e-SOTER
Regional pilot platform as EU contribution to a Global Soil Observing System

Applications of e-SOTER related to major soil threats

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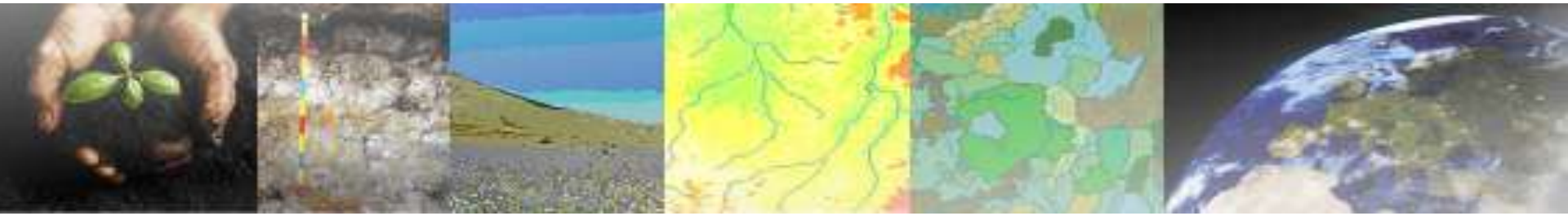


Workshop Towards Global Soil Information
FAO, 21 March 2012

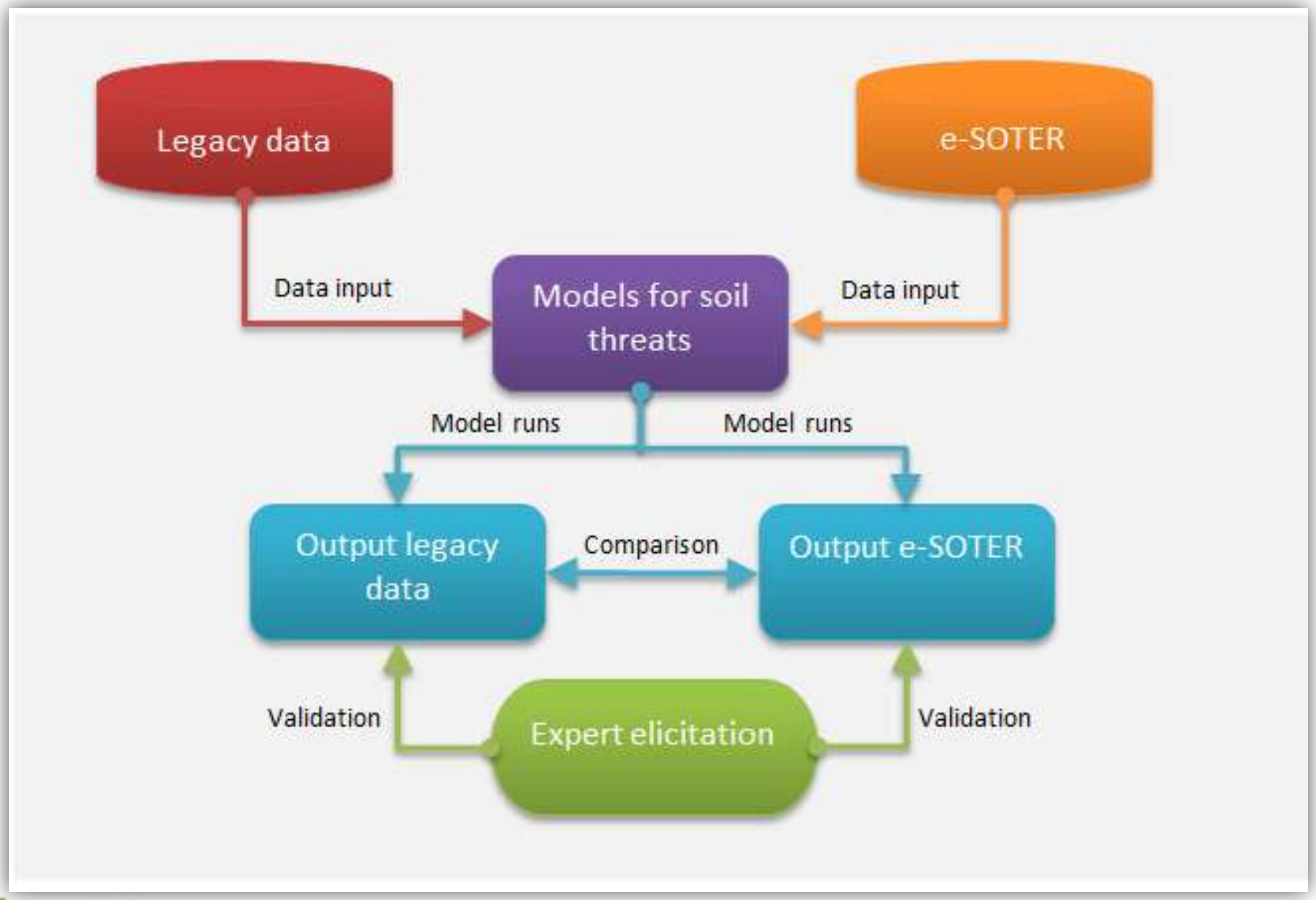
Objectives

- To provide examples of how e-SOTER can be used to evaluate threats to soils
- To investigate whether use of the e-SOTER database will improve evaluation of threats to soil quality and performance compared with using data from legacy soil maps and databases.

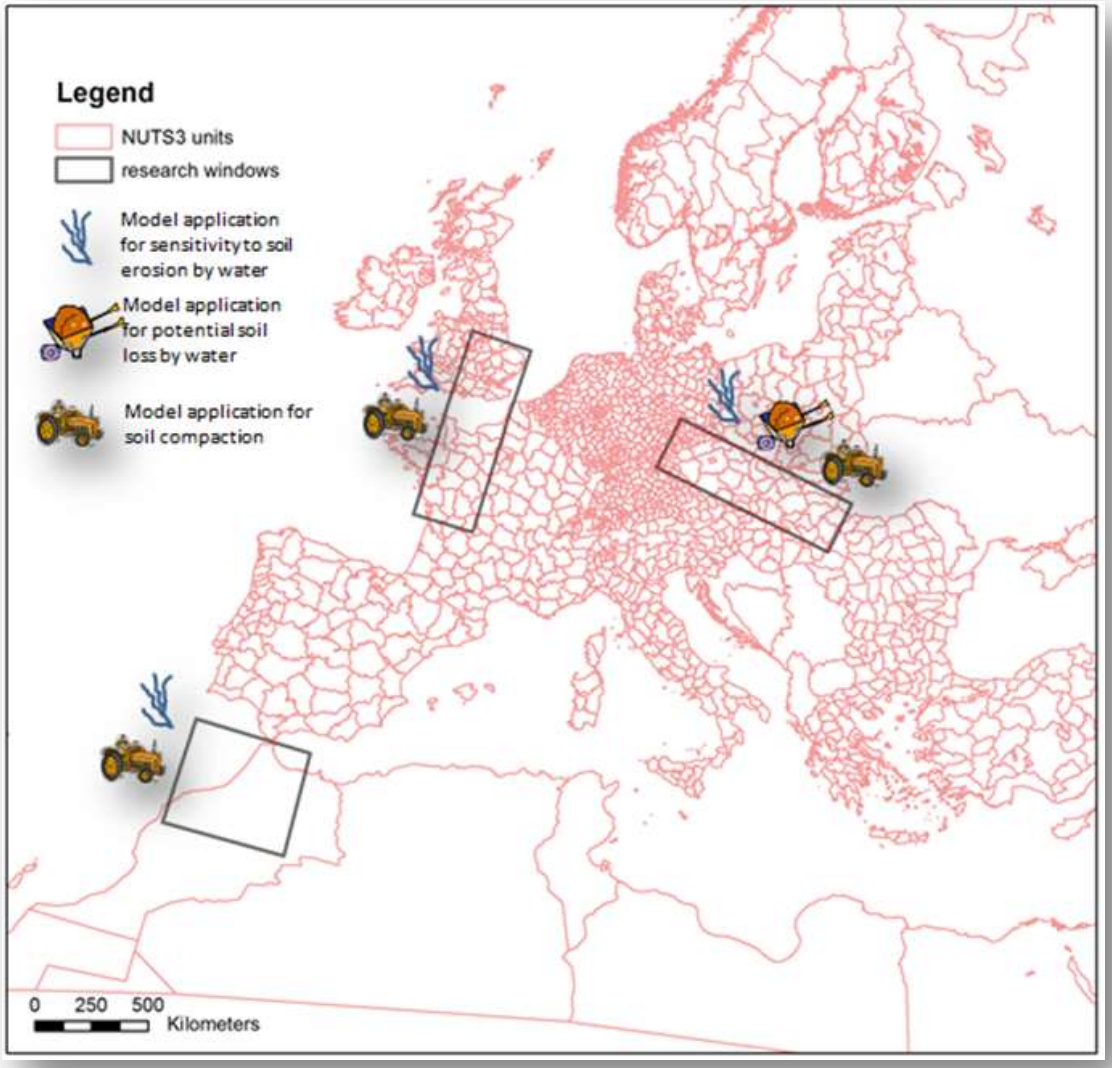
soil erosion by water

soil compaction

Approach


Legacy data
e-SOTER
Data input
Models for soil threats
Data input
Model runs
Model runs
Output legacy data
Comparison
Output e-SOTER
Validation
Expert elicitation
Validation

Methods – model applications



Soil erosion

- Soil sensitivity to water erosion (MESALES, BGR2)
- Potential soil loss (BGR1)

Soil compaction

- Inherent susceptibility to subsoil compaction (Jones)

Input variables

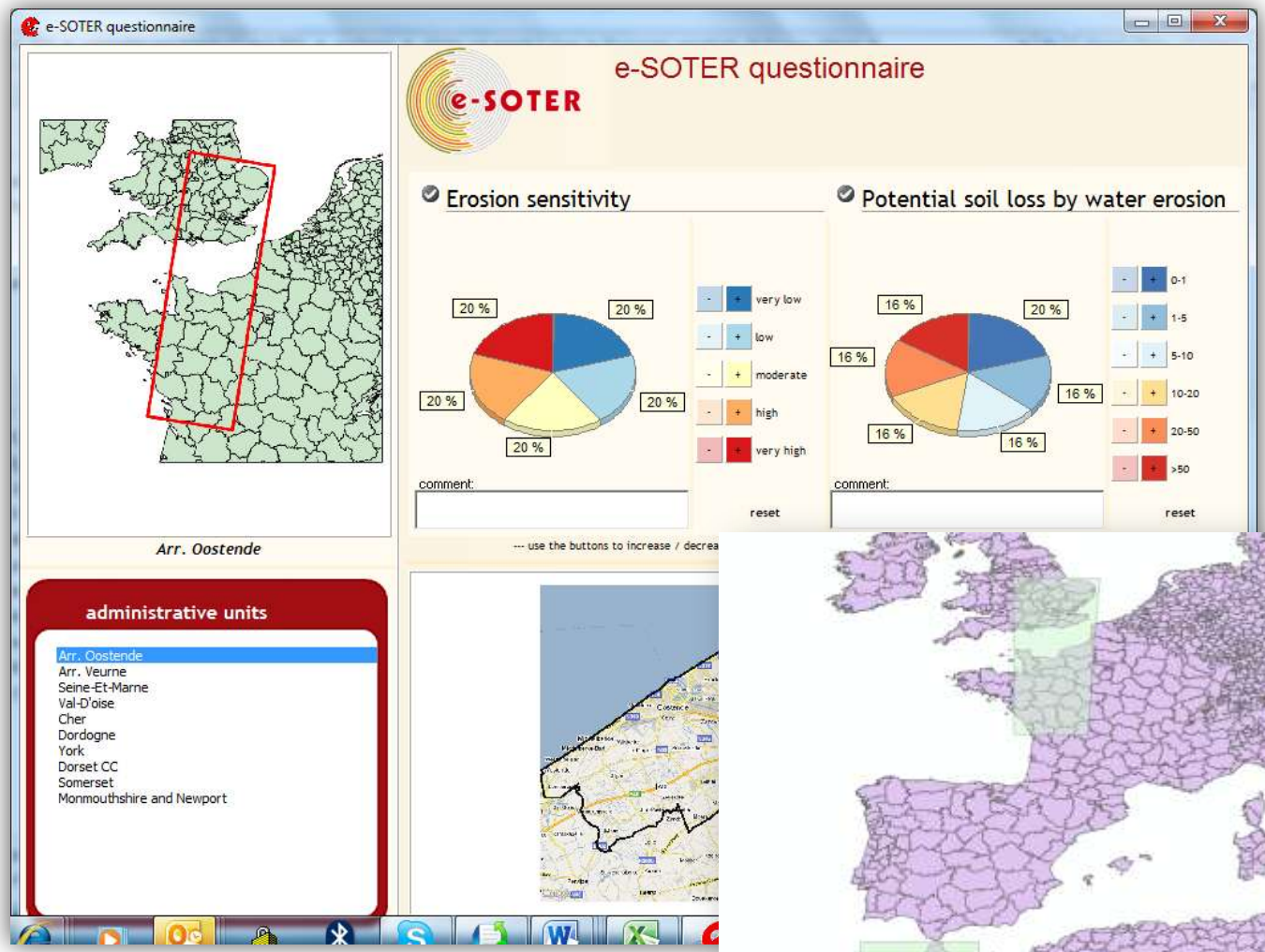
Soil erosion

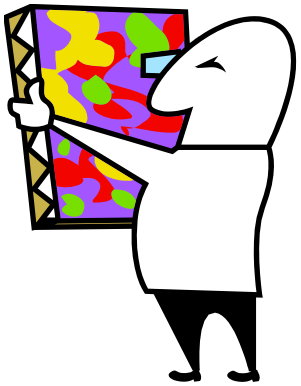
- Soil surface texture
- Coarse fragments
- Parent material

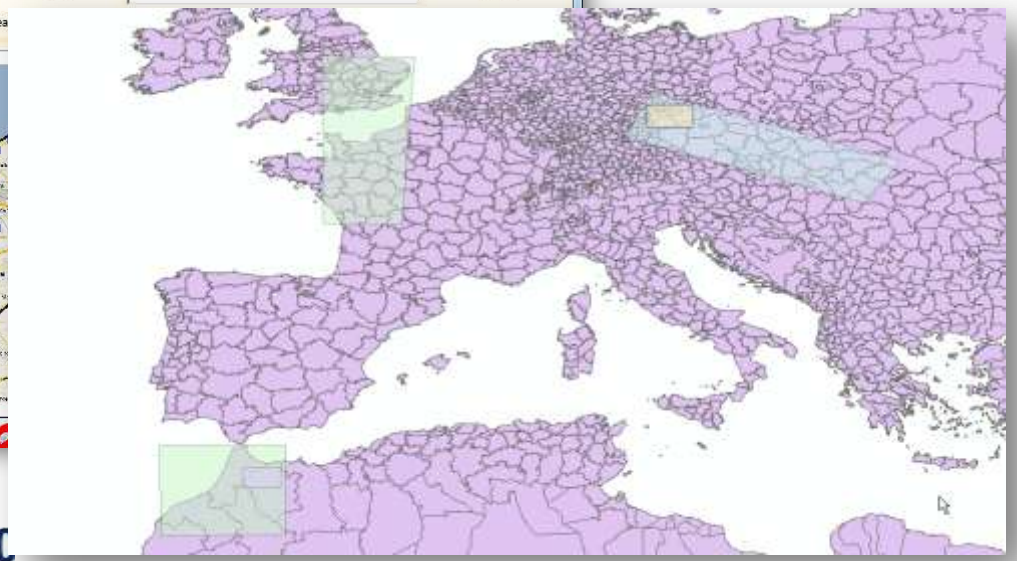
Soil compaction

- Subsoil texture
- Packing density
- Bulk density
- Clay content

Expert elicitation







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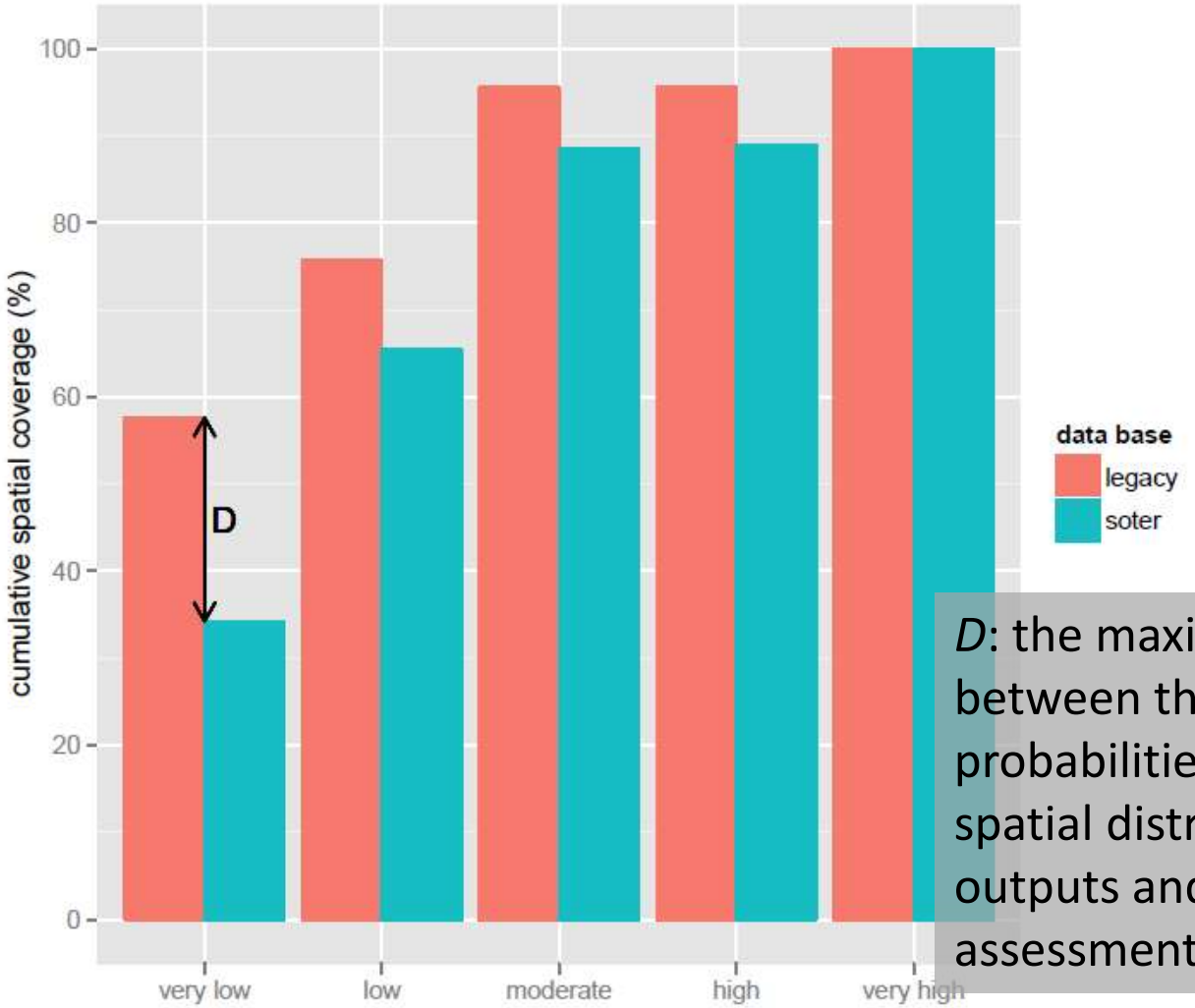
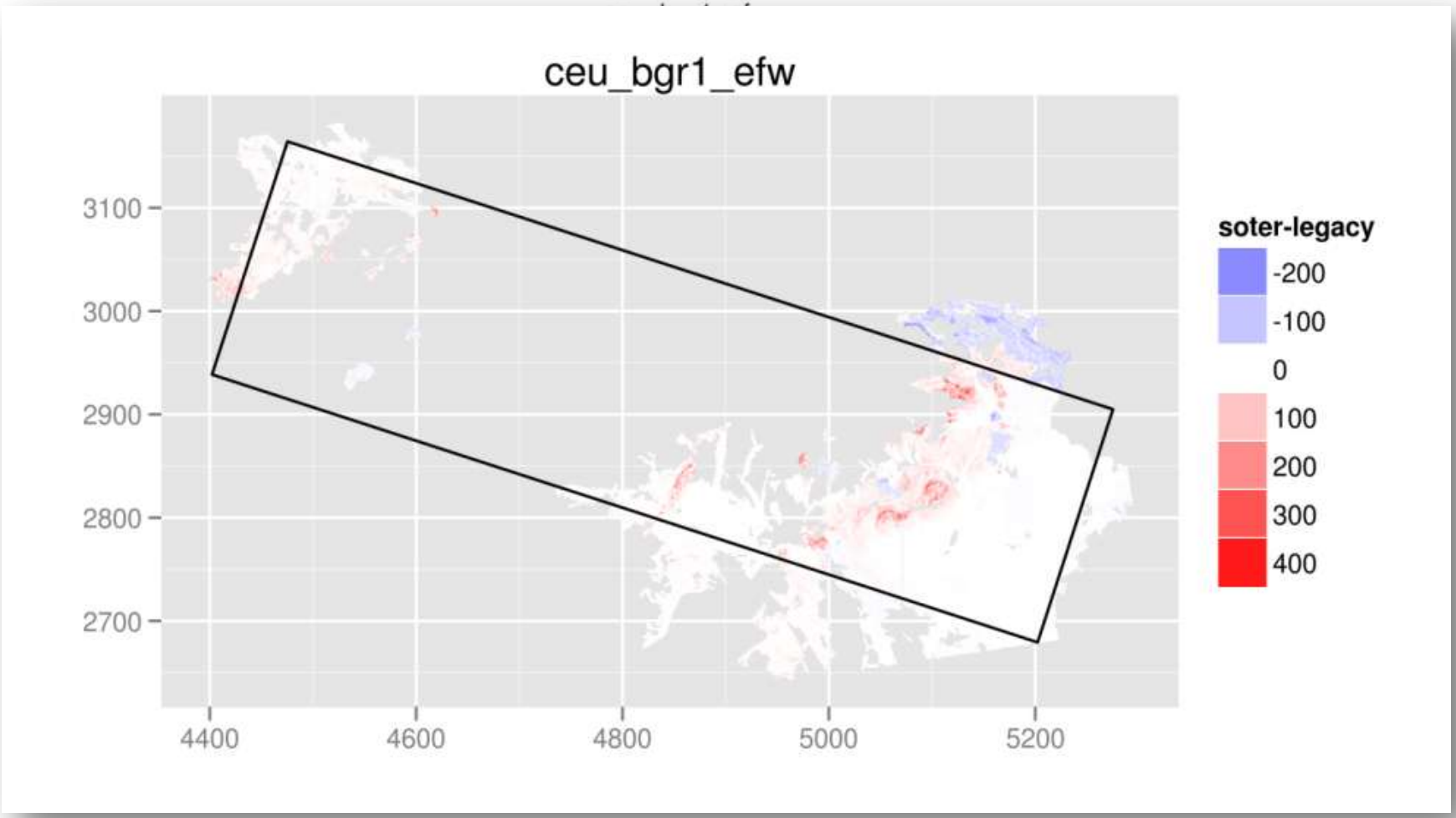
Analysis



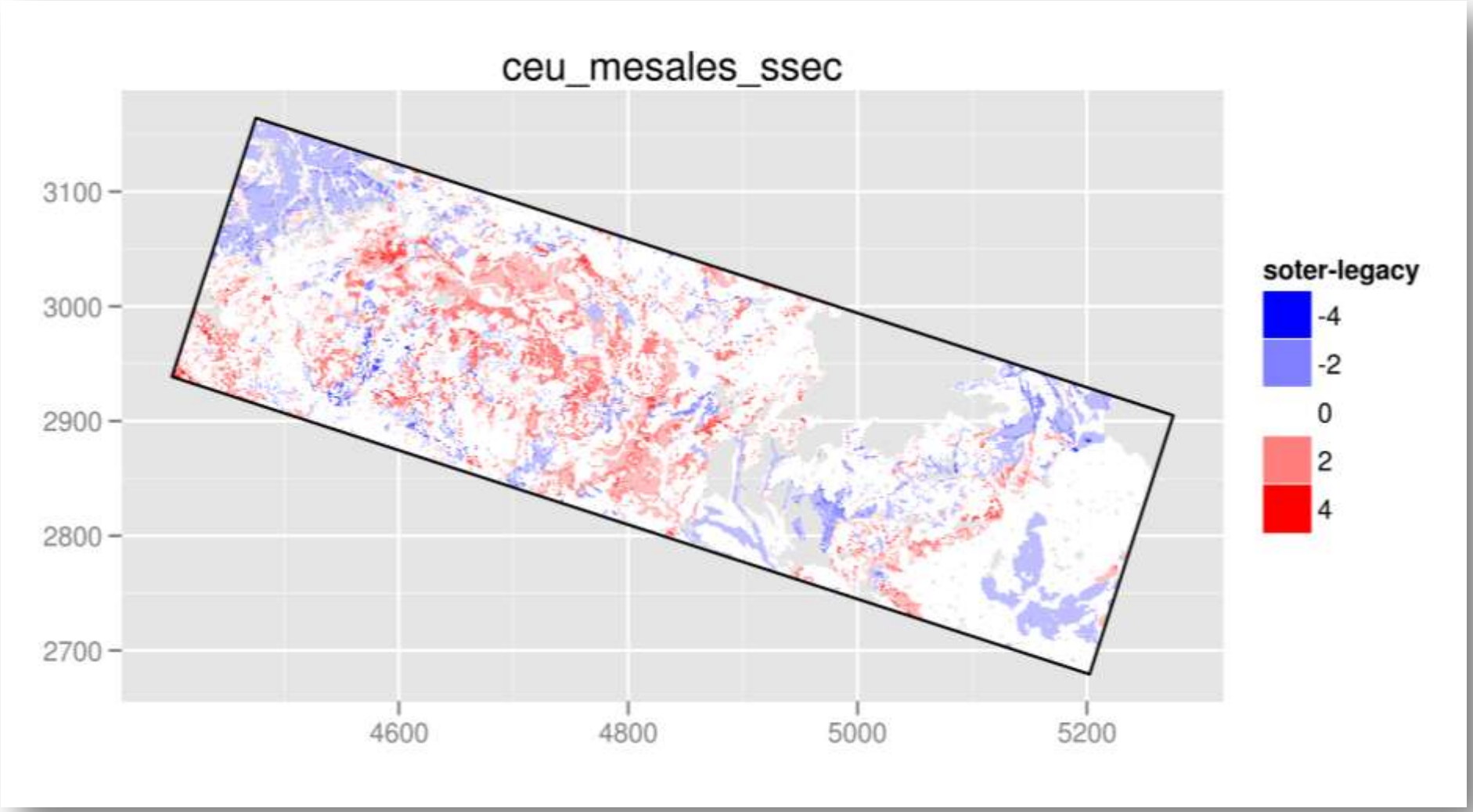
D: the maximum difference between the cumulative probabilities of the (discrete) spatial distributions of model outputs and/or expert assessments

Results – Model outputs

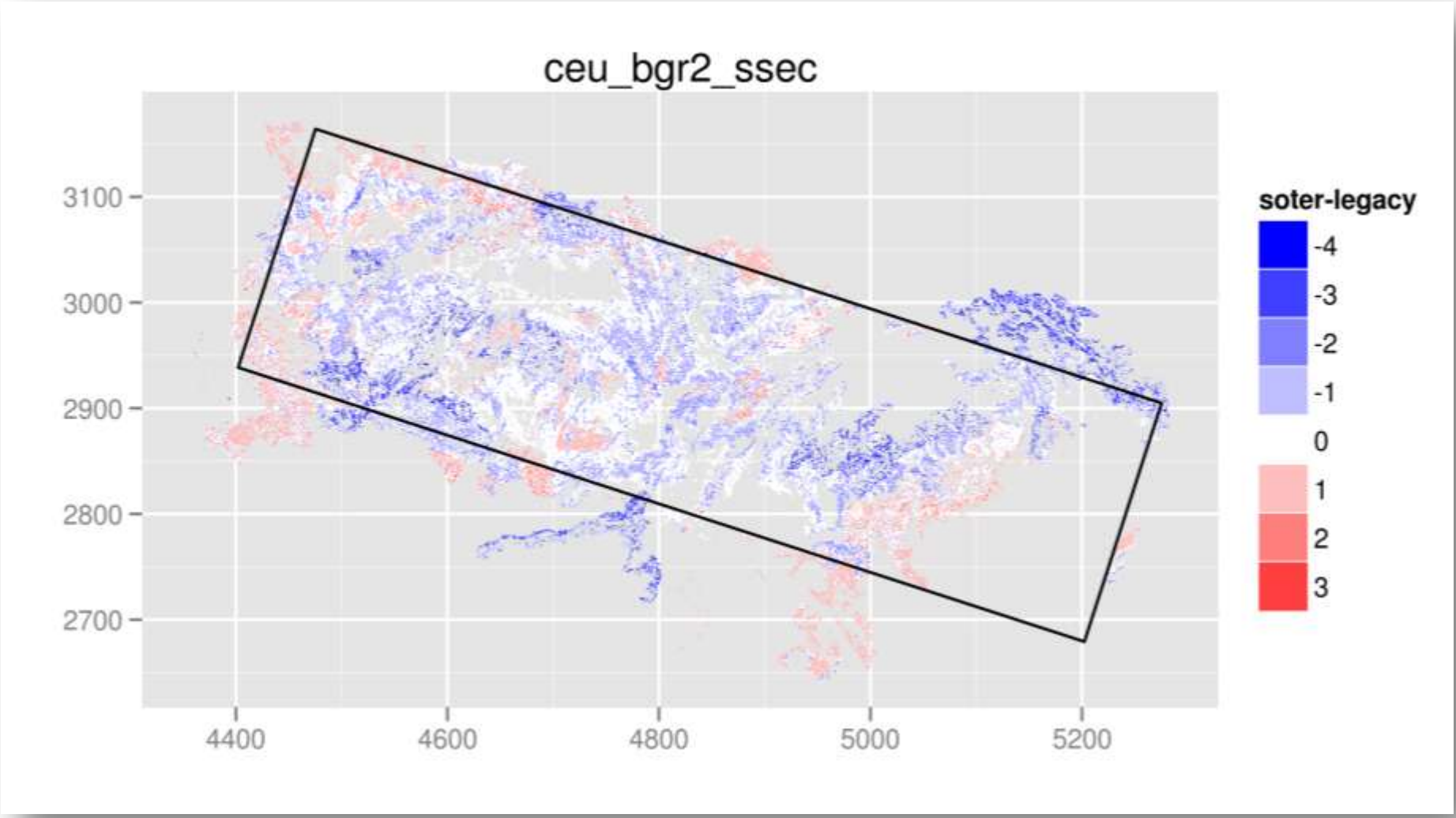
Potential soil loss-CEU window



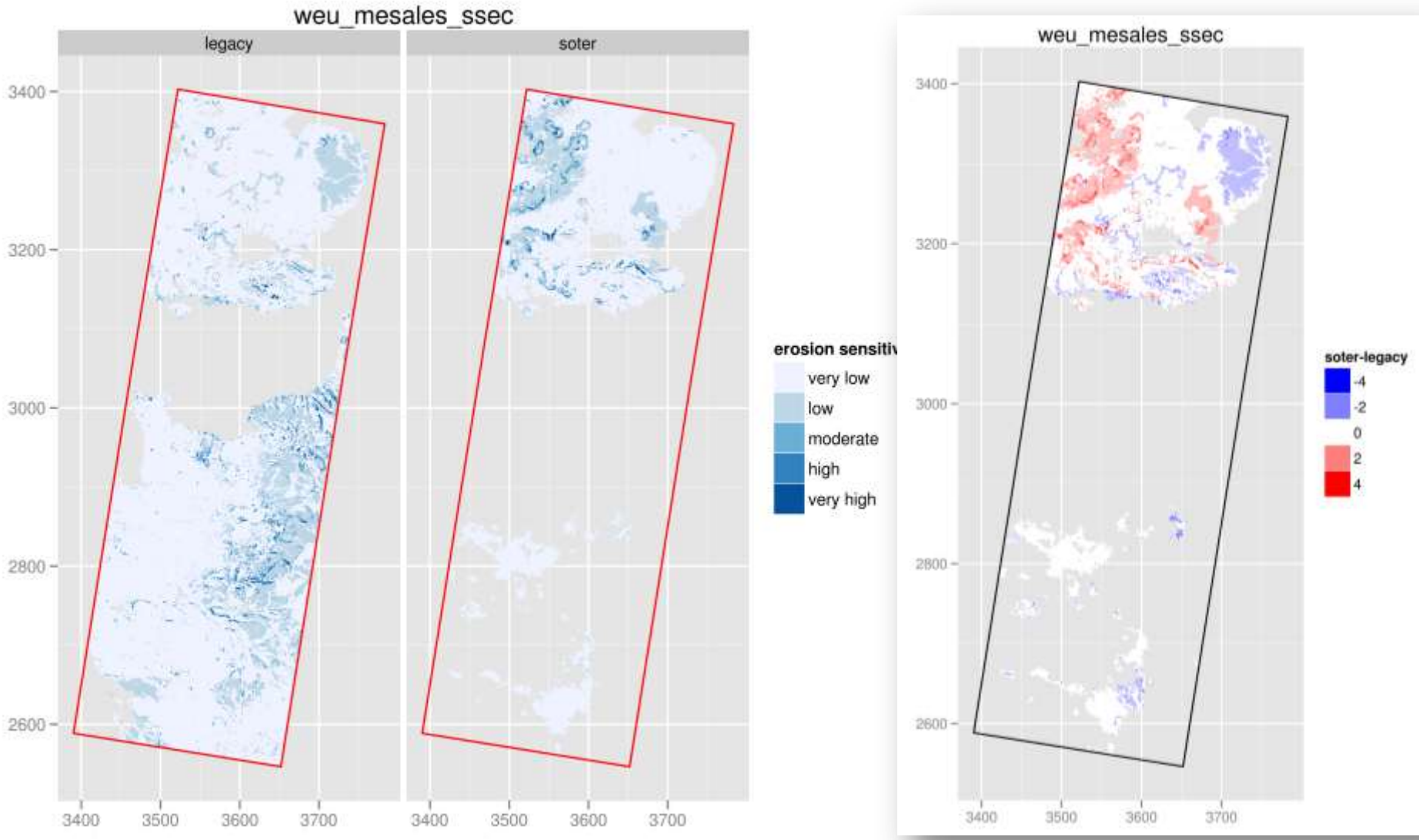
Sensitivity to water erosion – CEU window



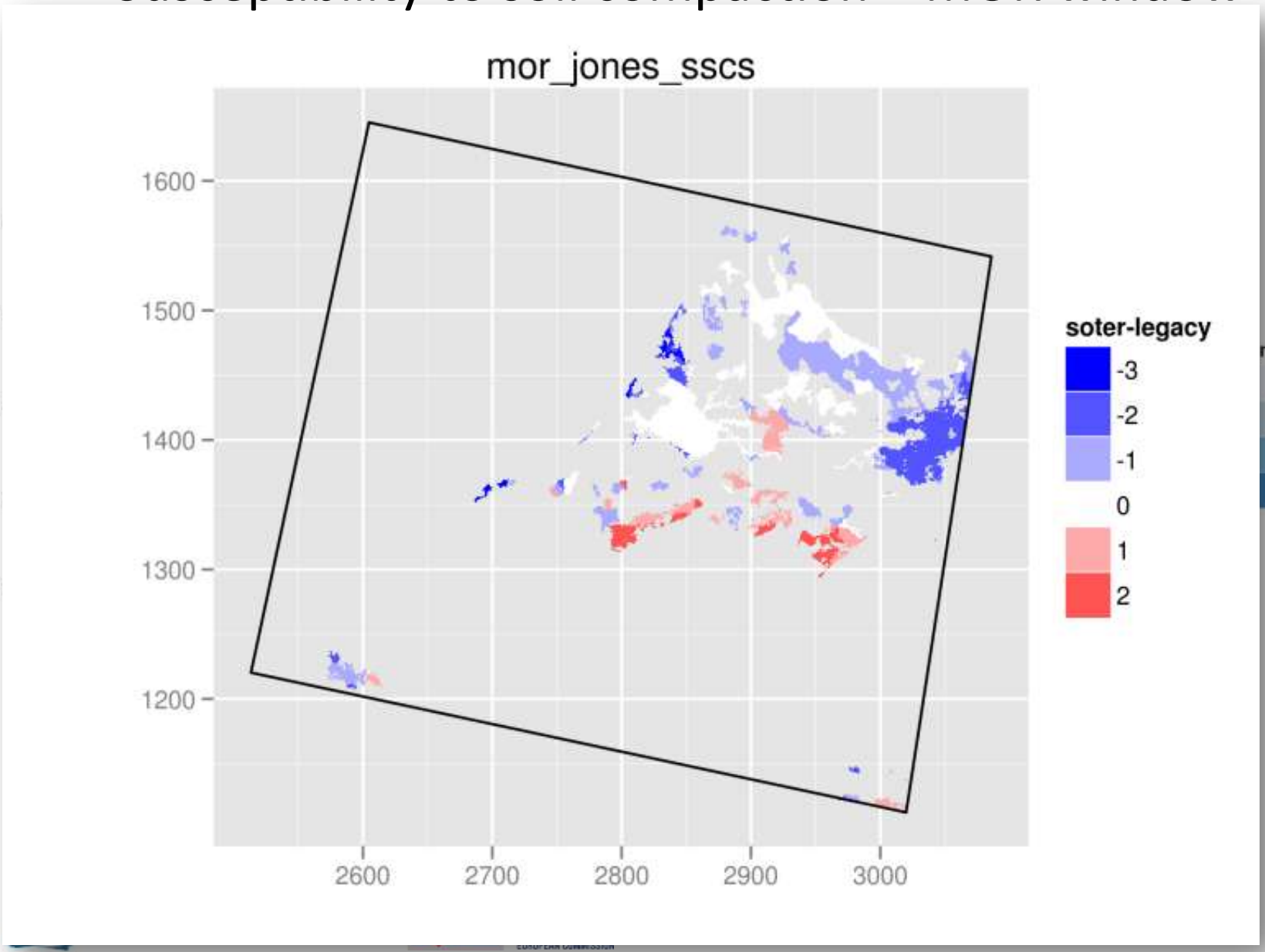
Sensitivity to water erosion – CEU window



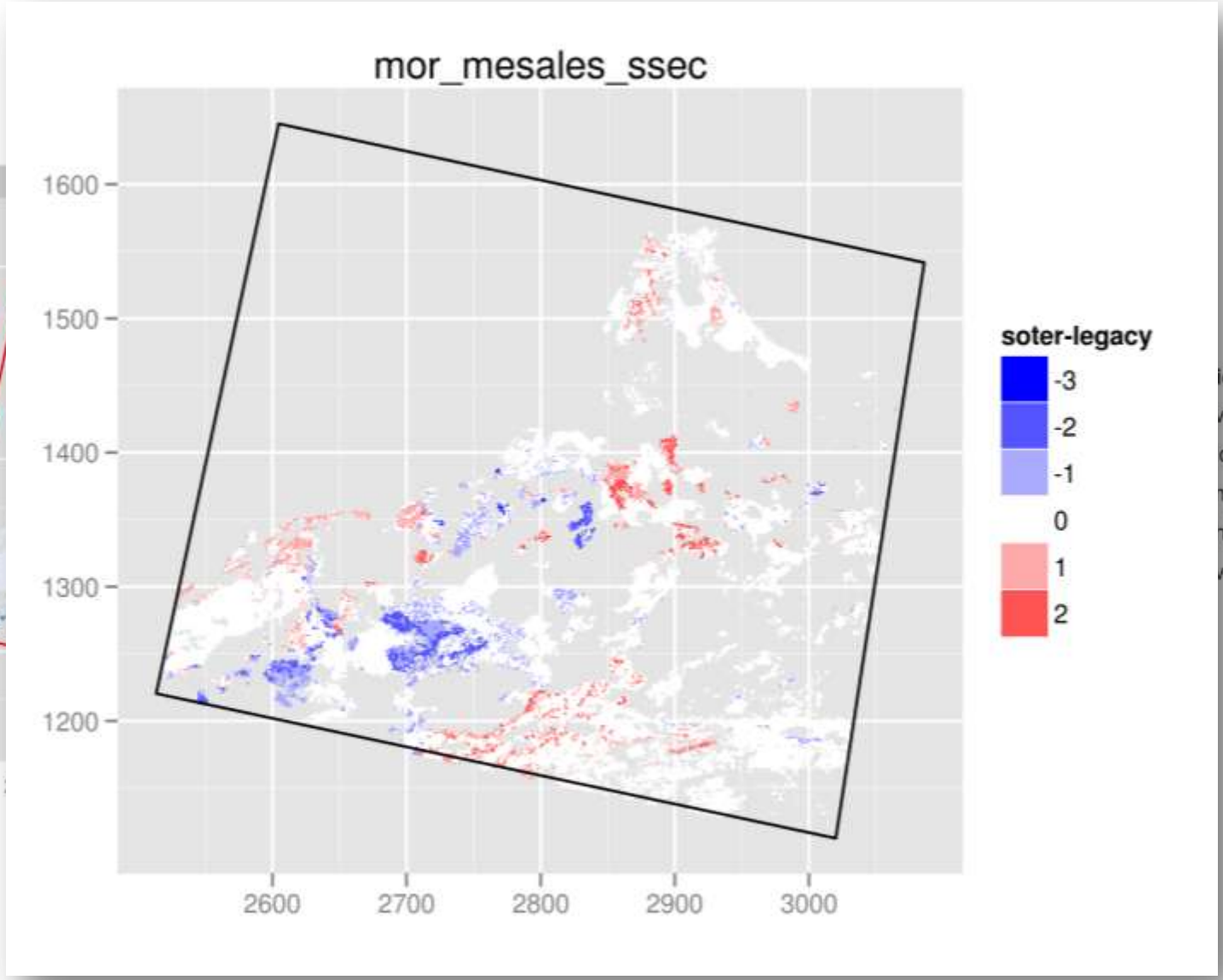
Sensitivity to water erosion – WEU window



Susceptibility to soil compaction – MOR window

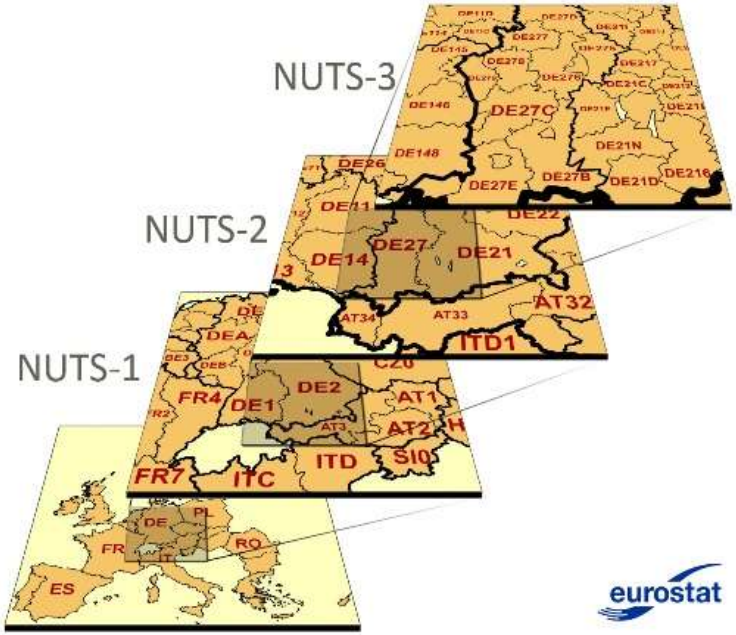


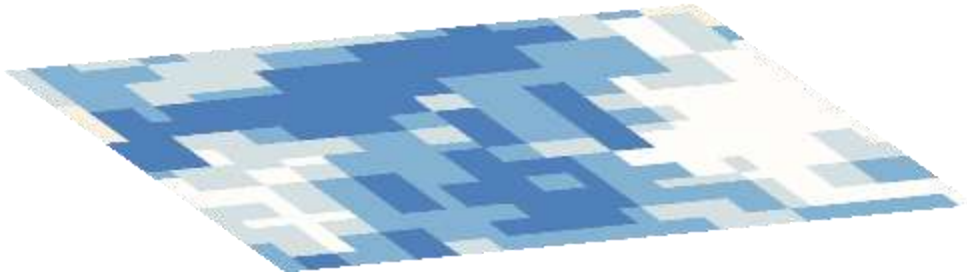
Sensitivity to water erosion – MOR window



Comparison model - expert

Experts: NUTS3-units





Model: 1*1 km^2 pixels

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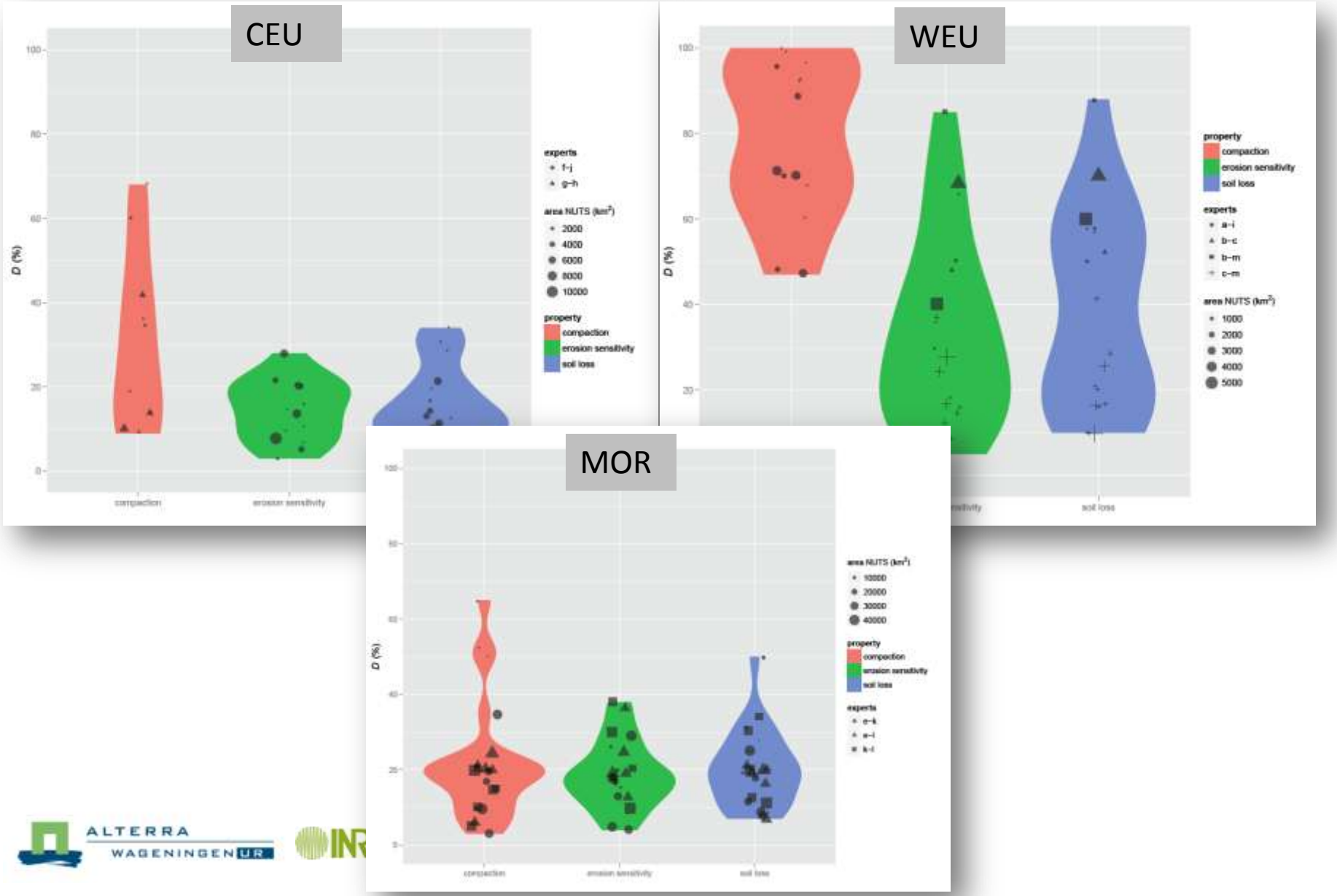
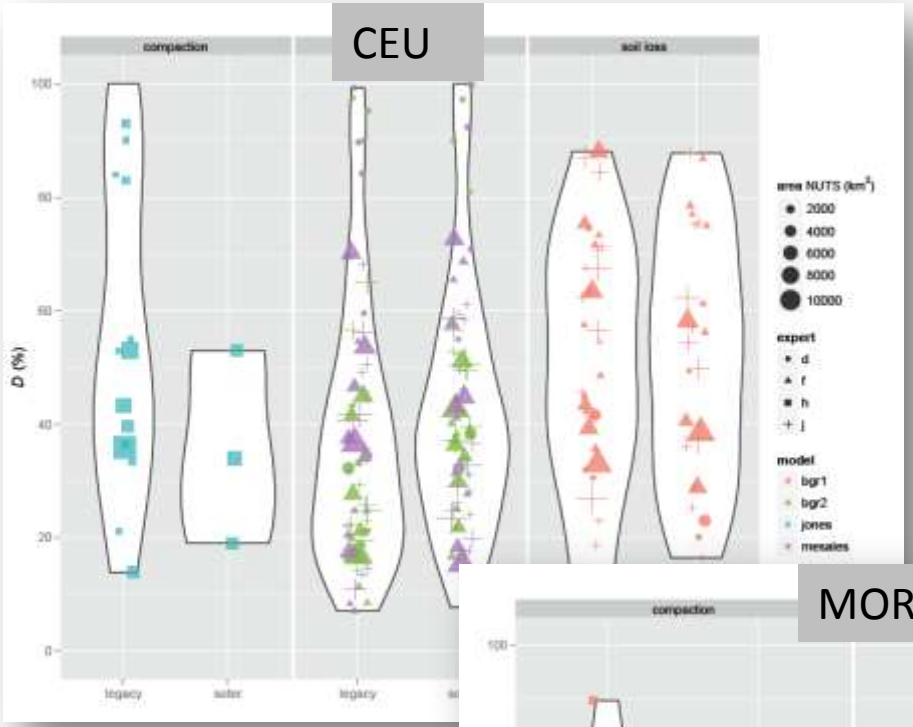
Expert elicitation results

disagreement

agreement


CEU
WEU
MOR
D (%)
compaction
erosion sensitivity
soil loss
property
experts
area NUTS (km²)

CEU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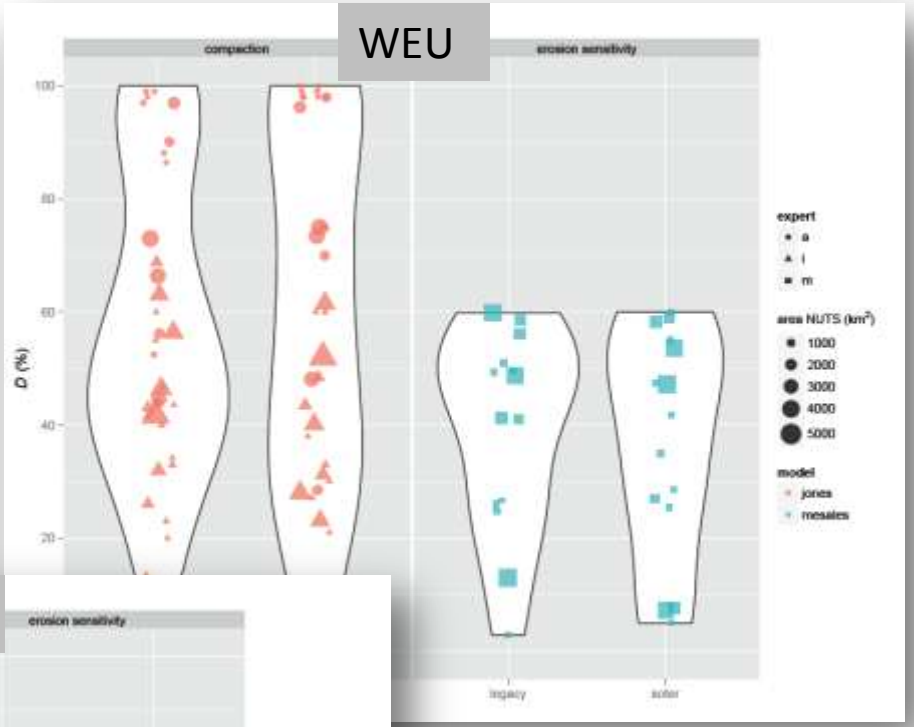
WEU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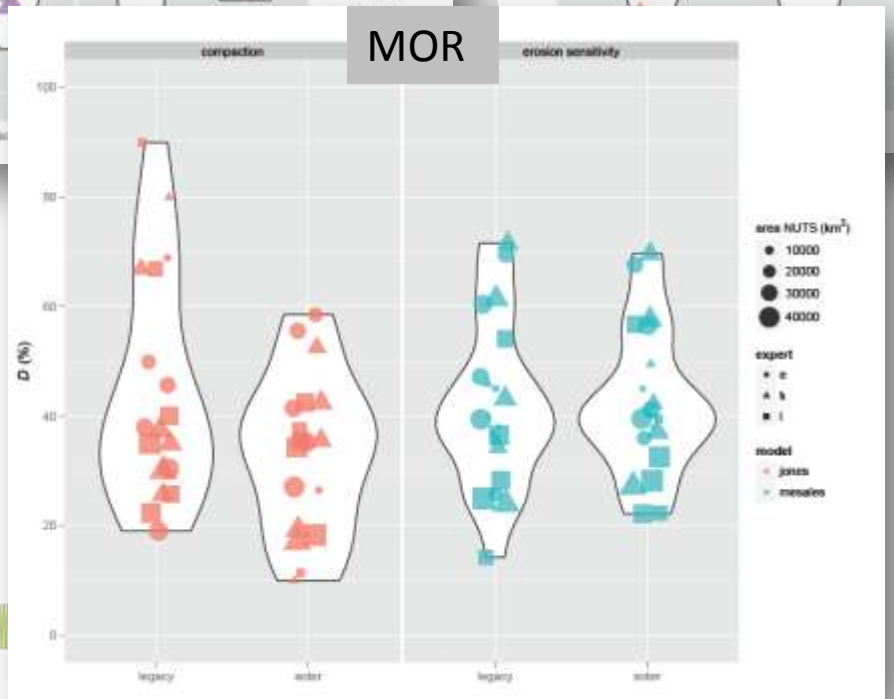
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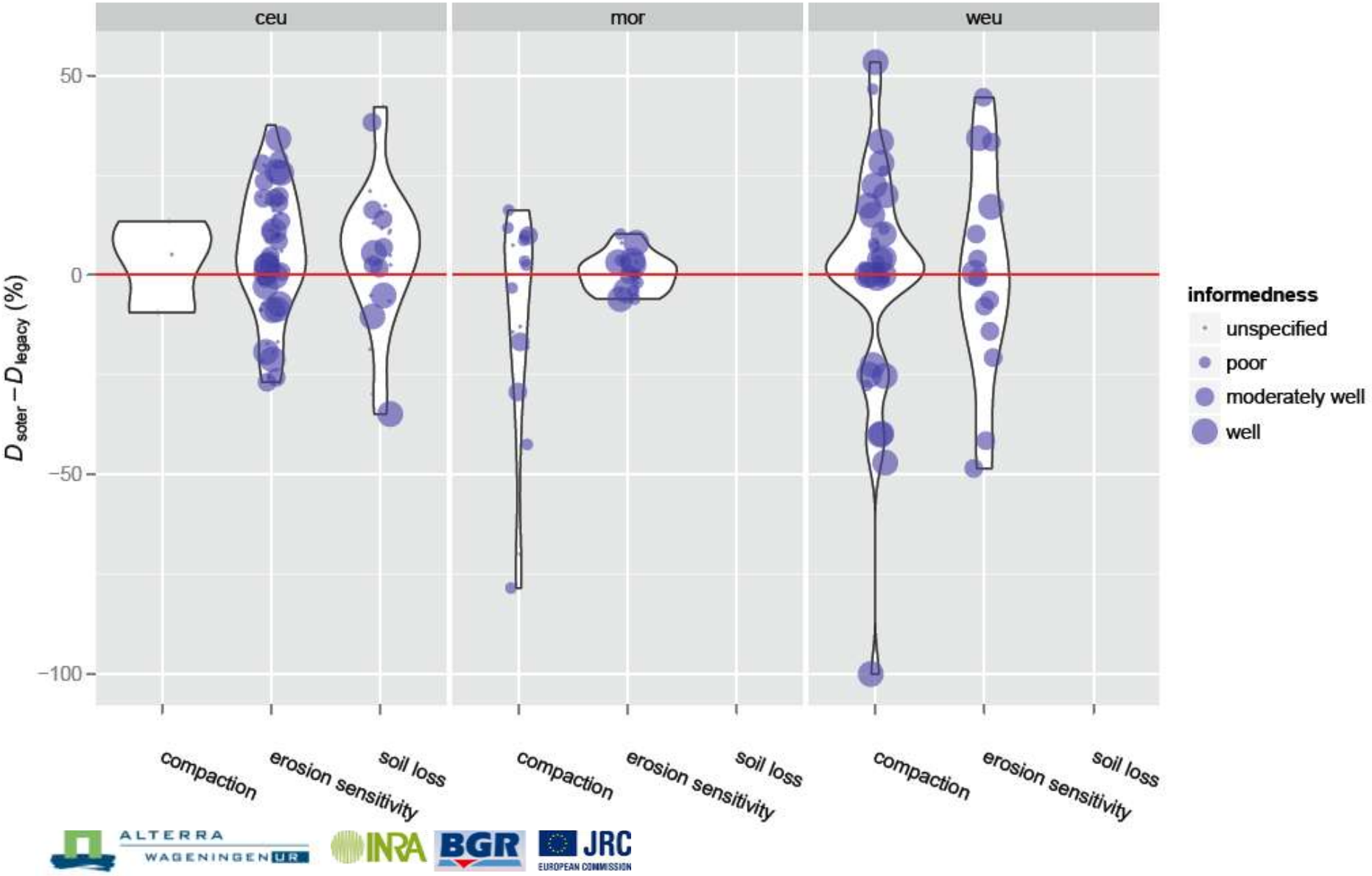
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0
−50
−100
$D_{soter} - D_{legacy}$ (%)
compaction
erosion sensitivity
soil loss
informedness
unspecified
poor
moderately well
well

Conclusions-Model results

- Different results for model applications using eSOTER versus legacy databases
- Missing information on input variables in the eSOTER database for considerable parts of the windows

Conclusions - Expert results

- Larger values and variation of *D* in the WEU window
- Larger values and variation of *D* for soil compaction
- No influence of area size or expert

Conclusions – model vs expert results

- Large deviation of model outputs compared to expert responses (D up till 100%)
- Model outputs based on the eSOTER database are not always better according to the experts than those based on legacy databases
- D shows no differentiation according to individual experts or the size of administrative units

Discussion

- The eSOTER database does not fully cover the administrative units in the windows
- The comparison of the databases only refers to the input variables of the models that differed between the databases
- Model outputs are on ordinal scales (ordered classes). Differences between the databases providing the model inputs may therefore be tempered.

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Heading (24 pt)

Text (20 pt)

Spatial distributions in NUTS3-units

Similar distributions for legacy and eSOTER

Larger coverasge of high potential soil loss classes in eSOTER

Larger coverasge of high potential soil loss classes in legacy database

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