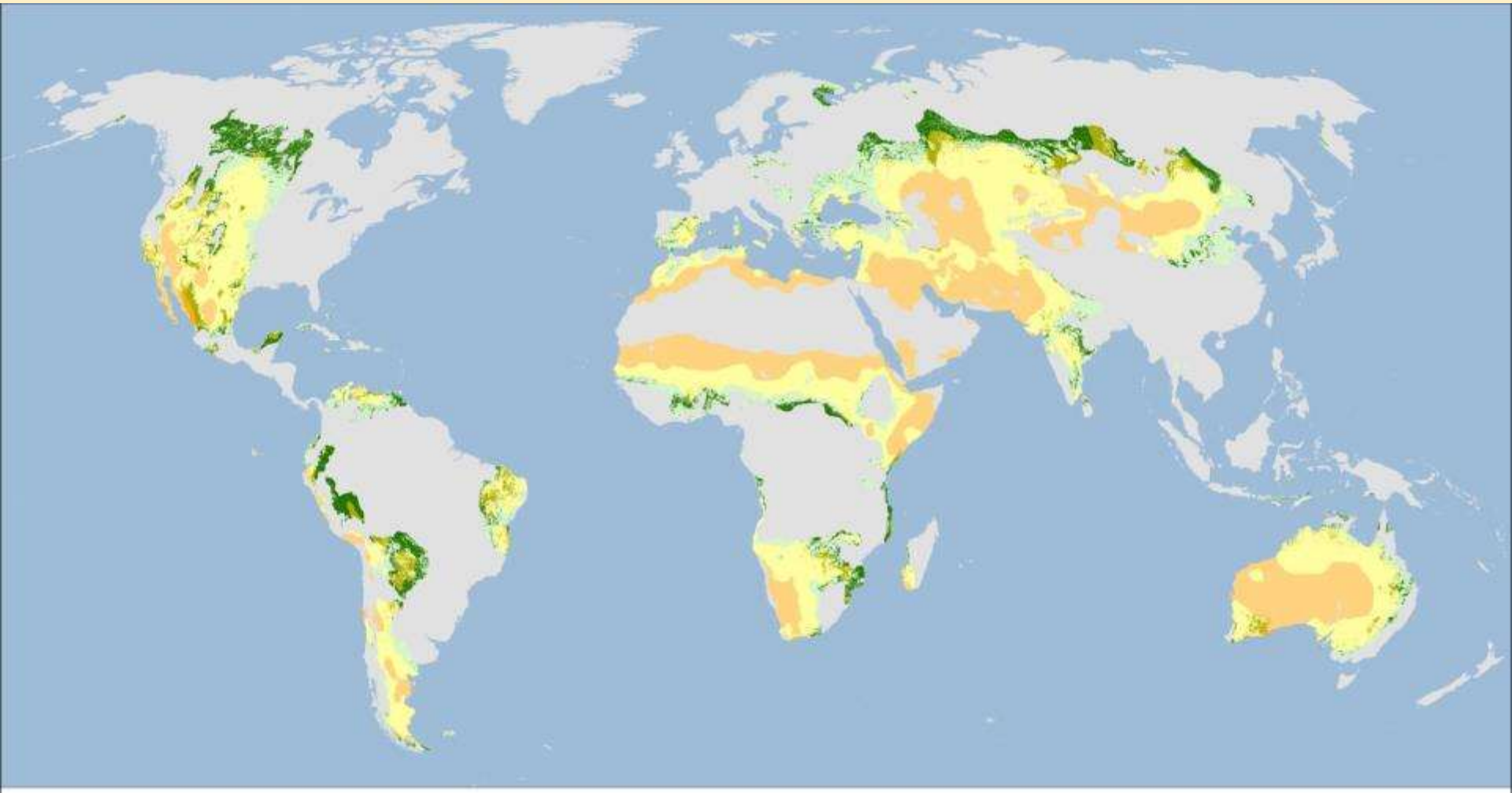
ICNF
Instituto da Conservação da Natureza e das Florestas

ADP Mértola

For CLIMADAPT Project: Climate Change Forest Adaptation Initiatives in Portugal - Monte do Vento (Mértola – SE Portugal)

Lúcio do Rosário & Paulo Silva

Institute for Nature Conservation and Forests & Associação para o Desenvolvimento do Património de Mértola



UNCCD delineation of drylands

Forests within drylands

- dry subhumid: P/PET 0.50 - 0.65
- semiarid: P/PET 0.20 - 0.50
- arid: P/PET 0.05 - 0.20

Non-forest drylands

- dry subhumid: P/PET 0.50 - 0.65
- semiarid: P/PET 0.20 - 0.50
- arid: P/PET 0.05 - 0.20

Scale: 1:100 million
Projection: Robinson
Sources: ESRI, 1993; UNEP/GRID, 1991
CRU/UEA; WWF-US, 2004
Global natural forest area at >10% tree cover as defined by the 2005 MODIS Vegetation Continuous Fields (MODIS05 VCF) and the Global Land Cover 2000 (GLC 2000) datasets, which was used to identify and exclude non-natural forest areas. (as published in Schmitt et al., 2009). (http://www.sciencedirect.com/science/article/B6V5X-4WB37CX-1/2/5322fc298a1e386ba3c5ab0dc414815a)

UNEP WCMC

DISMED

Desertification Information System for the Mediterranean

Climatic Sensitivity to Desertification

Aridity Index

Structural analysis 1951 - 1990

Scale 1:8000000

0 100 200 300 Kilometers

Data analysis and map elaboration:

DISMED Project

Foundation for Applied Meteorology (FMA)

Climate Observatory - Institute of Biometeorology

of the National Research Council (IBIMET-CNR)

Florence, ITALY - March 2002

http://dismed.mclink.it/

Aridity Index Classification (Rainfall/PET)

Rainfall vs. PET (Thousandths)

- 0 - 0.1 (hyper arid)
- 0.1 - 0.4 (arid)
- 0.4 - 0.7 (semi-arid)
- 0.7 - 1.1 (sub-humid)
- > 1.1 (humid)
- No Data

Projection : Lambert Conformal Conic

Spheroid : WGS 84

Central Meridian : 12

Reference Latitude : 35

Standard Parallel 1 : 30

Standard Parallel 2 : 47

Data spatialization procedures

Rainfall spatialization procedure :

- Kriging interpolation

Temperature spatialization procedure :

- Multilinear regression using DEM, Latitude, Longitude and sea distance

Data sources

Coast Layer :

- ESRI Digital Chart of the World 1:1M

Digital Elevation Model :

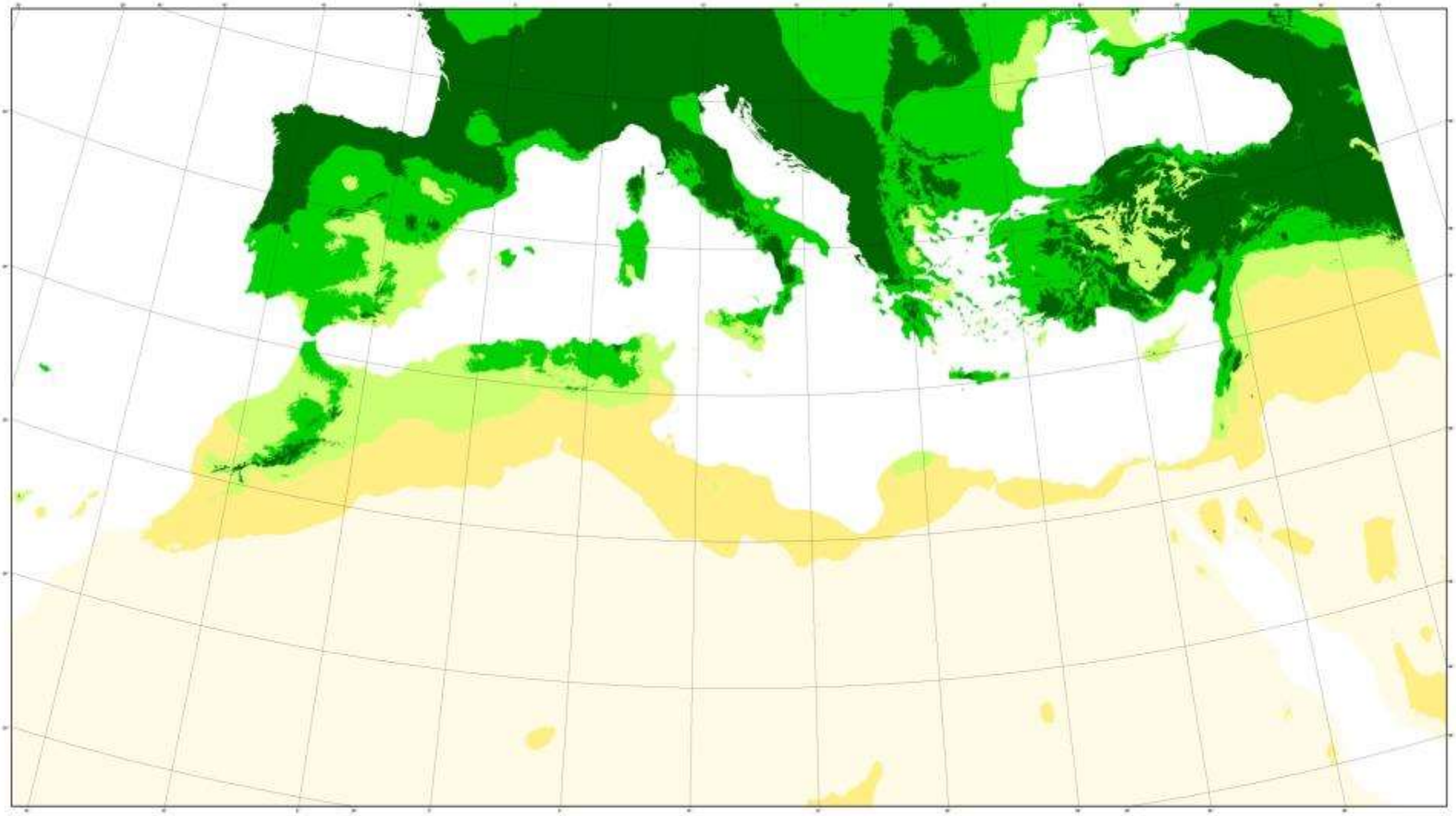
- USGS/EDC GTOPO 30

Rainfall data :

- FAO/CLIM 2 database (version 2.0)
- NOAA - GPS Global Climate Sampler
- CD Anyone 1961-90 (New Hope Climatology)

Temperature data :

- FAO/CLIM 2 database (version 2.0)



DISMED
Desertification Information System for the Mediterranean

Vegetation Sensitivity to Desertification

Normalized Difference Vegetation Index (NDVI)
Annual Trend Analysis 1982 - 2000

Unprojected data - Approximate Scale 1 : 5.000.000

Data analysis and map elaboration:

DISMED Project
Foundation for Applied Meteorology (FMA)
Institute of Bioclimatology of the National Research Council (IBIMET-CNR)
Florence, ITALY – June 2005
http://dismed.sisinet.eu.net

NDVI Annual

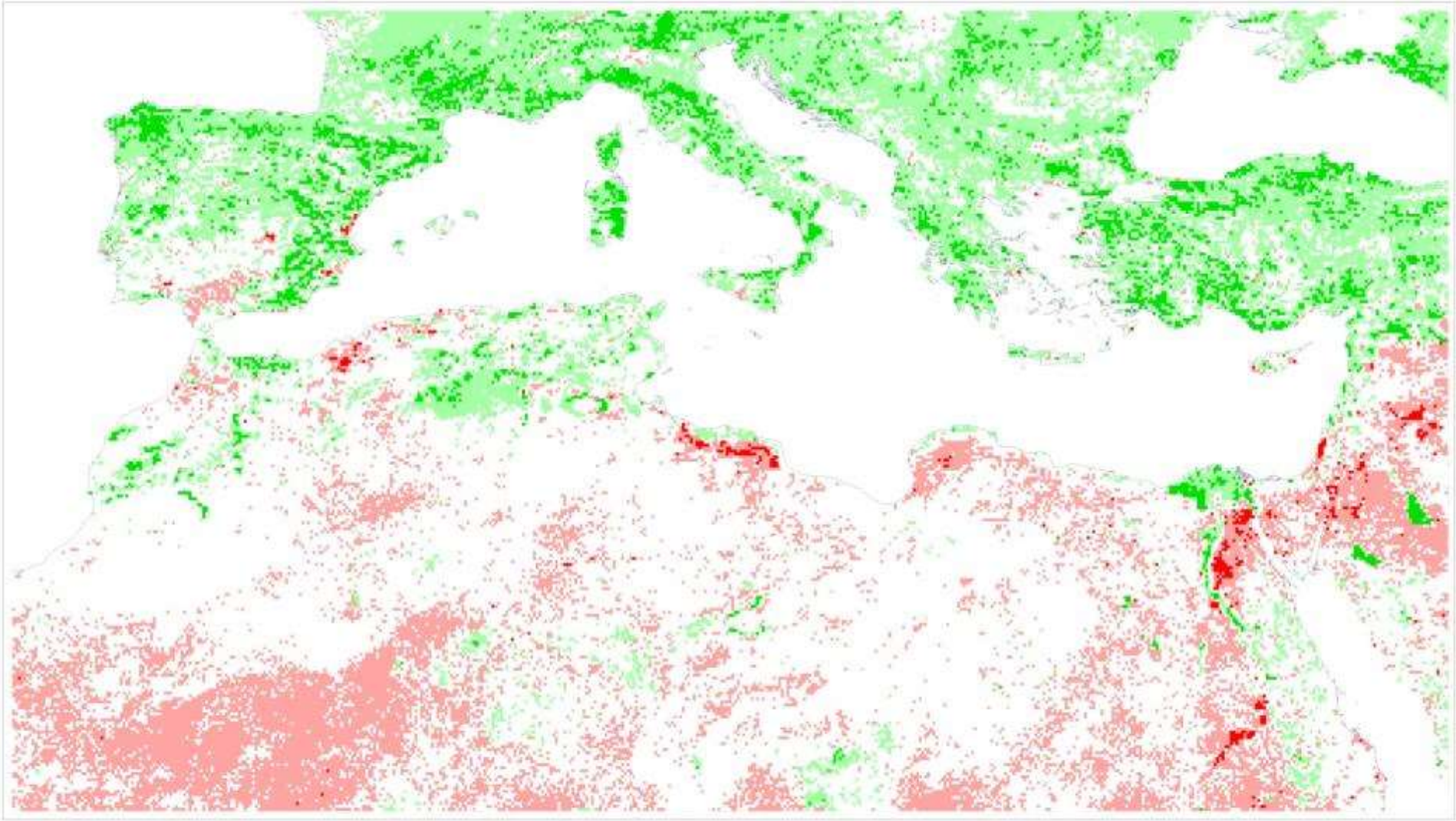
M_trend5
Annual
- Highly Negative Trend
- Negative Trend
- No Trend
- Positive Trend
- Highly Positive Trend

Data elaboration procedures:

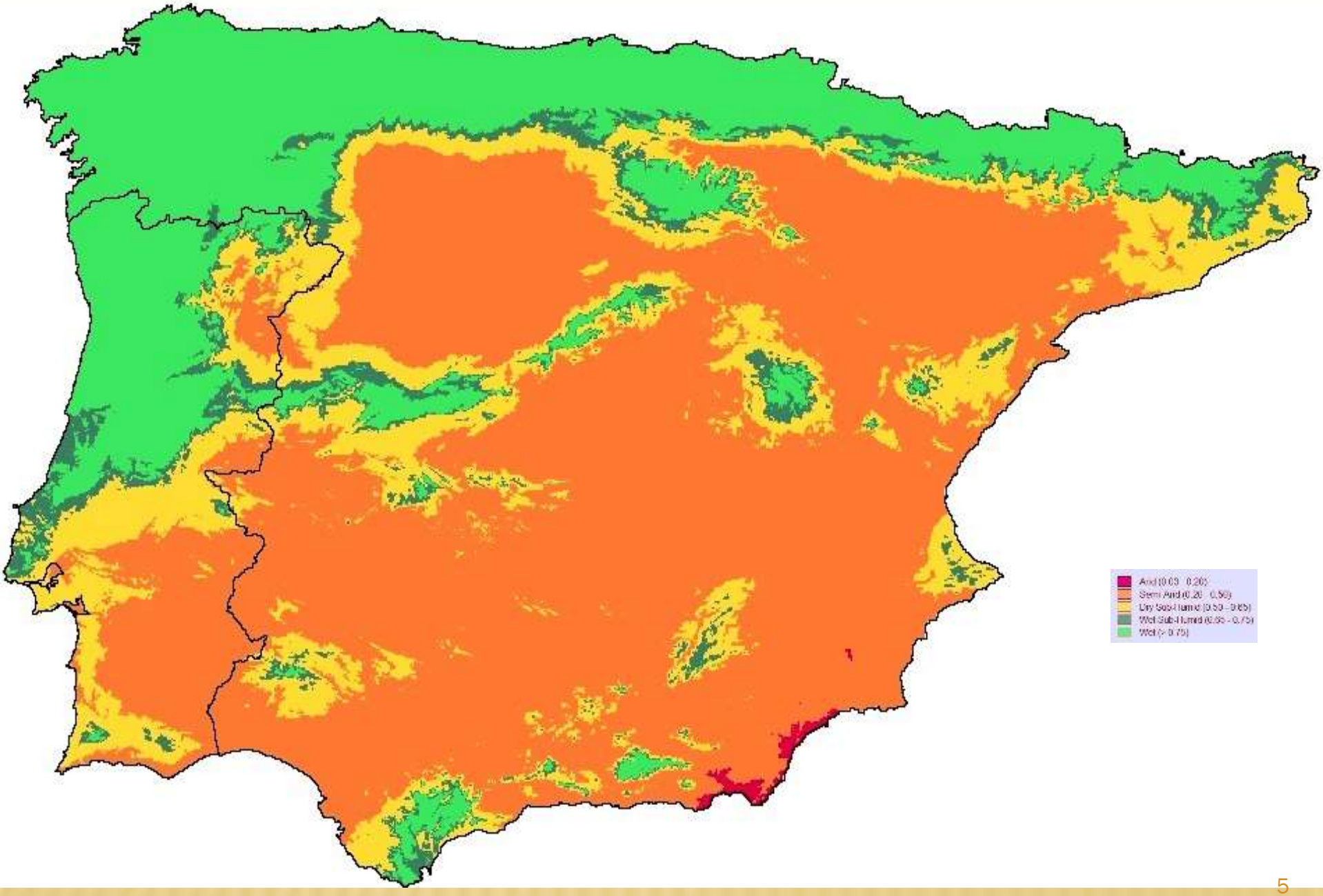
Images Georeferencing
Decoded NDVI Profiles Filtering
Decoded Linear Trend Analysis
Annual Trend Analysis

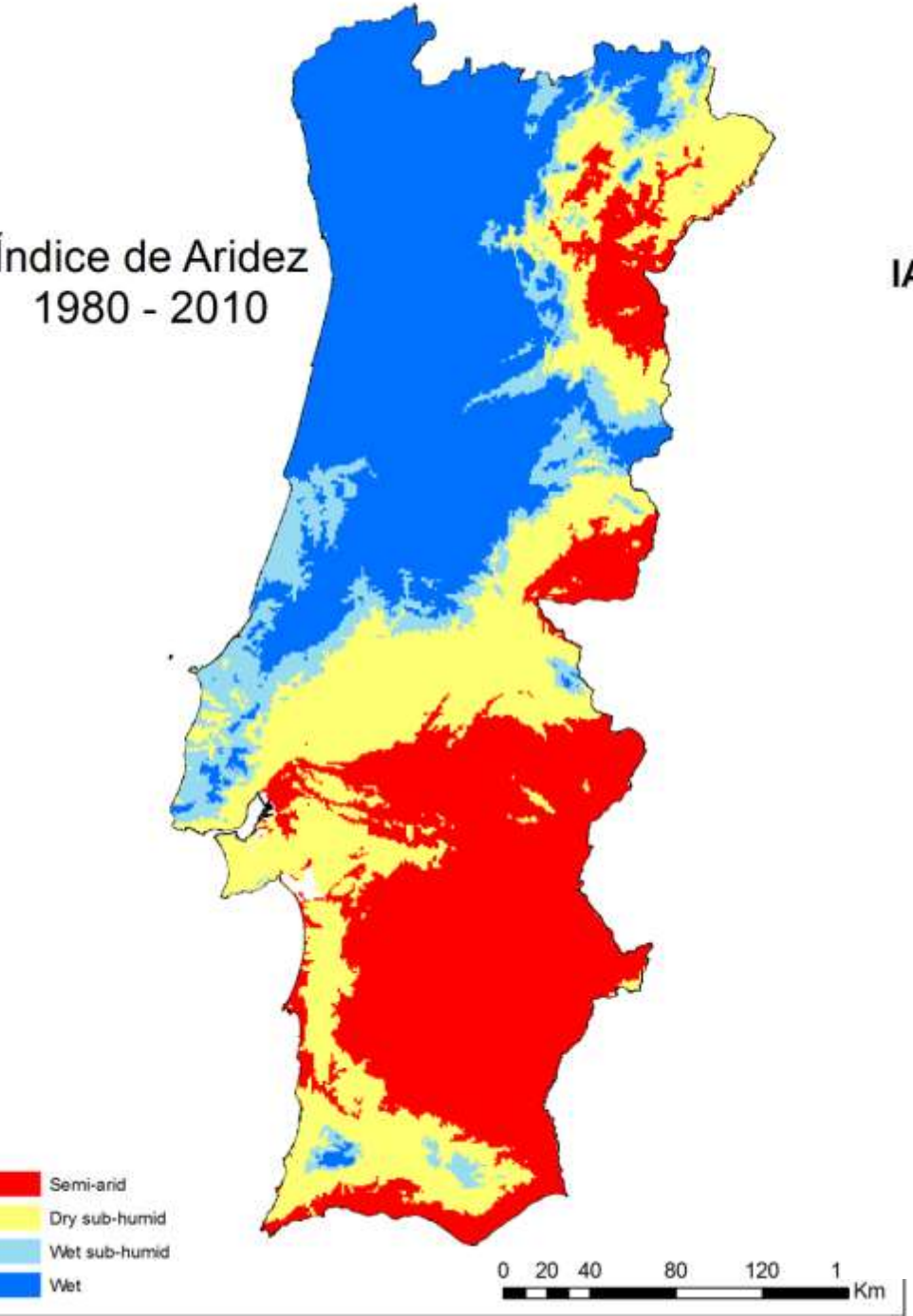
Data sources:

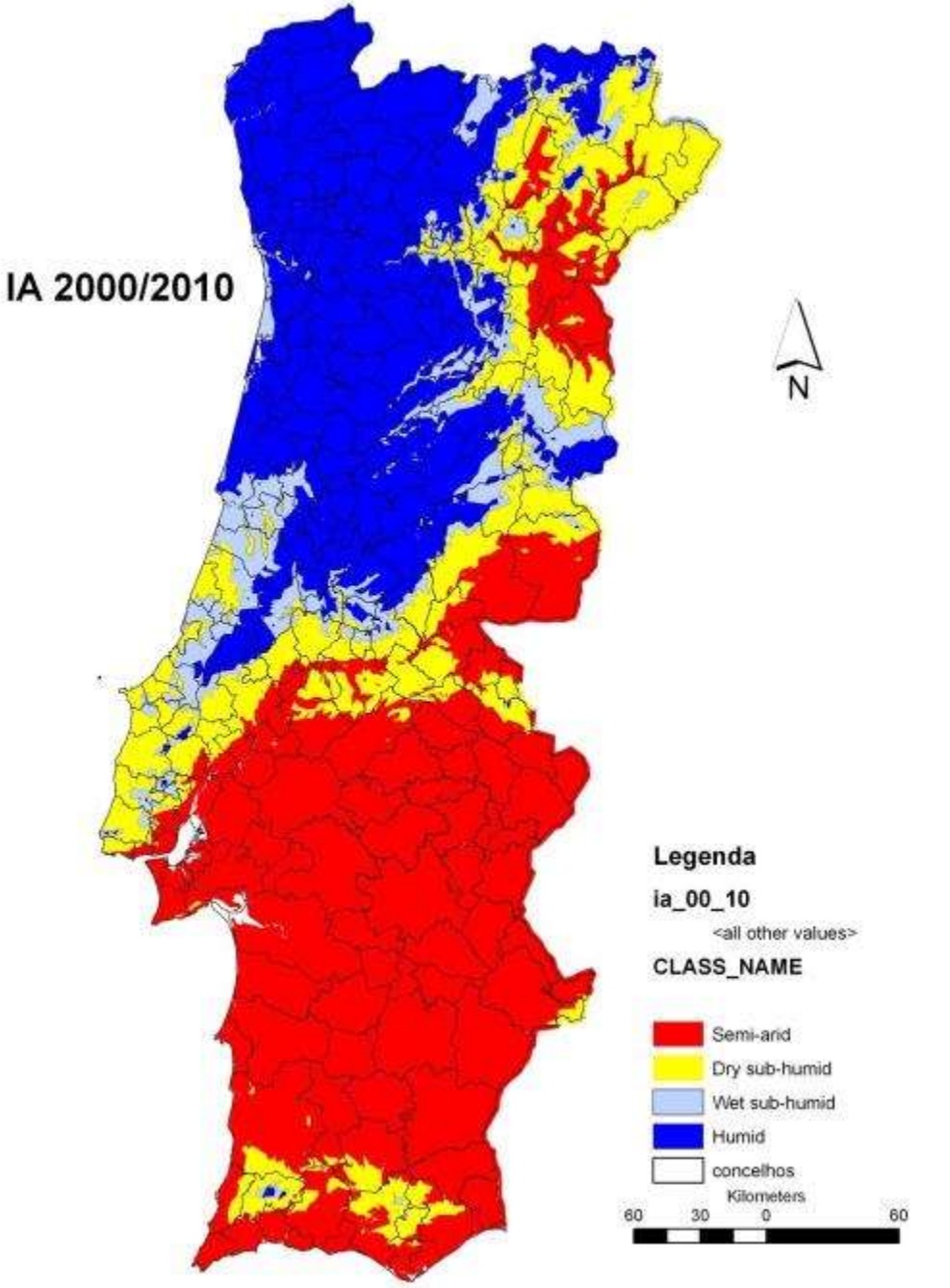
Cover Layer:
- ESRI Digital Chart of the World 1:1M
NDVI data:
- NOAA/NASA Pathfinder AVHRR Land (PAL) Program
- source: ftp://disc.gsfc.nasa.gov/data/avhrr/global_filter



Mean FAO-UNEP Aridity Index 1980-2010

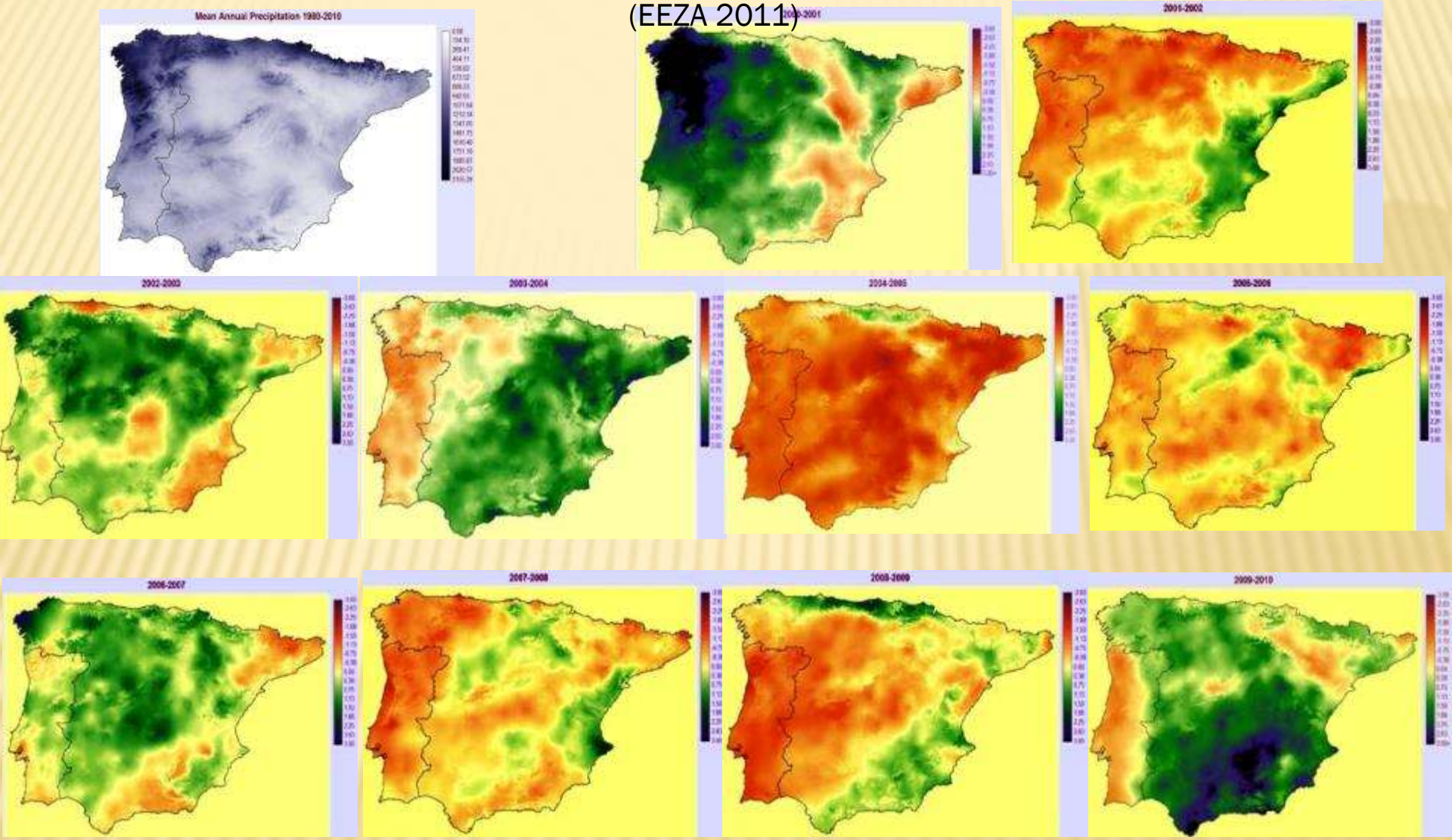



ndice de Aridez
1980 - 2010
Semi-arid
Dry sub-humid
Wet sub-humid
Wet
0 20 40 80 120 1
Km

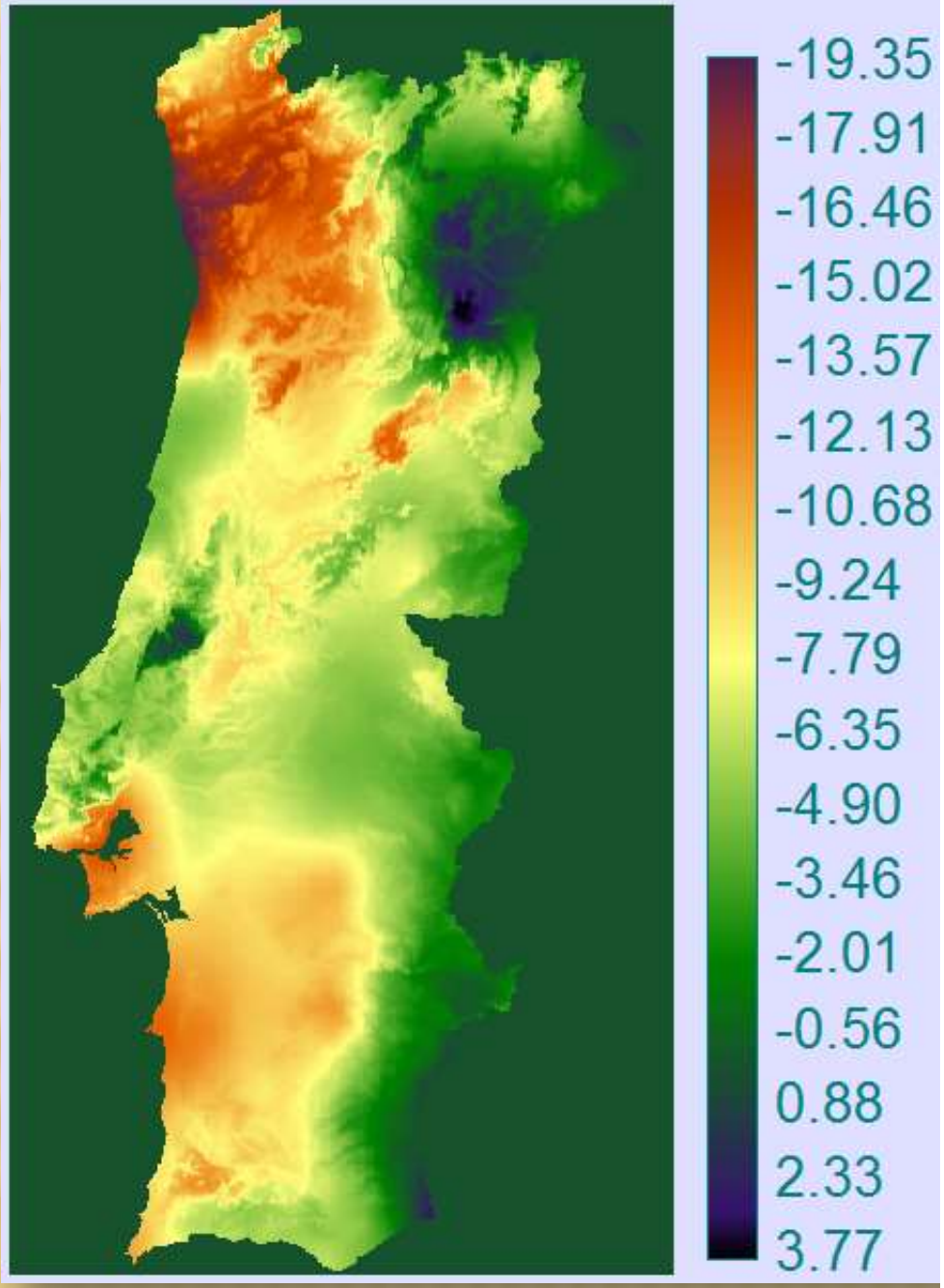

IA 2000/2010
N
Legenda
ia_00_10
<all other values>
CLASS_NAME
Semi-arid
Dry sub-humid
Wet sub-humid
Humid
concelhos
Kilometers
60 30 0 60

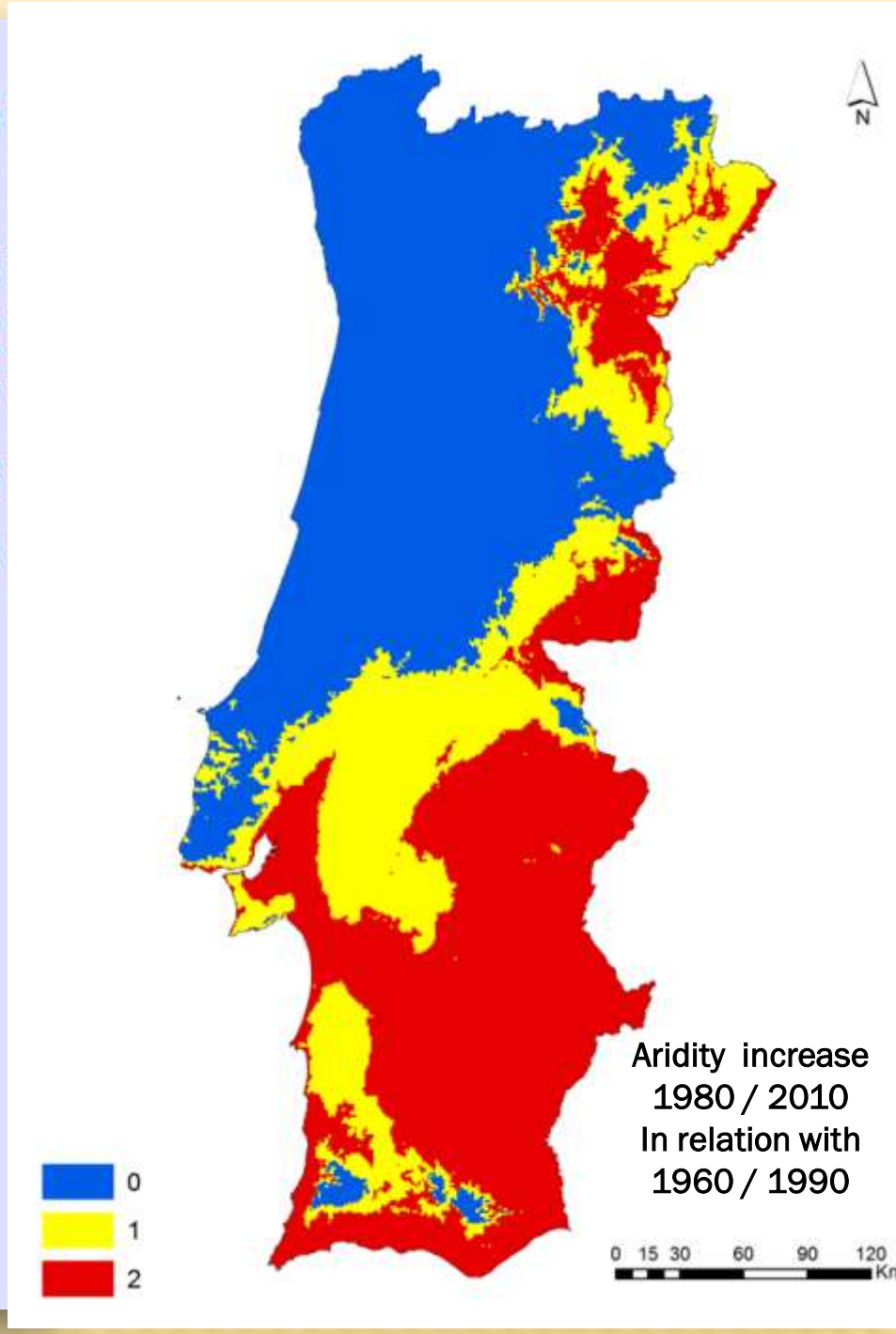
Standard deviations of the annual precipitation 2000 /1 – 2009/10 (hydrologic years) face to the precipitation avarage serie 1980/2010 for the Iberian Península

(EEZA 2011)



Aridity Index Changes 1970 / 2000 for 1980 / 2010 (%)





Desertification Sensitivity Areas Evolution in Portugal Continental on the last 50 years

Aridity classes	1960 – 1990 %	1970 – 2000 %	1980 – 2010 %	2000 – 2010 %
Semi-arid	28	24	31	45
Dry Sub-humid	8	29	28	18
Dry Areas	36	53	58	63
Wet Sub-humid		9	10	9
Wet		37	33	29
Wet Areas	64	46	42	37

PT LAND COVER NFI 2005 AND SD AREAS 2000 / 2010

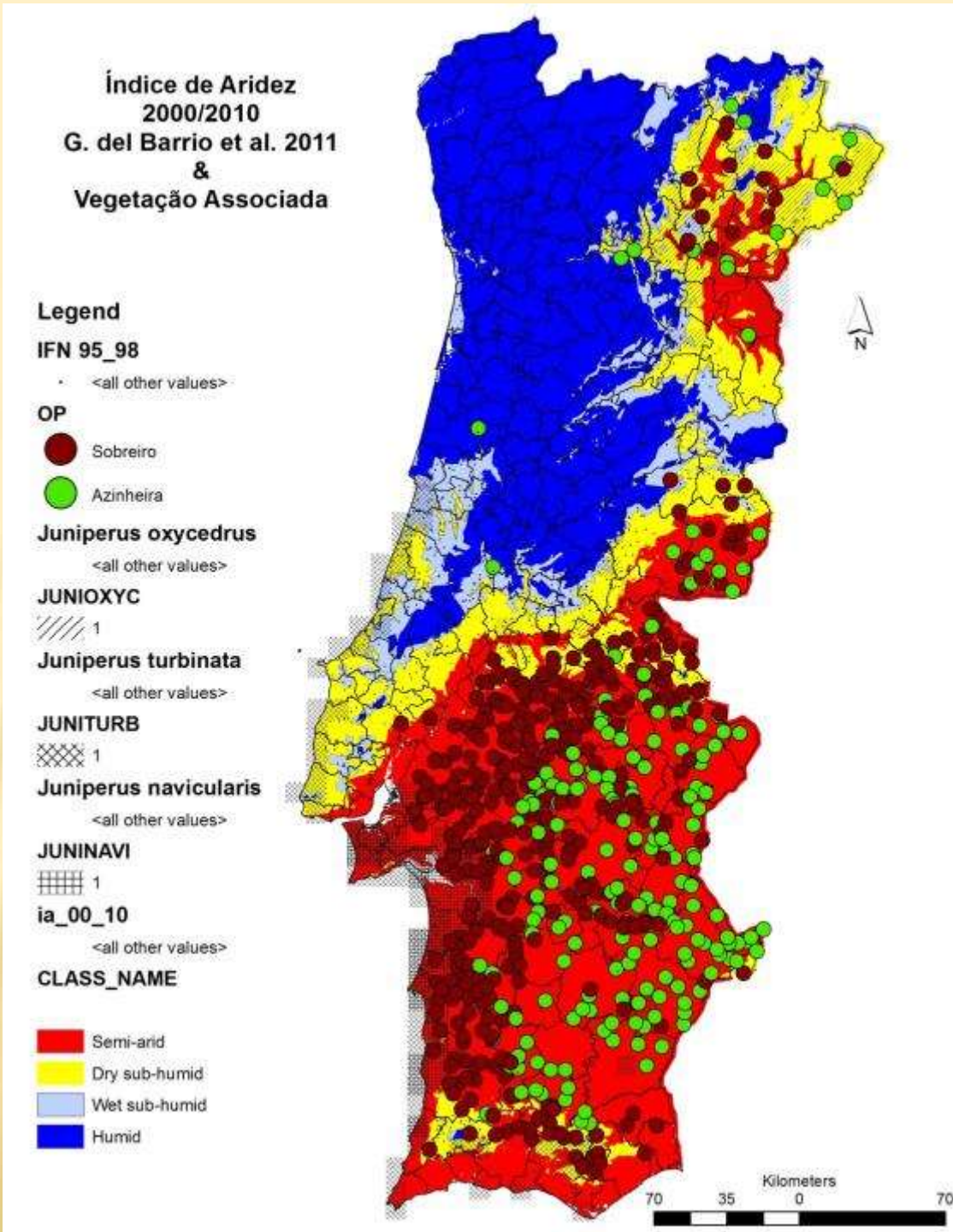
c. 25 ha/ Plot

Land Cover	NFI Plots Total PT Cont	% Total	NFI Plots SD Areas	% Total SD Areas	% Total U Territory
Forest	125.542	35,23	75.966	34,09	60,51
Schrubs	81.781	22,95	40.451	18,15	49,46
Agriculture	125.969	35,35	93.411	41,92	74,15
Wetlands	6.399	1,80	4.903	2,20	76,62
Other uses	16.613	4,66	8.090	3,63	48,70
TOTAL	356.304	100,00	222.821	100,00	62,54

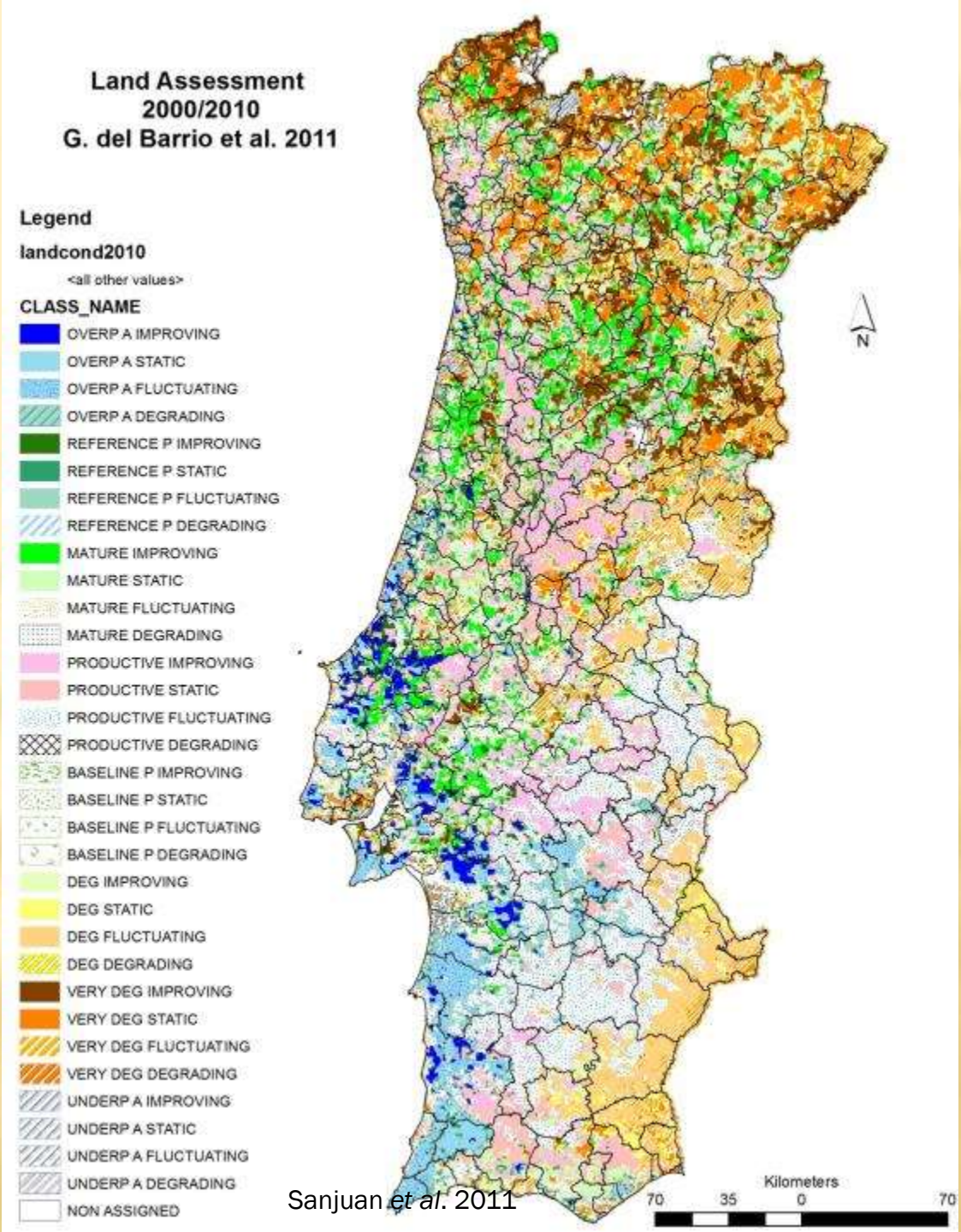
PT FOREST COVER / SUSCEPTIBLE TO DESERTIFICATION AREAS 2000 / 2010

Land Cover	Plots Total PC	%	Plots SD areas	%	% Total PC Territory
Qsuber	26.748	21,31	26.572	34,98	93,34
Qilex	11.332	9,03	11.261	14,82	99,37
Qx	5.902	4,70	1.924	2,53	32,60
Csativa	1.196	0,95	479	0,63	40,05
Eucaliptus	30.833	24,56	14.313	18,84	46,42
Acacias	197	0,16	37	0,05	18,78
Fx	3.737	2,98	1.621	2,13	43,38
Ppinaster	32.177	25,63	7.986	10,51	24,82
Ppinea	4.094	3,26	4.005	5,27	97,83
Rx	804	0,64	323	0,43	40,17
Ww (new plant)	7.311	5,82	6.581	8,66	90,02
Other forest	1.211	0,96	864	1,14	71,35
TOTAL	125.542	100,00	75.966	100,00	60,51

Forest Sructures (NFI 1995) and Aridity Index 2000 – 2010
in Portugal Continental

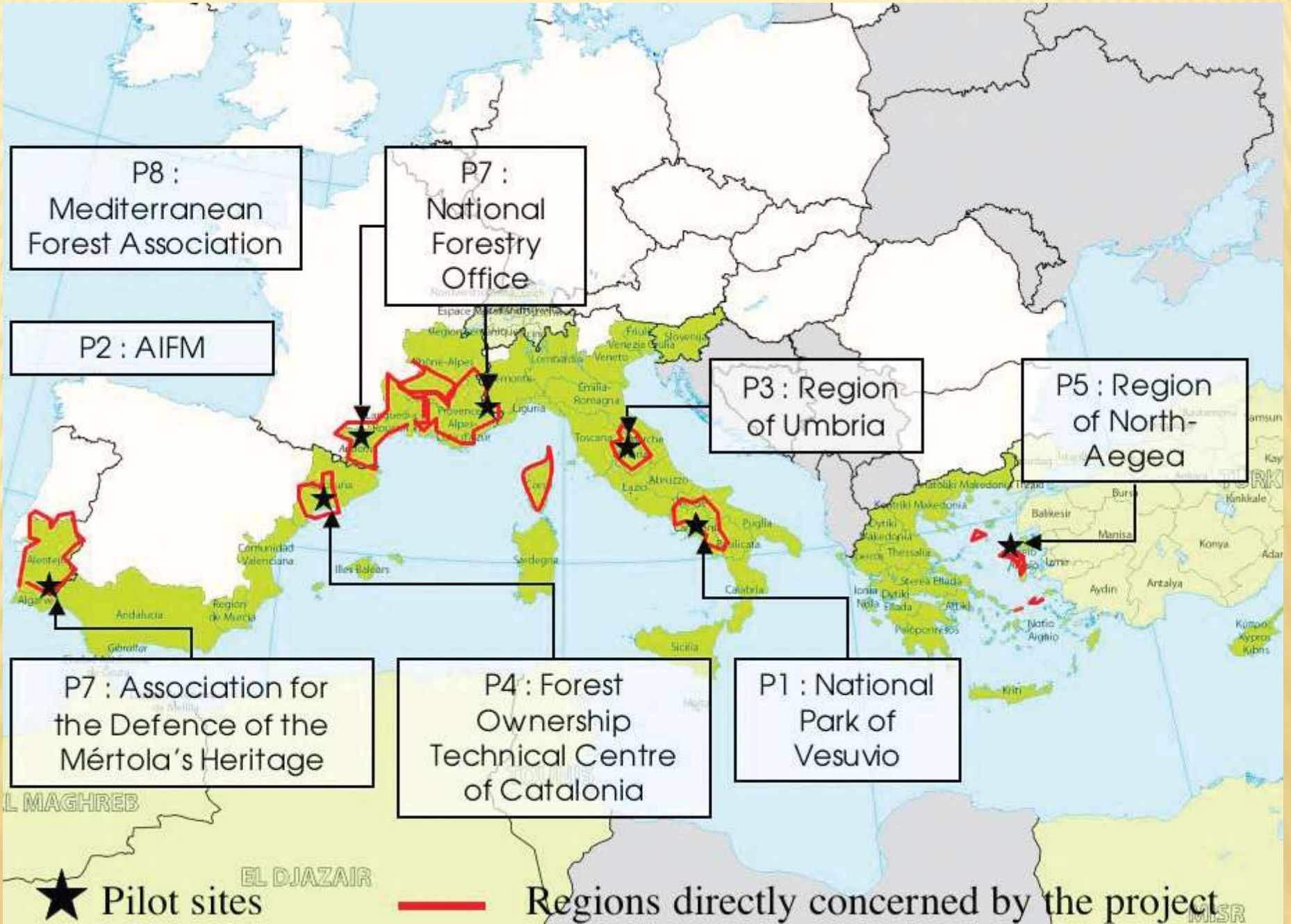


Desertification affected Areas 2000 – 2010 in Portugal Continental

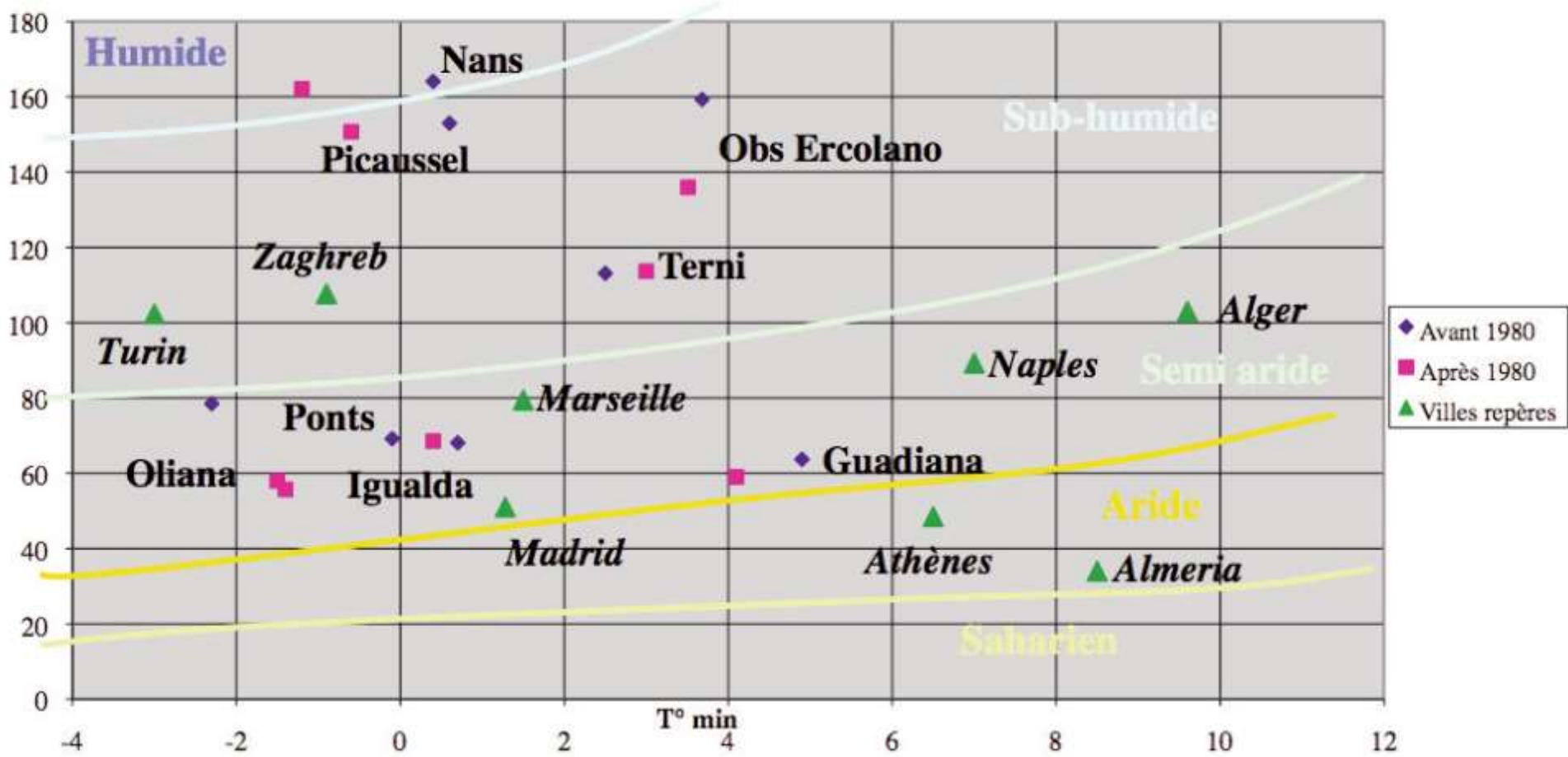


Sanjuan *et al.* 2011

For CLIMADAPT Partnership & Pilot Sites locations in the MED area.

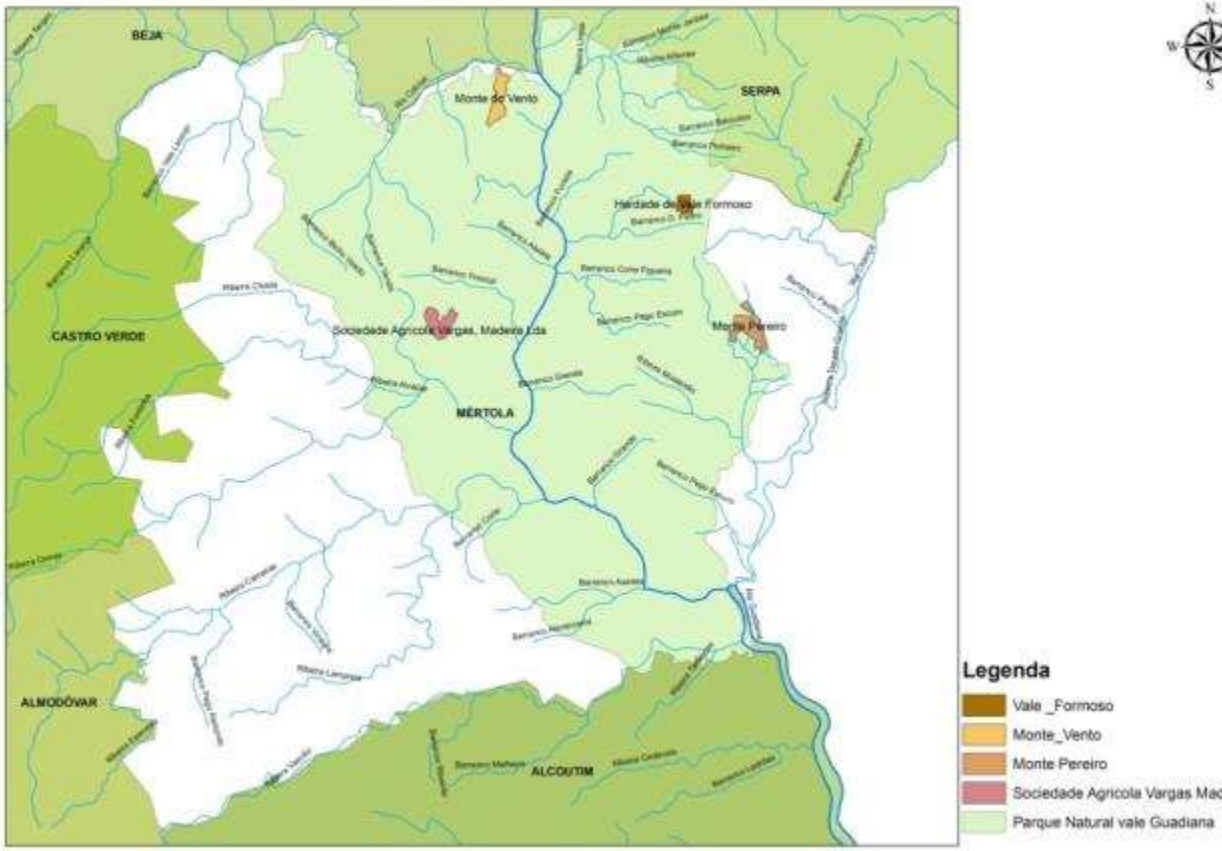


Climagramme d'Emberger évolutif des sites pilotes FOR CLIMADAPT



Abscissa, «T min» is the average minimum temperature of the coldest month (° Kelvin). Ordinate, «Q2» is an index based on annual rainfall and temperatures (including the differences between the warm season and cold season). (For CLIMADAPT Progress Book 2 30/10/2012))

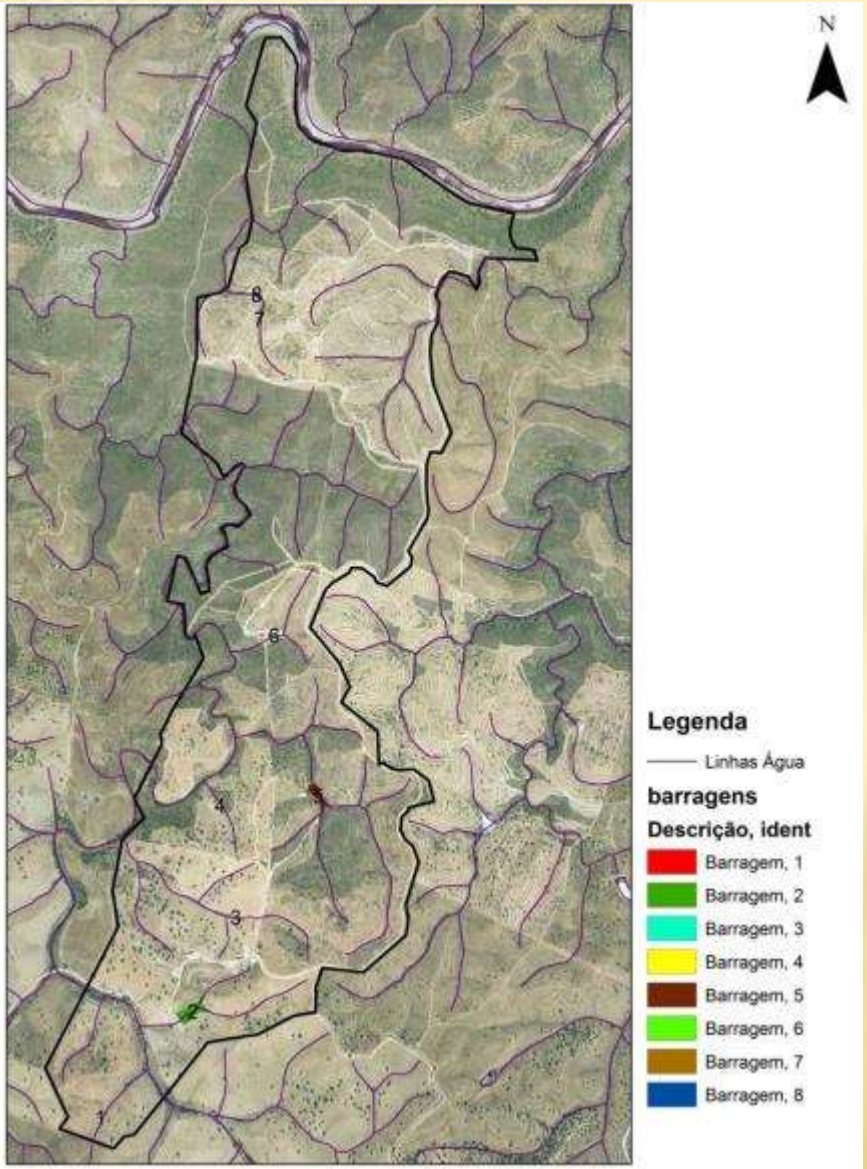
ADPM is located in Mértola, a small village in South Easth Portugal (Baixo Alentejo region). It has 1.279,40 Km^2 and 8.712 inhabitants, being one of the most depopulated areas of Portugal (6,7 hab/km^2).



TERRITORY IDENTITY FILE	
Region's/province's name	Baixo Alentejo
Region or province area	8505 km^2
Population	125 066 hab (15/km^2)
Global economic and social situation	PIB/hab = 8900€ Unemployment rate = 11,5%
Institutional structure	Regional Departments that have some decison capacity.
Protected natural area	-Natural Park of Guadiana Valley (69.773ha), -SIC of Mourão Barrancos (PTCON0053) (43.309ha), -SIC of Guadiana (PTCON0036) (38.463ha), -ZPE of Castro Verde (PTZPE0046) (85.344ha), -ZPE of Guadiana (PTZPE0047) (76.546ha)
Forested area in the region/province	427 524 ha (50%)
Including private forests	363 395 ha (85%)
National or regional organism for forest management	Ministério da Agricultura, Mar, Ambiente e Ordenamento do Território - Direcção-General da Conservação da Natureza e Florestas
Global tendencies of the forest policy usually implemented in the region	Low intervention degree. Priority given to protection and tourism.
Main potential climate change related impacts in the region	Die-back of *Quercus ilex* and *Suber*, increase wildfires, increase of erosion and desertificatio problems

PILOT SITE IDENTITY FILE	*Natural Park of Vale de Guadiana*
Particular status and available regulation and planning tools	Natural Park, Natura 2000, Baixo Alentejo Forest Plan
Pilot site area	69 773 ha
Population	7500 (11/km^2)
Main cities and municipalities	Mértola.
Forested area in the pilot site	13954ha (20%)
Including private forests	13500ha
Organism locally responsible for forest management	Ministério da Agricultura, Mar, Ambiente e Ordenamento do Território - Direcção-Geral da Conservação da Natureza e Florestas
Main forest tree species	*Quercus ilex, Quercus suber, Olea europea, Fraxinus angustifolia, Populus alba, Salix sp. Eucalyptus globulus*
Stand productivity	New projects (600 trees/há), *Montado* (90 trees/há)
	Main production is cork (2Ton/ha) and acorns for cattle (20 sheeps/ ha) or (3 cows/ha), firewood and charcoal
Main role of the forest	Protection, grazing, Tourism
	Grazing activities
Other land uses category on the pilot site (non forested area)	Agriculture, livestock, tourism, grazing
Annual amount of precipitations (millimetres)	450
Mean lower temperatures of the coldest month (°C.)	4,7
Mean higher temperatures of the warmest month (°C.)	33,8
Global geological conditions	Acid very thin schist soils with a very low productivity
Main natural risks threatening the pilot site	Drought, wildfire, desertification and high risk of erosion

MONTE DO VENTO CLIMADAPT PILOT SOLUTIONS TESTED



- **Forest production**: cork, holm oak, arbutus unedo, apiculture and grazing (sheep);
- Use of practices that improve **ecological services** (hydrological cycle, soil conservation, CO2 retention and landscape improvement);
- **Conservation of critical areas for fauna or flora**;
- **Increment of biodiversity** – 21 different species planted, mycorrization of cork and holm oak, increase of availability of food to birds and small mammals
- **Fire prevention** – restoration of natural fire breaks, different composition of stands; grazing acting like fire breaks;
- **Use of funds available** for ordinary land owners (possibility to replicate in other properties)

MERTOLA'S LANDSCAPES

MERTOLA'S LANDSCAPES

Monte do Vento interventions

Lúcio do Rosário
ICNF
Rua Santa Marta, 55
1150-294 Lisboa
t. +351 213507900
f. +351 213507986
lucio.rosario@icnf.pt

Paulo Silva
ADPM
Largo Vasco da Gama, s/n
7750 - Mértola
t. +351 286610000
f. +351 286610001
interambiental@adpm.pt