



# Introduction to use of existing field studies not tailored for DegT50 (legacy studies)

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# Outline

- Introduction
- Derivation of DegT50 values from existing (legacy) studies
- EFSA endpoint selector



# Introduction

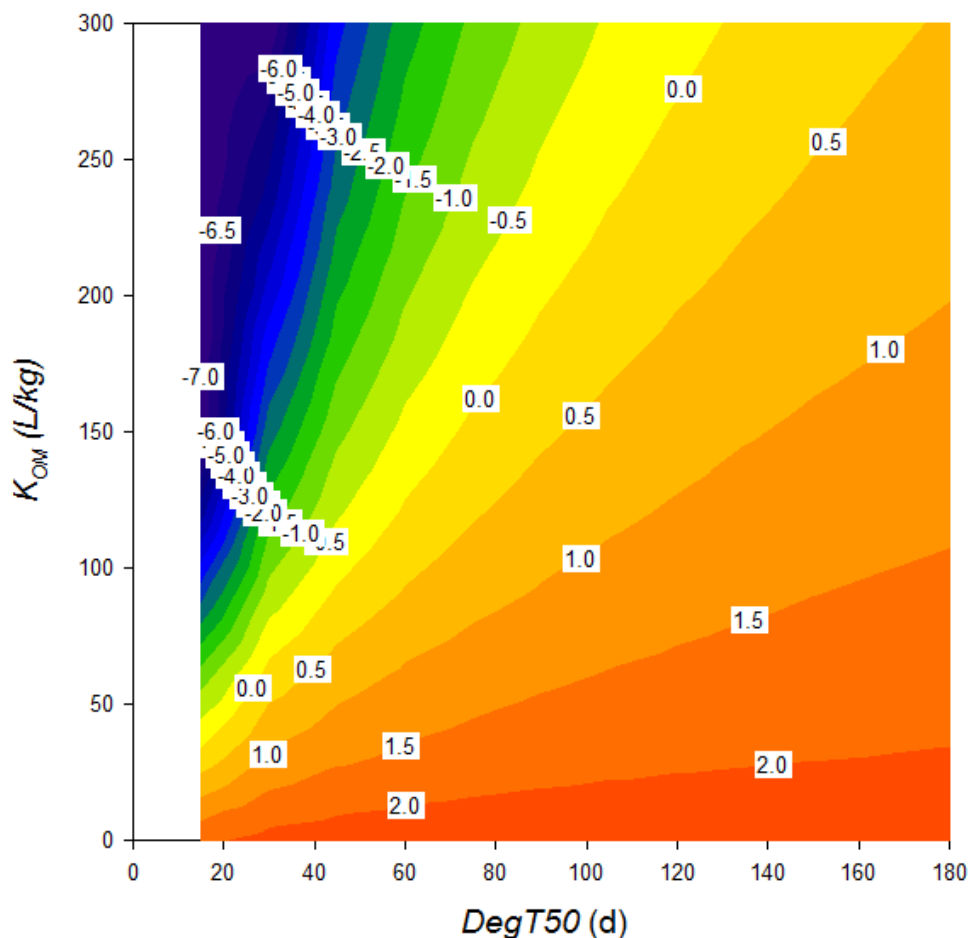
## Overview of the guidance development process in EFSA

- EFSA guidance opinion on field persistence studies in 2010
- EFSA guidance: “cookbook”
- Public consultation autumn 2013
- Publication May 2014
  
- Now:  
EFSA Technical Meeting with stakeholders



# Introduction

## Contour plot of FOCUS leaching concentration ( $\mu\text{g/L}$ )



- Okehampton scenario (FOCUSPEARL 4.4.4)
- application of 1 kg/ha in winter cereals

Sensitivity of leaching to DegT50 is extremely large, so guidance important

# Introduction

## Two-step approach

- assessment of individual field studies to derive a defensible DegT50 from a single field
- estimate median/geomean DegT50 for required exposure scenario considering all relevant DegT50 values from lab plus field studies






## DegT50 from existing (legacy) field studies

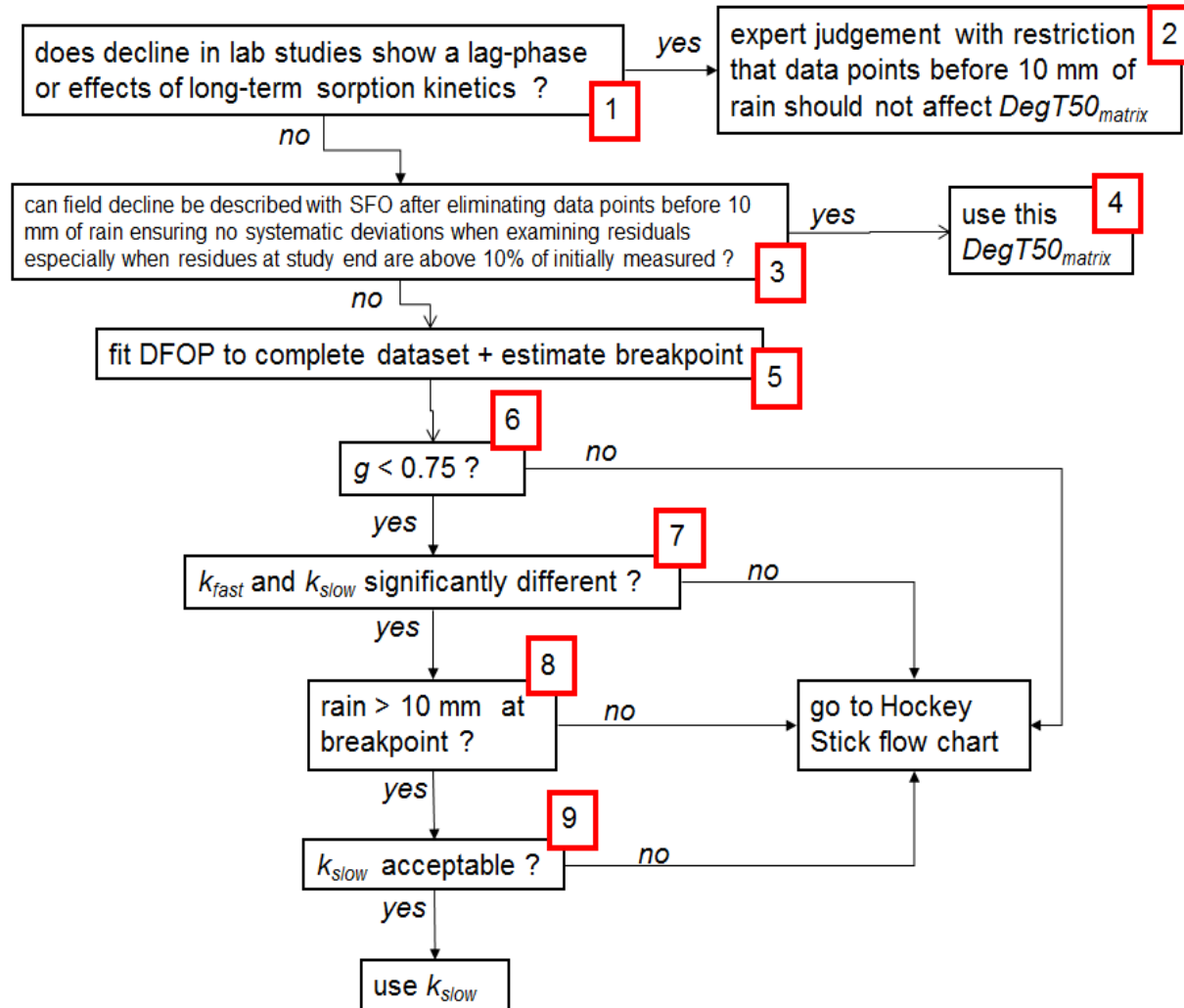


Surface processes (e.g. photolysis) should not influence DegT50 because it is used in the simulation models for the degradation within the soil matrix

## DegT50 from existing (legacy) field studies

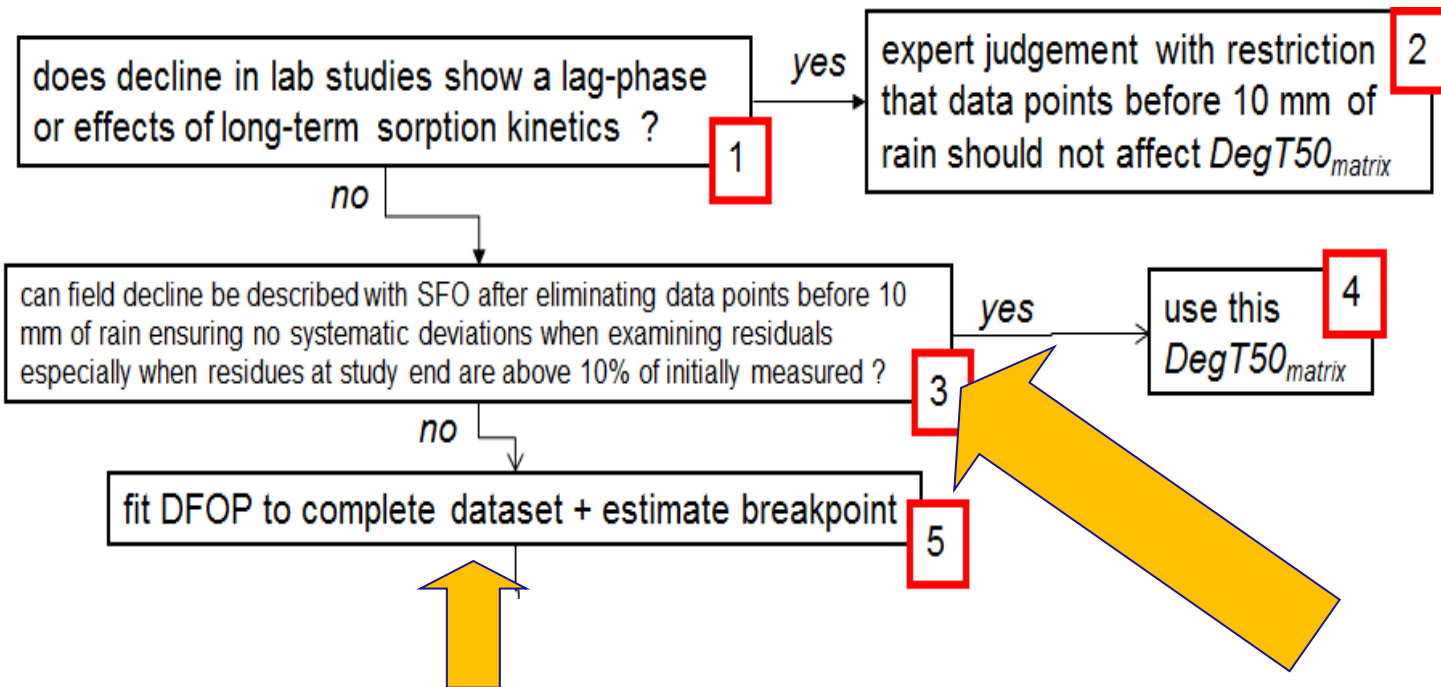
- 
- DegT50 values from field studies have to be normalised to 20°C and moisture content at field capacity via inverse modelling (time-step normalisation)
  - Inverse modelling based on number of assumptions:
    - Arrhenius activation energy of 65 kJ/mol for temperature dependence
    - exponent B of 0.7 for moisture dependence
    - adequate simulation of soil moisture and temperature with simulation models
  - so, a field DegT50 is not a solid parameter as a lab DegT50

# DegT50 from existing (legacy) field studies





# DegT50 from existing (legacy) field studies



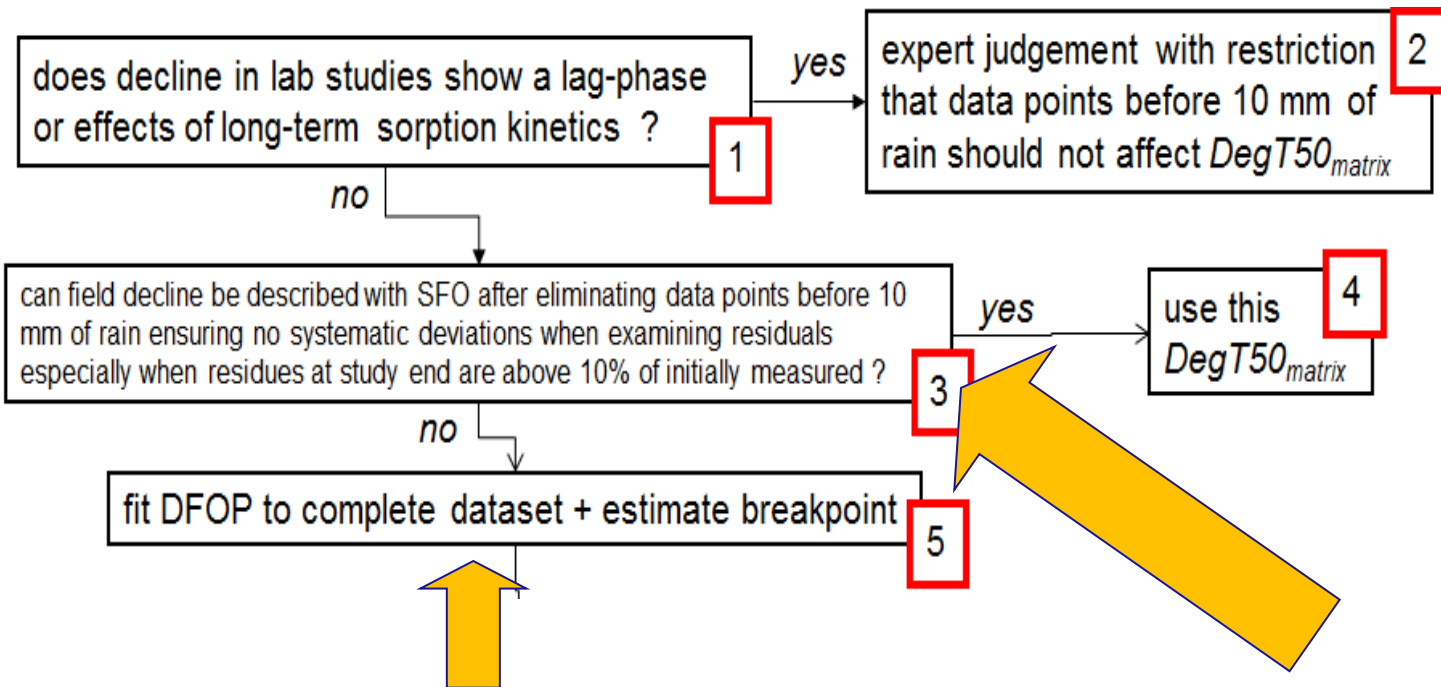
FOCUS Deg Kin criteria for good SFO description:

- visual assessment of fit
- $\chi^2$  test for goodness of fit
- t-test for confidence in DegT50

essential to exclude data points before 10 mm of rain to avoid effect of surface processes



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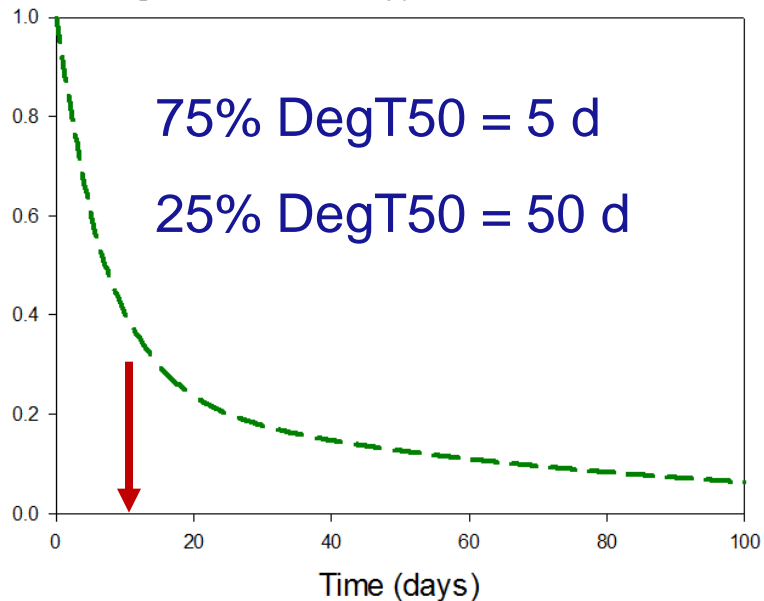
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# DegT50 from existing (legacy) field studies

fit DFOP to complete dataset + estimate breakpoint **5**

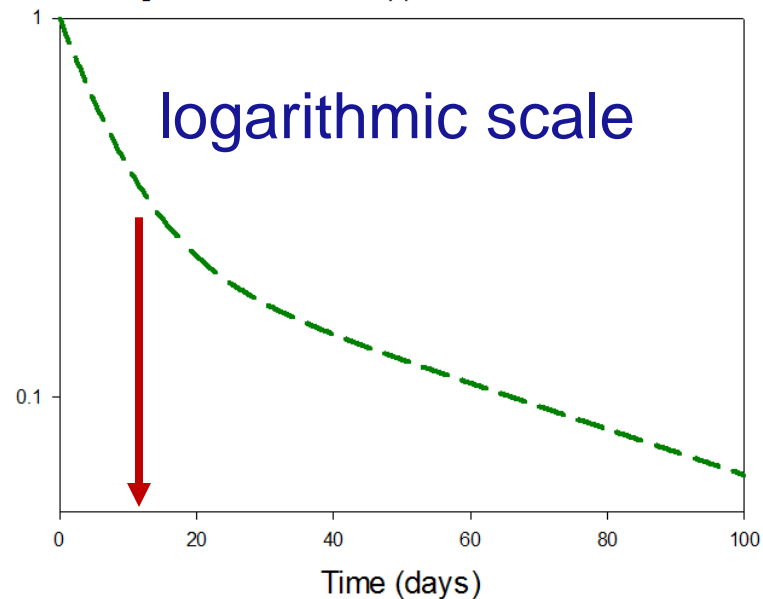
- DFOP = Double First-Order Parallel

Remaining fraction of dose (-)



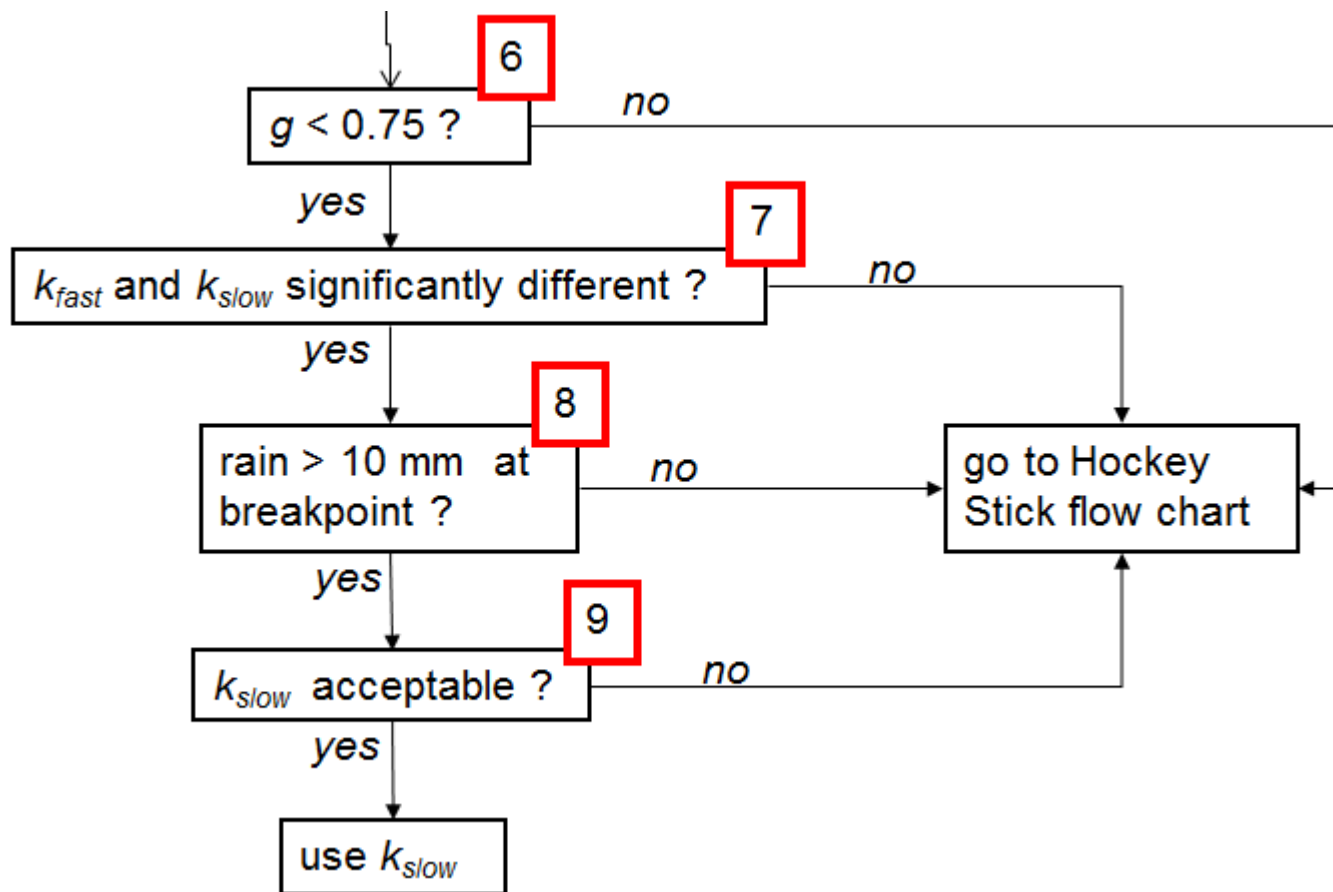
**breakpoint 15 d**

Remaining fraction of dose (-)



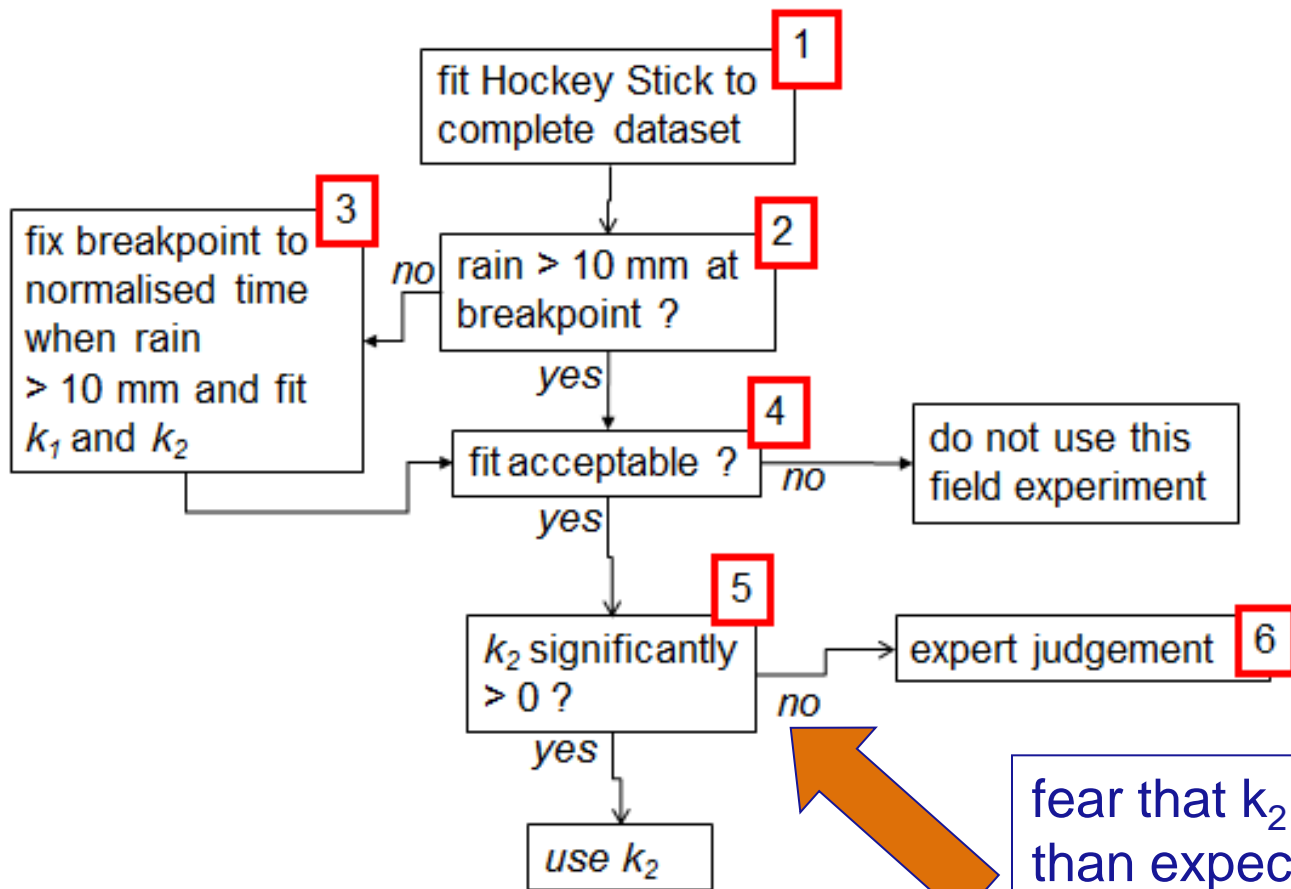
**breakpoint 15 d**

# DegT50 from existing (legacy) field studies



$g$  = fraction in fast compartment

# DegT50 from existing (legacy) field studies



fear that  $k_2$  is slower than expected from lab studies due to poor quality of  $k_2$

## DegT50 from existing (legacy) field studies

Procedure when field DegT50s that are longer than lab DegT50s:

- Check whether any individual field DegT50 is significantly longer than the population of lab DegT50s (statistical test)
- Very unlikely that field study with a soil shows longer DegT50 at same temperature and moisture than a lab study with this soil
- Recommendation:
  - repeat inverse modelling with Arrhenius activation energy of 115 kJ/mol instead of 65 kJ/mol and with moisture exponent B of 1.5 instead of 0.7
  - if new field DegT50 is not anymore significantly longer than DegT50 from labstudies then discard field DegT50



## EFSA DegT50 Endpoint Selector

### Statistical test in guidance

- Single field DegT50 longer than lab DegT50s ?
- EFSA developed user-friendly spreadsheet for testing of this hypothesis (see following presentations)





**Thank you !**