



"Gheorghe Asachi" Technical University of Iasi, Romania



DETECTION OF LONG-TERM VEGETATION DEGRADATION IN BALUCHISTAN IN SOUTHWEST ASIA USING NDVI PRODUCTS OF THE MODIS SENSOR OF TERRA SATELLITE

**Peyman Mahmoudi^{*}, Safdar Ali Shirazi², Seyed Mahdi AmirJahanshahi³,
Fatemeh Firoozi⁴, Nausheen Mazhar⁵**

¹*Department of Physical Geography, Faculty of Geography and Regional Planning Faculty,
University of Sistan and Baluchestan, Zahedan, Iran*

²*Department of Geography, Faculty of Science, University of the Punjab, Lahore, Pakistan*

³*Department of Statistics, Faculty of Mathematics, Statistics and Computer Science,
University of Sistan and Baluchestan, Zahedan, Iran*

⁴*Department of Remote Sensing and Geographical Information System (GIS),
Faculty of Geography, University of Tehran, Tehran, Iran*

⁵*Department of Geography, Faculty of Natural Sciences,
Lahore College for Women University, Lahore, Pakistan*

Abstract

The present study aimed at investigating the long-term degradation of vegetation in Baluchistan in southwest Asia. To achieve the objective NDVI products of the MODIS sensor on Terra Satellite (MOD13A3) with spatial resolution of 1×1 km for a period of 16 years (2000-2015) were used. After obtaining images from the NASA land processes distributed active archive center, all images downloaded for the study area were mosaiked and referenced by Universal Transverse Mercator Project System and by using the nearest-neighbor re-sampling method. Then, on a pixel-based scale, the trend of long-term changes in vegetation was studied using the seasonal Mann-Kendall non-parametric test. The results show that 1.23% of the total area under study had a long-term decreasing trend in vegetation. Out of this 1.23%, 0.33% were significant at a probability level of $\alpha = 0.01$, 0.24% were significant at a probability level of $\alpha = 0.05$, and 0.12% were significant at a probability level of $\alpha = 0.1$. The decreasing trend of 0.54% of them was not confirmed at any of the significant levels. Among the various types of vegetation, shrublands and croplands had the most significant long-term decreasing changes, which could be dangerous signs of ecotones degradation as well as weakening the sustainable rural livelihoods in this land.

Keywords: Afghanistan, desertification, Iran, MODIS, NDVI, Pakistan, seasonal mann-Kendall Nonparametric test, trend

Received: January, 2020; *Revised final:* July, 2020; *Accepted:* October, 2020

^{*} Authors to whom all correspondence should be addressed: e-mail: p_mahmoudi@gep.usb.ac.ir; Phone: +98 9183803462; Fax: +98 54 31136791