



NETWORKS AND ENGINEERING STANDING COMMITTEE

AGENDA

CHAIR: MATTHEW WILKINSON

CO-CHAIR: GEORG KIRCHNER

AGENDA

- Beam Divergence Procedure
- NESC Forum
- What stations require to identify and eliminate systematics.
- Site log review
 - Stations Changes File proposal (Christian Schwatke)



BEAM DIVERGENCE MEASUREMENTS

NETWORKS AND ENGINEERING STANDING COMMITTEE

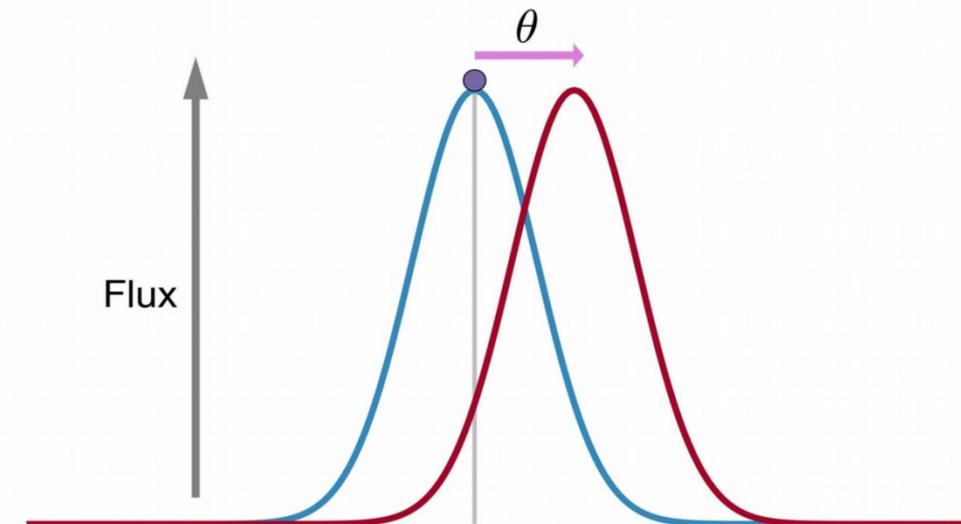


ENERGY DENSITY AT SATELLITE HEIGHTS

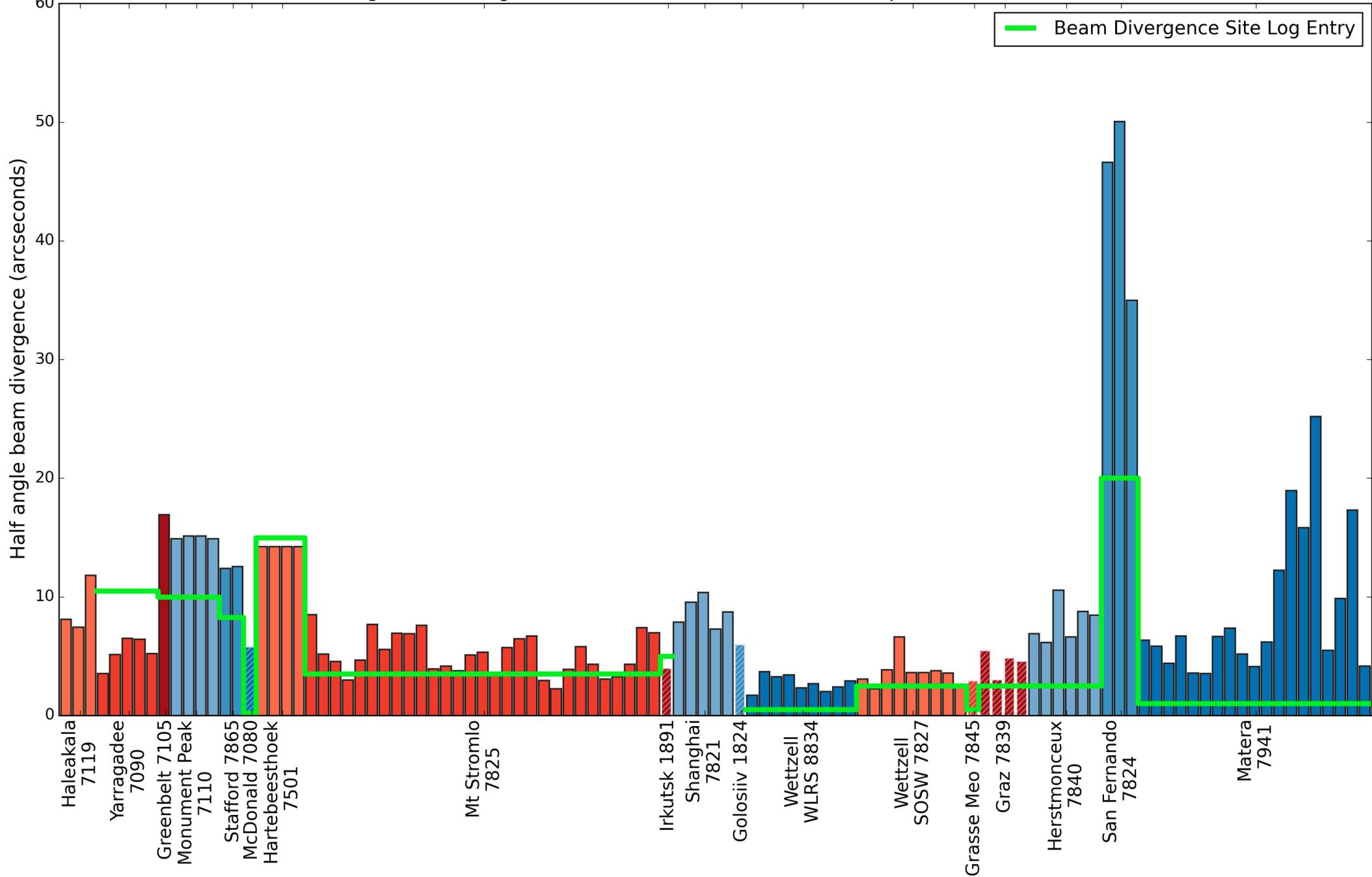
- A number of missions operators have asked questions about the laser energy densities incident on their satellite.
- Calculations of energy density can be made from the laser pulse energy, the beam divergence angle and the satellite height
- The upcoming ACES experiment onboard the ISS adds additional importance to determining these values.

BEAM DIVERGENCE PROCEDURE

- Building on the work of M. Davis, R. Burris and J. Rodriguez, a beam divergence procedure was designed and provided to the ILRS community on the ILRS website.
- The procedure involves scanning the satellite to find the point of extinction and then finding the energy reduction required to match the extinction.
- In the run up to the ILRS Workshop I have been in contact with ILRS stations to request that they carry out the beam divergence measurement procedure.



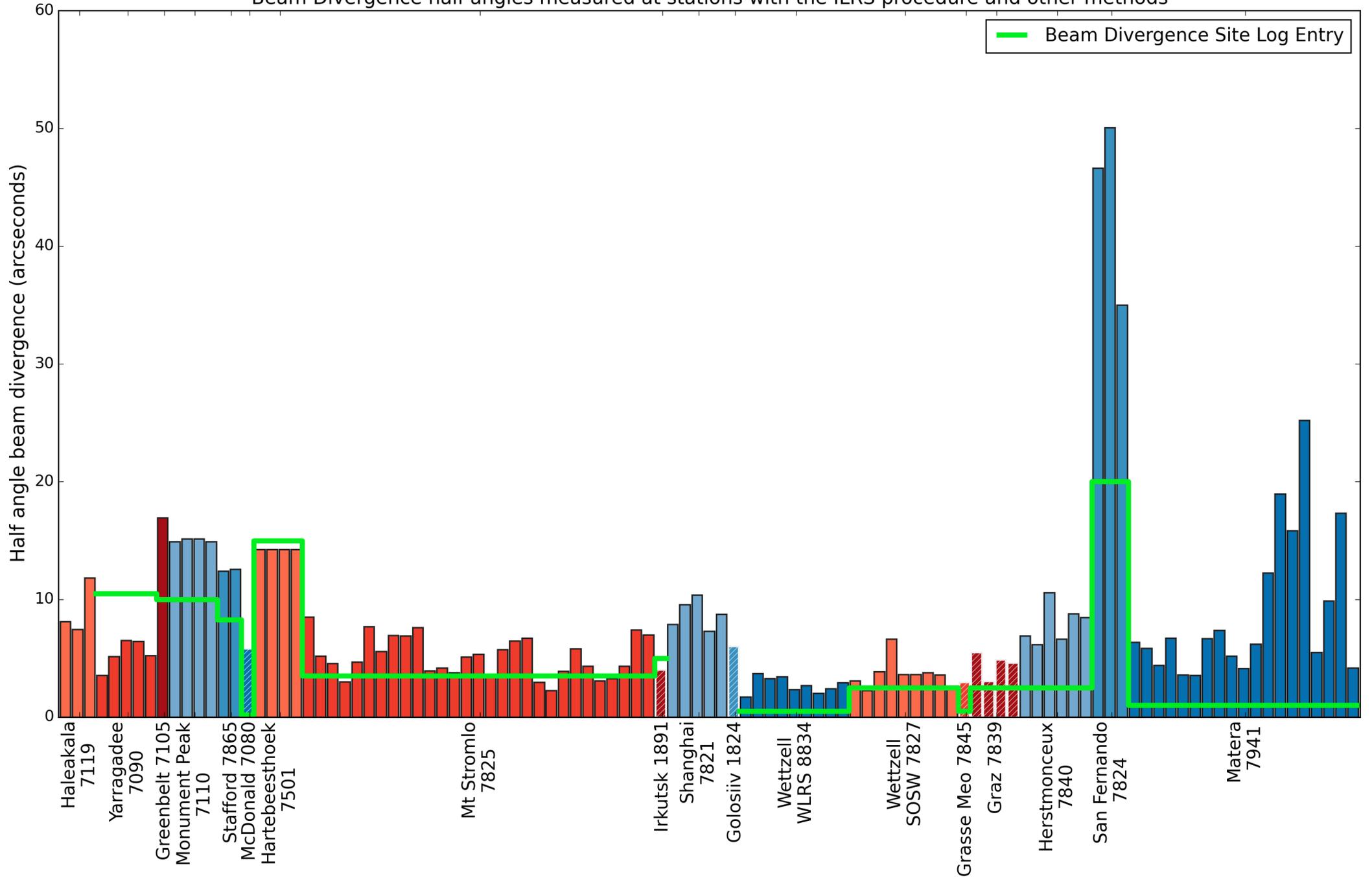
Beam Divergence half-angles measured at stations with the ILRS procedure and other methods



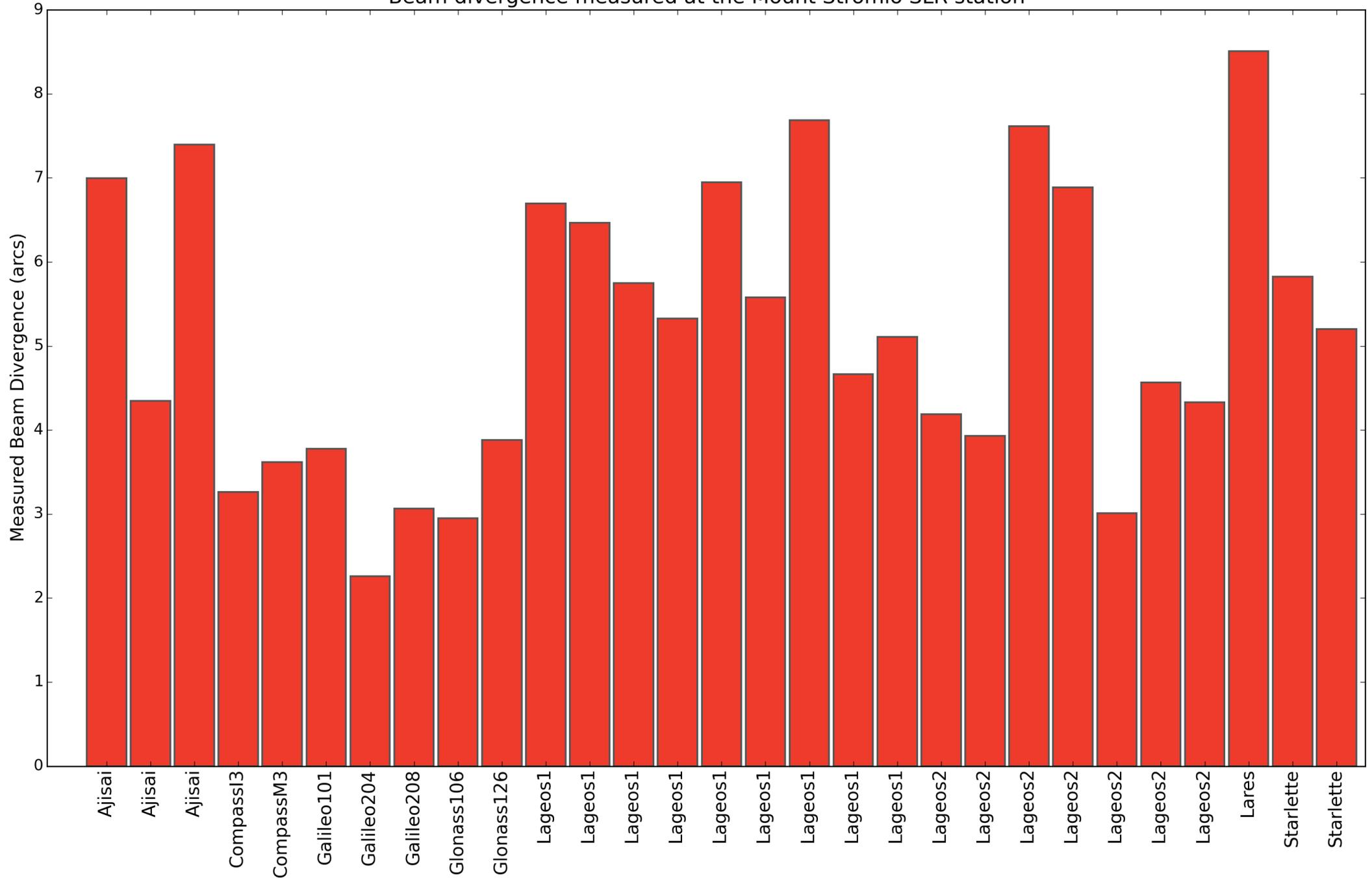
NOT A PROCEDURE FOR ALL

- The stations are hashed in white are those that did not carry out the procedure but did provide alternative information.
 - **Graz** provided satellite scan data
 - **Grasse** have developed an alternative satellite scan method
 - **McDonald** provided beam divergence calculations from ray tracing
 - **Golosiv** and **Irkutsk** calculate divergence by measuring the beam diameter in the focal plane.
- **McDonald** and **Golosiv** could not perform the procedure due to limited pointing accuracy of their telescope. **San Fernando** have same problem but performed measurement anyway.
- **Borowiec** do not have a working energy meter
- **Riga** had a problem with the threshold of their timer
- Some stations have technical problems (**Zimmerwald**, **Simosato**)

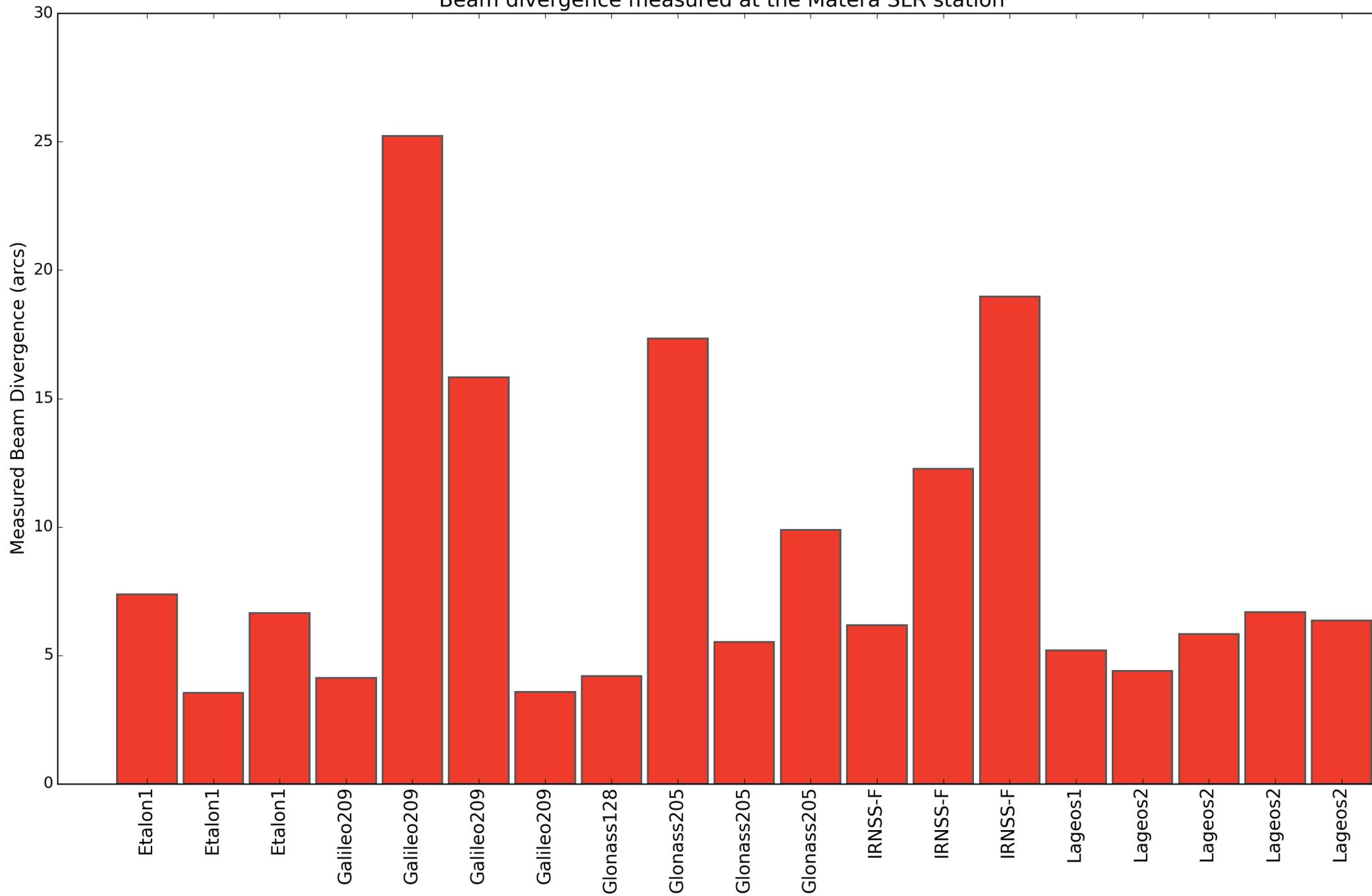
Beam Divergence half-angles measured at stations with the ILRS procedure and other methods



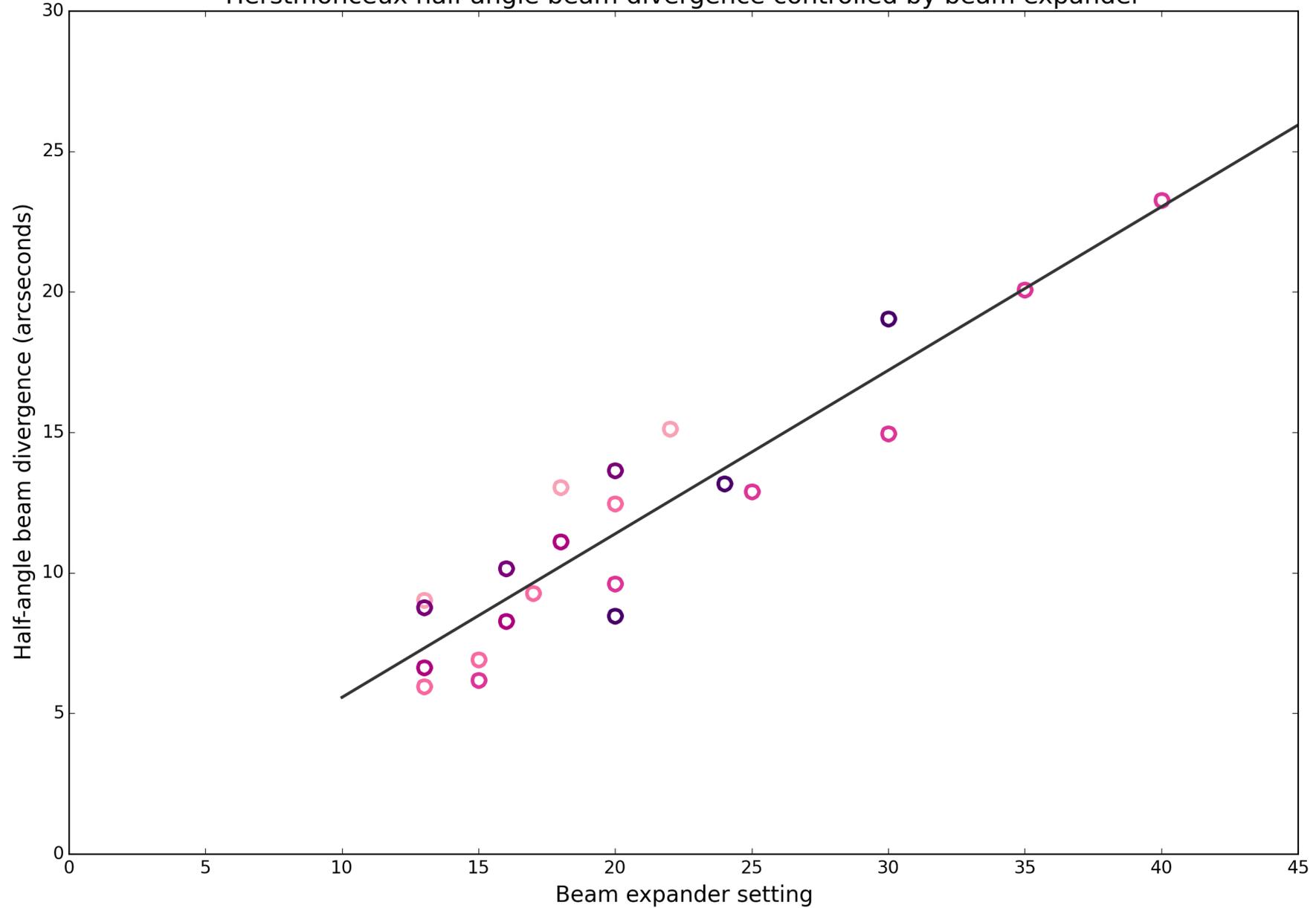
Beam divergence measured at the Mount Stromlo SLR station



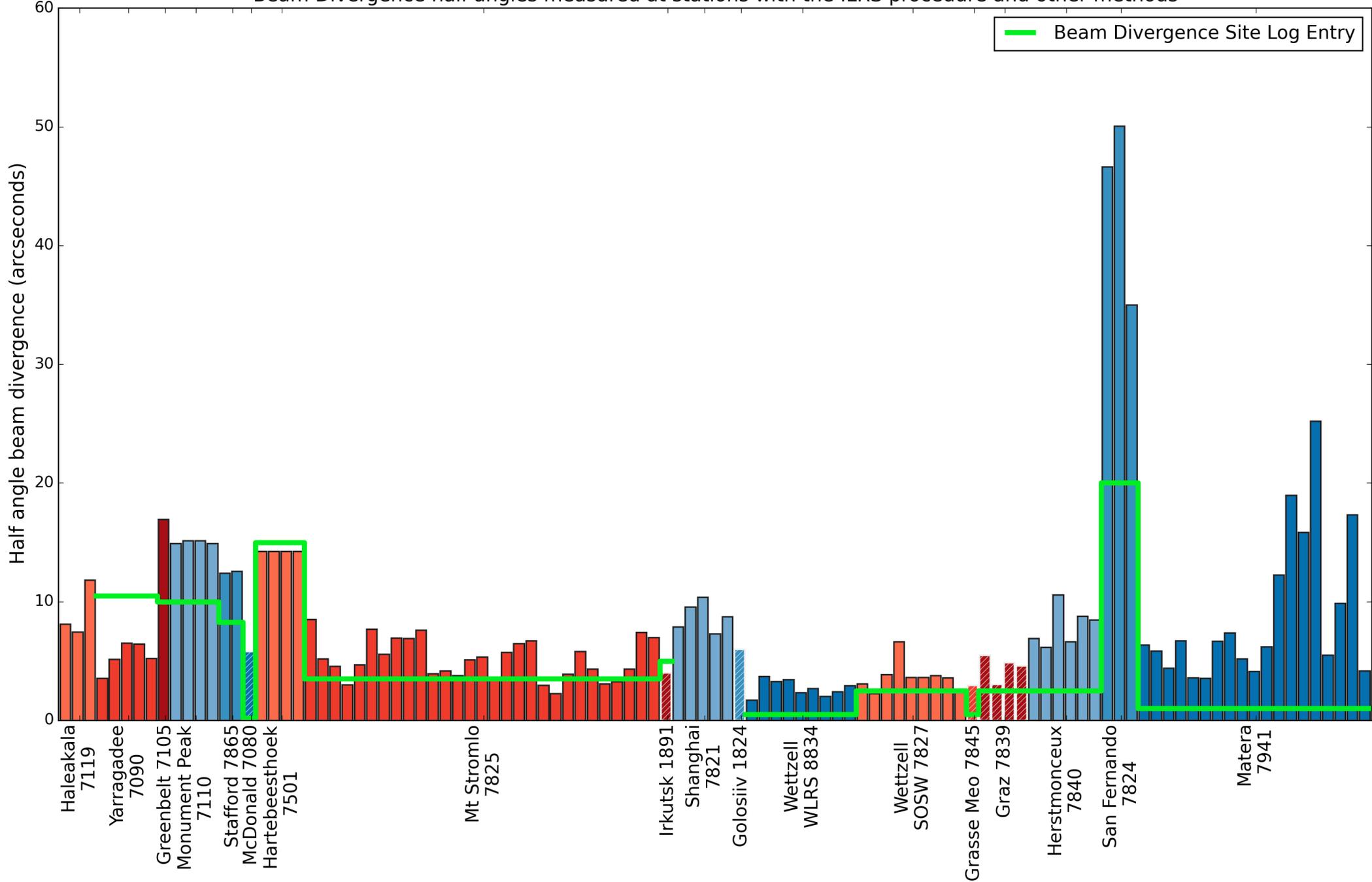
Beam divergence measured at the Matera SLR station



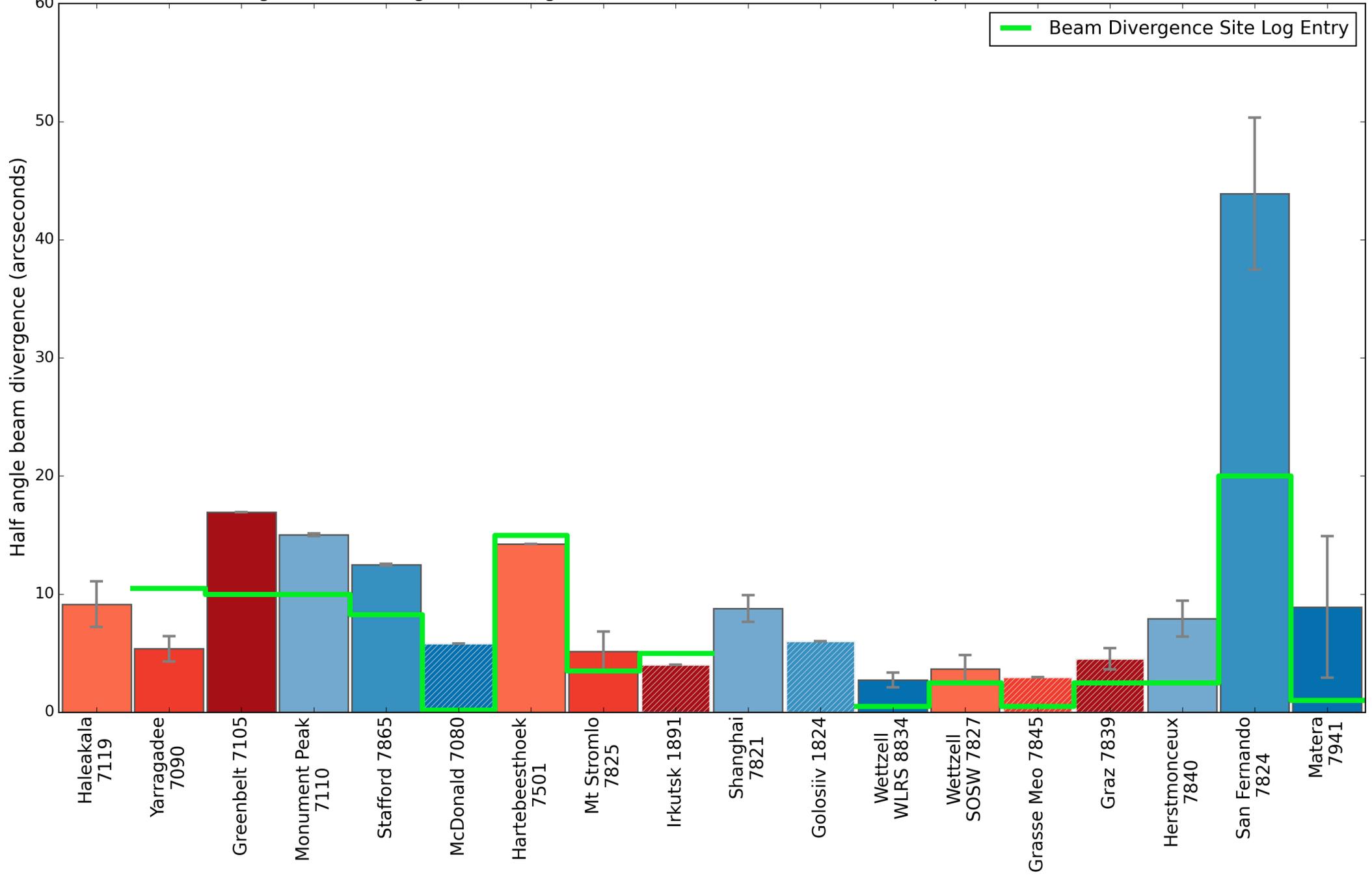
Herstmonceux half-angle beam divergence controlled by beam expander



Beam Divergence half-angles measured at stations with the ILRS procedure and other methods

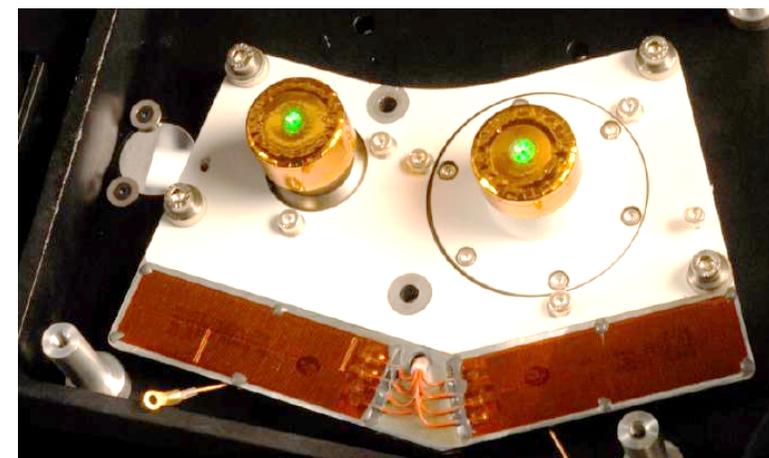


Averaged Beam Divergence half-angles measured at stations with the ILRS procedure and other methods

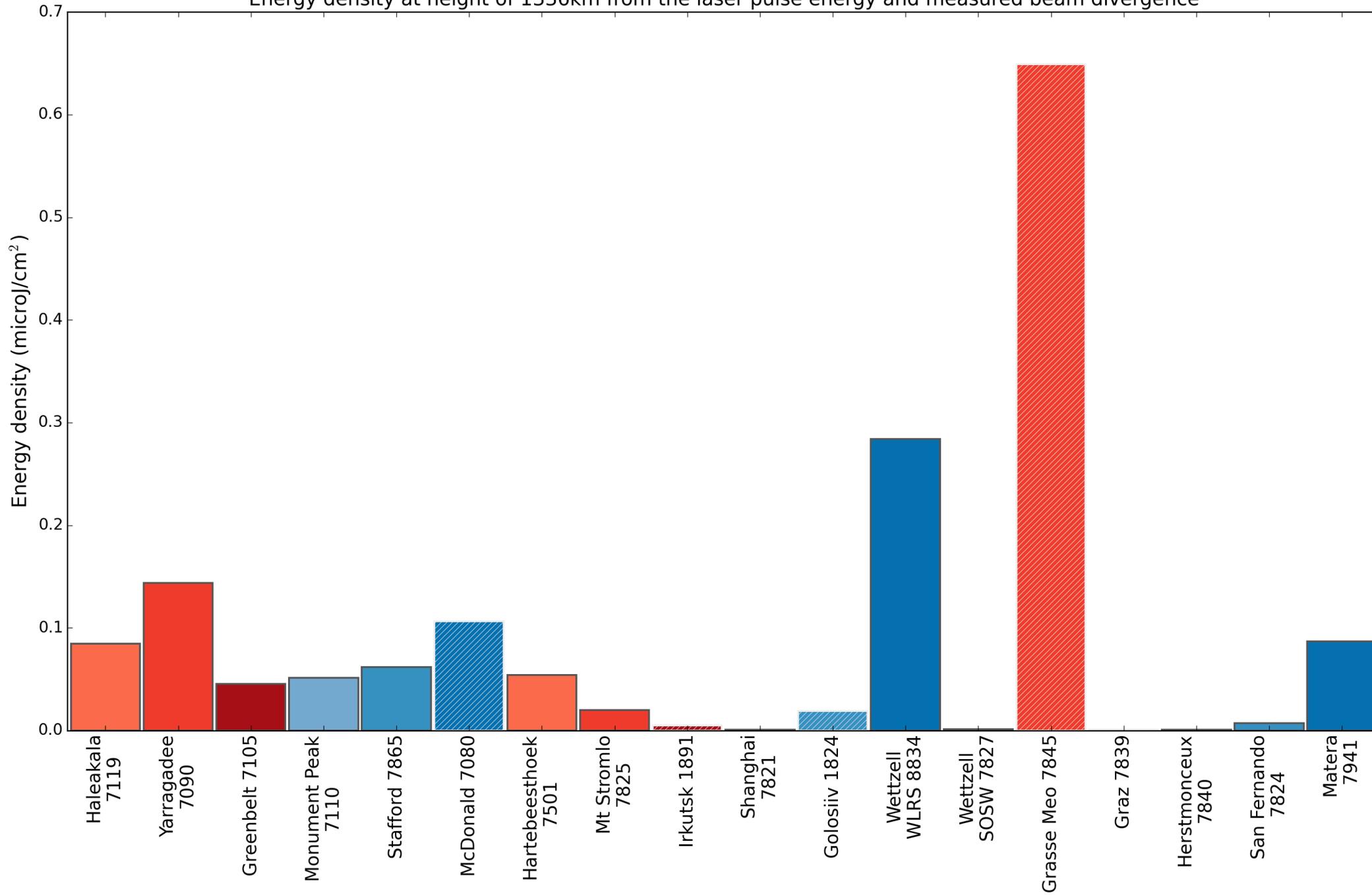


JASON2 ENERGY DENSITIES

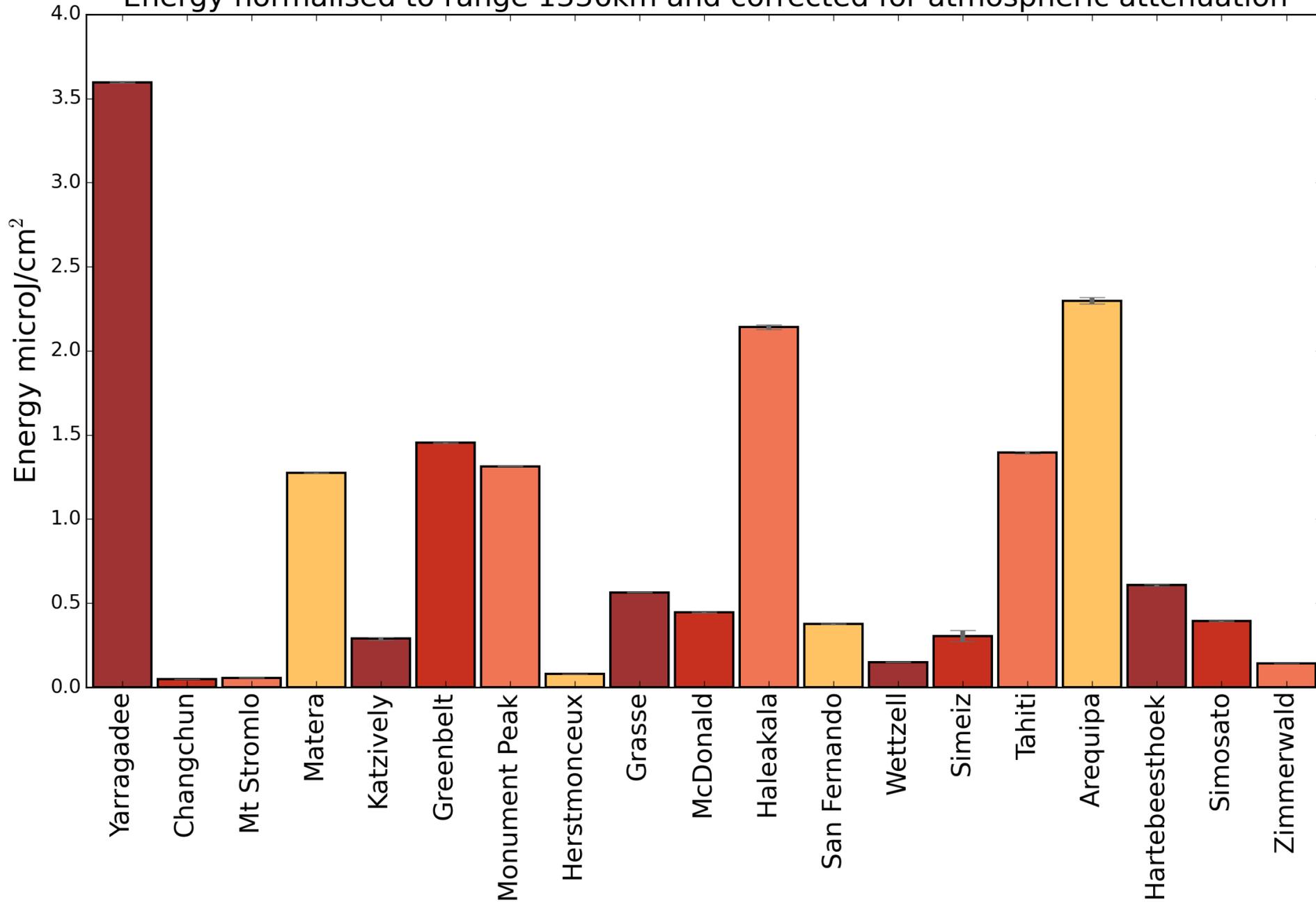
- From its launch in 2008, as part of the OCA/CNES time transfer by laser link (T2L2) payload, Jason-2 recorded energy densities of incoming SLR laser pulses.
- The raw data is corrected for this filter to give a measure of J/m^2 , in the plane perpendicular to the line of sight.
- Using the Site Log laser pulse energy and measured beam divergences, I calculated the energy density at Jason2 height of 1336km.
- Pierre Exertier provided pulse energies recorded at Jason2 for the year 2015.



Energy density at height of 1336km from the laser pulse energy and measured beam divergence



Average Energy of Laser Pulses Detected by Jason2 T2L2 in 2015.
Energy normalised to range 1336km and corrected for atmospheric attenuation



*With thanks to
OCS and CNES
colleagues for
providing this
data.*

CONCLUSIONS

- The beam divergence procedure works well for many stations, but it does not work for all stations.
- Recommend that an entry “Measured Beam Divergence” section is added to the Site Log.
- This method can inform the Missions SC questions on energy densities at satellite heights.



NESC ONLINE FORUM

NETWORKS AND ENGINEERING STANDING COMMITTEE



ILRS NESC FORUM

- The new NESC forum aims to:
 - Strengthen the connection, communication and collaboration between international colleagues.
 - Exploit the wealth of experience and knowledge in the ILRS network to address problems that are common to multiple stations.



<http://sgf.rgo.ac.uk/forumNESC>

ILRS NESC FORUM

- Online now and open to the ILRS community
- Register as a member to:
 - Post topics
 - Post replies
 - Get notifications by email
 - See attachments



<http://sgf.rgo.ac.uk/forumNESC>



Networks and Engineering Standing Committee Forum

Welcome

Welcome to the ILRS NESC Forum

This Forum is open to ILRS Networks and Engineering Standing Committee members and to the wider satellite laser ranging community. It is provided so that colleagues can discuss issues, develop ideas, pose questions and ask for or provide advice. Please do what you can to make this an lively and enjoyable forum that proves to be an important tool for the NESC and the ILRS community.

3 Posts
1 Topics

Last post by Matt_SGFHx
in Re: NESC Forum - Please ...
on June 27, 2016, 11:05:05 AM

General Topics



Open a Discussion

Bring up an issue for the attention of the NESC Forum

2 Posts
1 Topics

Last post by jose_sgf
in Re: Anybody know Arnold ...
on July 22, 2016, 09:36:53 AM



Ideas

What bright ideas have you had recently?

4 Posts
1 Topics

Last post by Matt_SGFHx
in Re: Making satellites vi...
on September 21, 2016, 08:17:53 AM



Detecting and Minimising Station Range Bias

Discuss here techniques for detecting sources of range bias at SLR stations and ways to minimise these errors.

0 Posts
0 Topics



Station Performance

Discuss the performance of stations in terms of data quality and quantity.

4 Posts
3 Topics

Last post by Toshimichi Otsubo
in Station performance char...
on September 20, 2016, 04:03:20 PM



Station Updates and News

Let the community know what's happening at your SLR station

1 Posts
1 Topics

Last post by serna_yebes
in Hello from Yebes Observa...
on June 20, 2016, 10:31:57 AM



Networks and Engineering Standing Committee Forum - Statistics Center

General Statistics

Total Members:	47	Average registrations per day:	0.26
Total Posts:	23	Average posts per day:	0.21
Total Topics:	13	Average topics per day:	0.10
Total Categories:	3	Total Boards:	14
Users Online:	3	Latest Member:	Hiroo Kunimori
Most Online:	36 - July 01, 2016, 05:48:34 AM	Average online per day:	2.95
Online Today:	3	Male to Female Ratio:	8:1
Total page views:	3426	Average page views per day:	15.29

Top 10 Posters

Matt_SGFHx		9
Manuel		2
Toshimichi Otsubo		2
delpino@riga		1
shaosr		1
Luis Manuel Cortina		1
Iglg		1
Evan GSFC		1
serna_yebes		1
Georg		1

Top 10 Boards

Ideas		4
Station Operational Questions		4
Station Performance		4
Welcome to the ILRS NESC Forum		3
Data Handling Questions		2
Open a Discussion		2
Station Equipment Questions		1
Station Updates and News		1
Lasers		1
In-Sky Safety		1

Top 10 Topics (by Replies)

Making satellites visible during daylight ranging		3
NESC Forum - Please read on joining the forum		2
Normal Points software		2

Top 10 Topics (by Views)

Making satellites visible during daylight ranging		313
SLR Hit Rate 2015		259
NESC Forum - Please read on joining the forum		237

Pages: [1]

[REPLY](#)[ADD POLL](#)[UNNOTIFY](#)[MARK UNREAD](#)[SEND THIS TOPIC](#)[PRINT](#)[Author](#)

Topic: Making satellites visible during daylight ranging (Read 308 times)

May 06, 2016, 10:16:32 AM

Georg

Newbie



Posts: 1



Making satellites visible during daylight ranging

« on: May 06, 2016, 10:16:32 AM »

[Quote](#) [Modify](#) [Remove](#) [Split Topic](#)

Hi everybody from Graz !

During our last visit at Potsdam SLR station in March 2016, Lutz Grunwaldt showed us CCD images of short visible flashes of Envisat during a daylight tracking session - a surprise for us !

We have now installed a proper CCD in our detection package, and have started to visualize at least large targets during daylight tracking; we expect it to be quite useful when tracking e.g. debris using TLE with larger TB values etc....

We have started now to fill a list, which targets we have seen already during daylight... maybe I can report more about, when I am back from a 3 week holiday, which will start tomorrow :-)

Any other experiences with that ?

Georg



Report to moderator 193.170.87.144 (?)

July 05, 2016, 05:14:04 PM

Reply #1

Iglg

Newbie



Posts: 1



Re: Making satellites visible during daylight ranging

« Reply #1 on: July 05, 2016, 05:14:04 PM »

[Quote](#) [Modify](#) [Remove](#) [Split Topic](#)

I, too, once in the daytime saw GLONASS, when the satellite was well illuminated by the sun. I think that should be visible Ajisai.



Post reply

Subject:

Message icon: 

B  **U**      Font Face Font Size Change Color

 Attachments and other options

shortcuts: hit shift+alt+s to submit/post or shift+alt+p to preview

Topic Summary

Posted by: **Matt_SGFHx**
« on: September 21, 2016, 08:17:53 AM »

 Insert Quote

Hi Georg

Do you have any more details on how to do this? What equipment do you use? And can you post an image?

Matt

ILRS NESC FORUM

- Notifications
 - In order to get email notifications of new posts or daily or weekly summaries it is necessary to select 'NOTIFY' on the topics or boards that you want to follow.



The screenshot displays the ILRS NESC Forum interface. At the top, there is a navigation bar with links for Home, Help, Search, Admin, Moderate, Profile, My Messages, Members, and Logout. Below this is a search bar. The main content area shows a forum thread titled "Station Operational Questions". The thread list includes two entries:

Subject / Started by	Replies / Views	Last post
Beam Divergence Measurement Started by Matt_SGFHx	0 Replies 49 Views	August 23, 2016, 03:08:44 PM by Matt_SGFHx
Normal Points software Started by Manuel	2 Replies 141 Views	July 22, 2016, 09:11:48 AM by Matt_SGFHx

At the top of the thread list, there are buttons for "NEW TOPIC", "NEW POLL", "NOTIFY" (circled in red), and "MARK READ".

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