NAM2015

Performance of the Birmingham Solar-Oscillations Network (BiSON)

The Variable Sun: Cycles, Waves, Oscillations, and Instabilities - 2015 July 9

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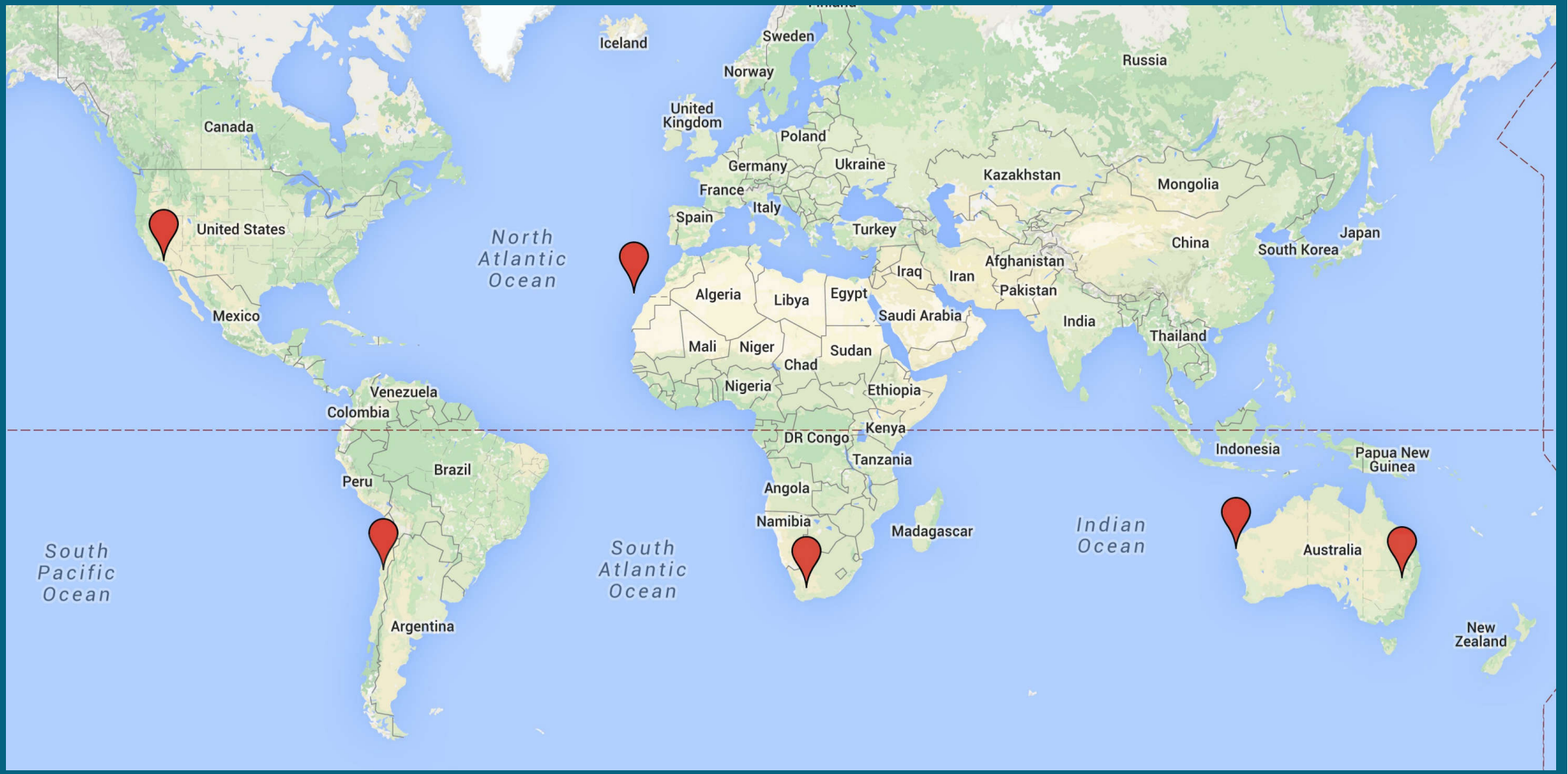
UNIVERSITY OF BIRMINGHAM

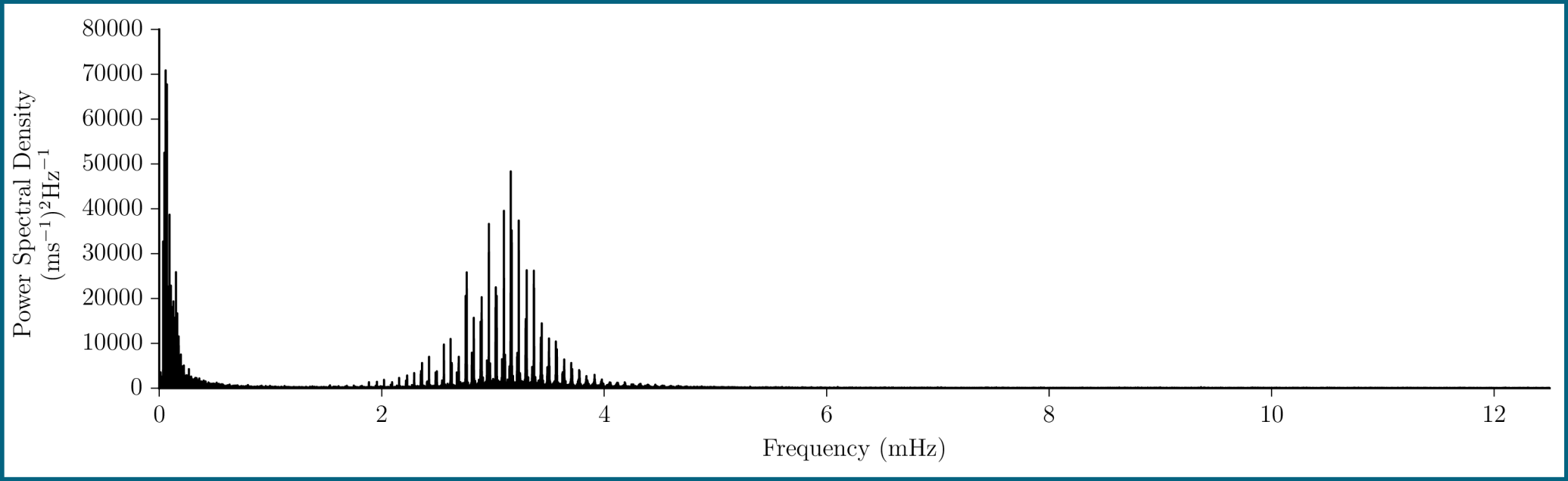
Science & Technology Facilities Council

BiSON Locations



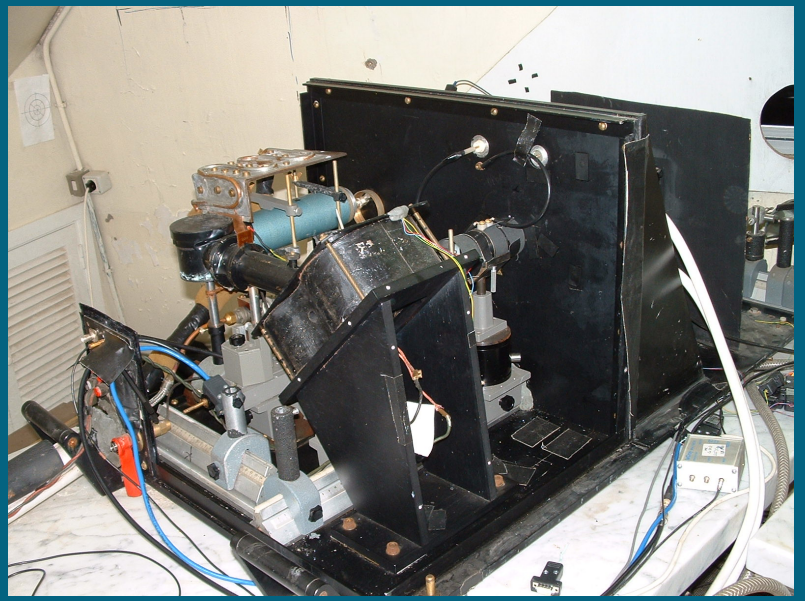
Six sites all observing global “Sun-as-a-star” oscillations.

BiSON Data Quality Metrics



Five Minute Signal:	2 mHz to 5 mHz
Noise:	5.5 mHz to 12.5 mHz
Figure of Merit (FOM):	Five Minute Signal / Noise
Low Frequency Noise:	0.8 mHz to 1.3 mHz
High Frequency Noise:	10 mHz to 12.5 mHz

BiSON Site: Izana, Tenerife



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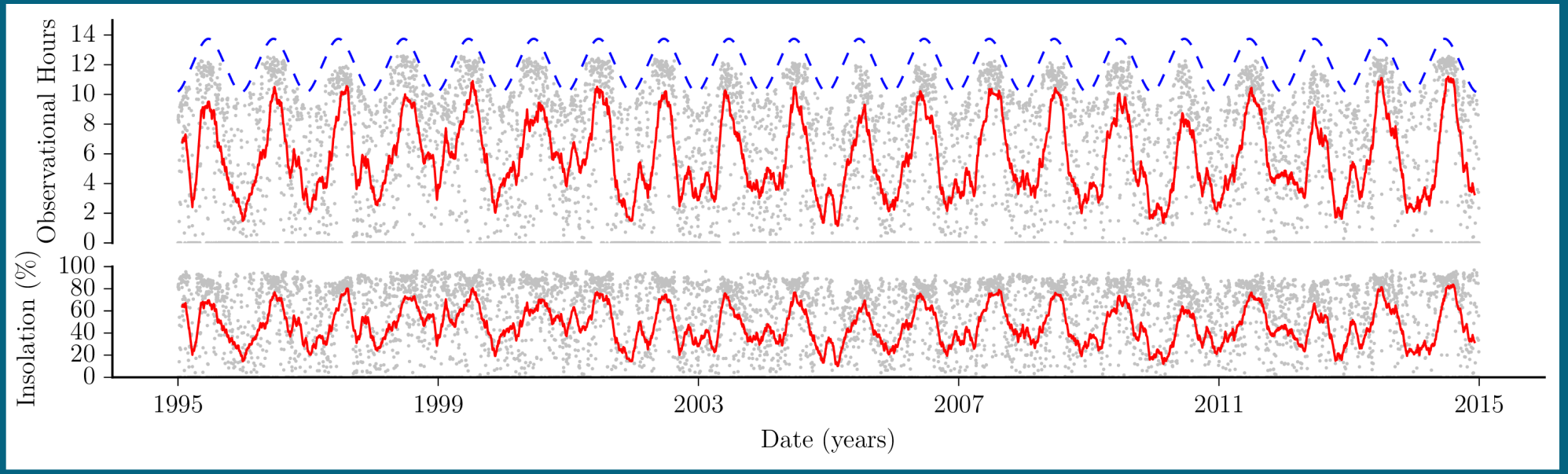
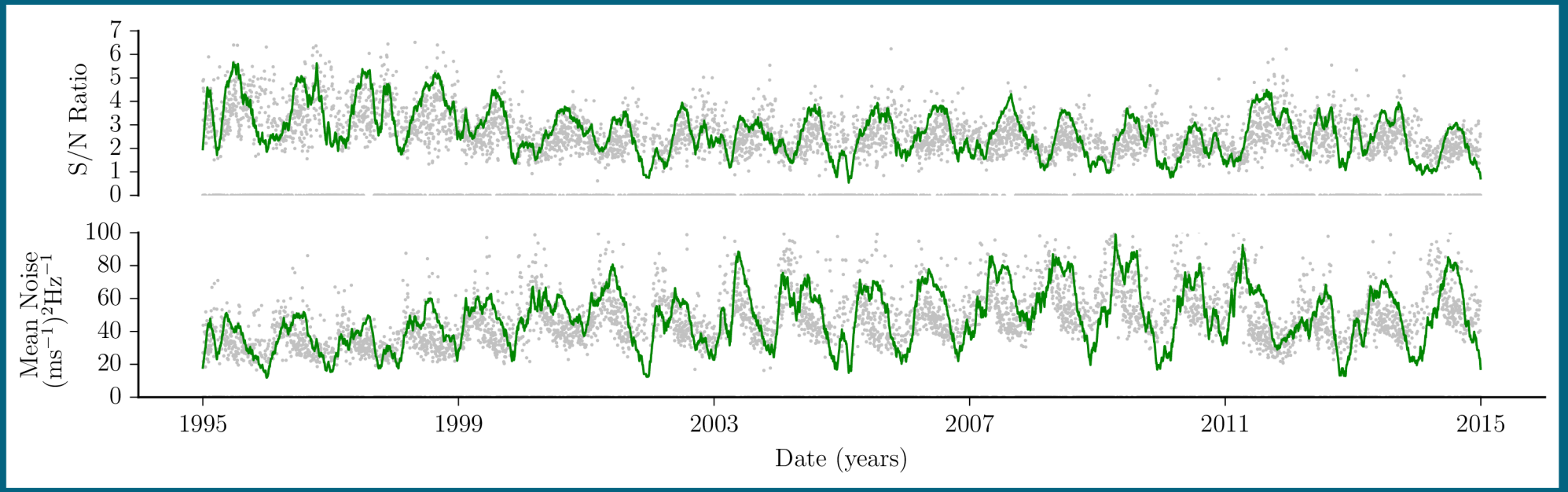
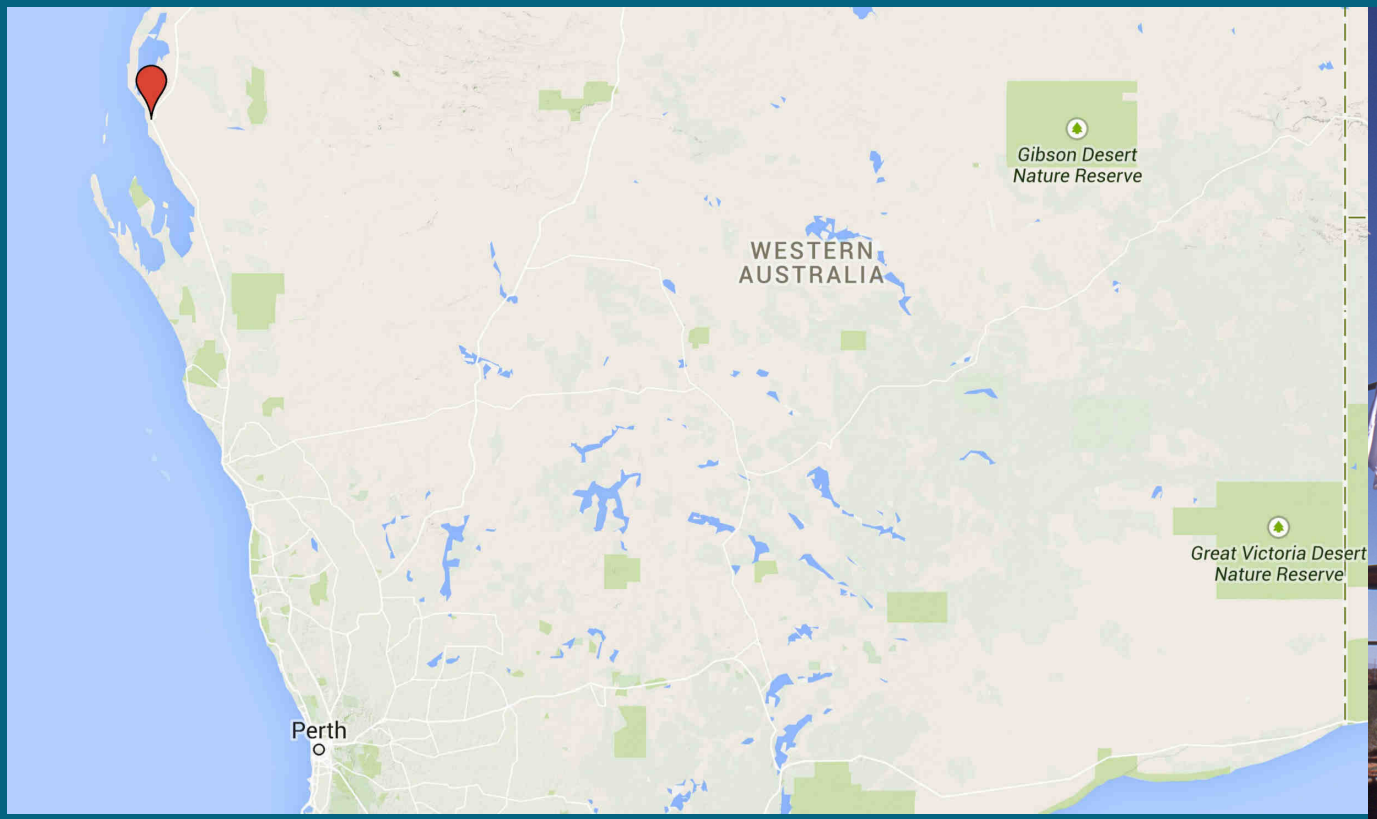
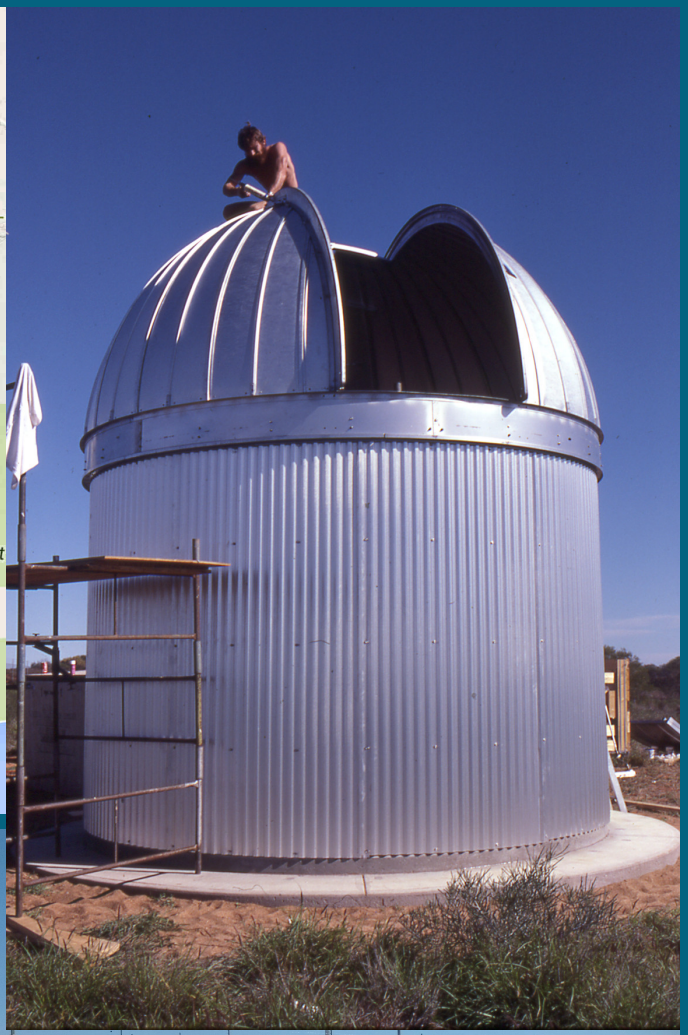




BiSON Site: Carnarvon, Australia





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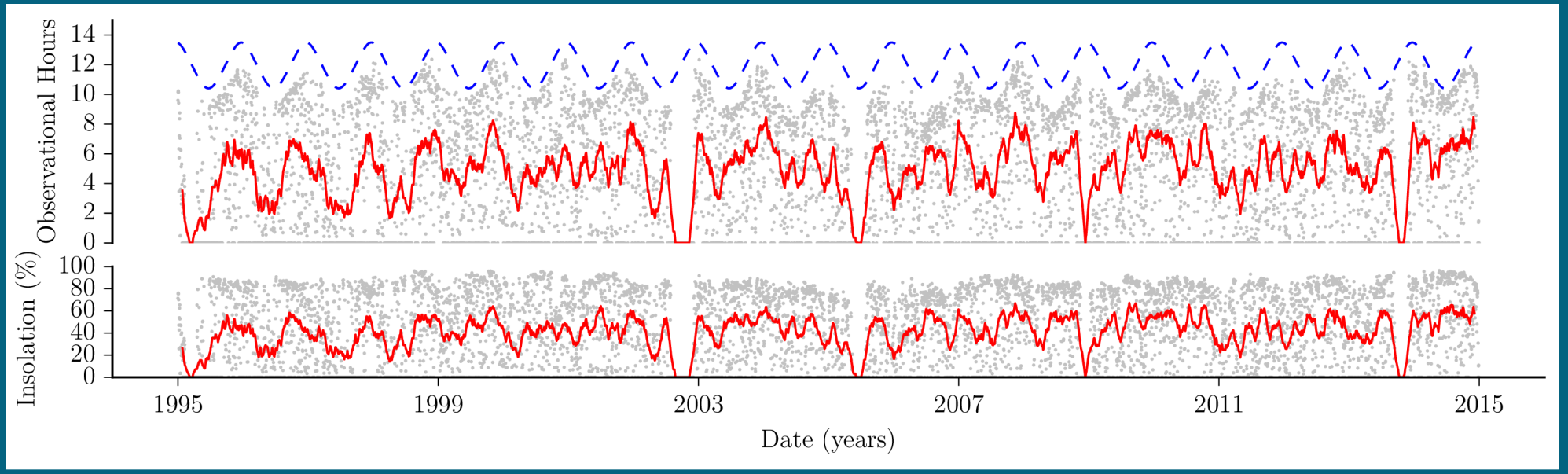
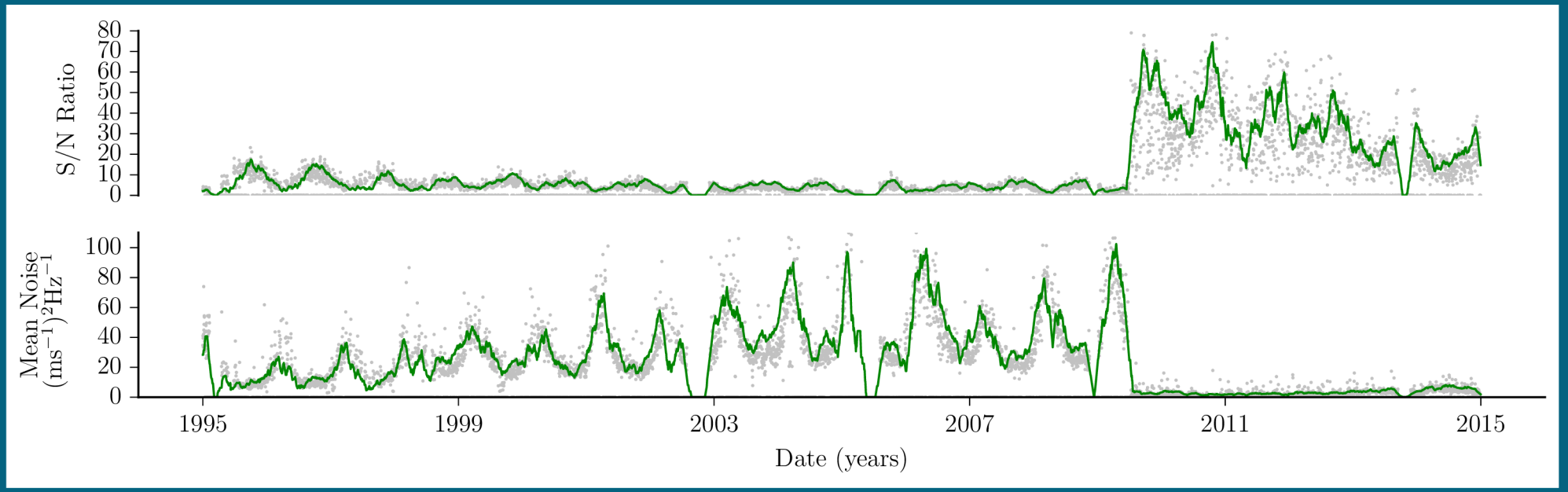
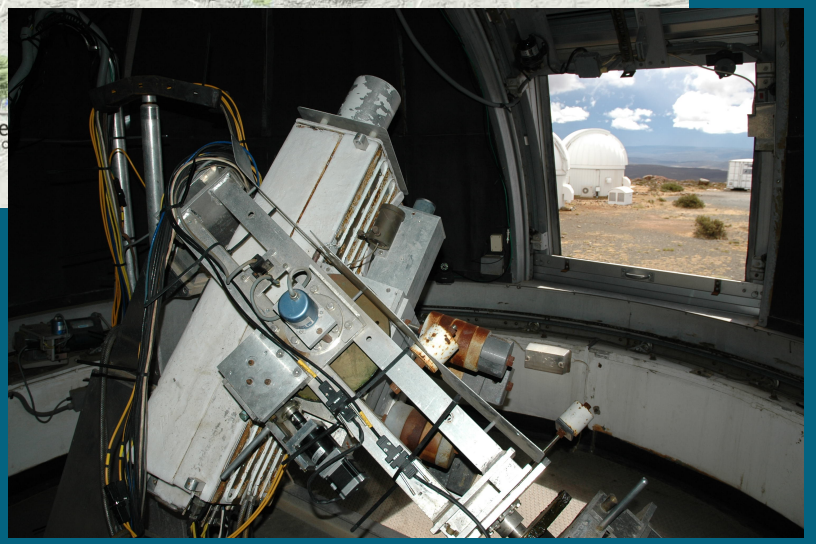




BiSON Site: Sutherland, South Africa



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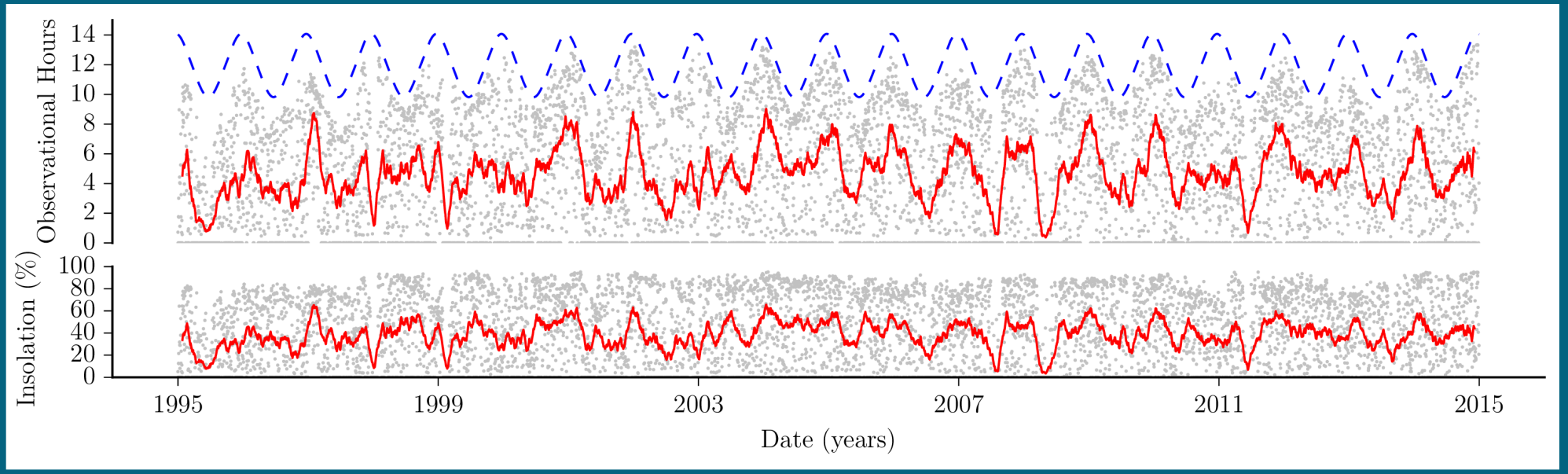
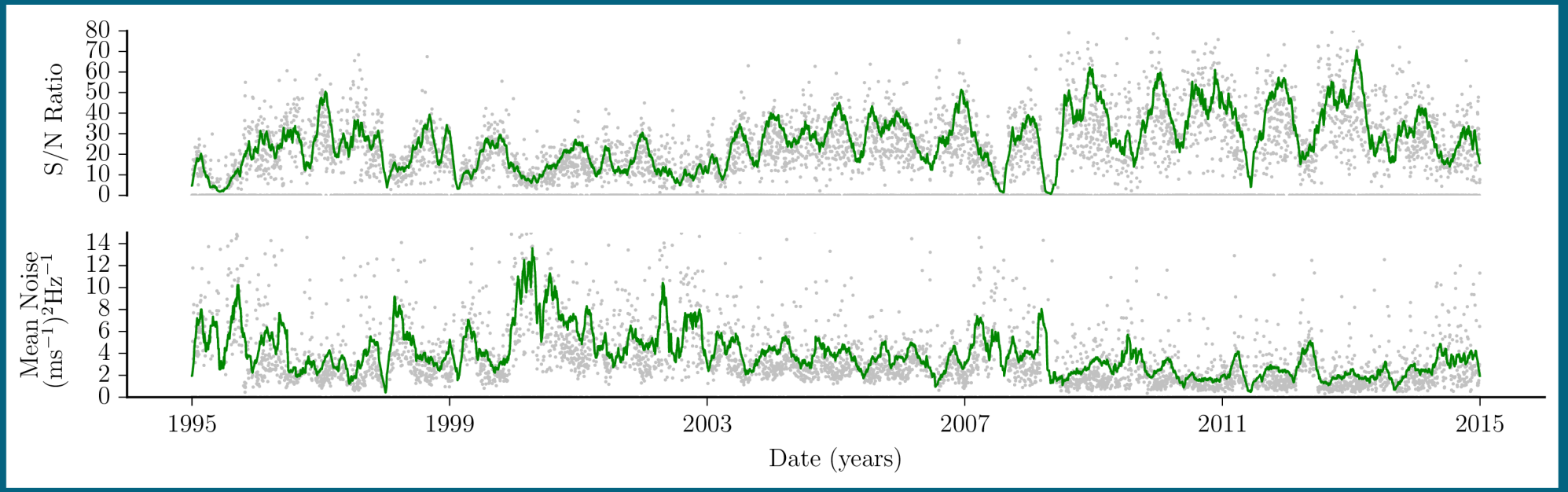
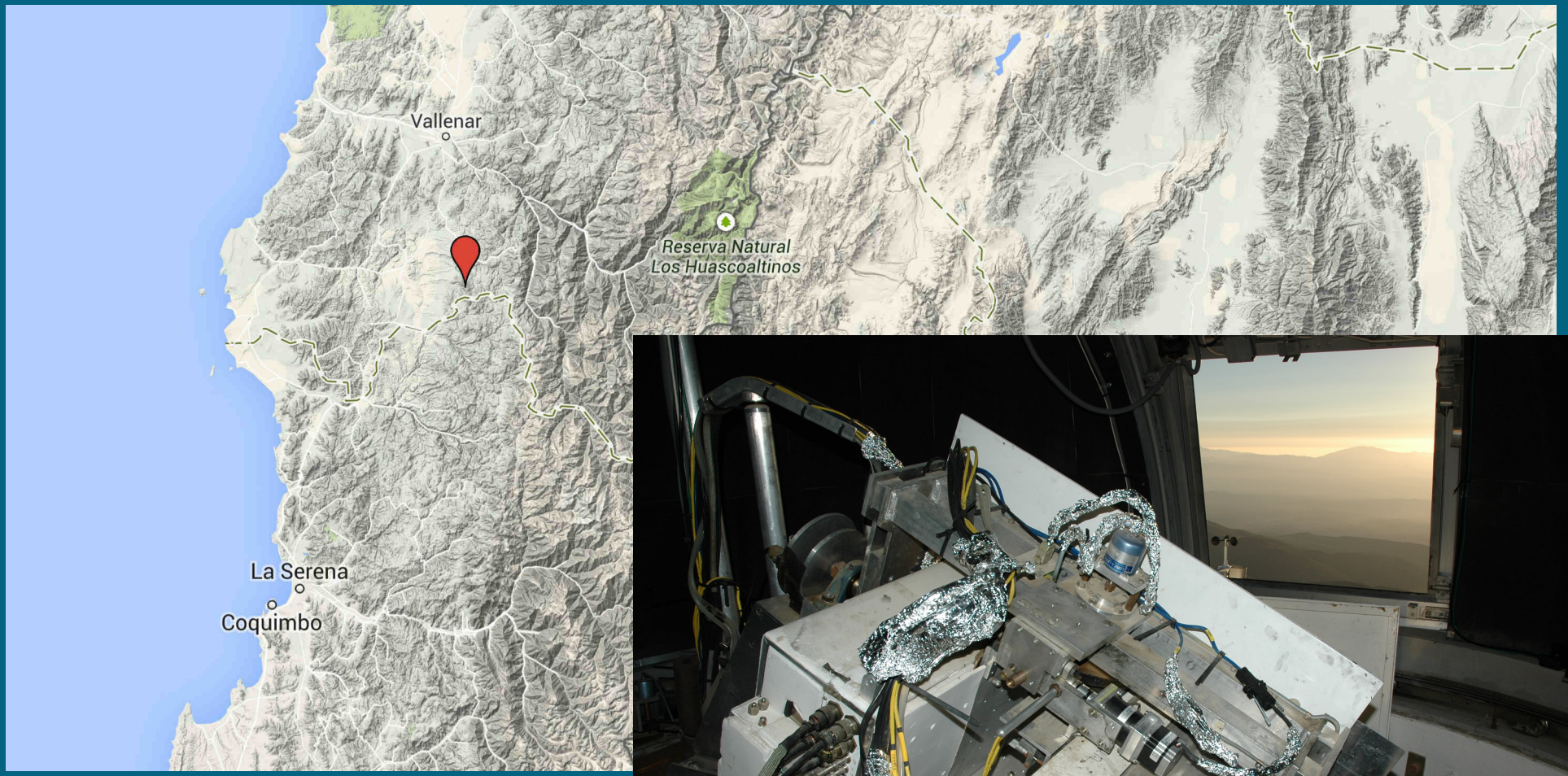
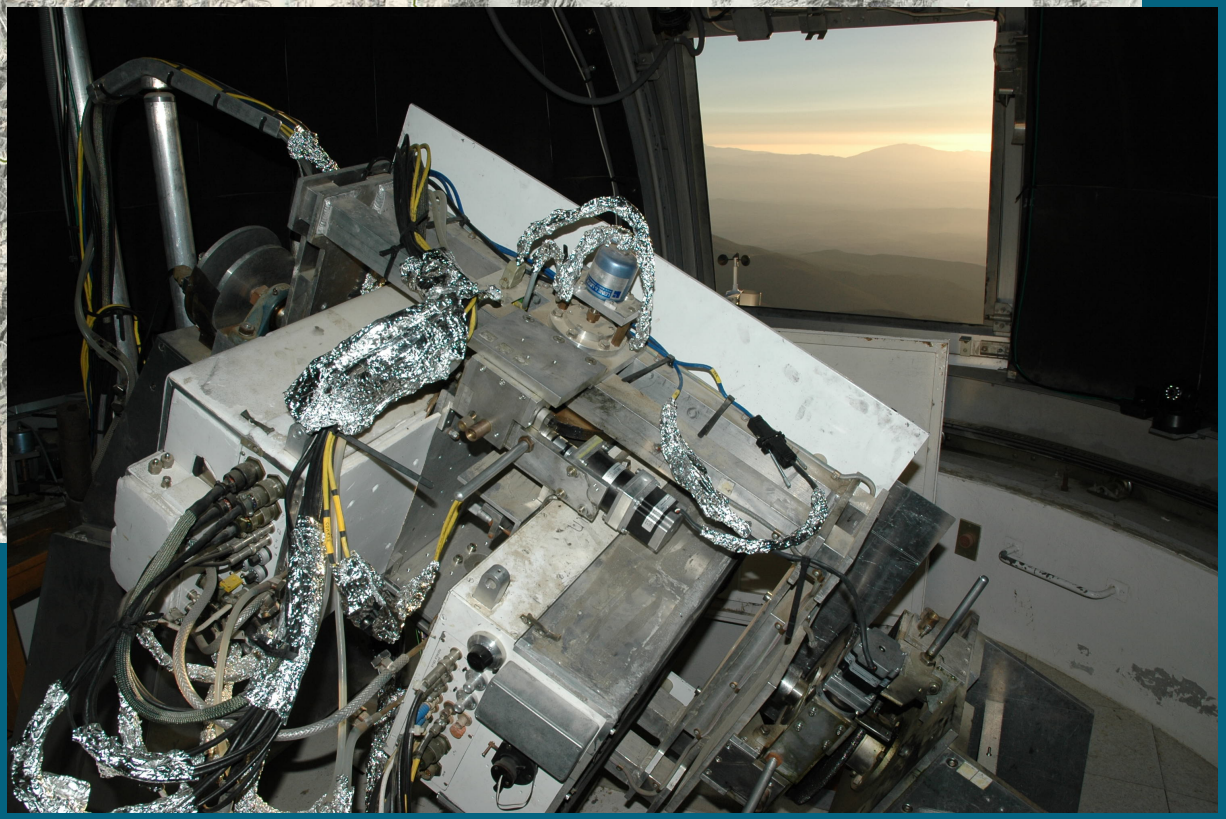




BiSON Site: Las Campanas, Chile





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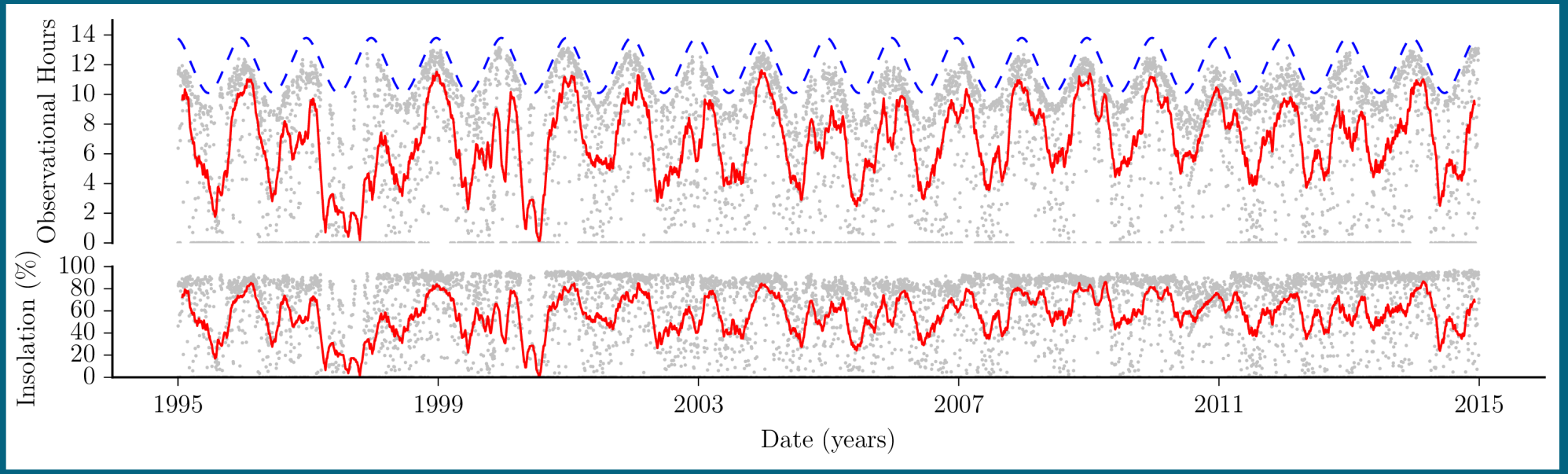
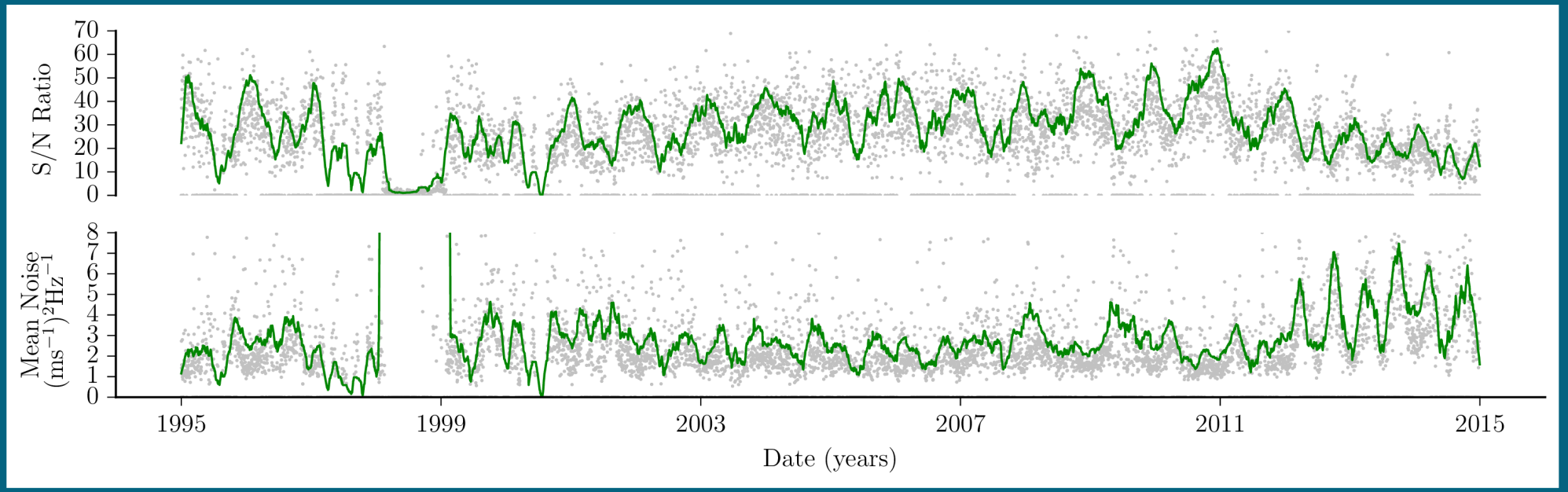
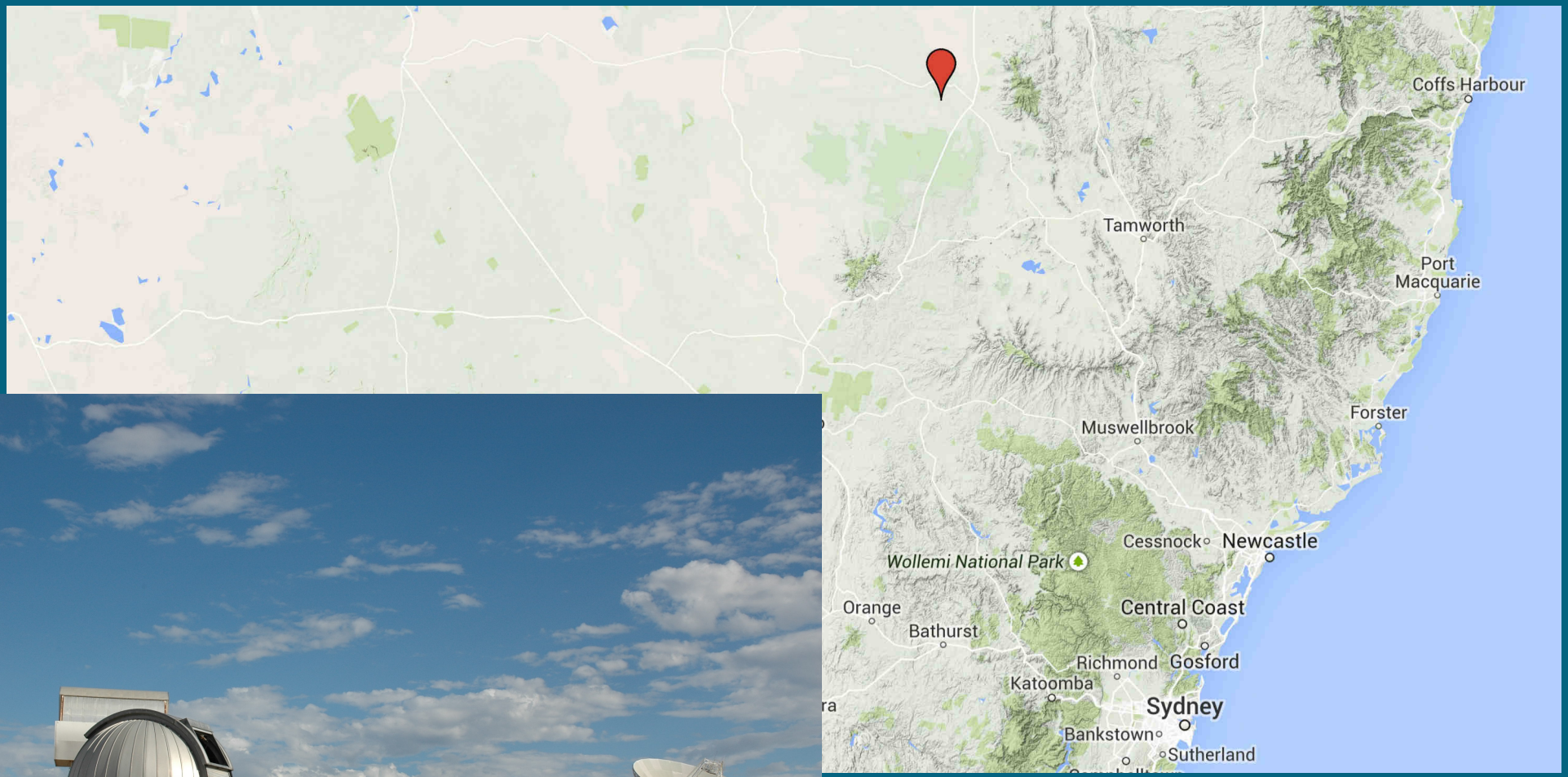




BiSON Site: Las Campanas, Chile

BiSON Site: Narrabri, Australia



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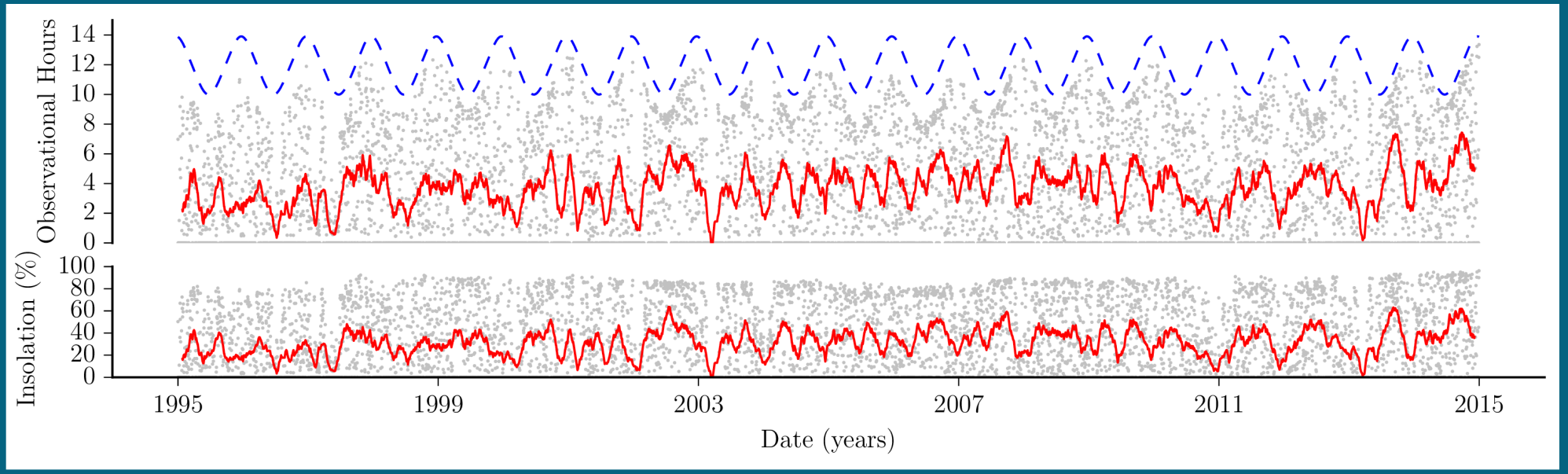
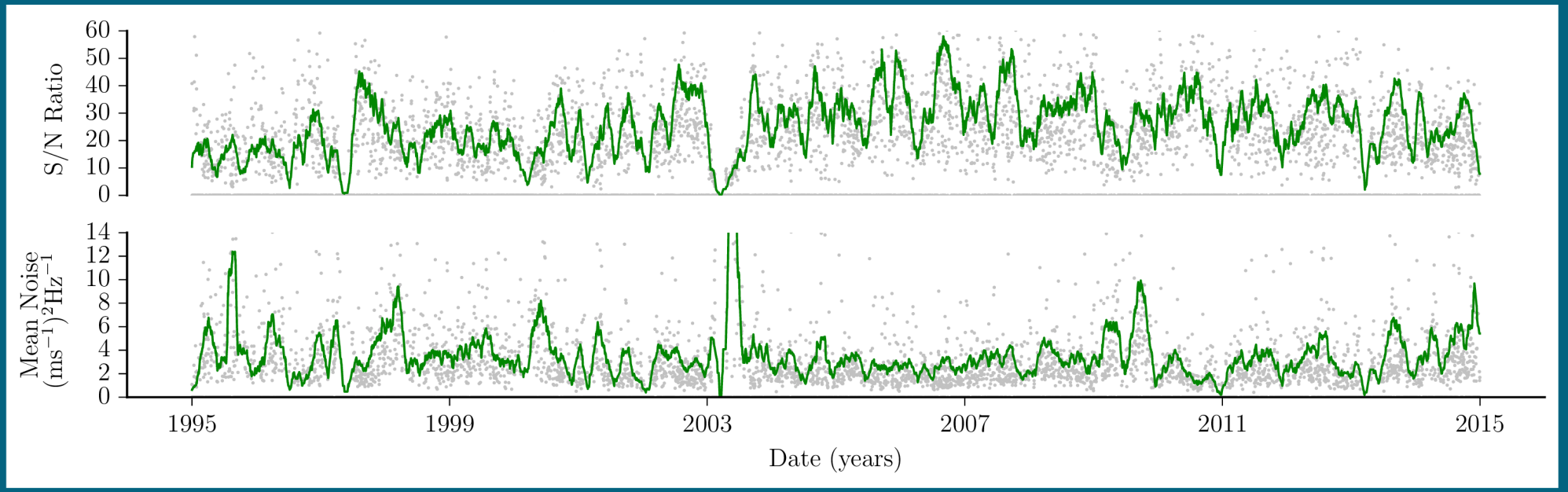
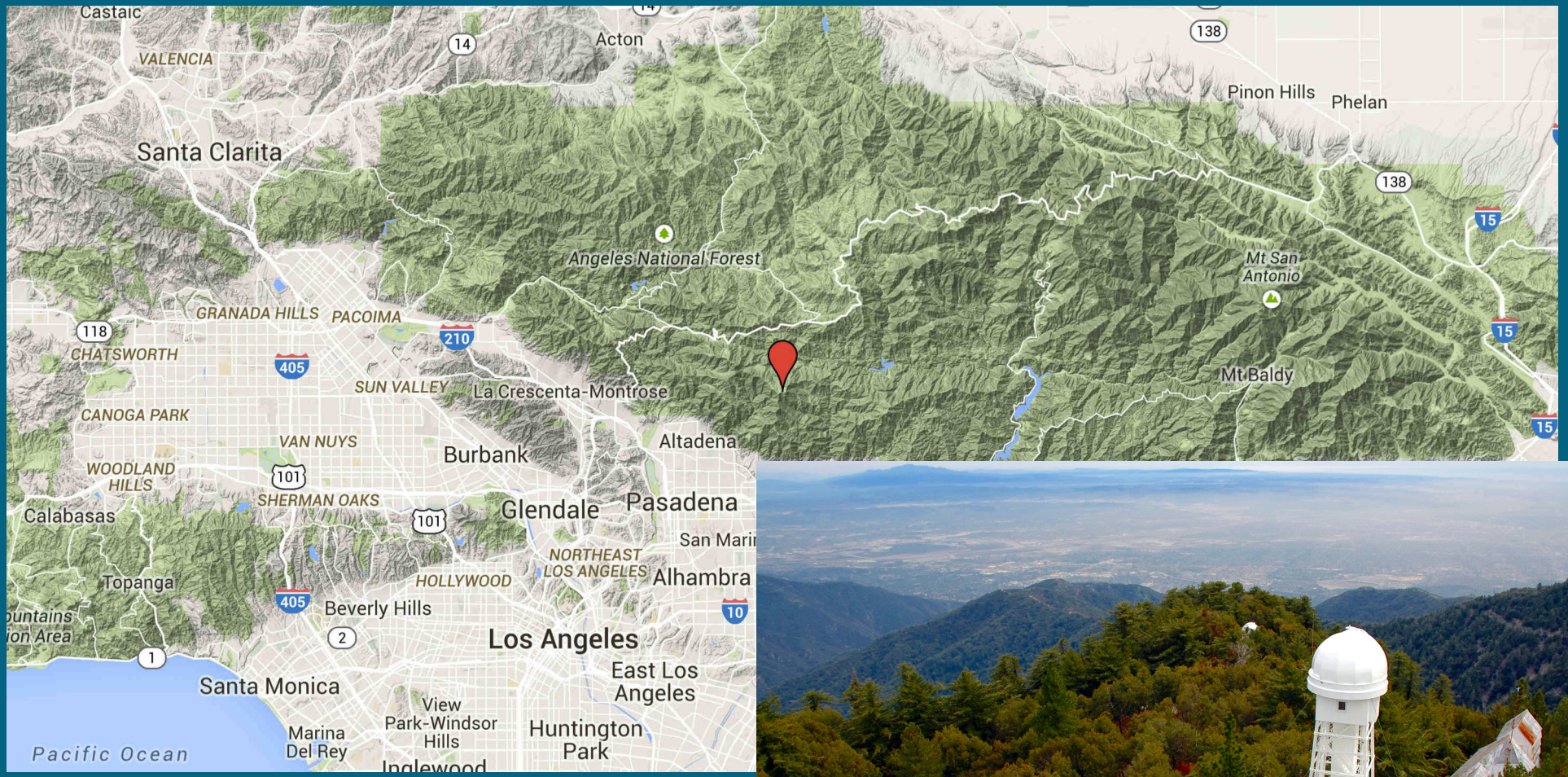




BiSON Site: Mount Wilson, USA



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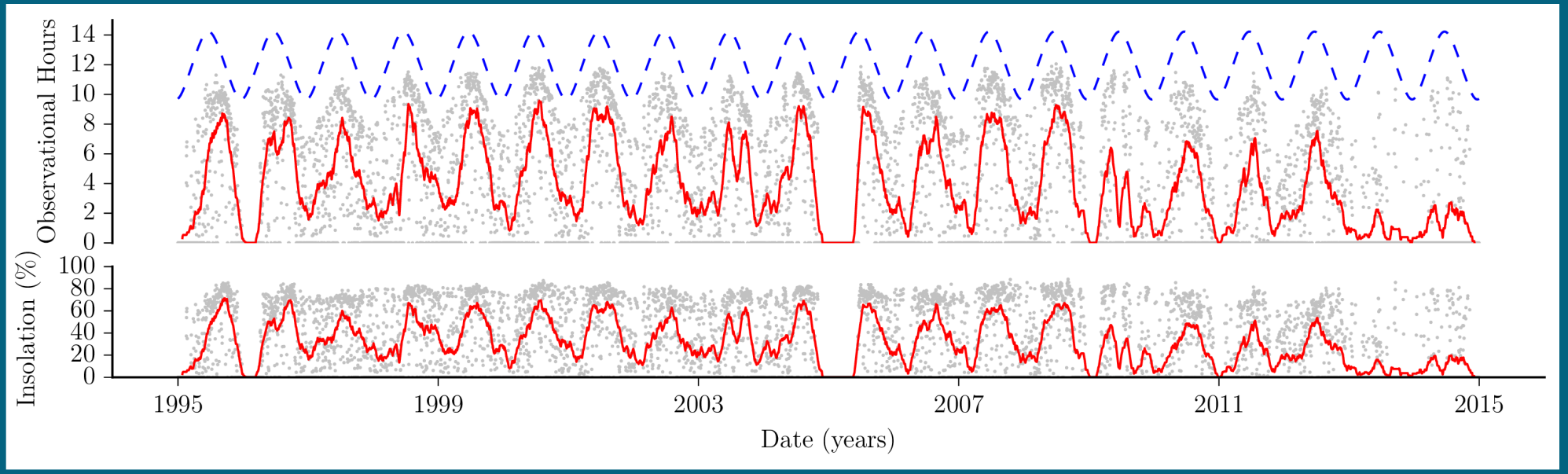
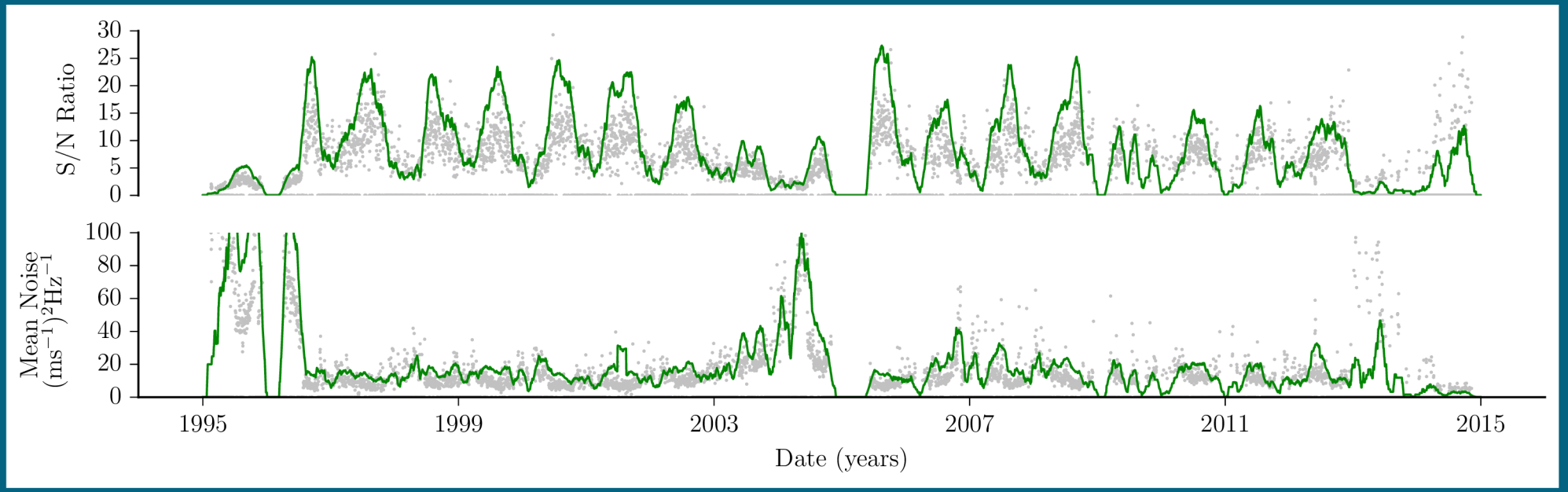




BiSON Site: Mount Wilson, USA

BiSON Concatenation Techniques

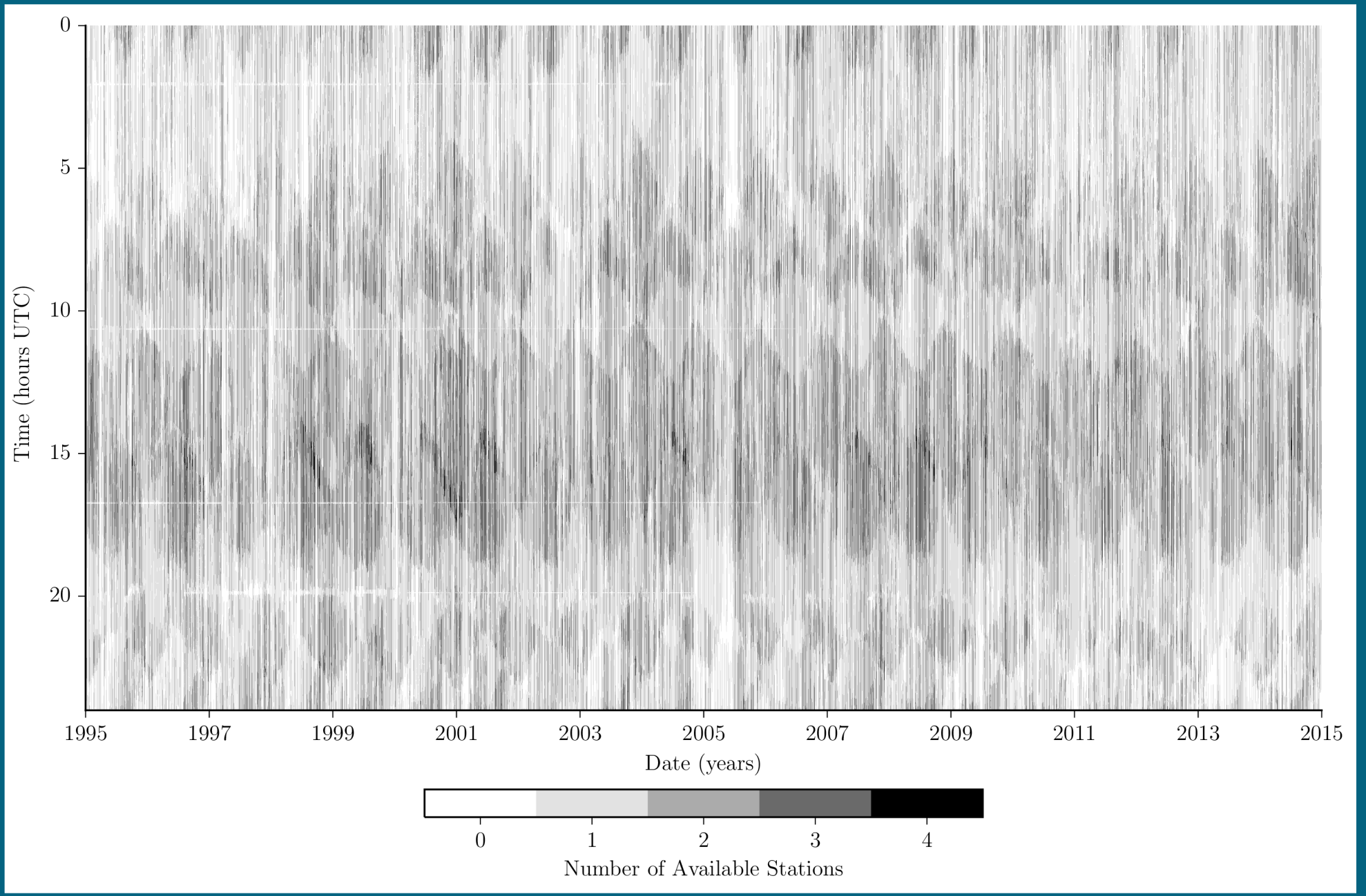
Historically, overlapping sites were handled by simply selecting the best site as defined by the quality metrics discussed earlier.

Low-frequency oscillations prevented averaging of data from different sites without high-pass filtering.

An updated data-processing pipeline that includes correction for atmospheric differential extinction has removed most of these slow drifts. This allows better use of site averaging to beat down the noise level.

The entire archive has been refreshed using the new pipeline and new concatenated time-series produced using weighted averaging of sites, with the weights defined by the standard quality metrics.

BiSON Site: Combined



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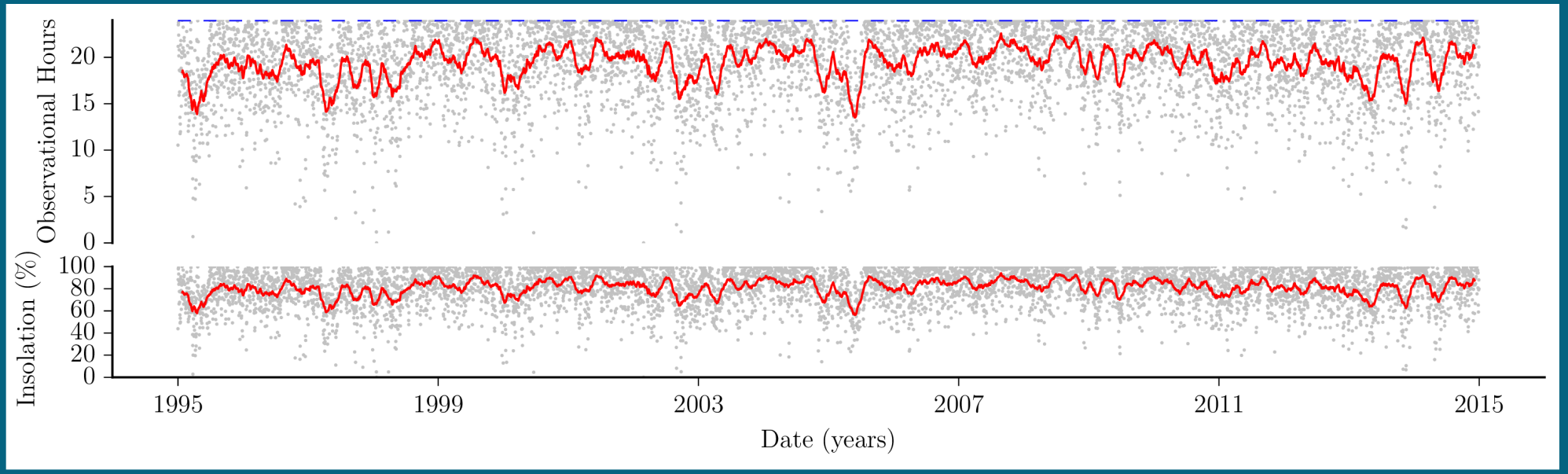

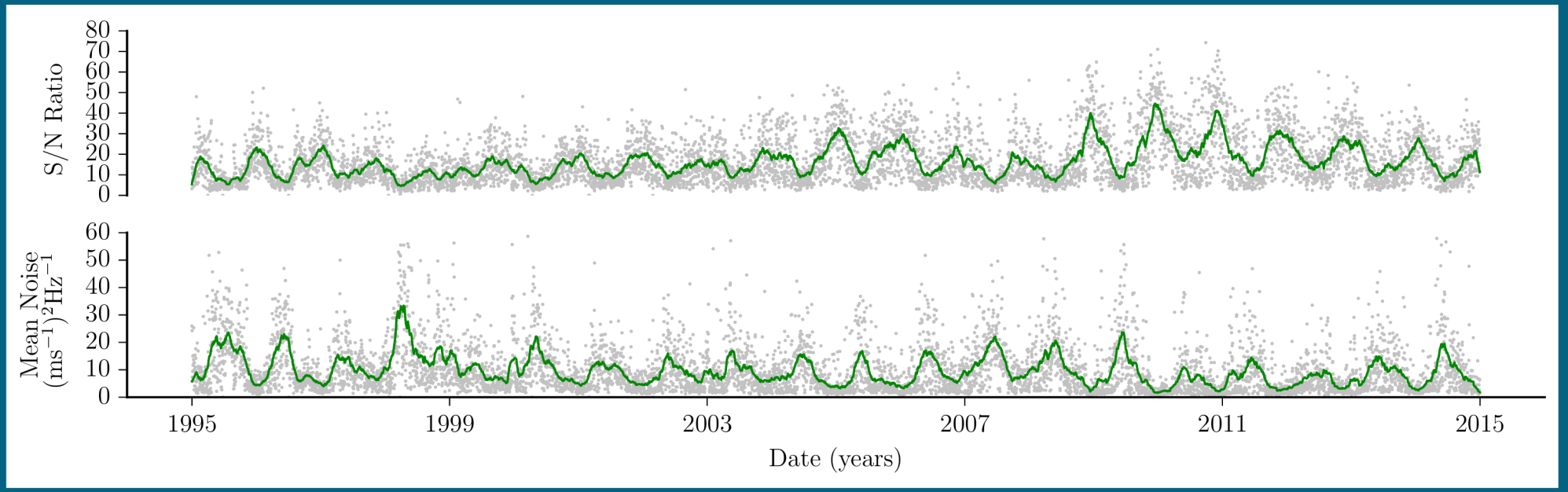

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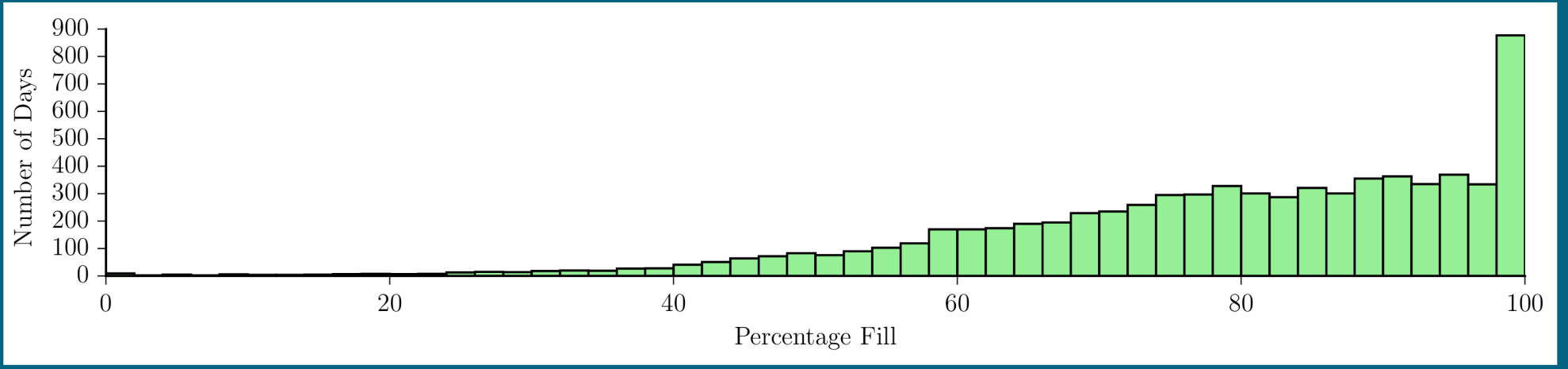
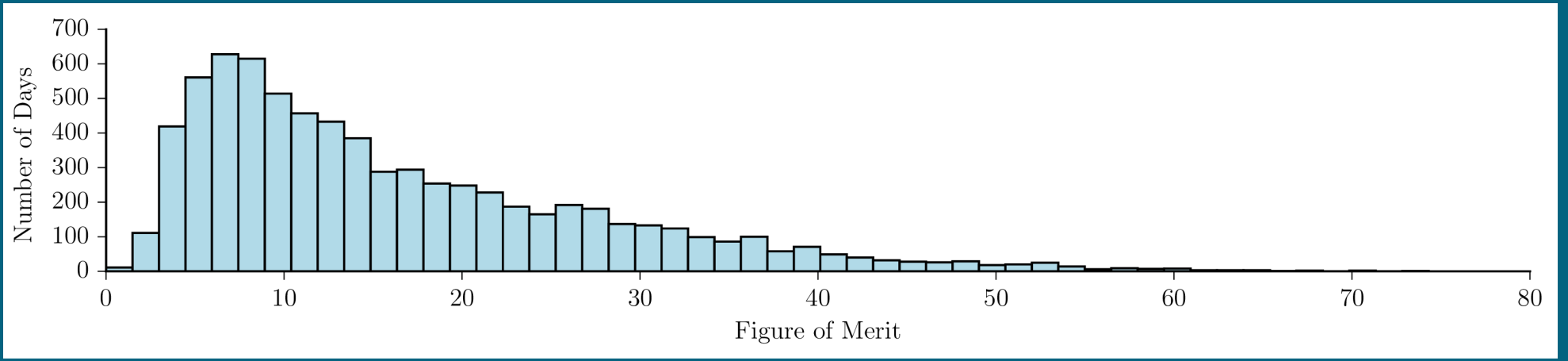


Total number of days: 7305 (20 years)
One site: 45.5% Two sites: 30.3% Three sites: 6% Four sites: 0.06%
Zero fill: 9 days. Better than 98% fill: 877 days. Complete 100% fill: 312 days.
Average annual fill: 82%



BiSON Open Data Portal

http://bison.ph.bham.ac.uk/opendata

Data also mirrored in the Birmingham University Long Term Storage Archive (LTSA) as the facility comes on line. This will provide a persistent URL for a minimum of ten years.

We also hope to provide all datasets with a Digital Object Identifier (DOI) as soon as this facility becomes available via the archive.

Data products are in the form of calibrated velocity residuals, concatenated into a single time series from all BiSON sites. Individual days of data, and also bespoke products produced from requested time periods and sites, are available by contacting me directly:

s.j.hale@bham.ac.uk