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Evaluation of the water space evolution in the Middle Jaguaribe during the period 2007 to 2017

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Introduction

Since 2012, the state of Ceará faces one of the worst droughts in the historic series with declining levels and even complete emptying of reservoirs. Despite the situation of water shortage faced by the state, there is a growth of economic activities of highwater requirement, such as irrigation agriculture and shrimp farming in the region of the Middle Jaguaribe. In this way, the guarantee of water safety emerges as a subject of relevant social importance and the use of remote sensing.

Therefore, the present work aims at applying remote sensing and satellite image processing using the GIS software to estimate the evolution of water mirror areas of the Jaguaribe medium region in the periods of 2007 and 2017. This is applied to observe the proportions of the drought and take appropriate measures. The use of remote sensing is helping to manage water resources.

Materials and methods

Were obtained using the USGS Earth Explorer digital platform, images of the LandSat 5 satellite on 12/09/2007 and LandSat 8 on 11/26/2017, these dates were chosen due to lower cloud interference and mark the dry season studied. The images were pre-processed with the unification of spectral bands 3, 4 and 5 for LandSat5 and 4, 5 and 6 for LandSat8 as we can see in Figure 1.

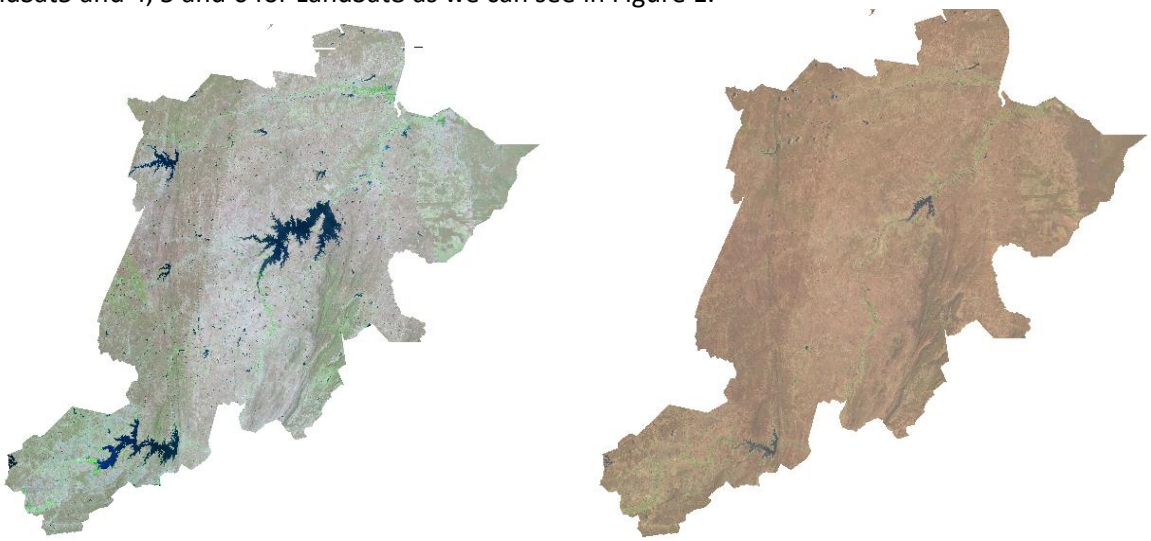

Figure 1. Water mirror in 2007 and 2017.

Results and concluding remarks

It was possible to observe in Table 1 the drastic reduction of the waterfalls of Castanhão and Orós, 44,36%, which reflects the extreme drought conditions that the region is suffering. Also, this affects the economy and all the water uses in the region, mainly irrigation and human use.

Table 1. Decrease of water mirror.

Period	Area (km²)
2007	668,14
2017	371,73

Water resource planning is essential to ensure water safety. Therefore, policies must be urgently made so that there is no lack of water in the region.

The analysis and interpretation of images using techniques of remote sensing and digital processing can be used to help water resource planning. Thus, these techniques are low cost and must be incorporated the tools of management.

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