Multitemporal satellite remote sensing and GIS for the monitoring of eroded areas: the case-study of Saccione River basin

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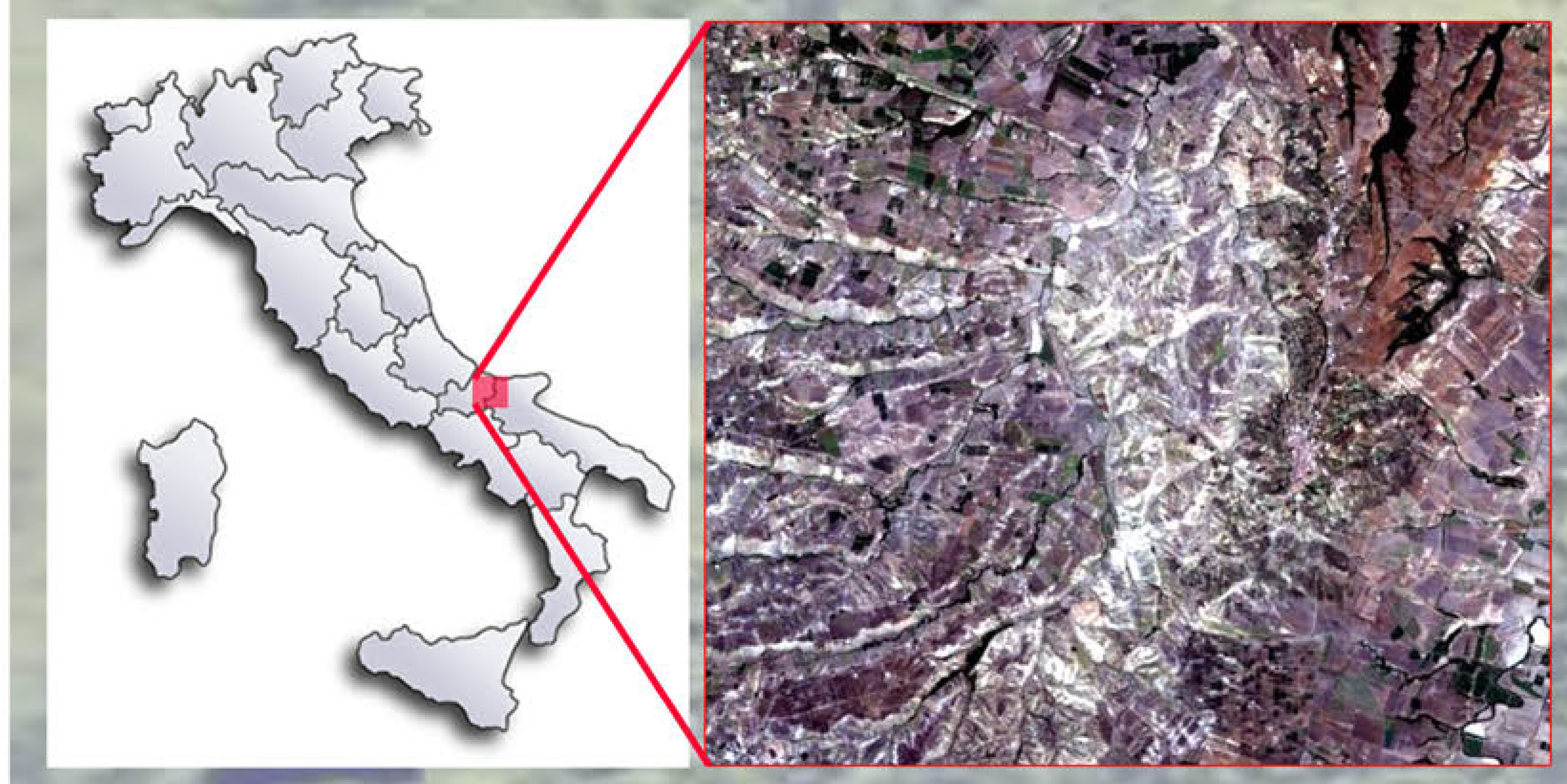
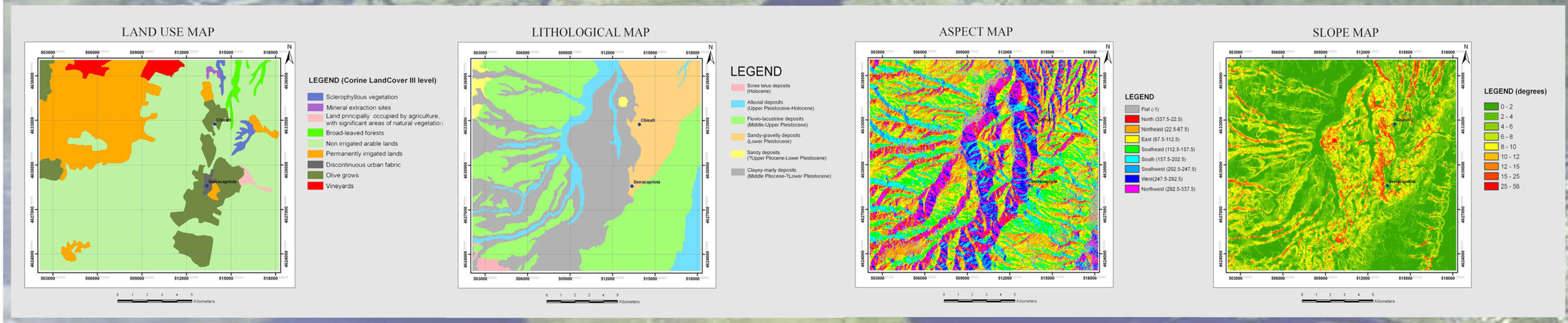


The aims of this study are the assessment of the multitemporal spatial distribution and the basinal mapping of the eroded landsurface (Els) denunced by geomorphological features and drew out by Landsat ETM 7+ data supported by panchromatic color orthophotos interpretations. These landsurfaces are interested by areal (sheet and solifluxion processes) and linear (rill and gully erosion) erosional processes responsible of their modelling. The study has been performed in the Saccione river basin (North Apulia), wide 228.6 km^2, located in southern Italy.

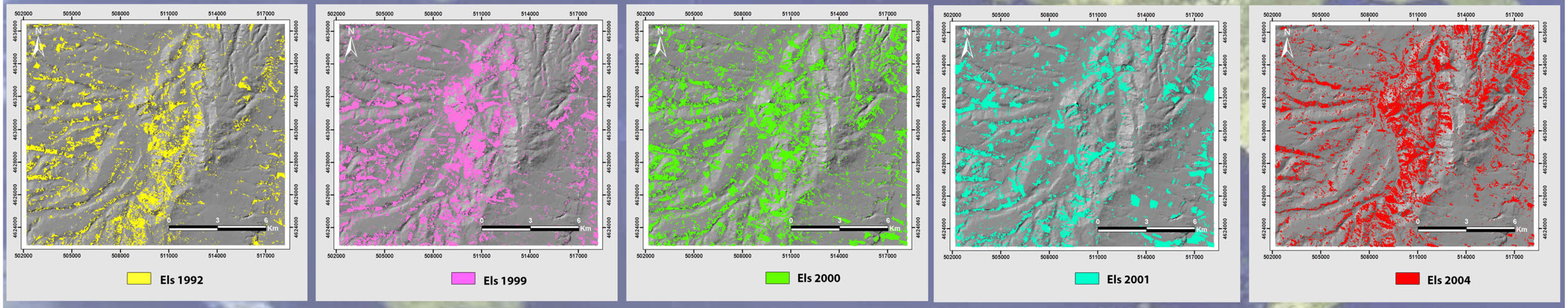
The first step of the study consist of digital thematic map editing of main characteristics of the area (lithological, land-use, slope, aspect, etc).

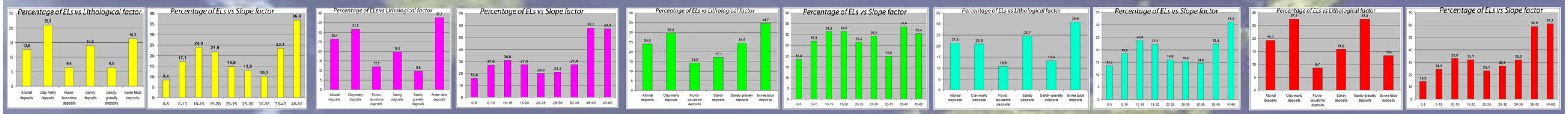


The second step of the study consist of recognition and survey of eroded landsurfeces in the field.

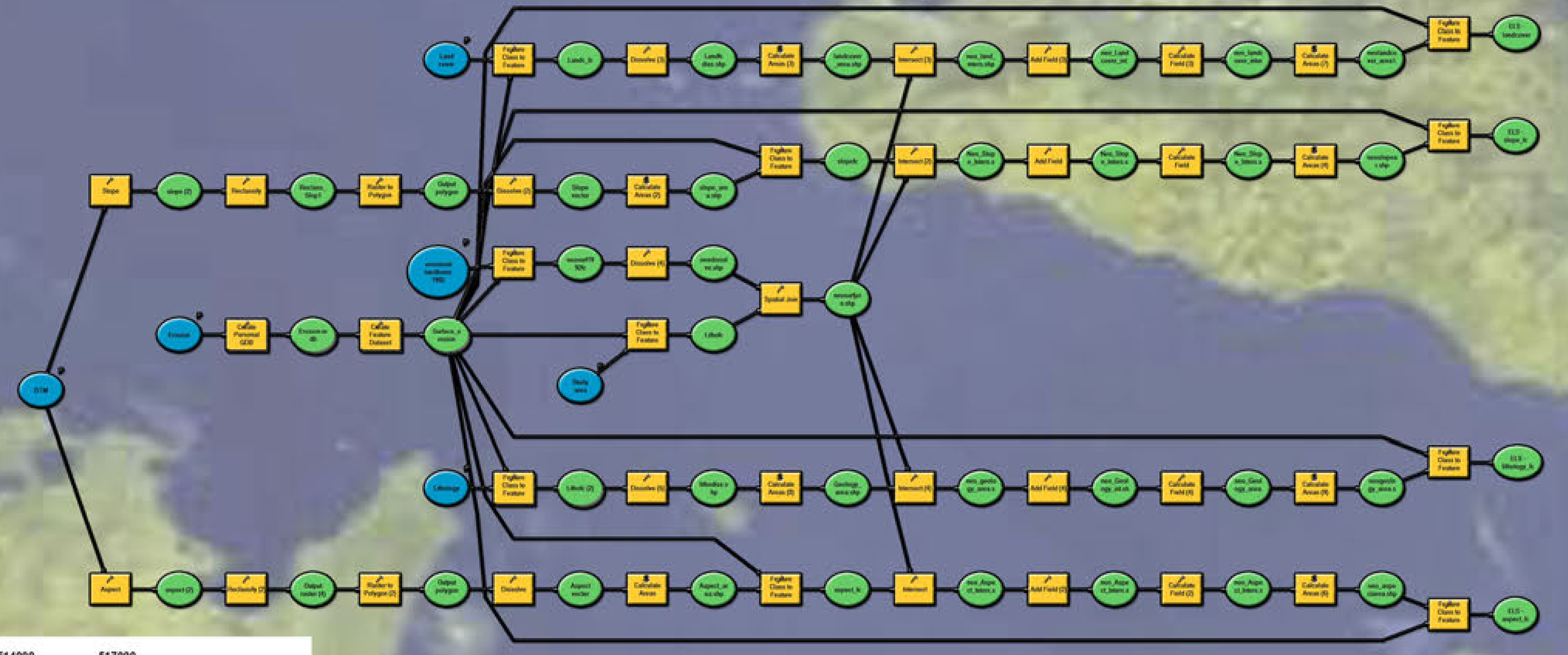
Examples of eroded landsurfaces surveyed in the study area

The third step consist of Els distribution maps of 1992, 1999, 2000, 2001 and 2004 years generated respectively according to the classification results by remote sensing data. The results of the classification process have been checked in the field and by photointerpretation on the base of random sampling. Finally, a spatial analysis was performed to temporal monitoring of the ELs shape and location. The field survey and the image processing have allowed to highlight that some classified Els-like "objects", even if showing the same spectral response, could not be Els: this confirm the strategic importance of the field checking on the semi-automatically produced data.

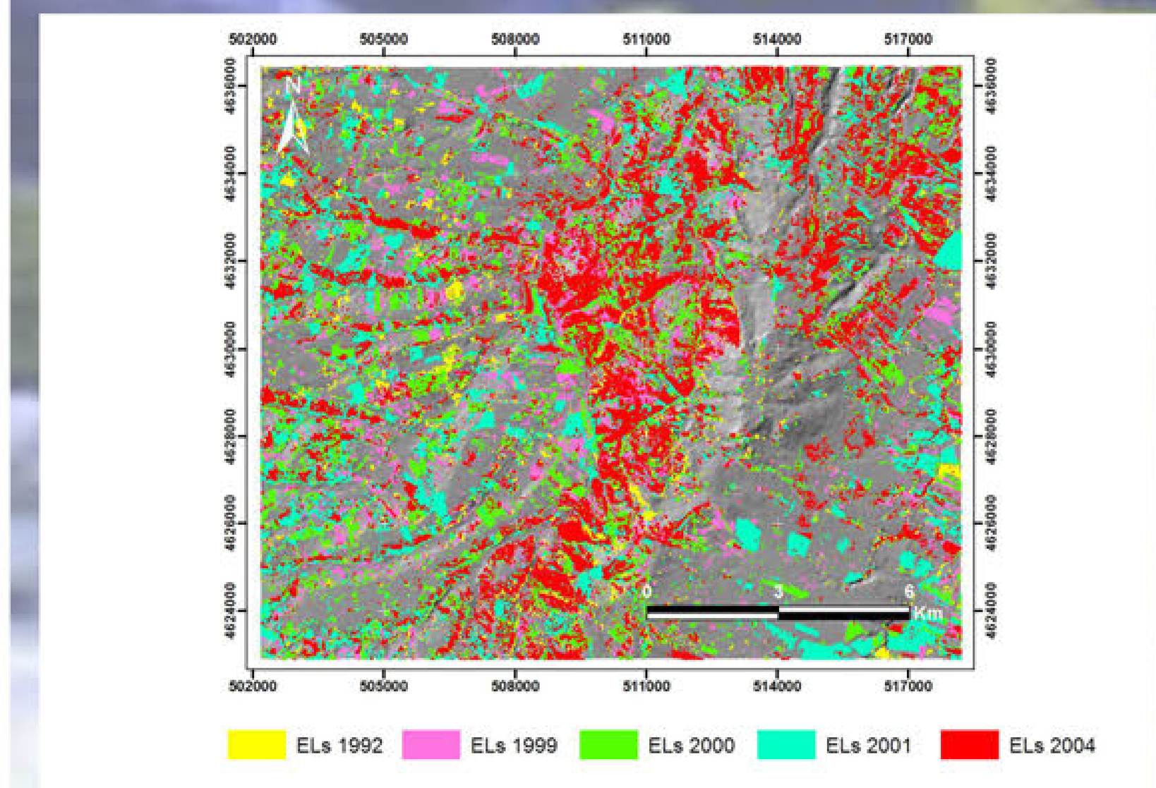


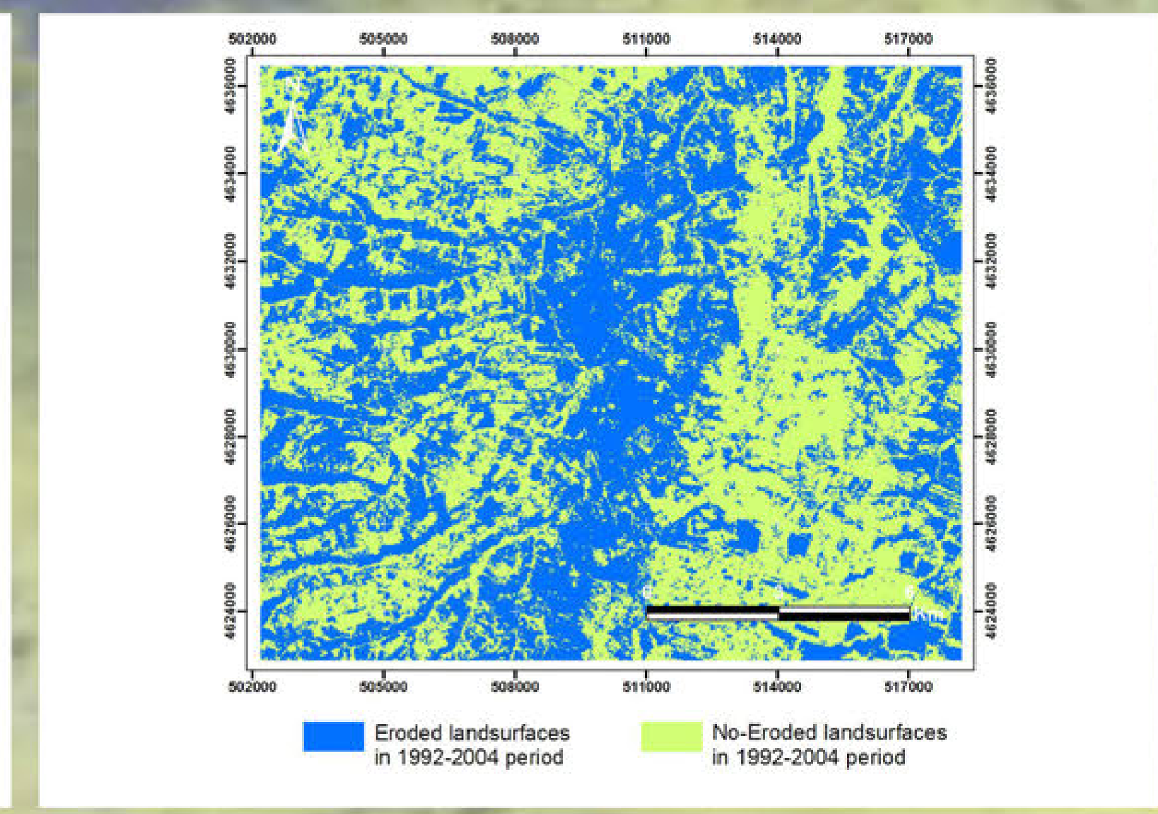


The fourth step of the study consist of building of a flow model for the spatial analisys of dataset concerning the feature and factors of ELs.

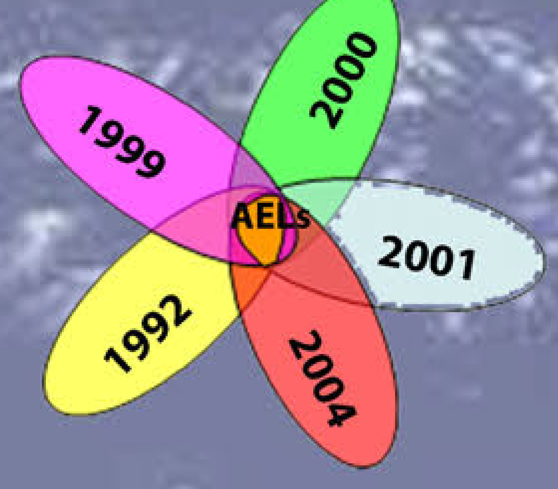


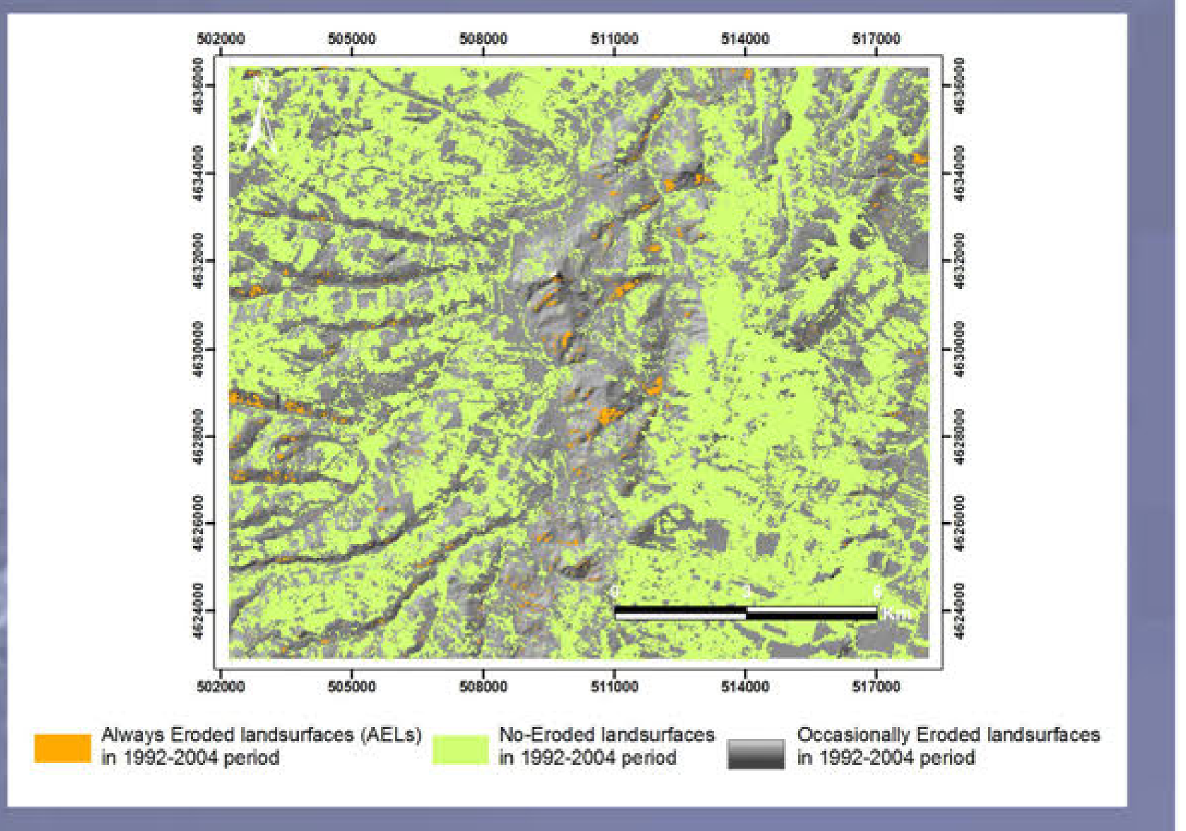
The hystograms derived from the multitemporal spatial analysis show the relationships betwen lithological and slope factor and the pertage distribution of the Els in the study area





The result of intersect analysis is a new feature from common area that represent the Always Eroded Landsurfaces (AELs) in the 1992-2004 period.





The results of multitemporal spatial analysis has evidenced the changes in the shape and position of the Els and the intersect analisys has evidenced the always eroded landsurfaces in 1992-2004 as result of intersect analysis. Such results, verified in the field, are connect with bad and non conservative agricultural practices, suggesting that these practices could play an important role as triggering of erosional processes and their evolution.