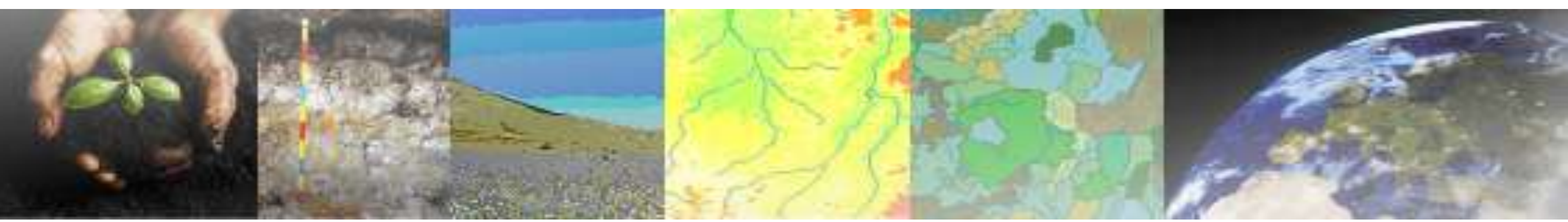
e-SOTER

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

Overview

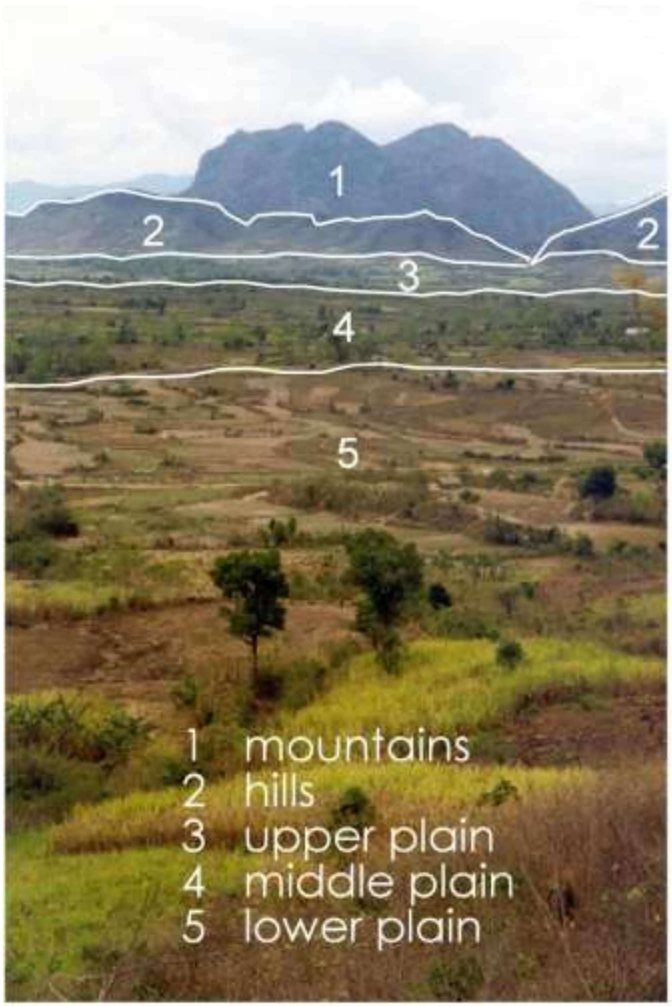
Vincent van Engelen

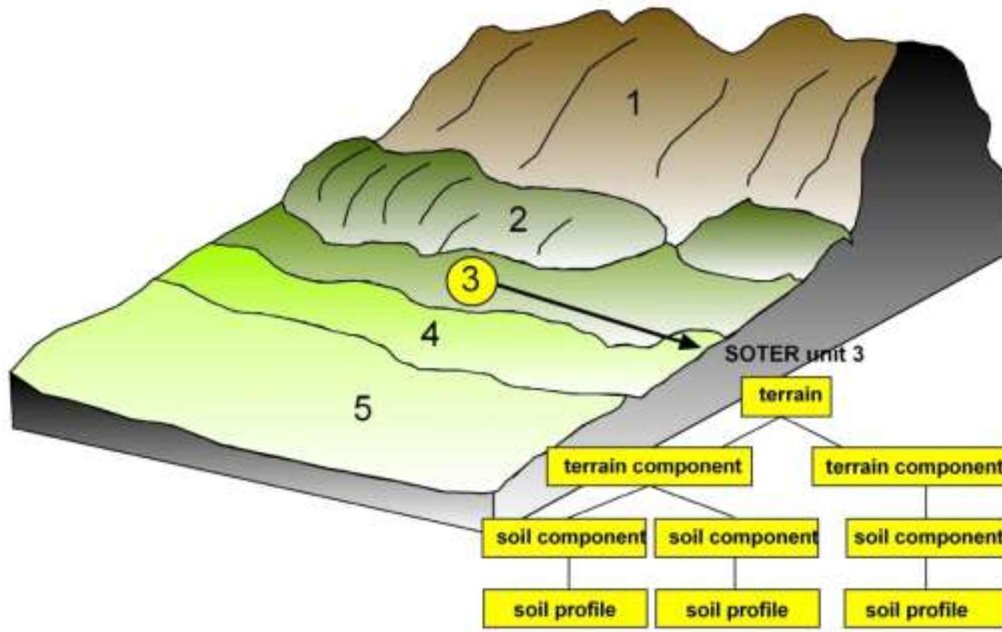
ISRIC – World Soil Information



SOTER setting

- SOTER (SOil and TERrain database) was initiated in 1984 by IUSS to create up-to-date 1:1 million scale digital soil map and database intended to replace the FAO-Unesco Soil Map of the World
- First Procedures Manual 1988, operational PM version 1995 (also as FAO Soil Resources Bulletin 74)
- Revision PM (Draft) 2012





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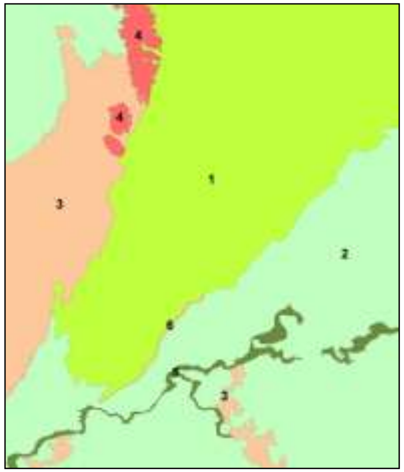
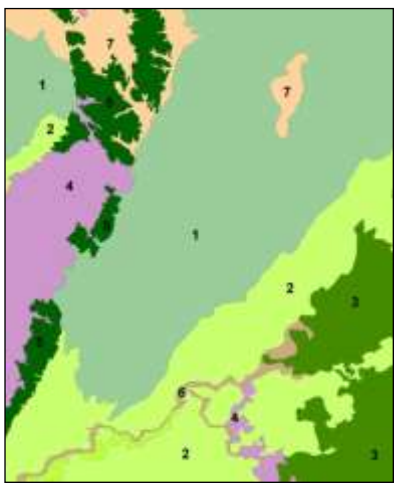
SOTER terrain units



Landform legend
1 = Plateau
2 = Plain
3 = Medium-gradient hill
4 = High-gradient hill
5 = Valley floor
6 = Medium-gradient escarpment zone



Parent material legend
1 = Limestone
2 = Clastic sedimentary rock
3 = Shale
4 = Andesite, trachyte
5 = Ironstone
6 = Fluvial sediments
7 = Eolian sediments

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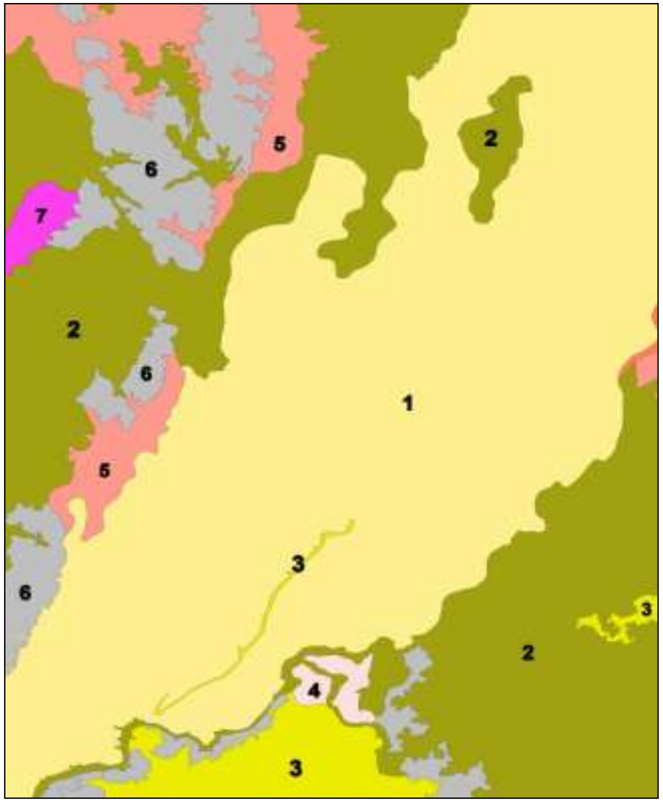
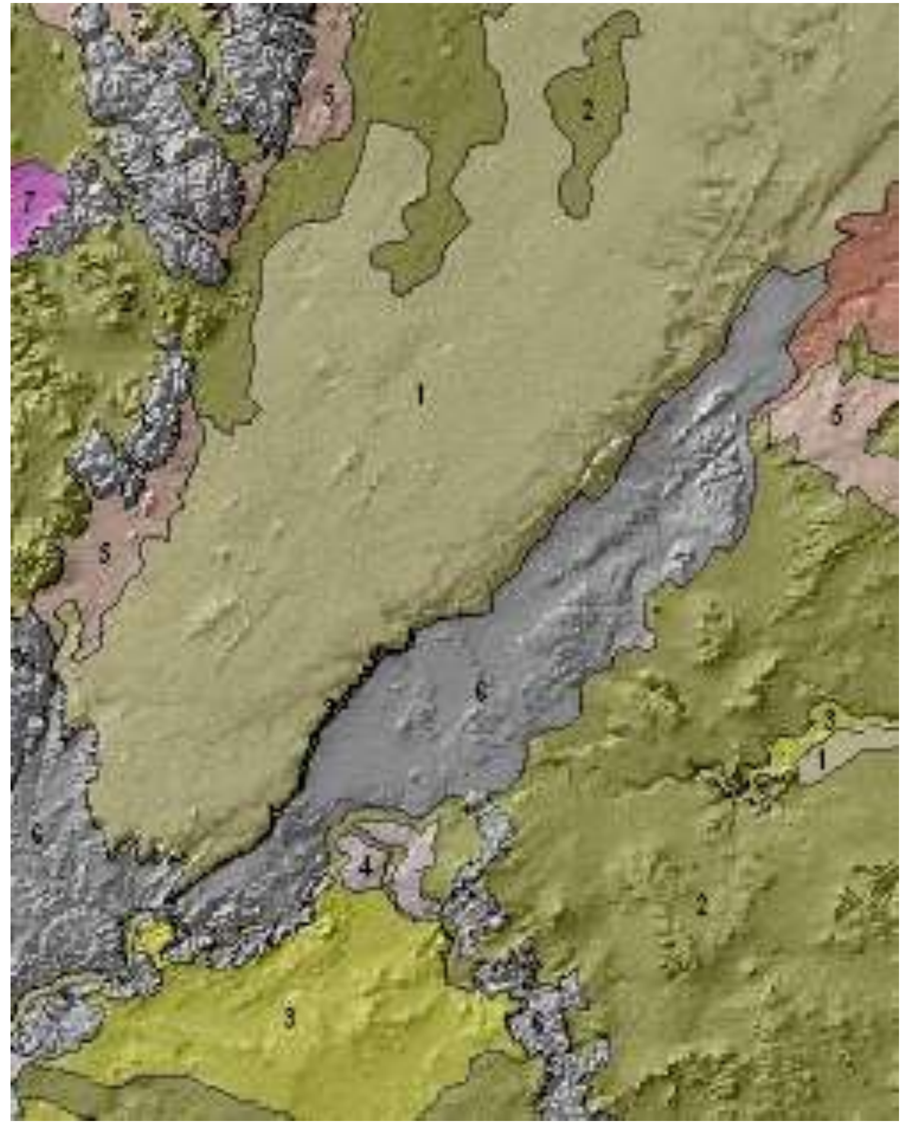
SOTER units





Legend soils

1. Petric Calcisols
2. Chromic Cambisols
3. Calcaric Cambisols
4. Haplic Arenosols
5. Ferralic Arenosols
6. Lithic Leptosols
7. Calcic Solonchaks

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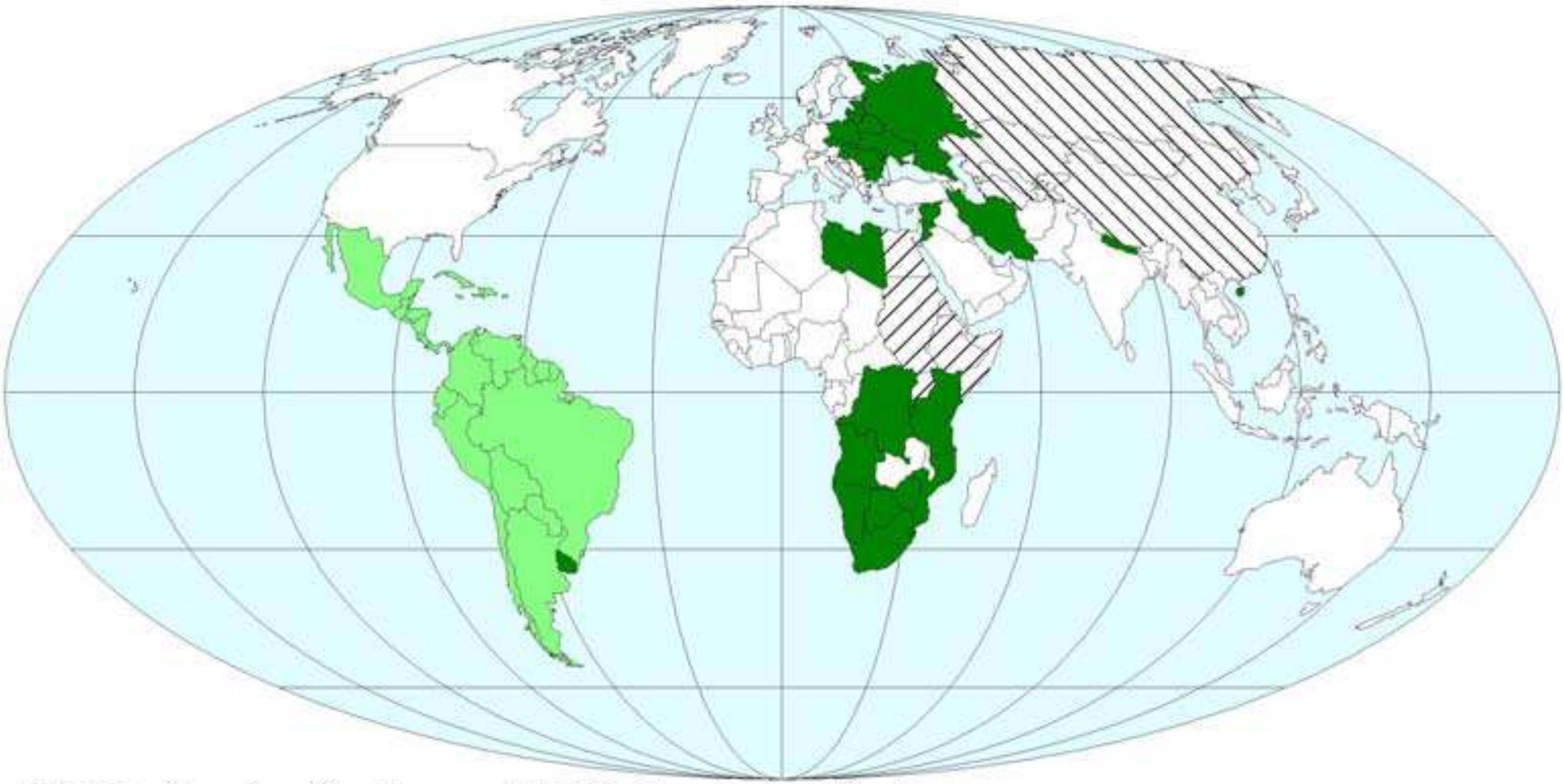
SOTER setting

- Available SOTER databases 2012
- Incorporated in Harmonized World Soil Database (v 1.2)
- In progress: Malawi



SOTER with soil profile data

1 : 1M to 1 : 2.5M

1 : 5M

SOTER without soil profile data

1 : 1M

1 : 5M

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

- EC-funded FP7 collaborative research project
- Duration 3.5 years
- Consortium of 14 partners

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UNIVERSITY OF MISKOLC MISKOLCI EGYETEM
BGR Bundesanstalt für Geowissenschaften und Rohstoffe
JRC EUROPEAN COMMISSION
Cranfield UNIVERSITY
ALTERRA WAGENINGEN UR
Szent István Egyetem
The University of Nottingham
CZU Czech University of Life Sciences Prague
ISSCAS
sci Lands scientific landscapes
INRA
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WAGENINGEN UNIVERSITEIT WAGENINGEN UR

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Research needed on various aspects of the procedure:

- Morphometric descriptions - enabling quantitative mapping of landforms as opposed to crude slope categories. This will build upon EU- initiated DEM landform classification procedures (Dobos 2005)
- Soil parent material characterization and pattern recognition by remote sensing
- Soil pattern recognition by remote sensing
- Standardization of methods and measures of soil attributes to convert legacy data already held in the European Geographical Soil Database and various national databases to a common standard - so that they may be applied, e.g. in predictive and descriptive models of soil behavior

Other project activities

- Quality assessment by validation and uncertainty analysis
- Applications of *e-SOTER* in the field of major soil threats (soil erosion and compaction) and comparisons with applications based on earlier datasets.
- Dissemination of the results of the project through web-based services (development SoTerML, schema development, algorithms database, WMS)

SOTER

Conventional/ manual

Landform:	manual interpretation of topography
Parent material:	from legacy geological maps
Soils:	from legacy soil maps and soil profiles

e-SOTER

Partly automated (scale 1:1 million)

Landform:	SOTER algorithm using DEM
Parent material:	(a) from legacy geological maps (b) RS
Soils:	(a) from legacy soil maps and soil profiles (b) RS

New approaches (scale 1:250,000)

Landform:	(a) geomorphological (b) hill-shed analysis (c) object oriented classification
Parent material:	from legacy geological/soil maps supported by gamma-ray
Soils:	from soil observation points

1:1 million approach

- Landform classification and delineation

  Development of algorithm that applies existing SOTER procedures using fixed thresholds for landform classification using SRTM DEM

- Parent material classification and deliniation

  Development of a new hierachical classification system of soil PM

  Using legacy geological information

  Using RS to delineate PM attributes

- Soil information

  Converting soil legacy profile data into WRB

  Using RS to delineate soil patterns

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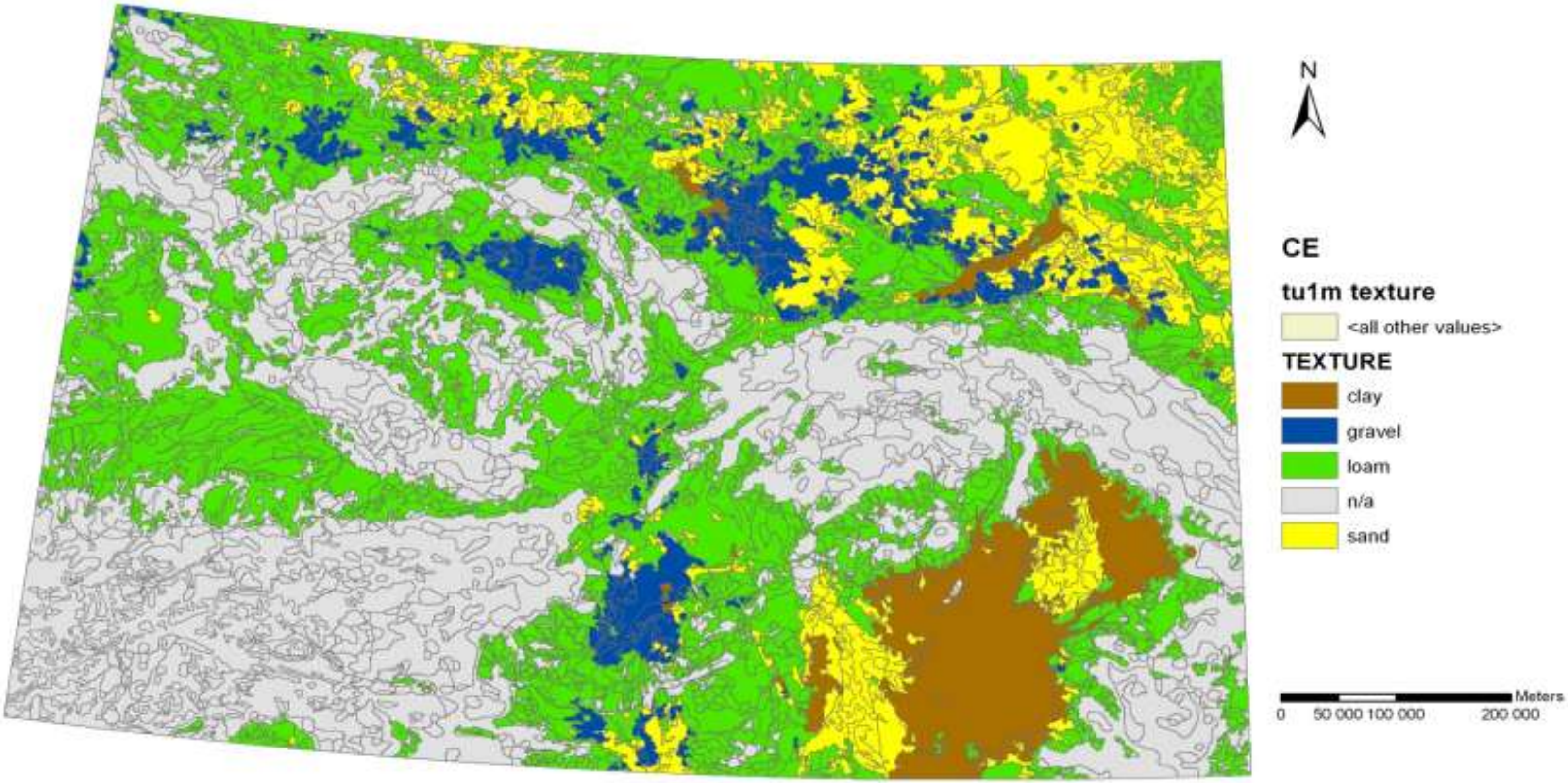
Terrain Unit CE Texture



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New methods for analysing landform at scale 1:250 000

Fixed thresholds for classification often do not match local terrain conditions:
- homogeneous terrain units can be broken,
- fixed thresholds do not meet local breaks in terrain

- using self-adjusting thresholds for classification which meet local terrain conditions, e.g. breaks in slope
- using segmentation techniques to identify areas with homogeneous values of terrain parameters

Two approaches for landform classification by Cranfield University

- Hill-shed analysis
- Object oriented classification

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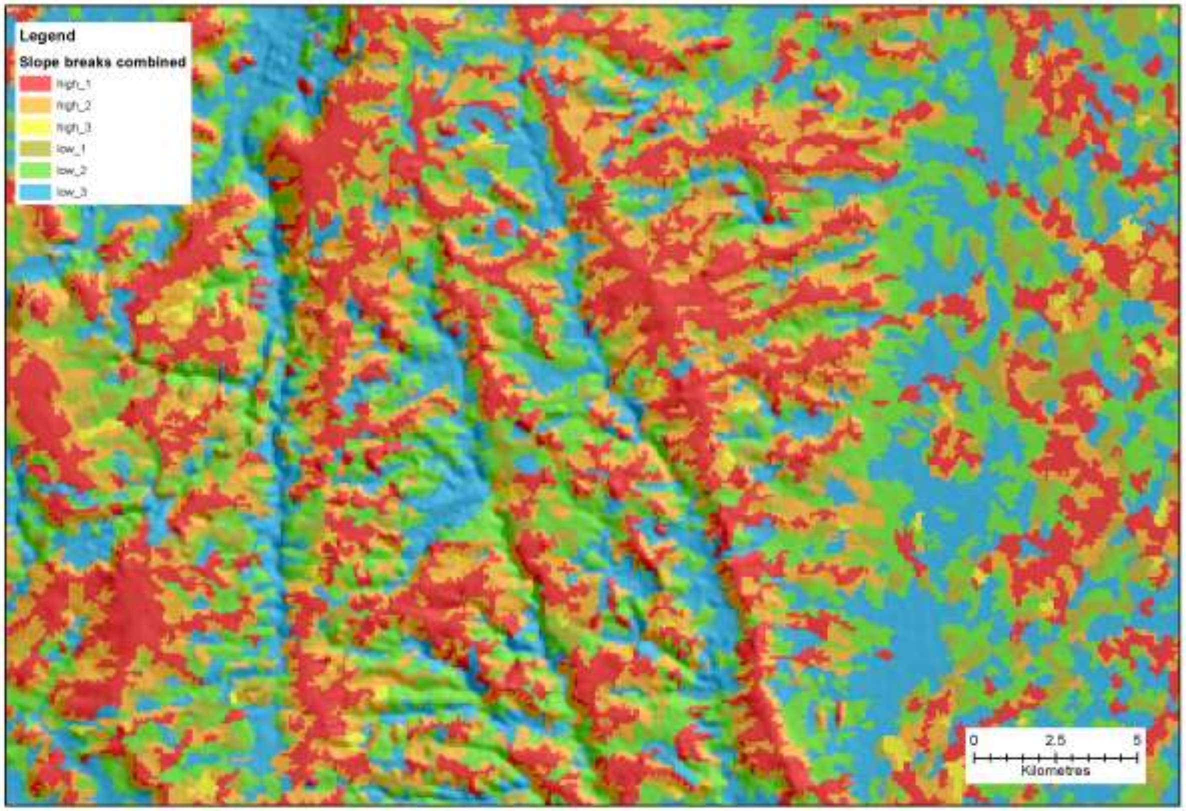
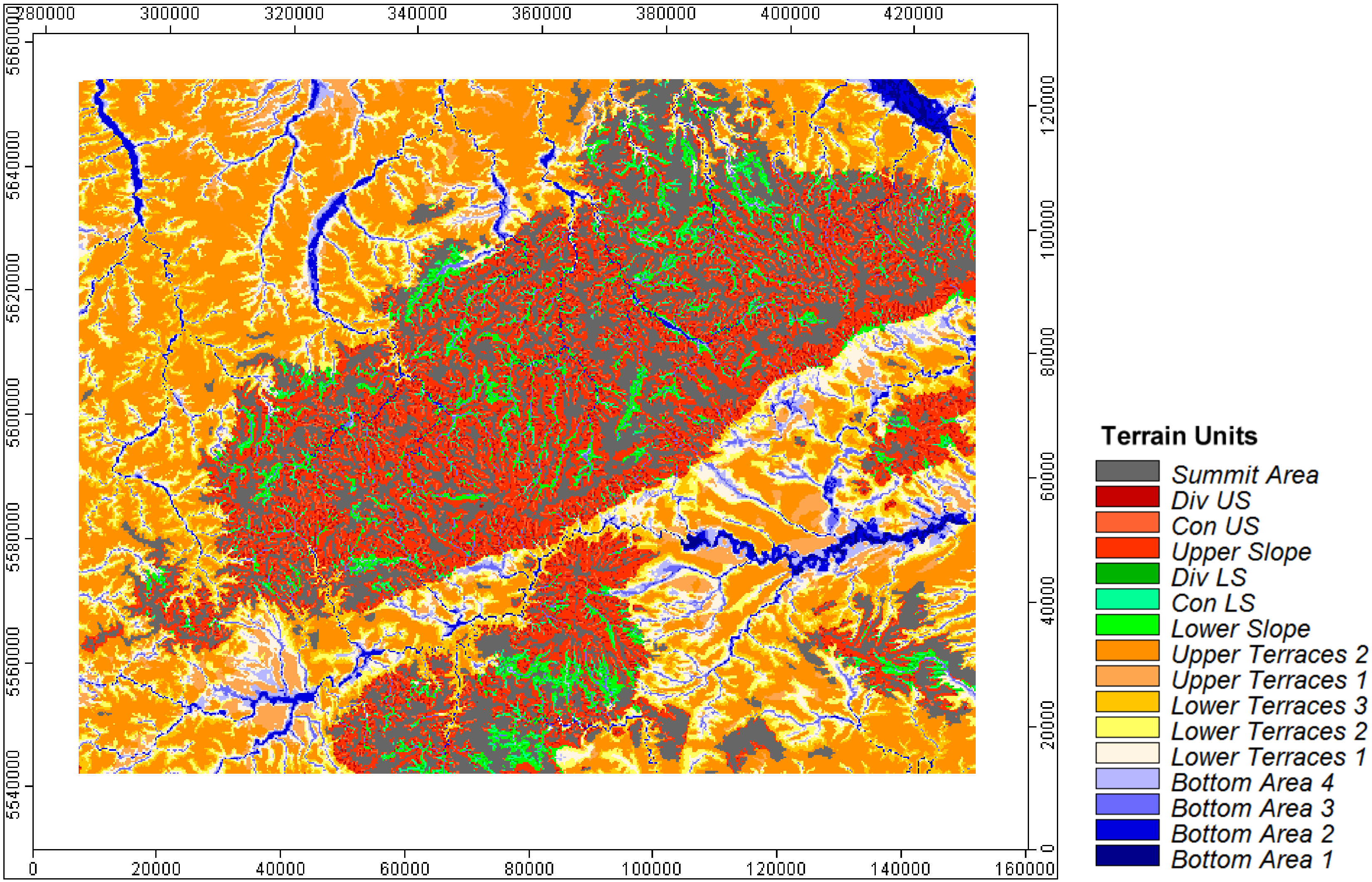
Slope breaks in hill-shed analysis by Cranfield University



Slide Credit: Joanna Zawadzka and Thomas Mayr

Landform delineation Scilands approach at D/CZ pilot area



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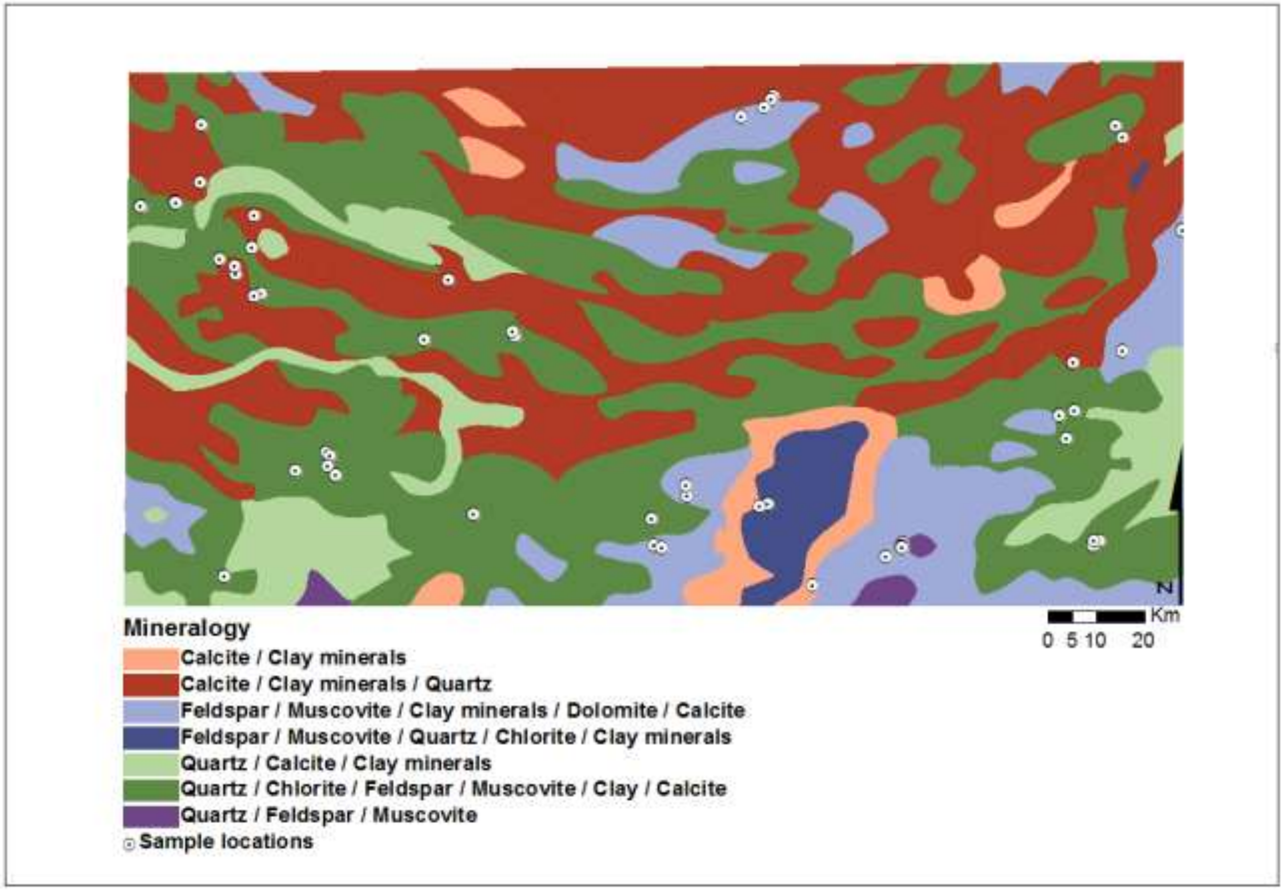
The use of Remote Sensing for soil and terrain mapping at regional scale by Wageningen University



Slide Credit: Titia Mulder

Thank you

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