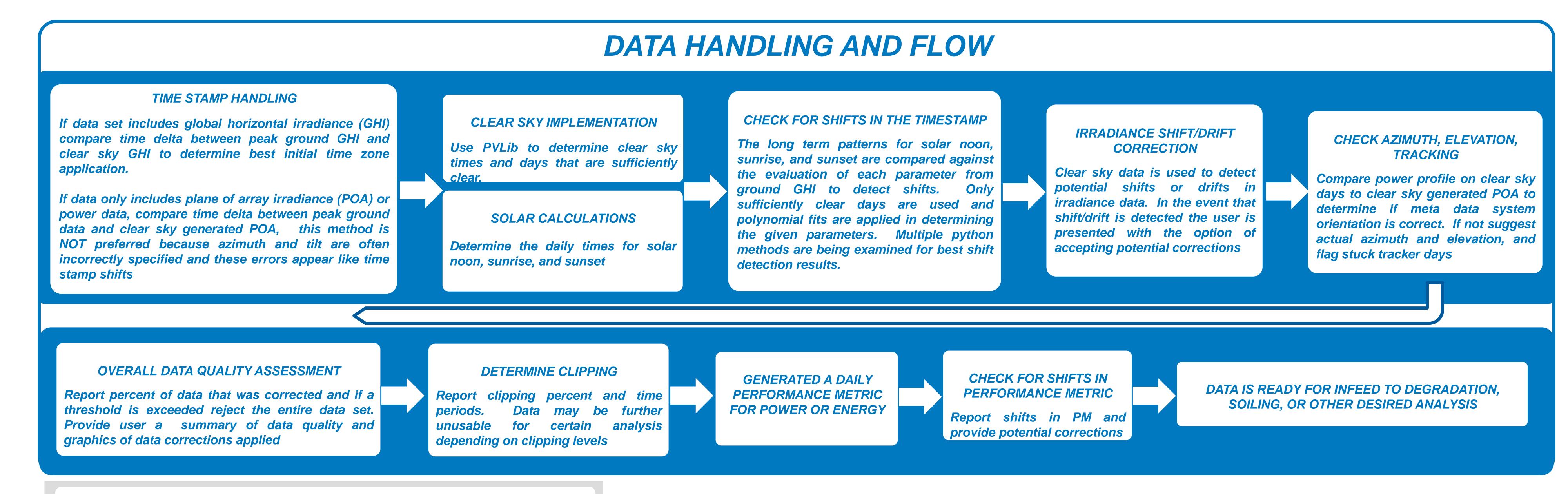
## KINREL

## Development of Automated Methods to Determine the Quality of Long-term PV Data Sets

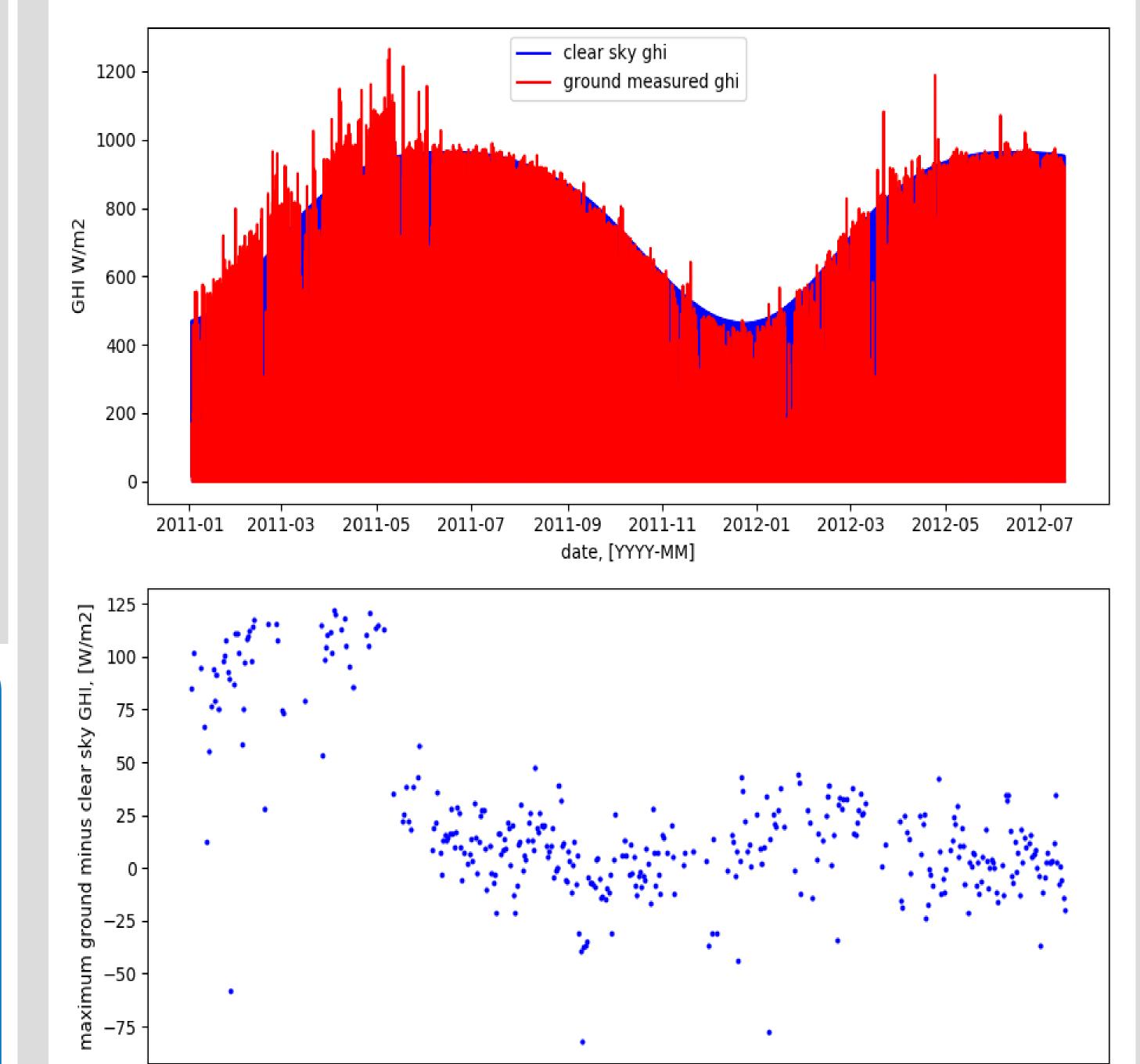
Matthew Muller, National Renewable Energy Laboratory

**PROBLEM:** analysis of PV degradation, soiling, and other performance trends benefits from analyzing 100s of time series data sets. These data are often provided with quality issues such as incorrect time stamps, drifting or miscalibrated sensors, incorrect field names, or missing periods of data. PV experts can often manually identify and correct the issues but this method is too time consuming for large scale analysis. **GOAL:** open source algorithms to automatically flag suspect data and present the user with potential corrections

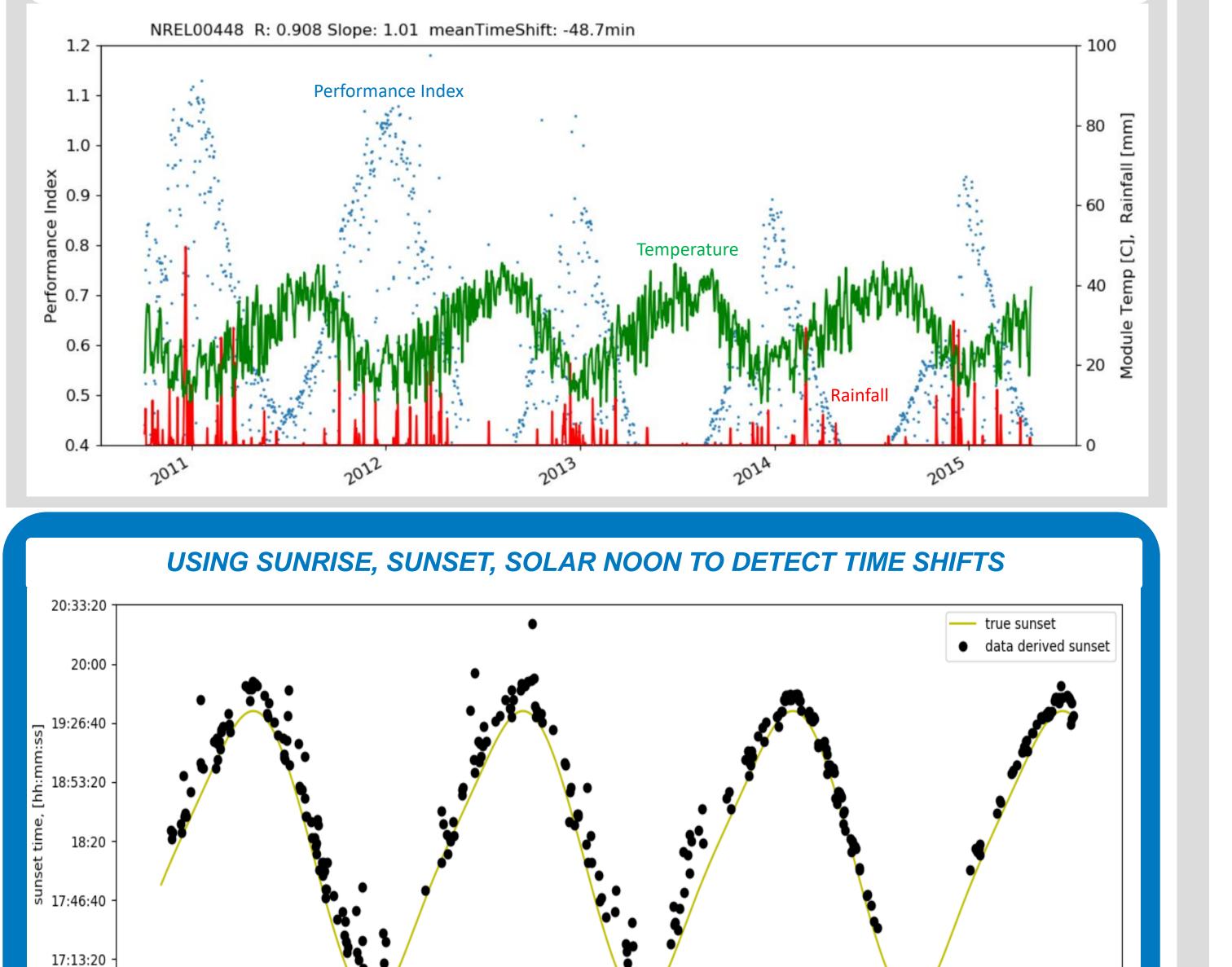


## DATA SET WITH MULTIPLE PROBLEMS IDENTIFIED

- Initial timestamp handling identified a mean time shift between the peak clear sky POA and peak power of 49 minutes.
- Tilt error was identified
- Performance shift between 2012 and 2013 was identified
- Large seasonal swings in performance index due to both time error and tilt error

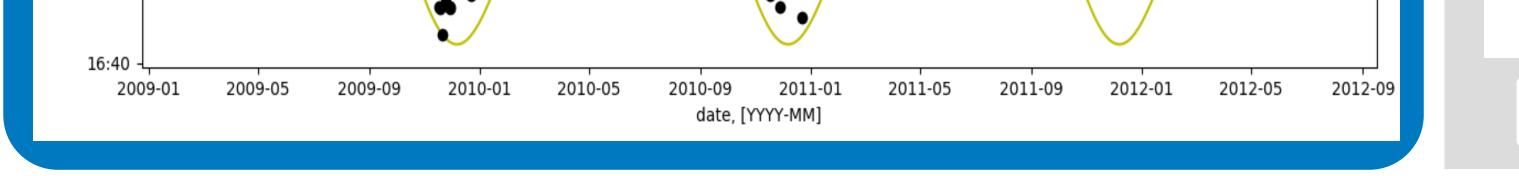


## **RESULTS AND ONGOING WORK**



2011-01 2011-03 2011-05 2011-07 2011-09 2011-11 2012-01 2012-03 2012-05 2012-07

- Algorithms are being tested on initial data sets
- There are 101 potential quality issues with data and the algorithms are not yet generalized enough to handle a wide range of variation in such problems
- Filtering levels are being tested to determine what settings best handle various data sets and time stamps
- Ground GHI data provide a much stronger starting point for quality analysis than POA or power data alone.
- Various python shift detection algorithms are being tested for robustness to solar data
- EVENTUAL SHARING THROUGH
  RDTools





This work was authored by the National Renewable Energy Laboratory, operated by Alliance for Sustainable Energy, LLC, for the U.S. Department of Energy (DOE) under Contract No. DE-AC36-08GO28308. Funding provided by U.S. Department of Energy Office of Energy Efficiency and Renewable Energy Solar Energy Technologies Office. The views expressed in the article do not necessarily represent the views of the DOE or the U.S. Government. The U.S. Government retains and the publisher, by accepting the article for publication, acknowledges that the U.S. Government retains a nonexclusive, paid-up, irrevocable, worldwide license to publish or reproduce the published form of this work, or allow others to do so, for U.S. Government purposes.

2019 PV Systems Symposium Albuquerque, New Mexico 5/14 – 5/16/2019