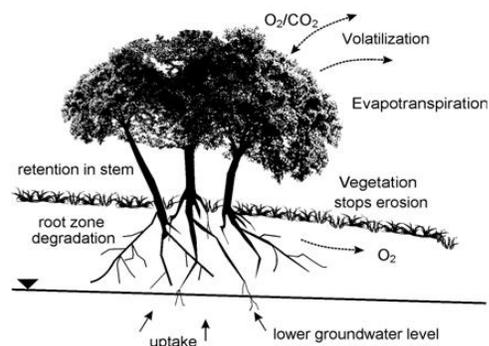
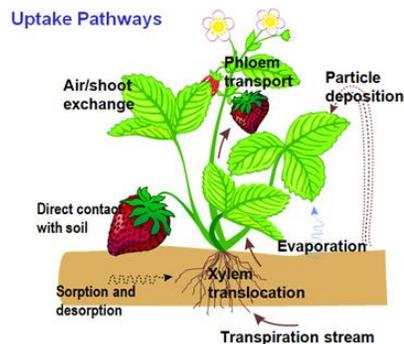
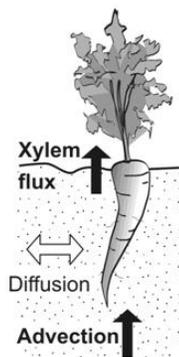


This course aims at giving a theoretical and practical introduction to uptake of chemicals in plants and its relevance for science and engineering. The focus is on mathematical modeling and its application. The course will cover the plant physiological, physical, chemical and mathematical basics of plant uptake. Simple and advanced models will be taught, and the source code with documentation will be available for all participants. The models will be applied to study plant uptake of pesticides, persistent organic pollutants, emerging pollutants (incl. pharmaceuticals), ionisable compounds and heavy metals. We will work with examples from risk assessment, pesticide design, dietary exposure, contaminated sites, urban gardening and phytoremediation. Students will have hands-on exercises with all models and practice also the tree core phytoscreening method for delineation of subsurface contamination. Besides, we will stimulate the exchange between the participants by short presentations of their work.

The course is given at the Technical University of Denmark by local and international teachers and is credited with 5 ECTS points. To finalize the course you will prepare your own model simulation and a short report. The course material will be electronically available in advance from the course homepage at homepage.env.dtu.dk/stt/teaching.htm

The course is supported by the European FP7 project TIMBRE and free of charge for registered PhD students. The course fee for professionals is 800 € but can be reduced by interesting presentations from their work. Rooms will be available in the Campus Village (app. 50 €/day). **Please contact Stefan Trapp sttr@env.dtu.dk for further information or to sign-up.** Info about DTU at www.dtu.dk



Course content (draft)

Week before: Reading (material will be provided in time)

Day 1: Processes governing plant uptake of chemicals
Plant anatomy and physiological basis
Physico-chemical principles
Regressions and equations
Standard model for plant uptake

Exercises: Chemical risk assessment, persistent organic pollutants

Day 2: Crop-specific models
Introduction to root, potato, lettuce and fruit tree models
Dietary human exposure
Contaminated sites

Exercises: Pros and cons of urban gardening, dietary human exposure

Day 3: Dynamic modeling
Mathematical principles of systems science
Multi-cascade model
Coupled model for solute transport in soil and plant
Heavy metals

Exercises: Pesticide optimization, field scale simulations, sensitive parameters

Day 4: Ionisable compounds
Physico-chemical principles
Cell model
Standard model for ionisable compounds
Dynamic simulations on field scale

Exercises: Pesticide optimization, field scale simulations, sensitivity analysis

Day 5: Experimental work
Tree coring
Phytoremediation
Uncertainty analysis

Week 3: homework (4-page report on model application)

Denmark in summer, that means:
- long days, blue sea, beautiful beaches
- Copenhagen is a modern, pulsing metropolis
www.copenhagen.dk/en/

See you in Lyngby this June - it's the week with white nights

Stefan, Charlotte and team



We acknowledge the co-funding via the support of the project TIMBRE from the European Community's Seventh Framework Programme – Theme ENV.2010.3.1.5-2 Environmental technologies for brownfield regeneration, project TIMBRE under grant agreement no 265364 (2011-2014) – Learn more about TIMBRE: <http://www.timbre-project.eu>.