GENESIS OF BANDING GENERAL

slope migration of banded vegetation

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ecent studies of banded vegetation have suggested a "Y-? ''!::z2
successioml model, in which bare bands are colonised ;&>y

by a pioneer front on the upslope side of a vegetation ;Gzx,; band. Vegetation patterns in south-west Niger have %2s:$
been interpreted to suggest that spatial transitions :;e%& +vm
reflect this form of temporal succession. and in these patterns there is !@$& m* corroborating evidence for slow up-slope migration. However, given the
inherent difficulties of long-term field experiments there are few data to kE!$
judge the validity of this model. >?W"< a.i&gt

The use of the artificial radionuclide caesium- 137 (137G) to provide
information on net soi1 flux over the past 30 years offers potential in
this regard. Furthermore. the identification of various types of soi1 crust.
which can induce different types of hydrological behaviour. provides
valuable information for predicting soi1 evolution. To test the hypothesis
that banded vegetation migrates upslope. a 70 m transect encompassing two vegetation bands and a single bare lane was sampled in south-west Niger. The transect was aligned orthogonal to the bands and approximately parallel to the direction of water, soi1 and nutrient flow. Soil samples for gamma-ray spectrometsy and particle-size analysis were collected along the transect at twenty one locations with I m intervals in the lower part and three samples were obtained on the upper part. Prior to collection, the soi1 surface characteristics were examined to

distinguish between crust types and to identify the presence of termite . activity.
The results emphasise the utility of these techniques for examining the
net redistribution of soi1 over periods of three decades and its relations

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SIS OF BANDING GENERAL MODELS

to vegetation succession. The amount of soi1 eroded was found generally to decrease downslope, whilst the proportion of fine silt in the soi1 generally increased downslope. These patterns correspond with the location of the erosion and sedimentation crusts identified using a standardised classification. The relations between microtopography and net soi1 flux may also explain some of the spatial variation in soi1 redistribution processes. The intensity of crust and 137Cs measurements on the upslope edge of the lower vegetation band enabled the calculation of the upslope migration rate (c. 0.3 m yr-1) which coincided with other independent studies in the same region. Moreover. because considerable spatial variations in topography and soi1 flux were found to occur over very small distances, further detailed studies over larger areas will be needed.

PART III