

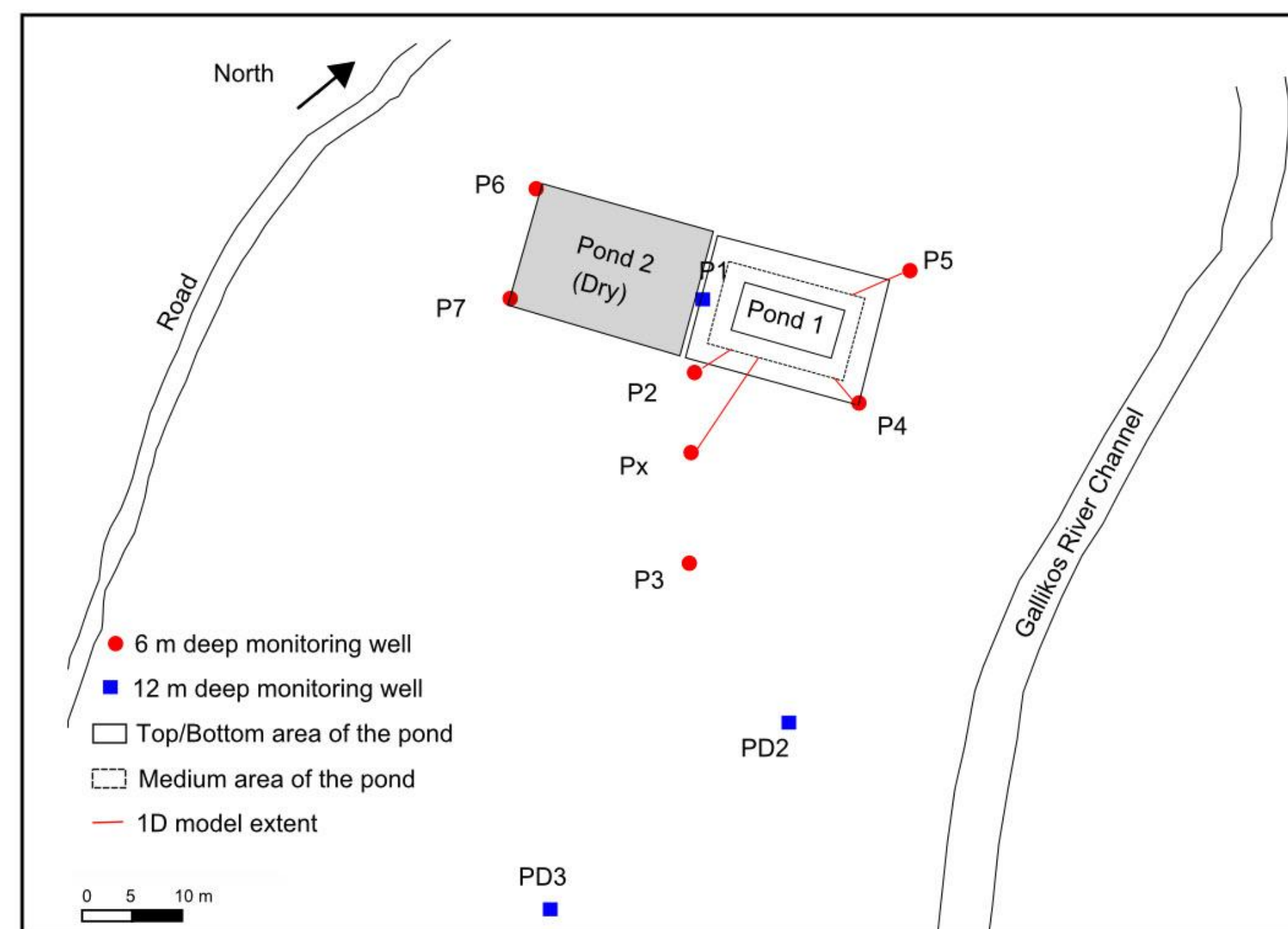
## Introduction

Soil-Aquifer Treatment (SAT) is a technique utilizing the natural filter and removal capacity of the soil and aquifer to improve the quality of surface or treated waste water for later water supply.

Simple 1<sup>st</sup> order degradation rate constants and linear adsorption coefficients provide useful information to quantify the removal of compounds for a first-step assessment.

The objective of current study was to investigate the transport behavior of 16 EOCs during ponded aquifer recharge by numerical modeling based on field scale experiments at a pilot site in Greece.

## Study Site



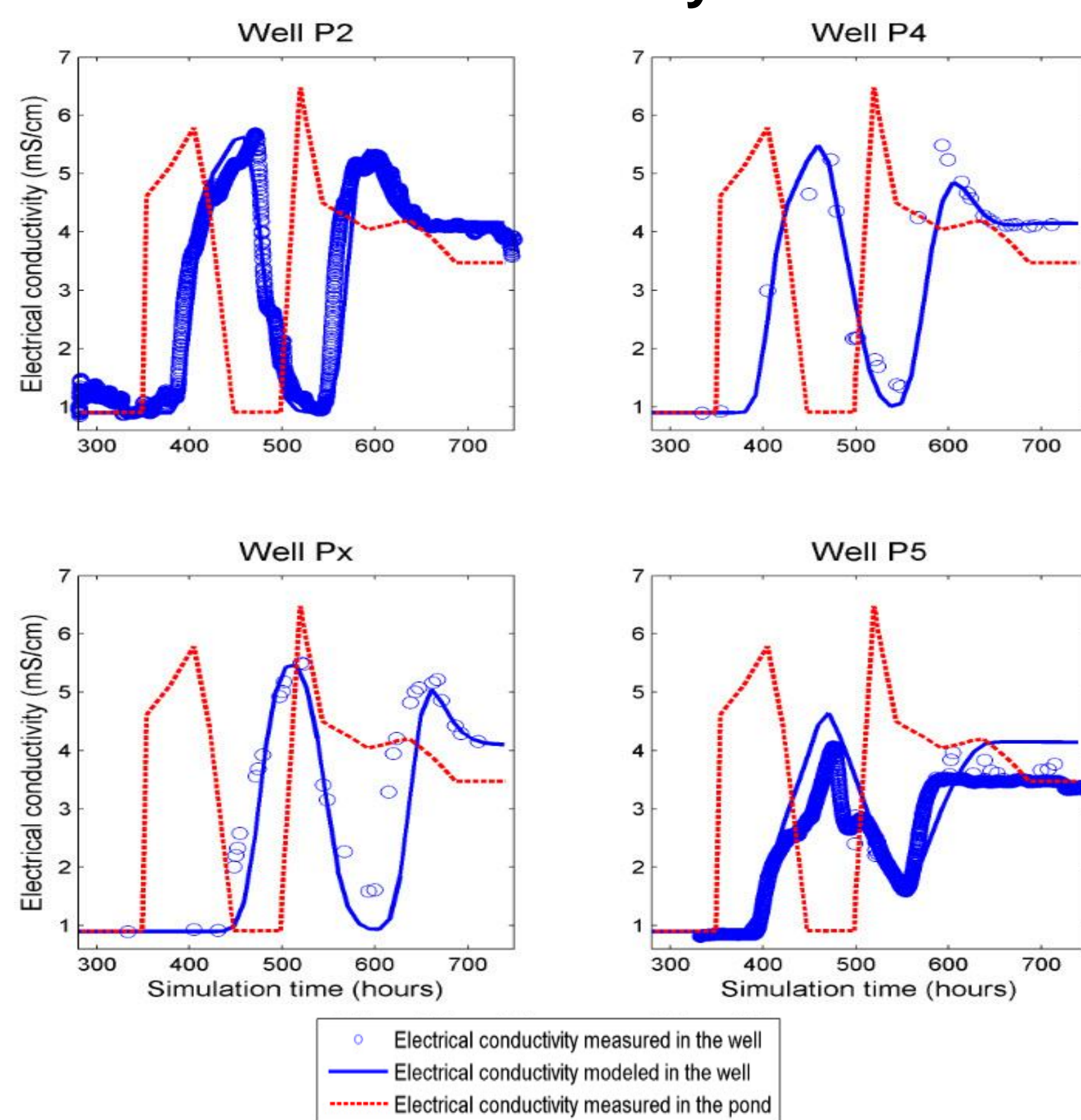
## Infiltration Experiments

- Experiment duration: from 28.08.2008 to 28.09.2008.
- Alternating infiltration of tap and wastewater at pond 1.

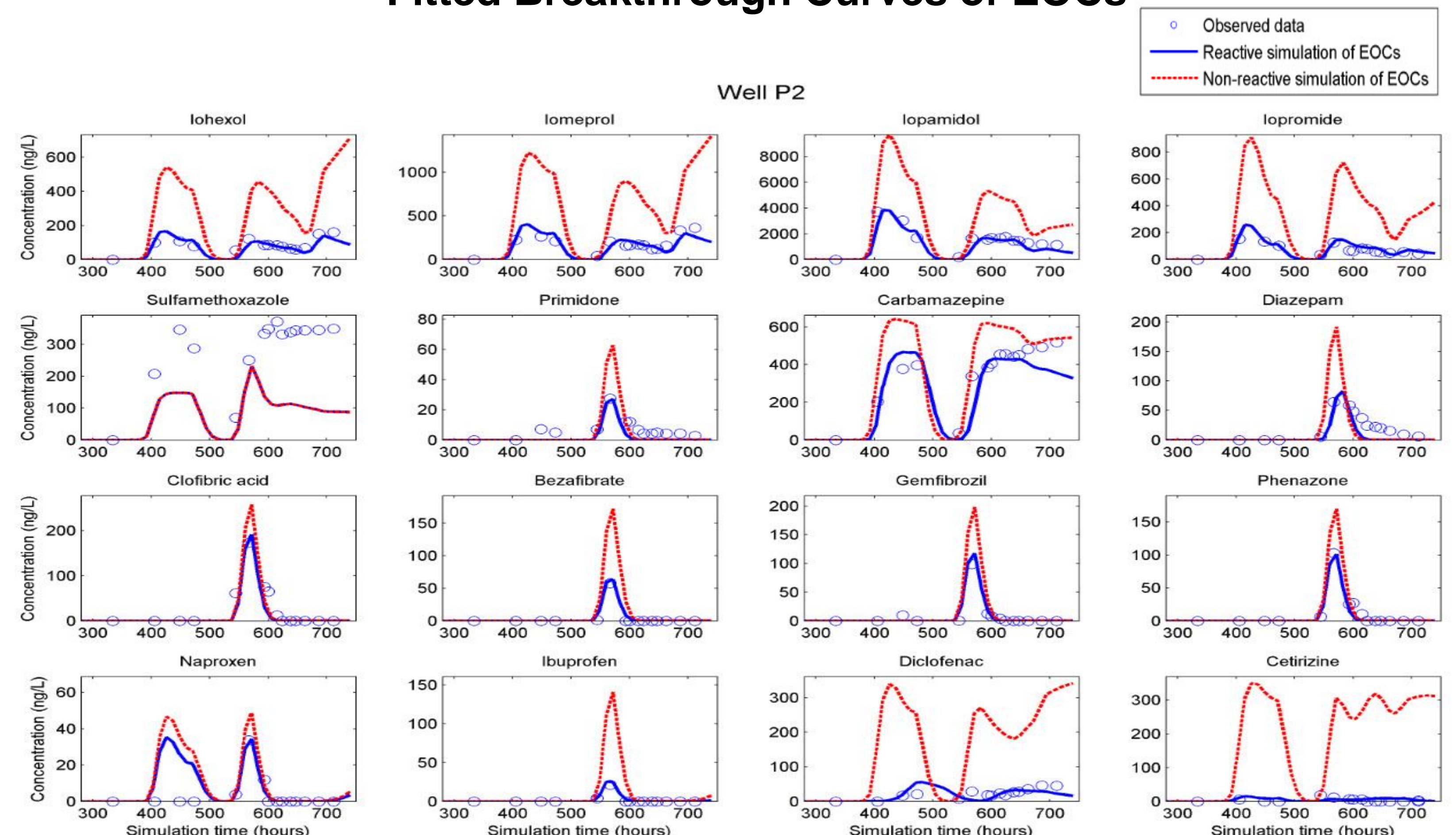
## Model Setup

- PMWIN: MODFLOW /MT3DMS
- Individual 1D models for wells P2, P4, P5 & Px
- Transient flow model
- Non-reactive transport model
- Reactive transport model

## Fitted Breakthrough Curves of Electrical Conductivity



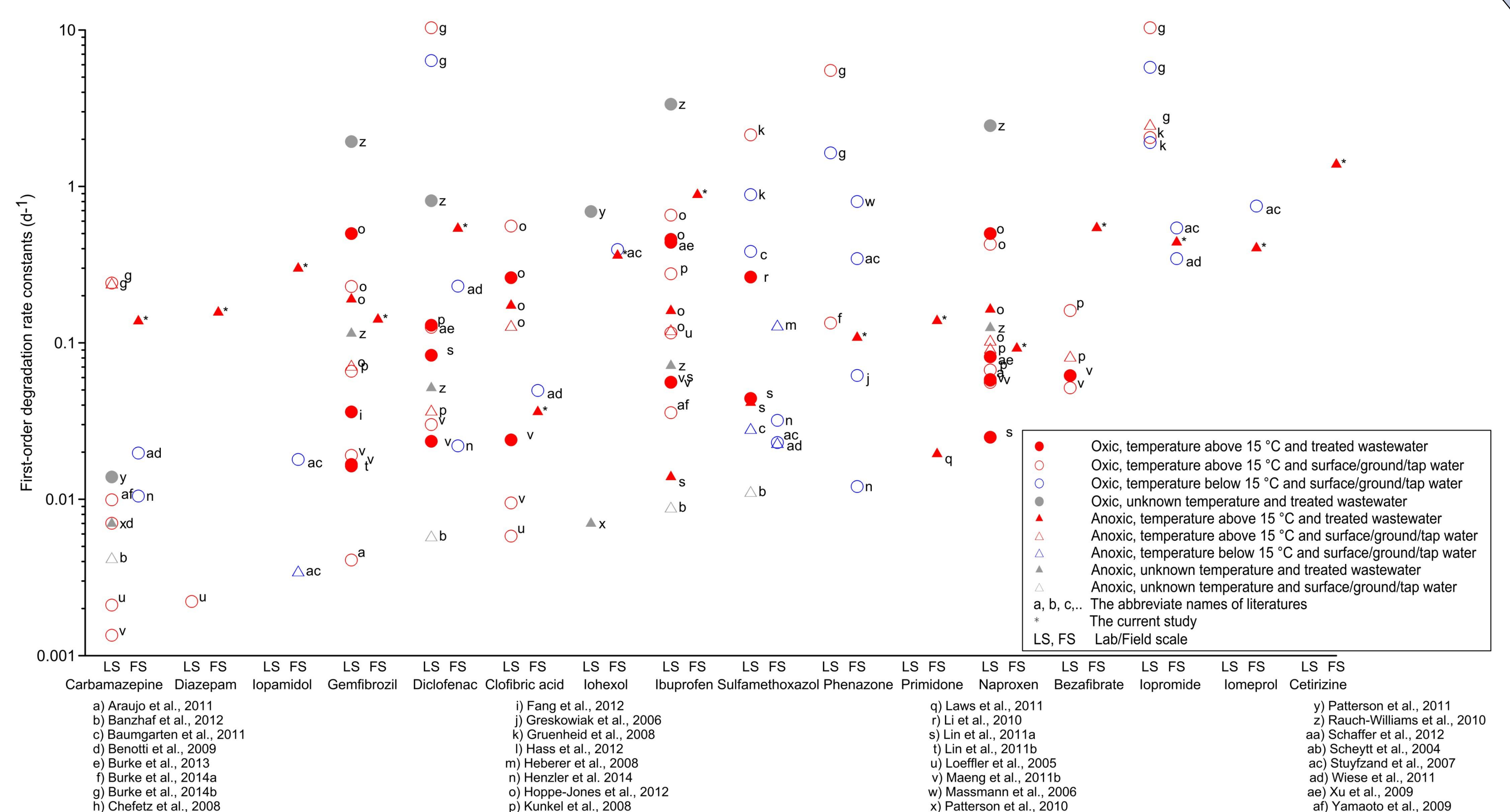
## Fitted Breakthrough Curves of EOCs



## Summary of Fitted Parameters

Application	Substance	Retardation R	Degradation	
			$\lambda$ (1/d)	$t_{1/2}$ (day)
Contrast media	Iohexol		0.28 - 0.50	1.4 - 2.5
	Iomeprol		0.35 - 0.46	1.5 - 2
	Iopamidol		0.20 - 0.39	1.8 - 3.5
	Iopromide		0.35 - 0.53	1.3 - 2
Antibiotics	Sulfamethoxazol		0	$\infty$
Anticonvulsants, sedatives	Primidone		0.14 - 0.28	2.5 - 5
	Carbamazepine	1.04 - 1.16	0.10 - 0.20	3.5 - 7
	Diazepam	1.16 - 1.81	0.20 - 0.23	3 - 3.5
Lipid regulators	Clofibric acid		0.00 - 0.10	7 - $\infty$
	Bezafibrate		0.33 - 0.69	1 - 2.1
	Gemfibrozil		0.05 - 0.17	4 - 15
Anti-inflammatory drugs	Phenazone		0.09 - 0.17	4 - $\infty$
	Naproxen		0.12 - 0.14	5 - $\infty$
	Ibuprofen		0.58 - 0.99	0.7 - 1.2
	Diclofenac	1.04 - 1.81	0.39 - 0.69	1.0 - 1.8
Antihistamines	Cetirizine		1.38	0.5

## Comparison of Fitted Degradation Rate Constants with Literature Values



## Conclusions

- Sorption was mostly insignificant.
- Degradation rate constants show strong variations, but are generally high compared to those reported in the literature.
- Caution must be taken when transferring rate constants from one site to another and/or from one study to another.

## Acknowledgments

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## References

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