The resilience of soil erosion rate under LUC and the role of the Mediterranean grassland.

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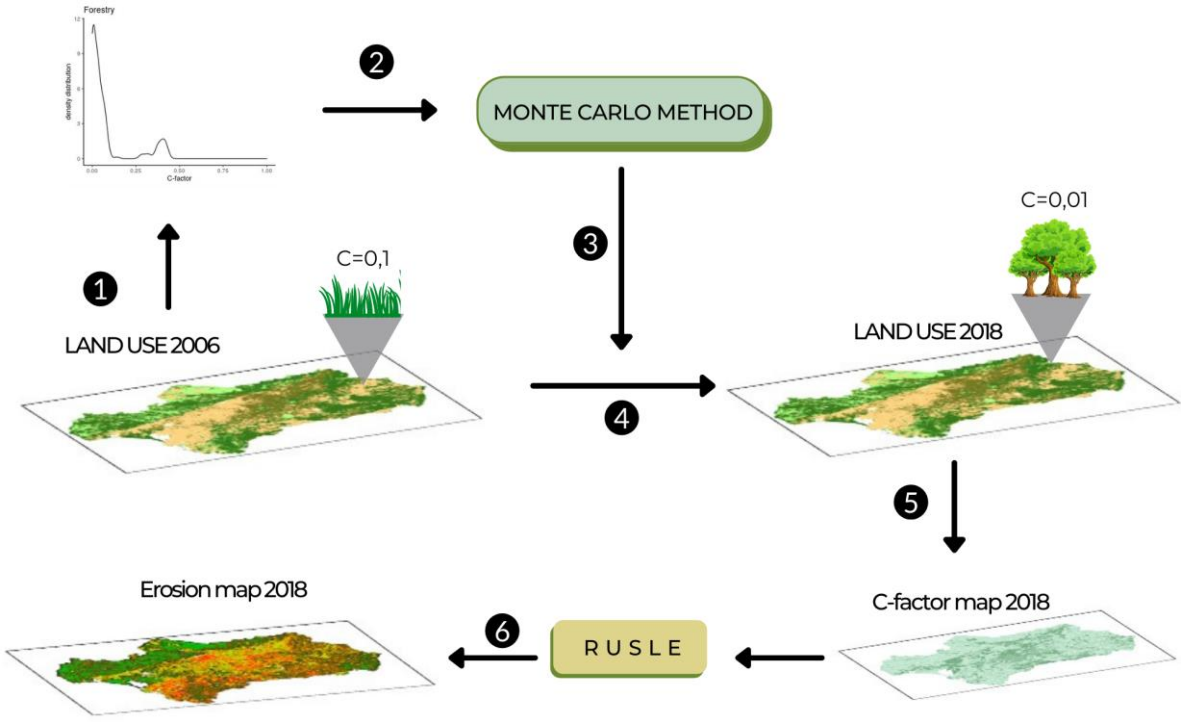
Main objectives:

(i) **To quantify and analyze the historical LULC between 1956 and 2018 in Southern Spain.**

(ii) **To quantify the current importance of PG for soil conservation**

(iii) **To calculate soil erosion rates for past, future and potential land use scenarios, by varying the C-factor of the RUSLE model through a Monte Carlo approach.**

Materials and Methods



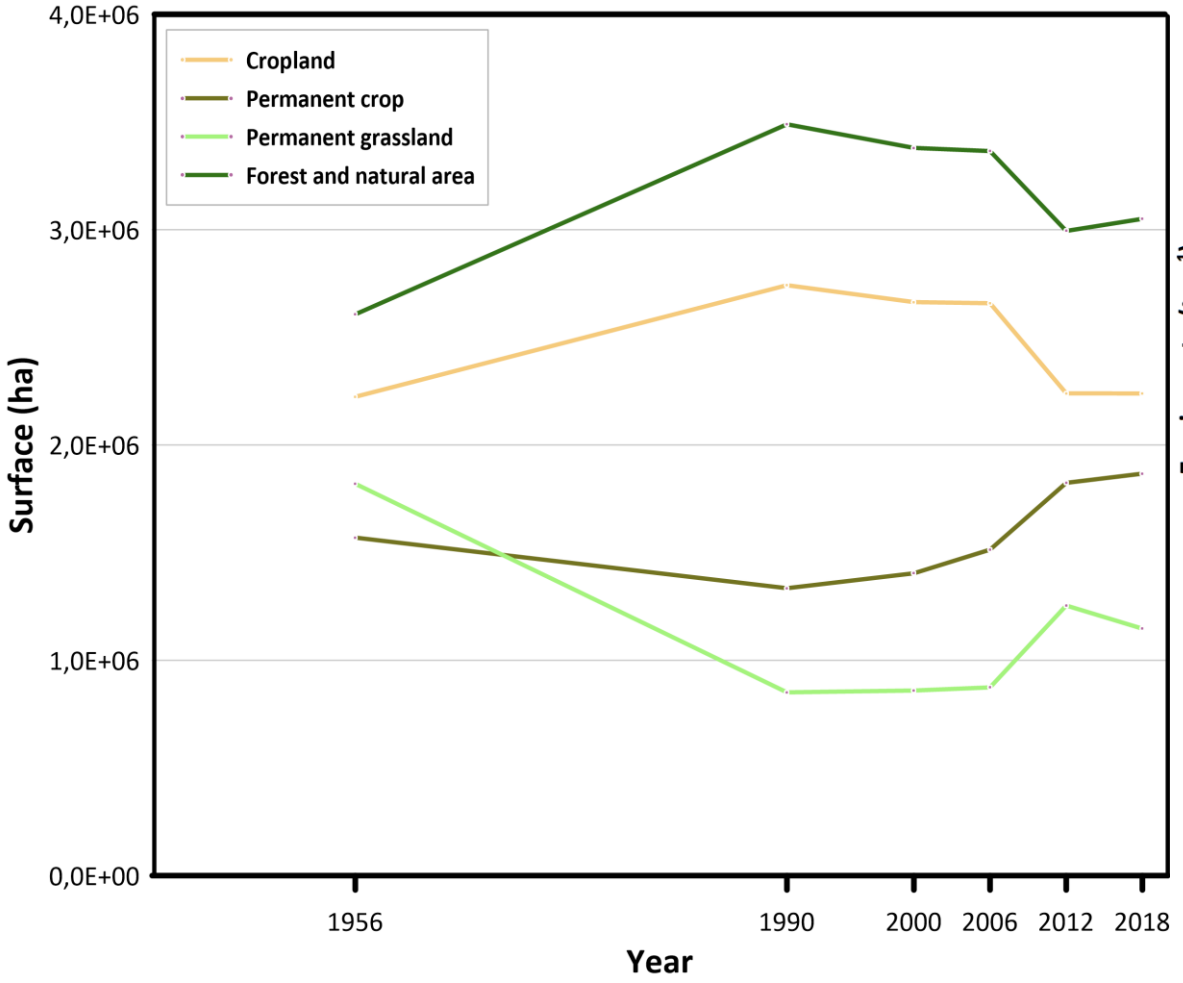
Materials

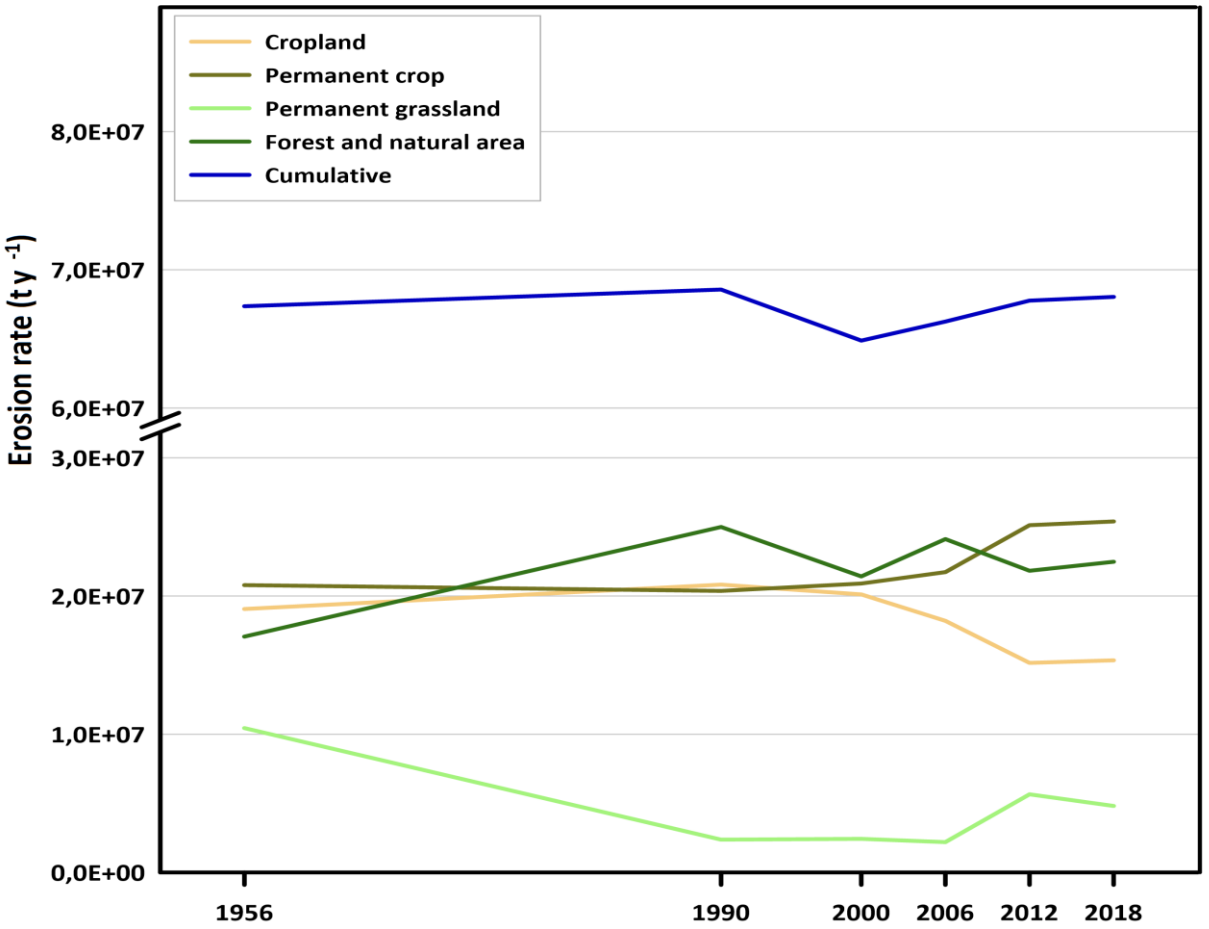
- **Corine Land cover maps from 1990 to 2018**
- **Regional Land use map of 1956**
- **European RUSLE's factor maps** (Panagos et al.,2014, Panagos et al.,2015a, Panagos et al.,2015b, Panagos et al.,2015c)

Methods

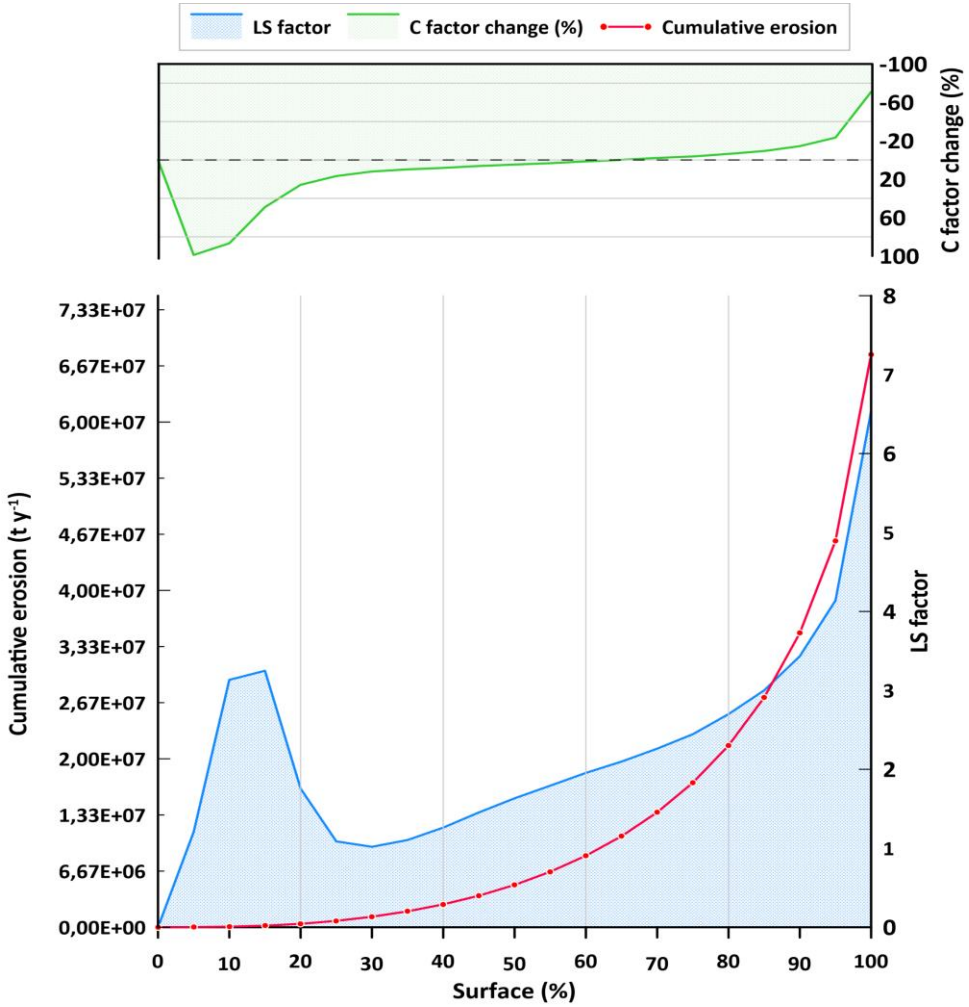
- **LU map reclassification**
- **C-values extraction**
- **Spatial allocation by MCM**

Results: LULC and Historical erosion





Contribution of surface to cumulative erosion rate

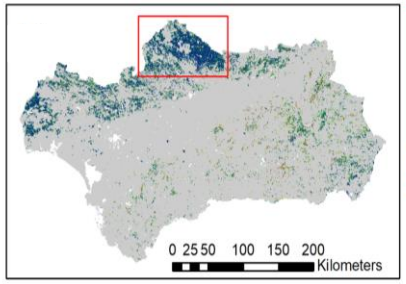


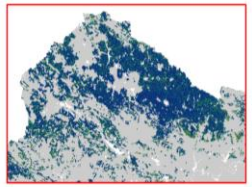
From further analysis …

- **K- factor** and **R- factor** did not variate significantly from 1956 and 2018
- **LS- factor** is the dominant factor in the erosion rate production

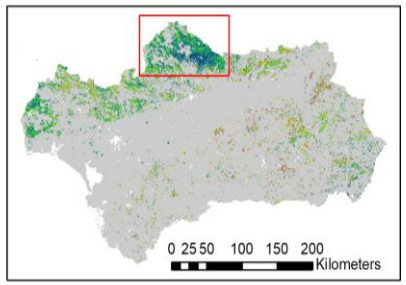
67% of the total erosion is produced by the 20% of the surface

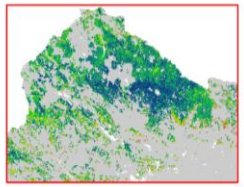
The role of the PG in erosion mitigation





FP





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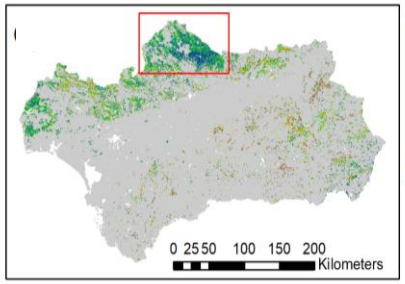
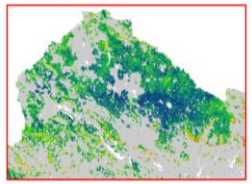
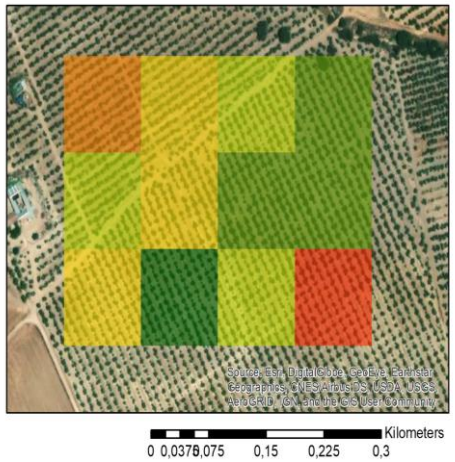




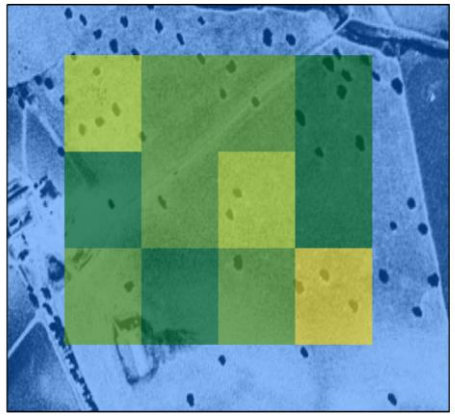
PP

Erosion rate
t ha-1 y-1
30,1 - 40
25,1 - 30
20,1 - 25
10,1 - 20
8,1 - 10
5,1 - 8
3,1 - 5
2,1 - 3
1,1 - 2
0 - 1

2018



Erosion rate (t y-1)
1
1,1 - 2
2,1 - 3
3,1 - 4
4,1 - 7
7,1 - 8



1956

Scenario	Mean (t ha^{-1} y^{-1})	Cumulative change (%)
2018	8,2	0%
PP	9,3	13 %
CP	9,3	14%
FP	8,2	0 %

FP= Total change of PG to Forest
CP= Total change of PG to Cropland
PP= Total change of PG to Permanent crop

Conclusion

- **Erosion rates were found resilient to land use change, with very little change.**
- **This resilience is due to erosion “hotspots” that control most of the response, as only 20% of the area causes 67% of the total, regional erosion**
- **Importance of permanent grasslands, as its conversion to permanent crop and cropland increased soil erosion with respectively 13% and 14 %**

Thanks for the attention!

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