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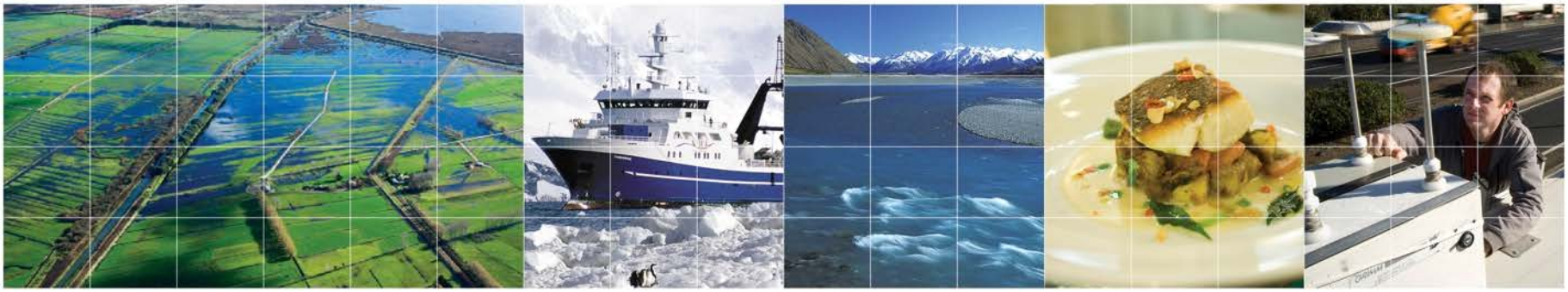
Update on Lauder activities

Richard Querel February 25, 2015



Lauder Station

- Site founded in 1961 (operating for 54 years)
- Began as an auroral research station
- Situated at 45 S, 169 E, 370 m.asl
- Semi-arid, rural countryside. In the rain shadow of the Southern Alps. Manuherikia river valley, Central Otago.
- Relatively low aerosol background (apart from seasonal high-country burn-off…)

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Measurement capabilities

- *In situ* sampling, flasks
- Surface radiation
- Balloonsondes
- Spectrometers
- LIDARs
- Microwave radiometers

Lauder personnel:

- 5 Scientists
- 5 Technicians (-1 soon)
- 2 Emeritus
- 1 Postdoc
- 2 PhD Students

+ GRUAN/SASBE PhD Student beginning March 2015

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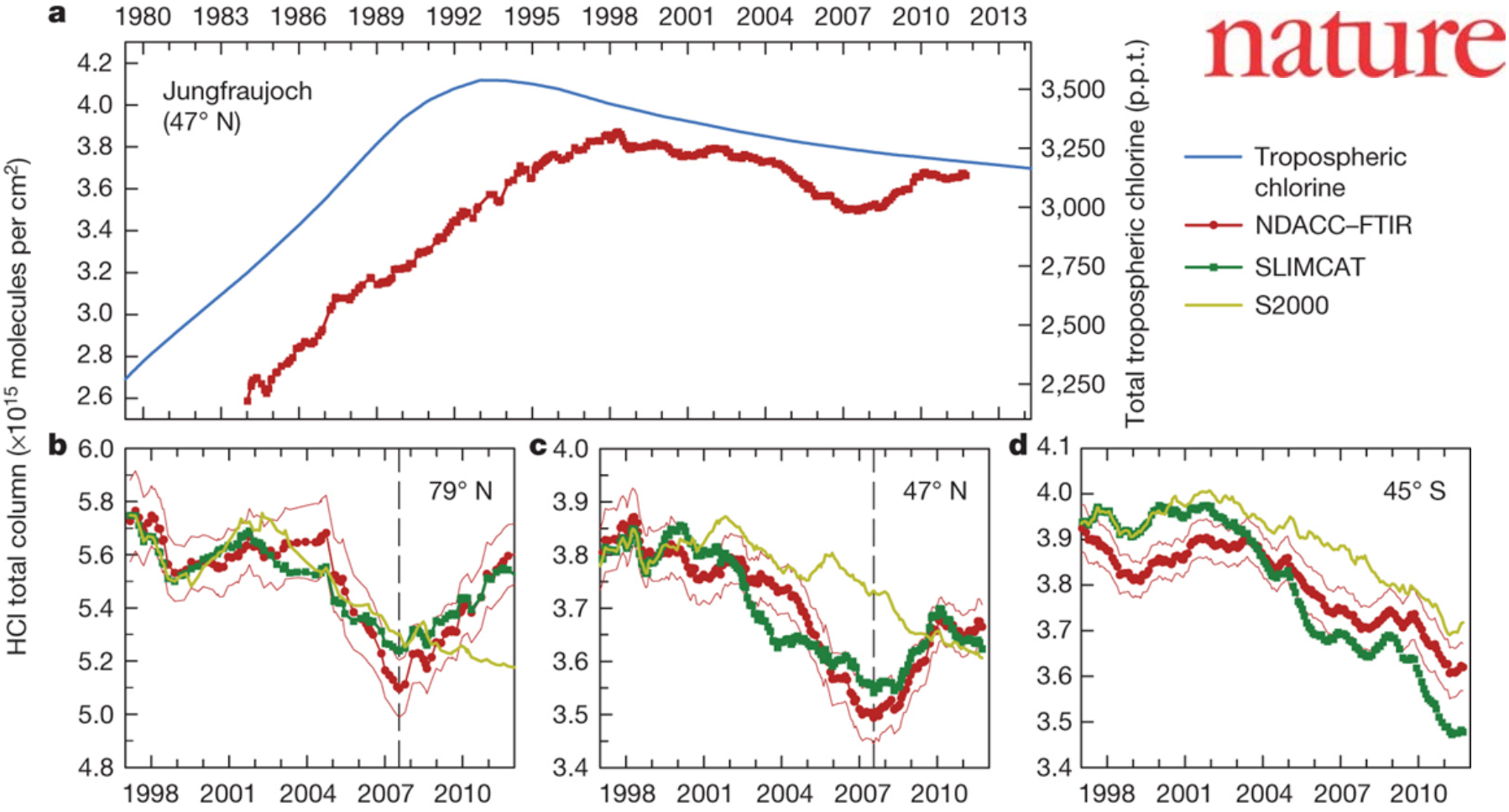
Lauder is the only Southern Hemisphere site that measures ozone profiles with the 5 standard methods:

- LIDAR
- Dobson Umkehr
- Ozonesonde
- FTIR
- Microwave radiometry

An intercomparison paper is being written.

Lauder's ongoing long time series measurements

- Stratospheric NO_2 since 1980 (35 years)
- Ozonesondes since 1986 (29 years)
- Dobson Ozone since 1987 (28 years)
- UV Spectrometers since 1989 (26 years)
- Aerosol LIDAR since 1992 (23 years)
- Microwave radiometers since 1992 (23 years)
- Ozone LIDAR since 1994 (21 years)
- Bruker 120HR FTS (Mid-IR) since 2000 (15 years)
- Frost-point hygrometers since 2004 (11 years)
- TEI *in situ* ozone analyser since 2004 (11 years)
- Bruker 125HR (NIR) since 2009 (6 years)



Recent Northern Hemisphere stratospheric HCl increase due to atmospheric circulation changes.
E. Mahieu, et al. Nature (2014), 515,104–107 doi:10.1038/nature13857

Atmos. Chem. Phys. Discuss., 15, 5241–5267, 2015
www.atmos-chem-phys-discuss.net/15/5241/2015/
doi:10.5194/acpd-15-5241-2015

Atmospheric Chemistry and Physics Discussions

Unusual stratospheric ozone anomalies observed in 22 years of measurements from Lauder, New Zealand

G. E. Nedoluha[1], I. S. Boyd[2], A. Parrish[3], R. M. Gomez[1], D. R. Allen[1], L. Froidevaux[4], B. J. Connor[2], and R. R. Querel[5]

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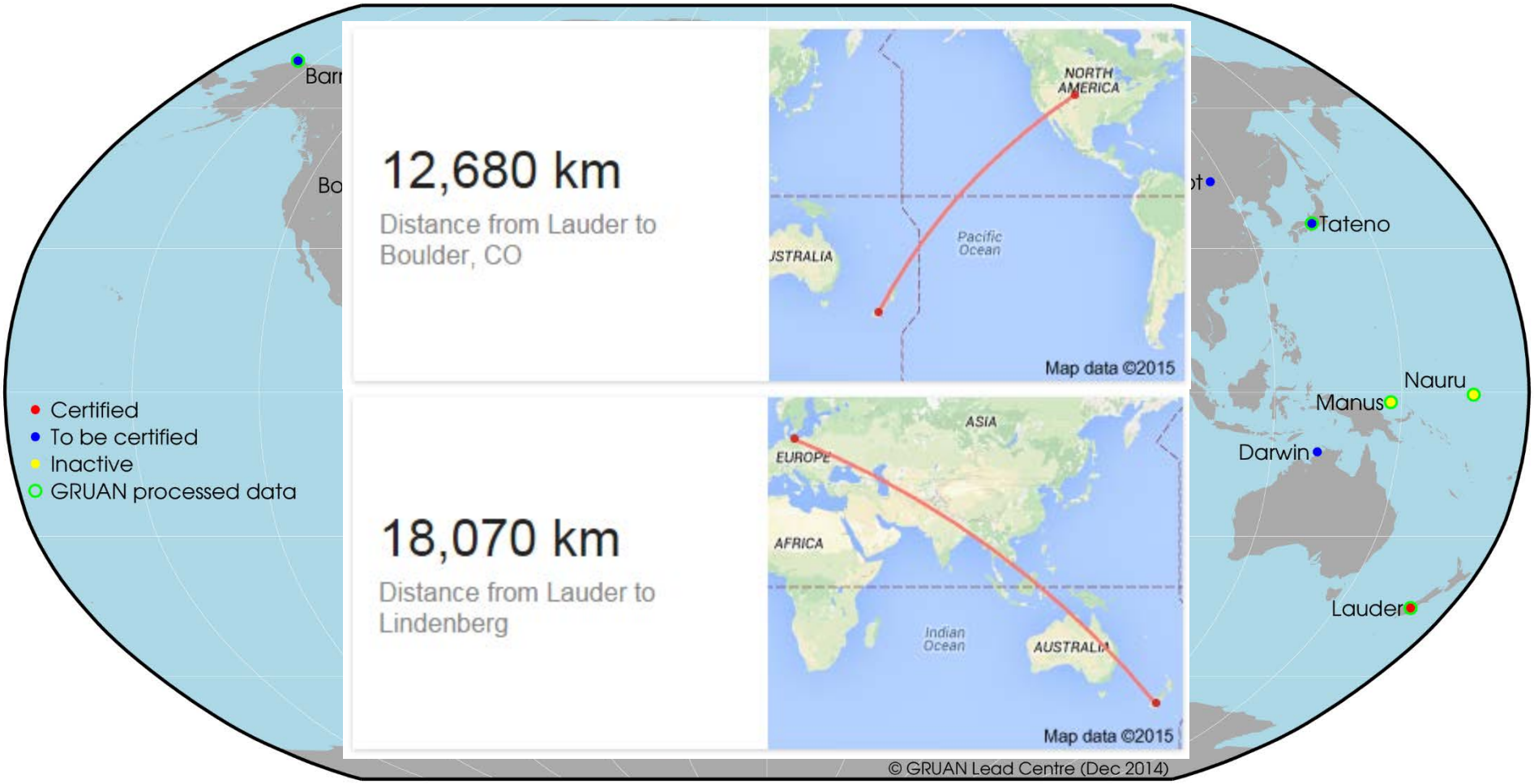
November 2014: Lauder's RS-92 radiosonde program received GRUAN certification!

There are now four sites with GRUAN-certified measurements:

- Lindenberg, Germany
- Ny-Ålesund, Norway
- Boulder, U.S.A.
- Lauder, N.Z.

GCOS Reference Upper-Air Network



March 10, 2015, a GRUAN certification event will be held at Lauder.

In attendance will be:

- NIWA executive
- NZ MetService executive
- Ministerial representatives

Plan to discuss GRUAN/GUAN links

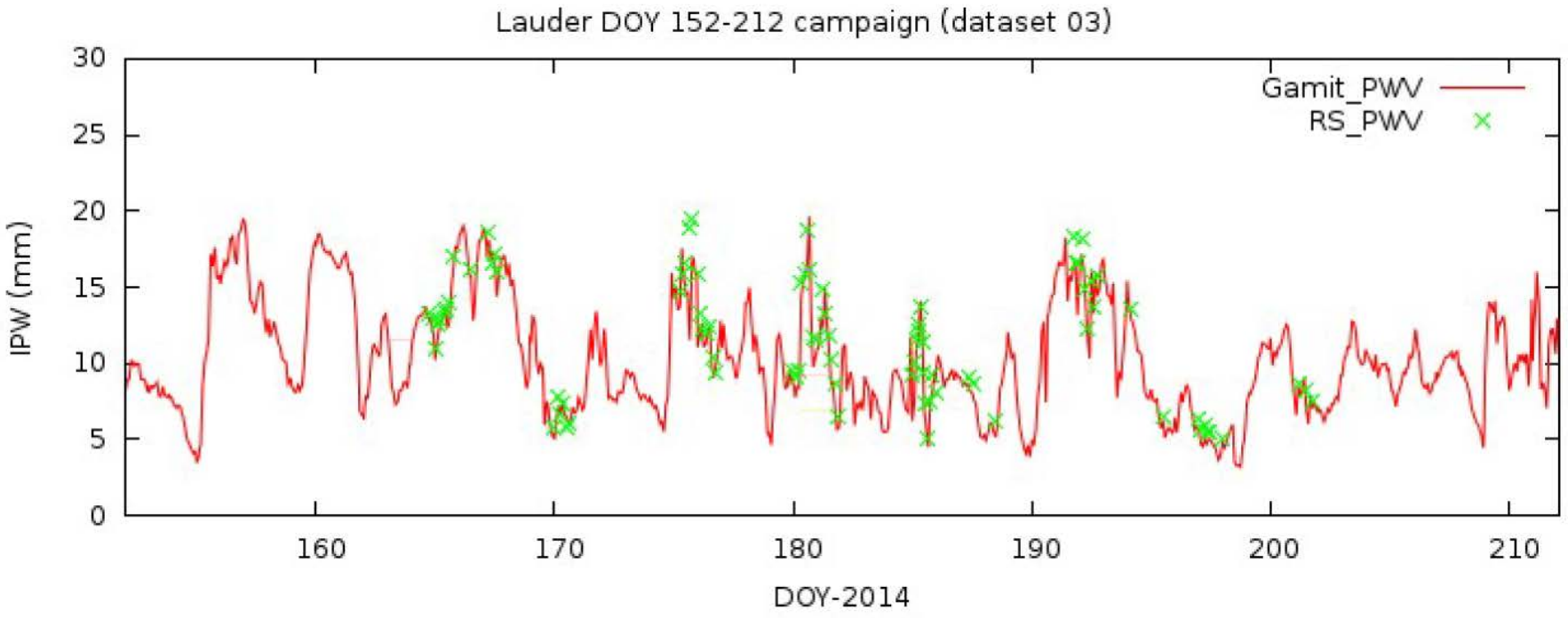
Lauder as GUAN submitter

- Working with NZ MetService
- Now have a WMO# for Lauder (93817)
- Configuring DigiCORA to output TEMP and PILOT and BUFR messages needed for GTS
- Will forward these generated messages to MetService for them to redistribute to GTS

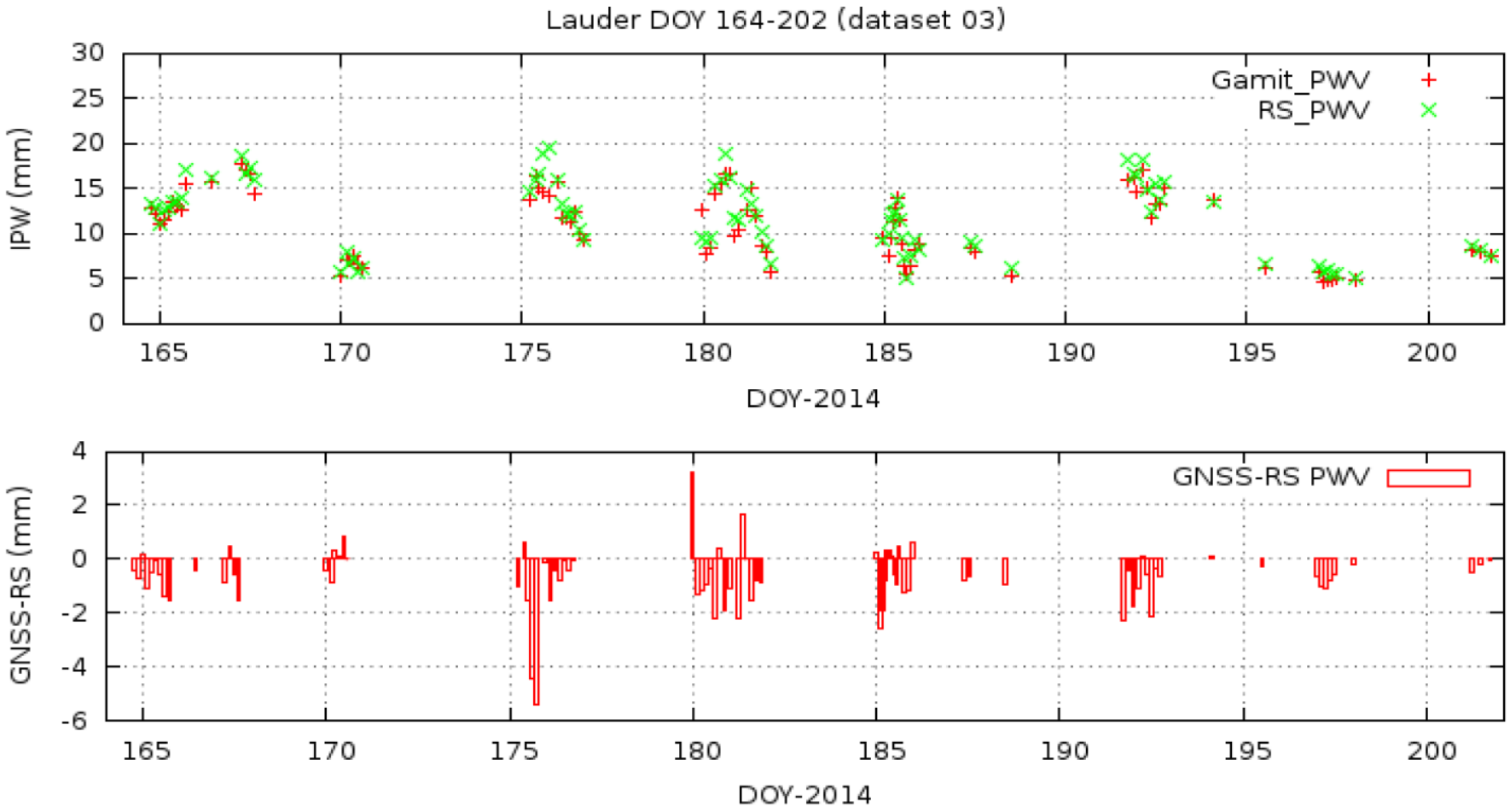
Lauder GNSS

- LDRZ (Fort Lauderdale was already LAUD)
- Thank you Markus Bradke for helping set-up the site-log GNSS meta data document
- Lauder GNSS meta data package may be instructive for others who need to create one
- Lauder GNSS data for Feb 1, 2015 uploaded through the GRUAN GNSS pipeline

Lauder GNSS-PW sanity test



Kalev Rannat processed the Lauder GNSS-PW for the period covered by 83 radiosondes launched during DEEPWAVE-NZ



- These preliminary GNSS-PW values seem biased towards dry (up to 20%).

Lauder/Arrival Heights Activities

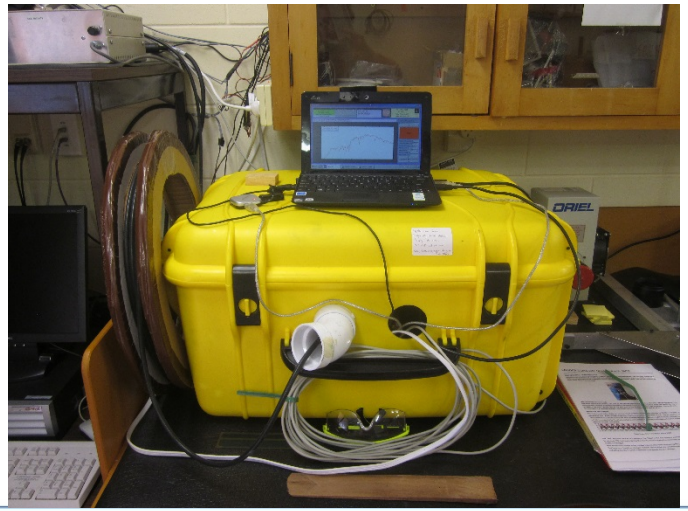
- Upgraded AH Dobson, intercomparison at Lauder (< 1 DU), and reinstalled (Feb.2015)
- Installation of new Bruker HR125 at Arrival Heights (Dec.2014)

DEEPWAVE-NZ activities nearly concluded:

- DLR LIDAR measurements (ended Nov.2014)
- OH mesospheric all-sky camera (ongoing)

Lauder Activities

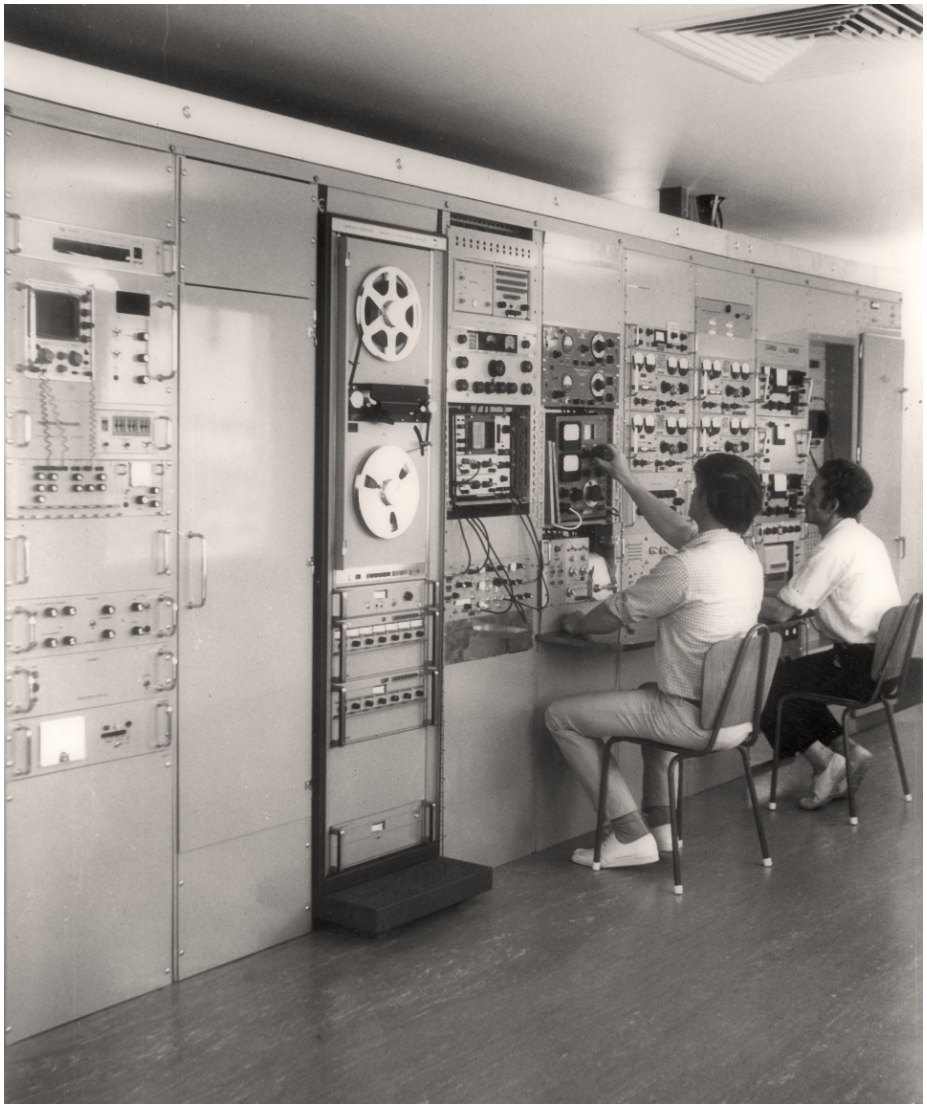
- OCO-2 is now targeting Lauder for TCCON
- NO_2 intercomparison between Lauder DOAS instruments and NASA Langley Pandora spectrometer underway (since Sept.2014)



Upcoming Lauder Activities

- NOAA AirCore campaign (Sept.2015)
- NASA SAGE-III-ISS validation (early 2016?)
- Sentinel-5 Precursor (TROPOMI) validation (2016?)

Sites like Lauder will continue to remain relevant as ever more sensitive and powerful satellite instruments will keep needing to be calibrated and validated against high-quality, stable reference measurements.



Receiving ISIS telemetry at Lauder (1974)

Questions?