WAGENINGEN UNIVERSITY
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European Research Council

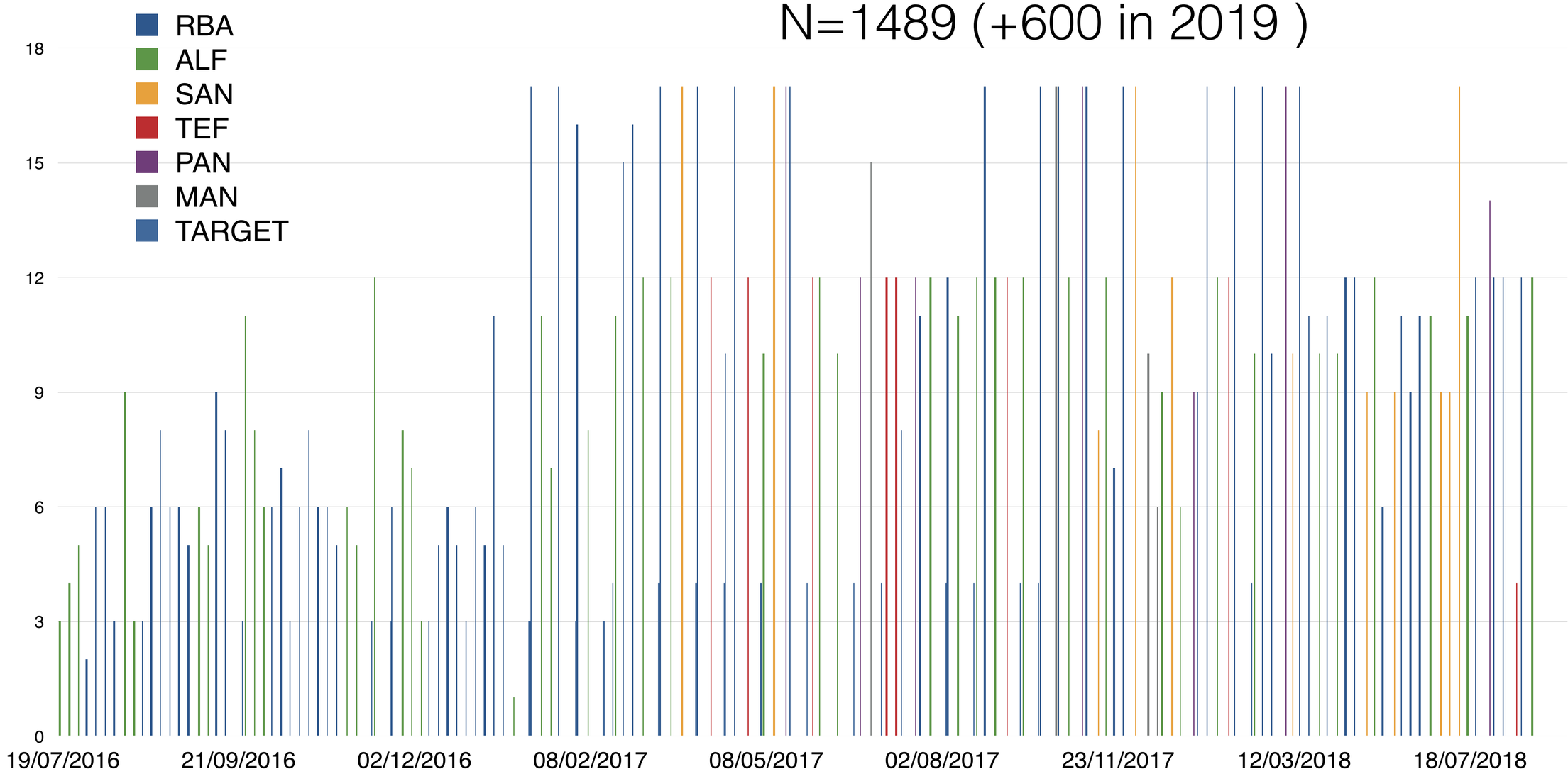
Measuring and modeling the impact of droughts on the Amazon carbon cycle

Wouter Peters
Gerbrand Koren, John Miller, Luciana Gatti,
Manuel Gloor, Ingrid Luijkx, Stijn Naus,
Liesbeth Florentie

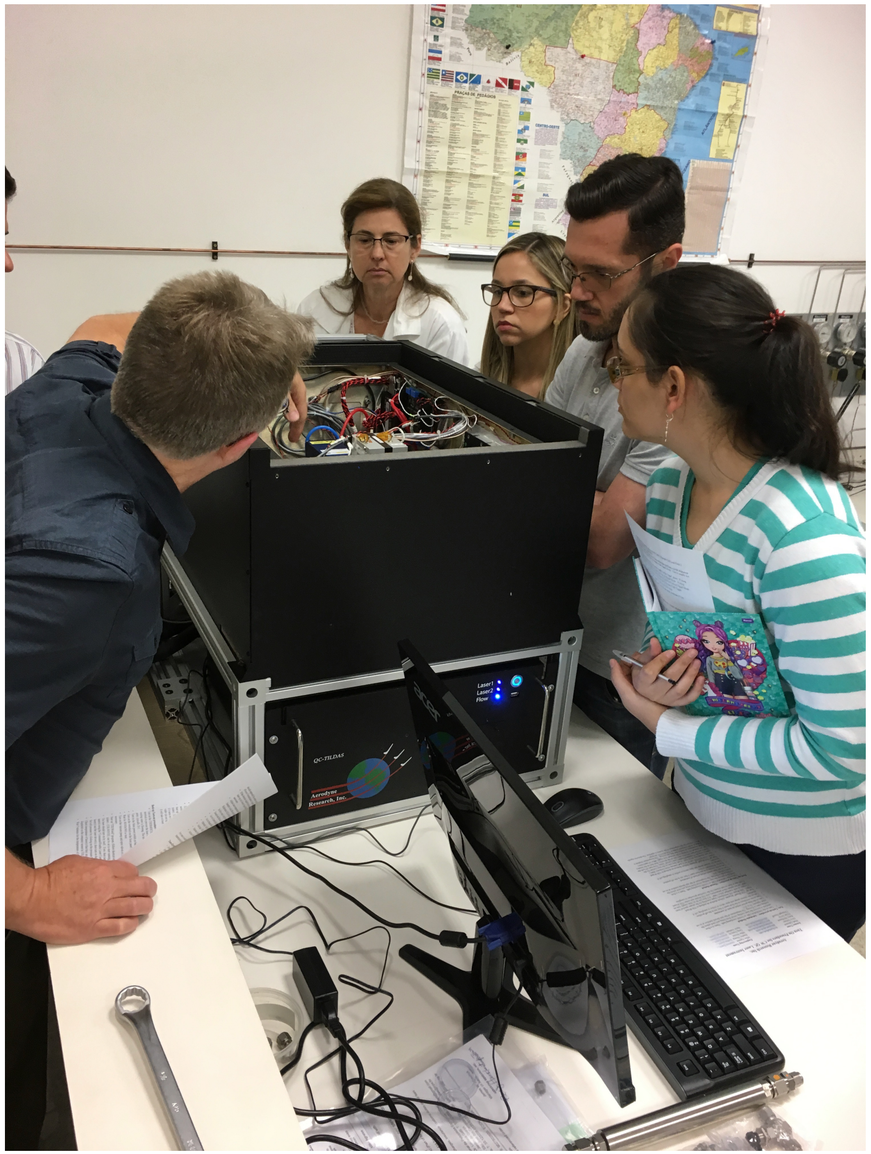
ASICA

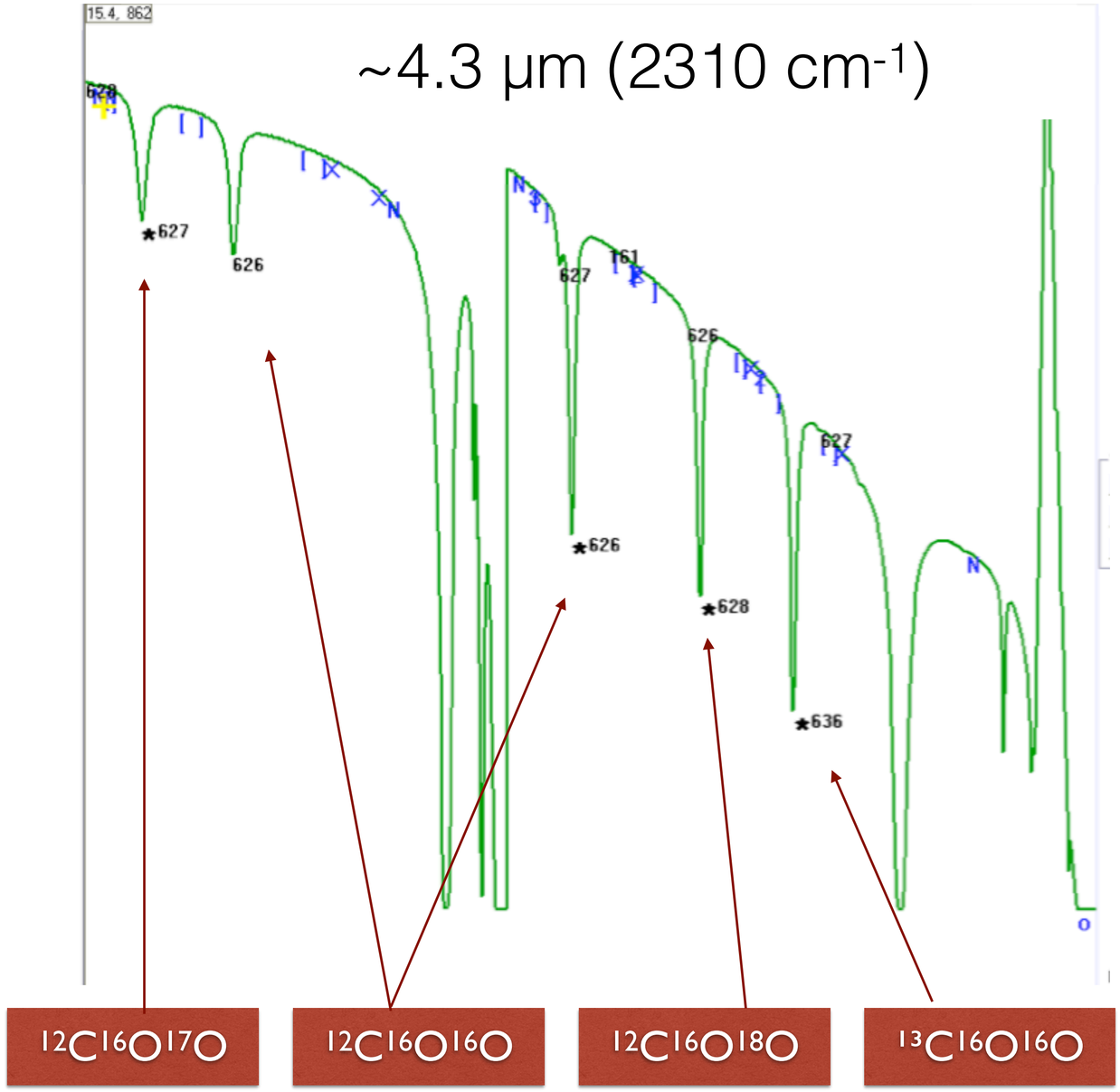
university of groningen

Samples collected by extraction



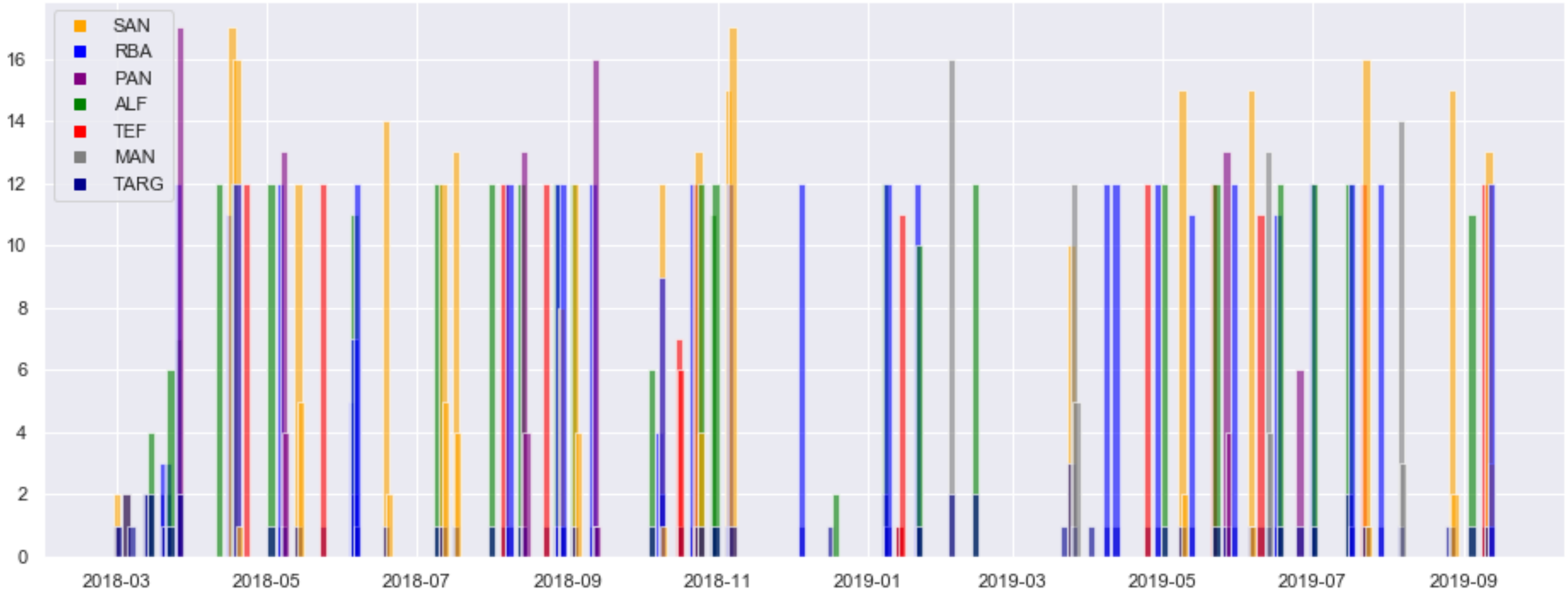
Aerodyne TILDAS dual-laser





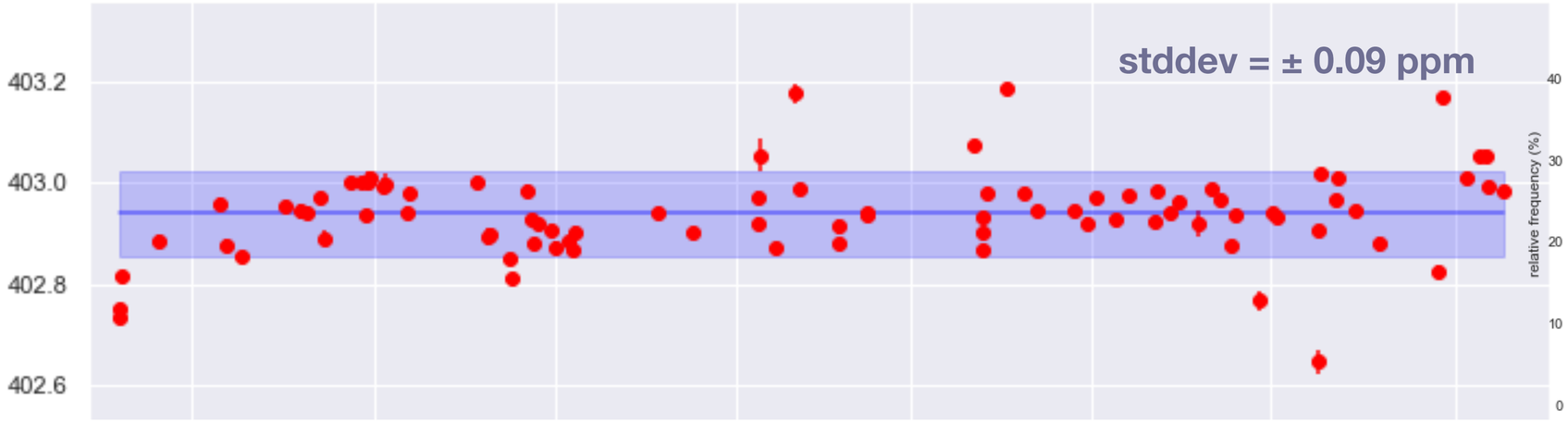
Samples on Aerodyne TILDAS dual-laser

(N=1285, also extracted)

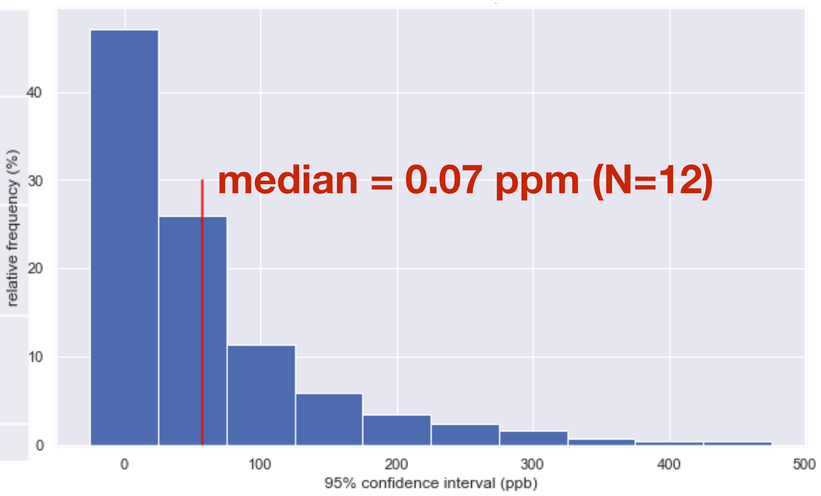


Precision and Stability

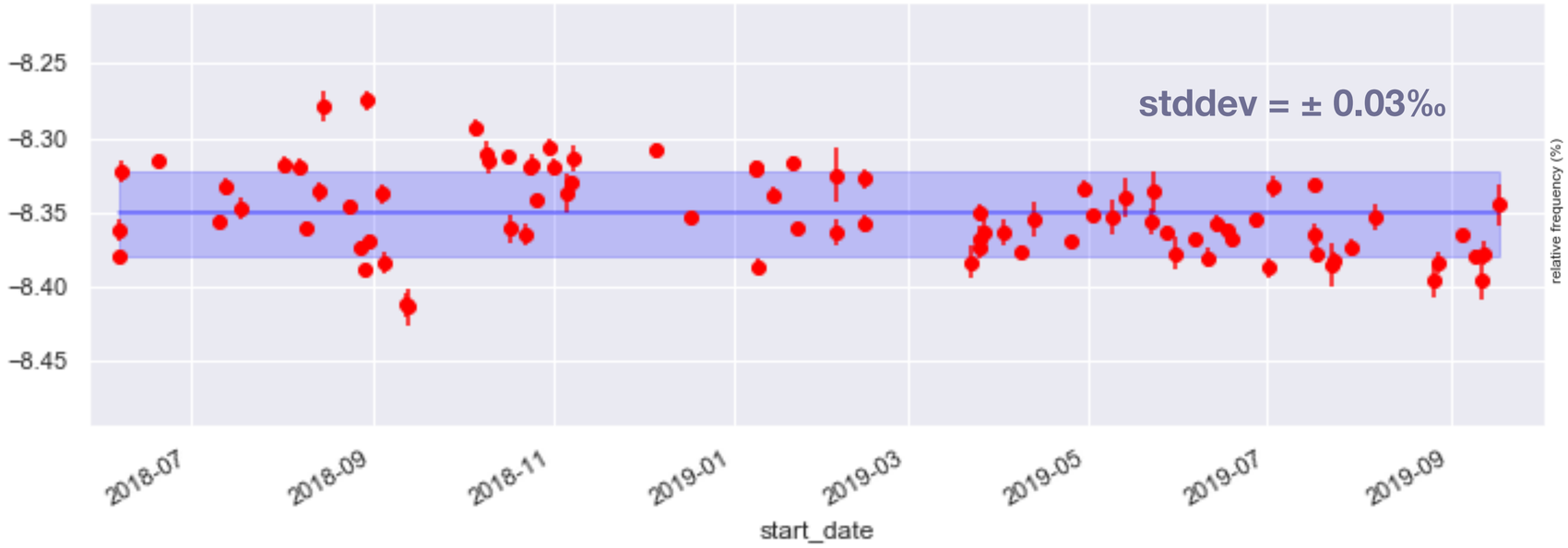
CO_2 in *TARGET* tank (treated as unknown)

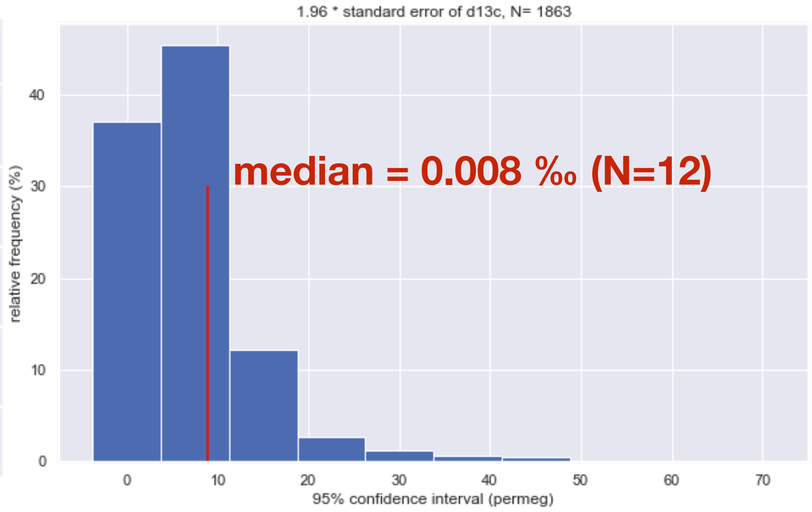


95% CI of 1858 samples measured

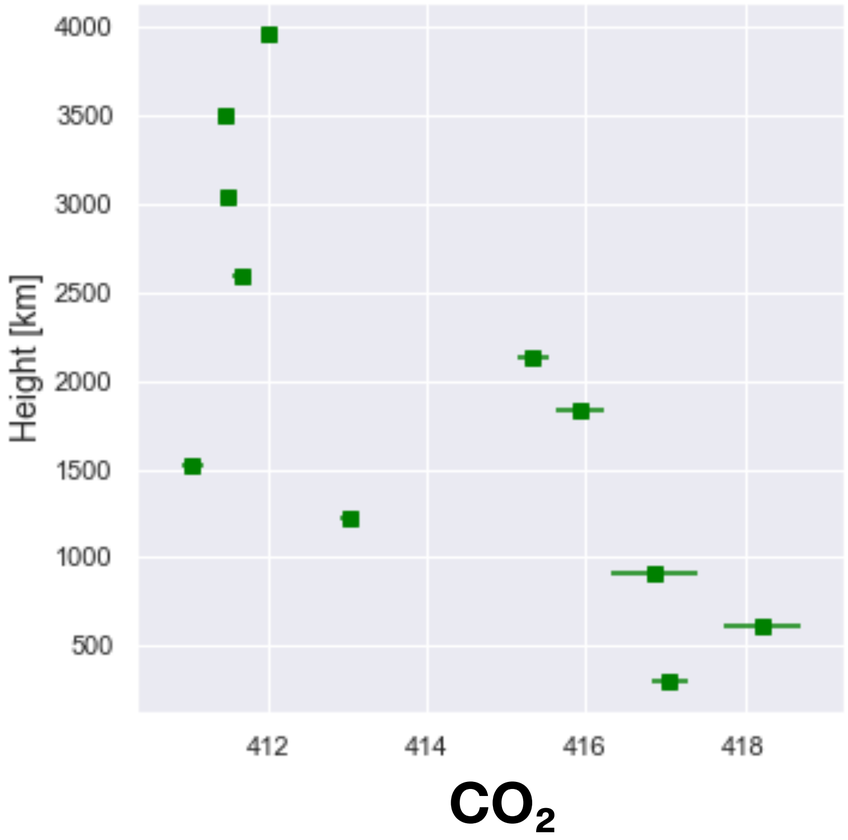


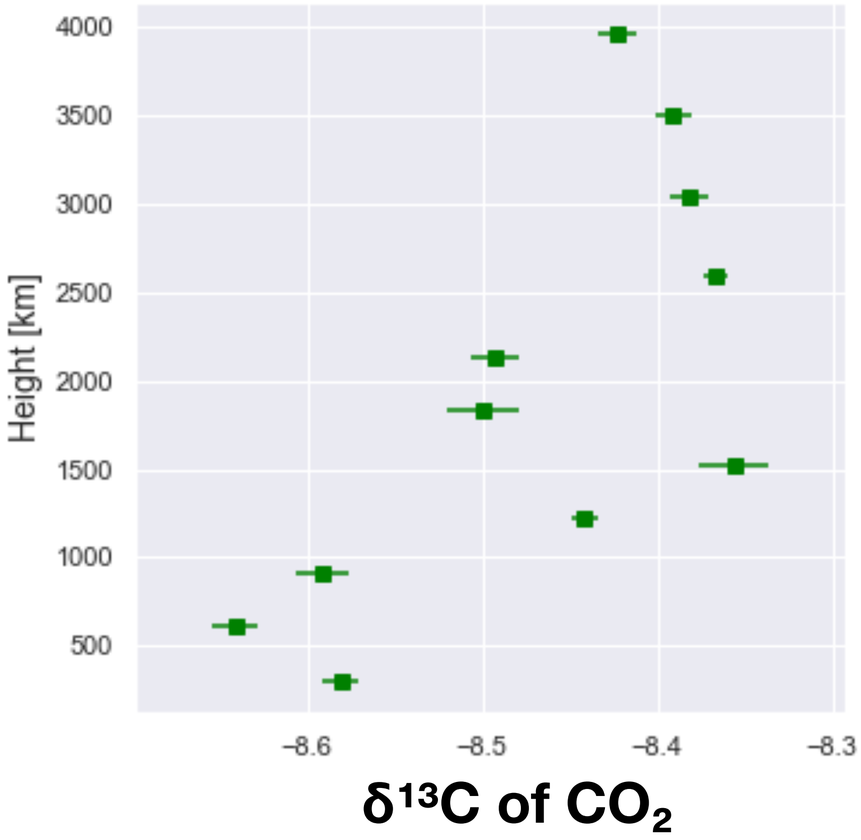
$\delta^{13}C$ of CO_2 in *TARGET* tank (treated as unknown)





Aircraft Vertical Profiles from the Amazon Basin



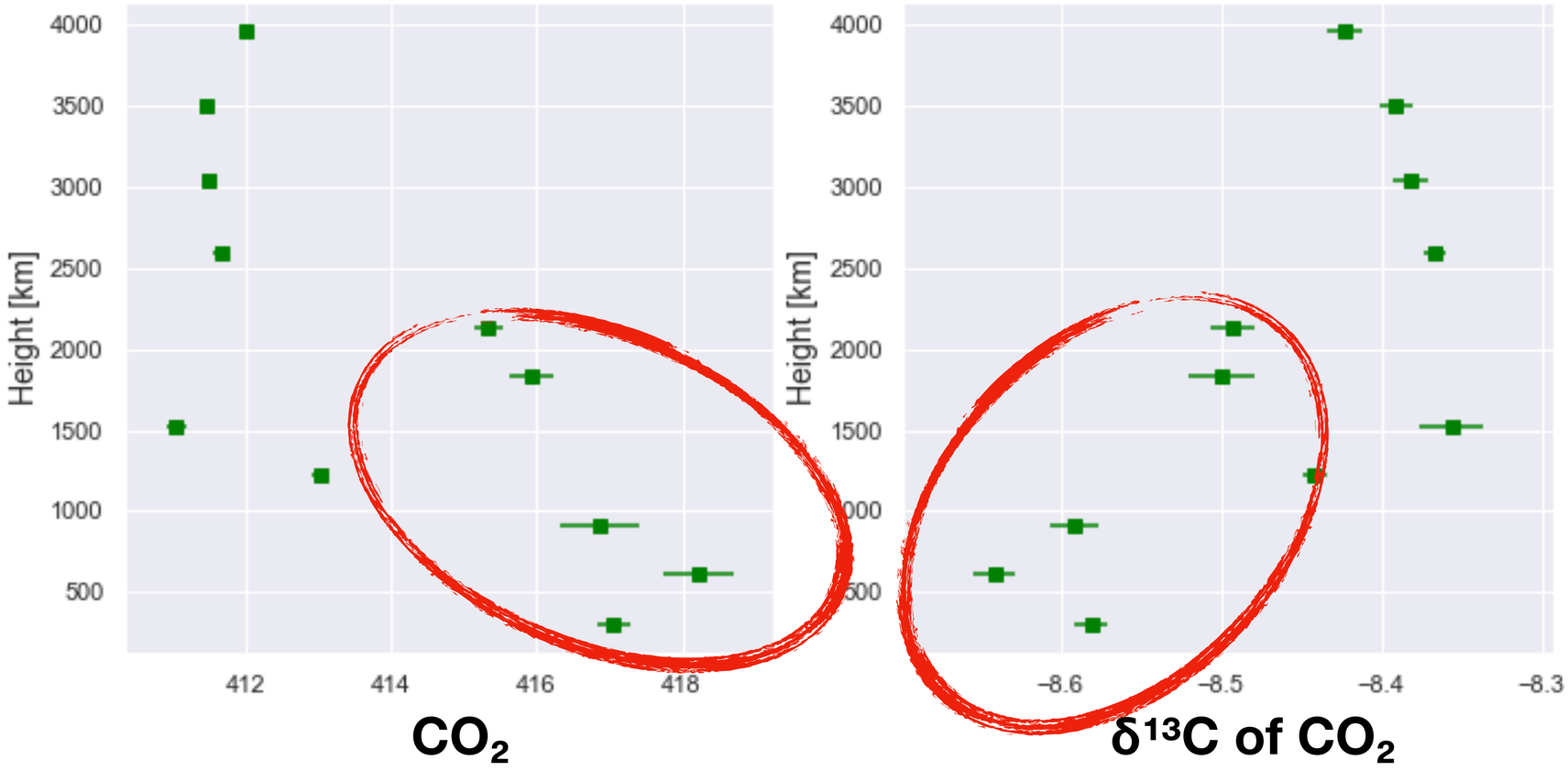


12 Sep 2019
…Amazon Fires

CO_2: ±0.2 ppm
$\delta^{13}C$: ± 0.03‰

Rio Branco profile collected by L. Gatti and co-workers, using V3 PFP including the ASICA air dryer

Aircraft Vertical Profiles from the Amazon Basin



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Elevated CO_2 with more negative $\delta^{13}C$
=> release of ‘light’ carbon with relatively much ^{12}C

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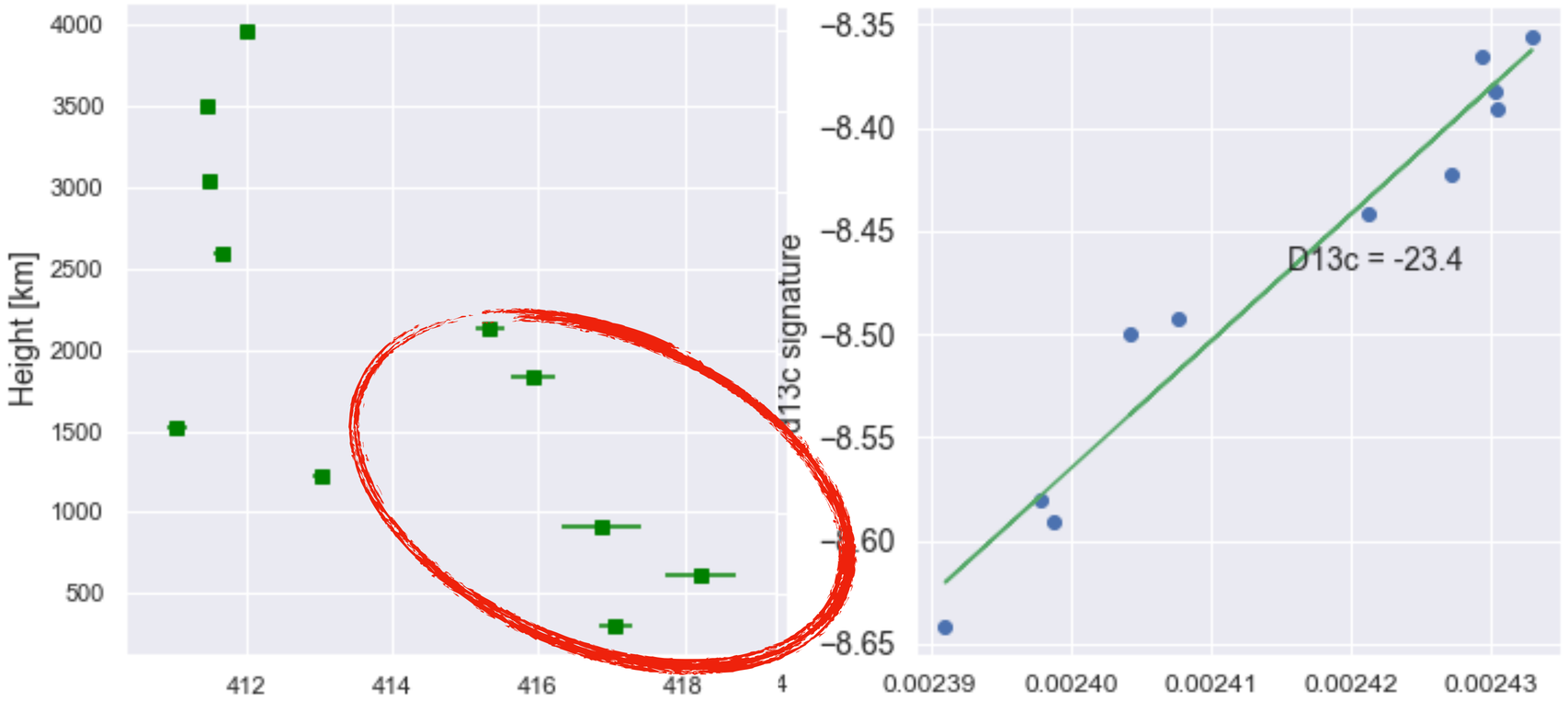
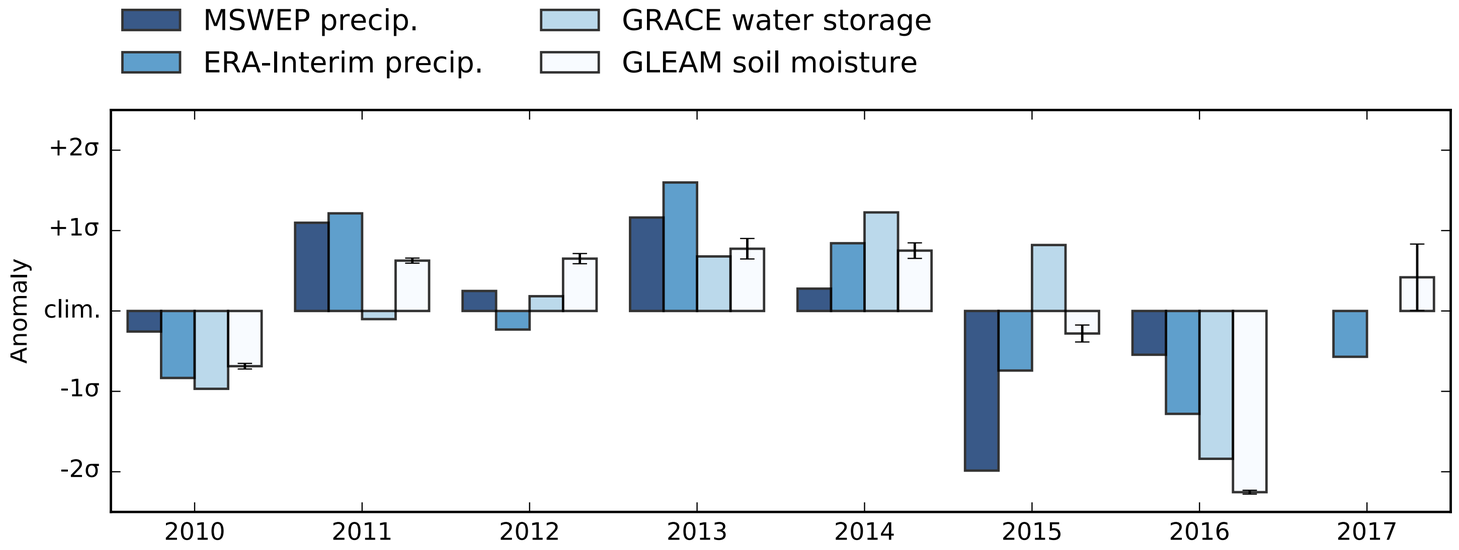


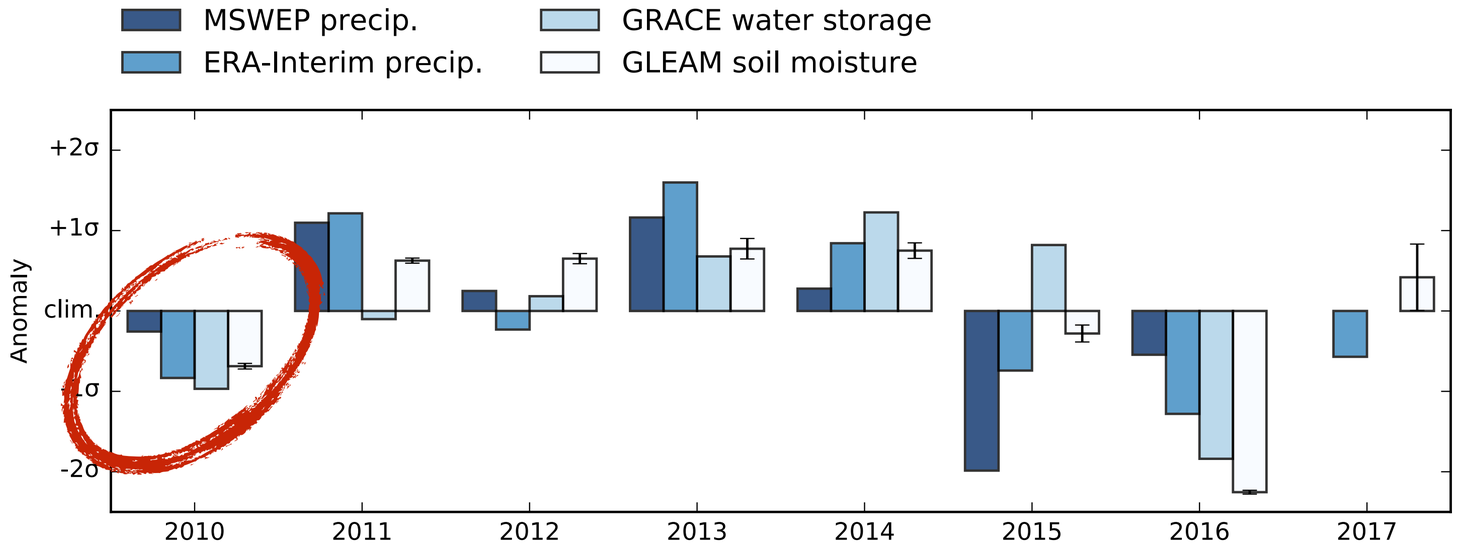
CO_2 **$\delta^{13}C$ of CO_2**

12 Sep 2019
…Amazon Fires

CO_2: ±0.2 ppm
$\delta^{13}C$: ± 0.03‰

Elevated CO_2 with more negative $\delta^{13}C$
=> release of 'light' carbon with relatively much ^{12}C
=> C3 plants or fossil fuels (-24‰ — -30‰)
=> C4 plants (-12‰) sign of fires ? To be judged through CO…


MSWEP precip.
ERA-Interim precip.
GRACE water storage
GLEAM soil moisture
Anomaly
+2σ
+1σ
clim.
-1σ
-2σ
2010
2011
2012
2013
2014
2015
2016
2017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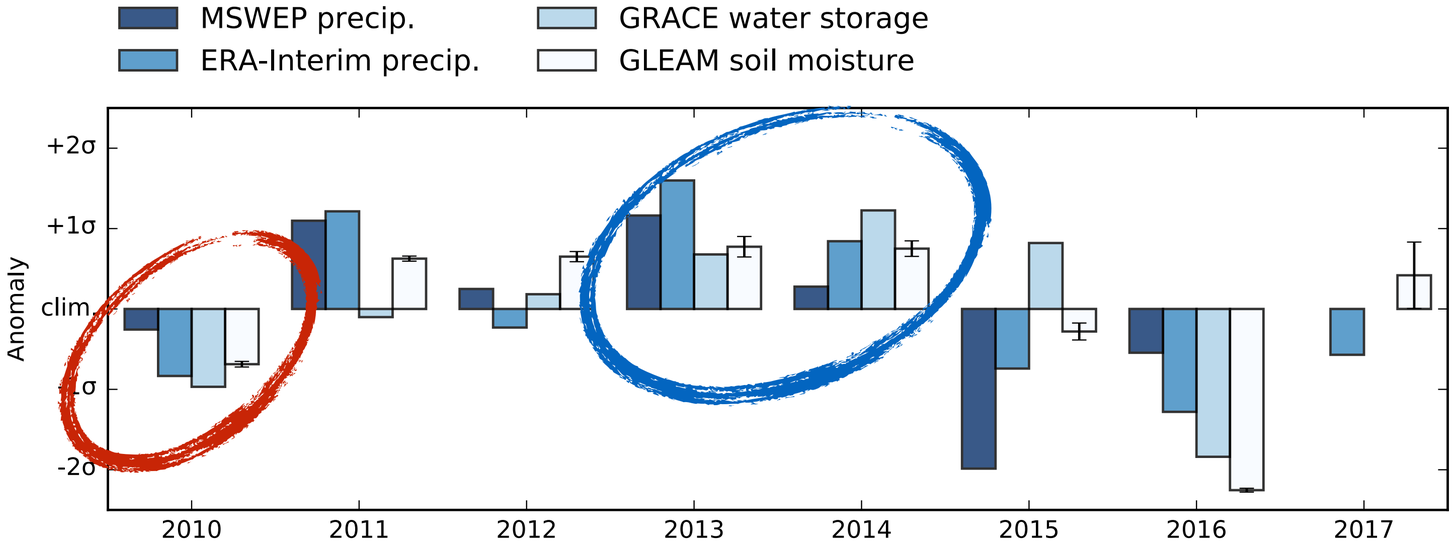
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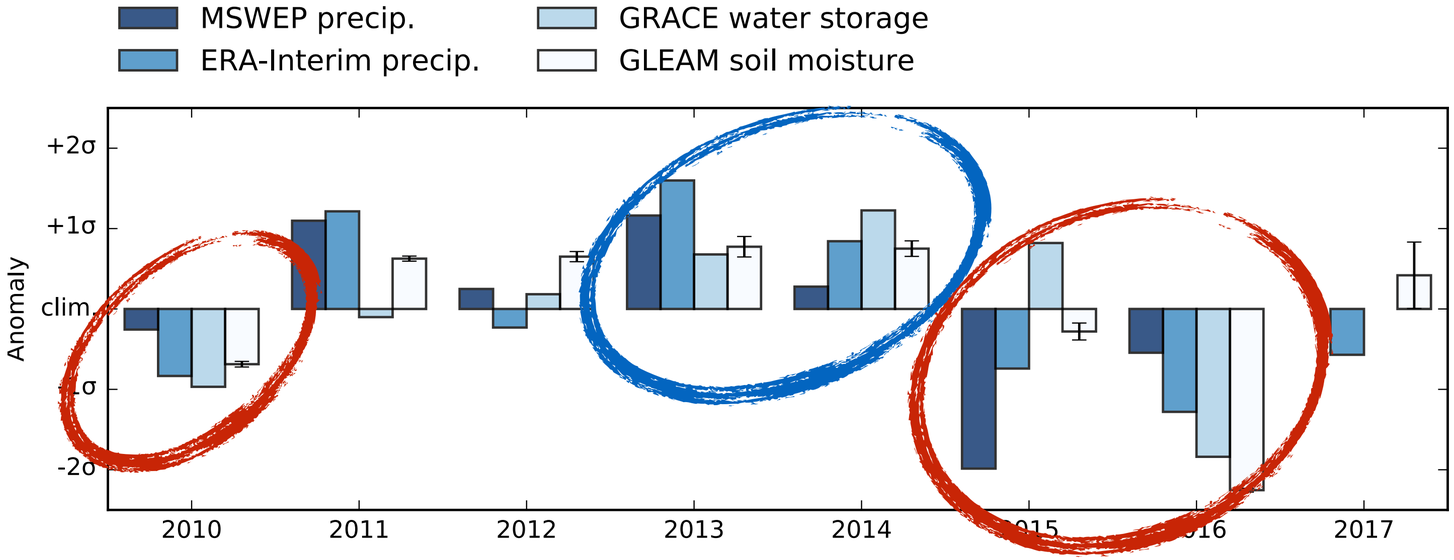
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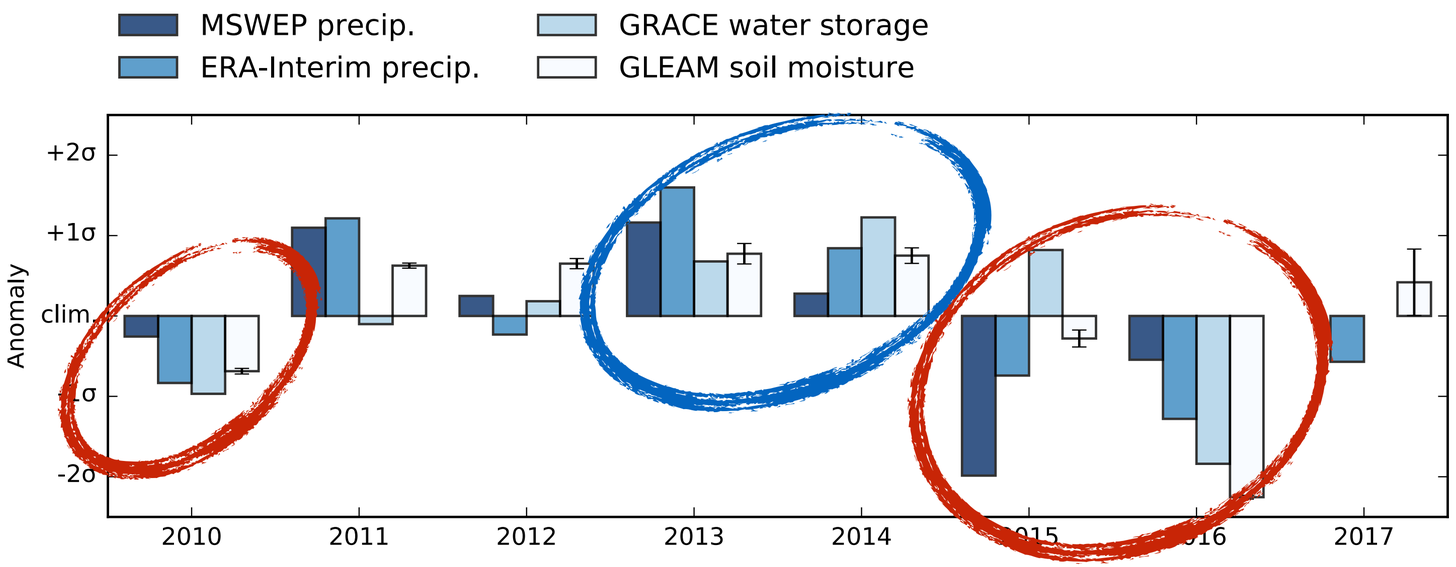
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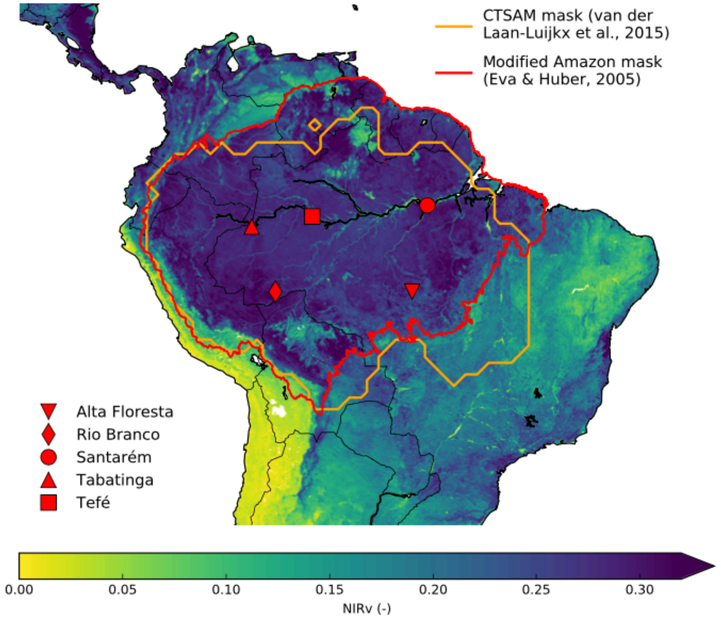
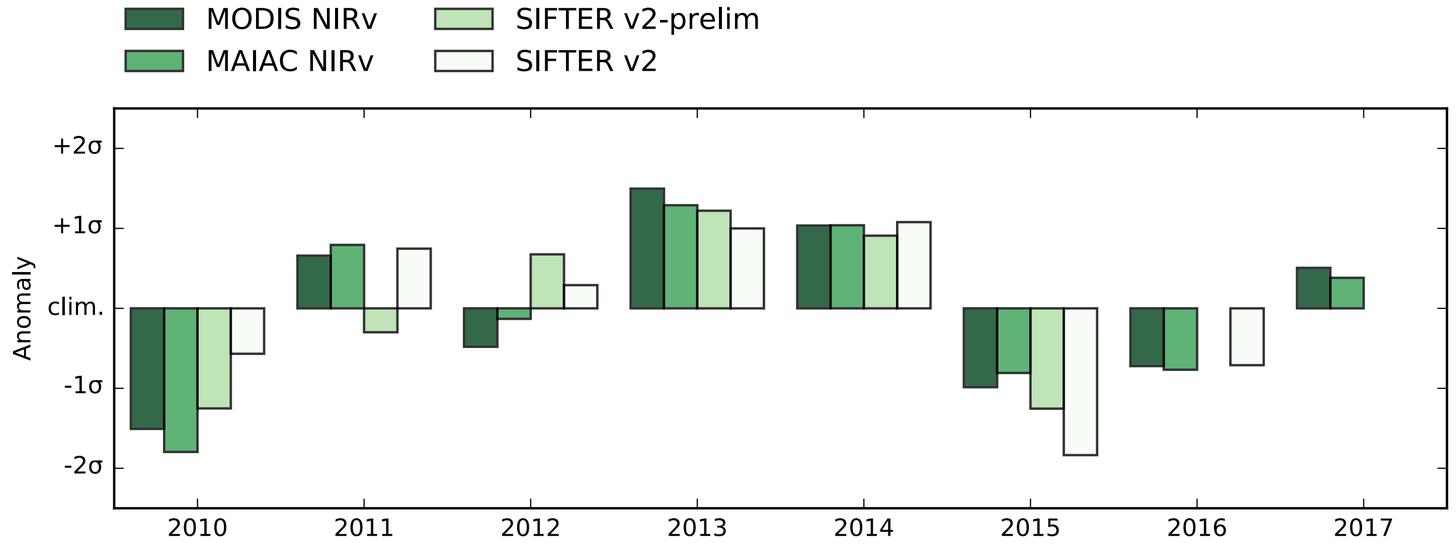
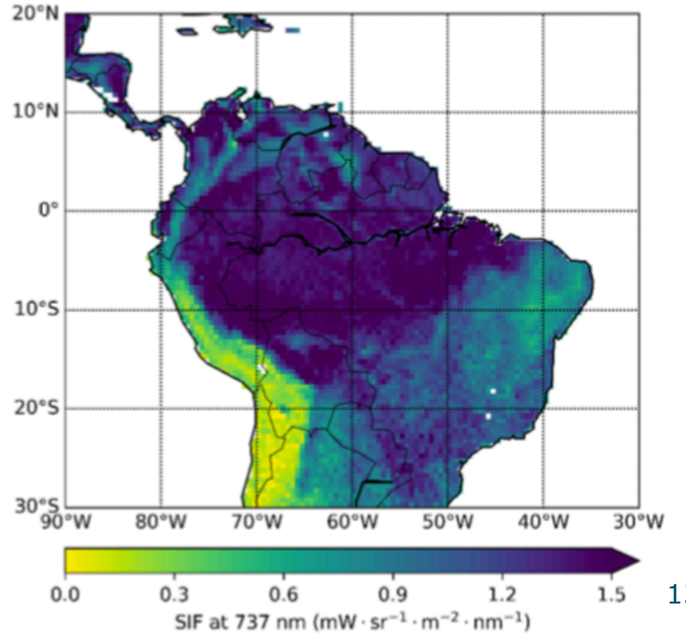
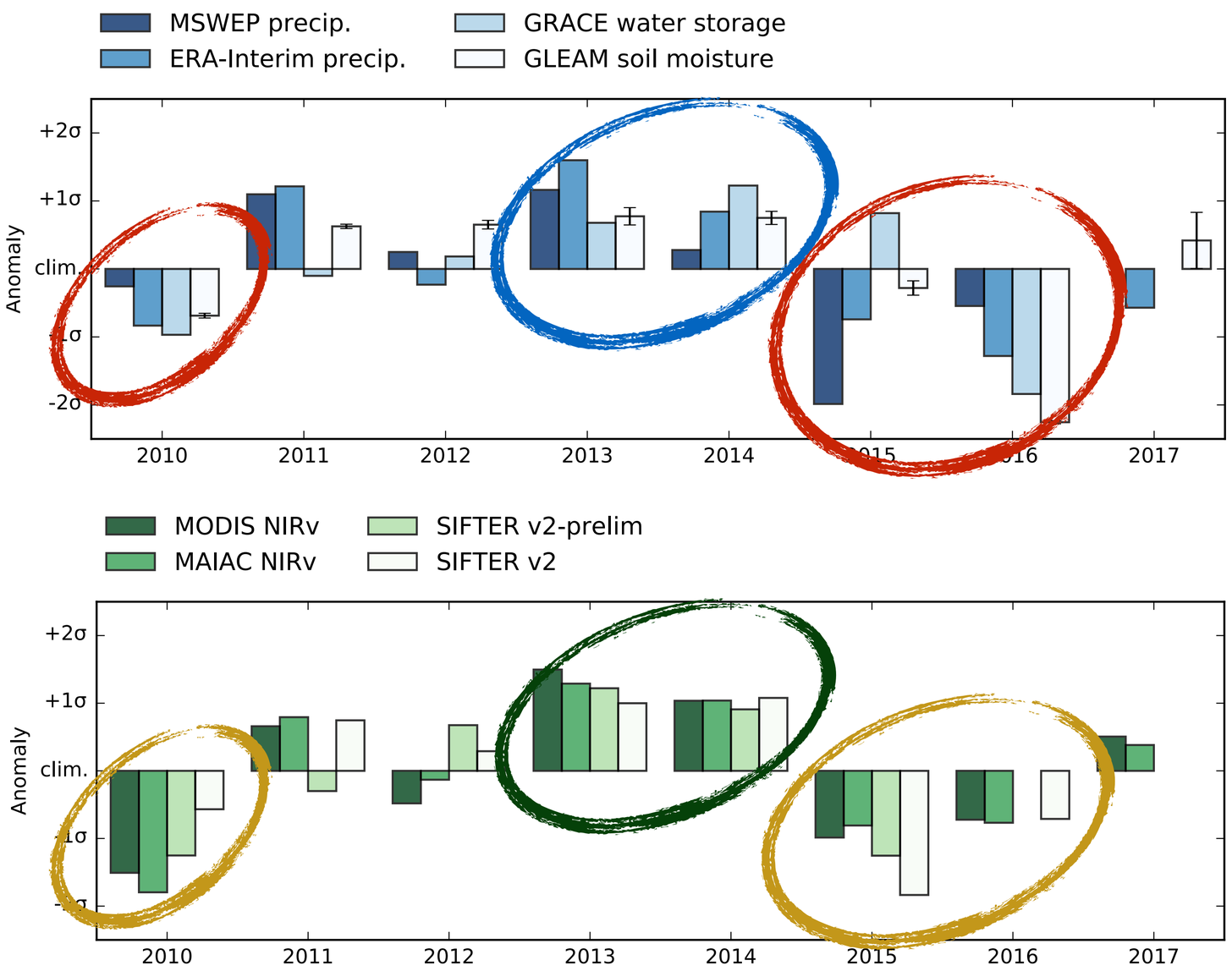

CTSAM mask (van der Laan-Luijkx et al., 2015)
Modified Amazon mask (Eva & Huber, 2005)
Alta Floresta
Rio Branco
Santarém
Tabatinga
Tefé
0.00
0.05
0.10
0.15
0.20
0.25
0.30
NIRv (-)


MODIS NIRv
MAIAC NIRv
SIFTER v2-prelim
SIFTER v2
+2σ
+1σ
clim.
-1σ
-2σ
Anomaly
2010
2011
2012
2013
2014
2015
2016
2017


20°N
10°N
0°
10°S
20°S
30°S
90°W
80°W
70°W
60°W
50°W
40°W
30°W
0.0
0.3
0.6
0.9
1.2
1.5
SIF at 737 nm (mW · sr⁻¹ · m⁻² · nm⁻¹)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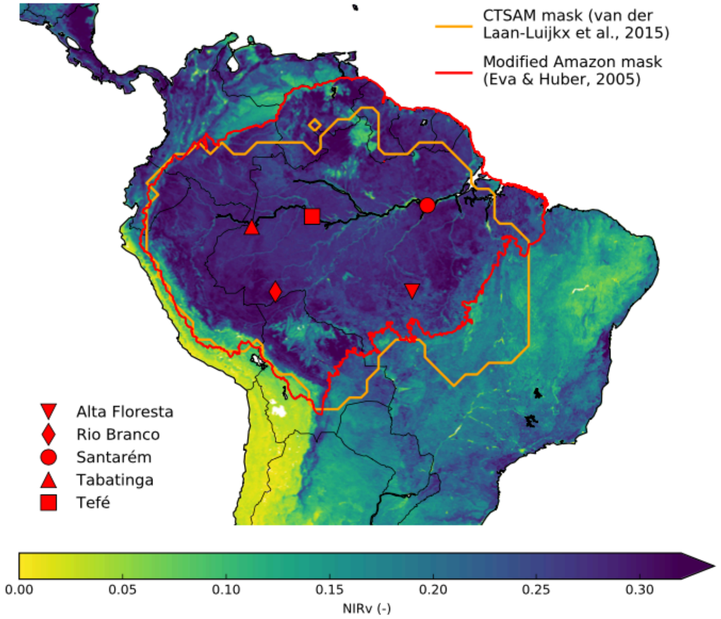
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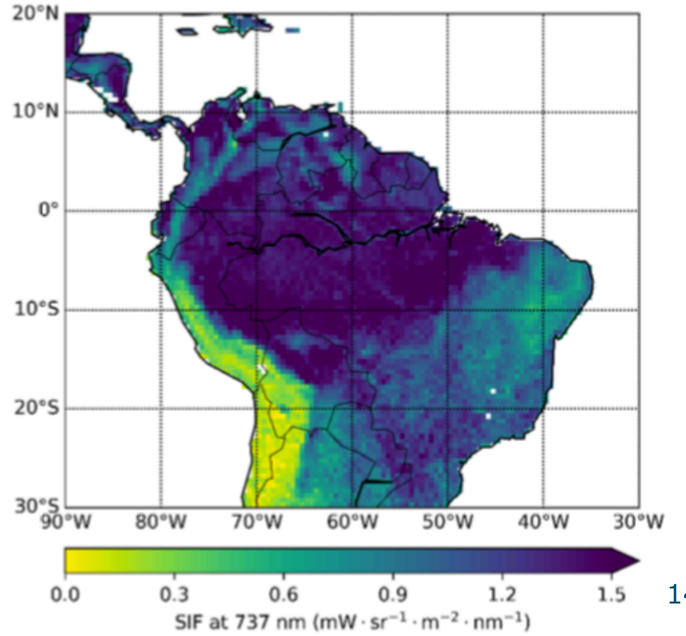
20°N
10°N
0°
10°S
20°S
30°S
90°W
80°W
70°W
60°W
50°W
40°W
30°W
0.0
0.3
0.6
0.9
1.2
1.5
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