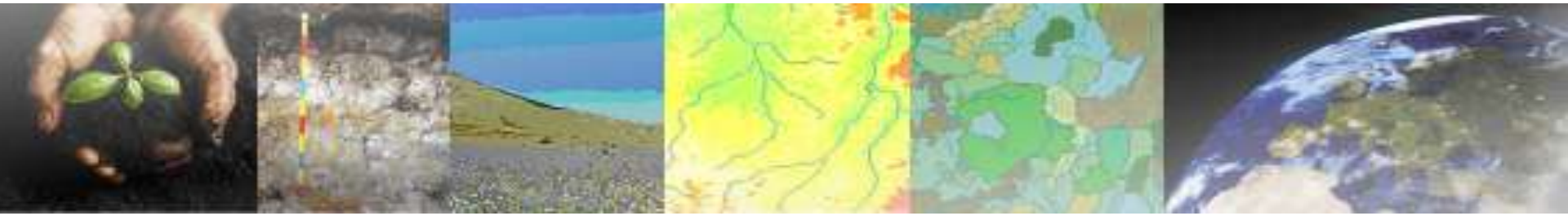
e-SOTER

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

Integration of terrain, parent material and soil information in e-SOTER at scale 1:250.000

Michael Bock



SciLands scientific landscapes

BGR Bundesanstalt für Geowissenschaften und Rohstoffe
GEOZENTRUM HANNOVER

COOPERATION

content

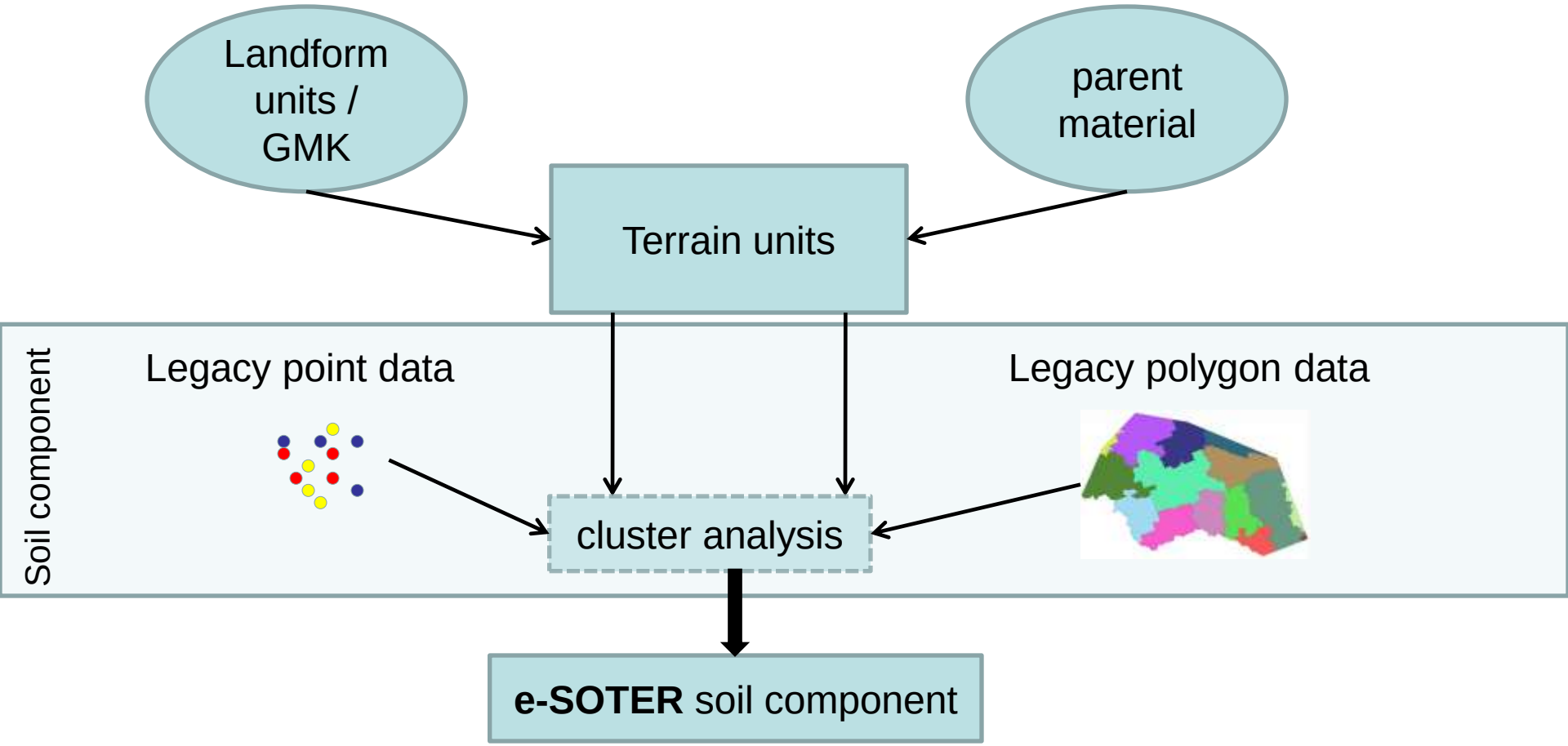
I. Basic procedure

II. Case study 1: data rich environment Chemnitz (Germany/Czech Rep.)
- landform
- parent material
- terrain
- soil data situation
- critical number of sample points
- cluster analysis
- e-SOTER Map

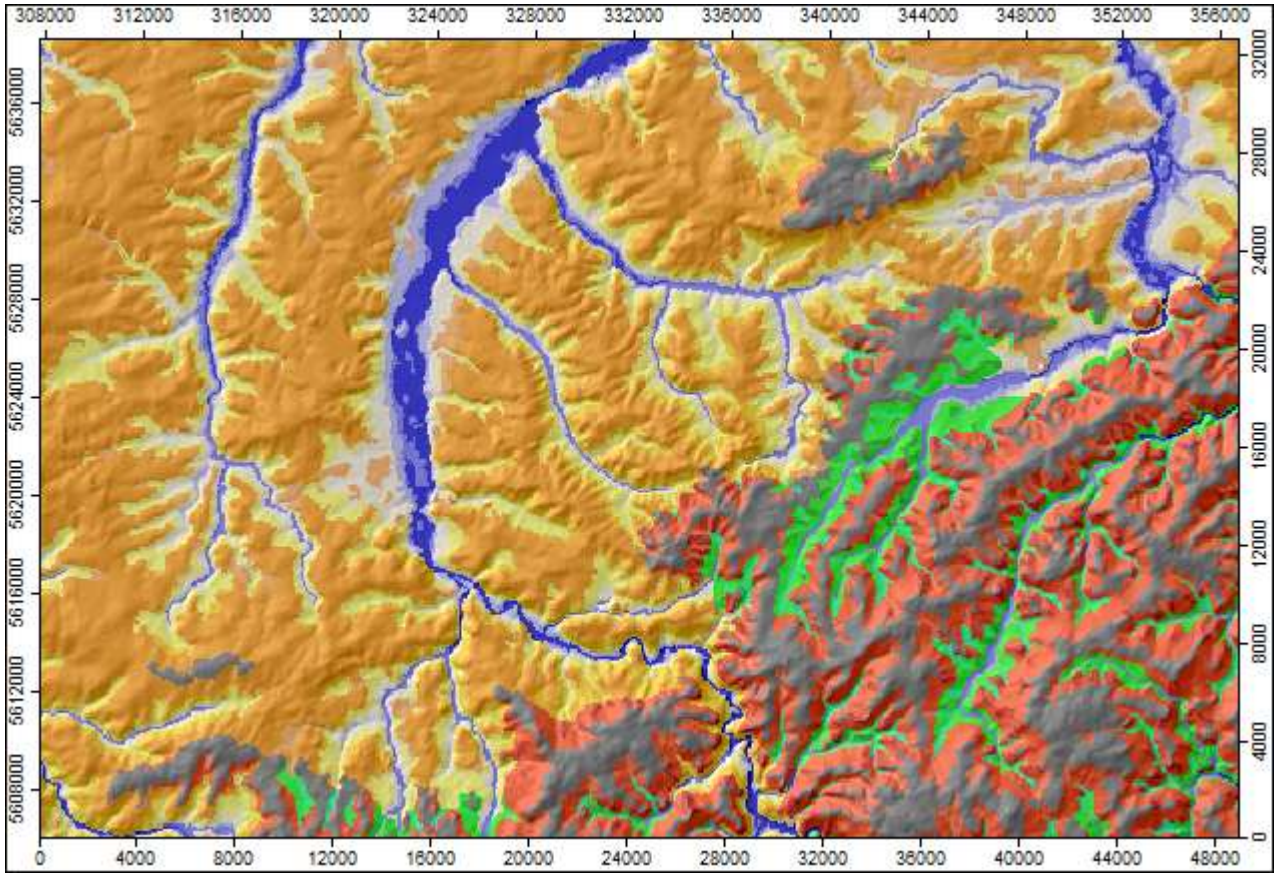
III. Case study 2: data poor environment Fes (Morocco)
- landform
- parent material
- terrain
- soil data situation
- further processing and cluster analysis
- eSOTER draft Map
- validation trip

IV. Outlook

I. Basic procedure



II. Case study: data rich environment Chemnitz
- landform units: Geomorphographic map (GMK) -

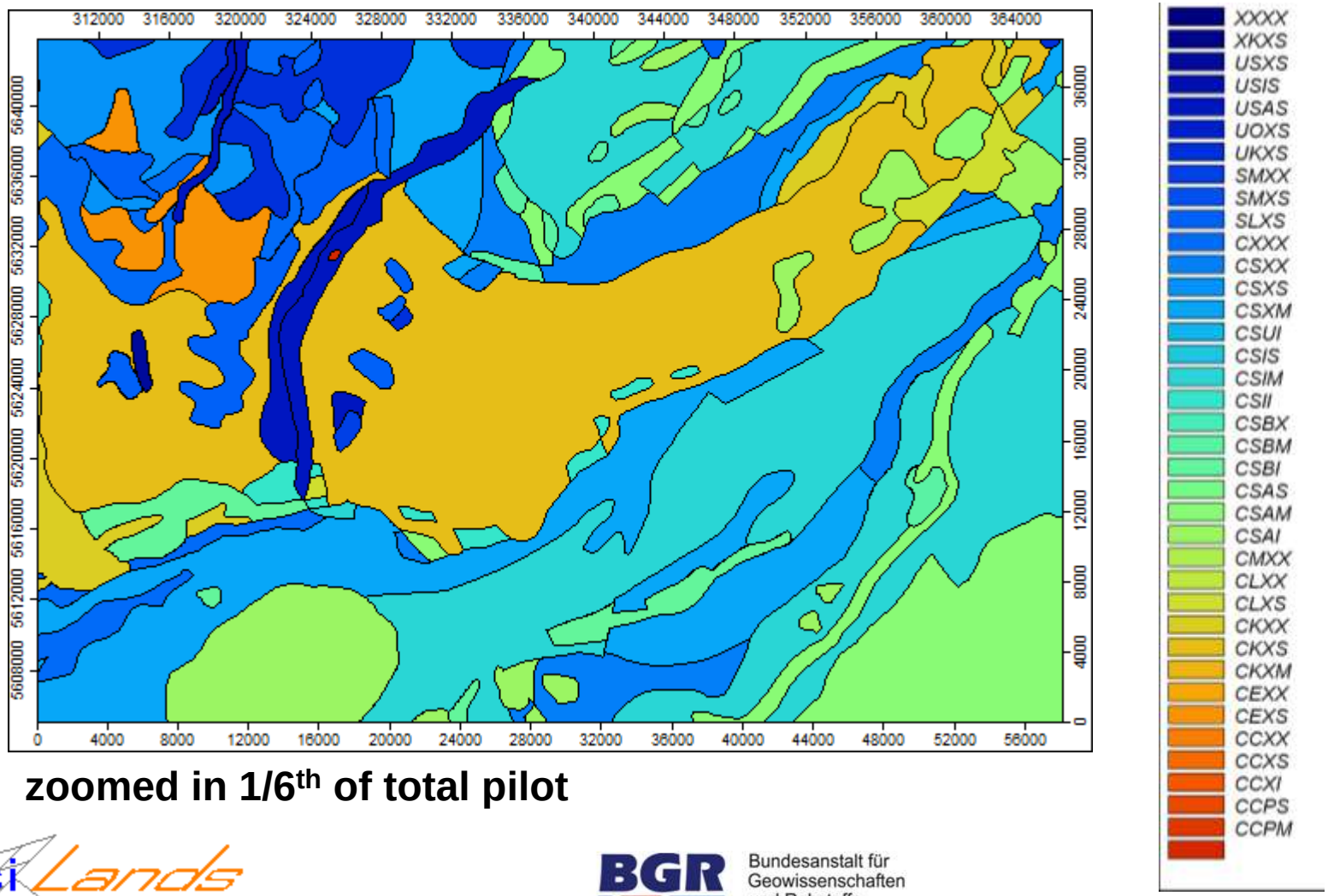


Summit Area
Div US
Con US
Upper Slope
Div LS
Con LS
Lower Slope
Upper Terraces 2
Upper Terraces 1
Lower Terraces 3
Lower Terraces 2
Lower Terraces 1
Bottom Area 4
Bottom Area 3
Bottom Area 2
Bottom Area 1

zoomed in 1/6th of total pilot

Bundesanstalt für Geowissenschaften und Rohstoffe
GEOZENTRUM HANNOVER

II. Case study: data rich environment Chemnitz
- parent material units: reclassified Geological map -



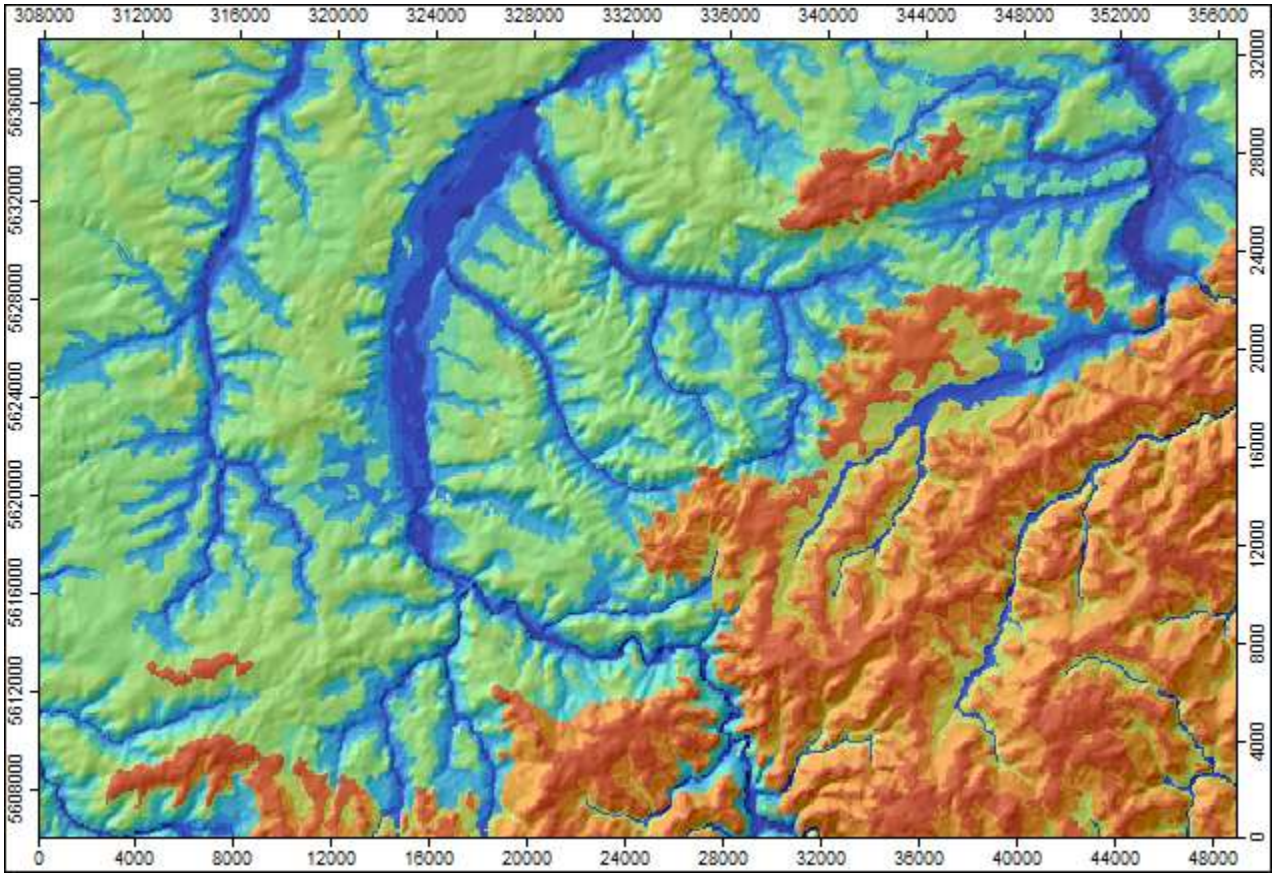
zoomed in 1/6th of total pilot

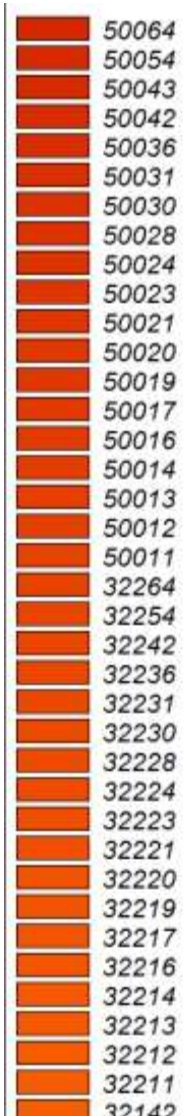
SciLands scientific landscapes

BGR Bundesanstalt für Geowissenschaften und Rohstoffe
GEOZENTRUM HANNOVER

COOPERATION

II. Case study: data rich environment Chemnitz
- terrain units: merging GMK with PM = 349 classes –
(first 3 digits landform unit / last 2 parent material)





zoomed in 1/6th of total pilot

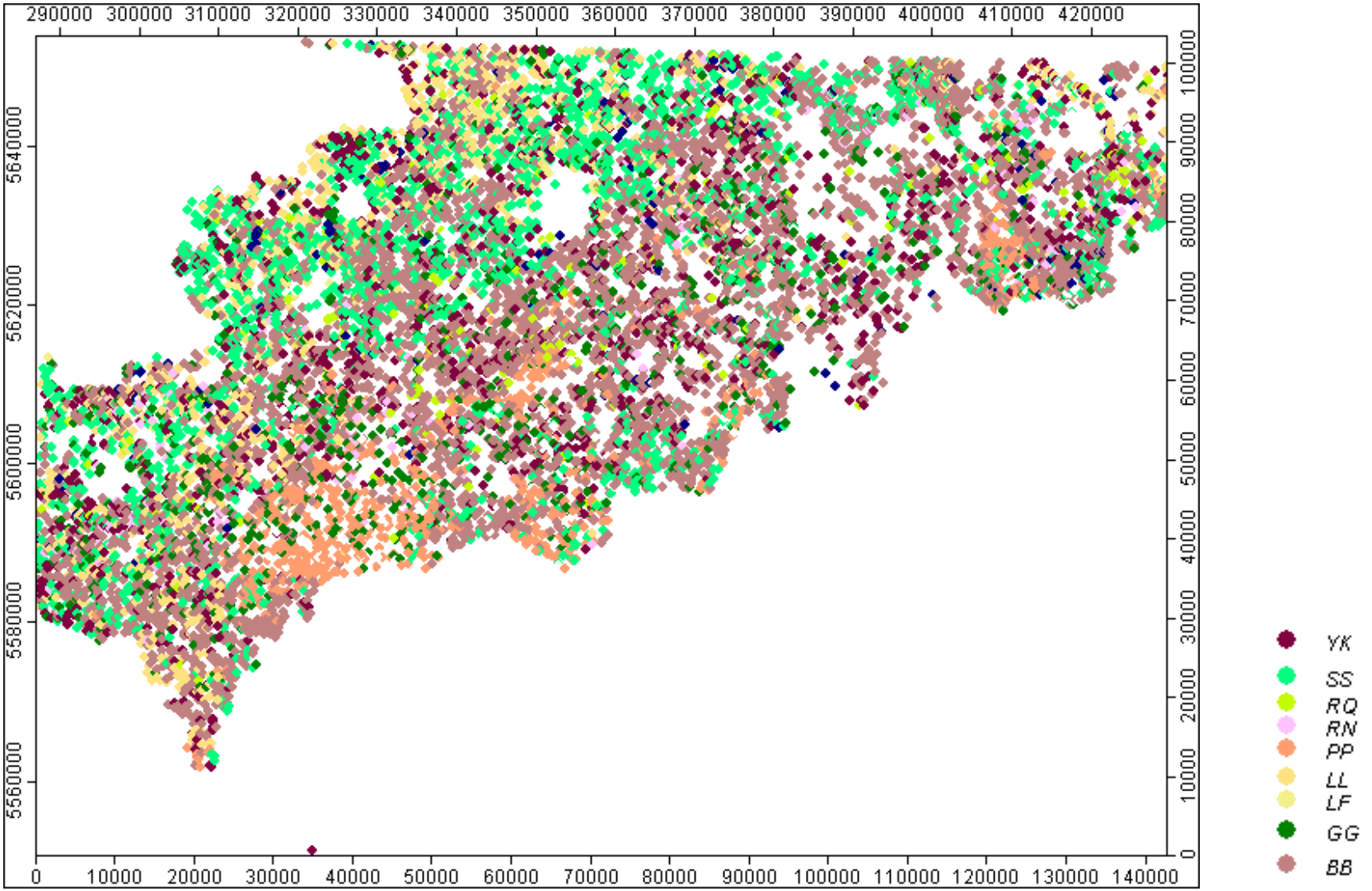
SciLands scientific landscapes

BGR Bundesanstalt für Geowissenschaften und Rohstoffe
GEOZENTRUM HANNOVER

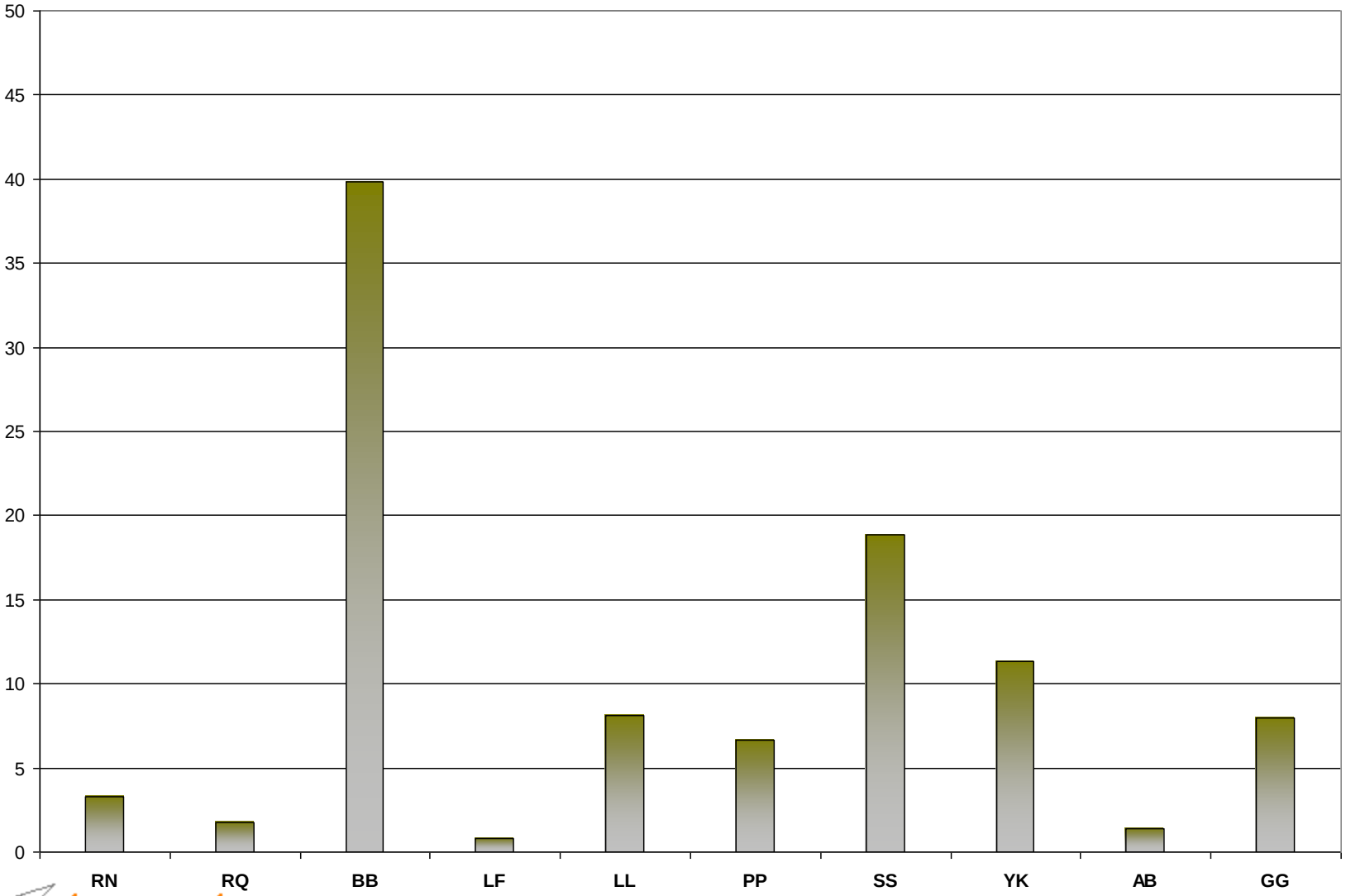
COOPERATION

- The system picks up on the idea that the combination of landform and parent material information dissects the landscape in a complex manner sufficiently to represent delineations conform with soil-landscape formation
- The legend of the terrain units requires aggregation according to soil content

Profile data with10 main soil types in pilot Chemnitz (13480 samples)

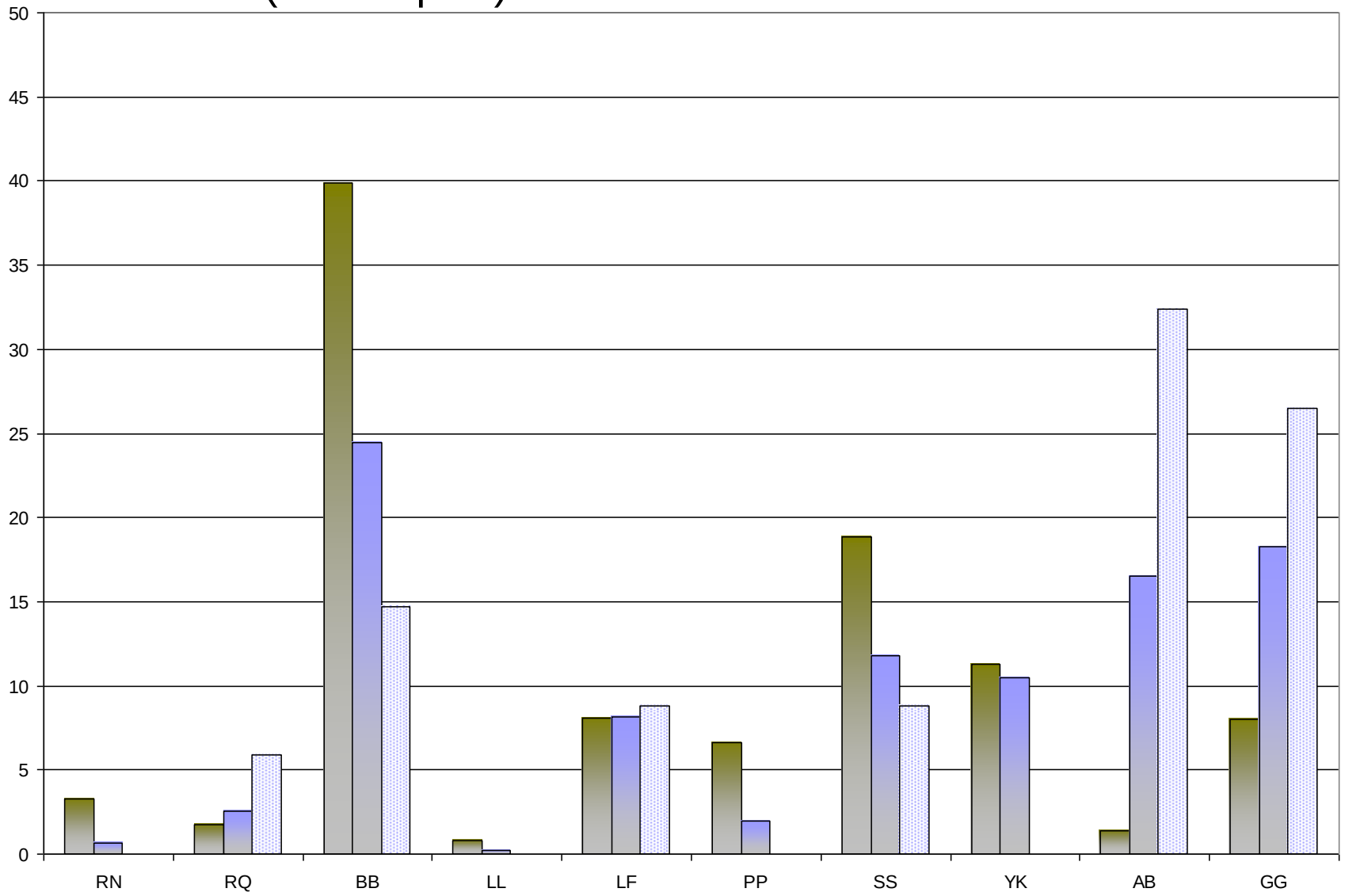


Analyzing profile data:
Proportions of main soil types in Chemnitz [%]

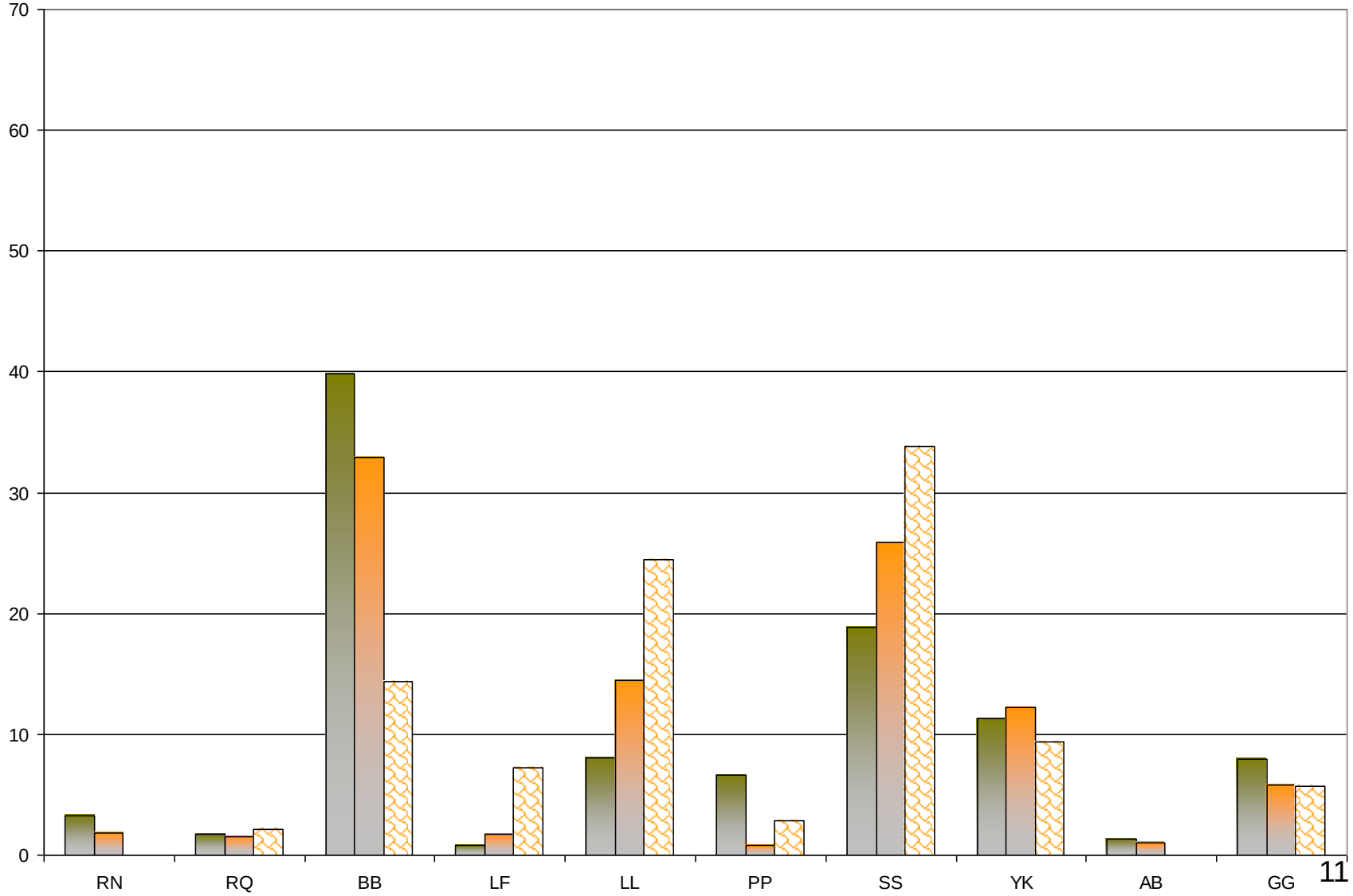


Analyzing profile data:

Proportions of main soil types in bottom areas [%] | area 2 | USAS (34 samples)



Main soil types in Upper terraces 2 | SLXS (139 samples)



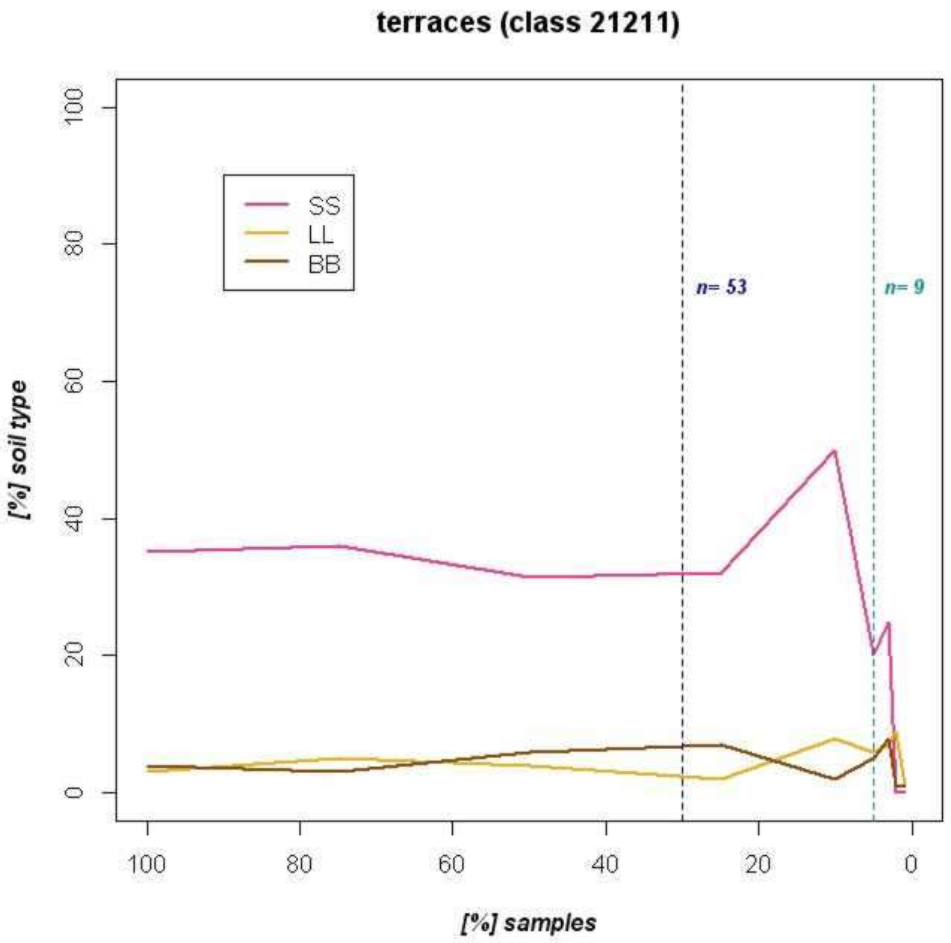
Analysing profile data within terrain units

Reduction of the number of points

Randomly reducing the points down to 15% of the points still leads to the same results. More reducing leads to accidently altering the proportions.

In Chemnitz 2.500 points would have been enough for more than 17.000 km^2,

≙ 1 point ~ 9km^2.

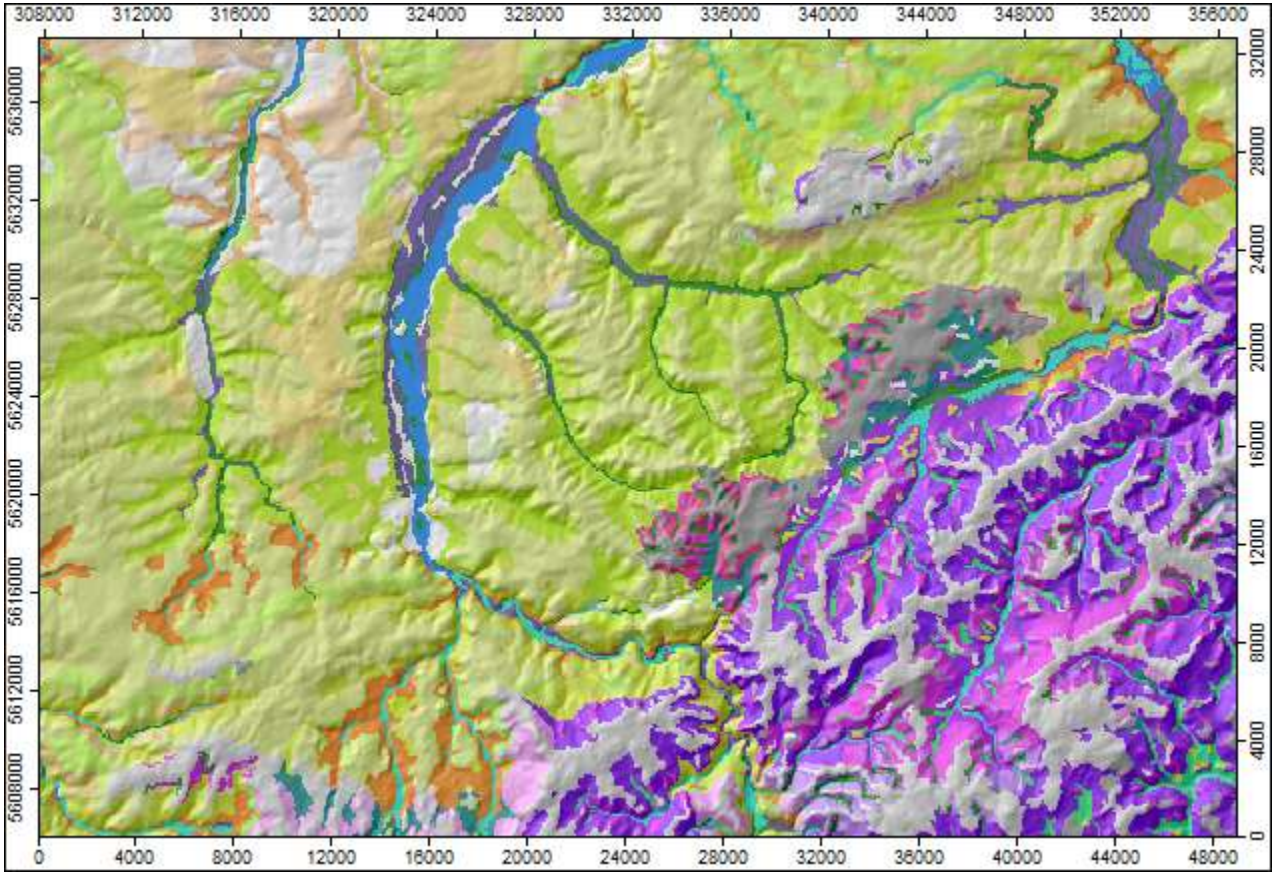


Analyzing profile data:

Differences in main soil types in bottom areas, data preparation for terrain unit aggregation

	RN	RQ	BB	LF	LL	PP	SS	YK	AB	GG	control sum	number of points
10153	-0,6	-2,6	-24,5	-0,2	-8,2	-1,9	-11,8	-10,5	43,5	-18,2		5
10211	-0,6	-2,6	15,5	-0,2	-8,2	-1,9	-11,8	-10,5	33,5	-18,2		10
10212	-0,6	-2,6	-24,5	-0,2	-8,2	-1,9	-11,8	-10,5	43,5	-18,2		5
10216	-0,6	-2,6	15,5	-0,2	-8,2	-1,9	28,2	-10,5	-16,5	-18,2		5
10217	-0,6	-2,6	14,4	-0,2	0,2	-1,9	-6,2	11,7	-11,0	-7,1		36
10220	-0,6	-2,6	-24,5	-0,2	11,8	-1,9	-11,8	-10,5	13,5	11,8		10
10224	-0,6	4,5	11,3	-0,2	-8,2	-1,9	-4,7	10,9	1,3	-11,1		28
10228	-0,6	-2,6	4,1	-0,2	-8,2	-1,9	-11,8	-10,5	12,0	10,4		7
10230	-0,6	-2,6	-24,5	-0,2	-8,2	-1,9	6,4	7,7	-16,5	27,3		11
10231	-0,6	-2,6	-24,5	-0,2	-8,2	-1,9	-11,8	-10,5	33,5	-18,2		6
10253	-0,6	3,3	-9,8	-0,2	0,7	-1,9	-3,0	-10,5	15,8	8,3		34
10254	-0,6	-2,6	21,0	-0,2	-8,2	-1,9	24,6	-10,5	-16,5	-18,2		11
10311	-0,6	-2,6	-3,0	-0,2	-1,0	-1,9	13,2	0,2	-2,2	3,2		28
10312	-0,6	-2,6	-24,5	-0,2	11,8	-1,9	1,5	9,5	-16,5	15,1		15
10314	-0,6	-2,6	-24,5	-0,2	-8,2	-1,9	-11,8	-10,5	50,1	-18,2		3
10316	-0,6	-2,6	-8,7	-0,2	-8,2	29,7	9,3	-10,5	-16,5	8,1		19
10317	-0,6	-2,6	22,0	-0,2	-3,5	-1,9	-11,8	-3,5	-7,2	2,7		43
10320	-0,6	-2,6	-24,5	-0,2	-8,2	-1,9	-11,8	-10,5	-16,5	21,8		5
10324	-0,6	-2,6	14,8	-0,2	6,1	-1,9	-11,8	3,8	-16,5	6,8		28
10328	-0,6	5,1	-16,8	-0,2	-8,2	-1,9	3,6	4,9	-8,8	20,3		26
10330	-0,6	-2,6	-24,5	-0,2	-8,2	-1,9	-11,8	32,3	-16,5	-18,2		7
10331	-0,6	-2,6	-4,5	-0,2	-8,2	-1,9	-11,8	-10,5	36,8	-18,2		15
10353	-0,6	-2,6	-24,5	-0,2	-8,2	-1,9	16,8	-10,5	-16,5	-18,2		7
10411	-0,6	-2,6	10,8	-0,2	3,6	-1,9	5,8	1,2	-4,8	-18,2		17
10412	-0,6	-2,6	-24,5	-0,2	-8,2	-1,9	38,2	-10,5	-16,5	-18,2		4
10416	-0,6	-2,6	4,1	-0,2	-8,2	-1,9	-11,8	-10,5	-16,5	10,4		7
10417	-0,6	-2,6	6,3	-0,2	14,9	-1,9	-11,8	12,6	-16,5	-18,2		13
10420	-0,6	-2,6	-24,5	-0,2	-8,2	-1,9	-11,8	-10,5	-16,5	15,1		6
10424	-0,6	-2,6	-24,5	-0,2	29,3	-1,9	-11,8	-10,5	-16,5	-18,2		8
10428	-0,6	-2,6	-24,5	-0,2	-8,2	-1,9	33,7	-10,5	-16,5	-18,2		11
10430	-0,6	-2,6	-24,5	-0,2	-8,2	-1,9	10,4	11,7	5,7	-18,2		9
10454	-0,6	-2,6	8,9	-0,2	-8,2	-1,9	54,9	-10,5	-16,5	-18,2		6

eSOTER map Chemnitz with soil component



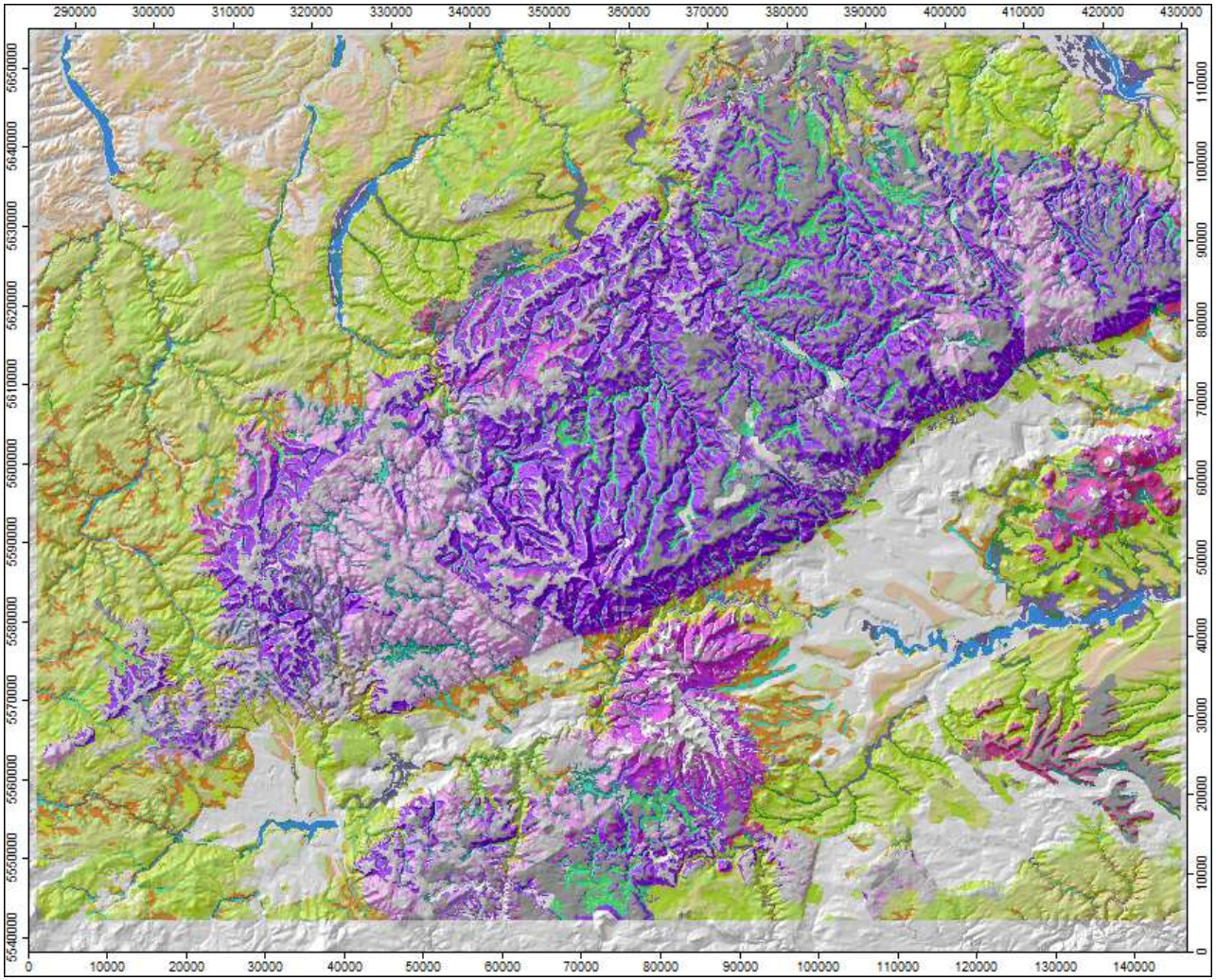
eSOTER units

TYPE

- 100 - AB-GG-BB
- 101 - BB-AB-YK
- 102 - SS-BB-AB
- 103 - AB-SS-BB
- 104 - GG-BB-YK
- 200 - BB-SS-LL
- 201 - BB-YK-SS
- 202 - BB-SS
- 203 - SS-YK-BB
- 204 - YK-LL-SS
- 205 - BB-LL-SS
- 206 - BB-LL-SS
- 207 - LL-YK-SS
- 208 - BB-SS-GG
- 209 - SS-BB-YK
- 210 - BB-SS-LL
- 211 - SS-LL-BB
- 212 - SS-BB-LL
- 310 - BB-GG-SS
- 311 - BB-SS-YK
- 312 - BB-GG-SS
- 313 - SS-GG-BB
- 314 - GG-YK-SS
- 320 - BB-SS-YK
- 321 - BB-PP-GG
- 322 - BB-PP-GG
- 323 - BB-GG-SS
- 324 - BB-YK-PP
- 325 - BB-YK-SS
- 326 - BB-PP-YK
- 500 - BB-PP-SS
- 501 - BB-SS-YK
- 502 - SS-YK-LL

zoomed in 1/6th of total pilot

eSOTER map Chemnitz with soil component



eSOTER units

TYPE

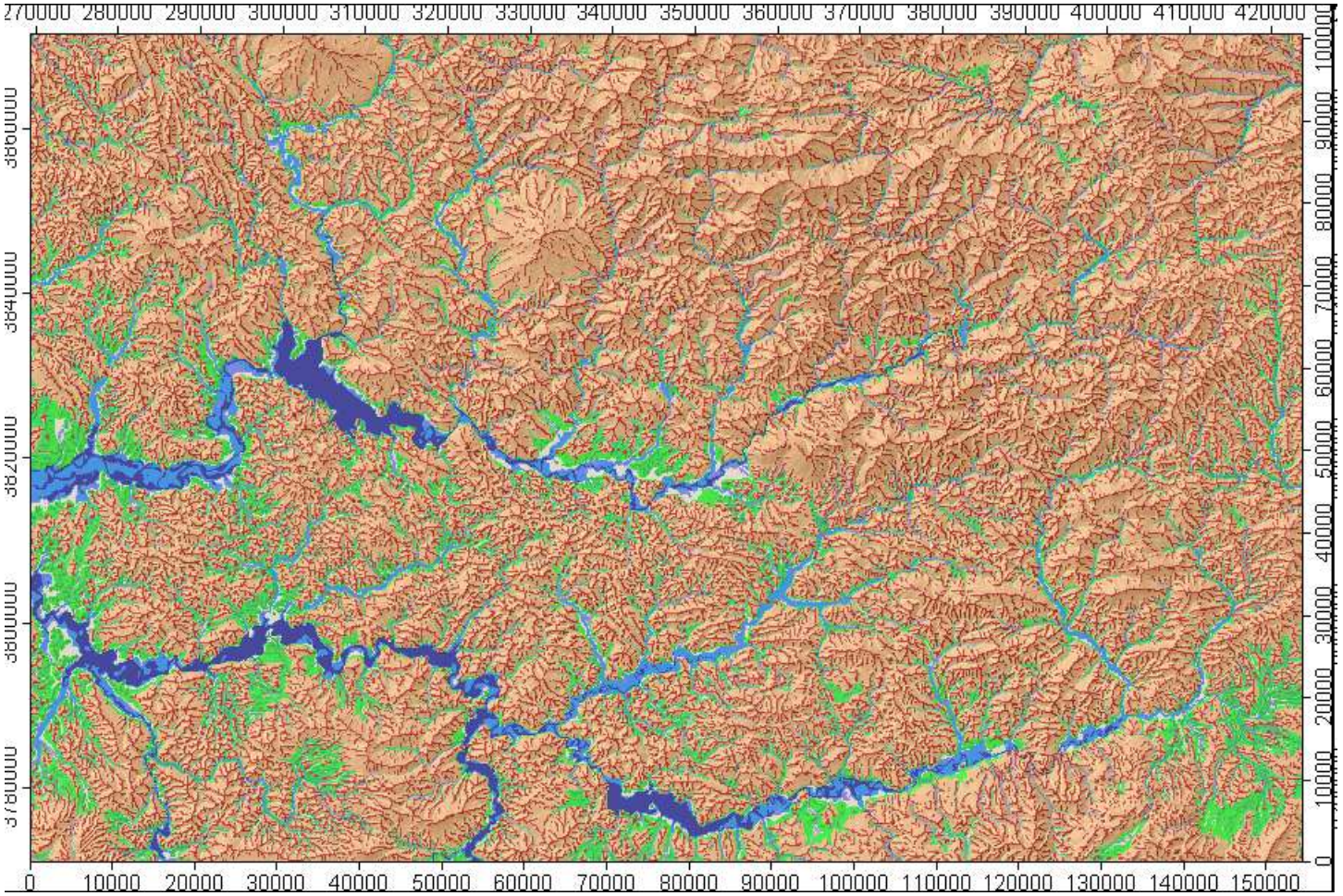
- 100 - AB-GG-BB
- 101 - BB-AB-YK
- 102 - SS-BB-AB
- 103 - AB-SS-BB
- 104 - GG-BB-YK
- 200 - BB-SS-LL
- 201 - BB-YK-SS
- 202 - BB-SS
- 203 - SS-YK-BB
- 204 - YK-LL-SS
- 205 - BB-LL-SS
- 206 - BB-LL-SS
- 207 - LL-YK-SS
- 208 - BB-SS-GG
- 209 - SS-BB-YK
- 210 - BB-SS-LL
- 211 - SS-LL-BB
- 212 - SS-BB-LL
- 310 - BB-GG-SS
- 311 - BB-SS-YK
- 312 - BB-GG-SS
- 313 - SS-GG-BB
- 314 - GG-YK-SS
- 320 - BB-SS-YK
- 321 - BB-PP-GG
- 322 - BB-PP-GG
- 323 - BB-GG-SS
- 324 - BB-YK-PP
- 325 - BB-YK-SS
- 326 - BB-PP-YK
- 500 - BB-PP-SS
- 501 - BB-SS-YK
- 502 - SS-YK-LL

Bundesanstalt für Geowissenschaften und Rohstoffe

GEOZENTRUM HANNOVER

III. Case study: data poor environment Fes

- landform units: Geomorphographic map (GMK) -



e-SOTER

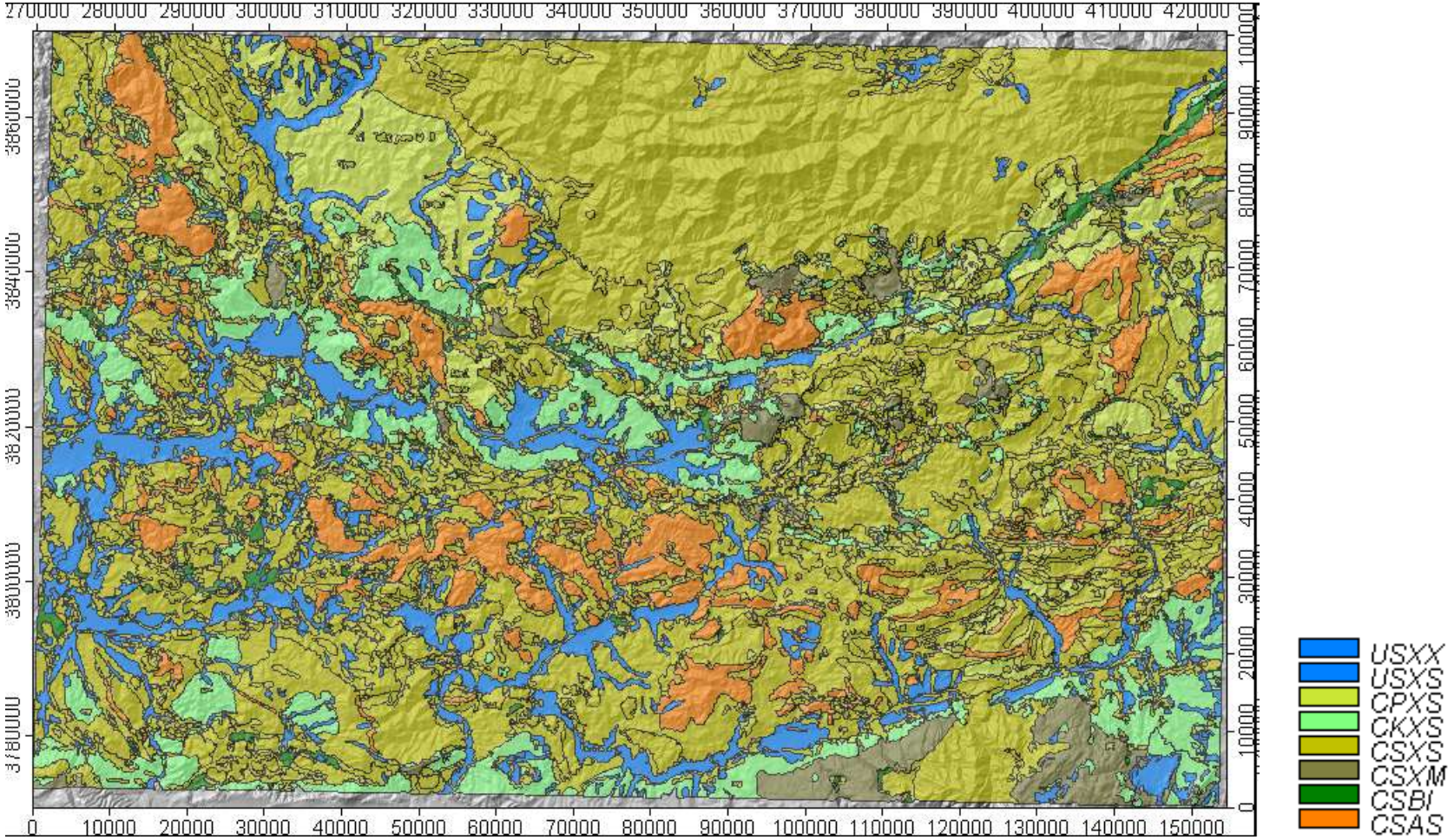
sciLands scientific landscapes

BGR Bundesanstalt für Geowissenschaften und Rohstoffe

GEOZENTRUM HANNOVER

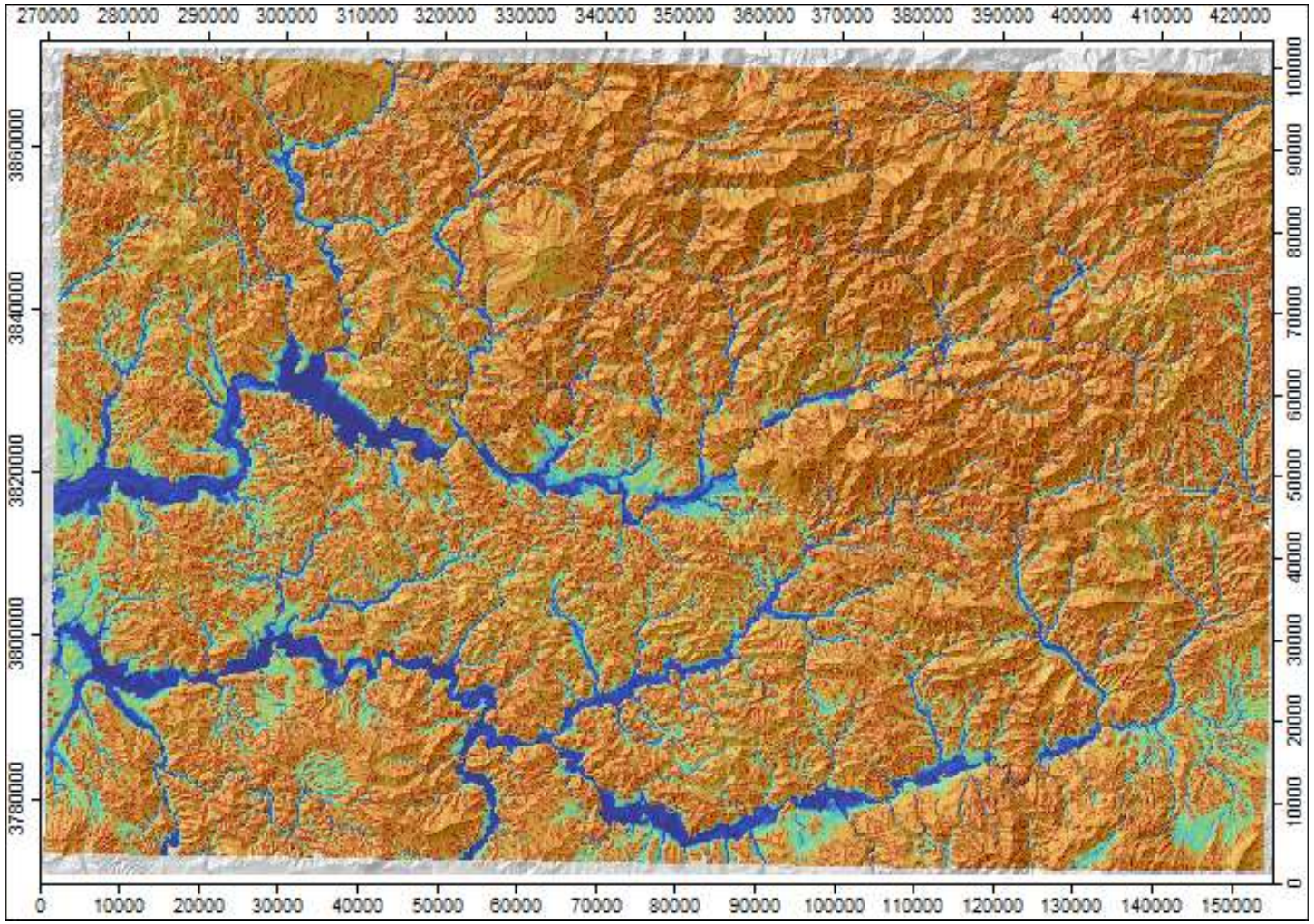
COOPERATION

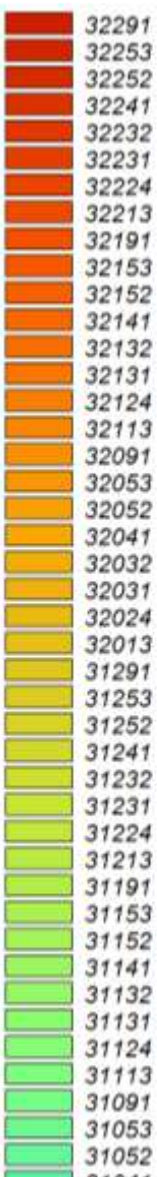
III. Case study: data poor environment Fes
Parent material information,
reclassification of Geological map (Schuler)



III. Case study: data poor environment Fes

Terrain units merging GMK with PM = 88 classes – (first 3 digits landform unit / last 2 parent material)



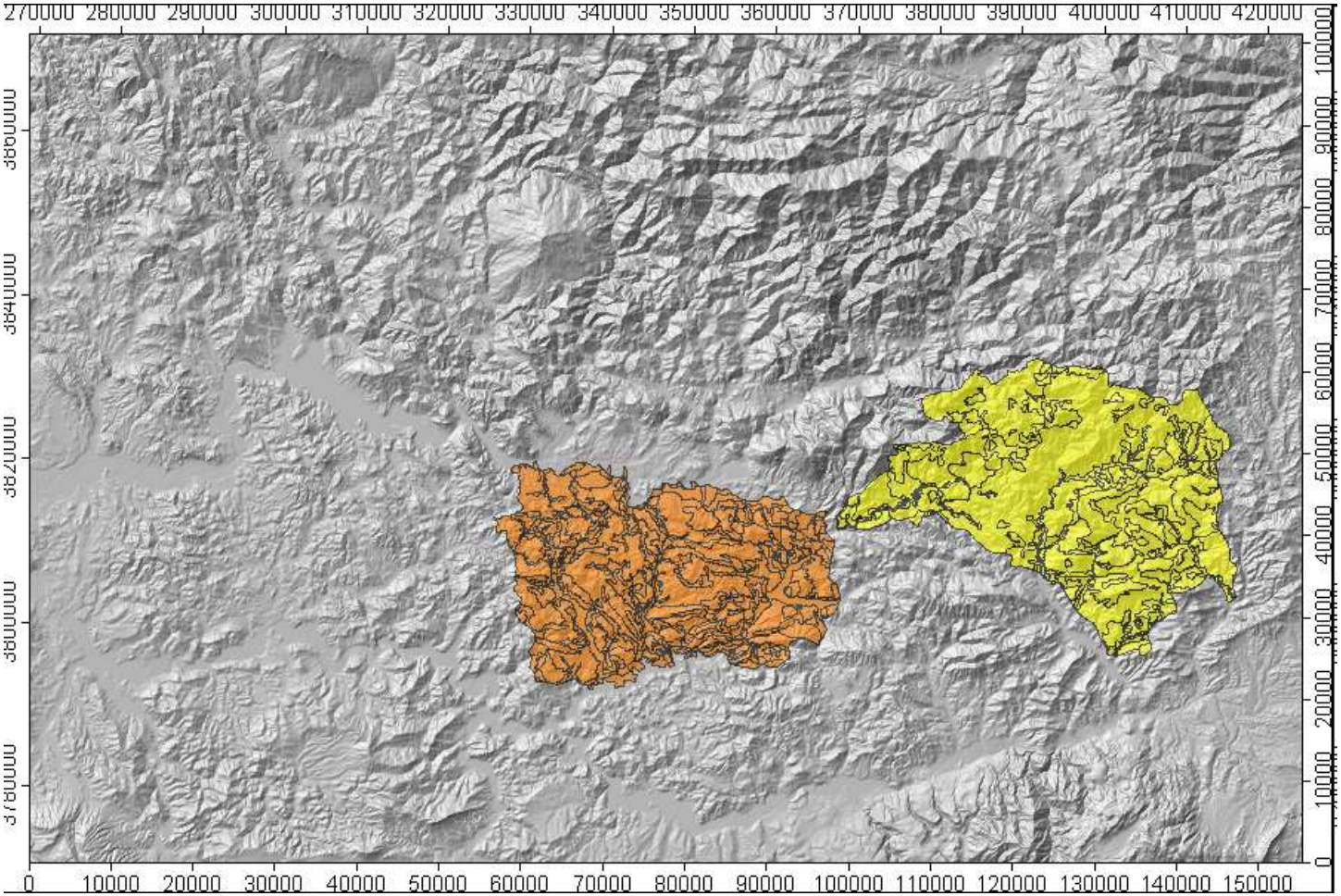


sciLands scientific landscapes

BGR Bundesanstalt für Geowissenschaften und Rohstoffe

GEOZENTRUM HANNOVER

III. Case study: data poor environment Fes
2 soil maps for soil component

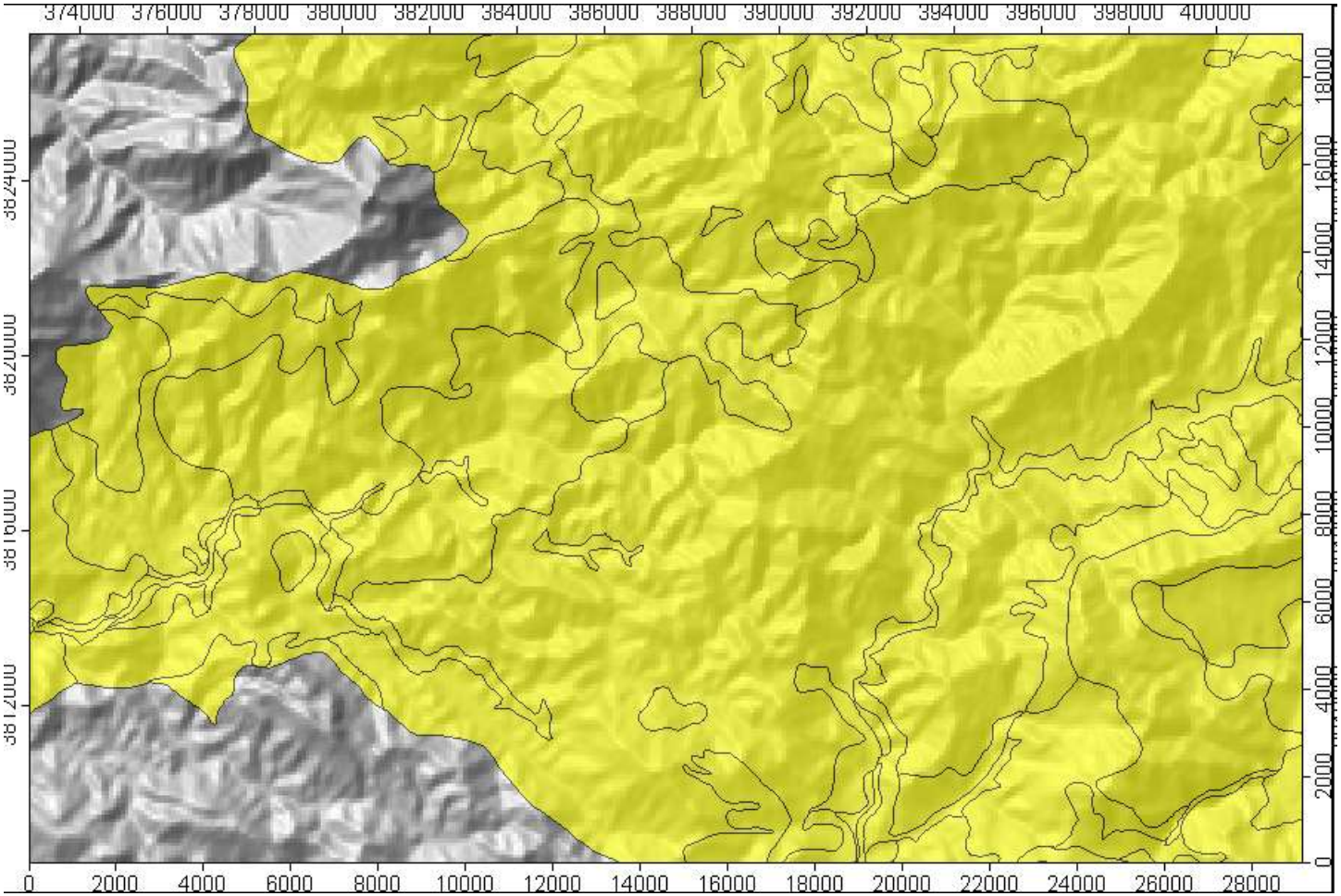


sciLands scientific landscapes

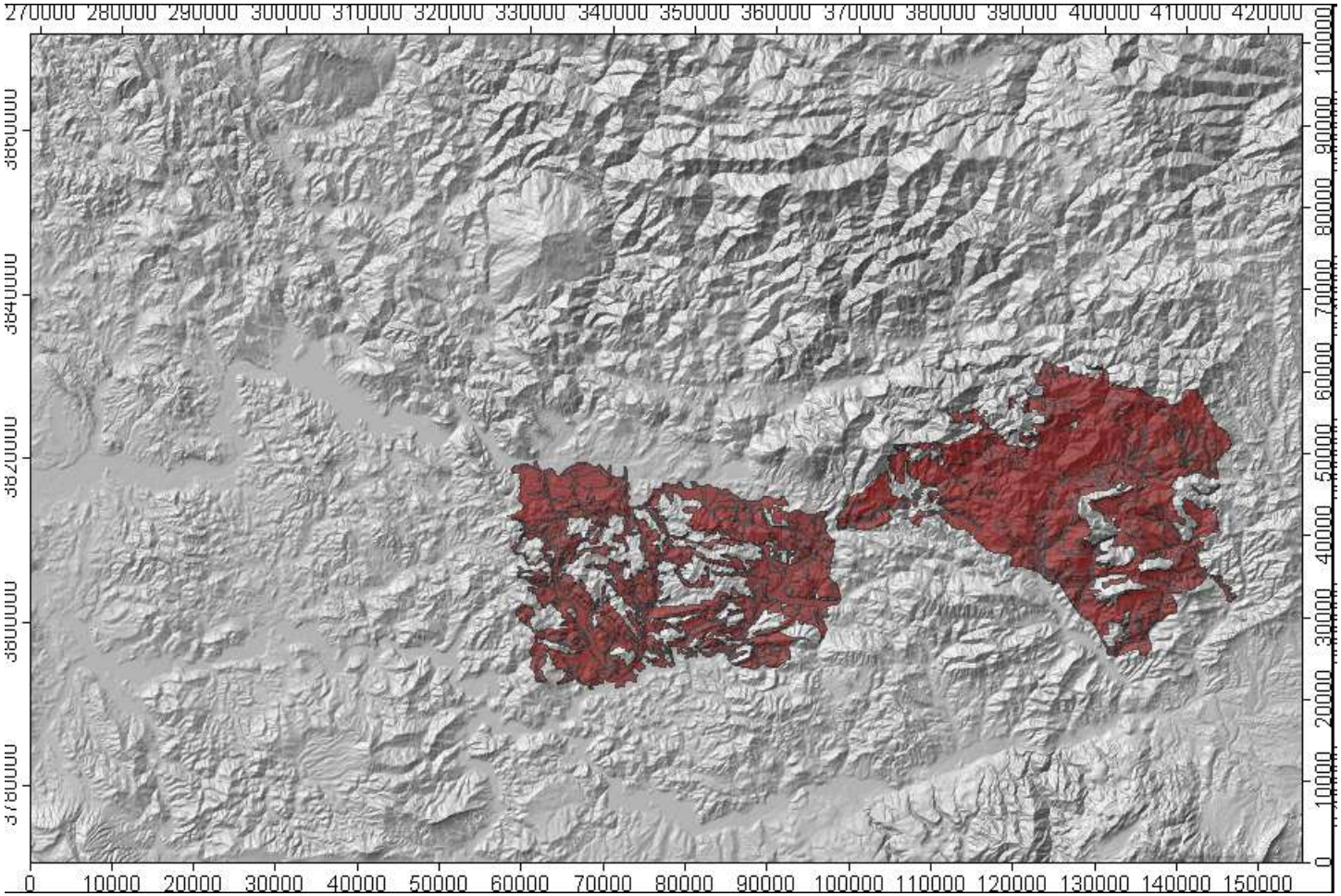
BGR Bundesanstalt für Geowissenschaften und Rohstoffe
GEOZENTRUM HANNOVER

COOPERATION

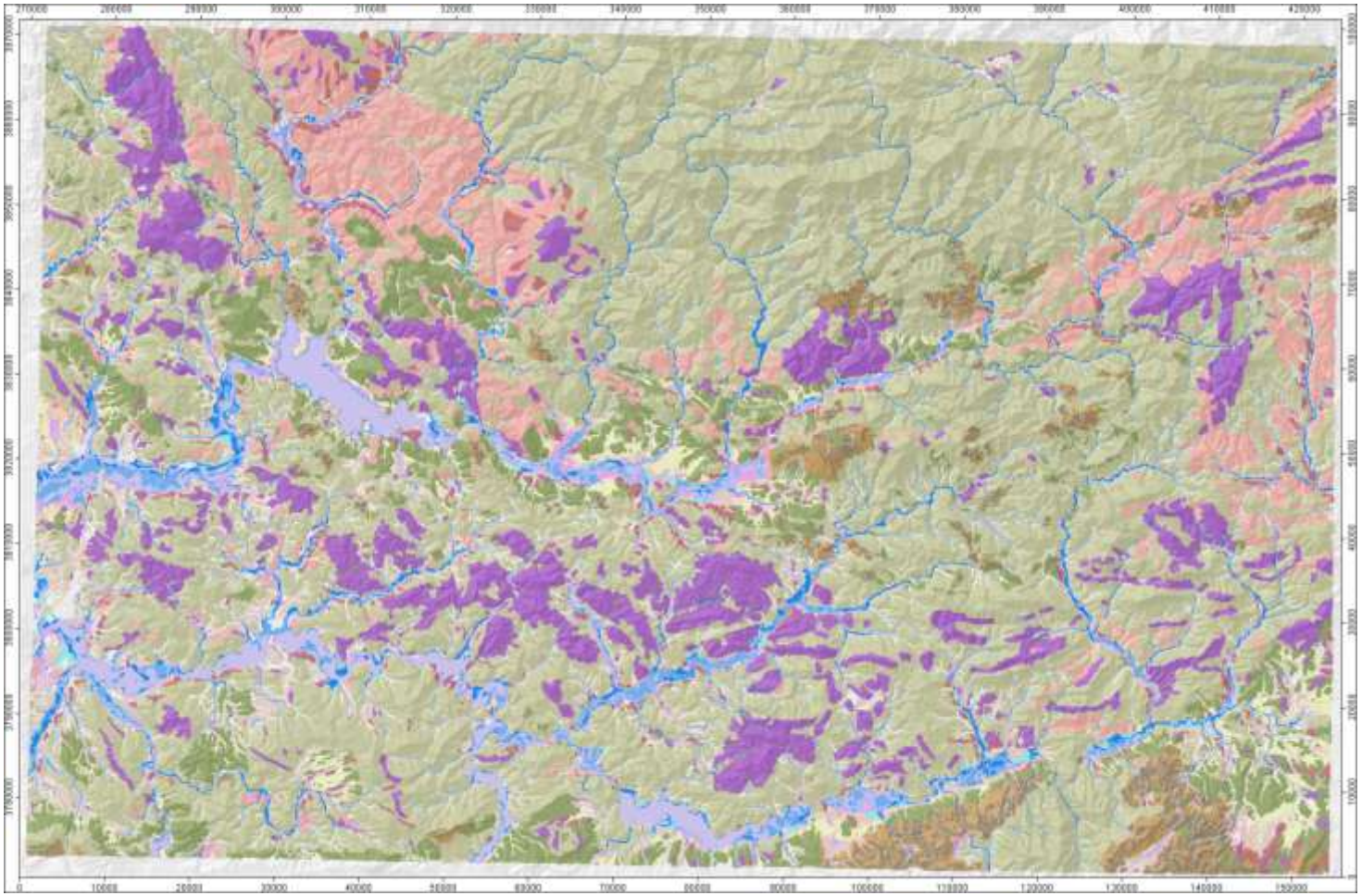
problem 1: poor spatial resolution



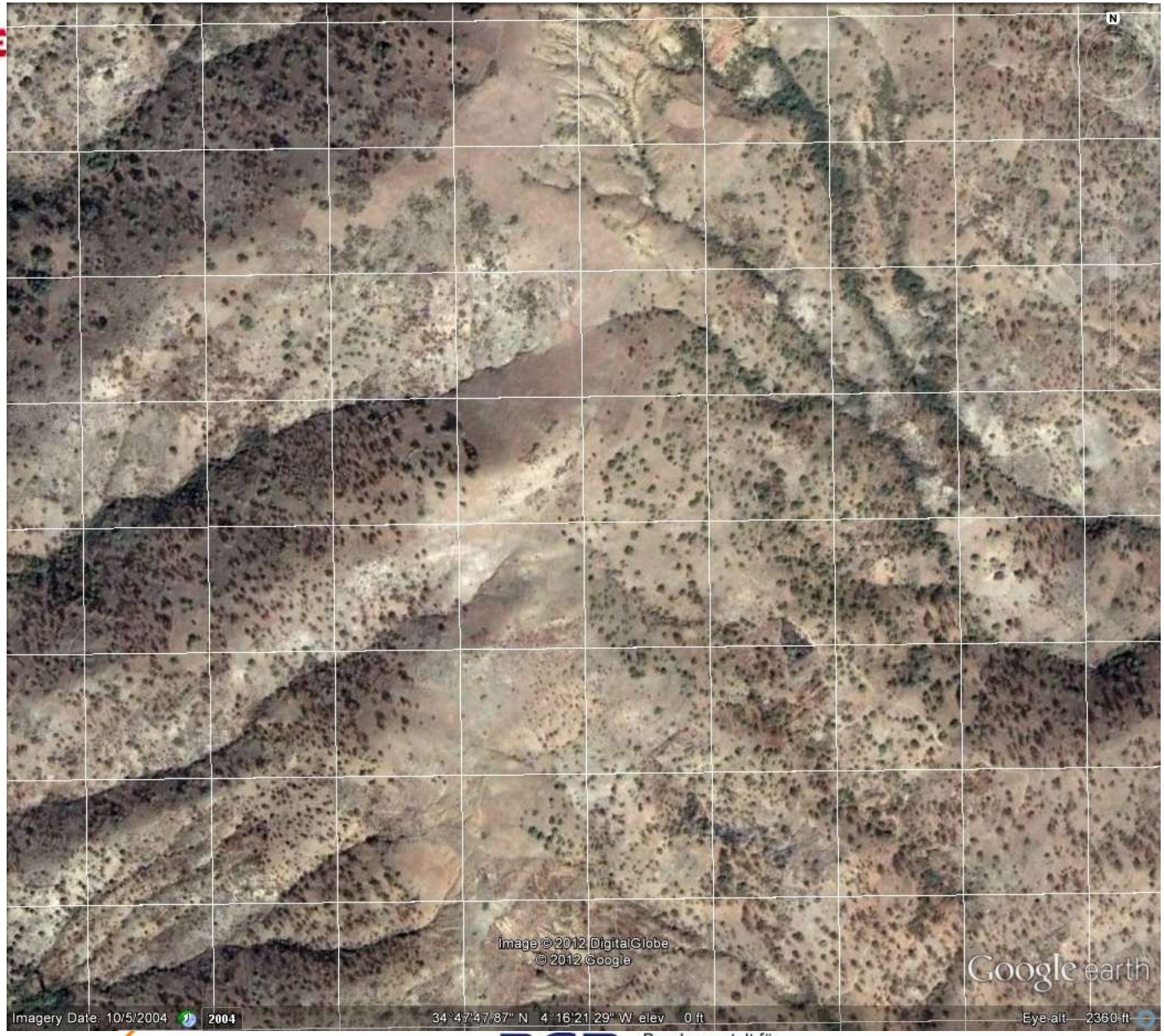
problem 2: poor semantic information



eSOTER draft map



validation trip with massive experience!!



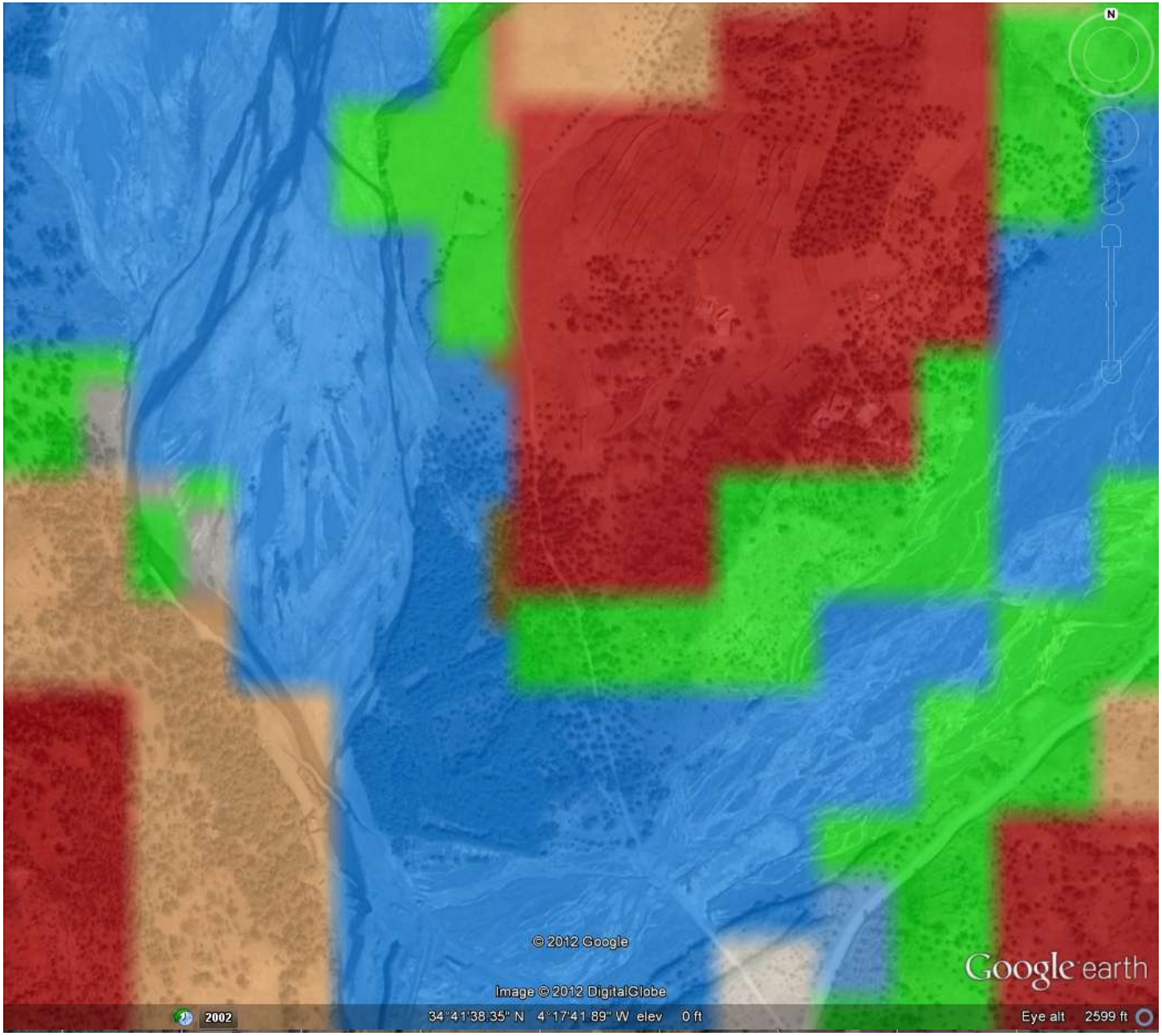
e-SOTE

sciLands
scientific landscapes

BGR Bundesanstalt für Geowissenschaften und Rohstoffe

GEOZENTRUM HANNOVER

COOPERATION


N
© 2012 Google
Image © 2012 DigitalGlobe
Google earth
2002
34°41'38.35" N 4°17'41.89" W elev 0 ft
Eye alt 2599 ft

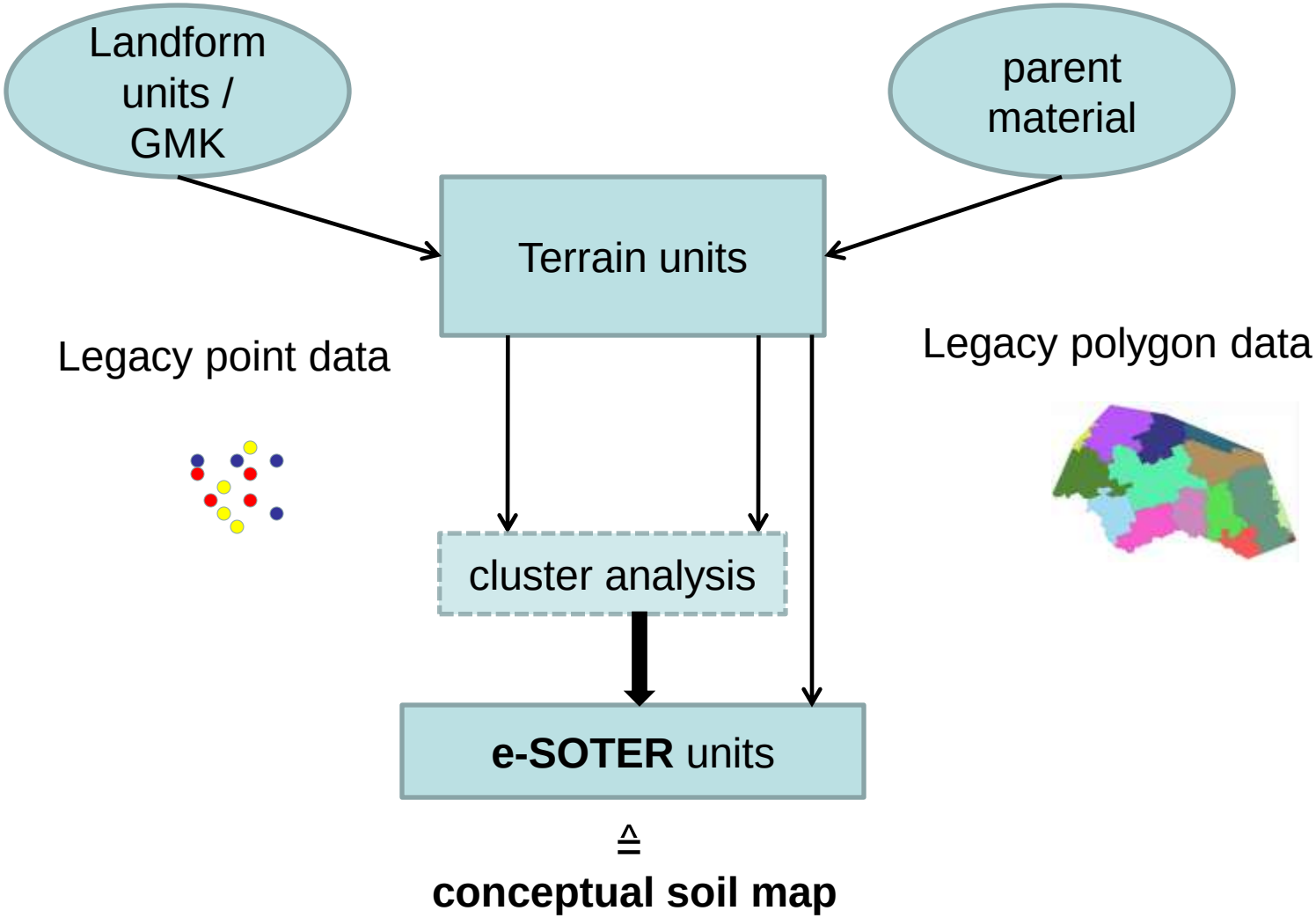
validation trip: outcomes

- The delineations of terrain units were traceable
- The content of the soil component wasn’t reliable due to the quality of the soil data
- Nevertheless the eSOTER draft map can serve as a conceptual soil map





III. Conclusion



IV. Outlook

- In principle this procedure consistently implements the site factors relief and parent material
- Prestratification of the landscape according to soil regions required for larger mapping projects
- The conceptual of this soil components integrates existing soil data and SOTER mapping data of different scales and area coverage
- The validity to serve as a conceptual soil map is promising. Of course it needs further investigation by soil mappers

Derivation of random points