Australian Government
Bureau of Meteorology

Agency Report to CEOS WGCV-41
Australian Bureau of Meteorology

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OVERVIEW OF BOM AND SATELLITE APPLICATIONS

Australian Bureau of Meteorology

The BoM provides Australians with environmental intelligence for safety, sustainability, well-being and prosperity

- Monitor and report on current environmental conditions.
- Analyse and explain trends in environmental data.
- Provide forecasts, warnings and long-term outlooks on environmental phenomena that affect the safety, prosperity and resilience of Australians.
- Foster greater public understanding and use of environmental intelligence.

- ~1500 staff
- Head Office in Melbourne, Regional centres around the nation
- Strong links with Asia-Pacific nations, national & international agencies

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National Observing Network

Point/Localised Data

- Automatic Weather Stations
- Rainfall Observations
- Upper Air Balloon Flights

Medium-area Coverage

- Radar
- Lightning Detectors

Wide-area Coverage

- Polar-Orbiting Satellites
- Geostationary Satellites

Specialised surface networks

- Solar radiation & aerosol
- Total column ozone & ozonesondes
- Wind profilers

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Weather Satellites Used in the Bureau

Polar-orbiting

NOAA series

Metop series

Aqua & Terra

Suomi-NPP

Fengyun-3

TRMM

Jason-2

SARAL

WindSat

GCOM-W1

Geostationary

MTSAT series

Fengyun-2 series

GOES series

METEOSAT

Himawari-8

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O&I Division – Passive Remote Sensing: Satellite-based products

External use

- Solar Radiation
- Grassland Curing
- NDVI (vegetation greenness)
- Sea Surface Temperature
- Volcanic Ash
- Fog / Low cloud
- Aircraft Icing Potential
- Public imagery

Internal use

- Sounder radiances
- Atmospheric Motion Vectors
- Forecaster imagery

Future development

- Cloud properties
- Convective initiation
- Precipitation
- Advanced Dvorak analysis (TC)

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VALIDATION OF SELECTED SATELLITE PRODUCTS

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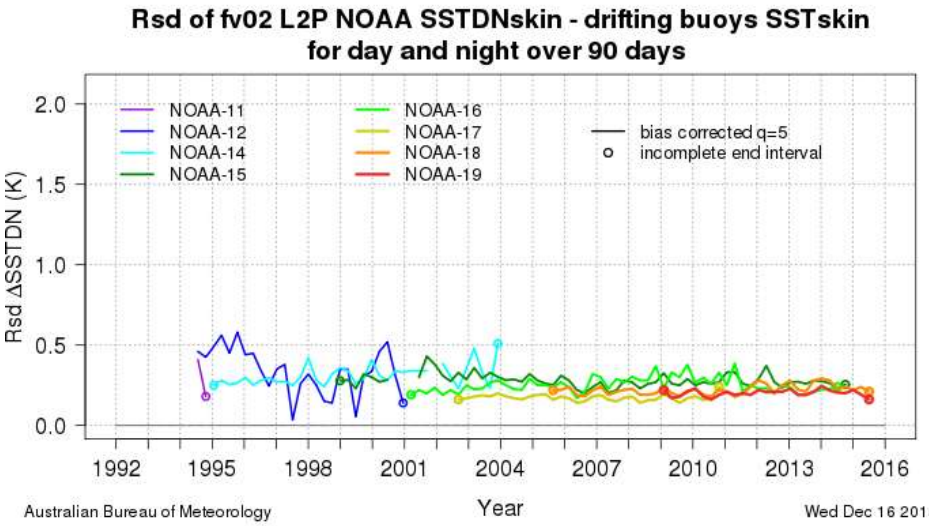
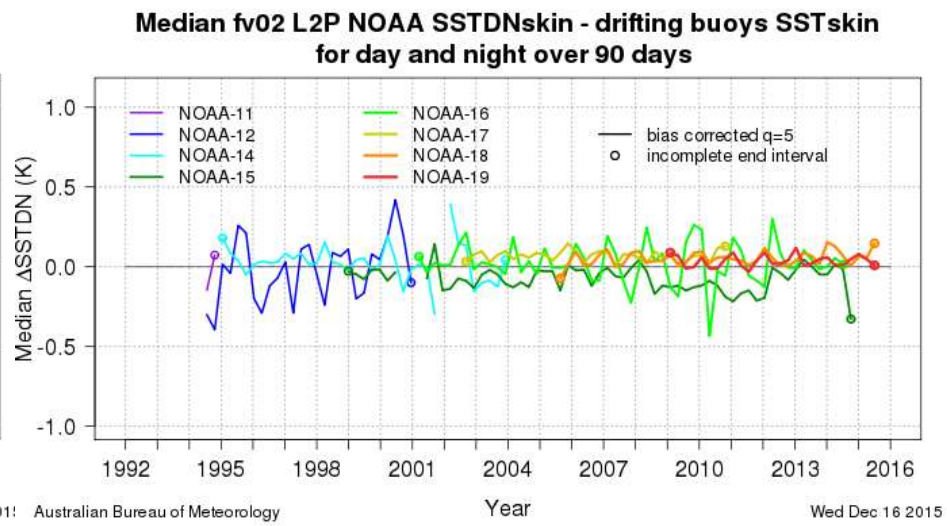
Sea Surface Temperature: AVHRR

- Long AVHRR LAC (1 km) record contributed to GHRSST
- Estimates of uncertainty from in situ observations
  - Data Buoy Cooperative Panel (WMO/IOC)
  - Argo/Ship data retained for independent verification





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SST: Advanced Himawari Imager

- Needed SST from Himawari-8 / AHI for real-time operations
- Limited in situ observations, poor geographic distribution
- So developed a regression model against NPP/VIIRS SST
  - Regression is fast and has limited dependencies
  - Trained on NOAA-ACSPO VIIRS SST

$$
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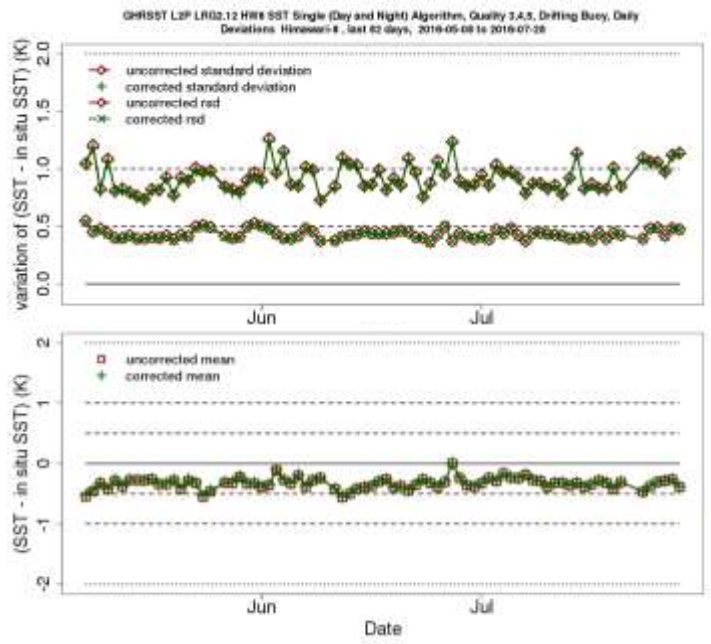
\mathrm{SST} \;=\; & \mathrm{BT}_9\,(a_9 + g_9(\sec\theta_z - 1)) + \\
& \mathrm{BT}_{13}\,(a_{13} + g_{13}(\sec\theta_z - 1)) + \\
& \mathrm{BT}_{14}\,(a_{14} + g_{14}(\sec\theta_z - 1)) + \\
& \mathrm{BT}_{15}\,(a_{15} + g_{15}(\sec\theta_z - 1)) + \\
& T_0
\end{aligned}
$$



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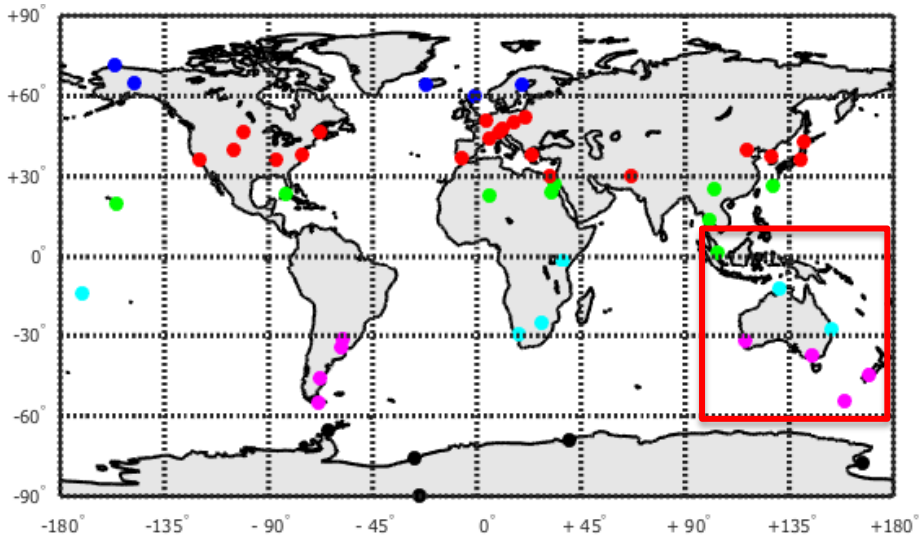
Total Column Ozone

Dobson instrument network

- BoM sites contribute a large fraction of the data at southern latitudes
- BoM will host a regional Dobson intercomparison February 2017 (WMO Region V: Australia, New Zealand, Philippines, Singapore?)



Map from Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2016-11, 2016

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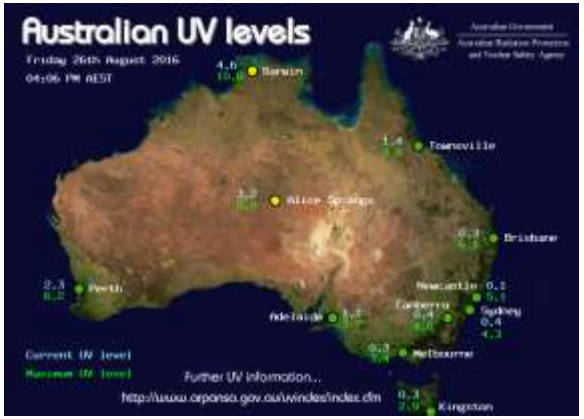
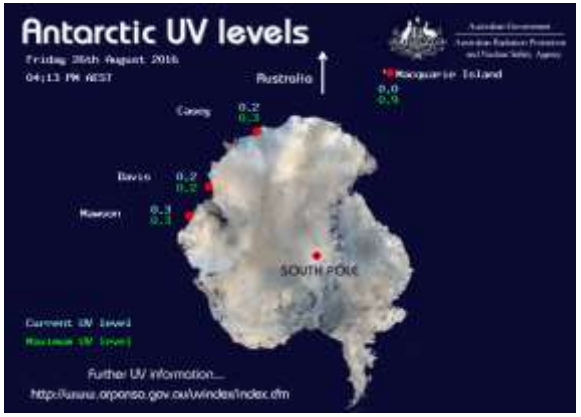
UV

Validation of UV (important for skin health in Australia)

- Tentative plan to derive UV maps (clear & cloud-adjusted) from AHI
- Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) maintains a network of solar ultraviolet (UV) measurements in major Australian cities and in the Australian Antarctic territories





http://arpansa.gov.au/uvindex/index.cfm

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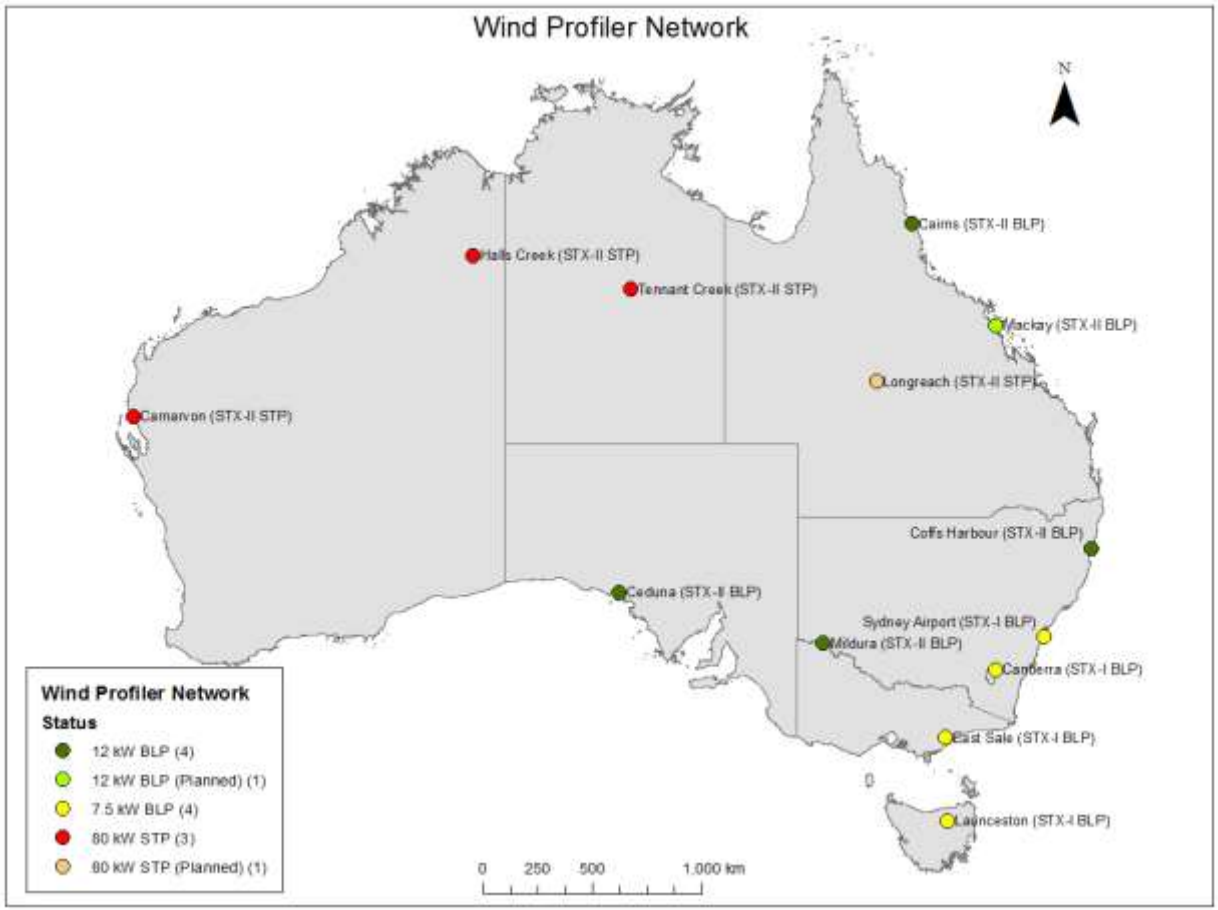
Wind

ABoM wind profilers are available to support validation of ADM-Aeolus

- Data stream recently put onto the GTS



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Thank you…

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