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USING SATELLITE IMAGE PROCESSING FOR STUDY OF DYNAMICS OF THE COASTAL ZONE
OF THE CASPIAN SEA

Abstract

The coastal zones are environmentally and economically important regions. Monitoring of the coastal zone and, in particular, the precise demarcation of the coastline is important as a fundamental research object in solving problems such as environmental protection in the context of global climate change. Shorelines are important particular qualities for land/water resources management, geographical mapping, safe navigation and coastal monitoring. The most common methods for shoreline extraction involve visual interpretation from conventional ground surveys or aerial photographs. These methods are, by definition, subjective and depend on the interpreter's individual abilities, often requiring the operator to be familiar with the local environment. Usage of tidal datum indicators is a better method to identify the shoreline, but it is limited when determining the historical shoreline. In recent years, there has been an increase in the usage of remote sensing data using optical and synthetic aperture radar (SAR) satellites to extract and map the shoreline automatically or semi-automatically. In Caspian Sea, the minimum sea level for the past years registered in 1977 by a ground station at -29 m. Since 1978, the sea level has risen, and in 1995 it was registered at -26.66 m and whereupon the sea level was almost stable with slight decrease. In 2016-2020, a 0.2 meter descent observed in the Caspian Sea. In the study, high-resolution Sentinel2 satellite images for 2016–2021 were used. The study area covers the coastal zone from Cape Bandovan to Astarachay. Areas identified where the highest rates of abrasion and accumulation observed in the study area and changes in the coastline of Kurdili Island were identified. Thus, it was determined that the coastline of the Azerbaijani coast from Cape Bandovan to Asatarachay changed from 0.01 m to 197.85 m towards the land as a result of the abrasion process, from 0.05 m to 7405 m advanced towards the sea as a result of accumulation and some areas remained unchanged. In the period of 2016-2021, coastal changes are mainly accumulation, and to a lesser extent erosion. In 2016-2021, 8052 ha of land was gained as a result of accumulation processes, 71.47 ha of land was lost as a result of erosion. On Kurdili Island, 623.66 ha of land area increased and 220 ha decrease. The results show that there is a change in the coastline in 2016-2021, and an average of 230 m of coastal movement to the sea.