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LATE HOLOCENE ENVIRONMENTAL CHANGES AND PRESENT-DAY GEOMORPHIC PROCESSES IN THE WURGO CATCHMENT (WOLLO, ETHIOPIA)

ABSTRACT: COLTORTI M., CINQUE A., FUBELLI G., DRAMIS F., ABEBE B. & ASRAT A., *Late Holocene environmental changes and present-day geomorphic processes in the Wurgo catchment (Wollo, Ethiopia)*. (IT ISSN 0391-9838, 2009).

The recent geomorphic evolution of a river catchment, located in Wollo (Ethiopia) between 2794 and 3374 m a.s.l., is outlined. The catchment is carved in Tertiary volcanics, intruded by felsic and mafic dikes. The slopes are bare and widely affected by erosion. At the slope toes thick colluvial deposits are found. Deep gullies cut these deposits, showing buried soils overlying alluvial gravels, likely emplaced during the last «Glacial». Most gullies have developed during the last decades, probably due to minor climatic fluctuations. A sequence of colluvial/alluvial deposits and buried soils, the lowest of which is dated 3900 yr ¹⁴C BP (2570-2145 cal. BC), suggests a progressive reduction of vegetation cover likely due to climate change to drier conditions and man-made forest clearing.

KEY WORDS: Geomorphology, Climate change, Human impact, Holocene, Ethiopia.

RIASSUNTO: COLTORTI M., CINQUE A., FUBELLI G., DRAMIS F., ABEBE B. & ASRAT A., *Variazioni ambientali tardo-oloceniche e morfogenesi in atto nel bacino di Wurgo (Wollo, Ethiopia)*. (IT ISSN 0391-9838, 2009).

Questa nota prende in esame l'evoluzione geomorfologica di un bacino fluviale ubicato nella regione del Wollo (Etiopia), tra 2794 a 3374 m s.l.m. Il bacino è modellato in rocce vulcaniche del Terziario, intruse da dicchi sialici e femici. I versanti sono denudati e diffusamente interessati da processi erosivi che hanno accumulato alla loro base spessi depositi colluviali. Questi sono incisi da profondi fossi di erosione sulle cui pareti si rinvengono suoli sepolti sovrapposti a ghiaie fluviali messi in posto con ogni probabilità nell'ultimo «Glaciale». Molti di questi fossi si sono sviluppati negli ultimi decenni, probabilmente in conseguenza di minori fluttuazioni climatiche. Una sequenza di depositi alluvio-colluviali e suoli

sepolti, il più basso dei quali datato a 3900 yr ¹⁴C BP (2570-2145 cal. BC), suggerisce una riduzione progressiva della copertura vegetale dovuta verosimilmente a uno spostamento del clima verso condizioni aride e a deforestazione antropica.

TERMINI CHIAVE: Geomorfologia, Cambiamento climatico, Impatto antropico, Olocene, Etiopia.

INTRODUCTION

Geomorphological research has been carried out in the Ethiopian highlands within the framework of the Ethio-Italian Cooperation Programme in order to understand the recent geomorphological evolution of landscape and its present-day trends as a basic tool for land reclamation/rehabilitation projects. In this perspective, the upper Wurgo catchment (ca. 15 km²), a tributary of the Abbai (Blue Nile) River has been investigated.

The study area is located in the highlands of Wollo at elevations ranging between 2794 and 3374 m a.s.l. Its climate falls within the cool subtropical summer rainfall zone of FAO/UNESCO (1990) classification: the mean annual temperature is estimated to range between 8.0 °C and 11.0 °C; the annual rainfall is more than 1200 mm (Tegene, 1997). The rainfall regime is marked by a bimodal rainfall distribution, with a lesser maximum («belg» season) from March to May, and a larger maximum («meher» season) from July to October (Ethiopian Mapping Authority, 1988).

The potential vegetation of the area is that of *Juniperus* and *Podocarpus* woodlands passing to ericaceous woodland at the higher altitudes (Ethiopian Mapping Authority, 1988). However, as for a large part of the Ethiopian highlands (Pankhurst, 1990; Nyssen & alii, 2004), the study area has been extensively deforested in historical times. As a consequence, the original vegetation cover has disappeared and most slopes are bare or covered with scrub vegetation.

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