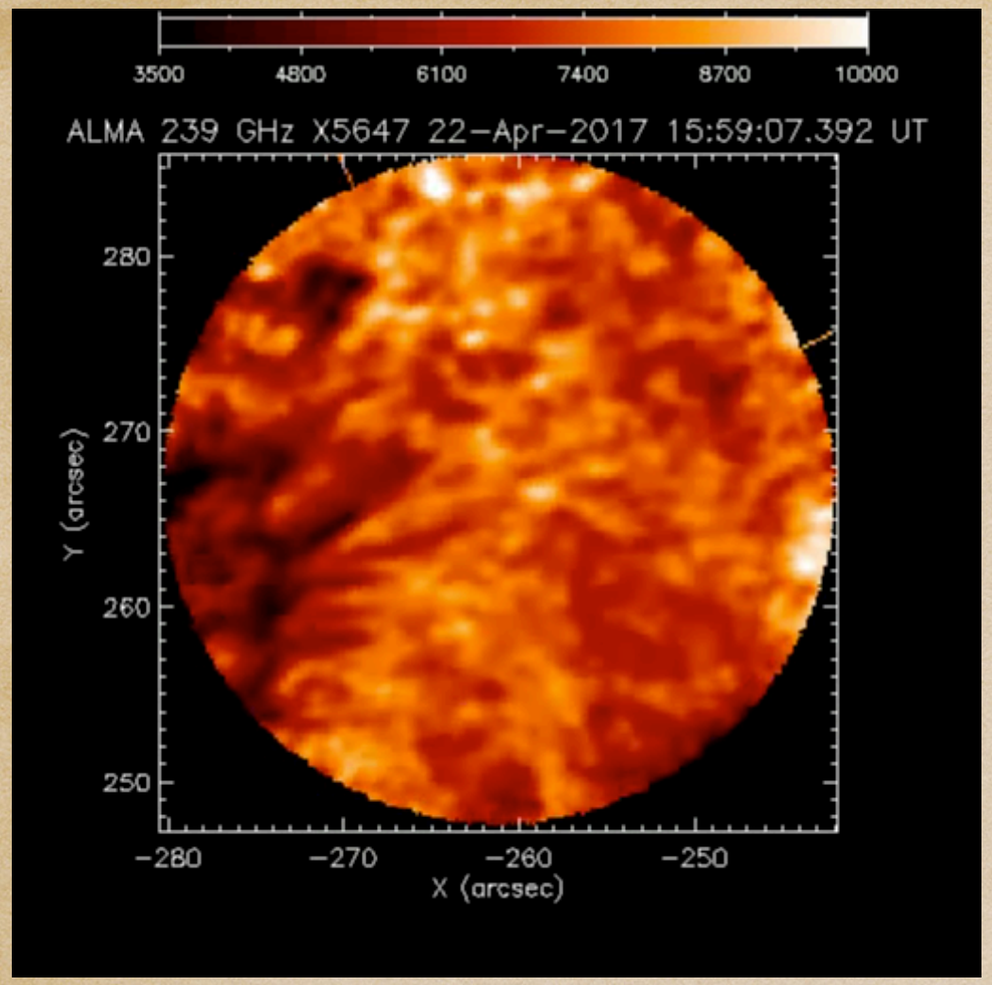
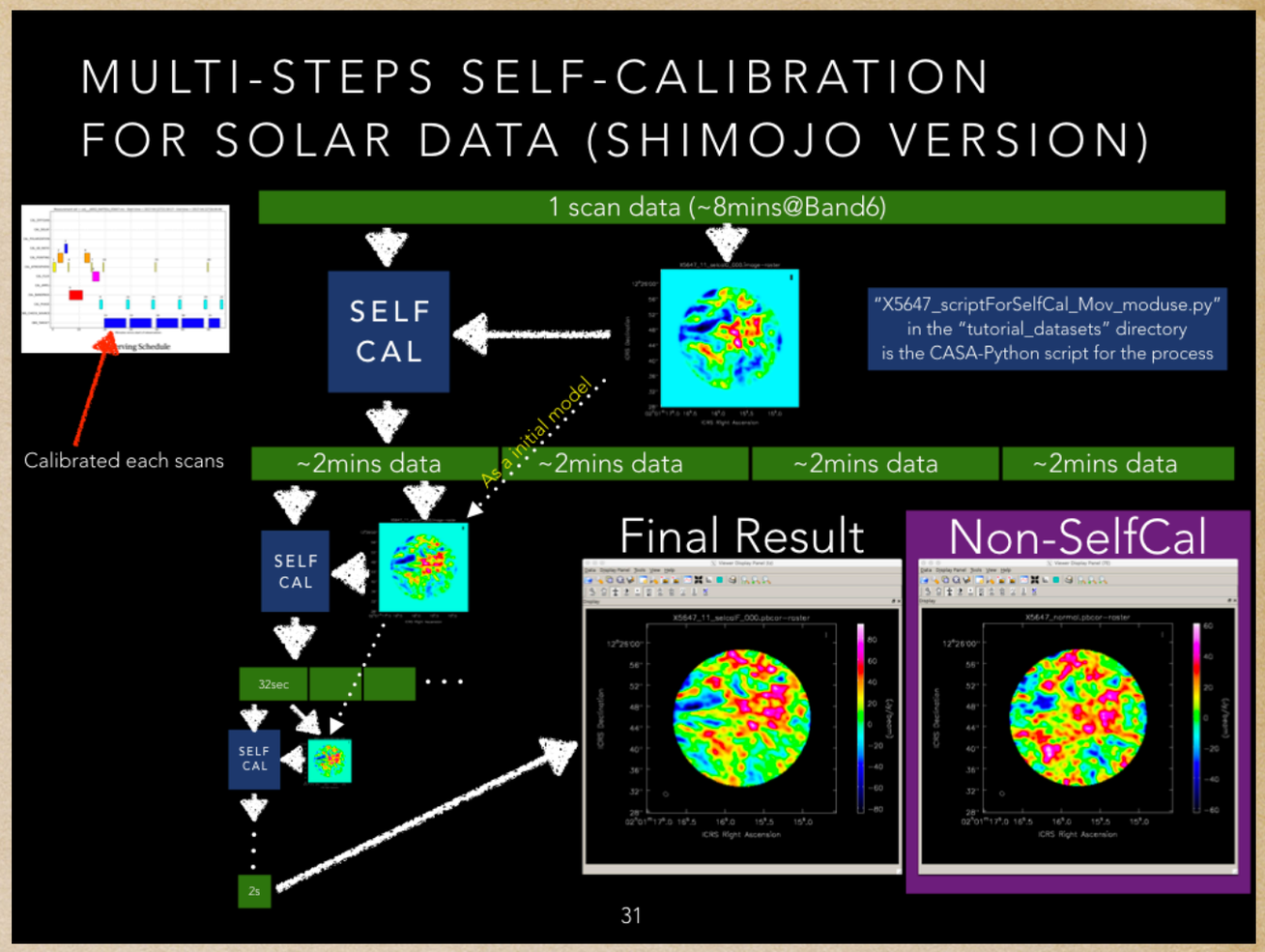
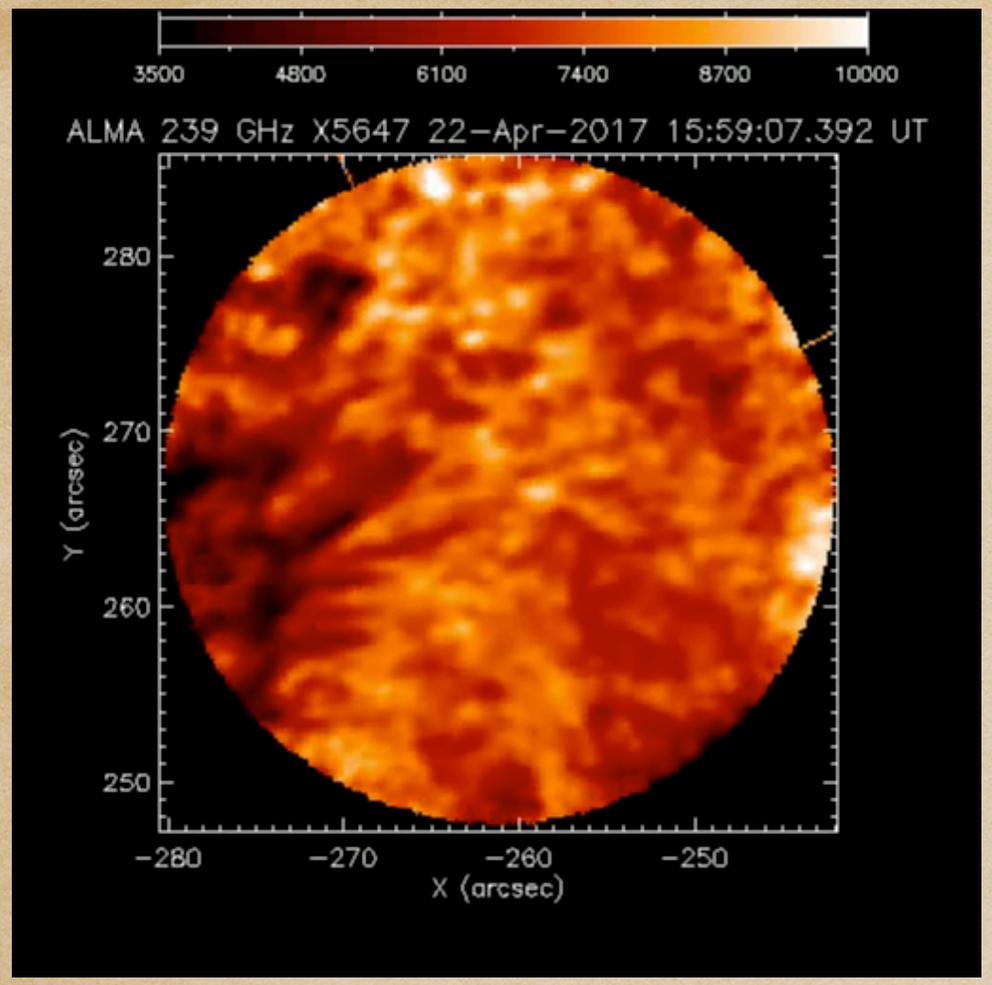


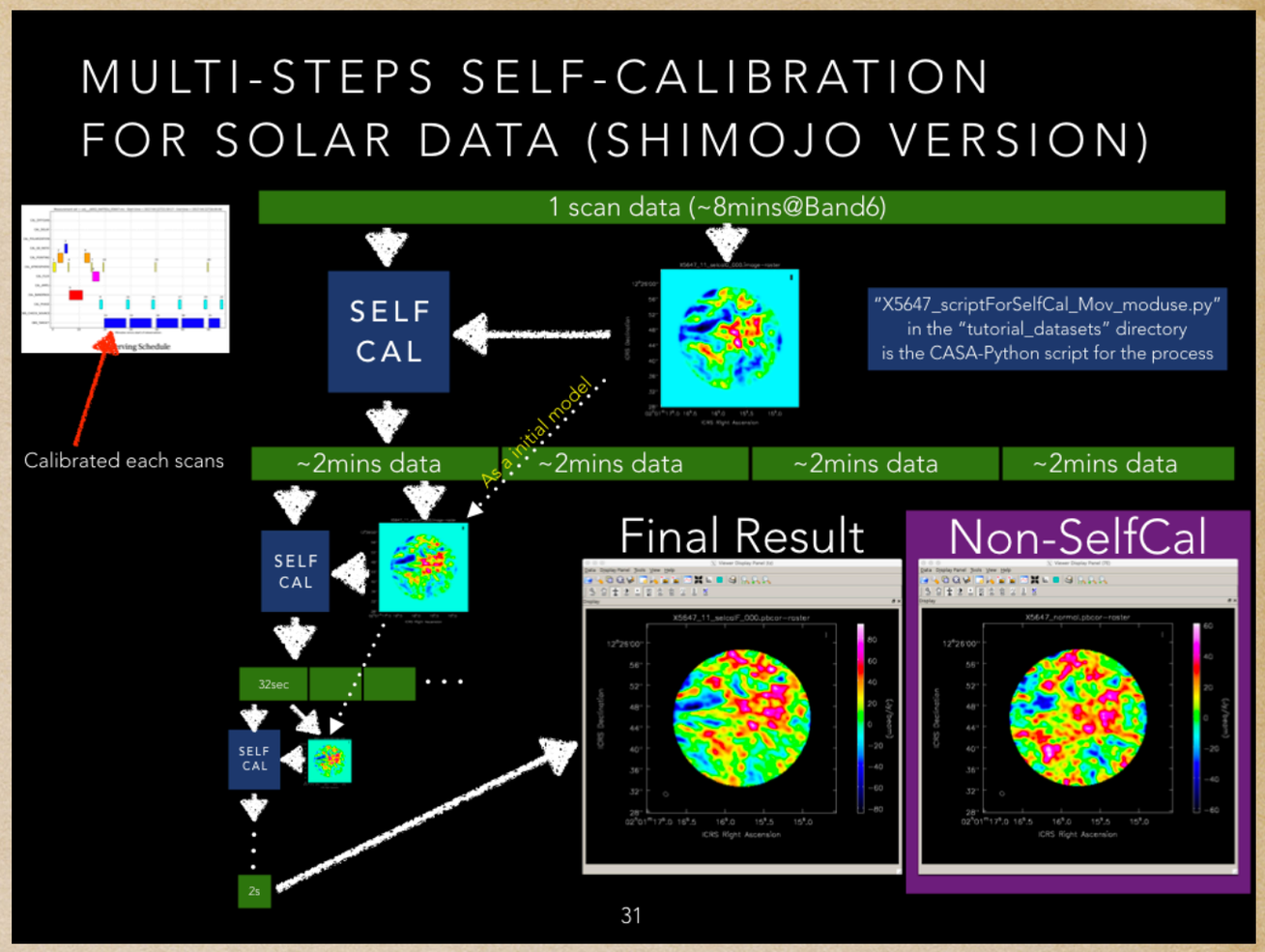


Status report of the development of solar image synthesis From EA-ARC

Masumi Shimojo
National Astronomical Observatory of Japan

2020/03/02 1st International Workshop on Solar Imaging with ALMA@RoCS/UiO, Norway





Status report of the development of solar image synthesis

~~From EA ARC~~ 👉 From Shimojo

Masumi Shimojo

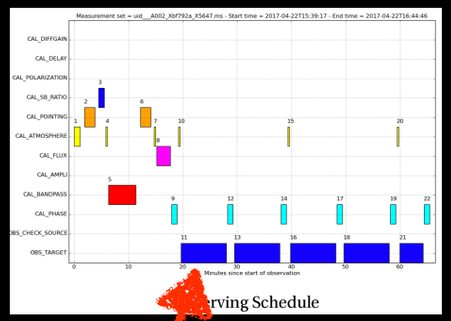
National Astronomical Observatory of Japan

2020/03/02 1st International Workshop on Solar Imaging with ALMA@RoCS/UiO, Norway

Topics

- Multistep Self Calibration on CASA
  - Method (It is based on Tim's script)
  - Results (good and no-good)
- The Image database of Cycle 4 Solar Obs.

MULTI-STEPS SELF-CALIBRATION FOR SOLAR DATA (SHIMOJO VERSION)

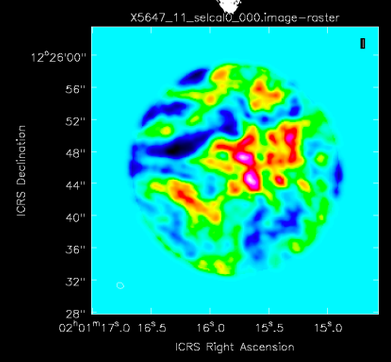


rving Schedule

Calibrated each scans

1 scan data (~8mins@Band6)

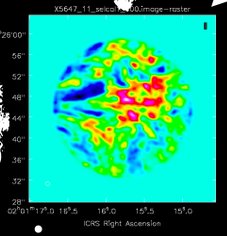
SELF CAL



As a initial model

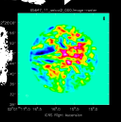
~2mins data | ~2mins data | ~2mins data | ~2mins data

SELF CAL



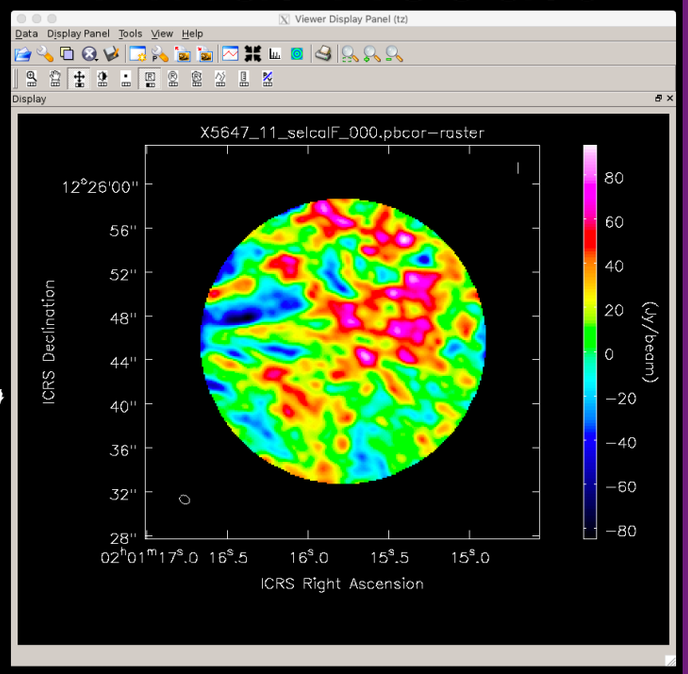
32sec

SELF CAL

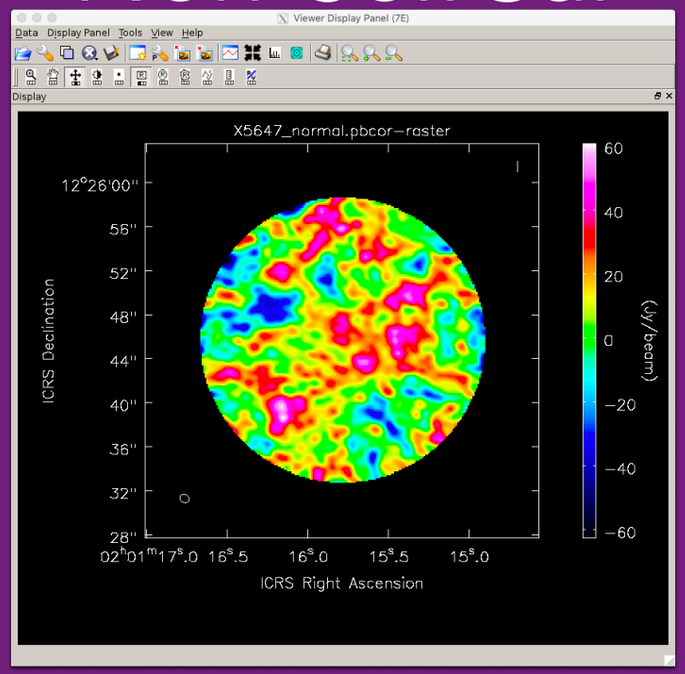


2s

Final Result



Non-SelfCal

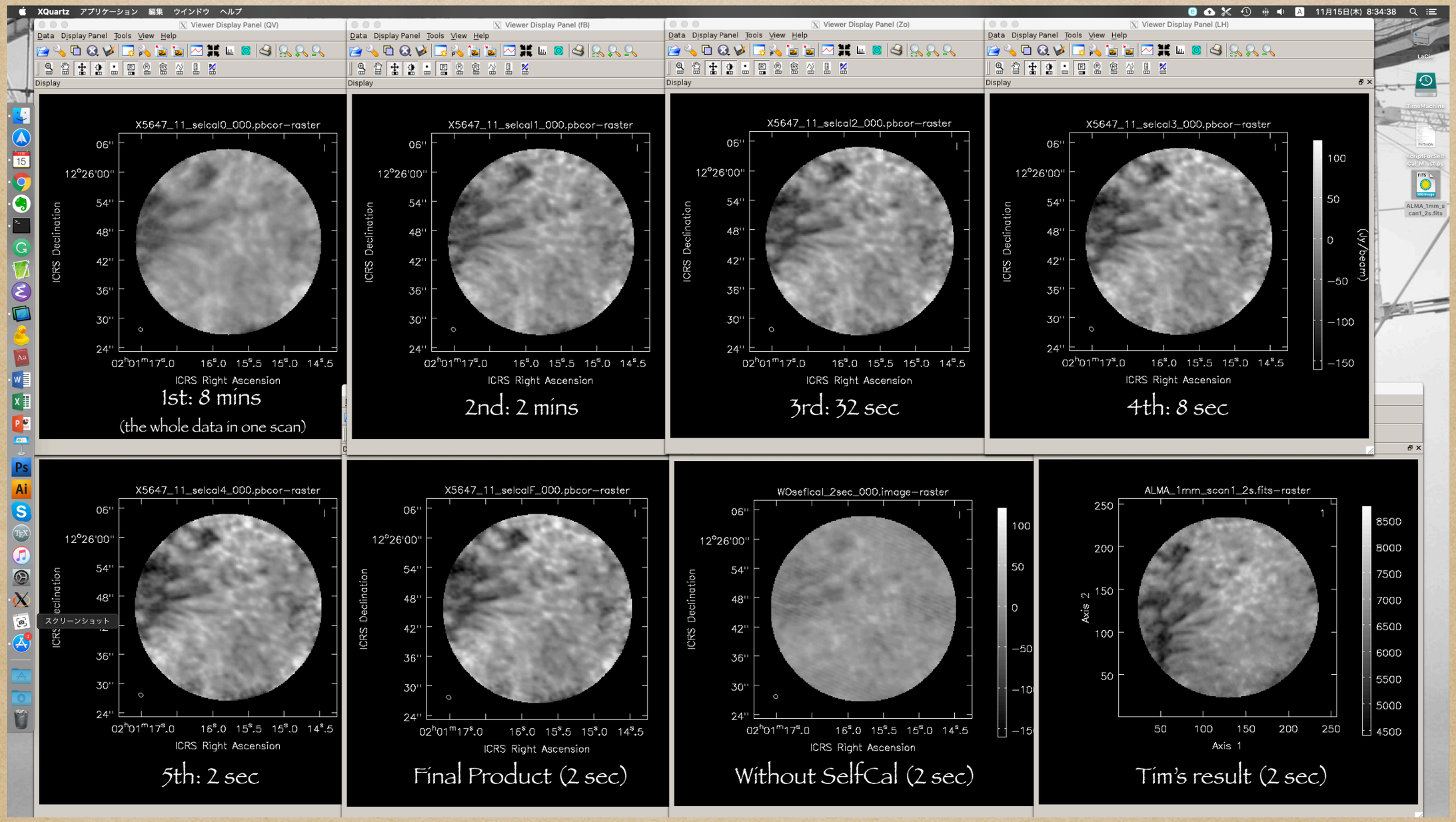


Details of my 5-steps Self Calibration

- 5-steps Self Calibration
  - CASA ver. : 5.4.0 or later.
  - "Analysis Utility" package is required.
  - CLEAN with "clark" algorithm in most cases. (Sometimes "multiscale" is used.)
  - Gridder : "mosaicft" because we use the data taken with both 7m and 12m antennas.
  - The duration of the data for synthesizing one image.
    - 1st step: using the whole data in one scan (10min@band3, 8min@band6)
    - 2nd step : ~2 mins, 3rd step: ~32 sec, 4th step : ~8 sec, 5th step(Final) : 2 sec.
      - I applied the method only to the data take in Cycle 4, yet.
- Threshold for suspending "CLEAN": 2 Jy/beam
- Maximum # of iteration in each step: 50,000
  - The iteration number is not enough to converge at 1st, 2nd, and 3rd step.
- Weighting: briggs with "robust =1.0"
- Gain of CLEAN: 0.025
- Since 2nd-step, the synthesized images created in the previous step is used as the "startmodel".
- The method calibrates only "Phase".
- The CASA script can be get from the URL http://bit.do/fvnTE.

Interim images in the 5-steps SelfCal

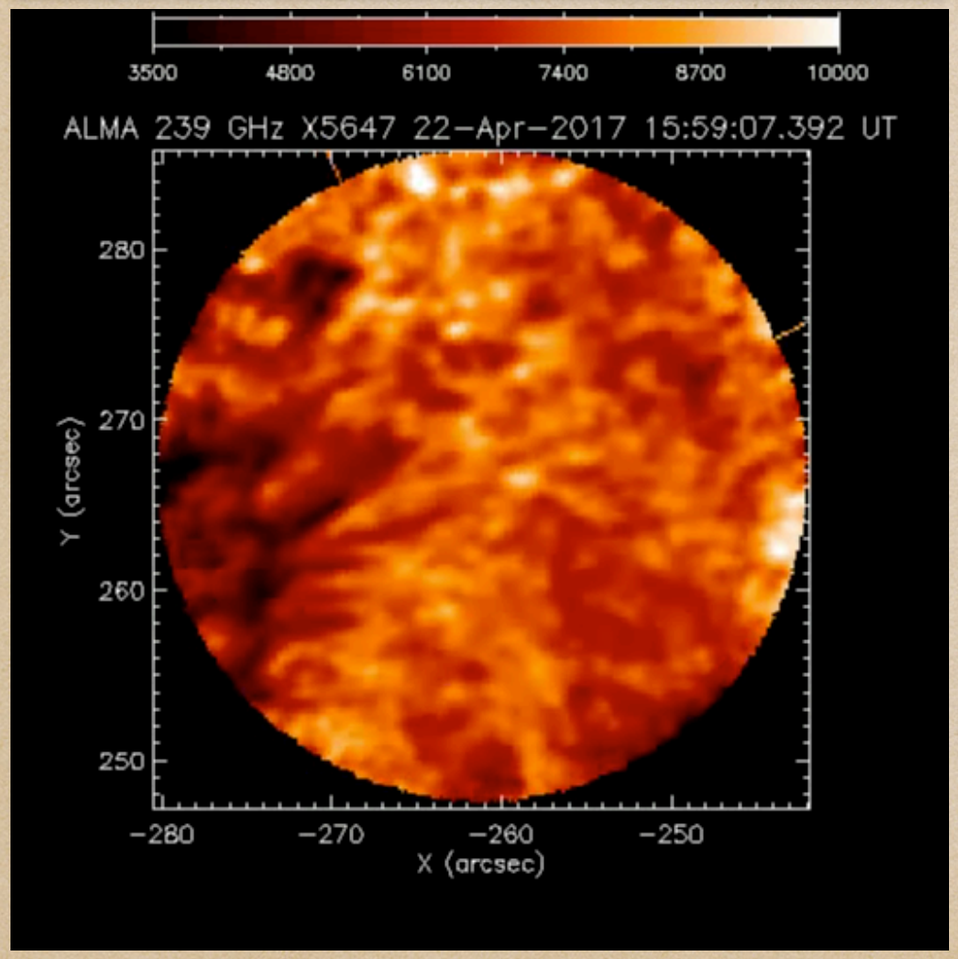
Project ID: 2016.1.00050.S, PI: Bart De Pontieu, EB ID: uid://A002/Xbf792a/X5647, Band6/Single-pointing



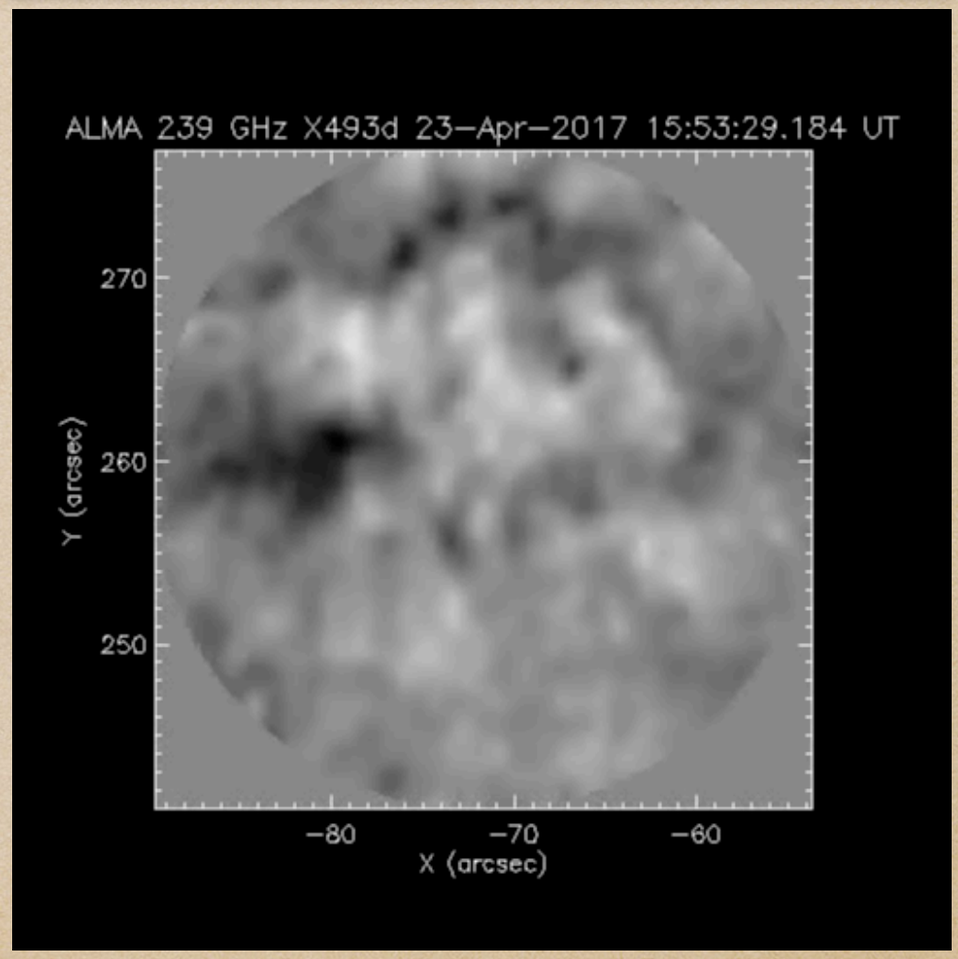
Note: The color scale in the images are the same, except for Tim's result.

Succeeded and Unsucceeded examples of 5-steps Self Calibration

Succeeded Example
Project ID: 2016.1.00050.S, PI: Bart De Pontieu,
EB ID: uid://A002/Xbf792a/X5647, Band6



Unsucceeded Example
Project ID: 2016.1.01129.S, PI: Kevin Reardon
EB ID: uid://A002/Xbf894a/X493d, Band6

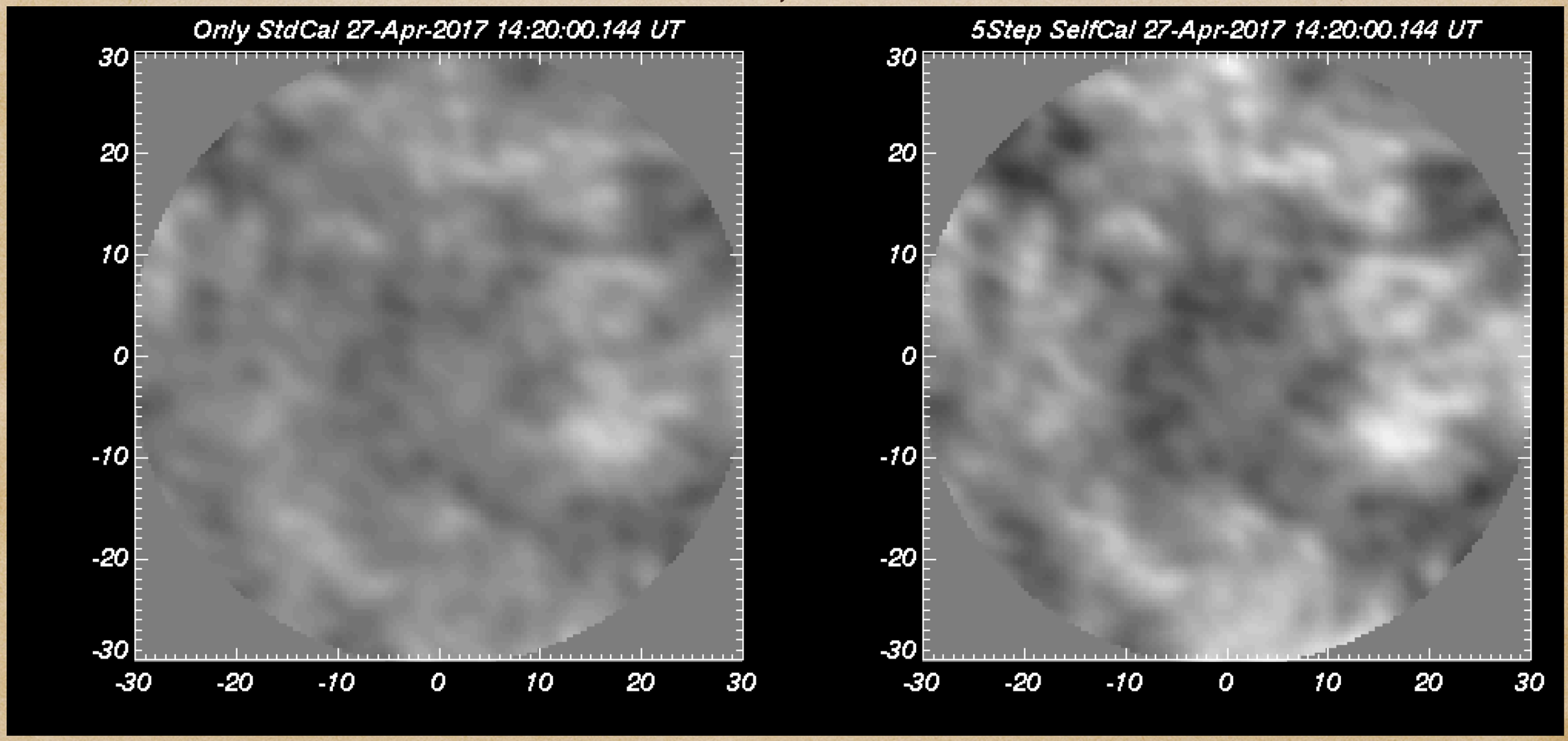


I do not apply the method to MOSAIC observations, *yet*.

The method do not show significant improvement for Band3 data.

Project ID: 2016.1.01532.S, PI: Bin Chen, EB ID: uid://A002/Xbfb22d/X53da, Band3/Single-pointing

Contrast is increased, but there is no significant improvement in structures.
It might be caused by the smaller atmospheric effect for Band3 than for Band6.



Note: The color scale in the images are the same.

ALMA-SOL-CDAW19

A domestic ALMA Workshop supported by the EA-ARC in January 2019.

ALMA-Cycle4 DB (incomplete)

http://bit.do/fvnQR

ALMA-Cycle 4: Solar Projects and Actual Observations

ファイル 編集 表示 挿入 表示形式 データ ツール アドオン ヘルプ 最終編集: 2019年9月2日

共有

uid://A002/Xbfb22d/X53da

	ID	Observing Date (First Obs.)	Source name	INT/TP	SP or MOSAIC	Target	Band	Antenna Configuration	Release date	Archive URL	EB ID	Observing Period (Only Scinece Scans)	Reference Time	Heliocentric Coordinate of FoV Center at Ref. Time (XCEN, YCEN)	QL Image URL (QA2 Product)	QL Movie URL with CASA 5.3.0 (with Bug)	CASA 5.4.0 Movie (w/m-SelCal)	Deconvolution method (for 5.4.0)	Combine with TP data	IRIS URL	Hinode QL URL	Published paper(s)	
2		2017-03-19									uid://A002/Xbe18f4/X3827	2017-03-19 15:32:23 - 16:27:01	2017-03-19 15:37:00	-493.350, -46.155	https://drive.gooc	https://drive.gooc	https://drive.gooc	Clark	Impossible				
3	2016.1.00030.S	2017-03-19	Sun_10	INT	SP	AR	3	C40-1	2018-07-11	https://almasci	uid://A002/Xbe18f4/X39bc	2017-03-19 16:52:42 - 17:47:19	2017-03-19 16:57:53	-482.532, -45.366	https://drive.gooc	https://drive.gooc			Impossible	http://www.ln	https://hinode.na		Reference times are changed fr
4		2017-03-19									uid://A002/Xbe18f4/X3ae5	2017-03-19 18:15:53 - 19:10:20	2017-03-19 18:21:03	-471.330, -44.574	https://drive.gooc	https://drive.gooc			Impossible				No TP data
6		2017-04-22	Sun_10	INT	SP	Plage	6	C40-3	2018-07-07		uid://A002/Xbf792a/X5647	2017-04-22 15:58:58 - 16:43:34	2017-04-22 16:00:00	-261.1738, 266.4682	https://drive.gooc	https://drive.gooc	https://drive.gooc	Clark	Combined	http://www.ln	https://hinode.na		
8	2016.1.00050.S	2017-04-22	Sun	TP	-	Full Sun	6	TP	2018-07-18	https://almasci	-	-	-	-	-	-	-	-	-	-	-		
9		2017-04-22	Sun_10	INT	SP	Plage	3	C40-3	2018-07-22		uid://A002/Xbf792a/X5912	2017-04-22 17:20:04 - 17:55:04	2017-04-22 17:20:40	-249.0388, 266.5862	https://drive.gooc	https://drive.gooc	https://drive.gooc	Clark	Combined	-	https://hinode.na		
10		2017-04-26	Sun	TP	-	Full Sun	3	TP	2018-08-10		-	-	-	-	-	-	-	-	-	-	-		
11	2016.1.00070.S	2017-04-26	Sun_10	INT	SP	Limb	3	C40-3	2018-09-05	https://almasci	uid://A002/Xbf9c0a/Xb0ab	2017-04-26 14:35:34 - 16:11:47	2017-04-26 14:35:35	959.6238, -1.7056	https://drive.gooc	https://drive.gooc	https://drive.gooc	Clark	-	http://www.ln	https://hinode.na		
12		2017-04-29									uid://A002/Xbfc4be/X6161	2017-04-29 15:38:32 - 16:20:48	2017-04-29 15:38:41	954.8612, 201.4834	https://drive.gooc	https://drive.gooc		-	-	http://www.ln	https://hinode.na		
13	2016.1.00156.S	2017-04-27	Sun	TP	-	Full Sun	6	TP	2018-07-11	https://almasci	-	-	-	-	-	-	-	-	-	-	-		
14		2017-04-27	Sun_10	INT	SP	Prominence	6	C40-3	2018-07-11		uid://A002/Xbfb22d/X5c1f	2017-04-27 17:13:59 - 17:57:31	2017-04-27 17:15:00	912.9245, 378.4807	https://drive.gooc	-		-		http://www.ln	https://hinode.na		A prominece erupted before the
16	2016.1.00166.S	2017-04-25	Sun	TP	-	Full Sun	6	TP	2018-08-29	https://almasci	-	-	-	-	-	-	-	-	-	-	-		No INT data
17	2016.1.00182.S	2017-04-13	Sun	TP	-	Full Sun	6	TP	2018-07-28	https://almasci	-	-	-	-	-	-	-	-	-	-	-		
18		2017-04-13	Sun_10	INT	MOSAIC	Polar Limb	6	C40-3	2018-08-29		uid://A002/Xbf032d/X4ddc	2017-04-13 16:46:13 - 17:49:41	2017-04-13 16:49:56	-4.9874, 954.1810	https://drive.gooc	https://drive.gooc	https://drive.gooc	Clark	-	http://www.ln	https://hinode.na		The self calibration is not apply
19	2016.1.00201.S	2017-04-29	Sun	TP	-	Full Sun	3	TP	2018-07-11	https://almasci	-	-	-	-	-	-	-	-	-	-	-		
20		2017-04-29	Sun_10	INT	SP	Polar Limb	3	C40-3	2018-07-11		uid://A002/Xbfc4be/X5f0f	2017-04-29 14:19:18 - 15:01:19	2017-04-29 14:36:40	-0.3263, -961.6663	https://drive.gooc	https://drive.gooc				http://www.ln	https://hinode.na	https://ui.adsa	
24	2016.1.00202.S	2017-04-27	Sun_10	INT	SP	QS	3	C40-3	2018-08-08	https://almasci	uid://A002/Xbfb22d/X56f4	2017-04-27 16:00:17 - 16:44:08	2017-04-27 16:05:22	174.4101, -214.7680	https://drive.gooc	https://drive.gooc	https://drive.gooc	Clark	Combined	http://www.ln	https://hinode.na		Reference time is changed and
26		2017-04-16	Sun_10	INT	MOSAIC	QS	6	C40-3	2018-08-10		uid://A002/Xbf2b10/X61d3	2017-04-16 15:58:26 - 17:35:12	2017-04-16 16:00:00	204.3606, 98.9747	https://drive.gooc	https://drive.gooc	https://drive.gooc	Clark	Combined	http://www.ln	https://hinode.na		
27	2016.1.00298.S	2017-04-16	Sun	TP	-	Full Sun	6	TP	2019-08-06	https://almasci	-	-	-	-	-	-	-	-	-	-	-		Carry Over to Cycle 5
28		2017-04-16	Sun	TP	-	Full Sun	3	TP	2019-08-07		-	-	-	-	-	-	-	-	-	-	-		
29		2017-04-16	Sun_10	INT			6	C40-3	2019-08-06														
30		2017-04-16	Sun_10	INT			3	C40-3	2019-07-26														
39		2017-03-16	Sun	TP	-	Full Sun	3	TP	2018-07-27		-	-	-	-	-	-	-	-	-	-	-		
40		2017-03-16	Sun_1	INT	SP	QS	3	C40-1	2018-07-27		uid://A002/Xbe025c/X1dfb	2017-03-16 15:22:23 - 15:32:45	2017-03-16 15:27:34	-679.1511, -679.1412	https://drive.gooc	https://drive.gooc				http://www.ln	https://hinode.na		
41		2017-03-16	Sun_5	INT	SP	QS	3	C40-1	2018-07-27		uid://A002/Xbe025c/X23be	2017-03-16 18:40:42 - 18:51:04	2017-03-16 18:42:42	-382.6056, -406.5865	https://drive.gooc	https://drive.gooc				http://www.ln	https://hinode.na		Reference times are changed fr
42		2017-03-16	Sun_3	INT	SP	QS	3	C40-1	2018-07-28		uid://A002/Xbe025c/X20aa	2017-03-16 16:56:27 - 17:06:49	2017-03-16 16:58:00	-581.1501, -587.6227	https://drive.gooc	https://drive.gooc				http://www.ln	https://hinode.na		Reference times are changed fr
43		2017-03-16									uid://A002/Xbe025c/X1dfb	2017-03-16 15:22:23 - 15:32:45	-	-	https://drive.gooc	-	-	-		-	-		The raw data is NOT archived
44	2016.1.00572.S	2017-03-16	Sun_4	INT	SP	QS	3	C40-1	2018-07-28	https://almasci	uid://A002/Xbe025c/X22b3	2017-03-16 17:58:54 - 18:09:16	2017-03-16 18:02:35	-468.0557, -484.1861	https://drive.gooc	https://drive.gooc				http://www.ln	https://hinode.na		
45	スクリーンショット	2017-03-16	Sun_6	INT	SP	QS	3	C40-1	2018-07-31		uid://A002/Xbe025c/X24ff	2017-03-16 19:22:53 - 19:33:11	2017-03-16 19:28:00	-260.5251, -295.2374	https://drive.gooc	https://drive.gooc				http://www.ln	https://hinode.na	https://ui.adsa	
46		2017-03-23	Sun	TP	-	Full Sun	6	TP	2018-08-03		-	-	-	-	-	-	-	-	-	-	-		Strange MOUS ID.
47		2017-03-16	Sun_2	INT	SP	QS	3	C40-1	2018-08-18		uid://A002/Xbe025c/X1f81	2017-03-16 16:14:39 - 16:25:01	2017-03-16 16:19:50	-686.1363, -666.3915	https://drive.gooc	https://drive.gooc				http://www.ln	https://hinode.na		
48		2017-03-23	Sun_1	INT	MOSAIC	QS	6	C40-1	2018-08-24		uid://A002/Xbe43ba/X4c96	2017-03-23 15:48:32 - 16:00:50	2017-03-23 15:49:51	481.0550, -837.9927	https://drive.gooc	-		-		http://www.ln	https://hinode.na		Only 3 maps in the data, Strang
49		2017-03-16	Sun_7	INT	SP	QS	3	C40-1	2018-08-29		uid://A002/Xbe025c/X26ed	2017-03-16 20:18:20 - 20:28:38	2017-03-16 20:23:29	10.3958, -19.1613	https://drive.gooc	https://drive.gooc				http://www.ln	https://hinode.na		
50	2016.1.00788.S	2017-03-28	Sun	TP	-	Full Sun	6	TP	2018-06-23	https://almasci	-	-	-	-	-	-	-	-	-	-	-		
51		2017-03-21	Sun	TP	-	Full Sun	3	TP	2018-07-28		-	-	-	-	-	-	-	-	-	-	-		
52		2017-03-28	Sun_10	INT	SP	Plage	6	C40-1	2018-08-08		uid://A002/Xbe7502/X471f	2017-03-28 15:09:11 - 15:58:08	2017-03-28 15:13:00	-181.0878, 346.8956	https://drive.gooc	https://drive.gooc	https://drive.gooc	Clark	Not yet	http://www.ln	https://hinode.na		pointting shift between scans
53		2017-03-21	Sun_10	INT	SP	Plage/QS	3	C40-1	2018-08-12		uid://A002/Xbe2ed7/X5ace	2017-03-21 15:42:02 - 16:45:48	2017-03-21 15:42:10	-78.3683 , -42.1107	https://drive.gooc	https://drive.gooc	https://drive.gooc	Clark	Combined	http://www.ln	https://hinode.na		pointing shift between 1st and 2
57	2016.1.01129.S	2017-04-18	Sun_10	INT	SP	QS	6	C40-3	2018-08-08	https://almasci	uid://A002/Xbf4033/X6f9e	2017-04-18 14:21:53 - 15:09:23	2017-04-18 14:26:02	-578.1882, 230.5331	https://drive.gooc	https://drive.gooc	https://drive.gooc	Clark	Not yet	http://www.ln	https://hinode.na		TP data is not released yet. (20
58		2017-04-18									uid://A002/Xbf894a/X493d	2017-04-23 15:53:20 - 16:40:58	2017-04-23 15:57:30	-71.6649, 258.9918	https://drive.gooc	https://drive.gooc	https://drive.gooc	Clark	Not yet	http://www.ln	https://hinode.na		SelCal does not work well. We c TP data is not released yet. (20
60		2017-04-23	Sun_10	INT	SP	QS	6	C40-3	2018-08-12		uid://A002/Xbf894a/X466a	2017-04-23 14:23:48 - 15:11:14	2017-04-23 14:27:56	-859.6961, -128.9562	https://drive.gooc	https://drive.gooc		-	-	http://www.ln	https://hinode.na		
62		2017-04-23	Sun_10	INT	SP	QS	3	C40-3	2018-08-15		uid://A002/Xbf894a/X4bdc	2017-04-23 17:19:10 - 18:53:14	2017-04-23 17:24:50	-58.7129, 258.8083	https://drive.gooc	https://drive.gooc	https://drive.gooc	Clark	Combined	http://www.ln	https://hinode.na		SelCal does not work well in so
64	2016.1.01408.S	2017-04-15	Sun	TP	-	Full Sun	6	TP	2018-09-06	https://almasci	-	-	-	-	-	-	-	-	-	-	-		
65		2017-04-15	Sun_10	INT			6	C40-3	2018-11-15														
66	2016.1.01532.S	2017-04-27	Sun	TP	-	Full Sun	3	TP	2018-08-12	https://almasci	-	-	-	-	-	-	-	-	-	-	-		
67		2017-04-27	Sun_10	INT	SP	AR	3	C40-3	2018-08-12		uid://A002/Xbfb22d/X53da	2017-04-27 14:19:44 - 15:31:25	2017-04-27 14:24:53	518.4532, 279.0280	https://drive.gooc	https://drive.gooc	https://drive.gooc	Clark	Combined	http://www.ln	https://hinode.na		Reference time is changed and

一番下に 1000 行 追加

End

Thank you for your attention.