NEWSLETTER

July 2022

Previously the "Reflections" newsletter

News in Brief

Relocation of ATRAD Offices

After more than 11 years at 20 Phillips Street, Thebarton, ATRAD is moving! All contact details remain the same except for our physical location. We are moving to a quasi-distributed model, with several employees working remotely. ATRAD administration will be located on level 2, 246 Pulteney Street, Adelaide.

Pending Installs

- HF Ionospheric Radar, USA
- SII Ionospheric Radar, China
- EMDR Radar, China
- 6-channel Remote Receiver, China
- Two remote receiving systems to Chile and Argentina (relocation)

New Hardware

SII Ionospheric Radar with electronic beam steering (~0.1°)

SpaceFest Lite / SACT 22 3

ATRAD plans to participate in SACT 22 3 together with Adelaide University

Some Recent Related Publications

1. Zeng, Jie, Wen Yi, Xianghui Xue, Iain Reid, Xiaojing Hao, Na Li, Jinsong Chen, Tingdi Chen, and Xiankang Dou. 2022. Comparison between the Mesospheric Winds Observed by Two Collocated Meteor Radars at Low Latitudes, *Remote Sensing*, 14, no. 10: 2354. https://doi.org/10.3390/rs14102354
2. Qiao, Z., Liu, A.Z., Pedatella, N., Stober, G., Reid, I., Fuentes, J. and Adami, C., 2022. *Enhanced Quasi-6-Day Wave during the 2019 Southern Hemisphere SSW and its modulation of diurnal tides and gravity waves* (No. EGU22-10996). Copernicus Meetings.
3. *Satterfield, E.A. et al. (2022). Statistical Parameter Estimation for Observation Error Modelling: Application to Meteor Radars. In: Park, S.K., Xu, L. (eds) Data Assimilation for Atmospheric, Oceanic and Hydrologic Applications (Vol. IV). Springer, Cham.* https://doi.org/10.1007/978-3-030-77722-7_8

Some Recent Highlights

(Above) The equipment racks for the two 96 kW drivers

192 kW Jicamarca transmitter drivers come online

A set of new transmitters that we recently provided for the Jicamarca Radio Observatory Instituto Geofísico del Perú 50 MHz Radar as drivers for the 1.5 MW final stages have been brought into operation. The 2 transmitters provide 96 kW peak power each, for a total combined power of 192 kW peak. You can read more about the observatory here: https://www.igp.gob.pe/observatorios/radio-observatorio-jicamarca/?page_id=6609 or follow their radar operations here: http://jro.igp.gob.pe/calendar.html.

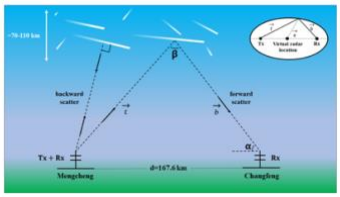
(Above) Another view of the equipment racks for the two 96 kW drivers (Photo credits IGP)

Darwin Meteor Radar

In cooperation with the Institute of Atmospheric Physics in Germany (https://www.iap-kborn.de/en/home/), we plan to bring the Darwin meteor radar back into operation. Originally installed in 2006 by the University of Adelaide, and mothballed in 2014, we will partially refurbish the radar and operate it at its present location until a more permanent site can be found. The radar is located at 12.5° S, making it of particular interest for international studies of low latitude mesosphere lower thermosphere (MLT) dynamics. The radar is of the older STX1 based meteor detection radar design.

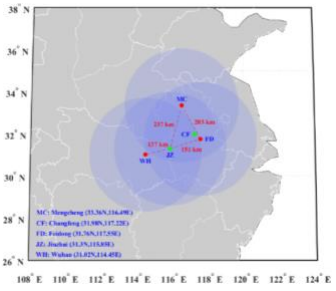
First results from a multistatic meteor system in China

Wen Yi and colleagues from the University of Science and Technology, China (USTC) have prepared a manuscript on the first results from a multistatic meteor radar in China. The monostatic meteor radar is located near Mengcheng and the remote receiving system at a site near Changfeng, about 167 km distant.



(Above) The schematic diagram of the principle of operation (from Wen Yi's manuscript).

Wen has plans to develop a larger meteor radar network in China, as summarized in the map below



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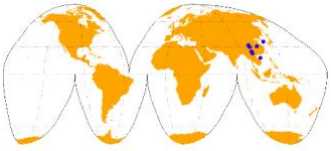
NEW HARDWARE

SII Ionospheric Radar

We have replaced the cable beam steering approach used on the older SIA ionospheric radars provided by ATRAD. The beams are now steered electronically, with a resolution of about 0.1°. The first of the SII radars based on this approach will be installed shortly in China. The same approach was applied to the MIOS radar highlighted in the previous Newsletter (Li, G., Xie, H., Wang, Y., Yang, S., Hu, L., Sun, W., et al. (2022). Design of meteor and ionospheric irregularity observation system and first results. *Journal of Geophysical Research: Space Physics*, 127, e2022JA030380. https://doi.org/10.1029/2022JA030380) and can be applied to any of our beam steered radars, including the ST Wind Profiling Radars.

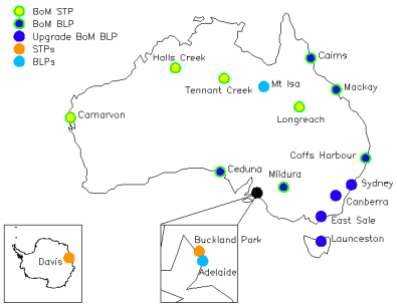
(Above) A six receiver channel 48 kW SII ionospheric radar. The radar power is expandable in 24 kW increments, and the receiver numbers in three channel increments



(Above) Map showing the 10 Ionospheric radars previously installed in the Asian sector

Bureau of Meteorology interlocks

We are installing interlocks on all the Australian Bureau of Meteorology wind profiler sites. There are 13 radars in the network, and four of the five legacy profilers shown in the map below (originally installed commencing in 1996) were recently upgraded to the current build standard. Additional radars are operated at Mt Isa (Xstrata mines), Antarctica (Australian Antarctic Division), and near Adelaide (ATRAD and the University of Adelaide).



(Above) A map of wind profiling radars in Australia and Antarctica

(Above) radar enclosure with interlock fitted

Other Activity of Interest

New home for two 2.4 m dishes

Following on from our relocation, ATRAD has donated two 2.4 m Cassegrainian feed dishes and other surplus hardware to members of the Amateur Radio Experimenters Group (AREG) (https://www.areg.org.au/). The dishes were originally part of the CP2 radar* operated by the Bureau of Meteorology in Brisbane, Australia. We look forward to seeing some interesting results in the near future!

(Above) The two dishes with their transport covers on

(Above) The somewhat dusty dishes loaded onto a car transporter (with covers off) for relocation from ATRAD

**See Keenan, T., et al., (2006). The restoration of CP2 in Brisbane, Australia. 4th European Conf. on Radar in Meteorology and Hydrology (ERAD 2006), Barcelona, Spain (pp. 367-370)*

Other Items of Interest

Dr Bronwyn Dolman, Senior Scientist at ATRAD

Bronwyn is pursuing her passion for the sport of cycling and has taken leave from ATRAD to work for a three-month period as the Workforce Coordinator for the 2022 UCI Road World Championships to be held in Wollongong, Australia (https://wollongong2022.com.au/). The championships will be held in September.

Dr Thomas Chambers, Scientist at ATRAD

Congratulations to Thomas Chambers on the completion of his PhD! Tom has been working a fractional appointment at ATRAD on a new product since early this year.

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