

# Evaluating Higher Tier Modelling Submissions in the UK

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# Introduction

- Evaluating higher tier modelling submissions
  - Best practice; the good and the bad
- FOCUS surface water in the UK
- Hard surface model
- SEISMIC 2.0

# Information sources

- **UK PSD Data Requirements Handbook**
  - [http://www.pesticides.gov.uk/applicant/registration\\_guides/data\\_reqs\\_handbook/env\\_fate.pdf](http://www.pesticides.gov.uk/applicant/registration_guides/data_reqs_handbook/env_fate.pdf)
  - Development of guidance on parameterisation of MACRO (PL0538)
  - Evaluation of the use of preferential flow models (PL0516)
  - [http://www.pesticides.gov.uk/applicant/registration\\_guides/data\\_reqs\\_handbook/supporting/PL0516 - Evaluation of preferential flow models.pdf](http://www.pesticides.gov.uk/applicant/registration_guides/data_reqs_handbook/supporting/PL0516-Evaluation%20of%20preferential%20flow%20models.pdf)
- **Approaches and tools for higher tier assessment of environmental fate**
  - [http://www.pesticides.gov.uk/applicant/registration\\_guides/data\\_reqs\\_handbook/Supporting/Research\\_PL0546-HigherTierGuidance.pdf](http://www.pesticides.gov.uk/applicant/registration_guides/data_reqs_handbook/Supporting/Research_PL0546-HigherTierGuidance.pdf)
- **Defra science and research projects**
  - [http://www2.defra.gov.uk/research/project\\_data/default.asp?SCOPE=1&M=&V=%LVI=0&Cat1=&Cat2=&Cat3=&Cat4=&Cat5=](http://www2.defra.gov.uk/research/project_data/default.asp?SCOPE=1&M=&V=%LVI=0&Cat1=&Cat2=&Cat3=&Cat4=&Cat5=)
- **Re-registration: checklist for environmental assessment**
  - [http://www.pesticides.gov.uk/applicant/aahip/aahI0233\\_checklist.htm](http://www.pesticides.gov.uk/applicant/aahip/aahI0233_checklist.htm)
- **PSD website**
  - <http://www.pesticides.gov.uk/>

# Evaluating higher tier submissions: General principles

- Good scientific principles & common sense
- 1<sup>st</sup> tier (standard scenarios):
  - GAP and pesticide properties
- Higher tier (non-standard scenarios):
  - Soil and weather data
  - surface water parameterisation
  - England and Wales: SEISMIC

# Inverse modelling of field dissipation and lysimeter studies

- Model selection and justification
- Data quality
  - approximation to 1<sup>st</sup> order kinetics
- Minimisation of variables
- PEST
- Site specific soil and climate data
- Further information:-
  - Dubus, Beulke and Brown (2002) Calibration of pesticide leaching models: critical review and guidance for reporting *Pest Management Science* **58**:745-758

# Common problems

- Insufficient data points above the LOQ
- No clear degradation phase for metabolite
  - Fix formation fraction at minimum
- Incorrect kinetics
  - Metabolite formation via an independent variable
  - Multi-compartment kinetics
- Manual inverse modelling
  - Graphical interpretation of goodness of fit

# FOCUS surface water in the UK

- UK National product approvals
  - Basic drift values (Rautmann *et al.*, 2001)
  - PSD 1<sup>st</sup> tier drain flow assessment
- UK Rapporteur
  - FOCUS<sub>sw</sub> AND current approach
    - <http://www.pesticides.gov.uk/applicant/aahip/aahl0325.htm>
- Representativeness of FOCUS<sub>sw</sub> to UK
  - CEA and NSRI (PS2214)
    - [http://www2.defra.gov.uk/research/project\\_data/More.asp?I=PS2214&SCOPE=0&M=KWS&V=PS2214&Lvl=0&Cat1=&Cat2=&Cat3=&Cat4=&Cat5=](http://www2.defra.gov.uk/research/project_data/More.asp?I=PS2214&SCOPE=0&M=KWS&V=PS2214&Lvl=0&Cat1=&Cat2=&Cat3=&Cat4=&Cat5=)

# Hard Surface Model

- Background
  - Crude assessment: 100% loss in 25mm
- Empirical data
  - Herbicide losses in the field plus partitioning studies
- 4 scenarios
  - Water bodies based on FOCUSsw Steps 1 & 2
  - Urban and rural; ground and surface water
- Assumptions
  - Spring, continuous application in a wet year
  - No dissipation or retention in gully pots



# SEISMIC 2.0

- Spatial Environmental Information System for Managing the Impact of Chemicals
- Major upgrade by NSRI (PL0551)
  - Windows based technology
  - Up-to-date cropping information for England and Wales (2000)
  - Spatial data on groundwater resources
  - Improved soil hydraulic property data sets
  - ‘SWELTER’ weather generator