

Portuguese Contribution to the Cost 729

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FACULDADE DE CIÊNCIAS UNIVERSIDADE DE LISBOA



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Assessing and managing nitrogen fluxes in the atmosphere-biosphere system in Europe

Cost 729

- “ the research on ammonia emissions has shown that there is a huge uncertainty in NH_3 emissions from diffuse sources and its spatial and temporal variations”.
- “the spatial resolution of emissions estimates is an important factor to be considered, as most effects occur close to sources or source areas, and current estimates are frequently of limited resolution”
- Models of formation and deposition are not fully tested in Mediterranean climates.

The most detailed map with NH₃ emissions produced by APA

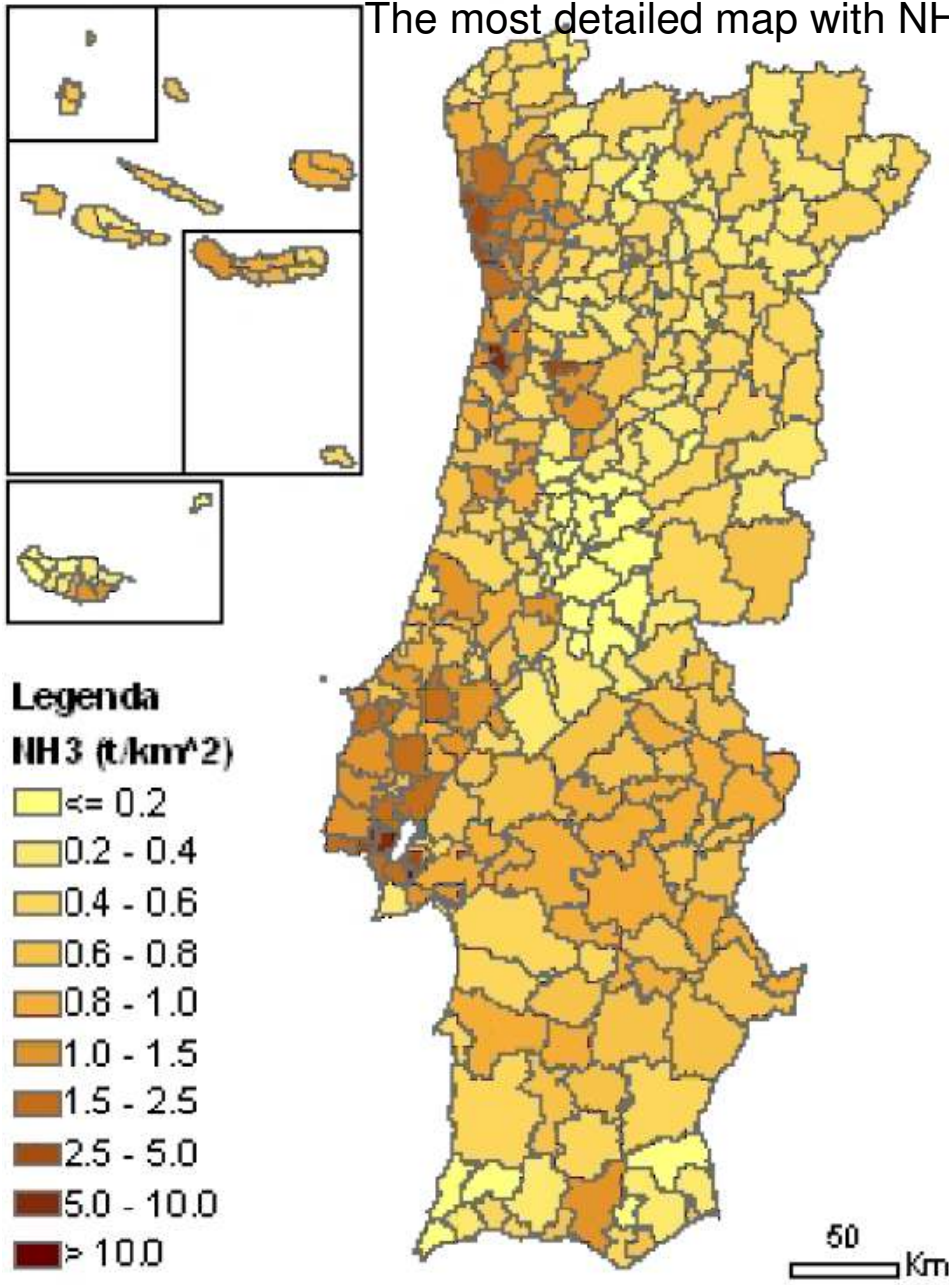
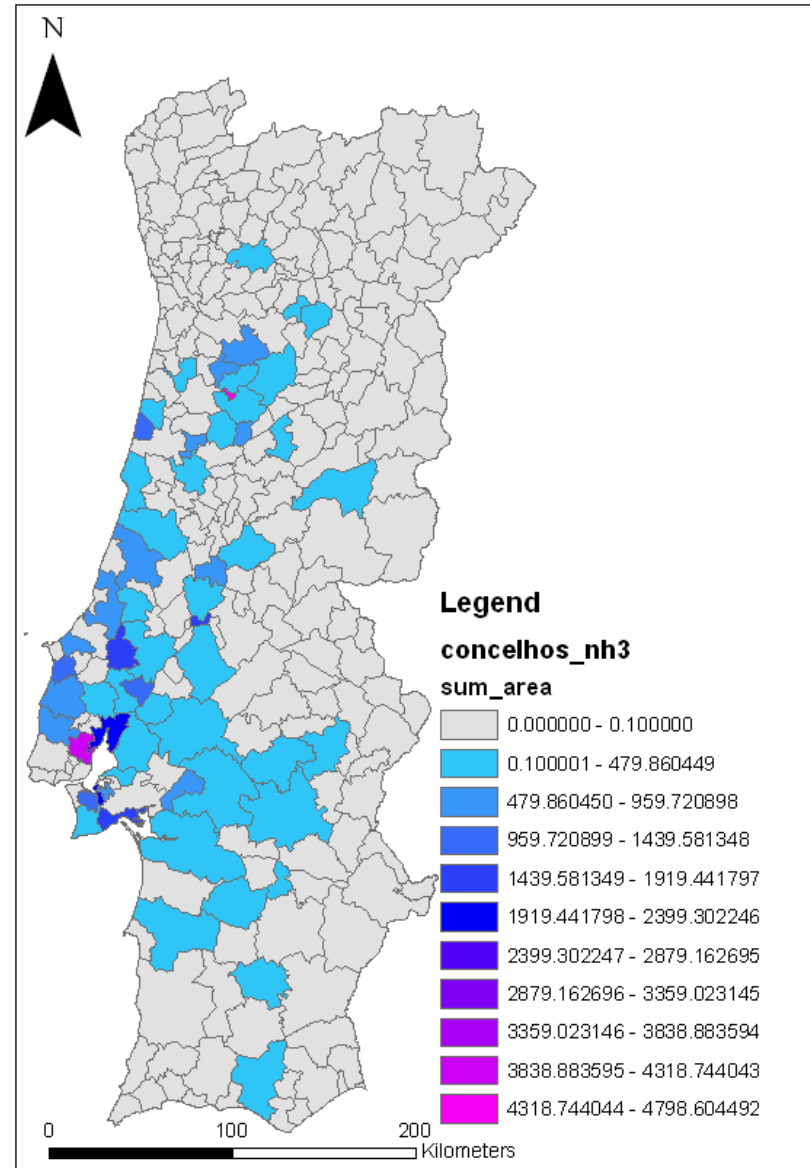


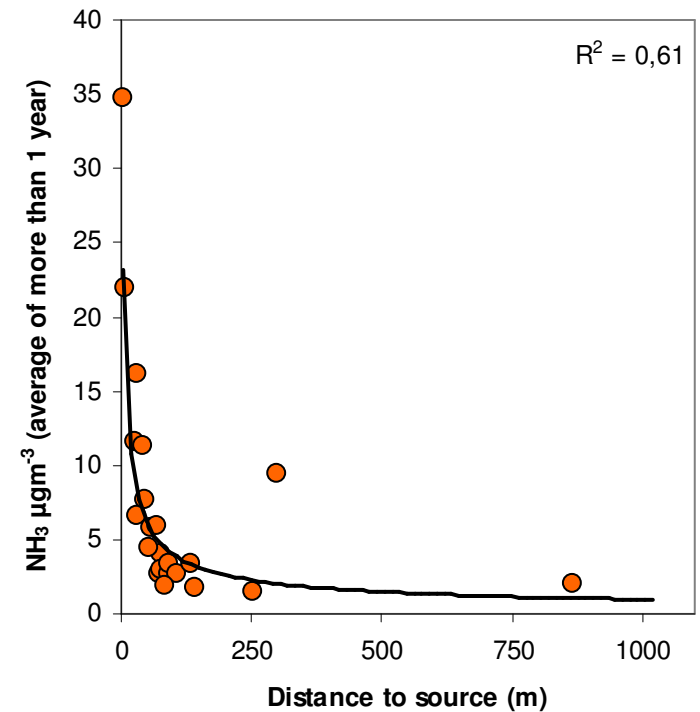
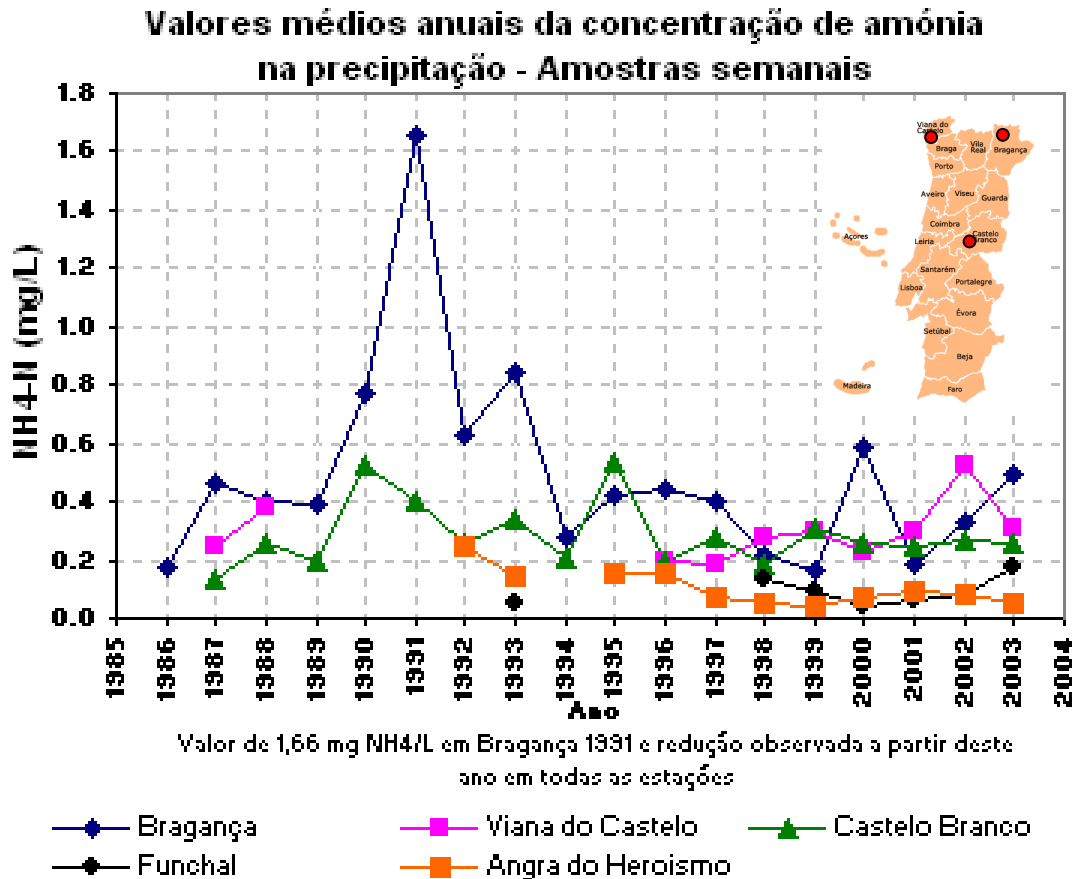
Figura 13. Emissões totais de NH₃ em 2003

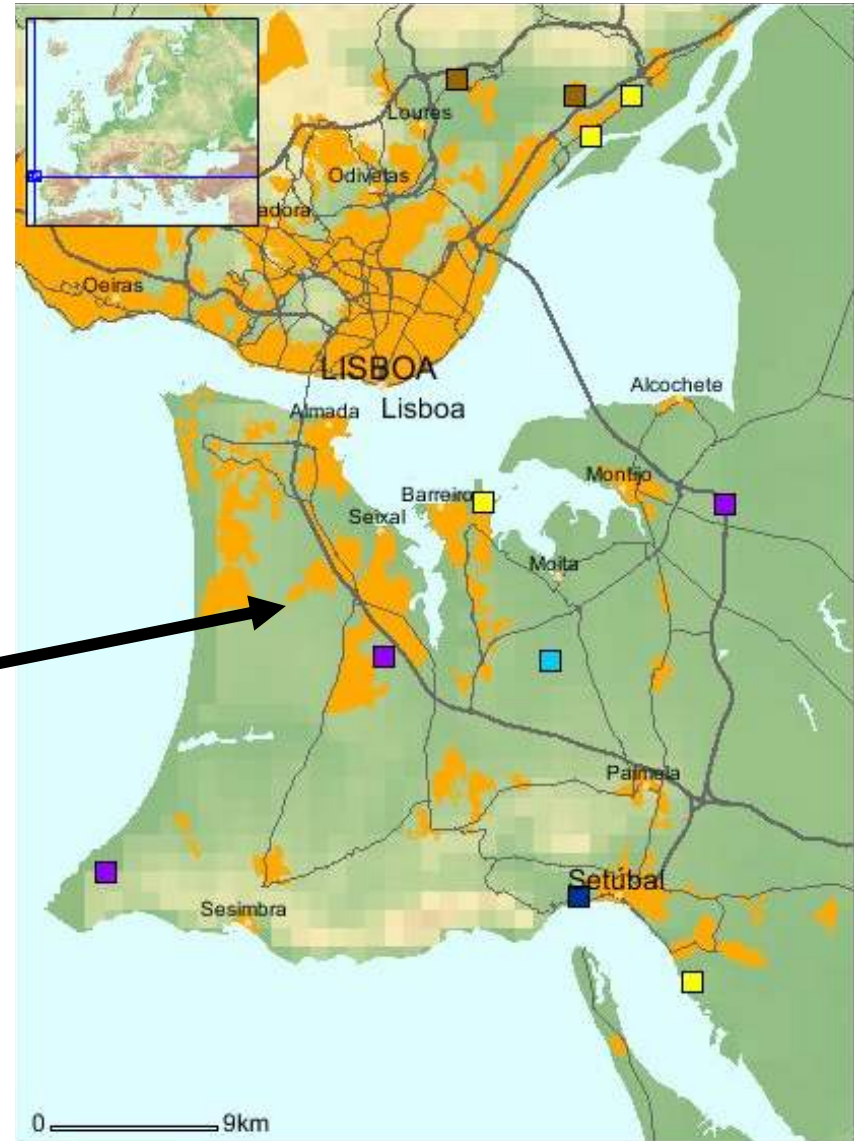
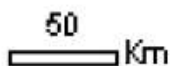
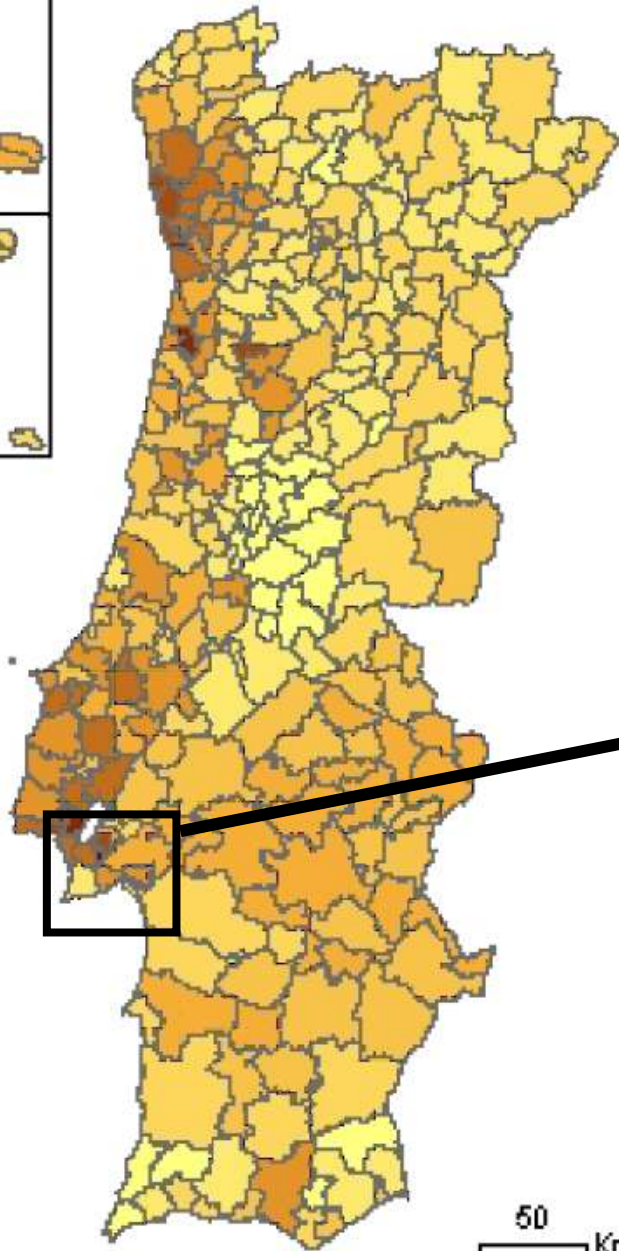
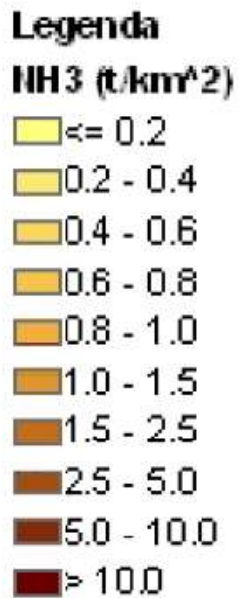
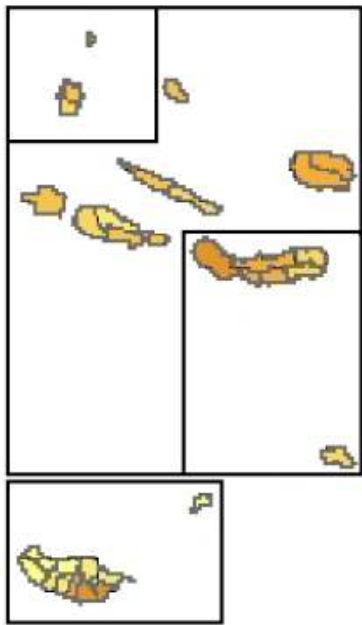
Spatialization of the PT EPER Data Base
 In total represents 10% of the total emissions



There are only 3 monitoring stations measuring continuously NH_4^+ in rain water in the continental part of the country.

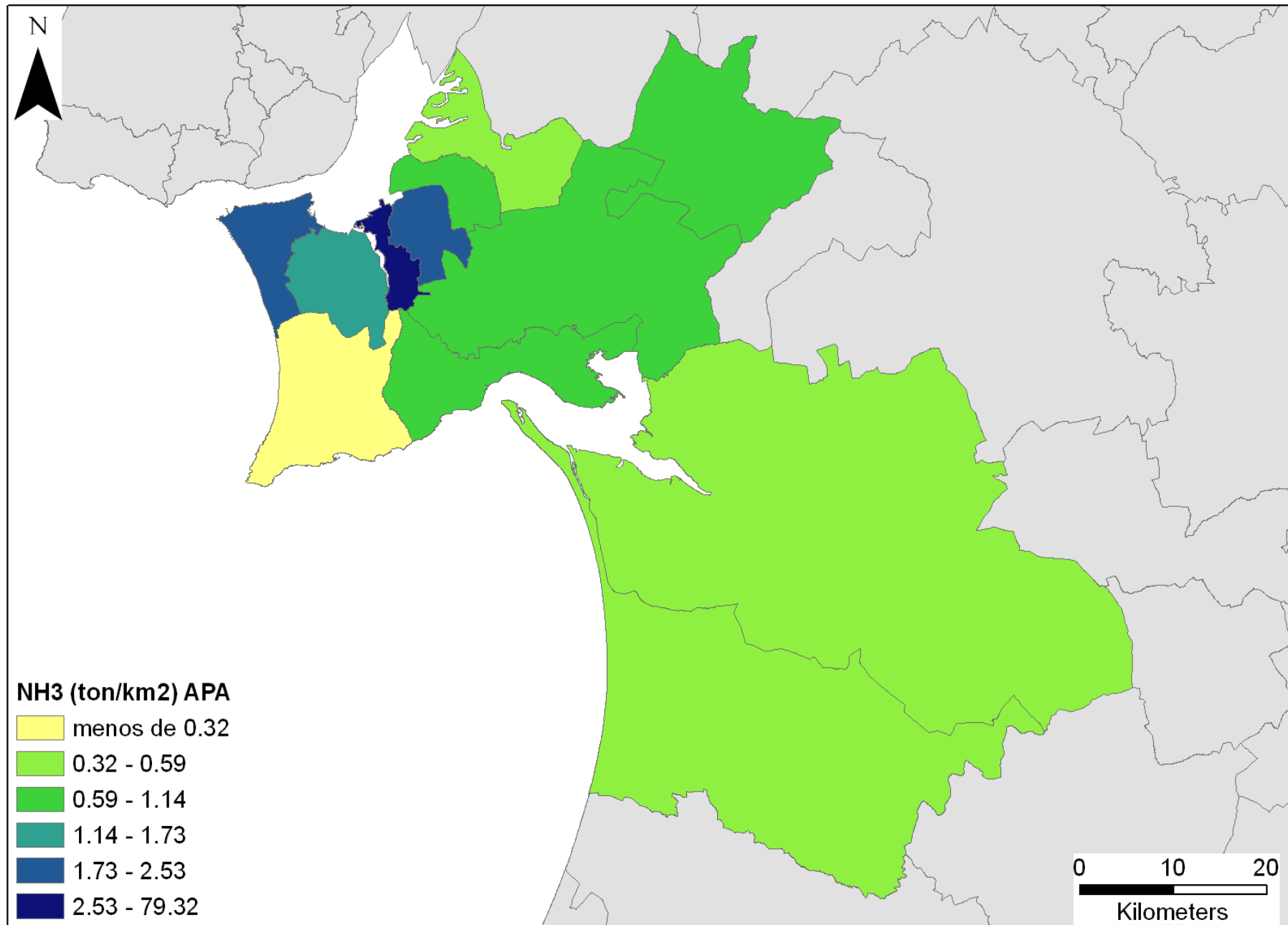
The effect of NH_3 is observed locally. Sampling grids and the actual territory unit used for mapping NH_3 are not adequate to represent the local sources of NH_3 .





Total emissions of NH3 in 2003

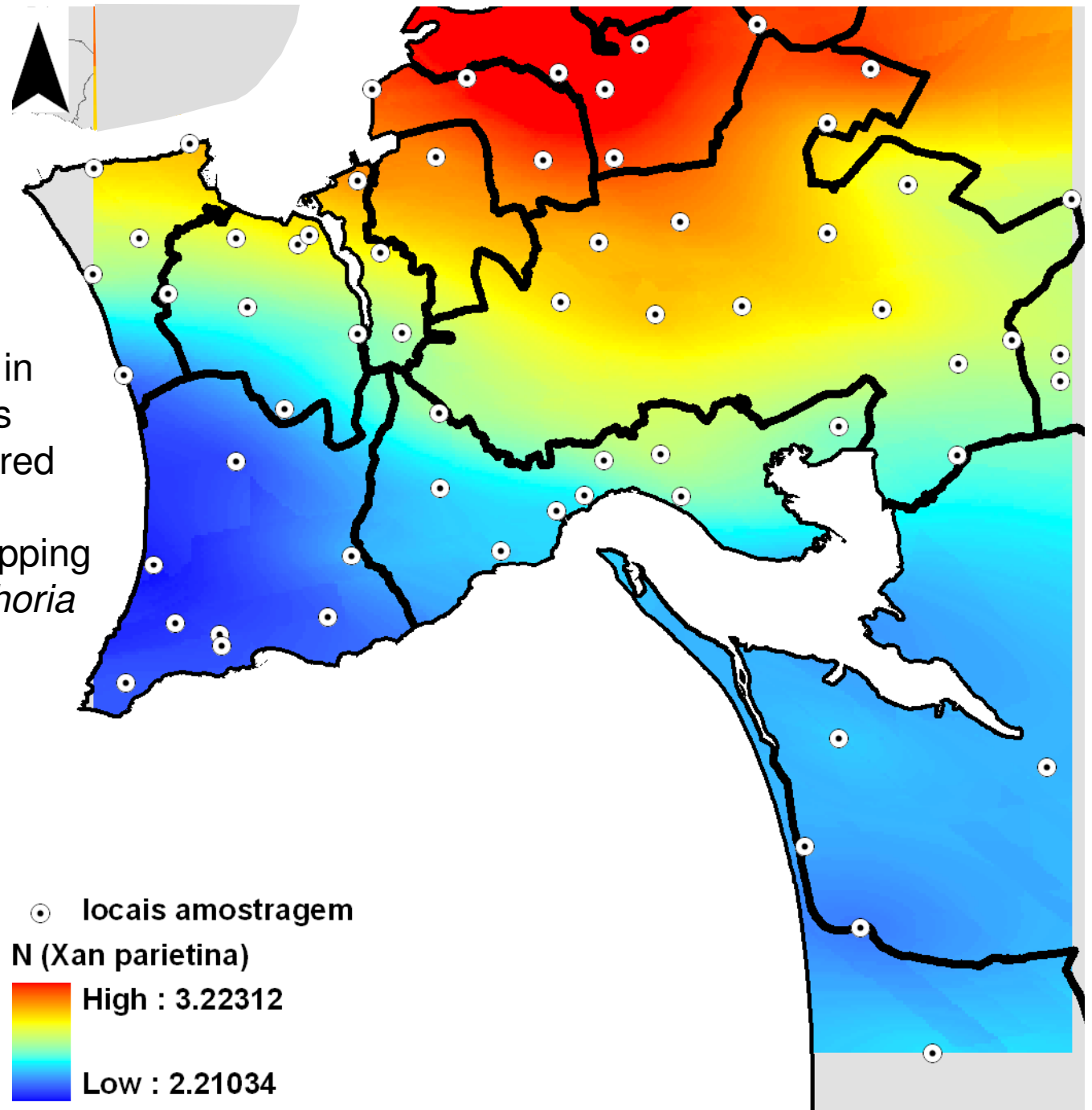
NH₃ Total emissions for Portugal in Península de Setúbal (APA, 2003) – Municipality level





Lichens were collected in
Several sampling points
And total N was measured

This represents the mapping
Of N in the lichen *Xanthoria
parietina*



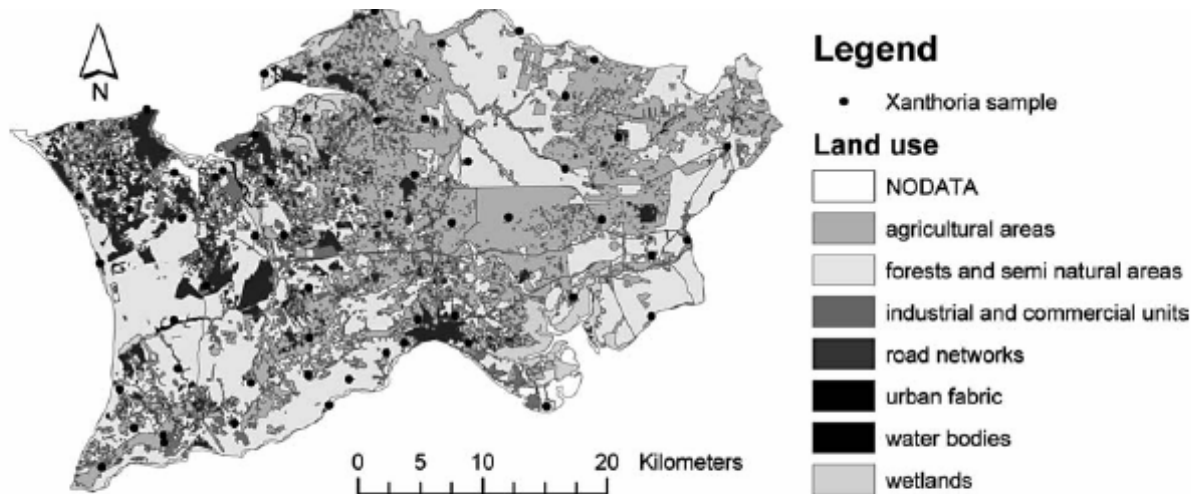


Figure 2. Land use map of the study area, Setúbal peninsula (developed by the Life Environment Program ENV/P/000556 and Life Nature Program 98-NAT/P/5235), with the distribution of the 60 sampling sites where the lichen *Xanthoria parietina* was collected from house roof-tiles (represented by dark points).

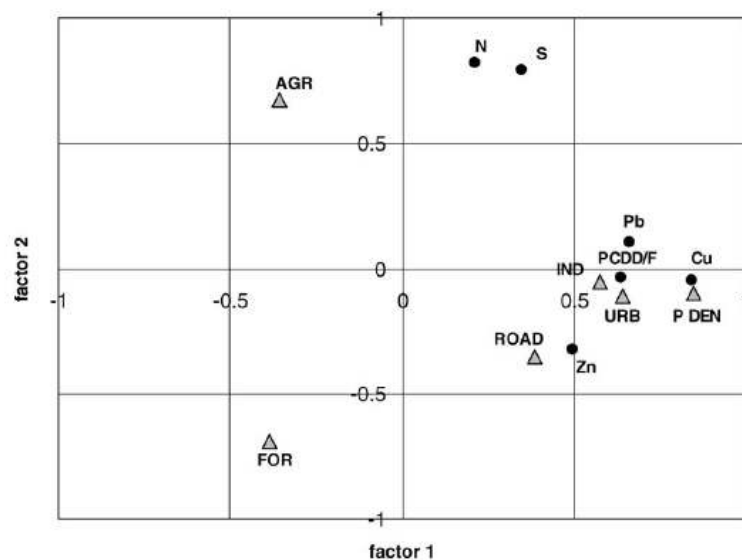


Figure 3. Principal component analysis (PCA) of the pollutant data obtained through chemical analysis of the 60 samples of the lichen *Xanthoria parietina* collected in March 2000 in the Setúbal peninsula; the first two factors explain 53.0% of the data variance.

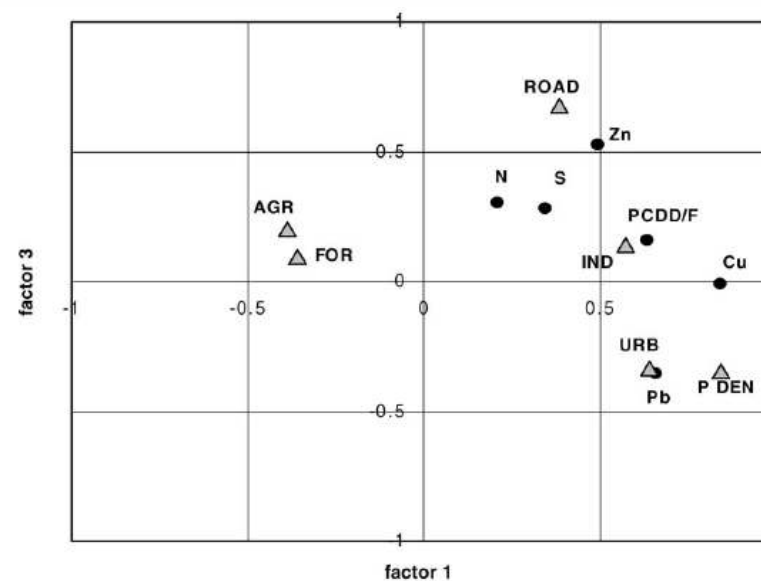
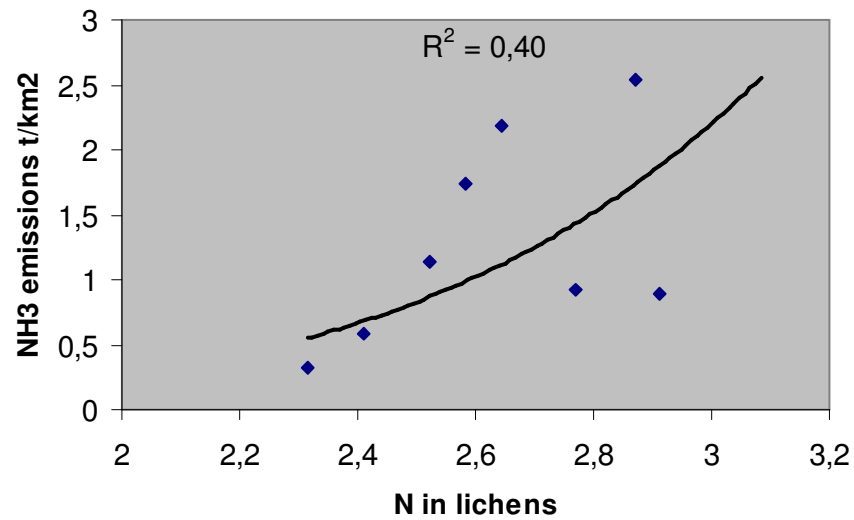
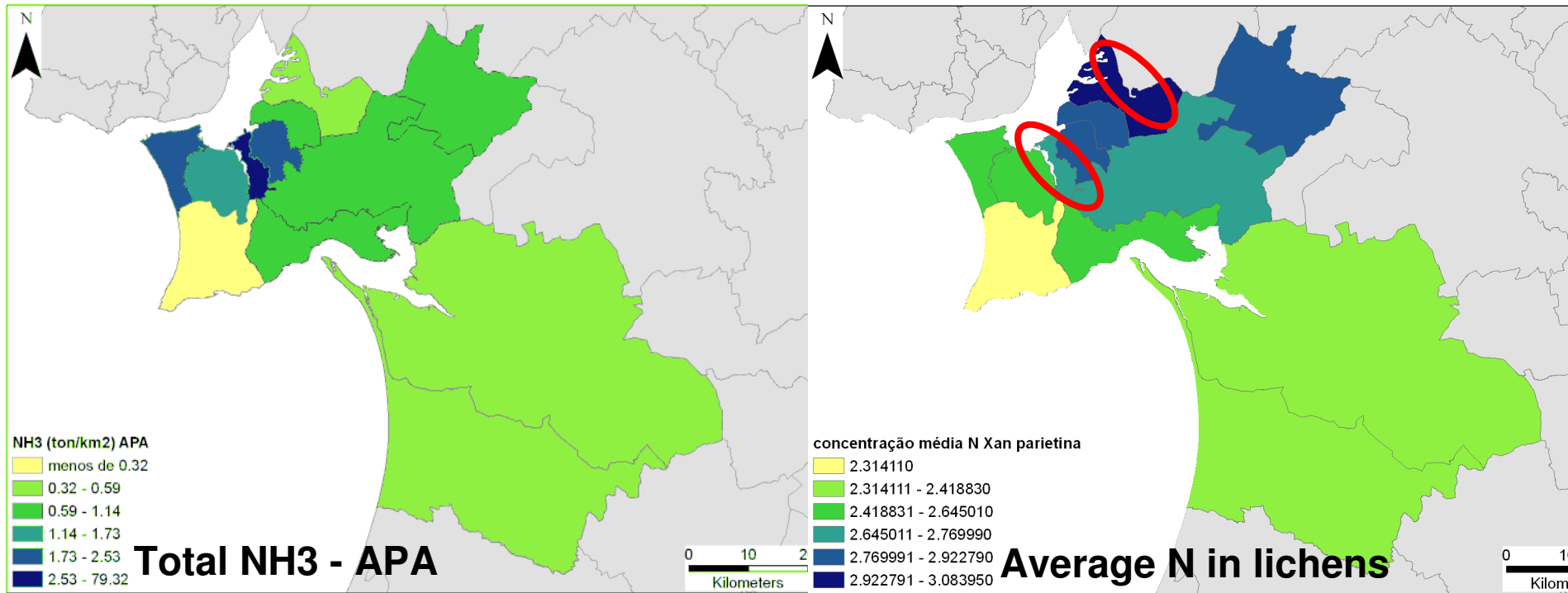


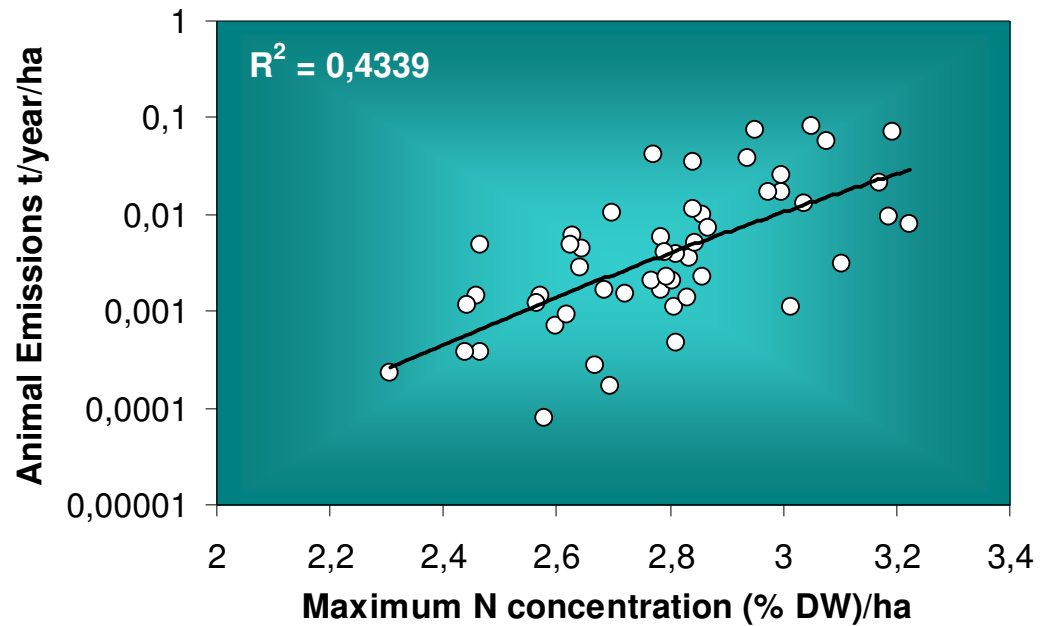
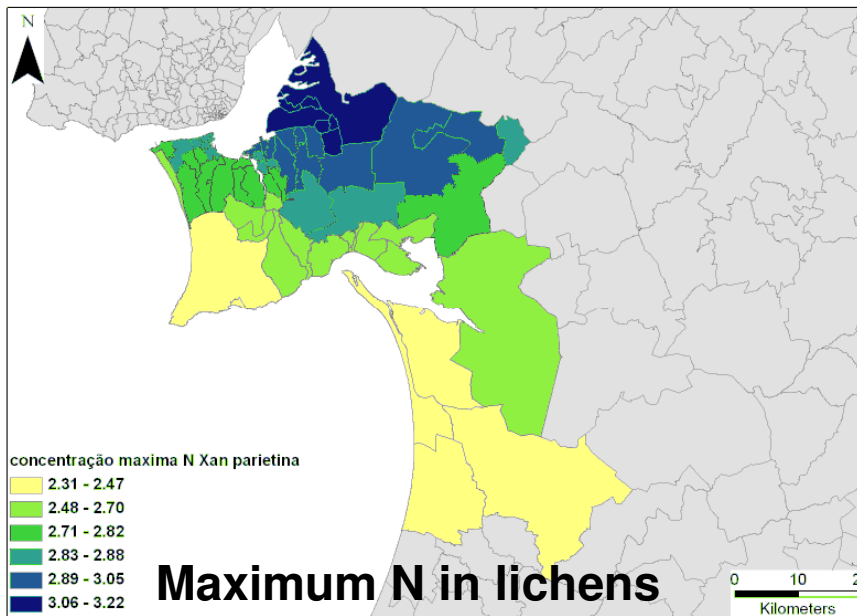
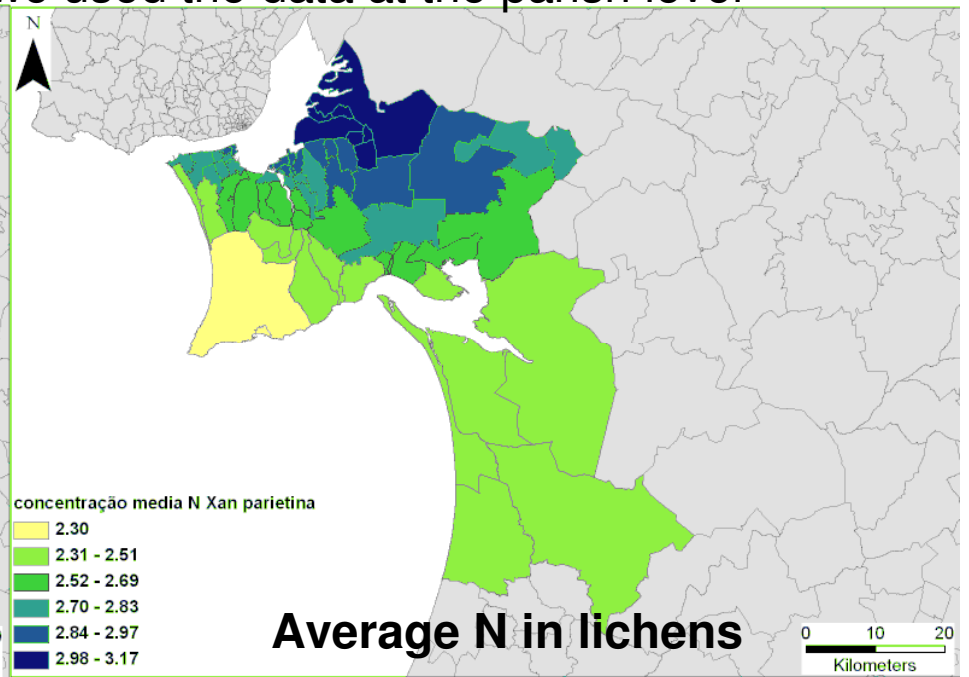
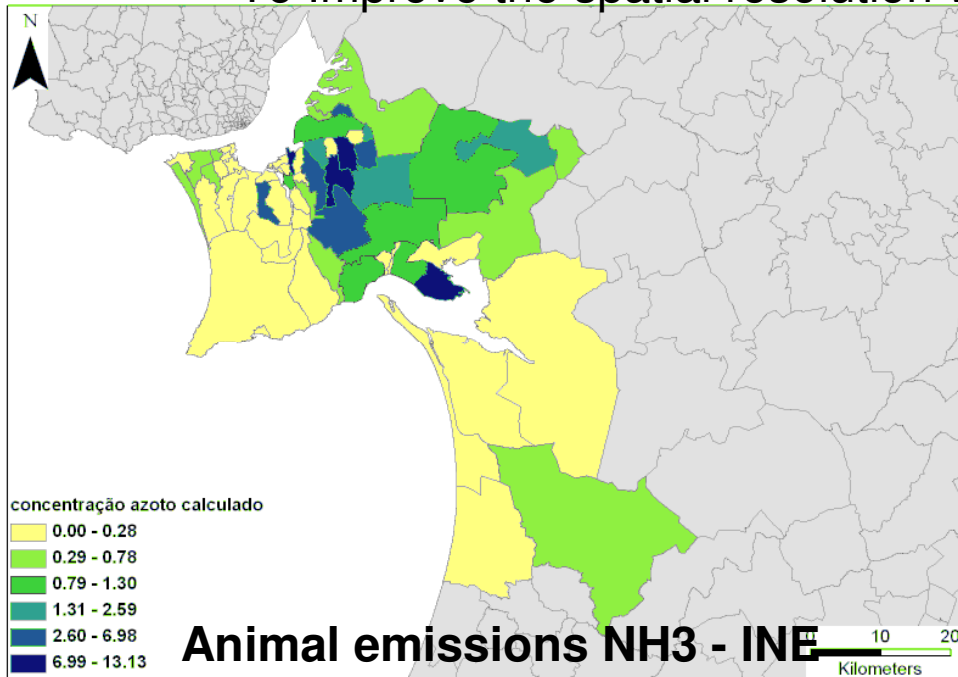
Figure 4. Principal component analysis (PCA) of the pollutant data obtained through chemical analysis of the 60 samples of the lichen *Xanthoria parietina* collected in March 2000 in the Setúbal peninsula; the first and third factors explain 43.5% of the data variance.

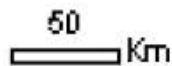
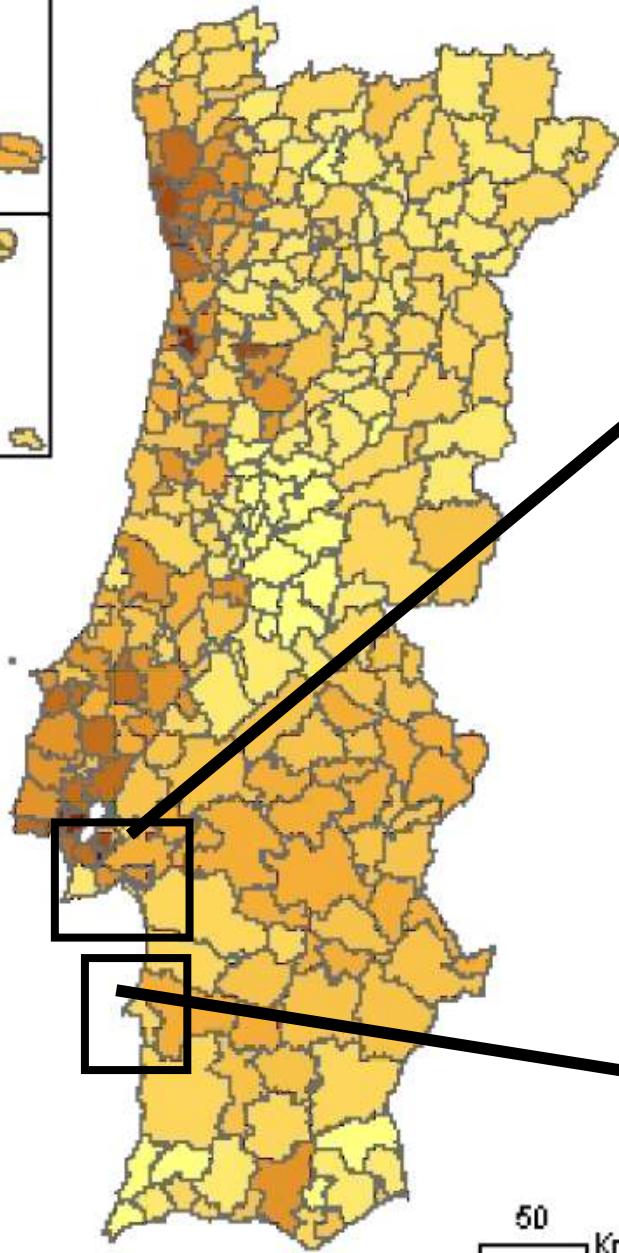
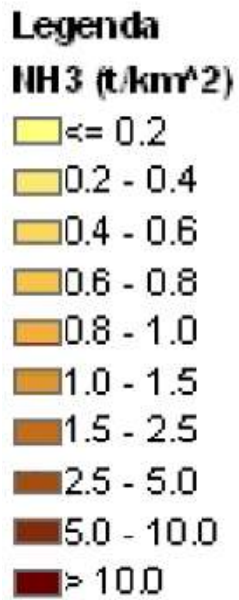
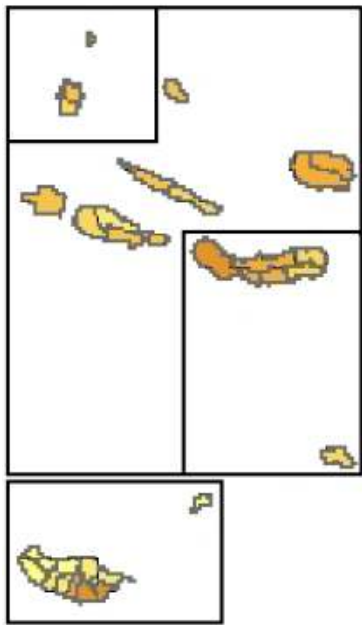


	NH ₃ (kt)	% NH ₃
Energy Production and Industrial Combustion	0,7	1,1
Transports	1,7	2,6
Industrial processes	3,8	5,9
Agriculture	50,1	77,9
Waste	8	12,4
Total National emissions 2003	64,3	100

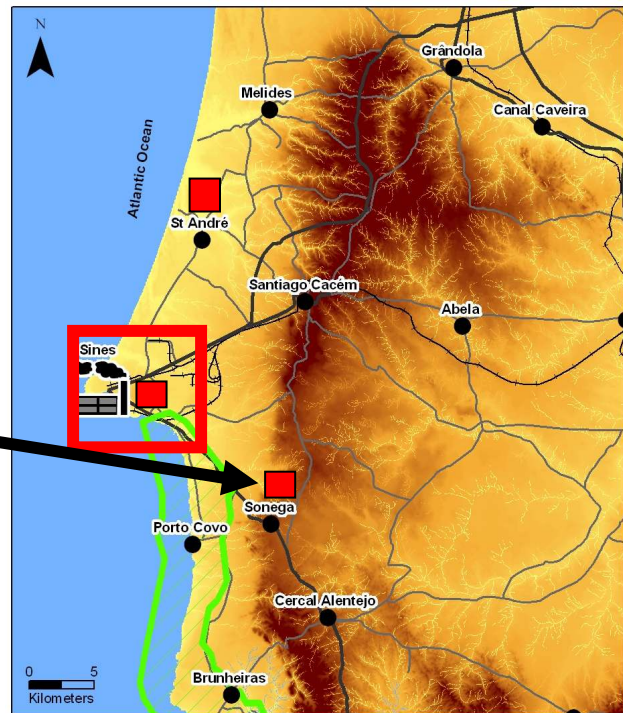
Source EPA

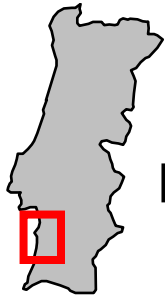
To Improve the spatial resolution we used the data at the parish level



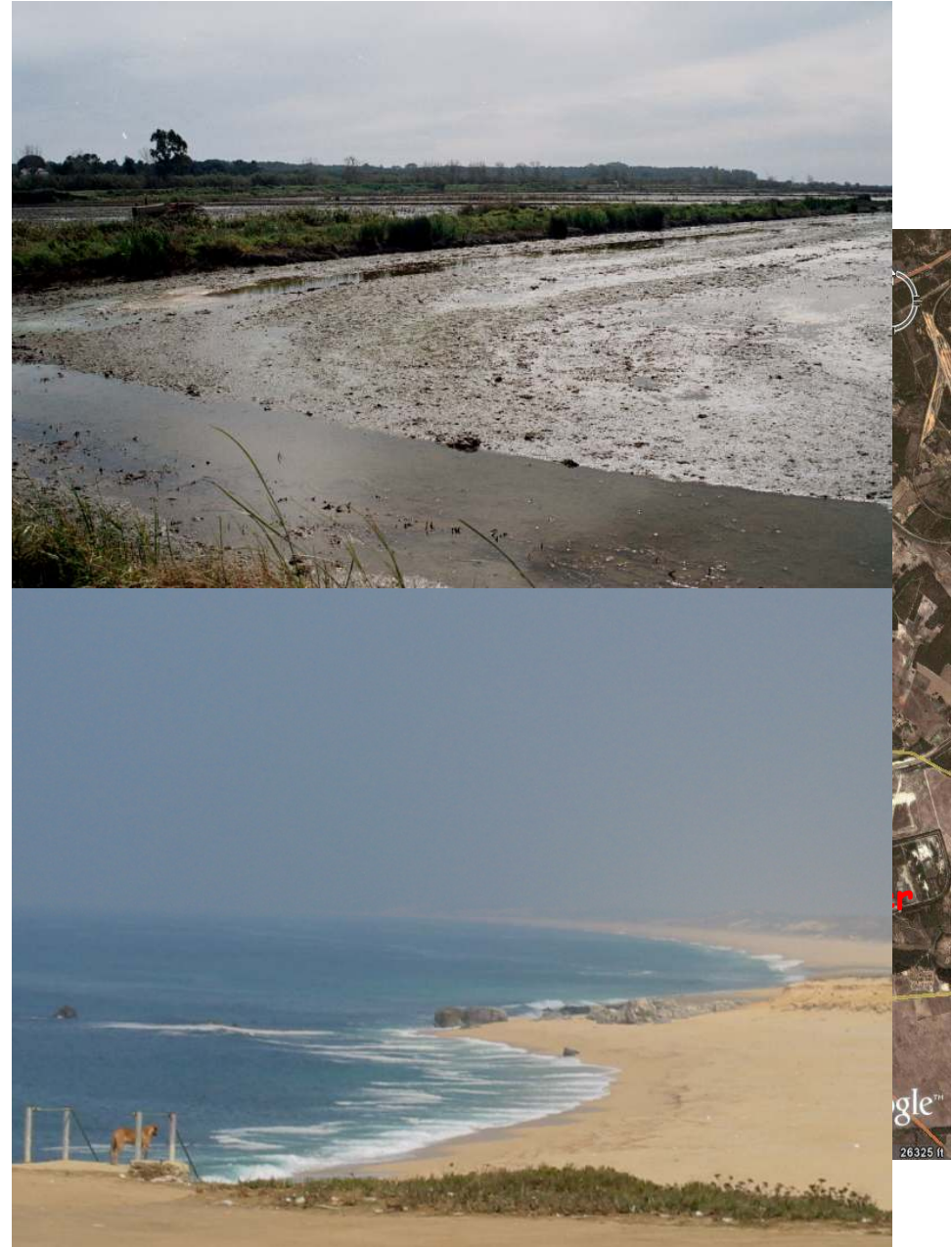
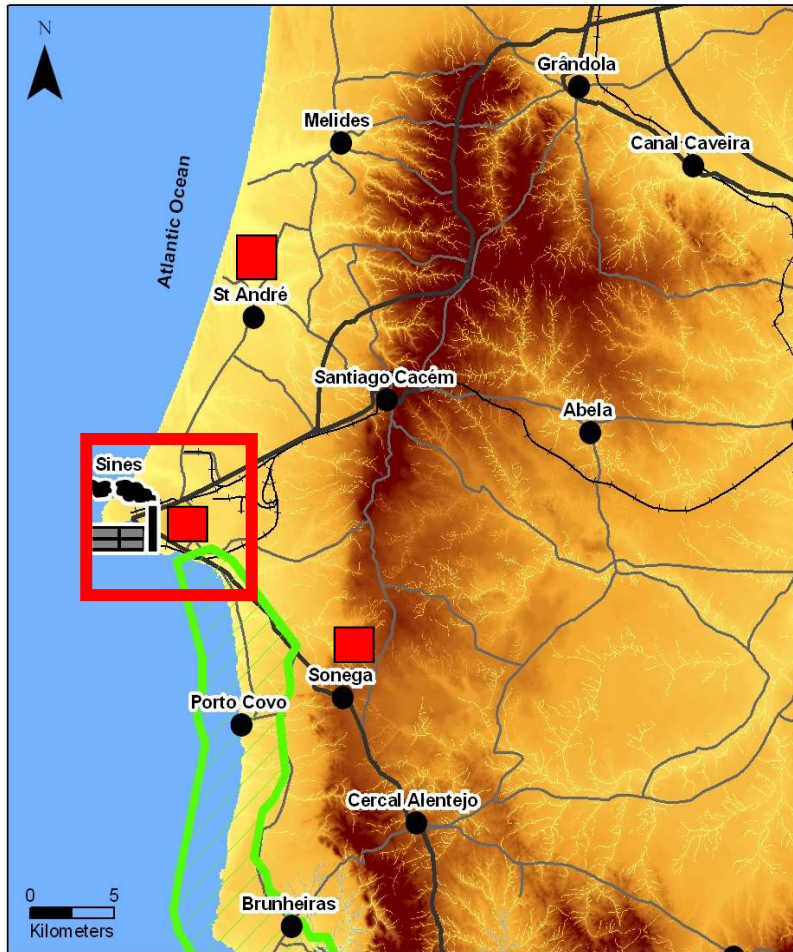


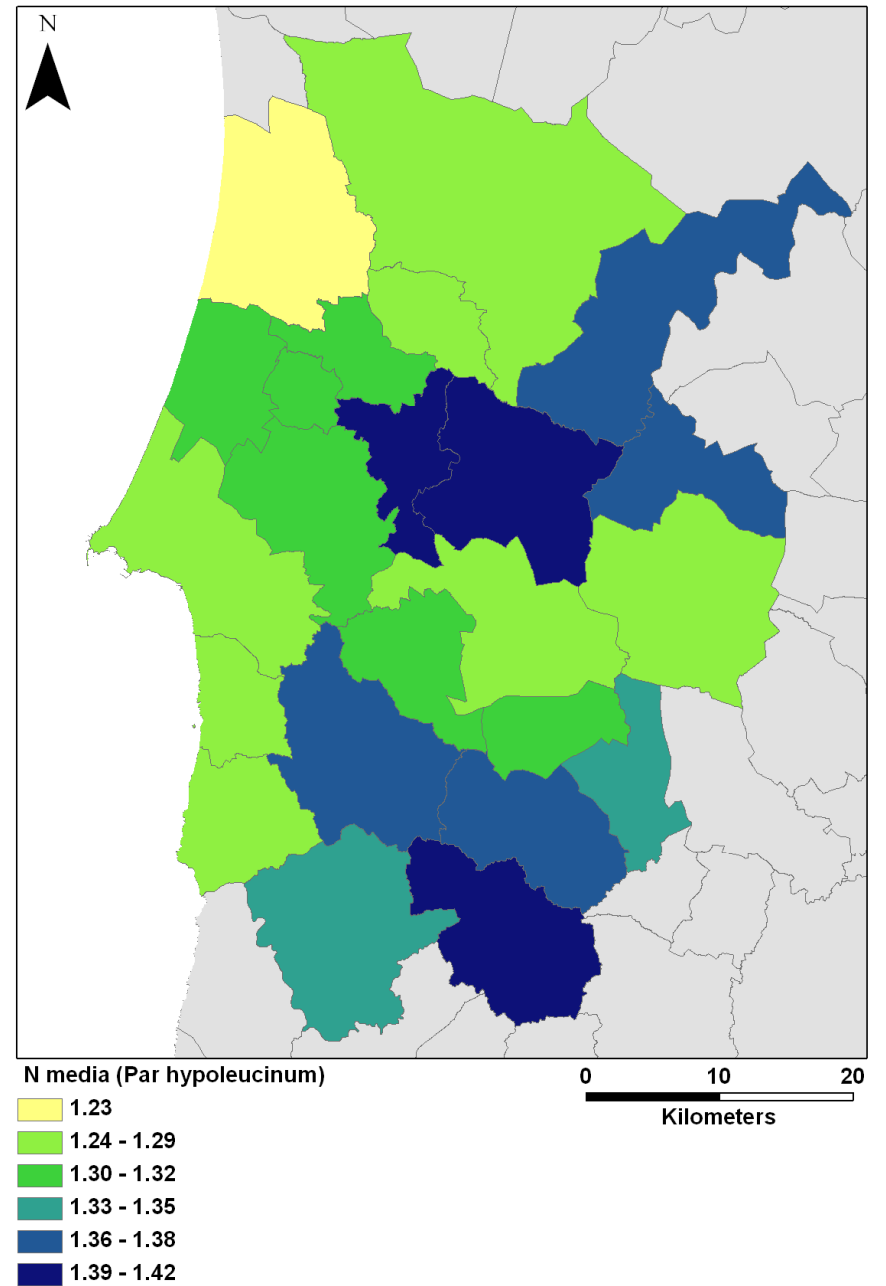
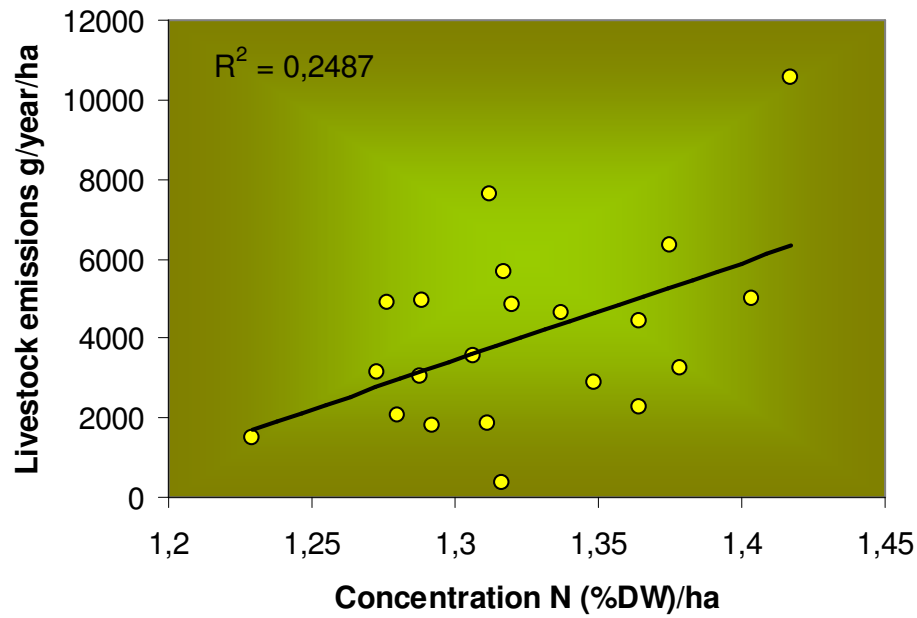
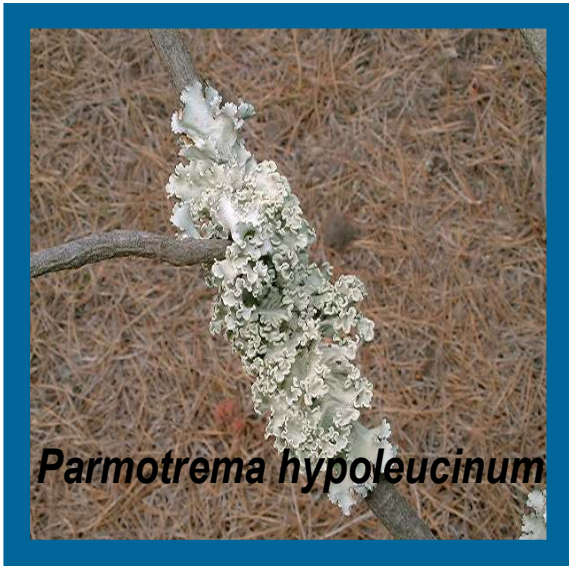
Total emissions of NH₃ in 2003



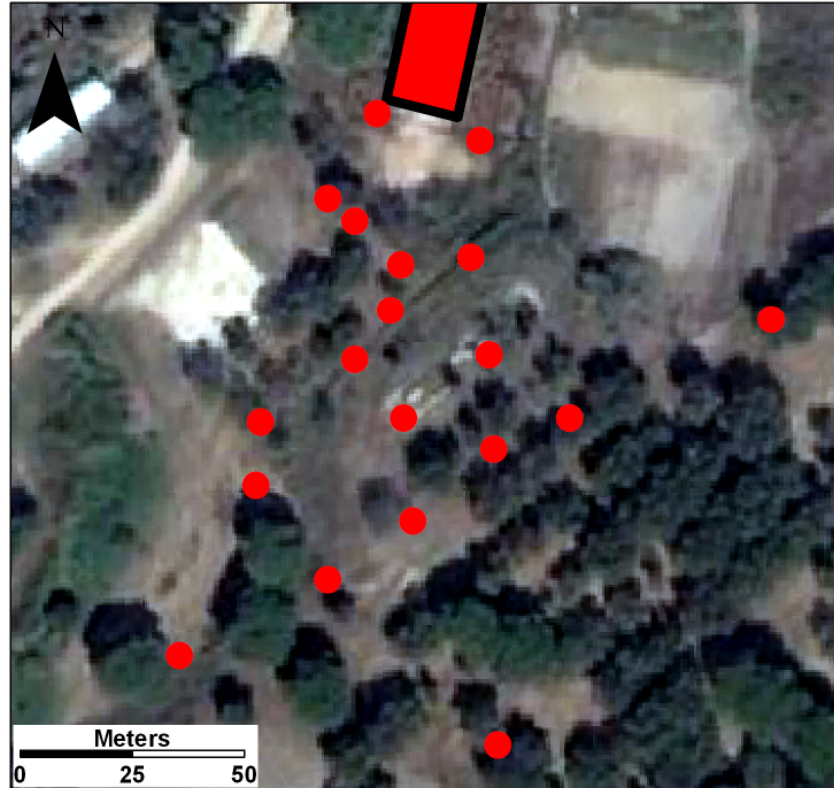
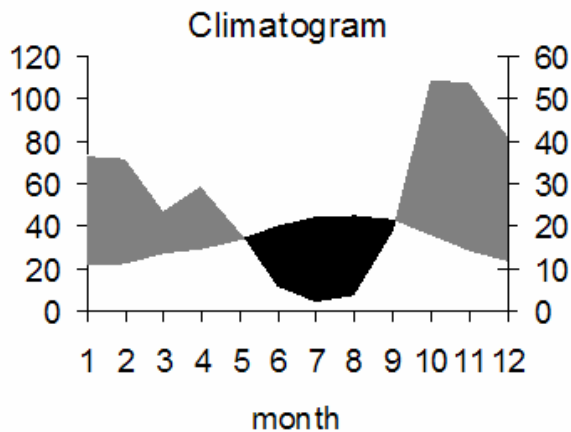
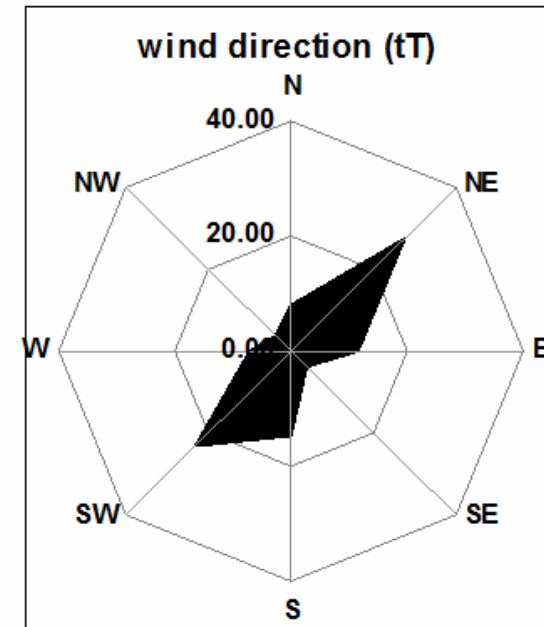


MULTIPLE Land-Uses





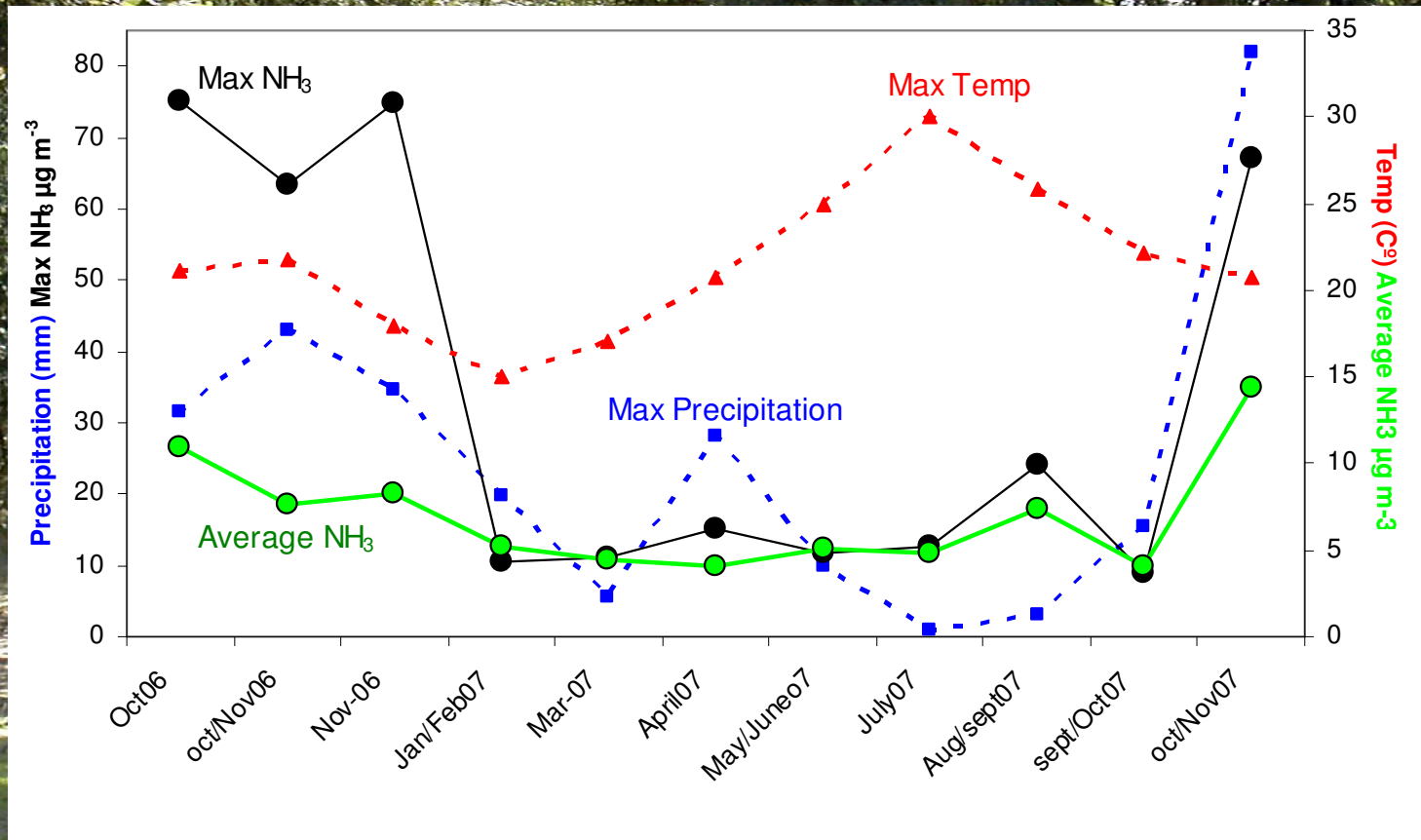
NH₃ Temporal variations on local scale: Mediterranean climate



■ barn
● ammonia sampling sites

Photo of the studied area showing the sampling points.

Seasonal variations with climate



Thank you!

