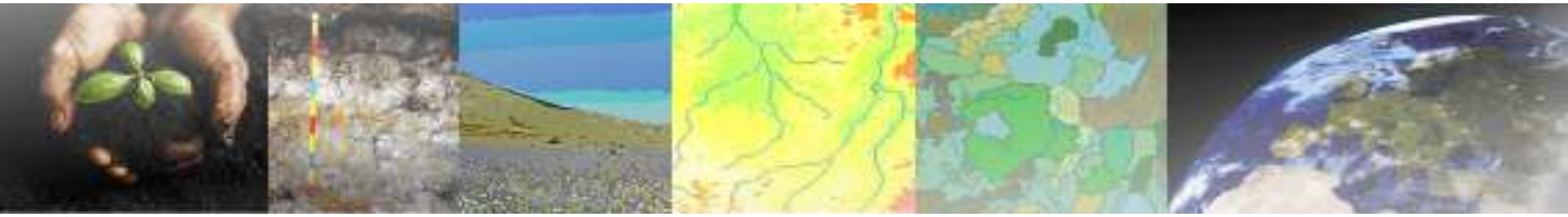
e-SOTER

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

Application of e-SOTER approach in Morocco: opportunities and constraints

INRA-Morocco



20-23 March 2012

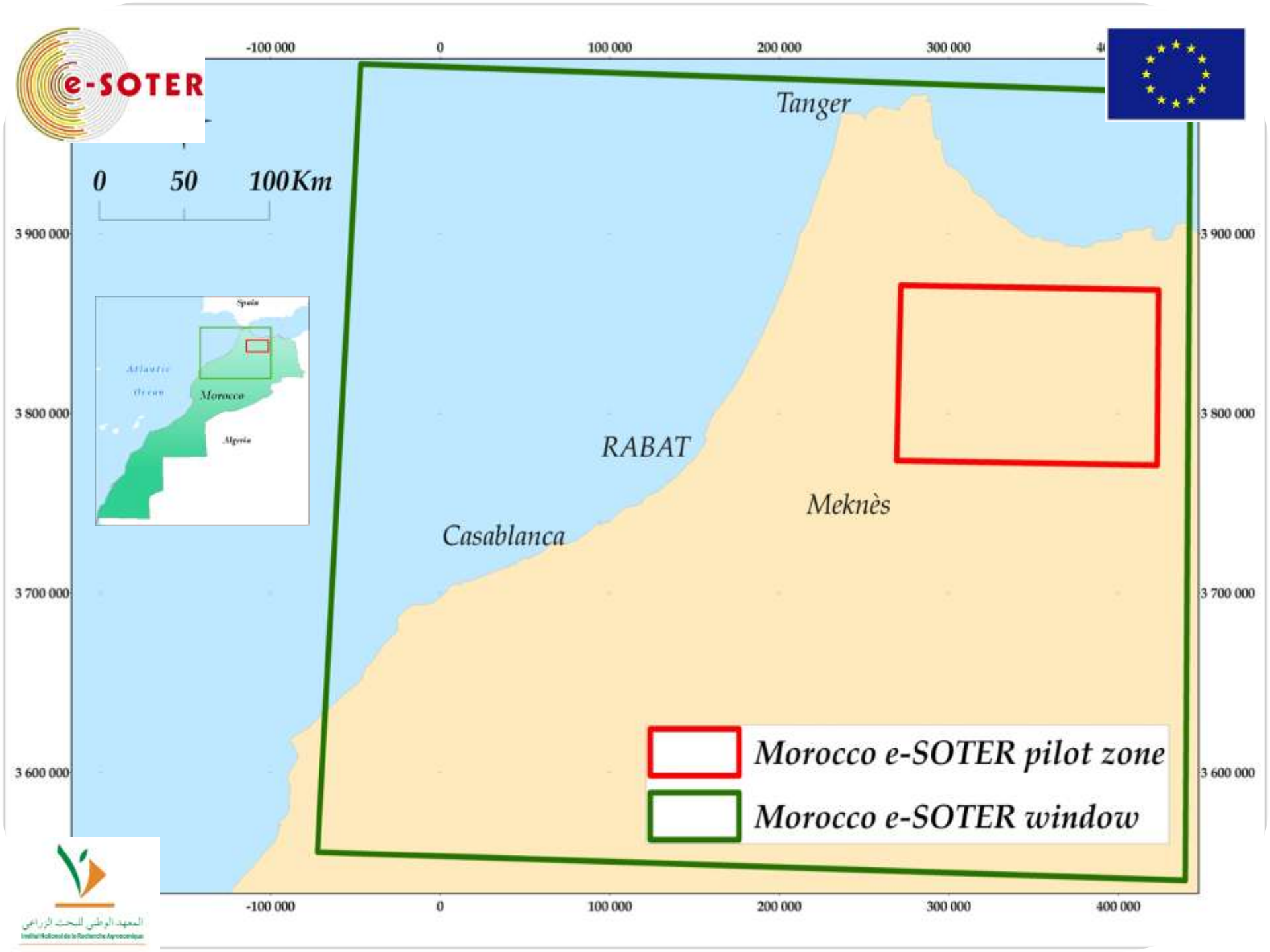
Introduction

- As many Mediterranean countries, Morocco has a great diversity in soils formation and development processes

- Unfortunately, according to national statistics, soil maps at various scales cover around 30 % of national territory, the classical approach was used in most cases

- New cost and time effective soil mapping approaches are needed

- e-Soter project was a good opportunity to test a new (non conventional) large and medium scale mapping approach


e-SOTER
-100 000
0
100 000
200 000
300 000
400 000
Tanger
0 50 100Km
3 900 000
3 800 000
3 700 000
3 600 000
Spain
Atlantic Ocean
Morocco
Algeria
RABAT
Meknès
Casablanca
Morocco e-SOTER pilot zone
Morocco e-SOTER window
المعهد الوطني للبحث الزراعي
Institut National de la Recherche Agronomique

e-Soter main objectives

- ***Morphometric landforms description;***

- ***Soil parent material characterization and pattern recognition by remote sensing;***

- ***Standardization of methods and measures of soil attributes to convert legacy data and various national databases to a common standard.***

Working program

Input Data compilation & delivery	→	***Moroccan team & project partners***
Data processing & GIS modelling	→	***Moroccan team & project partners***
Field verification	→	***Moroccan team & project partners***

Involving local team is important= Capacity building

e-Soter main outputs for Morocco case study

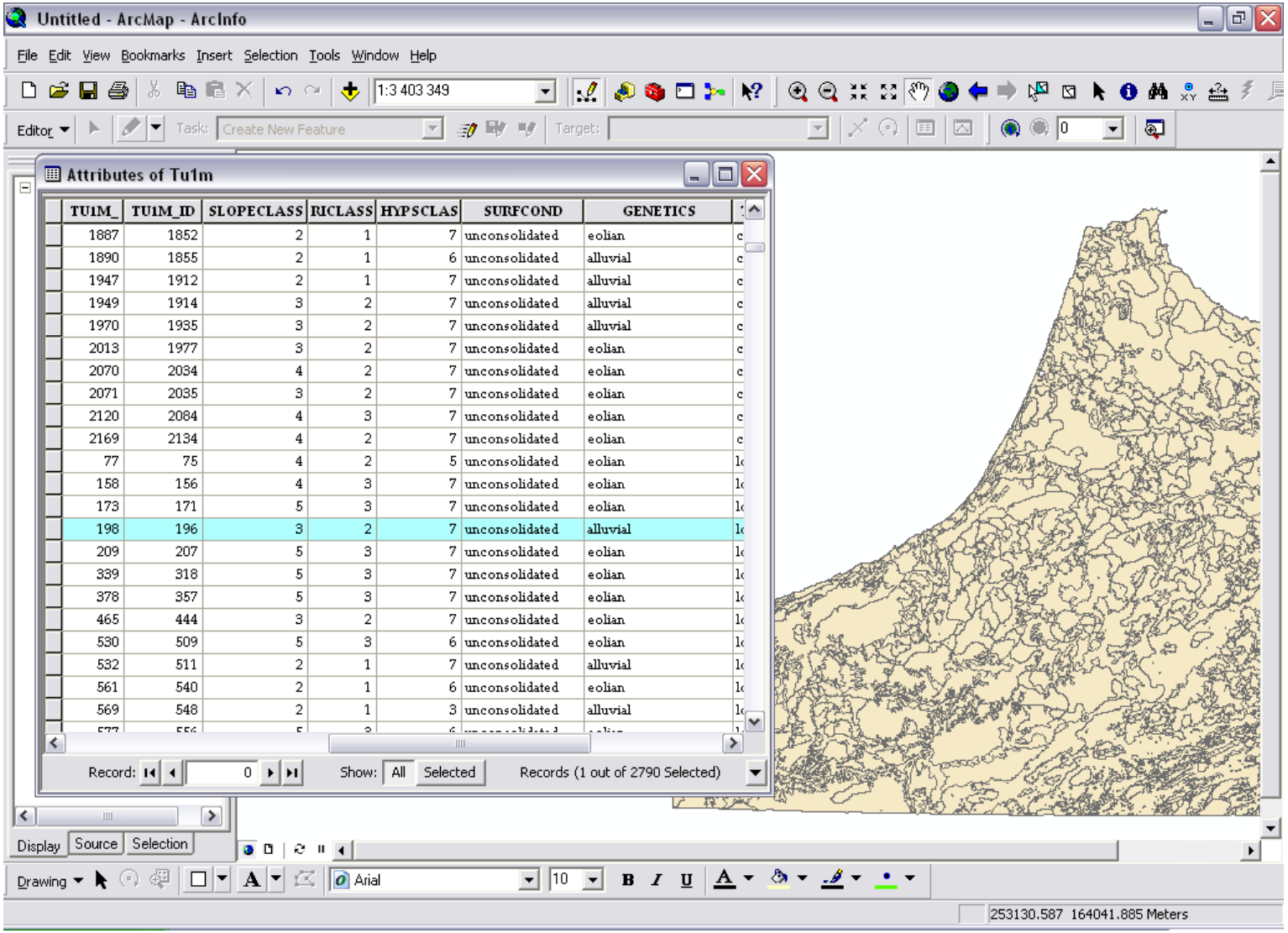
- *Geodatabases for morphometric characteristics and parent material at large and medium scale;*

- *Correlation of available soil attributes from local soil classification (CPCS) to WRB;*

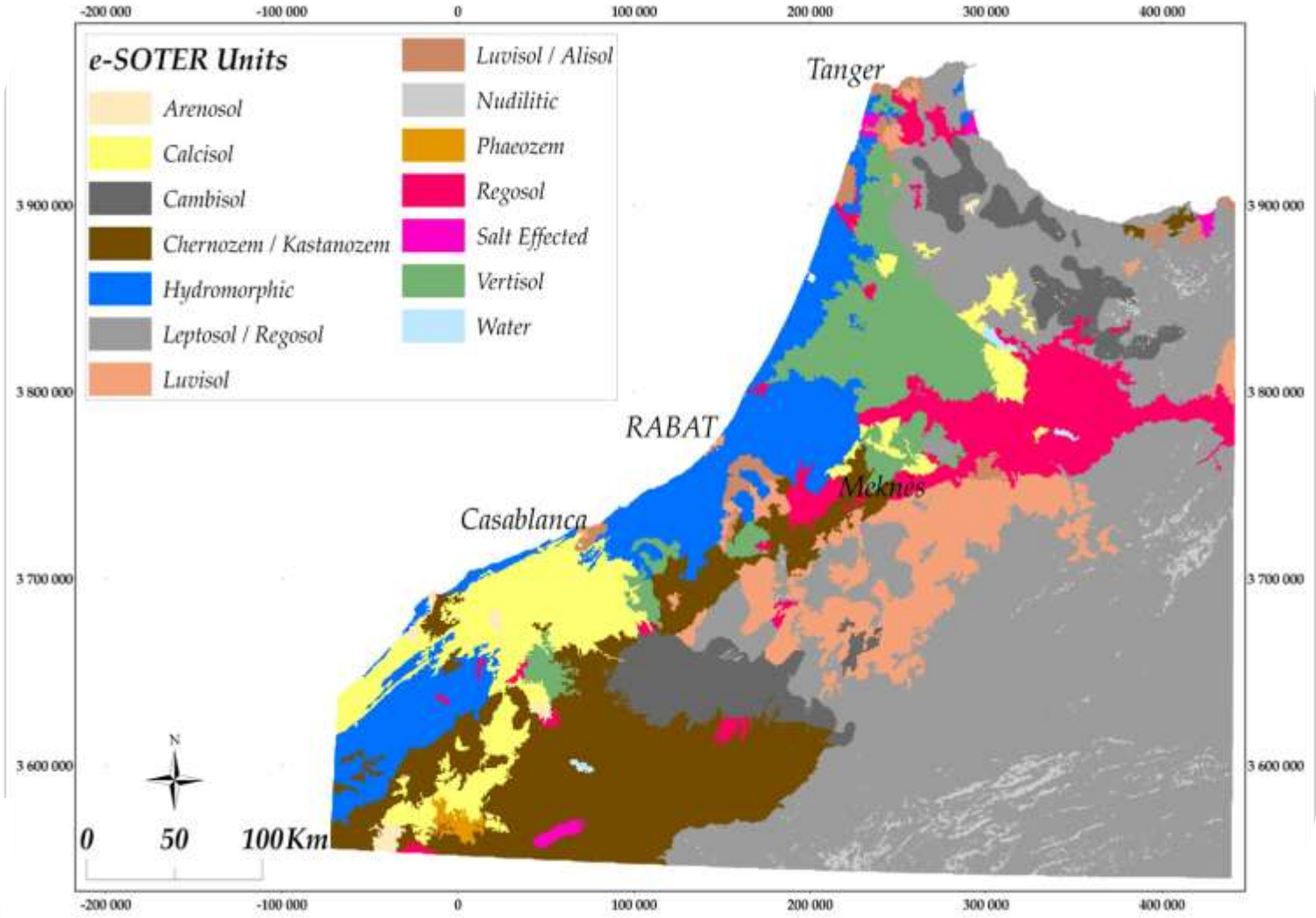
- *Soil FAO-WRB units of target areas at large and medium scales;*

- *Conception of a methodology of soil mapping using legacy data, expert-based knowledge and geomatics for further Digital Soil Mapping in the unstudied areas of the country.*

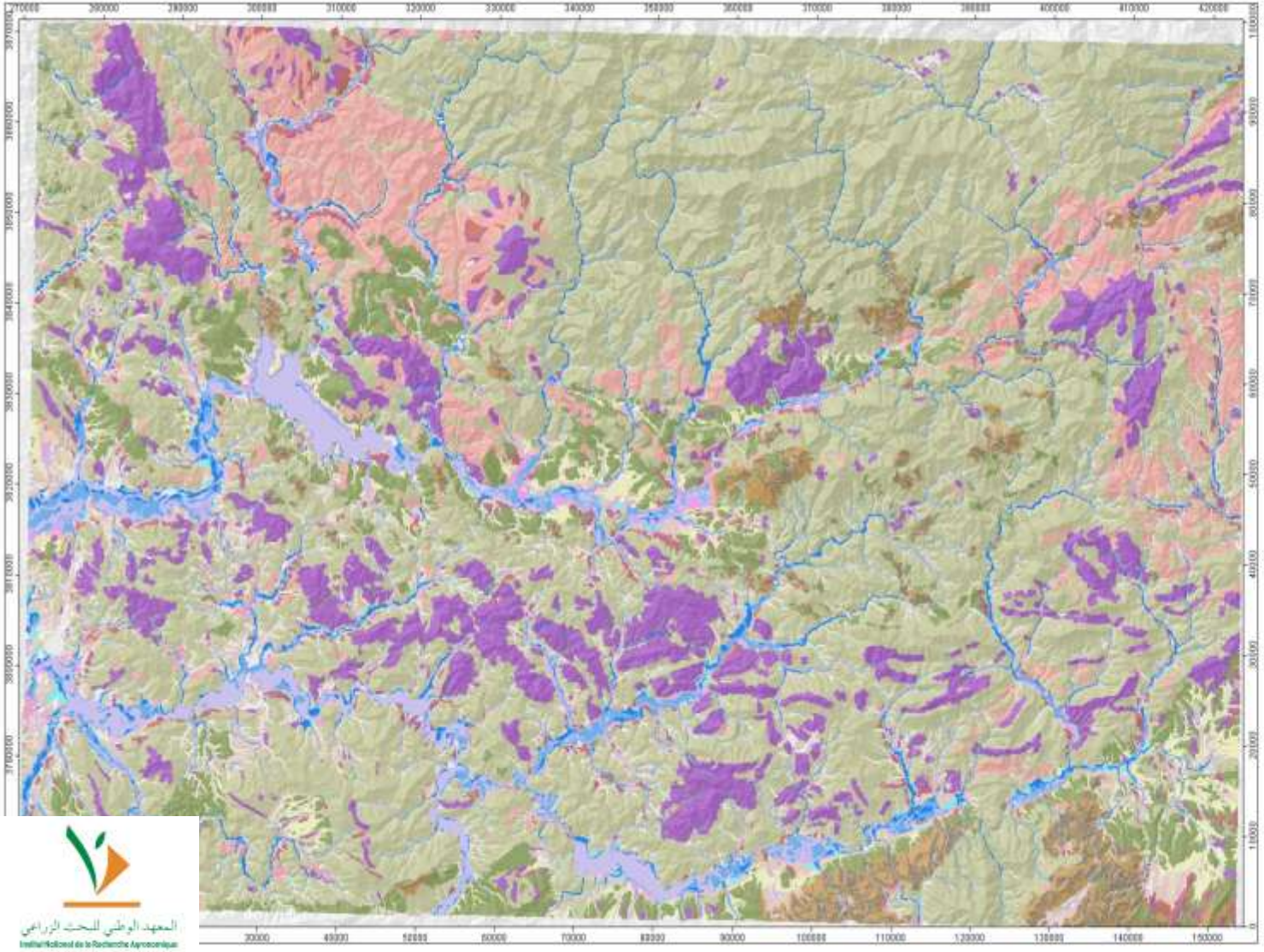
Geodatabase of the geomorphometry



Soil units for the window (1/1.000.000)



Soil units for the pilot area (1/250.000)

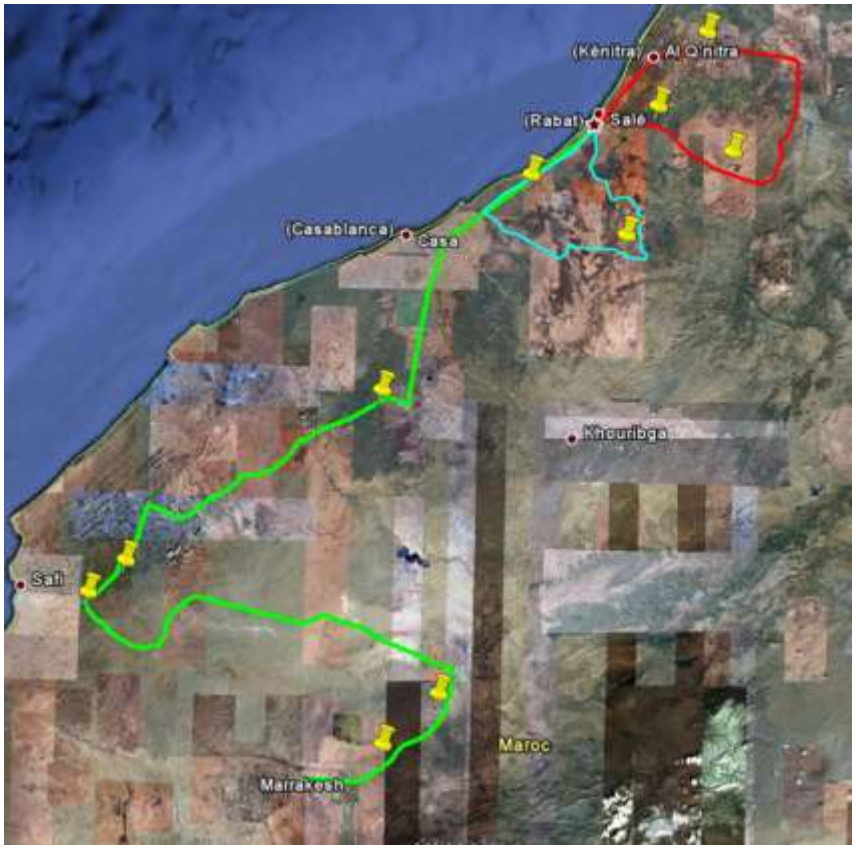


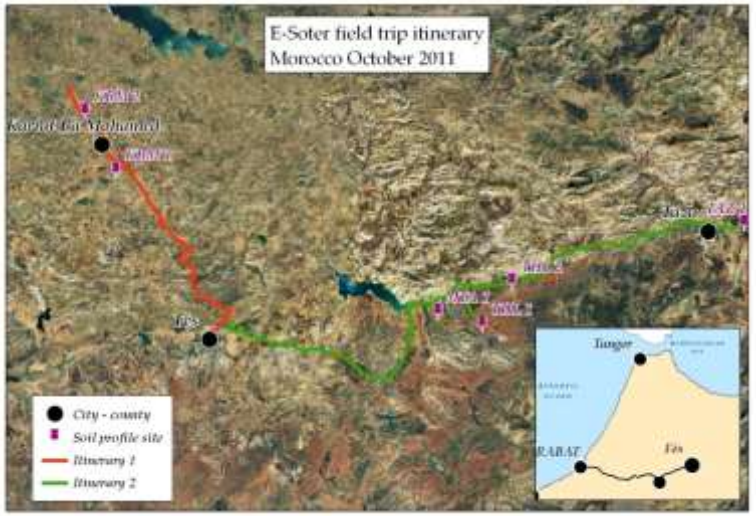
eSOTER Morocco

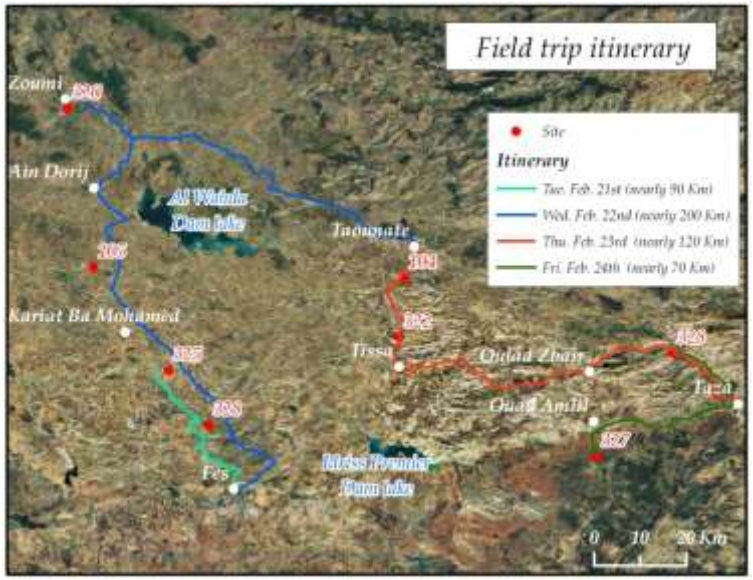
soil component - draft version

- 100 Fluvisol-Vertisol
- 101 Fluvisol-Calcisol
- 106 Fluvisol
- 200 Vertisol
- 203 Fluvisol
- 310 Vertisol-Calcisol-Leptosol
- 311 Calcisol-Regosol
- 312 Calcisol-Vertisol
- 313 Leptosol-Calcisol
- 314 Vertisol
- 315 Leptosol
- 320 Calcisol-Leptosol
- 321 Calcisol-Vertisol
- 323 Leptosol-Calcisol
- 325 Calcisol-Cambisol-Kastanozem
- 327 Leptosol-Regosol
- 328 Leptosol-Vertisol
- 329 Calcisol-Leptosol

Validation Field trips







Validation Field trips

2010, Mai 10th – 14th :Khemisset – Zaer – Gharb – Chaouia – Doukkala & Al-Haouz regions

Learning by dowing

Validation fieldtrip for the 1/1.000.000 product

Validation Field trips

2011, October 6th – 7th : Fes - Kariat Ba Mohamed & Taza regions





Validation fieldtrip for the 1/1.000.000 product

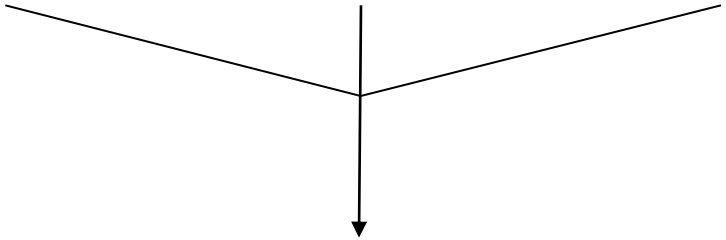
Test to e-Soter methodololy

Correlation between e-Soter units & real terrain data for the pilot area (1/250.000)

Validation fieldtrips data

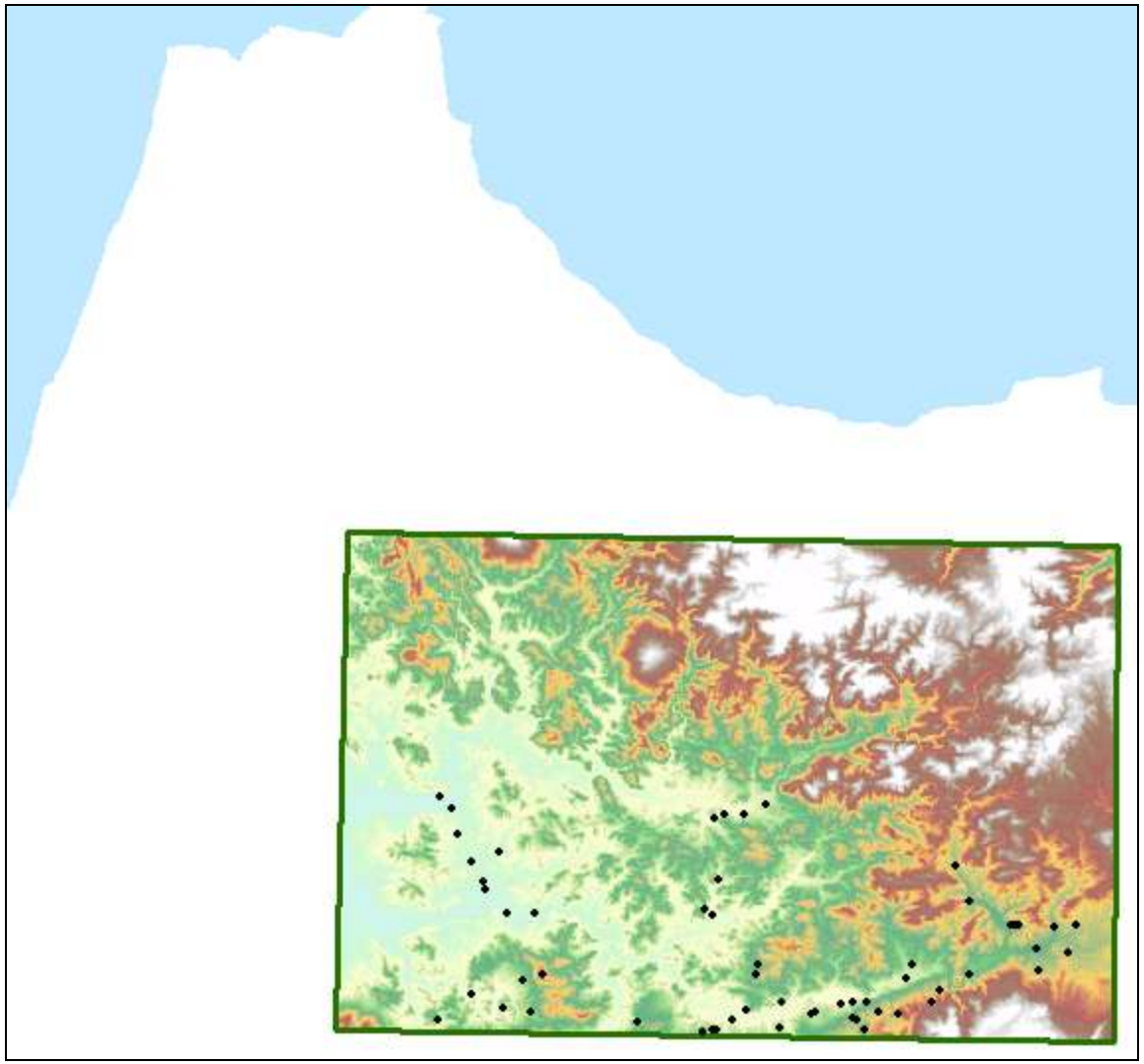
Field control points

Other soil legacy data



57 control points

Test to e-Soter methodololy



Validation Field trips

2012, February 21st – 24th : Zoumi - Kariat Ba Mohamed - Taounate & Taza regions





Validation fieldtrip for the 1/250.000 product

Test to e-Soter methodoloy

Id	e-Soter unit	Field observation	Accuracy
1	Leptosols - Vertisols	Calcisol	No
2	Calci - Cambisols - Kastanozems	Calcisols	Yes
3	Calcisols - Leptosols	Calcisols	Yes
4	Calcisols - Vertisols	Calcisols	Yes
5	Fluvisols - Calcisols	Calcisols	Yes
6	Vertisols	Calcisols	No
7	Fluvisols	Cambisols	No
8	Fluvisols	Cambisols	No
9	Leptosols - Vertisols	Cambisols	No
10	Calcisols - Leptosols	Cambisols - Fluvisols	No
11	Fluvisols	Cambisols - Fluvisols	Yes
12	Calcisols - Leptosols	Chernozems	No
13	Leptosols	Chernozems	No
14	Vertisols	Chernozems	No
15	Calcisols - Leptosols	Kastanozems	No
16	Fluvisols	Kastanozems	No
17	Vertisols	Kastanozems	No
18	Leptosols - Vertisols	Kastanozems	No
19	Calcisols - Leptosols	Leptosols	Yes
20	Leptosols	Leptosols	Yes
21	Leptosols	Leptosols	Yes
22	Leptosols - Regosols	Leptosols	Yes
23	Leptosols - Regosols	Leptosols	Yes
24	Leptosols - Regosols	Leptosols	Yes
25	Leptosols - Vertisols	Leptosols	Yes
26	Leptosols - Vertisols	Leptosols	Yes
27	Vertisols	Leptosols	No
28	Leptosols	Leptosols	Yes
29	Leptosols	Leptosols	Yes

Id	e-Soter	Field observation	Accuracy
30	Leptosols - Regosols	Leptosols - Calcisols - Luvisols	Yes
31	Fluvisols	Leptosols - Fluvisols	Yes
32	Leptosols - Vertisols	Lepto - Regosols -Phaeozems	No
33	Fluvisols - Vertisols	Luvisols	No
34	Leptosols - Vertisols	Luvisols	No
35	Vertisols	Luvisols	No
36	Vertisols - Calcisols - Leptosols	Luvisols	No
37	Calcis-Cambisols-Kastanozems	Regosols	No
38	Calcisols - Vertisols	Regosols	No
39	Leptosols	Regosols	No
40	Vertisols	Regosols	No
41	Vertisols - Calcisols - Leptosols	Regosols - Cambisols	No
42	Leptosols - Vertisols	Regosols - Phaeozems	No
43	Calci- Cambisols - Kastanozems	Rendzic Regosols	No
44	Calci- Cambisols - Kastanozems	Vertisols	No
45	Calcisols - Leptosols	Vertisols	No
46	Calcisols - Regosols	Vertisols	No
47	Calcisols - Vertisols	Vertisols	Yes
48	Fluvisols	Vertisols	No
49	Fluvisols - Calcisols	Vertisols	No
50	Fluvisols - Vertisols	Vertisols	Yes
51	Vertisols	Vertisols	Yes
52	Vertisols	Vertisols	Yes
53	Calcisols - Vertisols	Vertisols	Yes
54	Vertisols	Vertisols	Yes
55	Vertisols	Vertisols	Yes
56	Vertisols	Vertisols	Yes
57	Vertisols	Vertisols	Yes

Advantages of e-Soter methodololy

Based on the used control points:

- The e-Soter classification for the pilot area was satisfied at 56% ;

- The most correlated soil units concern Leptosols and Vertisols then Calcisols ;

- The e-Soter methodology is a more accurate medium scale soil mapping methodology if enough field and expert-knowledge data are available.

Limits of the approach

In the Moroccan context, the e-Soter approach presents some limits related to the cartography of some soil formation processes:

- The decarbonatation processes, specific to semi-arid areas ;

- Vertisolisation processes / hydrological system ;

- Organic matter redistribution processes ;

- Add local information about geomorphology / soil distribution (catena/ topo - sequence)

Conclusion

- e-Soter approach remains good as a first step framework for a soil mapping program of the unstudied areas of Morocco (2Mha)

- Great opportunity improving the local team capacity building (young soil scientists) who start collecting soil data for studied areas of Morocco to establish a Soil Database (>7Mha) (climate change, soil erosion and fertility, land suitability projects)

Thank you

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