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USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Southern Regional Cooperative Soil Survey Conference:

Innovative Technologies for the New Soil Survey

July 14-17, 2008 | Gainesville, FL

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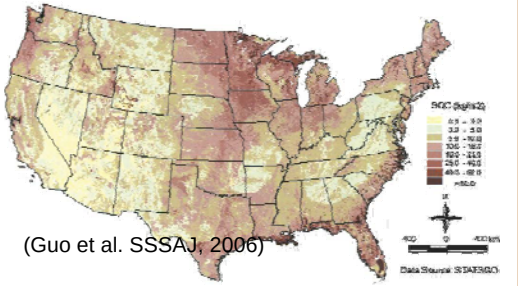
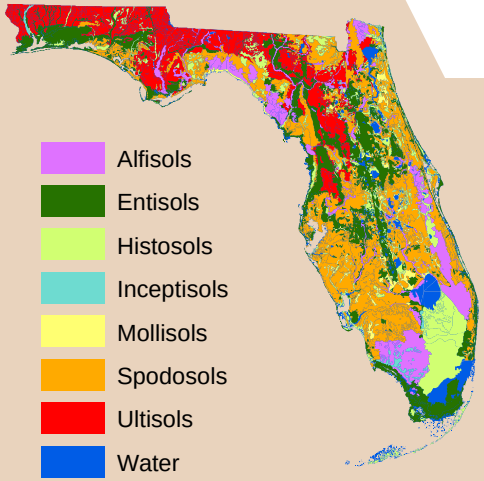
Land Resource Region (LRR) 1:7,500,000


(Guo et al. SSSAJ, 2006)

Major Land Resource Area (MLRA) 1:3,500,000

Land Resource Unit (LRU) 1:1,000,000



STATSGO 1:250,000

SSURGO 1:24,000

Soil Series

Pedon

x, y

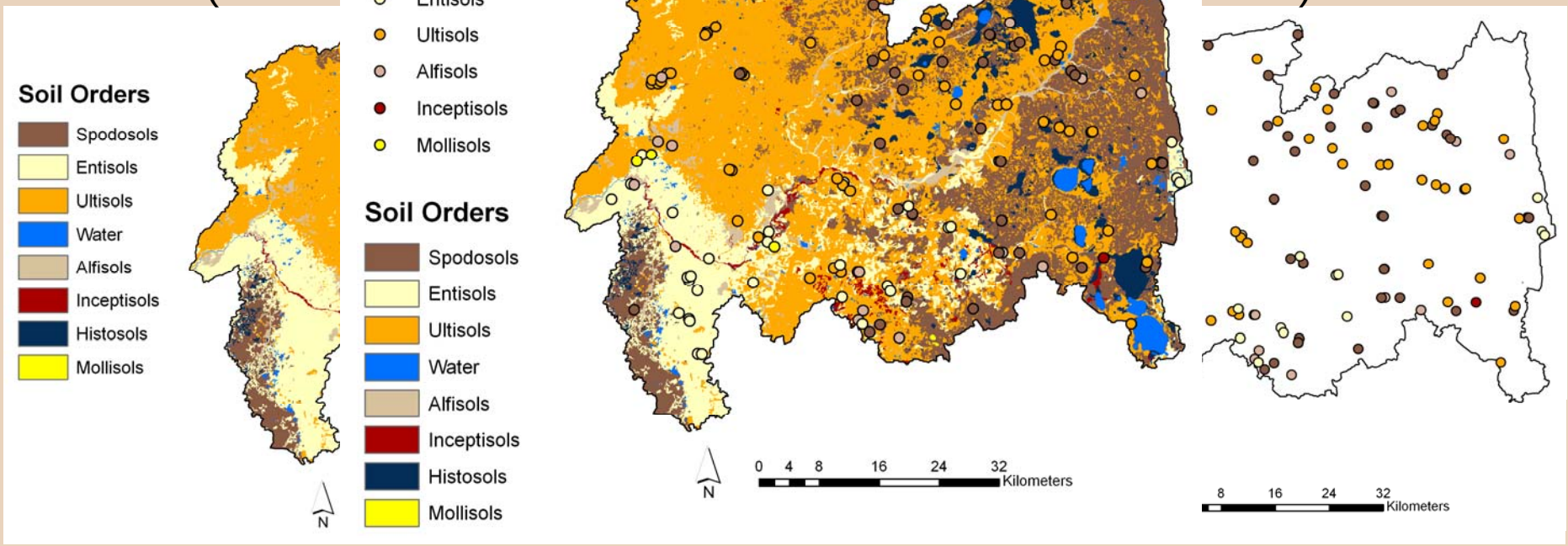
Modified after Soil Geography (NRCS) http://soils.usda.gov/survey/geography/

Soil Mapping Spatial Scale

Taxonomic Accuracy

Santa Fe River Watershed (3,585 km^2) ~8 counties in NE FL

SSURGO (Soil Da … : 143) - Wade Hurt



Soil Order accuracy: 60.3%

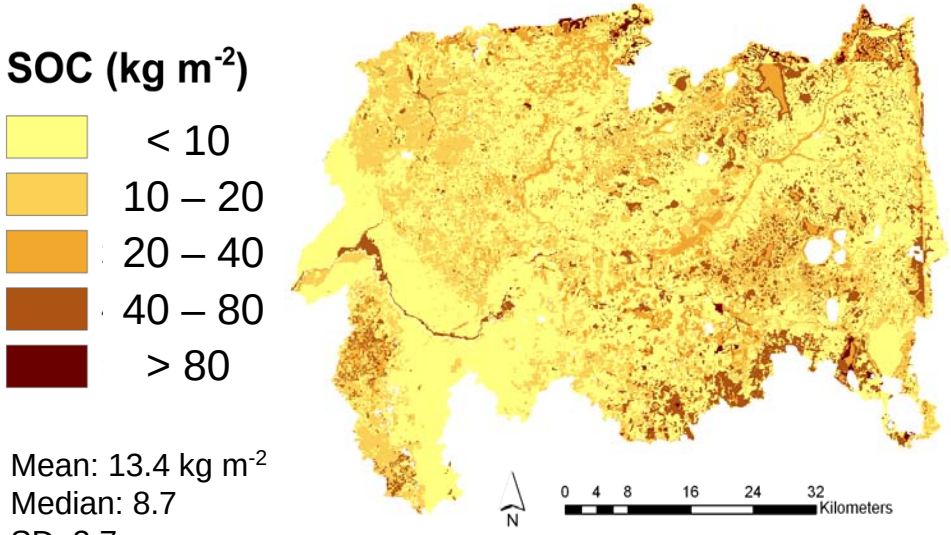
Accuracy Soil Order & drainage class: 45.1%

Soil Series accuracy: 20.4%

Soil Property Accuracy

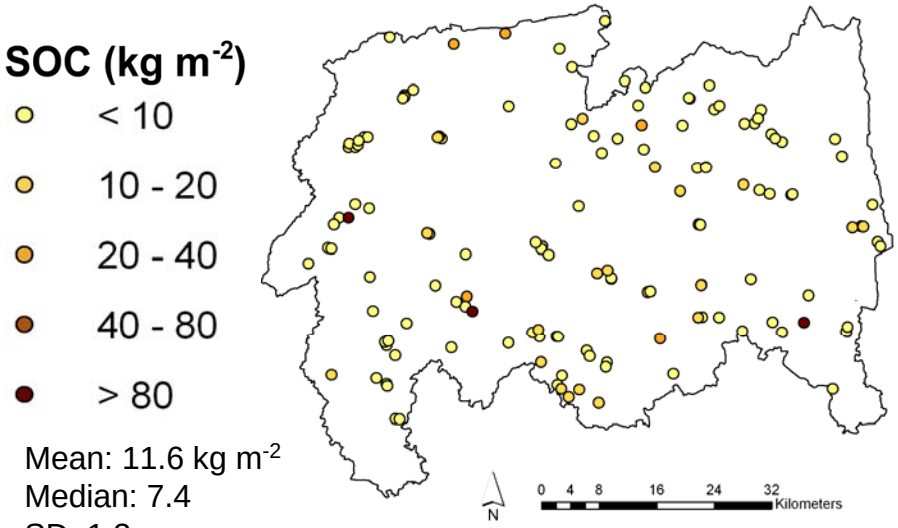
Santa Fe River Watershed (3,585 km^2) ~8 counties in NE FL

SSURGO (Soil Data Mart) 1:24,000



Mean: 13.4 kg m^{-2}
Median: 8.7
SD: 3.7

Field sampling (n: 141) – Lab Data



Mean: 11.6 kg m^{-2}
Median: 7.4
SD: 1.3

Soil organic carbon (SOC) accuracy (1 m profile):

Root Mean Square Error = 27.8 kg m^{-2}

Absolute SOC stored within watershed (1m profile) [SSURGO]:

53,350,771 Mg C **+/- 73,556,748 Mg C error**

Tremendous needs for high-resolution and high-quality soil data

Soil Carbon Sequestration

Soil and Water Quality

Google Images

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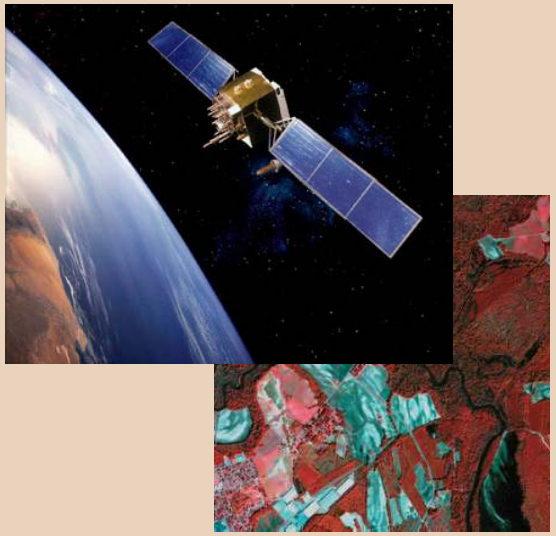
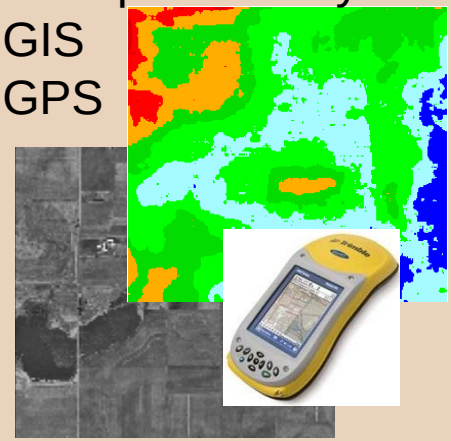
Soil-landscape relationships

Remote sensing

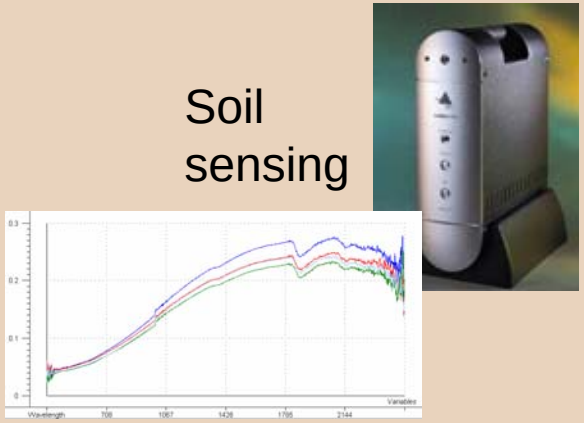


Field mapping

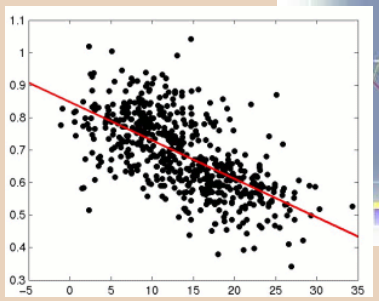
Geospatial analysis
GIS
GPS

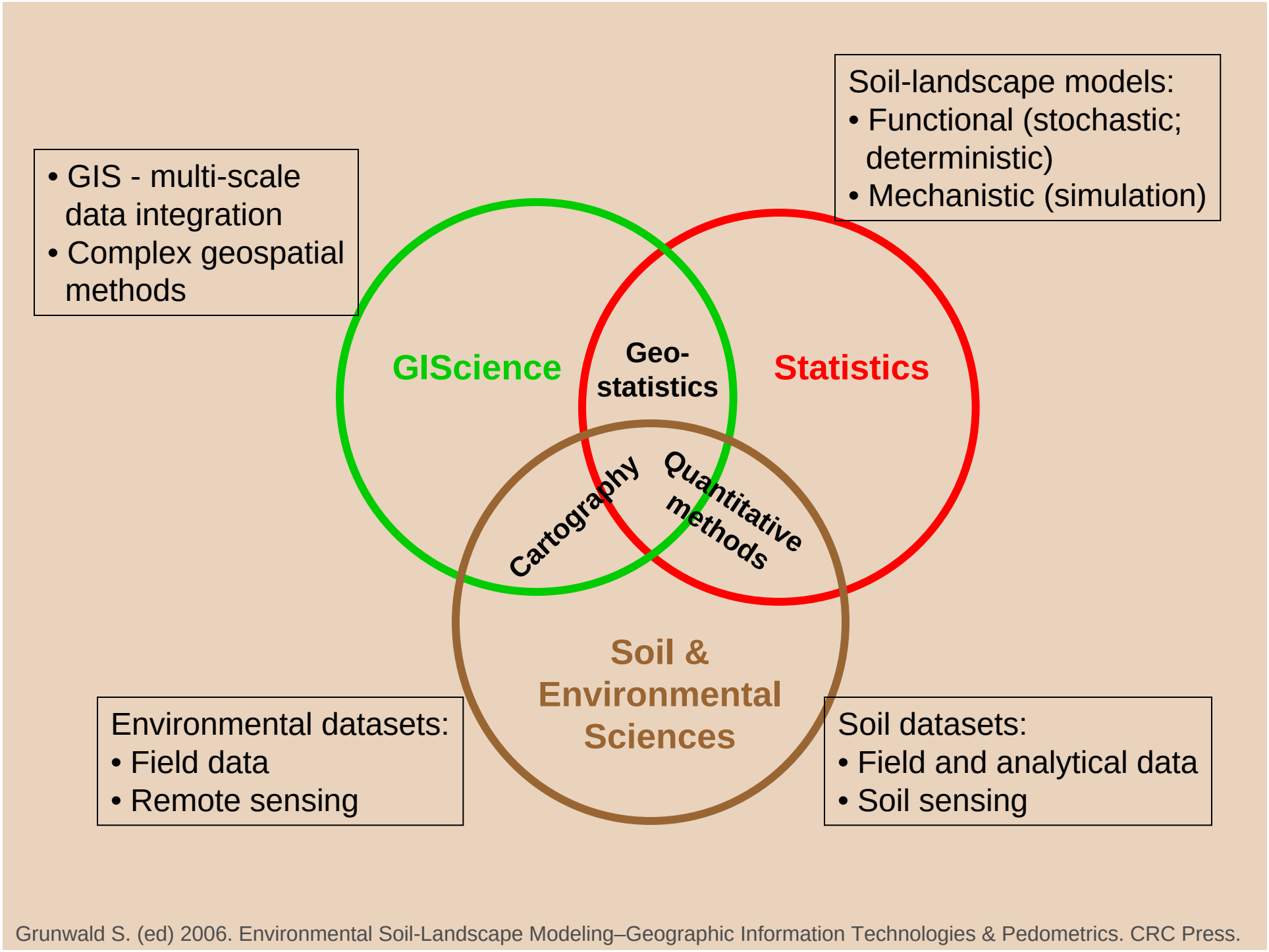


Soil sensing



Models





Grunwald S. (ed) 2006. Environmental Soil-Landscape Modeling–Geographic Information Technologies & Pedometrics. CRC Press.

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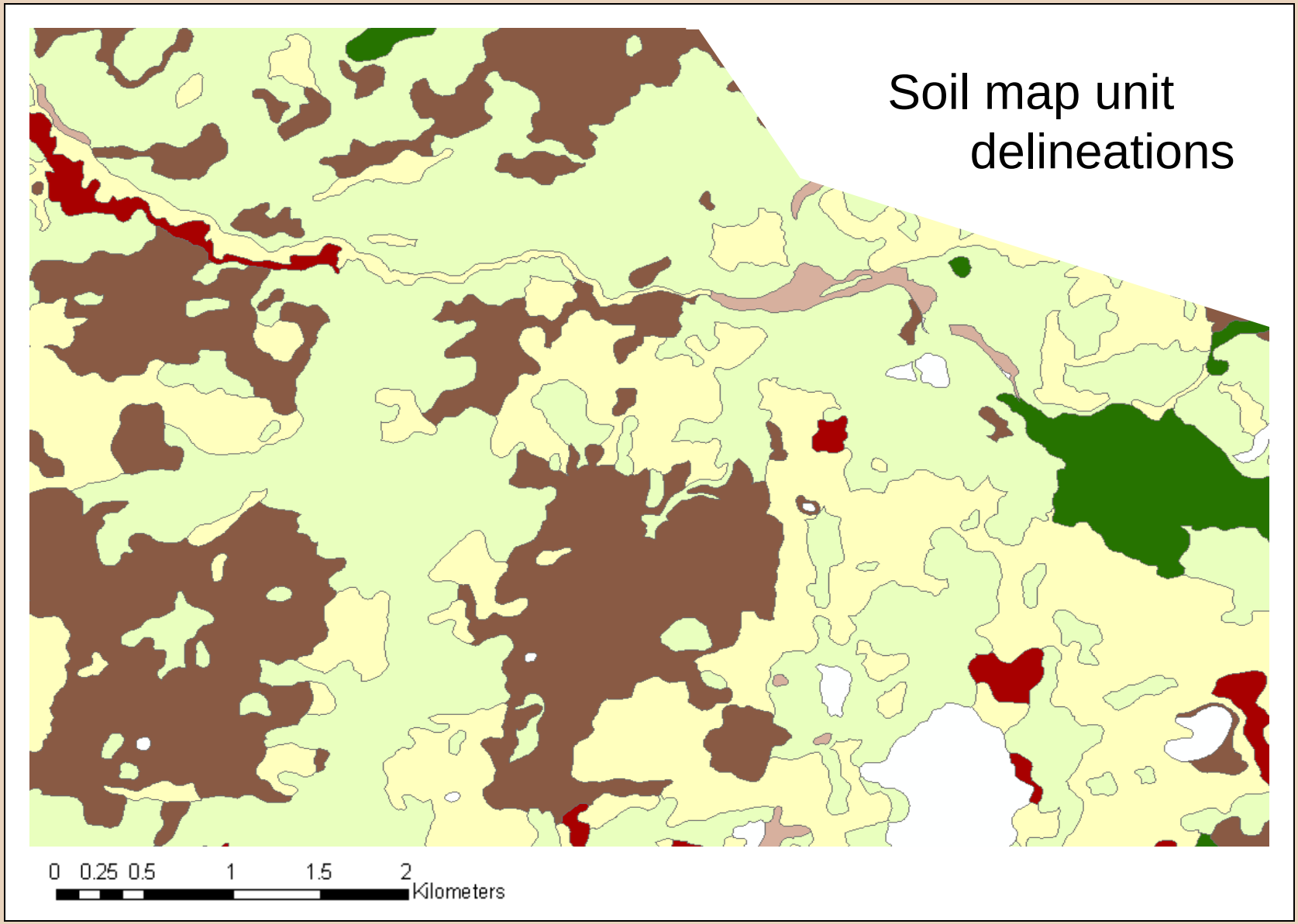
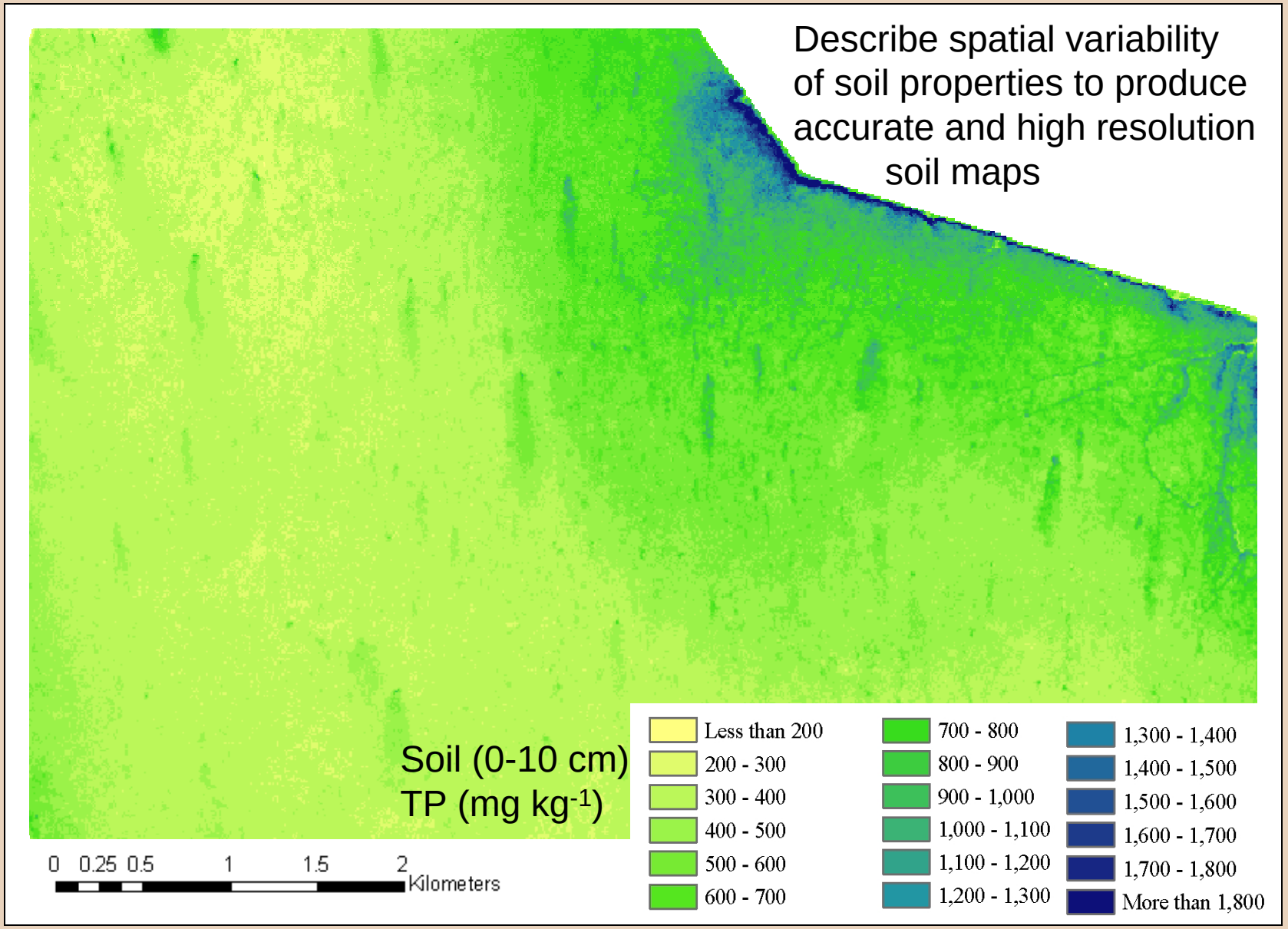
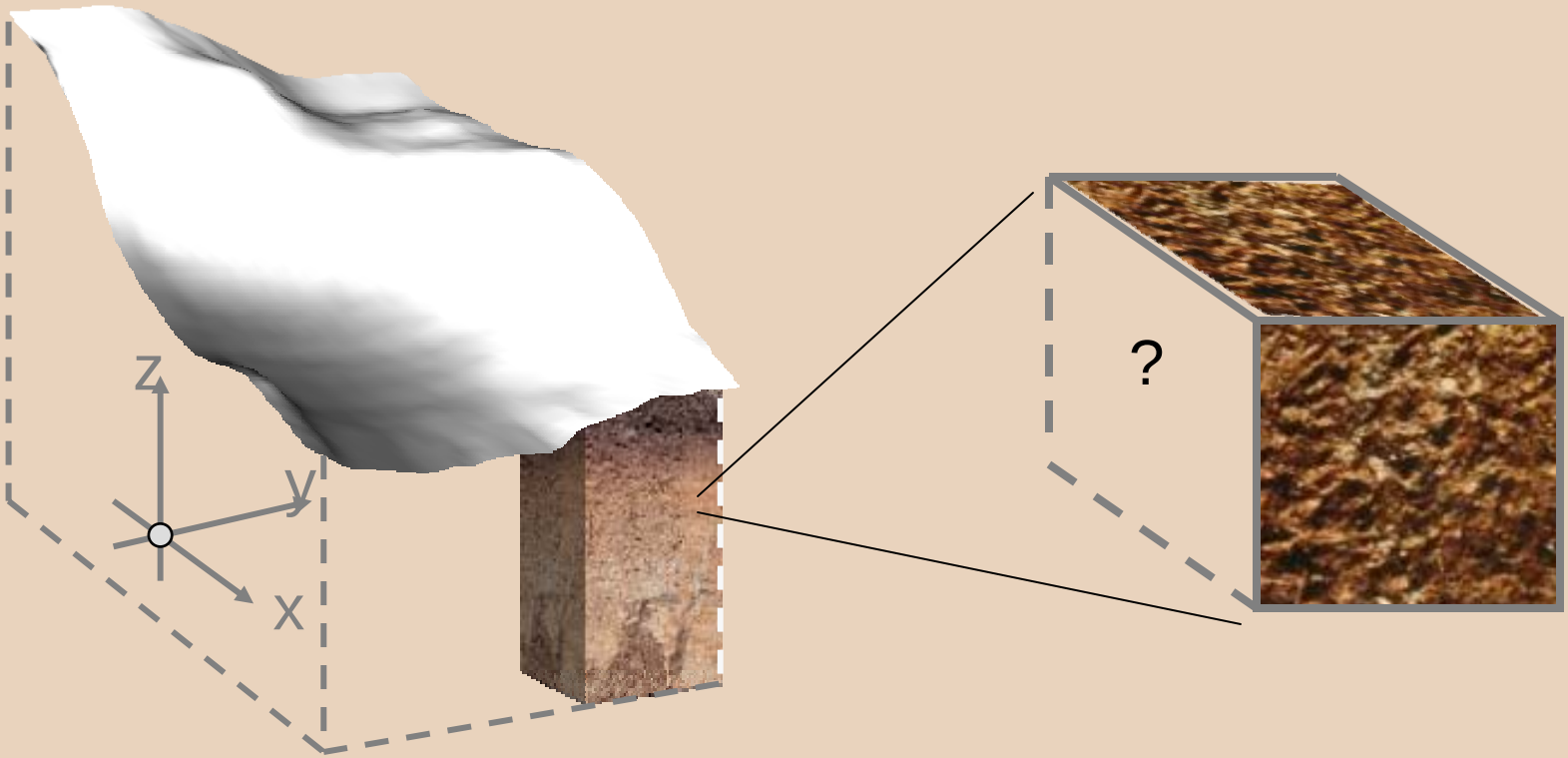
Soil Mapping
Spatial Variability


Soil map unit delineations
0 0.25 0.5 1 1.5 2
Kilometers


Describe spatial variability of soil properties to produce accurate and high resolution soil maps
Soil (0-10 cm) TP (mg kg-1)
0 0.25 0.5 1 1.5 2
Kilometers
Less than 200
200 - 300
300 - 400
400 - 500
500 - 600
600 - 700
700 - 800
800 - 900
900 - 1,000
1,000 - 1,100
1,100 - 1,200
1,200 - 1,300
1,300 - 1,400
1,400 - 1,500
1,500 - 1,600
1,600 - 1,700
1,700 - 1,800
More than 1,800

Key questions:

How large to make a map unit or soil pixel?

Which soil attributes should be mapped in a unit/pixel?

What is the accuracy and precision of soil data?