

An aerial photograph of the Amazon rainforest, showing a vast expanse of green canopy stretching to the horizon. A faint rainbow is visible in the sky above the forest. The text is overlaid on the upper half of the image.

Large Scale Biosphere- Atmosphere Experiment in Amazônia (LBA)

Diane E. Wickland
Manager, Terrestrial Ecology Program
National Aeronautics and Space Administration





New Implementing Arrangement (Ajuste Complementar) Signed for Large Scale Biosphere-Atmosphere Experiment in Amazônia (LBA)

Photos from Signing Ceremony on July 20, 2006





Large Scale Biosphere-Atmosphere Experiment in Amazônia (LBA)

LBA is an international, multi-disciplinary cooperative research program led by Brazil. NASA leads the U.S. participation in LBA, working in close partnership with the Brazilian leaders and scientists.

LBA research is focused on producing new knowledge about the:

- climatological, ecological, biogeochemical, and hydrological functions of Amazônia,**
- impact of land use change on these functions**
- interactions between Amazônia and the Earth system.**

LBA is the largest cooperative international scientific project ever to study the interaction between tropical forests and the atmosphere.



The Amazon region of South America as viewed by MODIS on NASA's Terra satellite.





LBA Achievements and Results

- ❖ Discovered that forests green-up, are more productive, and store more carbon in the dry season. Light limitations in the wet season constrain productivity more than water limitations do in the dry season.
- ❖ Discovered that in the wet season, cloud cover and rain in the western Amazon resemble oceanic conditions. These “green ocean” conditions are controlled by natural particulate emissions from the vegetation.
- ❖ Developed new remote sensing methodologies to detect and quantify selective logging in the Amazon and quantify its effect on carbon budgets.
- ❖ Developed a Brazilian early warning system for deforestation (DETER) based on NASA MODIS technology.
- ❖ Developed a model (now operational in Brazil at CPTEC) using satellite fire detections to predict the transport of smoke.
- ❖ Produced 1154 research publications, including 8 Special Issues.
- ❖ Trained 932 students, including 241 Ph.D.'s.



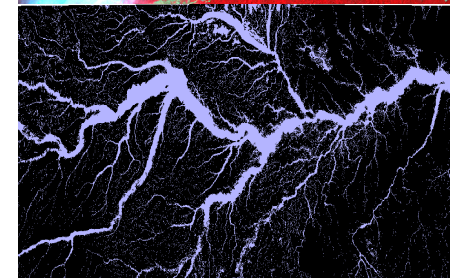
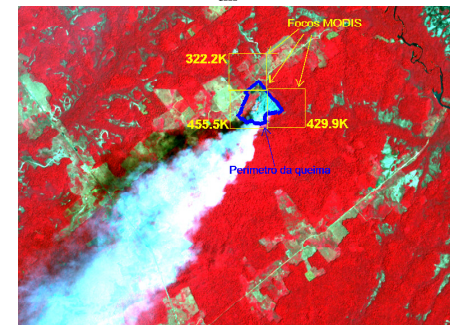
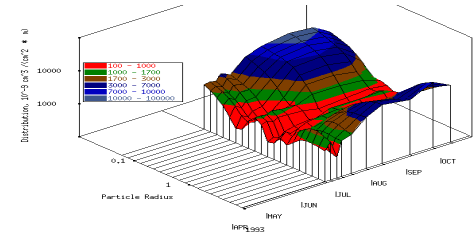


Anticipated Future Results

Approval of the new Implementing Arrangement for LBA will ensure:

❖ **Continued collaboration between Brazilian and U. S. scientists on LBA data analysis and interpretation, including:**

- ❖ Synthesis of carbon research results that will quantify the Amazon's carbon budget, addressing interannual variations and whether it is a carbon source or sink.
- ❖ An integrated analysis of the meteorological conditions, ecological, economic, and social effects of the 2005 drought and forest fires in Western Amazônia.
- ❖ Analyses of remote sensing data on natural and anthropogenic disturbances to constrain the temporal and spatial variations in forest turnover and stream biogeochemistry.
- ❖ **A rich, and well-documented archive of LBA data and data products will be publicly available for a wide variety of uses.**
- ❖ **Coordinated public release of results by the U.S. and Brazil.**
- ❖ **Continuation of training and education activities.**





A Rich Archive of LBA Data

The LBA data archive will be a major aspect of our legacy (along with the scientific knowledge created and the scientists trained).

LBA has assembled unique and comprehensive data about Amazônia and its functions – we need to make sure those data are not “lost” to future generations.

I challenge all of you to make sure all of your data (quality-assured primary data, valuable analyzed and synthetic products, and adequate documentation) become available in the LBA archives **within the next 12 months, and to encourage your colleagues in LBA to do the same!**



Public Release of Results

The new Implementing Arrangement between the U.S. and Brazil calls for each partner to inform the other of new results about to be published. I request that you keep me informed so that I can comply with this obligation.

It would be good to assess what we have learned and craft a “message” that conveys LBA’s major contributions to science and society.

As books and synthesis volumes are published, we should attempt coordinated press releases or other such events.



LBA-ECO Transition

The transfer of NASA LBA-ECO property and equipment to Brazilian research institutions is essentially complete (awaiting only INPA's response to the personal property transfer).

NASA-sponsored project personnel in Brazil have nearly completed their work.

BARCA is moving forward under a Scientific Expedition License (does not involve NASA – other than as the funding sponsor for the U.S. scientists participating in BARCA).

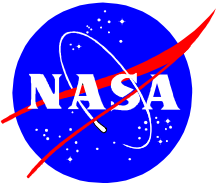
LBA-ECO Project Office “merged” with new support offices for the North American Carbon Program and the Carbon Cycle & Ecosystems Focus Area.



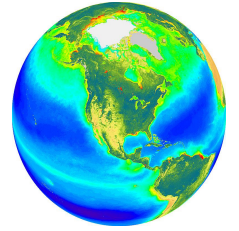
NASA Joint Workshop (Biodiversity, Terrestrial Ecology, & Applied Sciences)

LBA break-out session report:

- Noted several unanswered questions or important topics for future investigations:
 - many open questions regarding physiology (controls on phenology, response to CO₂ and temperature increases, controls on productivity)
 - role of wetlands and rivers in carbon transport and release
 - effects of increasing intensive agriculture in the region
 - effects of land use change on water quality and biodiversity
 - **controls on the forest-savanna transition in the Amazon**
- Called for a unified vegetation/land cover data product to advance synthesis studies



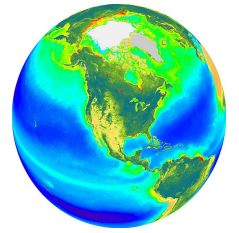
NASA TE Program Concerns



-
- Future of systematic observations for scientific research
 - Next steps in ecosystems and global carbon cycle modeling, analysis, and data assimilation
 - Being adequately prepared for OCO mission
 - Fate of our researchers in reduced funding environment
 - Ability to secure approval / funding for new measurements and missions
 - Capacity to do the scientific groundwork (including modeling, laboratory, and airborne test beds) to establish the rationale and requirements for new missions
 - Capacity / Need in Terrestrial Ecology Program to support major field campaigns
 - Impacts of NASA's transition to full-cost accounting



Future Directions



- Possible workshop to explore future research directions – beyond LBA (suggested by INPE, INPA Directors)
- Future U.S.-Brazil satellite collaboration?
- NASA heavily involved in North American Carbon Program
- NASA interested in exploring new ideas for future field campaign(s)

Have a Productive Meeting!