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Gabon's Forests...

Mapped and **Monitored** to reduce climate change

Tropical forests are vital carbon sinks, absorbing about 10-15% of all human-induced carbon dioxide emissions. Conversely, their destruction and degradation accounts for 10-20% of all anthropogenic emissions.

Gabon plans to be one of the first developing countries in the world to map, assess and set up a monitoring system covering all of its forests and carbon stocks. The Government of Gabon has commissioned a multidisciplinary team of satellite specialists and experts in ground-based forest monitoring to help with this task.

Accurate monitoring of the carbon stocks of tropical vegetation is needed to identify trends in carbon dioxide emissions from tropical deforestation and degradation. Measuring these carbon stocks allows the Government of Gabon to develop policies, which reduce carbon dioxide emissions and the effects of climate change.

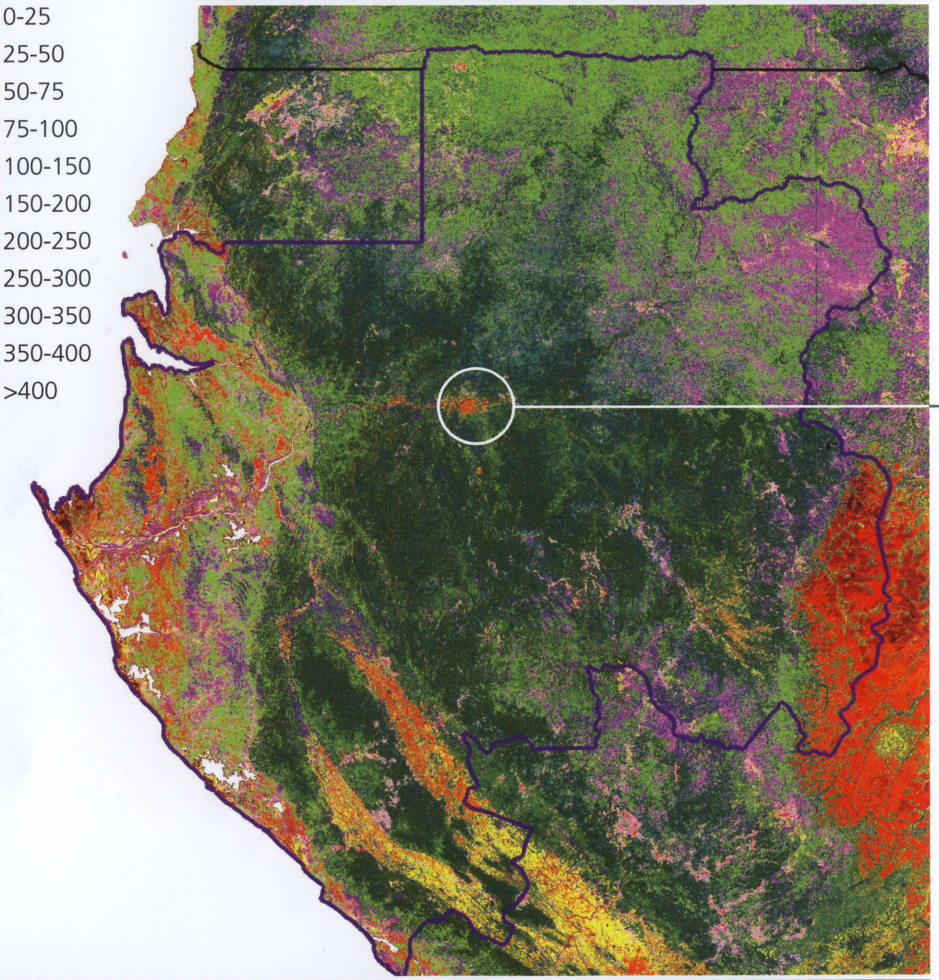
Gabon's Carbon Stocks

The map highlights areas of savannah, high-carbon storage forest, and areas of degradation and deforestation. It measures the above-ground biomass and its capacity to store carbon dioxide. Gabon's forests stored approximately 4.2 billion tonnes of carbon earlier this decade.

Above-ground Biomass (Mg ha^{-1})

- 0-25
- 25-50
- 50-75
- 75-100
- 100-150
- 150-200
- 200-250
- 250-300
- 300-350
- 350-400
- >400

Gabon's forests stored approximately 4.2 billion tonnes of carbon early in this decade

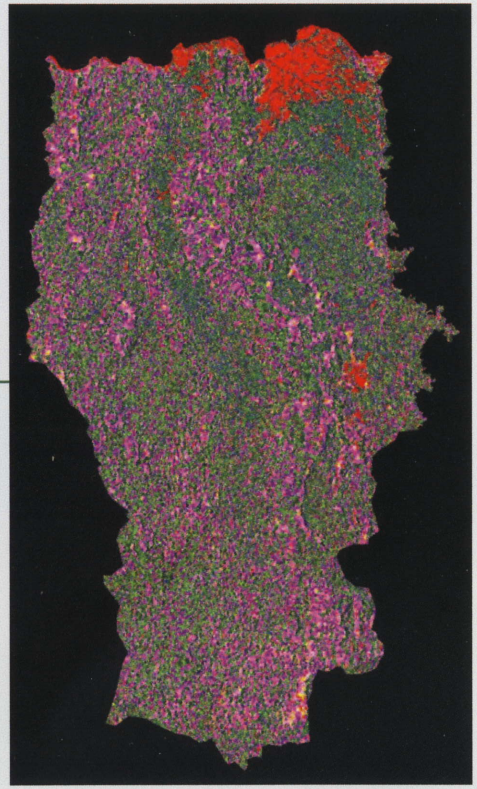


The map is derived from 2,250 forestry plots, 7,089 forest heights from GLAS lidar abroad ICESAT satellite, 139 scientific inventory plots, and 9 remote sensing layers from MODIS (optical), JERS-1 (radar) and SRTM, using Maximum Entropy (Maxnet), a predictive non-parametric multi-dimensional methodology and a decision rule classifier, both previously used to estimate species distributions and biomass across Amazonia.

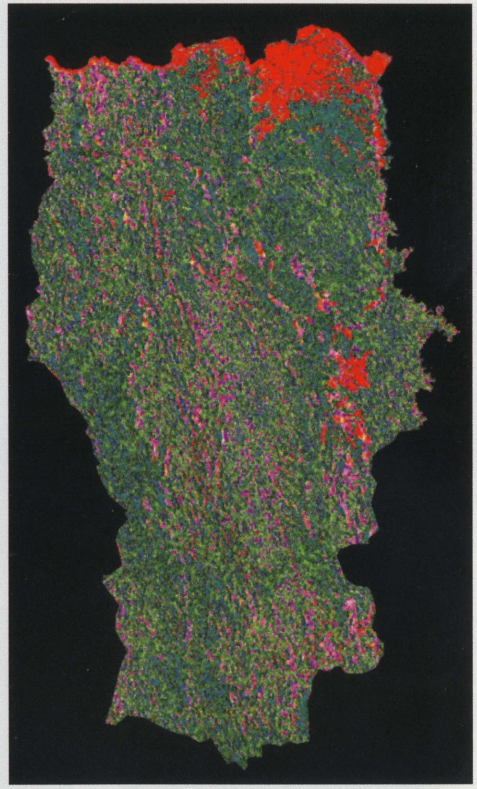
Case Study: Carbon stocks in Lope National Park

Total carbon stocks in the park increased from 51 Tg C (1 Tg = 1 million tonnes) in 1996 (±15 Tg C) to 64 Tg C in 2007 (±16 Tg C). This increase is due to woody encroachment in some savannah areas, post-logging recovery, and the 'natural' carbon sink effect (Lewis et al. 2009, *Nature*). Carbon stocks have been slightly reduced by deforestation in the North and East of the park.

1996



2007



Mapping the Nation

Having tested various monitoring and observation techniques during 1996 and 2007 in Lope National Park, preliminary findings suggest that it is possible to monitor carbon stocks across whole tropical countries using satellite-based Earth observation instruments and extensive direct on-the-ground measurements of trees. This data enables the quantification of changes in carbon storage and hence carbon emissions over time.

The release of further satellite data in early 2010 should allow this change analysis to be extended to the whole of Gabon.