Goddard Super-Computing Study Maps Individual Trees, Advances Carbon Research

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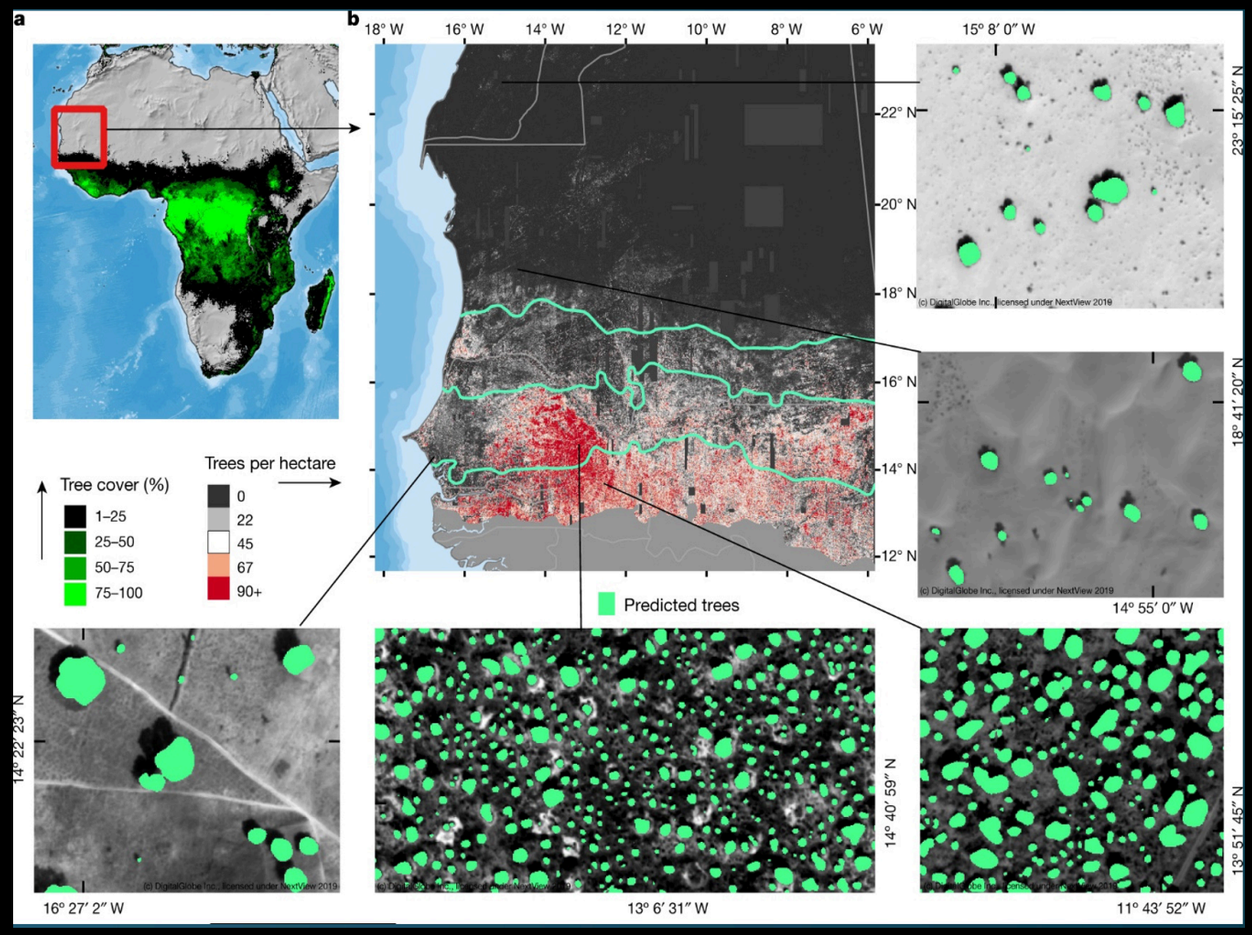
Scientists from Goddard and international collaborators demonstrated a new method for mapping the location and size of trees growing outside of forests, discovering billions of trees in arid and semi-arid regions and laying the groundwork for more accurate global measurement of carbon storage on land.

Using powerful supercomputers and machine learning algorithms, the team mapped the crown diameter – the width of a tree when viewed from above – of more than 1.8 billion trees across an area of more than 500,000 square miles, or 1,300,000 square kilometers. The team mapped how tree crown diameter, coverage, and density varied depending on rainfall and land use.

Mapping non-forest trees at this level of detail would take months or years with traditional analysis methods, compared to a few weeks for this study. The use of very high-resolution imagery and powerful artificial intelligence represents a technology breakthrough for earth science, and one that is unique to Goddard. This study is intended to be the first in a series of papers whose goal is not only to map non-forest trees across a wide area, but also to calculate how much carbon they store – vital information for understanding the Earth's carbon cycle and how it is changing over time.



Brandt, M., Tucker, C.J. et al. An unexpectedly large count of trees in the West African Sahara and Sahel. *Nature* (2020). https://doi.org/10.1038/s41586-020-2824-5