EPFL

Soil Physics: Introduction

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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)

EPFL

Teaching staff

- Coodinator: Prof. Gabriele Manoli, gabriele.manoli@epfl.ch
- Computer Lab: Guo-Shiuan Lin, guo-shiuan.lin@epfl.ch
- Assistants: Fiona Jetzer, fiona.jetzer@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 assigned readings to complete before each class. 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.* Bring your laptop (at least 1 per group).

Choose your group in Moodle by Oct. 17
(missing people will be randomly assigned to a group)

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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)

Recorded lectures

- The recordings of previous years (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)

- Other resources provided during the course, for example:

  Selker and Or: Soil Hydrology and Biophysics - YouTube

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%	5 December
2.	**Exam (*individual)*** *Open and/or multiple-choice questions + exercises on the material covered during the course*	TBD	TBD

A bit about me ...

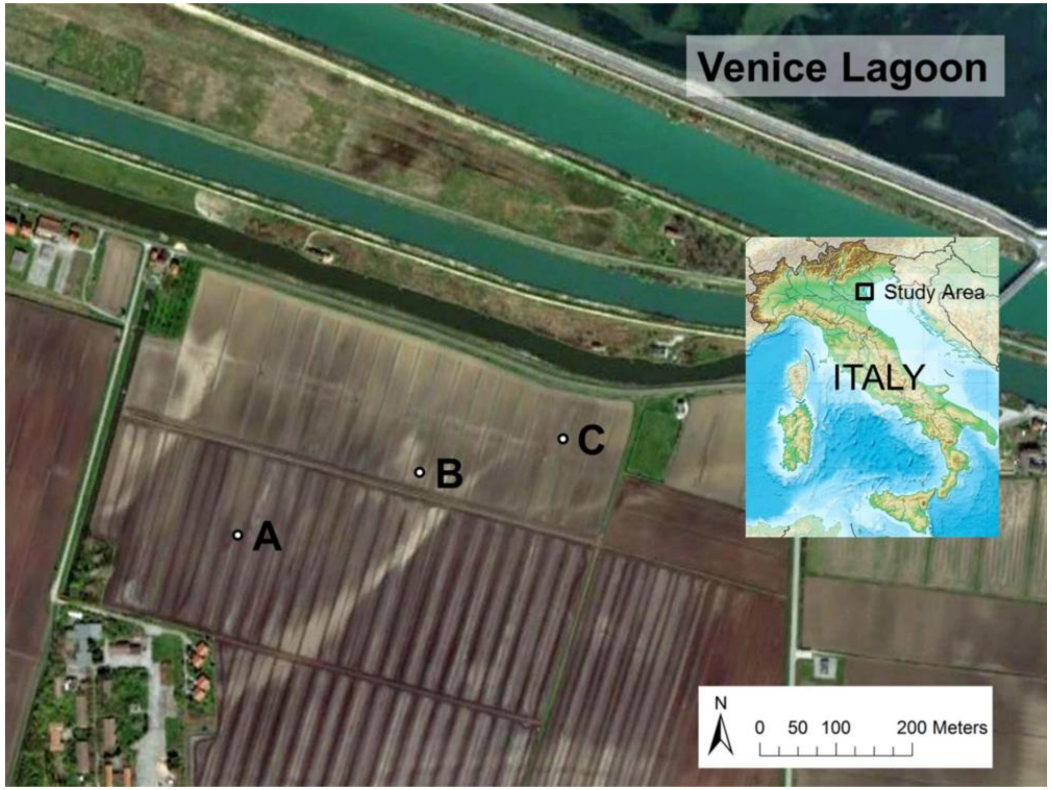
Laboratory of Urban & Environmental Systems (URBES)

(Urban) Ecohydrology

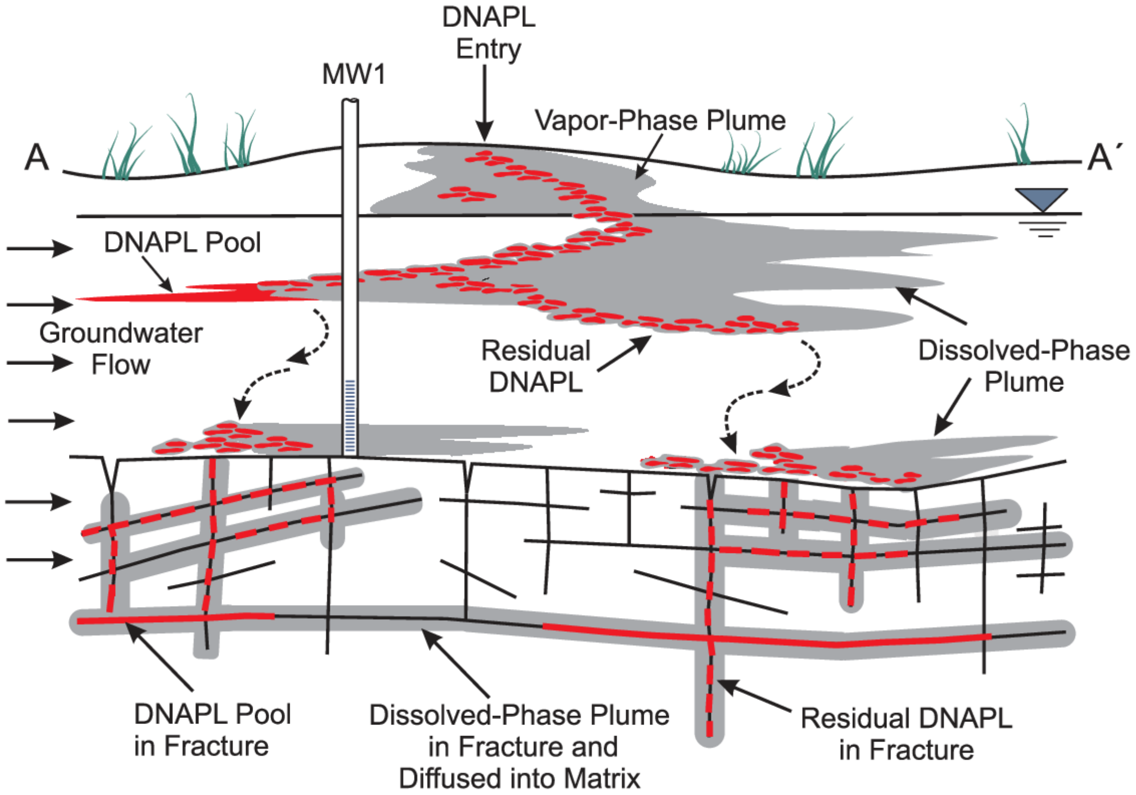
Urban Climate & Health

Urban Structure & Dynamics

A bit about me ...

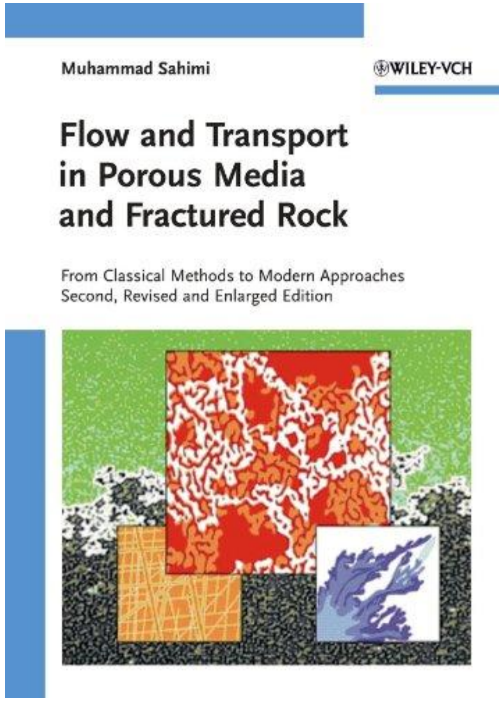


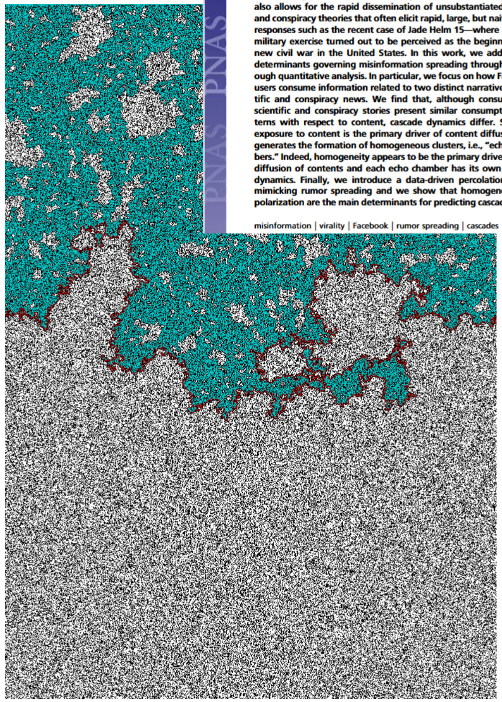
Scudiero et al. (2012)

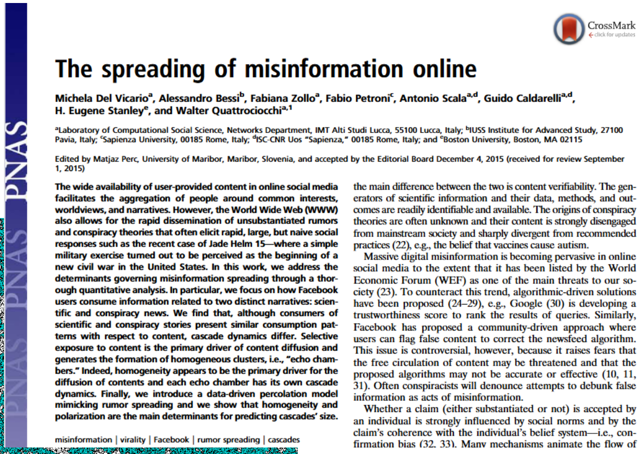


[Kueper & Davies]

A bit about me ...







PNAS

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The spreading of misinformation online

Michela Del Vicario[a], Alessandro Bessi[b], Fabiana Zollo[a], Fabio Petroni[c], Antonio Scala[a,d], Guido Caldarelli[a,d], H. Eugene Stanley[e], and Walter Quattrociocchi[a,1]

[a]Laboratory of Computational Social Science, Networks Department, IMT Alti Studi Lucca, 55100 Lucca, Italy; [b]IUSS Institute for Advanced Study, 27100 Pavia, Italy; [c]Sapienza University, 00185 Rome, Italy; [d]ISC-CNR Uos "Sapienza," 00185 Rome, Italy; and [e]Boston University, Boston, MA 02115

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The wide availability of user-provided content in online social media facilitates the aggregation of people around common interests, worldviews, and narratives. However, the World Wide Web (WWW) also allows for the rapid dissemination of unsubstantiated rumors and conspiracy theories that often elicit rapid, large, but naive social responses such as the recent case of Jade Helm 15—where a simple military exercise turned out to be perceived as the beginning of a new civil war in the United States. In this work, we address the determinants governing misinformation spreading through a thorough quantitative analysis. In particular, we focus on how Facebook users consume information related to two distinct narratives: scientific and conspiracy news. We find that, although consumers of scientific and conspiracy stories present similar consumption patterns with respect to content, cascade dynamics differ. Selective exposure to content is the primary driver of content diffusion and generates the formation of homogeneous clusters, i.e., "echo chambers." Indeed, homogeneity appears to be the primary driver for the diffusion of contents and each echo chamber has its own cascade dynamics. Finally, we introduce a data-driven percolation model mimicking rumor spreading and we show that homogeneity and polarization are the main determinants for predicting cascades' size.

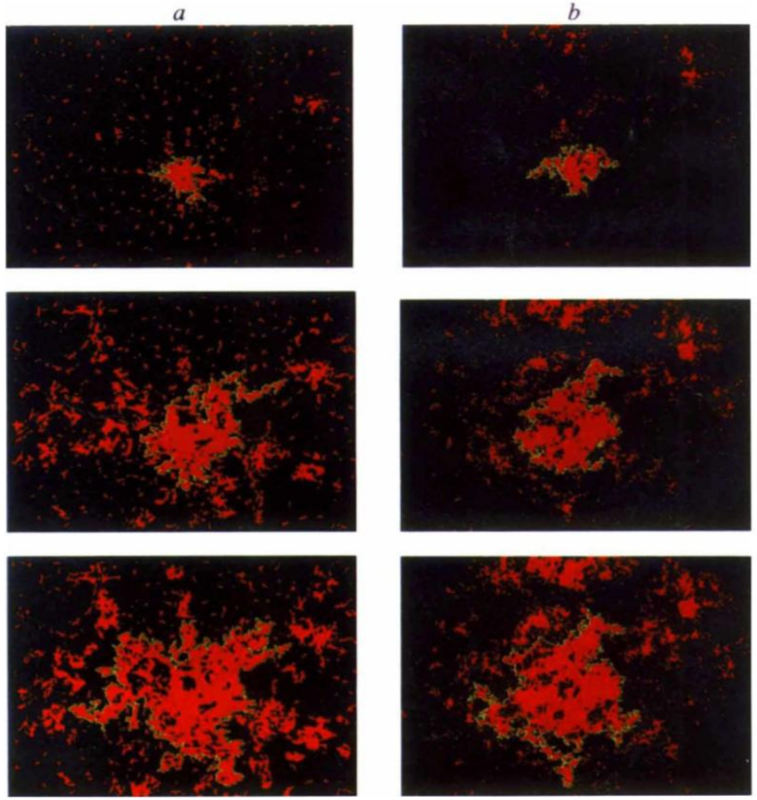
misinformation | virality | Facebook | rumor spreading | cascades

the main difference between the two is content verifiability. The generators of scientific information and their data, methods, and outcomes are readily identifiable and available. The origins of conspiracy theories are often unknown and their content is strongly disengaged from mainstream society and sharply divergent from recommended practices (22), e.g., the belief that vaccines cause autism.

Massive digital misinformation is becoming pervasive in online social media to the extent that it has been listed by the World Economic Forum (WEF) as one of the main threats to our society (23). To counteract this trend, algorithmic-driven solutions have been proposed (24–29), e.g., Google (30) is developing a trustworthiness score to rank the results of queries. Similarly, Facebook has proposed a community-driven approach where users can flag false content to correct the newsfeed algorithm. This issue is controversial, however, because it raises fears that the free circulation of content may be threatened and that the proposed algorithms may not be accurate or effective (10, 11, 31). Often conspiracists will denounce attempts to debunk false information as acts of misinformation.

Whether a claim (either substantiated or not) is accepted by an individual is strongly influenced by social norms and by the claim's coherence with the individual's belief system—i.e., confirmation bias (32, 33). Many mechanisms animate the flow of

[Percolation theory: about math and gossip]



[Modelling urban growth patterns | Nature]