

NaWaM

Nachhaltiges Wassermanagement



ReWaM

GEFÖRDERT VOM



Bundesministerium
für Bildung
und Forschung



Simulation of the environmental fate of the fungicide Penconazole and its transformation products in a vineyard- terraces catchment

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Motivation

Problem:

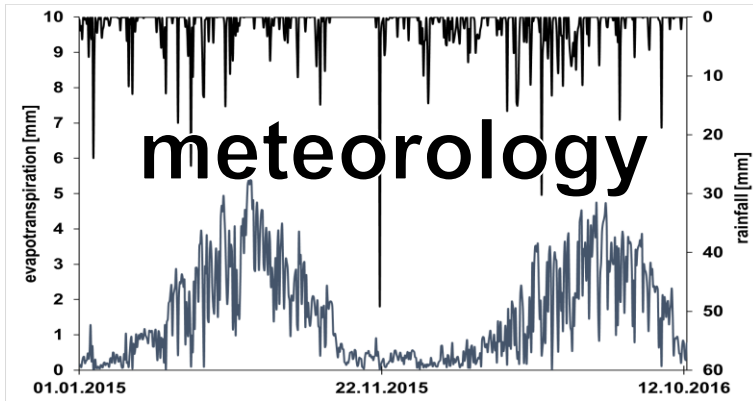
- High usage of fungicides in viticulture common
- Frequently detection of concentrations of Penconazole (max: 0.64 µg/L) and TPs in study area
- Model ZIN-AgriTra used successfully for simulation of herbicides (GASSMANN et al., 2013) → gap for catchment models for fungicides + TP

Aim:

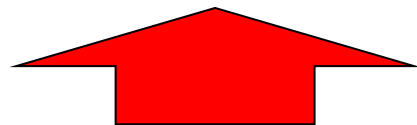
- Adaption of the model for fungicides (general more persistent, application on plants)
- Simulation of spraying period as first step for simulation of mitigation measures
- Identification of critical source areas and export pathways
- Information for the development of water pollution control strategies

Modell ZIN-AgriTra

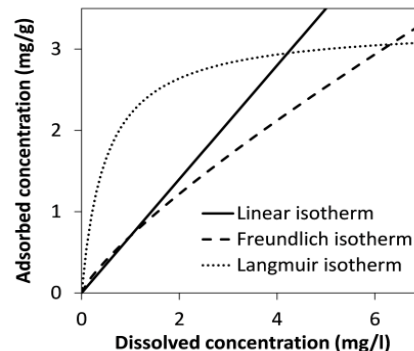
10x10 m cells, time step: 10 min



transformation:
half time +
formation fraction



sorption:
linear isotherm
+ kinetic

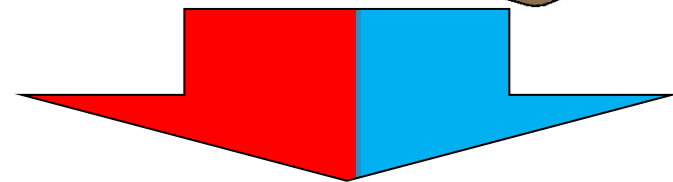
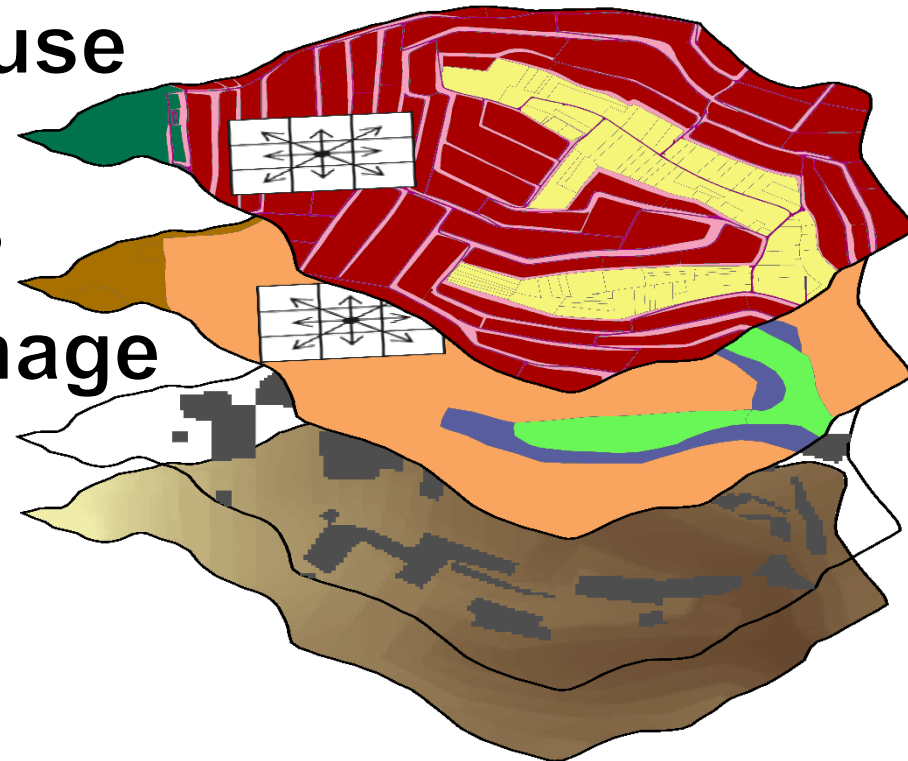


landuse

soils

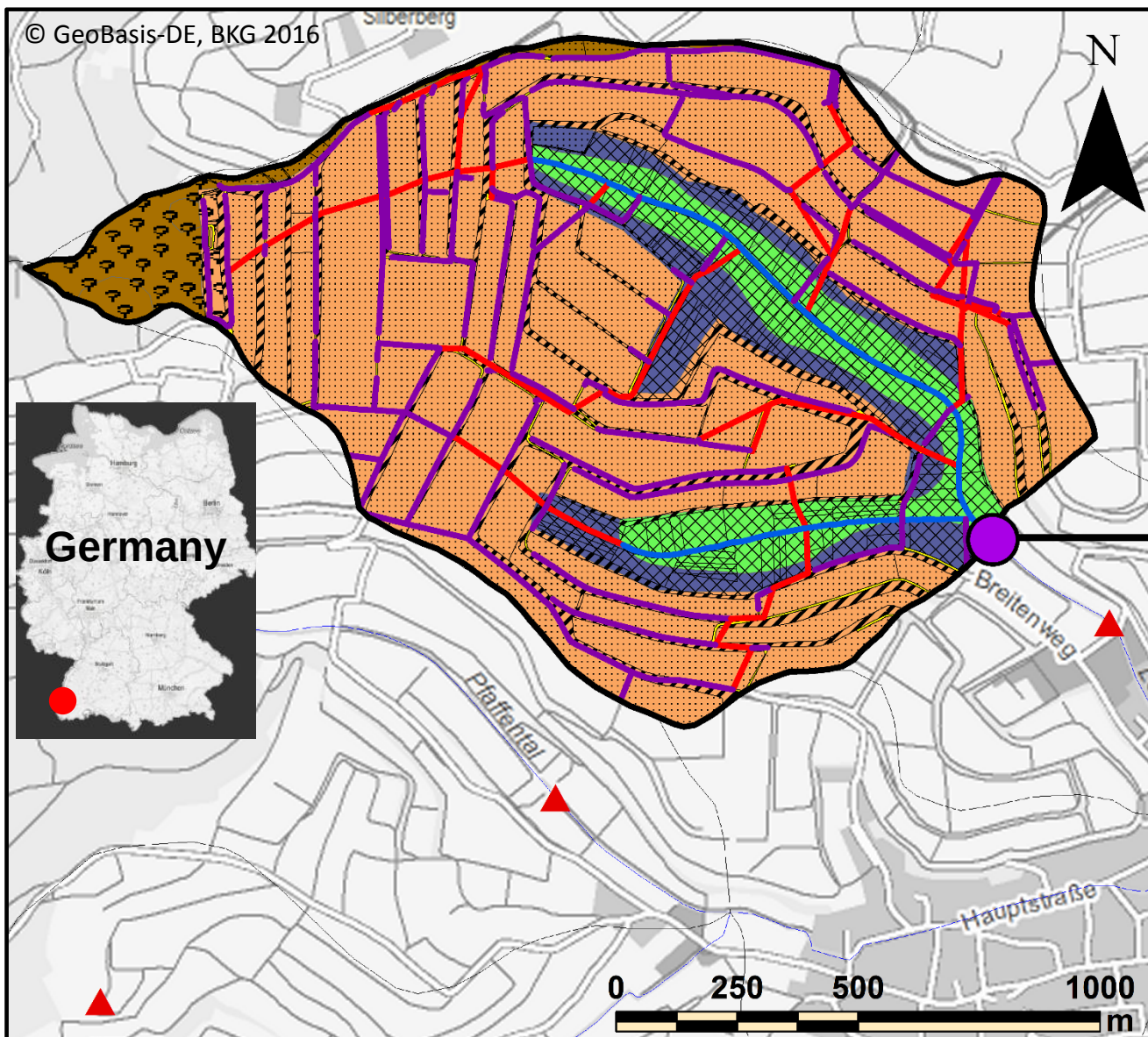
drainage

DEM



outflow
Penconazole concentrations
TP concentrations

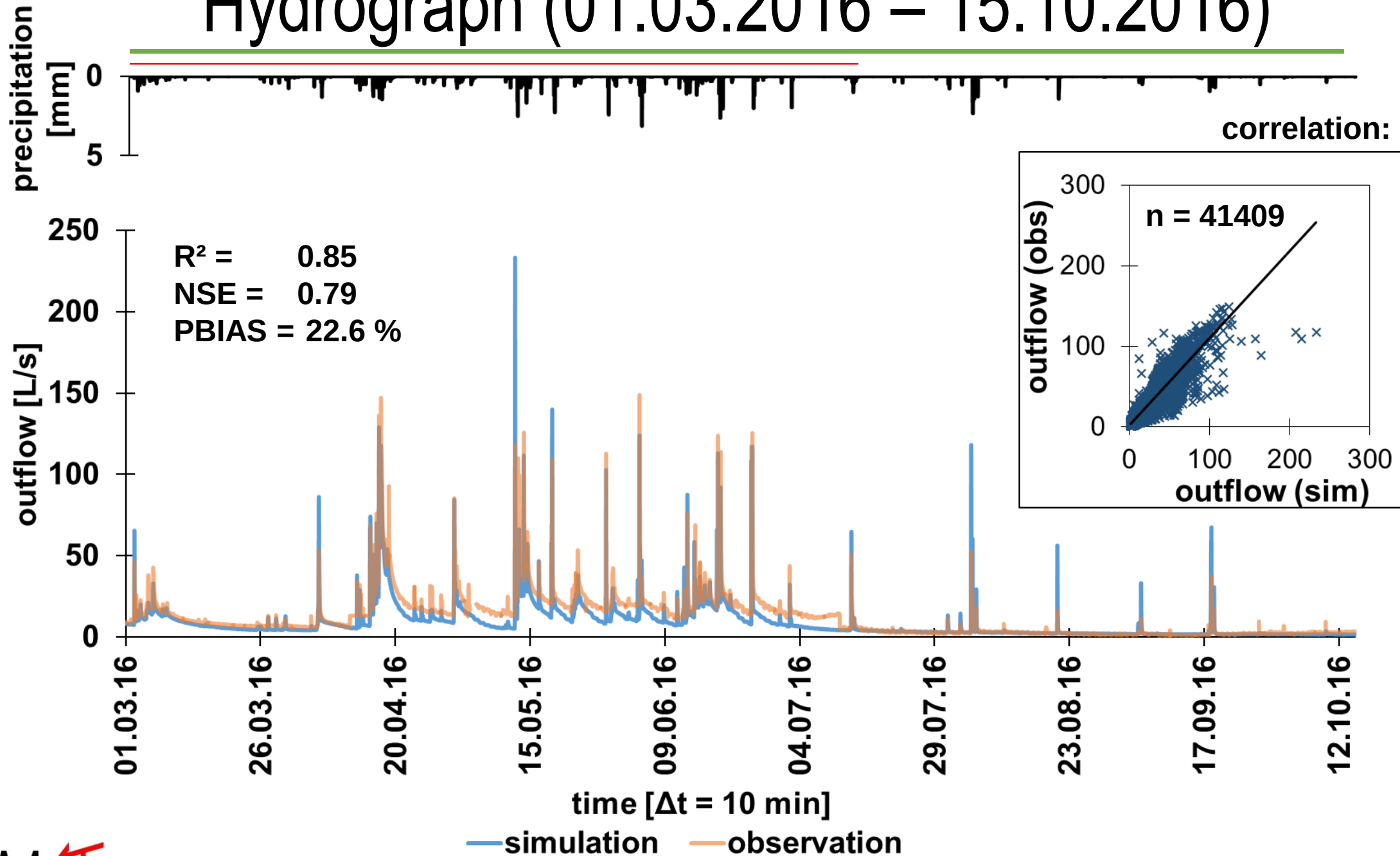
Study site: Loechernbach catchment (180 ha)



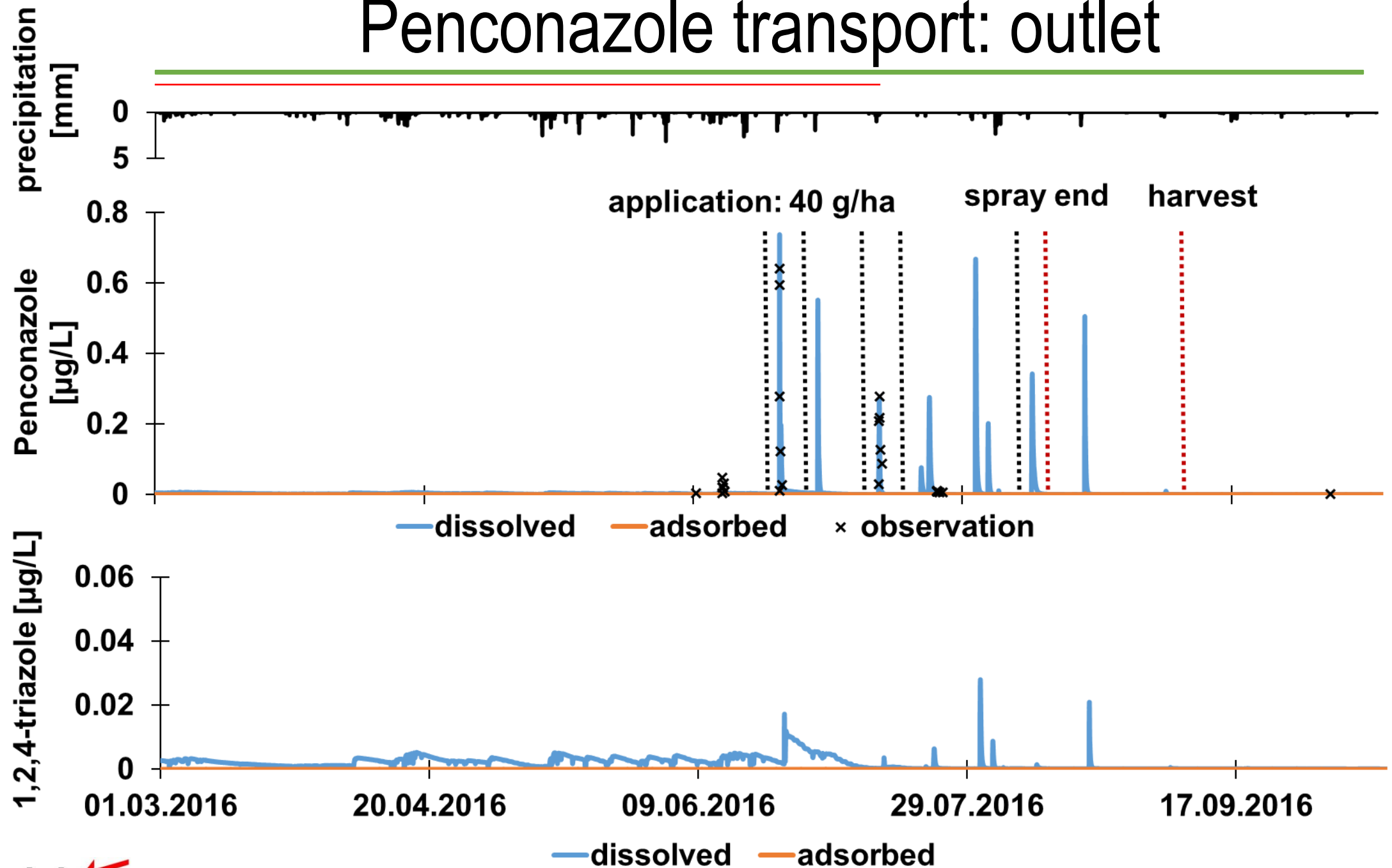
streamflow gauge

streams	landuse	soil
— pipe	acclivity	gley
— ditch	agriculture	colluvium
— street	street	pararendzina (terraces)
● outlet	forest	pararendzina (forest)
▲ rainfall gauge	vineyard	

Hydrograph (01.03.2016 – 15.10.2016)

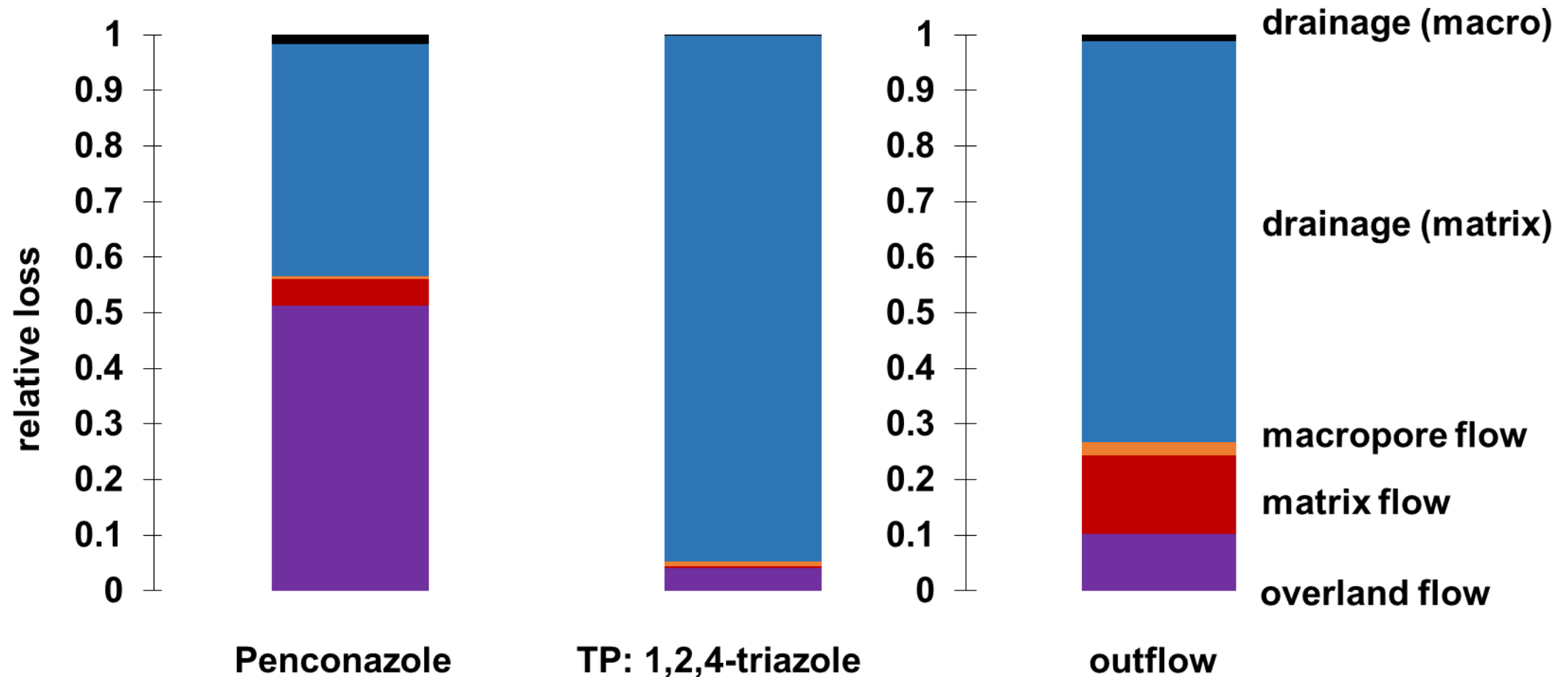


Penconazole transport: outlet



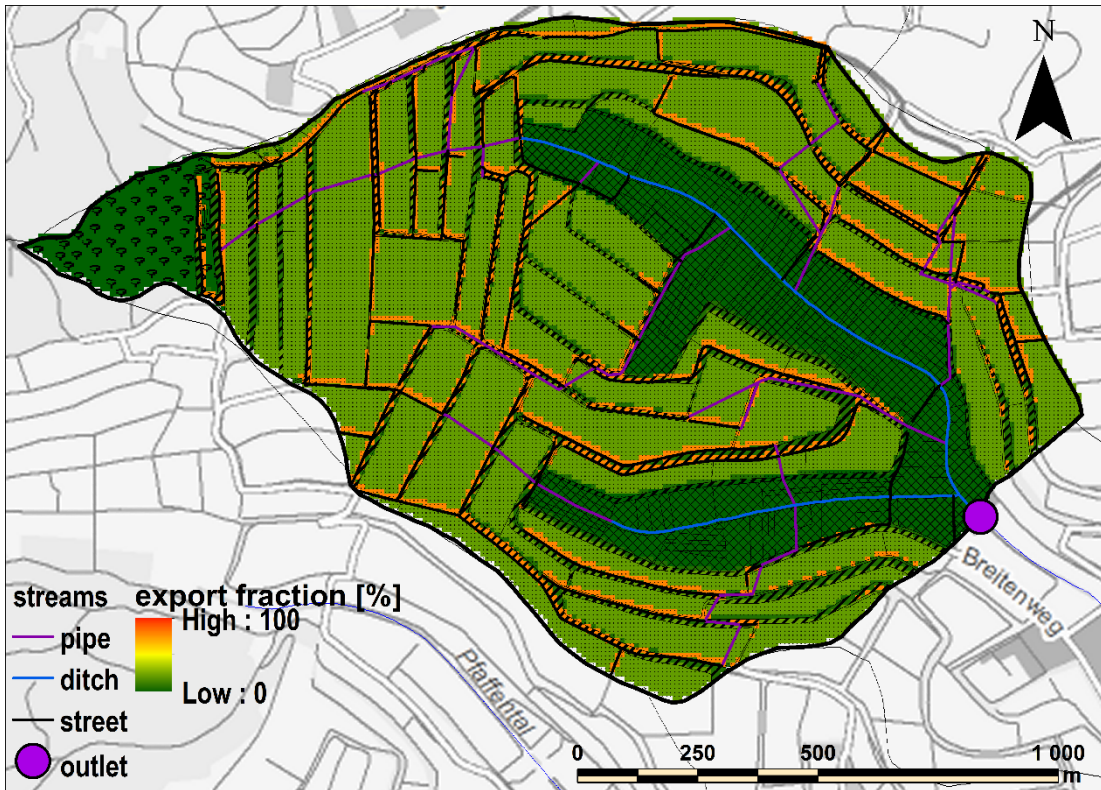
Export processes

Export processes (01.03.2016 – 15.10.2016):

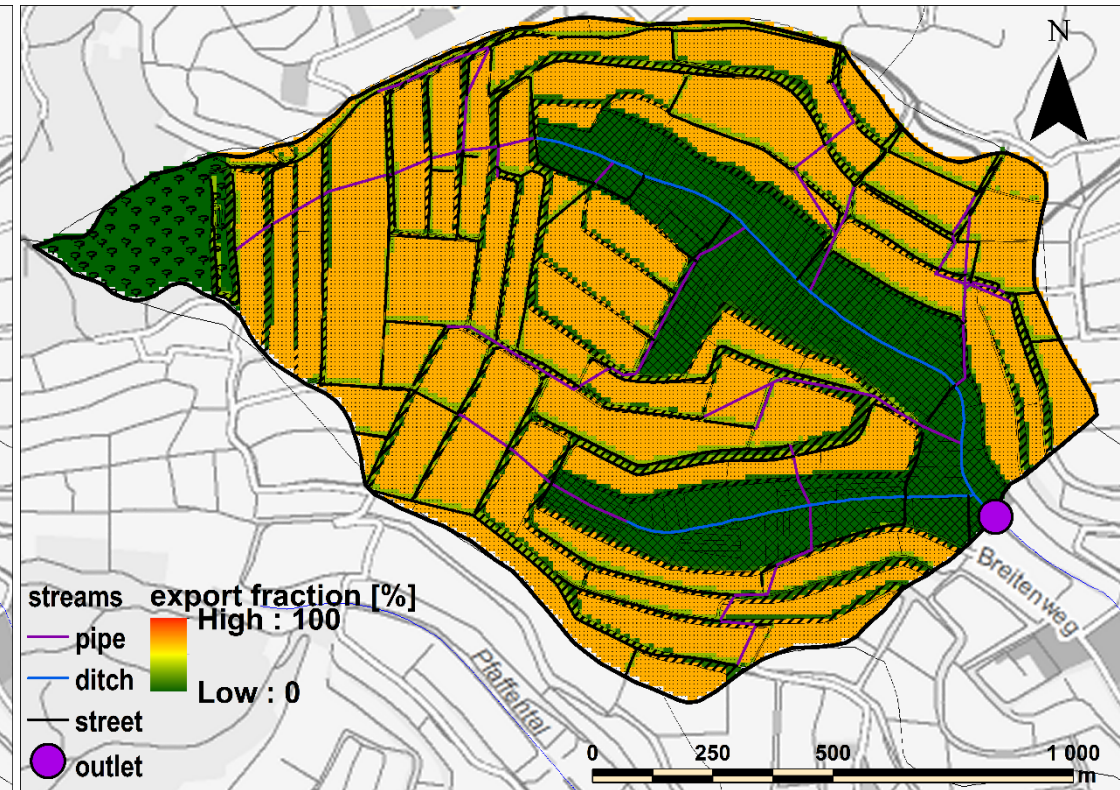


Critical source areas

Penconazole

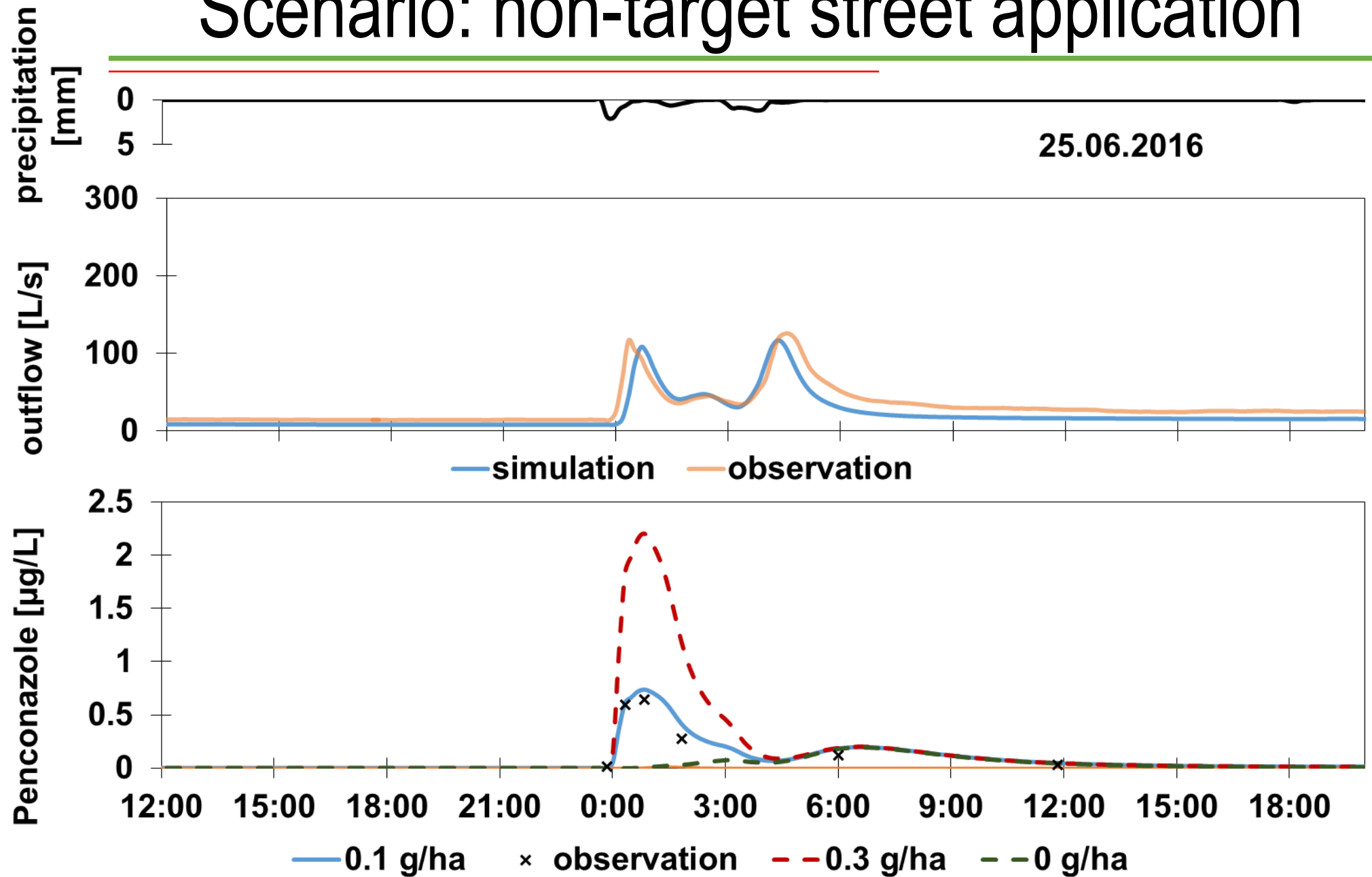


TP: 1,2,4-triazole



- Different critical source areas for PC & TP
- Major street contribution for PC export (80 %)

Scenario: non-target street application



Conclusion

Successful simulation of spraying period 2016:

- Most of applied fungicides remains in catchment
- TP & PC have different export pathways
- Main export of Penconazole via street and of TP via field release
- Next step: validation of TP export