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

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Instrument	Abbreviation	Data Available IOP1	IOP2	Investigator
Aerosol Chemical Speciation Monitor (Aerodyne)	ACSM	Yes	Yes	Artaxo
Scanning Mobility Particle Sizer (TSI)	SMPS	Yes	Yes	Artaxo
Condensation Particle Counter (Grimm, model 5412)	CPC	Yes	Yes	Pöhlker
Multiangle Absorption Photometer 5012 (Thermo, model 5012)	MAAP	Yes	Yes	Pöhlker
Aethalometer (Magee)	AE30	Yes	Yes	Artaxo
Nephelometer (Ecotech Aurora 3000)		Yes	Yes	Artaxo
Ultra-High Sensitivity Aerosol Spectrometer (DMT)	UHSAS	Yes	Yes	Pöhlker
Single Particle Soot Photometer (DMT)	SP2	Yes	Yes	Pöhlker
Size-Resolved Cloud Condesation Nuclei Counter (DMT)	Size-resolved CCNC	No	Yes	Artaxo/Pöhlker
Optical Particle Sizer (TSI, model 3330)	OPS	Yes	Yes	Pöhlker
Wide Range Aerosol Spectrometer (Grimm)	WRAS	No	Yes	Pöhlker
Wideband Integrated Bioaerosol Spectrometer (DMT)	WIBS-4	No	Yes	Su
Proton-Trasfer-Reaction Quadrupole Mass Spectrometer (Ionicon)	PTR-Q-MS	Yes	Yes	Kesselmeier
Picarro CRDS (Model G1302; S/N CKADS-018)		Yes	Yes	Lavric
Picarro CRDS (Model G1301; S/N CKADS-109)		Yes	Yes	Lavric
Chemolimuniscence NOx monitor (Ecotech CLD TR 780)	CLD	Yes	Yes	Sörgel
CO2 monitor (LI-COR 7000)		Yes	Yes	Sörgel
Ozone monitor (TEI 49 I)		Yes	Yes	Sörgel / Souza
Optical Fog Sensor (Eigenbrodt)		No	Yes	Pöhlker
Soil Heat Flux Sensor (HFP01, Hukseflux)		Yes	Yes	Araujo
Water Content Reflector (CS615, Campbell)		Yes	Yes	Araujo
Thermistor (108, Campbell)		Yes	Yes	Araujo
Pyranometer (CMP21 & CMP4, Kipp & Zonen)		Yes	Yes	Araujo
Quantum Sensor (PAR-LITE, Kipp & Zonen)		Yes	Yes	Araujo
Net radiometer (NR-LITE, Kipp & Zonen)		Yes	Yes	Araujo
UV radiometer (Kipp & Zonen, CUV5)		Yes	Yes	Araujo
Rain Gauge (TB4, Hydrological Services Pty. Ltd.)		Yes	Yes	Araujo
Termohygrometer (CS215, Rotronic Measurement Solutions)		Yes	Yes	Araujo
Barometer (PTB101B, Vaisala)		Yes	Yes	Araujo
2-D Sonic Anemometer (Windsonic, Gill)		Yes	Yes	Araujo
3-D Sonic Anemometer (Windmaster, Gill)		Yes	Yes	Araujo
IRGA (LI-7500A & LI7200, LI-COR)		Yes	Yes	Araujo

Table S1

Instrument	Abbreviation	Data Available IOP1	IOP2	Investigator
Hg Monitor (TEKRAN)	Tekran	Yes	Yes	Artaxo
Nephelometer (Ecotech)	Neph_M9003	Yes	Yes	Artaxo
Multi filter shadow band radiometer (YesInc)	MFR	Yes	Yes	Barbosa
Sun Photometer (Cimel)	Aeronet	Yes	Yes	Artaxo
UV Raman Lidar (Raymetrics)	Lidar	Yes	Yes	Barbosa
24GHz Micro Rain Radar (Metek)	MRR	No	Yes	Barbosa
Laser precipitation monitor (Thies)	Disdro_Thies	Yes	Yes	Barbosa
Meteorological weather station (Davis)	MetDavis	No	No	Barbosa / Souza
Meteorological weather station (Thies)	MetThies	No	Yes	Barbosa
Meteorological weather station (Gill)	MetGill	No	Yes	Barbosa
NetR8 GNSS Receiver (Trimble)	GNSS	Yes	Yes	Barbosa
Precipitation Collector NSA 181/KE DURAN (Eigenbrodt)	Eigenbrodt	No	Yes	Barbosa
Meteorological weather station (Campbell)	MetCambpell	Yes	Yes	Machado
Passive Infraread Microwave radiometer MP3000 (Radiometrics)	MP3000	Yes	No	Machado
Parsivel Disdrometer (OTT)	Parsivel	Yes	No	Machado
IRGASON Integrated CO2 and H2O Open-Path Gas Analyzer and 3D Sonic Anem	FluxCampbell	Yes	Yes	Machado

Table S2

Instrument	Abbreviation	Data Available IOP1	IOP2	Investigator
Proton tranfer reaction mass spectrometer	PTR-MS	Yes	Yes	Jardine
Gas chromatograph - mass spectrometter	GC-MS	Yes	Yes	Jardine
Proton tranfer reaction mass spectrometer	PTR-MS	No	Yes	Chamecki/Fuentes
Gas chromatograph - mass spectrometter	GC-MS	No	Yes	Chamecki/Fuentes
Sonic anemometers (10)		No	Yes	Chamecki/Fuentes
Water vapor gas analyzer	IRGA	No	Yes	Chamecki/Fuentes
Carbon dioxide gas analyzer	IRGA	No	Yes	Chamecki/Fuentes
Ozone gas analyzer		No	Yes	Chamecki/Fuentes
Sulfur dioxide gas analyzer		No	Yes	Chamecki/Fuentes
Carbon monoxide gas analyzer		No	Yes	Chamecki/Fuentes
Nitric oxide gas analyzer		No	Yes	Chamecki/Fuentes
Fast mobility particle sizer	FMPS	No	Yes	Chamecki/Fuentes
Cloud condensation nuclei counter	CCN counter	No	Yes	Chamecki/Fuentes
Picarro (CO, CO2, H2O)	CKADS	Yes	Yes	Jardine/Fuentes

Table S3

Instrument	Abbreviation	Data Available IOP1	IOP2	Investigator
High-Resolution Time-of-Flight Aerosol Mass Spectrometer (Aerodyne Inc.)	HR-ToF-AMS	Yes	No	McFiggans
Proton-Trasfer-Reaction Quadrupole Mass Spectrometer (Ionicon)	PTR-Q-MS	Yes	No	McFiggans
Multiangle Absorption Photometer 5012 (Thermo)	MAAP	Yes	Yes	Artaxo
Nephelometer (TSI)		Yes	Yes	Artaxo
Tapered-Element Oscillating Microbalance	TEOM	No	Yes	Artaxo
Picarro (CO, CO2, H2O)	CKADS	Yes	Yes	Artaxo
Ozone	Thermo_49i	Yes	Yes	Artaxo
Four daily sondes at (-2.639°, -60.157°) (7.5 km to the southeast of T0t)		Yes	Yes	Machado

Table S4

Instrument	Abbreviation	Data Available IOP1	IOP2	Investigator
Meteorological station	MetHOBO	Yes	Yes	Souza
Solar radiation and photosynthenitically active radiation	MetHOBO	Yes	Yes	Souza
Passive tubes for trace gases		No	Yes	Souza
PM2.5 Filter Sampler		No	Yes	Souza

Table S5

Instrument	Abbreviation	Data Available	
		IOP1	IOP2
Four daily radio sondes		Yes	Yes
S-band radar operated by the Amazon Protection System (SIPAM)		Yes	Yes

Table S6

Instrument	Abbreviation	Data Available IOP1	IOP2	Investigator
Proton-Trasfer-Reaction Quadrupole Mass Spectrometer (Ionicon)	PTR-Q-MS	Yes	Yes	Artaxo
Ozone Monitor 49i (Thermo)	O3 Monitor	Yes	Yes	Artaxo
SO2 Monitor 43i (Thermo)	SO2 Monitor	Yes	Yes	Artaxo
Cavity Attenuated Phase Shift NO2 Monitor (Aerodyne Inc.)	CAPS NO2	No	Yes	Artaxo
CO, N2O monitor (Los Gatos Research)	CO, NO2 LGR	Yes	Yes	Souza
Scanning Mobility Particle Sizer (TSI Inc.)	SMPS	Yes	Yes	Artaxo
Aerosol Chemical Speciation Monitor (Aerodyne Inc.)	ACSM	Yes	Yes	Artaxo
Multiangle Absorption Photometer 5012 (Thermo)	MAAP	Yes	Yes	Artaxo
Aethalometer (Magee Inc.)	7l - AE33	Yes	Yes	Artaxo
Nephelometer (Ecotech)	3-l Neph Aurora	Yes	Yes	Artaxo
Tapered Element Oscillating Microbalance 1405 (Thermo)	TEOM PM2.5 & PM10	No	Yes	Artaxo
Cloud Condensartion Nuclei Counter (Droplet Measurement Technologies)	Size-resolved CCNC	No	Yes	Artaxo

Table S7

Instrument	Abbreviation	Data Available IOP1	IOP2	Investigator
Disdrometer (Parsivel)		Yes	Yes	Machado
X-Band Radar		Yes	Yes	Machado
Micro Rain Radar	MRR	No	Yes	Machado
High-Resolution Time-of-Flight Aerosol Mass Spectrometer (Aerodyne Inc.)	HR-ToF-AMS	Yes	Yes	Alexander/Martin
Semi-Volatile Thermal Desorption Aerosol Gas Chromatograph	SV-TAG	Yes	Yes	Goldstein
Size-Resolved Cloud Condensation Nuclei Counter	SCCN	Yes	Yes	Wang
Harvard Rebound Apparatus	HBA	Yes	Yes	Martin
Oxidation Flow Reactor	OFR	Yes	Yes	Jimenez
Proton Transfer Reaction Time-of-Flight Mass Spectrometer	PTR-ToF-MS	Yes	Yes	Martin/MAOS
Proton Transfer Reaction Time-of-Flight Mass Spectrometer	PTR-ToF-MS	Yes	Yes	Guenther
Scanning Mobility Particle Sizer	SMPS	Yes	Yes	Jimenez
HOx Chemical Ionization Mass Spectrometer	HOx-CIMS	Yes	Yes	Kim
Picarro CRDS G2401 analyzer (CO, CO2, CH4)	Picarro	Yes	Yes	Jimenez
Medium Volume Filter Sampler, PM1 (MCV, S.A.)		Yes	Yes	Jimenez
Air Quality Monitoring 60 (O3)	AQM-60	Yes	Yes	Souza
Sequential Filter Sampler		Yes	Yes	Goldstein
Transmission electron microscope grip sampler	TEM grid sampler	Yes	Yes	Buseck
PM2.5 Filter Sampler		Yes	Yes	Godoi/Souza
Filter sampler (quartz and nuclepore)		Yes	Yes	Artaxo
Laser-induced flurescence	LIF	Yes	Yes	Keutsch
Micro-Orifice Uniform-Deposit Impactor	MOUDI	No	Yes	Laskin
Neutral cluster and Air Ion Spectrometer	NAIS	No	Yes	Petaja
Nano particle size distribution	NPSD	Yes	Yes	Kuang
Passive tubes for trace gases		Yes	Yes	Godoi/Souza
Particle Size Magnifier	PSM	No	Yes	Petaja
Laser Induced Phosphorescence	LIP	No	Yes	Keutsch
Thermal Desorption Chemical Ionization Mass Spectrometer	TD-CIMS	Yes	Yes	Smith
Precipication collection for chemical analysis		No	Yes	Pauliquevis
Solar radiation and photosynthenitically active radiation		Yes	Yes	Souza
Meteorological station		Yes	Yes	Souza

Table S8

Instrument	Abbreviation	Data Available IOP1	IOP2
Aerosol Chemistry Speciation Monitor	ACSM	No	Yes
Aethalometer, 7-Wavelength	Aeth	Yes	Yes
CO, N2O and H2O Analyzer	CO/N2O/H2O	Yes	Yes
Condensation Particle Counter, Fine Mode	CPCf	Yes	Yes
Condensation Particle Counter, Ultrafine Mode	CPCu	No	No
Meteorology Sensor	Met	Yes	Yes
Nephelometer	Neph	Yes	Yes
Nephelometer, dry	NephDry	Yes	Yes
Oxides of Nitrogen Analyzer	NO/NOx/NOy	Yes*	Yes
Ozone Analyzer	O3	Yes	Yes
Photoacoustic Soot Spectrometer, 3-Wavelength	PASS-3	No	No
Particle Soot Absorption Photometer	PSAP	Yes	Yes
Proton Transfer Mass Spectrometer	PTRMS	Yes	Yes
Scanning Mobility Particle Sizer	SMPS	No	No
Single Particle Soot Photometer	SP2	Yes	Yes
SO2 Analyzer	SO2	No	Yes
Ultra-High Sensitivity Aerosol Spectrometer	UHSAS	Yes	Yes

*Only NO and NOy in IOP1

Table S9

Instrument	Abbreviation	Data Available IOP1	IOP2
Two-Channel Narrow Field of View Zenith Radiometer	2NFOV	Yes	No
Atmospheric Emitted Radiance Interferometer	AERI	Yes	Yes
Propeller Vane Wind Sensors	Anemometer	Yes	Yes
Black and White pyranometer, shaded, downwelling	B/W 8-48-SKY	Yes	Yes
Barometer	Barometer	Yes	Yes
Ceilometer Cloud Lidar	Ceilometer	Yes	Yes
Cloud Condensation Nuclei Counter	CCN	Yes	Yes
Continuous Light Absorption Photometer	CLAP	Yes	No
Condensation Particle Counter	CPC	Yes	Yes
Cimel Sunphotometer	CSPHOT	Yes	No
Doppler Lidar	DL	Yes	Yes
Eddy Correlation Flux Measurement System	ECOR	No	Yes
Infrared Thermometer Downlooking	IR Therm Grd	Yes	Yes
Infrared Thermometer Uplooking	IRT-Sky	Yes	Yes
ARM-Standard Meteorological Instrumentation at Surface	Met	Yes	Yes
Multi-Filter Radiometer	MFR	No	Yes
Multi-Filter Rotating Shadow Band Radiometer	MFRSR	Yes	Yes
Micropulse Lidar	MPL	No	Yes
Microwave Radiometer	MWR	Yes	Yes
Microwave Radiometer 3 Channel	MWR 3C	Yes	Yes
Microwave Radiometer High Frequency	MWR HF	No	No
Microwave Radiometer P	MWR P	No	No
Nephelometer	Neph	Yes	Yes
Nephelometer, wet	NephDry	No	Yes
Normally Incident Pyroheliometer: Installed and recording data	NIP	Yes	Yes
Optical Rain Gauge	ORG	No	No
Parsivel Present Weather detector	Parsivel2 disdrometer	No	No
Pyrogeometer, upwelling	PIR-GRND	Yes	Yes
Pyrogeometer, downwelling	PIR-SKY	Yes	Yes
Present Weather Detector	PWD	Yes	Yes
Particle Soot Absorption Photometer	PSAP	Yes	Yes
Precision Spectral Pyranometer, upwelling	PSP-GRND	Yes	Yes
Precision Spectral Pyranometer, downwelling	PSP-SKY	Yes	Yes
Radar Wind Profiler	RWP	Yes	Yes
Ka/W-band Scanning ARM Cloud Radar	SACR	No	No
Shortwave Array Spectroradiometer - 180 deg field of view	SAS-HE	Yes	Yes
Shortwave Array Spectroradiometer - Zenith pointing	SAS-ZE	Yes	Yes
Surface Energy Balance System	SEBS	Yes	No
Sound-based wind profiler	SODAR	Yes	Yes
Sonic Anemometer	Sonic	No	Yes
Tipping Bucket Rain Gauge	TB Rain Gauge	No	No
Total Sky Imager	TSI	No	No
Temperature and Humidity Sensor	T/RH	Yes	Yes
W-band (95 GHz) ARM Cloud Radar	WACR	Yes	Yes
Five daily radio sondes (0, 6, 12, 15 and 18 UTC)		Yes	Yes

Table S10

Instrument	Abbreviation	Data Available IOP1	IOP2	Investigator
Disdrometer (Joss)		Yes	Yes	Machado
Disdrometer (Parsivel)		Yes	Yes	Machado
Rain Gauge		Yes	Yes	Machado
Microwave Radiometer (MP3000)		No	Yes	Machado
Micro Rain Radar	MRR	Yes	Yes	Machado
GPS-Based Integrated Water Vapor	IWV	Yes	Yes	Machado
Field Mill		Yes	Yes	Machado

Table S11

Instrument	Abbreviation	Data Available IOP1	IOP2
Global Positioning System (DSM 232)	GPS	Yes	Yes
Temperature (Rosemount E102AL)		Yes	Yes
Pressure (Rosemount 1201F1)		Yes	Yes
Gust Probe: Rosemount 1221F2 (3 units)		Yes	Yes
Chilled-mirror hygrometer (GE-1011B)		Yes	Yes
Tuneable Diode Laser Hygrometer	TDL-H	Yes	Yes
Aircraft Integrated Meteorological Measurement System	AIMMS-20	Yes	Yes
Video Camera P1347 (forward looking)		Yes	Yes
Video Camera P1344		Yes	Yes
Ultrafine Condensation Particle Counter (Model 3025A)	UCPC	Yes	Yes
Condensation Particle Counter (Model 3010)	CPC	Yes	Yes
Fast Integrated Mobility Spectrometer	FIMS	Yes	Yes
Ultra High Sensitivity Aerosol Spectrometer - Airborne	UHSAS-A	Yes	Yes
Passive Cavity Aerosol Spectrometer	PCASP	Yes	Yes
Particle/Soot Absorption Photometer	PSAP	Yes	Yes
Three-Wavelength Integrating Nephelometer (Model 3563)		Yes	Yes
High Resolution Aerosol Mass Spectrometer	HR-ToF-AMS	Yes	Yes
Cloud Condensation Nuclei Counter	CCN Counter	Yes	Yes
Optical Particle Counter (Model CI-3100)	OPC	Yes	Yes
Quadrupole Proton-Transfer-Reaction Mass Spectrometer	PTR-MS	Yes	Yes
N2O and CO concentrations (Los Gatos 23r)		Yes	Yes
Oxides of Nitrogen (Nox)		Yes	Yes
Ozone (Thermo Scientific Model 49i)		Yes	Yes
Picarro Cavity Ring Down System (Model G1301-m)	CRD	Yes	Yes
Multi Element Water content System (SEA WCM-2000)		Yes	Yes
High Volume Precipitation Spectrometer (Version 3)	HVPS-3	Yes	Yes
Two-Dimensional Stereo Probe	2D-S	Yes	Yes
Fast Cloud Droplet Probe	Fast-CDP	Yes	Yes
Cloud Droplet Probe (version 2)	CDP ver2	Yes	Yes
Cloud Particle Imager (version 2)	CPI ver2	Yes	Yes
Sunshine Pyranometer, shaded	SPN-1	Yes	Yes
Sunshine Pyranometer, unshaded (up and down looking)	SPN-1	Yes	Yes

Table S12

Instrument	Abbreviation	Data Available IOP1	IOP2
Counter-flow Virtual Impactor Inlet	CVI inlet	No	Yes
Precipitation Imaging Probe	PIP	No	Yes
Cloud Combination Probe (Cloud ImagingProbe + Cloud Droplet Probe)	CCP (CIP + CDP)	No	Yes
Novel Ice EXpEriment - Cloud and Aerosol Particle Spectrometer	NIXE-CAPS	No	Yes
Small Ice Detector Probe (version 3)	SID-3	No	Yes
Microwave Temperature Profiler	MTP	No	Yes
Ultra High Sensitivity Aerosol Spectrometer - Airborne	UHSAS-A	No	Yes
Cloud and Aerosol Spectrometer with Depolarization	CAS-DPOL	No	Yes
Particle Habit Imaging and Polar Scattering Probe	PHIPS-HALO	No	Yes
Compact Time of Flight Aerosol Mass Spectrometer	C-ToF-AMS	No	Yes
Aerosol MEasuremenT SYSTem	AMESTYST	No	Yes
SiNgle-ParticleSOOtPhotometer System	SNOOPY	No	Yes
HALO Aerosol Submicrometer Inlet	HASI	No	Yes
Cloud Condensation Nucleus Counter	CCNC	No	Yes
Photo-Acoustic Spectrometer	PAS	No	Yes
Single Particle Soot Photometer	SP-2	No	Yes
Fast Ice Nucleus Chamber	FINCH	No	Yes
CO, O3	AMTEX	No	Yes
SO2, HNO3, PFC	PAN-MS	No	Yes
NOy, NO	IPA-NOy	No	Yes
Mini Differential Optical Absorption Spectroscopy	miniDOAS	No	Yes
Spectral Modular Airborne Radiation Measurement System	SMART	No	Yes
Imaging Spectrometer Package Eagle/Hawk		No	Yes
Hygrometer for Atmospheric Investigations	HAI	No	Yes

Table S13

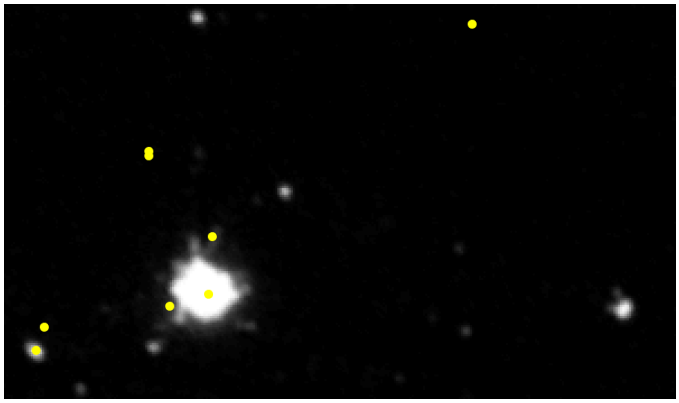
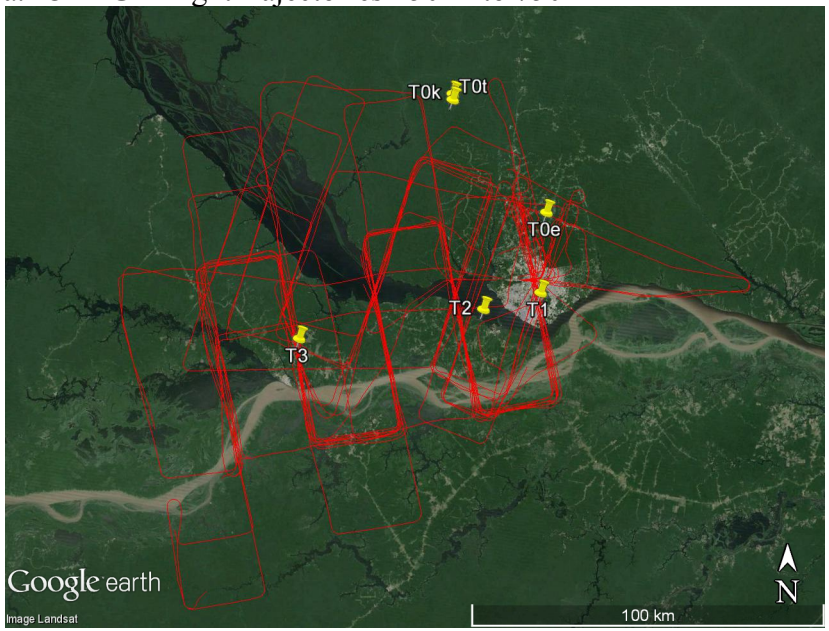
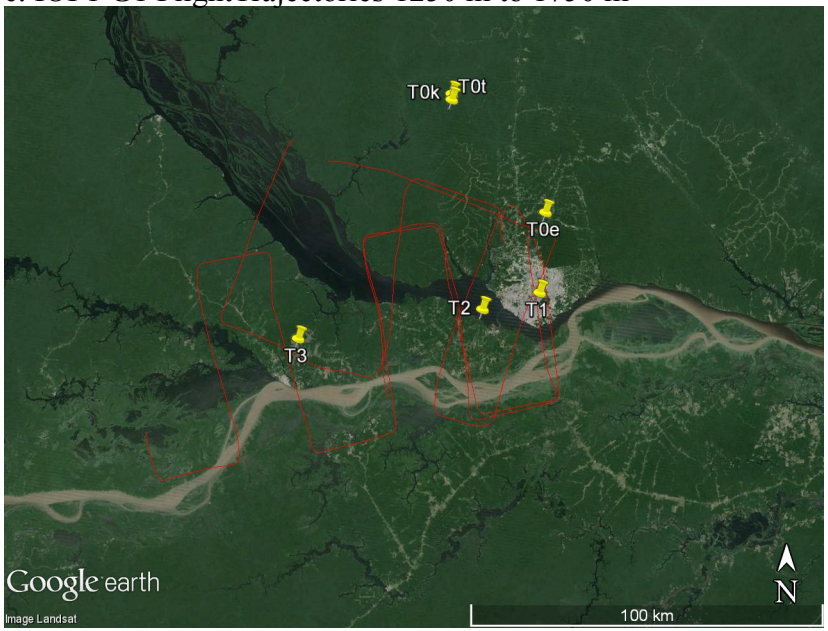


Figure S1

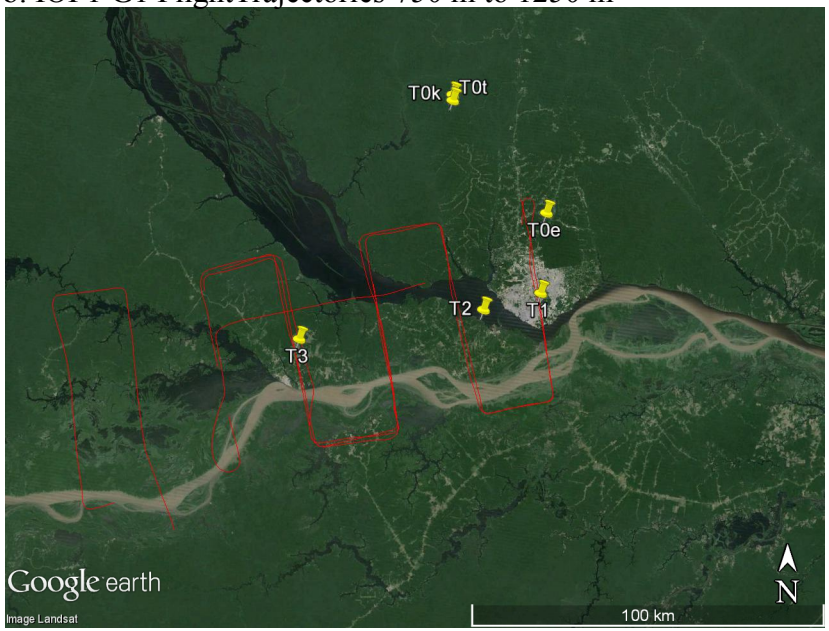
a. IOP1 G1 FlightTrajectories 250 m to 750 m



c. IOP1 G1 FlightTrajectories 1250 m to 1750 m



b. IOP1 G1 FlightTrajectories 750 m to 1250 m



d. IOP1 G1 FlightTrajectories above 1750 m

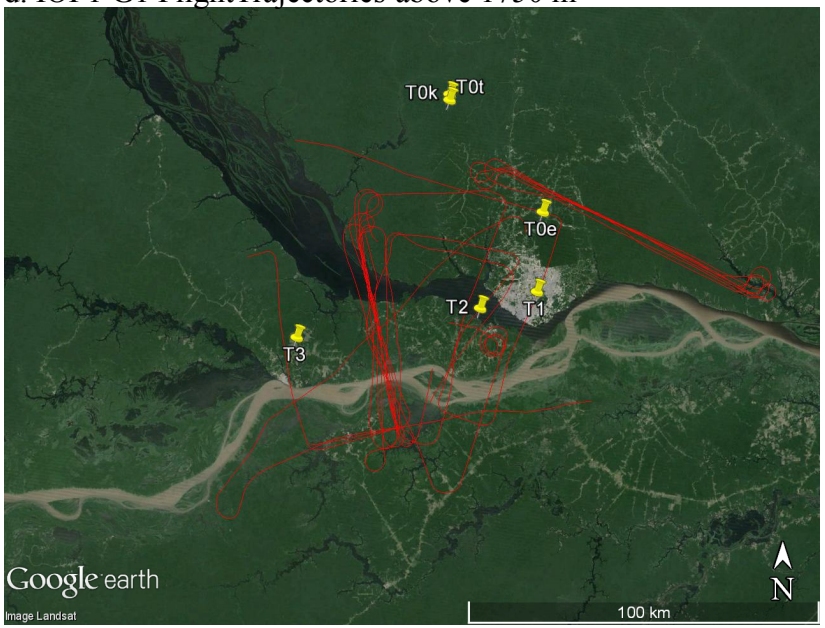
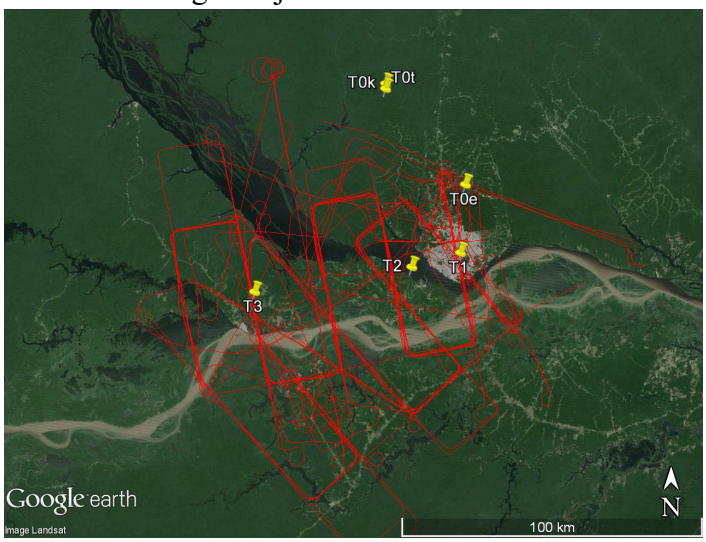
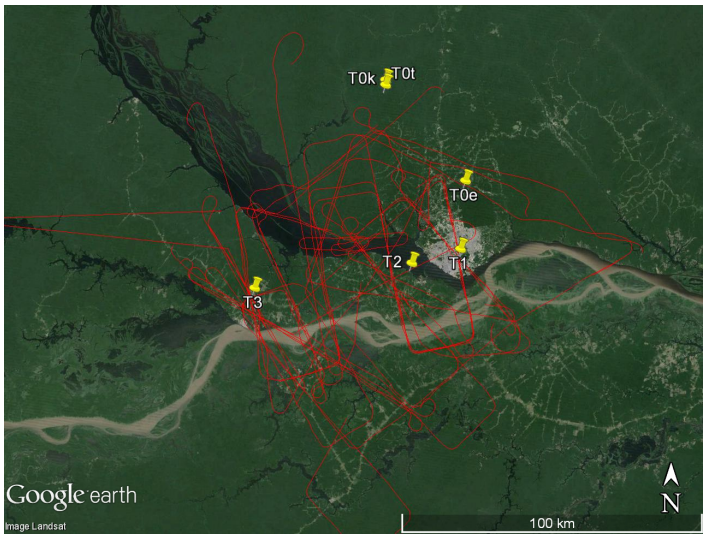


Figure S2

a. IOP2 G1 FlightTrajectories 250 m to 900 m



b. IOP2 G1 FlightTrajectories 1000 m to 2000 m



c. IOP2 G1 FlightTrajectories above 2000 m

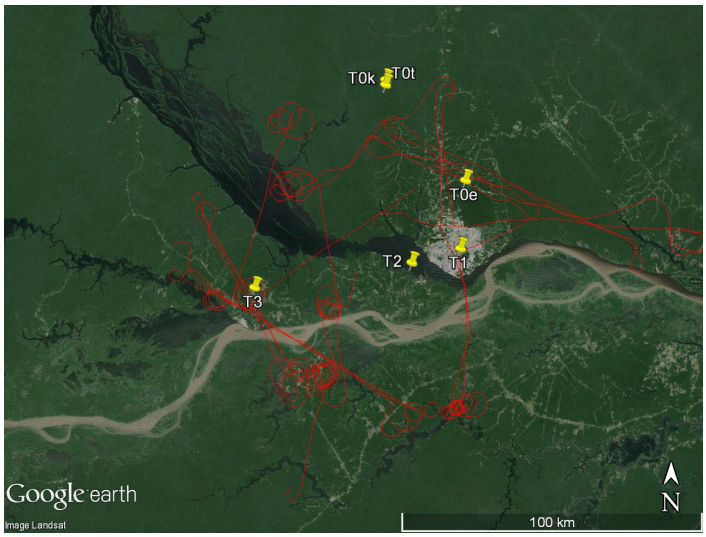


Figure S3

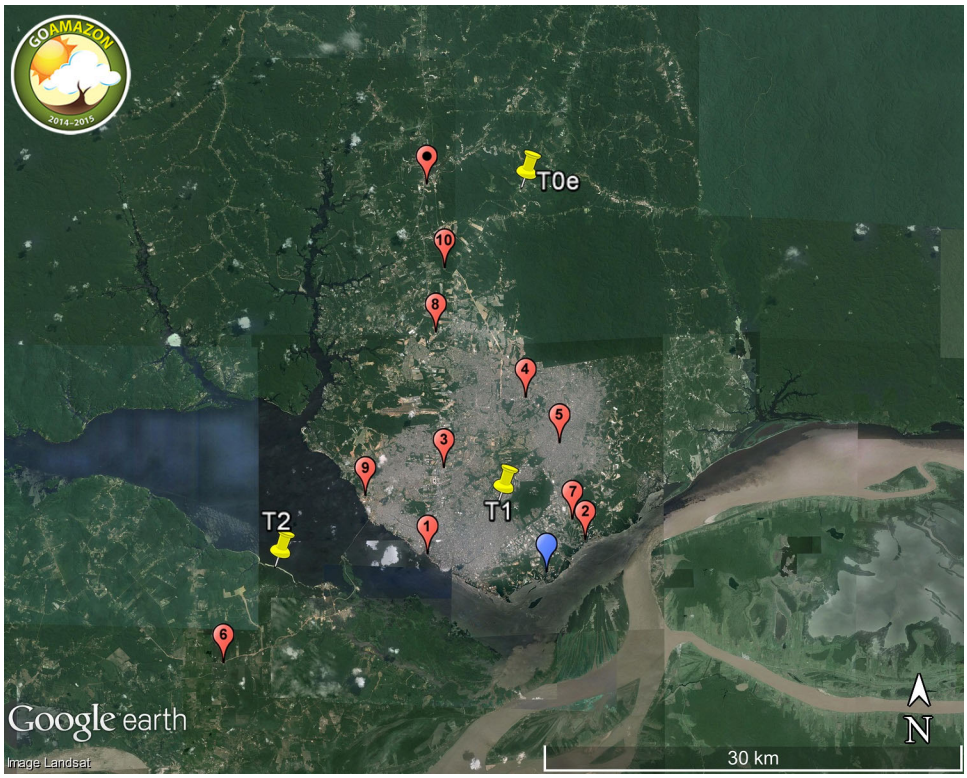

GOAMAZON
2014–2015
T0e
T1
T2
1
2
3
4
5
6
7
8
9
10
Google earth
Image Landsat
30 km
N

Figure S4

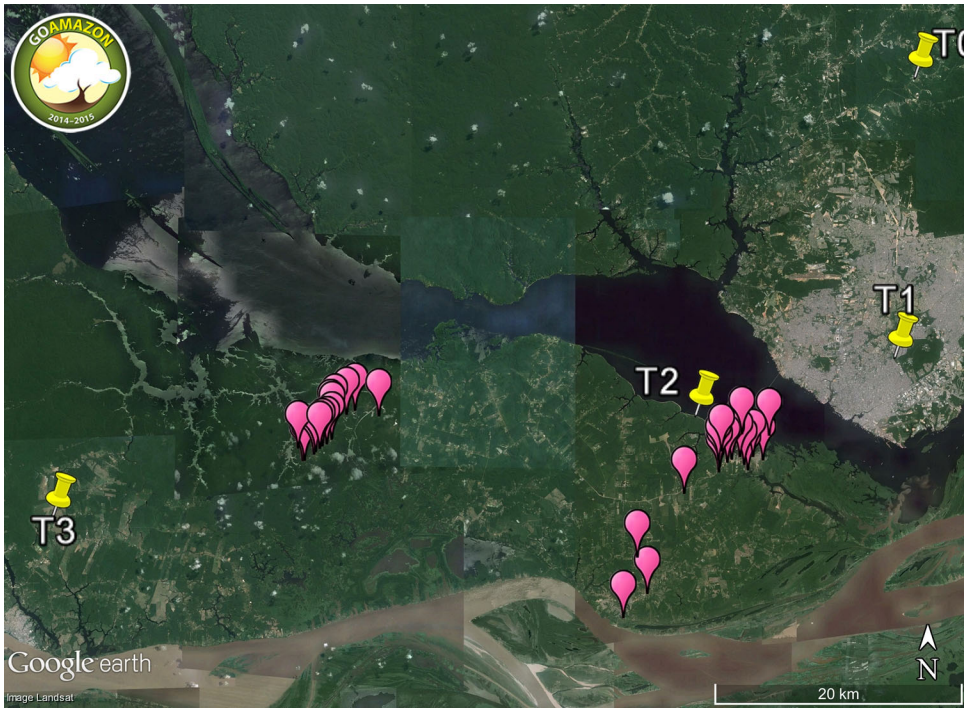

GOAMAZON
2014–2015
T0
T1
T2
T3
Google earth
Image Landsat
N
20 km

Figure S5

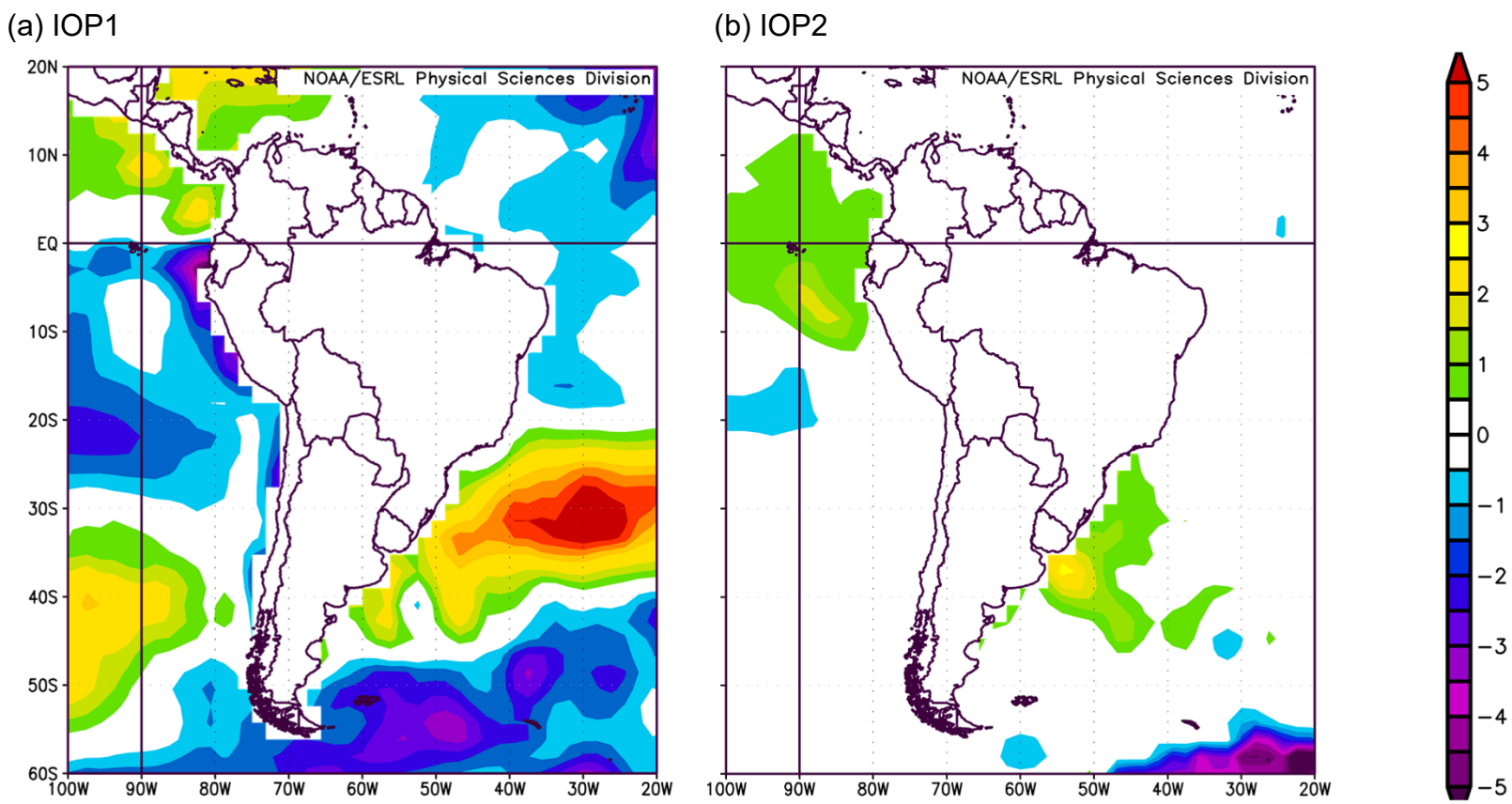

(a) IOP1
(b) IOP2
NOAA/ESRL Physical Sciences Division
NOAA/ESRL Physical Sciences Division
20N
10N
EQ
10S
20S
30S
40S
50S
60S
100W
90W
80W
70W
60W
50W
40W
30W
20W
5
4
3
2
1
0
−1
−2
−3
−4
−5

Figure S6

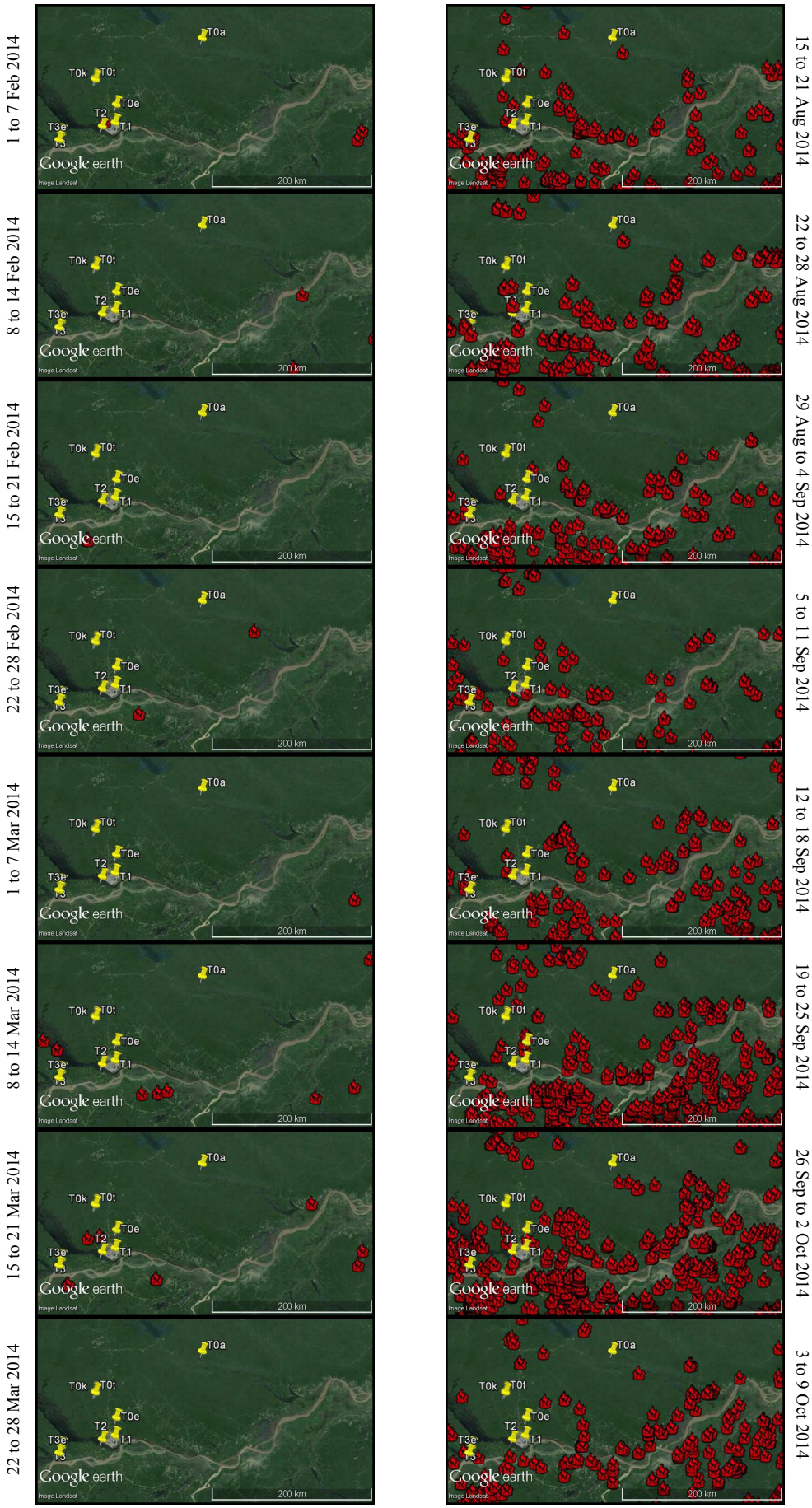

1 to 7 Feb 2014
8 to 14 Feb 2014
15 to 21 Feb 2014
22 to 28 Feb 2014
1 to 7 Mar 2014
8 to 14 Mar 2014
15 to 21 Mar 2014
22 to 28 Mar 2014
15 to 21 Aug 2014
22 to 28 Aug 2014
29 Aug to 4 Sep 2014
5 to 11 Sep 2014
12 to 18 Sep 2014
19 to 25 Sep 2014
26 Sep to 2 Oct 2014
3 to 9 Oct 2014
T0a
T0k
T0t
T0e
T2
T1
T3e
T3
Google earth
200 km

Figure S7

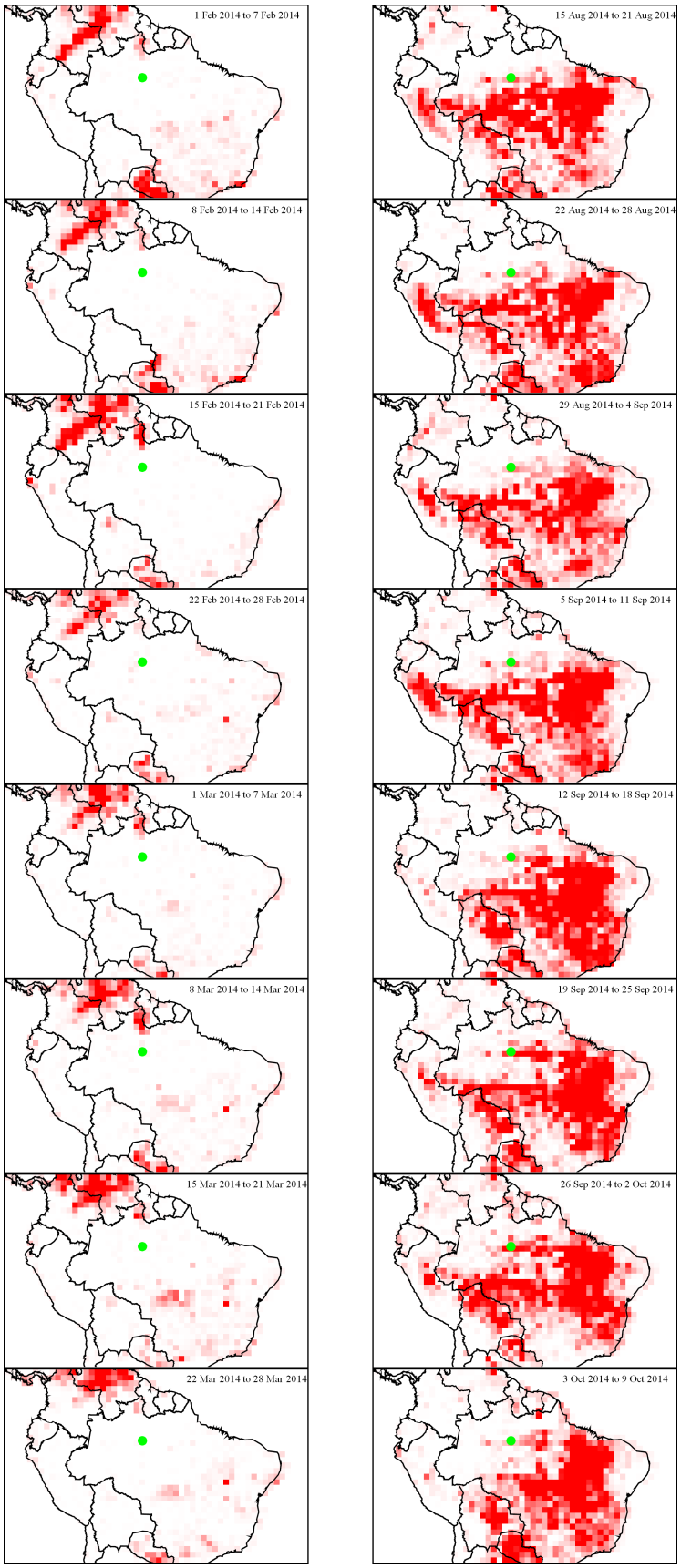

1 Feb 2014 to 7 Feb 2014
8 Feb 2014 to 14 Feb 2014
15 Feb 2014 to 21 Feb 2014
22 Feb 2014 to 28 Feb 2014
1 Mar 2014 to 7 Mar 2014
8 Mar 2014 to 14 Mar 2014
15 Mar 2014 to 21 Mar 2014
22 Mar 2014 to 28 Mar 2014
15 Aug 2014 to 21 Aug 2014
22 Aug 2014 to 28 Aug 2014
29 Aug 2014 to 4 Sep 2014
5 Sep 2014 to 11 Sep 2014
12 Sep 2014 to 18 Sep 2014
19 Sep 2014 to 25 Sep 2014
26 Sep 2014 to 2 Oct 2014
3 Oct 2014 to 9 Oct 2014

Figure S8

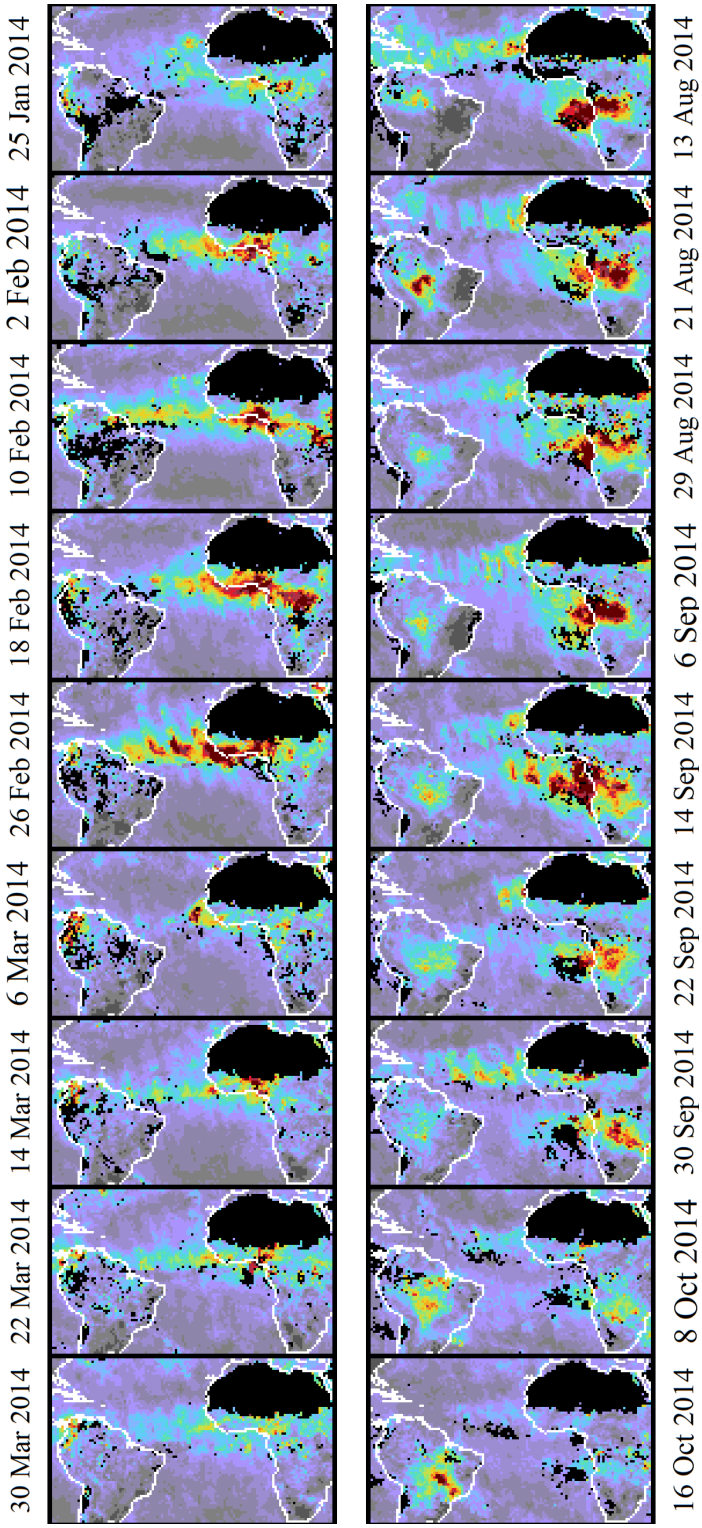

30 Mar 2014
22 Mar 2014
14 Mar 2014
6 Mar 2014
26 Feb 2014
18 Feb 2014
10 Feb 2014
2 Feb 2014
25 Jan 2014
16 Oct 2014
8 Oct 2014
30 Sep 2014
22 Sep 2014
14 Sep 2014
6 Sep 2014
29 Aug 2014
21 Aug 2014
13 Aug 2014

Figure S9