Blowing the whistle on the climate of the Great Barrier Reef

A synopsis of research by Dr. Bill Johnston

Main points

- Locations of weather station at Cairns, Townsville and Rockhampton were incorrectly specified by Bureau of Meteorology metadata. Step-changes in maximum temperature caused by site moves and changes (or adjustments related to site changes) were ignored or misrepresented to imply the climate has warmed when it hasn't.
- There is no evidence that warming or climate change threatens or is likely to threaten Great Barrier Reef ecosystems. Populist hysterical claims of impending catastrophe linked to anthropogenic warming are unfounded.
- An open public inquiry into the costly misdirection of research priorities by the Australian Research Council and the consequent misallocation of millions of taxpayer dollars to frivolous pursuits based on false notions about the climate is urgently needed.

Background

Weather stations at Rockhampton, Townsville and Cairns were part of the Aeradio network setup in 1939 by Amalgamated Wireless (Australasia) on behalf of the Civil Aviation Board to track aircraft along Australia's major air routes and forecast and advise of weather conditions en route (disturbances, wind-strength, direction, temperature and humidity profiles etc.).

Staff consisted of proficiency-certified radio operators/technicians and weather observers and forecasters trained by the Weather Bureau in Melbourne. From June 1940 Aeradio was conscripted as a section of the Royal Australia Air Force (RAAF) and when demobilised in June 1946, air traffic control transferred to the Department of Civil Aviation (DCA) (and later became Flight Services) while met-staff moved to the Weather Bureau within the Department of the Interior (which later became the Bureau of Meteorology (BoM)). During WWII the United States Weather Bureau and the United States Army Air Force (USAAF) also operated meteorological facilities at some Australian airfields including Townsville and Rockhampton.

Queensland Government aerial photographs and documents and plans in the National Library and National Archives of Australia (NLA and NAA) show unequivocally that post-WWII site moves and changes have been misrepresented to imply the climate has changed and warmed. Following is an overview of ongoing research on the climate of the Great Barrier Reef.

Discussion

The Cairns Aeradio office was adjacent to the control tower beside the apron and main runway in the northwestern sector of the aerodrome (Figure 1). The instrument enclosure with Stevenson screen was adjacent to the apron about 30 m northeast of the office, not 1000 m southeast (at Latitude -6.8872^{o} Longitude 145.7572^{o}) as claimed by site-summary metadata.

Instead of moving the enclosure to a section of reclaimed mangrove-swamp north of the office in 1962, it relocated to a 2-metre high mound near the center of the airport in 1966 and from there about 200 m to another mound before September 1983 to be out of the way of a new taxiway (Figure 2). As one site was bulldozed while the other was built and there is no data missing, another site must have operated in the interim. The 1983 aerial photograph shows the likely

position of a fourth site on reclaimed land on the western side of the runway in the vicinity of where the current automatic weather station (AWS) and met-office are located. A maximum temperature (Tmax) step-change (1.01^{o}C) in 1986 probably marks the end of when data were adjusted to account for the move to the second mound.

Aerial photographs show the current met-office and radar was built before October 1994 by which time the second mounded site was abandoned. Correcting for the 1986 step-change leaves no residual trend or cycles and no evidence that the climate has changed or warmed.

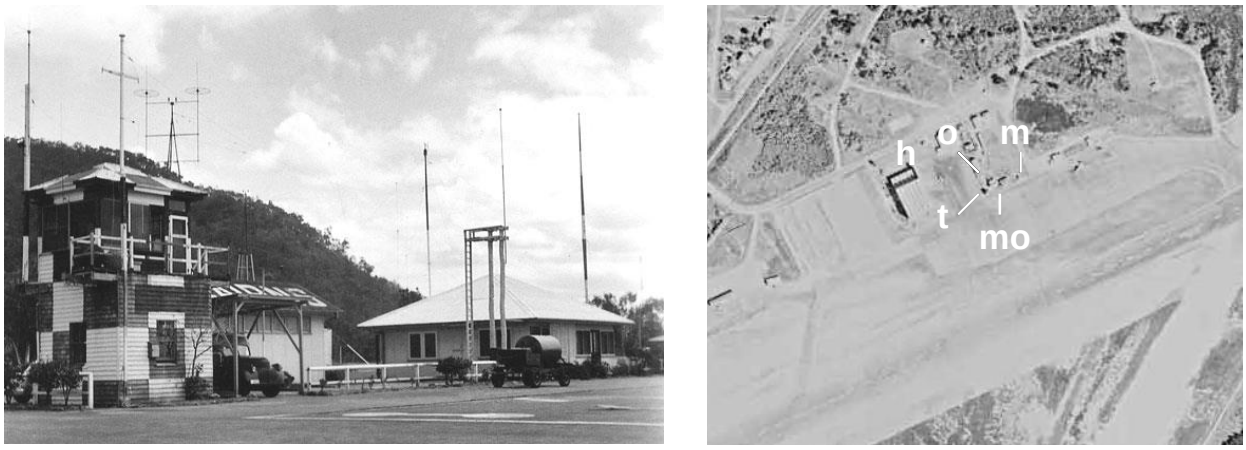


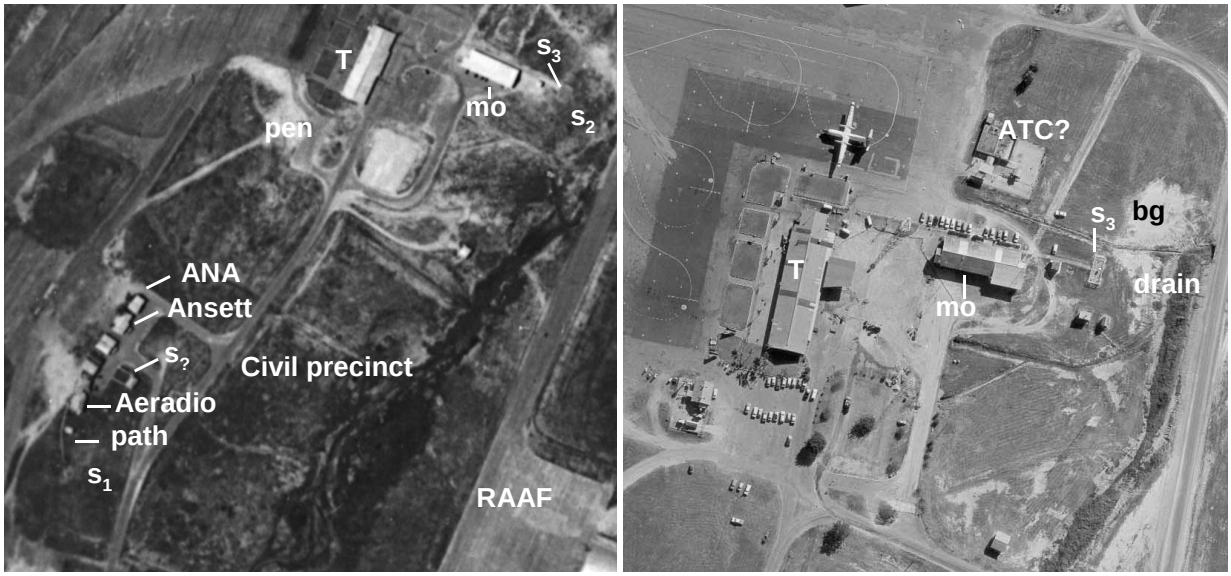
Figure 1. Cairns control tower (t) (and signal square for visual communication in front), operations centre (o) and the Aeradio met-office (mo) in *c.* 1959 (left). The met-enclosure with Stevenson screen (m) was north of the Aeradio office facing the apron (NAA[1] Barcode 16012351 p. 155) and (h) is the WWII-era hanger. (Airside photograph courtesy of the Civil Aviation Historical Society; aerial photograph portion of QAP0298012[2]; 30 June 1952.)

Figure 2. Cairns airport in 1968 (left) (portion of QAP1774012) and 1983 (QAP4193016) showing the location of the original Aeradio site (S_1), a site proposed but rejected in 1962 (S_p), the 1966 site located on a mound near the anemometer (S_2), the site having been pushed (bulldozed) out of the way of a new taxiway in 1983 (S_3) and that while neither site could have been operating another site (S_4) appeared to have opened near where the current AWS is located (at that stage the new met-office had not been built). The main runway was extended before 1952, again in 1962 and was being extended further in 1983.

ACORN-SAT[3] metadata states "Observations have been made at the airport (031011) since 1943" and that the only move was "1.5 km northwest (to the other side of the runway)" in December 1992, **but its not true**. Metadata ignored that the original site beside the apron moved to the

mound in the middle of the airport in 1966 then to another mound before September 1983. Effects of those moves appear to be adjusted-out of the data. Metadata also does not mention the fourth site identified in the September 1983 aerial photograph or that the 230-litre Stevenson screen was replaced with a 60-litre one on 4 October 2005.

The Townsville Aeradio office moved from the Ross River landing strip to the civil aviation precinct on the eastern side of the runway at the new RAAF aerodrome at Garbutt in 1940 (Figure 3). Aerial photographs and archived documents and plans show the Aeradio office met-enclosure probably moved once before the screen was relocated near a radiosonde hut east of the 1949 operations center in 1953/54. After it was blown over by Cyclone Agnes in March 1956 the replacement screen was apparently reinstated in a pre-existing met-enclosure behind the office.



Garbutt 10Sqn print 5005, 1 February 1952 (https://nla.gov.au/nla.cat-vn4602275).

QAP15231119, 1 July 1965.

Figure 3. Locations of weather station sites (S) near the 1940 Aeradio office (left) and the 1949 meteorological office (mo). A plan indicates the original site was probably a fenced compound indicated by $S_?$. The Stevenson screen apparently moved from S_1 to the vicinity of the radiosonde hut (S_2) in 1953/54 and after it was damaged in March 1956 its replacement relocated to the met-enclosure behind the office (S_3) where it remained until December 1969. The previous operations centre became the terminal (T) and the building to the north appears to be an air traffic control centre. After the office was extended bare ground (bg) east of S_3 may have affected observations.

Following protracted negotiations with the RAAF, a 100-foot square 1-metre high mound was built by the Department of Public Works (Cwth) on the western side of the runway in 1968. Instruments were set-up in 1969 and observations transferred there from January 1970. Another site near the 1954 met-aids office apparently operated before 1976 and while the AWS on its 2-m high mound commenced operating in December 1994, observations continued at the previous site, which at some point moved about 150 m west to an area of reclaimed swamp (Figure 4) after October 1995. Comparison data were allocated a new site number (32178)

According to ACORN-SAT metadata: “Observations have been made at Townsville Airport since 1942. There are no documented moves until one of 200 m northeast on 8 December 1994, at which time an automatic weather station was installed", **but its not true**. Archived files, plans and aerial photographs show the site moved at least six times before December 1994. While some changes had no impact, moves in 1953/54 and 1970 were ignored to imply the climate changed and warmed when it didn't. Furthermore, although no buildings existed west of the runway before 1954 and the site moved from S_5 after the 1954 MetAids building was demolished and replaced; as

if to rewrite history, site-summary metadata places the 1940 Aeradio site at Latitude -19.2492°, Longitude 146. 7647°, which is site S_6 in Figure 4.

Moving the site in 1953/54, 1970 and 1994 accounts for all the warming in Tmax data (0.55°C median-rainfall adjusted). Adjusting correctly for those changes leaves no residual trend, cycles or step-changes attributable to the climate.

https://nla.gov.au/nla.cat-vn4602323; Run 10, print CAS 623 (19 October 1972)

QAP32238379 (23 June 1976) rescaled and overlaid on QAP5831015 (30 June 2000)

Figure 4. There were no buildings on the western side of the runway before the RAAF/DCA tower and MetAids buildings were constructed in 1954. Observations transferred from S_3 to the mound (S_4) from January 1970; however, the resulting step-change was ignored to imply the climate changed. (Filled trenches link remote anemometers and radar to the control centre and tower.) An aerial photograph (QAP5268201) shows the 1954 MetAids office was demolished before 23 August 1995 and as the S_6 site was a patch of swamp at that time, it was sometime later the site moved.

The Rockhampton Aeradio office (and US Weather Bureau office) was north of the aerodrome runways and the weather station with Stevenson screen was near the WWII garrison and canteen on the aerodrome boundary (Figure 5). The site moved about 450m southeast to near its present position before May 1956 and aerial photographs show both sites were observed concurrently possibly until 1963. In 1993 the site was apparently moved away from the SatCom ground station (visible in an October 1989 aerial photograph), which was probably installed in 1986. The earliest Google Earth Pro satellite image (13 September 2003) shows the current screen is 30 m from extensive hardstanding that wasn't there in March 1999 (Figure 6).

ACORN-SAT metadata states: "The site has been operating since 1939. A site move (80 m northeast) took place on 1 April 1993; an automatic weather station was installed at this time and became the primary instrument on 1 November 1996", **but it's not true**. Documents, plans and aerial photographs unequivocally show the original site was on the northern boundary of the WWII aerodrome and it's likely the Bureau adjusted for the move to near the middle of the airport using overlap data. A step-change in 1986/87 aligns with rollout of the Australian aviation satellite communication system (SatCom) by the Civil Aviation Authority. Although it was only 30 m away, the screen was not moved to a new mounded-site until April 1993. A 60-litre screen replaced the previous 230-litre one on 22 March 2000 and subsequent data were contaminated by nearby

hardstanding. Site-related changes account for 1.30°C of warming in Tmax data (median-rainfall adjusted) and there are no residual cycles, changes or warming attributable to the climate.

Rockhampton 'drome 27 October 1943, https://nla.gov.au/nla.cat-vn4602301, V1045)

Rockhampton 12 July 1956 (https://nla.gov.au/nla.cat-vn2153709 (DOCA collection) 2Sqn 246, print 5004)

Figure 5. Rockhampton RAAF 1943 (left). WWII-era buildings cross-referenced to maps are: (1) signal square for visual communication and (2) control tower; (3) office, store, hanger and fuel facilities (powerhouse behind); (4), Aeradio-met; (5), W/T and Ops (USAAF); (6), armoury; (7), canteen and detention quarters. Other aerial photographs in the DCA series (https://nla.gov.au/nla.cat-vn2153709) indicate that while a new met-enclosure was established at 'X' before 1961, the original site was monitored possibly until 1965.

Discussion and conclusions

Cairns, Townsville and Rockhampton (and Gladstone) temperature datasets consist of untrending segments disrupted by step-changes caused by site changes and correctly adjusting for site-relocations leaves no residual trends or changes attributable to the climate. As the climate has stayed the same since the 1940s it's not true that Great Barrier Reef ecosystems are threatened by 'a changing world'[4] and despite modelled projections, there is little likelihood that the situation will change markedly in the future.

Modelling[5] is not trustworthy and populist campaigns invoking the false notion the climate is rapidly changing, such as by the ARC Centre of Excellence for Coral Reef Studies, lack merit. There is simply no evidence that "reefs are increasingly threatened … and ... challenged by accelerating, human-induced environmental changes"[6]; or that organisms are likely "to face unprecedented rates of change … due to anthropogenic climate-change"[7].

Although it's desirable and necessary to conduct on-going investigation and monitoring of Reef ecosystems, it is essential that research be based on rigorously analysed hard-data so it is duplicable, trustworthy and adds to our storehouse of unbiased knowledge.

Rivers of money mostly from taxpayers spent each year by a flotilla of organisations may be miss-spent. Its apparent for instance, that the Australian Research Council, the Great Barrier Reef Foundation, the Global Change Institute, James Cook University, the Marine Park Authority, CSIRO, the Government of Queensland, Universities of Queensland, NSW, Melbourne and ANU and advocates like WWF, Greening Australia, GetUp!, the Purves Environment Fund and the Climate

Council have not independently verified that climate change and global warming is detectable in individual weather station datasets.

Graphic claims by WWF that “coral bleaching is the ghostly face of climate change..." and GBRF that “climate change is the biggest threat to the Great Barrier Reef" are not substantiated and as the climate hasn’t changed, episodes of bleaching are caused by something else. For their part, the GBRF should return the half-billion dollars gifted to them without due process by Australia’s former Prime Minister, Malcolm Turnbull so it can be reallocated to other priority areas of natural resources research including an in-depth review of the entire BoM climate monitoring network.

By ignoring site changes, Bureau scientists have gamed the data to show the climate has warmed when it hasn't. An open public inquiry into the climate-change industry is long overdue.

Rockhampton airport during the 1991 floods (QAP4925078)

The site moved 80 m northeast on 1 April 1993 (QAP5222027 (1994))

Figure 6. The site moved from the northern boundary of the airport to site S_2 before May 1956. The SatCom ground station (S/C) and associated heat emitting electrical cabinet installed in 1986/87 caused maximum temperature to step-up 0.48°C from 1987 but the site was not moved away until April 1993. Another step-change in 2013 was due to over-reporting of upper-range values due to either a fault with the instrument or data processing.

Further information

Further information, detailed analyses and a case study of analysis methods based on Gladstone Radar is available at http://www.bomwatch.com.au/.

About

Dr Bill Johnston is a retired natural resources research scientist with a career-long interest in climate. The climate of the Great Barrier Reef is being audited using data for weather stations at Rockhampton, Gladstone Radar, Townsville and Cairns (and Mackay and Bundaberg). The project is unfunded.

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[1] NAA Barcodes can be searched at http://soda.naa.gov.au/barcode/
[2] https://qimagery.information.qld.gov.au/
[3] Australian Climate Observations Reference Network – Surface Air Temperature (ACORN-SAT)
[4] https://www.coralcoe.org.au/responding-to-a-changing-world
[5] E.g. Lewis, King and Mitchell (2017) (https://doi.org/10.1002/2017GL074612)
[6] https://www.nature.com/articles/s41598-018-27891-3
[7] https://doi.org/10.1111/gcb.13287