

# M17 Data Analysis

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## ABSTRACT

Here is a summary on the 450um M17 data analysis.

### 1. Data

We have raw files from three nights: 07/08/2010 (2 dither sets), 07/10/2010 (11 dither sets) and 07/11/2010 (5 dither sets). By setting `-l 201 201`, all dither sets passed the Chauvenet's criterion.

File	Dither Set#	Comment
51362-51365	01	-
51366-51369	02	-
51436-51439	03	51436 bad file
51440-51443	04	-
51444-51447	05	-
51450-51453	06	-
51454-51457	07	51457 bad file
51458-51461	08	-
51462-51465	09	51464 bad file
51467-51470	10	-
51471-51474	11	-
51475-51478	12	51477 bad file
51479-51482	13	-
51514-51517	14	-
51519-51522	15	-
51523-51526	16	-
51528-51531	17	-
51532-51535	18	-

Tau and points (linear interpolation) are from the Excel logbook from July 2010 Run-by-Run section.

Here is the file list:

File	Tau	FAZO	FZAO
51362_int.fits	0.052	-92.2	83.1
51363_int.fits	0.052	-92.2	83.1
51364_int.fits	0.052	-92.2	83.1
51365_int.fits	0.052	-92.2	83.1
51366_int.fits	0.053	-92.2	83.1
51367_int.fits	0.053	-92.2	83.1
51368_int.fits	0.053	-92.2	83.1
51369_int.fits	0.053	-92.2	83.1
51437_int.fits	0.048	-88.8	86.6
51438_int.fits	0.049	-88.9	86.8
51439_int.fits	0.050	-90.0	87.0
51440_int.fits	0.052	-90.1	87.2
51441_int.fits	0.052	-90.2	87.4
51442_int.fits	0.052	-90.3	87.6
51443_int.fits	0.051	-90.3	87.8
51444_int.fits	0.051	-90.4	88.0
51445_int.fits	0.053	-90.5	88.2
51446_int.fits	0.054	-90.6	88.4
51447_int.fits	0.056	-90.7	88.6
51450_int.fits	0.057	-90.8	88.8
51451_int.fits	0.056	-91.0	88.7
51452_int.fits	0.055	-91.3	88.5
51453_int.fits	0.055	-91.6	88.4
51454_int.fits	0.054	-91.8	88.3
51455_int.fits	0.054	-92.0	88.1
51456_int.fits	0.055	-92.3	88.0
51458_int.fits	0.057	-92.8	87.8
51459_int.fits	0.054	-93.0	87.7
51460_int.fits	0.051	-93.3	87.5
51461_int.fits	0.048	-93.6	87.4
51462_int.fits	0.045	-93.8	87.3
51463_int.fits	0.044	-94.0	87.2
51465_int.fits	0.042	-94.6	86.9
51467_int.fits	0.042	-94.8	86.8
51468_int.fits	0.042	-94.8	86.2
51469_int.fits	0.041	-94.8	85.9
51470_int.fits	0.041	-94.8	85.6

Table 1: Group 1

File	Tau	FAZO	FZAO
51471_int.fits	0.040	-94.8	85.2
51472_int.fits	0.040	-94.8	84.9
51473_int.fits	0.039	-94.8	84.6
51474_int.fits	0.039	-94.8	84.2
51475_int.fits	0.038	-94.7	83.9
51476_int.fits	0.038	-94.7	83.6
51478_int.fits	0.037	-94.7	82.9
51479_int.fits	0.036	-94.7	82.6
51480_int.fits	0.036	-94.7	82.2
51481_int.fits	0.035	-94.7	81.8
51482_int.fits	0.035	-94.7	81.4
51514_int.fits	0.057	-94.7	81.0
51515_int.fits	0.058	-94.7	81.0
51516_int.fits	0.058	-94.7	81.0
51517_int.fits	0.059	-94.7	81.0
51518_int.fits	0.060	-94.7	81.0
51519_int.fits	0.061	-94.7	81.0
51520_int.fits	0.059	-94.7	81.0
51521_int.fits	0.058	-94.7	81.0
51522_int.fits	0.056	-94.7	81.0
51523_int.fits	0.055	-94.7	81.0
51524_int.fits	0.055	-94.7	81.0
51525_int.fits	0.054	-94.7	81.0
51526_int.fits	0.053	-94.7	81.0
51528_int.fits	0.053	-94.7	81.0
51529_int.fits	0.056	-94.7	81.0
51530_int.fits	0.060	-94.7	81.0
51531_int.fits	0.062	-94.7	81.0
51532_int.fits	0.065	-94.7	81.0
51533_int.fits	0.065	-94.7	81.0
51534_int.fits	0.065	-94.7	81.0
51535_int.fits	0.065	-94.7	81.0

Table 2: Group 2

## 2. Software parameters:

See emails from Giles (20 Oct 2010) and John (25 Oct 2010) for details.

I used John's rgm file, from kilauea at

```
~sharp:Runs/2010July/process/rgm.dat
```

```
./sharpinteg_2 sharc2-051362.fits -r rgm.dat -f 1 -w -sil -em
```

```
./sharp_combine M17 M17.fits -hwp 4 -l 201 201 -sm 2 -ma 5 -ps 4.75 -pm 6.3 -bg 100  
100 -ip 0.0 0.0 0.0 0.0
```

## 3. Results:

Figure 1 shows the M17 intensity map.

Figure 2 is the M17 polarization map with the intensity contours.

You can find the fits file here:

<http://www.pha.jhu.edu/~lingzz/SHARP/M17/M17.fits>

I did the -idl analysis:

The background subtractions were flat after 40 iterations (Figure 3).

John did the SHARP vs HERTZ plot in Figure 4

## 4. Chi2 analysis:

All 69 file were divided into 2 groups, base on the Q-error of the combine maps. The first group (Table 1) has the first 37 files (Q-error =  $1.35e-4$ ), while the second group (Table 2) has the last 32 files (Q-error =  $1.39e-4$ ).

Chi2 result: Reduced Chi Squared mean and standard dev. for the I map: 29.195424, 43.783957

Reduced Chi Squared mean and standard dev. for the Q map: 1.866556, 2.897107

Reduced Chi Squared mean and standard dev. for the U map: 2.229469, 2.848467

The inflation factor averaged over the map: 1.381393

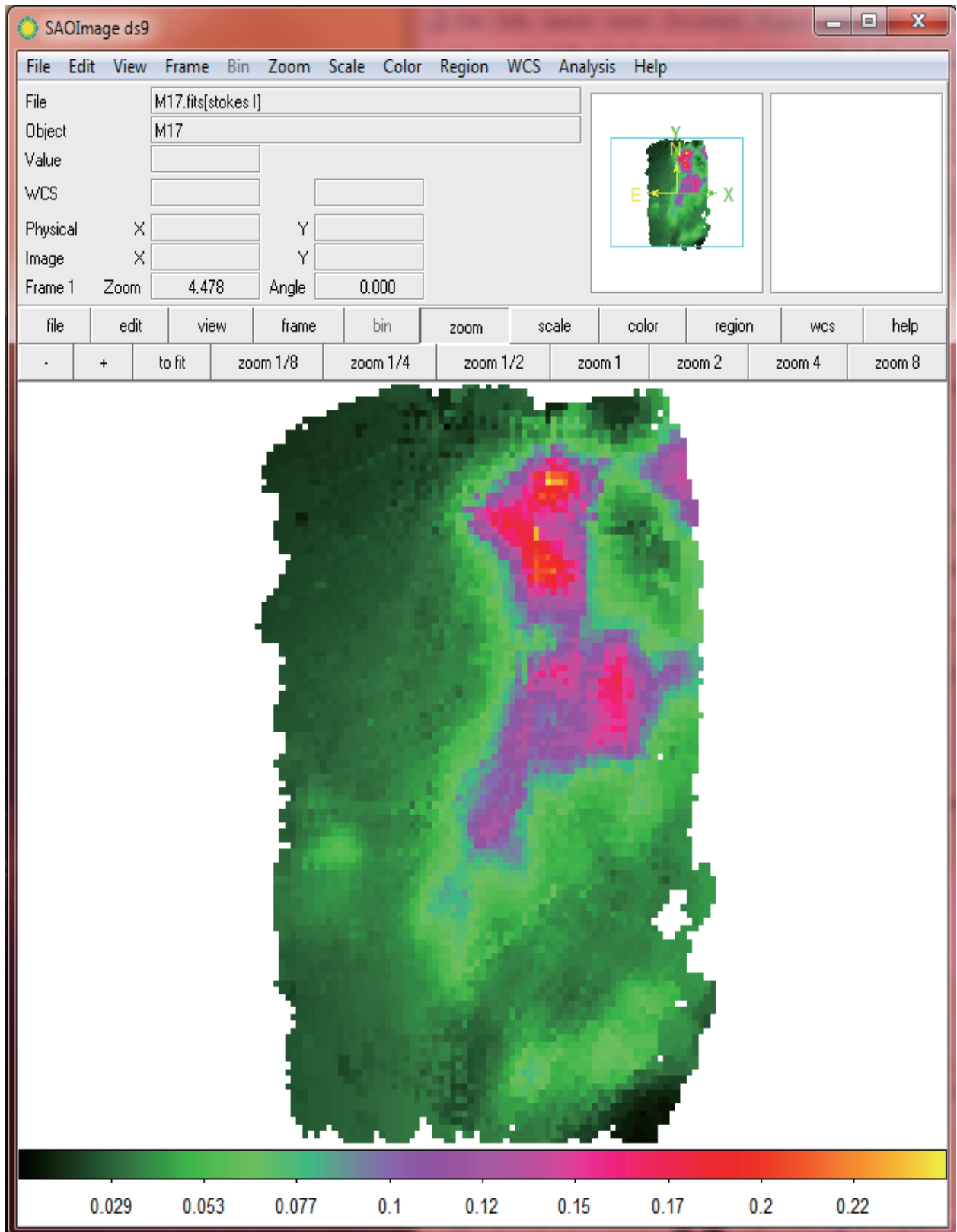


Fig. 1.— M17 I map

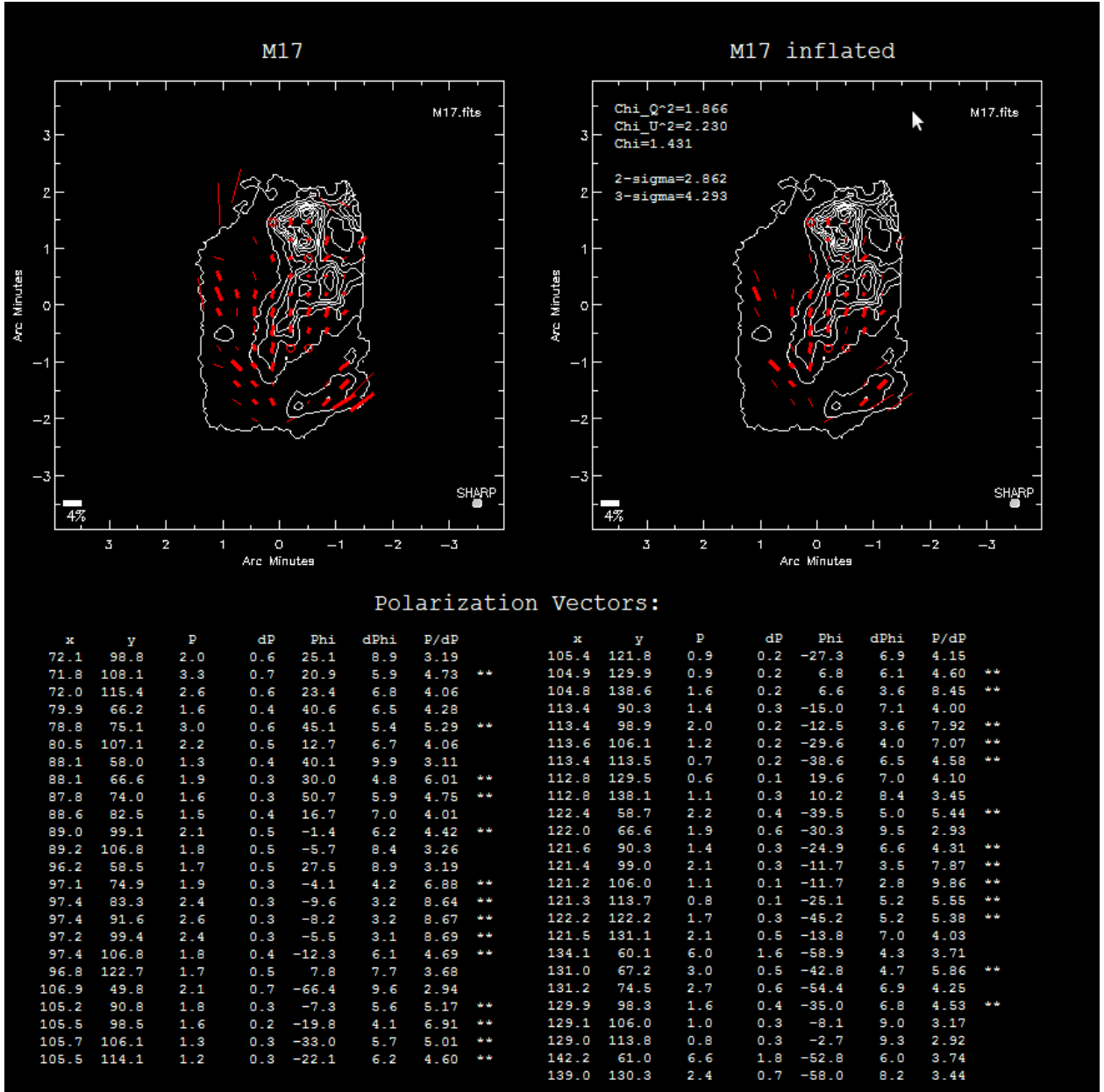


Fig. 2.— M17 Polarization Map, polsharp5 with scale = 1.0, skipv = 8

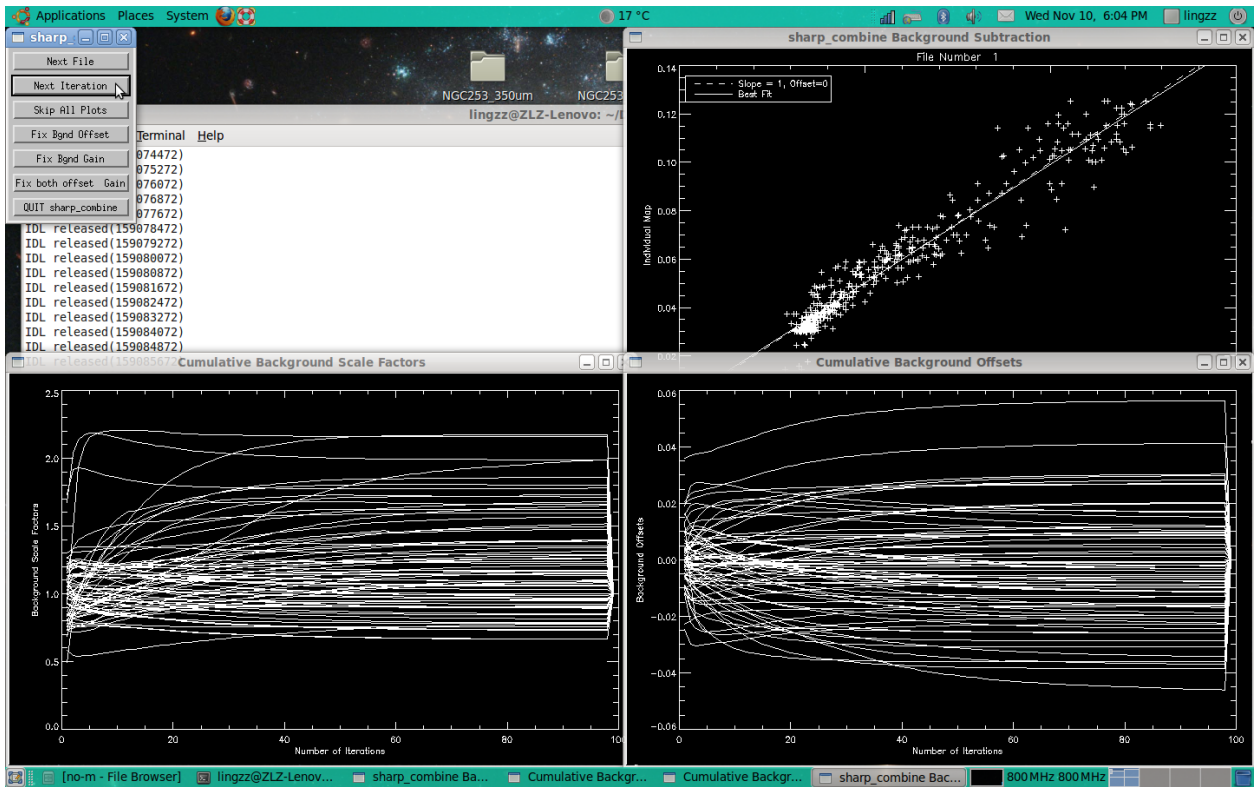


Fig. 3.— IDL analysis

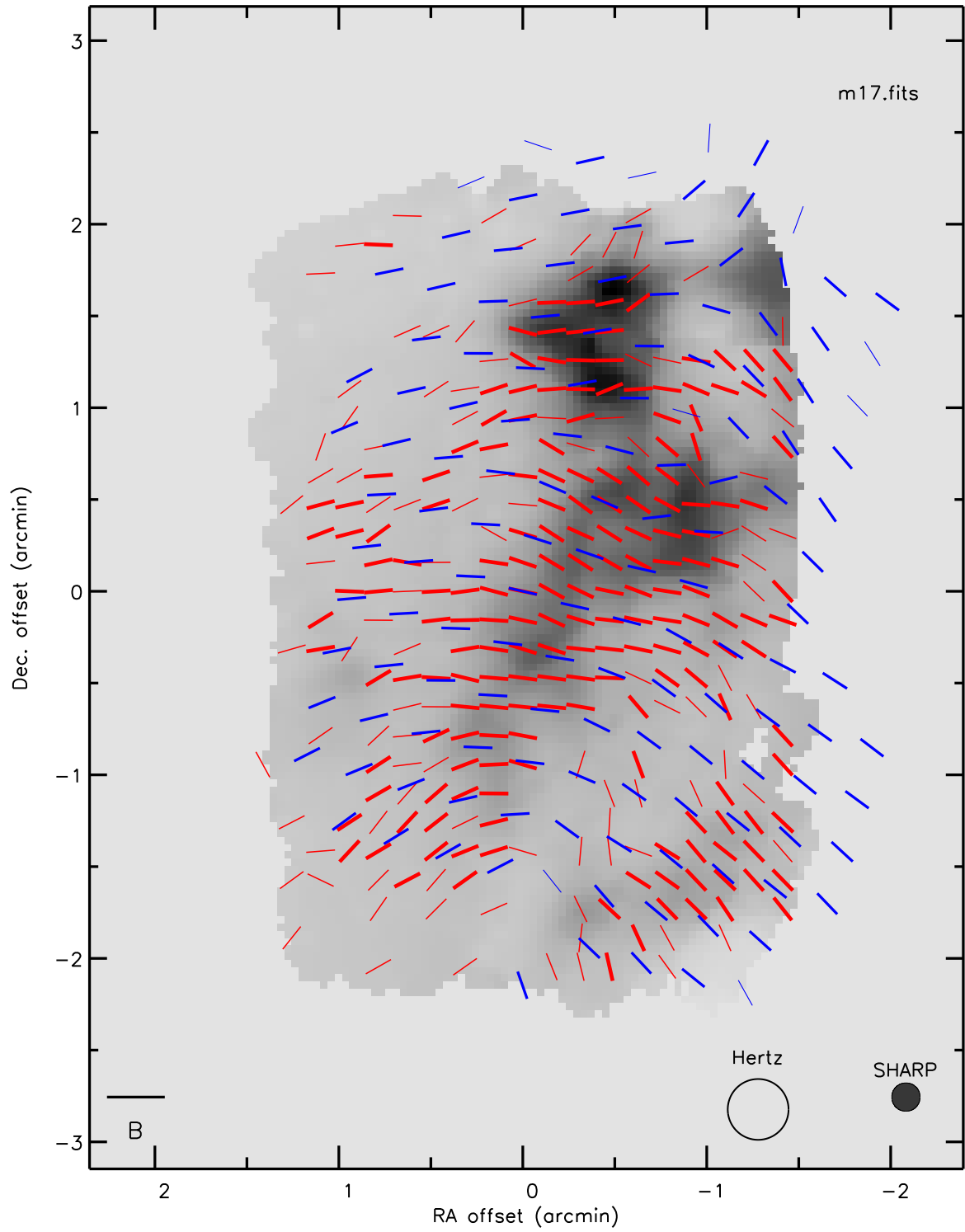


Fig. 4.— SHARP-Hertz data



## 5. Discussion:

Our results are in very good agreement with Hertz data:

<http://adsabs.harvard.edu/abs/2003cdsf.conf...91H>

also agree with the far infrared measurement:

<http://adsabs.harvard.edu/abs/1996ApJ...470..566D>