Automatic identification of soil erosion areas using Aster imagery in the Blue Nile, eastern Sudan

M. El Hag El Tahir

Department of Geosciences, University of Oslo, Norway (majdulie@ulrik.uio.no/ Fax: +47 228 55269)

This paper is the first in a set of studies to evaluate the spatial and temporal variability of soil water in terms of natural factors as well as land-use changes as fundamental factors for vegetation regeneration in arid ecosystems in the Blue Nile-Eastern Sudan. The specific objective of this study is to better understand the implications of land-use change on soil degradation in the region. Remote sensing and geographic information systems (GIS) are used to determine the change of eroded areas during the last twenty years in the Upper Blue Nile, Eastern Sudan. Although soil erosion is a serious problem in many locations worldwide, little is known about its importance at large spatial scales. Remote sensing contribution to the spatial assessment of erosion has thus far mostly been confined to visual image interpretation. The current study was conducted to determine whether automatic classification of optical ASTER imagery could accurately discriminate erosion khors. *Wadi* or *khor* is the Arabic word for seasonal water course. A maximum likelihood classifier was trained with two classes, khors and no-khors, and applied to images of March (just before the wet season) and December (just after the wet season) 2006.

Moreover, a bi-temporal classification was performed by labeling a pixel as *khor* when both for the March and December image it was classified as such. Validation was done using field data (from January 2007). The results allowed the identification of erosion *khors*. Because the selected study site is representative of the wider Blue Nile province, it is expected that the approach presented could be applied to larger areas.