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ANALYSIS OF HARMFUL ALGAL BLOOMS IN LAKE TITICACA USING REMOTE SENSING

**Abstract**

Lake Titicaca is located between the countries of Peru and Bolivia at the height of 3812 m.a.s.l., it is the highest navigable lake in the world, considered in the List of Wetlands of International Importance of Ramsar, flora and fauna in this lake is diverse. Due to the mismanagement of waste from the cities surrounding Lake Titicaca, in the last 30 years a green carpet of *Lemna gibba*, also known as duckweed, has been formed, this type of aquatic plant is found mainly in lakes and rivers. The factors that contribute to the growth of the duckweed are the bad collection and treatment of garbage, the formal and informal mining and the treatment of the drains, these sources of contamination come from Peru and Bolivia. For example, the city of Puno only treats 20 Harmful algal formations feed on the nutrients contained in the wastewater and deteriorate the quality and water renewal capacity, degrade the habitat, contribute to the disappearance of oxygen from the water, which leads to the death of any form of aquatic life. The rapid proliferation of duckweed has turned it into a toxic bloom of binational concern. Given this problematic, the present study has the primary objective of performing a spatio-temporal analysis of harmful algal blooms in Lake Titicaca using remote sensing images and geographic information systems. This analysis could be a crucial tool to obtain parameters such as Sea Surface Temperature, the anomalies in the concentration of chlorophyll and the characteristics of absorption and retrospection that will allow us to detect the presence of harmful algae blooms in the study area. The present study aims to monitor and possible forecast of future algal blooms in the lake, which will allow us to define which areas are most affected, identify priority areas of attention, generate intervention and conservation maps. This tool will facilitate the efforts being made by the Binational Authority of Lake Titicaca (ALT) since unfortunately; this binational agency carries out limited actions since it lacks the funding resources to undertake monitoring and remediation plans on a large scale.