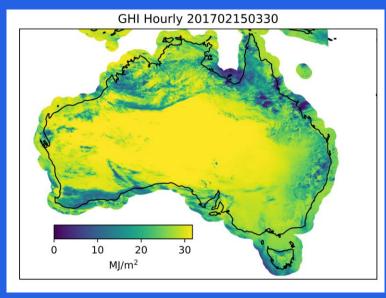


Satellite Surface Solar Irradiance

Caroline Poulsen, Leon Majewski, Chris Griffin, Vincent Villani, Dave McQueen, Harrison Cook, Matt Tully, and colleagues at Paris Mines Tech

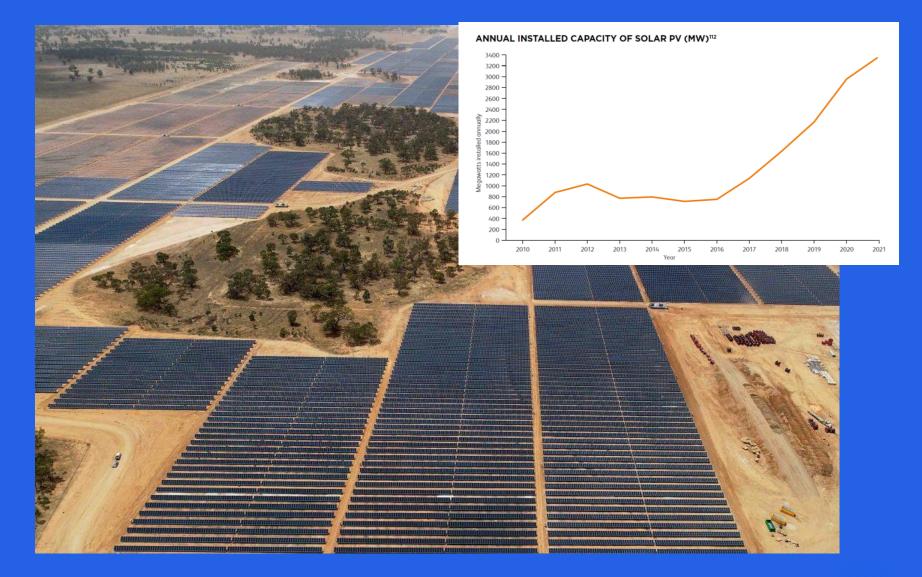
Thanks to Japan for Himawari

caroline.poulsen@bom.gov.au





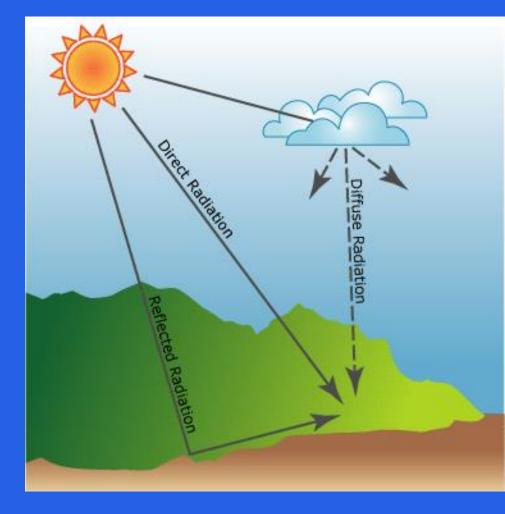
Solar irradiance applications





SSI (~0.3–4.0 µm) Surface solar irradiance

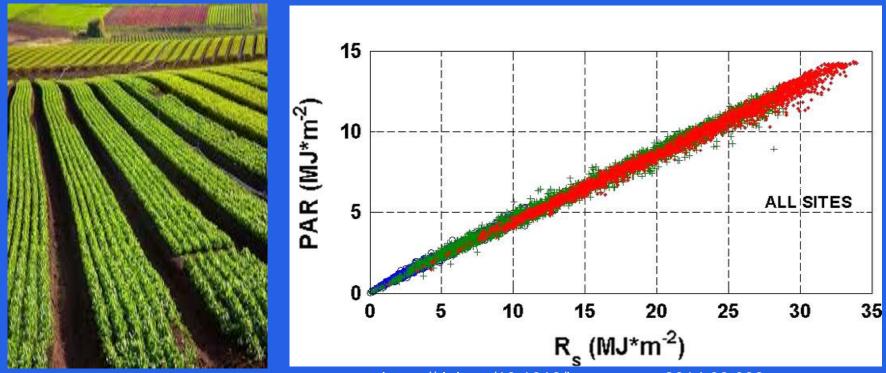
GHI Global Horizontal Irradiance DNI Direct Normal Irradiance DHI Diffuse Horizontal Irradiance Units W/m²



$GHI = DNI X cos(\theta) + DHI$



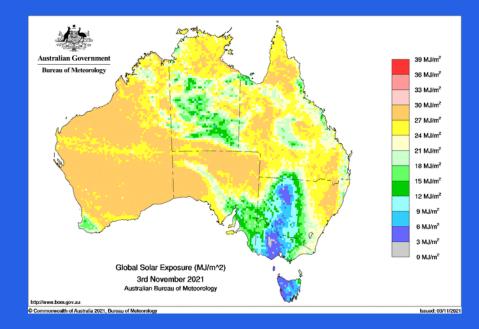
Photosynthetic Active Radiation (PAR) 400-700nm



https://doi.org/10.1016/j.enconman.2014.09.038

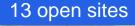


- Bureau has been producing satellite solar products since 1991 (Weymouth and Le Marshall)
- Existing products produced for each hour and 5km resolution
- Whats new?
 - Himawari satellite now every 10
 minutes and 2km resolution
 - New developments in the solar modelling community
 - BoM has new cloud retrieving capability
 - Extend over sea





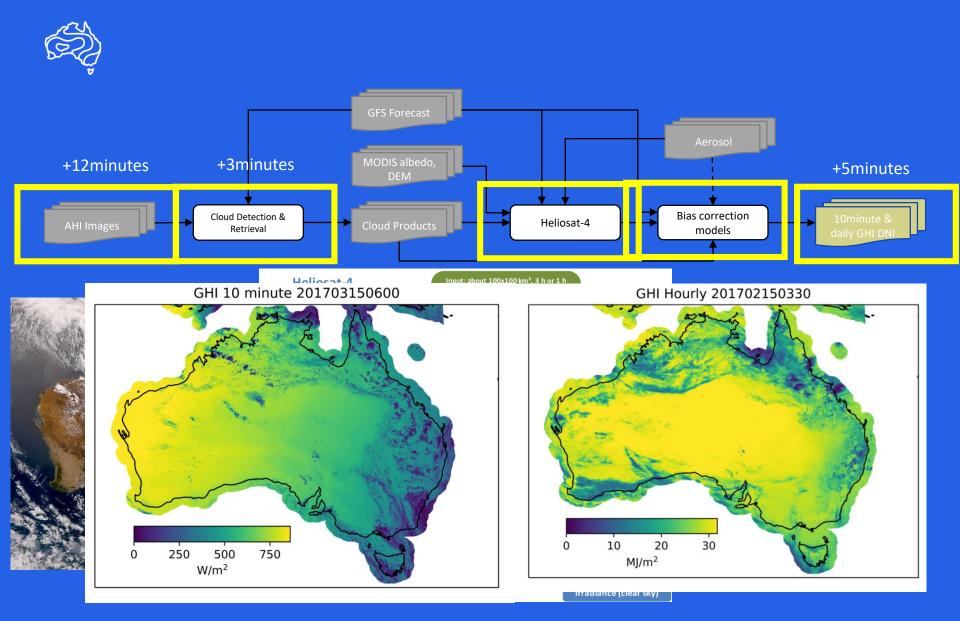
Ground-based solar observations



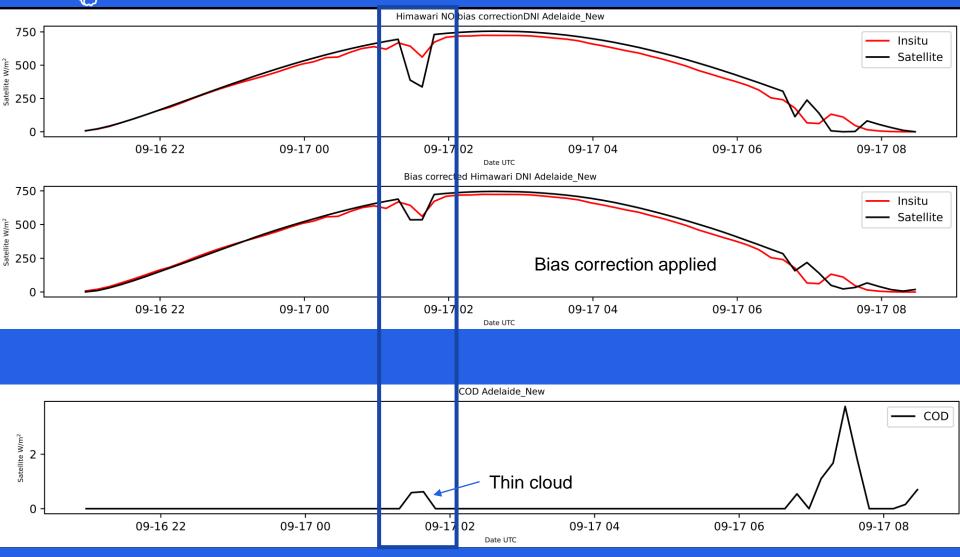




→Key for validating the results
→Key to developing bias correction

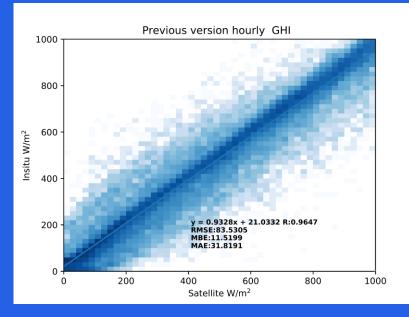


Daily with and without bias correction



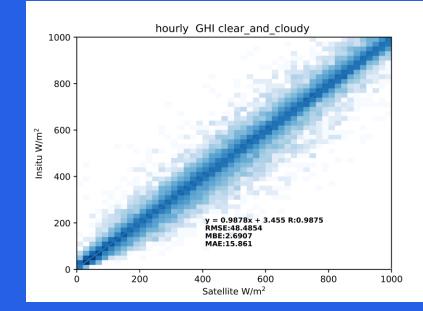


Old



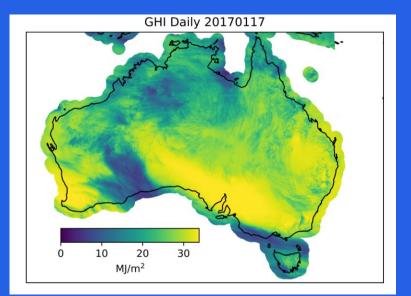
MAE= Median absolute error MBE =Mean Bias error

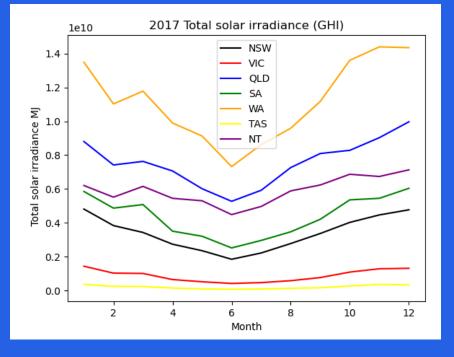
New solar





Daily average GHI by state for 2017



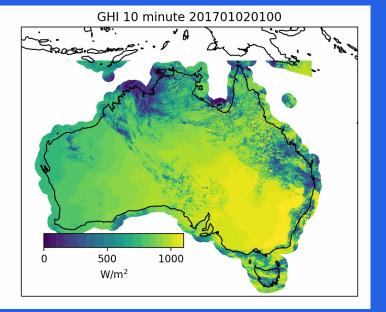




Summary: Solar Irradiance Products

Bureau has updated its Near Real Time Surface Solar Irradiance service

- Applications, solar industry, agriculture and climate.
- 10 minute 2km resolution Global Horizontal irradiance (GHI) and Direct normal Irradiance (DNI)
- Standard HelioSat-4 products bias corrected using machine learning
- <u>http://www.bom.gov.au/research/publicati</u> ons/researchreports/BRR-062.pdf
- Identified a number of areas we can improve
 - Aerosol information
- New project Forecasting Capability being investigated watch this space!



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Data is available to researchers

- CC-BY-NC-4.0 license
- 3 month delay vs operational / commercial access

Python Extension P 🕒 Save to Mendeley 🎦 Web Slice Gallery	n 🛅 New folder 🎦 DBNET 👋 Solar Irradiance, Da	> Other favourites		Web Slice Gallery 🎦 New folder 🎦 DBNET 🥚 Solar Irradiance, Da	> 🛅 Other favou
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			 surface_downwelling_shortwave_flux_in_air Direct normal irradiance at surface 	Datetime: 2022 v 2 v 9 v 03.20:00 v UTC first frame last frame	
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