EPFL

Soil Physics: Introduction

Prof. Gabriele Manoli
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Today's session

Outline

- **Introduction & Information**

- **Lecture 1: Soil Phases** (solid, liquid, gas)

This part of the course is taught in **English** but in Moodle you can find material in French as well as English-French translations.

Course Info (soil physics part)

Teaching staff

- Coodinator: Prof. Gabriele Manoli, gabriele.manoli@epfl.ch

- Computer Lab: Guo-Shiuan Lin, guo-shiuan.lin@epfl.ch

- Assistants: Thomas Gil (thomas.gil@epfl.ch)

  Matteo Thome (matteo.thome@epfl.ch)

Course Info (soil physics part)

Course objectives

- Gain an understanding of the fundamental concepts of soil physical and hydraulic properties;
- Learn how to model water movement in the soil (saturated and unsaturated conditions)
- Solve complex problems related to soil-plant-atmosphere processes

Key references

- Slides (in *English*) and notes (in *French*) available in Moodle
- Jury, W. A., & Horton, R. (2004). *Soil physics*. John Wiley & Sons.
- Hillel, D. (2003). *Introduction to environmental soil physics*. Elsevier.

Course format (soil physics part)

In this part of the course (**7 weeks**), there are <u>assigned readings to complete before each class</u>. It is **essential** that you read these notes in order to be prepared for the class.

Format

- ▪ **Lectures** (Wednesdays, Manoli): *blackboard and projected material*

- ▪ **Exercises** (Fridays, Gil+Thome): *complete exercises in class*

- ▪ **Computer laboratory** (Mondays, Lin): *work in groups of 2-3 students on modeling assignments.* <u>Bring your laptop (at least 1 per group).</u>
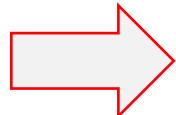
⇨ **Choose your group in Moodle by** <mark>Oct. 18</mark>
(missing people will be randomly assigned to a group)

Course format (soil physics part)

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Each week, the assigned reading, the slides used in class, and the exercises cover the same material.

Note: some slides are left for self study – indicated by this symbol

Self-Study

Course format (soil physics part)

Lectures

The recordings of last year lectures (Soil Physics part) are available here:

https://mediaspace.epfl.ch/channel/ENV-222+Sciences+du+sol/29959

Note: different Travaux Pratiques in videos (now Computer Lab)

Assessment (soil physics part)

	Task	Assessment Value	Date
1.	**Computer Lab Report (*group*)** *Write a short report on the modeling activities carried out during the Computer Laboratory sessions (see assignments and project description in Moodle).*	15%	6 December
2.	**Exam (*individual*)** *Open and/or multiple-choice questions + exercises on the material covered during the course*	TBD	TBD

Tips & "rules"

- **"Get to know your classmates":** you will work in groups during the computer lab but it is important that you stay in touch with your classmates

- **"Three-Before-Me" rule**: You must seek out at least three avenues to obtain information regarding a question or problem you are having before you ask me ... chances are, someone in the class may have the answer!

- **Searching for info?** Check this out: https://graphsearch.epfl.ch/

- For any issue, send me an email, I'll reply as soon as possible (hopefully within 3-4 days but **be patient** if it is not urgent).

- Set some **ground rules for your team** (tasks, deadlines, regular meetings, etc)
  - e.g. "sign" a team contract: http://www.learnhigher.ac.uk/working-with-others/group-work-working-with-others/ground-rules-for-group-work/

Tips & "rules"

Self-respect

At EPFL, we want to ensure that staff, students and researchers can get the psychological help and support they need to achieve their full potential. Find details of the mental health and well-being services available to EPFL community members.

Respect for others

EPFL's strength is rooted in its extraordinary diversity. Consideration that we show for each other is an indicator of our own worth. Do not remain indifferent in the event of harassment, violence or discrimination.

Respect for the environment

Sustainability is a priority that manifests itself on many levels at EPFL, transversally, through campus operations. This networking also relies on the commitment of each and every one of us to make our school a healthy place.

Trust and Support Network

The Trust and Support Network (TSN) offers listening, guidance and support in complete confidentiality. It is composed of internal and external instances with a mandate to provide assistance in situations related to psychosocial risks.

https://www.epfl.ch/about/respect/

A bit about me ...

Laboratory of Urban & Environmental Systems (URBES)

(Urban) Ecohydrology

Urban Climate & Health

Urban Structure & Dynamics

A bit about me …

Scudiero et al. (2012)
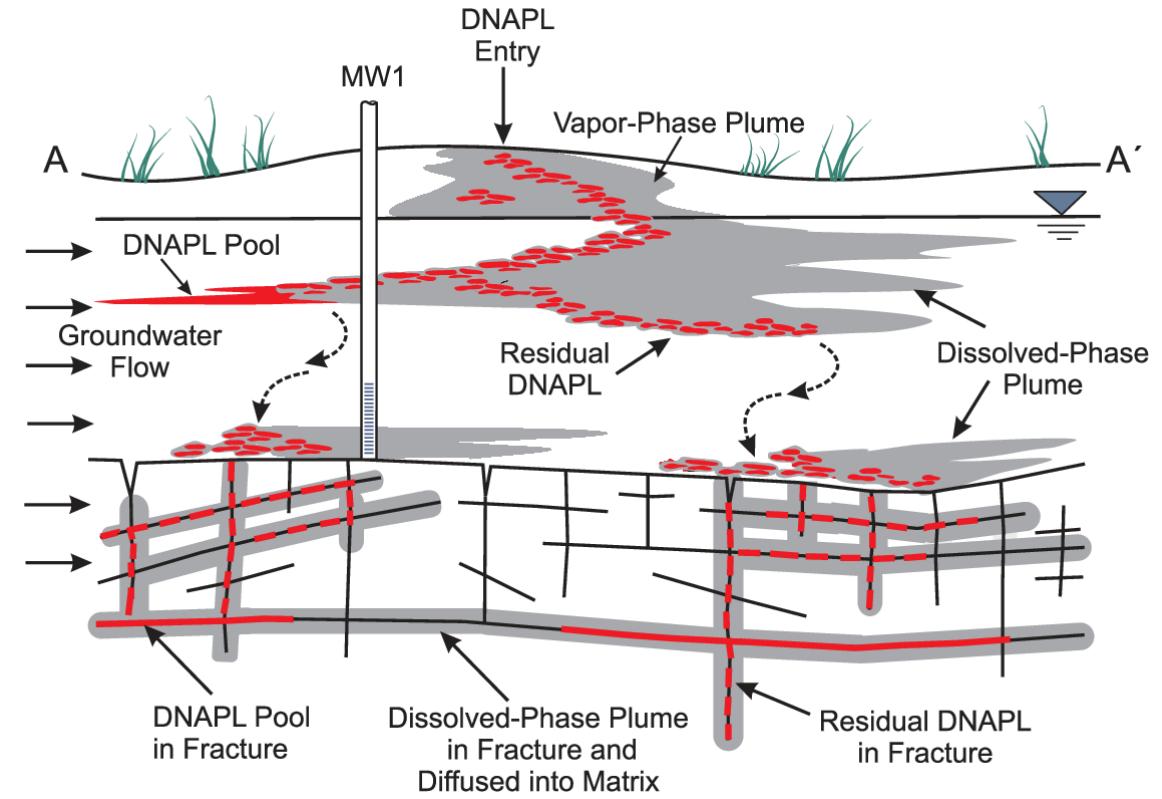
Kueper & Davies

A bit about me …
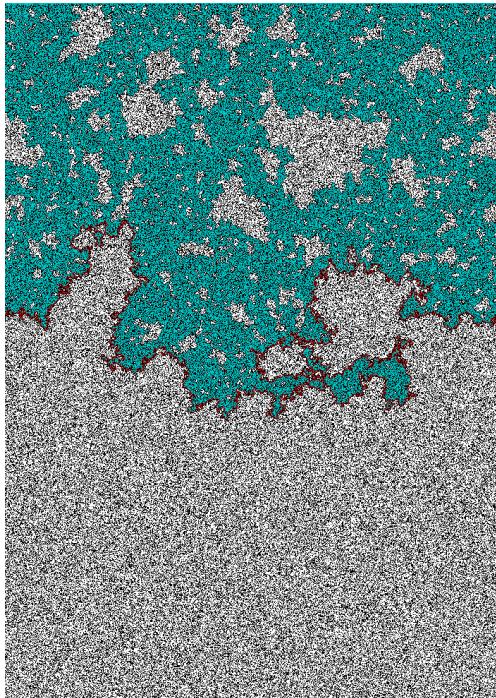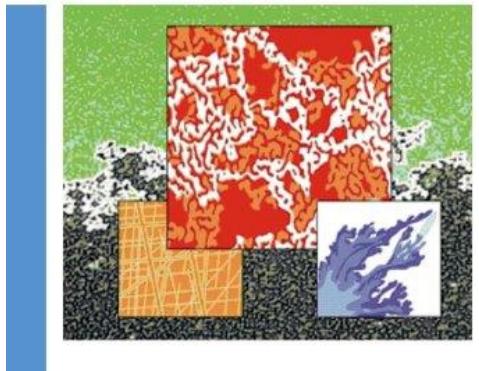
Percolation theory: about math and gossip

FIG. 2 Qualitative comparison between the actual urban data and the proposed model. *a*, Three steps of the growth with time of Berlin and surrounding towns. Data are shown for the years 1875, 1920 and 1945 (from top to bottom). *b*, Dynamical urban simulations of the proposed model. We fix the value of the correlation exponent to be $\alpha = 0.05$ (strongly correlated case), and choose the occupancy probability $p(r)$ to correspond to the density profiles shown in Fig. 4. We use the same seed for the random-number generator in all panels.
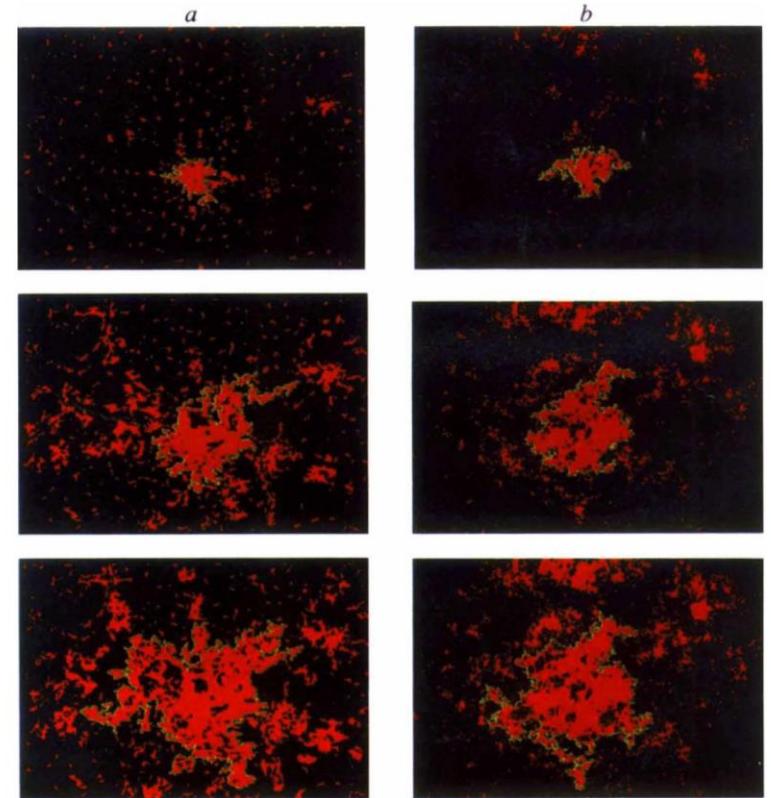
Modelling urban growth patterns | Nature