

## **README to go with the OCO-2 L2 data release, March 30, 2015**

Edited by Annmarie Eldering and David Crisp, Jet Propulsion Lab/Caltech

The Orbiting Carbon Observatory (OCO-2) team is delivering the first release of a Level 2 (L2) data product, containing estimates of the column averaged dry air mole fraction,  $X_{CO_2}$ , and other geophysical quantities retrieved from OCO-2 observations. This version of the L2 Product is Build 6.0 (B6). The dataset will commence with a forward processing stream, starting in late March 2015, and progressing into the future. Shortly afterward, this forward stream will be augmented with a backwards processing data stream, starting in late March 2015 moving back to Sept 2014. Initially, the B6 forward processing collection stream will include about a week of data. By the end of April, we expect to have at least two months of data in the backwards processing collection, called B6R, along with a month of B6 data in the forward processing collection.  
(<http://disc.sci.gsfc.nasa.gov/OCO-2/data-holdings>)

The attached image shows a map of the  $X_{CO_2}$  field for March 21-26. This corresponds to a period of nadir data collection and hence with data shown only over land. The gradient between the northern and southern hemispheres is consistent with that measured during the spring with Total Carbon Column Observing Network (TCCON) stations in previous years.

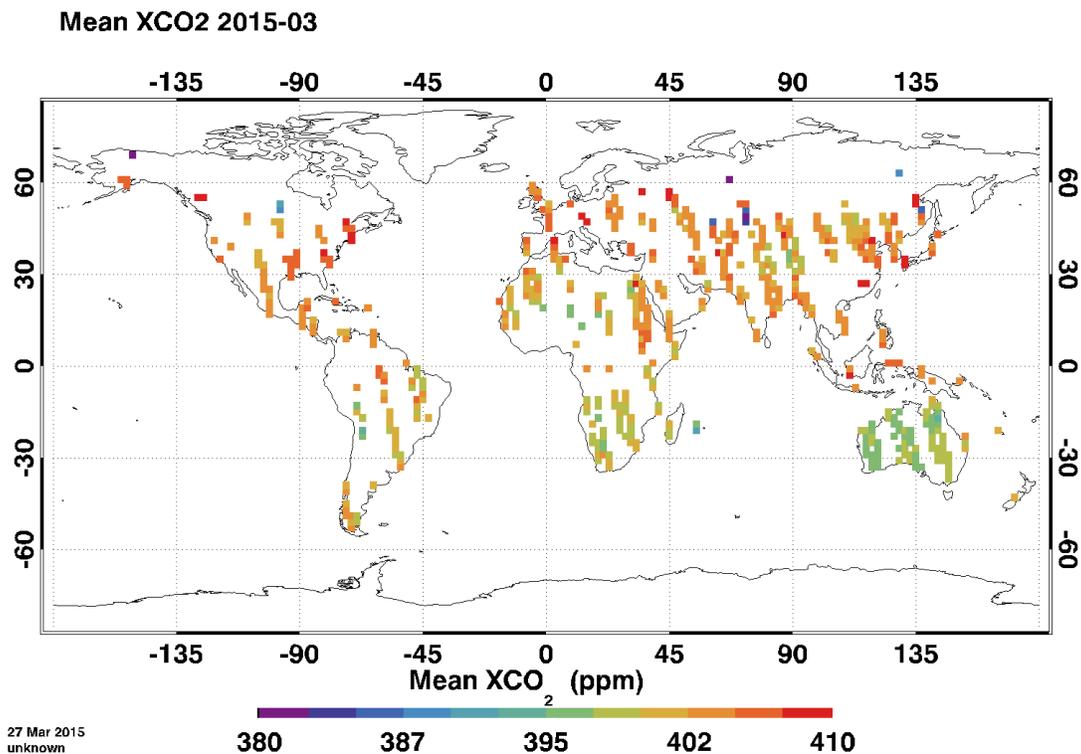
As a fundamental component of the project, OCO-2 data products are and will be compared continuously to TCCON data to evaluate bias and validate the L2 data. As backward reprocessing of the data is completed, an initial estimate of bias and recommended bias correction algorithm will be made available along with a validation report.

Once a bias correction has been established, “lite” files (one file per day) containing a reduced number of fields and a bias corrected  $X_{CO_2}$  product will be available by mid-April at [co2.jpl.nasa.gov](http://co2.jpl.nasa.gov).

User’s will greatly benefit from reading the documentation that has been prepared. Specifically, the Data User’s Guide (DUG) provides an overview of the mission, and information about the key data fields and how to use them. It addresses both the Level 1B (L1b) and L2 data and includes a description of the content of the product files as well as the software interface specification (SIS) documents. The physics of the measurements and the retrieval technique are described in the L2 Algorithm Theoretical Basis Document (ATBD). Similarly, there is an updated ATBD for the L1b data. Users are referred to <http://disc.sci.gsfc.nasa.gov/OCO-2/documentation/oco-2-v6>. Note that as of March 30<sup>th</sup>, the DUG and ATBD updates are slightly delayed – they are useful, but users are referred to the SIS documents for the most accurate data tables.

Users will note that there are two data collections for OCO-2, V6 and V6R. The v6 is a forward processing data stream, and the calibration terms (gain coefficients, temperature dependence, dark subtraction) are estimated from past data. In the reprocessing collection (V6R), the calibration data is estimated from the full timeseries of data (before, during, and after the measurements), and is expected to be of slightly higher quality.

We strongly recommend that users consider the warn levels assigned to each retrieved sounding (see the L2 ATBD). We recommend using nadir data with warn levels equal to or less than 8, and glint data with warn levels less than or equal to 11. Currently, due to unexpected bad spectral samples, we also recommend using a  $\chi^2$  filter of 5 in the weak band and 4 in the strong band. We have noted that the throughput may reduce with time, as instrument changes over time are not completely reflected in the calibration data. The  $\chi^2$  filters are designed to identify data impacted by improper specification of bad spectral samples. Issues associated with this will be addressed in future reprocessing of the data.



Map of the XCO<sub>2</sub> estimates from OCO-2 for the period March 22- 26, 2015.