The Bureau of Meteorology

Region 5: South-West Pacific

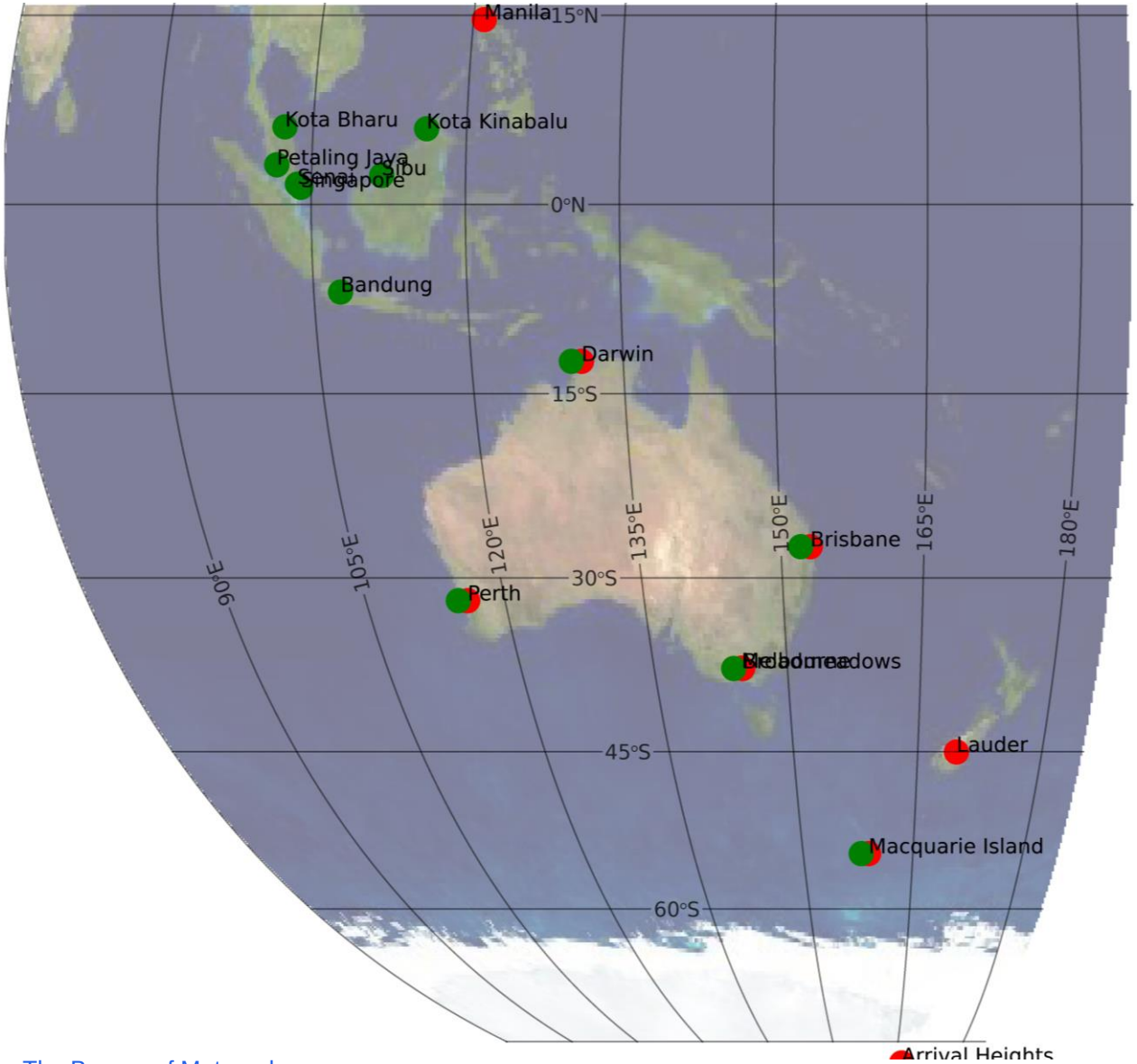
Matt Tully, Bureau of Meteorology (Australia)

WMO/UNEP Ozone Research Managers of the parties to the Vienna Convention for the Protection of the Ozone Layer

Twelfth Meeting Geneva, 24-26 April 2024

Observational Capability

Dobsons & Brewers



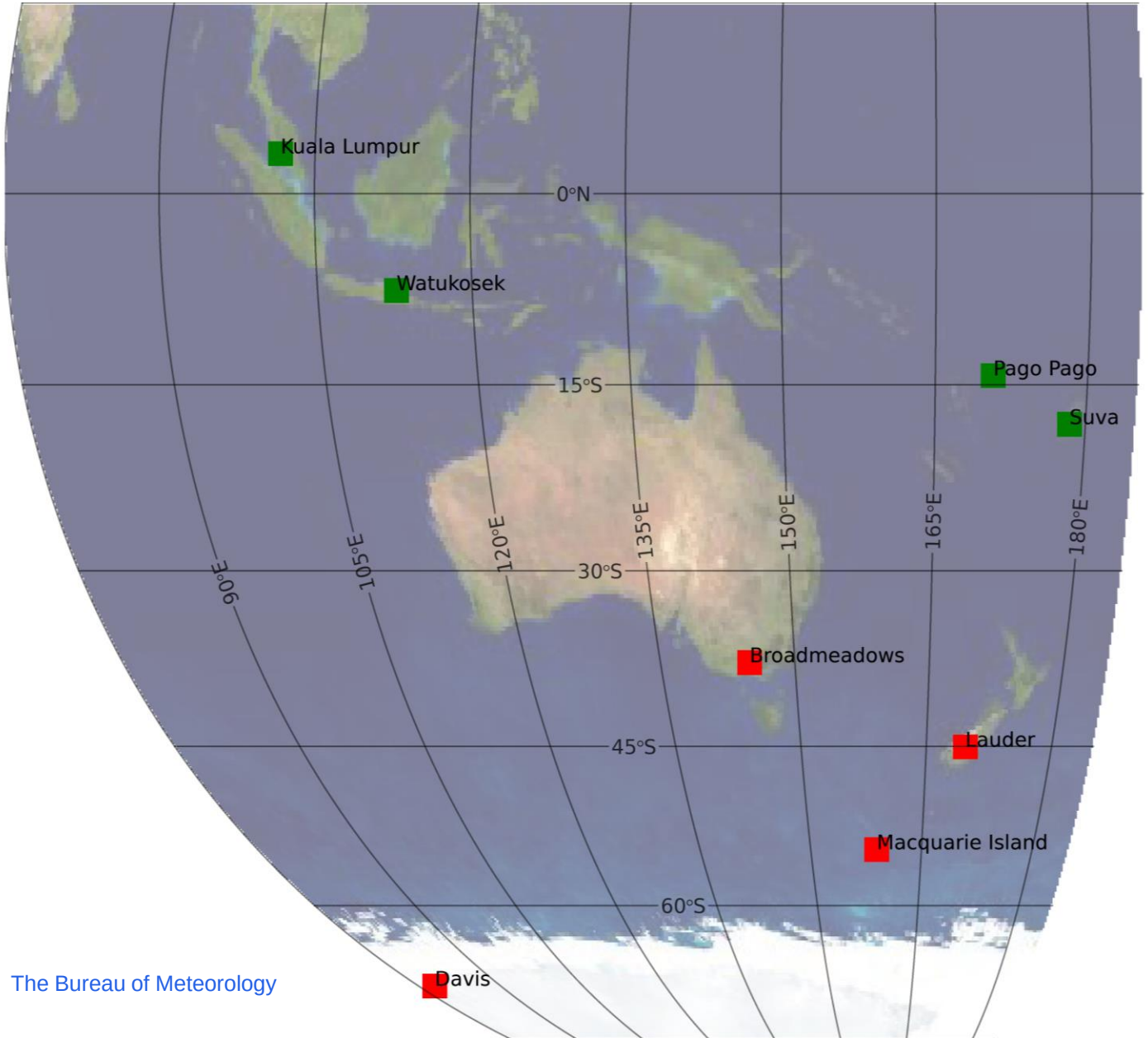
Dobson

Brewer

Dobsons & Brewers

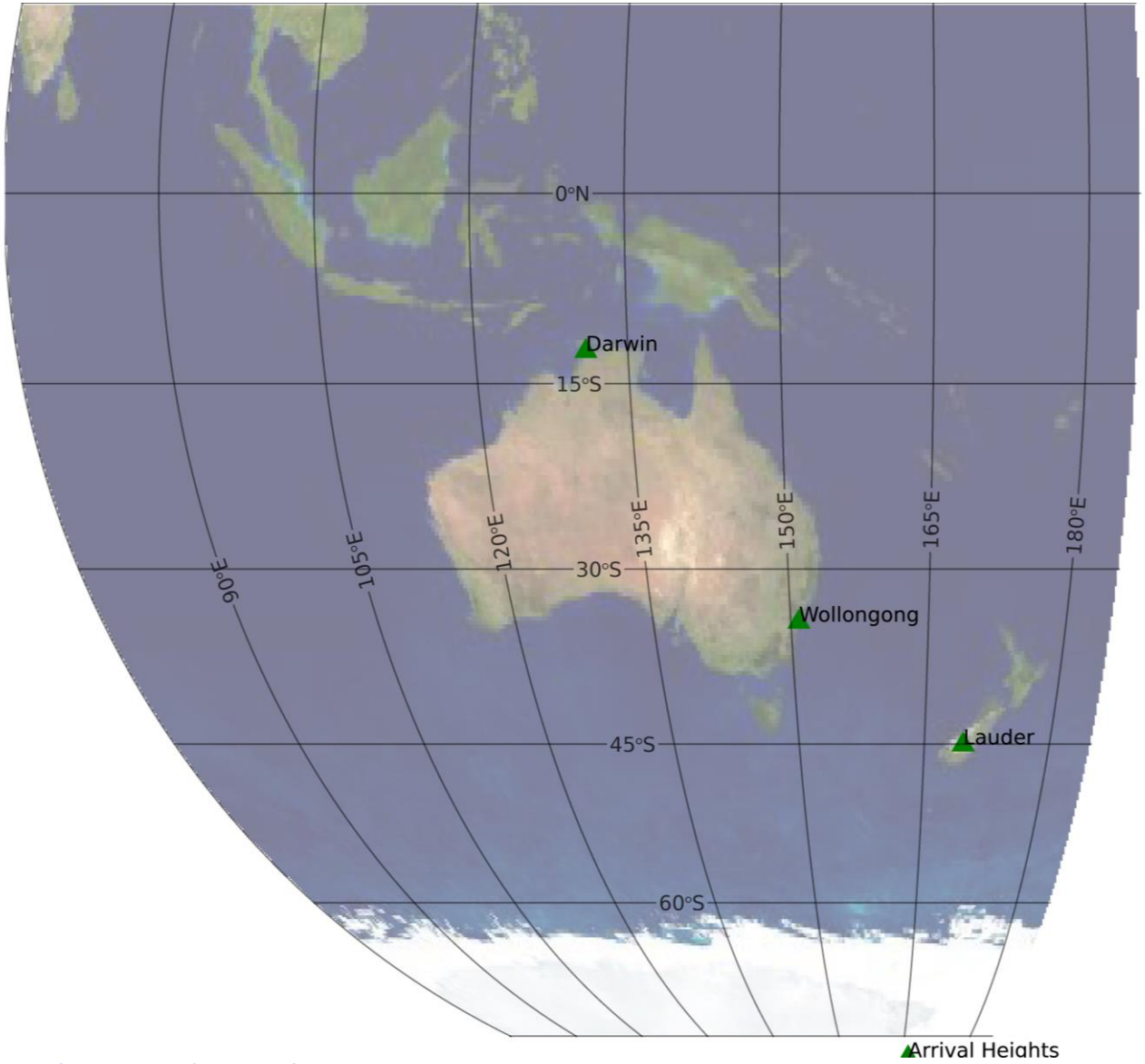
- Australia plans to phase out its Dobson network over the next few years (no decision yet on the Regional Dobson Calibration Centre).
- Australia, New Zealand and the Philippines have all recently approached Kipp & Zonen for quotations for new Brewers.

Ozonesondes



SHADOZ

FTIR, LIDAR, Microwave

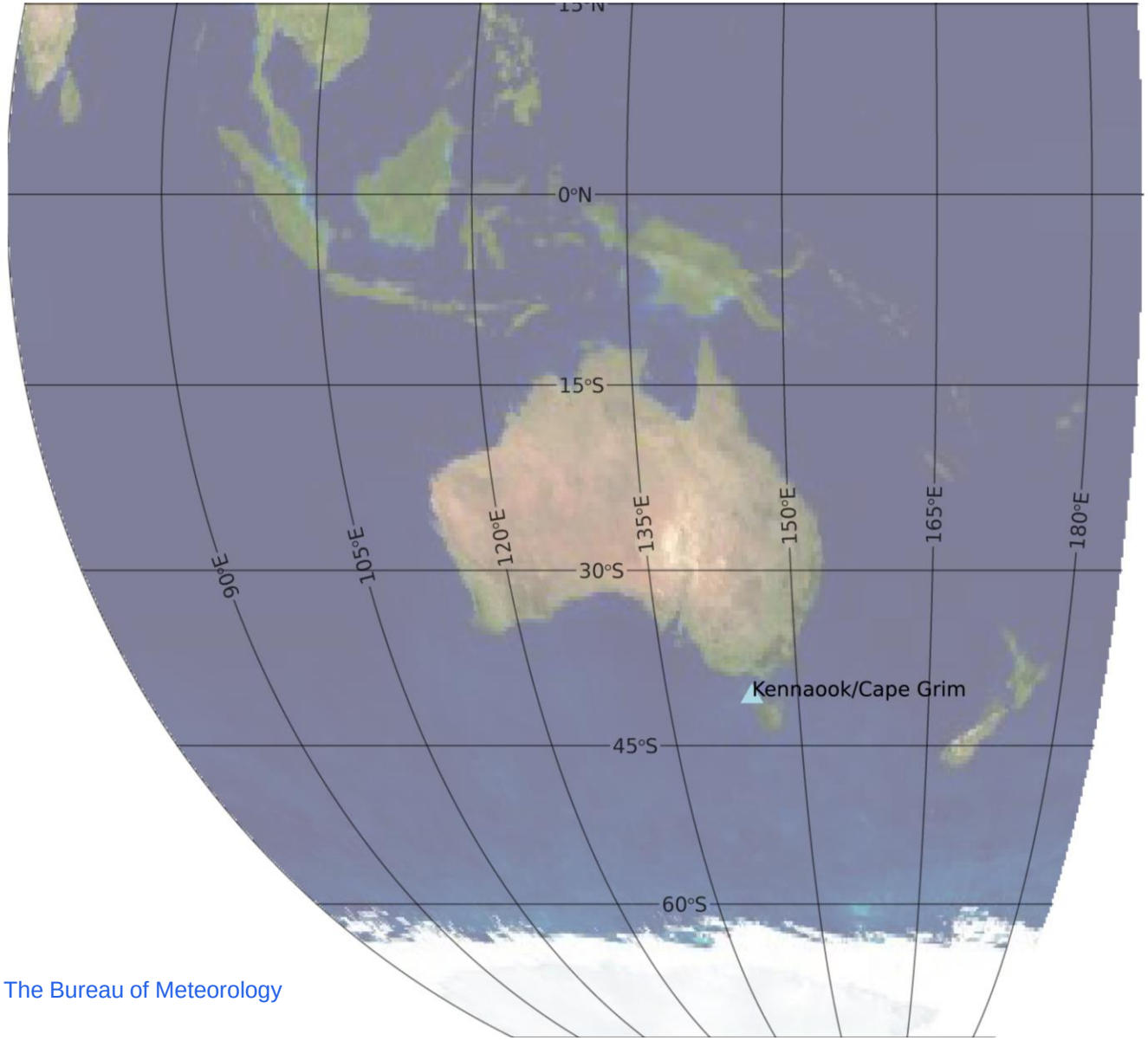


Darwin and Wollongong FTS

Lauder has a wide range of techniques for measuring ozone profile, including ozonesondes, Dobson Umkehr, FTS, LIDAR and Microwave.

Arrival Heights also has FTS and Microwave.

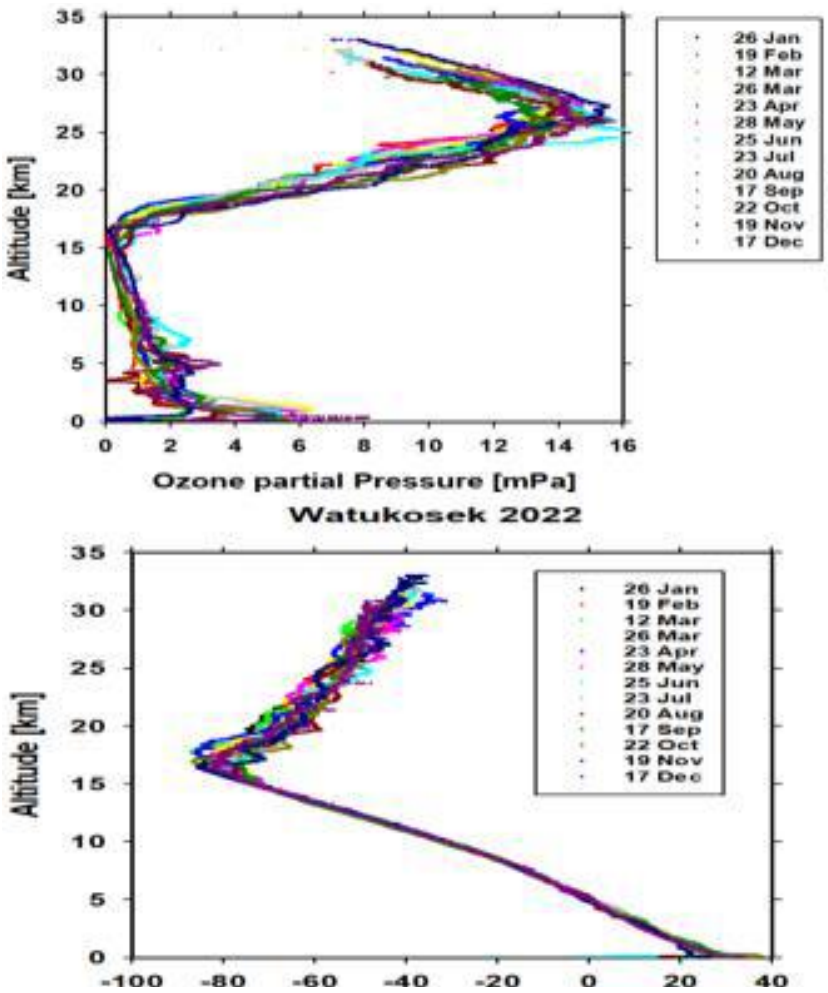
Ozone Depleting Substances

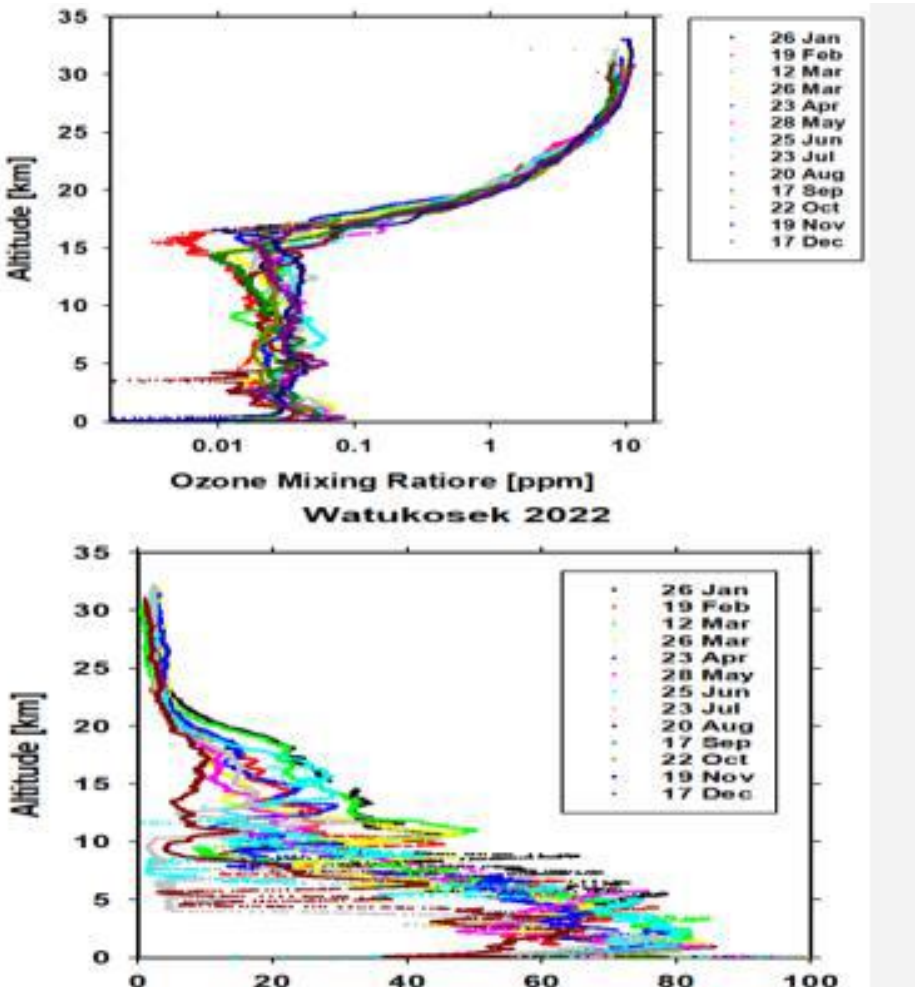


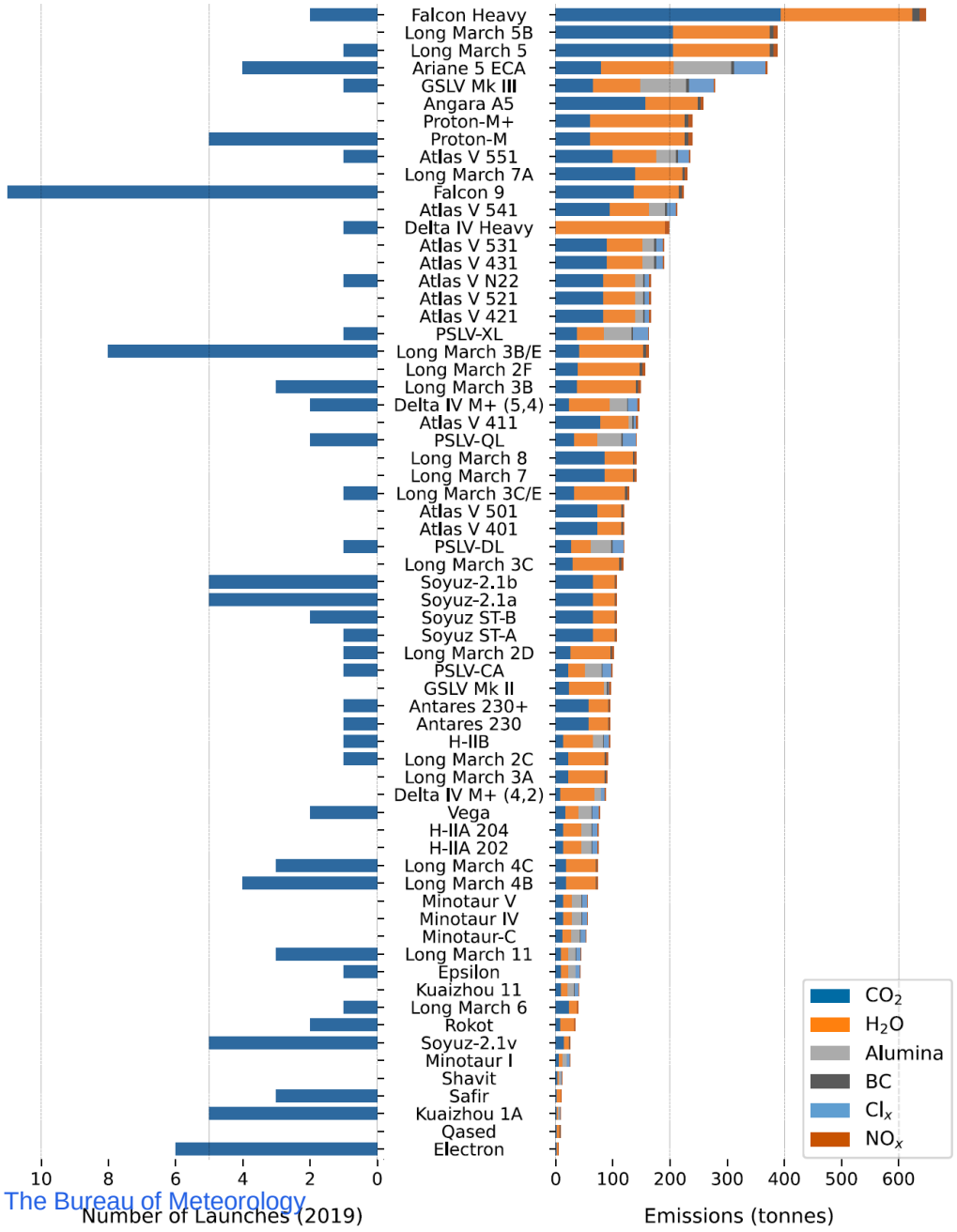
New name – *Kennaook / Cape Grim* - recognising the indigenous inhabitants

Research Highlights

Ozone profiles from Watukosek , Java (SHADOZ)







Stratospheric emissions (within 15–50 km altitude) of all rockets launched in 2019.

Brown, T., Bannister, M., Revell, L.E., Sukhodolov, T. and Rozanov, E., Worldwide rocket launch emissions 2019: an inventory for use in global models, Earth and Space Science (in review).

New trend analysis of the homogenised ozonesonde record from Lauder

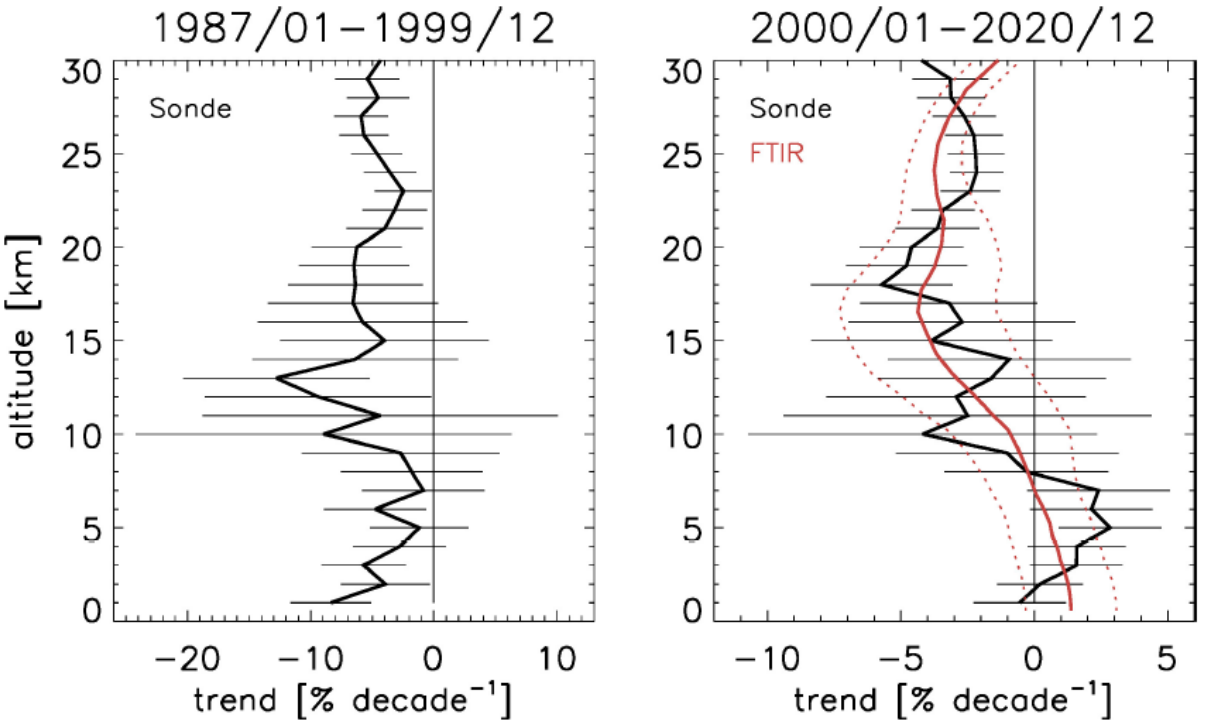
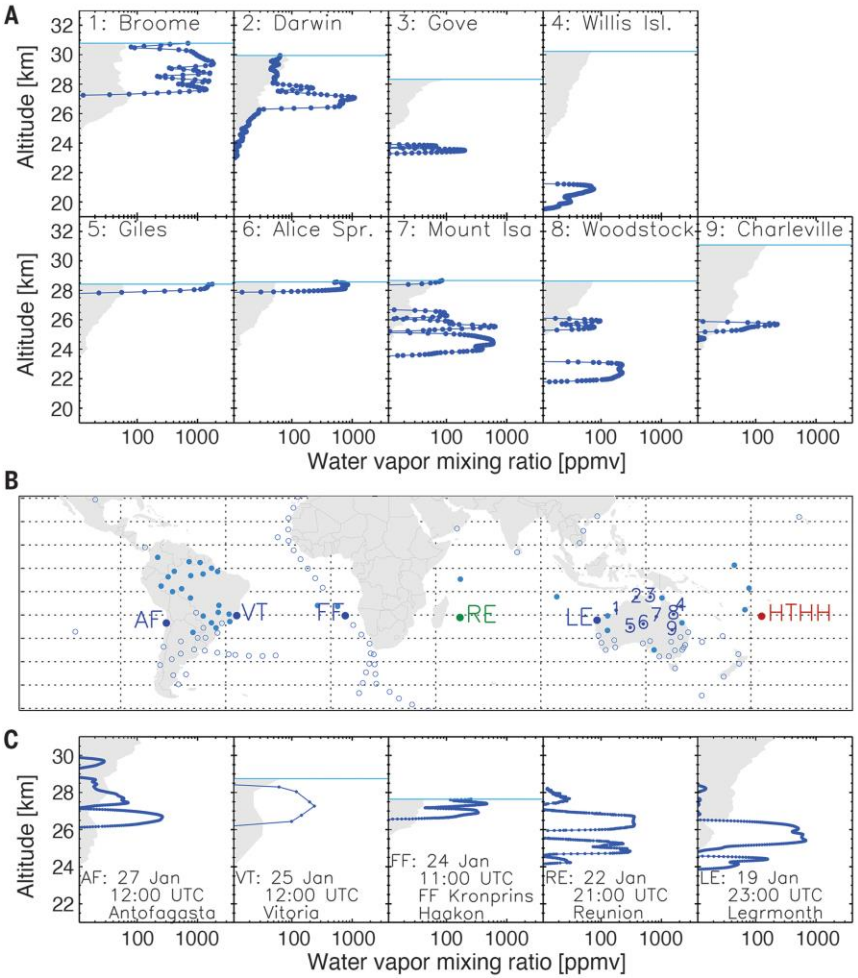


Figure 4. Vertically resolved observed trends in monthly mean ozone (homogenised) and their uncertainties ($\pm 2\sigma$) at Lauder over two periods, i.e., 1987-1999 and 2000-2020, from ozonesonde measurements (black), and from FTIR measurements (red, for the 2001-2021 period).

Zeng, G., Querel, R., Shiona, H., Poyraz, D., Van Malderen, R., Geddes, A., Smale, P., Smale, D., Robinson, J., and Morgenstern, O.: Analysis of a newly homogenised ozonesonde dataset from Lauder, New Zealand, EGUsphere [preprint], https://doi.org/10.5194/egusphere-2023-2534, 2023.

Stratospheric water vapour over Australia following Hunga Tonga eruption



The operational radiosonde network measured high resolution vertical profiles of the stratospheric water vapour plume.

Holger Vömel, Stephanie Evan & Matt Tully: Water vapor injection into the stratosphere by Hunga Tonga-Hunga Ha'apai.*Science* **377**,1444-1447(2022).DOI:10.1126/science.abq2299

Needs and recommendations

Needs & recommendations

- Support for the continued operation of existing observational programs, especially those with long time-series in such a data sparse area
- Resume Brewer production!
- Support for stratospheric chemistry-climate modelling in Australia and New Zealand
- Samoa has a willingness to launch a project for ozone monitoring, but would require international expertise to train current staff members and advise on what is most feasible.
- Indonesia
  - Support for continued operation of ozone and UV monitoring, and assistance for calibration and maintenance. Financial support for travel to meetings and conferences.
  - More research into tropical UV and its past and expected future changes.
  - ODS monitoring in Indonesia

Ongoing research needs

- Research into long-term changes in southern hemisphere tropical and mid-latitude ozone
- Impacts on stratospheric ozone of major bushfires and Hunga Tonga
- Coupling between Antarctic ozone hole and southern hemisphere surface climate and weather
- UTLS changes in the southern hemisphere

The Bureau of Meteorology

Thank you

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