DISCORDANCE OF EROSIONAL TEMPOS:
A NON-LINEAR AND SCALE DEPENDENT EVOLUTION IN THE
ORANGE RIVER BASIN (SOUTHERN AFRICA)

INTRODUCTION

Over the past decades Earth scientists have expanded
the range of methods used to infer erosion rates the appli-
cation of which has spurred significant advances in quanti-
fying the rhythms of geomorphic processes, a familiar ap-
proach for our colleague and yet friend Monique Fort. A
quarter of century after a defence of a thesis about South
Africa (Lageat, 1989), the following contribution to her
«Mélanges» intends to assess the advancement of research-
es dealing with erosion tempos at various spatial and tem-
poral scales, a fundamental topic in geomorphology. This
paper reports average rates of denudation for various time
intervals from the Mesozoic to the present, determined for
the Orange drainage system, at areal scales ranging from
the headwaters of the major tributaries to the whole catch-
ment and over time scales varying from decades to millions
of years. An opportunity is thus offered to aim at charac-
terising and quantifying the terrigenous supply eroded in
the drainage area, this set of data providing a rich informa-
tion about erosion rates which extends along various time
spans. The relevance of this knowledge for the modelling
of landscape evolution remains a topic of considerable de-
bate, allowing a critical approach of the methods applied
to address this cardinal question.

THE ORANGE RIVER: A POWERFUL CONVEYOR

The Orange River originates in the north-eastern cor-
ner of Lesotho, in the Maloti Highlands, at Thaba Putsoa,
3350 m above sea level, at a distance of only 193 km from
the Indian Ocean (fig. 1). After leaving Lesotho, where it
is named Sanqu, the river flows westwards for 2092 km
through regions of steadily increasing aridity, finally dis-
charging its water and sediment in the South Atlantic
Ocean at Alexander Bay.

The natural discharge

The Orange River Basin encompasses all of Lesotho,
48% of South Africa, 27% of Namibia and 12% of
Botswana. It is by far the largest catchment in southern
Africa, but the effective catchment area is difficult to de-