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Dynamism of a Apennines Watershed (1950-2008): interactions between land uses, river morphology and hydrology

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In the current study an attempt was made to gain some knowledge about the changes in the 20th century of the land use connected to the river morphology and of the climate changes, in a typical Tuscan-Emilia Apennines watershed: the Reno river (2.597 km2) where clayey sedimentary formations prevails with an intrinsic tendency to disruption and erosion.
From the beginning of the 1900, have been led two conflicting and simultaneous phenomena: population moving both to cities and valley bottoms and agricultural mechanization. Their consequences have been evident on land use: abandonment of less productive fields, of sylvicoltural practices and enlargement of the remaining plots because of agricultural mechanization.
The river environment is an important matter of ecology, hydraulic and landscape that suffering today the effects of antropic expansion of the city and for the agriculture development.
The riparian belts are the interface between aquatic environment and river terraces. These areas along the river are a well-being indicator if are widely wooded and bushed.
This study analyses the dynamic of the land-use, of the riparian vegetation and of the river bed morphology of a trunk of Reno river during 1954- 2003, on the basis of aerial photography, satellite image (Quickbird) and field survey.
During the last fifty years, strong qualitative and quantitative changes in the riparian vegetation are observed, that are connected with the change of the river bed morphology and also with the changes of basin land-uses.
During the 1954- 2003 the reduction observed of the river bed surface is about 80% . The principal cause of this change of river morphology is the water flow decrease and the suspended solids delivery reduction, the main direct cause of these two phenomena is the abandoning of the agriculture in the watershed and the water withdrawals from river for many scopes. At last also the climatic change in the precipitation distribution, the increase of the air temperature and the water flow variation are observed.
In regard to riparian belts, in 1954 they were absent, instead at present they are well-developed especially in the right of the river bank
In the study area is observed a decrease of crop lands for practicability works and urbanization and also to increase of the untilled, that now are about 24% of the area, but only of 0,8% in 1954.
The data show also an increase of the woods from 156,6 ha (1954) to 578 ha since today and a increase of the wetlands, where were the gravel pits, and the environmental requalification in the river park of Casalecchio di Reno town.
This phenomena have interested the mountain Reno river basin like all the Italian Apennine in the last fifty-year.
The study has formulated operating proposals to the aim to improve the quality of riparian belts of the river.