

PhD Course

MODELING CLIMATE EFFECTS ON CROPS AND CROPPING SYSTEMS

OCTOBER 4TH TO 11TH 2010

Faculty of Agricultural Sciences, Research Centre Foulum

Description of course:

Modeling the effects of climate change on crop photosynthesis, growth and development is vital for evaluating the future yields of crops, the risk of weeds and diseases in different cropping systems, and the future environmental threats.

This course aims at giving the Ph.D. student a thorough background in the development, evaluation and use of models of crops and cropping systems in the context of climate change. The course will include a combination of lectures, hands-on model development, and hands-on evaluation and use of existing models. Lectures and exercises will cover all steps in the modeling process: qualitative and quantitative model formulation, parameter estimation, and model validation and analysis. Parts of the modeling process will be exemplified using a simple simulation tool (PowerSim) and parts by using the simulation model DAISY. The practical and theoretical exercises will be conducted in groups. Each practical exercise will result in a short exercise report from each student. These reports will make up the student personal course portfolio.

Teachers:

Mikhail A. Semenov, Henrik Eckersten, Jens Hesselbjerg, Jørgen E. Olesen, Mathias Neumann Andersen, Christen Duus Børgesen and Mette Lægdsmand

Program:

Monday 4/10: Welcome. Climate change projections and uncertainty. Climate change effects in agriculture. Systems and models. Model formulation.

Tuesday 5/10: Modeling of crop growth in a context of climate change. Build a model of crop growth.

Wednesday 6/10: Environmental factors in modeling of plant growth. Build a simple sub-model simulating the water balance of the crop and soil.

Thursday 7/10: Short introduction to DAISY. Methods of parameter estimation. Estimate climate sensitive parameters in the crop model and DAISY.

Friday 8/10: Methods of validation. Validation of DAISY against a historical dataset of crop growth. Social event.

Saturday 9/10: Model analysis. Sensitivity analysis of critical parameters and input variables in DAISY.

Sunday 10/10: Downscaling of climate projections and use of weather generators. Scenario analysis using the generated weather in DAISY

Monday 11/10: Departure.

Volume: 5 ECTS

Target group: Ph.D. students within agronomy, environmental engineering or biology

Location: Foulum, Denmark

Accommodation: Danhostel Viborg

Course fee: 2500 DKK (including accommodation, course material and social event)

Registration: <http://stair.agrsci.dk>

Course organizer: Mette Lægdsmand

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