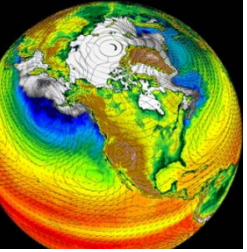
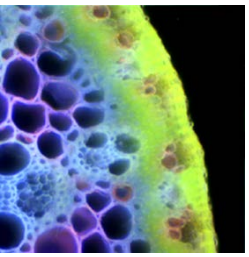
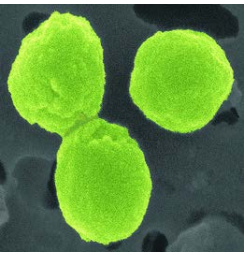


GOAmazon - Green Ocean Amazon

SBR/TES Science Team Meeting
May 15, 2013

Paul Bayer
EMSL Program Manager
BER, CESD

Why the Amazon Basin?

- **The Amazon Basin is a critical climatic regime.**
- **Tropical deep convection in a natural state is poorly understood and modeled, with insufficient observational data sets for model constraint.**
- **Future climate scenarios show the possible drying and the eventual possible conversion of rain forest to savanna in response to global climate change.**
- **Aerosols strongly influence cloud processes and in the Amazon aerosols are dominated by vegetative sources.**
- **There is a strong and little understood connection between terrestrial ecosystems and the atmosphere.**

Opportunity for CESD

- **In 2010 ARM approved the proposal to send the ARM Mobile Facility, two aerosol observing systems, and the G-1 aircraft to Brazil in 2014. In 2012 the extension through CY 2015 was approved.**
- **Given the scientific importance of the location and key questions in the proposal, other BER program managers quickly identified the opportunity to leverage their funds to design a more ambitious experiment.**
- **The decision was to create an integrated activity that focused on addressing a key limitation in earth system models-- the difficulty in coupling land surface-atmospheric modules and the limited understanding of the physical and biological processes involved in that coupling.**

Seeking Community Input

- A planning workshop of atmospheric and terrestrial experts was conducted in Crystal City, VA, on July 26 & 27, 2012
- The workshop included 27 process and modeling scientists with expertise in atmospheric and terrestrial ecosystem research
- Experts from the U.S. and Brazil participated.

Workshop Goals

- **Identify important unresolved science questions concerning relationships between aerosols and cloud properties under pristine and polluted conditions in the target region.**

- **Identify and discuss observation and modeling strategy to address gaps in understanding**

Workshop Guidance

- **What are the priority gaps in understanding related to the cloud-aerosol-precipitation interactions that can be addressed in GOAmazon2014?**
- **What are the priority gaps in understanding related to the terrestrial ecosystem that can be addressed in GOAmazon2014?**
- **What are the priority gaps in understanding related to the coupling of the land surface/terrestrial ecosystem-atmosphere that can be addressed in GOAmazon2014?**
- **Consider the relative roles of large scale dynamical versus local biosphere-atmosphere effects on hydrology; also the potential influences of local pollution.**
- **What measurement capabilities beyond those currently identified are needed to address each of these questions?**

Workshop Report

- CESD program managers drafted the report
- Participants reviewed the draft for accuracy
- The report on the findings of the workshop is now available on the web and hardcopy.

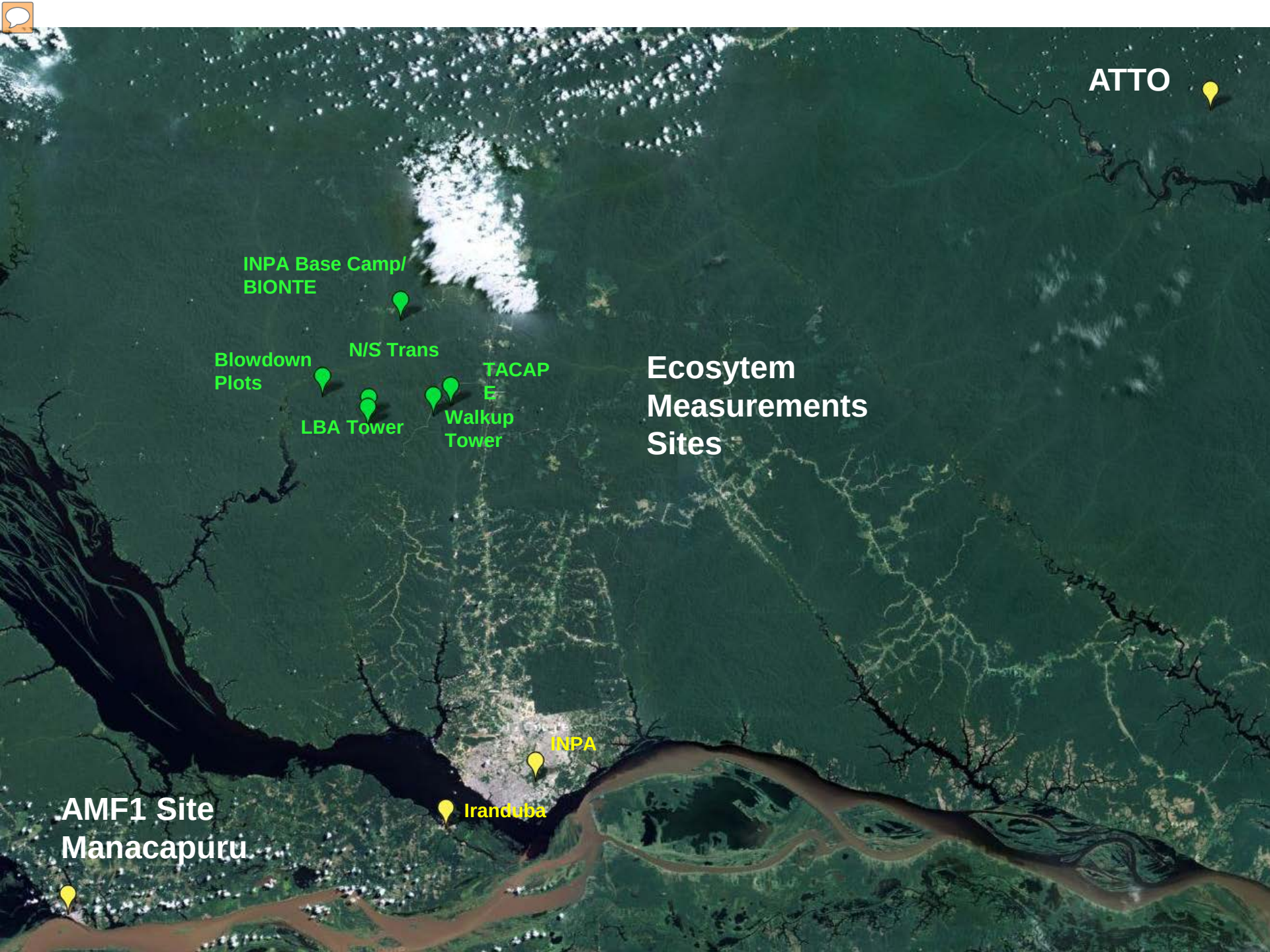
http://science.energy.gov/~/media/ber/pdf/GOAmazon2014_200dpi.pdf

GOAmazon2014-2015

- **BER's commitment is to provide a dataset and associated research needed to improve model representations of organic aerosols, cloud and convection schemes, and terrestrial vegetation components and how these are perturbed by pollution.**
- **BER programs are working with interagencyand international partners to effect a successful integrated research activity.**

Climate Research Focus

- The scientific focus is on atmospheric, terrestrial ecosystem, carbon cycle, and coupling questions dealing with tropical systems in the Amazon.
- The experiment is being designed to enable the study of how aerosols and surface fluxes influence cloud cycles under clean conditions, as well as how aerosol and cloud life cycles, including cloud-aerosol-precipitation interactions, are influenced by pollutant outflow from a tropical megacity.


ATTO
INPA Base Camp/
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Plots
TACAP
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LBA Tower
Walkup
Tower
Ecosytem
Measurements
Sites
INPA
Iranduba
AMF1 Site
Manacapuru

BER Observing Systems

- ARM will send the ARM Mobile Facility, the G-1 aircraft and two aerosol observing systems for cloud and aerosol measurements
- EMSL will provide a high resolution aerosol mass spectrometer and laboratory studies
- Terrestrial Ecosystem Science instruments will provide terrestrial ecosystem measurements

Brazilian Observing Systems

- **LBA K34 flux tower** will continue its operations for Amazon2014-2015 campaign and will measure fluxes of carbon, heat and water vapor.
- **CHUVA Measurements**
  - Radar band X dual pol - operated at the SIPAM site.
  - MP3000, Joss, Pluv + radiossondes at EMBRAPA site
  - Operation of the MRR, Parsivel _ Heat flux, pluv. at the T2- Iranduba
  - Water vapour column with GPS
  - Radiossondes at the Air Force Base and Embrapa.
  - Parsivel, pluv e MRR at Manaus City.
- **Center for Weather Forecasting and Climate Studies (CPTEC)** modeling efforts include the GCM and regional ETA model with 20 Km resolution. It will continue over 2014 and 2015.
- **USP IAG BRAMS model** in very high resolution (2 Km) is already running continuously over the domain of GoAmazon.
- **Proposed FAPESP GoAmazon 2014-2015 Thematic proj**ect, if approved, will provide very extensive instrumentation and support for Iranduba and ZF2/Embrapa/ATTO sites

European Observing Systems

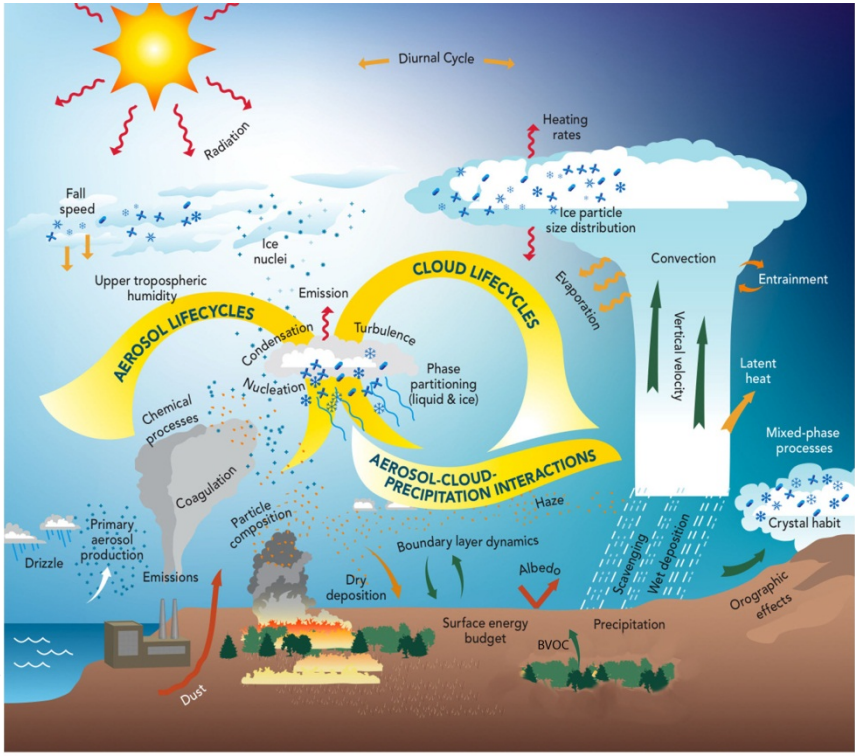
- **Data from the tall tower** by German PI, Meinrat Andreae, will be available.
- **German Halo Gulfstream V** scheduled to fly with the G-1 in late 2014 (aerosol and cloud measurements)
- A **workshop** will be held this year in Europe to investigate additional European participation in 2015.

Interagency Coordination

- Scientists have submitted a proposal to NSF requesting the deployment of their *S-Pol radar*
- NSF will accept proposals from scientists to field additional instruments and to conduct research using the data
- Discussions with NOAA are ongoing

Research Support

- The research will use these data to evaluate and improve the representation of these processes in the climate models.
- Research supported by
  - Atmospheric System Research
  - Earth System Modeling
  - Regional and Climate Modeling
  - Terrestrial Ecosystem Science
  - Fundação de Amparo à Pesquisa do Estado do Amazonas
  - Fundação de Apoio à Pesquisa do Estado do São Paulo



GOAmazon Leadership

- *Scot Martin, Harvard, leads the atmospheric component*
- Jeff Chambers, LBNL, leads the terrestrial ecosystem component
- Kim Nitschke, LANL, leads logistics and operations
- DOE Program Manager Steering Committee:
  - Wanda Ferrell, ARM
  - Dan Stover, TES
  - Paul Bayer, EMSL
  - Dorothy Koch, CESM

- DOE/Brazil Joint FOA
  - Renu Joseph, RGCM
  - Dan Stover, TES
  - Ashley Williamson, ASR
  - Andrea Viviana Waichman, Fundação de Amparo à Pesquisa do Estado do Amazonas - FAPEAM
  - Carlos Henrique de Brito Cruz, Fundação de Apoio à Pesquisa do Estado do São Paulo - FAPESP

Planning Continues

BER program managers continue discussions in house and meet with the team leads monthly

Efforts will be made to make the data from all sources available to users in as seamless as possible manner.

Campaign dates: ***January 1, 2014- December***

Campaign website: ***http://campaign.arm.gov/goamazon2014/***