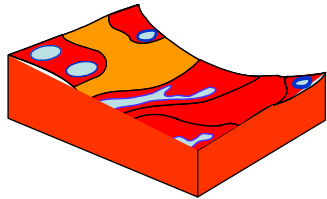


The Soil Typological Unit

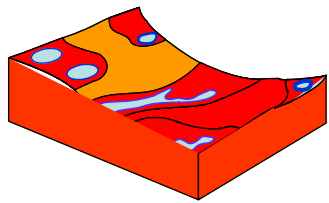
Dominique King and Christine Le Bas
INRA Orleans, France



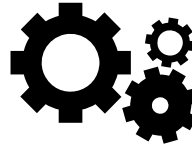
ESBN 2007 Plenary meeting
Hannover, 23-24/04/07

INTRODUCTION

Objective : Definition of soil risk areas



Soil cover



Data processing



Soil map

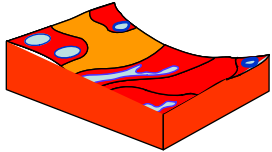


Soil risk areas



1

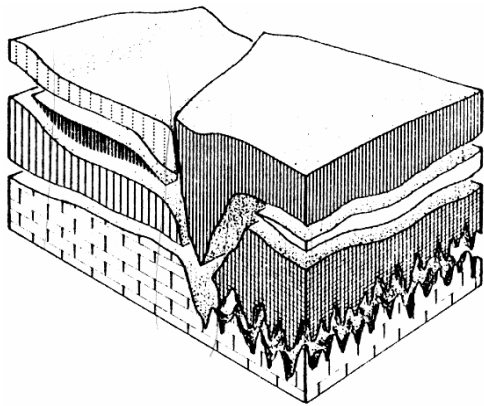
Diversity and variability of soils



- Soil variability is the result of processes of soil formation
- Soil formation processes lead to « **natural soil bodies** »
- Soil formation knowledge = best tool for soil typology
and soil mapping

1

Natural Soil bodies (3D volume)

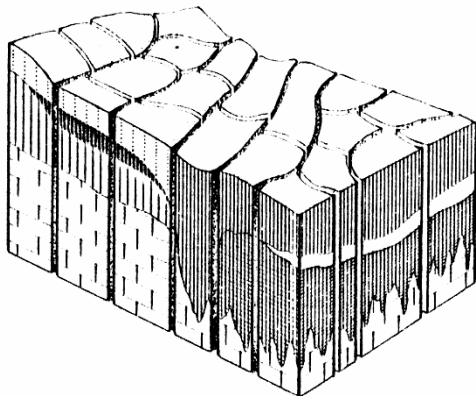


horizontal view :



HORIZON

Attributes : Clay content, color, thickness, etc.



vertical view :



SOIL TYPOLOGICAL UNIT (STU)

Attributes : Horizons list, root depth water table, etc.

1

Definition Soil Typological Unit

- Summary (In : *Georeferenced Soil Database for Europe* - EUR 18092, 1998 - p. 8)

« STU is a portion of the soil cover with diagnostic characteristics resulting from similar processes of soil genesis »

« STU description »... is based on ... « morphological and analytical attributes of the main horizons »

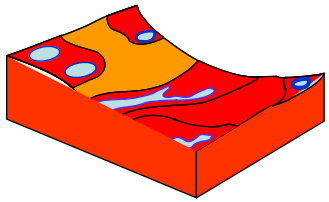
« STU corresponds to a real portion of the soil cover, but delineation on a map is not always possible »

1

Definition Soil Typological Unit = Table

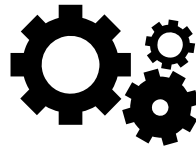
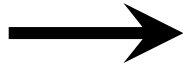
STU n°	Horizon n°	Clay content				Thickness				Soil classification			
		Mode	Q1	Q5	...	Mode	Q1	Q5	...	WRB			
1	1												
	2												
2	1												
3	1												
	3												

*STU = spatial entity
Data estimated from statistics or expertise*



Soil cover

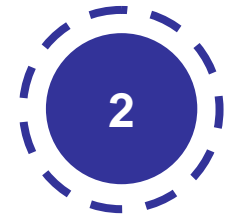
1



Data processing



Soil map
Soil risk areas



2

Soil Map Soil Geographical DataBase (SGDB)



- Soil Map = Representation of the soil variability in 2D with scale constraints and poor information
- SGDB = GIS concepts with 2 separate data sets
 - Geometric set = delineation
 - Semantic set = soil attributes

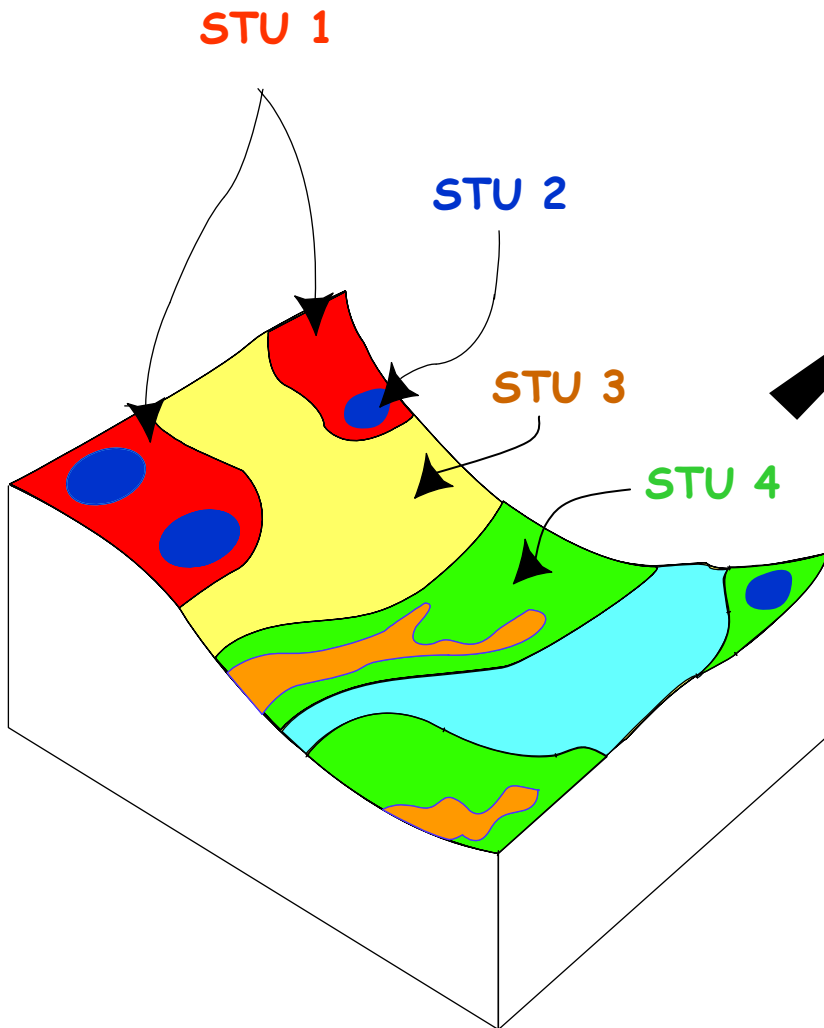
STU definition : Semantic set > Geometric set

2

STU identification

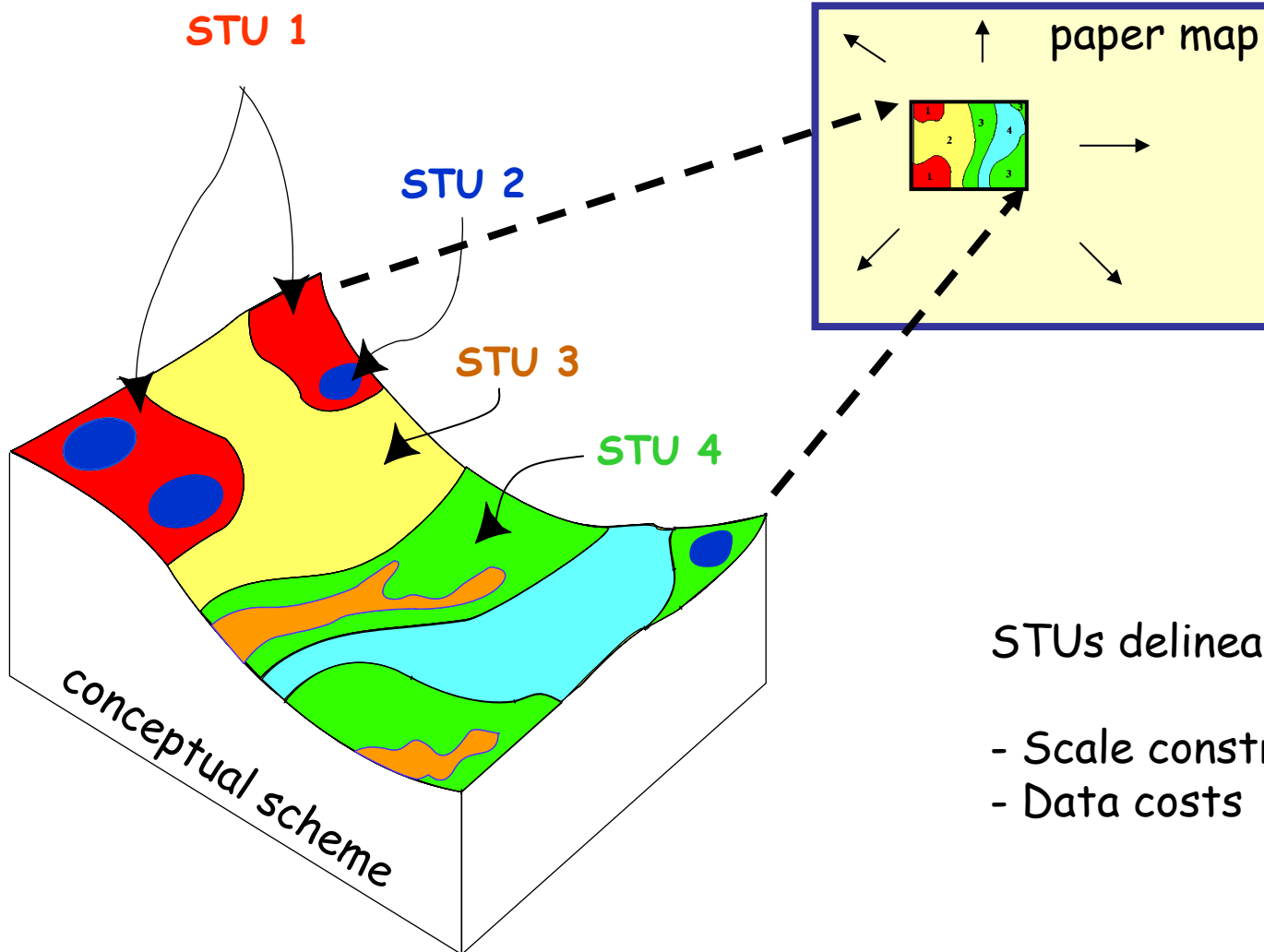
Conceptual scheme :

Spatial Organisation Model



2

STU representation

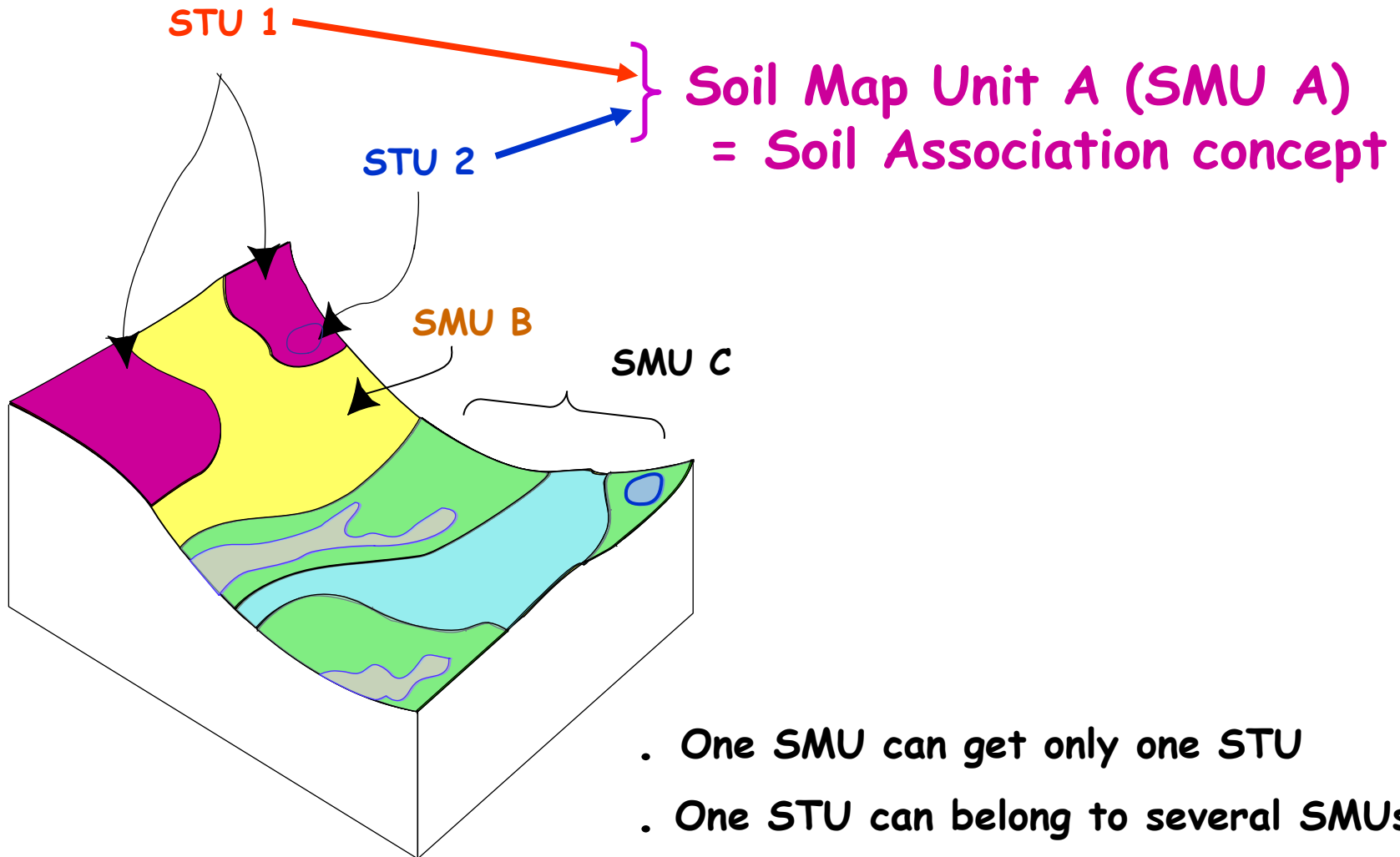


STUs delineation :

- Scale constraints
- Data costs

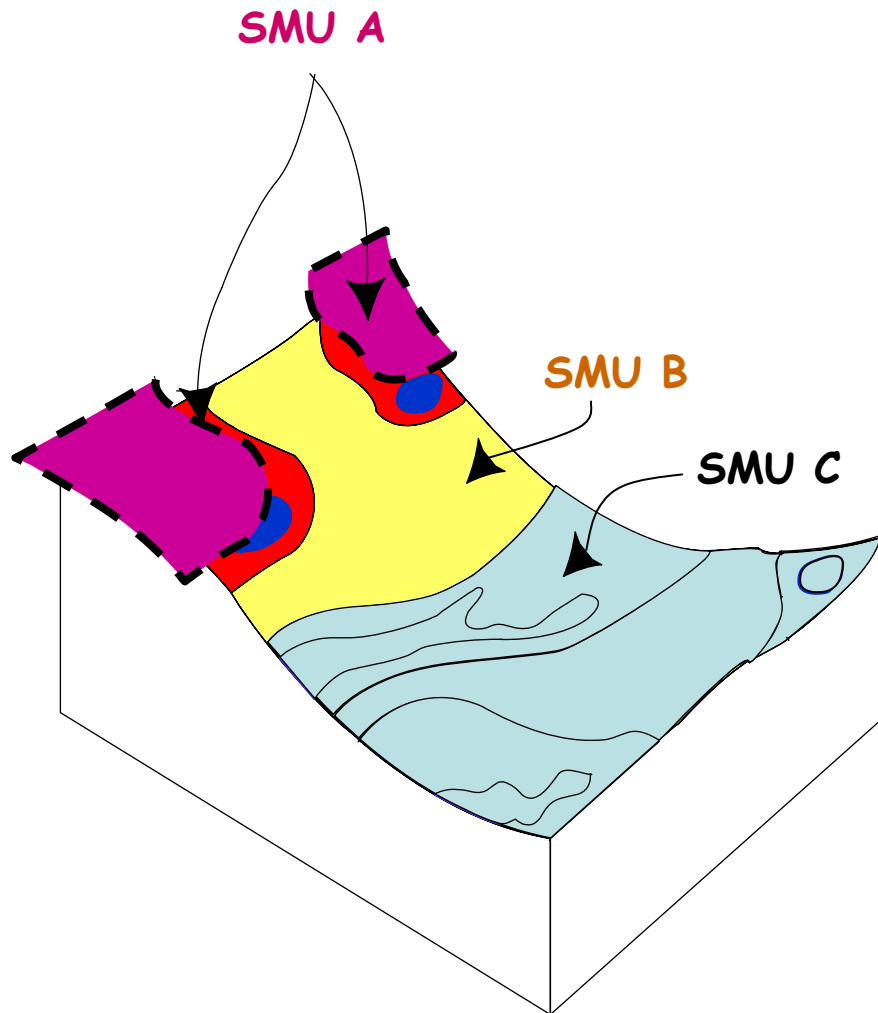
2

STU representation



2

STU representation through SMU



SMU n°	STU n°	% area	Geometric delineation
A	1	60	Polygons i, j...
A	2	40
B	3	100
C	4	90
C	2	10

SMU/STU relational table

Conclusion

STU = Soil body defined by **attributes** and related to a soil classification

Location of STUs is known through Soil Map Unit delineation
AND **percentage** within SMU

- *SMUs and STUs are defined and mapped thank to soil attributes*
- *Soil attributes are used to derive criteria for soil risk assessment*

STU/SMU concepts allow to have :

- **rigour to characterise** soils on common criteria at European level
- **flexibility to map** soil areas at regional level

Recommendation

Soil Geographical DataBase can deliver information for soil risk areas

→ **Soil risk area maps derived from STUs attributes**

2 last remarks, with 2 proposals :

Soil attributes have an uncertainty

→ **Uncertainty maps (confidence level)**

Risk area are mapped from SMU delineation

AND percentage of STU within SMU

→ **Representativity maps (% STU within SMU)**