



THE WOODS HOLE RESEARCH CENTER

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First Phase of Pantropical Forest Mapping Debuting at COP15

December 10, 2009

Tropical forest loss accounts for an estimated 17% of global emissions of carbon dioxide. As part of a strategy to reduce these greenhouse gas fluxes to the atmosphere, the UNFCCC's Conference of the Parties 15 in Copenhagen is working to adopt a strategy for Reducing Emissions from Deforestation and Forest Degradation (REDD) in the post-Kyoto climate treaty. For tropical nations to be effective in tracking and reporting their emissions reductions from forest management and conservation, baseline data sets enabling wall-to-wall forest mapping and monitoring are invaluable.

The Woods Hole Research Center (WHRC) has initiated a three-year project focused on producing spatially consistent pan-tropical data sets to support the monitoring of forest cover and associated carbon stocks stored in above-ground forest biomass. A circa-2007 high-resolution, cloud-free radar data set from the Japan Aerospace Exploration Agency's (JAXA) ALOS/PALSAR sensor is the cornerstone of the pan-tropical forest cover mapping effort. A circa-2005 500-meter biomass product is being produced through the fusion of optical (MODIS) and lidar (ICESat/GLAS) data provided by the National Aeronautics and Space Administration (NASA). Pantropical mosaics of ALOS/PALSAR and MODIS data are now complete and can be viewed for the first time on Google Earth.

According to Josef Kelldorfer, an associate scientist at the Woods Hole Research Center who is leading the radar-mapping portion of the project, "Japan's cloud-penetrating ALOS/PALSAR sensor has greatly advanced satellite-based forest observation. JAXA's Kyoto and Carbon Initiative has been instrumental in pushing a global radar-based data acquisition and observation strategy since 2006. Given the strong sensitivity of the PALSAR sensor to forest classification, pan-tropical remote sensing of forests has been significantly improved, aiding countries in their ability to build robust national carbon accounting systems."

NASA's MODIS and IceSAT sensors are used in the project to build consistent **pantropical maps of forest carbon stocks**. Alessandro Baccini, an assistant scientist at WHRC involved with this initiative, explains, "The unprecedented quality and high temporal resolution of MODIS data allow us to produce cloud-free mosaics with many optical information channels, overcoming cloud-cover which affects optical remote sensing in the tropics. Coupled with lidar measurements that provide information on the vertical structure of the vegetation, as well as targeted field observations, it is possible to generate increasingly accurate maps of above-ground carbon stored in woody vegetation across the pan-tropical belt."

According to Craig Dobson, NASA Program Scientist, "NASA is pleased to support this effort through provision of the MODIS and IceSAT data and the processing of JAXA's ALOS PALSAR data. The combination of frequent MODIS coverage with the forest structural information provided by the IceSAT/GLAS lidar and the PALSAR radar data provides a rich data set for monitoring forests. The public release of the pantropical products by WHRC is both timely and a testament to the value of multi-agency and multi-institutional collaboration with unrestricted access to data. This effort is very much in tune with the spirit of the Group on Earth Observations's (GEO) Global Earth Observing System of Systems (GEOSS)."

The Woods Hole Research Center is a partner in this GEO Task on Forest Carbon Tracking. "Satellite observations will be key to measure trends in forest carbon. We are impressed by the Woods Hole Research Center's work, in partnership with



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JAXA and NASA. Systematically generated data sets such as the present pan-tropical compilation will significantly strengthen national forest tracking capabilities," said José Achache, Executive Director of GEO, the Group on Earth Observations.

The WHRC mapping initiatives are accompanied by on-the-ground work. Through workshops, a visiting scholars program, and other related activities, new maps will be produced, assessed, disseminated and discussed with various stakeholders within countries - including representatives from government, civil society, indigenous and traditional forest communities, and the private sector. An integral part of the project is to transfer knowledge and skills of forest and carbon mapping to those countries that are increasingly engaged in international efforts to slow deforestation and enable these countries to evaluate alternative options for management of their forest resources. Nadine Laporte, an associate scientist at WHRC who coordinates in-country activities states "field measurements coupled with the satellite observations are an essential part of producing accurate maps of tropical forests, and building capacity with stakeholders in the region."

Luis Solorzano of the Gordon and Betty Moore Foundation (GBMF) states, "As funders, we are proud of the work advanced by WHRC. Our support to WHRC is part of a growing partnership between GBMF, Google.org and the David and Lucile Packard Foundation. Our unusual partnership brings together scientists, private sector, governments and philanthropies, all motivated by a shared commitment to halt the most severe threats to our global environment. Our common goal is to create the capacity to broadly deploy data, information, and analysis tools for the global community to transparently monitor and improve the management of global environment. Most essential, we seek to initiate open spaces for the collaborative creation of knowledge, and to freely share and use it in broad and transparent ways. This work by WHRC is uniquely important for its contribution to our primary purposes and principles."

This work is a partnership project of the Woods Hole Research Center, JAXA's Kyoto and Carbon Initiative, NASA, the Alaska Satellite Facility, SARMAP, Boston University, and SpotImage PlanetAction. Funding for this work has been provided by The Gordon and Betty Moore Foundation, the David & Lucile Packard Foundation, Google.org, and NASA.

Details on the project, sensors, and visualizations of the data sets can be found at:

<http://whrc.org/pantropical>

<http://www.eorc.jaxa.jp/ALOS/en/>

<http://modis.gsfc.nasa.gov/>

<http://icesat.gsfc.nasa.gov/>

The datasets can also be viewed on the GEO-Forest Carbon Tracking Portal at: <http://www.geo-ftp.org>

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