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Introduction

Water characteristics determine bioavailability of zinc towards freshwater organisms and should therefore determine water quality standards...



*Oncorhynchus mykiss*



*Daphnia magna*



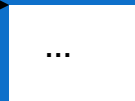
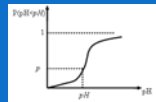
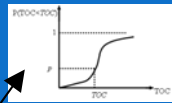
*Pseudokirchneriella subcapitata*

...so differences in water characteristics should lead to different water quality standards

Methodology

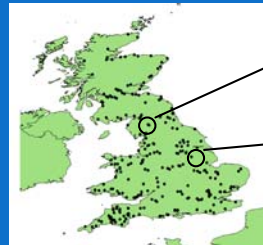
Differences due to temporal variability...

...quantified using cumulative probability distributions



Differences due to geographical variability...

...quantified using a GIS (Geographic Information System)



pH = 7.33  
TOC = 5.66  
...

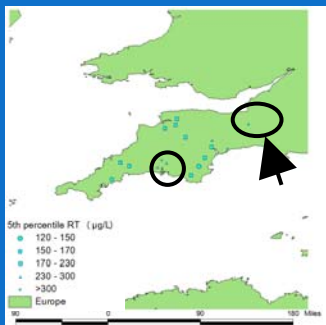
pH = 6.55  
TOC = 15.7  
...

**Biotic Ligand Model** application in a Monte-Carlo approach for three species (fish, water flea and algae)

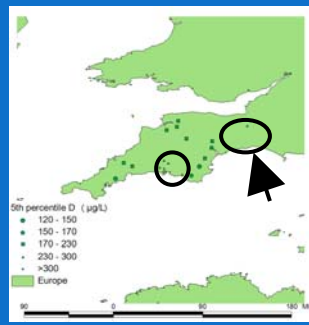
→ cumulative probability distributions of the No Observed Effect Concentration for the modeled species on different locations in southern UK

Representing the 5th percentiles of these NOEC distributions through the GIS...

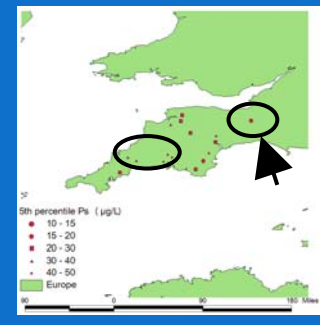
Results



*Oncorhynchus mykiss*



*Daphnia magna*



*Pseudokirchneriella subcapitata*

...shows "less sensitive" spots for all three species (marked) and shows one location (arrow) where toxicity to trout and water flea is modified while toxicity to algae is magnified

**Zn bioavailability is heavily influenced by temporal and geographical variability**  
→ 1 fixed water quality standard may not serve in all circumstances