la Repubblica TORINO.it

Scalenghe, gli spettacolari cerchi nel grano diventano un'attrattiva turistica

509

Slideshow 4 di 5


UNIVERSITÀ
DEGLI STUDI
DI PALERMO

photo Jean-Dominique Lajoux
UNIVERSITÀ
DEGLI STUDI
DI PALERMO
25°45′0″N, 8°15′0″ E

UNIVERSITÀ
DEGLI STUDI
DI PALERMO

FAO SOILS PORTAL

FAO soil and land legacy maps

FAO Land and Water Division (NRL) has made an effort to make Soil Legacy data and information available for their users. In that regard, FAO has just finished uploading **1228 soil and land legacy maps** (mainly soil maps and also land use, geological and land cover legacy maps). FAO will continue working in this activity and will include Soil Profile Legacy data soon.

The maps are available for the following countries: Afghanistan, Algeria, Angola, Argentina, Bangladesh, Benin, Bolivia, Burundi, Botswana, Brazil, British Guiana, Burkina Faso, Cambodia, Cameroon, Central Africa Republic, Chad, Chile, China, Colombia, Comoros, Congo, Ivory Coast, Costa Rica, Cuba, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, French Guiana, Gabon, Gambia, Guatemala, Honduras, India, Indonesia, Iran, Israel, Jamaica, Japan, Korea, Lebanon, Malaysia, Mauritius, Mexico, Mozambique, Namibia, Nicaragua, Niger, Nigeria, Pakistan, Panama, Papa New Guinea, Paraguay, Peru, Philippines, Rwanda, Senegal, Sierra Leone, South Africa, Sri Lanka, Sudan, Swaziland, Syria, Taiwan, Tanzania, Thailand, Togo, Tunisia, Uganda, Uruguay, Venezuela, Vietnam, Zambia, Zimbabwe.

External links

EuDASM - European Digital Archive of Soil Maps

ISRIC - World Soil Information library and map collection

EUDASM

European Digital Archive of Soil Maps

UNIVERSITÀ DEGLI STUDI DI PALERMO

doi> 10.1080/17538947.2011.596580

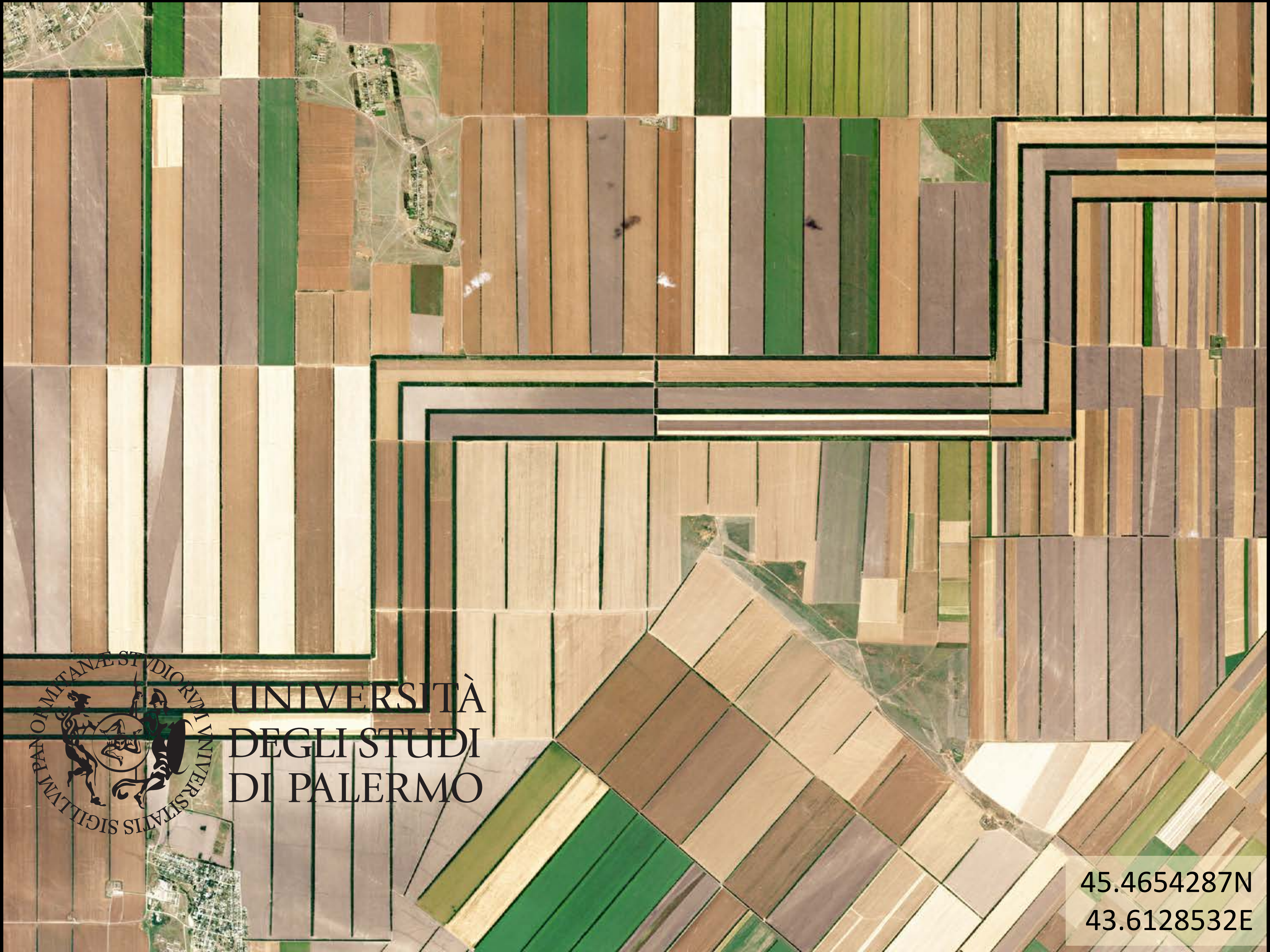
ἔδαφος

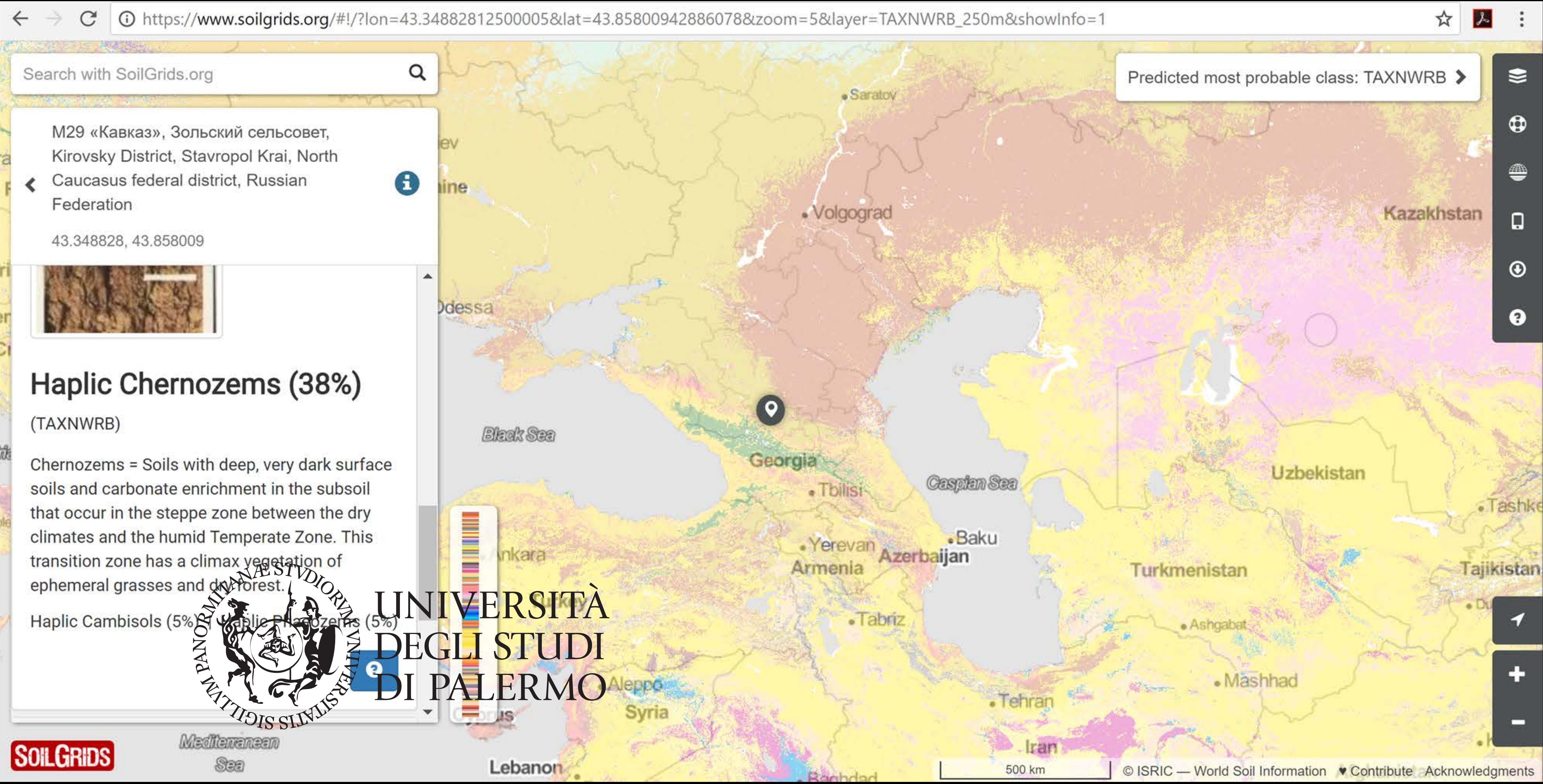
terrae

UNIVERSITÀ
DEGLI STUDI
DI PALERMO

UNIVERSITÀ
DEGLI STUDI
DI PALERMO

Leonardo da Vinci
The observation of water


UNIVERSITÀ
DEGLI STUDI
DI PALERMO
45.4654287N
43.6128532E


https://www.soilgrids.org/#!/?lon=43.34882812500005&lat=43.85800942886078&zoom=5&layer=TAXNWRB_250m&showInfo=1
Search with SoilGrids.org
M29 «Кавказ», Зольский сельсовет, Kirovsky District, Stavropol Krai, North Caucasus federal district, Russian Federation
43.348828, 43.858009
Haplic Chernozems (38%)
(TAXNWRB)
Chernozems = Soils with deep, very dark surface soils and carbonate enrichment in the subsoil that occur in the steppe zone between the dry climates and the humid Temperate Zone. This transition zone has a climax vegetation of ephemeral grasses and dry forest.
Haplic Cambisols (5%) | Haplic Phaeozems (5%)
Predicted most probable class: TAXNWRB
Saratov
Volgograd
Kazakhstan
Odessa
Black Sea
Georgia
Tbilisi
Caspian Sea
Uzbekistan
Baku
Yerevan
Armenia
Azerbaijan
Ankara
Turkmenistan
Tajikistan
Tabriz
Ashgabat
Aleppo
Syria
Mashhad
Tehran
Iran
Lebanon
Mediterranean Sea
SOILGRIDS
500 km
© ISRIC — World Soil Information
♥ Contribute
Acknowledgments

FAO SOILS PORTAL

Soil properties
Soil classification
World Reference Base
FAO legend
USDA soil taxonomy
Universal soil classification
National systems
Numerical systems
Topsoil classifications
Geology Unified soil Classification

World Reference Base


Dominant soils of the world

The World Reference Base (WRB) is the international standard for soil classification system endorsed by the International Union of Soil Sciences. It was developed by an international collaboration coordinated by the IUSS Working Group. It replaced the FAO/UNESCO Legend for the Soil Map of the World as international standard. The WRB borrows heavily from **modern soil classification concepts**, including Soil Taxonomy, the legend for the FAO Soil Map of the World 1988, the Référentiel Pédologique and Russian concepts. As far as possible, diagnostic criteria match those of existing systems, so that correlation with national and previous international systems is as straightforward as possible.

The distribution and sample pictures of the Reference Soil Groups are based on work carried out by FAO, ISRIC World Soils and the Universities of Leuven and Wageningen University.

DataApp: A Mobile App Framework for Field Data Capture – Stage 1

TAGS: Computer Science/Information Technology | Engineering/Design | Environment | Life Sciences | Physical Sciences | Water | Ideation

AWARD: **$30,000 USD**
ACTIVE SOLVERS: 76
SOURCE: InnoCentive

DEADLINE: **Jul 06 2017 23:59 EDT**
POSTED: May 23 2017

Data collection and capture are fundamental to water and environmental science and management. Scientists, engineers, and technicians are increasingly using mobile devices such as tablets and smartphones to capture data in the field. Numerous apps are available to support general data collection, however existing apps do not provide the functionality and flexibility needed to support the broad range of water and environmental monitoring needs. More importantly, these existing apps do not support the development and sharing of new features and functions by individual users and communities of practice.

The Bureau of Reclamation, in collaboration with the U.S. Geological Survey, is seeking development of an application (app) framework to support electronic data collection and capture using mobile devices across a diverse range of data collection situations. The app framework should be flexible, extensible, and open source to enable future improvement and development of added features by a community of app developers and users.

This Ideation Challenge is Stage 1 of a planned three-stage Challenge. This Ideation stage asks for ideas focusing on identifying robust and efficient software architecture concepts and software technologies for development of the desired app framework.

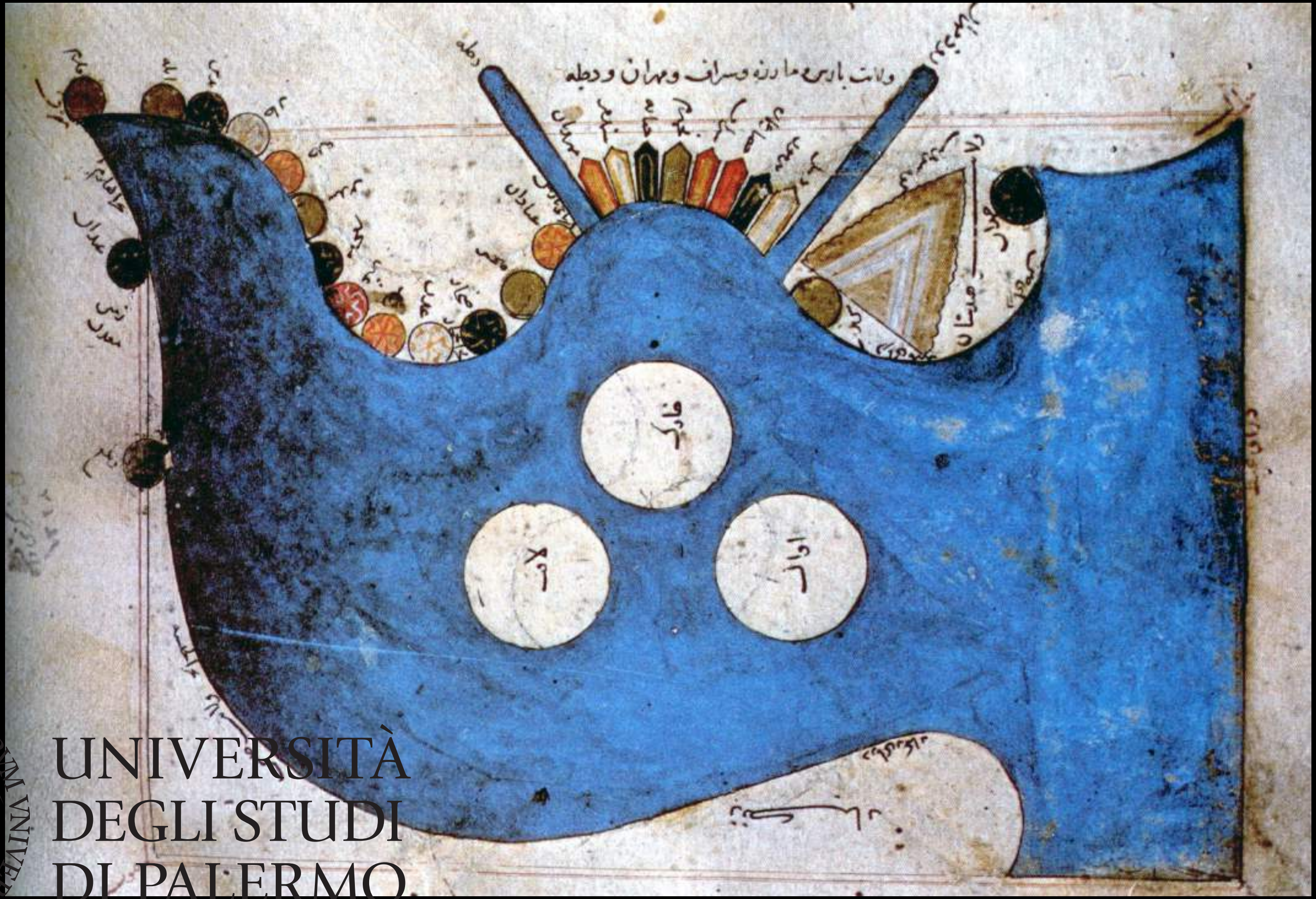
Software development was made possible thanks to the support of the IUSS Stimulus Fund and the Division 1 of IUSS

WRB tool for android phone

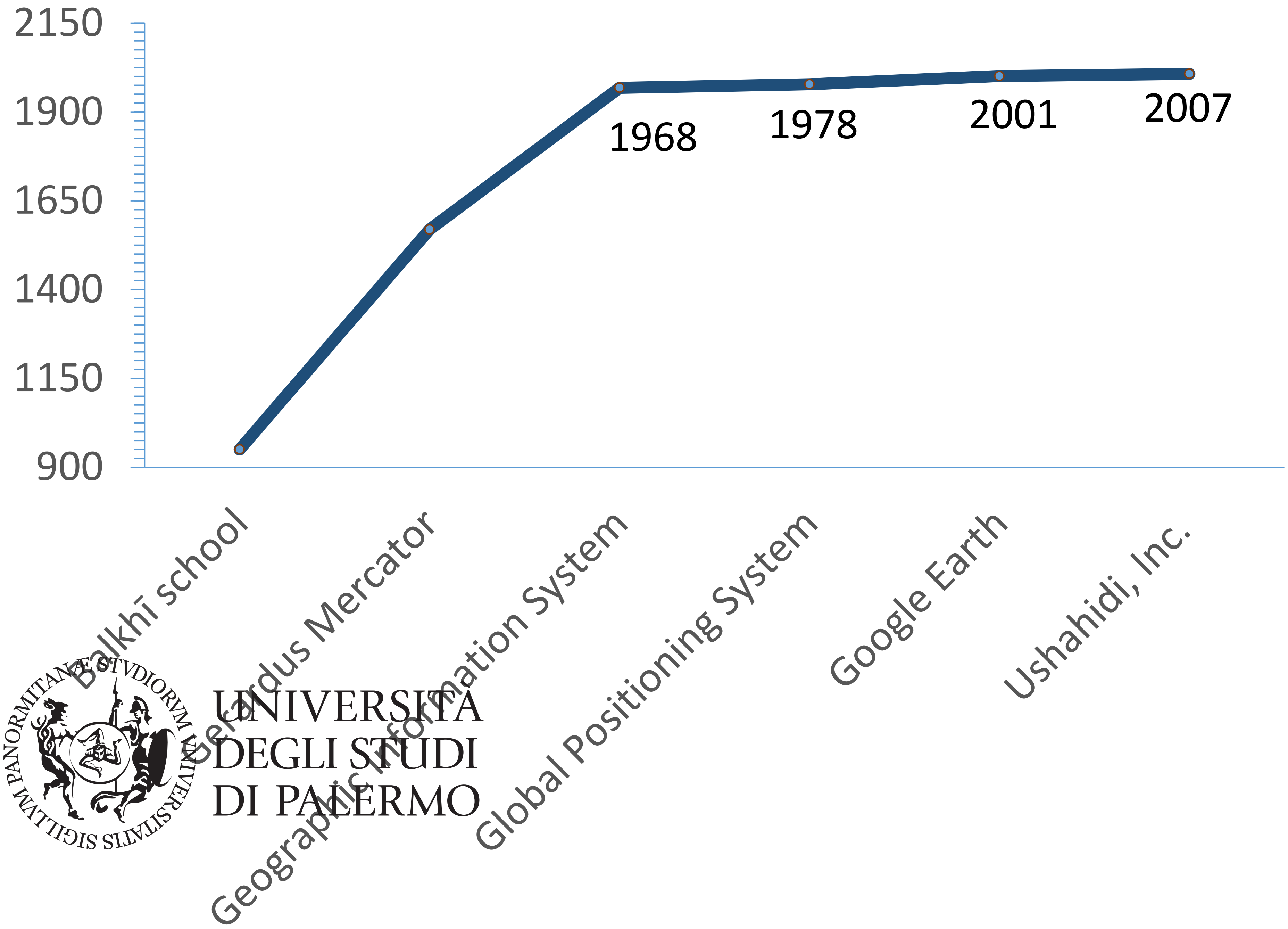
WRB tool for apple phone

UNIVERSITÀ DEGLI STUDI DI PALERMO

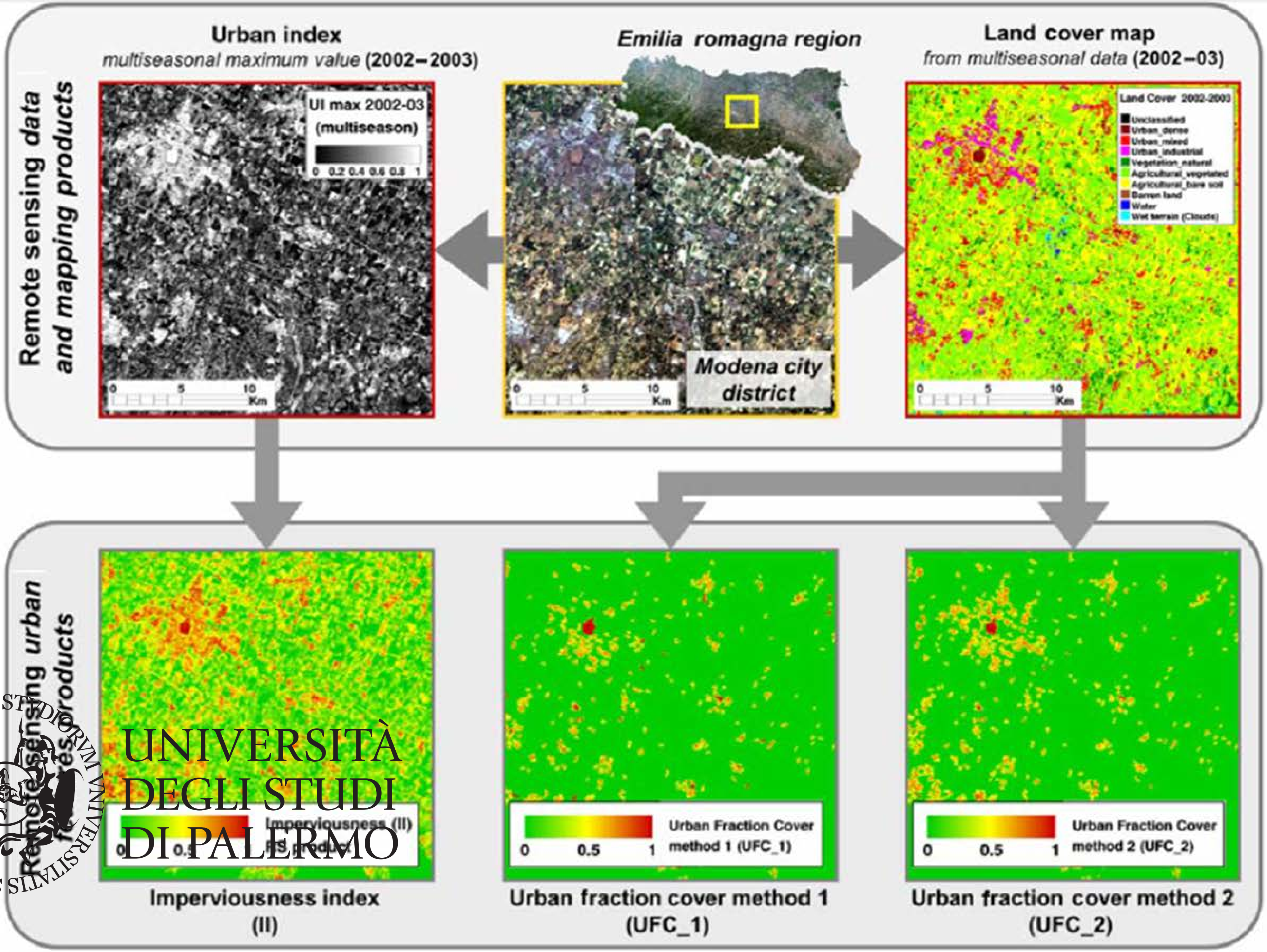
WRB tool for Windows mobile



Al-Istakhri Persian Gulf map (*XIV c*)



UNIVERSITÀ
DEGLI STUDI
DI PALERMO



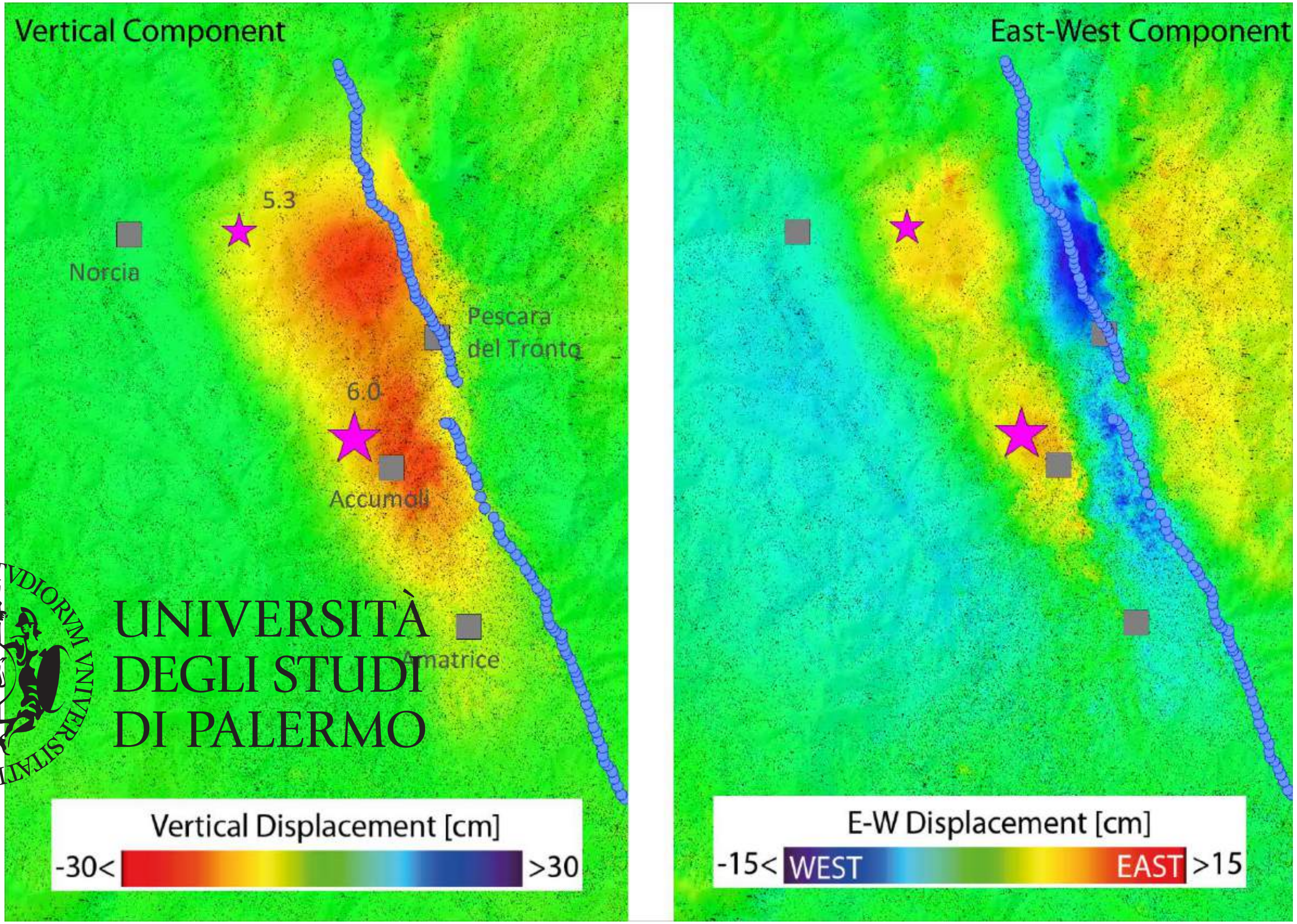
DOI> 10.1109/JSTARS.2014.2328862

SENTINEL-2 systematic coverage

- all continental land surfaces (including inland waters) between latitudes 56° south and 83° north
- all coastal waters up to 20 km from the shore
- all islands greater than 100 km^2
- all EU islands
- the Mediterranean Sea
- all closed seas (e.g. Caspian Sea)
- With two satellites all regular areas indicated above will be revisited every five days under the same viewing conditions.

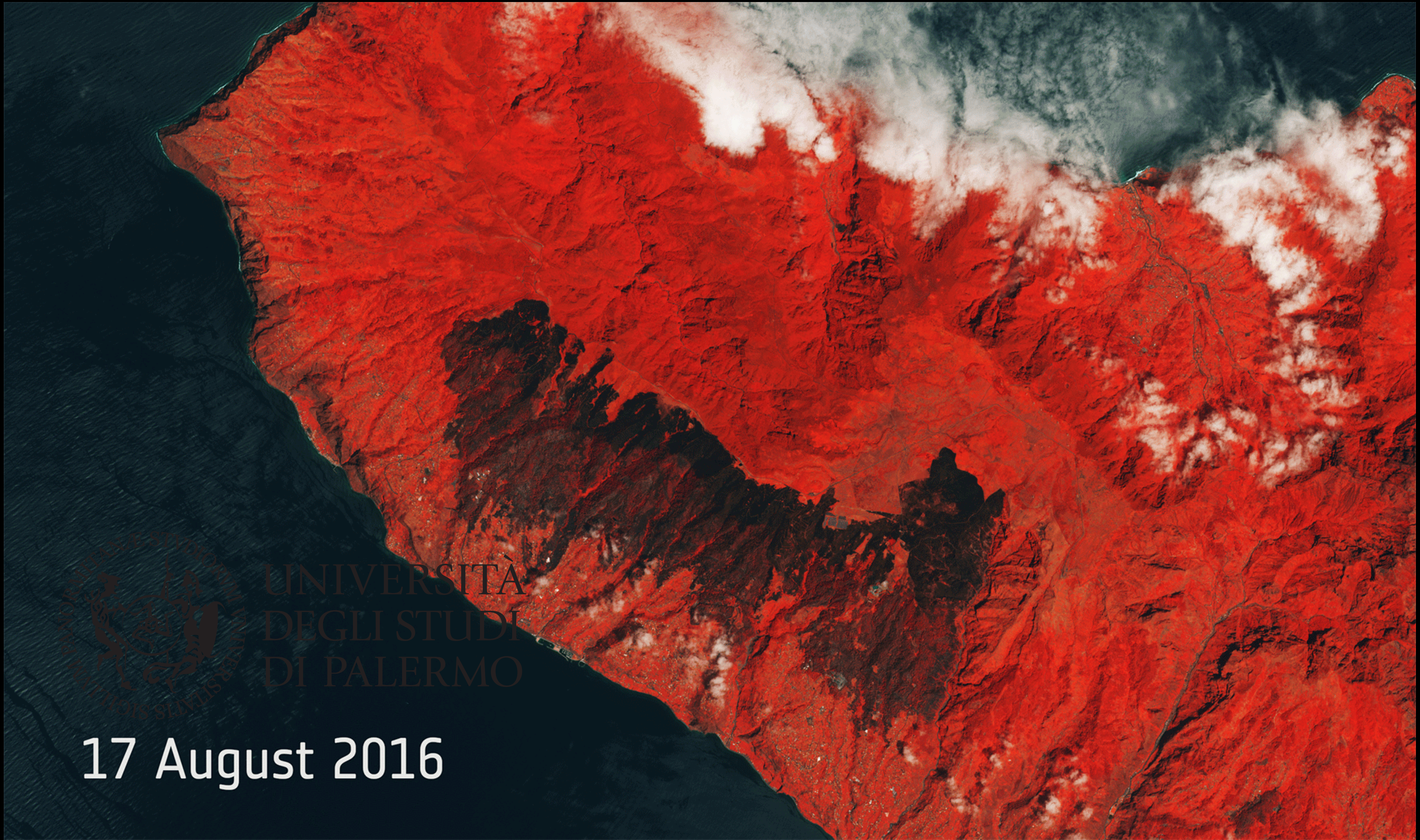
UNIVERSITÀ
DEGLI STUDI
DI PALERMO

Sentinel-1 radar 27 August 2016

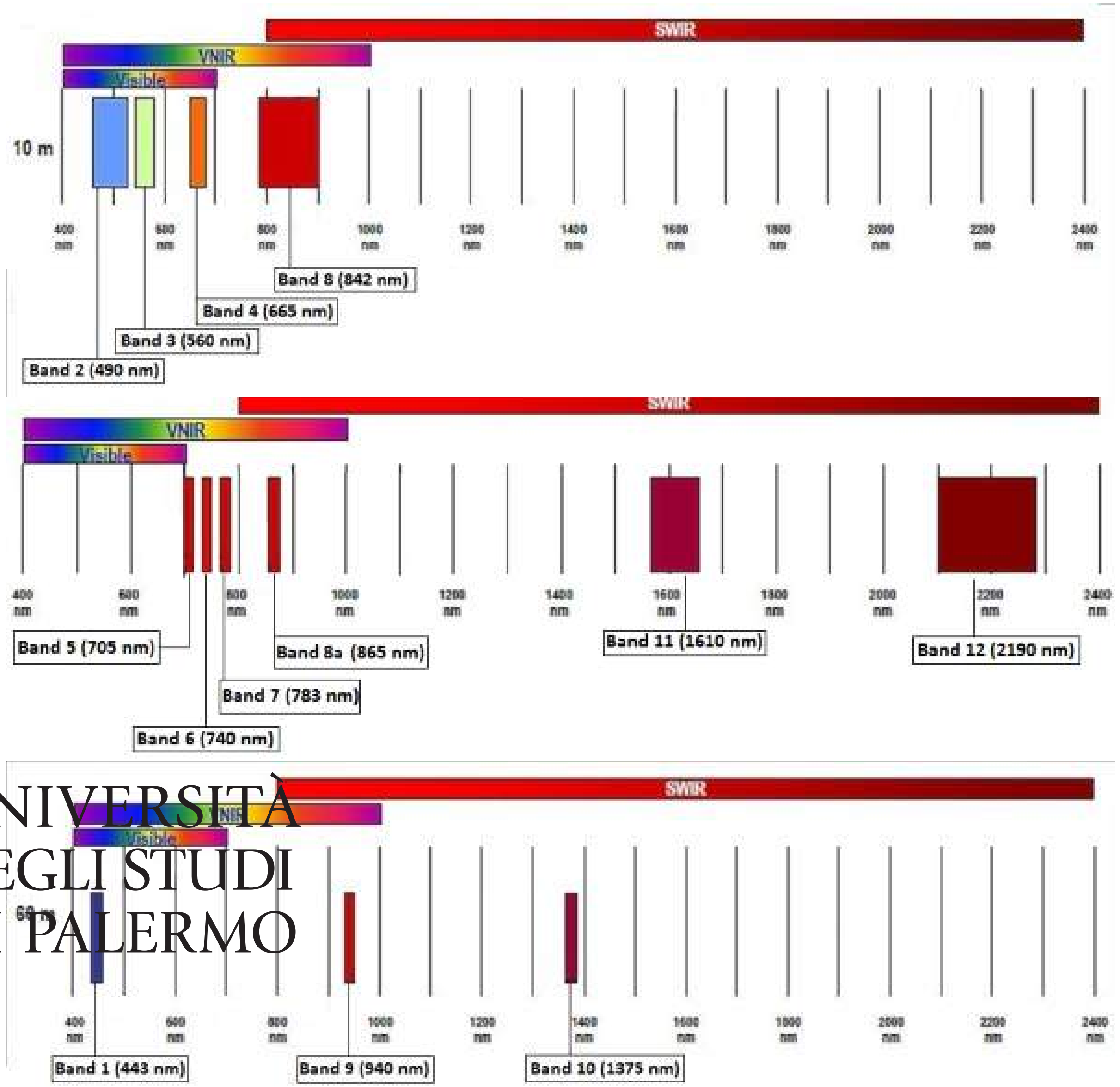


UNIVERSITÀ
DEGLI STUDI
DI PALERMO

Sentinel-2A Madeira false-colour image

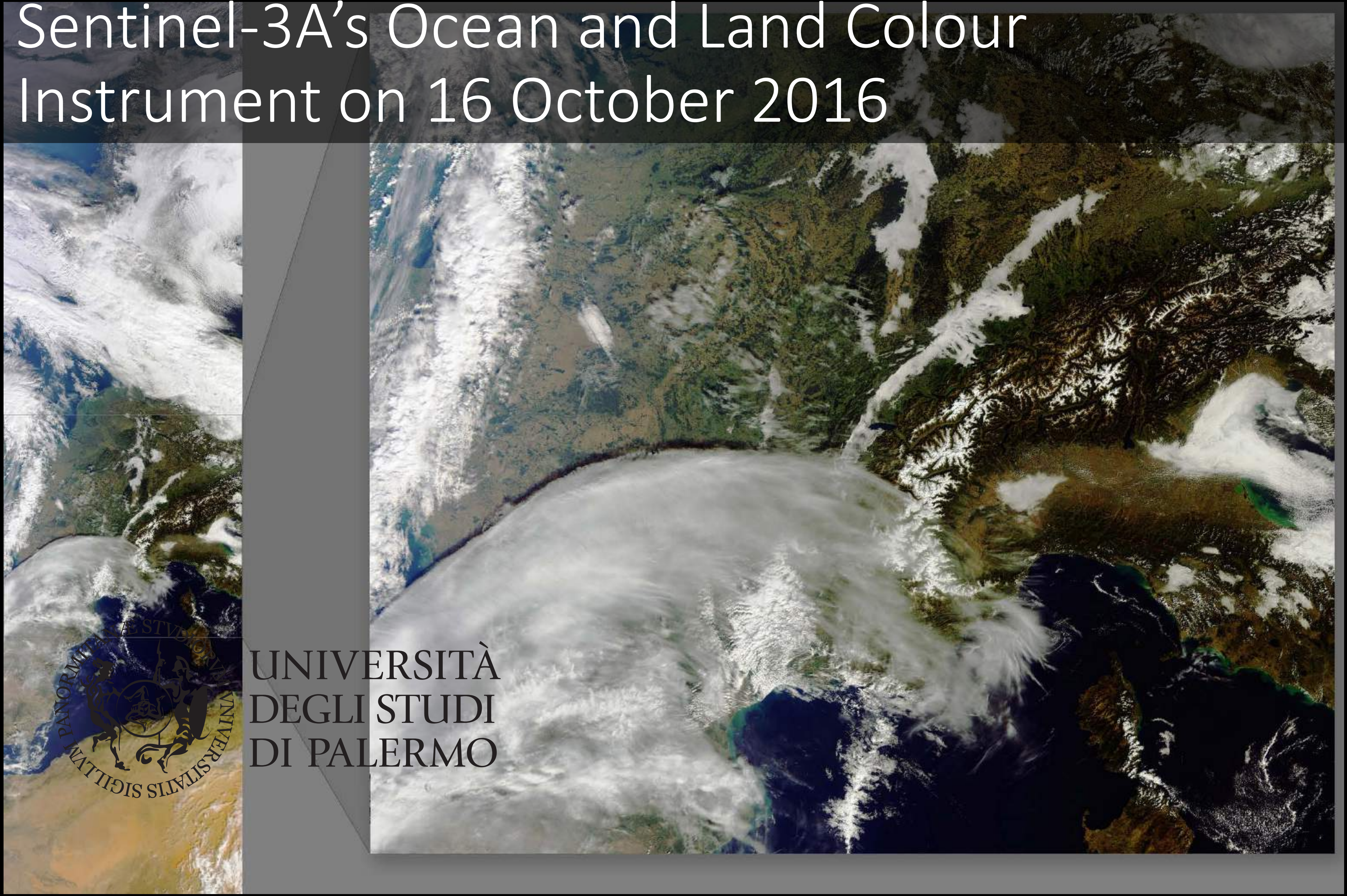


Sentinel-2

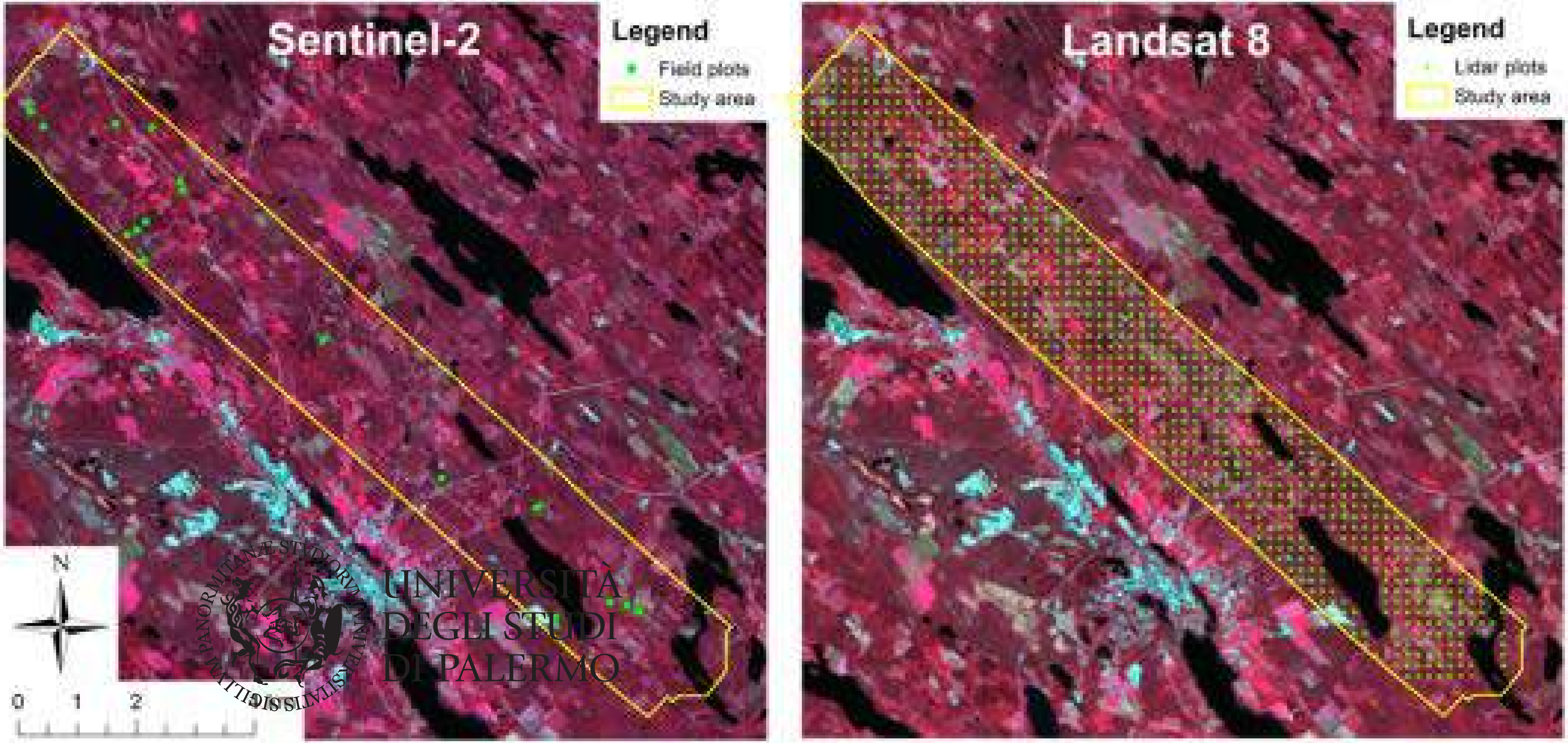


UNIVERSITÀ DEGLI STUDI DI PALERMO

Sentinel-3A's Ocean and Land Colour Instrument on 16 October 2016

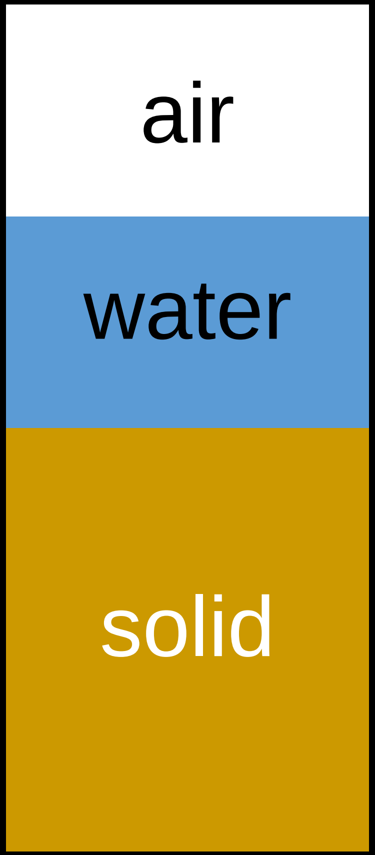


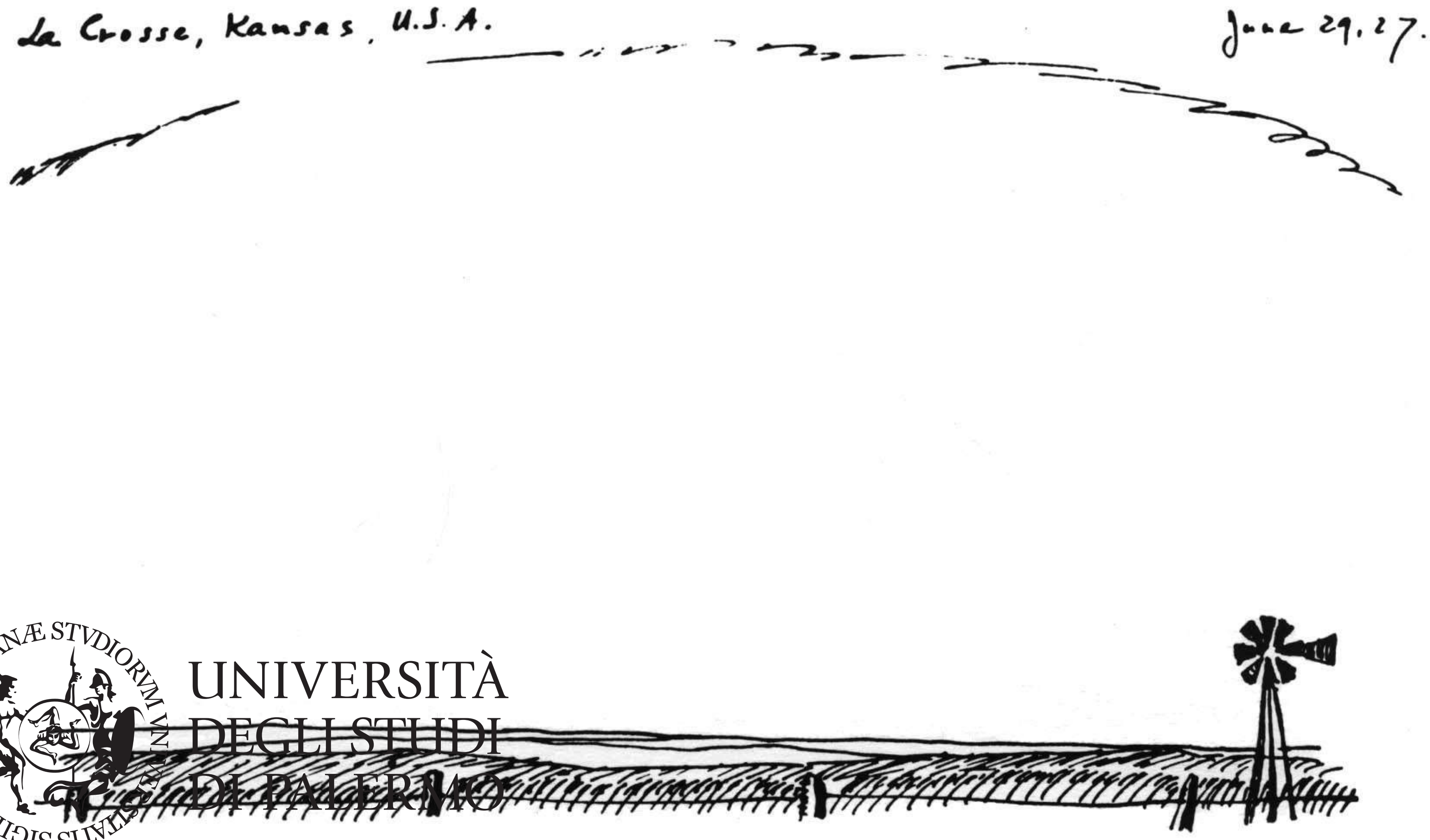
UNIVERSITÀ
DEGLI STUDI
DI PALERMO

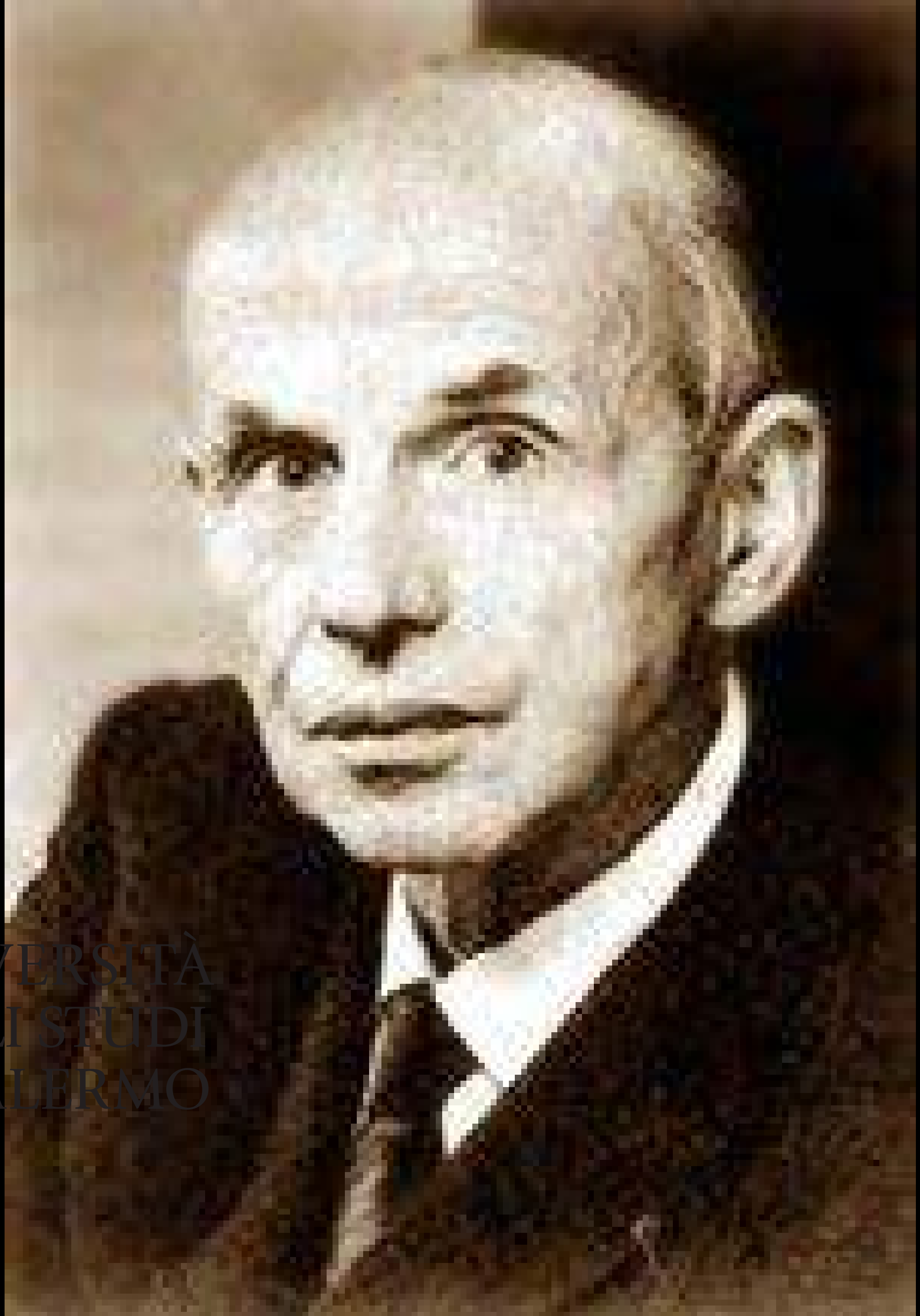


doi> 10.1016/j.rse.2017.03.021


UNIVERSITÀ
DEGLI STUDI
DI PALERMO
Piazza Armerina
37°22’N 14°21’E 330 m a.s.l.
Calcic Luvisol

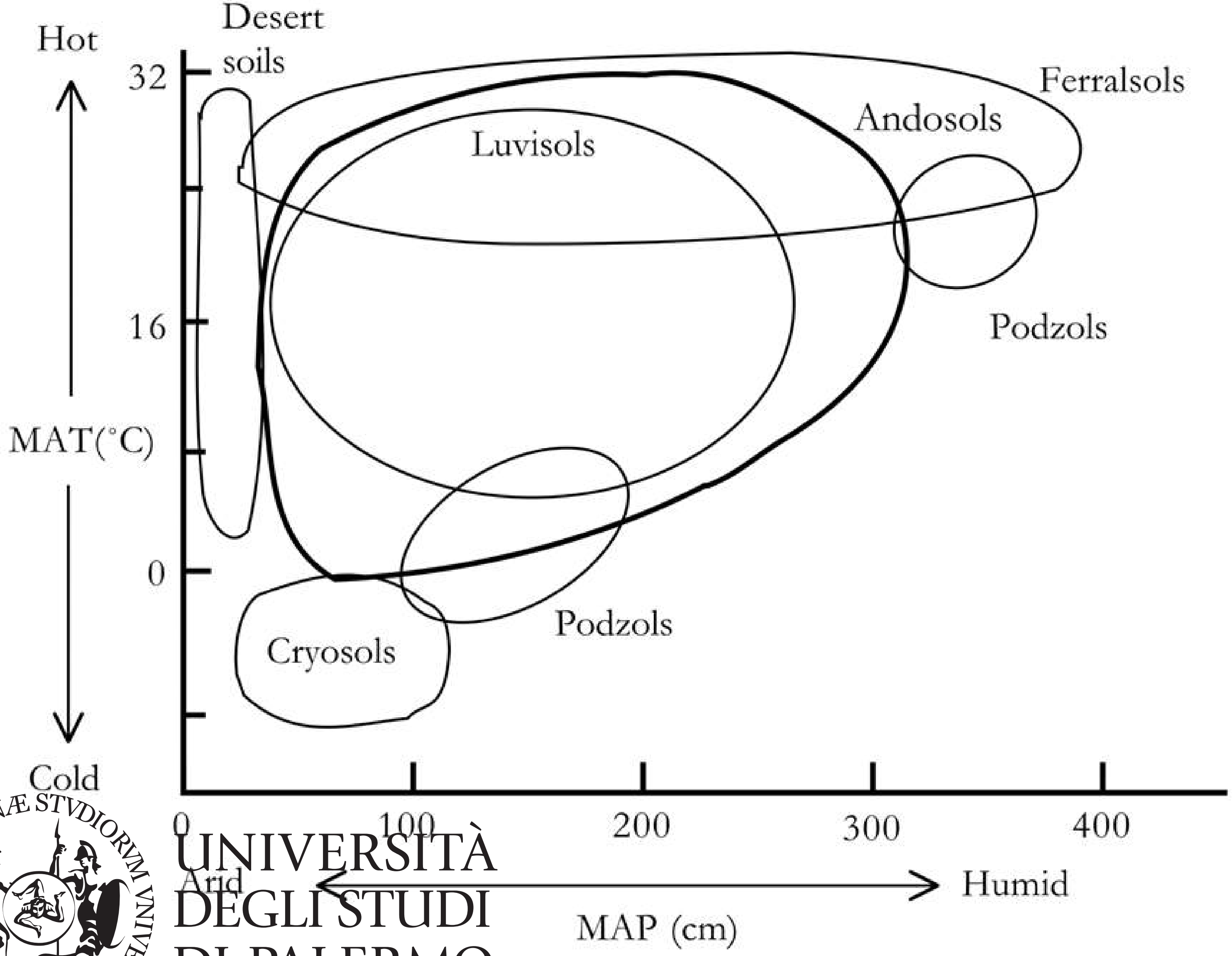

air
water
solid


La Crosse, Kansas, U.S.A.
June 29, 27.



climate
parent material
organisms
topography
time

FACTORS OF SOIL FORMATION
A System of Quantitative Pedology
HANS JENNY
https://goo.gl/5Ae0EZ



UNIVERSITÀ DEGLI STUDI DI PALERMO

Fig. 10.1. Distribution of selected soil groups in a mean annual precipitation–mean annual temperature (MAP–MAT) graph.

doi> 10.1017/CBO9780511535802.011


UNIVERSITÀ
DEGLI STUDI
DI PALERMO
11°41′05″N 37°05′06″E 1850 m a.s.l.

Leptosols

Shallow soil over hard rock or gravelly material (from Greek *leptos*, thin).

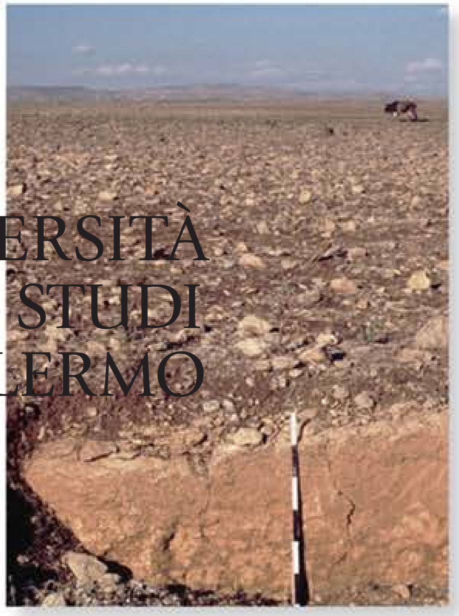
Leptosols are shallow soils over hard rock, very gravelly material or highly calcareous deposits. Because of limited pedogenic development, Leptosols have a weak soil structure. Leptosols occur all over Africa, especially in mountainous and desert regions where hard rock is exposed or comes close to the surface and the physical disintegration of rocks due to freeze/thaw or heating/cooling cycles are the main soil-forming processes. In WRB, bare rocks exposes at the surface (possibly displaying only microscopic soil formation) are referred to as Nudilithic Leptosols.

Left: Rock outcrops are typical of Leptosol landscapes. Trees must be shallow rooting or develop where the soil is a little deeper and where impeded drainage can lead to higher water retention. (EM)

Below: Leptosol from Ethiopia – a cover of debris some 20 cm thick overlies a dolerite. Soil development is slow. Only limited extensive grazing is possible. (JD)

The map shows where Leptosols are dominant. They cover around 17% of Africa.

Soil Taxonomy classifies most of these soils as Entisols.



Lixisols

Slightly acid soils with a clay-enriched subsoil and low nutrient-holding capacity (from Latin *lixivia*, washed-out substances)

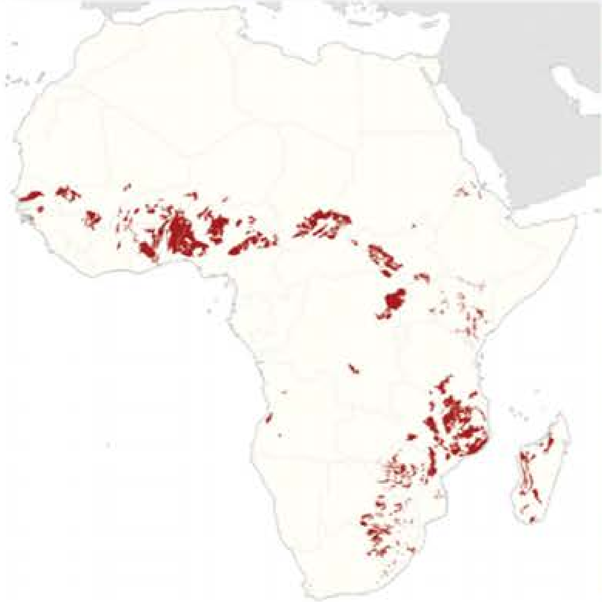
Lixisols are slightly acid soils that show a distinct increase in clay content with depth. The clay is predominantly kaolinite with limited capacity to hold nutrients. Occurring mainly in the dry savannah region with low biomass production, Lixisols do not hold much organic matter and lack a well developed soil structure. High-intensity rainfall will destroy any soil structure present making Lixisols prone to erosion. If the soil is not protected, a crust may develop which prevents rain entering the soil. Overland flow will then erode the topsoil which is the most fertile part. Wind erosion may be an issue as loose soil particles at the surface can easily be blown away.

Left: A cultivated Lixisol from Tanzania. Note the use of sorghum stalks as a mulch to protect the soil from erosion. (OS)

Below: A characteristically red Lixisol from Tanzania. (EM)

The map shows where Lixisols are dominant. They cover around 4% of Africa.

Soil Taxonomy classifies most of these soils as Alfisols.



doi> 10.2788/52319

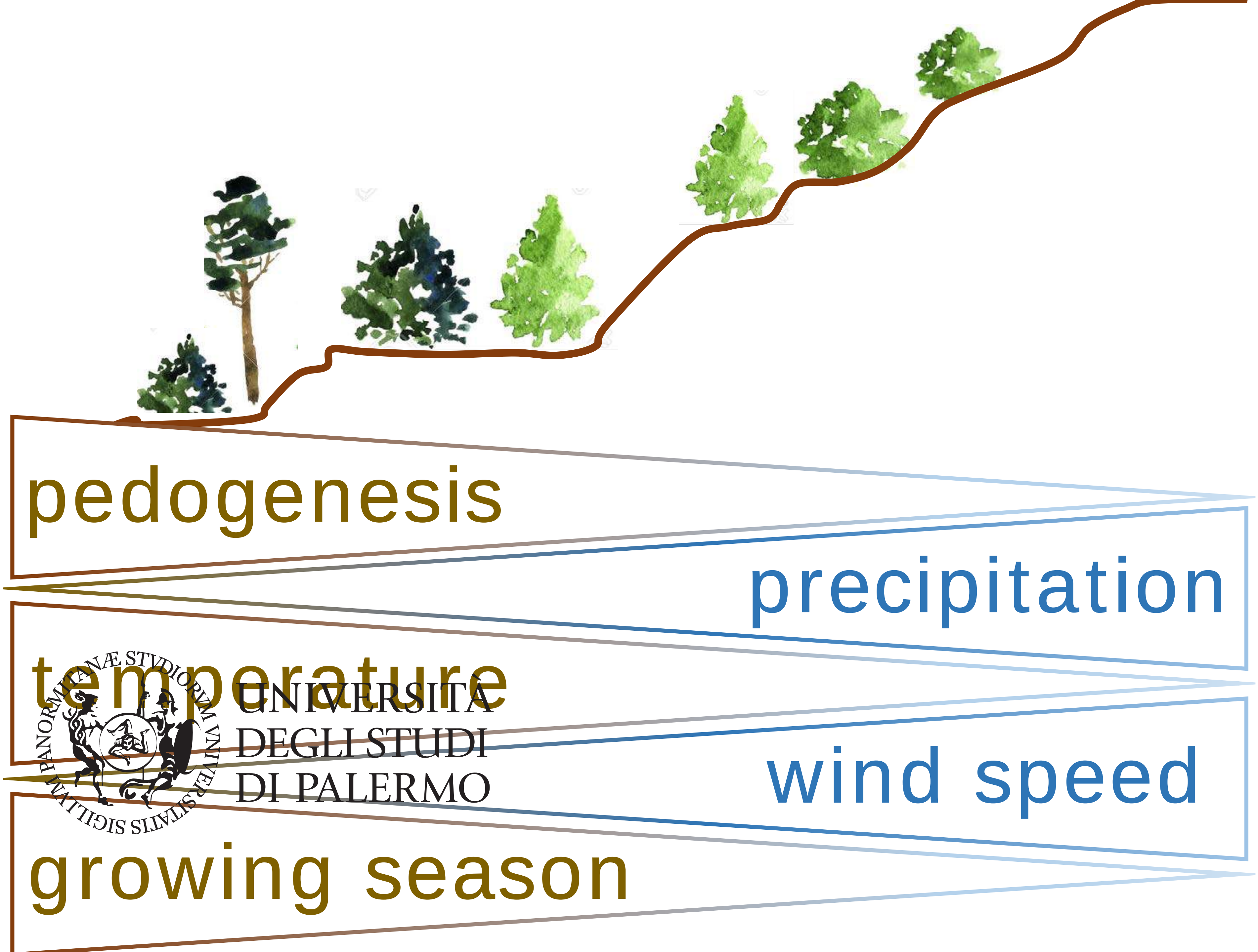
Table 10.1. *Soils and soil-forming processes as summarized by Ugolini and Spaltenstein (1992)*

	Zone	Cold desert	Polar desert	Tundra	Boreal forest	Temperate forest: Coniferous	Temperate forest: Deciduous	Grassland	Desert	Savanna: Treeless	Savanna: Arboreal	Tropical rainforest
ST[a]	Soil Order	Entisols (Gelisols)	Entisols (Gelisols)	Inceptisols (Gelisols)	Spodosols	Inceptisols	Alfisols	Mollisols	Aridisols	Vertisols	Ultisols	Oxisols
WRB[b]	Soil Group	Cryosols	Cryosols	Cryosols	Podzols	Cambisols	Luvisols	Chernozems	Solonchaks	Vertisols	Acrisols	Ferralsols
Climate	Moisture	ultra xeric (very dry)	ultra xeric (very dry)	aridic (dry)	udic (humid)	udic (humid)		ustic (semi-arid)	aridic (arid)	ustic (semi-arid)	udic (humid)	perudic (very humid)
	Temperature	ultra pergelic (extremely cold)	pergelic (very cold)	cryic (cold)	frigid (cool)	mesic (temperate)		mesic (temperate) thermic (warm)		isothermic (hot)		isohyperthermic (very hot)
Specific impact of climate and surface conditions on the horizons	O			under-saturated non-mobile organic acids	very under-saturated mobile organic acids	under-saturated non-mobile organic acids		saturated non-mobile organic acids		saturated non-mobile organic acids	under-saturated organic acids	very under-saturated mobile organic acids
	A, E Bh											
	B		Fe-hydroxide neoformation	smectite, vermiculite formation	non-crystalline aluminosilicates and Fe-hydroxide neoformation	smectite, vermiculite formation by transformation of preexisting phyllosilicates		Fe-hydroxide neoformation $CaCO_3$ precipitation	Fe-hydroxide neoformation $CaCO_3$ precipitation	smectite neofor-mation	kaolinite neo-formation	Fe- and Al- hydroxide neoformation
	C	$CaCO_3$ precipitation	$CaCO_3$ precipitation	Fe-hydroxide neoformation	Fe-hydroxide neoformation	Fe-hydroxide neoformation		$CaCO_3$ precipitation	$CaCO_3$ precipitation	$CaCO_3$ precipi-tation	Fe-hydroxide neo-formation	Kaolinite neoformation
	R	nil	nil	nil	nil	nil		nil	nil	nil		Fe-hydroxide neoformation
Speed of pedogenesis		extremely slow	very slow	slow	moderate	moderate		moderate	slow	fast		very fast

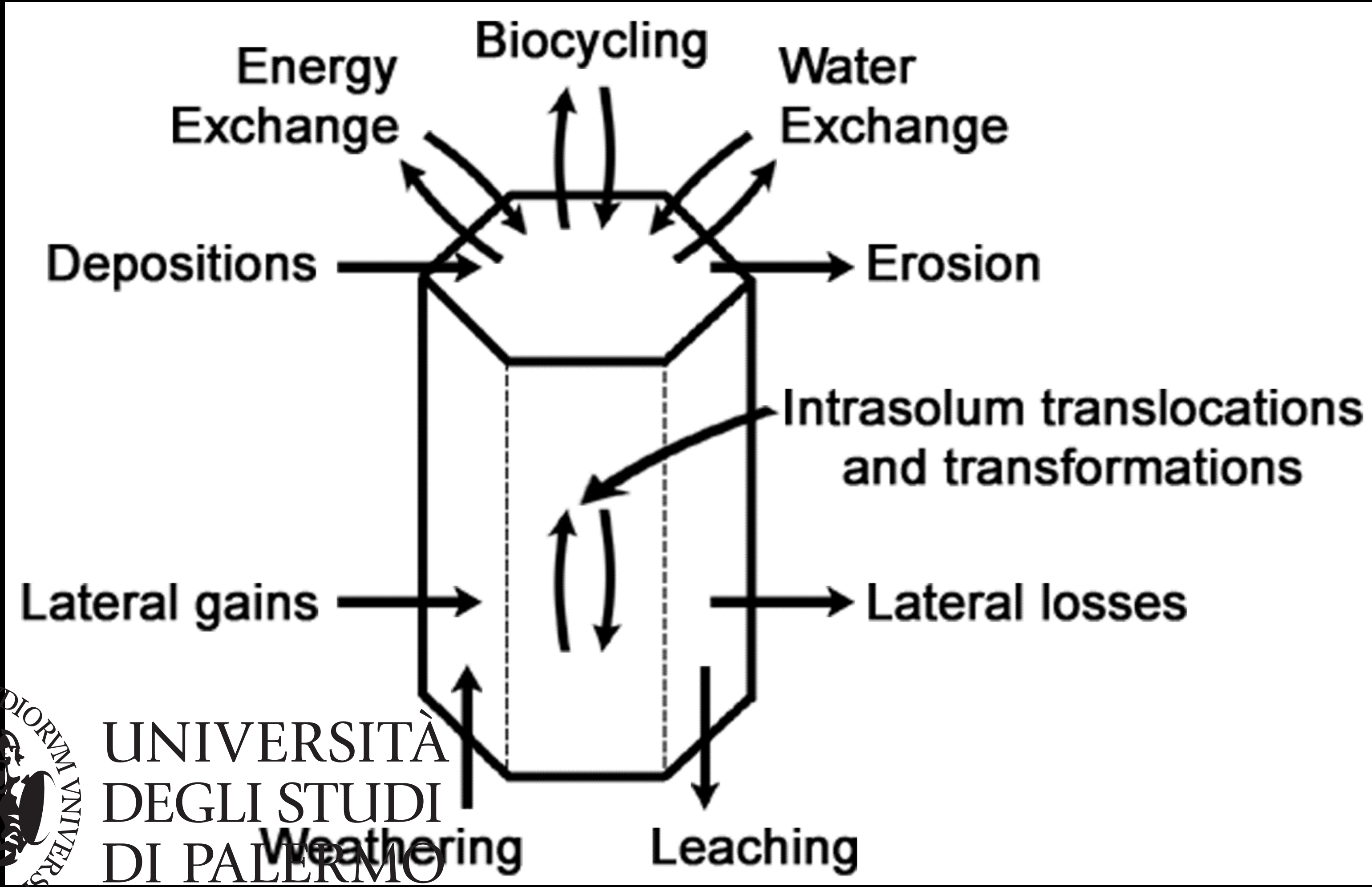
[a]ST, Soil Taxonomy.
[b]WRB, World Reference Base for Soil Resources.

UNIVERSITÀ DEGLI STUDI DI PALERMO

doi> 10.1017/CBO9780511535802.011


pedogenesis
precipitation
temperature
wind speed
growing season
UNIVERSITÀ
DEGLI STUDI
DI PALERMO

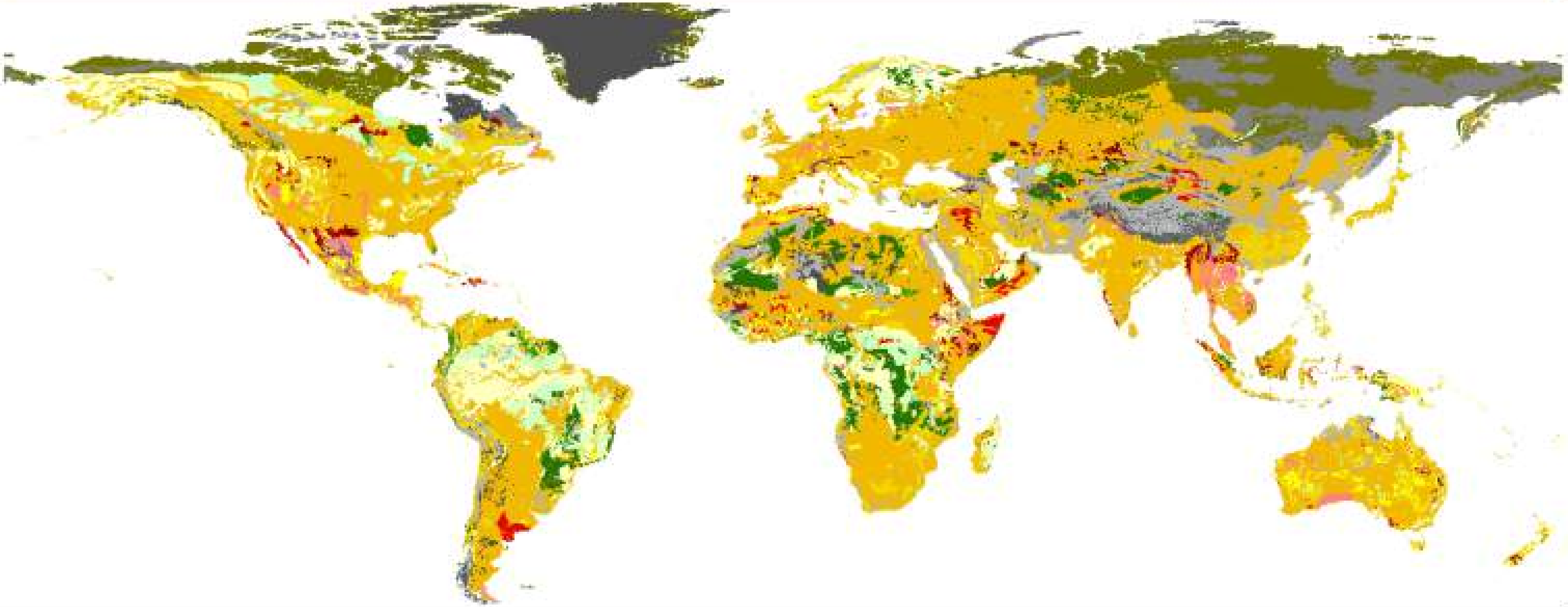
climate
parent material
organisms
topography
time


Biocycling
Energy Exchange
Water Exchange
Depositions
Erosion
Intrasolum translocations and transformations
Lateral gains
Lateral losses
Weathering
Leaching


UNIVERSITÀ
DEGLI STUDI
DI PALERMO


45°38’N 7°53’E 1750 m a.s.l.

Effective Soil Depth (cm)



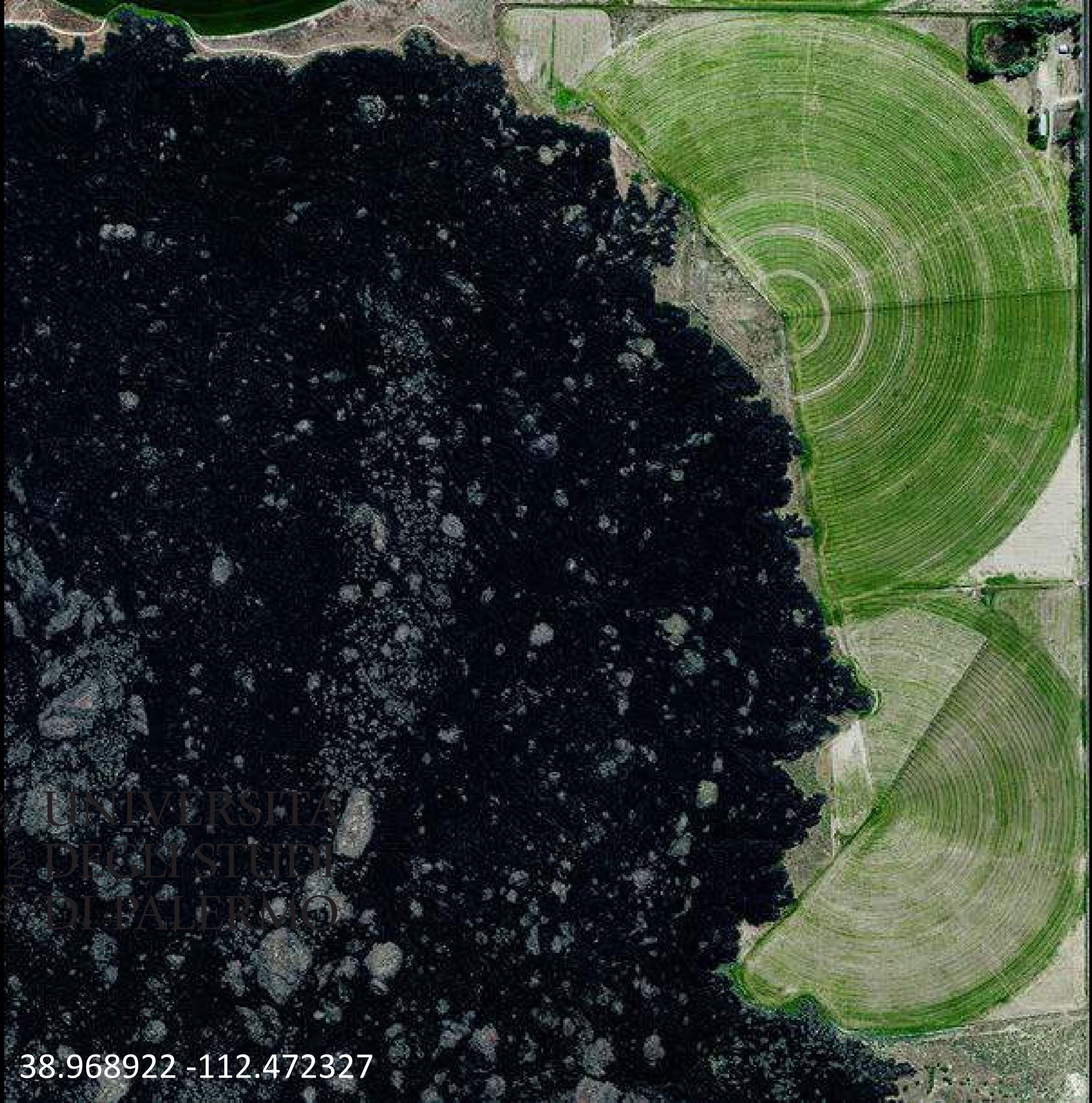
Legend

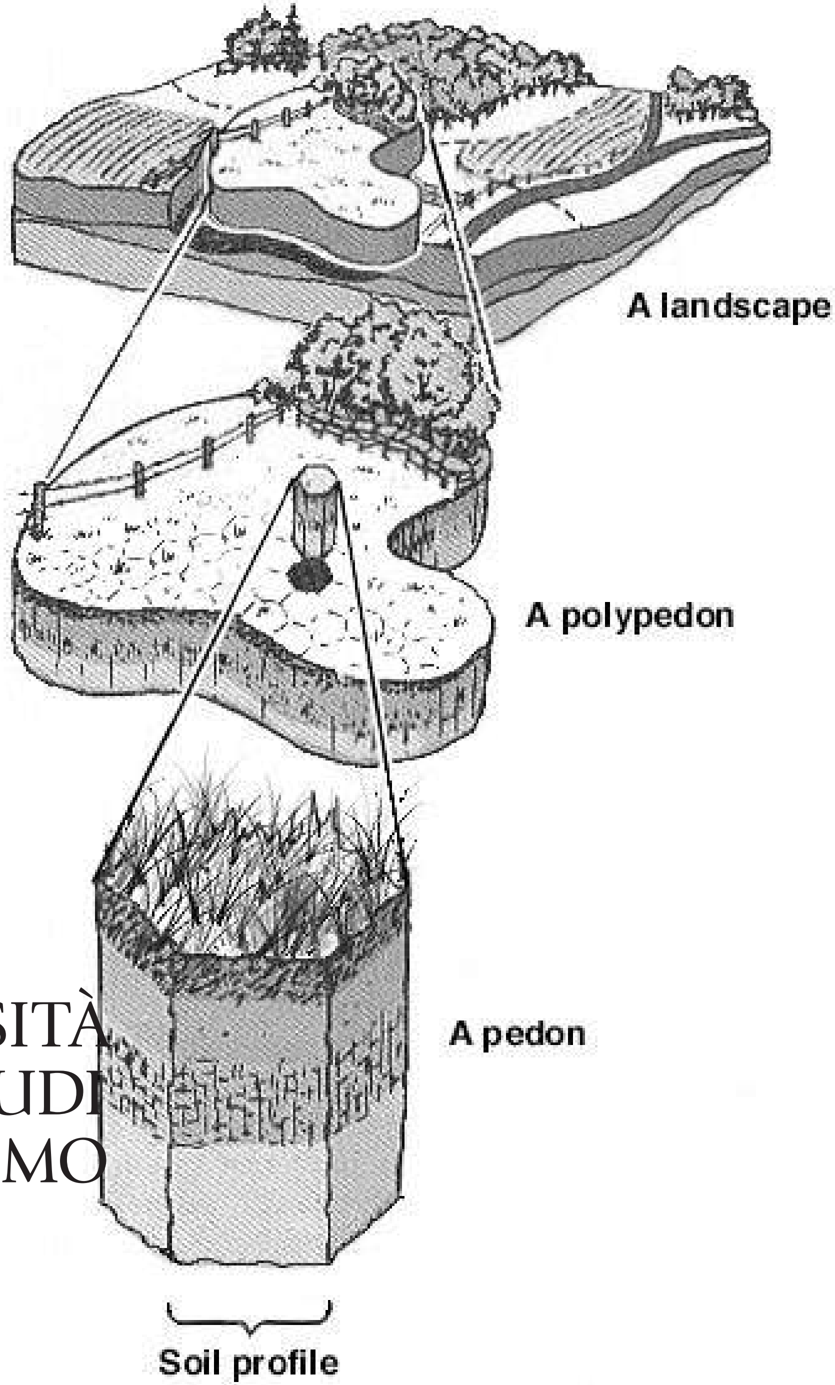
Very shallow (<10 cm)	|	Deep (100 - 150 cm)	|
Very shallow (<10 cm)	| Shallow (10 - 50 cm)	Deep (100 - 150 cm)	| Very shallow (<10 cm)
Very shallow (<10 cm)	| Moderately deep (50 -100 cm)	Deep (100 - 150 cm)	| Shallow (10 - 50 cm)
Very shallow (<10 cm)	| Deep (100 - 150 cm)	Deep (100 - 150 cm)	| Moderately deep (50 - 100 cm)
Very shallow (<10 cm)	| Very deep (150 - 300 cm)	Deep (100 - 150 cm)	| Very deep (150 - 300 cm)
Shallow (10 - 50 cm)	|	Very deep (150 - 300 cm)	|
Shallow (10 - 50 cm)	| Very shallow (<10 cm)	Very deep (150 - 300 cm)	| Very shallow (<10 cm)
Shallow (10 - 50 cm)	| Moderately deep (50 - 150 cm)	Very deep (150 - 300 cm)	| Shallow (10 - 50 cm)
Shallow (10 - 50 cm)	| Deep (100 - 150 cm)	Very deep (150 - 300 cm)	| Moderately deep (50 - 100 cm)
Shallow (10 - 50 cm)	| Very deep (150 - 300 cm)	Very deep (150 - 300 cm)	| Deep (100 - 150 cm)
Moderately deep (50 - 100 cm)	| Deep (100 - 150 cm)	Water	
		Glaciers, Rock, Shifting sand, Missing data	

Source: FAO-UNESCO Soil Map of the World   Geographic Projection   AGL-2007

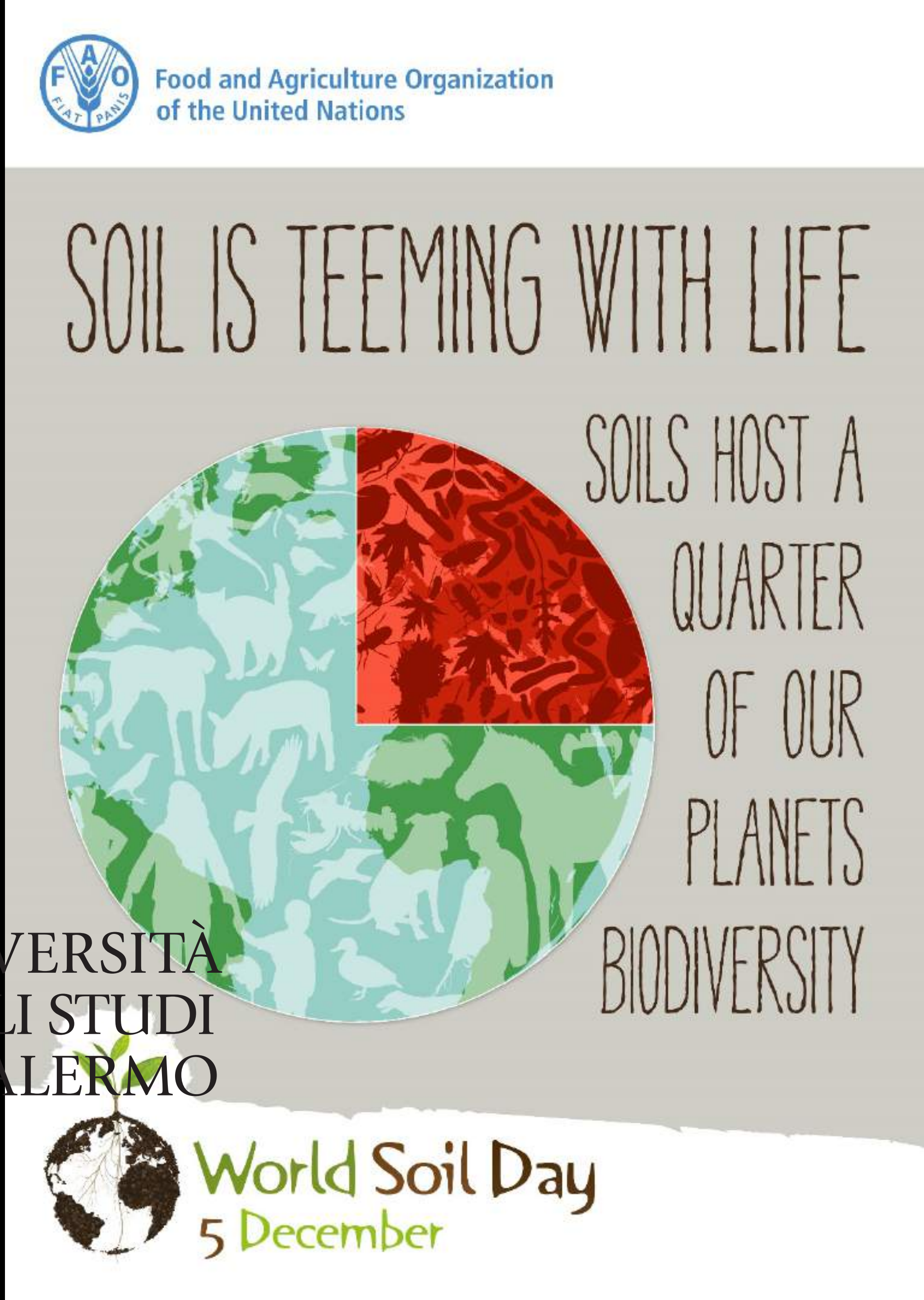
Transportation mode	**Type of parent material**	**Particle size sorting degree**
ice	glacial till	low
water	*alluvium*, outwash	medium - high
gravity	*colluvium*	low
wind	loess, aeolian, tephra	high
lake	lacustrine	high
in place	residual	low


UNIVERSITÀ
DEGLI STUDI
DI PALERMO
46°20’41’’N 8°17’32’’E 1872 m a.s.l.


38.968922 -112.472327

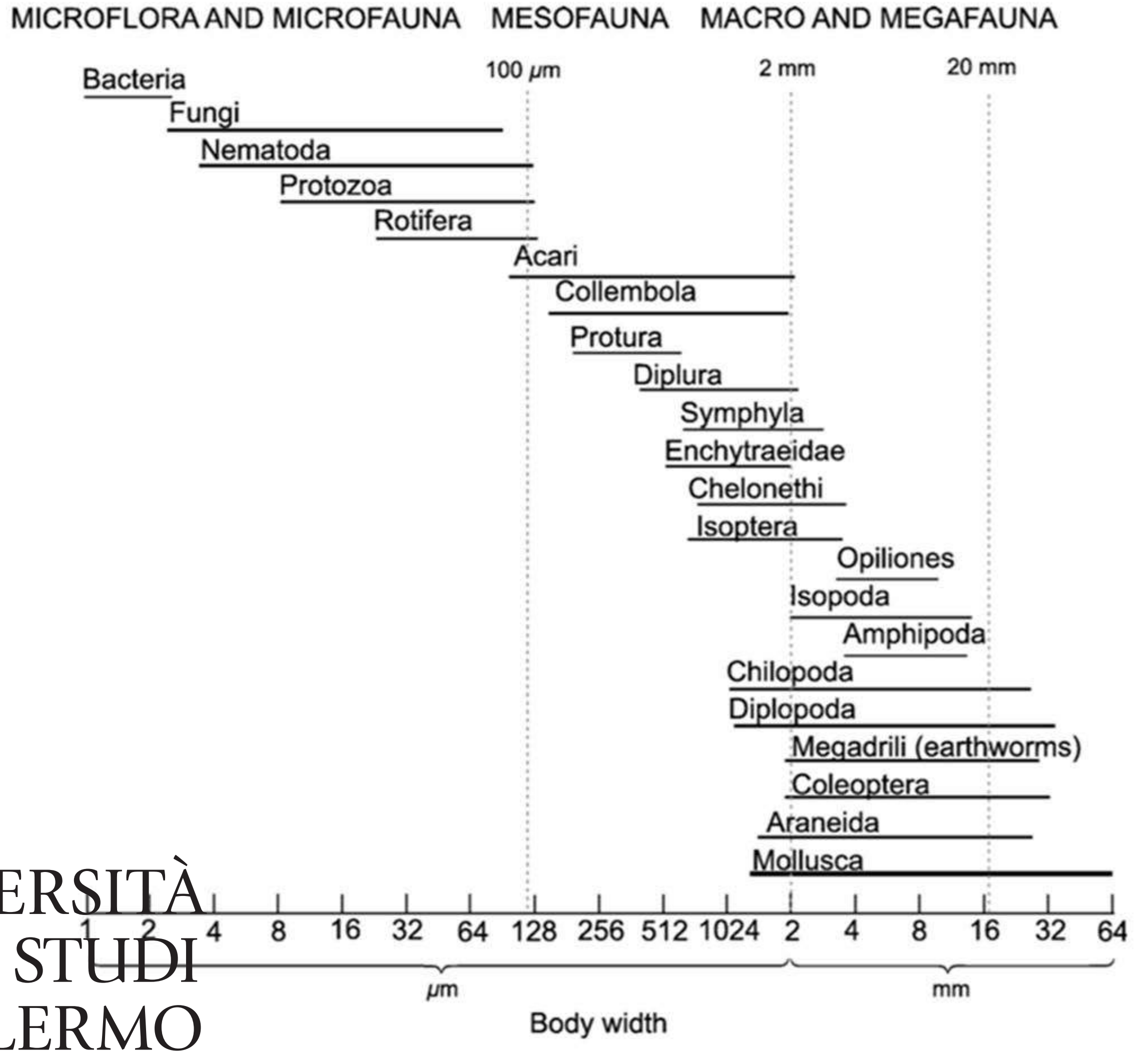

A landscape
A polypedon
A pedon
Soil profile

climate
parent material
organisms
topography
time



UNIVERSITÀ
DEGLI STUDI
DI PALERMO


Food and Agriculture Organization
of the United Nations
World Soil Day
5 December
THERE ARE MORE
ORGANISMS IN ONE
TABLESPOON OF
HEALTHY SOIL...
...THAN THERE ARE
PEOPLE ON EARTH
UNIVERSITÀ
DEGLI STUDI
DI PALERMO



UNIVERSITÀ DEGLI STUDI DI PALERMO

–Size classification of soil organisms according to body width (from Swift et al., 1979).

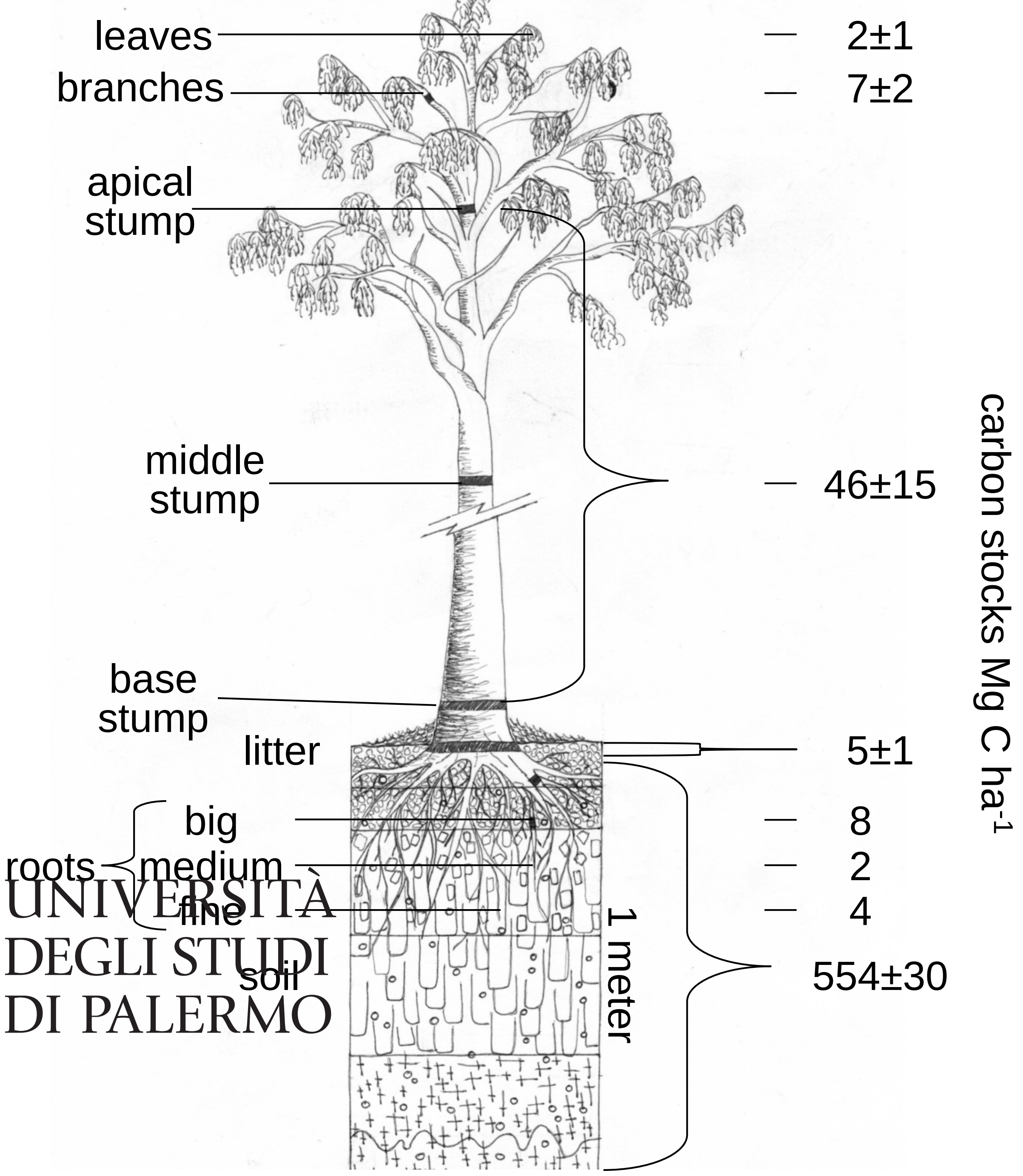
doi> 10.1016/j.ecolecon.2007.03.004

Table 7.2. *Biomass and specific activities of organisms abundant in soil*

	Biomass (kg C ha^{-1})	Specific activity (μl O_2 g^{-1} C h^{-1})
Macrofauna	50 (equivalent to 1 cow, 10 sheep)	5[a]
Mesofauna	5 (equivalent to 1 sheep)	0.6[b]
Microfauna	3 (equivalent to <1 sheep)	1.4[c]
Fungi	375 (equivalent 75 sheep)	50[d]
Bacteria	125 (equivalent 25 sheep)	500[d]

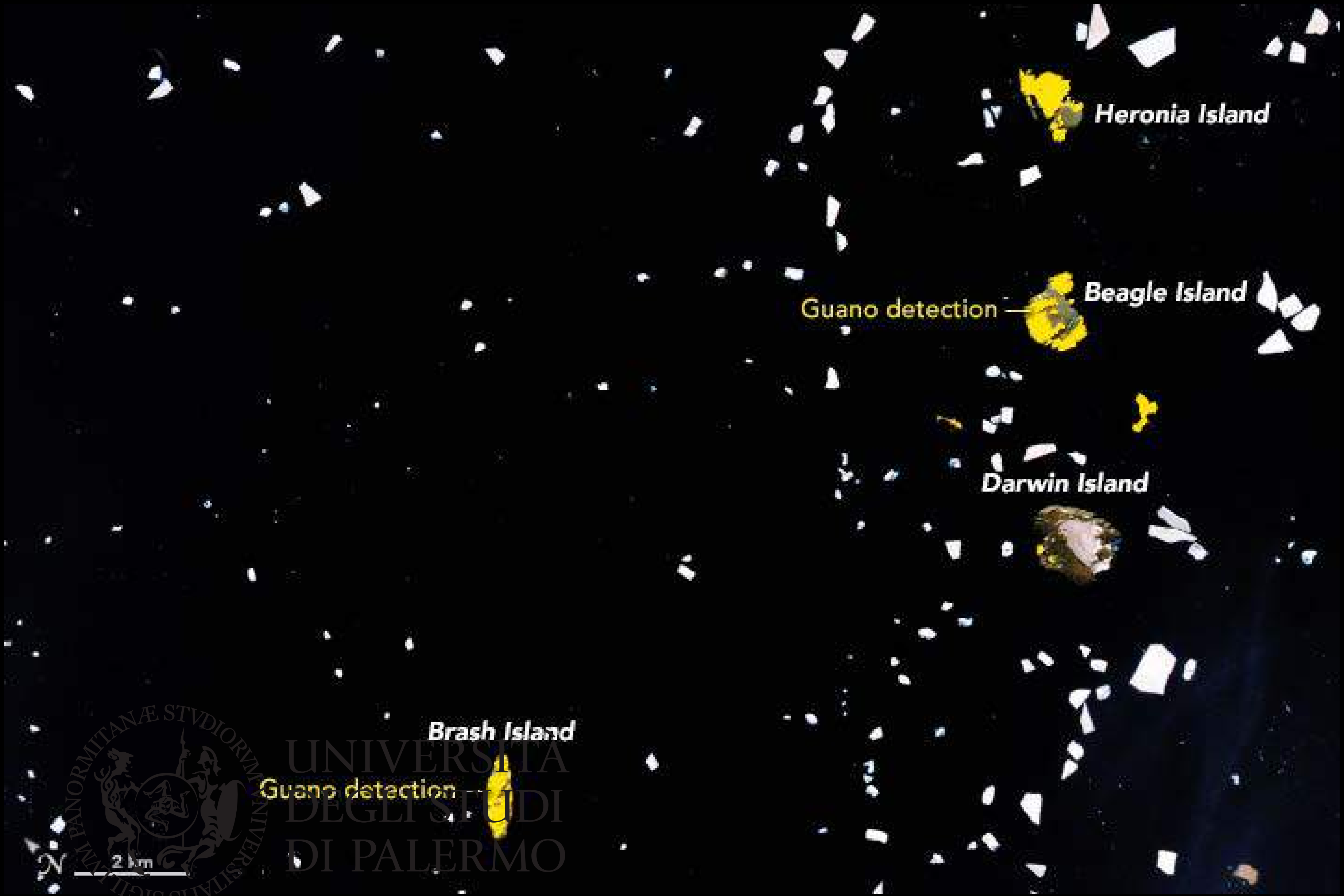
[a] At optimized conditions and assuming that C content is 50% of organic matter.
[b] For *Collembola*: using the formula of Ryszkowski (1975): μl $O_2 \cdot h^{-1} = 0.357 \cdot 1^{0.813}$.
[c] After Foissner (1987).
[d] Assuming that soil microbial biomass contains 25% bacteria and 75% fungi.

doi> 10.1017/CBO9780511535802.008



UNIVERSITÀ DEGLI STUDI DI PALERMO

doi> 10.2989/20702620.2015.1055541



doi> 10.1016/j.rse.2013.08.009

Table 1 General characteristics of the sites from Keller and Barton Peninsulas, King George Island, Maritime Antarctica

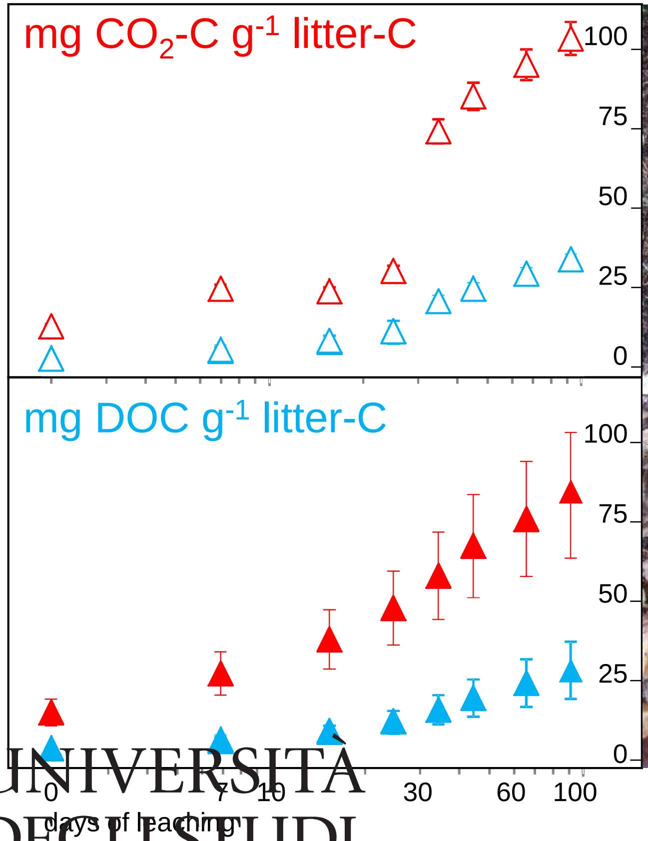
Coordinates UTM 21 E	Site description	Horizon	Depth / cm	Clay / g kg^{-1}	Structure[a]	Consistency[b]	Colour[c]
Soil 1	Cambisol Skeletic Turbic[d] Inceptisol Typic Dystrocryepts[e]						
426 006 m E 3 115 696 m N	Parent material sulphide-bearing andesites, west of Keller Peninsula, without ornithogenic influence, sparse cover of *Usnea antarctica* Du Rietz.	A	0–5	252	SG	So, Fr, NPl, SS	2.5Y 2/2
		B	5–40	268	SB, W, Sm	So, VF, SPl, SS	2.5Y 6/8
		C1	40–80	296	Ma	H, Fr, SPl, SS	2.5Y 2/8
		C2	80–95	324	Ma	H, Fr, SPl, SS	2.5Y 2/8
Soil 2	Mollic Leptosol Ornithic Inceptisol Humic Dystrocryepts						
425 873 m E 3 115 890 m N	Parent material basalt, west of Keller Peninsula, influence of Skua (*Stercorarius maccormicki* Saunders) nesting, sparse cover of *Deschampsia antarctica* E.Desv., *Usnea antarctica* Du Rietz and *Sanionia uncinata* (Hedw.) Loeske	A1	0–5	136	SG	H, St, NPl, NS	10YR 3/2
		A2	5–15	188	SG	SH, Fr, NPl, NS	10YR 3/2
Soil 3	Mollic Leptosol Ornithic Inceptisol Humic Dystrocryepts						
425 866 m E 3 115 889 m N	Parent material basalt, west of Keller Peninsula, influence of Skua (*Stercorarius maccormicki* Saunders) nesting, intense cover of *Deschampsia antarctica* E.Desv., *Usnea antarctica* Du Rietz and *Sanionia uncinata* (Hedw.) Loeske	A1	0–10	133	SG	H, Fr, NPl, NS	10YR 3/2
		A2	10–25	192	SG	H, Fr, NPl, NS	10YR 3/2
		B	25–35	296	SB, M, Sm	So, St, NPl,NS	7.5YR 5/1
Soil 4	Mollic Leptosol Ornithic Inceptisol Humic Dystrocryepts						
407 7[illegible] m E 3 0[illegible] m N	Parent material basalt, Nobong plateau in Barton Peninsula, influence of active penguin colony, *Usnea antarctica* Du Rietz and *Sanionia uncinata* (Hedw.) Loeske	A	0–20	102	SG	So, VF, NPl, NS	7.5YR 3/2
		B	20–30	140	AB, S, Me	So, St, Pl, S	10YR 4/4

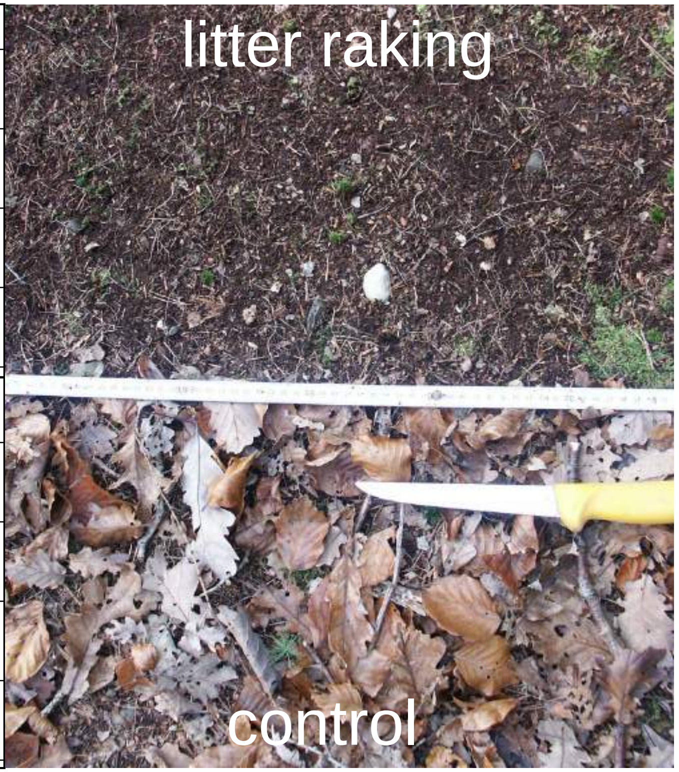
[a]Structure: type (SG, single grain; AB, angular blocky; SB, subangular blocky; Ma, massive); degree of development (S, strong; M, moderate; W, weak); size (Sm, small; VS, very small; Me, medium).
[b]Dry consistency (So, soft; SH, slightly hard; H, hard); wet consistency (VF, very friable; Fr, friable; St, steady); plasticity (Pl, plastic; NPl, non-plastic; SPl, slightly plastic); stickiness (S, sticky; NS, not sticky; SS, slightly sticky).
[c]Moist colour, Munsell Soil Colour Chart.
[d]FAO–WRB.
[e]Soil Taxonomy.

doi> 10.1111/ejss.12307

Litter beech leaves raking

Schweizerisches Institut für Volkskunde



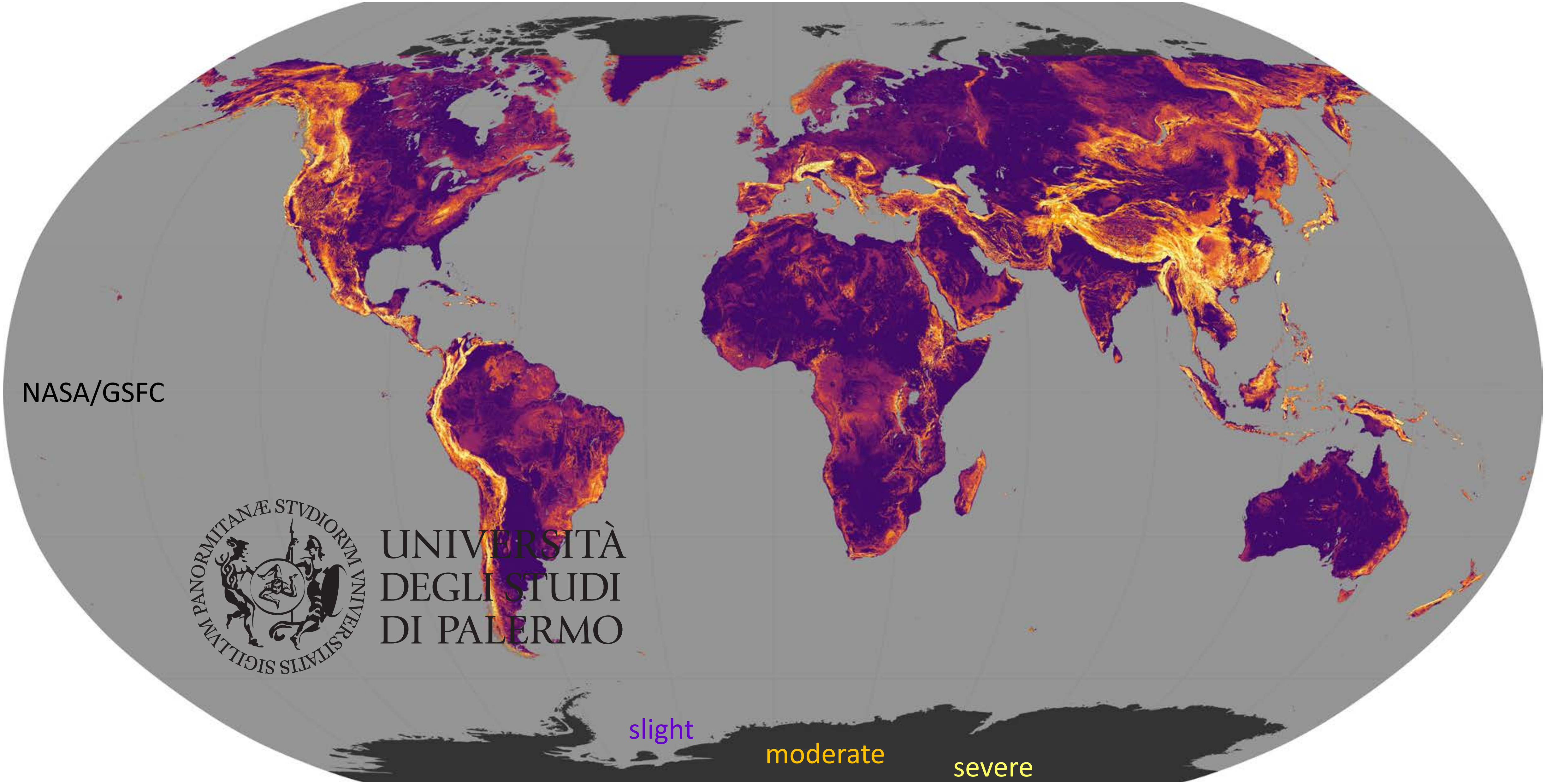


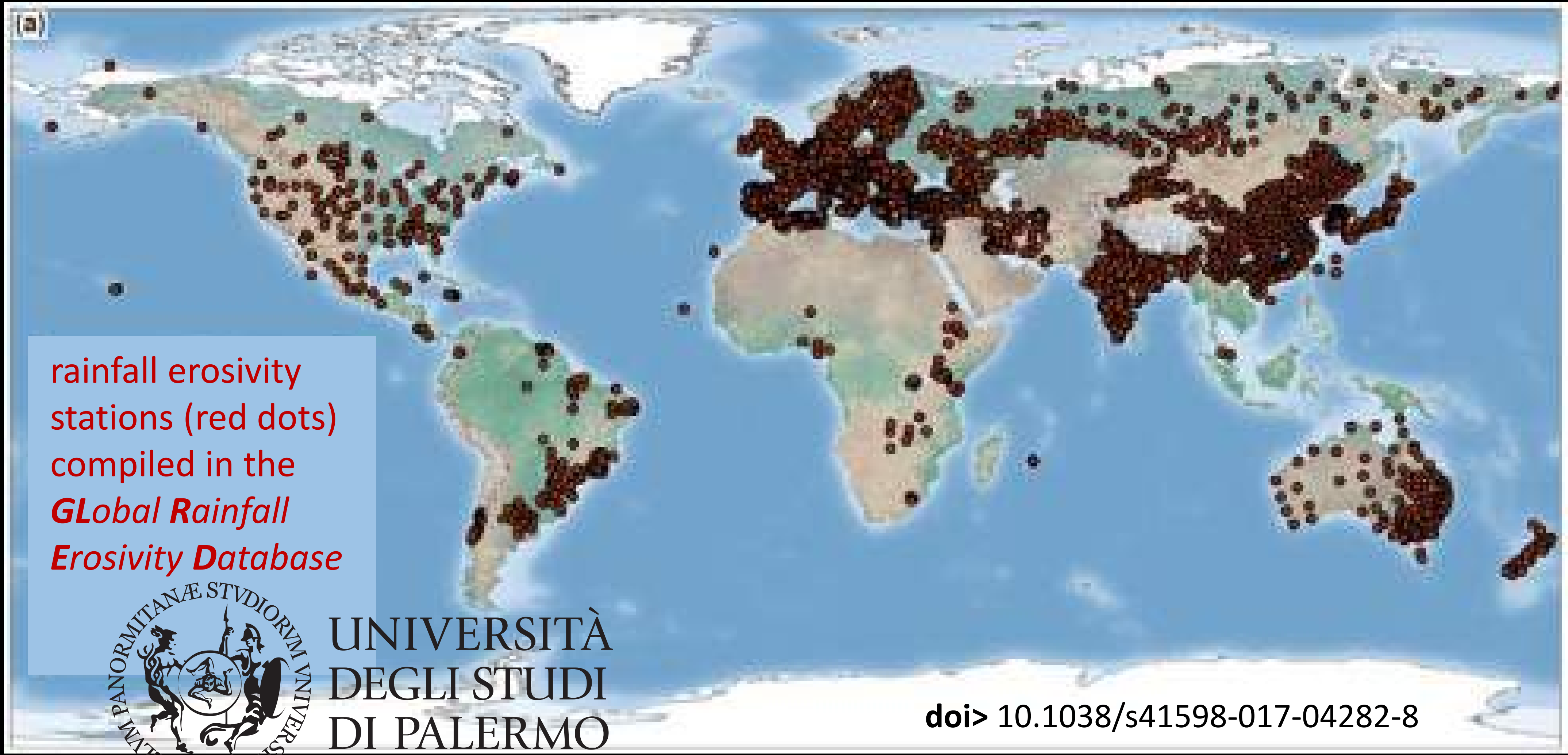
UNIVERSITÀ
DEGLI STUDI
DI PALERMO

doi> 10.1016/j.geoderma.2016.02.024

climate
parent material
organisms
topography
time

Global Landslide Susceptibility





rainfall erosivity stations (red dots) compiled in the ***GL**obal **R**ainfall **E**rosivity **D**atabase*

UNIVERSITÀ DEGLI STUDI DI PALERMO

doi> 10.1038/s41598-017-04282-8

Table 11.1. *Properties of soils along a catena formed on basalt in southern California*[a]

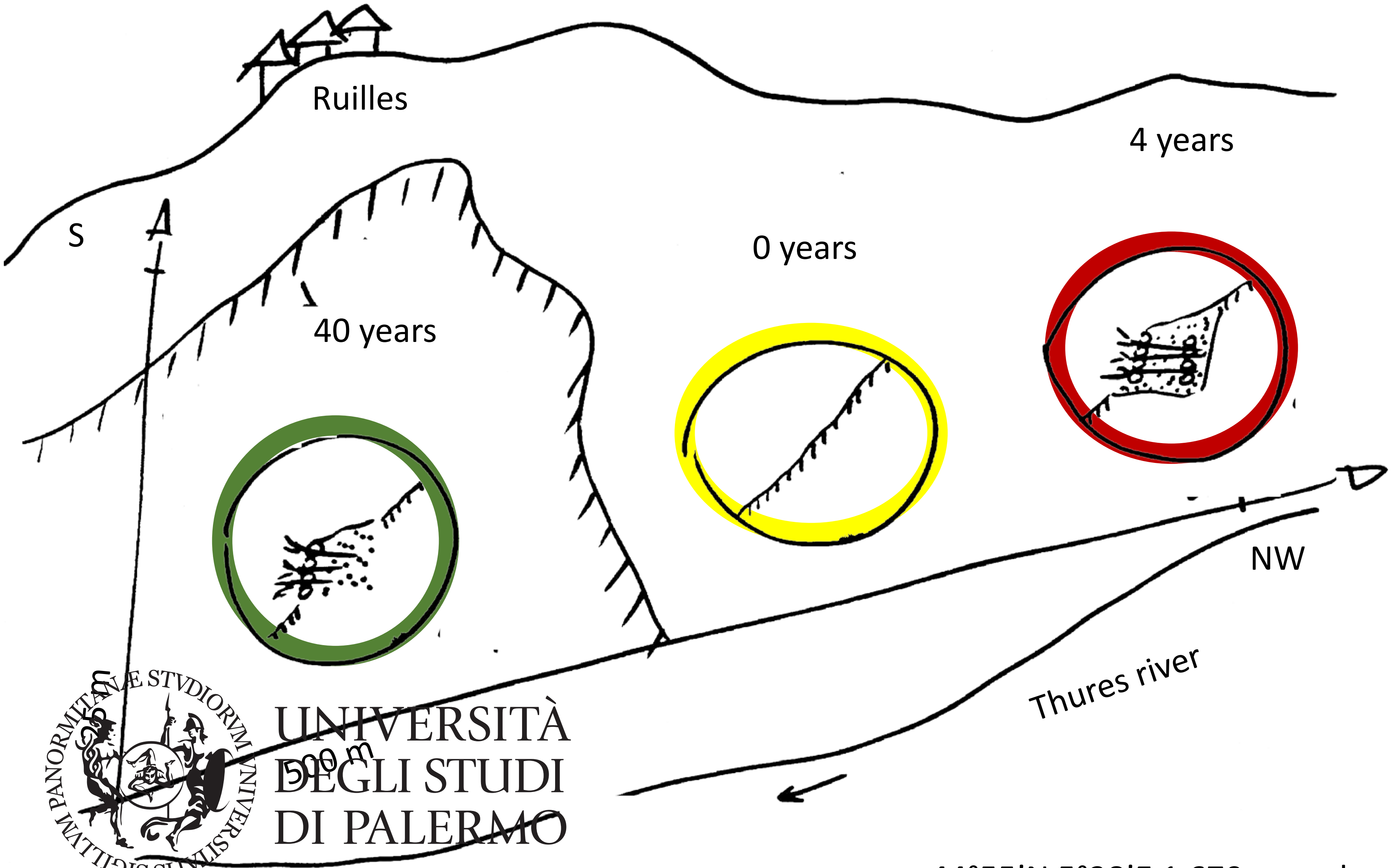
	Slope position				
	Summit	Back slope	Foot slope	Toe slope	Basin
Soil Order[b]	Entisols[c]	Entisols[c]	Alfisols	Vertisols	Vertisols
Depth to bedrock (cm)	21	40	52	46	98
Maximum clay concentration (%)	17	20	55	53	61
Dominant dry subsoil colour, Munsell	yellowish red 5YR 4/6	yellowish red 5YR 4/6	dark brown 7.5YR 3/2	dark brown 10YR 4/3	dark grey 10YR 4/1
Clay mineralogy	kaolin >> smectite	kaolin > smectite	not determined	smectite > kaolin	smectite >> kaolin
Base saturation (%)[d]	81	74	80	88	92
Fe as pedogenic Fe-oxides (%)[d]	4.3	5.1	2.3	1.7	1.0
Mn as pedogenic Mn-oxides (%)[d]	0.07	0.08	0.07	0.10	0.13

[a] Mean annual precipitation is 450 mm, primarily in the winter months. Shallow ponds (vernal pools) form in the basin during the winter and early spring. The summit is ~3 m higher than the basin and about 30 m lateral distance from the basin. Maximum slope gradient is 9%. The vegetation consists of grasses and herbaceous plants.

[b] Soil Taxonomy.

doi> 10.1017/CBO9780511535802.012

45°38’N 7°53’E
1750 m a.s.l.



44°55’N 5°38’E 1 670 m a.s.l.

doi> 10.1016/S1002-0160(08)60082-X

TABLE I

Morphology of the pedons and main soil properties. The loose debris facing down-valley in two differed areas were stabilized by log crib walls in the springtime of 1960 (40) and 1995 (4), respectively. The log crib walls were intended to retain the falling material and thus gradually reduce the inclination of the upper slope section. Their construction commenced with the excavation of the bank, just prior to the installation of the live crib wall. The soil profile sampled contained only the original material placed in crib cage during construction. Numbers within brackets are standard errors

Year	Horizon	Depth	Color[a)]	Structure[b)]	Cons.[c)]	Roots[d)]	Biological features[e)]	Skeleton[f)]	Boun.[g)]	pH (H_2O)	$CaCO_3$	Organic C	ATP	PSD[h)]	Porosity[i)]	PD[j)]
		cm									g kg^{-1}			%	cm^3 dm^{-3}	%
0	C	0–100+	10YR 5/1† 2.5Y 3/2‡	2, m, sbk	s, sp	f, vf	a	vb, an/san	b	9.3	255	4	0.010	8/71/21	380	8/32/51/9
										(0.1)	(35)	(1)	(0.002)	(1/3/1)	(40)	
4	A	0–25	10YR 5/1† 2.5Y 3/2‡	vw, abk, sg	l, ns, np	c, me, la	f, b	a, an	s	8.1	55	15	0.018	9/63/28	260	9/21/50/19
										(0.4)	(62)	(5)	(0.006)	(1/3/2)	(20)	
	C	25–100+	10YR 5/1† 2.5Y 3/2‡	2, m, sbk	s, sp	a	a	va, an/san	b	9.3	270	3	0.010	13/65/22	320	7/33/50/10
										(0.1)	(24)	(1)	(0.001)	(1/4/3)	(50)	
40	Oi	5–2	10YR 6/3† 2.5Y 4/4‡	vw, m, abk	l, ns, np	ffi, fm	m, b	la, an	w, d	7.8	15	42	0.092	10/35/55	n.d.	n.d.
										(0.4)	(5)	(8)	(0.012)	(3/5/3)		
	Oe	2–0	7.5YR 5/2† 10YR 3/2†	2, vf, gr	fri	avf, fco	m, b	f, an	s, a	7.9	21	24	0.080	20/40/40	n.d.	n.d.
										(0.5)	(11)	(6)	(0.026)	(3/5/4)		
	A	0–30	10YR 3/1† 2.5Y 3/1‡	w, f, gr	fri, ss/sp	avf, cco	m, b+c	f, an	w, c	8.1	45	9	0.035	15/48/37	700	14/25/46/14
										(0.2)	(7)	(1)	(0.021)	(2/3/3)	(70)	
	AB	30–45	10YR 3/1† 2.5Y 3/1‡	w, f, gr	fri, ss/sp	c, me, la	f, b+c	f, an	w, c	8.1	58	8	0.020	15/66/20	650	3/46/39/12
										(0.3)	(16)	(1)	(0.008)	(1/3/2)	(60)	
	Bw	45–70	10YR 3/1† 2.5Y 3/2‡	1, m/c, sbk	fri, ss/sp	c, fi	f, b	f, me	w, a	8.5	180	8	0.016	10/64/26	450	7/40/40/13
										(0.2)	(28)	(1)	(0.005)	(1/2/1)	(20)	
	BC	70–80	10YR 3/1† 2.5Y 3/2‡	2, m, sbk	sp	c, fi	a	a, an/san	w, a	9.1	210	4	0.002	10/55/35	410	7/26/55/13
										(0.1)	(33)	(1)	(0.001)	(1/5/3)	(50)	
	C	80–100+	10YR 5/1† 2.5Y 3/2‡	2, m, sbk	s, sp	a	a	va, an/san	b	9.3	290	4	0.002	8/72/20	380	5/28/53/14
										(0.1)	(42)	(1)	(0.002)	(1/3/2)	(10)	

a) †dry, ‡moist and crushed according to the Munsell charts.

b) 1 = strong, 2 = moderate, vw = very weak, w = weak, vf = very fine, f = fine, m = medium, sg = single grains, gr = granular, abk = angular blocky, sbk = subangular blocky.

c) Consistence: l = loose, fri = friable, fm = firm, s = sticky, p = plastic, np = no plastic, ns = no sticky, ss = slightly sticky, sp = slightly plastic.

d) a = absent, f = few, c = commun, m = many, vf = very fine, fi = fine, me = medium, co = coarse.

e) a = absent, f = few, c = commun, m = many, b = burrows, c = casts (earthworms).

f) a = absent, f = few, c = commun, ab = abundant, vb = very abundant, fi = fine, me = medium, la = large, an = angular, san = subangular, sr = subrounded, bsg = blached sand grains

Relative frequencies (RF) and relative density (RD) for the plant species

Year 0	RF	RD
Trisetum distichophyllum	0.60	0.47
Hieracium pilosella	0.22	0.09
Sesleria albicans	0.10	0.31
Artemisia absinthium	0.07	0.13

Year 4	RF	RD
Salix caprea[a]	n.d.[c]	n.d.
Salix viminalis[a]		
Salix triandra[a]		
Salix purpurea[a]		
Betula pendula[b]		
Trisetum distichophyllum	0.34	0.35
Hieracium pilosella	0.23	0.14
Sesleria albicans	0.12	0.17
Ononis rotundifolia	0.07	0.14
Plantago maritima	0.11	0.05
Anthyllis vulneraria	0.05	0.06
Artemisia absinthium	0.07	0.10

Year 40		RF	RD
	Salix purpurea[a]	n.d.	n.d.
	Betula pendula[b]		
	Salix caprea[a]		
	Salix viminalis[a]		
	Salix triandra[a]		
	Salix reticulata	0.01	0.01
	Alnus glutinosa	0.02	0.01
Querco-Fagetea	*Acer pseudoplatanus*	0.01	0.00
Querco-Fagetea	*Amelanchier ovalis*	0.02	0.01
Prunetalia	*Rosa canina*	0.04	0.02
Prunetalia	*Hippophae rhamnoides*	0.01	0.03
Vaccinio-Piceion[d]	*Sorbus aucuparia*	0.04	0.01
Vaccinio-Piceion[d]	*Clematis alpina*	0.03	0.00
Vaccinio-Piceion[d]	*Calamagrostis villosa*	0.05	0.07
Ononido-Pinion[d]	*Ononis rotundifolia*	0.01	0.03
Vaccinio-Piceetea[d]	*Larix decidua*	0.04	0.01
Vaccinio-Piceetea[d]	*Juniperus communis*	0.05	0.02
Seslerion variae[d]	*Plantago maritima*	0.02	0.01
Elyno-Seslerietea[e]	*Sesleria albicans*	0.02	0.04
Elyno-Seslerietea[e]	*Aster alpinus*	0.04	0.03
Elyno-Seslerietea[e]	*Carduus defloratus*	0.04	0.02
Arrhenatheretalia[f]	*Trifolium pratense*	0.06	0.12
Arrhenatheretalia[f]	*Campanula scheuchzeri*	0.05	0.01
Arrhenatheretea[f]	*Briza media*	0.06	0.10
Festucetalia valesiacae[g]	*Artemisia absinthium*	0.01	0.02
Festuco-Brometea[g]	*Anthyllis vulneraria*	0.01	0.01
Festuco-Brometea[g]	*Carex humilis*	0.02	0.02
Festuco-Brometea[g]	*Euphorbia cyparrissias*	0.02	0.01
Nardo-Callunetea[g]	*Hieracium pilosella*	0.04	0.03

[a] 4 cuttings m^{-2} of *Salix* were planted; [b] 1 rooted plant m^{-2} of *Betula* was planted; [c] Not detected; [d] Group 1; [e] Group 2; [f] Group 3; [g] Group 4.

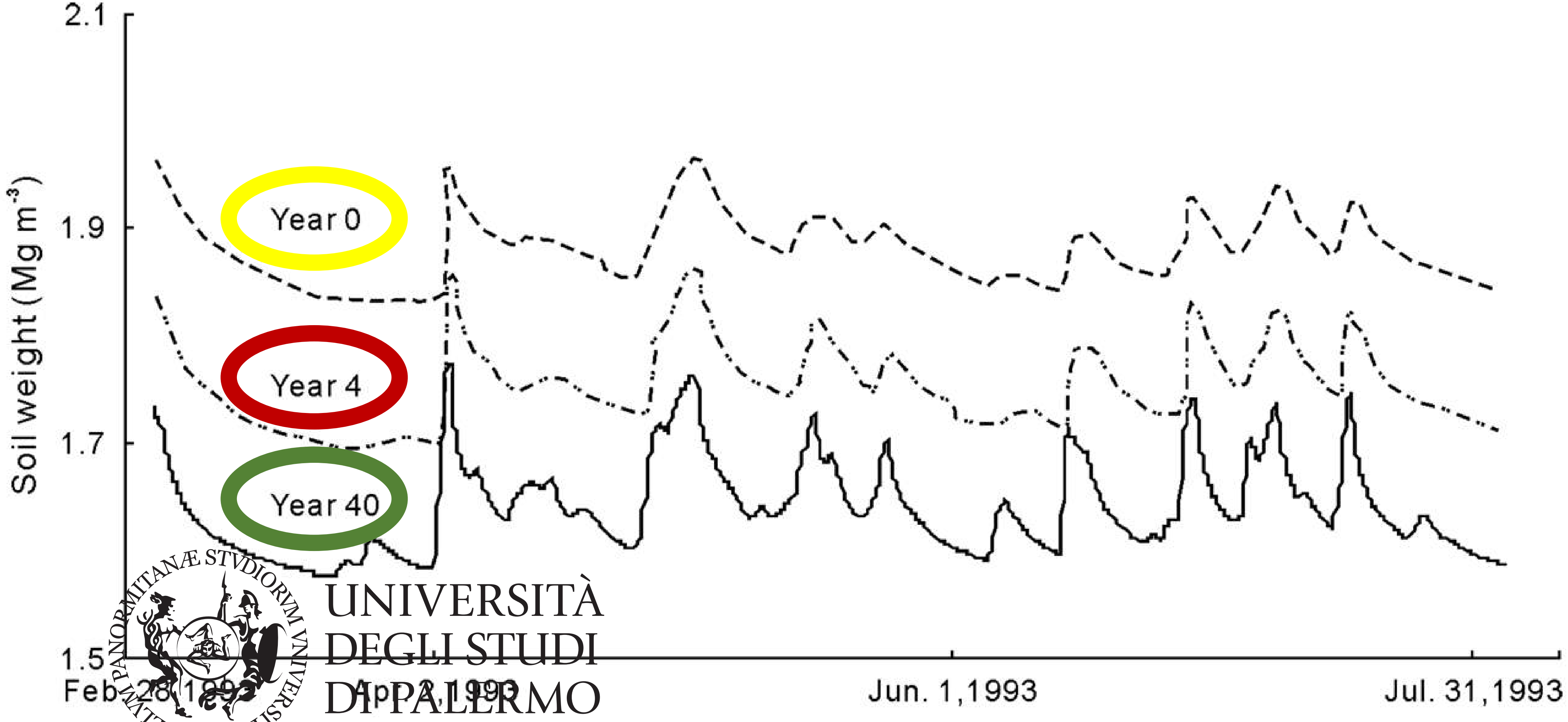
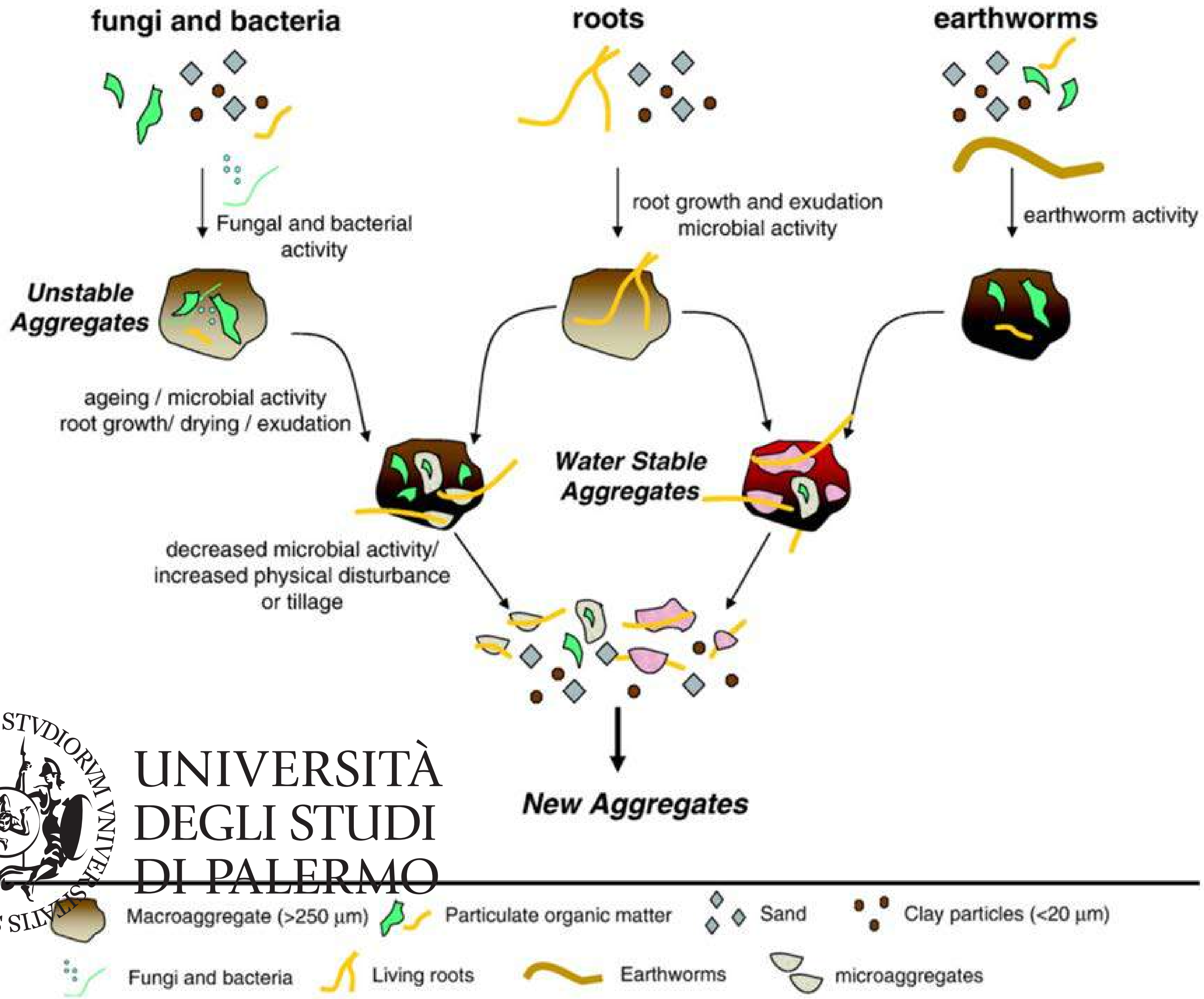


Fig. 2 Comparison of the soil weights, as simulated by the model ADHYDRA, during the period with significative meteoric inputs from February 28 to July 31, 1993.

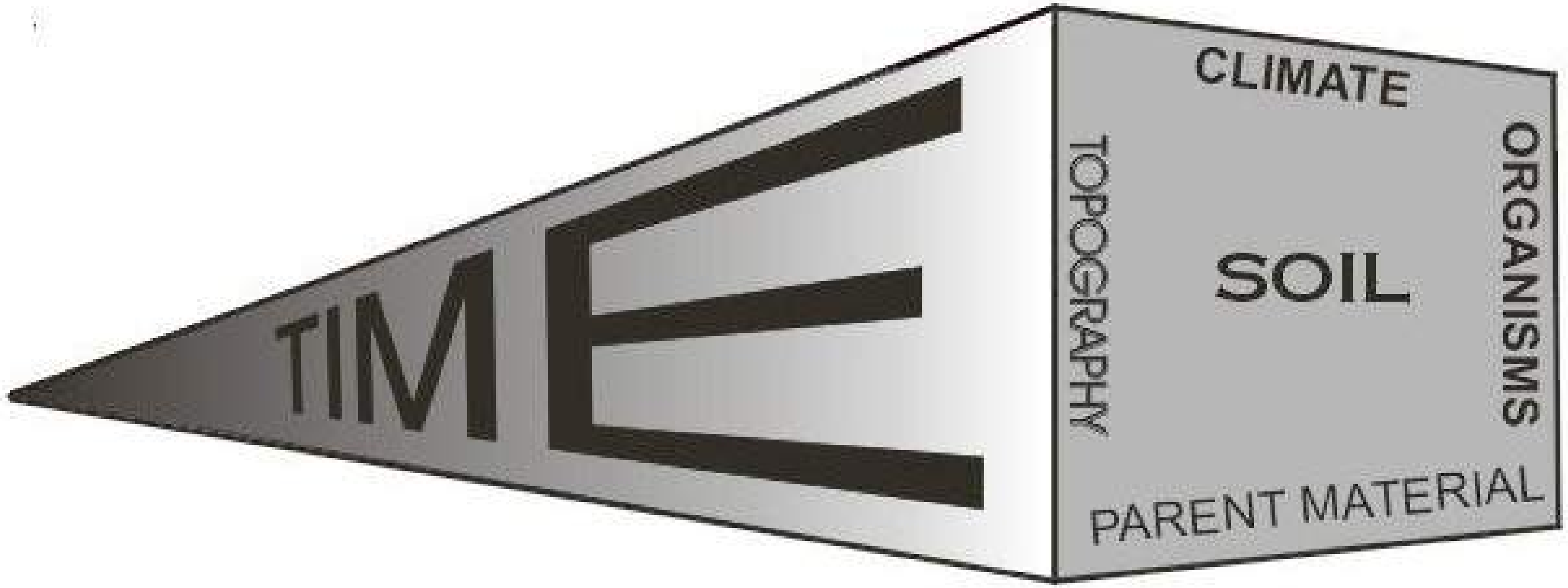
doi> 10.1016/S1002-0160(08)60082-X



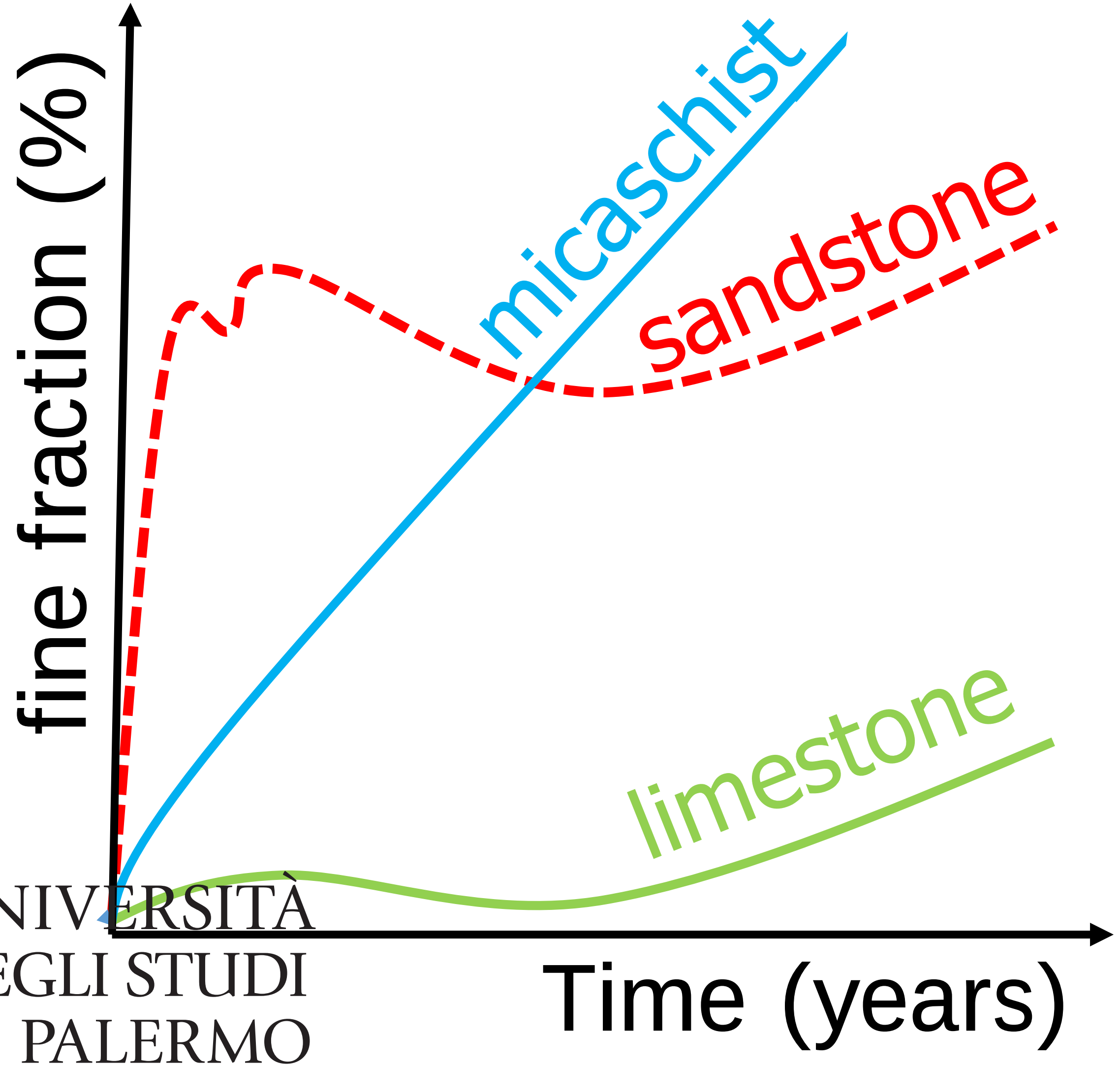
UNIVERSITÀ
DEGLI STUDI
DI PALERMO

doi> 10.1016/j.ecolecon.2007.03.004

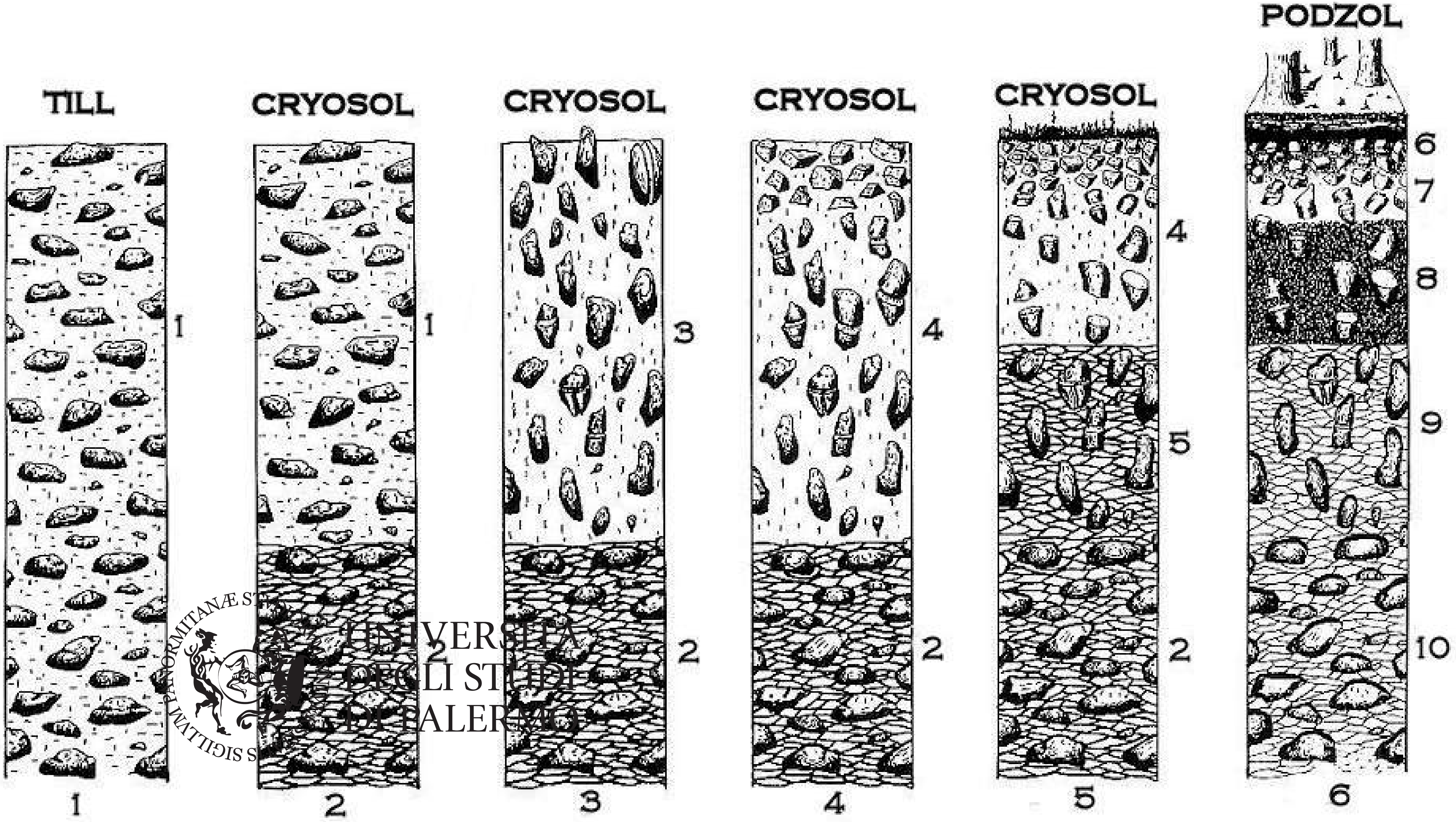

UNIVERSITÀ
DEGLI STUDI
DI PALERMO
45°38’N 7°53’E 1750 m a.s.l.



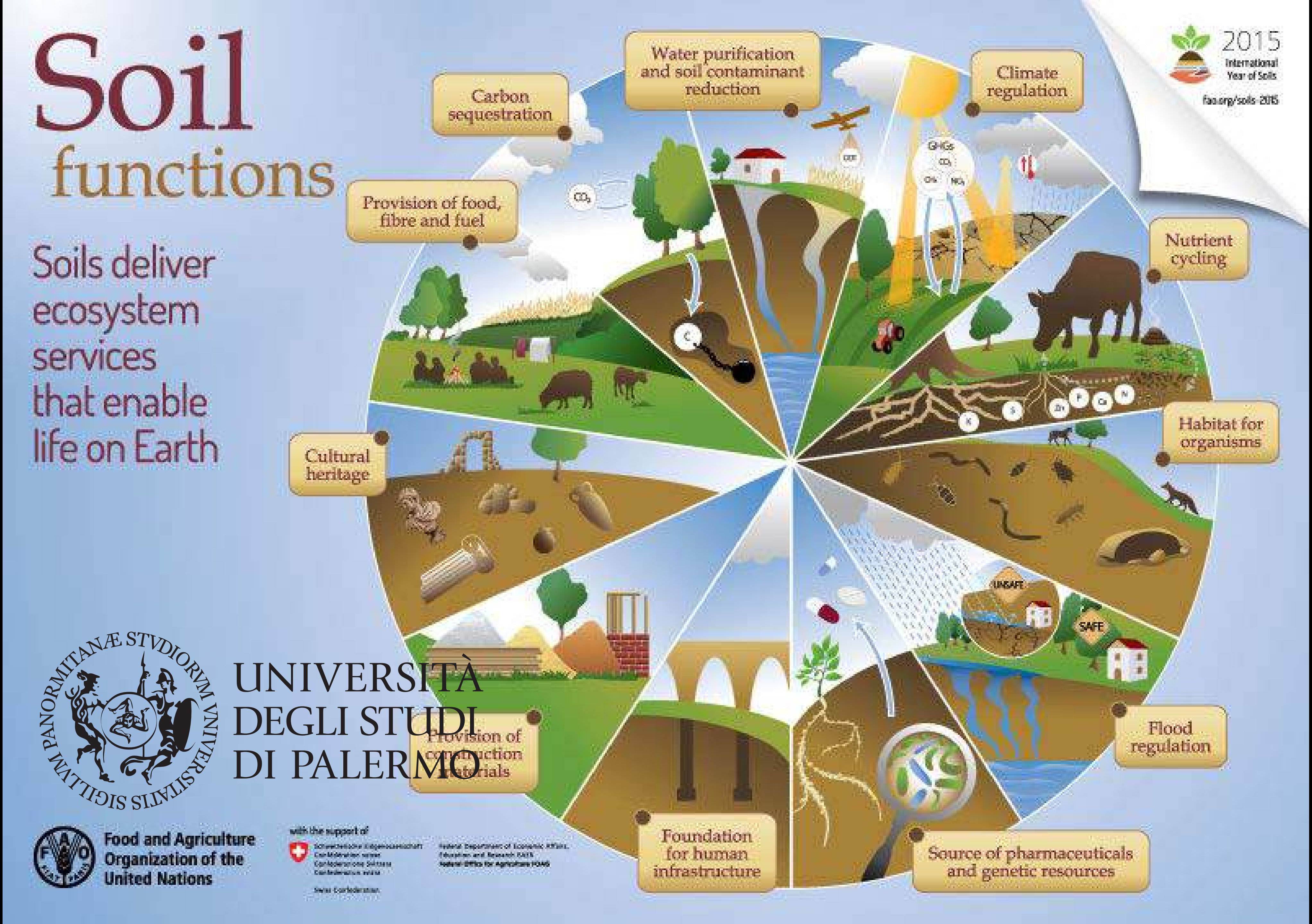
doi>10.1017/CBO9780511535802.014



UNIVERSITÀ
DEGLI STUDI
DI PALERMO

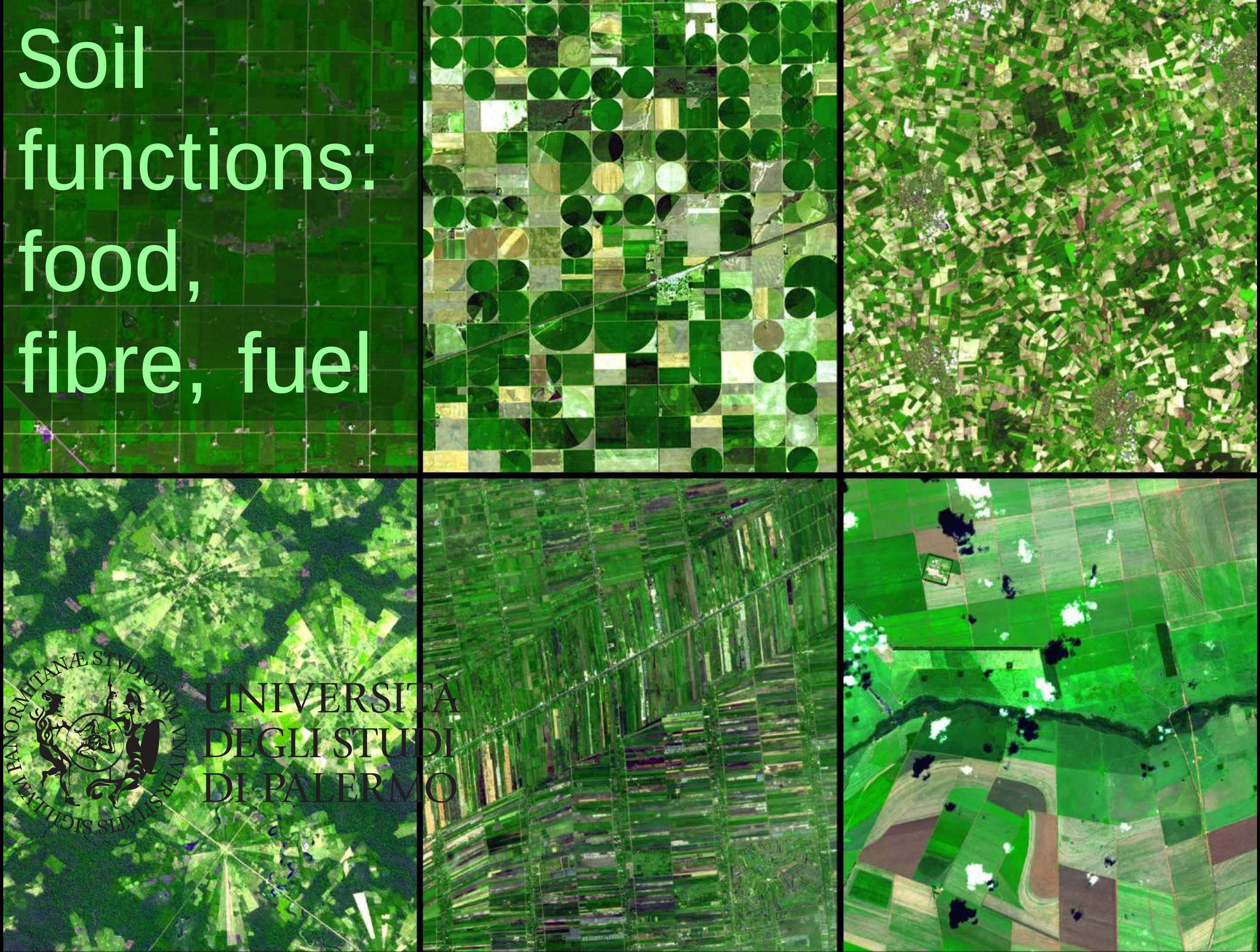


doi> 10.1017/CBO9780511535802.014

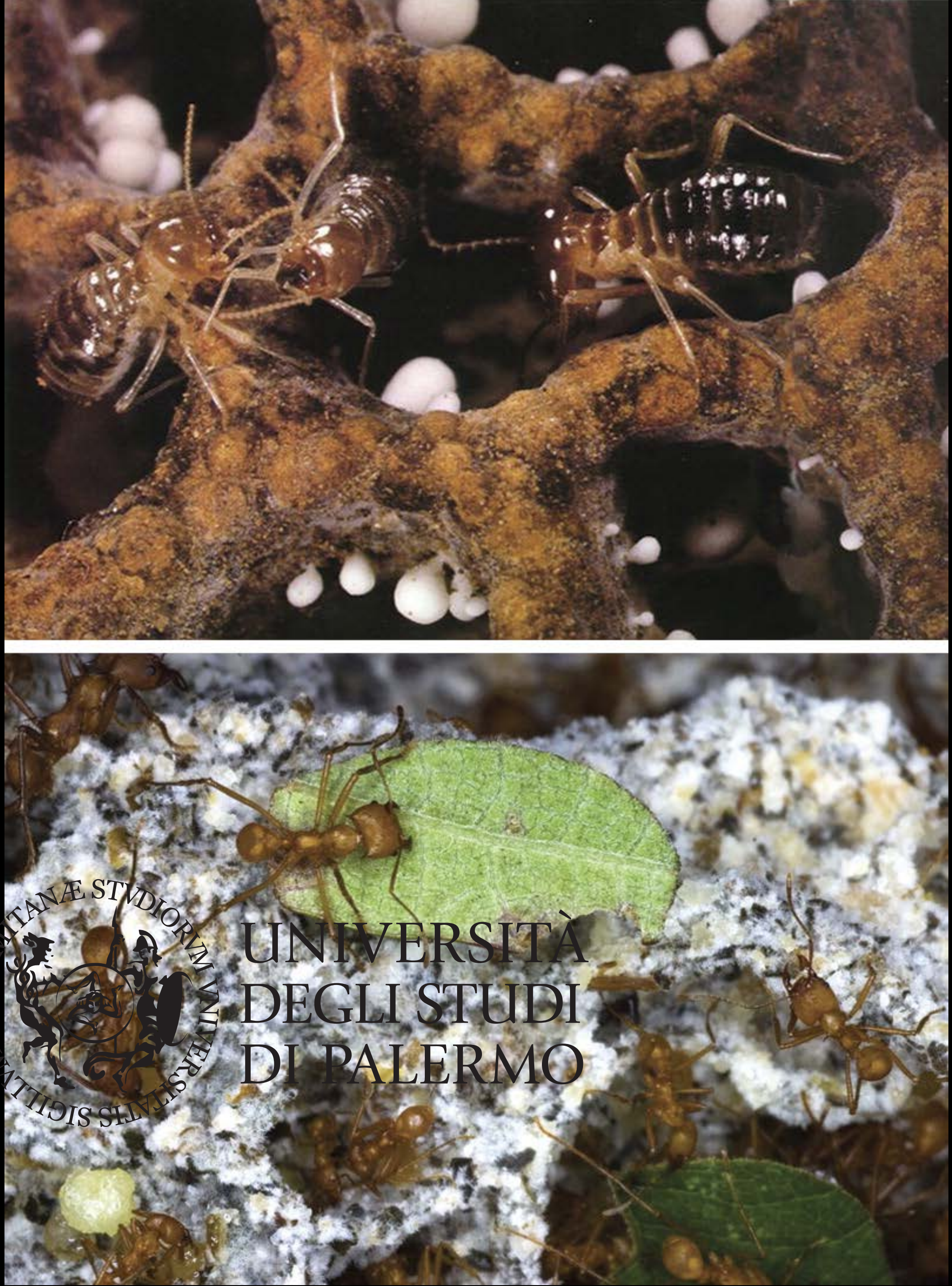


UNIVERSITÀ DEGLI STUDI DI PALERMO

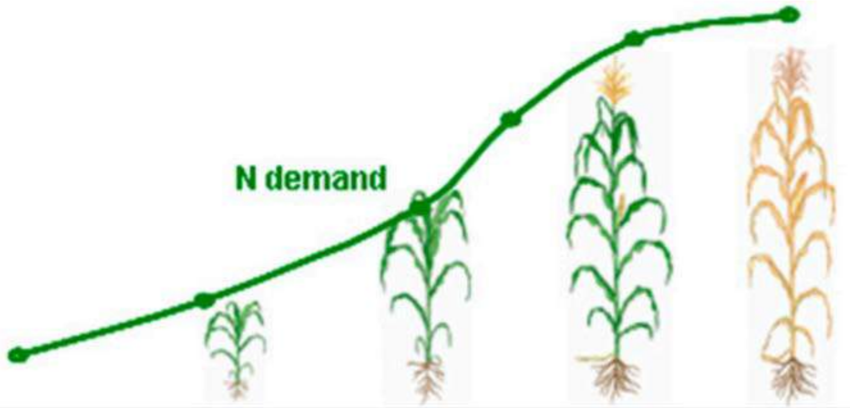
Soil functions: food, fibre, fuel



UNIVERSITÀ DEGLI STUDI DI PALERMO



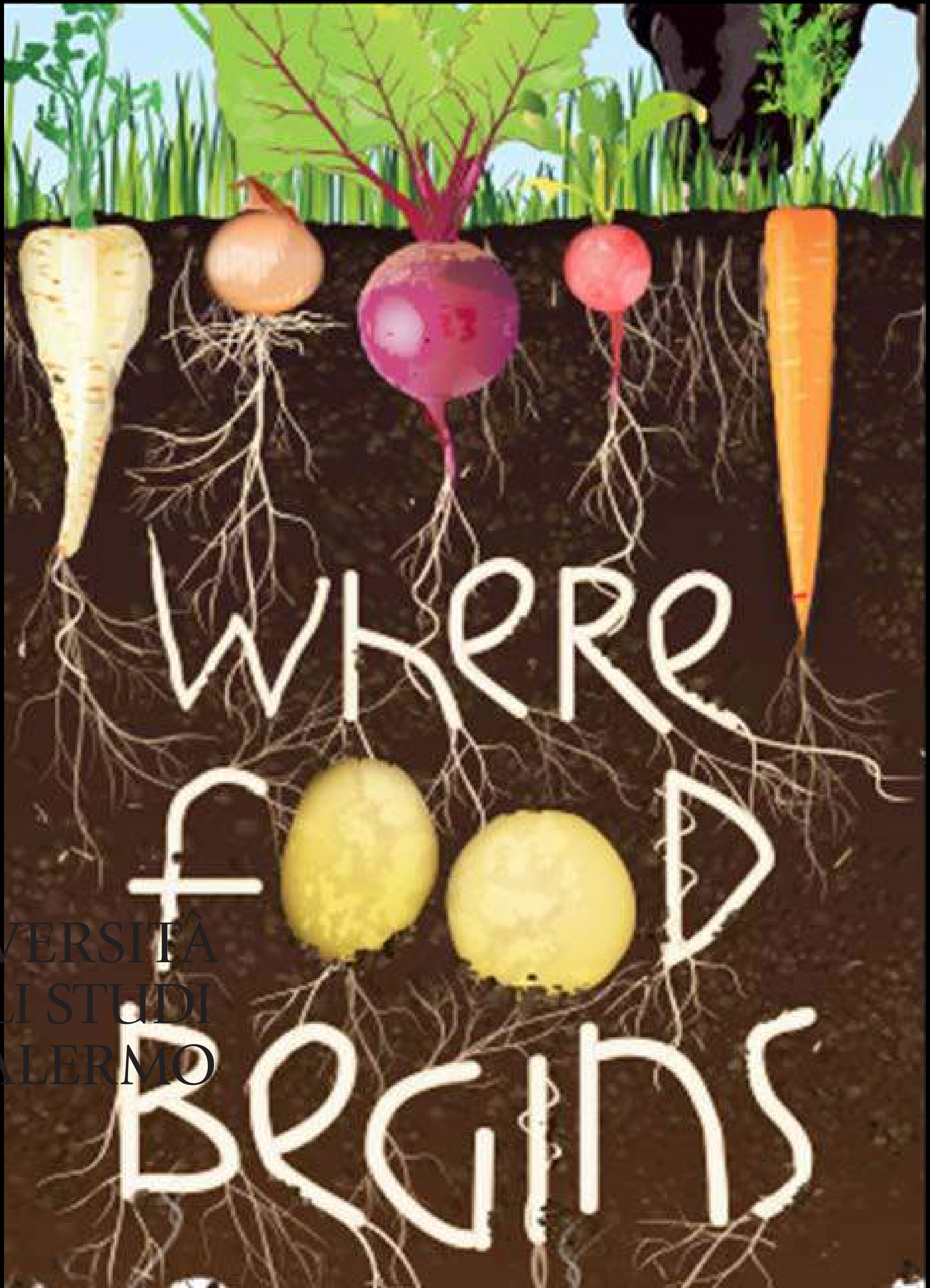
doi> 10.1016/j.cub.2006.11.016



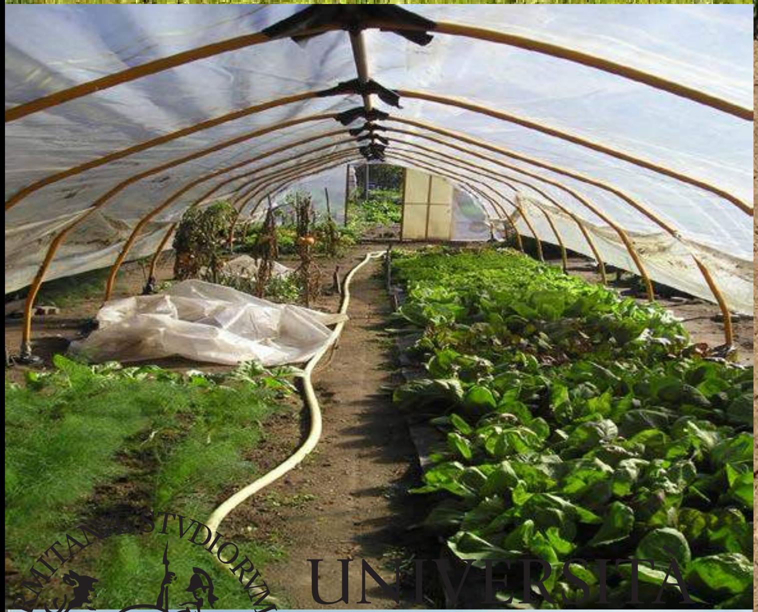
Growing stage	Planting-V_6	V_6-V_{10}	V_{10}-R_1	R_1-R_2	R_2-R_6
Depth of root-zone (cm)	0-30	0-60	0-90	0-90	0-90
Target N value (kg N ha^{-1})	80	130	130	140	120
N fertilizer rate (kg N ha^{-1})	68	52	30	30	45

UNIVERSITÀ DEGLI STUDI DI PALERMO

doi> 10.1073/pnas.1101419108


Where
food
Begins

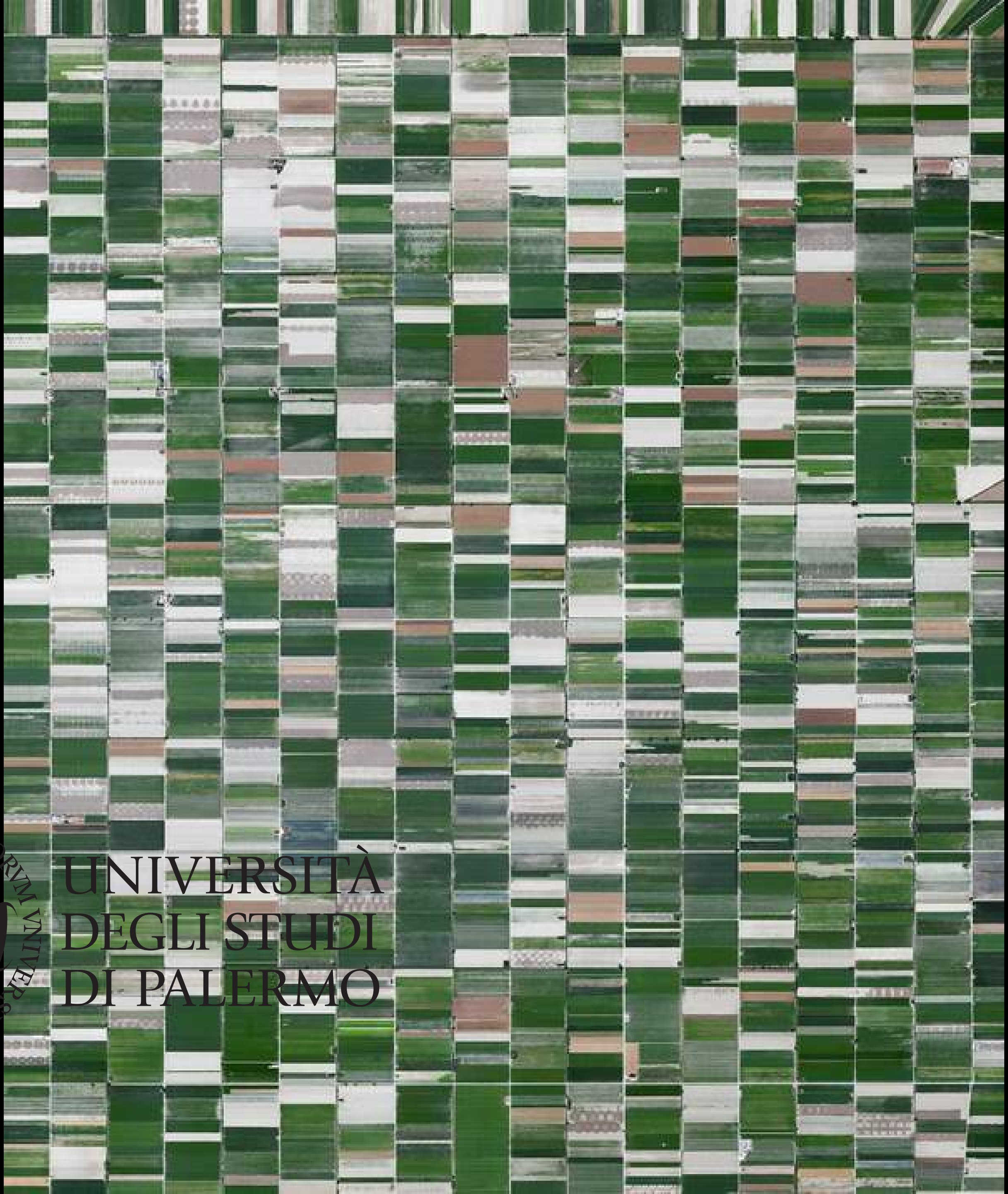
production function



UNIVERSITÀ DEGLI STUDI DI PALERMO

producing crops



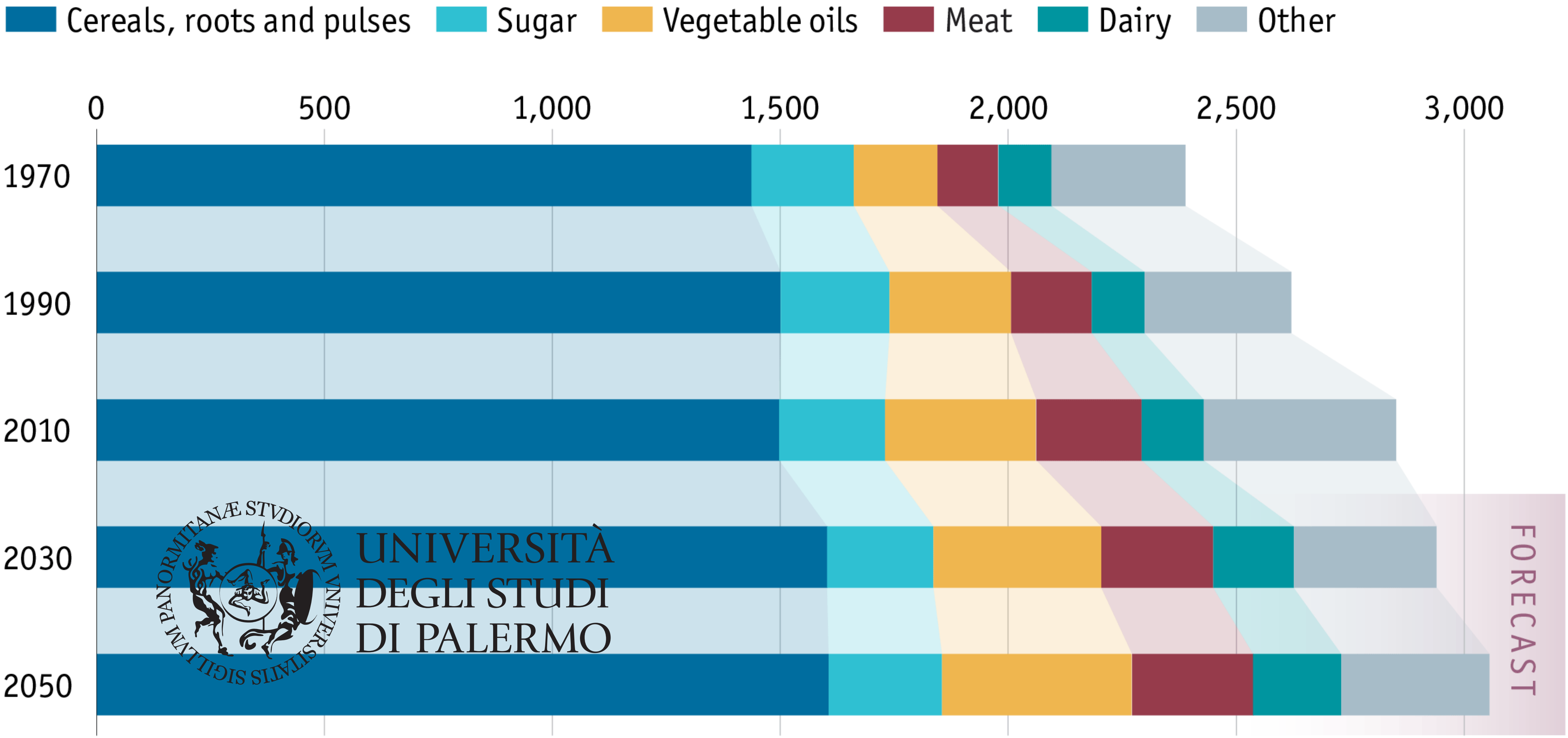
Fucino
41.995, 13.547222

Albenga

44.049985, 8.216569

What’s on the world’s menu

Daily calories per person by type of food



Source: FAO

ISBN 978-92-5-108993-4

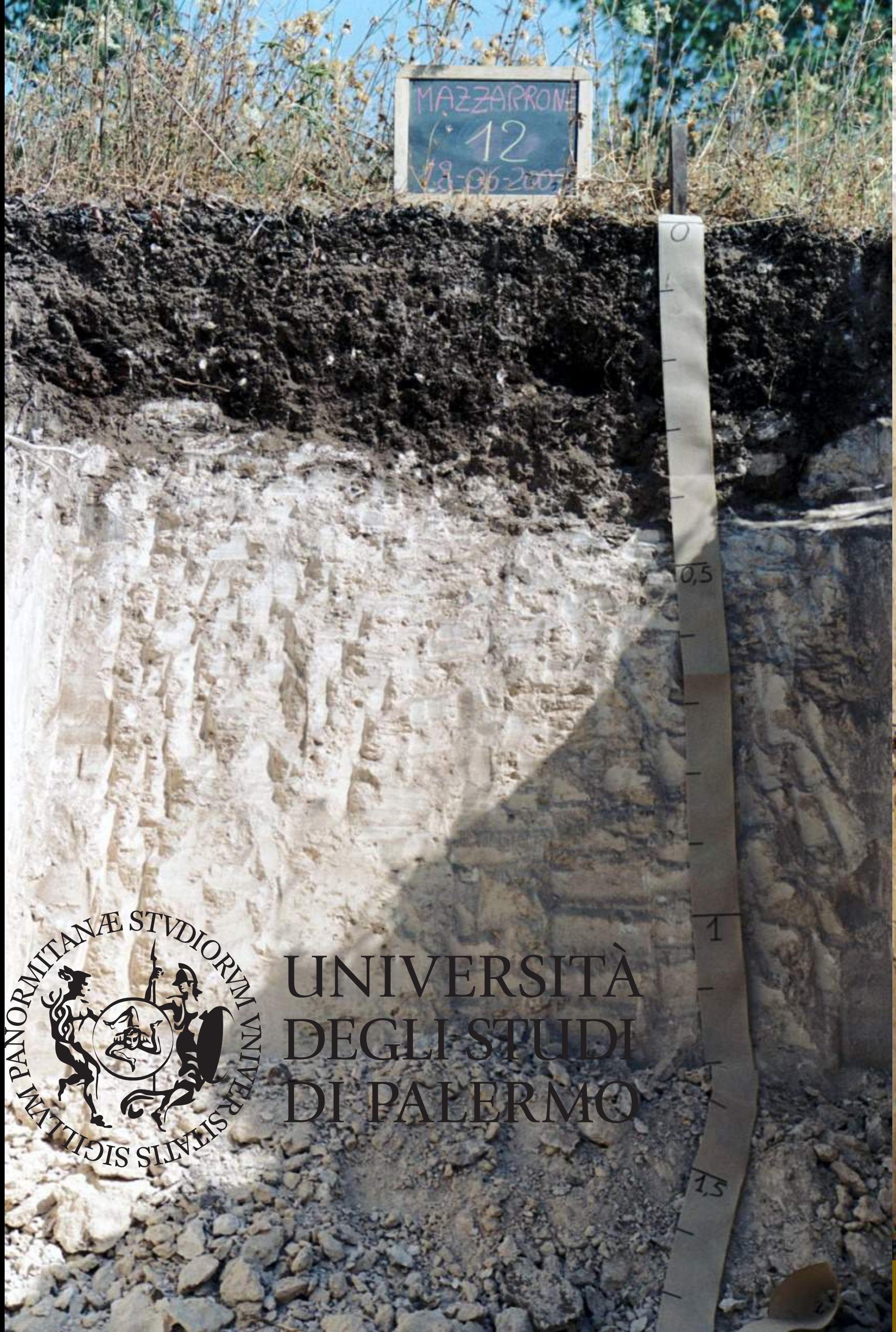
Image Francesco Malucelli

45.02°N
6.95°E

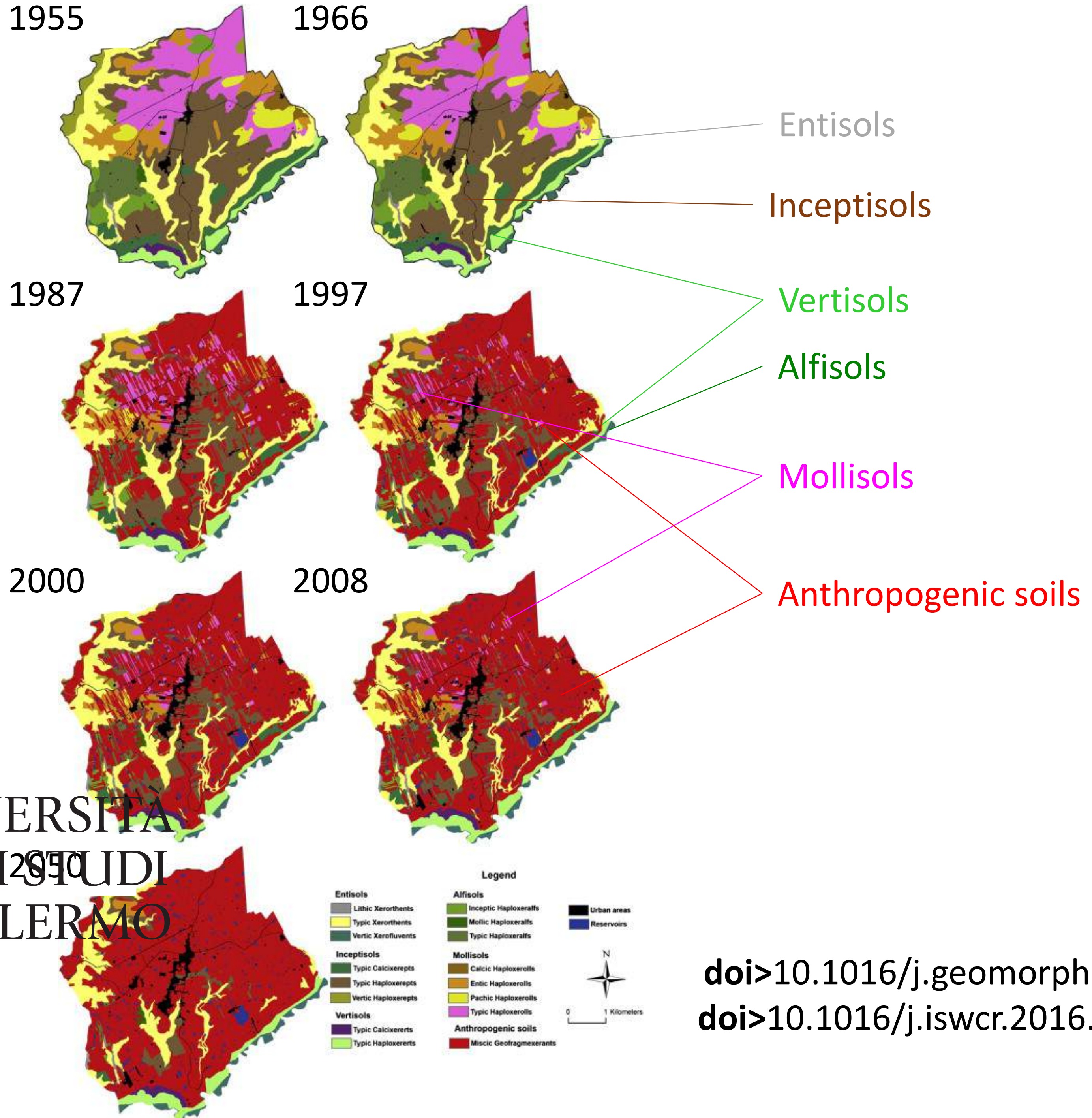

UNIVERSITÀ
DEGLI STUDI
DI PALERMO

UNIVERSITÀ
DEGLI STUDI
DI PALERMO

37.0849°N 14.5590°E



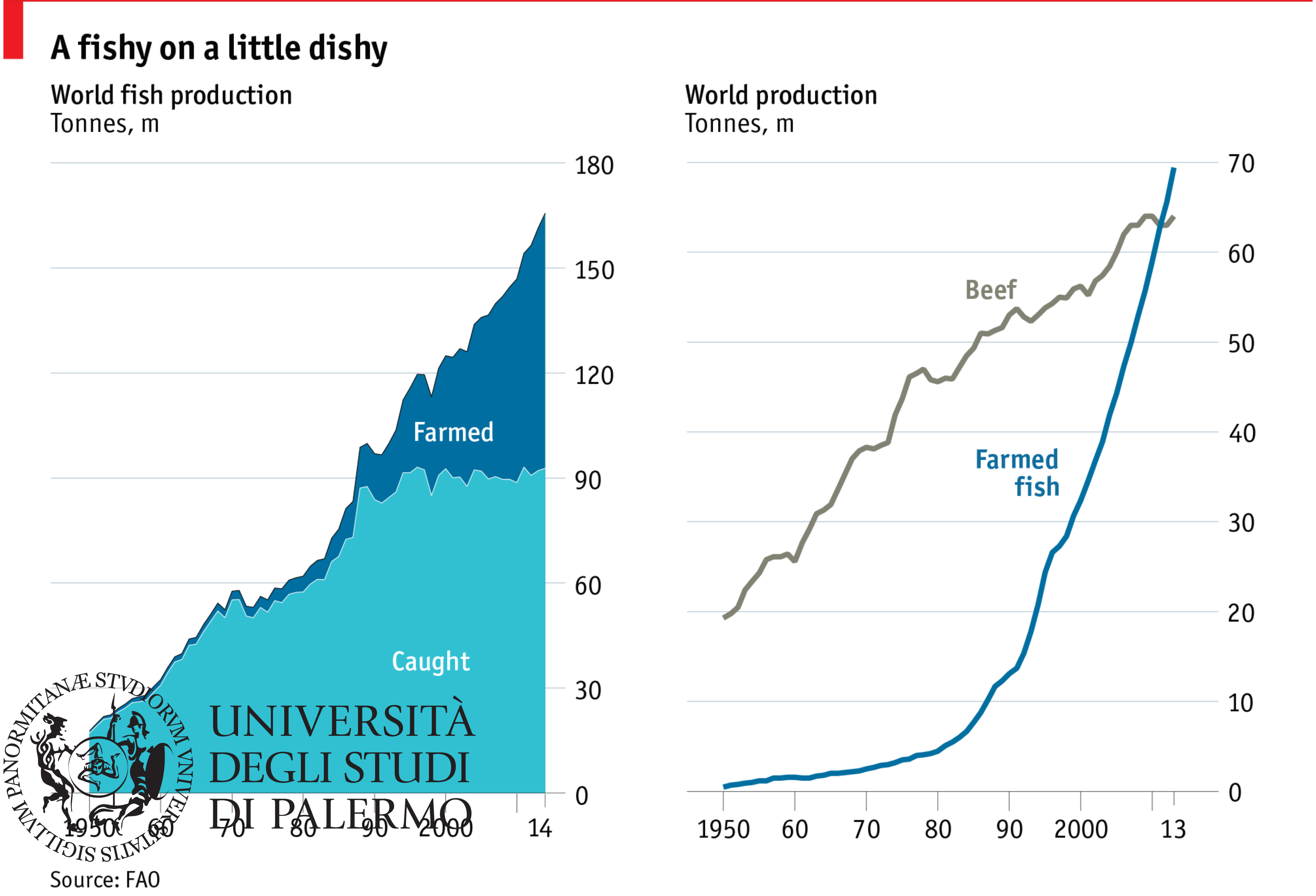
doi> 10.1016/j.jas.2009.06.025



UNIVERSITÀ
DEGLI STUDI
DI PALERMO

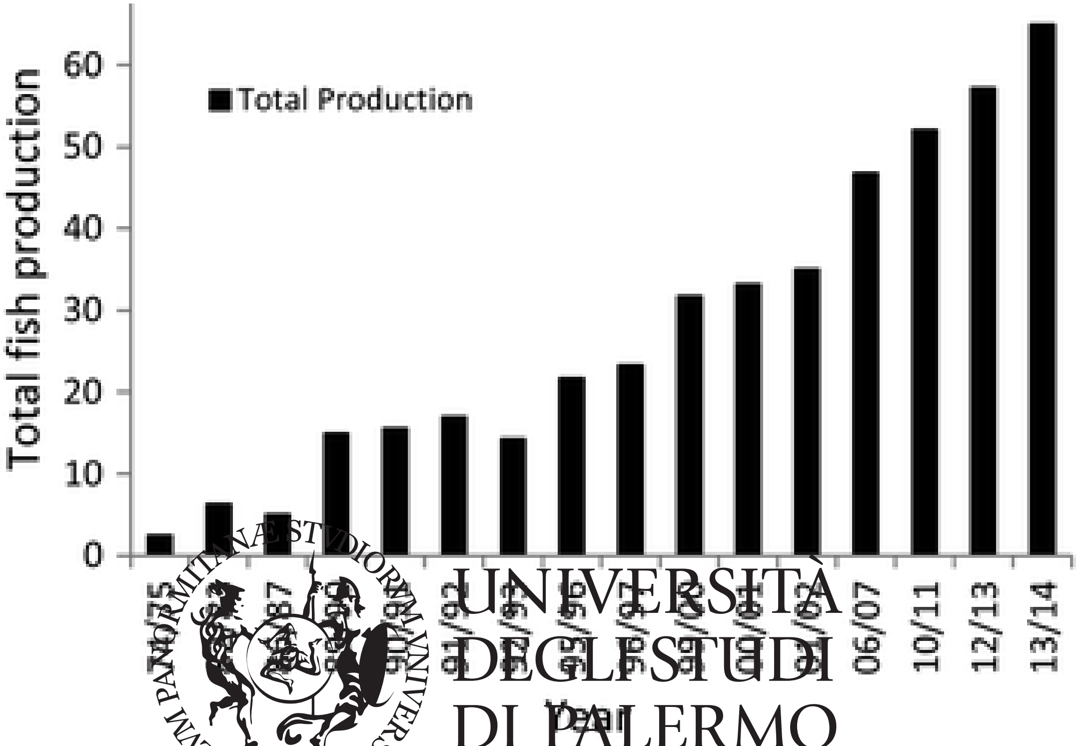
doi>10.1016/j.geomorph.2011.02.015
doi>10.1016/j.iswcr.2016.01.001

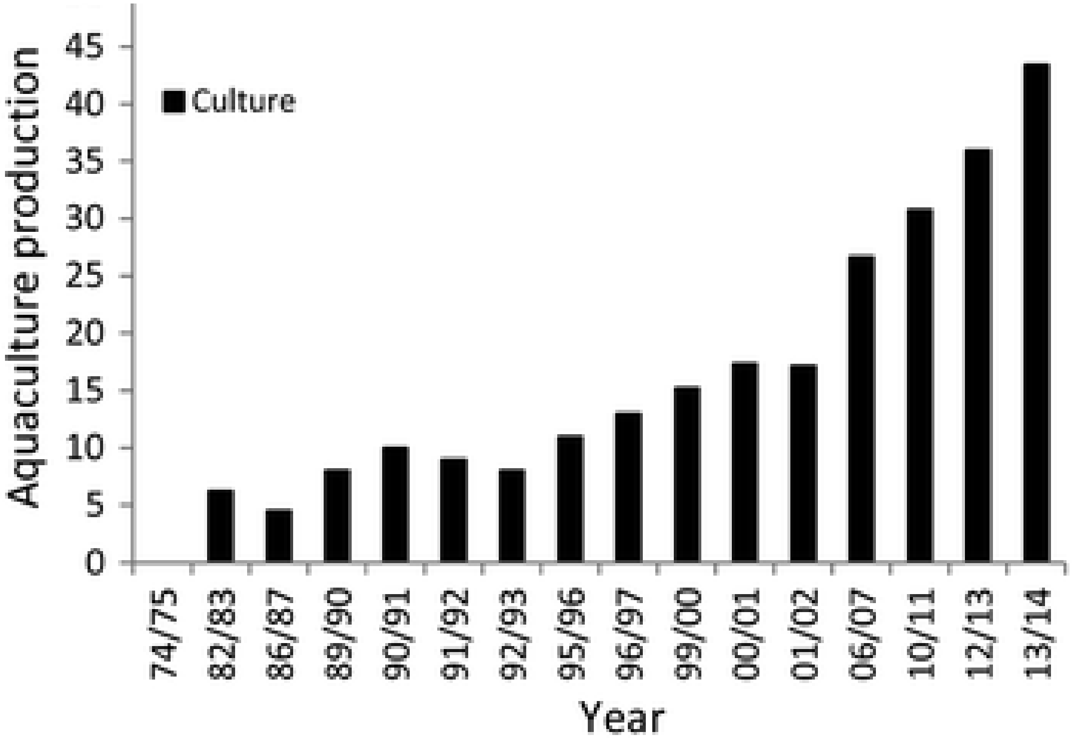

Food and Agriculture Organization of the United Nations
FIAT PANIS
HEALTHY SOIL IS THE KEY TO FOOD SECURITY AND NUTRITION FOR ALL
95%
OF OUR FOOD
COMES FROM OUR SOIL
World Soil Day
5 December



http://www.economist.com/printedition/2016-06-11

Total fish production in Nepal
'000 metric tonnes

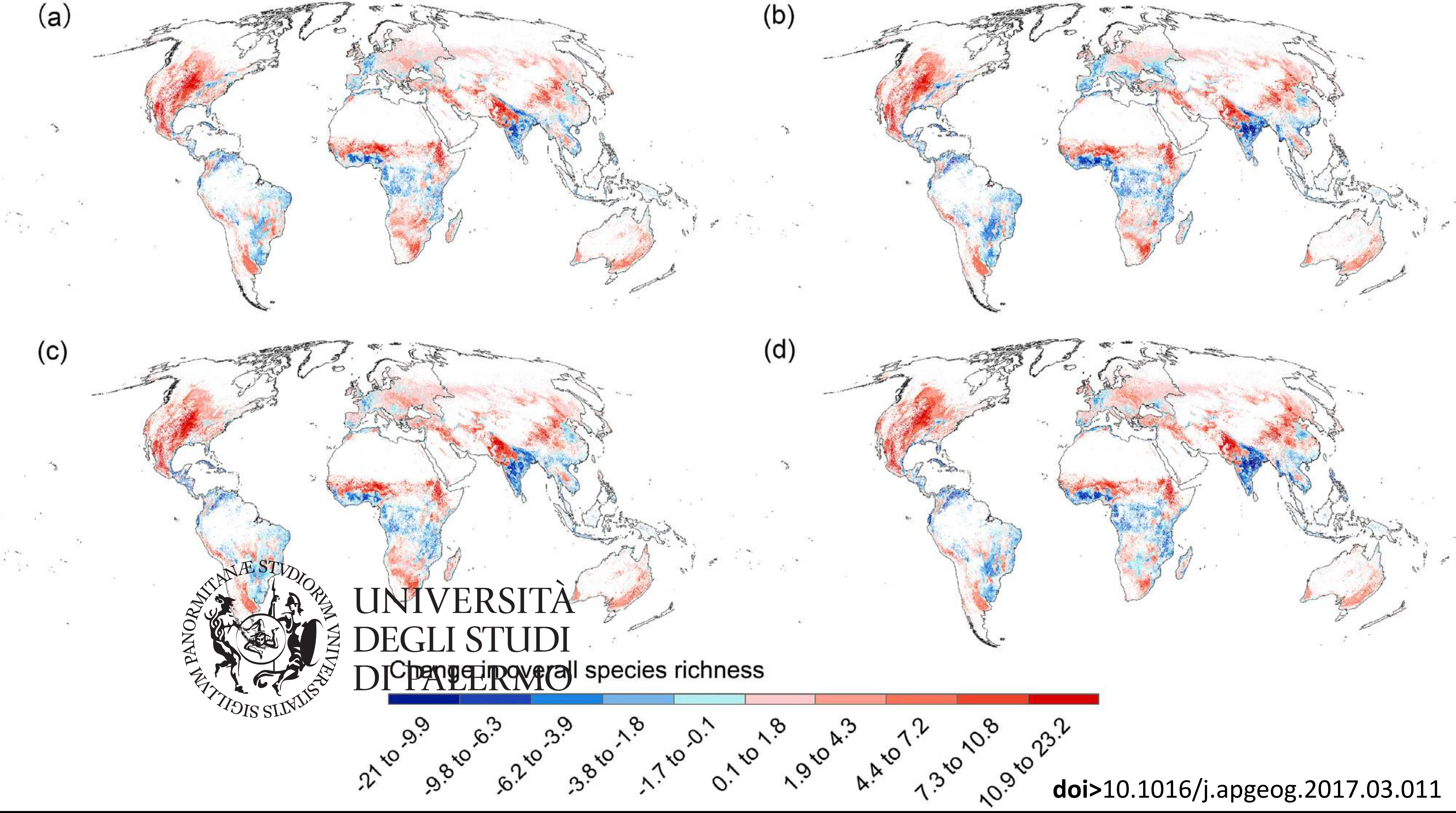




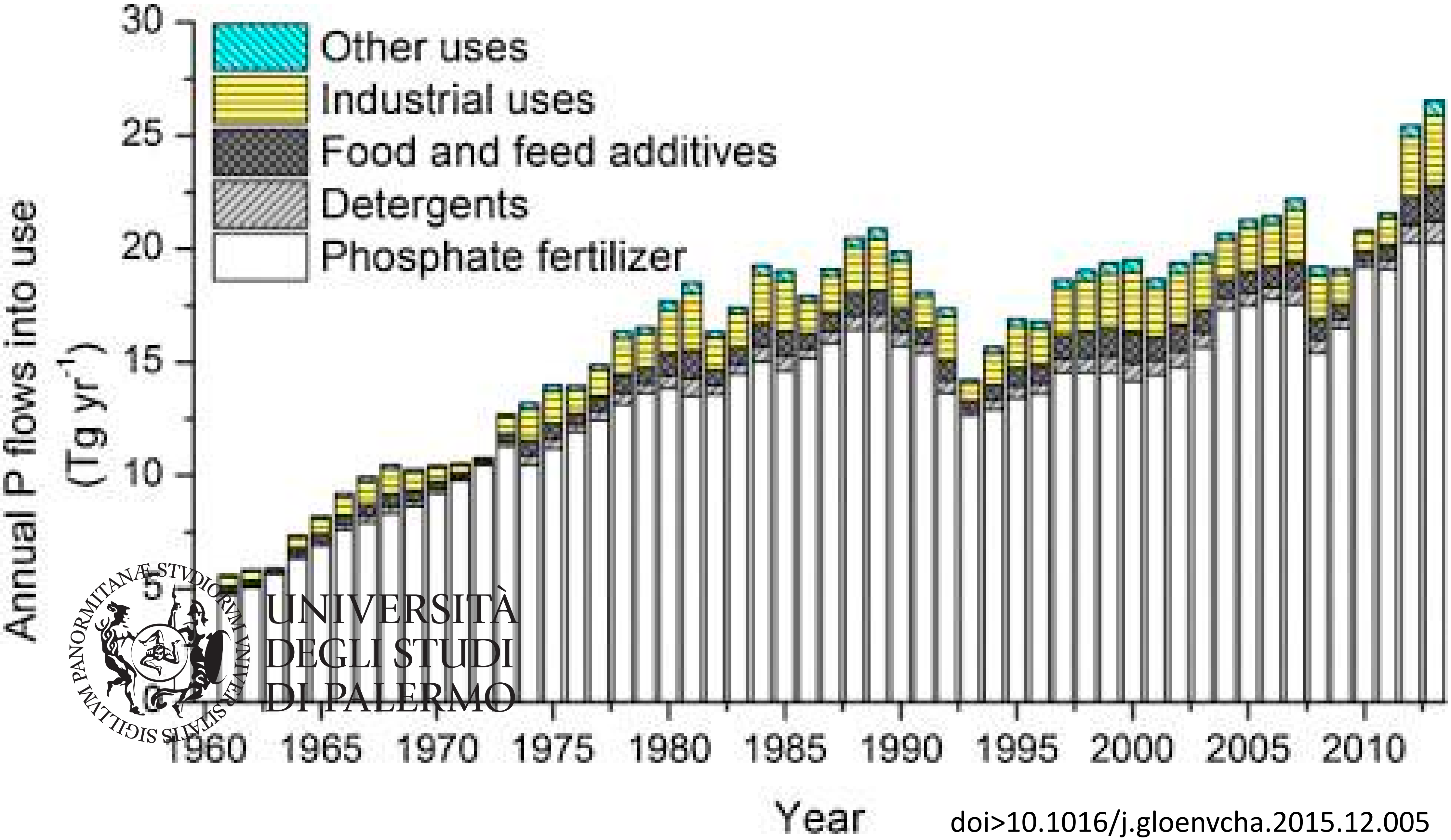
UNIVERSITÀ
DEGLI STUDI
DI PALERMO

doi> 10.1186/s40066-016-0063-7

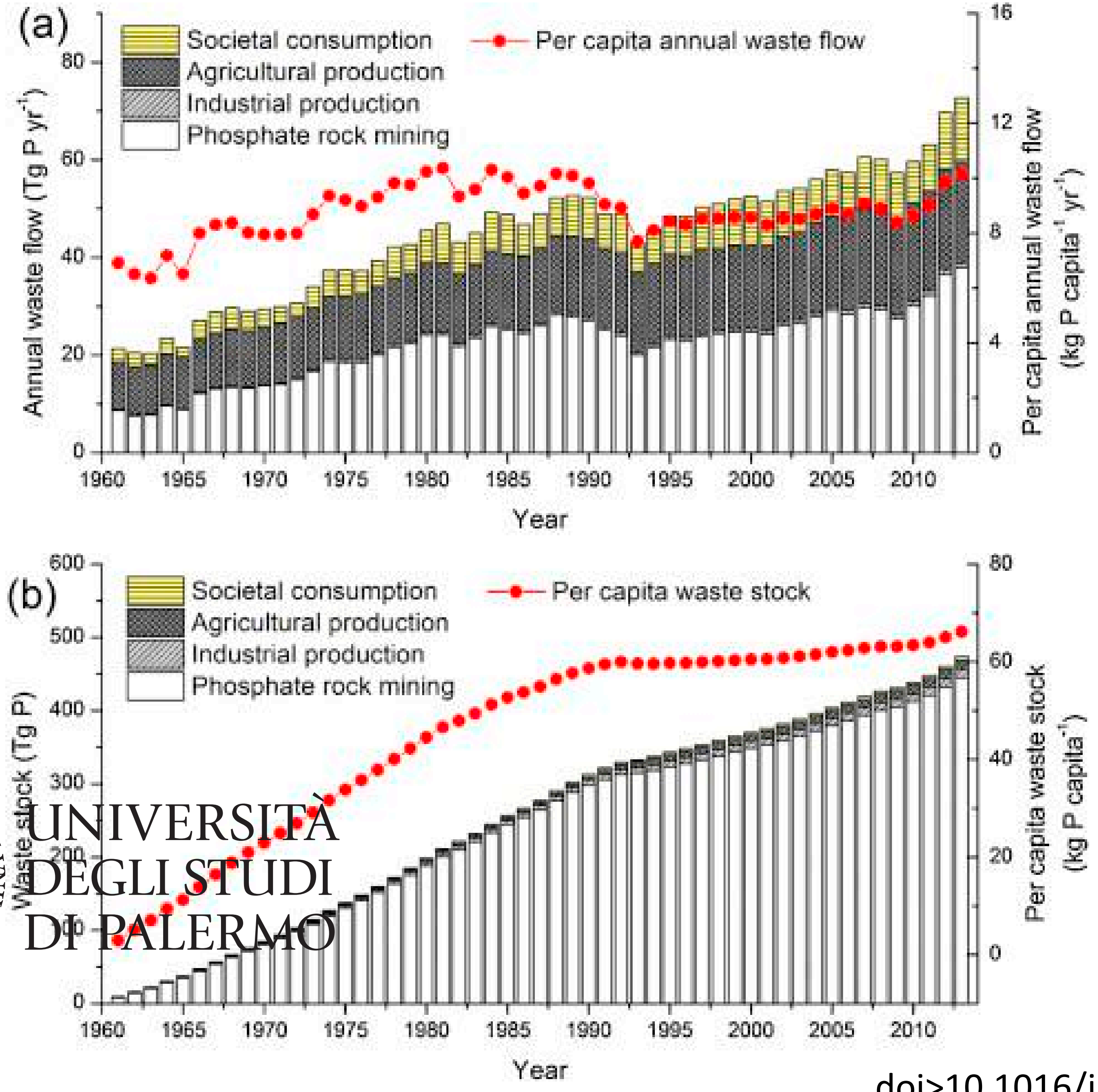
Photographs Francis Gako



doi>10.1016/j.apgeog.2017.03.011



doi>10.1016/j.gloenvcha.2015.12.005



UNIVERSITÀ
DEGLI STUDI
DI PALERMO

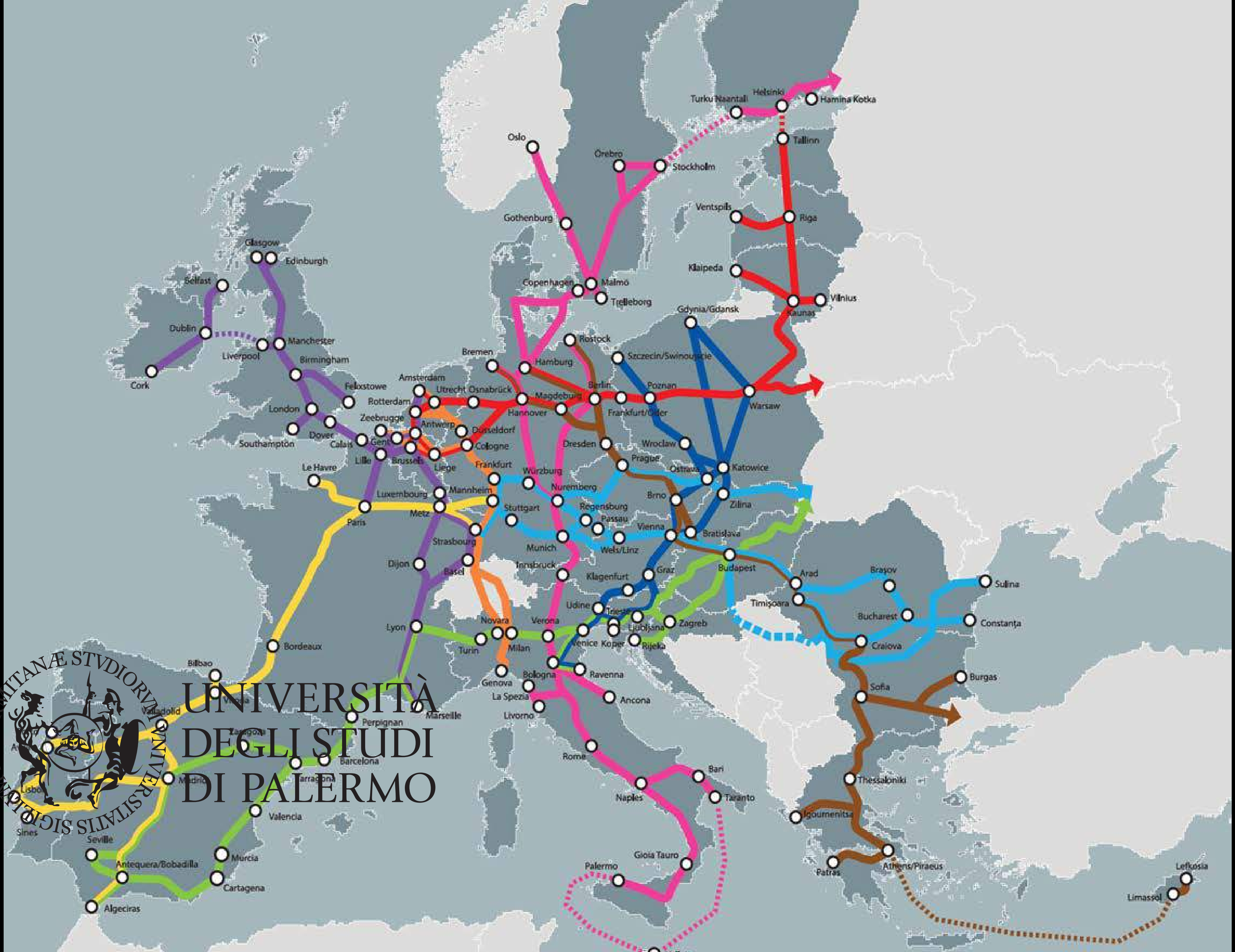
doi>10.1016/j.gloenvcha.2015.12.005

carrier function

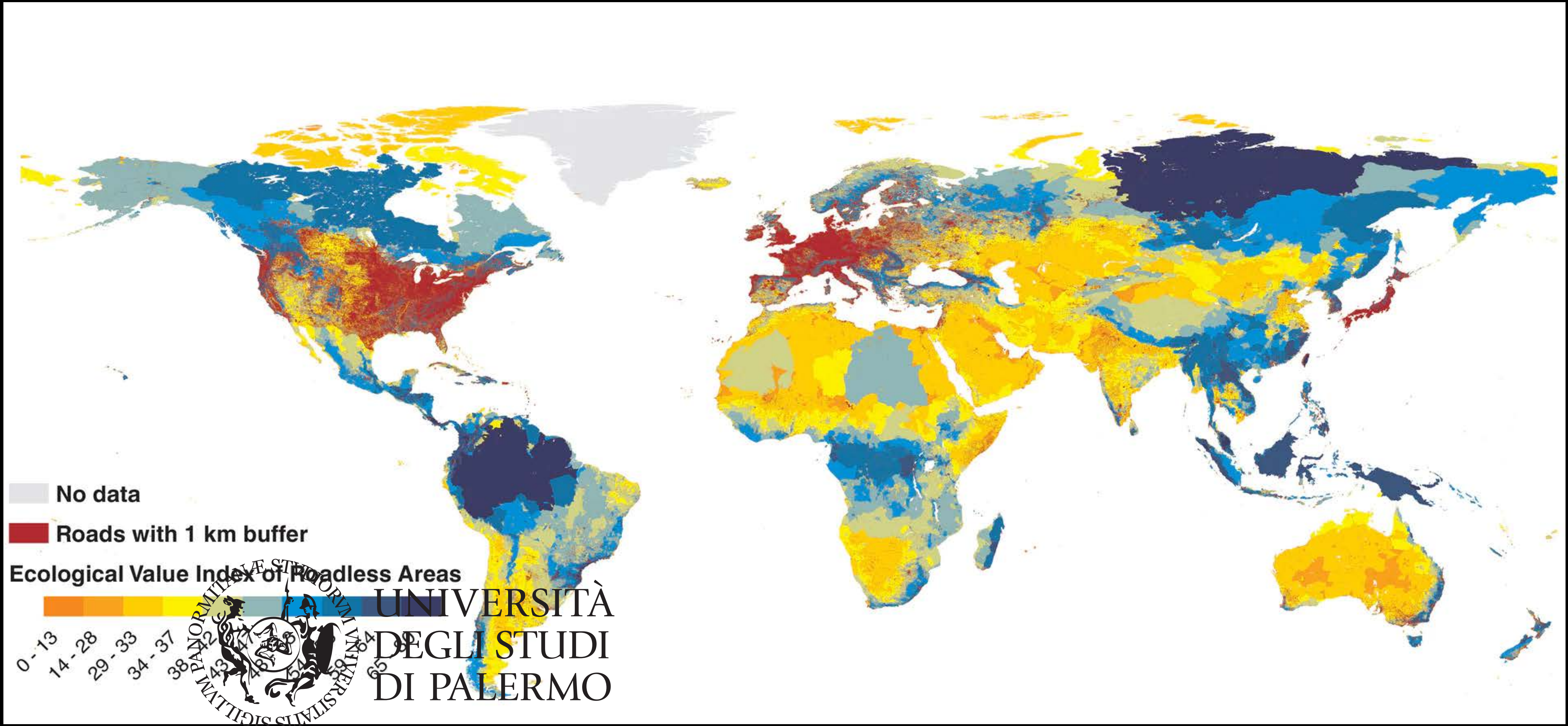
UNIVERSITÀ
DEGLI STUDI
DI PALERMO

bearing traffic and buildings

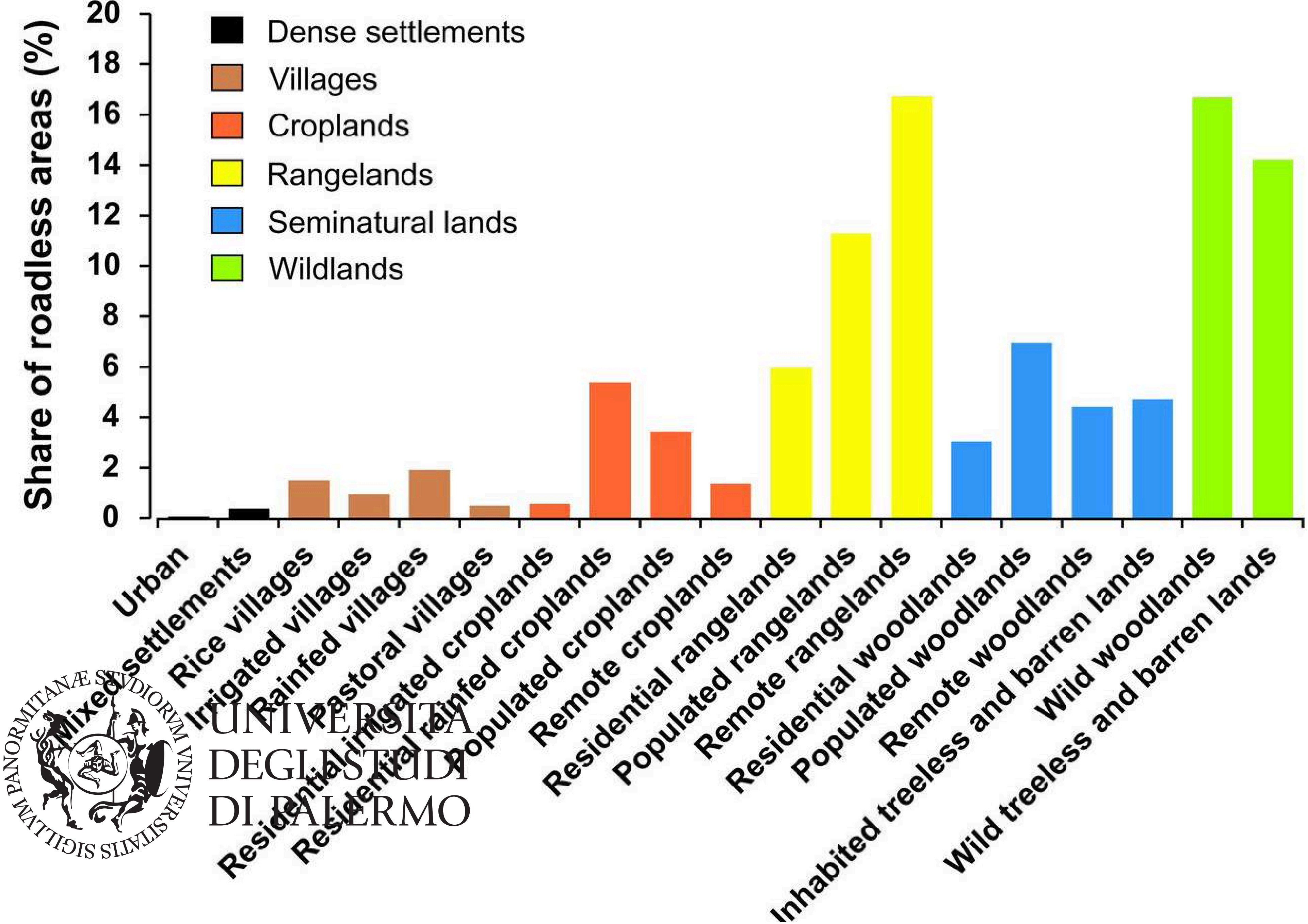

23°36’35’’S 46°43’28’’W

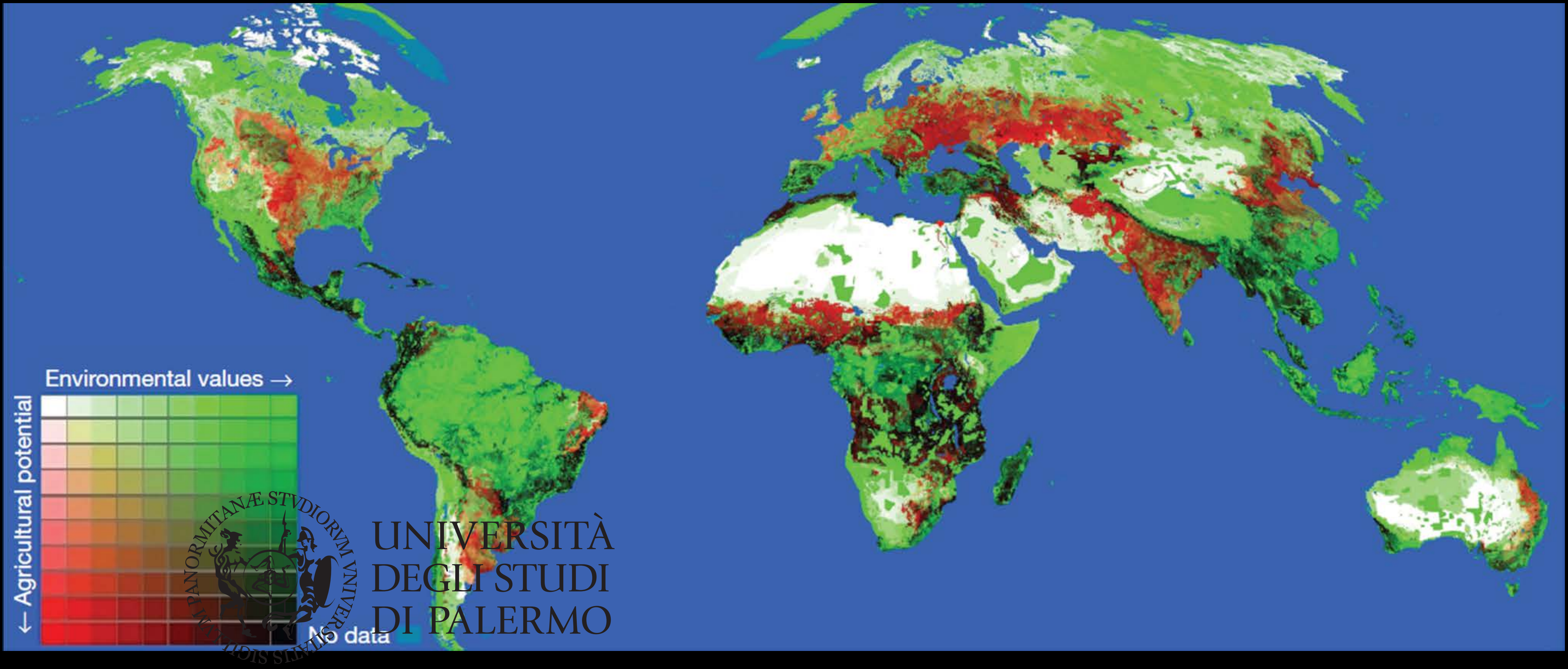


UNIVERSITÀ
DEGLI STUDI
DI PALERMO



doi> 10.1126/science.aaf7166


Share of roadless areas (%)
20
18
16
14
12
10
8
6
4
2
0
Dense settlements
Villages
Croplands
Rangelands
Seminatural lands
Wildlands
Urban
Mixed settlements
Rice villages
Irrigated villages
Rainfed villages
Pastoral villages
Residential irrigated croplands
Residential rainfed croplands
Populated croplands
Remote croplands
Residential rangelands
Populated rangelands
Remote rangelands
Residential woodlands
Populated woodlands
Remote woodlands
Inhabited treeless and barren lands
Wild woodlands
Wild treeless and barren lands



doi> 10.1038/nature13717

Infographic Land Trust Alliance

UNIVERSITÀ
DEGLI STUDI
DI PALERMO

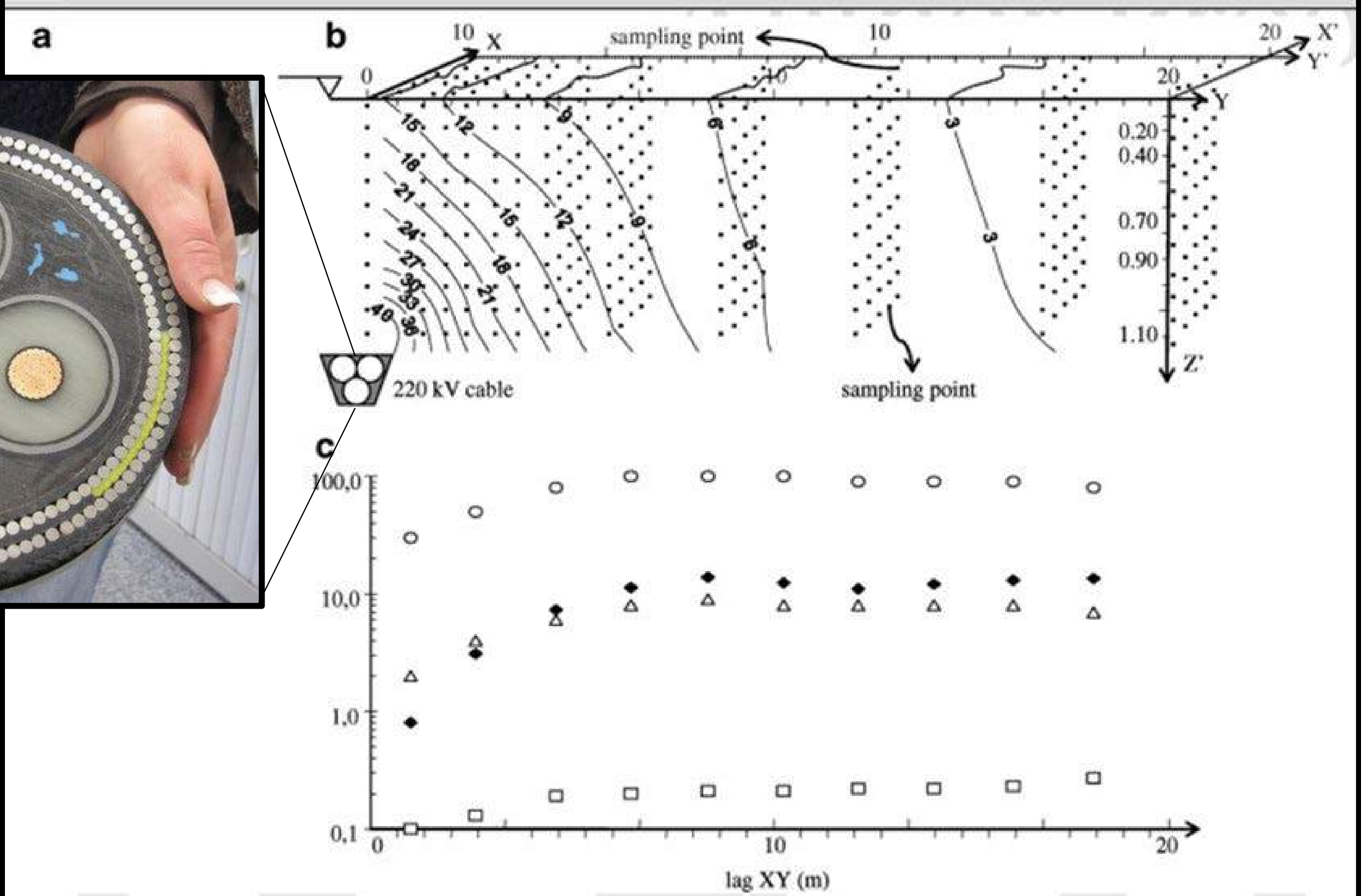
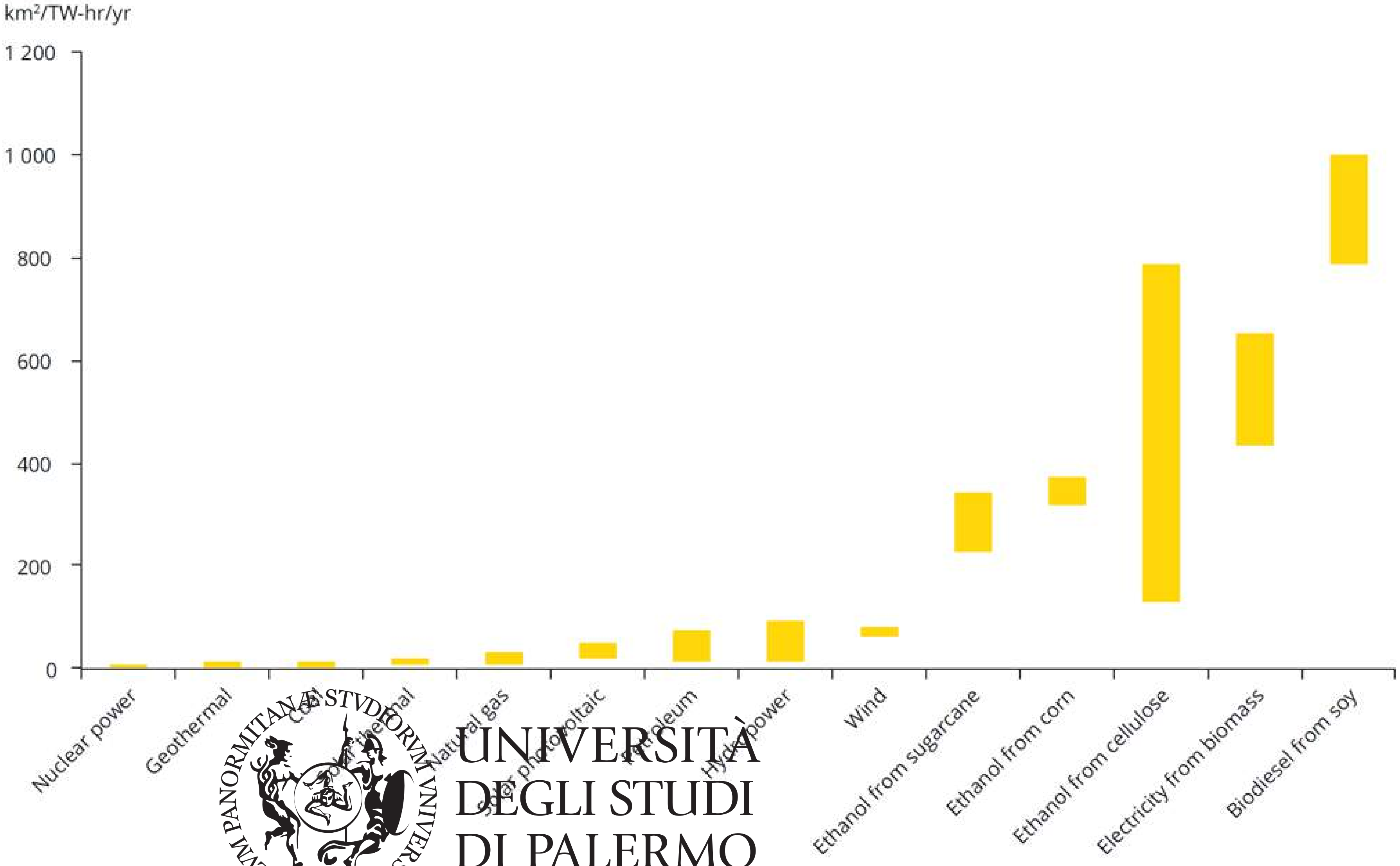


Fig. 1. (a) Sampling area (Biella, IT, 45 33′01′N, 8 03′54″E, 275 m a.s.l.). Lines indicate cables (full line is the underground 220–380 kV operative cable) and boxes the two sampling areas (white operative cable, pale gray unoperative). The area is grazed (permanent meadow, *Poa pratense*, *Lolium perenne*, *Phleum pratense*, *Dactylis glomerata*, *Bromus inermis*, *Festuca* spp., *Trifolium repens*, *Trifolium pratense*, *Medicago sativa*, *Plantago minor*, *Plantago major*, *Bellis perennis*, *Capsella bursa pastoris*), parent material is alluvium and soil classification is fine mesic Aquollic Hapludalf [NRCS-USDA, 2006]. Climate temperature (mean annual air temperature is 6.8 °C and mean annual rainfall is 1300 mm), pedoclimate is udic and mesic. (b) Sampling scheme. Individual sampled points (n = 480 at each cable) are shown. The horizontal distances (XY plane) are metrical, while the vertical distances (XZ plane) are decimetrical. Dotted lines indicated the kriged contour maps of measured MF (μT) at the 220 kV operative cable. MFs have been measured by a Wandel and Goltermann EFA-3 (operative ranges from 5nT to 10 mT and from 0.1 V/m to 100 kV/m). (c) Operative Cable. Semivariance (dissimilarity) of the MF, (−μT), ◆, against the proxy properties of the soil biological activity: OC (g/kg), ○, total nitrogen (g/kg), △, adenosintriphosphate (mg/kg), □. Lag vector represents separation between two spatial locations, here lag XY measure the directional (W 0°) horizontal distance (m) from the cable at the soil surface (0–20 cm).

UNIVERSITÀ
DEGLI STUDI
DI PALERMO

doi> 10.1002/bem.20367

Figure 4.6 Land-use intensity for energy production/conservation techniques



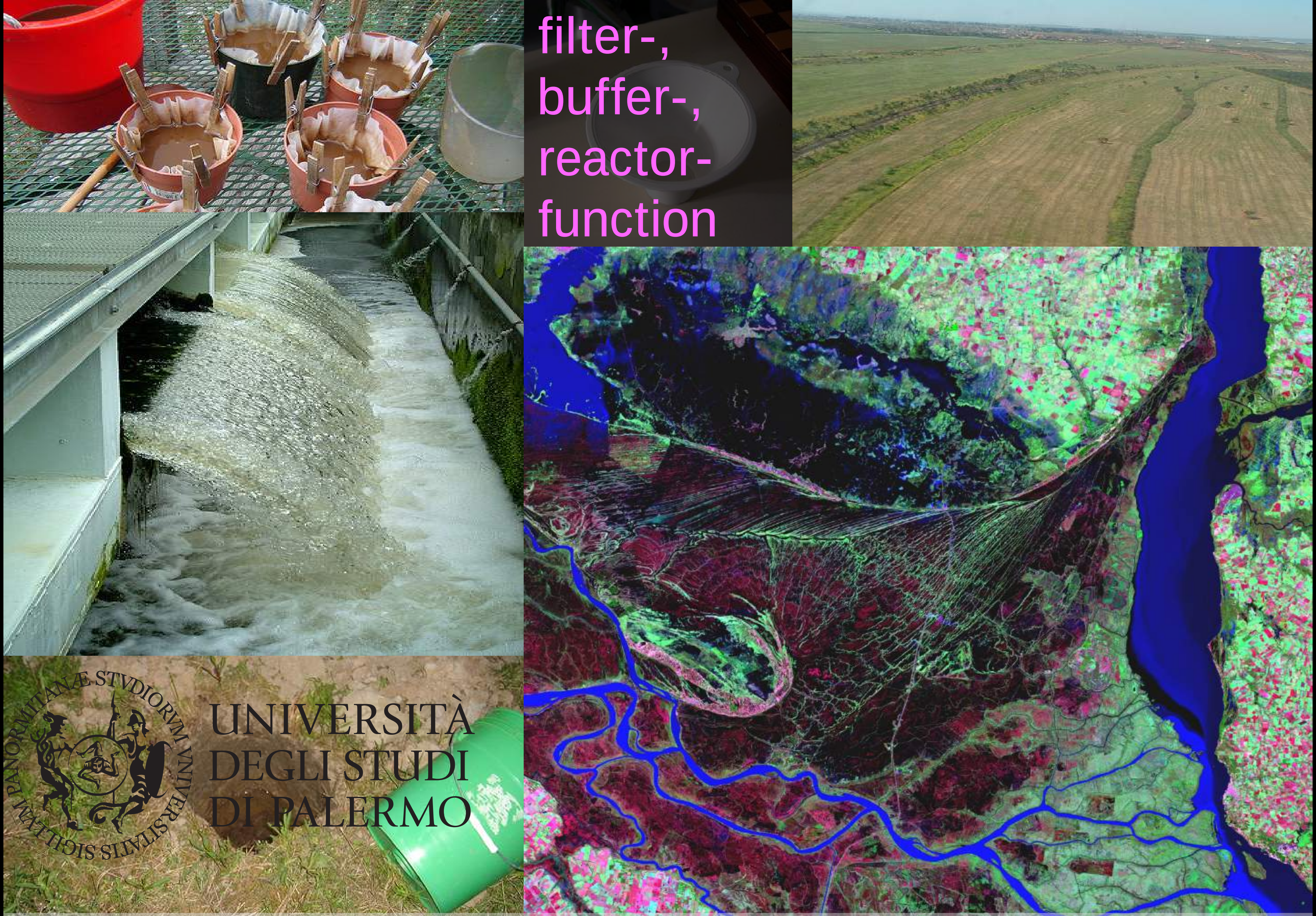
UNIVERSITÀ DEGLI STUDI DI PALERMO

Note: The values shown are for 2010, as measured in km² of impact area in 2030 per terawatt-hour produced/conserved in that year (km²/TW-hr/yr). Error bars show the most compact and least compact estimates of plausible current and future levels of land-use intensity. The numbers provided are the midpoint between the high and low estimates for different techniques.

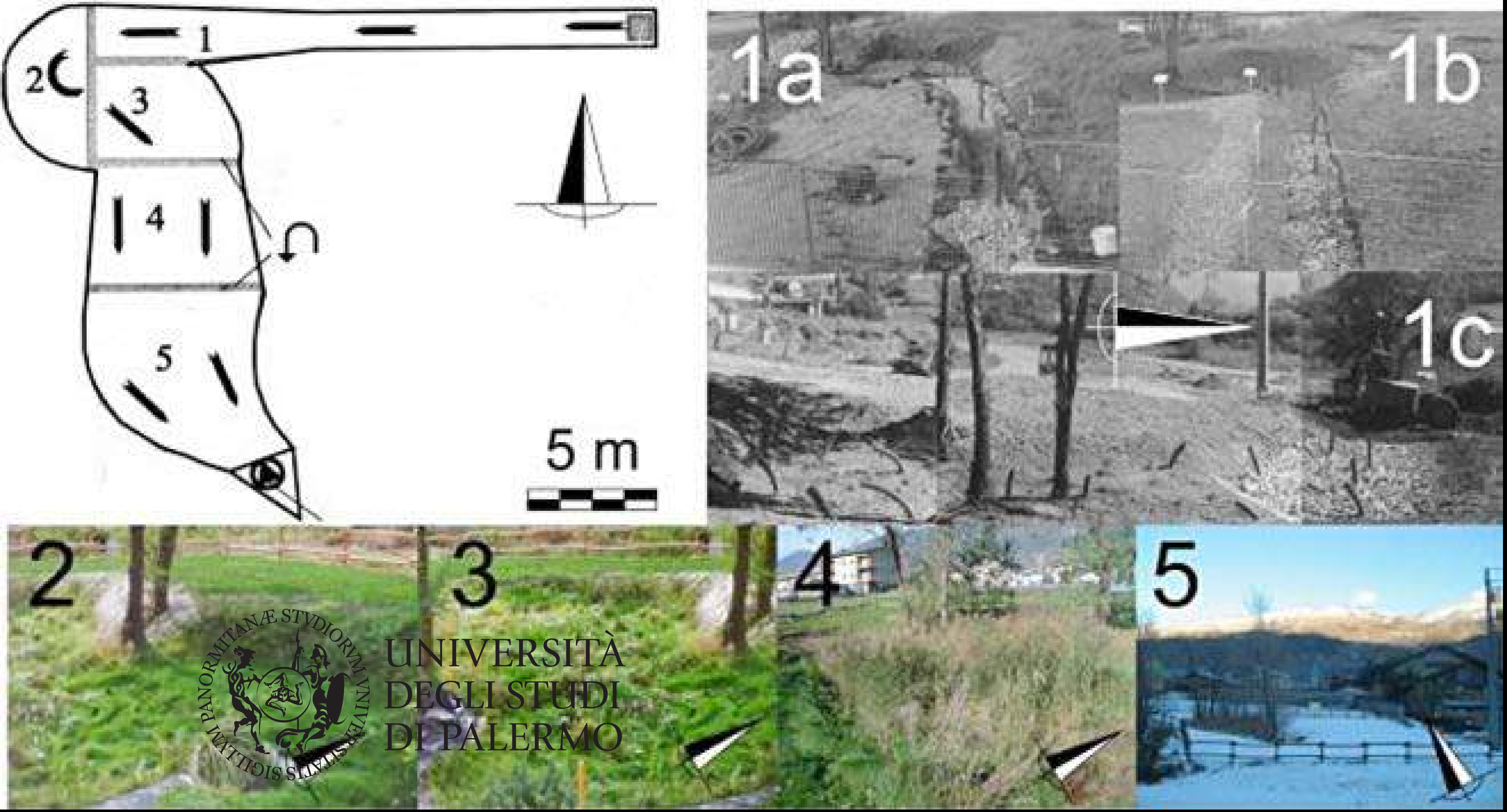
Error bars are a graphical representation of the variability of data and are used on graphs to indicate the error, or uncertainty in a reported measurement

doi> 10.2800/05464
10.1371/journal.pone.0006802

filter-,
buffer-,
reactor-
function

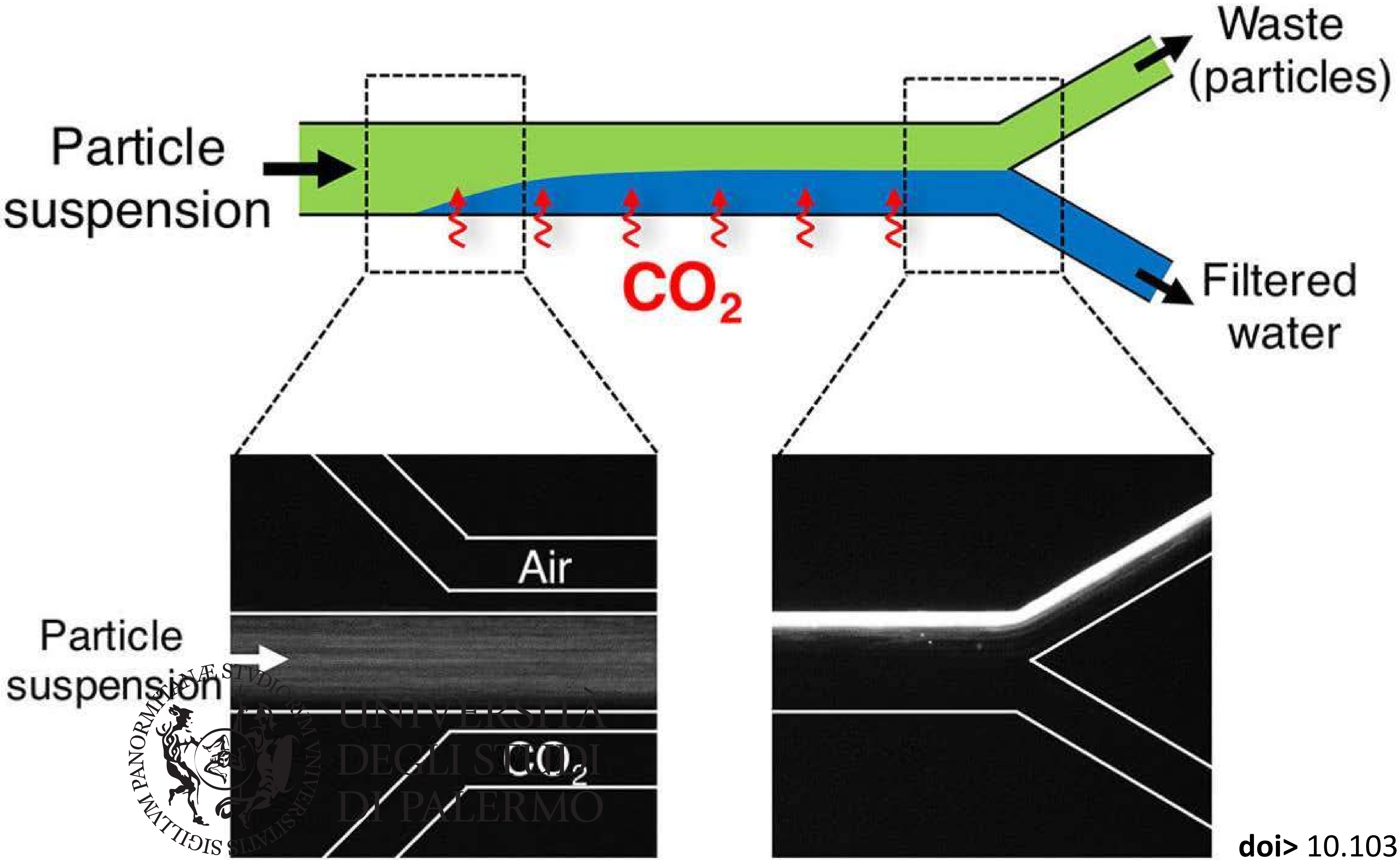


allowing transformations of solutes passing through



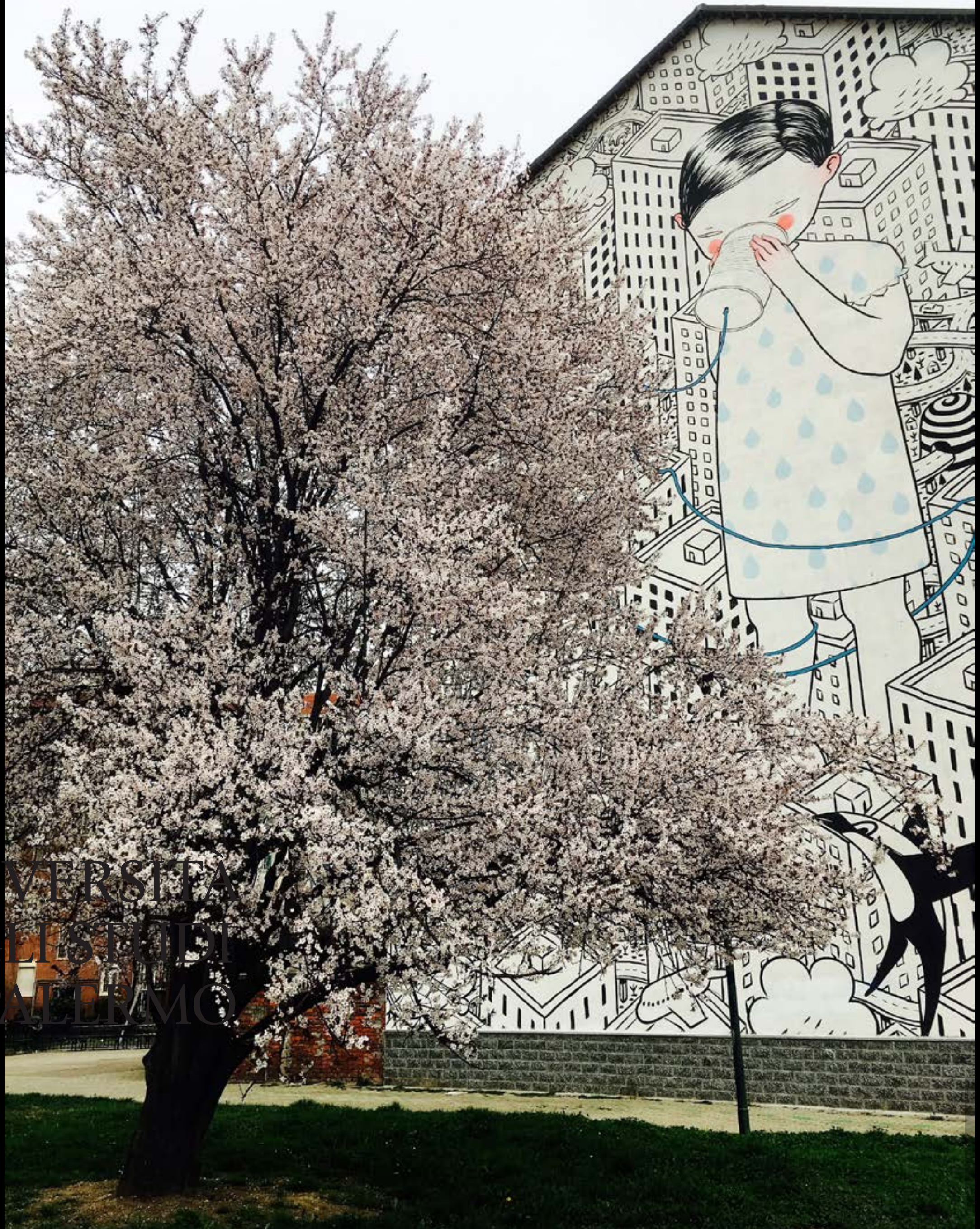
UNIVERSITÀ DEGLI STUDI DI PALERMO

doi> 10.1016/j.ecoleng.2014.09.013



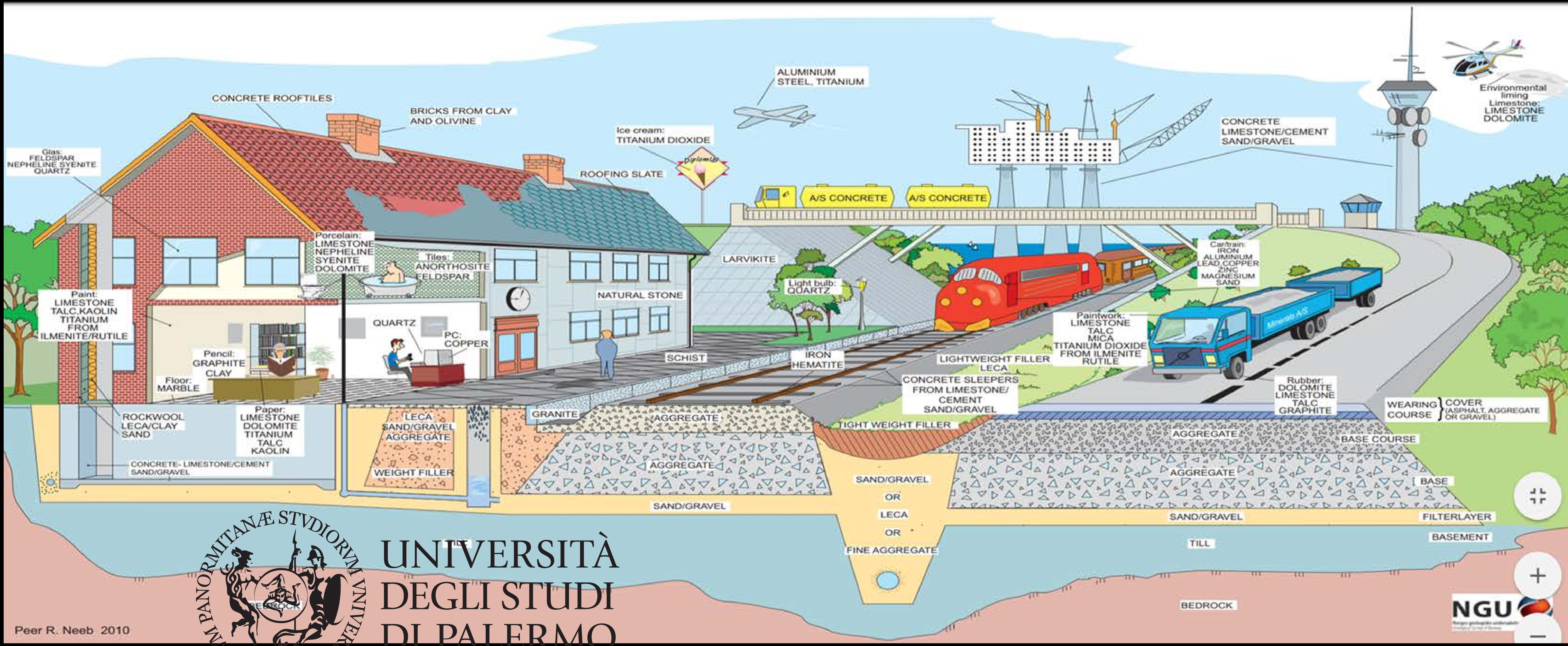
doi> 10.1038/ncomms15181

Filter function

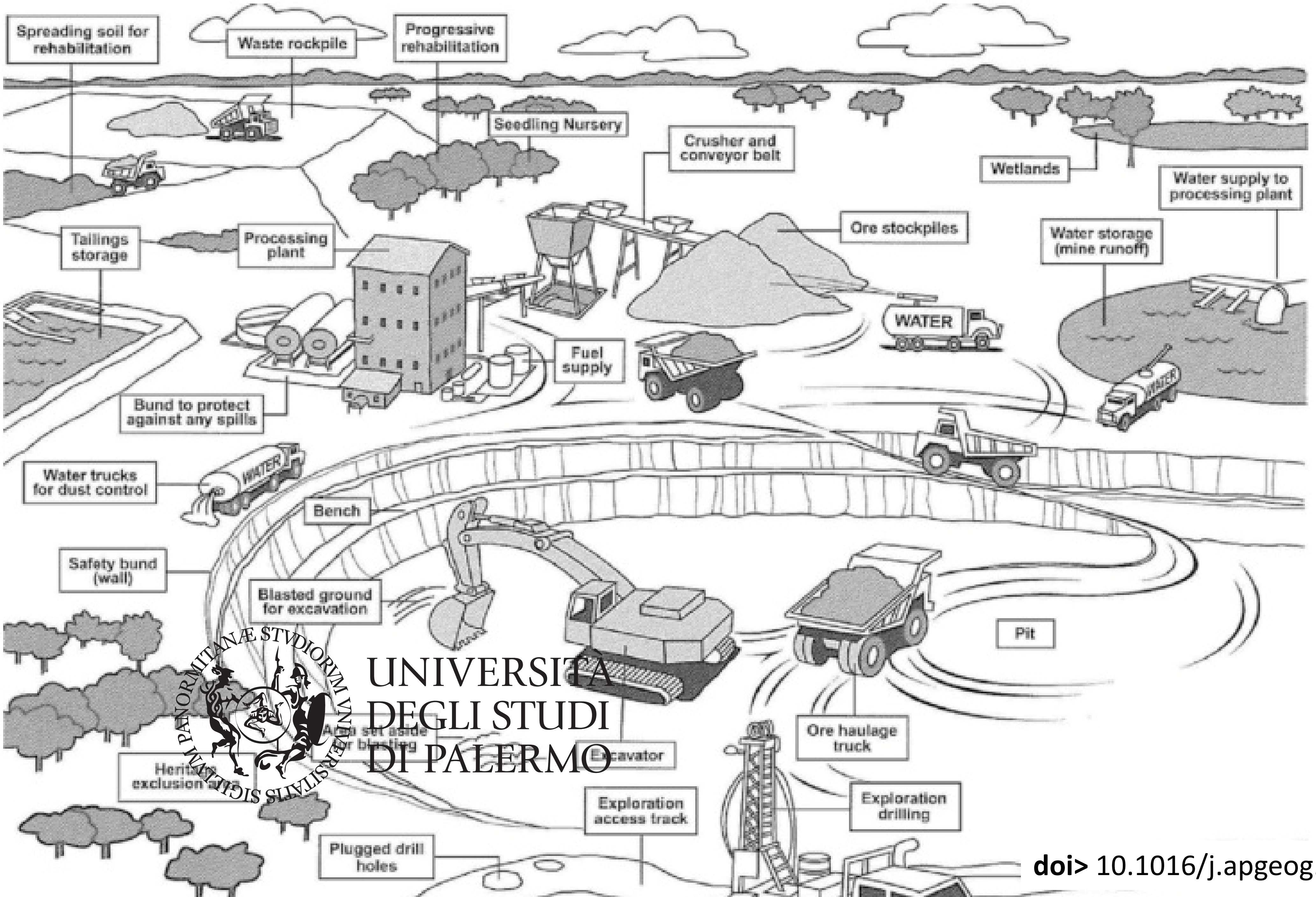


45°05'N 7°42'E
229 m a.s.l.


resource function
providing base materials for industry



UNIVERSITÀ
DEGLI STUDI
DI PALERMO



doi> 10.1016/j.apgeog.2016.07.001

COMMODITY GROUPING

Agricultural Minerals magnesite, magnesium compounds, peat, phosphate, potash, sulfur, vermiculite

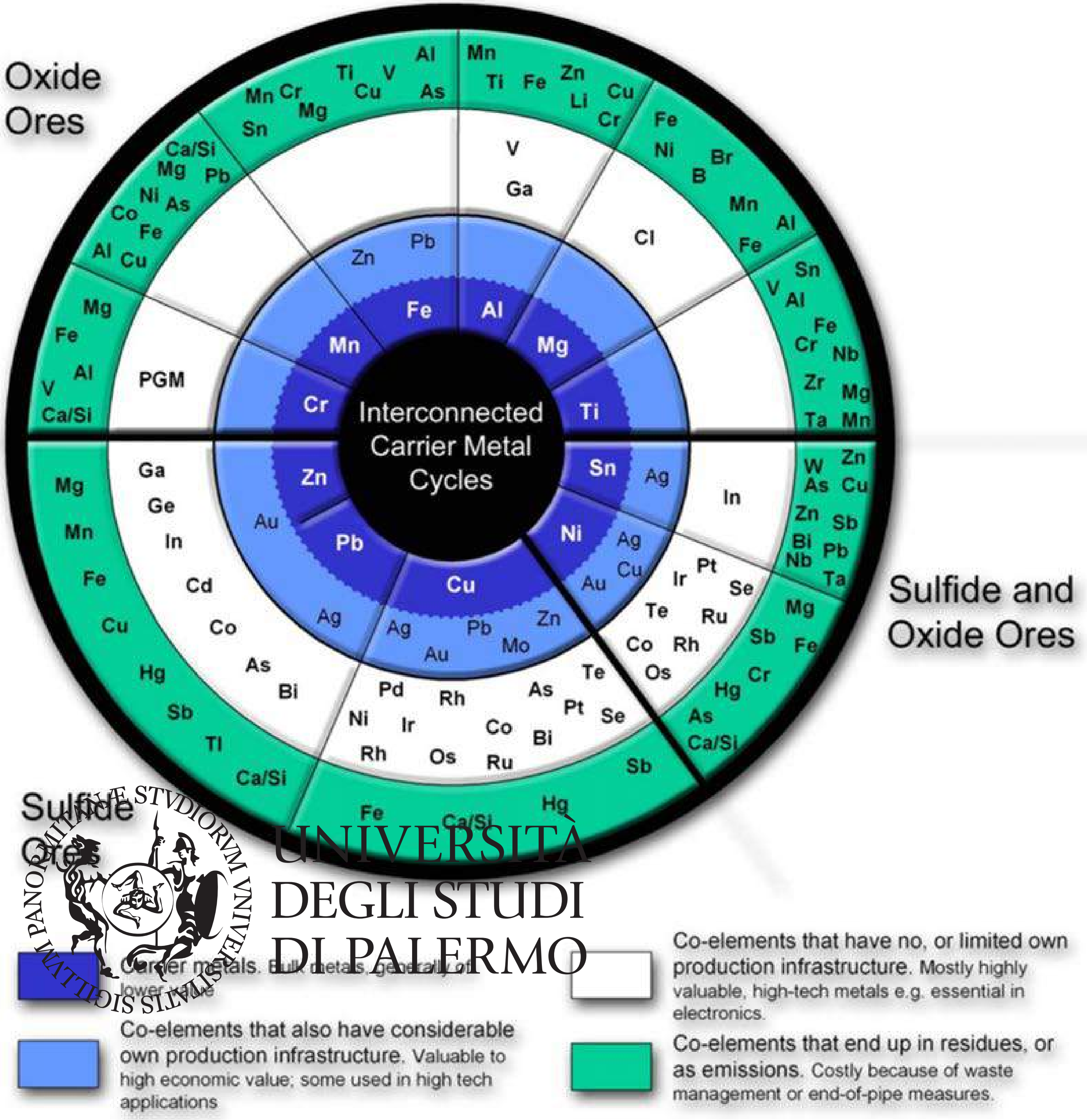
Coal Mines

Construction Minerals ball clay, cement, dimension stone, gypsum, mica, perlite, pumice

Refractory, Abrasive, and Other Industrial Minerals asbestos, bentonite, coltan, feldspar, garnet, gemstones, industrial sand or gravel, kyanite, olivine, Si, talc, wollastonite, zeolite, Zr

Metals—Ore Al, Sb, Be, Bi, Cd, Cr, Co, Ta, Cu, Au, Fe, Pb, Mg, Mo, Ni, Pt (PGM), rare earths elements (REY), Re, Se, Si, Ag, Te, Th, Sn, Ti, W, V, Zn, Zr


N
1 km
23°21′55″S 119°40′31″E

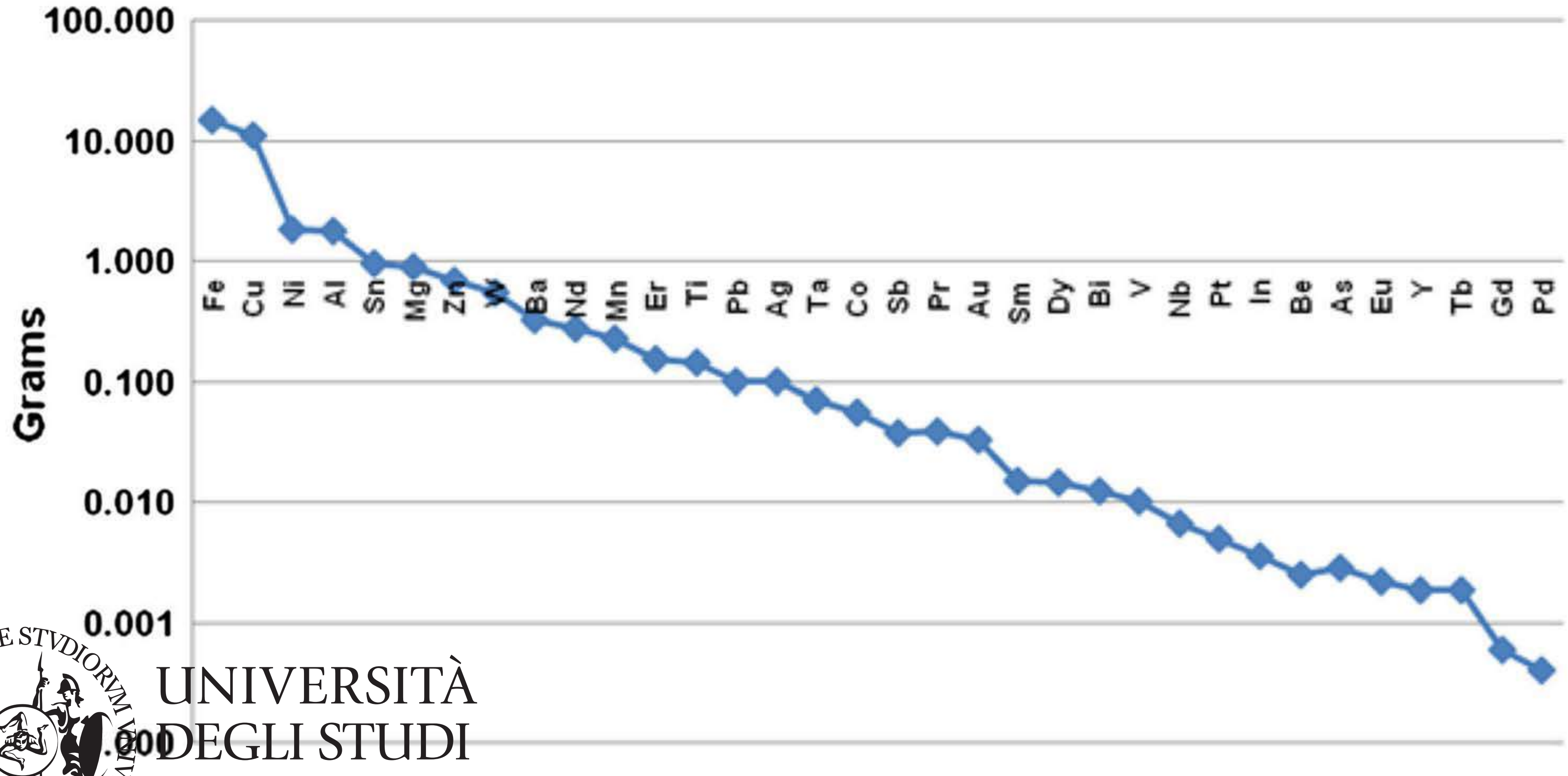


UNIVERSITÀ DEGLI STUDI DI PALERMO

Report of the Ad-hoc Working Group on defining critical raw materials

Critical raw materials for the EU
The ad-hoc Working Group is a sub-group of the Raw Materials Supply Group and is chaired by the European Commission

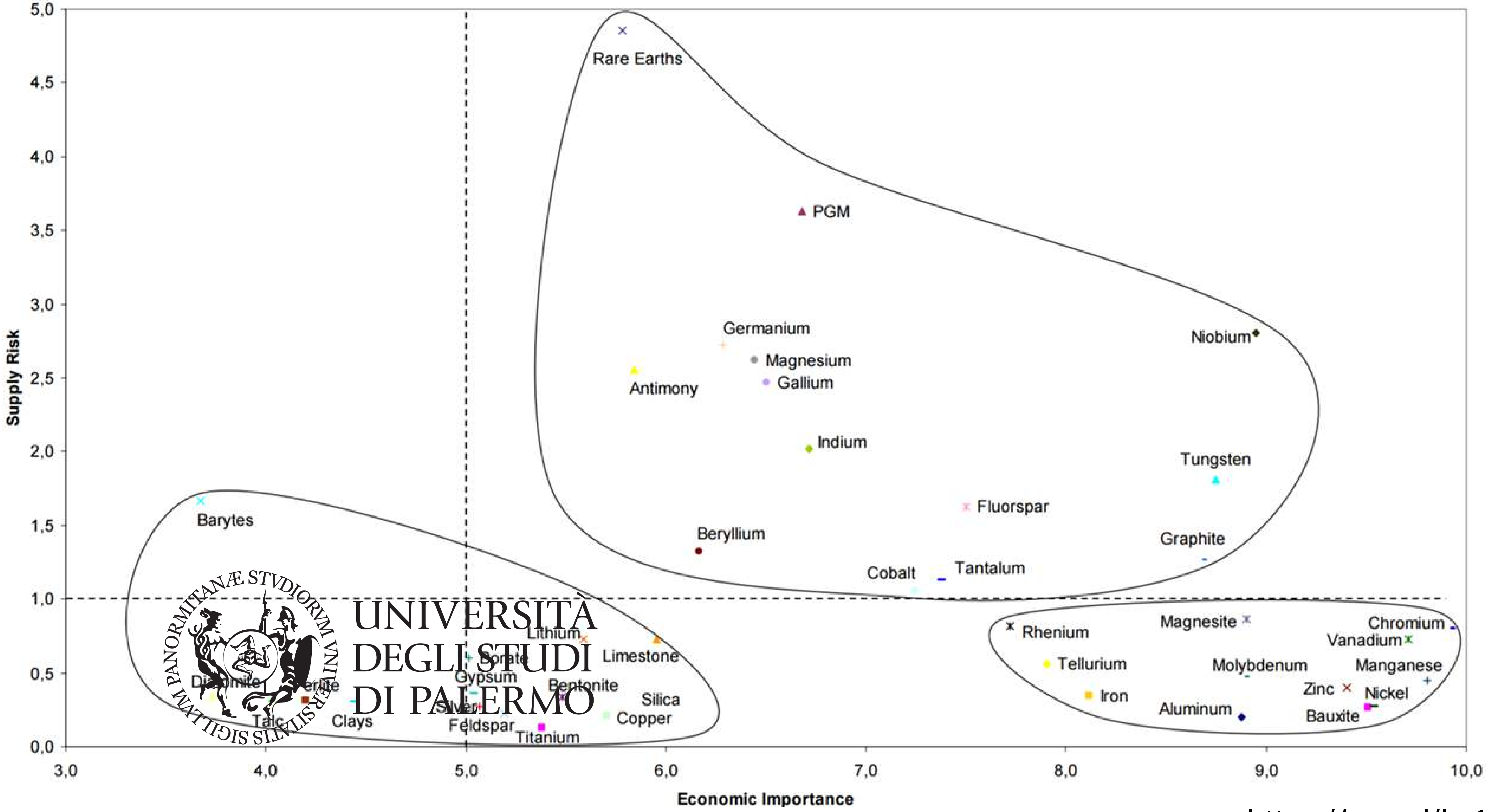
https://goo.gl/kp1kRF



Average abundances of the elements tested for in 85 cell phones.

UNIVERSITÀ DEGLI STUDI DI PALERMO

doi> 10.1007/s11664-014-3310-3



https://goo.gl/kp1kRF

Table 4: Global demand of the emerging technologies analysed for raw materials in 2006 and 2030 related to today's total world production of the specific raw material (Updated by BGR April 2010)

Raw material	Production 2006 [1] (t)	ETRD 2006 (t)	ETRD 2030 (t)	Indicator 2006	Indicator 2030
Gallium	152 [6]	28	603	0,18 [1]	**3,97** [1]
Indium	581	234	1.911	0,40 [1]	**3,29** [1]
Germanium	100	28	220	0,28 [1]	**2,20** [1]
Neodymium [7]	16.800	4.000	27.900	0,23 [1]	**1,66** [1]
Platinum [8]	255	very small	345	0	1,35 [1]
Tantalum	1.384	551	1.410	0,40 [1]	**1,02** [1]
Silver	19.051	5.342	15.823	0,28 [1]	0,83 [1]
Cobalt	62.279	12.820	26.860	0,21 [1]	0,43 [1]
Palladium [8]	267	23	77	0,09 [1]	0,29 [1]
Titanium	7.211.000 [3]	15.397	58.148	0,08	0,29
Copper	15.093.000	1.410.000	3.696.070	0,09	0,24
Ruthenium [8]	29 [4]	0	1	0	0,03
Niobium	44.531	288	1.410	0,01	0,03
Antimony	172.223	28	71	<0,01	<0,01
Chromium	19.825.713 [2]	1.250	41.900	<0,01	<0,01

UNIVERSITÀ DEGLI STUDI DI PALERMO

ETRD = Emerging Technologies Raw Material Demand

[1] Data updated by the BGR based on new information [2] Chromite [3] Ore concentrate [4] Consumption
[6] Estimation of full production in China and Russia [7] rare earth [8] platinum group metals

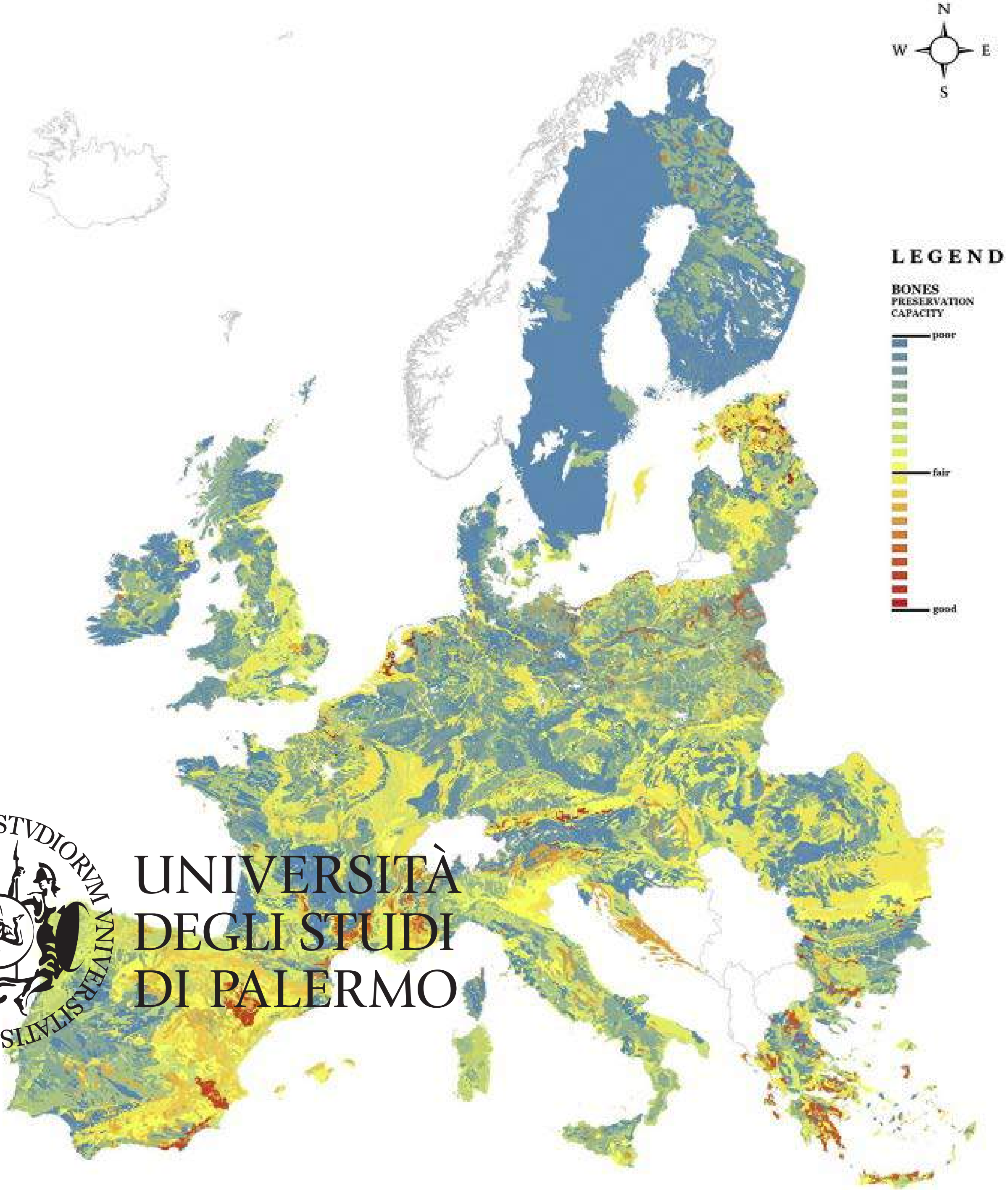
https://goo.gl/kp1kRF

cultural and historic function
reflecting past practices

Image NASA

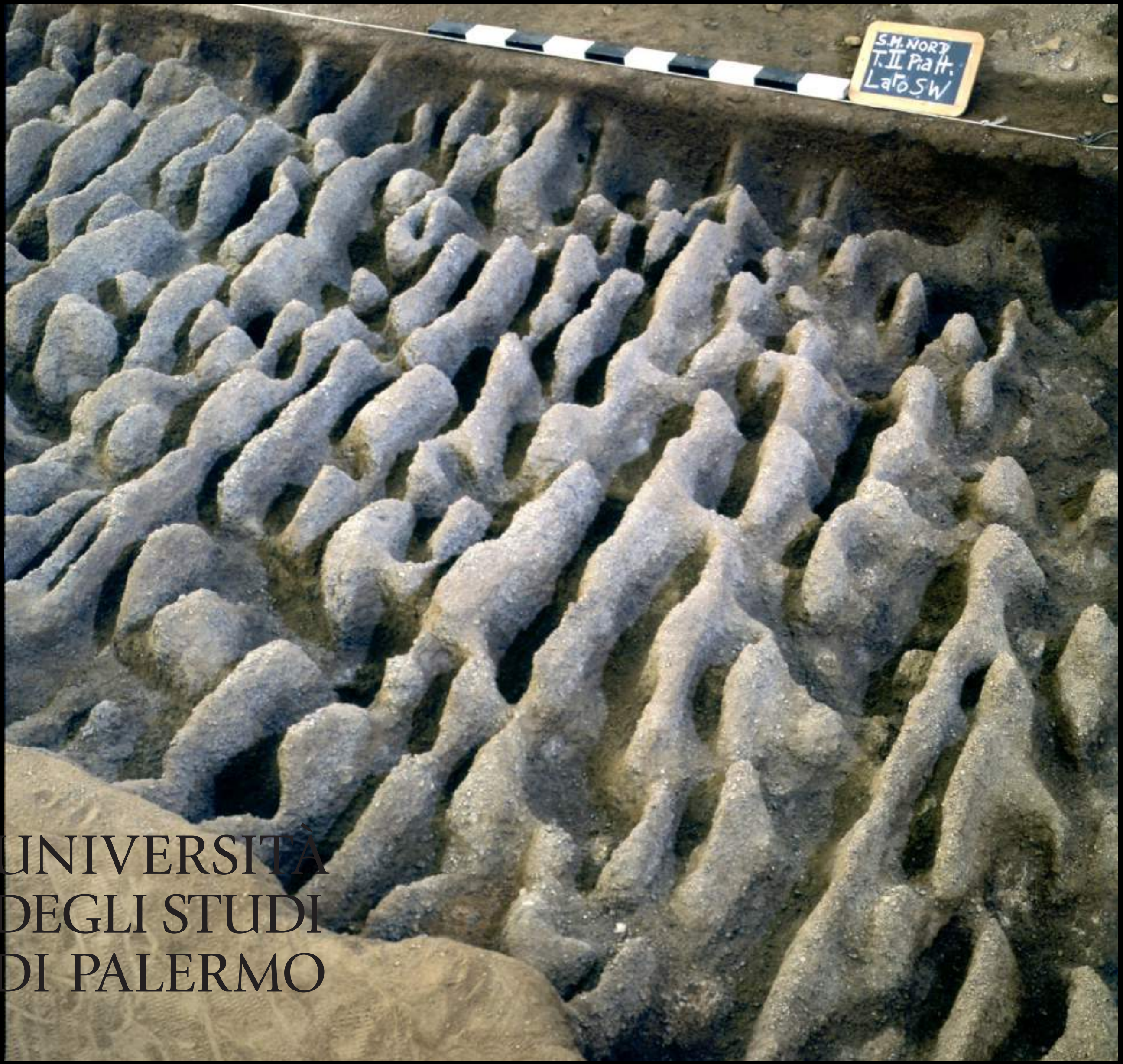
Image Patrick Aventurier

Soil-based preservation capacity for buried bones, teeth and shells



UNIVERSITÀ DEGLI STUDI DI PALERMO

doi> 10.1016/j.scitotenv.2015.04.036



UNIVERSITA
DEGLI STUDI
DI PALERMO

doi> 10.1016/B978-0-12-409548-9.10024-7
10.1126/science.349.6245.246-a

Percentages of the European Union area with soils assessed as having good, fair or poor preservation capacities for buried materials and stratigraphic evidence.

Preservation capacity	Poor	Fair	Good
Bones	55.6	39.7	4.7
Metals	68.2	31.5	0.3
Organics	59.3	32.4	8.2
Stratigraphic evidence	7.9	74.9	17.1

UNIVERSITÀ DEGLI STUDI DI PALERMO

doi> 10.1016/j.scitotenv.2015.04.036

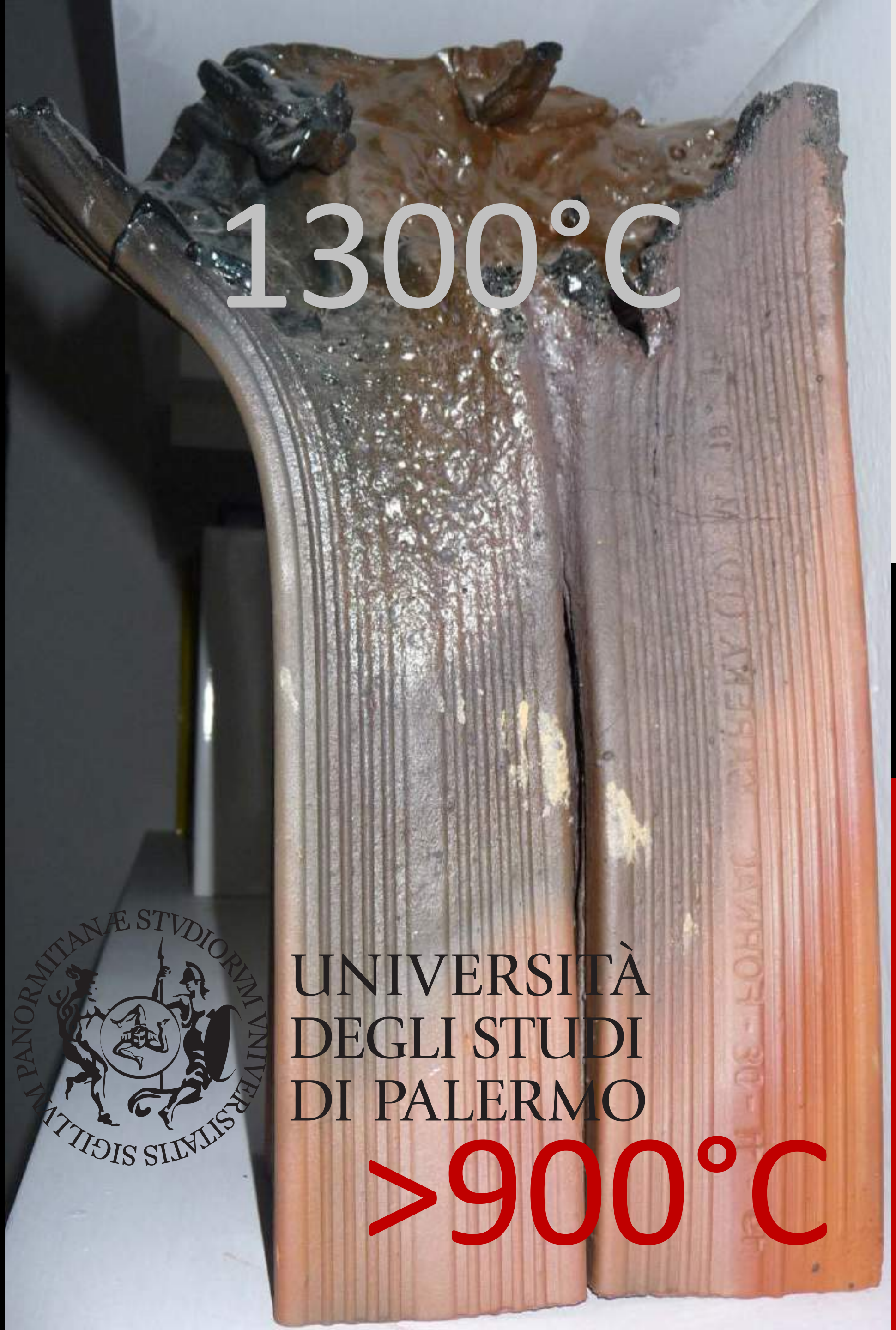
habitat function

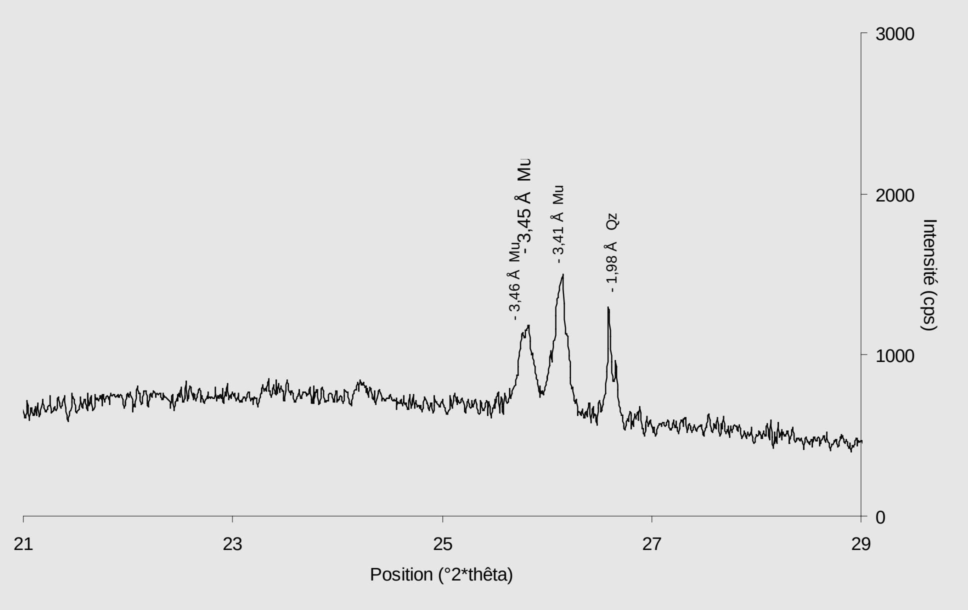


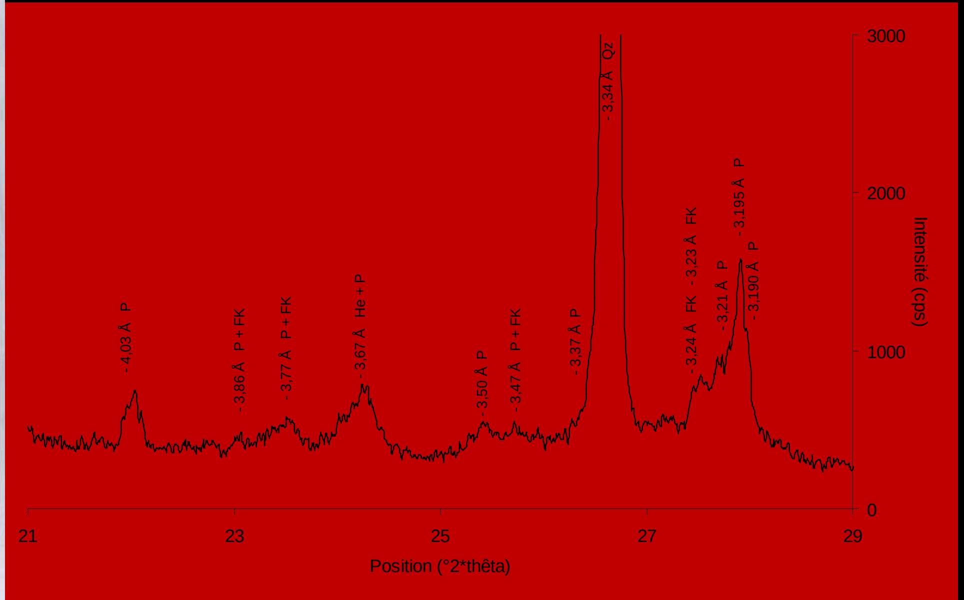



habitat for plants and animals

Image VertaseFLI Ltd


1300°C
UNIVERSITÀ
DEGLI STUDI
DI PALERMO
>900°C


3000
2000
1000
0
Intensité (cps)
21
23
25
27
29
Position (°2*thêta)
3,46 Å Mu
3,45 Å Mu
3,41 Å Mu
1,98 Å Qz

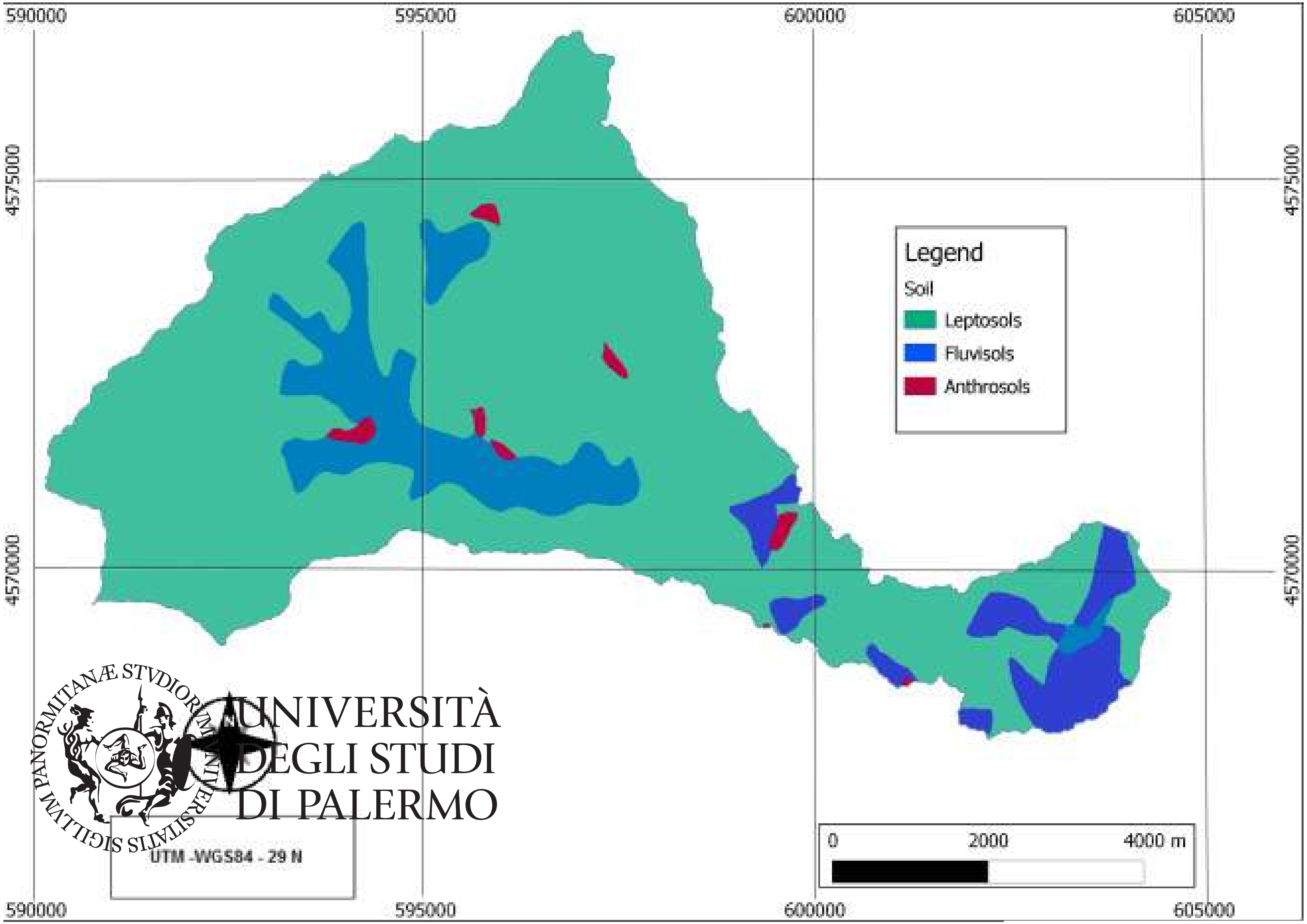

3000
2000
1000
0
Intensité (cps)
21
23
25
27
29
Position (°2*thêta)
4,03 Å P
3,86 Å P + FK
3,77 Å P + FK
3,67 Å He + P
3,50 Å P
3,47 Å P + FK
3,37 Å P
3,34 Å Qz
3,24 Å FK
3,23 Å FK
3,21 Å P
3,195 Å P
3,190 Å P


SIGILLVM PANORMITANÆ STVDIORVM VNIVERSITATIS
UNIVERSITÀ
DEGLI STUDI
DI PALERMO

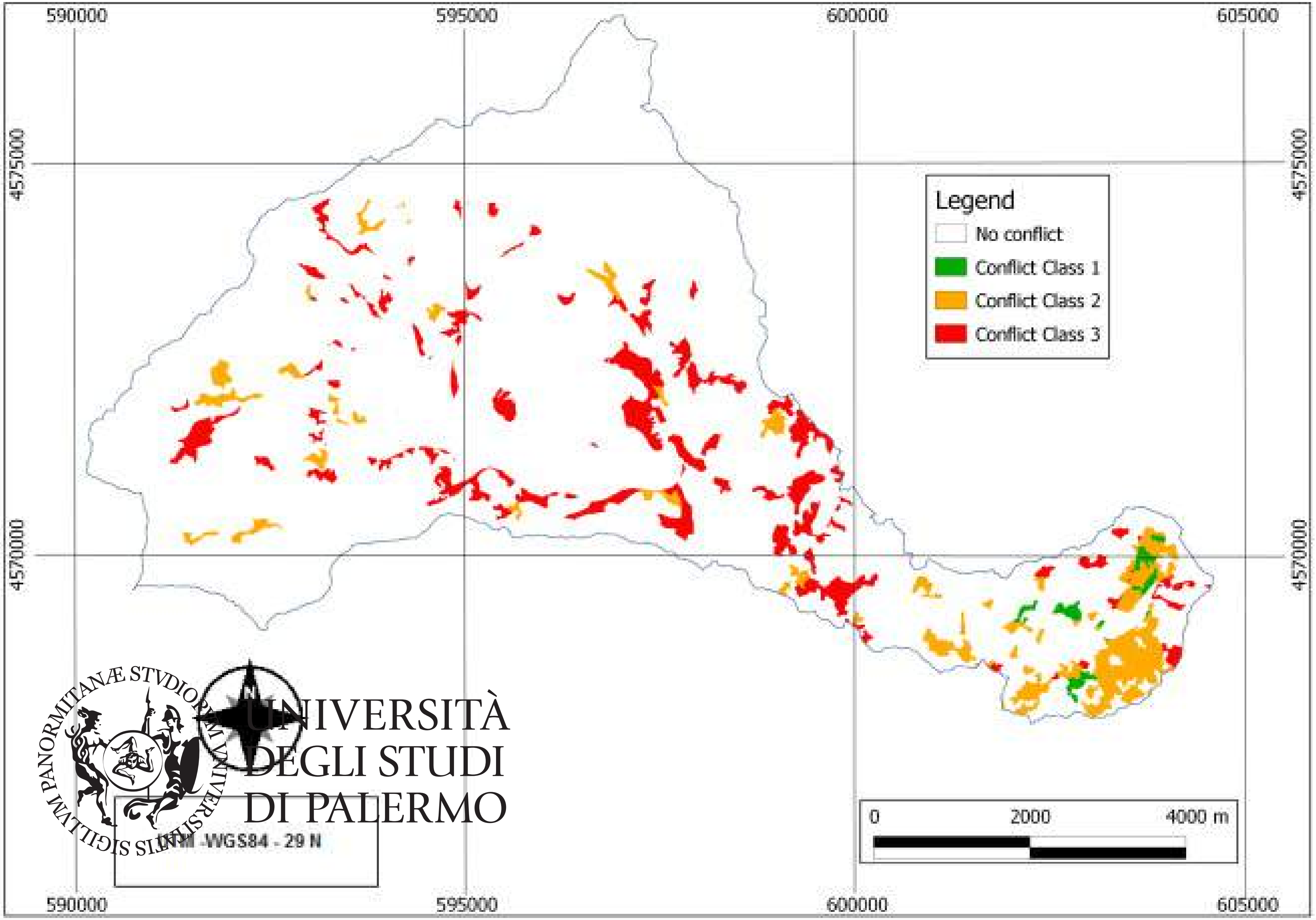
UNIVERSITÀ
DEGLI STUDI
DI PALERMO

UNIVERSITÀ
DEGLI STUDI
DI PALERMO


UNIVERSITÀ
DEGLI STUDI
DI PALERMO

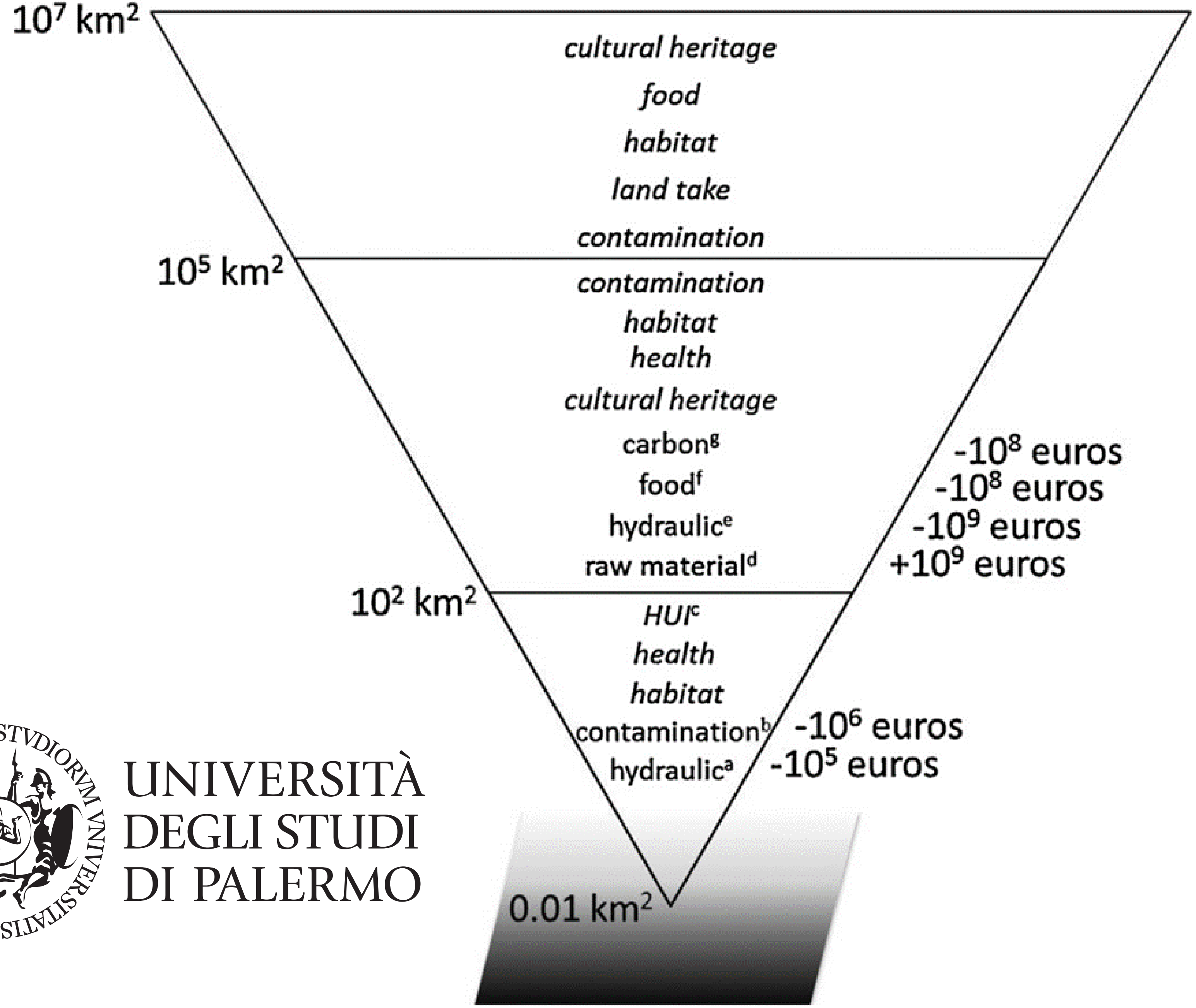


doi> 10.1016/j.landusepol.2014.05.012



UNIVERSITÀ DEGLI STUDI DI PALERMO

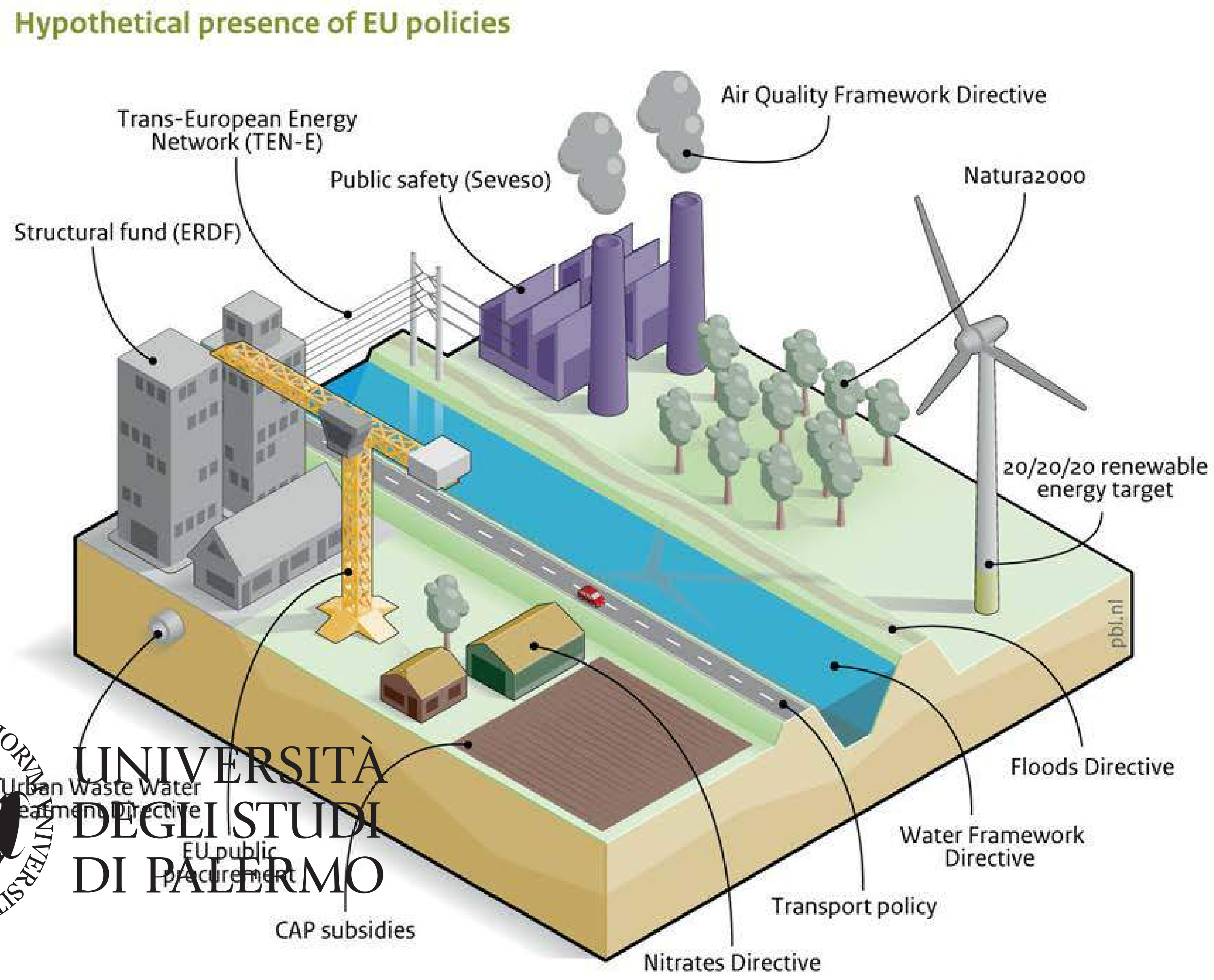
doi> 10.1016/j.landusepol.2014.05.012



UNIVERSITÀ
DEGLI STUDI
DI PALERMO

doi> 10.1016/j.landusepol.2014.01.019

Figure 1.2 EU policies influencing land use: a schematic view



Source: Evers, D. & J. Tennekes, 2016, *The Europeanization of Dutch Spatial Planning*, The Hague: PBL Netherlands Environmental Assessment Agency.

Table 3.2 Cohesion Policy spending, 2007–2013: key themes that can influence land use

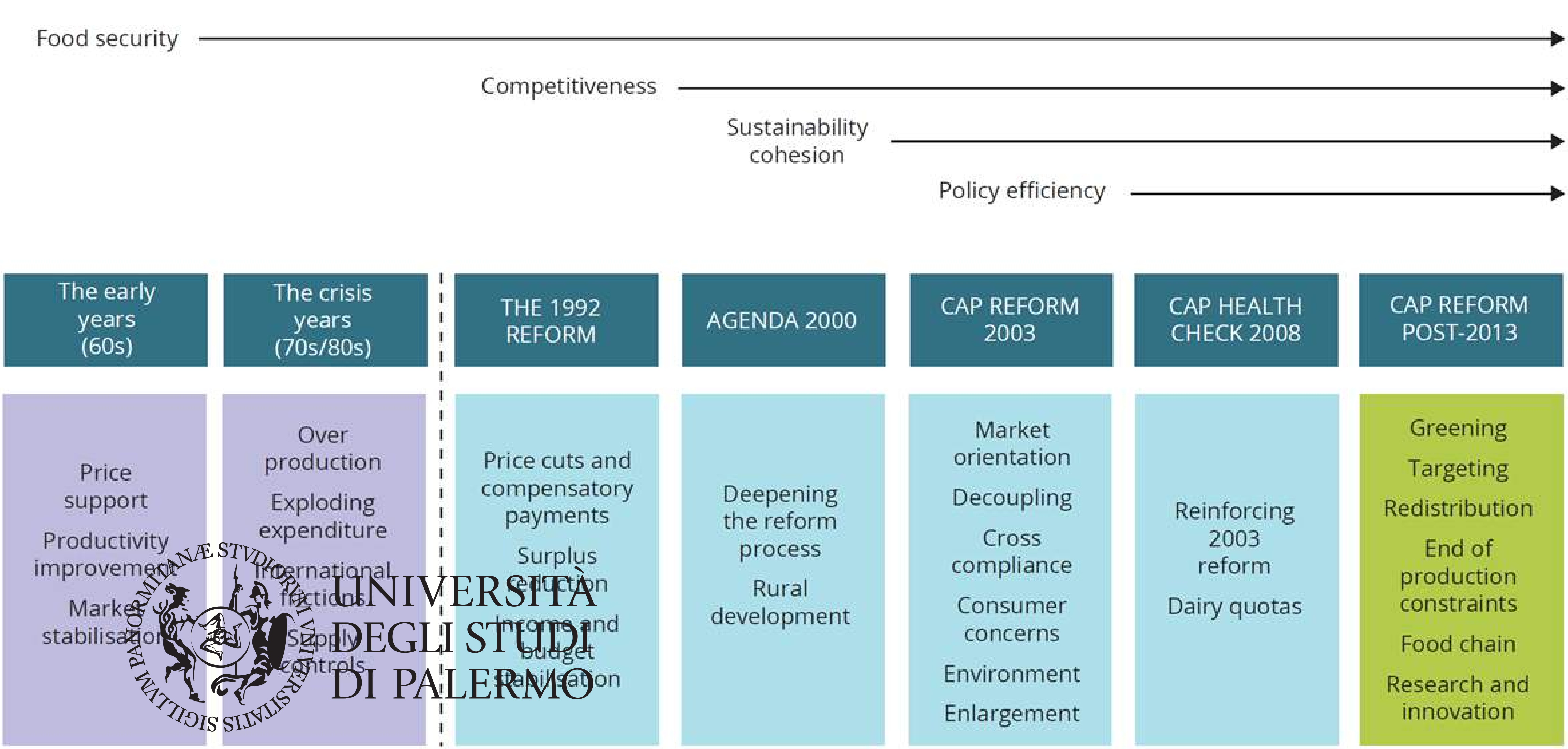
Theme	Project areas	Amount, 2007–2013 (billion EUR)
Transport	Railways, motorways, multimodal transport, airports, ports and inland waterways (including TEN-T projects)	75.5
Environmental protection and risk prevention	Environmental infrastructure, urban transport, brownfield redevelopment and contaminated site clean-up, biodiversity protection and Natura 2000 site investments	50.0
Energy	Electricity, natural gas and petroleum networks, and renewable energy	11.2
Urban and rural regeneration	Urban development, strengthening polycentric development and rural–urban links	11.0
Culture	Protection of cultural heritage, sustainable tourism and regional attractiveness	6.1
Tourism	Tourism services and protection of natural heritage	6.1

Note: The amounts represent the available funds per theme for the EU as a whole at the beginning of the period, resulting from the combined figures for the ERDF, the CF and the ESF. They do not reflect the actual spending. TEN-T: trans-European transport network.

Source: European Commission, DG Regional Policy.

doi>10.2800/05464

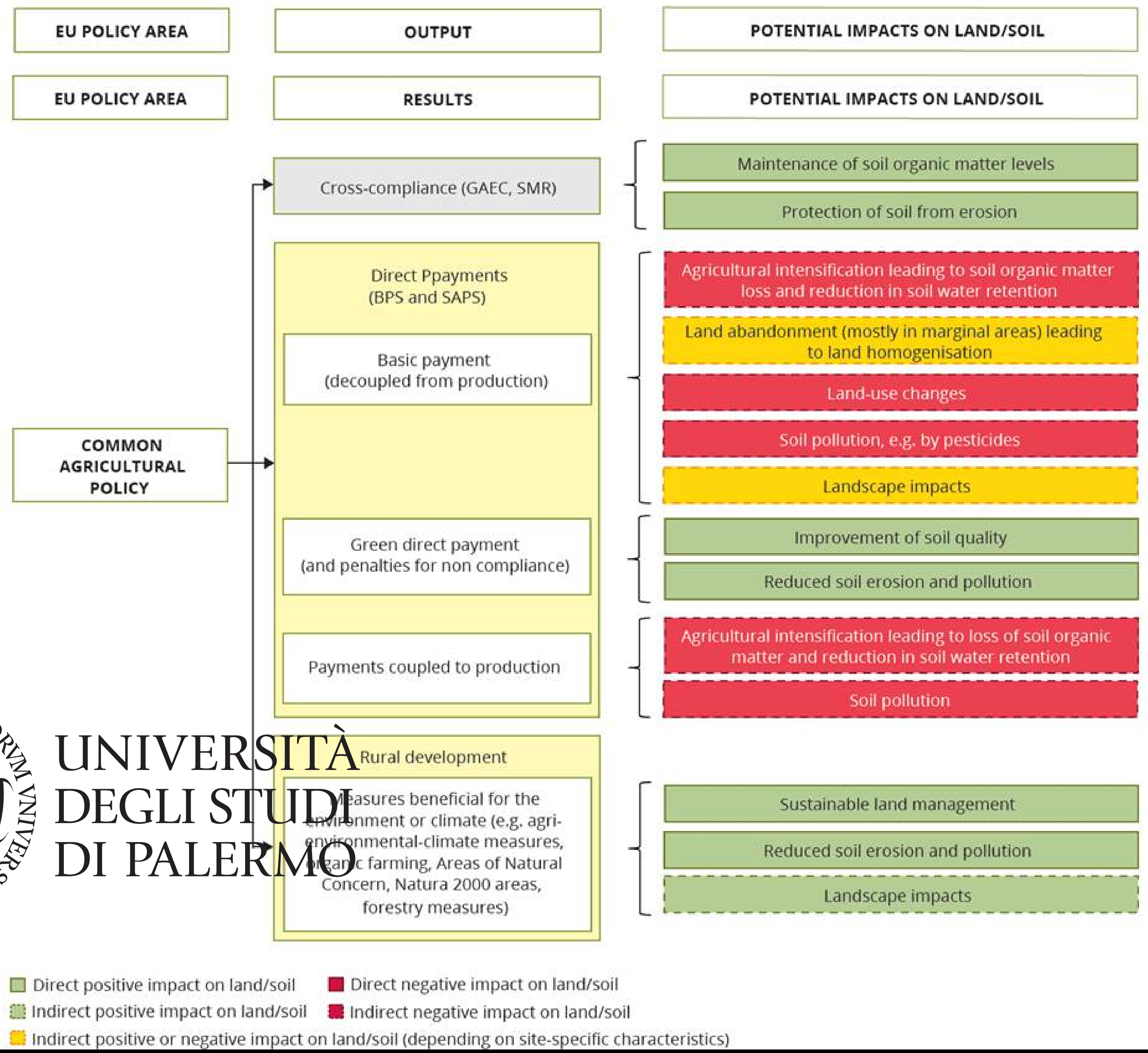
Figure 4.7 Historical development of the CAP



Source: European Commission, DG Agriculture and Rural Development.

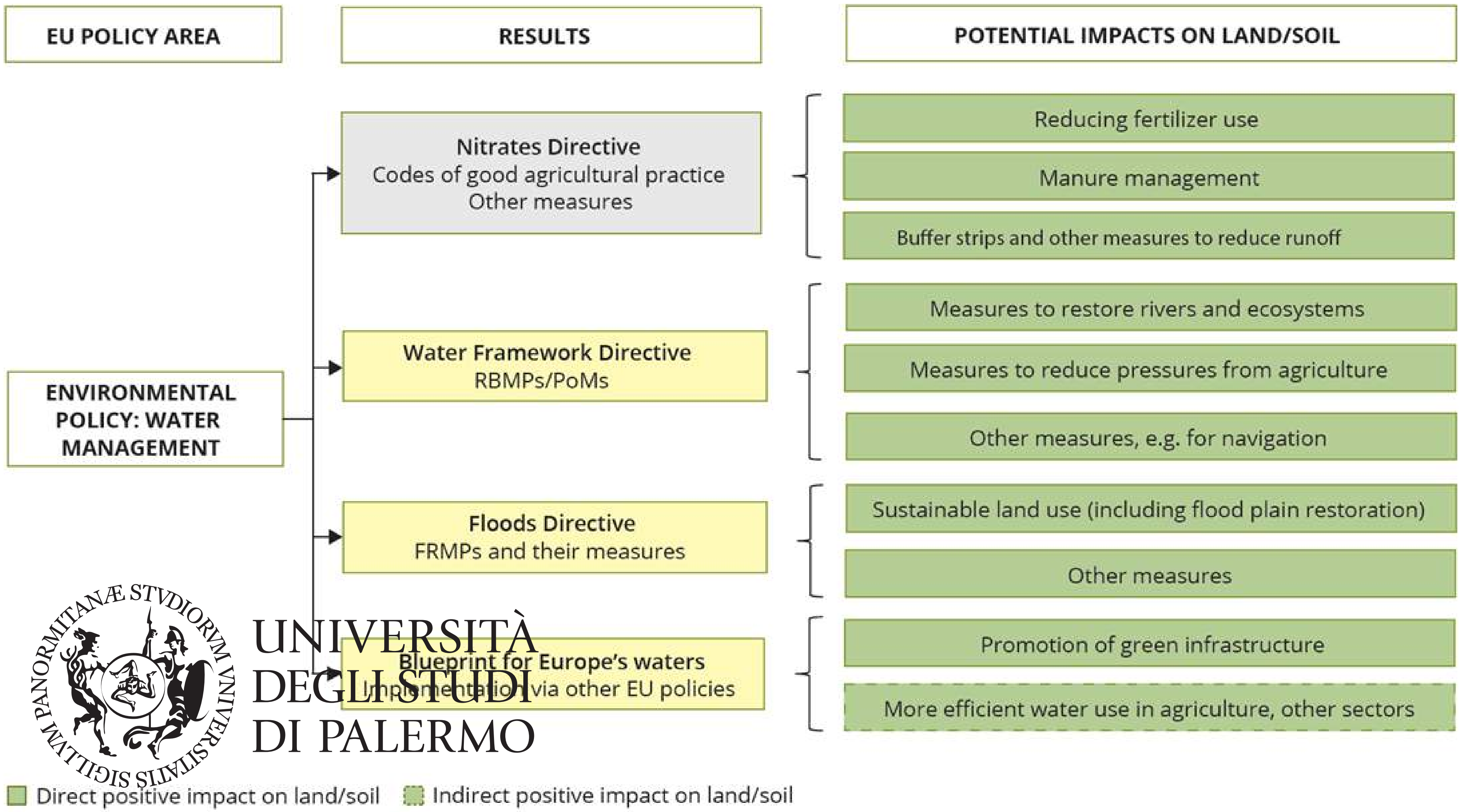
doi>10.2800/05464

Figure 4.11 Potential impacts of Common Agricultural Policy on land and soil



doi>10.2800/05464

Figure 5.5 Potential impacts of EU water policy on land and soil



Source: EEA/Milieu elaboration.

doi>10.2800/05464

Guidelines for sustainable soil management

- Minimize soil erosion
- Enhance soil organic matter content
- Foster soil nutrient balance and cycles
- Prevent, minimize and mitigate soil salinization and alkalinization
- Prevent and minimize soil contamination
- Prevent and minimize soil acidification
- Preserve and enhance soil biodiversity
- Minimize soil sealing
- Prevent and mitigate soil compaction
- Improve soil water management

UNIVERSITÀ DEGLI STUDI DI PALERMO

http://www.fao.org/3/a-i6874e.pdf

GLOBAL SOIL PARTNERSHIP

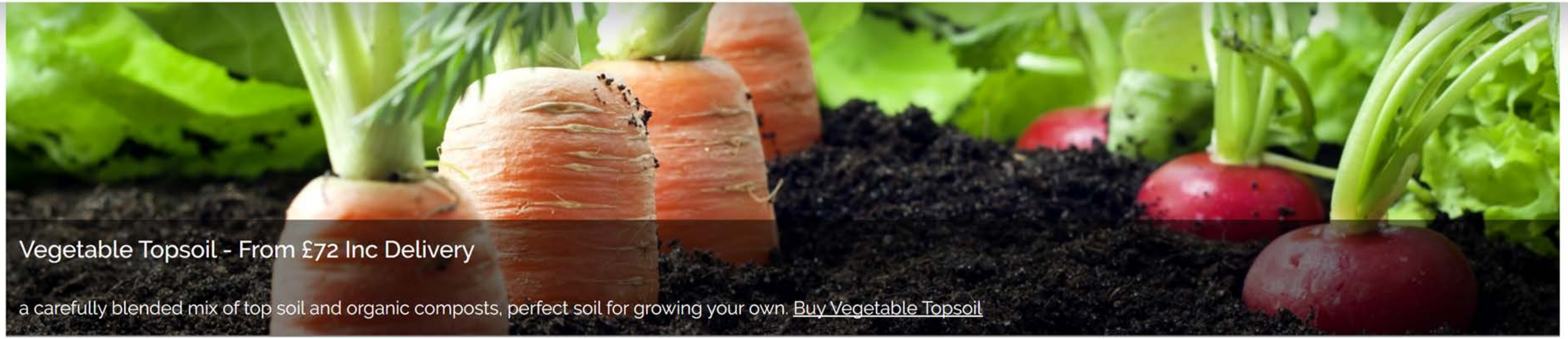
The 5 pillars of action

- Soil management
- Awareness raising
- Research
- Information and data
- Harmonization

SVALBARði

UNIVERSITÀ
DEGLI STUDI
DI PALERMO

Home Products Bulk Loads **TopsoilShop** Delivery Info Topsoil Calculator



Topsoil Suppliers

We are the UK's Leading Topsoil Suppliers. We deliver top soil, compost, turf, bark and other garden and landscape necessities, **nationwide with next day delivery.** All our online prices include VAT and delivery to most parts of the country.

Products

- Topsoil
- Soil Improvers
- Turf

our Soils under threat
Deforestation
Population growth
Urban expansion
Pollution and waste disposal
Climate change
Unsustainable soil management practices
Drivers of soil degradation
Biodiversity loss
Salinization and sodification
Nutrient imbalance
Compaction
Sealing
Pollution
Acidification
Erosion
Loss of organic carbon
Types of soil degradation
Water scarcity
Food and nutrition insecurity
Rapid climate change
Poverty and social insecurity
Migration
Reduction of ecosystem services
Consequences of soil degradation
Solution: sustainable soil management
Inclusive soil governance
Increase investment in sustainable soil management
Advocacy/ awareness raising
Establish soil information systems
Develop capacities and strengthen extension on soils
Stop soil degradation
Restore/ rehabilitate degraded soils
Implement land use planning
Analyse/ assess soil condition
Increase soil organic matter content
Keep soil surface covered
Use nutrients wisely
Minimum tillage
Crop rotation
Reduce erosion
Appropriate waste disposal
Waste water treatment
Food and Agriculture Organization of the United Nations
with the support of

banksy.co.uk