Brewer-OMI validation

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Overview

Ozone, UV, and AOD data for the XRBCCE campaign at El Arenosillo in May 25th to June 5th 2015

OMI data from the "El Arenosillo" station overpass file available at the Aura Validation Data Center (http://avdc.gsfc.nasa.gov)

Brewer data within 30 minutes of each OMI observation

Relative difference = $\frac{X_{\text{Brewer}} - X_{\text{OMI}}}{(X_{\text{Brewer}} + X_{\text{OMI}})/2} 100$

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Data at EUBREWNET's server

Ozone data levels:

0) All data from B files

1) Counts from B files, configurations in the server, ozone processed with the Brewer Python Module

1.5) L1 data with cloud, airmass, and Hg filters, plus standard lamp, filter, and stray-light corrections

2) Ozone processed using configurations which have been validated

Data at EUBREWNET's server

Ozone data levels:

0) All data from B files

1) Counts from B files, configurations in the server, ozone processed

Brewer operators should check the configurations at the server

1.5) L1 data … us standard lamp, filter, …

2) Ozone processed using configurations which have been validated

Data at EUBREWNET's server

UV data levels:

0) Data from UV and UVR files, processed with the Brewer Python Module

1)

1.5)

2)

In development by K. Lakala and S. León, see the UV talks tomorrow

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Data at EUBREWNET's server

AOD data:

Beer-Lambert-Bouguer equation
+ EUBREWNET’s ozone L1.5 product
+ parameters determined at calibration campaigns
+ calibration by Langley plots or transfer from reference Brewer

Some preliminary results, see the talks by T. Carlund and myself later today and tomorrow

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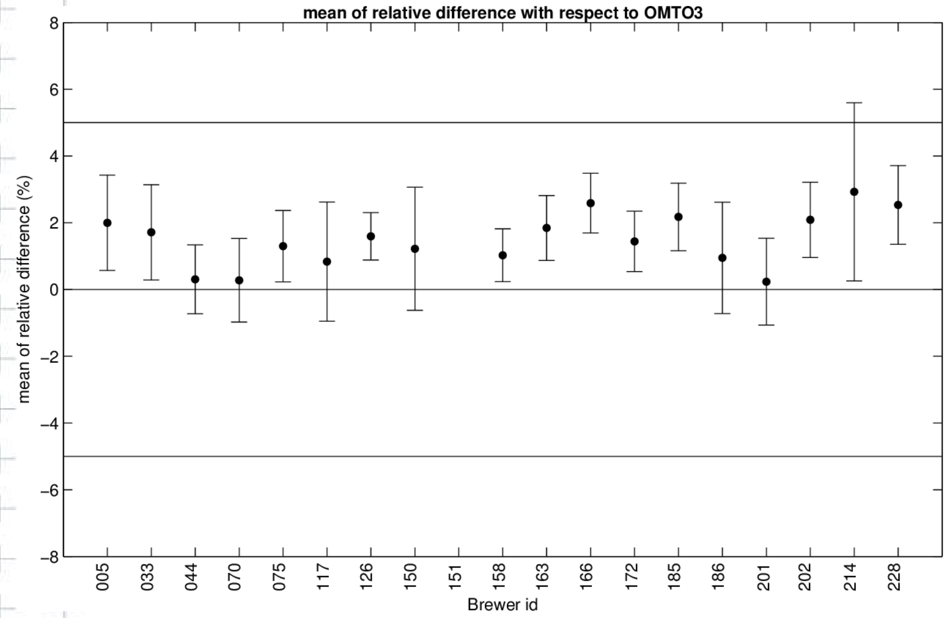
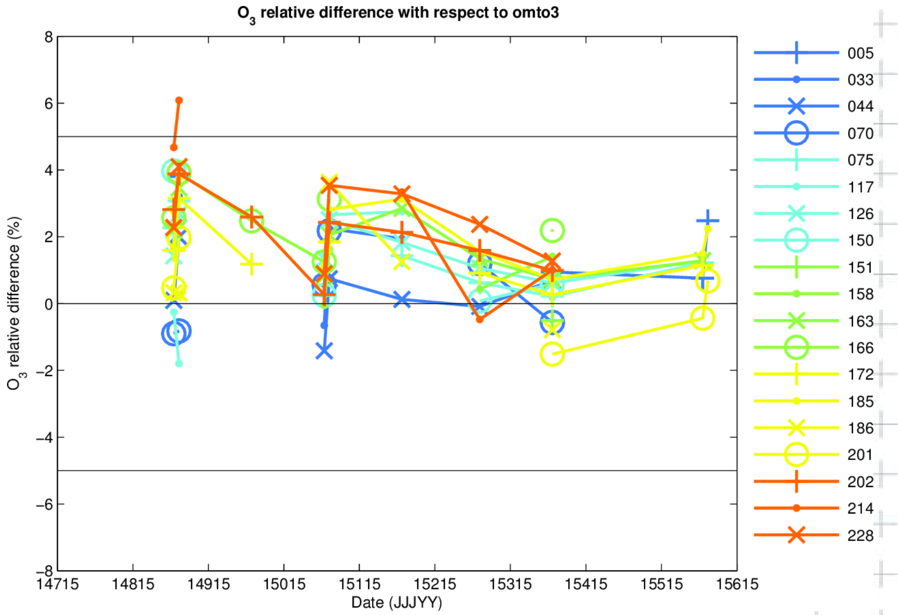
Ozone: EUBREWNET's L1.5 vs OMI's OMTO3

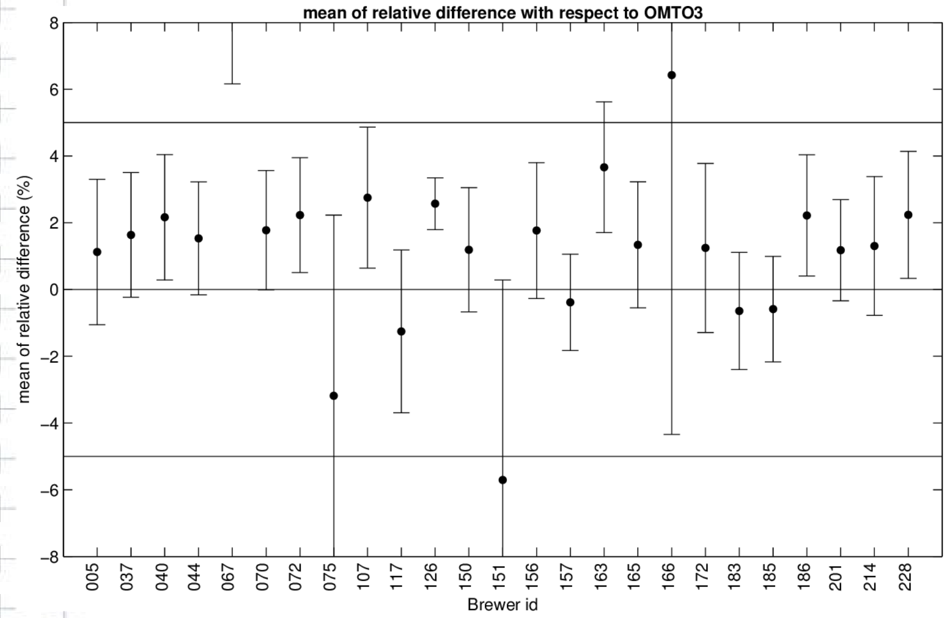


Mean over the whole campaign for each Brewer

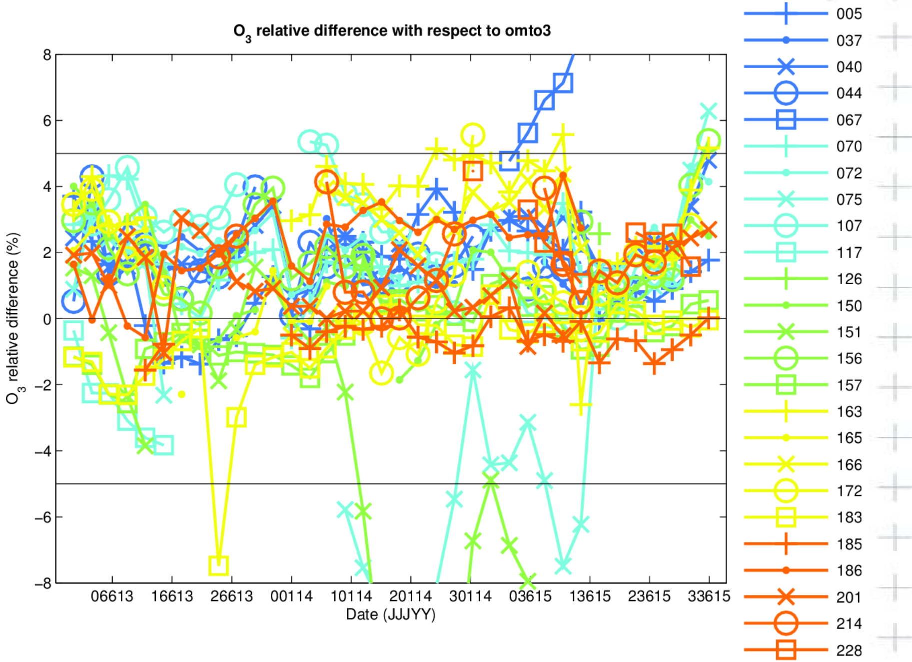


Simultaneous Brewer-OMI data

Ozone 2013-2015: EUBREWNET's L1.5 vs OMI's OMTO3

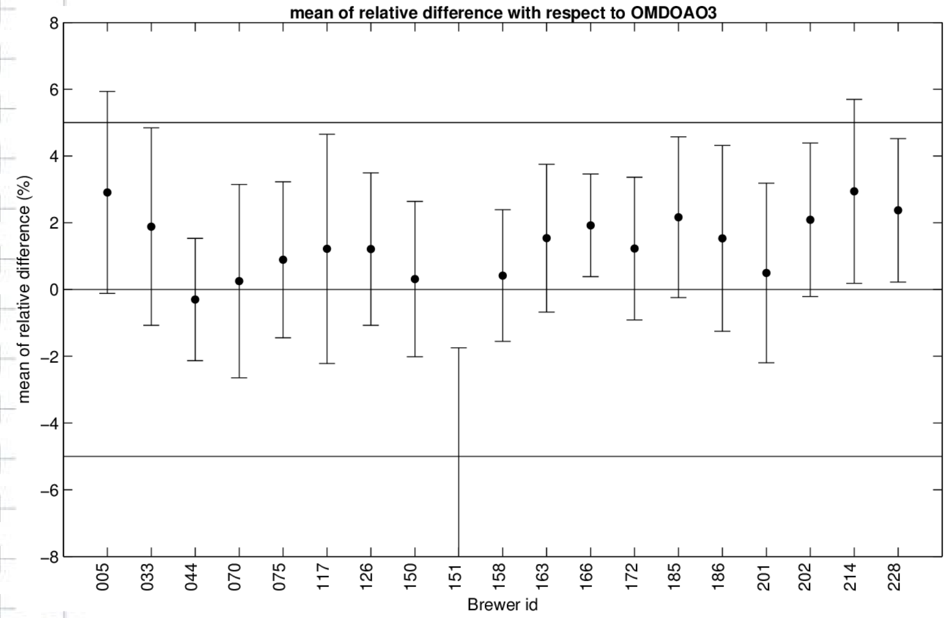


Mean over the whole period for each Brewer

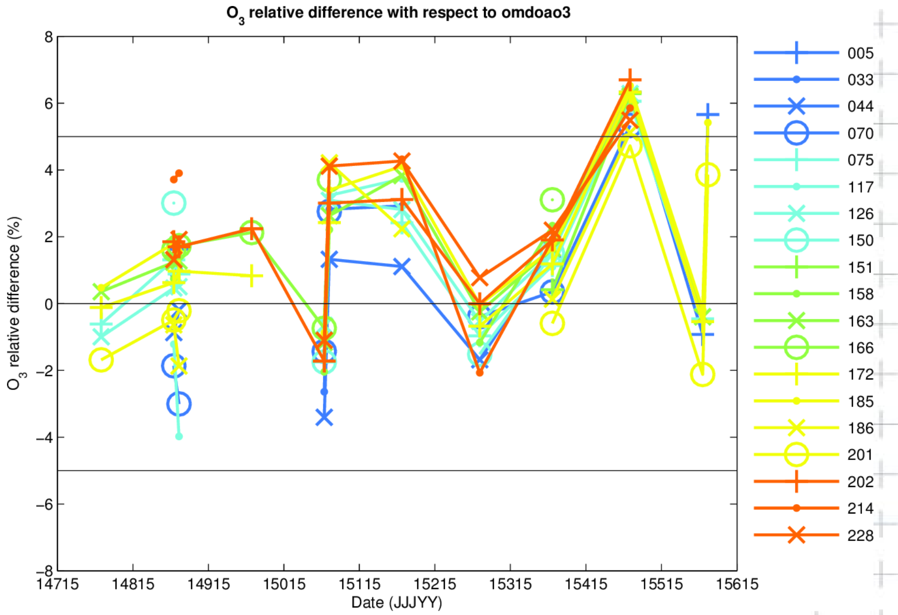


Simultaneous Brewer-OMI data

Ozone: EUBREWNET's L1.5 vs OMI's OMDOAO3

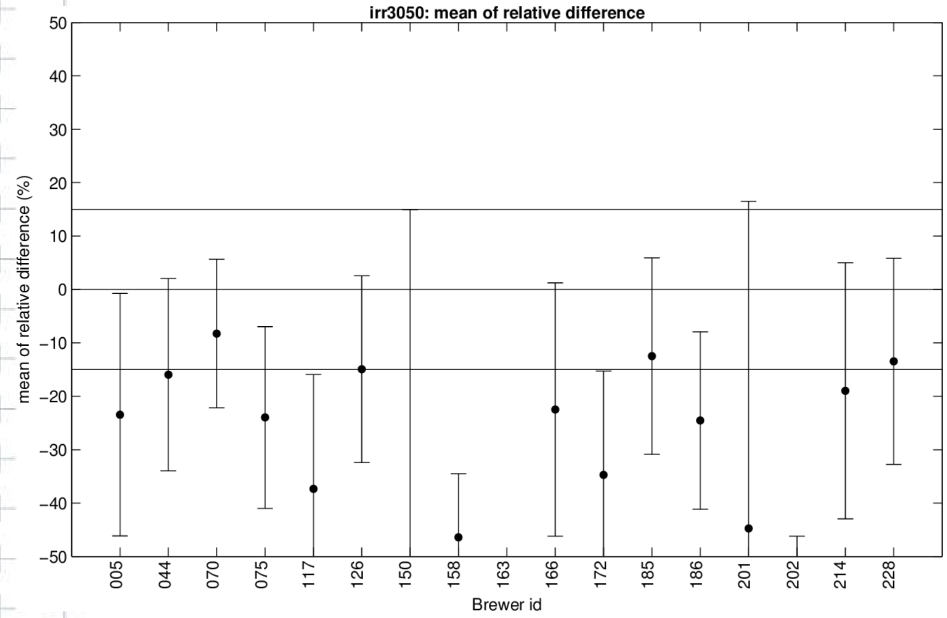


Mean over the whole campaign for each Brewer

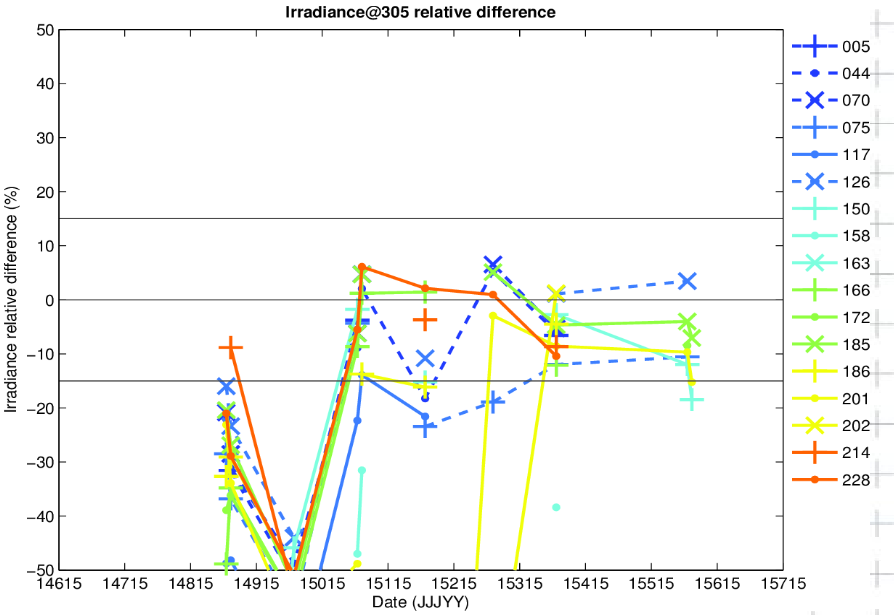


Simultaneous Brewer-OMI data

Irradiance at 305nm: EUBREWNET's L0 vs OMI's OMUVB

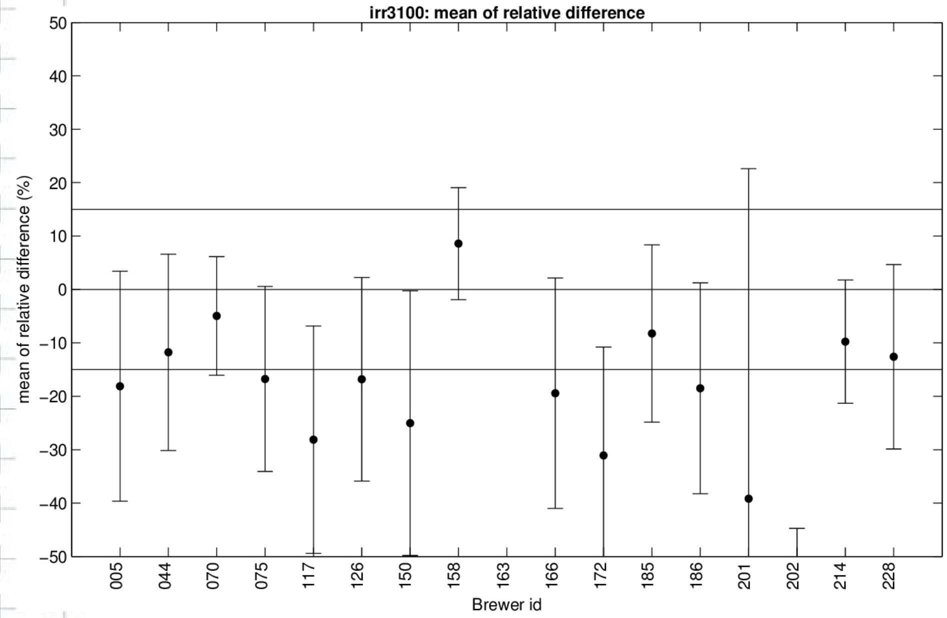


Mean over the whole campaign for each Brewer

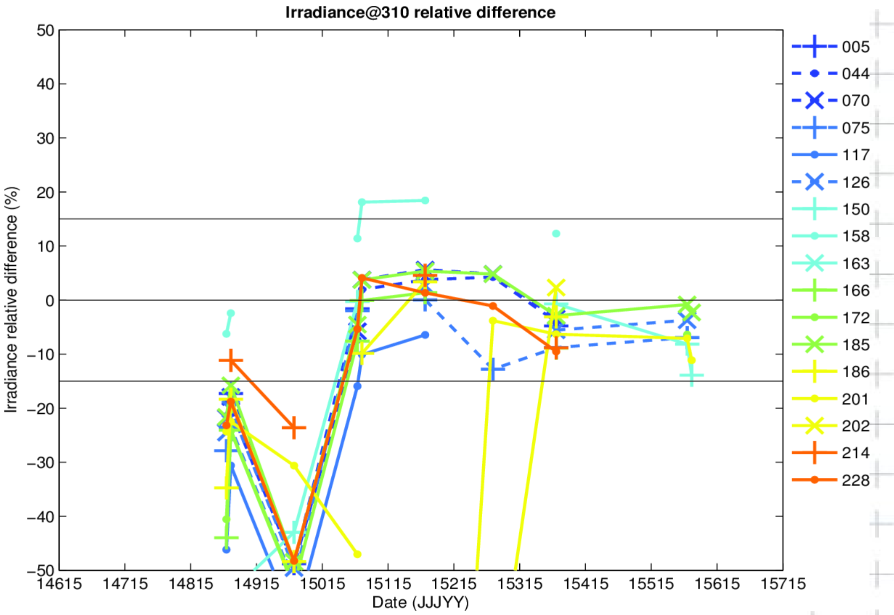


Simultaneous Brewer-OMI data

Irradiance at 310nm: EUBREWNET's L0 vs OMI's OMUVB

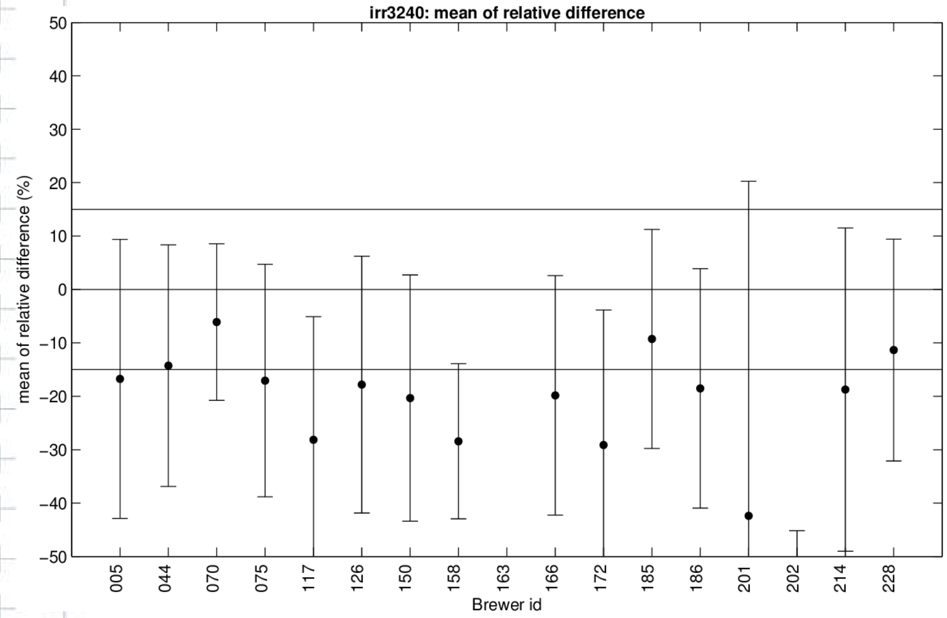


Mean over the whole campaign for each Brewer

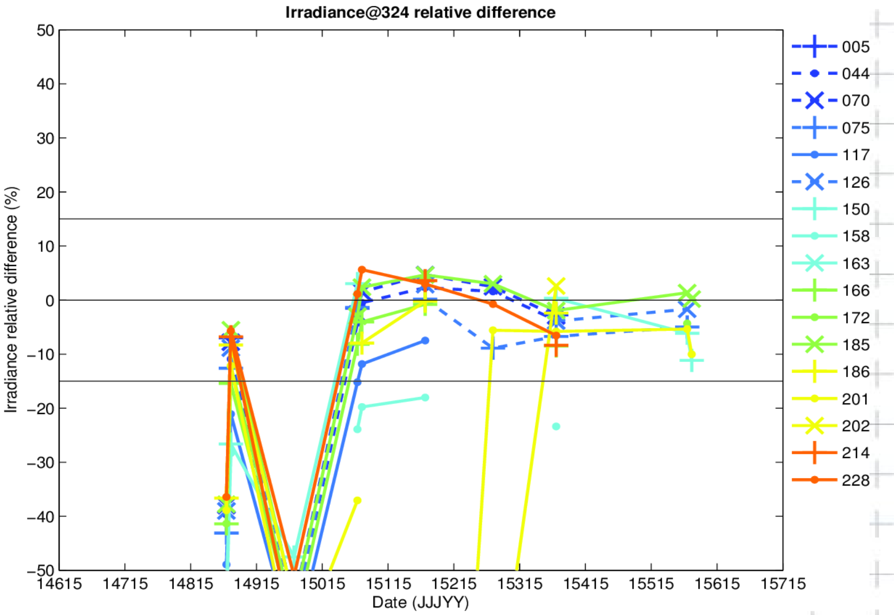


Simultaneous Brewer-OMI data

Irradiance at 324nm: EUBREWNET's L0 vs OMI's OMUVB

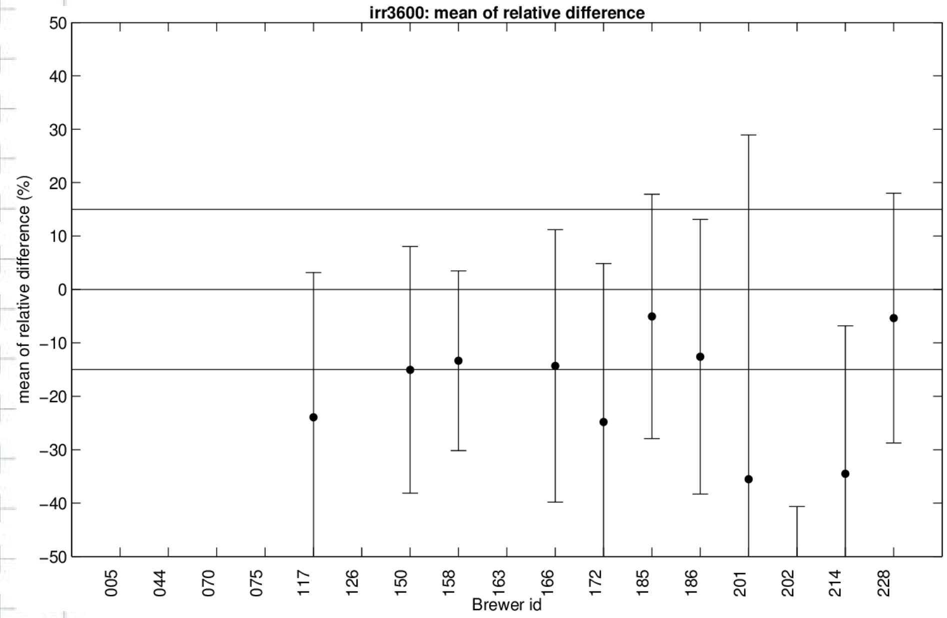


Mean over the whole campaign for each Brewer

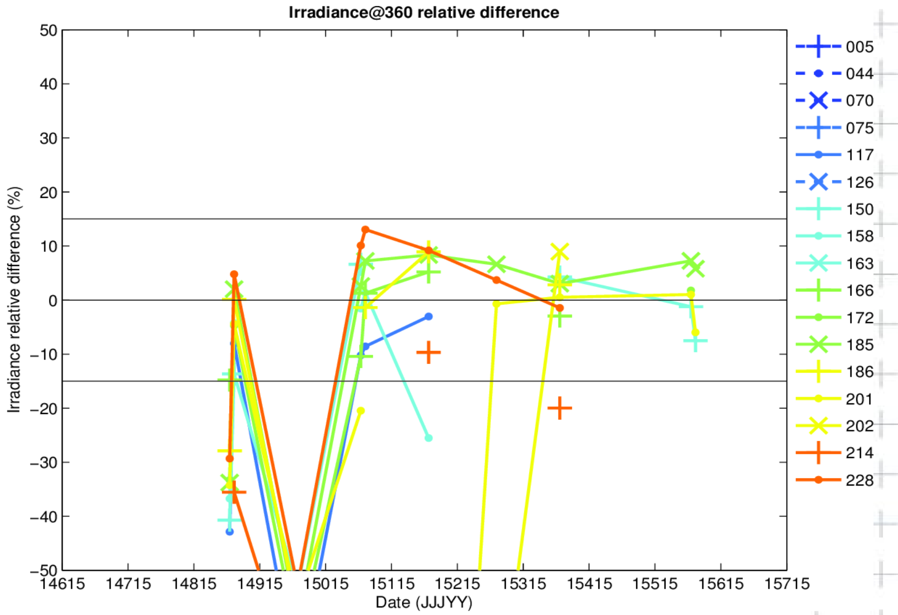


Simultaneous Brewer-OMI data

Irradiance at 360nm: EUBREWNET's L0 vs OMI's OMUVB

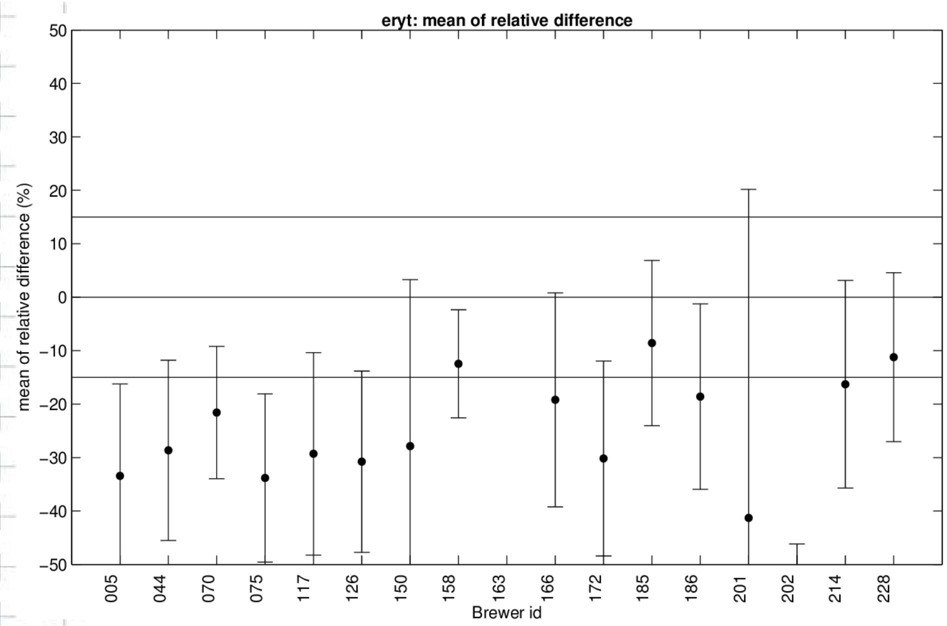


Mean over the whole campaign for each Brewer

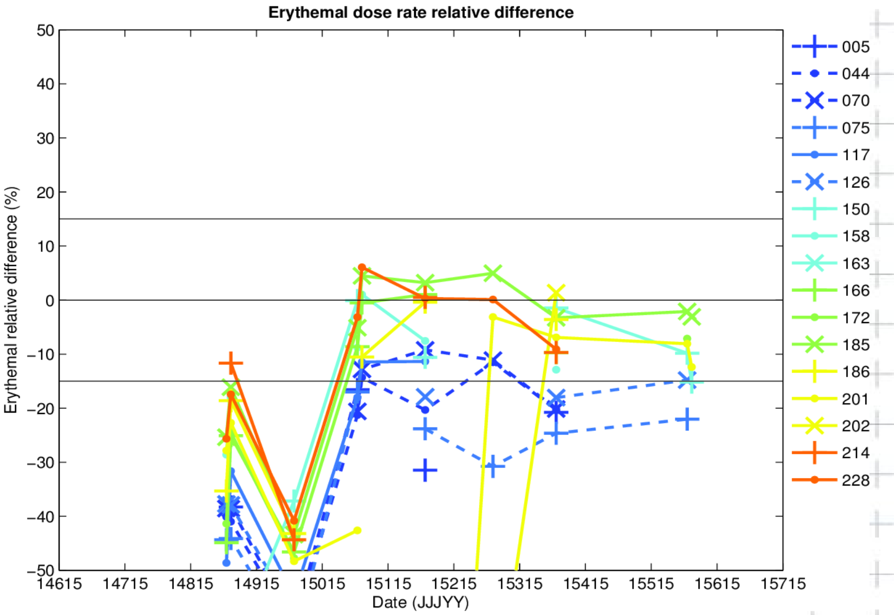


Simultaneous Brewer-OMI data

Erythemal dose rate: EUBREWNET's L0 vs OMI's OMUVB



Mean over the whole campaign for each Brewer



Simultaneous Brewer-OMI data

AOD 320.1nm: preliminary data vs OMI's OMAERUV

OMAERUV data filtering

```
#file: satellite_aura_omi_l2ovp_omaeruv_izana.h5
#date        time        aod354 flag  lat     lon        std      std(flag==0)
16-Apr-2016 14:12:27   0.7019  0     28.1509 -16.7922    1.6722   0.1549
16-Apr-2016 14:12:27   3.9254  1     28.2487 -16.4128    1.6722   0.1549
16-Apr-2016 14:12:29  0.41363  0     28.2699 -16.8289    1.6722   0.1549
16-Apr-2016 14:12:31  0.65605  0     28.3888 -16.8659    1.6722   0.1549
17-Apr-2016 14:55:14 0.013323  0     28.0111 -16.7419   0.98259   0.5138
17-Apr-2016 14:55:16  0.24081  0     28.1318 -16.7665   0.98259   0.5138
17-Apr-2016 14:55:18  0.56163  0     28.2525  -16.791   0.98259   0.5138
17-Apr-2016 14:55:18   2.7109  1      28.266 -16.3759   0.98259   0.5138
17-Apr-2016 14:55:20   1.3476  0     28.3733 -16.8155   0.98259   0.5138
17-Apr-2016 14:55:22  0.75385  0     28.5075 -16.4241   0.98259   0.5138
```

→ Remove groups of observations with std(flag==0)>0.1

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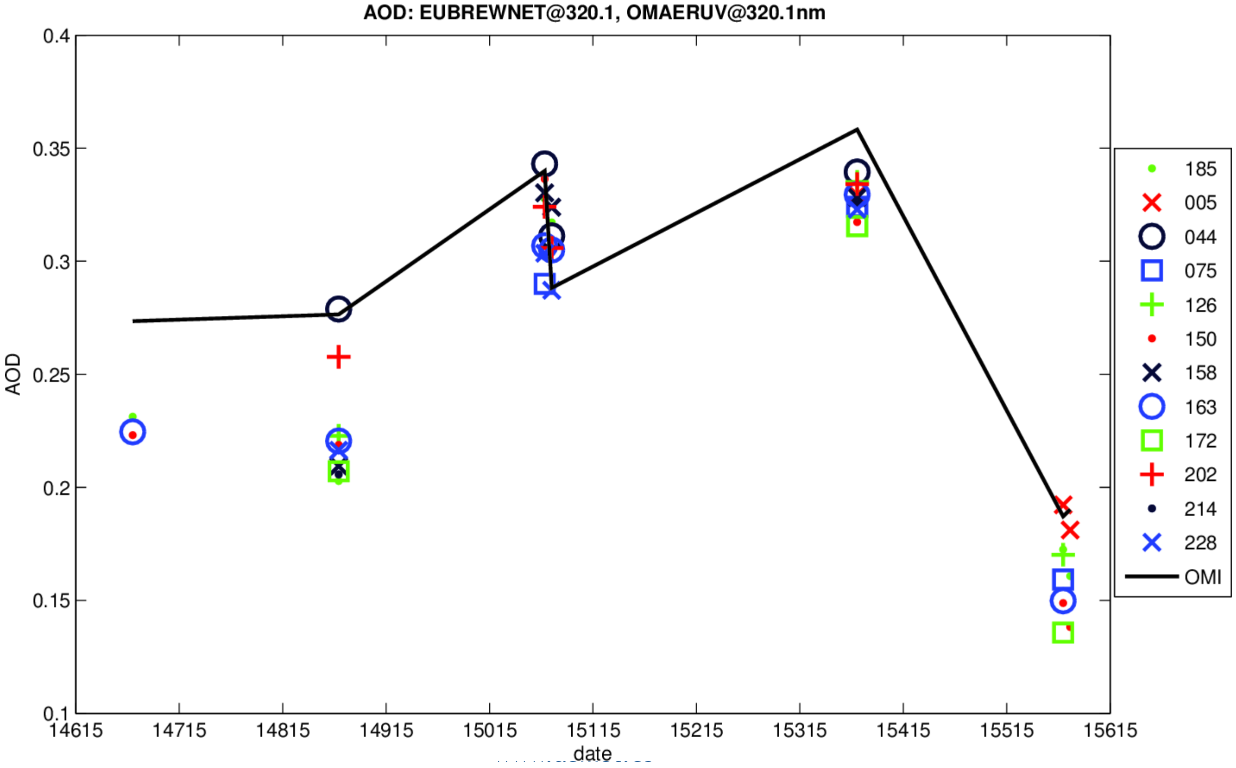
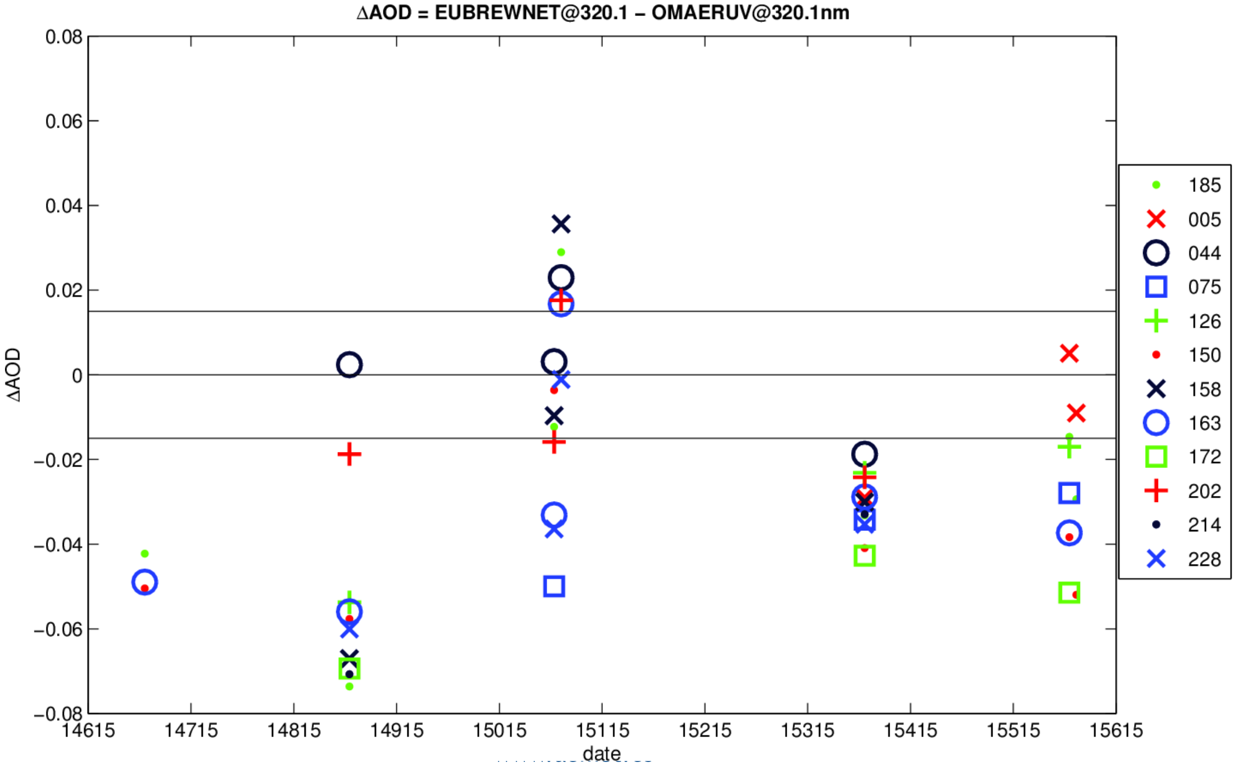
AOD 320.1nm: preliminary data vs OMI's OMAERUV (2)

OMAERUV@354nm extrapolated to 320.1nm with 354-500nm Ångström exponent



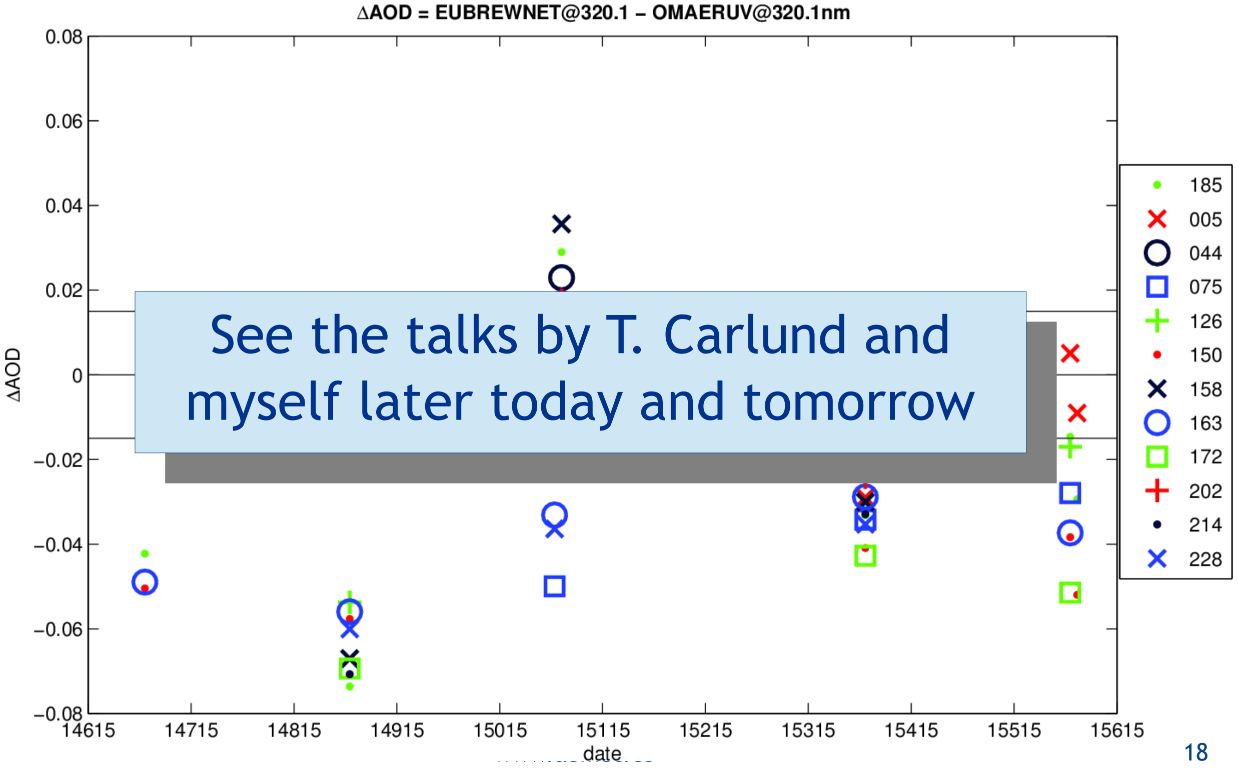
AOD 320.1nm: preliminary data vs OMI's OMAERUV (3)

OMAERUV@354nm extrapolated to 320.1nm with 354-500nm Ångström exponent



AOD 320.1nm: preliminary data vs OMI's OMAERUV (3)

OMAERUV@354nm extrapolated to 320.1nm with 354-500nm Ångström exponent



See the talks by T. Carlund and myself later today and tomorrow

Closing remarks

Ozone L1.5 *vs.* OMTO3/OMDOAO3 L2: relative differences lower than ~5%

UV L0 *vs.* OMUVB L2: relative differences lower than ~15%

AOD preliminary results *vs.* OMAERUV L2: differences lower than ~0.06

Brewer operators should check the configurations at EUBREWNET's server

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AOD 320.1nm: preliminary data vs OMI's OMAERUV (3)

Brewer ID	No. obs.	Lin. Reg. slope	Lin. Reg. intercept	Lin. Reg. r2	Pearson's corr.
005	3	0.839	0.028	0.993	0.997
044	4	0.691	0.100	0.841	0.917
075	3	0.922	-0.014	0.990	0.995
126	3	0.958	-0.020	0.947	0.973
150	6	1.121	-0.073	0.956	0.978
158	4	1.030	-0.027	0.476	0.690
163	6	1.068	-0.051	0.866	0.931
172	3	1.047	-0.067	0.979	0.990
185	7	1.011	-0.028	0.819	0.905
202	4	0.753	0.068	0.772	0.879
214	2	1.462	-0.198	1.000	1.000
228	4	1.001	-0.033	0.727	0.925

Ozone 2013-2015: EUBREWNET's L1.5 vs OMI's OMDOAO3