



GÖTEBORGS UNIVERSITET

Land use greenhouse gas emissions – measurements and models compared to IPCC guidelines and reporting to the UNFCCC and the Kyoto accounting, 3 credits (hp)

Course period: 26-30 October 2015	Last day for application: 2015-07-25
Course leader / Address for applications: Åsa Kasimir / asa.kasimir@gvc.gu.se	
Course description: Globally the land-use sectors, 'Agriculture' and 'Land Use Land Use Change and Forestry' (LULUCF), contribute 24% to the annual anthropogenic greenhouse gas (GHG) emissions (IPCC AR5). Land use will in most cases result in emission of the GHG's: CO ₂ , N ₂ O and CH ₄ . Although the size varies with soil type, crops, management and climate. Knowledge on this has been gathered for more than 30 years, by field measurements, experiments and modelling. The understanding of the microbial and soil processes causing the emissions has been built into process models, like the Coup-Model. This can after calibration be used to investigate vegetation growth as well as GHG emissions and other environmental influences for a range of different managements and systems. Each year Annex 1 states have to submit a National Inventory Reports (NIR) to the climate convention (UNFCCC) based on the IPCC guidelines and national statistics data. The data for the land use sectors, 'Agriculture' and 'Land Use Land Use Change and Forestry' (LULUCF), use activity data from statistics and emission factors (EF's). The IPCC guidelines contains Tier 1 EF's, the simplest level, constructed based on published data on field measurement. These are to be used for NIR if no other means for emission estimation are available, like national EF's (Tier 2) made by regional research or more detailed modelling approaches (Tier 3). Based on all NIR's submitted to the UNFCCC global land use is concluded responsible for 24% of anthropogenic GHG emissions. However a very small part of these emissions are Kyoto accounted. Food production has been the part most discussed in Sweden, requesting much lower meat consumption. Much life cycle research has used the IPCC Tier 1 EF's for estimation of GHG, how confident are the results? The structure of EF's, IPCC guideline and Kyoto rules influence conception of emissions and where mitigation actions are to be found. Thus influencing policy or a lack of policy.	



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Responsible department and other participation departments/organisations:

Department of Earth Sciences, University of Gothenburg / ClimBEco, Lund University

Teachers:

Åsa Kasimir (Course leader and main contact)

Other teachers to be announced

Examiner: Leif Klemedtsson

Faculty of Science; Department of Earth Sciences

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Third cycle education

1. Confirmation

The syllabus was confirmed by the Head of the Department of Earth Sciences 2015-06-22

Disciplinary domain: Science

Department in charge: Department of Earth Sciences

Main field of study: Greenhouse gas emissions

2. Position in the educational system

Elective course; third-cycle education.

3. Entry requirements

Admitted to third cycle education. Maximum 20 students.

4. Course content

We will in this course dig into how EF's are based for soil emissions of CO₂, CH₄ and N₂O, mostly for agricultural and forest systems. How data is generated by measurements and how models can be used.

How are the land use emissions reported to the UNFCCC and Kyoto, The different land use sectors and accounting rules. What implications this may have on the society. What data was available and used for the production of the IPCC Guidelines? Experience will be shared from the production of the IPCC wetlands supplement. What role does the IPCC Emission Factor DataBase have?



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Lectures are given in the morning and then presentations and in depth discussions by students will take place.

5. Outcomes

After completion of the course the Ph.D. student is expected to be able to

5.1. Knowledge and understanding

- Describe how data is generated by measurements
- Describe the function of EF's and how these are generated and updated
- Describe the national GHG reporting
- Describe the IPCC guidelines structure of GHG AFOLU emissions

5.2. Skills and abilities

- To critically approach scientific literature, data and national inventory reports
- To be able to discuss EF quality and appropriate use of EF
- To be able to discuss how the reporting structure influence the general conception of GHG AFOLU emissions

5.3. Judgement and approach

- To critically evaluate national inventory reports, for the AFOLU sectors.

6. Required reading

The reading list is supplied separate to the syllabus.

7. Assessment

To pass the course, the need is to actively participate in the seminar discussions with both oral and written reflections, prepared by reading materials. After the course a shorter individual home exam task has to be performed and approved.

8. Grading scale

The grading scale comprises Fail, (U), Pass (G)

9. Course Evaluation

The course evaluation is carried out together with the Ph.D. students at the end of the course, and is followed by an individual, anonymous survey. The results and possible changes in the course will be shared with the students who participated in the evaluation and to those who are beginning the course.

10. Language of instruction

The language of instruction is English.