UNAM

Comparison of coverage obtained by land use classification using Landsat and RapidEye. Case study: Tenosique, Tabasco, México. Nieto J. J.¹, Ramírez N. L.¹, Jácome M. P.¹, Ruiz T. X.²

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Photos taken by Tania Ximena



2010 - Image copyright Planet





Intro



Planet Team (2017). Planet Application Program Interface: In Space for Life on Earth. San Francisco, CA. <u>https://api.planet.com</u>. This work was supported by UNAM-PAPIITTA100523 AIR(Artist in Residency Planet Labs 2021) for Tania Ximena





- Land use classification studies help quantify the changes in forest cover that may occur at a given site over time. This quantification helps us understand the effect of the natural and anthropogenic processes over the study site.
- Activities such as agriculture, cattle ranching, and illegal logging, which in turn are related to the evolution of the site's public policies, can be evaluated through classification studies.
- With remote sensing, the task of quantifying the effect of public policies has become increasingly influential, and many studies are being conducted to evaluate the current state of the study zone. However, the results are known to depend directly on the images and methodologies used for this task.
- The aim of this project was to determine the influence of images used as inputs for land cover maps. Images from different satellite platforms (Landsat and RapidEye) with and without atmospheric correction were compared. Maximum likelihood classification was used for mapping.







Photo taken by Tania Ximena







Tenosique, Tabasco, México (Usumacinta River Middle Basin)

- Tenosique is located on the borders of Mexico and Guatemala.
- It is located in the Middle Basin, therefore it has tropical-type vegetation.
- The meaning of "Tenosique" in Maya refers to the "house of a un raveler or spinner".



Photo taken by Tania Ximena





Intro







A little history of the area



- This land host quite valuable biodiversity of Mexico, being also an important ecosystem that helps to mitigate the effects of the Climatic Change.
- During the century XX, this area was affected by several events and lack of proper decisions made unvaluable lost a lot of tropical forest, plants and animals.
- Such events (among others) are closely related to a human activities:
 - Economic Crisis.
 - Petroleum.
 - Livestock activities.
 - Floods
 - Deforestation
- Since 2008, Tenosique, belongs to the Natural Protected Area of Usumacinta River Canyon, a Natural Protected Area (ANP, Environmentally Guaranteed Mexican Territory).



"ANP" Map Source, CONANP, 2023







 For determinate land cover in the area, we used to a six and seven images. 6 images from Landsat 7 (2010 and 2020) and 7 images from Planet (Rapid Eye, 2010 and 2019).



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The steps we used to for the work was:



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2010 – Landsat 7



2010 – RE atmospheric correction Image copyright Planet

2010 – RE without atmospheric correction Image copyright Planet





























SUPERVISED CLASSIFICATION RE WITH ATM COR



SUPERVISED CLASSIFICATION RE WITHOUT ATM COR





2015 Supervised Classification without Correction



2015 Supervised Classification with Correction



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- The same Image with and without atmospheric correction results in different covers per class. Apparently, the corrected image more closely matches the class that the classification is expected to take. However, there are also areas that are misclassified in the corrected image, which match the base image.
- The images that correspond to the same year and month, look different depending on the satellite taking the picture. RapidEye images record clouds at clear sites within Landsat images of the same time frame. An image with clouds or fog does not contain enough information to be classified by the automated method.



















• A validation exercise of the coverage mapping is necessary.

 Also, to obtain more parameters like a change matrix, to understand better the study area.







Thanks! ¡Gracias!

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