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USE OF LANDSAT SATELLITE TECHNOLOGY FOR THE ANALYSIS OF THE EFFECTS OF CLIMATE CHANGE ON THE MANGROVES OF MEXICO AND THEIR SOCIO-ENVIRONMENTAL DERIVATIVES AT A GLOBAL LEVEL.

Abstract

Mangroves cover only 12 percent of the world's coastline, but they can still be seen from space thanks to the processing of satellite images with the help of the Landsat mission, a series of satellites put into orbit for earth observation and analysis from 1970 to the present day, and a very useful tool for identifying vegetation cover, which can be used to estimate the quantity, quality and development of vegetation.

In the same way, satellite monitoring of mangroves helps to gather new information on the global state of these coastal trees, especially data related to the fight against the climate crisis. Because climate change has caused a rise in ocean levels, increased CO2 in the atmosphere, changes in precipitation, among others, mangroves have not had the opportunity to develop. This is why their global extent has been considerably reduced.

The research is based on the analysis of the Landsat database, as well as geographic monitoring techniques such as NDVI and the green, red, blue and infrared bands. A comparison of images from different dates was carried out, resulting in a difference catalogued as a new dNDVI layer. The value of the new layer determined the status of the mangroves. Thus, the best result was obtained with the NDVI-based segmentation and in a lower range with the region growth segmentation.

The objective is to monitor the territorial effects of mangrove losses, where such losses would have consequences for climate change, such as CO2 release, reduction of barriers between coast and land, loss of species, among others. Also, taking into account the state of the mangroves, Machine Learning, "tensorflow", was used, where the dNDVI attribute table was used to predict the future of these data and the situations that would occur. This makes it a good technique to analyse the consequences we are facing, helping to have an updated record of the condition of the mangroves and possible solutions.