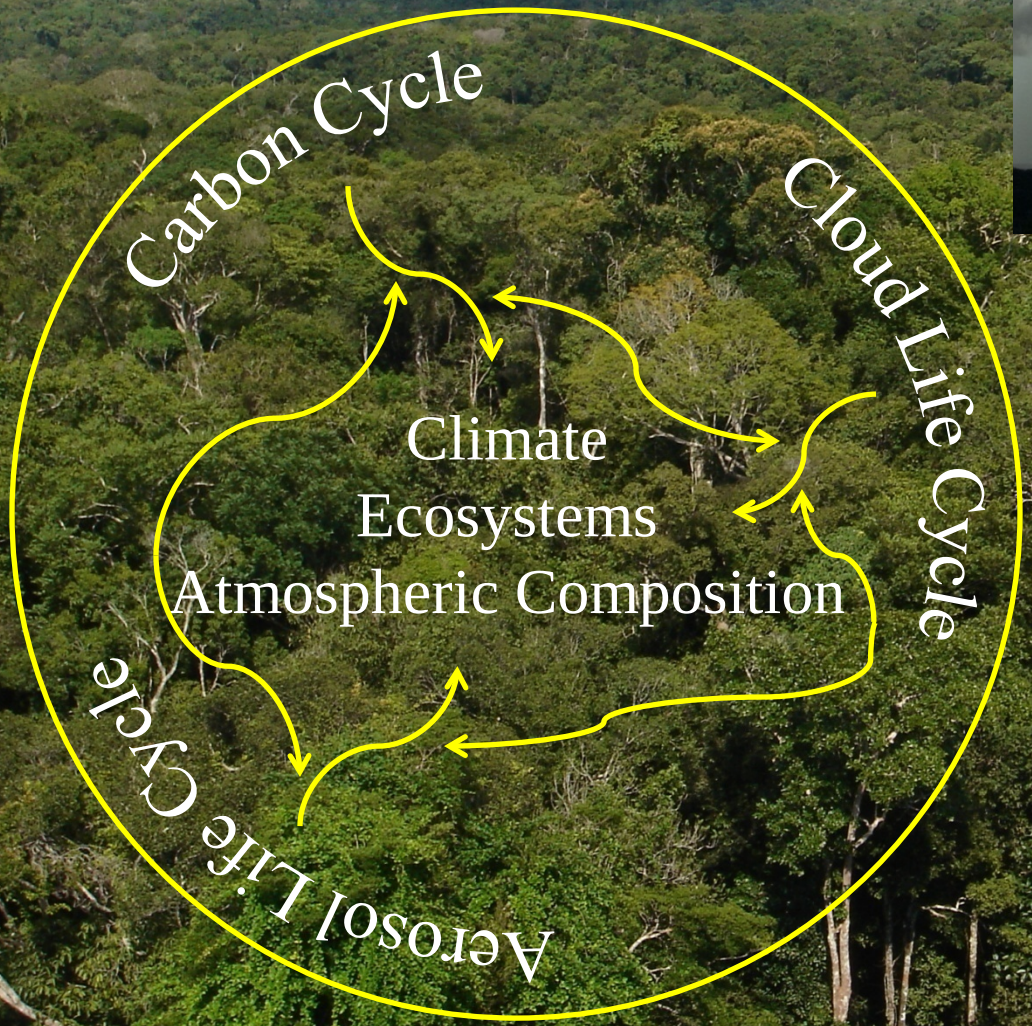
Observations and Modeling of the Green Ocean Amazon (GoAmazon2014/5)

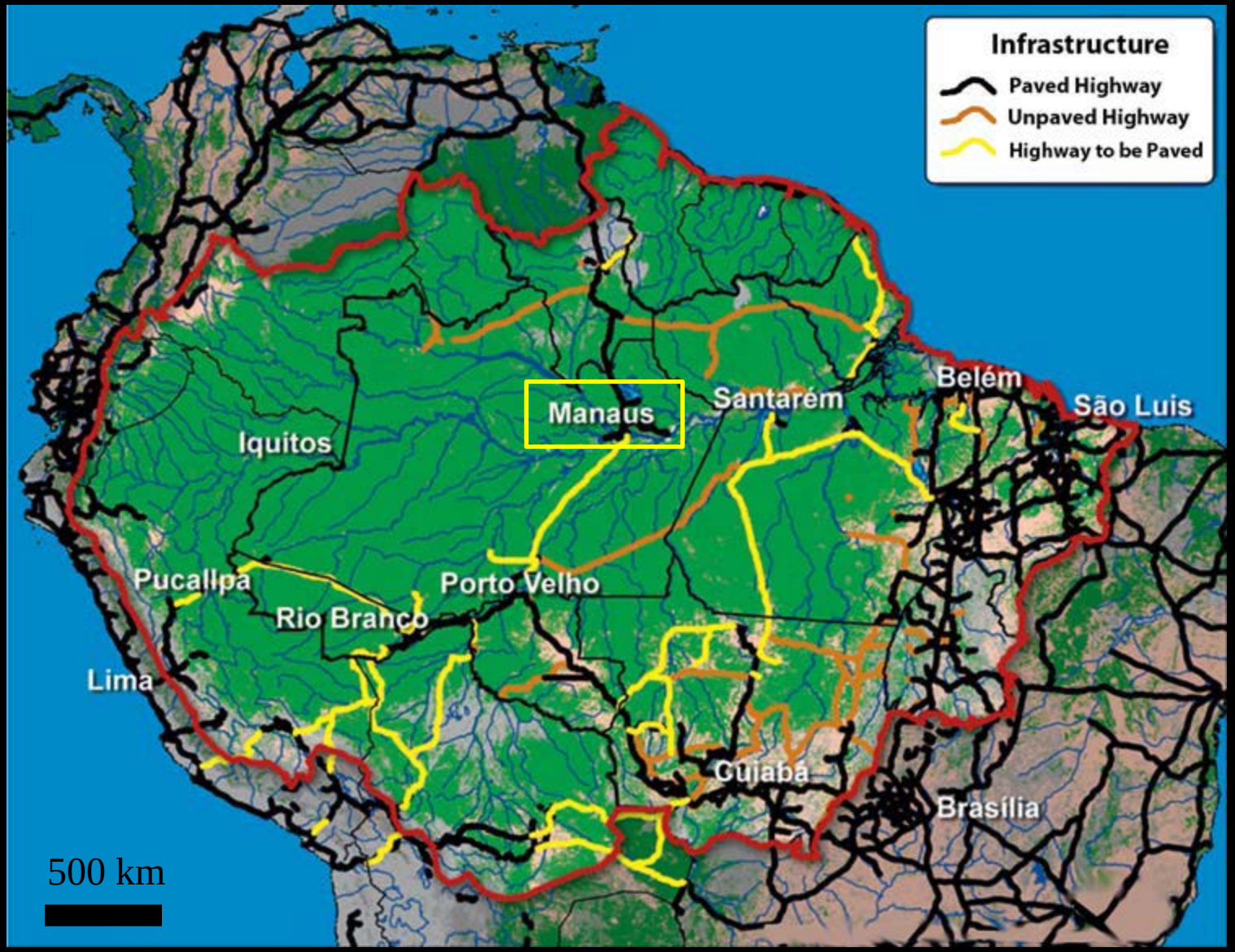


Presented by
Scot Martin (Harvard)
on behalf of Brazil
and USA partners

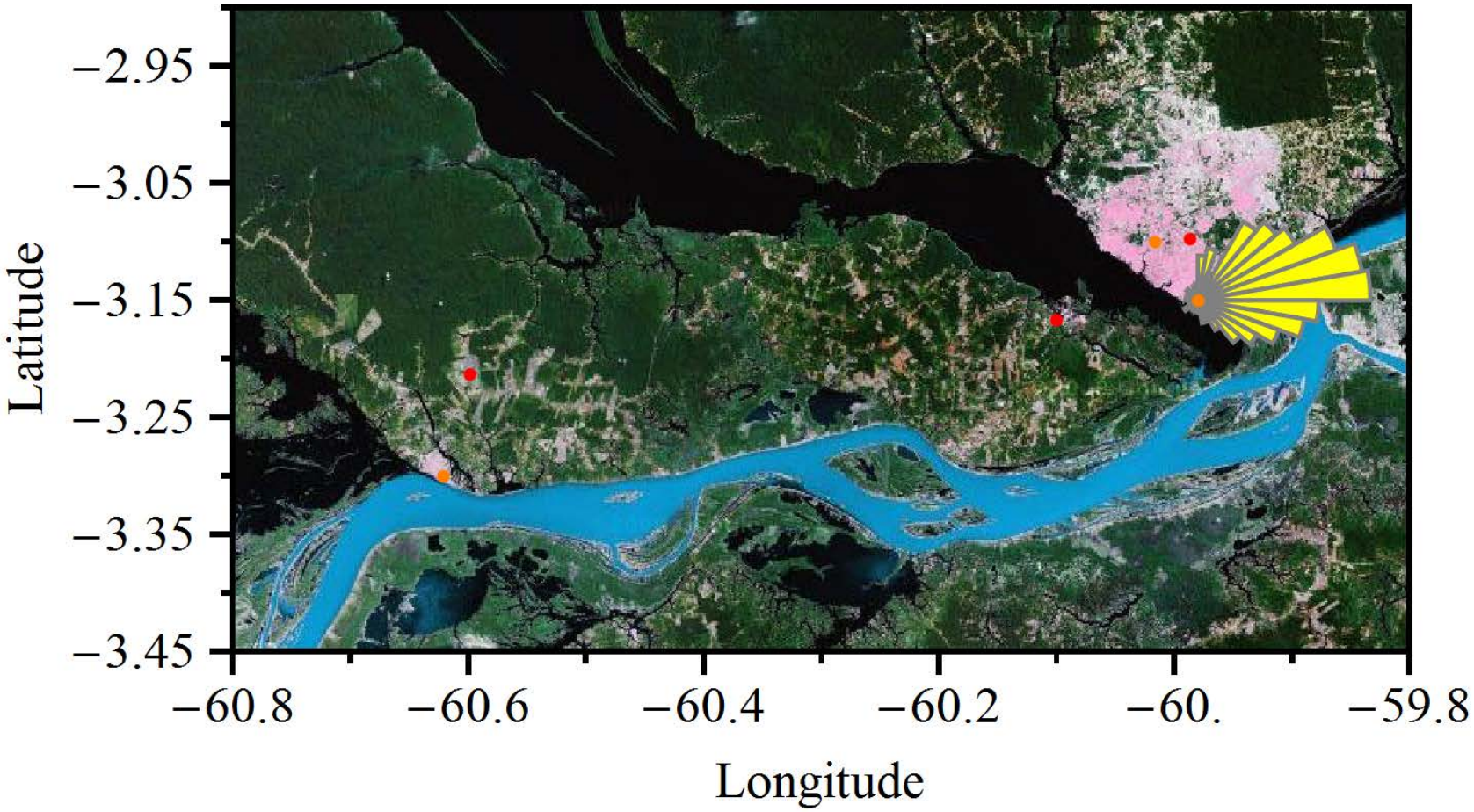
March 2013

DOE ASR Meeting

Site Location

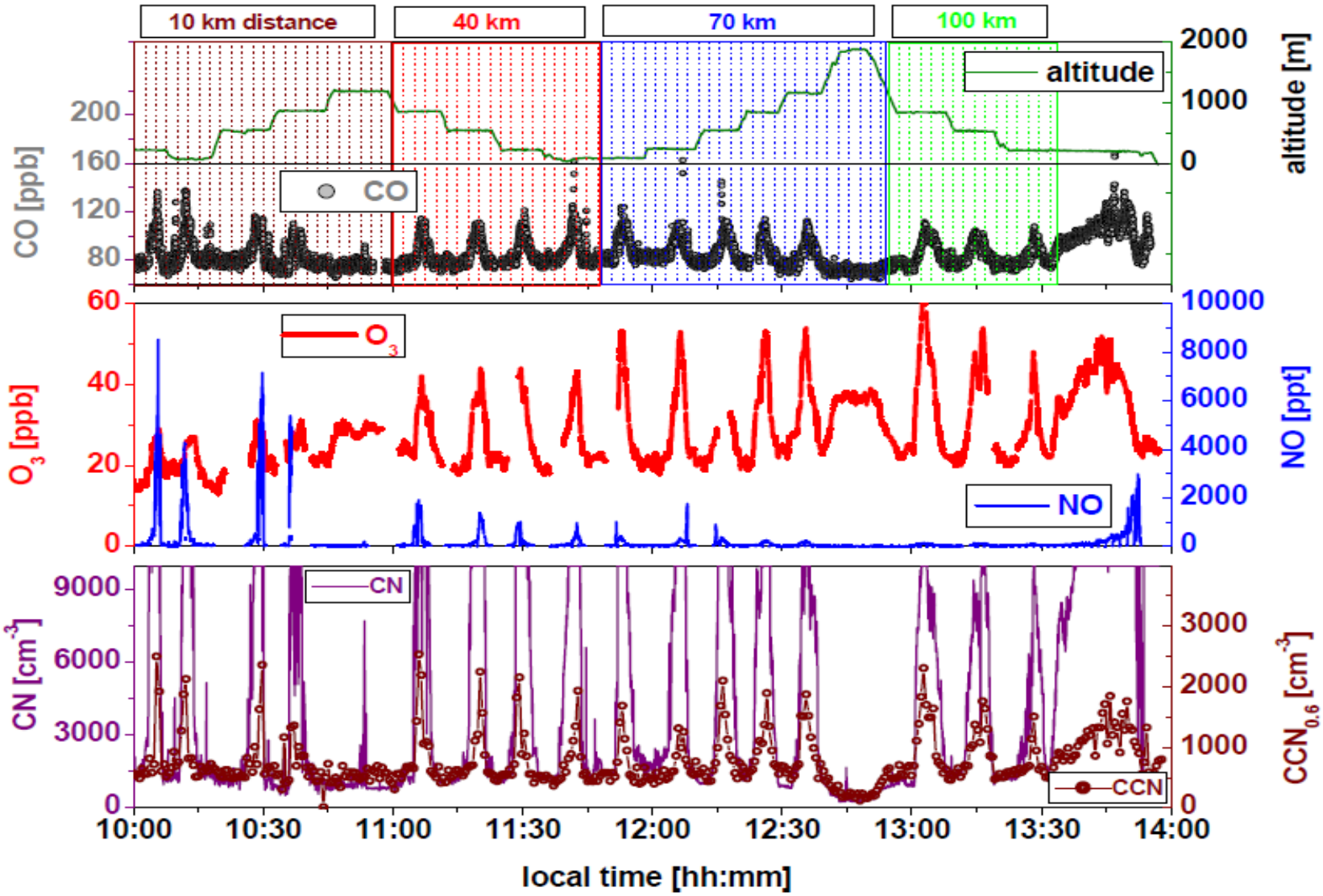


Downwind of Manaus



(−3.21328 ,	−60.5987)	DOE ARM ACRF	T3
(−3.16667 ,	−60.1)	TBD	T2
(−3.09722 ,	−59.9867)	INPA/UEA	T1
(−2.14663 ,	−59.005)	ATTO	T0
(−2.60908 ,	−60.2093)	K34	K34
(−2.59458 ,	−60.2093)	AMAZE08	TT34

- 111 by 60.8 km represented by this box.
- Wind speeds at 1 km altitude are typically 10 to 30 kph.
- T2→T3 transit time of 2 to 6 hr.



Reference: Kuhn, U.; Ganzeveld, L.; Thielmann, A.; Dindorf, T.; Welling, M.; Sciare, J.; Roberts, G.; Meixner, F. X.; Kesselmeier, J.; Lelieveld, J.; Ciccioli, P.; Kolle, O.; Lloyd, J.; Trentmann, J.; Artaxo, P.; Andreae, M. O., "Impact of Manaus City on the Amazon Green Ocean atmosphere: Ozone production, precursor sensitivity, and aerosol load," *Atmos. Chem. Phys.* **2010**, *10*, 9251-9282.

Downwind of Manaus

The deployment site is situated in the steady trade winds such that it experiences the extremes of:

(i) a pristine atmosphere when the Manaus pollution plume meanders; and

(ii) heavy pollution and the interactions of that pollution with the natural environment when the plume regularly intersects the site.

Reminder: GoAmazon2014/5 Theme: What is the effect of pollution on… these cycles and the coupling among them?

Dates of GoAmazon2014/5

AMF Operations (T3 ground site)

- 1 January until 31 December 2015

AAF Operations (aircraft)

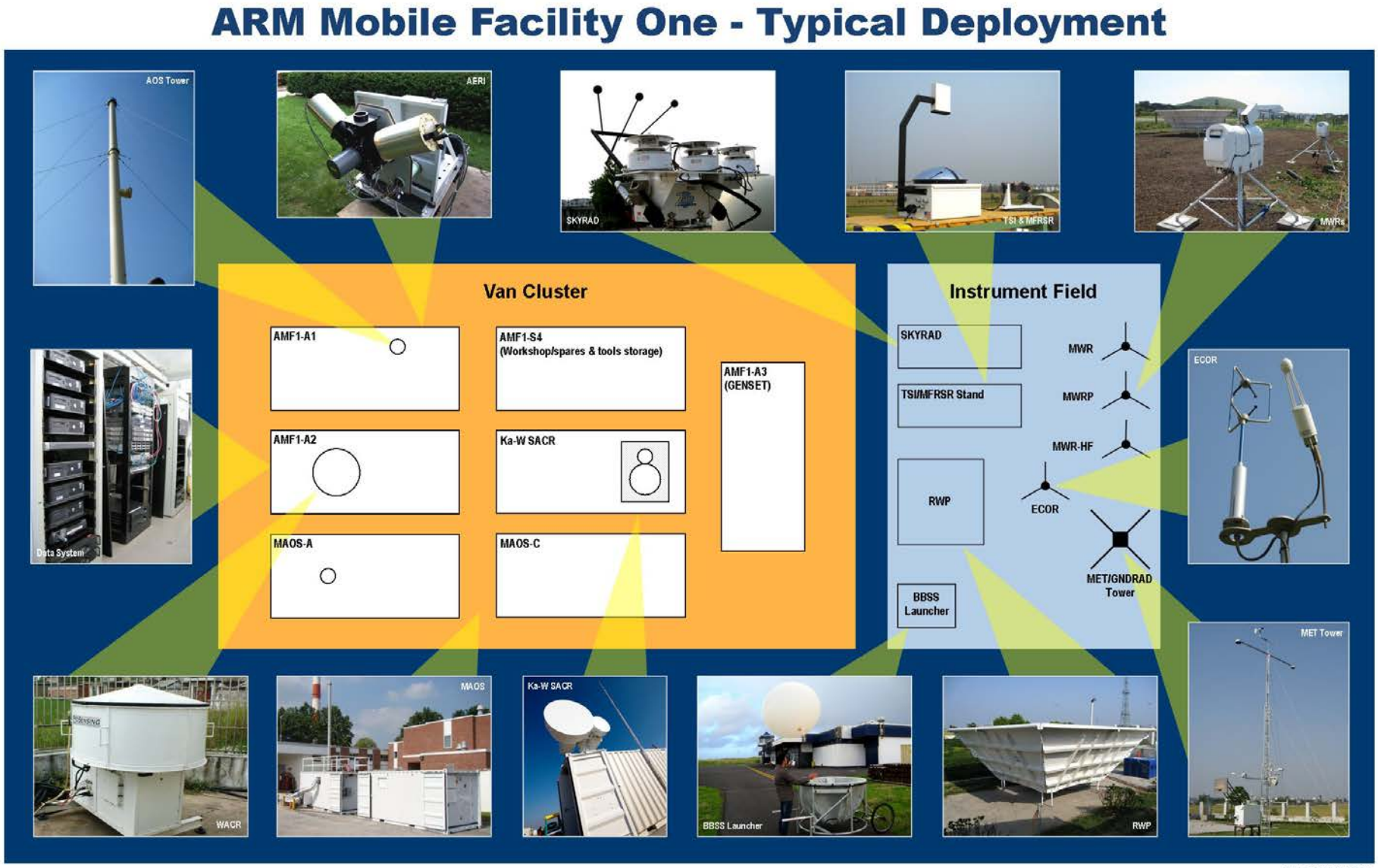
- 15 February until 26 March 2014 (wet season) (75 hrs)
- 1 September until 10 October 2014 (dry season) (75 hrs)

Aircraft operations correspond to the two *intensive operating periods* planned for the experiment.

Principal Research Site “T3”: *Fazenda Agropecuária Exata S/A*

18 March 2013, T3

“ARM Mobile Facility in Amazônia” (AMFA2014/5)

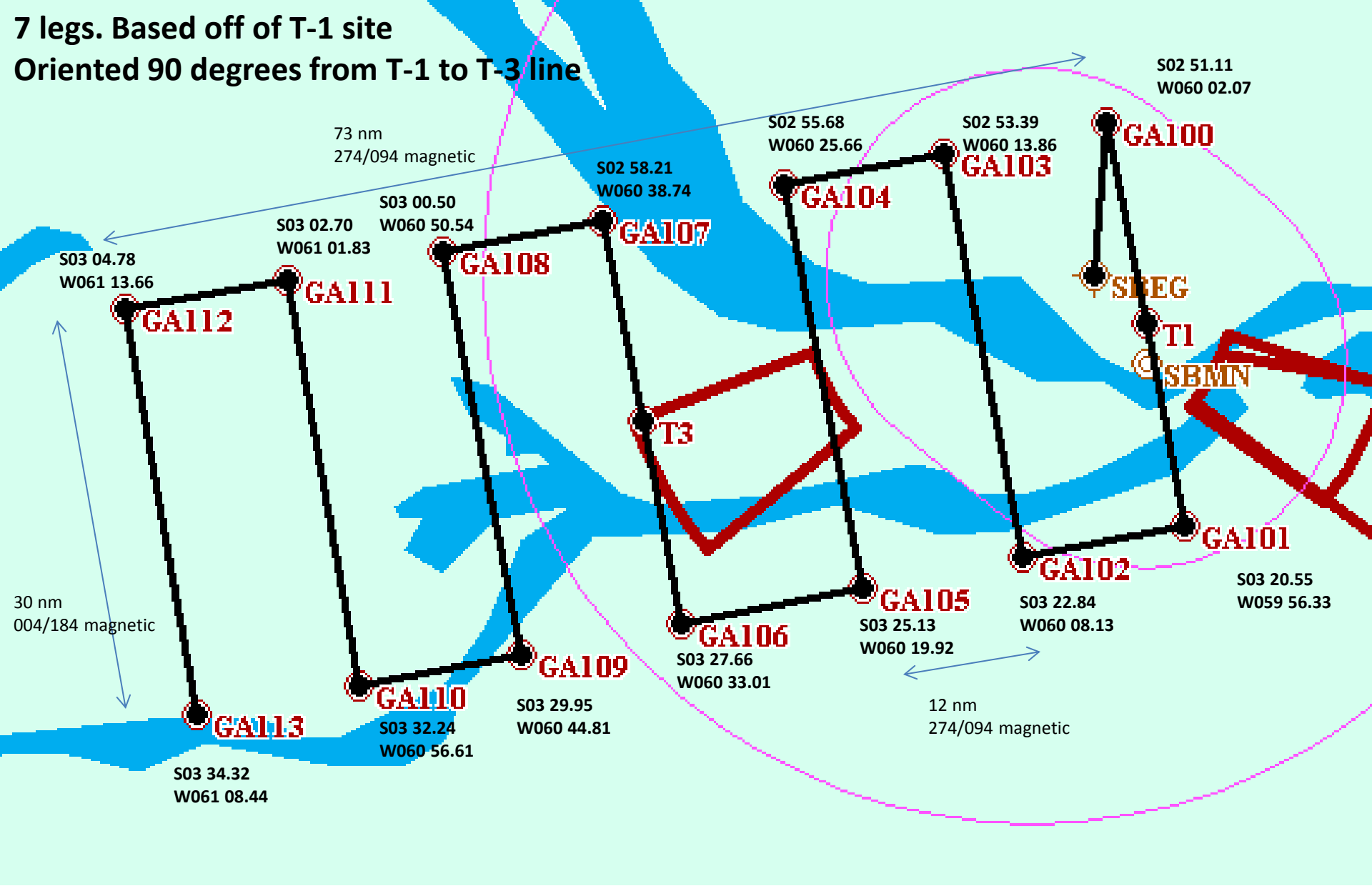


January 2014 , T3

“Intensive Airborne Research in Amazonia 2014” (IARA-2014)

The ARM Aerial Facility (AAF) in Brazil

Feb-Mar 2014, Sep-Oct 2014, T0, T1, T2, T3



IARA – Intensive Airborne Research in Amazonia

Flight Plan #7

1:35 to complete one pattern.

Brazil-Side Organizations

- LBA - Large-Scale Biosphere Atmosphere Experiment, http://lba.inpa.gov.br/lba/
- INPA - National Institute for Research in the Amazon, http://www.inpa.gov.br/
- INPE - National Institute for Space Research, http://www.inpe.br/ingles/index.php
- CTA - Department of Science and Aerospace Technology, http://www.cta.br/
- UEA - University of the State of Amazonas, http://www1.uea.edu.br/
- USP - University of São Paulo, http://www.thefullwiki.org/University_of_Sao_Paulo, http://web.if.usp.br/ifusp/, http://www.master.iag.usp.br/index.php?pi=N
- Links to GPM-CHUVA (http://chuvaproject.cptec.inpe.br/portal/en/index.html), SAMBBA (http://www.ncas.ac.uk/fgam/index.php?option=com_content&task=view&id=194&Itemid=1), Andes-Amazon Initiative (http://www.moore.org/andes-amazon.aspx), Amazon-PIRE (http://www.amazonpire.org/)
- Ciencas Sem Fronteiras (http://www.cienciasemfronteiras.gov.br/)

LBA: A Program of the Ministry of Science and Technology (MCT)

Main research foci:

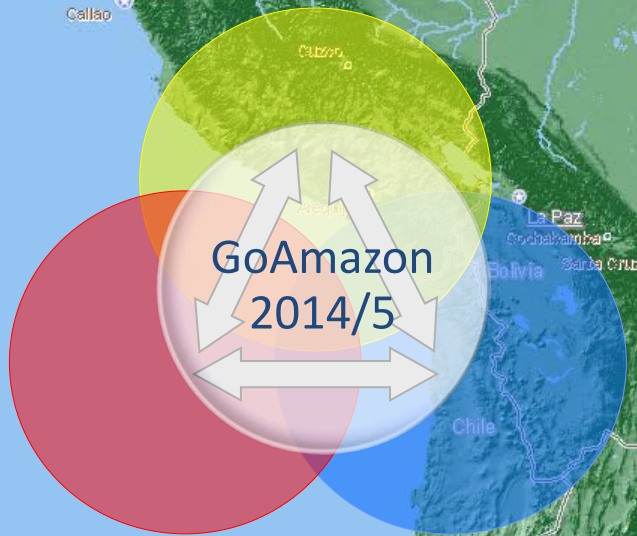
- The changing environment of Amazonia
- Environmental sustainability and the sustainability of current terrestrial and aquatic production systems
- Variability and changes in climatic and hydrologic systems – feedback, adaptation and mitigation

Integrated and interdisciplinary investigations:

Yellow: multi-scale physico-chemical interactions at biosphere-atmosphere interface;

Red: physico-chemico-biological processes in aquatic and terrestrial ecosystems and their interactions;

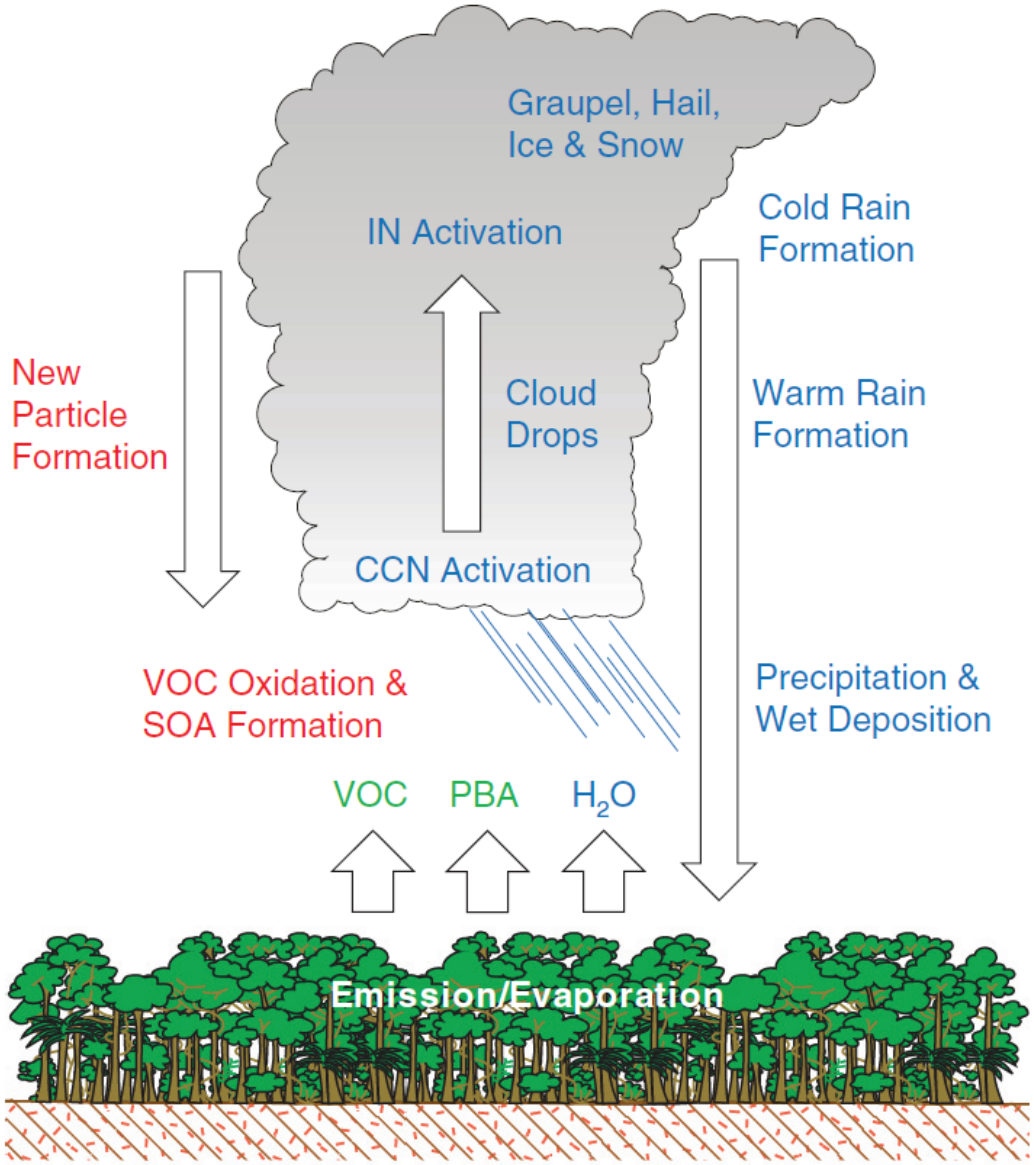
Blue: the social dimensions of environmental change and the dynamics of land cover change



Acknowledgments: Laszlo Nagy, INPA/LBA

Cloud Life Cycle, Aerosol Life Cycle, Aerosol-Cloud-Precipitation Interactions, Carbon Cycle are all represented in this schematic.

GoAmazon2014/5: *What is the effect of pollution on…* these cycles and the coupling among them?



Source: Pöschl, Martin, et al., "Rainforest aerosols as biogenic nuclei of clouds and precipitation in the Amazon," *Science*, 2010, 329, 1513-1516.

GoAmazon2014/5 Breakout Session

(*90 min; each talk 11 min + 4 min questions*)

The purpose is to provide a bridge between GoAmazon2014 opportunities and the priority questions of the different working groups of the DOE ASR program.

- Scot Martin, Overview of GoAmazon2014/5
- Paulo Artaxo, Brazil-side Contributions to GoAmazon2014/5
- Margaret Torn, Opportunities for Addressing the TES Working Group Questions
- Jian Wang, Opportunities for Addressing the ASR Working Group Questions of the Aerosol Life Cycle
- Courtney Schumacher, Opportunities for Addressing the ASR Working Group Questions of the Cloud Life Cycle
- Graham Feingold, Opportunities for Addressing the ASR Working Group Questions of the Cloud-Aerosol-Precipitation-Interaction Life Cycle

Join this Google group to receive email from PI:

http://groups.google.com/group/GoAmazon2014

Websites:

DOE maintained: http://campaign.arm.gov/goamazon2014/. See there a workshop report of July 2011.

PI maintained: http://www.seas.harvard.edu/environmental-chemistry/GoAmazon2014/