Your details

Title
Dr

First name
William

Last name
Laing

Submission details

I am making this submission as
An academic/researcher

Submission type
I am making a personal submission

Consent to make submission public
I give my consent for this submission to be made public

Share your experience or tell your story

Your story
I am a climate analyst. I have just completed a study of Australia's climate regime 1910-2018, analysing every Australian weather station in the high-quality Bureau of Meteorology ACORN-SAT database. My paper "Australia's climate regime 1910-2018: a coherent continent wide system with Stage 1 cooling 1910-1960 followed by Stage 2 heating to the present at 2.3 degrees per century, twice the published global rate" has been endorsed in principle by Dr David Jones Chief Climatologist of BOM and is being submitted for publication in the International Journal of Climatology. The key outcome of the study is a new international Index of Added Climate Heat Burden termed △Heat = Climate heating rate x Years heated, with units in degree years. △Heat directly measures the quantum of heat from climate change added to each city, town and location in Australia. It accommodates both the climate heating rate, and the time over which that heat has been applied to each location since the heating startdate for that location. As such △Heat is a direct index of Australian vulnerability to bushfire, in every part of the continent.

△Heat is digital, and can be analysed in GIS systems together with the full suite of other bushfire variables. △Heat is the unique Index of historic heating of the Australian landscape. Its application in NSW will advance our understanding of bushfire vulnerability in every part of the State. △Heat will permit prioritisation of resources at a strategic State-wide level, as an invaluable precursor to, and foundation for, empirical regional variables such as fuel load and recent weather conditions. △Heat has been employed by the Great Barrier Reef Marine Park Authority as an index of heat stress at each reef location, in the form of "degree heating days", based on data and maps provided by the Bureau of Meteorology. The launching in NSW of △Heat for historic climate heating will be an international first, and will prepare NSW for spatial analysis of historic climate change in every government and private institution.

Terms of Reference (optional)

The Inquiry welcomes submissions that address the particular matters identified in its Terms of Reference.

1.1 Causes and contributing factors
1. "The causes of, and factors contributing to, the frequency, intensity, timing and location of, bushfires ..... including consideration of any role of weather, drought, climate change, fuel loads and human activity."
Direct application: Delivers a digital map of NSW which identifies areas of anomalously-high climate heat burden via new Index △Heat. This Index is the highest-level factor influencing bushfire development, because it inserts historic climate change, quantitatively, into the bushfire equation. It will be analysed prior to considering lower-level factors such as fuel load and weather conditions.
Application: Immediate and instant. Cost: Insignificant.

1.2 Preparation and planning
2. "The preparation and planning by agencies, government, other entities and the community ..... including current laws, practices and strategies ....."
Direct application: The digital map of anomalously heated areas of NSW permits ready identification of (1) government jurisdictions most vulnerable to bushfire, (2) the quantum of heat burden borne by those vulnerable jurisdictions. Permits prioritisation of attention to the most climatically heated regions of NSW.
Application: Immediate and instant. Cost: Insignificant.

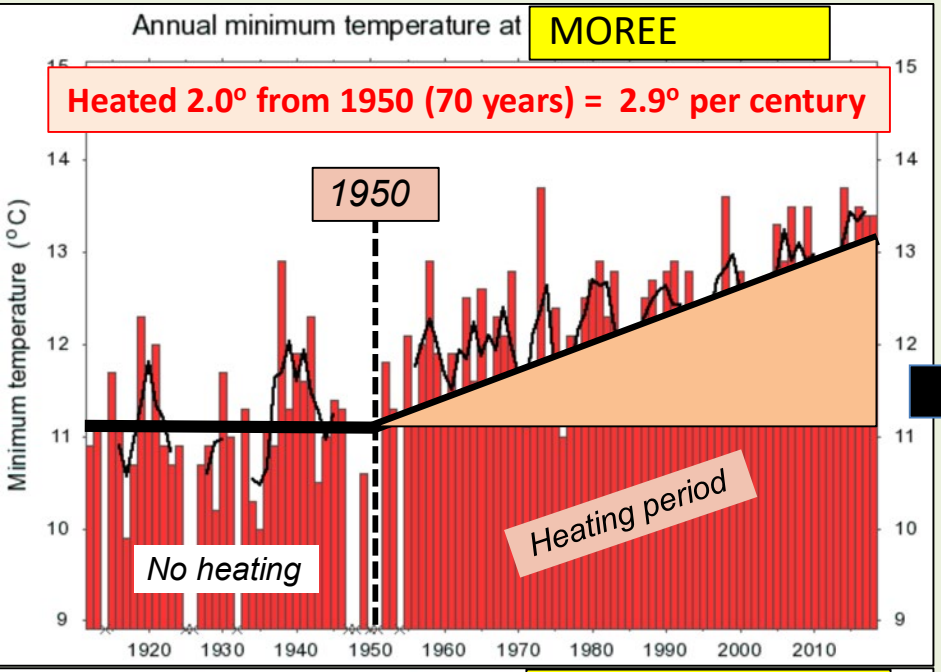
1.4 Any other matters
4. Any other matters that the inquiry deems appropriate in relation to bushfires. △HEAT IS A GLOBAL INDEX WHICH CAN BE EXTENDED WORLDWIDE. IT WILL PERMIT DIRECT COMPARISON WITH OTHER WELL-DOCUMENTED WILDFIRE TERRAINS, SUCH AS CALIFORNIA. THE DIGITAL CHARACTER OF △HEAT PERMITS ITS READY DEPLOYMENT IN OTHER TERRAIN DATABASES. NSW CAN IMMEDIATELY GAUGE ITS BUSHFIRE VULNERABILITY, QUANTITATIVELY AND OBJECTIVELY.
5. Preparation and planning for future bushfire threats and risks. △HEAT PRIORITISES VULNERABLE REGIONS.
6. Land use planning and management and building standards, including appropriate clearing and other hazard reduction, zoning, and any appropriate use of indigenous practices. BY PRIORITISING VULNERABLE REGIONS, △HEAT INFORMS AND IMPROVES ZONING, AND IDENTIFIES REGIONS FOR COLLABORATION WITH TRADITIONAL OWNERS.
9. Coordination and collaboration by the NSW Government with the Australian Government, other state and territory governments and local governments. NSW WILL BE THE FIRST AUSTRALIAN GOVERNMENT TO EMPLOY △HEAT AND IS IN A POSITION TO LEAD ITS NATIONAL AND INTERNATIONAL DEVELOPMENT.

Supporting documents or images

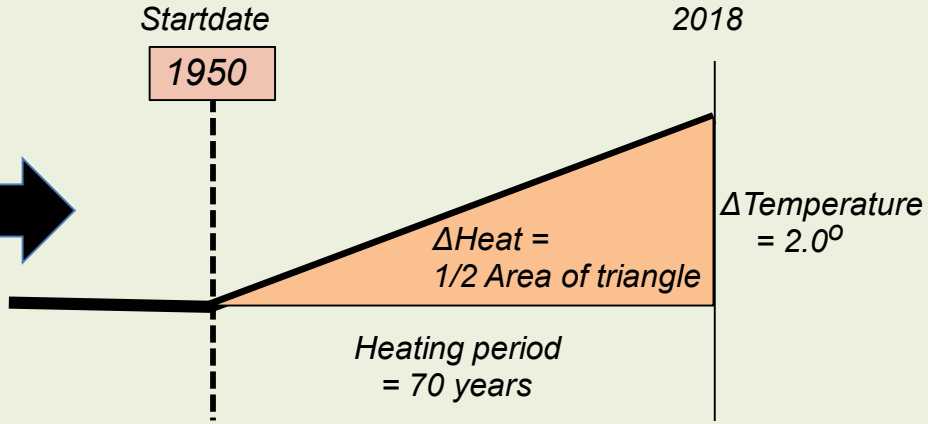
Attach files

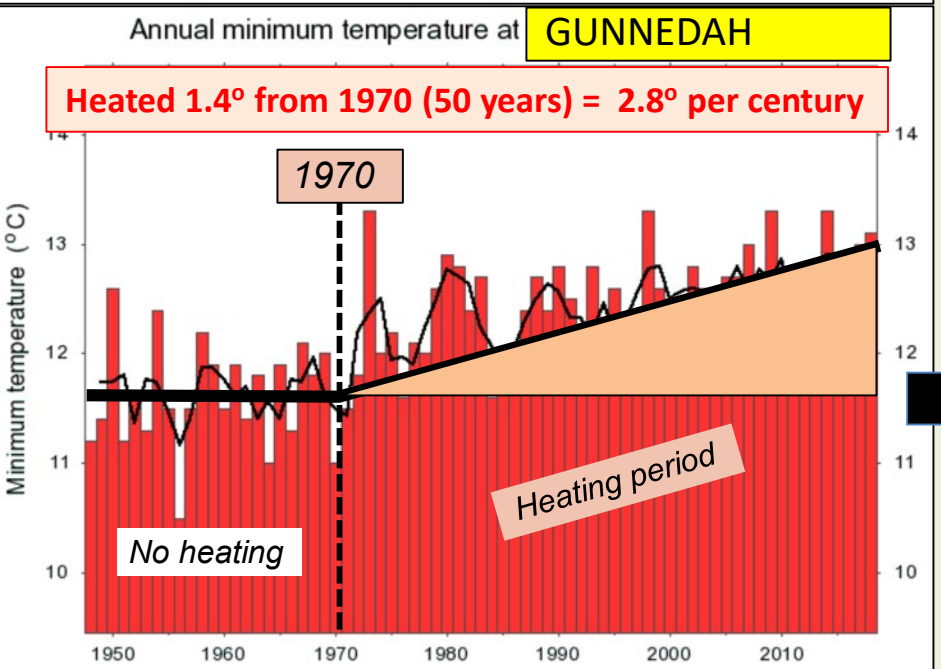
- Laing-NSW Bushfire Submission-Eastern Australia.pptx
- Laing-NSW Bushfire Submission-New England Hotspot.pptx

ΔHeat: its factors, definition and calculation - Examples

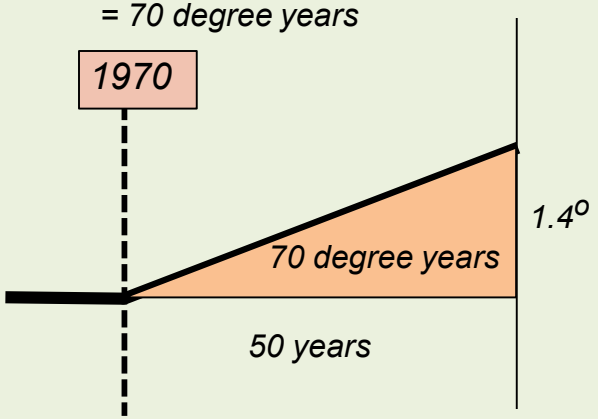


ΔHeat = ΔTemperature x Heating period
= 2.0 x 70
= 140 degree years





ΔHeat = ΔTemperature x Heating period
= 1.4 x 50
= 70 degree years



ΔHeat distribution in central & eastern Australia: Data

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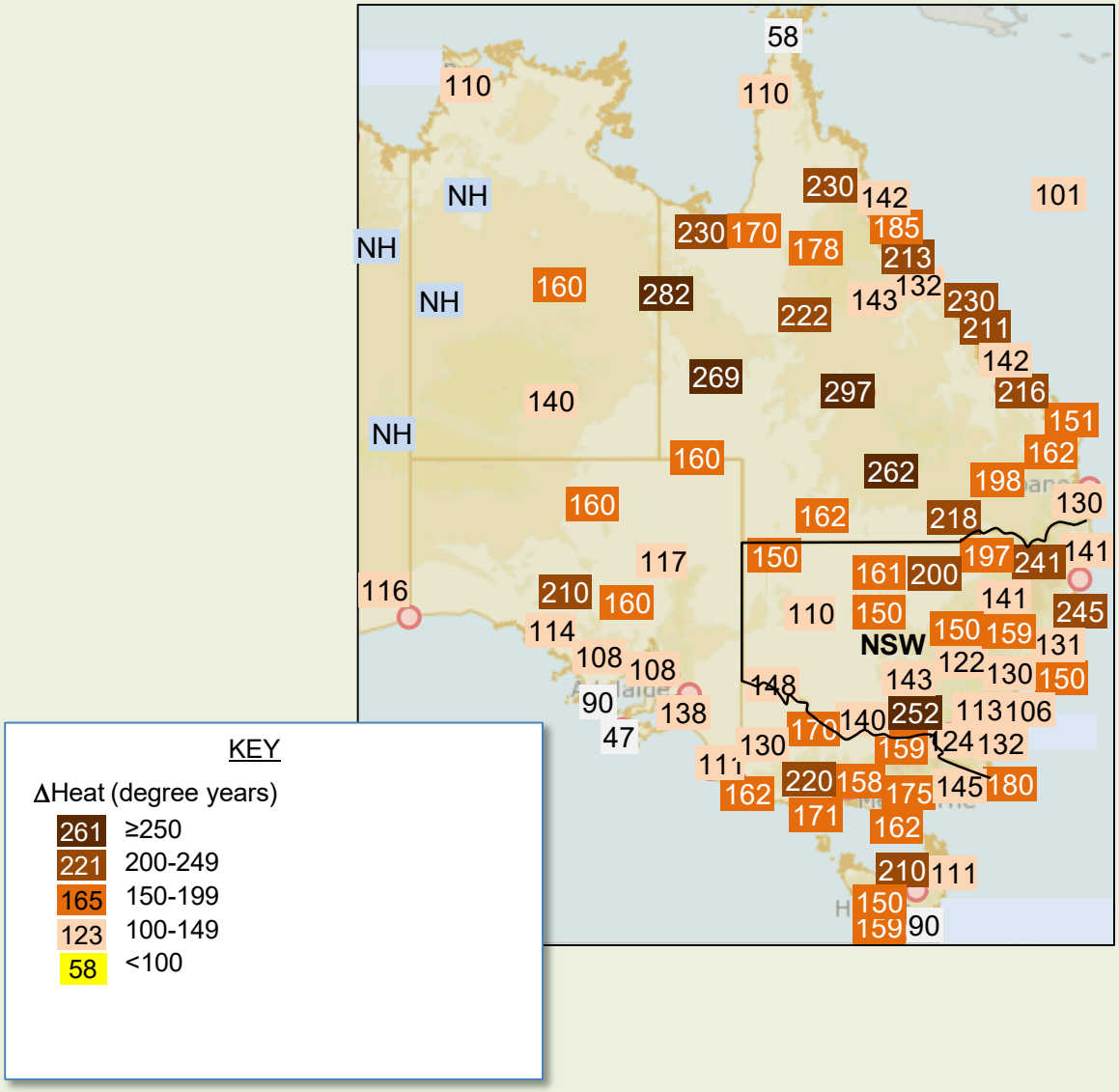
ΔHeat = Climate heating rate x Length of heating period (in degree years)



ΔHeat distribution in central & eastern Australia: Topology

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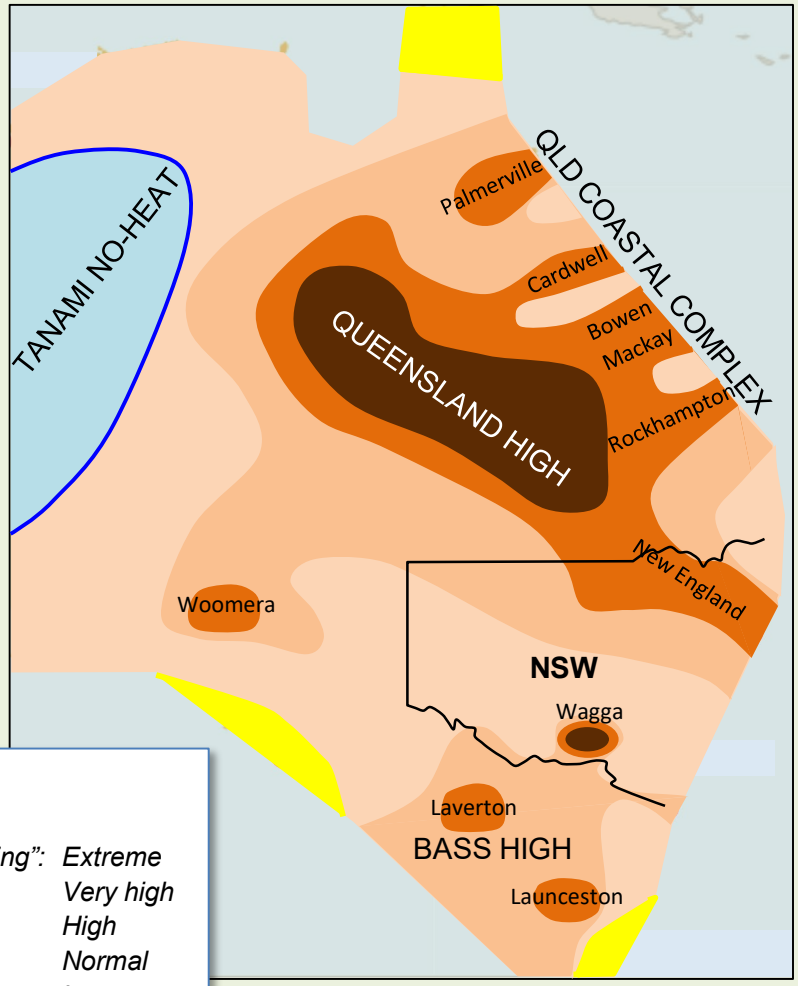


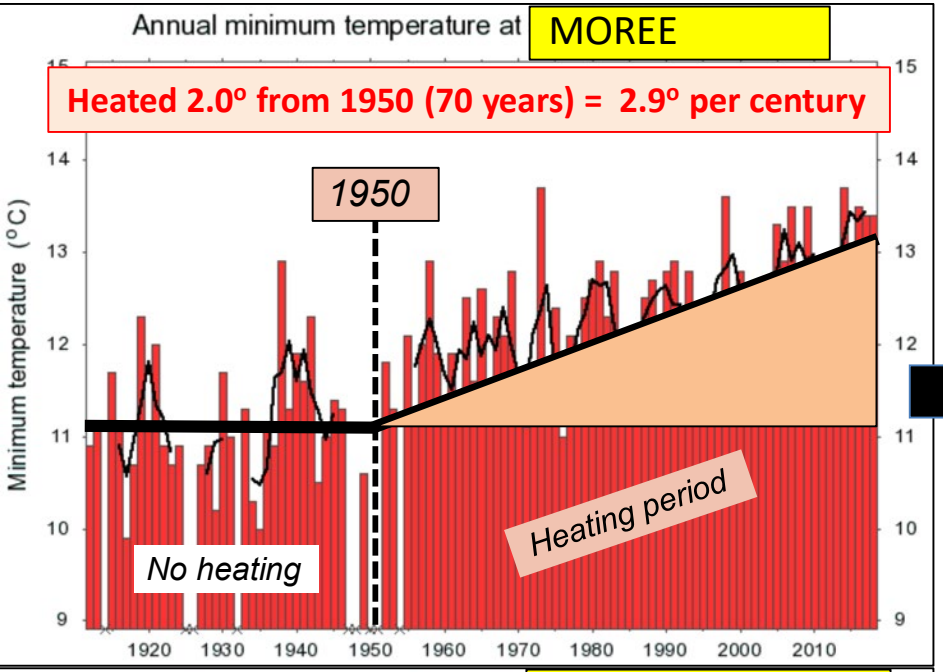
KEY

ΔHeat (degree years)

261	≥250	*"Slow roasting":*	*Extreme*
221	200-249		*Very high*
165	150-199		*High*
123	100-149		*Normal*
58	<100		*Low*

Continent-scale features shown in block letters
Local heating hotspots shown by place names

ΔHeat: its factors, definition and calculation



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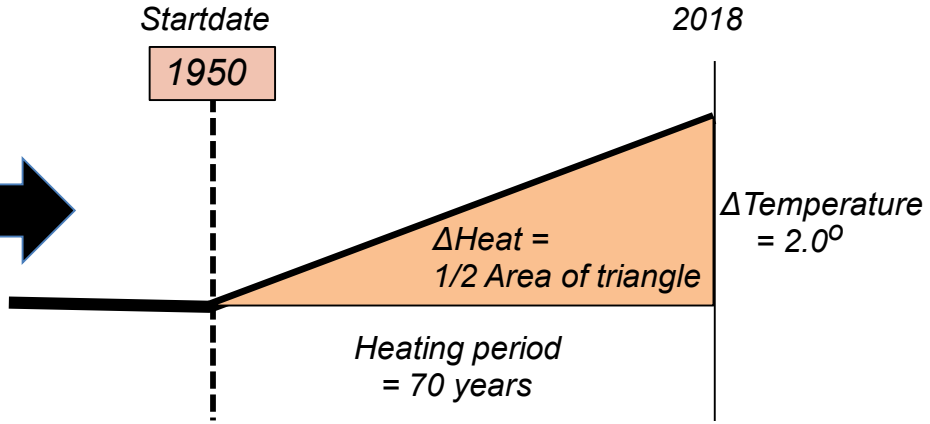

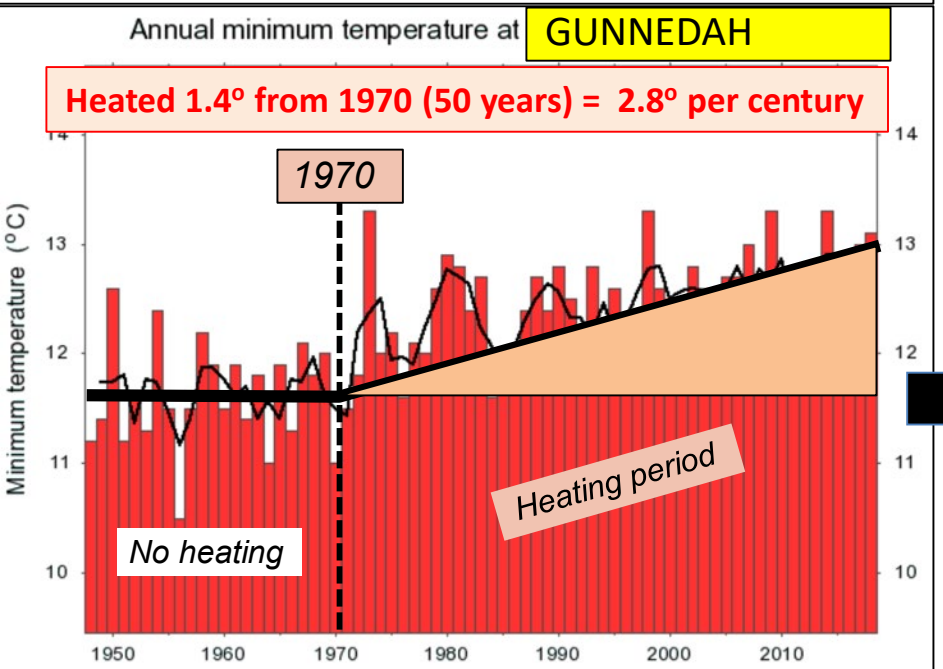

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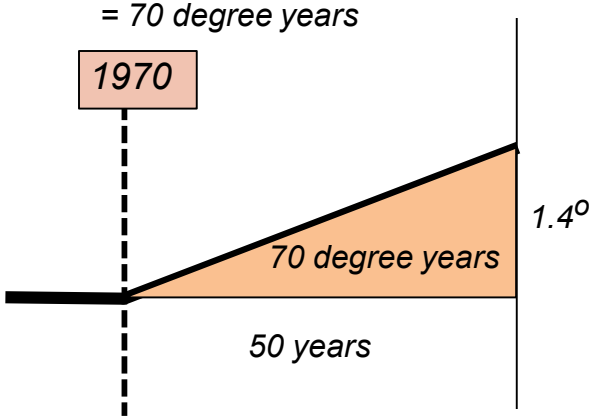
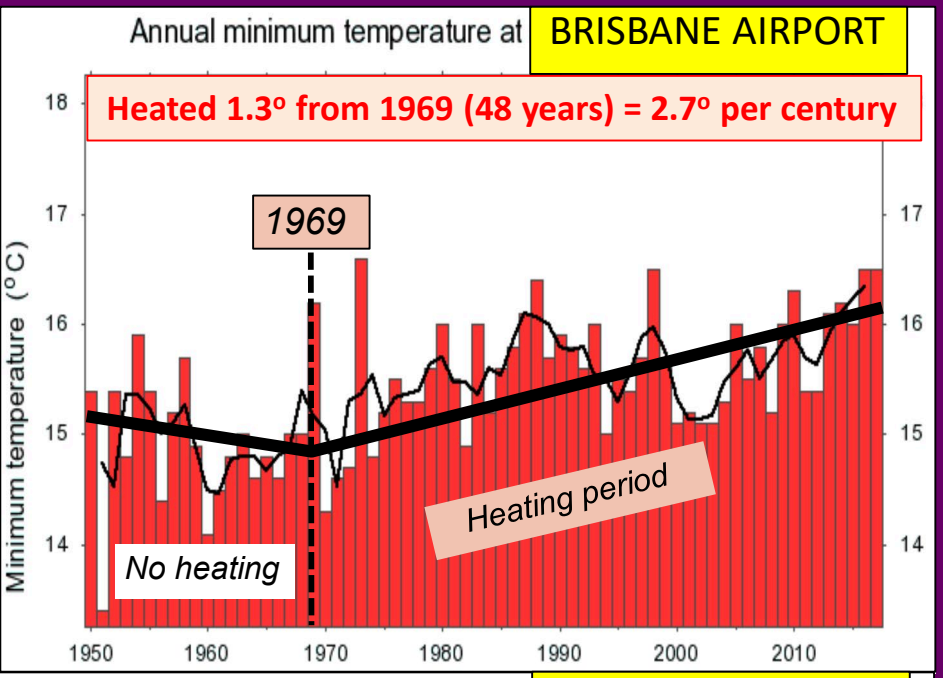
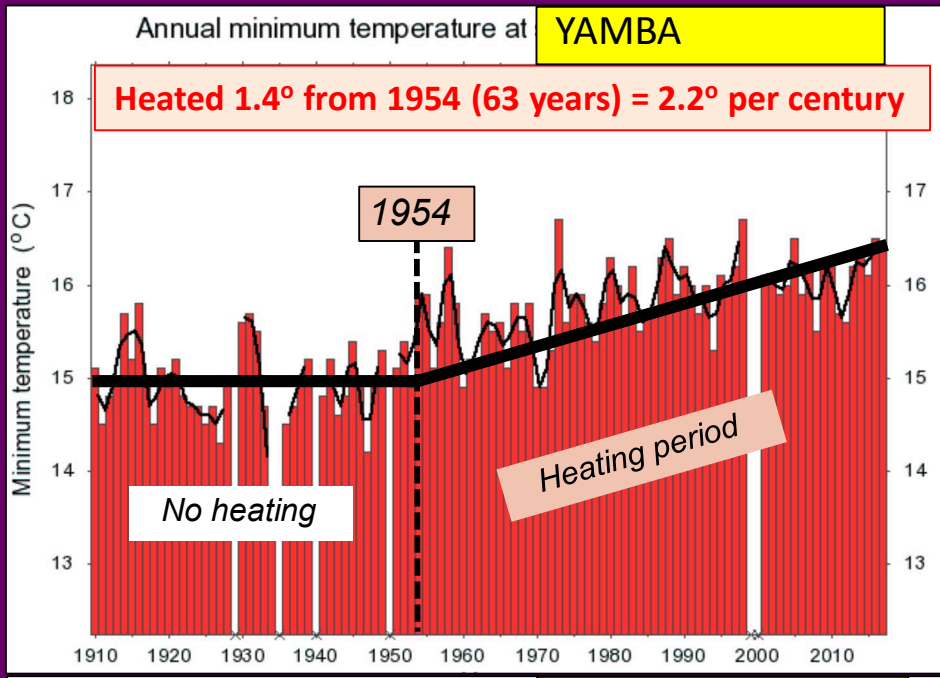
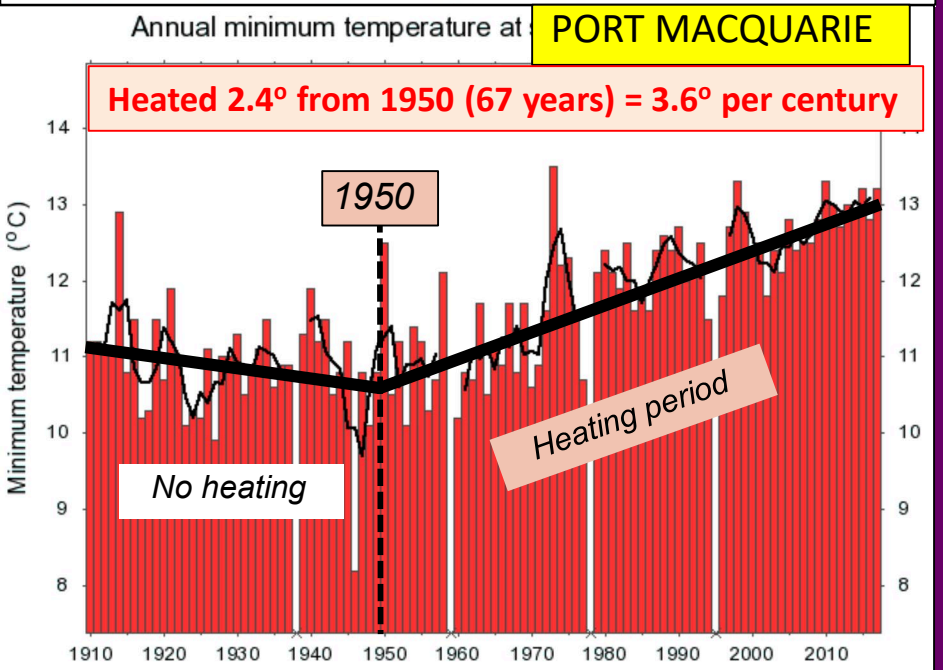
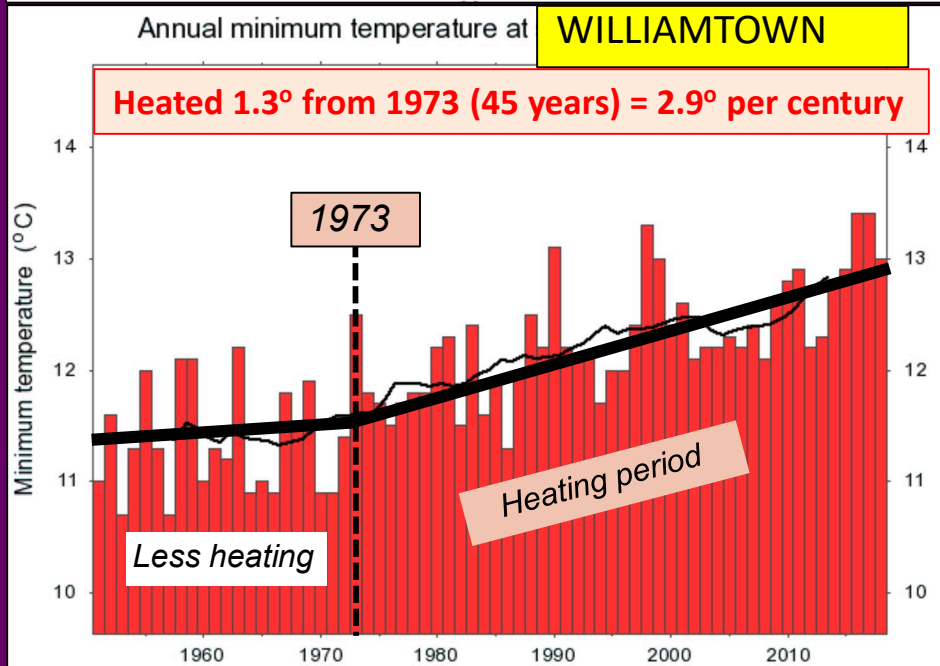


The New England Hotspot: Climate heating graphs since startdate









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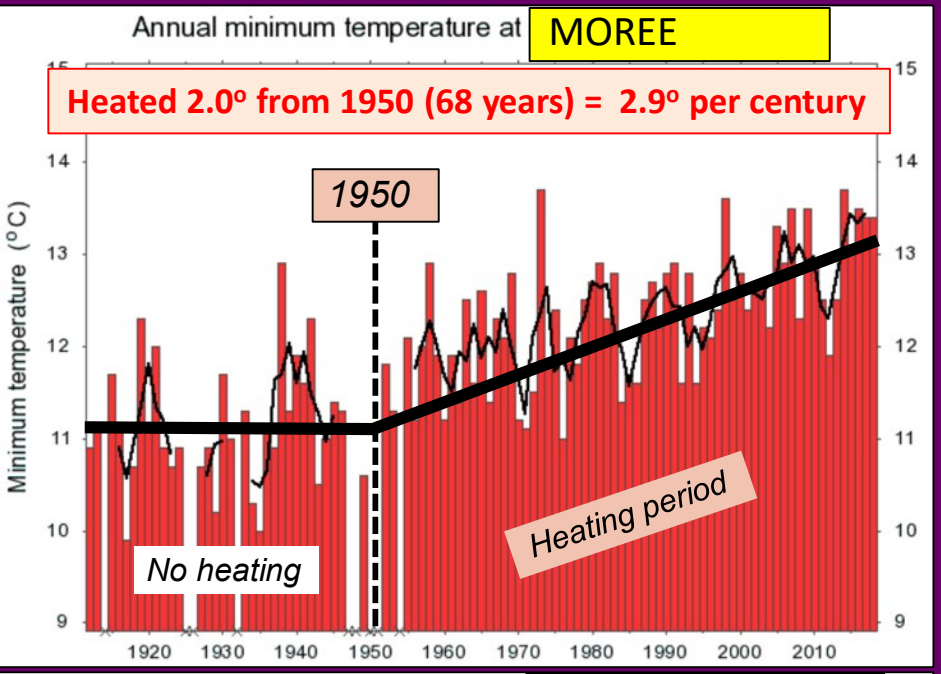
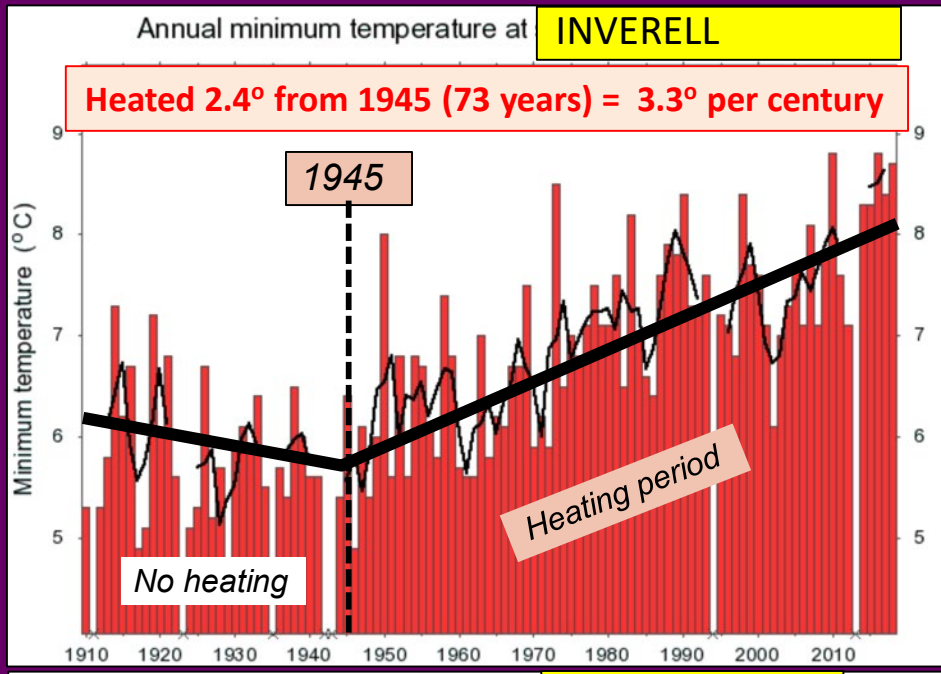
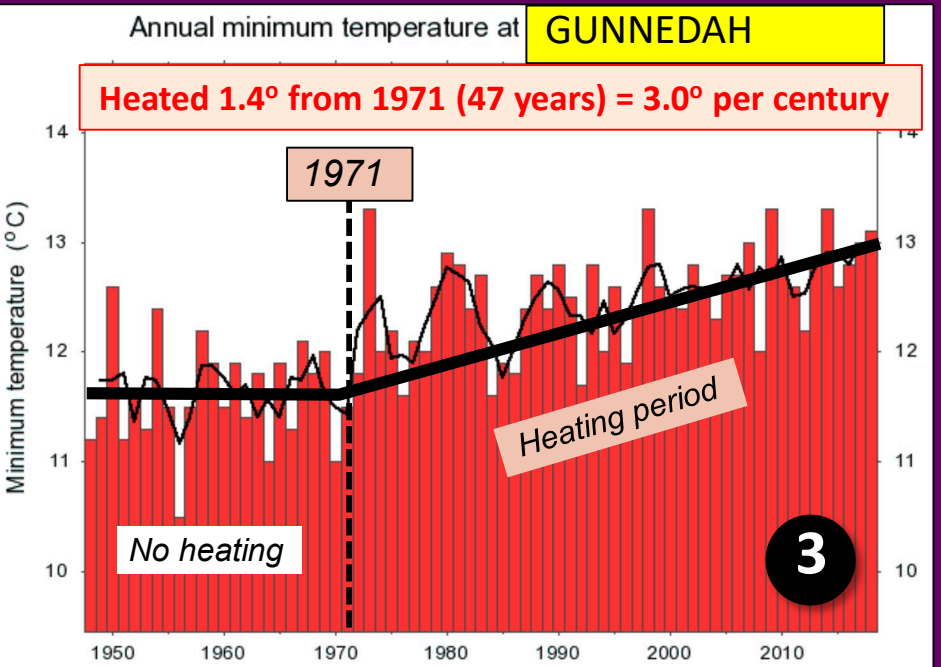
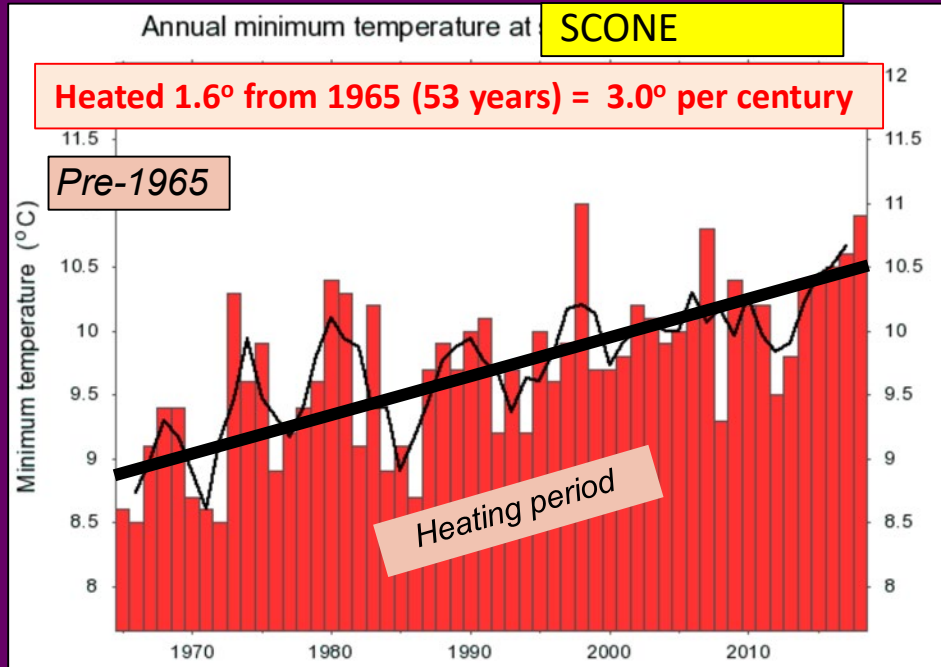
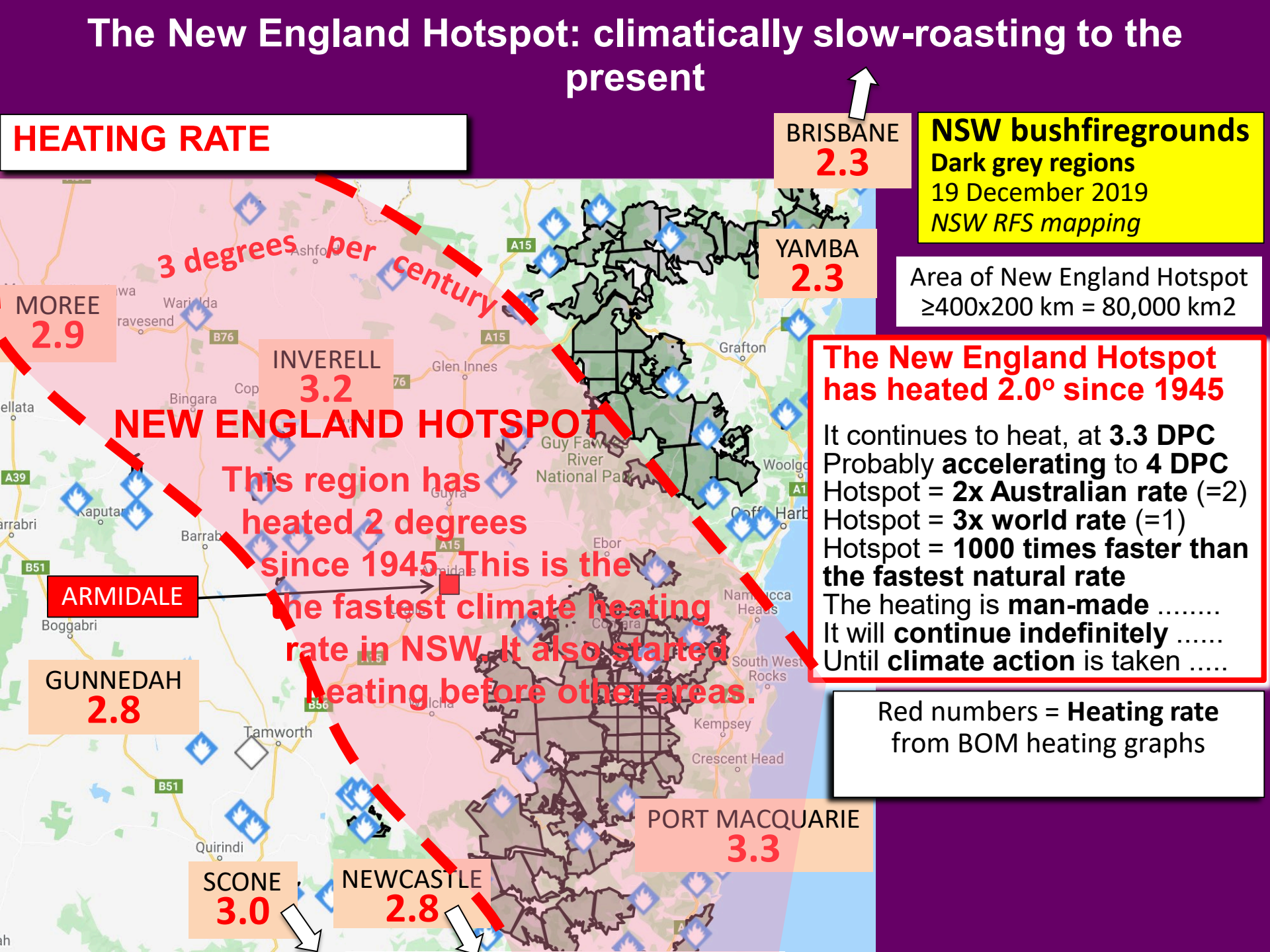








The New England Hotspot: climatically slow-roasting to the present



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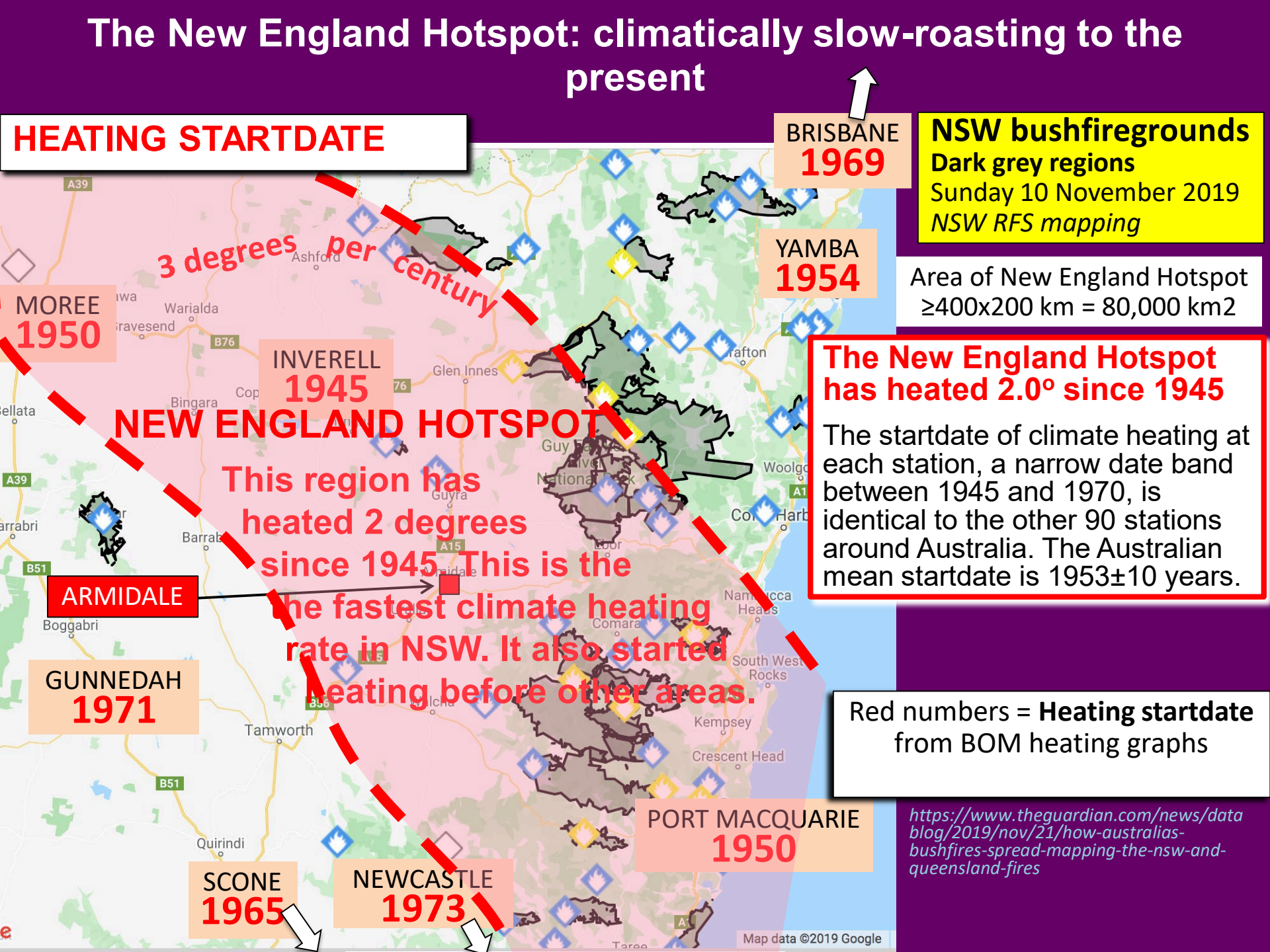

https://www.theguardian.com/news/datablog/2019/nov/21/how-australias-bushfires-spread-mapping-the-nsw-and-queensland-fires

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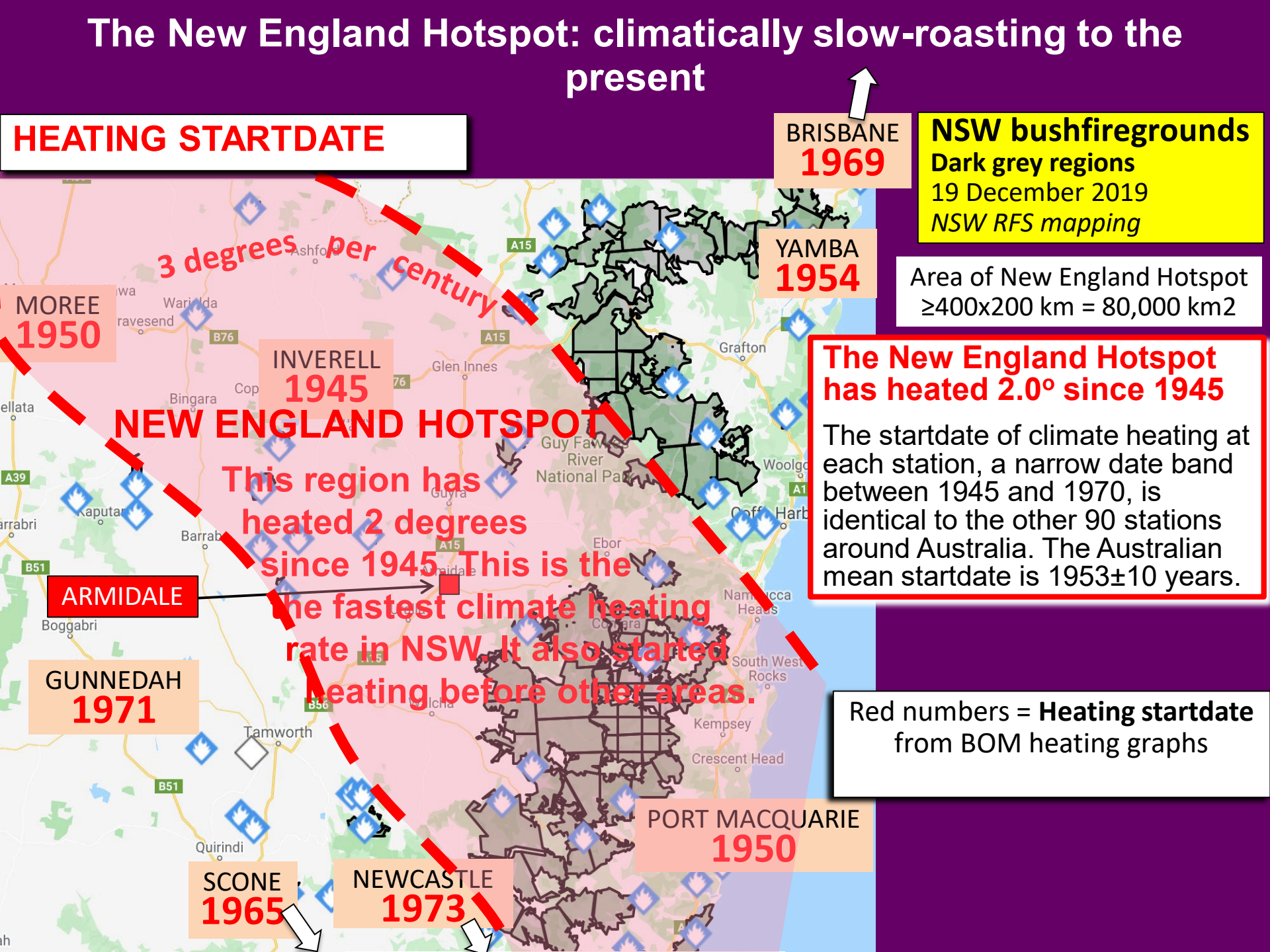

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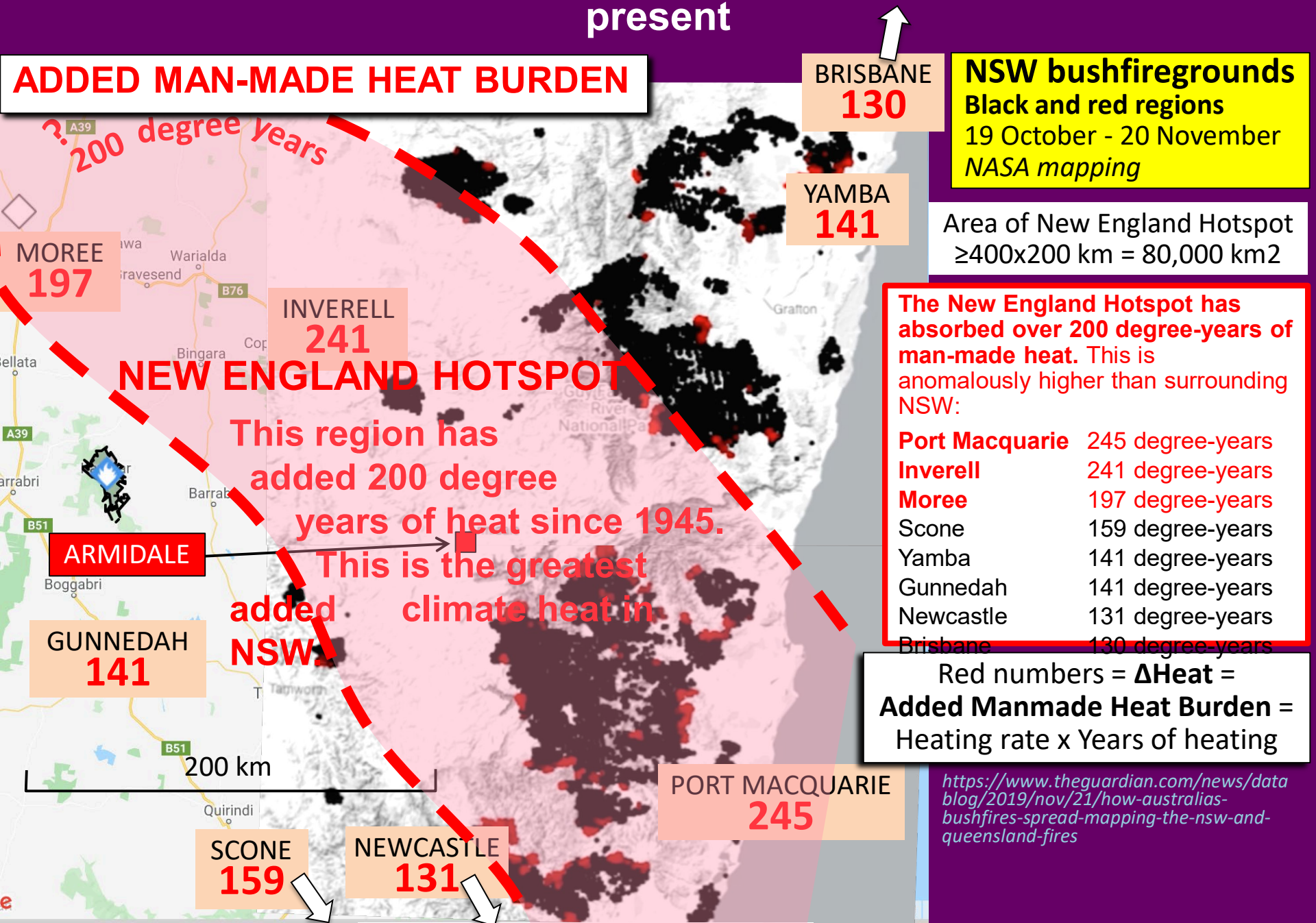

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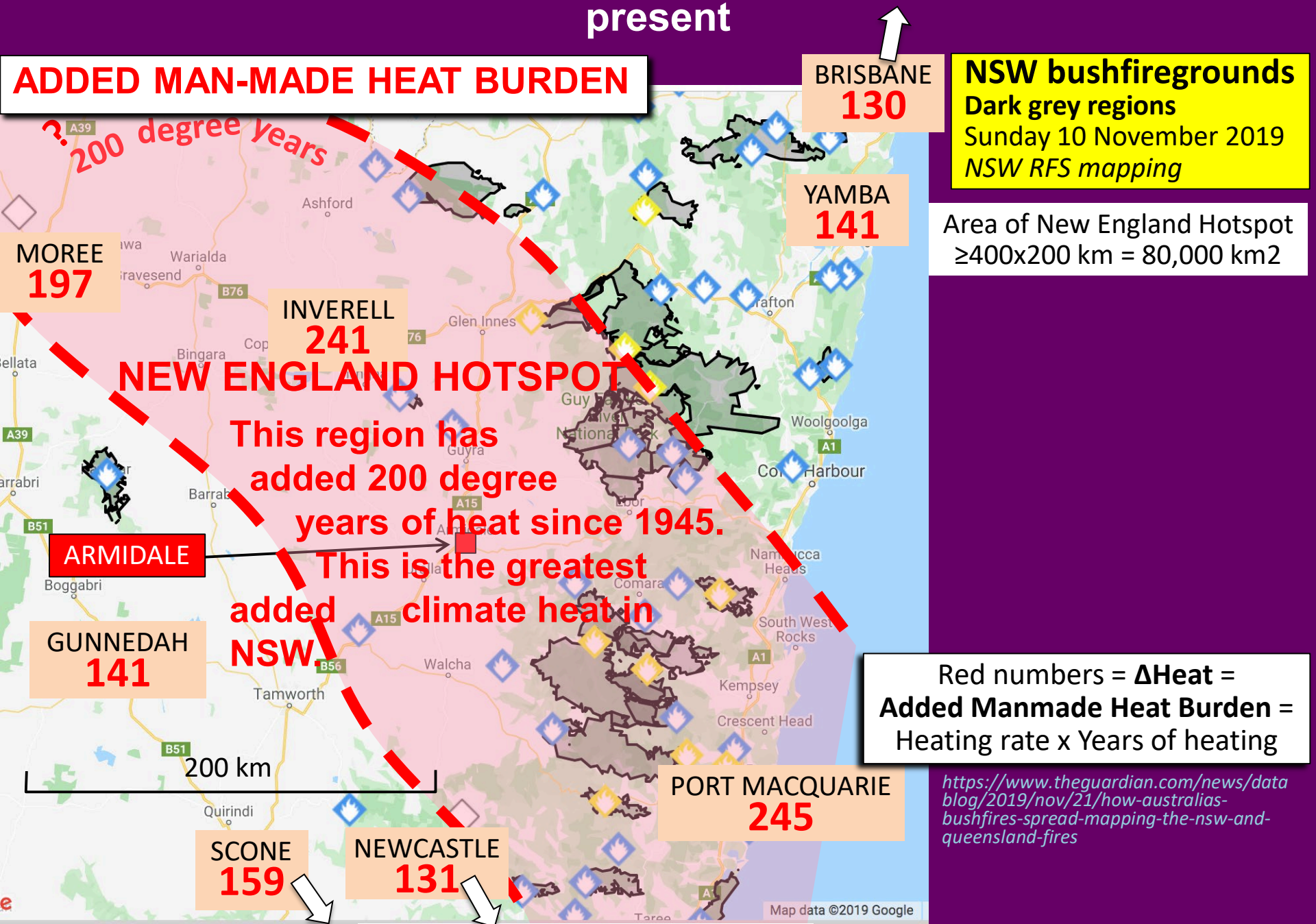
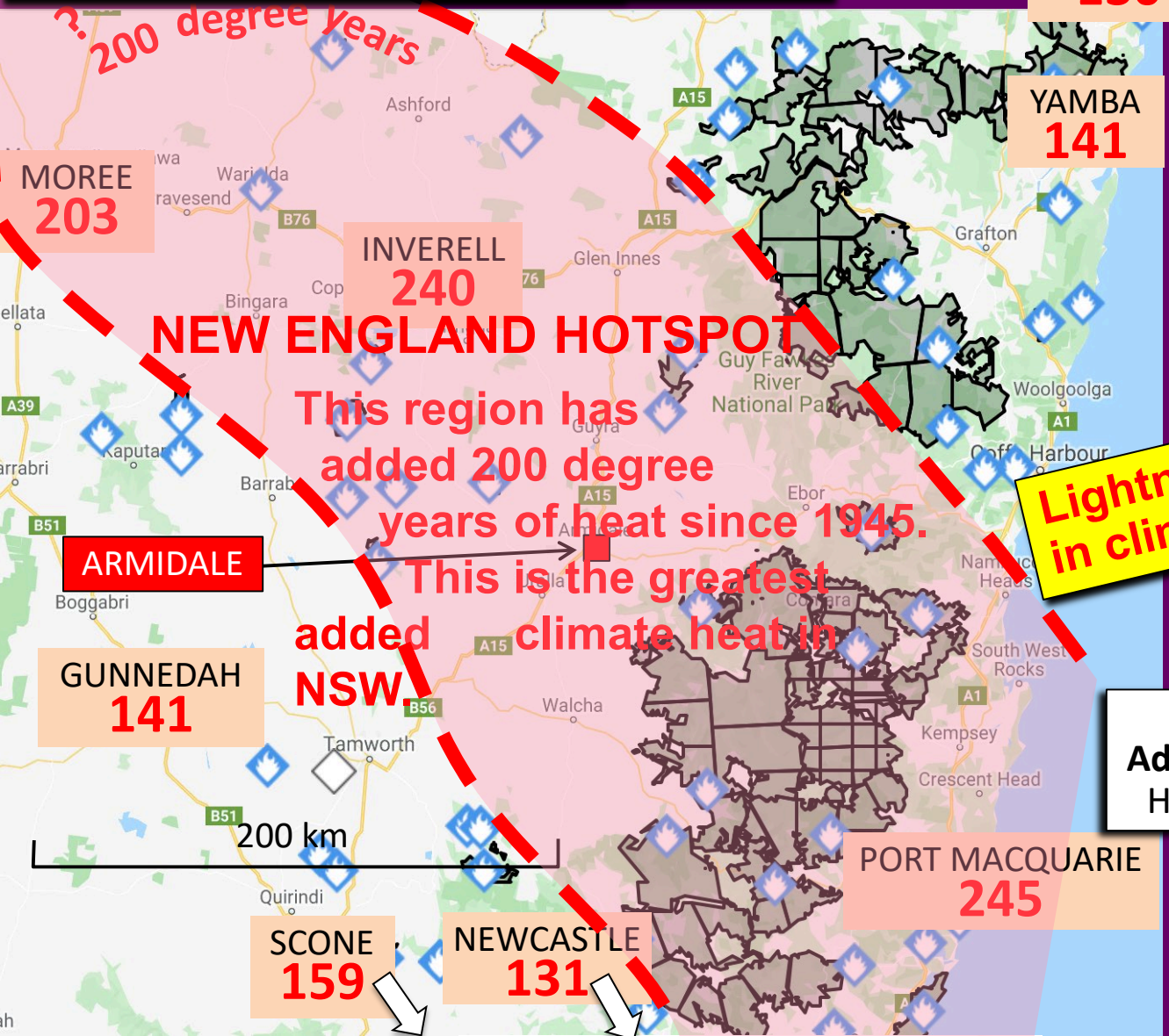


The New England Hotspot: climatically slow-roasting to the present

ADDED MAN-MADE HEAT BURDEN



BRISBANE
130

NSW bushfiregrounds
Dark grey regions
19 December 2019
NSW RFS mapping

Area of New England Hotspot
≥400x200 km = 80,000 km2

Lightning does strike twice, in climate hotspots

Red numbers = **ΔHeat** =
Added Manmade Heat Burden =
Heating rate x Years of heating