Geophysical Research Abstracts
Vol. 21, EGU2019-12310, 2019
EGU General Assembly 2019

Monitoring coastline dynamics of Alakol Lake in Kazakhstan using remote sensing data

Adilet Valeyev (1), Ainagul Abitbayeva (1), Saule Uxukbayeva (1), Marat Karatayev (2,3), Aruzhan Bektursynova (1), and Zhanerke Sharapkhanova (1)

(1) Institute of Geography, Satbayev University, Almaty, Kazakhstan (adiletv@gmail.com), (2) Energy Technologies Research Institute, University of Nottingham, University Park, Nottingham, NG7 2RD, United Kingdom, (3) University of Graz, Institute of Systems Sciences, Innovation and Sustainability Research, Ernst Mach Partnership Programme, Merangasse 18/1, A-8010 Graz, Austria

Alakol Lake is one of the largest hydrologically closed lake located in Balkash-Alakol River Basin in southeast Kazakhstan. Having a coastline approximately at 490 km Alakol Lake has faced multiple threats due to both natural and anthropogenic factors as a result of tectonic movements, geology and wind wave conditions, growing tourism activities, fishing and transport etc.
The present study aims to investigate the coastline changes along Alakol Lake in Kazakhstan by using remote sensing data in particular scale-space images Landsat – 5 TM, 7 ETM+, 8 OLI and Sentinel-2A. Based on Landsat and Sentinel, Modified Normalized Difference Water Index was calculated to demonstrate the coastline changes along Alakol Lake between 1990 and 2018. Moreover, the monitoring and analysis of coastline dynamics is based on the main morphometric characteristics of Alakol Lake including water surface area, coastline length, geomorphology of coast etc.
Our results reveals that there is a continuous coastline shrink toward land, depending on the coast types. For example, in case of the accumulative coast (mainly northeast, north and northwest coasts) a coastline shrink toward land was from 200 to 900 m. As a result, vast areas of agricultural land were flooded and degraded wetlands. In case of the denudation coasts, a coastline shrink toward land was from 120 to 270 m between 1990 and 2018. This study demonstrates the importance of monitoring coastline dynamics, since it provides essential information for understanding the coastal response to contemporary nature and anthropogenic impacts.