



Temperature projections for the Pacific

Michael Grose, on behalf of the team

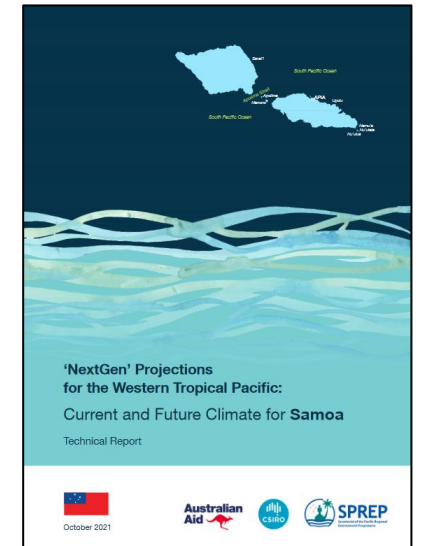
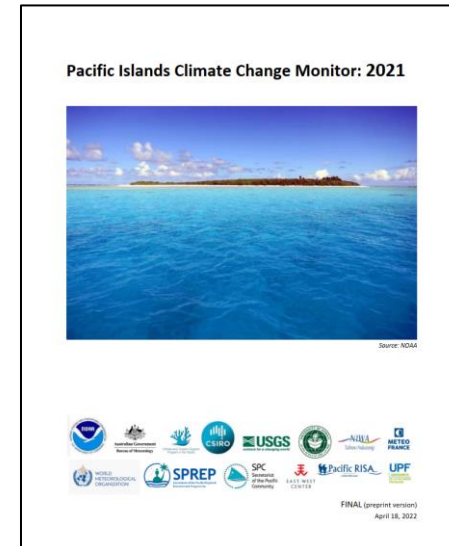
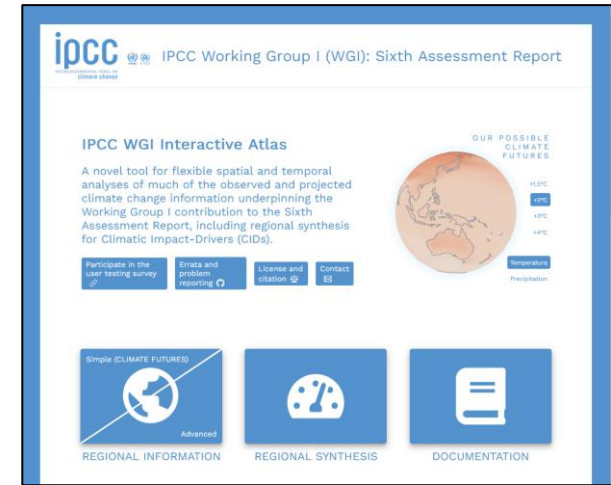
CLIMATE SCIENCE CENTRE

www.csiro.au



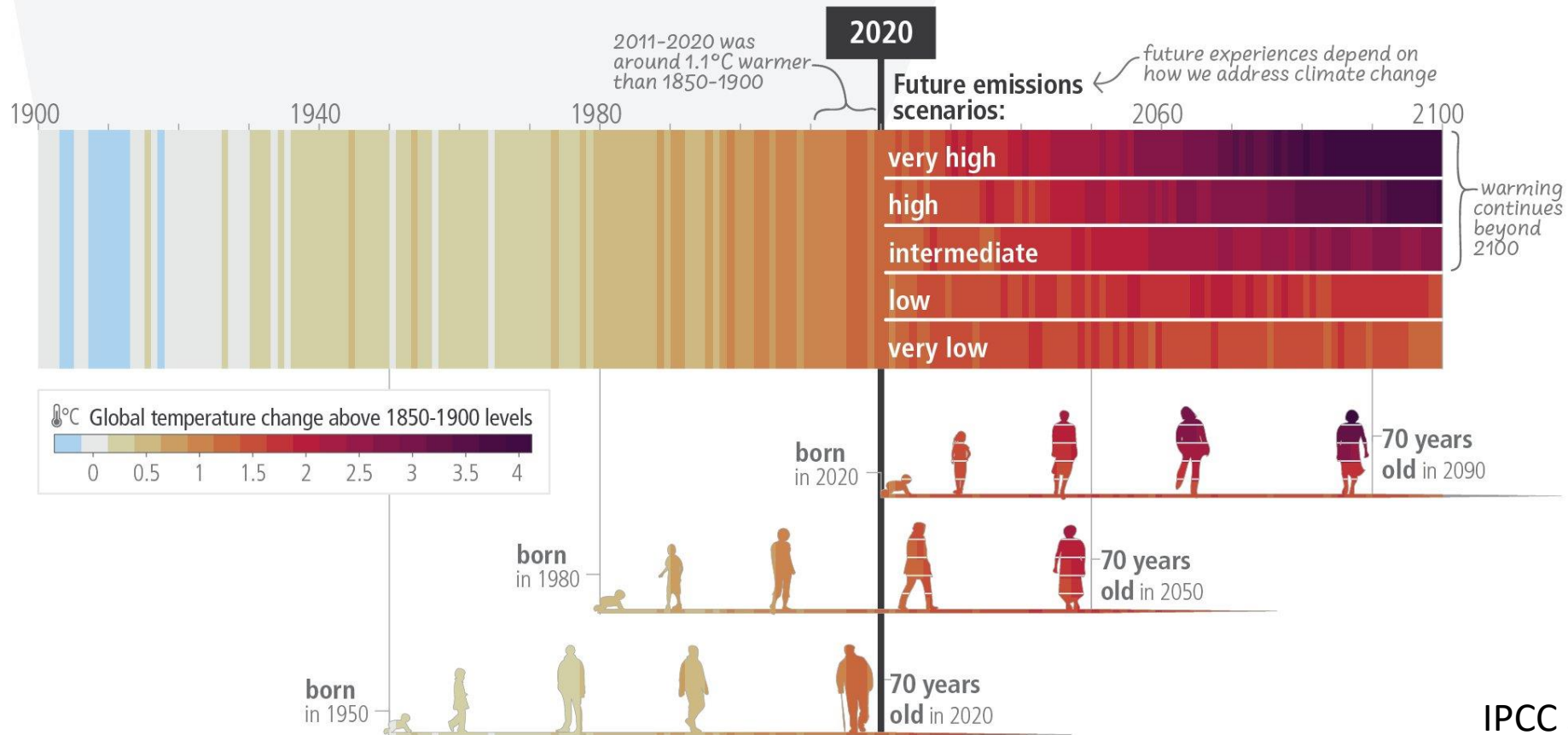
Sources

- IPCC Sixth Assessment report, including Interactive Atlas <https://interactive-atlas.ipcc.ch/>
- Pacific Climate Change Monitor: [https://www.pacificmet.net/sites/default/files/inline-files/documents/PICC%20Monitor 2021_FINALpp_0.pdf](https://www.pacificmet.net/sites/default/files/inline-files/documents/PICC%20Monitor%202021_FINALpp_0.pdf)
- Pacific 'NextGen' Projections report: <https://www.rccap.org/climate-change-update-for-the-pacific/>



Warming of the climate

c) The extent to which current and future generations will experience a hotter and different world depends on choices now and in the near-term

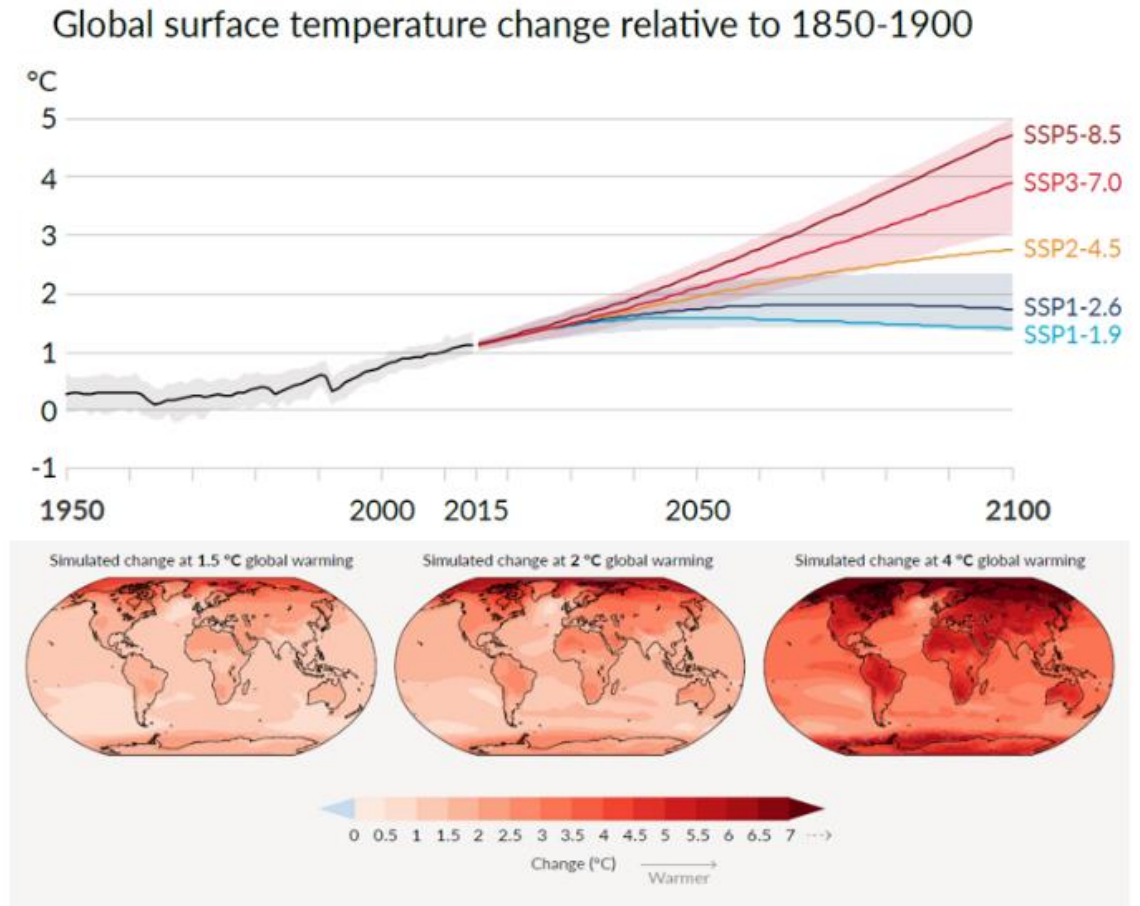


IPCC Synthesis Report 2023

Warming of the climate

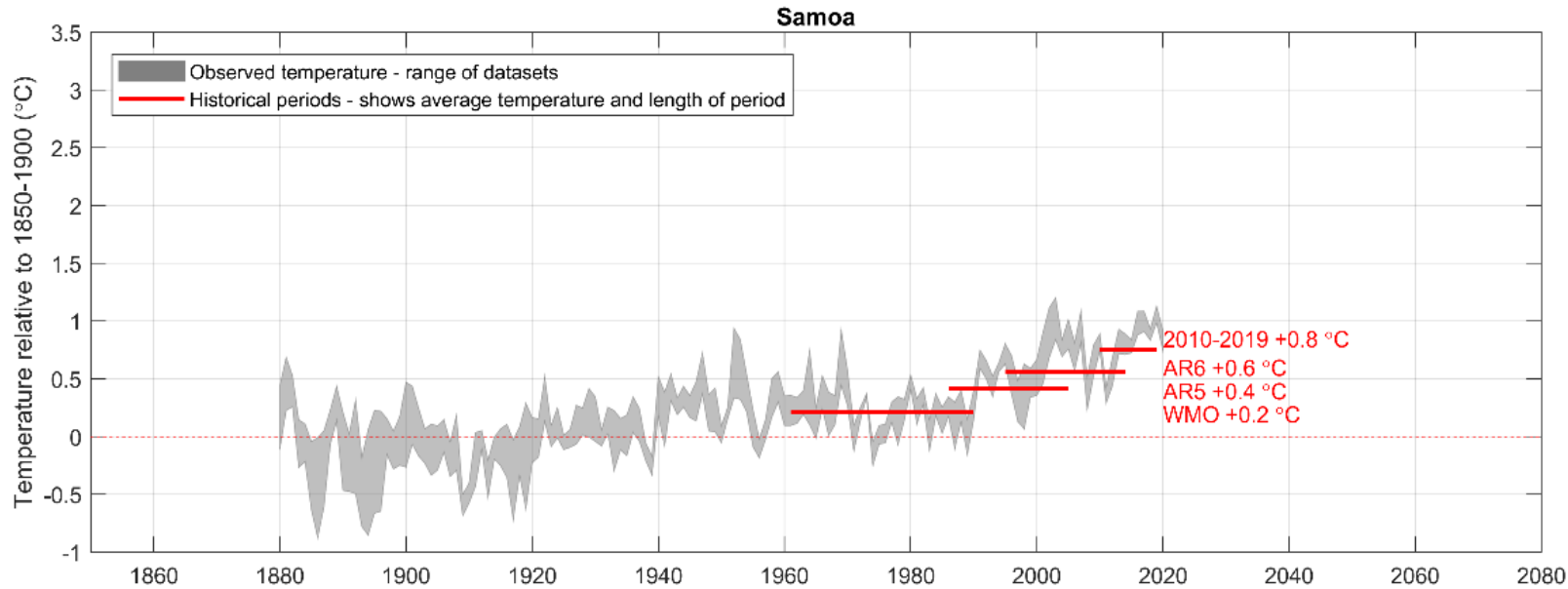
Can be thought of in terms of:

- Diverging pathways in to the future, depending on what the global community do about emissions, or
- ‘Global Warming Levels’ – what will it look like locally if the world gets to 1.5 or 2 °C above pre-industrial, or even 3 °C?
- Warmer climate = changing biophysical zones, more heat extremes, more heat impacts

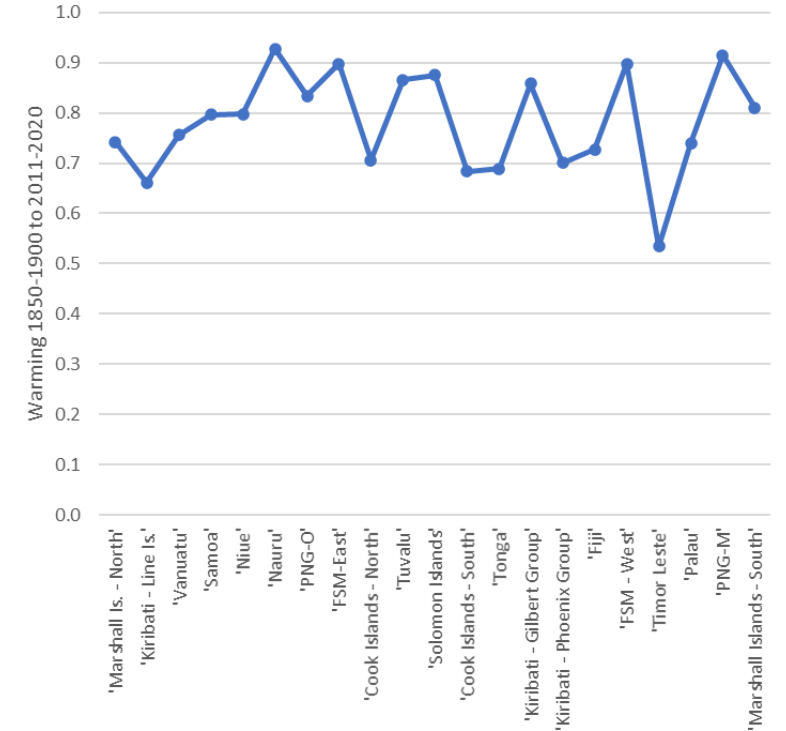


Global warming relative to 1850-1900	Pacific Nations warming relative to 1850-1900	Pacific nations warming relative to 1986-2005
1.5 °C	Around 1.1 °C	Around 0.7 °C
2 °C	Around 1.6 °C	Around 1.0 °C
3 °C	Around 2.4 °C	Around 1.8 °C

Warming since pre-industrial



- National EEZ regions, range of global gridded datasets
- Warming lower in Timor Leste, higher in Nauru
- Most of warming since 1960

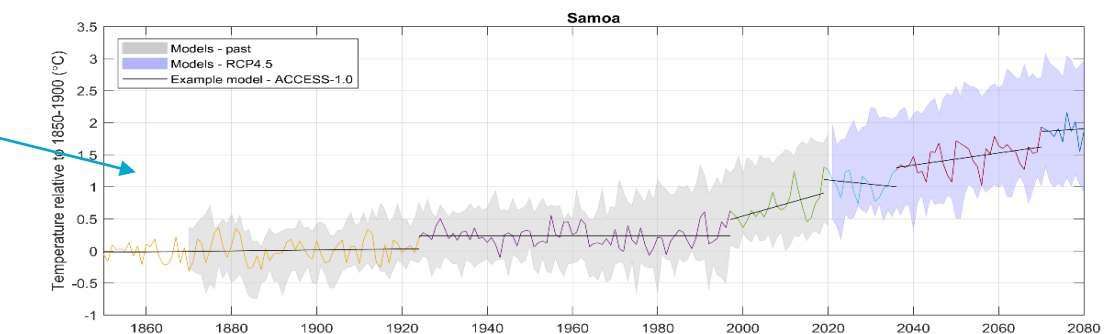
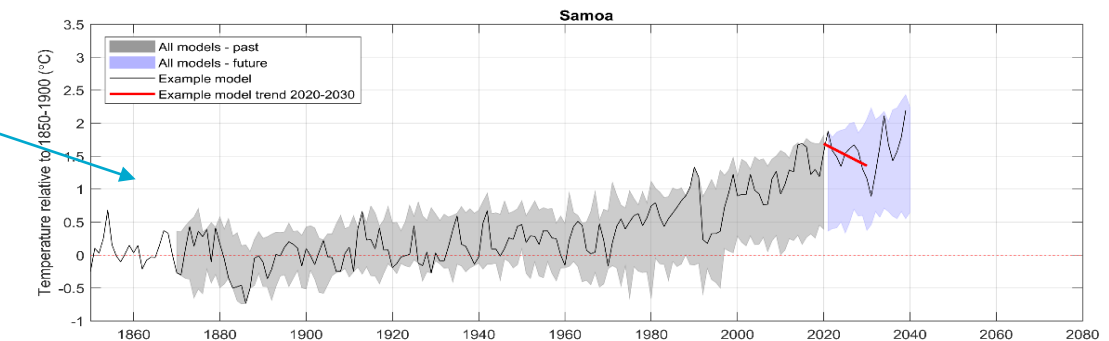
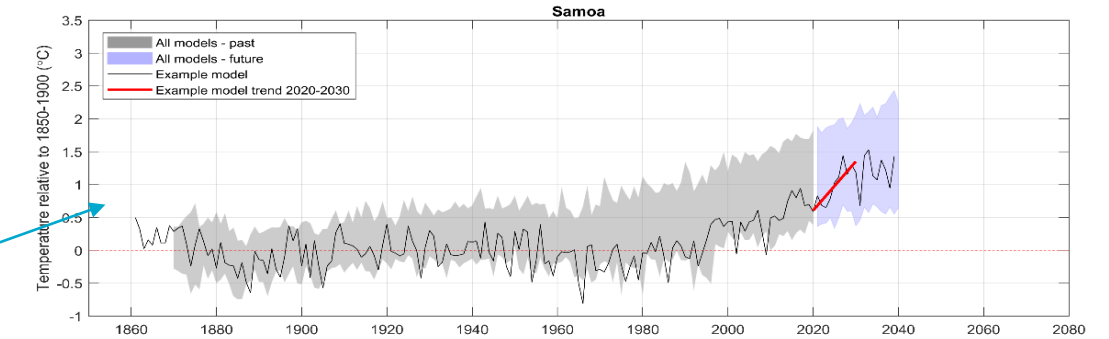
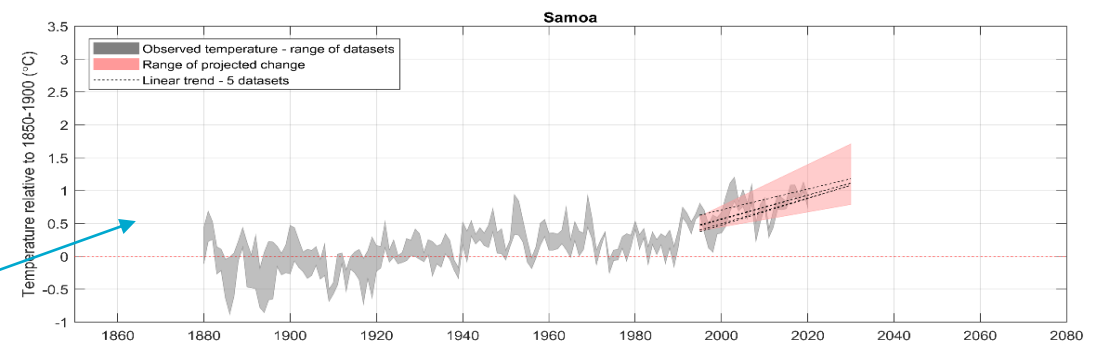


Projections

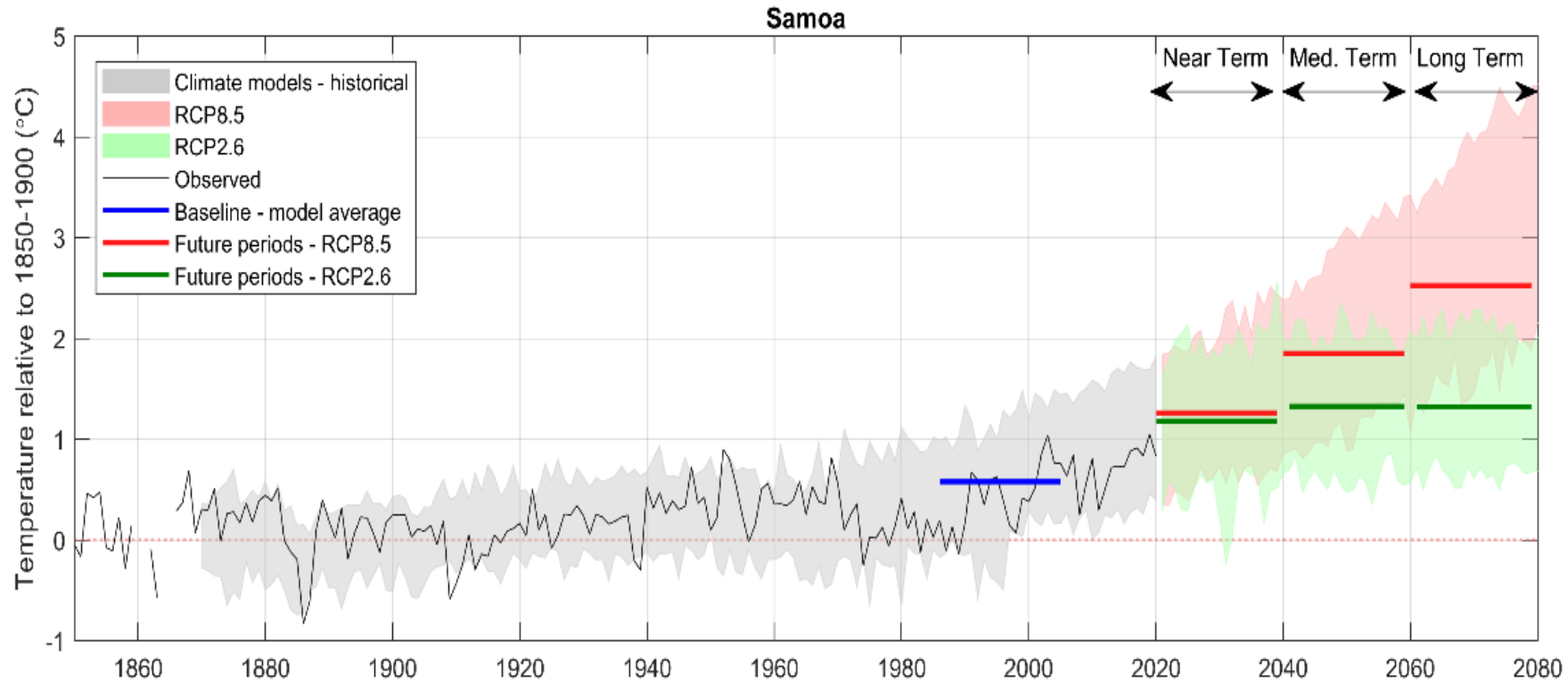
We are 'tracking' projected change quite closely – evidence they are reliable

Near-term and short-term trends may be higher or lower than long-term trend

In fact, may see warming appear like 'steps' rather than smooth change



Future pathways



Beyond 2040, the global pathway really matters

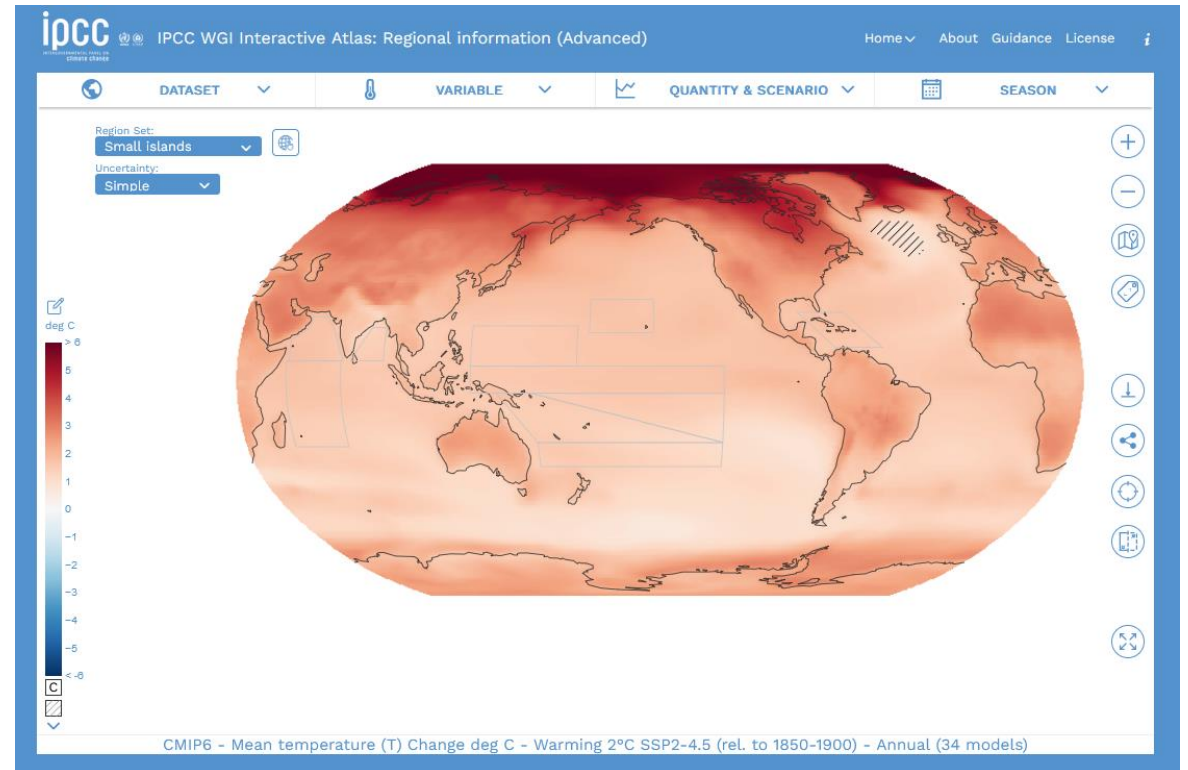
Warming – spatial pattern

Past and future warming in response to human effects:

- More over land than ocean
- Highest over the Arctic

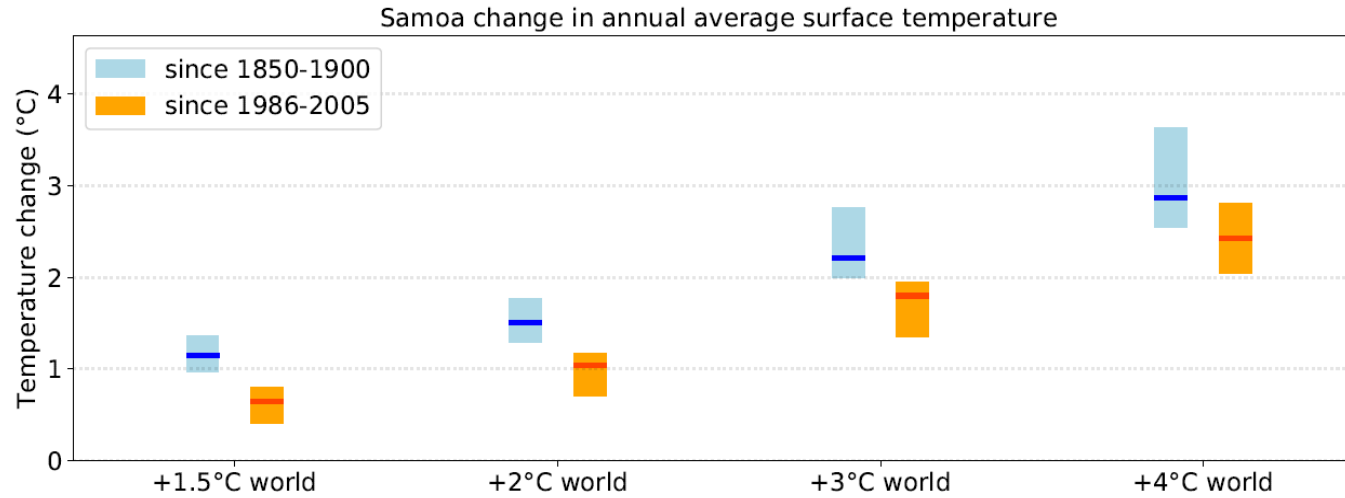
Pre-industrial era benchmark (1850-1900) for Paris Agreement goals. To 2011-2020:

- The world around +1.1 °C,
- Land areas +1.6 °C,
- Oceans +0.9 °C
- Western Pacific region around +0.8 °C



<https://interactive-atlas.ipcc.ch/>

Global Warming levels projections



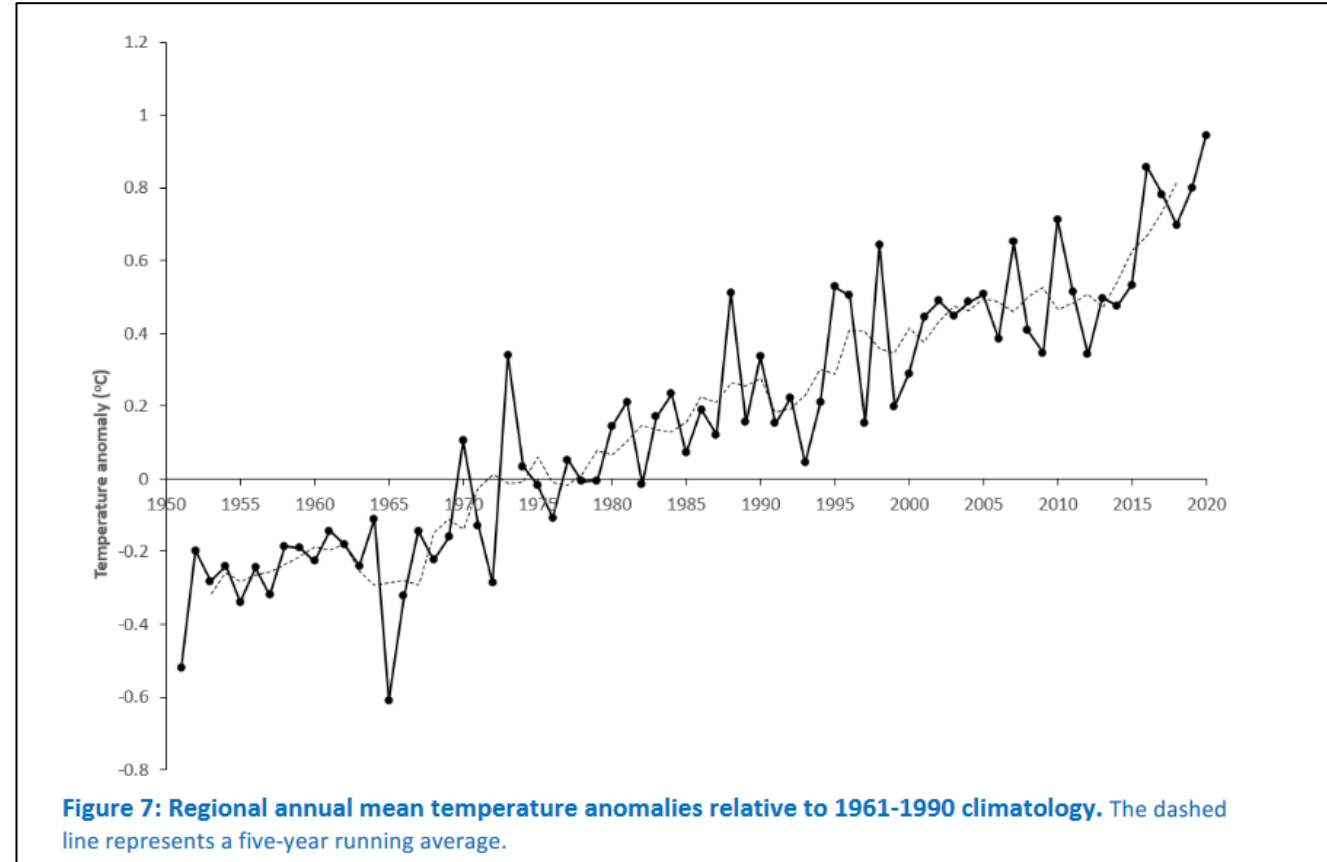
Observed warming – land only

- **Important point:**

So far shown warming for land and ocean – from coarse gridded observations and models

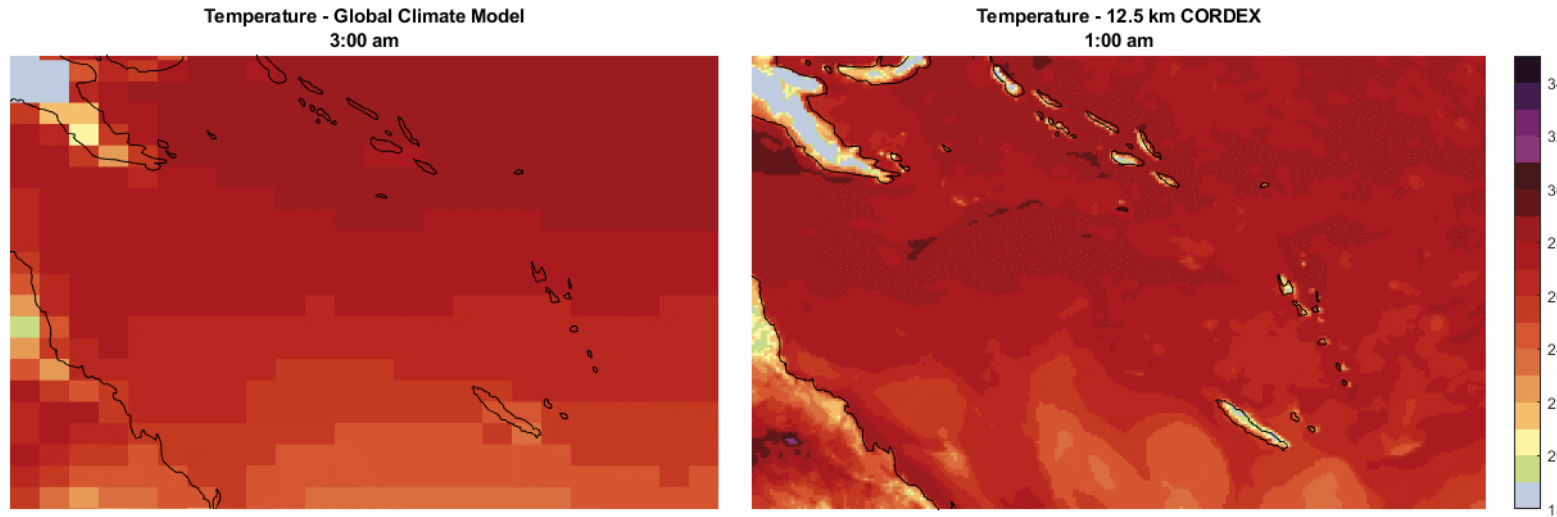
Land-only trends likely to higher

Station-based trend – NOT 0.8 °C since pre-industrial, in fact +1.1 °C since 1950!



Pacific Climate Change Monitor

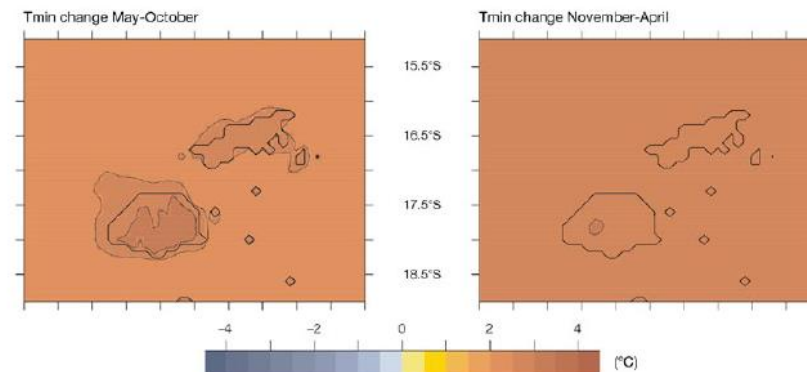
Projected warming – land only



Example new CMIP6-CORDEX simulation

If we run models at higher resolution:

1. Show details in current climate – e.g. daily cycle
2. Likely to show different projected trends over land, including enhanced warming
 - Early PCCSP result showed this – especially May-Oct season
 - What is CLIPSSA finding?



Projected change in
Fiji 1990 to 2090
A2 (high emissions) 8 km
Katzfey et al. 2011, PCCSP