



National Aeronautics and Space Administration
Jet Propulsion Laboratory
California Institute of Technology



Overview of Early Results from the OCO-3 Mission

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Jet Propulsion Laboratory/ Caltech
Pasadena, CA

for the European
Geophysical Union Mtg
May 2020

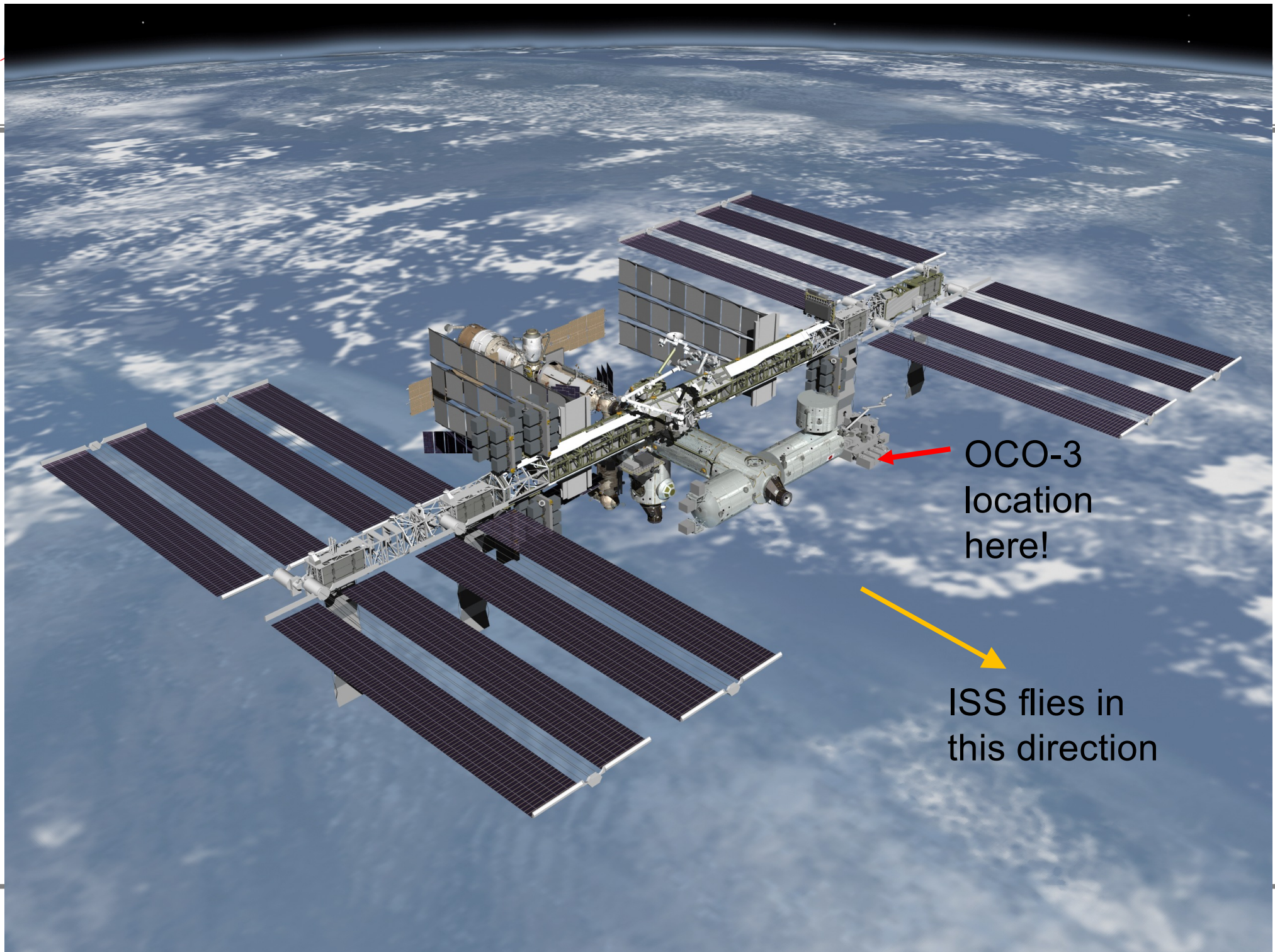


The International Space Station!



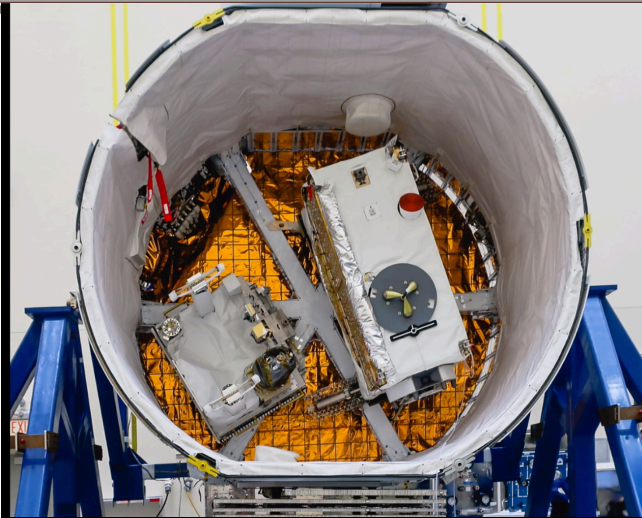
OCO-3 location is here.
(photo taken before we arrived)





OCO-3
location
here!

ISS flies in
this direction

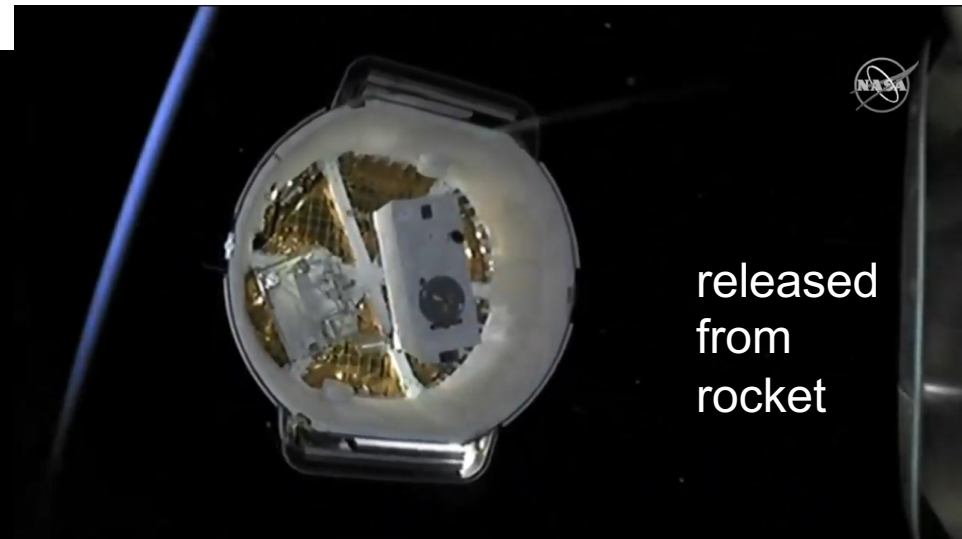


ready to get integrated on rocket



OCO-3 launched on a SpaceX Falcon 9 rocket on May 4th, 2019

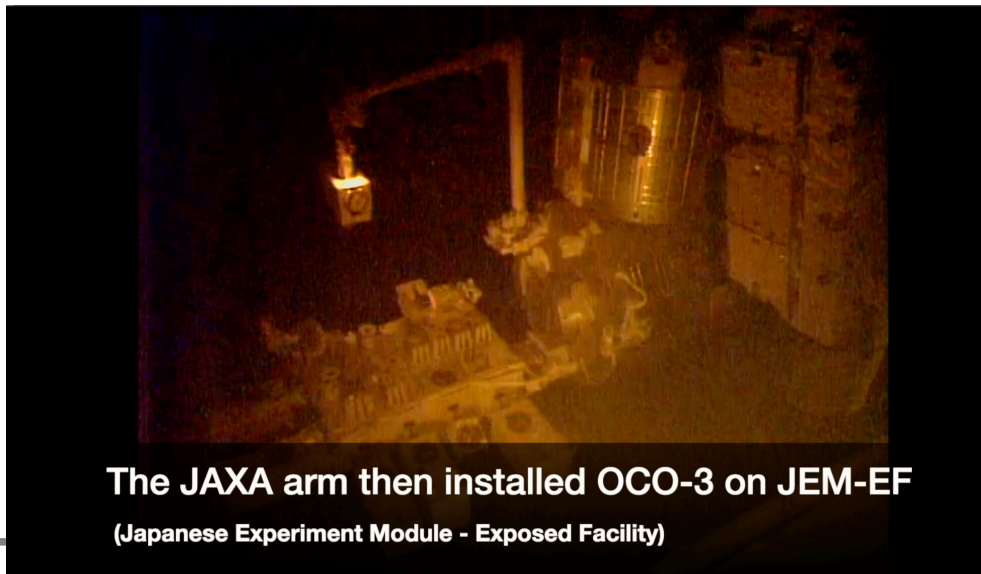
(Credit: SpaceX)



released
from
rocket



Installation on ISS

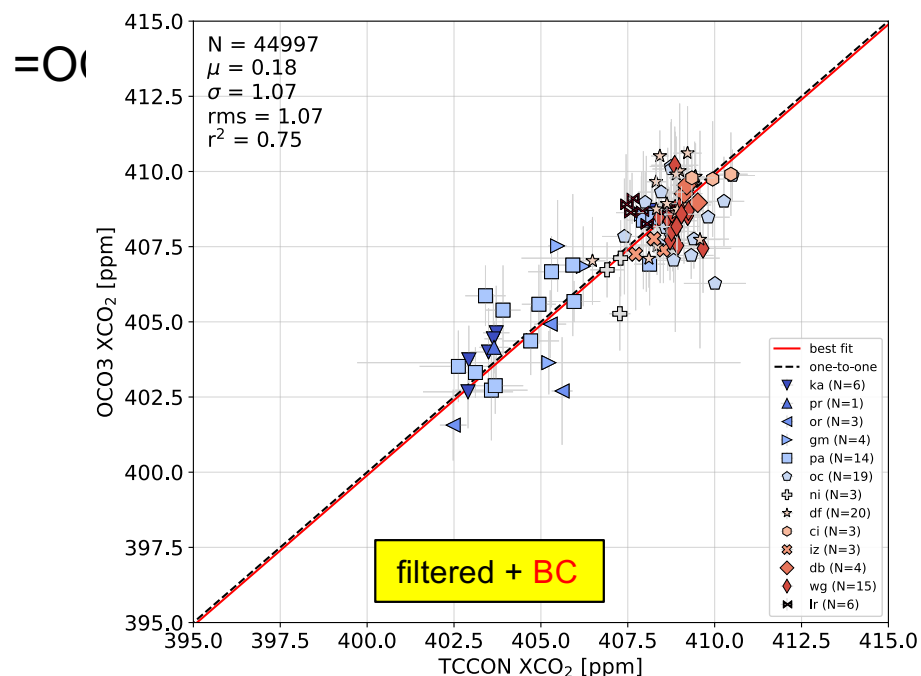
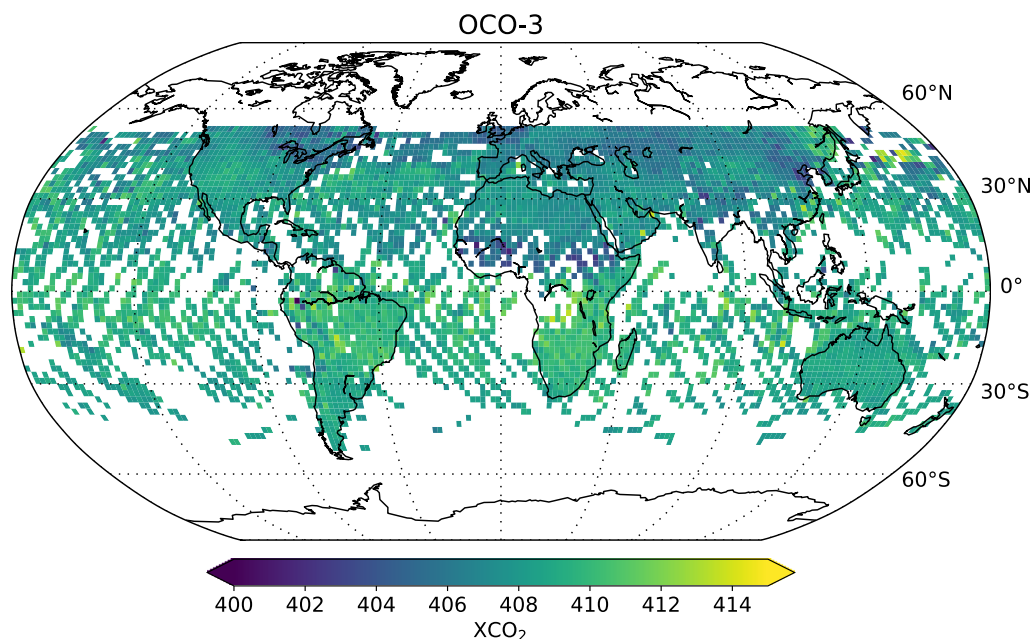


OCO-3 vEarly XCO₂ Data was released on April 30th, 2020



The first version of data has been released!

- Validation of the XCO₂ shows low bias relative to TCCON, and somewhat higher scatter as compared to OCO-2.
- We have prepared the data quality statement, data user's guide. Updated L1b and L2 ATBDs are coming along.
- Lite files will be delivered later in May. Complete record available by July 15.
- vEarly has some pointing and radiometry errors, but is a great set for you to test tools and data use approaches.



Figures by M. Kiel



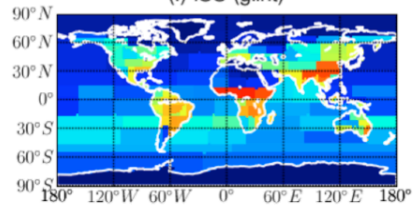
Science Motivation for Snapshot Area Maps (SAMs)



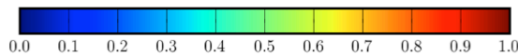
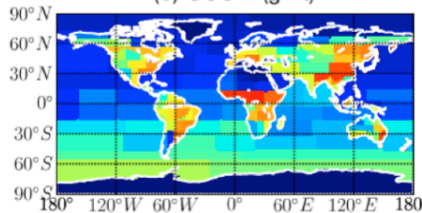
SAMS are data collected over ~80km by ~80km in two minutes - mini maps!

Continued Global CO₂ Flux Estimates

OCO-3 on
(f) ISS (glint)



(b) OCO-2 (glint)

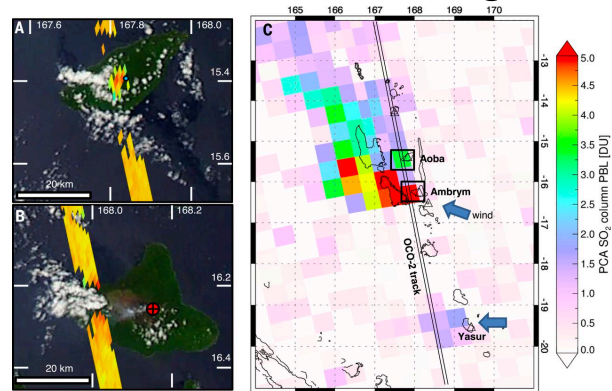


Flux error improvement for January
Palmer et al., 2011

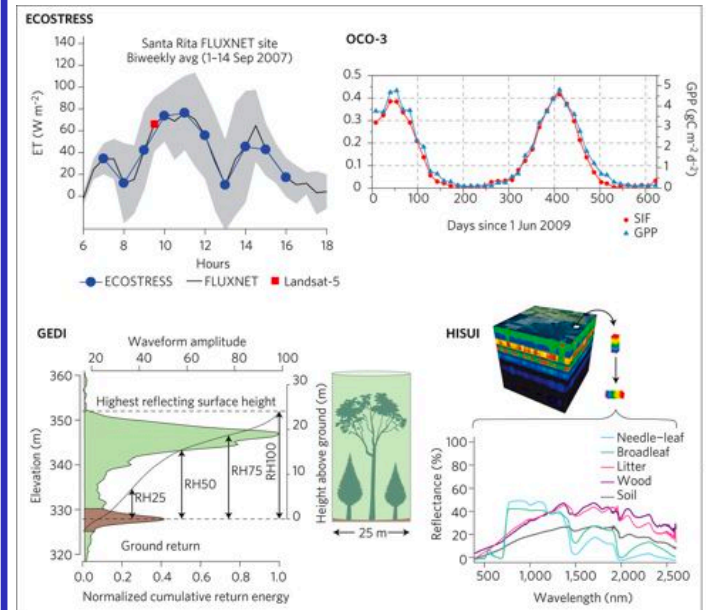
Anthropogenic Emissions



Volcanic Monitoring



Carbon Cycle and Ecosystem Process Studies



Ryan Pavlick

SAM over Buenos Aires, Argentina mapped in light level



Contrast between water and land is easily seen in the radiance map.

There are 6 different swaths, each about 14km wide.

Together they map out the region.

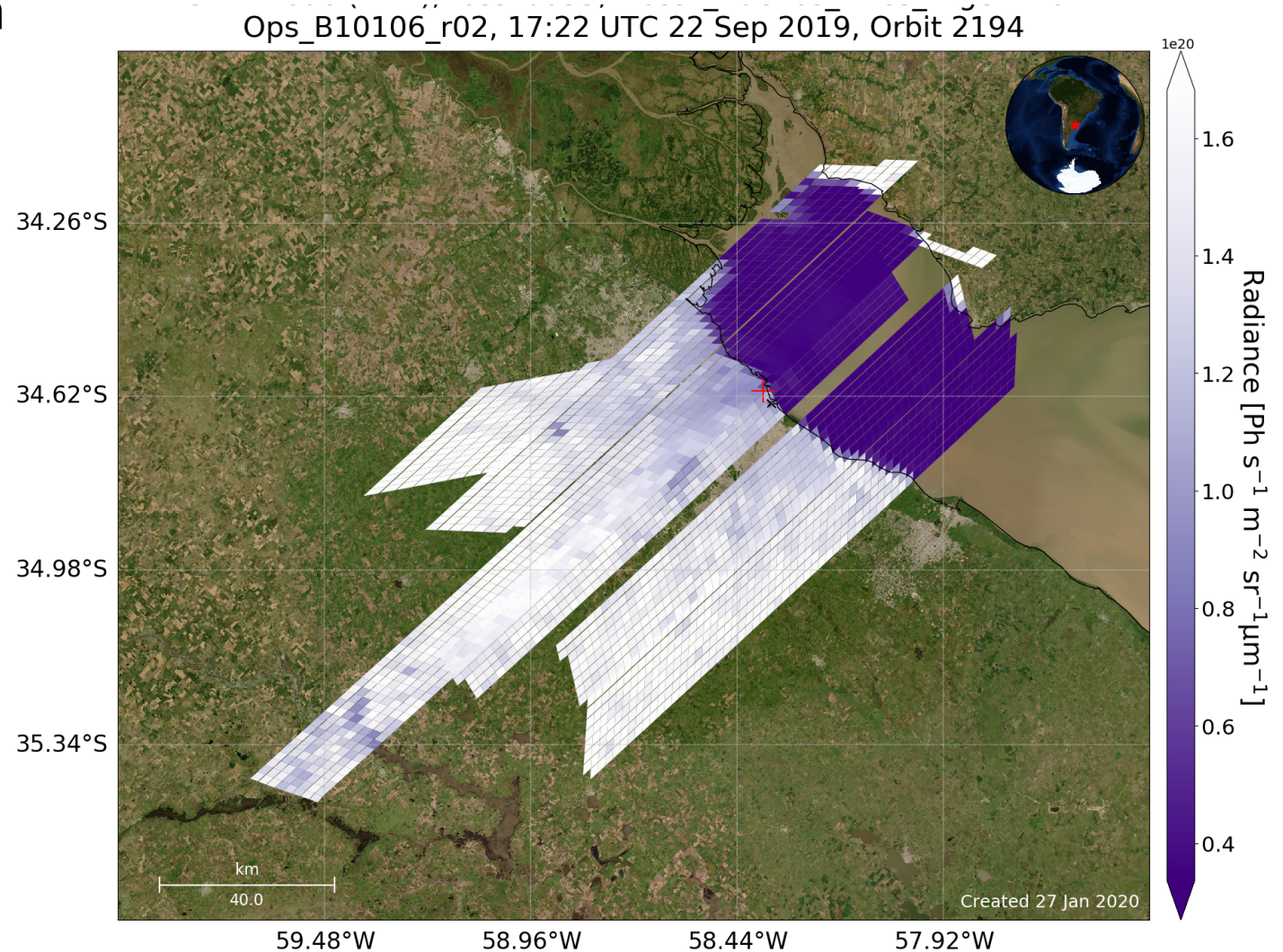
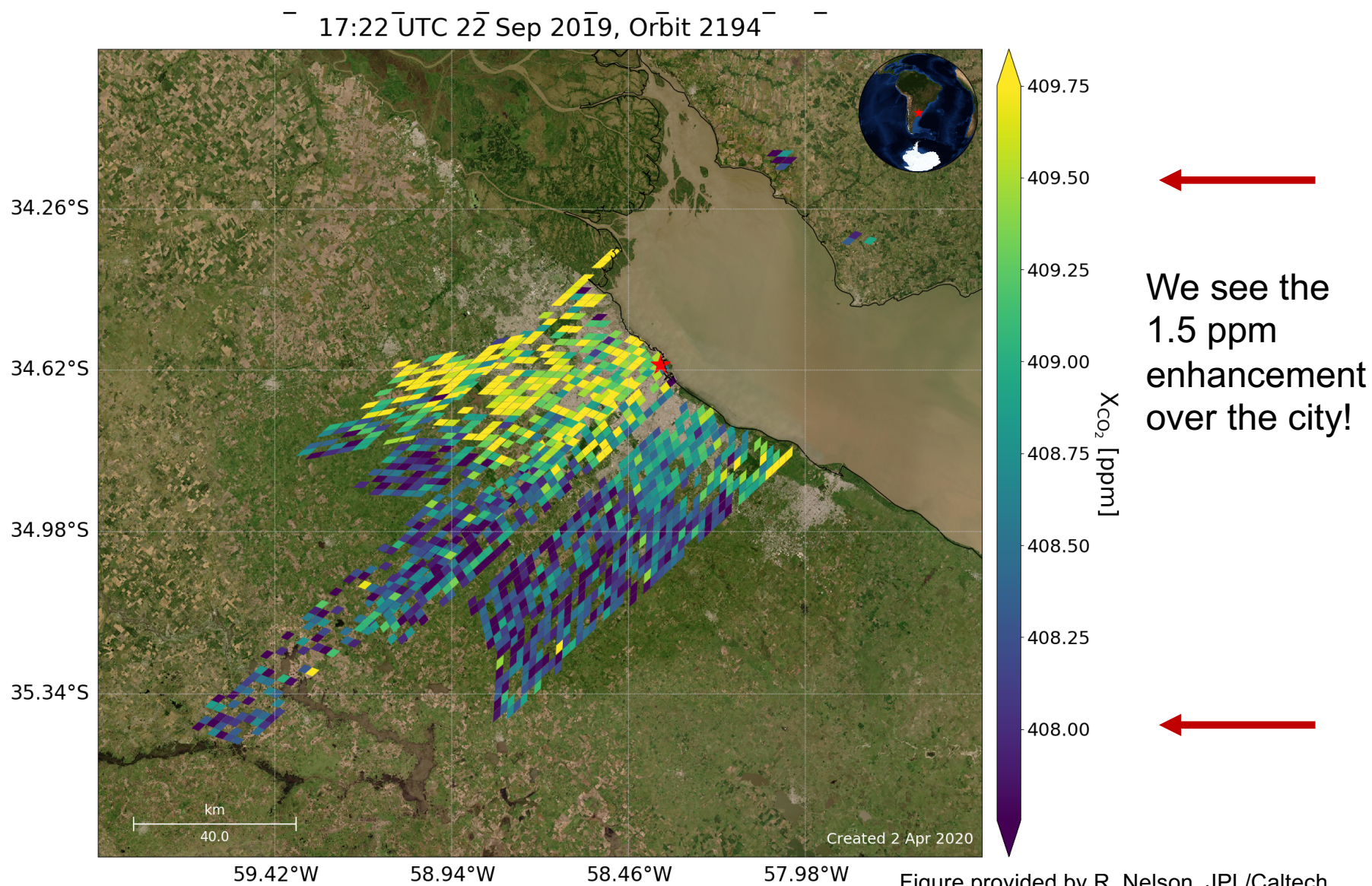
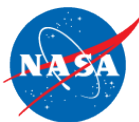


Figure provided by R. Nelson, JPL/Caltech

Transformed to CO₂ measurements





OCO-3 SAMs

OCO-3 uses the same instrument as OCO-2, but it has been adapted to work on the ISS. the OCO-3 instrument has an agile 2-D pointing mechanism, i.e., a Pointing Mirror Assembly (PMA) that allows for rapid transitions in pointing. The PMA is used to collect Snapshot Area Maps (SAMs) which are data collections over ~80km by 80km in 2 minutes. These small map like XCO₂ and SIF datasets will be collected to sample emission sources and gradients, areas where plants and crops are being studied, volcanos, and other local carbon sources from space. The PMA will also allow for target mode observations, similar to those taken by OCO-2, typically at Total Column Carbon Observation Network (TCCON) ground sites for use in validation.

This webpage creates a centralized location for information on where and when we collected SAMs and targets, data maps, and a method to get subsetting data.

Search All Sites

Marker colors denote the type of site: validation, desert, SIF_Low, fossil, SIF_high, and volcano

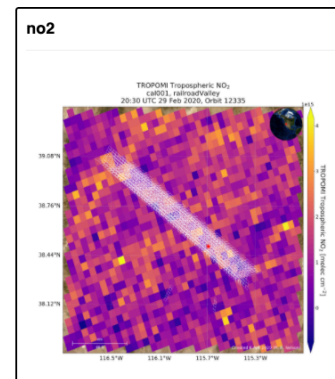
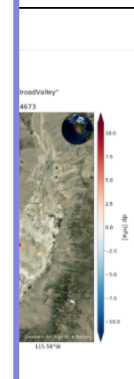
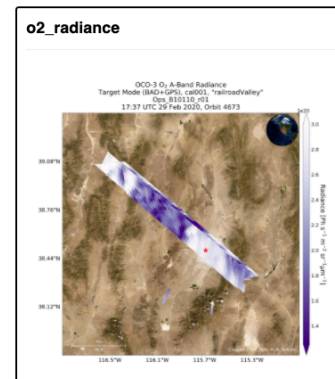
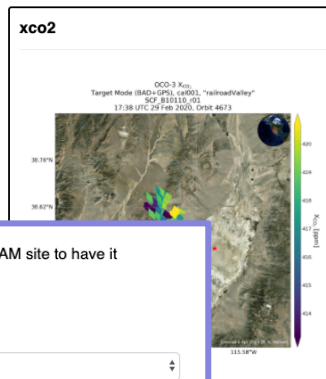


Please either use the map above to select a region that contains SAM sites or click a single SAM site to populate the form below. Fill out the rest of the form fields as appropriate.

New website tailored to search and get subsetting data for SAMs and targets

Plots for railroadValley beginning at 2020-02-29 17:37:25 GMT

Click on a plot for a larger view or [download data for this SAM](#).



Please either use the map above to select a region that contains SAM sites or click a single SAM site to have it populate the form below. Fill out the rest of the form fields as appropriate.

Site Name	Site Type
<input type="text" value="fossil_Guadalajara_Mexico"/>	<input type="text"/>
Start Date	End Date
<input type="text" value="MM/DD/YYYY"/>	<input type="text" value="MM/DD/YYYY"/>
SZA	+/- degrees
<input type="text"/>	<input type="text"/>
Spatial Region	
<input type="text" value="use map to select an area, if you did not fill out the 'Site Name' field"/>	
<input type="button" value="SEARCH"/>	

Search Results

Showing all available SAMs. Use the form above to narrow down this list.

Show entries

Search:

TargetID	Name	Start Date/Time	End Date/Time	Plots
cal001	railroadValley	2019-10-10 19:01:35	2019-10-10 19:03:40	no plots
cal001	railroadValley	2020-02-02 21:14:55	2020-02-02 21:17:00	no plots
cal001	railroadValley	2020-02-29 17:37:25	2020-02-29 17:39:30	plots
cal001	railroadValley	2020-04-05 20:20:45	2020-04-05 20:22:50	no plots

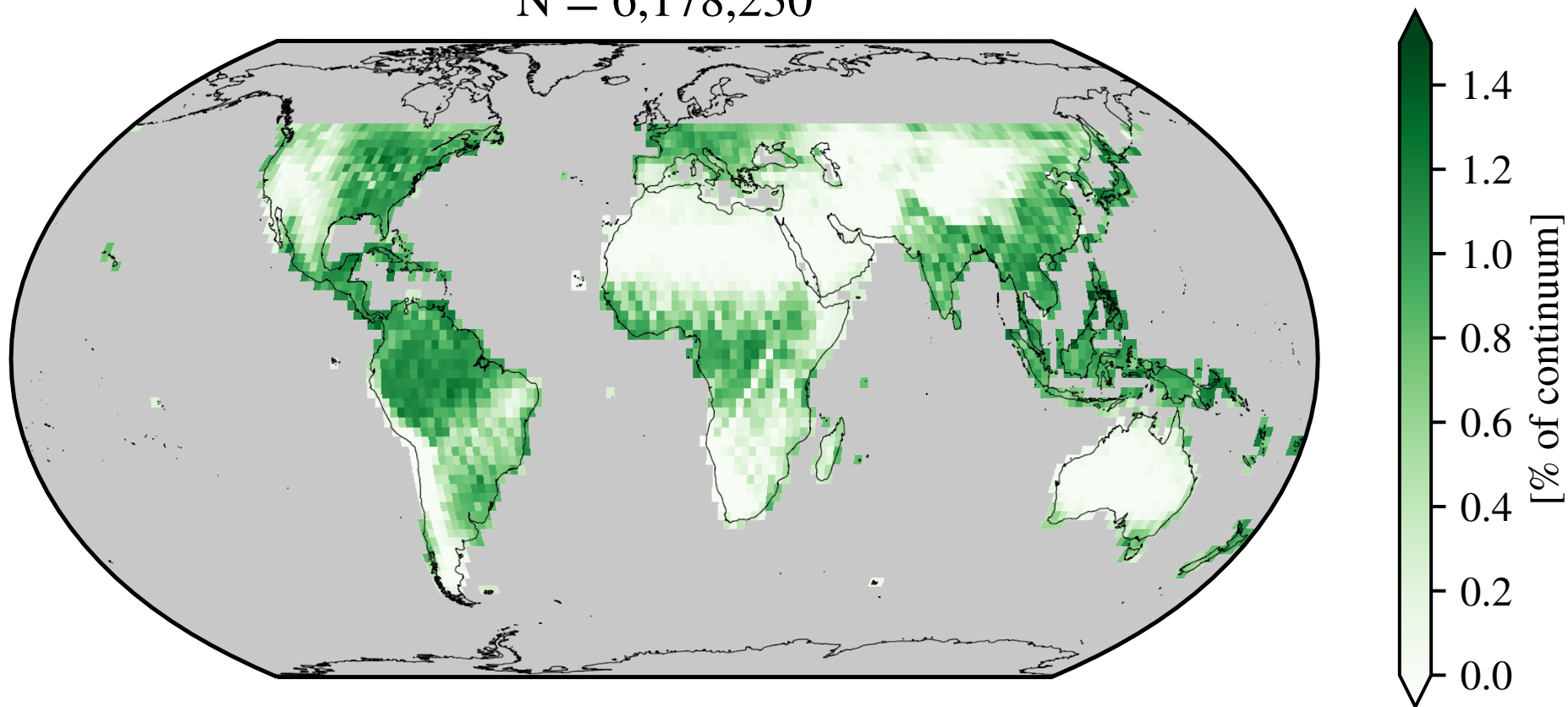


SIF products also available



- OCO-3 SIF appears to be comparable to OCO-2 SIF and will be released with lite files in May.

OCO-3 SIF @ 757nm
N = 6,178,230



- The OCO-3 project has release the vEarly version of science data.
- We are working with a wide range of scientists to evaluate data and use it for science analysis, and look forward to hearing from you.
- We expect an updated version in late 2020, which will address calibration (primarily radiometric) and remaining pointing errors (typically 1-2 km).
- Mission operations team has adapted nearly seamlessly to working from home. Overall, we have very few impacts from remote work across the project.
- The team is running at full speed – OCO-3 has 3 years on the ISS (until August 2022), then another payload will use the location!
- <https://ocov3.jpl.nasa.gov>
- <https://oco.jpl.nasa.gov>