How Does the ITCZ Affect the Grasslands in the Radom National Park, South Sudan?

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Introduction:

Our research focuses on how the Inter-Tropical Convergence Zone affects the grasslands; we started our study in central Radom National Park. The Radom National Park is a plot of wooded savanna in South Sudan, Sudan, and the Central African Republic. We began to study the movement of the Inter-Tropical Convergence Zone (ITCZ) in hopes to work out how the land would be affected as the ITCZ moved across it.

What is the ITCZ?

The ITCZ is a low-pressure belt encircling the globe around the equator. It is where the trade winds from the Northeast and Southeast meet. It migrates between the Tropics of Capricorn and Cancer, since the earth is tilted on its orbit around the sun.
The location of the ITCZ changes throughout the year: during July it is mostly located in the Tropic of Cancer, this contrasts where it is during January, in the Tropic of Capricorn.
The area around the ITCZ has heavy precipitation and thunderstorms due to the combination of hot dry air and warm moist air.

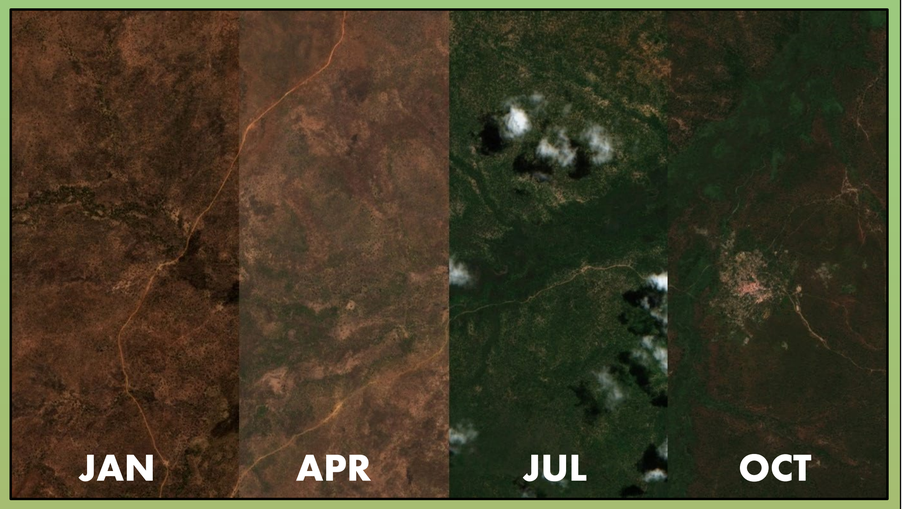
Radom National Park

The Radom National Park was established in 1980. The annual rainfall ranges between 900-1700mm, and the annual temperature ranges from 16-27°C. We picked this location due to its easily identifiable location on the map, found in the middle of distant parts of the ITCZ. This is our point of interest because of the low cloud coverage and the frequent satellite data that we had access to.
We chose to look at the months of January, April, July, October. This is because January and July are the parts of the year where the ITCZ are the furthest away – at its peaks. We chose April and October because they are in between, meaning we can see the transition of the ITCZ as it moves over the National Park.

Prediction:

We originally expected to see at least two distinct seasons as the ITCZ passed over the grasslands of the park, we would find evidence to prove this prediction by taking satellite data and studying the levels of green across the year; this colour level would have a direct correlation to the amount of water being taken in by plants, therefore informing us on how much precipitation an area receives.

Research Findings:



During July, there are more clouds visible – 12% cloud coverage in the above image, meaning there is higher precipitation. 12% of cloud coverage does not sound like a high amount, however, this was the lowest percentage of clouds throughout the month.
This contrasts the other months as no clouds are visible and therefore multiple days of little to no precipitation.
July has a "greener" surface, there is more vegetation, which is due to high rainfall.
This is closely followed by October, which has large green Areas. But some parts are starting to dry out, shown by the browner patches in the green. The high amount of vegetation in both July and October indicates that this time was when the Inter-Tropical Convergence Zone was above the Radom National Park due to the heavy precipitation – one of the effects that the ITCZ has on an area.
January and April are both equally dry, they have low rainfall shown through the lack of green in the satellite images, and this indicates that the ITCZ is not above the area. This matches our prediction, the contrasting levels of green show two distinct seasons, as we predicted.
However, something that these all have in common is the valley remains greener than the surrounding areas, this is because of the river flowing through it. We can assume the river flows east, meaning that the east will be greener due to the river flowing in that direction and that rivers gain more water as they go further along because of tributaries, widening the path that the river takes; this can be seen in the satellite images. The precipitation produces healthy plants due to the increase in soil moisture. This increase in soil moisture will replenish the water lost in the plant due to transpiration, which is when the plant removes excess water through the stomata – microscopic holes in the leaves.
Although high precipitation is positive in many ways, it can also be damaging to plant life in the area. Prolonged rainfall can result in stagnant water – water that has stopped moving – resulting in the plants potentially rotting or alternatively having damaged leaves or snapped stems, neither are very beneficial for a plant. Alongside this, due to soil erosion, the roots of plants may become exposed, which may also harm the plant. The rain also washes away the nutrients present in the soil, which may negatively affect the flora.

Conclusion

Our research findings demonstrates our prediction clearly. Satellite imagery helps us to distinctly see the difference between when the ITCZ was above the Radom National Park compared when it wasn't.
To gain more accurate results, we could've looked at a range of satellite data from a variety of places that are affected by the ITCZ, and then compared the findings. Additionally, we could've researched the effects that climate change has had, whether it has magnified the impact of the ITCZ over the last few decades as global warming has increased.
Our predictions stated that "we expected to see the performance of the ITCZ in at least two seasons", our research proved this point, presenting two seasons – wet and dry. These conditions contrast the cold and warm seasons of areas in higher latitudes.