrs)

Time slot: various

Trainer: various

Requirement: -

Description Expert lectures will provide the theoretical framework to this workshop. Participants are required to actively engage with the discussion after each lecture.

Block 3: Seminars and wrap-up

Length: 7 hrs contact time (7 hrs)

Time slot: various

Trainer: Sandra Arndt

Requirement: -

Description: Short introduction into topics of modelling labs, and wrap-up.