COVID-19: TEMPERATURE, HUMIDITY, LATITUDE AND SEASONALITY – THE AUSTRALIAN EXPERIENCE
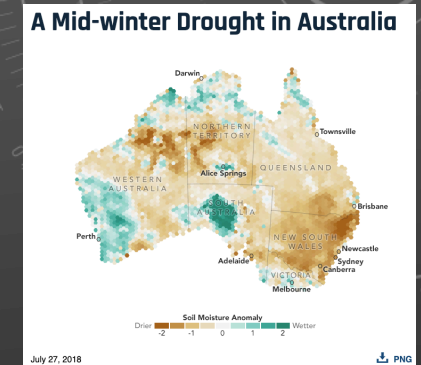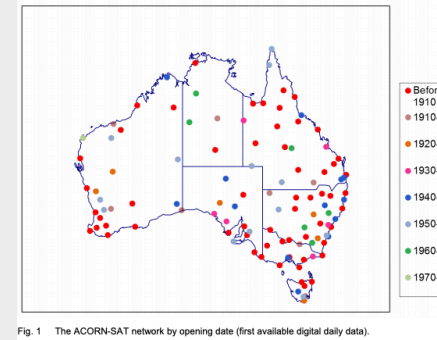
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AUSTRALIA 2020 – POPULATION ~ 25,722,000

Fig. 1   The ACORN-SAT network by opening date (first available digital daily data).

- The world's largest island and sixth-biggest continent

- Space technology and services utilization includes:

  - Weather forecasting

    - The Bureau of Meteorology ACORN-SAT dataset model also utilizes data from the UK MetOffice, NASA and NOAA

  - Emergency management

  - Telecommunications

  - Agriculture and mining

  - GPS.

- Frequent natural disasters - over the past twelve months affected by drought, bushfires, cyclones, floods and COVID-19

- 100 days since the official "lockdown" due to COVID-19 (some recent easing of restrictions depending on geographical location)

A Mid-winter Drought in Australia

Soil Moisture Anomaly
Drier   -2   -1   0   1   2   Wetter

July 27, 2018

Summer of Extremes in Australia

Drought and extreme heat primed much of the continent for unusually extreme fire activity, which was then followed by dangerous flooding.

Cyclones over Australia
Late summer cyclones Ferdinand and Esther passed over and near northern Australia.
Published Feb 25, 2020
Atmosphere | Water | Drought | Fires

Australian Smoke Plume Sets Records
Potent wildfires sent one of the largest plumes of smoke higher into the stratosphere than certain satellites have ever observed.
Published Jan 31, 2020
Image of the Day | Atmosphere | Heat | Land | Drought | Fires | Remote Sensing

Major Dust Storm Sweeps Across Australia
Following weeks of smoke, it was dust turning skies odd colors.
Published Jan 14, 2020
Image of the Day | Land | Drought | Fires

Fires Ravage Kangaroo Island
Nearly one-third of the island appears to have burned.
Published Jan 9, 2020
Land | Life | Drought | Fires

THE ORIGINAL PROMPT – COVID-19 AND ALPINE ENVIRONMENTS

- UNOOSA Space4Health webinar – multiple presentations on the use of EO to track and monitor the impact of COVID-19

- Eventually located the GEO Health Community of Practice webpage

JAMA Network | Open™

Original Investigation | Infectious Diseases

Temperature, Humidity, and Latitude Analysis to Estimate Potential Spread and Seasonality of Coronavirus Disease 2019 (COVID-19)

Mohammad M. Sajadi, MD; Parham Habibzadeh, MD; Augustin Vintzileos, PhD; Shervin Shokouhi, MD; Fernando Miralles-Wilhelm, PhD; Anthony Amoroso, MD

A number of studies, including laboratory studies,[9,10] epidemiological studies,[11,12] and mathematical modeling,[13] point to the role of ambient temperature and humidity in the survival and transmission of seasonal respiratory viruses. The tremendous level of research supporting both ambient temperature and humidity in its role in transmission and infection motivated this study to examine the influence of environmental factors on COVID-19. We sought to determine whether climate could be a factor in the spread of this disease.

- Research question: Does this apply to the Australian experience of COVID-19?

Key Points

Question Is severe acute respiratory syndrome coronavirus 2 associated with seasonality, and can its spread be estimated?

Findings In this cohort study of 50 cities with and without coronavirus disease 2019 (COVID-19), areas with substantial community transmission of COVID-19 had distribution roughly along the 30° N to 50° N latitude corridor with consistently similar weather patterns, consisting of mean temperatures of 5 to 11 °C combined with low specific and absolute humidity.
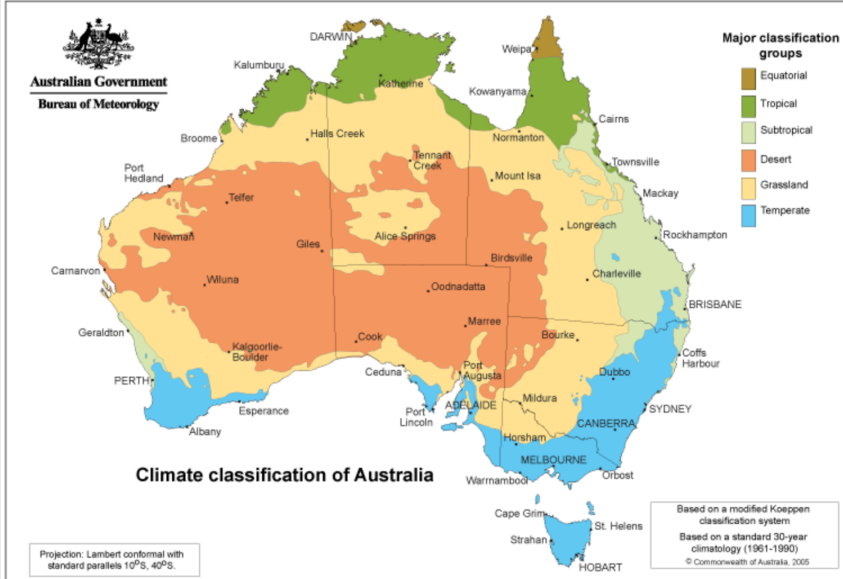
Meaning In this study, the distribution of substantial community outbreaks of COVID-19 along restricted latitude, temperature, and humidity measurements were consistent with the behavior of a seasonal respiratory virus; with modeling, it may be possible to estimate areas at high risk of substantial community transmission of COVID-19.

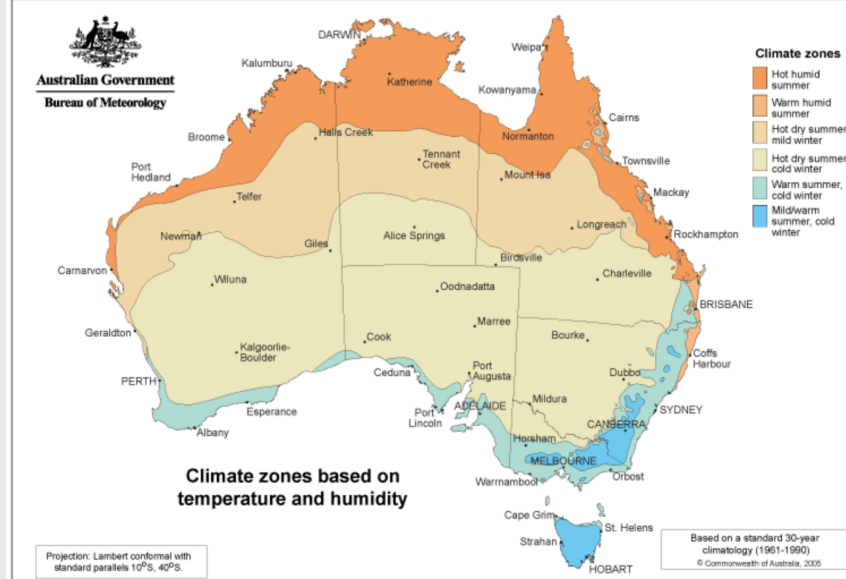# DOES THE 30°N TO 50°N LATITUDE CORRIDOR ALSO APPLY TO 30°S TO 50°S?
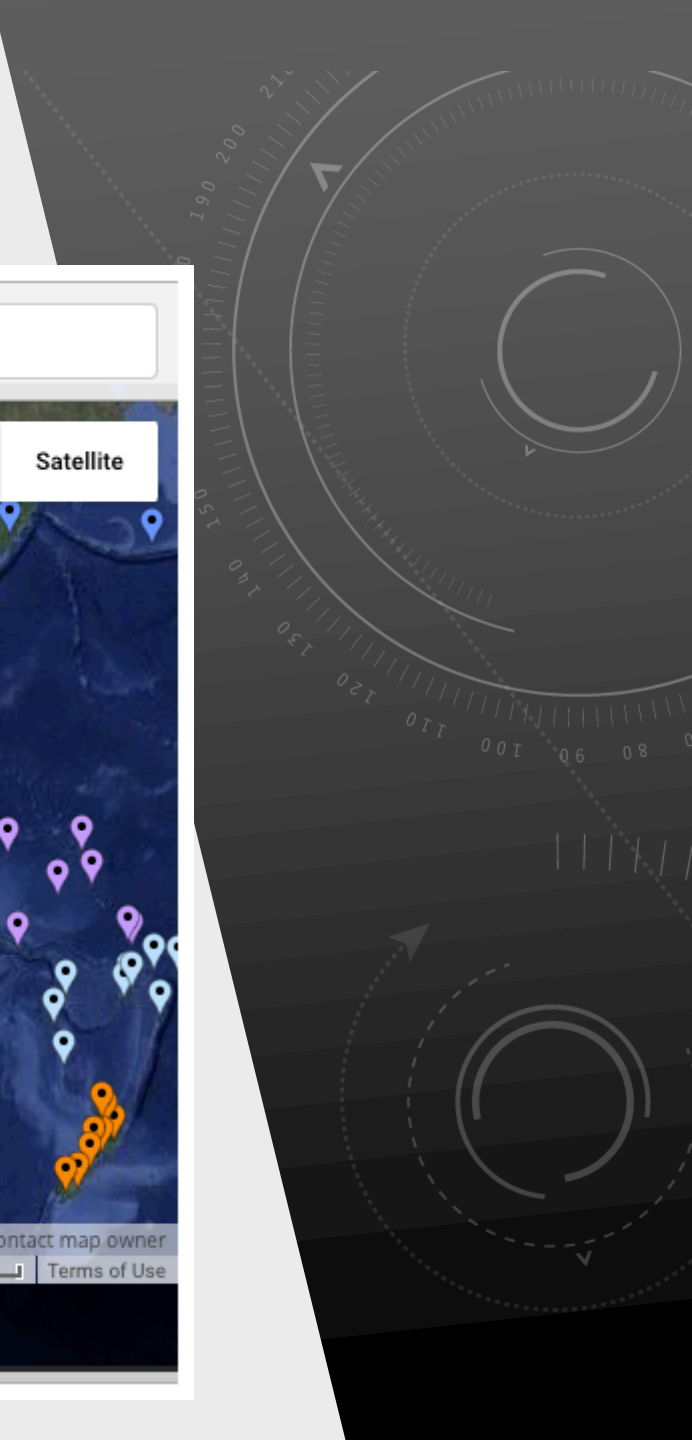
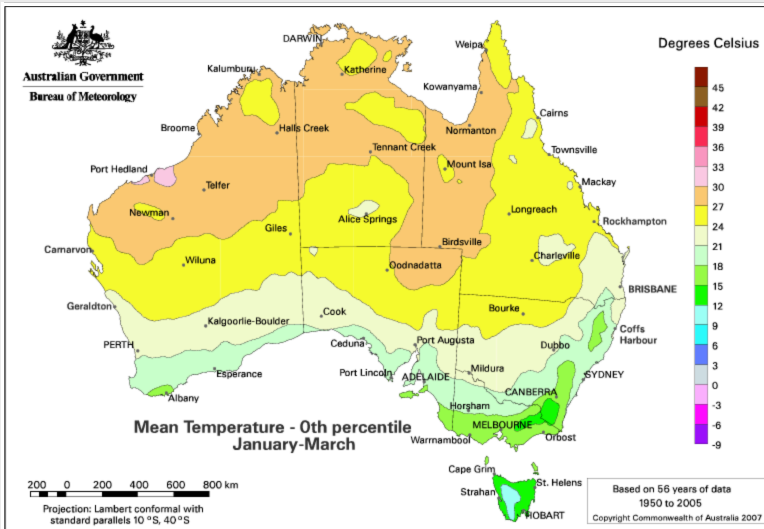# AUSTRALIA – CLIMATE, TEMPERATURE, HUMIDITY, LATITUDE
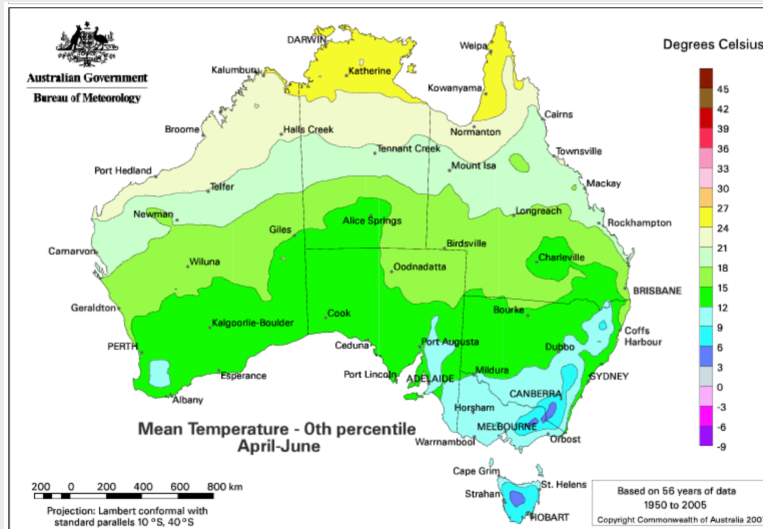## The Tropics (10°S) to Sub-Antarctic (45°S)

Climate classification of Australia

Product Code: IDCJCM0000

Climate zones based on temperature and humidity

Product Code: IDCJCM0000

Mean Temperature - 0th percentile January-March

Product Code: IDCJCM0010

Mean Temperature - 0th percentile April-June

Product Code: IDCJCM0010

Mean Temperature - 0th percentile July-September
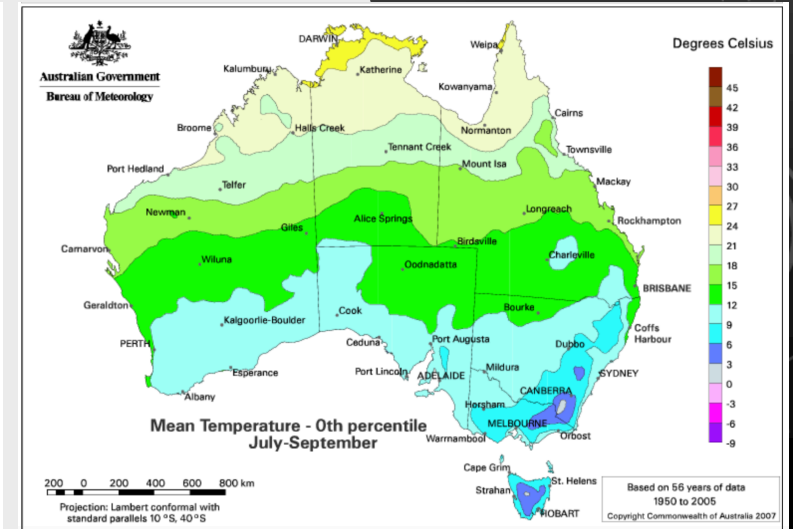
Product Code: IDCJCM0010

EARLY CONTAINMENT/ERADICATION SUCCESS
RECENT OUTBREAK IN MELBOURNE, VICTORIA (37°49'S)

New confirmed cases, daily count

Set time frame
All | Last 14 days

Last 7 days:
Av. 44 cases
R=1.11

VIC

Mainly community transmission

Melbourne: 75 new cases on 29 June
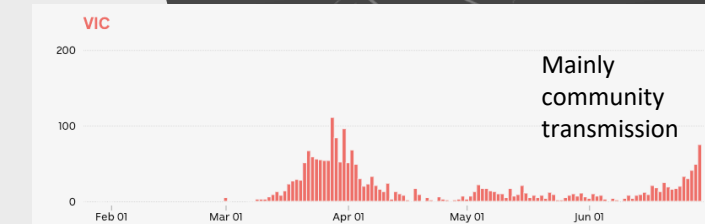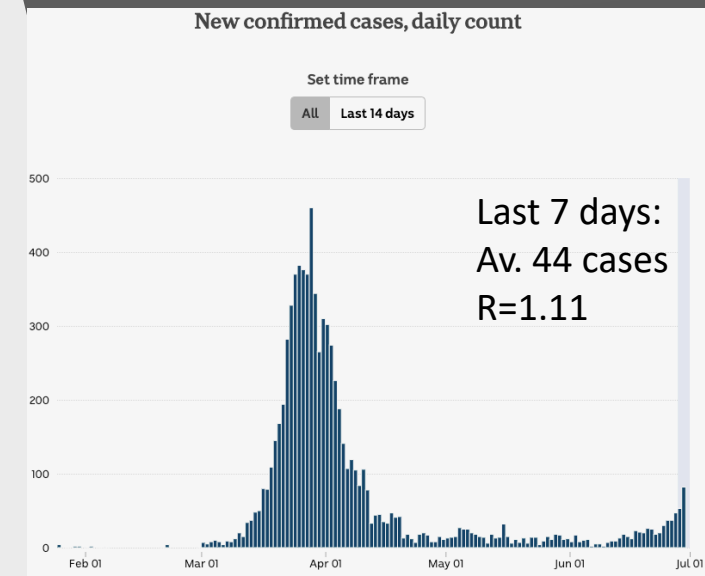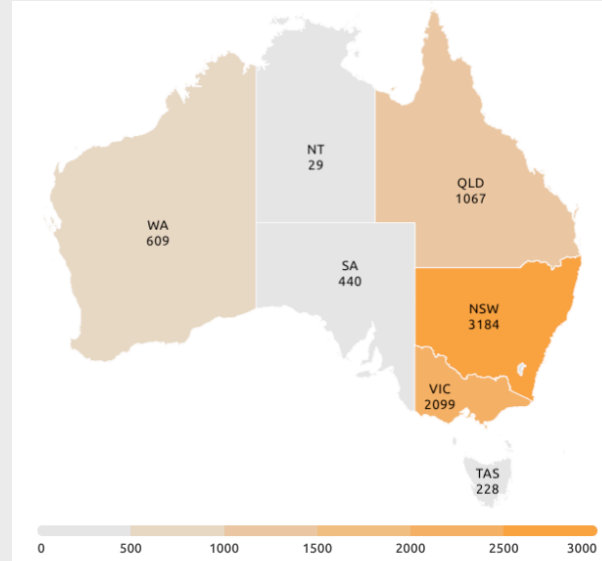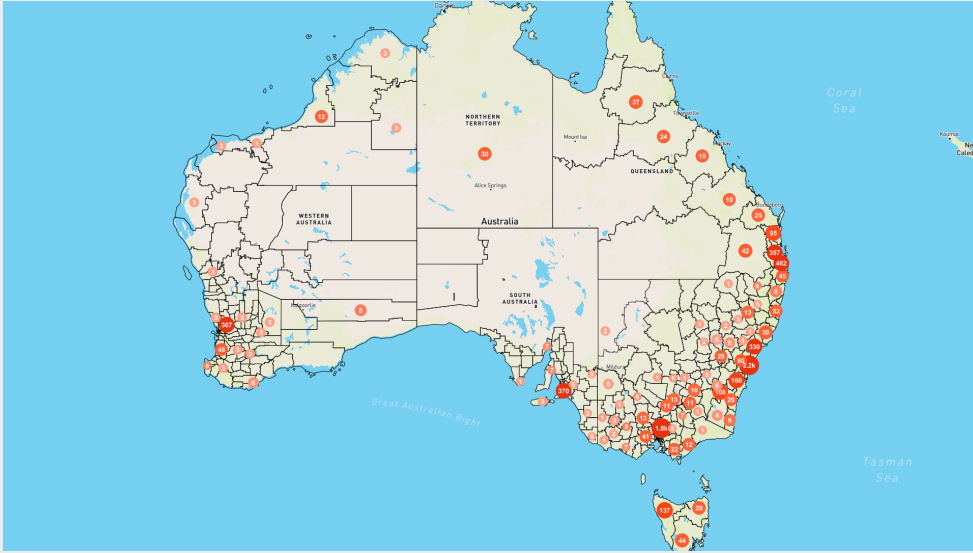
COVID-19 in Australia

State	COVID-19 cases	% of all cases in Australia	% of Australia's population	Deaths
NSW	3,184	41.0%	31.9%	49
VIC	2,099	27.0%	25.9%	20
QLD	1,067	13.7%	20.0%	6
WA	609	7.8%	10.3%	9
SA	440	5.7%	6.9%	4
TAS	228	2.9%	2.1%	13
ACT	108	1.4%	1.7%	3
NT	29	0.4%	1.0%	0
Totals	7,764			104

State and territory confirmed cases per 100,000 people

NSW | VIC | QLD | SA | WA | TAS | NT | ACT

www.covid19data.com.au

Mean Temperature (Tx+Tn)/2 (°C) May 2020
Australian Bureau of Meteorology

Is this a "seasonal outbreak"?

ACKNOWLEDGMENTS