Projections

SELECTION OF KEY FINDINGS RELEVANT TO THE PACIFIC
From the United Nations **Intergovernmental Panel on Climate Change's (IPCC's)** Synthesis Report. This is the final report in the IPCC's Sixth Assessment Cycle (AR6), integrating all IPCC reports from the past 7 years.

Only deep, rapid and immediate GHG emissions reductions

would limit the warming close to 1.5°C across the century.

At 1.5°C risks to
health, livelihoods, food security, water supply, human security and economic growth will increase

More sea level rise
is already unavoidable.
Sea level will remain higher for thousands of years

Coral reefs are projected to decline
by a further 70–90% globally at 1.5°C of global warming

Some impacts that the Pacific may experience include:


More intense tropical cyclones


More intense monsoon rainfall

Increased ocean acidification


More marine heatwaves

We will reach 1.5°C of warming
in the early 2030s under nearly all
emission scenarios

Pacific Island Nations
have higher climate-related risk
than the global average

Projections

SELECTION OF KEY FINDINGS RELEVANT TO THE PACIFIC

From the United Nations **Intergovernmental Panel on Climate Change's (IPCC's)** Synthesis Report. This is the final report in the IPCC's Sixth Assessment Cycle (AR6), integrating all IPCC reports from the past 7 years.

Global warming will increase in the near term, with estimates of reaching 1.5°C in the early 2030s.[1] Pacific Island Countries and Territories (PICTs) have continually advocated to limit warming to below 1.5°C, as the climate impacts beyond this level are particularly severe for Pacific Islanders.[2]

WHERE ARE WE HEADING?

Nearly all assessed scenarios show warming reaching 1.5°C in the early 2030s[3]. A very low emissions scenario leads us to warming of 1.4°C for 2081–2100, with a very high emissions scenario taking us to warming of 4.4°C for the same period.**[4]

The policies that were in place at the end of 2020 were not consistent with the national emissions reduction targets at the time, showing a gap between ambition and actual policies. **If those policies are not strengthened, warming is projected to reach around 3.2°C in 2100.*[5]**

Limiting warming to a specific level requires keeping total CO_2 emissions within a fixed carbon budget, along with strong reductions in other greenhouse gases.[6] From 1850–2019, we used about 80% of the total carbon budget to limit warming to 1.5°C.[7]

The remaining carbon budget for 1.5°C will be quickly used given current emissions and existing fossil fuel infrastructure[8]. The remaining carbon budget will be exceeded from the CO_2 emissions generated from existing and currently planned fossil fuel infrastructure alone.***[9] Note that these projections don't include emissions since 2020 and globally we have emitted another 84Gt of CO_2 in 2021 and 2022.[10]

Only deep, rapid and immediate GHG emissions reductions would limit the warming close to 1.5°C across the century[11].** Immediate emissions reductions are even more critical in pathways that limit overshoot. Overshoot is when a temperature limit is exceeded temporarily and then is brought back down to the chosen level of warming.[12] Emissions would have to peak and then be removed through Carbon Dioxide Removal (CDR) methods, such as reforestation.

SEA LEVEL RISE PROJECTIONS

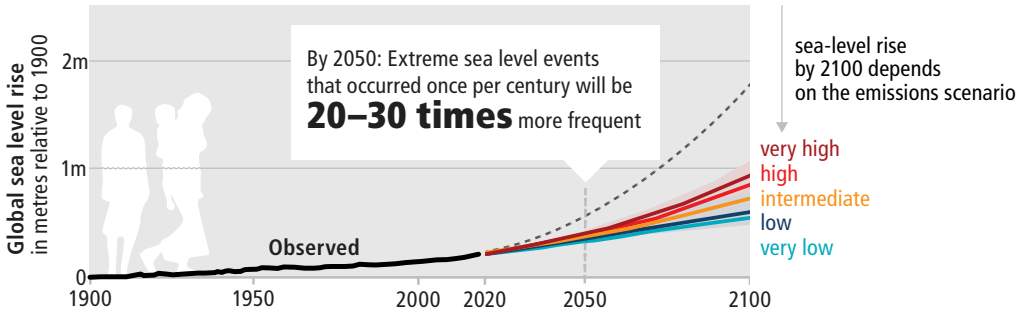
Sea level rise and related risks for people, coastal ecosystems, and infrastructure will continue to increase beyond 2100[13].**

More sea level rise is unavoidable due to continuing deep ocean warming and ice sheet melt, meaning the sea level will remain higher for thousands of years[14].** However, the timing and extent of sea level rise depend on our actions, with higher emissions leading to greater and faster rates of sea level rise.[15] Extreme sea-level events that recently only occurred once in 100 years will become more frequent, occurring yearly or more often by 2100 in more than half of tide gauge locations.**[16]

1 Summary for Policymakers (SPM) B.1
2 https://www.sprep.org/news/pacific-islands-continue-their-fight-for-a-15c-world
3 SPMB.1.1
4 SPMB.1.1
5 SPMA.4.4
6 SPMB.5.3
7 SPMB.5.4; This refers to keeping to 1.5°C with more than 50% likelihood. The term 'carbon budget' refers to the maximum amount of cumulative net global anthropogenic CO_2 emissions that would result in limiting global warming to a given level with a given probability, accounting for other anthropogenic climate forces
8 SPMB.5
9 SPMB.5; Based on unabated fossil fuel infrastructure (e.g. without carbon capture & storage).
10 Global Carbon Project 2022; Friedlingstein et al 2022 'Global Carbon Budget 2022'.
11 SPMB.6
12 SPMB.7
13 SPMB.2.2; Figure SPMB.4(c)
14 SPMB.3.1
15 SPMC.1
16 SPMB.1.4

* = medium confidence
** = high confidence
*** = very high confidence

Sea-level rise will continue for thousands of years, but how fast and how much depends on future emissions



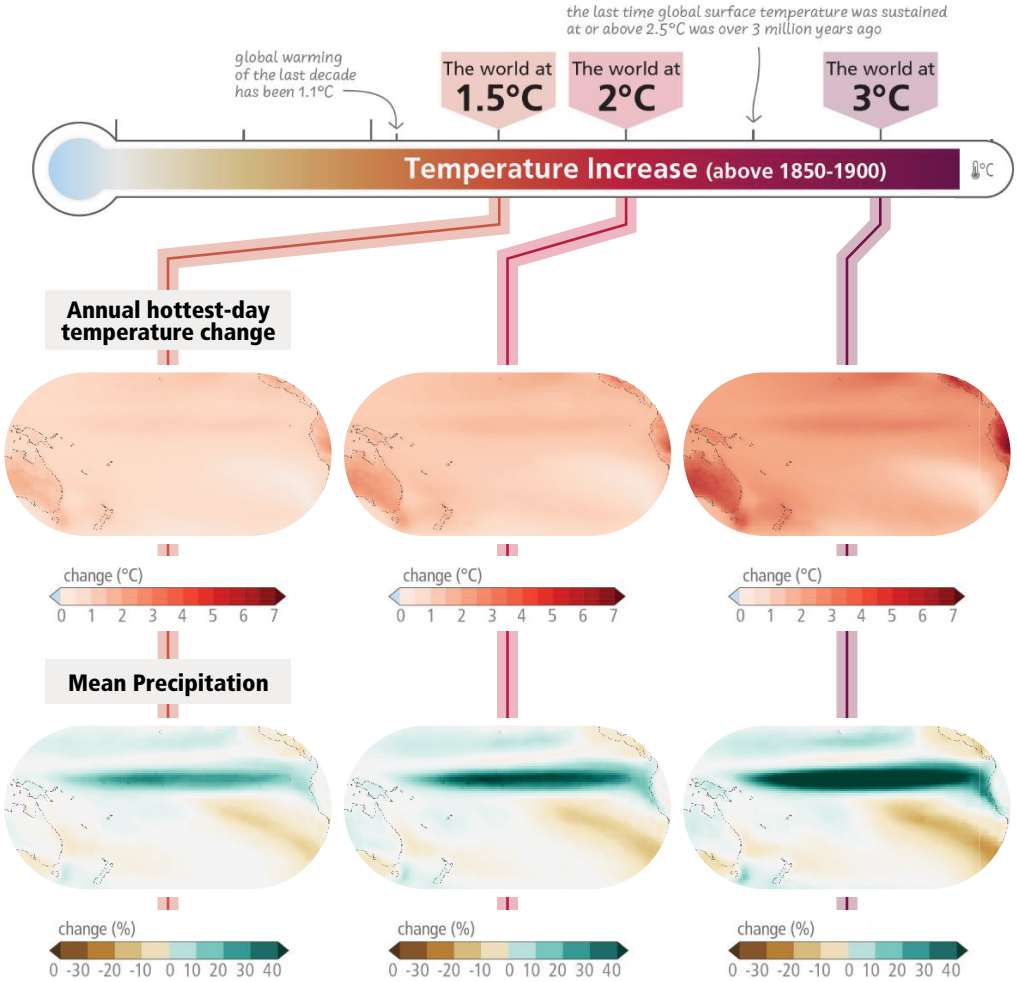
Adapted from Figure 3.4 — Sea-level rise will continue for millennia, but how fast and how much depends on future emissions

Observed and projected global mean sea level change relative to 1900 under different emissions scenario. Relative to 1995–2014, the likely global mean sea level rise is between 0.20–0.29m by 2050, 0.63–1.01m by 2100, and 0.98–1.88m by 2150 under the very high GHG emissions scenario.

WHAT WILL THE IMPACTS BE?

With further global warming, PICTs will continue to face more climate-related impacts, and risks will become increasingly complex and difficult to manage.[17]

These physical changes will lead to more impacts on humans and natural environments.



Adapted from Figure SPM.2 — Every increment of global warming results in multiple larger changes for the Pacific.

Projected changes in climate variables at global warming levels of 1.5°C, 2°C, and 3°C relative to 1850–1900. Each incremental increase in global warming results in multiple regional changes in annual hottest-day temperature change (°C) and annual mean precipitation change (%).

Please note that the Synthesis Report Figure SPM.2 displays 'wettest-day' projections. Mean annual precipitation is shown here instead, developed from the IPCC Interactive Atlas.

17 Longer Report, Section 3.1.1; 3.1.2; SPMB4.2

* = medium confidence
** = high confidence
*** = very high confidence

Continued global warming will cause:[18]

- Intensification of tropical cyclones^
- More intense global monsoon rainfall**
- More very wet and very dry weather events and seasons**
- Increased ocean acidification
- Increased marine heatwave frequency
- Loss of land, marine, and coastal biodiversity**
- Threats to human health and livelihoods**
- Reduced habitability of reef and non-reef islands leading to increased displacement**
- Risks to water security, food security and economic security — with economic decline in fisheries, agriculture and tourism**

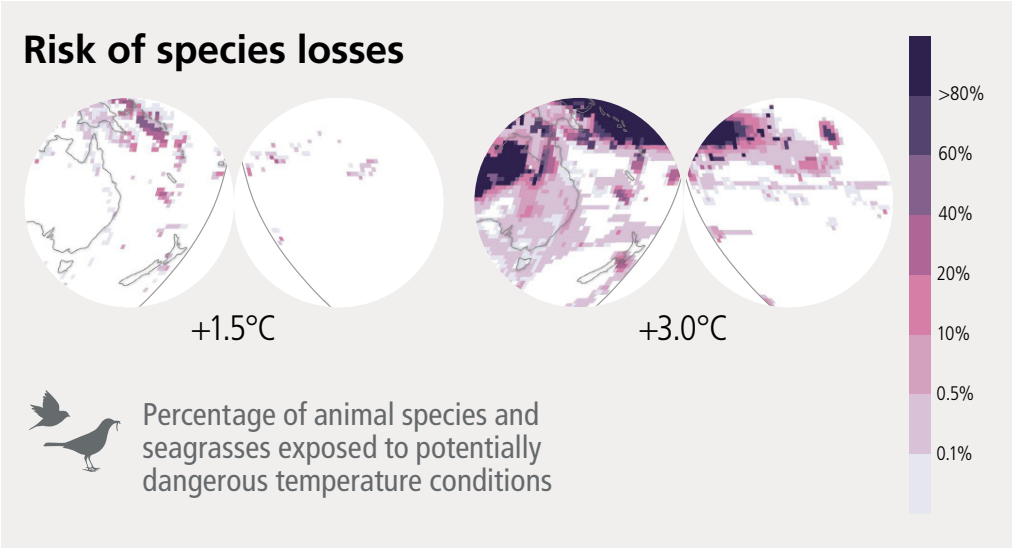
^Other reports from the region have mixed results about future cyclone projections. Please see **Pacific Islands Climate Change Monitor 2021** and **Climate Change in the Pacific 2022** for more information.

Future emissions are projected to affect all major parts of the climate system.** For example, every increment of global warming causes clear increases in hot extremes and extreme precipitation.**[19]

Climate-related risks for human and natural systems are significantly higher at 1.5°C of global warming than today[20].** Climate-related risks to health, livelihoods, food security, human security and water supply and economic growth will increase with global warming of 1.5°C and continue to worsen with further warming.

As warming levels increase, so do the risks of species extinction or irreversible loss of biodiversity in sensitive ecosystems such as forests*, and coral reefs.***[21]

In land ecosystems, 3–14% of the tens of thousands of species assessed will likely face a very high risk of extinction at warming of 1.5°C. Coral reefs are projected to decline by a further 70–90% at 1.5°C of global warming.**[22] The report highlights that Small Island Developing States (SIDS), including PICTs, have disproportionately high climate-related risk.**[23]



Adapted from Figure A1.16, Working Group II (WGII) Annex I — Increasing climate change is projected to intensify risk across natural and human systems.

Projected risks and impacts of climate change on biodiversity relative to 1850–1900 levels differ across regions, and emission scenarios. The impact on biodiversity increases as temperatures rise.

Please note this figure is used to show the findings of Synthesis Report Figure SPM.3 which reflects the same dataset but shows a different visual map. This map is taken from WGII Annex A1.16.

18 Longer Report Section 3.1.1; 3.1.2
19 SPMB.1.3
20 SPMB.2.2
21 Section 3.1.3 ; Figure SPM4
22 Figure SPM.4 (b)
23 Section 3.1.2

* = medium confidence
** = high confidence
*** = very high confidence

Prepared by the Australian National University Institute for Climate, Energy & Disaster Solutions
pacific climate change centre
SPREP Secretariat of the Pacific Regional Environment Programme