

# Questions, bugs and features.

**Tim Dittmann**  
2023 GNSS-IR short course



**GAGE  
SAGE**



**EarthScope  
Consortium**  
Operated by

# open science: 2023



GAGE  
SAGE



EarthScope  
Consortium



## Research Opportunities and Earth Science Released

THE WHITE HOUSE



JANUARY 11, 2023

## FACT SHEET: Biden-Harris Administration Announces New Actions to Advance Open and Equitable Research



OSTP

NEWS & UPDATES

PRESS RELEASES

*OSTP launches Year of Open Science to advance national open science policies across the federal government in 2023*

<https://nasa.github.io/Tra>

# open science



GAGE  
SAGE



EarthScope  
Operated by Consortium

“a **collaborative culture** enabled by technology that empowers the **open sharing of data, information, and knowledge** within the scientific community and the wider public to **accelerate scientific research and understanding.**”

Ramachandran et al. (2021)



# open scientific software

“efficiency, greater collaboration, reduced duplication, . . . a broadening of the user community, improved code testing, more reproducible research, and enhance[d] research transparency”

(NASEM, 2018, p. 3)

**We want you to use this software for your research.**

gnsrefl

github version: 1.3.7 pypi v1.3.7 DOI 10.5281/zenodo.5601495 docs passing

Our **We hope you might contribute to this software.**

The [shortcourse registration page](#) is live.

If you want to sign up for the GNSS-IR email list, please contact Kristine Larson.

**Goal: continuously improve the software and community.**

# github.com/kristinemlarson/gnssrefl



When you are using this software in the future:

## UPDATE:

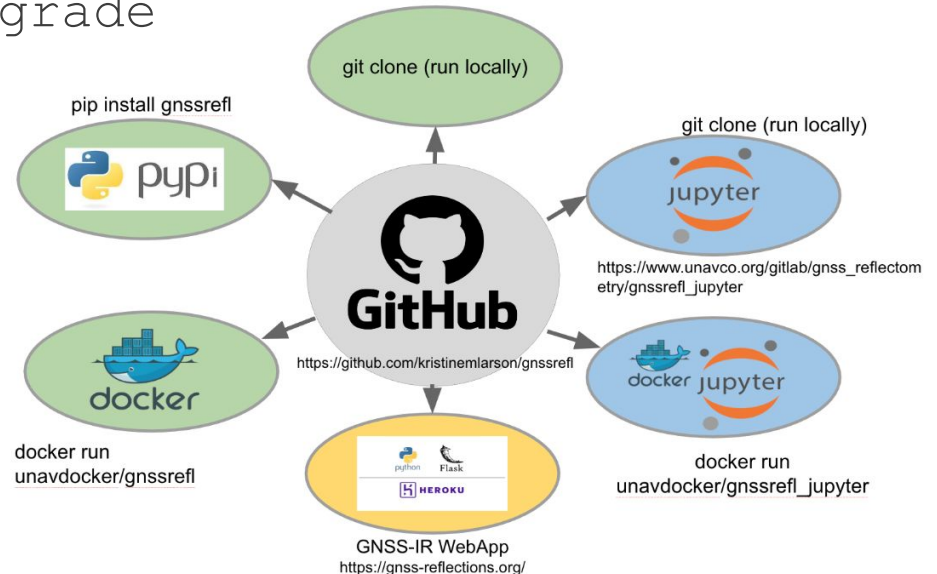
```
git pull
pip install gnssrefl --upgrade
docker pull gnssrefl
```

## QUESTIONS/ISSUES:

email  
github issue

gnssrefl

github version: 1.3.8 [pypi v1.3.8](#) [DOI 10.5281/zenodo.5601495](#) [docs](#) [passing](#)



# How to add an Issue

- Use for reporting bugs or requesting features
- Be descriptive with bug reporting
- Check to see if issues already exist before adding one

The image shows a screenshot of the GitHub repository page for `kristinemlarsongnssrefl`. The 'Issues' tab is selected, and the 'Bug report' form is visible. An orange arrow points to the 'Issues' tab in the navigation bar. The repository page includes a file list on the left, an 'About' section with tags like `python`, `ioc`, `gps`, `noaa`, `rinex`, `snow`, `gnss`, `tides`, `snr`, `reflectometry`, `gnssir`, and `gnss-ir`, and a 'Releases' section with a 'First release' on Oct 27, 2021. The 'Bug report' form has a 'Get started' button. The footer contains links for Terms, Privacy, Security, Status, Docs, Contact GitHub, Pricing, API, Training, Blog, and About, along with the GitHub logo and copyright notice for 2022.

Search or jump to... Pull requests Issues Marketplace Explore

kristinemlarsongnssrefl Public Watch 12 Fork 40 Star 79

<> Code Issues Pull requests Actions Projects Security Insights

master 2 branches 1 tag Go to file Add file Code About

**kristinemlarsongnssrefl** fixed typo in use\_pmtl.md bec697f 4 days ago 1,117 commits

docs	Merge pull request #23 from timdittmann/docker...	5 days ago
gnssrefl	bug fix: misspelled variable name	4 days ago
tests	fixed typo in use_pmtl.md	4 days ago
.dockerignore	Add Dockerfile for distribution	10 months ago
.gitignore	mostly updating the documentation	2 months ago
Dockerfile	update dockerfile for no cache and station_pos	6 days ago
LICENSE	first package	2 years ago
MANIFEST.in	more	2 years ago
README.md	update readme for email list	6 days ago
README_VEG.md	doc	3 months ago
pyproject.toml	changed setuptools < 60 instead of <= 60	17 days ago
requirements.txt	removing version restrictions on requirements.txt	2 years ago

GNSS Reflections Code

python ioc gps noaa rinex snow gnss tides snr reflectometry gnssir gnss-ir soilmoisture

Readme GPL-3.0 license 79 stars 12 watching 40 forks

Releases 1

First release Latest on Oct 27, 2021

Packages

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<> Code Issues Pull requests 1 Actions Projects Security Insights

**Bug report** Create a report to help us improve Get started

**Feature request** Suggest an idea for this project Get started

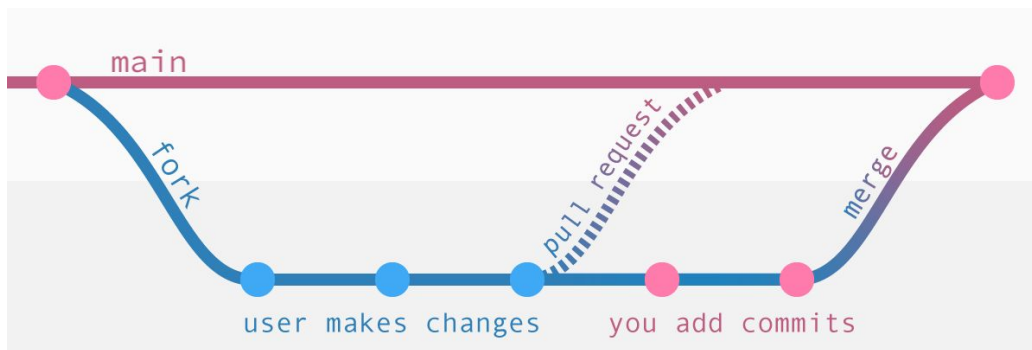
Don't see your issue here? [Open a blank issue.](#) Report abuse

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© 2022 GitHub, Inc.

# gnsrefl: a bug or a feature

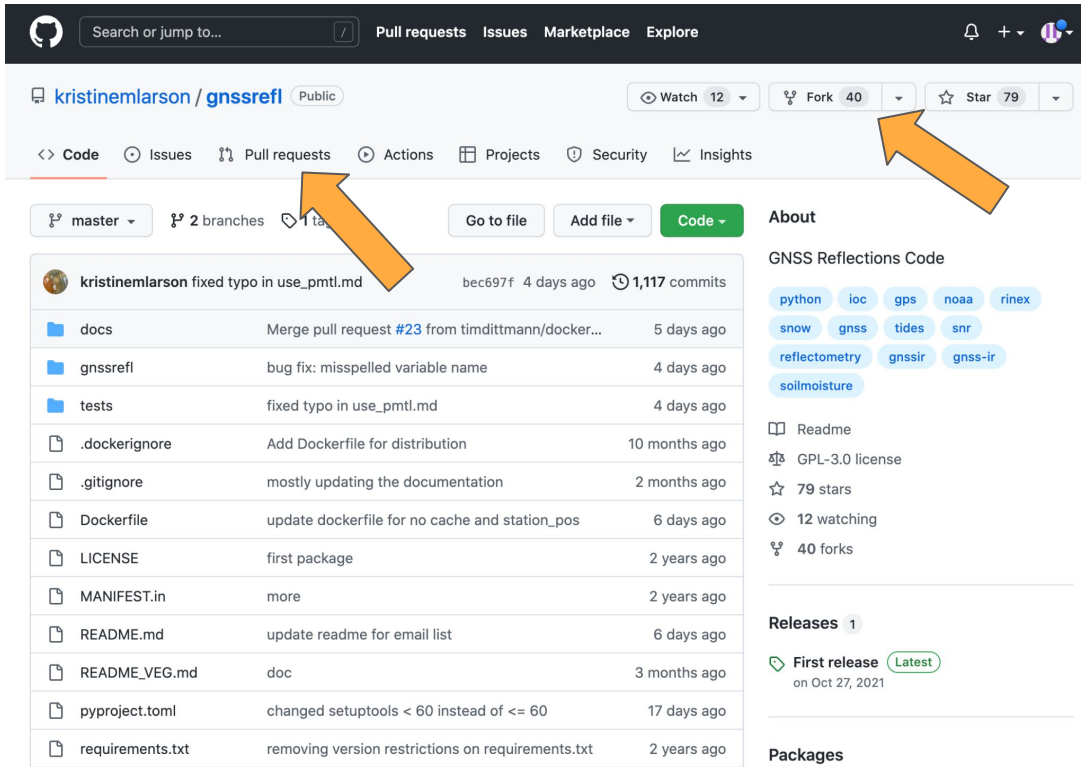
1. **Raise the issue** (with specifics)
2. **Make a pull request (PR)**



<https://tighten.com/insights/adding-commits-to-a-pull-request/>

<https://www.dataschool.io/how-to-contribute-on-github/>

# How to create a pull request



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Code Issues Pull requests Actions Projects Security Insights

master 2 branches 1 tags

Go to file Add file Code

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README_VEG.md	doc	3 months ago
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requirements.txt	removing version restrictions on requirements.txt	2 years ago

About

GNSS Reflections Code

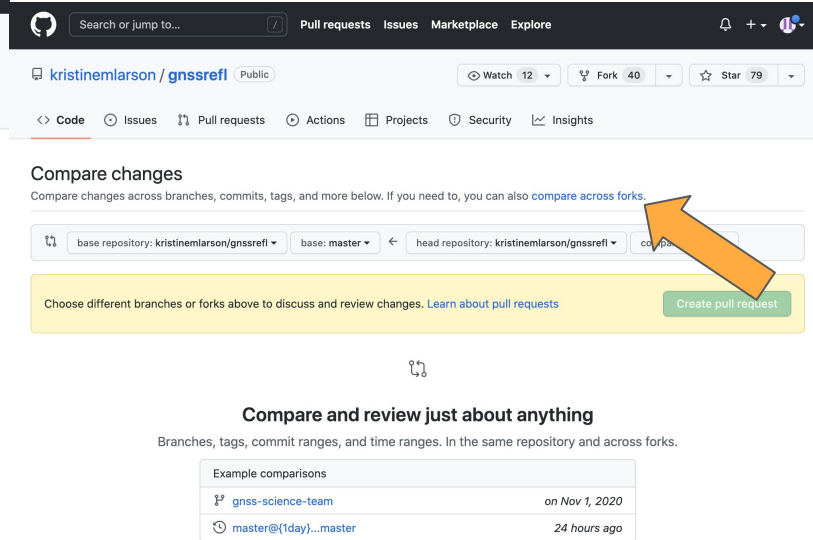
python ioc gps noaa rinex snow gnss tides snr reflectometry gnssir gnss-ir soilmoisture

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### Compare changes

Compare changes across branches, commits, tags, and more below. If you need to, you can also [compare across forks](#).

base repository: kristinemarlson/gnssrefl base: master head repository: kristinemarlson/gnssrefl

Choose different branches or forks above to discuss and review changes. [Learn about pull requests](#)

Create pull request

### Compare and review just about anything

Branches, tags, commit ranges, and time ranges. In the same repository and across forks.

Example comparisons		
gnss-science-team		on Nov 1, 2020
master@{1day}...master		24 hours ago

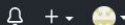


# Improvements



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## Label issues and pull requests for new contributors

[Dismiss](#)

Now, GitHub will help potential first-time contributors [discover issues](#) labeled with [good first issue](#)

Filters

is:issue is:open

[Labels](#) 10

[Milestones](#) 0

[New issue](#)

[16 Open](#) [36 Closed](#)

[Author](#) [Label](#) [Projects](#) [Milestones](#) [Assignee](#) [Sort](#)

[phase code](#)  
#122 opened last week by kristinemlarson

[add more defaults](#)  
#119 opened last week by kristinemlarson

[add nyquist code to gnsrefl](#)  
#118 opened last week by kristinemlarson

[Migrate container base image](#) [docker](#)  
#108 opened on Apr 3 by timdittmann

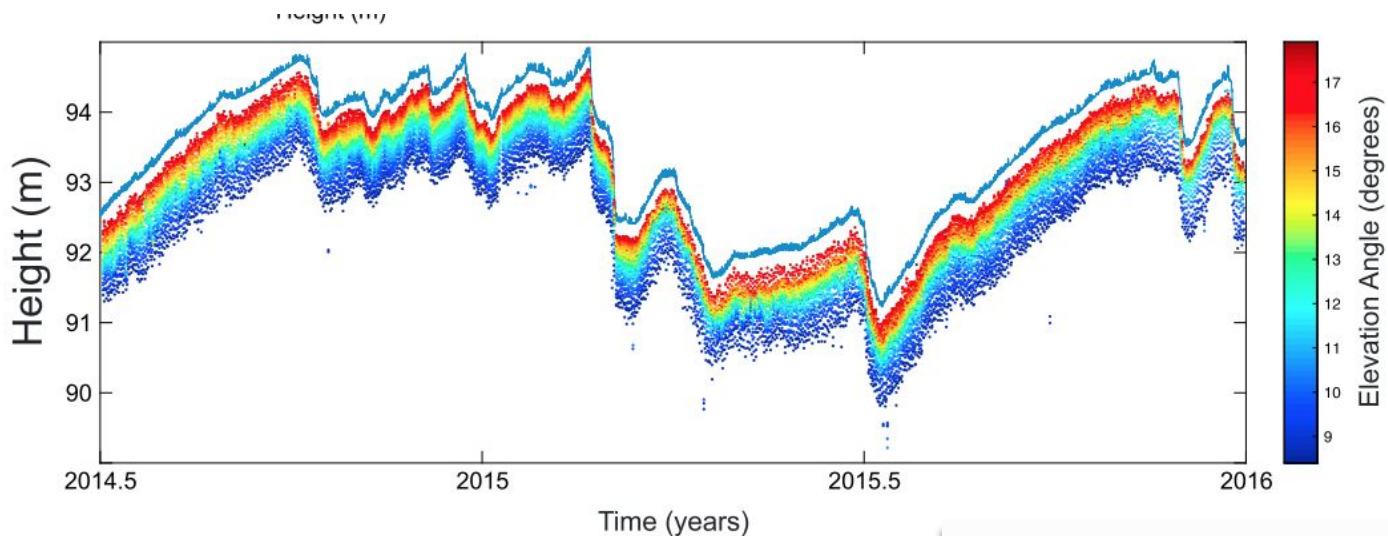
[unphysical elevation angles in NMEA files](#) [help wanted](#)  
#98 opened on Mar 24 by kristinemlarson

# Feature:

## refraction correction #53

Open

kristinemlarson opened this issue on Jan 28 · 0 comments



Williams and Nievinski (2017)

**gnssrefl.refraction module**

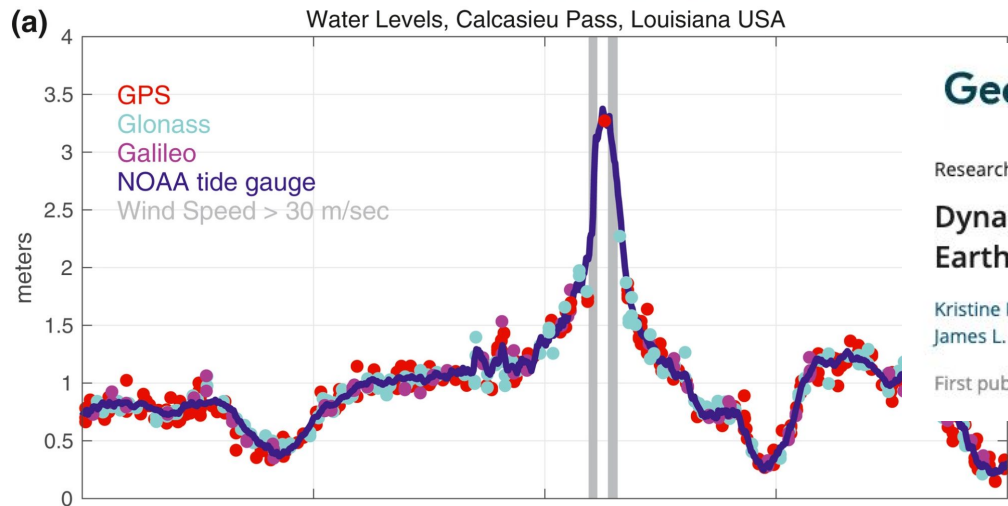
written in python from from original TU Vienna codes for GMF

# Feature:

# Significant Wave Height #47



kristinemlarson opened this issue on Jan 18 · 0 comments



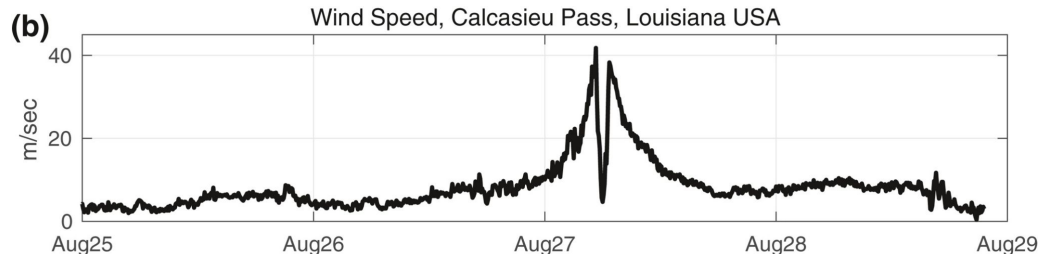
## Geophysical Research Letters\*

Research Letter | [Open Access](#) |

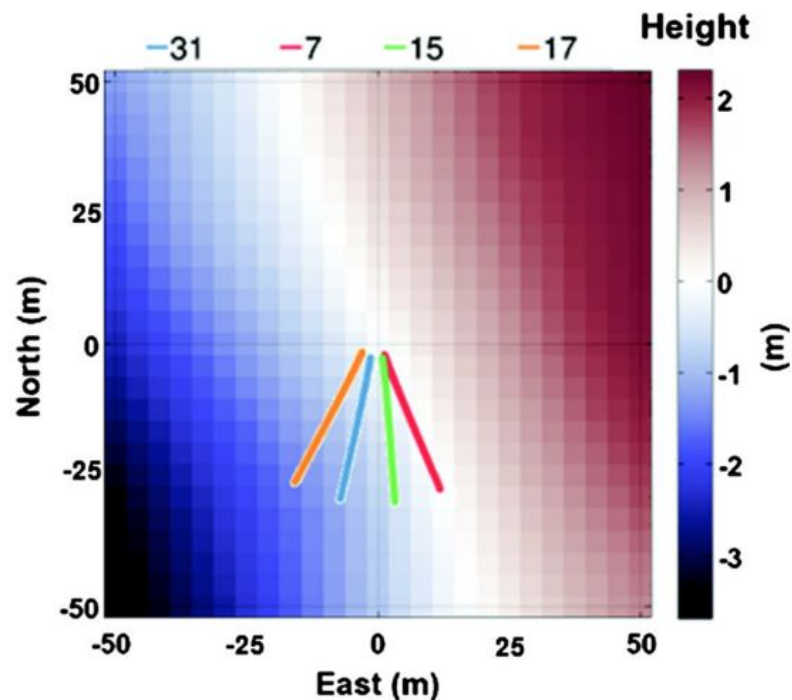
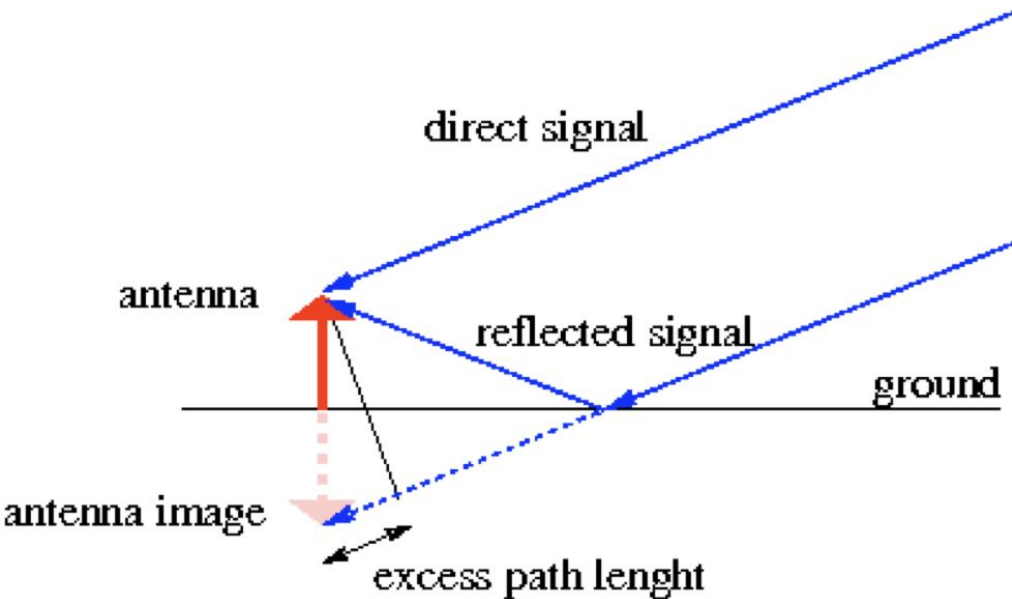
### Dynamic Sea Level Variation From GNSS: 2020 Shumagin Earthquake Tsunami Resonance and Hurricane Laura

Kristine M. Larson , Thorne Lay, Yoshiki Yamazaki, Kwok Fai Cheung, Lingling Ye, Simon D.P. Williams, James L. Davis

First published: 28 December 2020 | <https://doi.org/10.1029/2020GL091378> | Citations: 13



# Feature: Surface Slopes

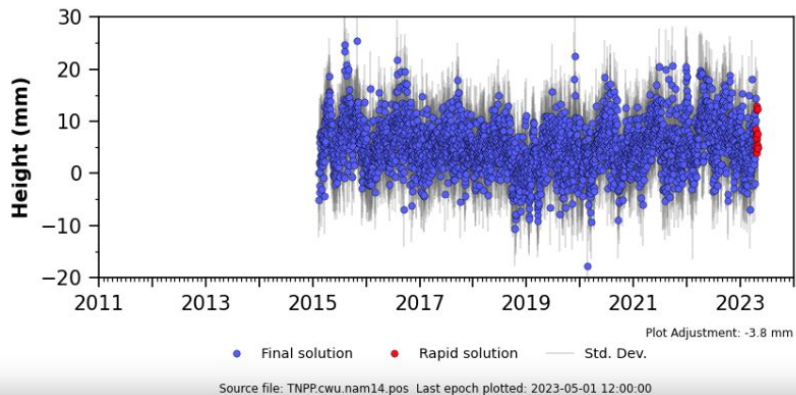
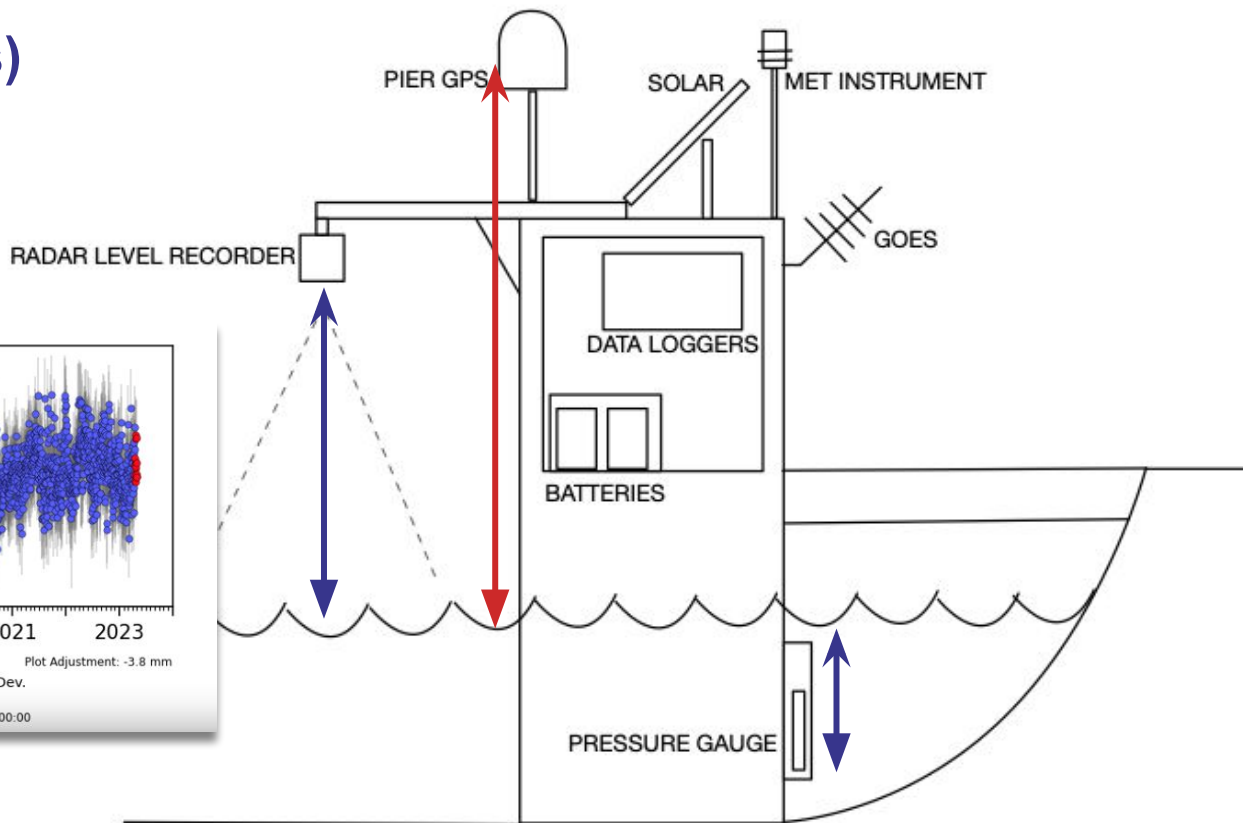


Chew, et al. (2016)

# Feature: ITRF observations

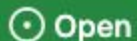
traditional tide gauge(s)

gnss-ir



# Feature:

## simple metadata database #52



Open

kristinemlarson opened this issue on Jan 28 · 0 comments



- receiver changes impact soil moisture estimates
- antennas impact sub daily users (eg. tides)

# Feature:

Add SWE module and advanced soil moisture modules to gnsrefl #46



kristinemlarson opened this issue on Jan 11 · 5 comments

GPS Solut  
DOI 10.1007/s10291-015-0462-4

ORIGINAL ARTICLE

## An algorithm for soil moisture estimation using GPS-interferometric reflectometry for bare and vegetated soil

Clara Chew<sup>1</sup> · Eric E. Small<sup>1</sup> · Kristine M. Larson<sup>2</sup>

## Snow depth, density, and SWE estimates derived from GPS reflection data: Validation in the western U. S.

James L. McCreight<sup>1</sup>, Eric E. Small<sup>2</sup>, and Kristine M. Larson<sup>1</sup>

<sup>1</sup>Department of Aerospace Engineering Sciences, University of Colorado, Boulder, Colorado, USA, <sup>2</sup>Department of Geological Sciences, University of Colorado, Boulder, Colorado, USA

Current soil moisture method works in semi-arid.

Port matlab model that supports higher vwc.

Currently gnsrefl estimates snow depth.

Port matlab SWE estimate.

# take aways



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Open-source scientific software enables efficient, reproducible, transparent science from a diverse community.

## Please use `gnssrefl` for your science.

- update the code
- ask questions
- modify it for your needs
- contribute bugs/features

We are improving this software through building this community: **you are a part of it now!**