Integration of historical maps and multi-temporal optical remote sensing data into a GIS system for studying of the large Roman urban system expansion since the early twentieth century.

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-Historical Evolution -

Rome, the capital of the Italian Republic and the centre of Christianity, is at the same time an historical and modern city. On one hand its monuments and artistic heritage testify its strong historical identity. On the other hand, Rome is as well open to the future and sensitive to innovation. The urban agglomeration of Rome is one of the fastest-growing urban areas in the world, and this growth has unprecedented effects on both sprawl and population dynamics. The Eternal City is in fact characterized by a large municipal territory, for which some population shifts towards surrounding municipalities has produced and continues to produce an impressive increase in buildings.



→Rome in 1869: the city had some 200.000 inhabitants and included only the area within the Aurelian Walls. with the addition of an area called Prati di Castello.



in 1900: the map superimpose to a rare photo of the city taken from an airship in 1924. The city was still limited to the historical center plus some areas built along principal roads.

→Rome in 1965: the population increased to some 2,200,000 inhabitants The Master Plan for new construction favored mainly the eastern and southern sectors of the city and identified new industrial zones between the Tiburtina and the Prenestina roads

→ Rome in 1930: new settlements were built outside the city, mainly along the consular roads as Casilina, Prenestina and Tuscolana.

During the Fascist era, the Historical centre underwent heavy demolitions in order to favour the flow of traffic and isolate the monuments and archaeological areas, but that was to the detriment of many historical buildings of minor importance.





The urban area increased a lot within the time range 1900-1960, but Roman buildings were still within the Great External Road Ring (GRA).



Between 1960 and 1980, the metropolitan area drastically increased within the belt of the GRA. Population growth peaked in the 1980s when part of the population started to settle, outside the GRA

1921 1931 1936

140000

100000

93.48

The present analysis is based on our past studies, carried out since 1980. From 1980 to 2003 the Master Plan of Rome underwent numerous variations, as the result of a process that has been characterize by several steps that have progressively led to its adoptions by the City Council. The population of Rome is now approximately amounting to 3,000,000 people. The city, subdivided into 15 Municipalities, covers an area of 1290 Km², out of which 877 Km² (roughly 86%) are no longer buildable. Between 2002 and 2010, the hinterland municipalities gained about 248,000 residents, out of which 87,6% due to net migration and 13.4% to the natural balance.



Via G. Galilei, Frascati (Roma) - Italia

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-Methodology-

This research was conducted to examine past and current effects of the urbanization process tath occurred in the large Roman urban system and made use of multi-source and multi-temporal optical remote sensing (RS) data, collected between 1990 and 2013. These changes were then validated via Geographic Information System (GIS) techniques.

Evaluation of the urban growth for the area of Rome within the Great Circular Road (345,2 Km²)

The proposed approach with GIS geo-statistical methods was used to calculate an innovative index (AP Index) that was useful for monitoring the phenomenon of urban sprawl.



The most noticeable of these patterns is urban expansion toward the north-eastern quarter of the city. In addition, urban developments are expected to emerge in the south- eastern areas, wich are expected to increase urban pressure as well. It can be concluded that the general urbanization trend is still growing within the study area (internal to GRA). In particular, the constant increase in the urban density process is currently filling up the remaining gaps left by the sprawl phenomena previously occurred. Results indicate that in the timeframe 2002-2011, the land use classes were likely to turn into built-up areas. This can be also confirmed from the ISTAT data: in the last years, the demographic growth trend, after a sudden fall (-8.2), is actually growing from 2001, even if not much (+3.6).



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