Wageningen University
Meteorology and Air Quality



Ingrid Luijkx (Assistant professor)



Kim Faassen (PhD student from January)

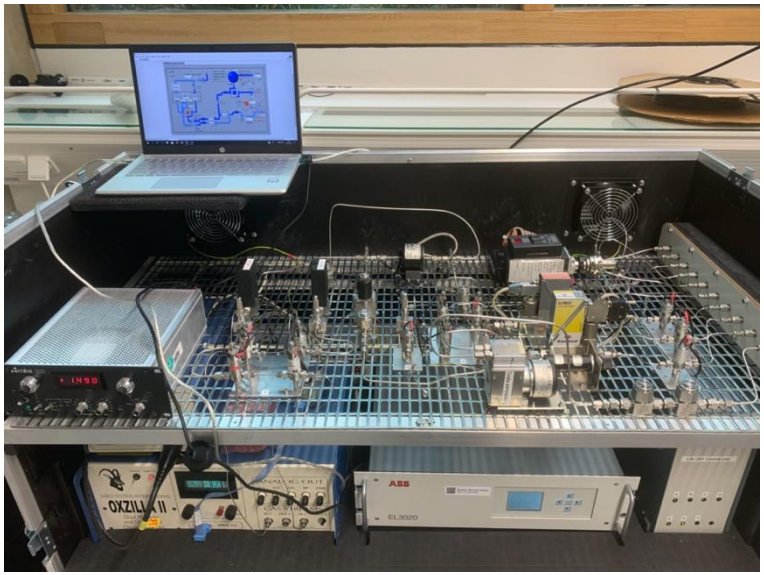
In collaboration with University of Groningen:
Harro Meijer (Professor)
Linh Nguyen (PhD student)
Auke van der Woude (PhD student)
Bert Kers (Technician)

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Continuous systems University of Groningen

- Oxzilla & NDIR (also ^{13}C)
- Old system: F3 Platform (Ingrid)
- Flightcase (Charlotte van Leeuwen, Elise Broekema, former PhDs): CCS leak detection and campaigns in Hyytiälä, Finland
- New flightcase system (Linh Nguyen): Fossil fuel verification Rotterdam



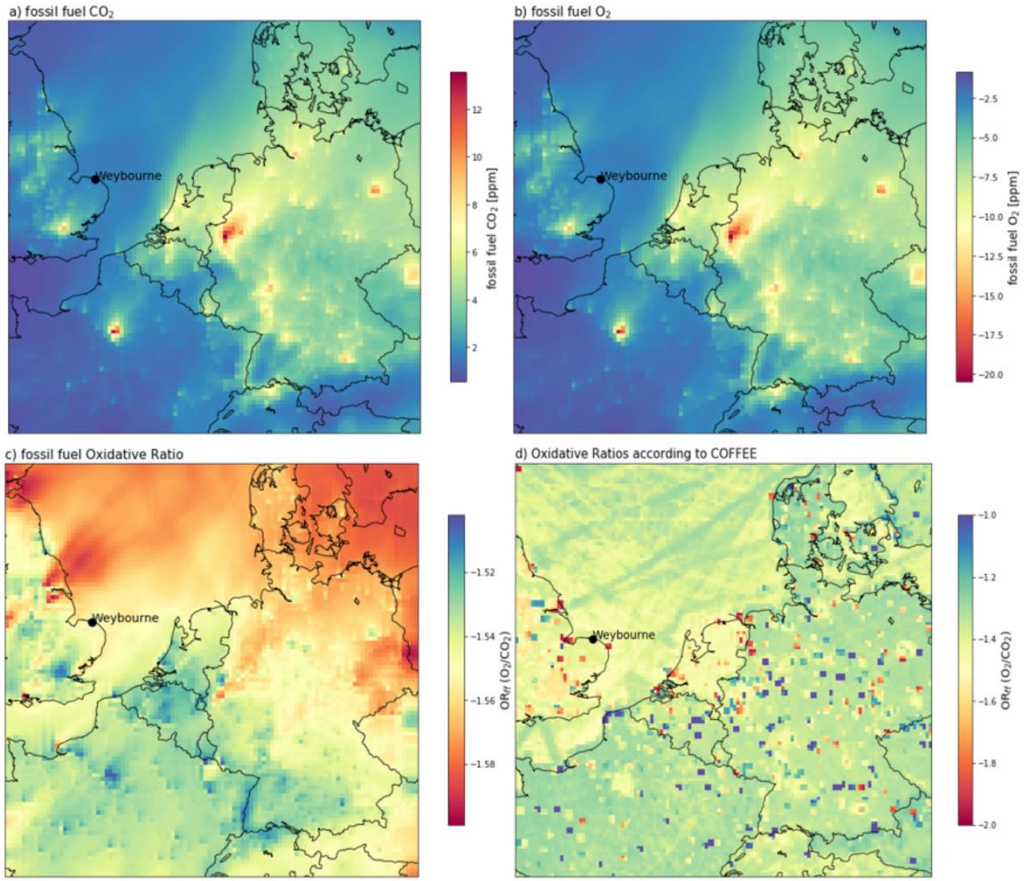


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van der Laan-Luijkx et al. (2010)
van Leeuwen et al. (2015)

Fossil fuel verification at Rotterdam

- Measurements by Linh Nguyen planned to start 2020/2021
- Regional scale modelling by Auke van der Woude, multi-tracer setup including also CO and ^{14}C.



MSc thesis Bernice Kuijpers

Campaigns: 2018 & 2019

O_2 and CO_2 measurements;

- 3 June 2018 – 2 August 2018
- 7 June 2019 – 22 July 2019

Radiosondes:

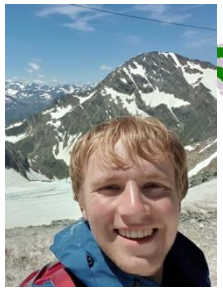
- 24 and 26 July 2018
- 9, 10, 11, 12 and 13 July 2019

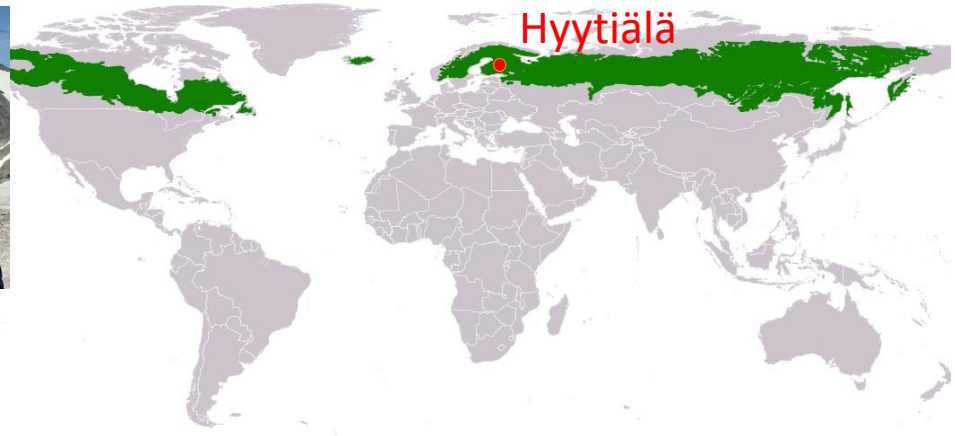




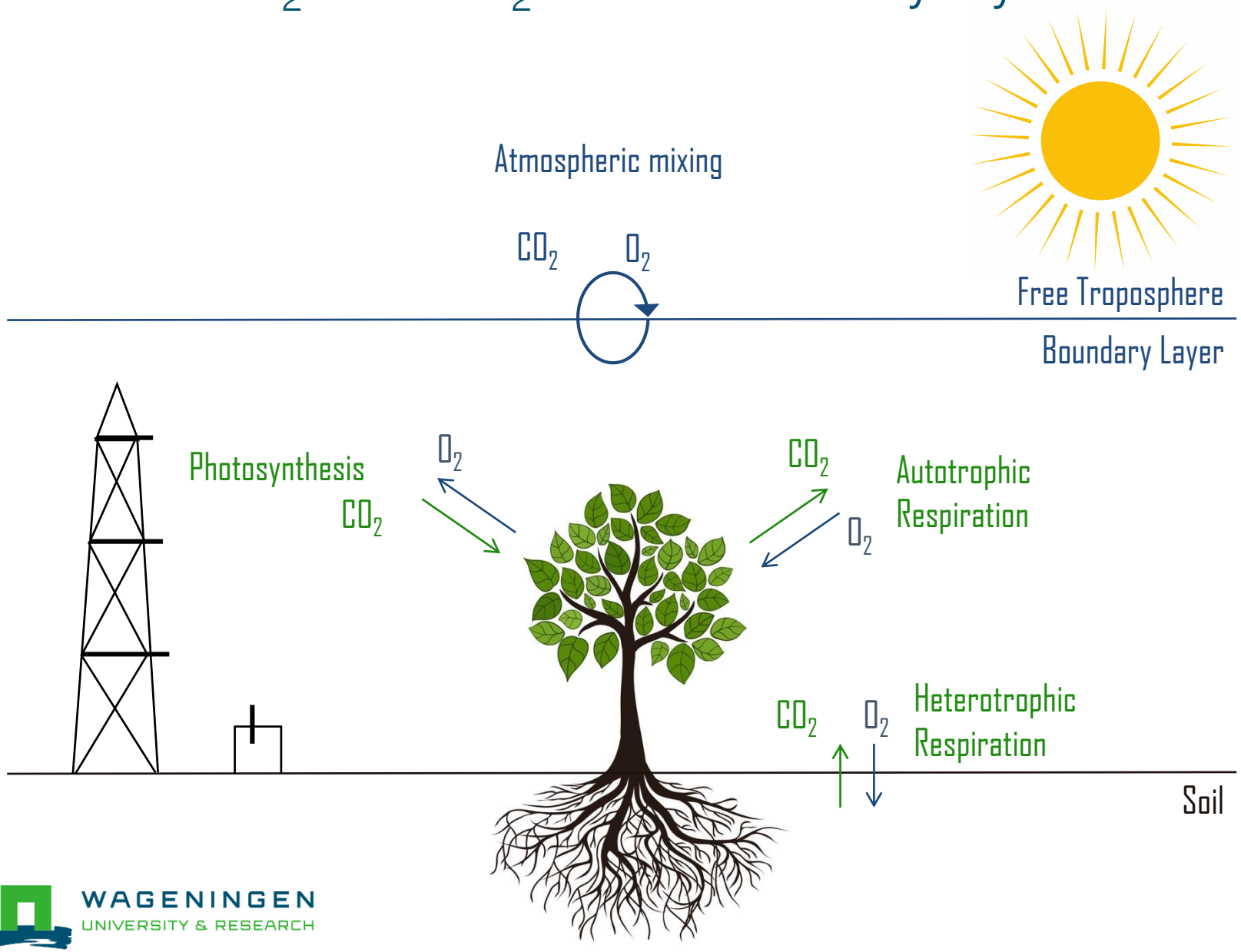








O_2 and CO_2 in the boundary layer



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Campaigns: 2018 & 2019









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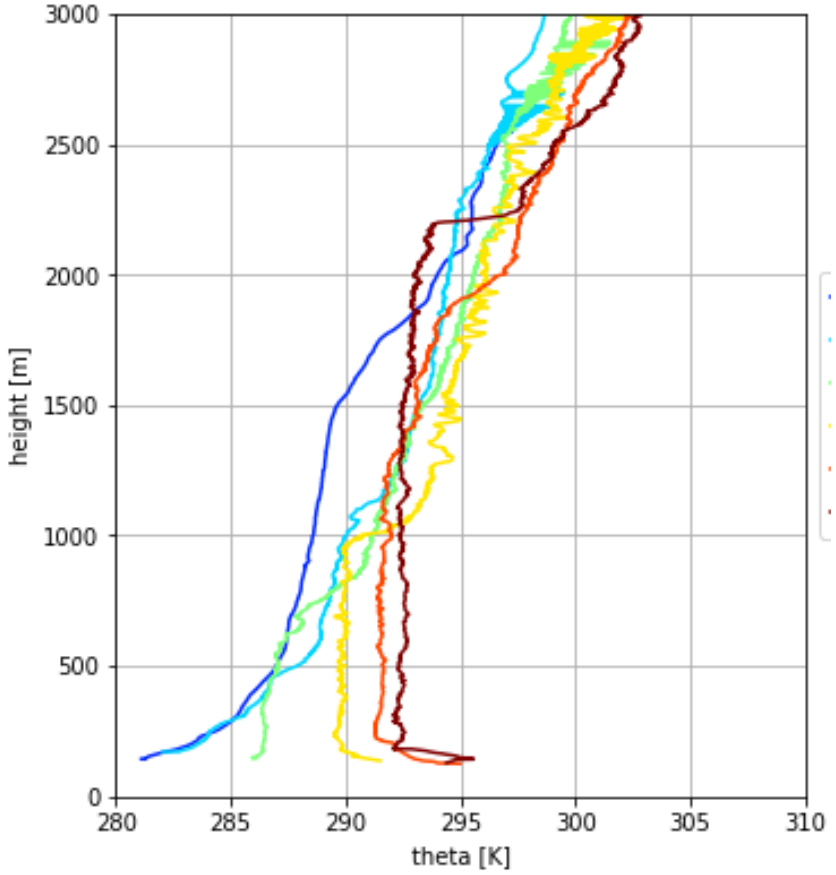
Radiosondes

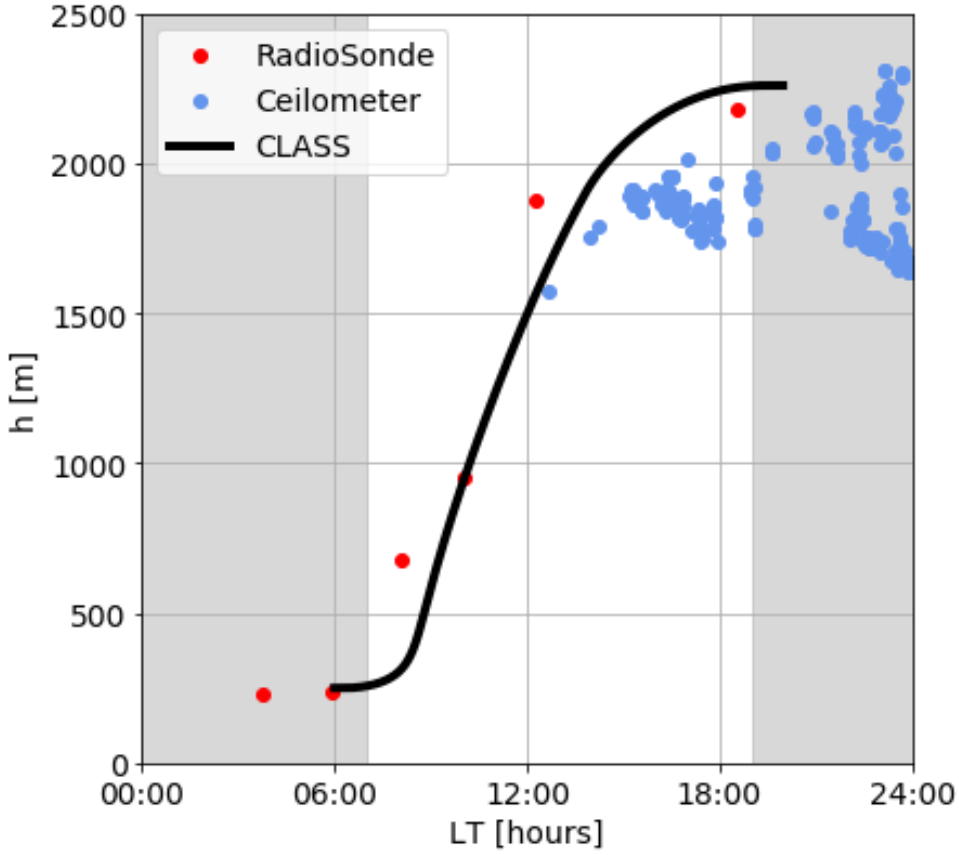
- Measures vertical profiles of Relative Humidity, Temperature, Pressure, Wind, Location
- Can be retrieved back
- Trying to add CO2 with simple low-weight sensor (SCD30) to get an idea for the ‘jump’ in CO_2 at the top of the BL





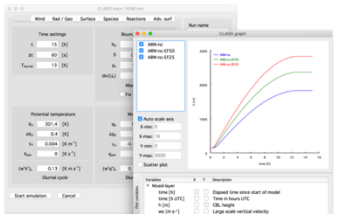
Radiosondes: boundary layer height





CLASS: http://classmodel.github.io

CLASS: Chemistry Land-surface Atmosphere Soil Slab model



Download CLASS

CLASS is released under a GPLv3 licence, the source code (with licence) is available at this website. Pre-compiled executables for Windows and OS X are available, for compiling CLASS on Linux see "useful links".

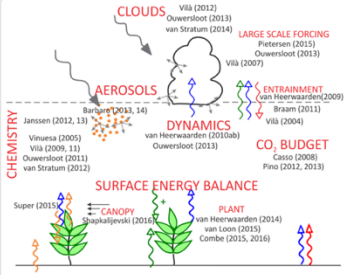
Executables | Source



Instruction and knowledge clips

To help users get started, we created short instruction and knowledge clips which introduce the CLASS model, the different options and settings, and some of the theory behind the model.

View the clips

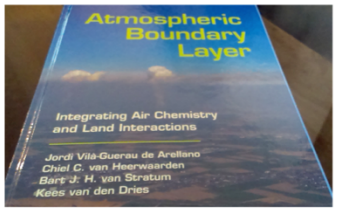


Research versions CLASS

Two research codes are available for conducting advanced experiments. The first is the MXLCH Fortran code, which contains all the features (and some extras) of the graphical user interface. The second is the Python version, which is a basic implementation of the coupled land-atmosphere model without the chemistry.

The research codes have been used in a number of publication. Click here for an overview.

Fortran | Python



Book

Our book: Atmospheric boundary layer: Integrating chemistry and land interactions is published by Cambridge University Press!

Cambridge website

The book has been reviewed by Katul and Fuentes (2016, Boundary-Layer Meteorology) and Schultz (2016, Agricultural and Forest Meteorology).

Suggestions / bugs

We have designed CLASS with care, but in case you run in to problems, please report them to us and we will do our best to solve issue.

Bugtracker | Email

Useful links

Below you can find some additional information on how to compile the model, and run it on recent versions of OS X.

Compiling CLASS on Linux »

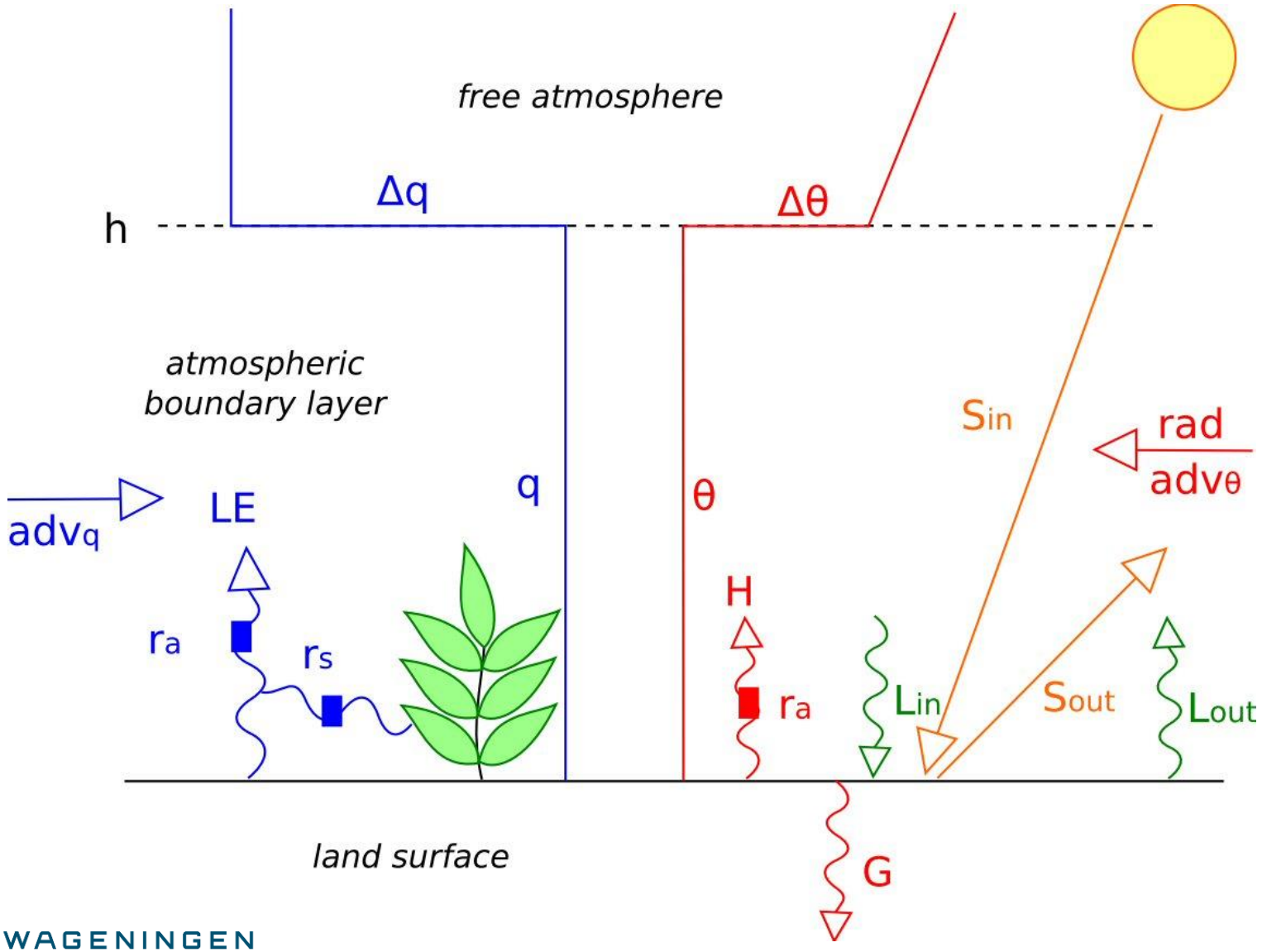
Notes for OS X users »

Exercises

We provide the numerical settings of the hands-on exercises proposed in the book. The book describes all exercises in detail, including background information on the initial and boundary conditions.

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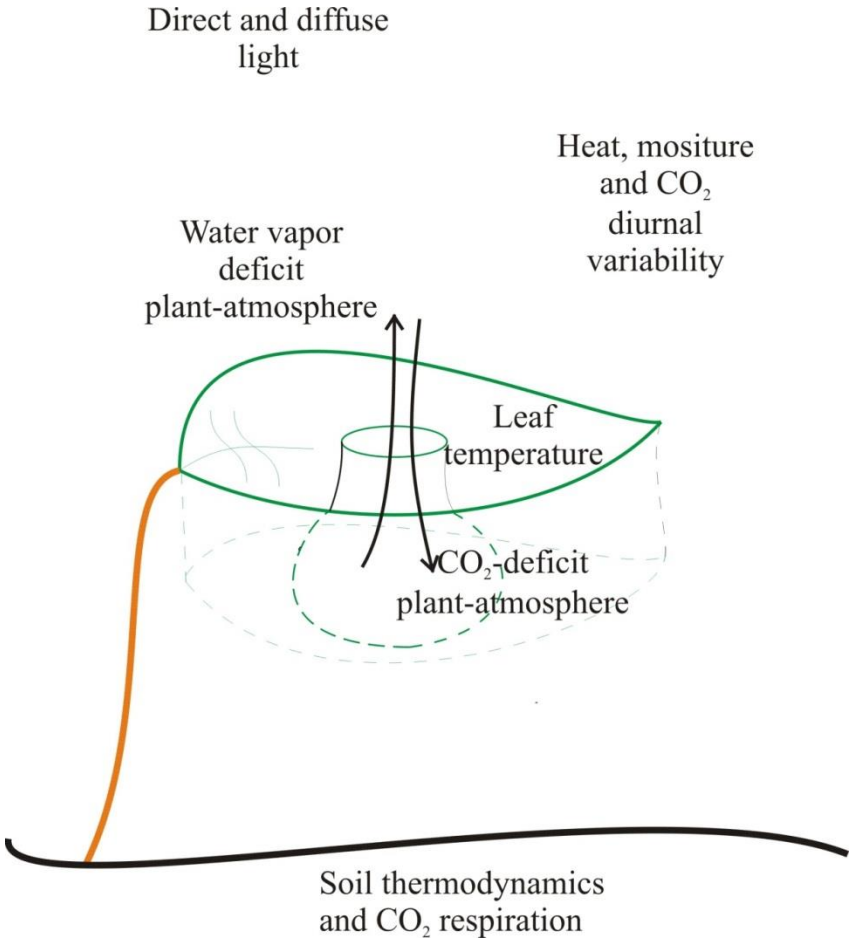
CLASS: mixed-layer model coupled to land-surface model



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CLASS: Plant physiology model (A-g_s model)

- Connecting the atmospheric processes to the biophysical and soil processes



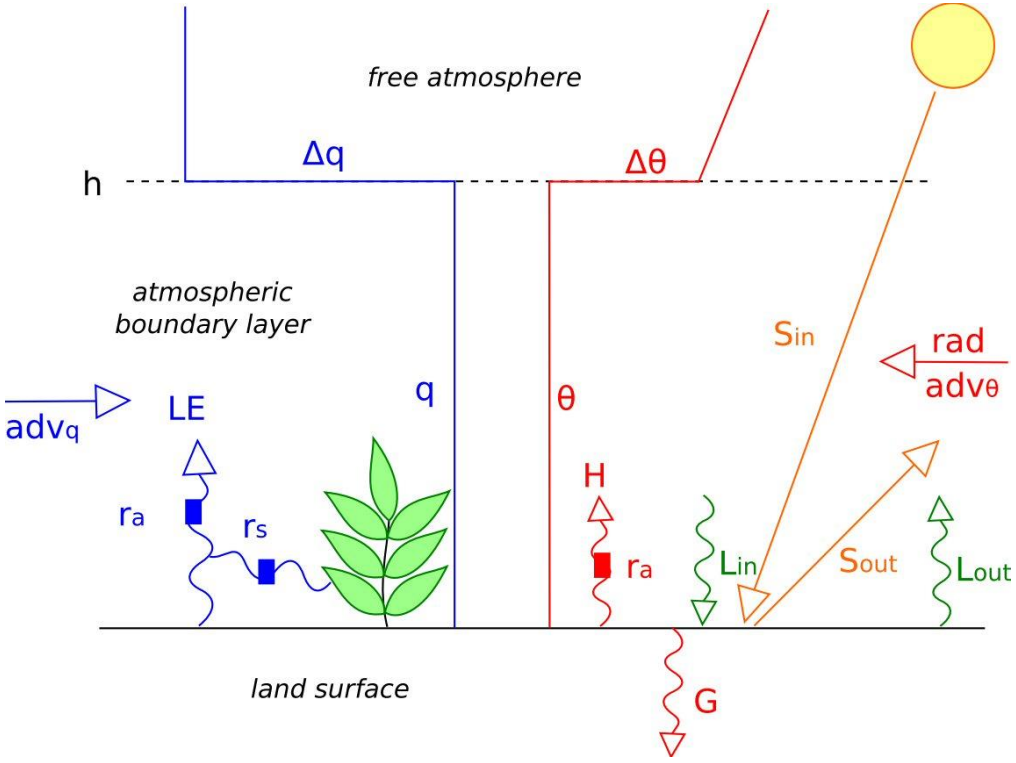
Jacobs & de Bruin 1997,
Ronda et al., 2001
Jacobs et al., 2007

Simulating O_2 in CLASS

- First step: implementing OR on flux level (Kim Faassen)
- Future work: implementing OR on leaf/process level in A-g_s model

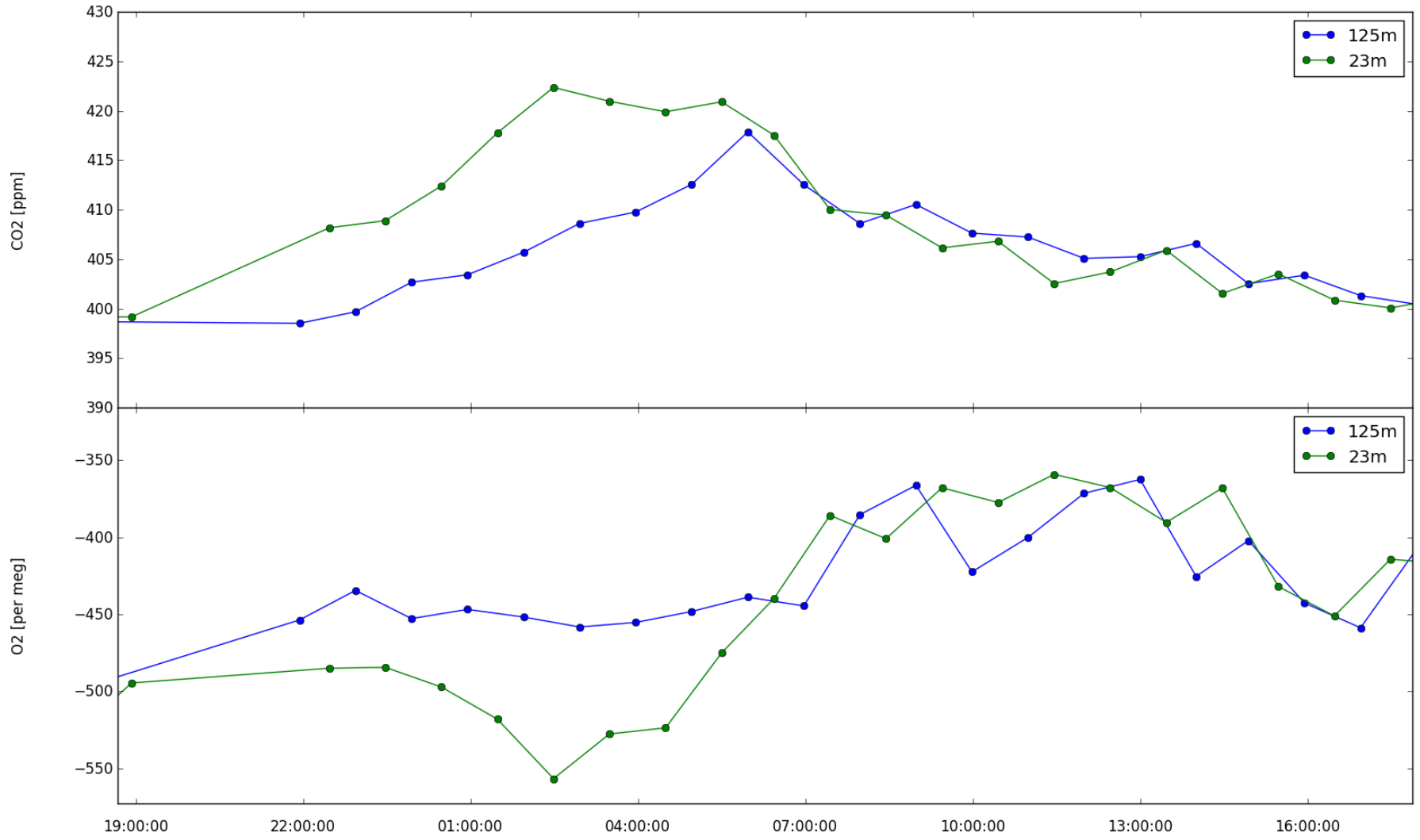






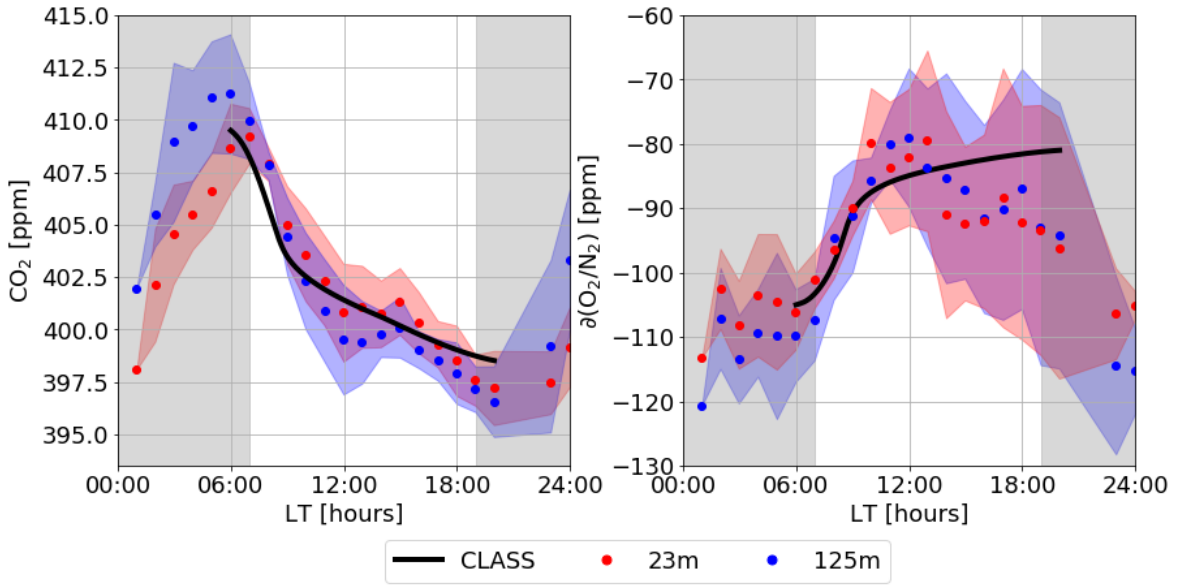
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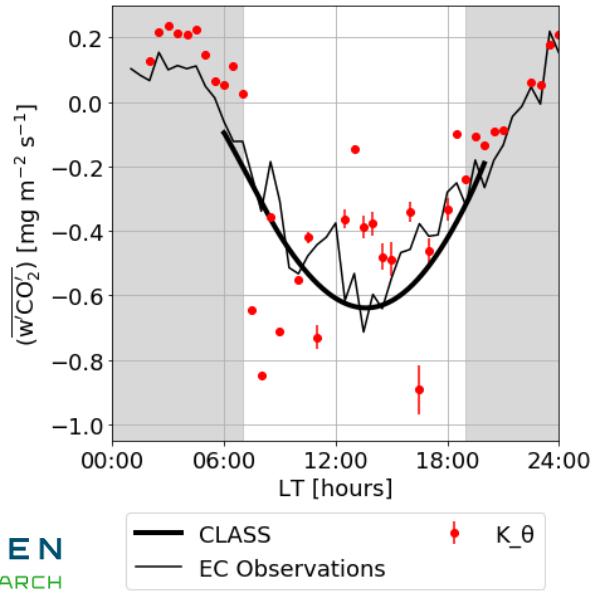
Example O_2 & CO_2 diurnal cycle 2 levels

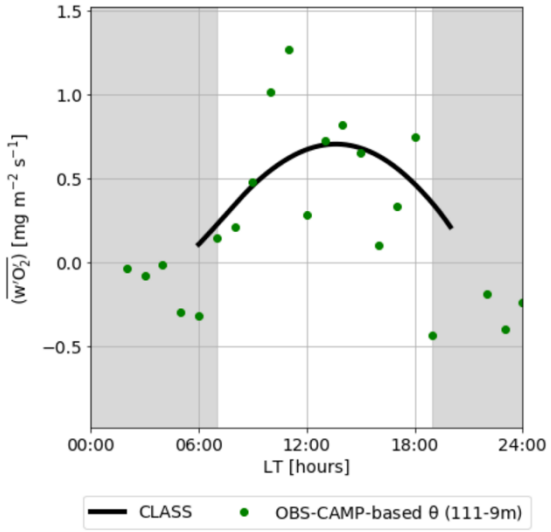


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Modelling diurnal scale







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MSc thesis Kim Faassen

Next steps

- Recalibration of the calibration tanks and O_2 / CO_2 instrument
- Analyzing the vertical CO_2 profiles from radiosondes
- New instrument will be placed in Rotterdam
- O_2 modelling: ecosystem scale



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