

Broad Band Instruments Journal

Laboratory of Atmospheric Physics

Contents

About	3
1996	4
1996-02-08 00:00 [ThanasisN]	4
2015	5
2015-12-30 [ThanasisN]	5
2016	6
2016-01-08 [ThanasisN]	6
2016-01-29 [ThanasisN]	6
2016-01-30 [ThanasisN]	6
2016-03-07 [ThanasisN]	6
2016-03-28 [ThanasisN]	6
2016-04-01 [ThanasisN]	6
2016-04-11 [ThanasisN]	6
2016-04-13 [ThanasisN]	6
2016-04-14 [ThanasisN]	6
2016-04-15 [ThanasisN]	6
2016-04-20 [ThanasisN]	6
2016-05-16 [ThanasisN]	6
2016-05-25 [ThanasisN]	6
2016-05-27 [ThanasisN]	6
2016-05-31 [ThanasisN]	6
2016-06-03 [ThanasisN]	7
2016-06-07 [ThanasisN]	7
2016-06-09 [ThanasisN]	7
2016-06-15 [ThanasisN]	7
2016-06-16 [ThanasisN]	7
2016-07-04 09:40 [ThanasisN]	7
2016-07-05 [ThanasisN]	7
2016-07-07 [ThanasisN]	7
2016-07-19 [ThanasisN]	7
2016-07-21 [ThanasisN]	7
2016-07-22 [ThanasisN]	7
2016-08-31 [ThanasisN]	7
2016-09-23 [ThanasisN]	7
2016-10-31 [ThanasisN]	7
2017	8
2017-01-10 [ThanasisN]	8
2017-01-11 [ThanasisN]	8
2017-01-12 [ThanasisN]	8
2017-01-19 [ThanasisN]	8
2017-02-22 [ThanasisN]	8
2017-03-03 12:39 [ThanasisN]	8
2017-05-04 09:30 [ThanasisN]	8
2017-07-12 09:34 [ThanasisN]	8
2017-08-09 [ThanasisN]	8
2017-08-15 [ThanasisN]	8
2017-08-16 [ThanasisN]	8
2017-08-17 09:45 [ThanasisN]	8

2017-08-22 [ThanasisN]	8
2017-09-07 [ThanasisN]	8
2017-09-13 09:10 [ThanasisN]	8
2017-10-02 09:30 [ThanasisN]	8
2017-10-09 11:17 [ThanasisN]	9
2017-10-30 09:23 [ThanasisN]	9
2017-12-05 [ThanasisN]	9
2017-12-13 [ThanasisN]	9
2017-12-15 [ThanasisN]	9
2017-12-18 10:04 [ThanasisN]	9
2017-12-25 [ThanasisN]	9
2017-12-26 [ThanasisN]	9
2018	10
2018-01-18 [ThanasisN]	10
2018-03-20 [ThanasisN]	10
2018-03-23 11:36 [ThanasisN]	10
2018-04-12 08:35 [ThanasisN]	10
2018-04-17 08:34 [ThanasisN]	10
2018-05-16 10:35 [ThanasisN]	10
2018-05-18 [ThanasisN]	10
2018-12-07 [ThanasisN]	10
2019	11
2019-04-11 09:27 [ThanasisN]	11
2019-05-06 [ThanasisN]	11
2019-05-10 09:22 [ThanasisN]	11
2019-05-13 [ThanasisN]	11
2019-05-18 09:10 [ThanasisN]	11
2019-05-30 10:13 [ThanasisN]	11
2019-06-12 10:54 [ThanasisN]	11
2019-06-17 09:35 [ThanasisN]	11
2019-06-27 08:33 [ThanasisN]	11
2019-07-04 [ThanasisN]	11
2019-07-12 10:26 [ThanasisN]	11
2019-07-26 08:59 [ThanasisN]	11
2019-12-16 11:00 [ThanasisN]	11
2020	12
2020-01-03 [ThanasisN]	12
2020-04-29 09:05 [ThanasisN]	12
2020-04-30 12:12 [ThanasisN]	12
2020-05-07 10:31 [ThanasisN]	12
2020-06-10 10:59 [ThanasisN]	12
2022	13
2022-02-17 00:00 [ThanasisN]	13
2022-02-21 00:00 [ThanasisN]	13
2022-02-21 13:50 [ThanasisN]	13
2022-05-23 [ThanasisN]	13
2022-06-03 [ThanasisN]	13
2022-06-16 00:00 [BA]	13
2022-06-27 11:40 [ThanasisN]	13
2023	14
2023-03-28 15:48 [ThanasisN]	14
2023-03-28 17:31 [ThanasisN]	14
2023-04-03 09:14 [ThanasisN]	14
2023-04-04 12:59 [ThanasisN]	14
2023-04-19 09:19 [ThanasisN]	14
2023-05-18 09:15 [ThanasisN]	14
2023-05-25 08:52 [ThanasisN]	14
2023-06-26 11:26 [ThanasisN]	14
2023-10-25 09:22 [ThanasisN]	14
2023-10-26 11:20 [ThanasisN]	14

2023-10-30 13:54 [ThanasisN]	14
2023-10-31 09:59 [ThanasisN]	14
Journal instructions	14
Format for entries	14
Filenames should be numerical sorted	14
File template	14
Build a journal document entries files	15
List of tags	15

About

This is a journal mainly for the instruments CM-21 and CHP-1 of LAP.

Other incidents on the roof may be reported here.

Other journals and log exist, but are not included here.

1996

1996-02-08 00:00 [ThanasisN]

Systematic cut-off of measurements due to gain error.

Occurs until the night of 1996-02-29.

Bias on daily radiation.

2015

2015-12-30 [ThanasisN]

Μάλλον βραχυκύκλωμα μιας κόλλησης της φωτοδιόδου του tracker.

Ανταλλάξαμε την πολικότητα των καλωδίων του αζιμούθιου κινητήρα ώστε να διορθώσουμε την ανάποδη φορά του κινητήρα.

2016

2016-01-08 [ThanasisN]

Φαίνεται ότι το πρόβλημα ήταν μία ή παραπάνω κολλήσεις στη πλακέτα του tracker.

Τώρα όλα φαίνονται εντάξει ακολουθεί το ήλιο κανονικά.

Μάλλον δεν μπορώ να τρέξω το faketime σε πραγματικές συνθήκες.

Ίσως γράψω ένα script που να αλλάζει την ώρα του υπολογιστή. Για να κάνω δοκιμή του κύκλου του tracking σε σύντομο χρόνο.

2016-01-29 [ThanasisN]

Εγκαταστάθηκε το πυρηλιόμετρο CHP-1.

Ευθυγραμμίστηκε ο tracker του CHP-1.

Παίρνουμε μετρήσεις direct.

2016-01-30 [ThanasisN]

Σήμερα είναι η πρώτη μέρα του το πυρηλιόμετρο θα κάνει μία πλήρη καταγραφή μόνο του.

Στα χθεσινά αποτελέσματα είχε Async cases κάτι που μάλλον φαίνεται και στις μετρήσεις του πυρηλιόμερου.

2016-03-07 [ThanasisN]

Σήμερα άλλαξα τη βάση του tracker με την παλιά βάση του brewer.

Επίσης ψέκασα το CHP-1 και τον tracker με αντισκοριακό για να αποτρέψω τις αράχνες.

2016-03-28 [ThanasisN]

Άλλαξα τη silica gel, μάλλον έπρεπε να το είχα αλλάξει από την αρχή.

Παρακολούθησα τον tracker ως το απόγευμα, φαίνεται να ήταν γενικά καλός.

2016-04-01 [ThanasisN]

Το κανάλι 8 τελικά δεν ήταν το κανάλι του CHP-1 και το 3 ήταν απενεργοποιημένο.

Οπότε σήμερα παίρνω τις πρώτες μου μετρήσεις από το CHP-1.

2016-04-11 [ThanasisN]

Το καλώδιο έφυγε την παρασκευή το βράδυ γιατί δεν το είχα βιδώσει καλά.

Τα δεδομένα ξεκινάν ξανά από σήμερα το πρωί.

Ξεκίνησε η μέτρηση της θερμοκρασία του οργάνου με το πολύμετρο.

2016-04-13 [ThanasisN]

Αποσύνδεση για δοκιμές.

Performed:

- Tracker leveling
- Instrument sighting

2016-04-14 [ThanasisN]

Σήμερα οι μετρήσεις είναι άχρηστες.

Ο traker είχε κολλήσει και δεν ξεκίνησε καθόλου όλη μέρα.

2016-04-15 [ThanasisN]

Ο tracker είχε κολλήσει από χθες, και οι πρωινές μετρήσεις είναι άχρηστες.

Είχε ένα μήνυμα ότι το COM port είναι σε ήδη χρήση??

Περίπου στις

7:30 UTC

άλλαξα τον τρόπο καταγραφής της ώρας του protek506.

Από το επόμενο λεπτό το έκανα στο προηγούμενο. Θα αλλάξω με το χέρι την αρχή και το τέλος των προηγούμενων αρχείων θερμοκρασίας.

Η μετατόπιση σήμερα, κατά ένα λεπτό, δεν νομίζω να χρειάζεται διόρθωση.

2016-04-20 [ThanasisN]

No mains power!

2016-05-16 [ThanasisN]

Tracker leveling today!

Last 3-4 there was a declination from good sighting.

2016-05-25 [ThanasisN]

Αλλαγή τρακερ από το καινούριο μοντέλο στο παλιό μοντέλο.

Για την ώρα θεωρούμε ότι δεν έχει sighting ούτε καθετοποίηση.

Πρέπει να επιβεβαιώσω ότι ακολουθεί τον ήλιο.

Είναι ξανά σε φωτογραφικό τρίποδο (δυσκολότερη η καθετοποίηση).

2016-05-27 [ThanasisN]

Ο τράκερ αποσυνδέθηκε για να αλλάξει θέση/βάση.

Αναμένεται να μπει ξανά σε λειτουργία στις 2016-05-31.

2016-05-31 [ThanasisN]

Έγινε η μόνιμη εγκατάσταση στο παλιό μοντέλο του τρακερ (tracker2).

Περίπου από τις 14:30 LT μετράει κανονικά

Μένει να γίνει επαλήθευση της σωστής διόπτρευσης τις επόμενες μια δυο μέρες.

2016-06-03 [ThanasisN]

Διόρθωση της τοποθεσίας με gps.

Οι αλλαγές θα δουλέψουν από αύριο.

2016-06-07 [ThanasisN]

Πετάμε τα σημερινά δεδομένα.

Κάποια στιγμή το μεσημέρι κουνήθηκε το όργανο σε σχέση με τον άξονα.

Μάλλον είναι εντάξει μετά τις

15:15

2016-06-09 [ThanasisN]

Μάλλον το πρόβλημα με τα λάσκα είναι η φθορά του ιμάντα.

Πριν τις

11:50 LT

το αποσυνδέσαμε για λίγη ώρα και το γυρνούσαμε το χέρι

2016-06-15 [ThanasisN]

Αλλαγή ιμάντα αζιμούθιου στον tracker και τέντωμα του κινητήρα.

Κάποια βελτίωση στα λάσκα του αζιμούθιου.

Μετακίνηση του γραναζιού του αζιμούθιου πιο κοντά στο επίπεδο του κινητήρα.

The tracker was leveled

Any off time was logged appropriately.

2016-06-16 [ThanasisN]

Σταμάτησε για λίγο το data aquisition.

Γίνανε εργασίες στη βάση των πυρανομέτρων και πιθανόν πλέον δεν είναι οριζόντια.

2016-07-04 09:40 [ThanasisN]

Εργασίες στα λούκια της σκεπής από

09:40 LC

2016-07-05 [ThanasisN]

Εργασίες επικάλυψης της σκεπής.

2016-07-07 [ThanasisN]

Τεχνικές εργασίες στη ταράτσα?

2016-07-19 [ThanasisN]

Ο tracker ξαναμπήκε, αλλά στήθηκε πάνω στην πλατφόρμα των brewer.

Δεν μπορεί να γίνει καλή οριζοντίωση ούτε και να διατηρηθεί.

Η επιφάνεια της πλατφόρμας είναι από λαμαρίνα η οποία παίζει αρκετά όταν πατάει κάποιος πάνω και οι δονήσεις φτάνουν στον tracker.

2016-07-21 [ThanasisN]

Όταν φύγαμε σήμερα άφησα τον tracker να δουλεύει, αλλά μάλλον, οι εργάτες που βάζανε την πίσσα τα κούνησαν όλα με την σκάλα που βάλανε πάνω στην βάση του tracker και του brewer.

Ίσως να την βάλανε το πρωί της επόμενης, δηλαδή 2016-07-22 και όχι σήμερα το απόγευμα.

2016-07-22 [ThanasisN]

Δεδομένης της σκάλας, και των επικείμενων εργασιών, κατέβασα το όργανο CHP-1 και τον tracker.

2016-08-31 [ThanasisN]

After last leveling of the tracker, the CHP-1 sighting seem to be continuously very accurate!!

2016-09-23 [ThanasisN]

Tests conducted near CM-21 instrument.

Shadowing of the instrument is possible.

2016-09-23 13:38 ; 2016-09-23 13:45 ;

UTC?

2016-10-31 [ThanasisN]

Done:

- leveling of CHP-1 tracker
- silica gel replace for CHP-1

2017

2017-01-10 [ThanasisN]

Snowfall, instruments probably covered by the snow.

2017-01-11 [ThanasisN]

Snowfall, instruments probably covered by the snow.

2017-01-12 [ThanasisN]

@cm21

Today is sunny.

Instruments domes had some ice on top (there are photos), early in the day.

Domes cleaned after 07:52 UTC

2017-01-19 [ThanasisN]

About 16:40 tests for better night park position

radmon pc crashed

At 17:00 UTC

Changed the park position for night to

$stepz = 4250$,
 $stepa = 5365$

Now it looks directly to the white wall of the building almost vertical

2017-02-22 [ThanasisN]

Ένα πουλί κάθισε στο όργανο και το κούνησε.

Τα παιδιά το γύρισαν ξανά.

Μετά έκανα reset από απόσταση.

2017-03-03 12:39 [ThanasisN]

Replace silica gel at

12:39 - 12:45 ?

2017-05-04 09:30 [ThanasisN]

Tracker found not in sync with the sun at
6:30 UTC

Reset was done and the problem was fixed.

2017-07-12 09:34 [ThanasisN]

Cleaning of Instruments domes. 02:02 - 02:03

The day is shining.

2017-08-09 [ThanasisN]

CHP-1 has some strange step up in data not according to global or photos.

Also CHP-1 standard deviation seems to be affected.

2017-08-15 [ThanasisN]

Data from CHP-1 show no sun in contrast with global.

Tracker was stack.

Logs from previous day stop at 20:30 not at 20:50 as for all other days

Seems like a reboot or disconnection at 09:13 - 9:15

2017-08-16 [ThanasisN]

Tracker found to be on park location. Seems like software was freeze.

Radmon-pc was rebooted -> tracker working properly.

Sighting seems correct.

All BB instruments have bad data!!!! Seems like a step of values before and after reboot!!!

Maybe normal clouds or something was actually wrong

2017-08-17 09:45 [ThanasisN]

Bad data recording for broadband continues.

Try reboot at 09:45 local time.

Major step on data observed!

Direct and global seems correct now!

2017-08-22 [ThanasisN]

Global and direct have some suspicious behavior that can not be confirmed by photos.

2017-09-07 [ThanasisN]

We did a leveling of the tracker.

Renew the silica gel on CHP-1.

2017-09-13 09:10 [ThanasisN]

Today tracker found on park position.

Computer could not run sun_tracker_main from schedule.

It seems, it was stacked and scheduler could not stop it, so it could not run it again.

Reboot was done.

Problem was solved.

2017-10-02 09:30 [ThanasisN]

The step on the tracker was corrected

from 0.103 to $0.6 * 12 / 70$ at 2017-10-02 07:30 UTC

$0.6 * 12 / 70 = 0.10285714285714284$

Cloudy sky prevents sighting for now

2017-10-09 11:17 [ThanasisN]

With the previous correction, seems that tracker now performs better.

2017-10-30 09:23 [ThanasisN]

Description Noise on all broadband

CHP-1 tracker was stack due to radmon

Actions Reboot was done.

After reboot all broadband show too much signal noise.

Reboot was done.

Measurements seems correct now.

2017-12-05 [ThanasisN]

Tracker seems to have been displaced

There is no written account

Two resets was done

2017-12-13 [ThanasisN]

Global and direct irradiance seems suspicious

2017-12-15 [ThanasisN]

Tracker did not start today.

Reboot was needed to start.

After first reboot erratic data on all broadband.

Second reboot done.

After second reboot data seems normal.

2017-12-18 10:04 [ThanasisN]

CHP-1 tracker was stack due to radmon

Reboot was done

After reboot all measurements seems correct.

It is possible to have been stacked **more than one day**

2017-12-25 [ThanasisN]

Async and step data shows that tracker is not working.

The signal from CHP-1 is zero!!

Will exclude direct data from analysis.

2017-12-26 [ThanasisN]

Tracker start working by itself probably!

2018

2018-01-18 [ThanasisN]

Early morning no main power

Late morning no main power and instruments shutdown.

Possible problem with all broadband data!!

2018-03-20 [ThanasisN]

Visible signal step after cleaning! On CHP-1.

2018-03-23 11:36 [ThanasisN]

From previous days until now, rain with a lot of dust is occurring.

Instruments domes are regular covered with thick dust.

Dome Cleaning

11:36 - 11:39 local time

09:36 - 09:39 UTC

2018-04-12 08:35 [ThanasisN]

Domes cleaned at

06:35 - 06:38 UTC

2018-04-17 08:34 [ThanasisN]

Domes cleaned at

06:34 - 06:39 UTC

There was excessive mud from rain yesterday.

2018-05-16 10:35 [ThanasisN]

Leveling of CHP-1

7:35 - 7:51 UTC

2018-05-18 [ThanasisN]

While sighting, I did an accidental reset to zero offset.

As a result for brief time was not in sync.

This happened close to disconnection.

2018-12-07 [ThanasisN]

radmon was down radmon had a disk corruption and was down for few days.

The system probably is in good order now.

For CHP-1 was performed

- Leveling
- Silica gel replacement
- Sighting

Was completed at

10:56 local time

8:56 UTC

2019

2019-04-11 09:27 [ThanasisN]

Instrument Cleaning

09:27 - 09:29 local time

06:27 - 06:29 UTC

2019-05-06 [ThanasisN]

Dimitris Karag. reported tracker misalignment!

Mostly corrected after reset!

2019-05-10 09:22 [ThanasisN]

Spider webs on the instrument window cleaned! at

~09:22 local

~06:22 UTC

Don't know how long affected measurements.

2019-05-13 [ThanasisN]

Daylight time was enabled on broadband computer!!!

Time was changed to correct format

2019-05-13 11:20 -> 10:21 !! UTC

Probably the time of measurement is wrong

Will be evident on CS detection data

2019-05-18 09:10 [ThanasisN]

Only CHP-1 and CM-21 cleaned domes at

09:10 local

06:10 UTC

2019-05-30 10:13 [ThanasisN]

Domes cleaned at

10:13 - 10:15 local

07:13 - 07:15 UTC

2019-06-12 10:54 [ThanasisN]

Testing azimuth measurements with zero elevation

Test starts at 7:54 UTC

It is logged on normal logs.

Take care to exclude data from normal processing!

Return to normal operation at 9:14 UTC

2019-06-17 09:35 [ThanasisN]

Clean domes at

06:35 - 06:36 UTC

2019-06-27 08:33 [ThanasisN]

Clean CHP-1 and CM-21 only at 05:33 UTC

2019-07-04 [ThanasisN]

After painting of the platforms, last ~two days the CHP-1 instrument, was covered with a plastic bag for protection.

- Leveling
- Silica gel renew
- Sighting

2019-07-12 10:26 [ThanasisN]

All dome cleaned

10:26 - 10:29 local time

07:26 - 07:29 UTC

2019-07-26 08:59 [ThanasisN]

Cleaning all domes

08:59 - 09:03 Local time

05:59 - 06:03 UTC

2019-12-16 11:00 [ThanasisN]

Power out for some minutes at 11:44-11:58

Ends approx 30 minutes later

Possibly bad data until 13:40 after a reboot

2020

2020-01-03 [ThanasisN]

There was a ransomware discovered at 2019-12-25

Sighting is Good after 2020-03-01 10:41 local time 8:41 UTC

2020-04-29 09:05 [ThanasisN]

Clean domes at

09:05 - 09:07 local time

06:05 - 06:07 UTC

2020-04-30 12:12 [ThanasisN]

New silica gel to

- CHP-1
- CM-21 Horizontal

- UVB diffuse metal cylinder.

12:12 - 13:25 local time

09:12 - 09:25 UTC

2020-05-07 10:31 [ThanasisN]

Dome clean at

10:31 - 10:33 local time

07:31 - 07:33 UTC

2020-06-10 10:59 [ThanasisN]

Domes cleaned

10:59 - 11:02 local time

07:59 - 08:02 UTC

2022

2022-02-17 00:00 [ThanasisN]

Broadband instruments were installed? after they have been removed from the instruments tables.

Work on instruments table was performed.

New instrument table was installed for CCD spectrometers.

CHP-1 was between brewers and the new CCD table, may be affected.

There are photos.

2022-02-21 00:00 [ThanasisN]

The CHP-1 was moved!

It was west of the brewers and moved east of the brewers.

The inclined CM-21 was leveled, for comparison to the horizontal one, before calibration of the horizontal.

There are photos

2022-02-21 13:50 [ThanasisN]

We consider after 11:50 UTC

the inclined CM-21 to have been set to horizontal position.

This is reflected on the measurements.

There are photos.

2022-05-23 [ThanasisN]

Installation of horizontal CM-21 07:55 - 08:17 UTC

There are photos.

2022-06-03 [ThanasisN]

The horizontal Global CM-21 was

- installed
- leveled
- start measuring **without sun shield**

Photos exist.

2022-06-16 00:00 [BA]

Τελικά έβαλα το σπασμένο shield (το κόλλησα πρόχειρα) σήμερα στις 7.00 UTC.

2022-06-27 11:40 [ThanasisN]

The inclined CM-21 is returned to the inclined position from the horizontal.

Last data in horizontal position is at 08:40 UTC

2023

2023-03-28 15:48 [ThanasisN]

We removed some Global radiation data output constrains.

Now we allowed:

- Any value of GHI during night (it was NA during night)
- Negative values during day (it was set to zero)

Will update all sirena data for years 2006-2022, previous exported by us.

2023-03-28 17:31 [ThanasisN]

Sirena TOT files updated for 2006-2022.

With the new output scheme.

2023-04-03 09:14 [ThanasisN]

Radmon found freezed with different system errors.

No tracking with CHP-1 at start of the day. Day is cloudy.

Reboot seems to fixed the problem.

2023-04-04 12:59 [ThanasisN]

The tracker didn't start at the morning due to an error of the com port.

Tracker program was restarted manual.

2023-04-19 09:19 [ThanasisN]

The tracker didn't start normally today.

I restart it manual at 09:10 LT

2023-05-18 09:15 [ThanasisN]

Cleaned broadband and brewers instruments at

06:07 - 06:10 UTC

A lot of dust from previous rain.

2023-05-25 08:52 [ThanasisN]

Clean spider web from inside of CHP-1 sun shader at

05:52 UTC

2023-06-26 11:26 [ThanasisN]

CHP-1 was cleaned from spider webs, in frond off the instrument window at

08:26 - 08:30 UTC

Also, instrument enclosure was sprayed with penetrating oil to deter insects.

2023-10-25 09:22 [ThanasisN]

Tracker is not tracking from yesterday.

Reset it today. Tried to find zero, but failed and continue trying forever.

Stop it reconnected, and now can not communicate with the control unit

2023-10-26 11:20 [ThanasisN]

We replaced 2 failed capacitors. Re install the board. But still there is no communication with the tracker

2023-10-30 13:54 [ThanasisN]

CHP-1 tracker still not working. Possible a faulty transistor. Will replace tomorrow.

2023-10-31 09:59 [ThanasisN]

Transistor was replaced,

We can communicate with the controller.

Although, the Azimuth channel is not working.

Journal instructions

Format for entries

Filenames should be numerical sorted

- ./YYYY/YYYYMMDD_0000.md
- ./YYYY/YYYYMMDD.md

File template

```
## 2022-02-21 00:00 [USERNAME]
```

```
[//]: # (Keywords: #key_1, #key_2)
```

Text for this entry.

Use simple text, it will parsed as markdown.

Build a journal document entries files

There is a Makefile to automate the process.

- “make” for default
- “make all” the defaults (pdf and html)
- “make pdf” nice!
- “make html” why not?
- “make odt” are you kidding?

Document options are defined by:

- Makefile
- .index.yaml
- .pre_process.sh
- .columns.lua

At least you need pandoc installed.

List of tags

```
5 #async
1 #brewers
2 #broadband
1 #ccd
57 #chp1
1 #cleaned
16 #cleaning
12 #cm21
2 #coddling
3 #data_corruption_certain
1 #data_format_change
34 #data_loss
3 #down_time
6 #error
2 #inclined
7 #katastroph
1 #key_1
1 #key_2
5 #leveling
1 #mounting
2 #panic
8 #problem
2 #pysolar
2 #radmon
1 #radmon_reboot
6 #silica
2 #sun_vector
10 #suspicious_data
1 #sync
1 #temp
1 #test
11 #tracker
20 #tracker2
1 #works
```