How biologically formed macropores influence subsurface flow

Jérome Nespoulous, Roy C. Slide, Yves Le Bissonnais, Merlin Ramel, Rodolphe Dombey, Alexia Stokes

To cite this version:


HAL Id: hal-01837358
https://hal.archives-ouvertes.fr/hal-01837358
Submitted on 5 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
How biologically formed macropores influence subsurface flow

J. Nespoulous³, R.C. Sidle², Y. Le Bissonnais³, M. Ramel³, R. Dombre³, A. Stokes³
1. INRA - National Institute of Agronomic Research, France. 2. University of Sunshine Coast, Sustainability Research Centre, Australia

Introduction
- Water flow in soil influences heavily erosion, pollution and/or agronomic issues. However, subsurface flow processes still need further research.
- Subsurface flow is described as preferential uniform or non-uniform flow occurring in interconnected macropores (diameter > 2mm).
- Biological macropores formed by plant root systems and pedofauna influence largely this preferential flow.

Aims
- How do different forest cover types influence preferential flow by root morphology and pedofauna activity ?
- Is there any evident relationship at this scale between preferential flow and biotic parameters ?

Methods
- Tropical climate
- Field work Xishuangbanna, Yunnan province, China

Treatments
- Rubber tree plantation (Hevea brasiliensis) vs endemic tree forest
- Understory fine root effect vs weak fine roots bare soil
- Sites have a similar soil texture

Experiment
- 1) Dyed infiltration simulation
  - 3 experimental plot per site
- 2) Soil excavation
  - 3-5 soil profiles per plot
- 3) Measurements for each soil profiles

Measurements
Photo-description-sampling : spatialized with referenced grid (Fig.2)
- Patterns of water infiltration by blue dyeing
- Image analysis (Fig.2)
- Roots impact by diameter classes
- Pedofauna activity: presence / absence
- Soil resistance to penetration

Acknowledgment
Thank you very much to all the colleagues for the field work in China and to the EASE team for the discussions.