Solar Forecast Arbiter

An open source evaluation framework for solar forecasting

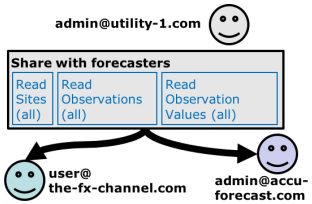
William F. Holmgren, Clifford W. Hansen, Aidan Tuohy, Justin Sharp, Antonio T. Lorenzo, Leland J. Boeman, Adam Wigington, David P. Larson, Qin Wang, Anastasios Golnas

solarforecastarbiter.org

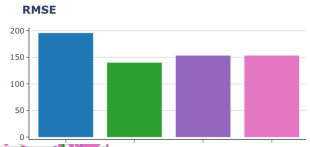
Standardized
Objective
Open source

GitHub

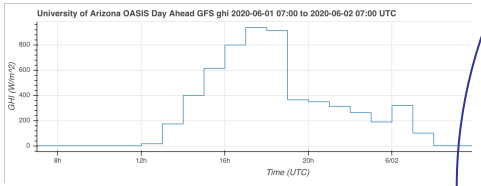
Free!
Available now!

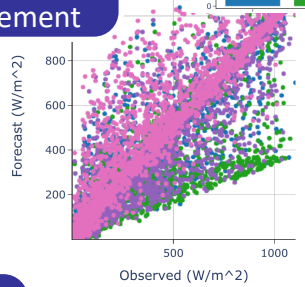


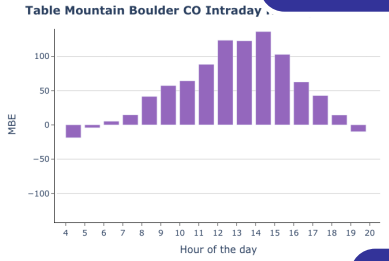
Safe, secure, private
Data rights management

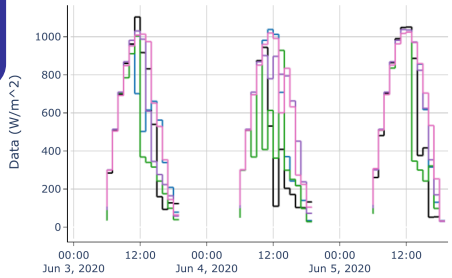


Stakeholder Informed







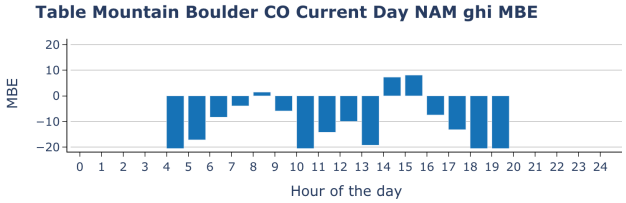


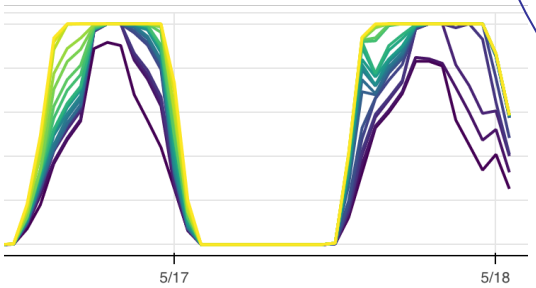
Solar Forecast Arbiter API

Download OpenAPI specification: Download

Graphical reporting
Automated workflow

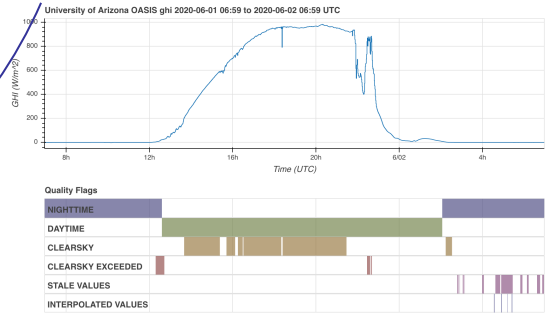
Many-vendor trial
Anonymization
Realtime and retroactive





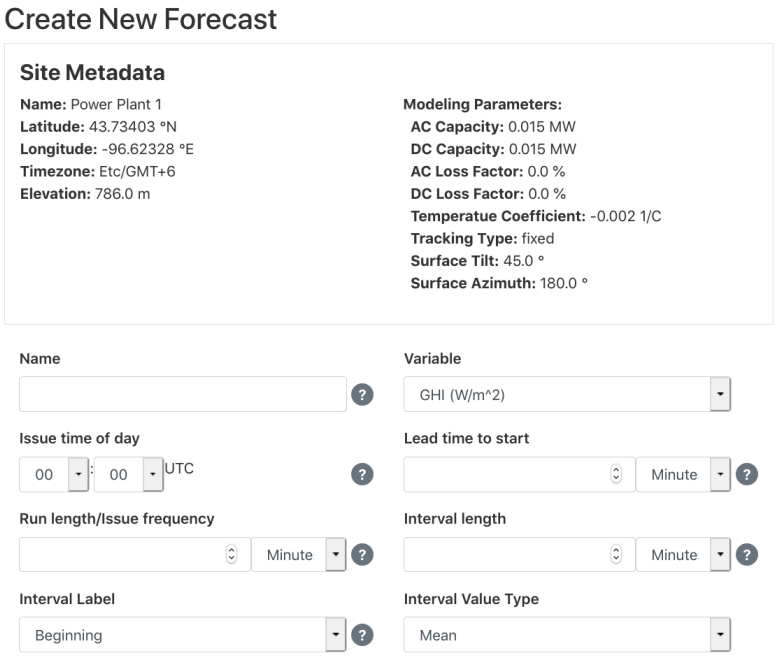
Deterministic
Event
Probabilistic

Data quality control
Reference data & forecasts



How do I use the Solar Forecast Arbiter?

1. **Define site, observation and/or forecast metadata**
2. Upload observation and/or forecast data
3. Optional: grant another user access to your metadata/data
4. Run analysis report



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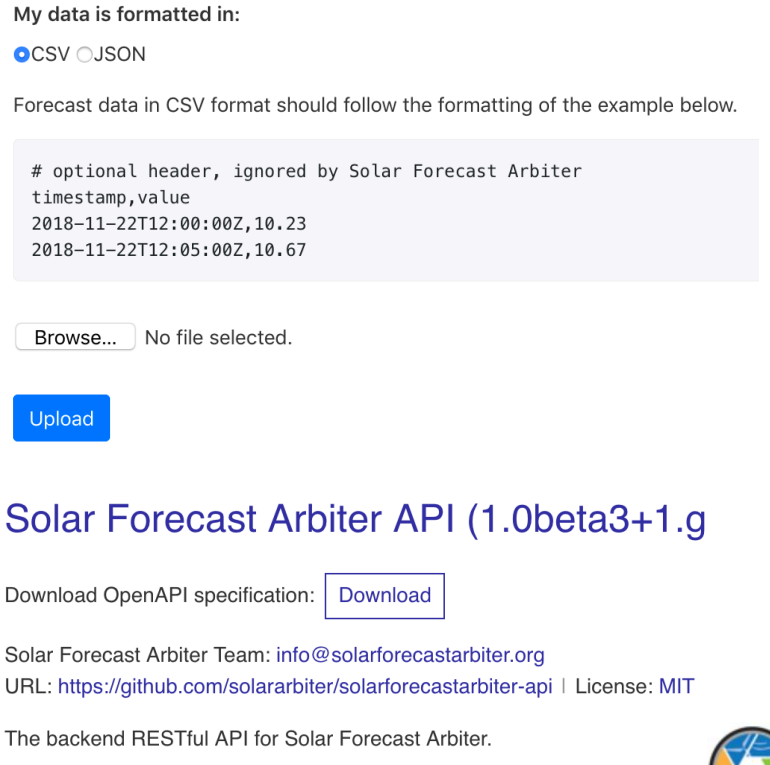

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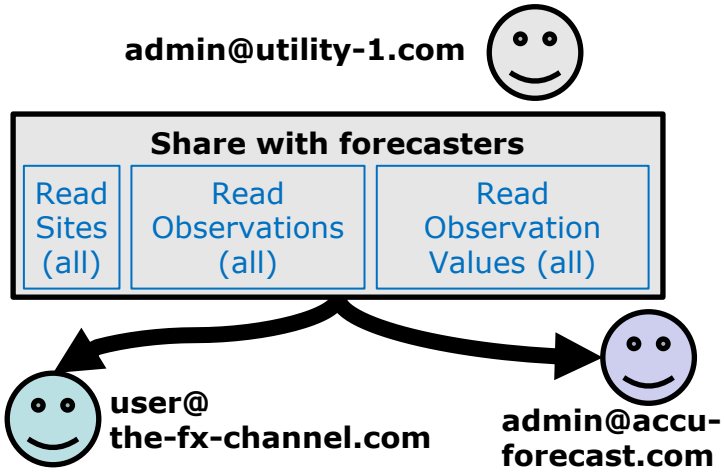

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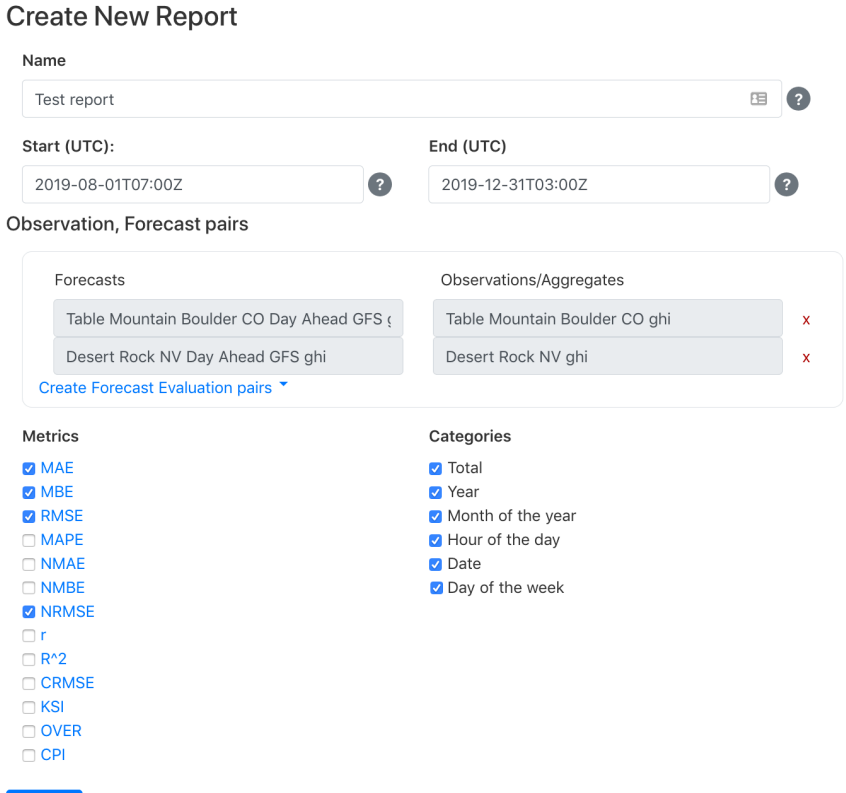


Example Report

2020 NOAA SURFRAD Table Mountain Boulder CO GHI

This report of solar forecast accuracy was automatically generated using the Solar Forecast Arbiter. Please see our GitHub repository for known issues with the reports or to create a new issue.

This report can be downloaded as a standalone HTML file or PDF file. The download is a ZIP archive that includes checksums for the report file and a PGP signature that can be used to verify the authenticity of the report. The Solar Forecast Arbiter PGP key ID is 0x22bd497c0930f8b0.

Report Metadata

- Name: 2020 NOAA SURFRAD Table Mountain Boulder CO GHI
- Start: 2020-01-01 00:00:00+00:00
- End: 2020-12-31 23:59:59+00:00
- Generated at: 2020-06-18 07:15:37+00:00

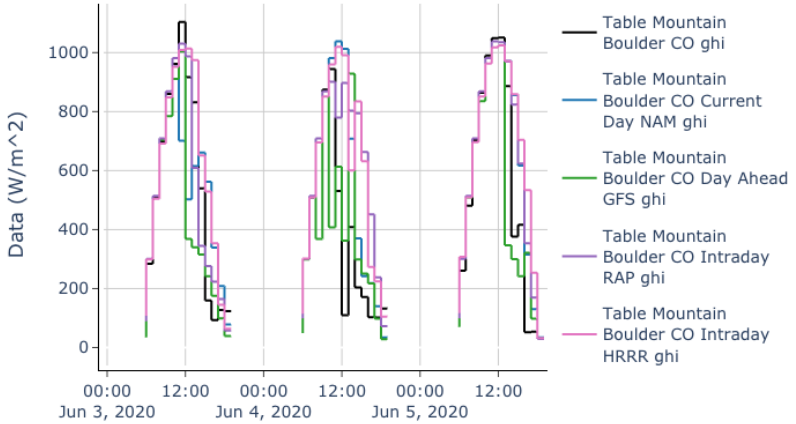
Data

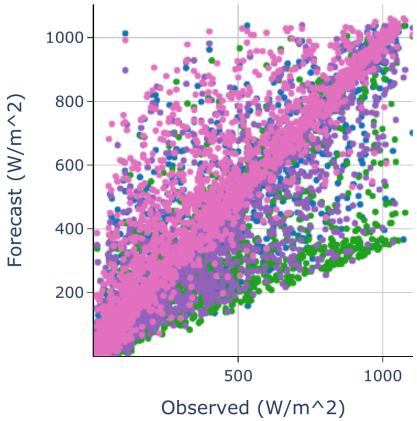
This report includes forecast and observation data available from 2020-01-01 00:00:00+00:00 to 2020-12-31 23:59:59+00:00.

Observations and Forecasts

The table below shows the observation, forecast, and reference forecast triplets analyzed in this report. The

Time series and scatter plots





Plotly

Interactive

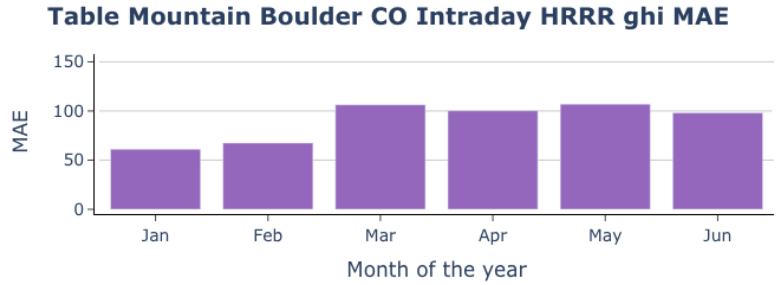
Downloadable

Example Report

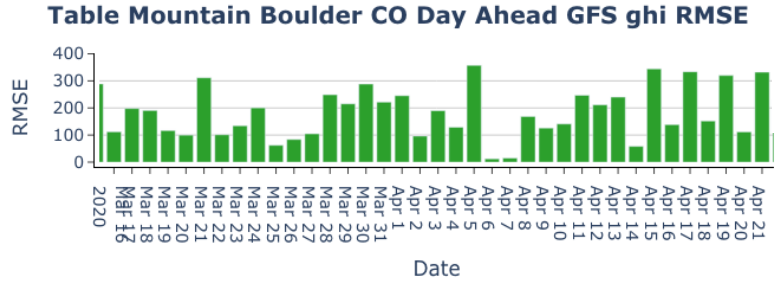
Metrics Summary Table

Forecast	MBE	MAE	RMSE
Table Mountain Boulder CO Day Ahead GFS ghi	-78.4	124	196
Table Mountain Boulder CO Current Day NAM ghi	-8.33	86.3	140
Table Mountain Boulder CO Intraday HRRR ghi	68.9	92.1	153
Table Mountain Boulder CO Intraday RAP ghi	-21.2	97.7	153

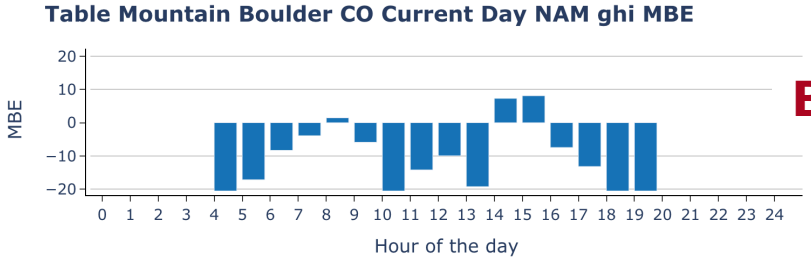
+ Forecast skill
+ Normalization
+ Deadband



By month



By date

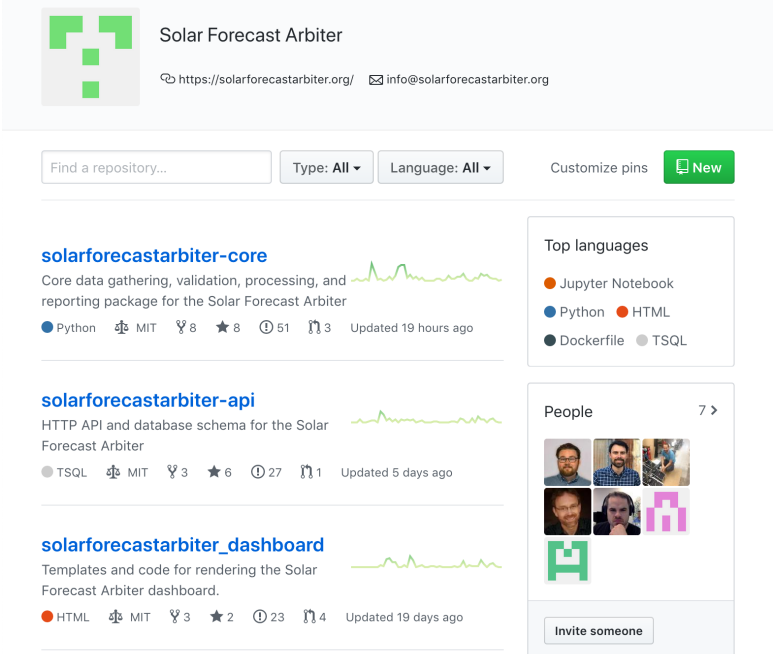


By hour

Solar Forecast Arbiter Components

Tool for analyzing accuracy of solar forecasts

- Web-based user interface
- Web-based API for scripting
- Python software package for analysis
- Scripts to redeploy entire software stack
- Detailed supporting documents
- Supported by stakeholder input, feedback



Open source. Transparently developed on GitHub

How to get started

Free!
Available now!

1. Make free user account
   - dashboard.solarforecastarbiter.org
   - Browse reference data, forecasts
2. If you like it
   - Sign the Use Agreement
   - Experiment with a small problem, upload some test data
3. If you love it
   - Help us test the operational forecast trial feature
   - Spread the word
   - Contribute to the open source code development on GitHub
4. Stay informed
   - solarforecastarbiter.org/emailist

Summary

- Open source, reproducible, transparent framework
- Use cases tailored to needs of forecast stakeholders
- Reference datasets
- Secure, private data upload. Sharing optional.
- Benchmark forecast capability
- Automated reports including bulk metrics, analysis filters
- Use dashboard, sign up for project updates at:

solarforecastarbiter.org

solarforecastarbiter.org

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admin@utility-1.com

Share with forecasters

Read Sites (all)	Read Observations (all)	Read Observation Values (all)

user@the-fx-channel.com

admin@accu-forecast.com

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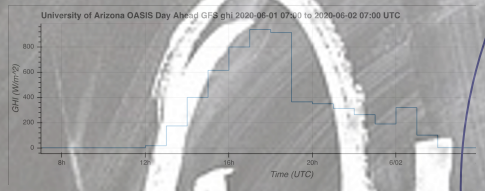

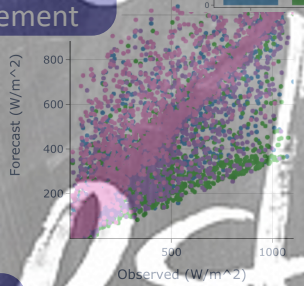

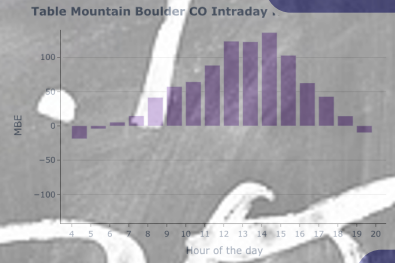

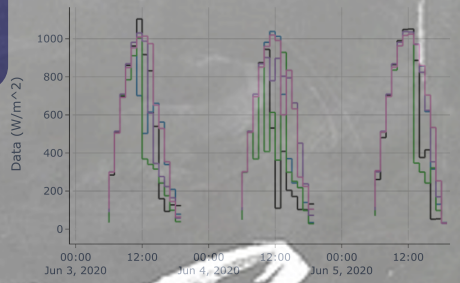

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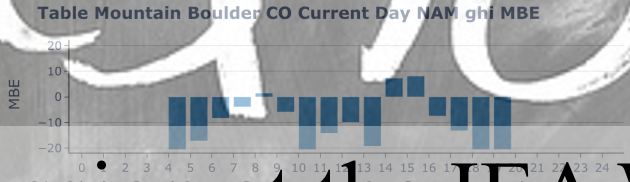

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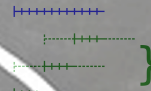

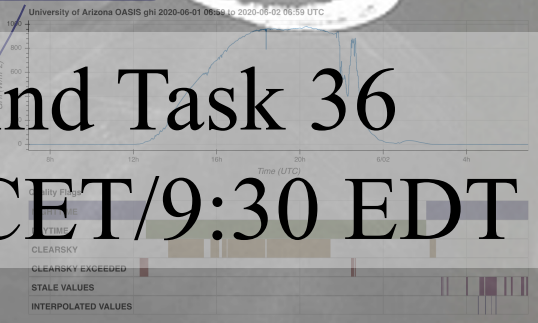

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Join the discussion at the IEA Wind Task 36 Meeting on June 24, 2020 at 15:30 CET/9:30 EDT