PACIFIC ISLANDS CLIMATE OUTLOOK FORUM - 13

23 - 27 OCTOBER, 2023

NADI, FIJI

PACIFIC METEOROLOGICAL COUNCIL

WORLD METEOROLOGICAL ORGANIZATION

ClimSA

SPREP
Secretariat of the Pacific Regional Environment Programme

Session 3: Looking back long-term

Status of key variables – tropical cyclones and surface winds

Simon McGree

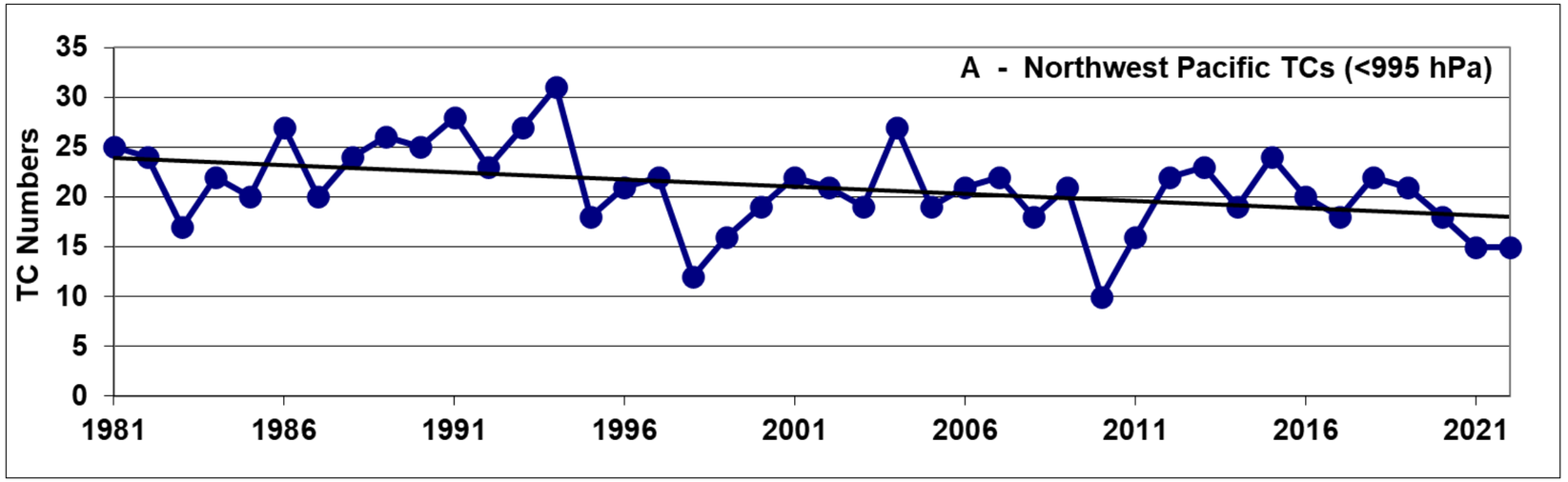
Bureau of Meteorology

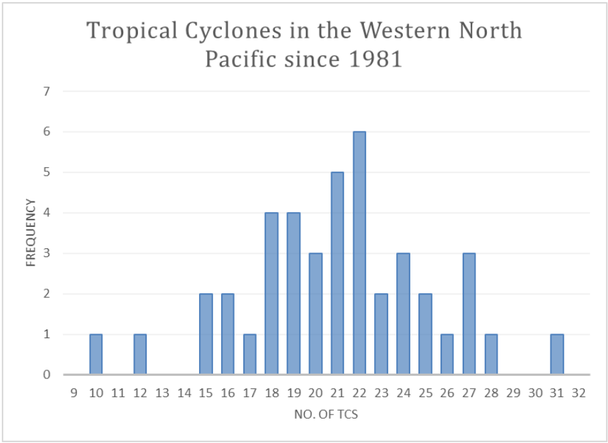
Trends in Tropical cyclones: Northwest Pacific Ocean

Trends in total numbers of tropical cyclones (<995hPa, severe tropical cyclones (<970hPa) and the proportion of severe tropical cyclones are presented for the period 1981 to 2022 for a sub-region of the North-west Pacific Ocean (120°E — 180°W; 0° — 40°N).

Trends are presented at a sub-regional scale as the numbers of tropical cyclones occurring within Pacific Island EEZs are insufficient for reliable long-term trends analysis.

Northwest Pacific Ocean – total numbers of TCs



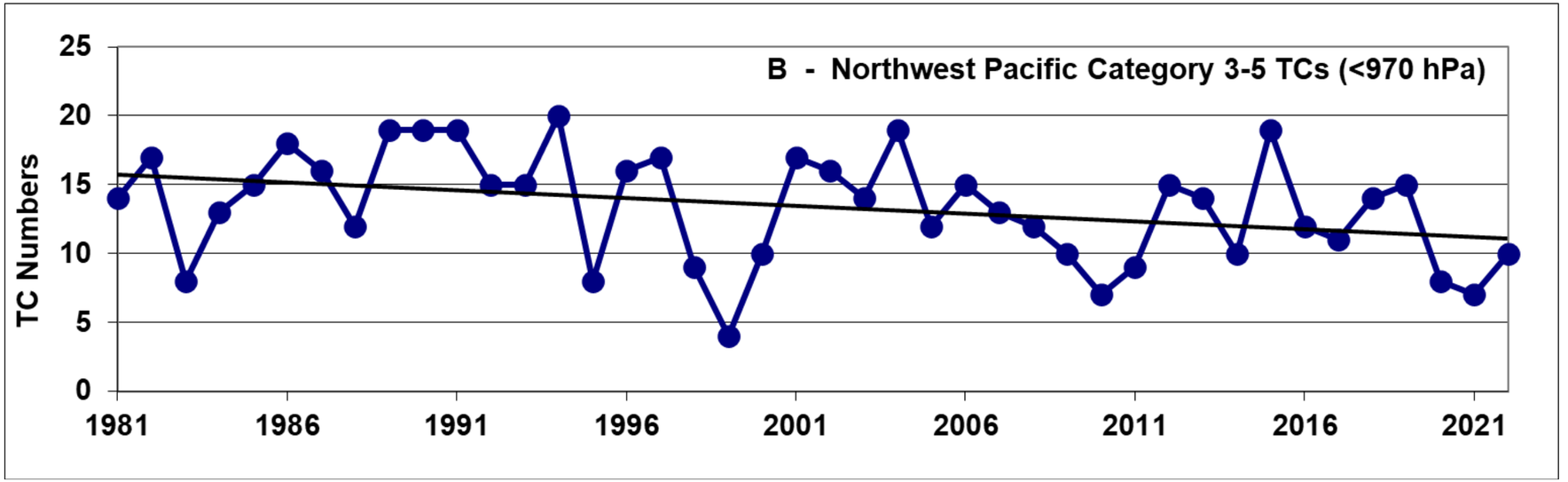


For the total numbers of TCs, the trend (and 95% confidence interval) is -1.45 (-2.46, -0.43) TCs/decade.

In other words, there has been a decline in total numbers of TCs over the last 42 seasons.

Average: annual TC occurrence 21.0 (995 hPa)

Northwest Pacific Ocean – Cat. 3-5 TCs

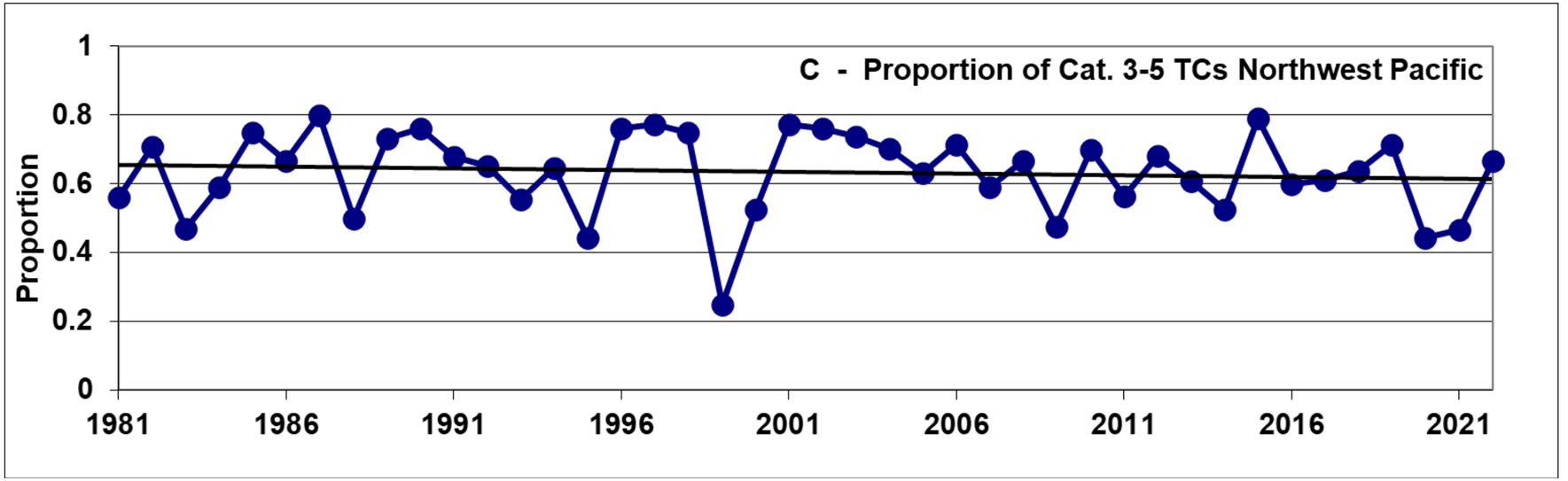


For the total numbers of severe TCs (Cat. 3-5), the trend is -1.11 (-2.09, -0.13) TCs/decade.

There has been a decline in the numbers of severe TCs over the last 42 seasons.

Average: annual TC occurrence 13.0 (970 hPa)

Northwest Pacific Ocean – Proportion Cat. 3-5 TCs



For the proportion of severe TCs, the trend is -0.01 (-0.04, +0.02) TCs/decade.

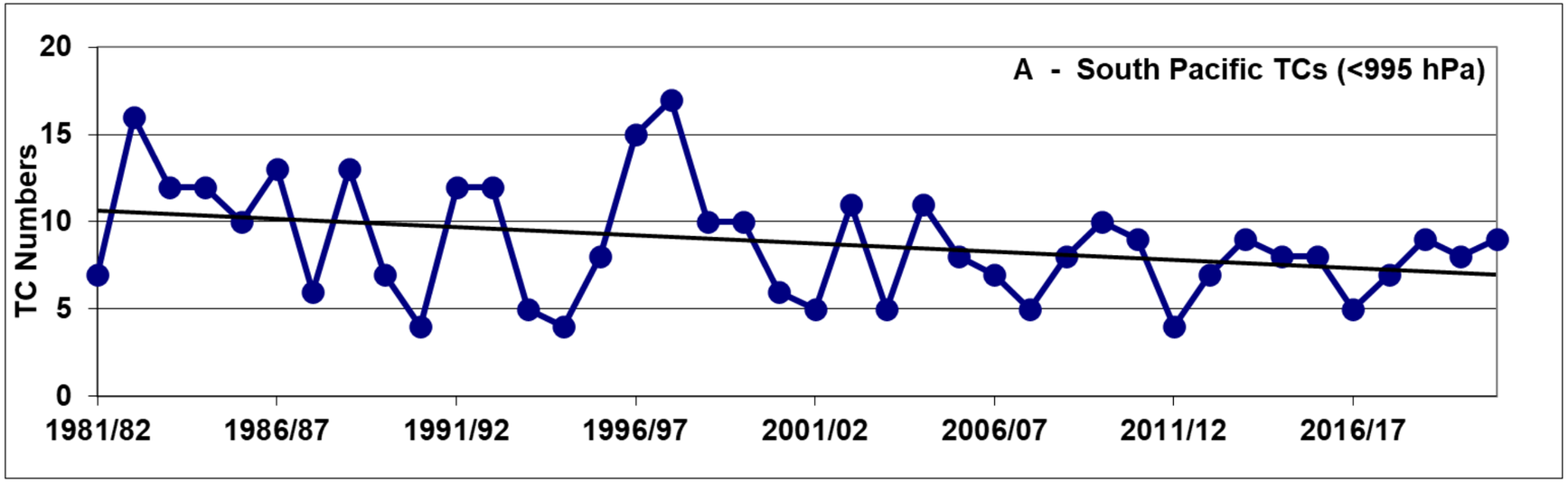
There has been little change in the proportion of TCs becoming severe TCs over the last 42 seasons.

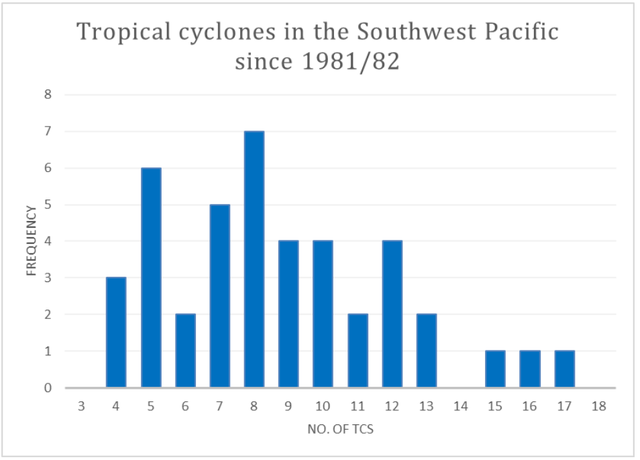
Trends in Tropical cyclones: Southwest Pacific Ocean

Trends in total numbers of tropical cyclones (<995hPa, severe tropical cyclones (<970hPa) and the proportion of severe tropical cyclones are presented for the period 1981/82 to 2022/23 for the Southwest Pacific Ocean (142°E — 120°W; 0° — 40°S).

Trends are presented at a sub-regional scale as the numbers of tropical cyclones occurring within Pacific Island EEZs are insufficient for reliable long-term trends analysis.

Southwest Pacific Ocean – total numbers of TCs



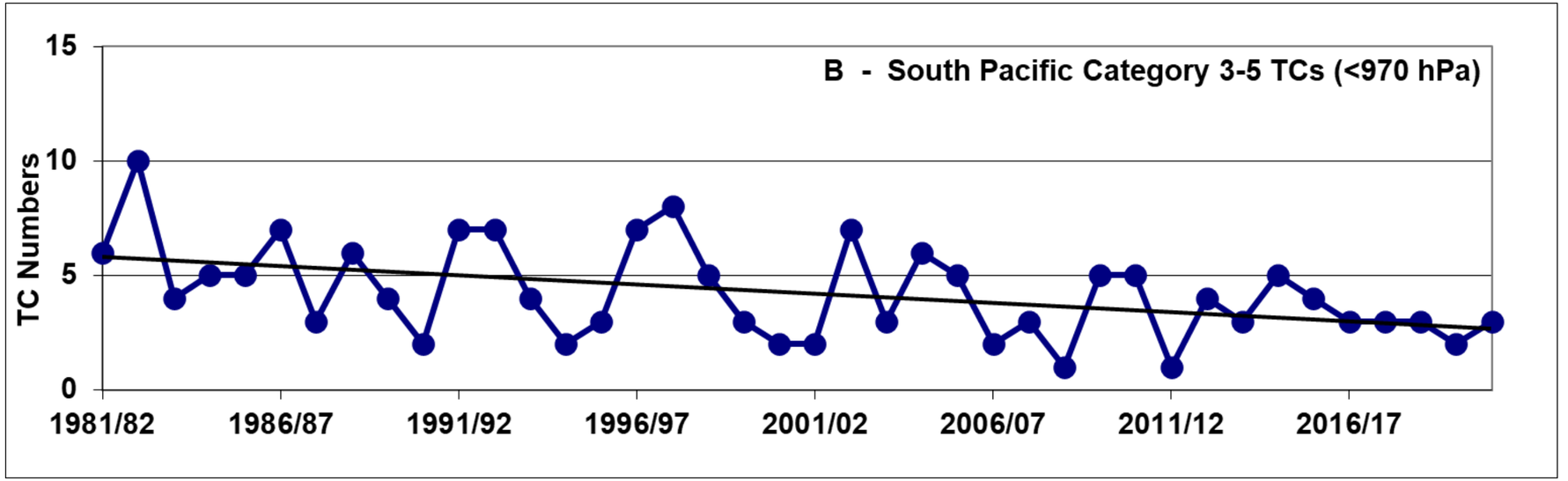


For the total numbers of TCs, the trend (and 95% confidence interval) is -0.97 (-1.76, -0.17) TCs/decade.

In other words, there has been a decline in total numbers of TCs over the last 42 seasons.

Average: annual TC occurrence 9 (995 hPa)

Southwest Pacific Ocean – Cat. 3-5 TCs

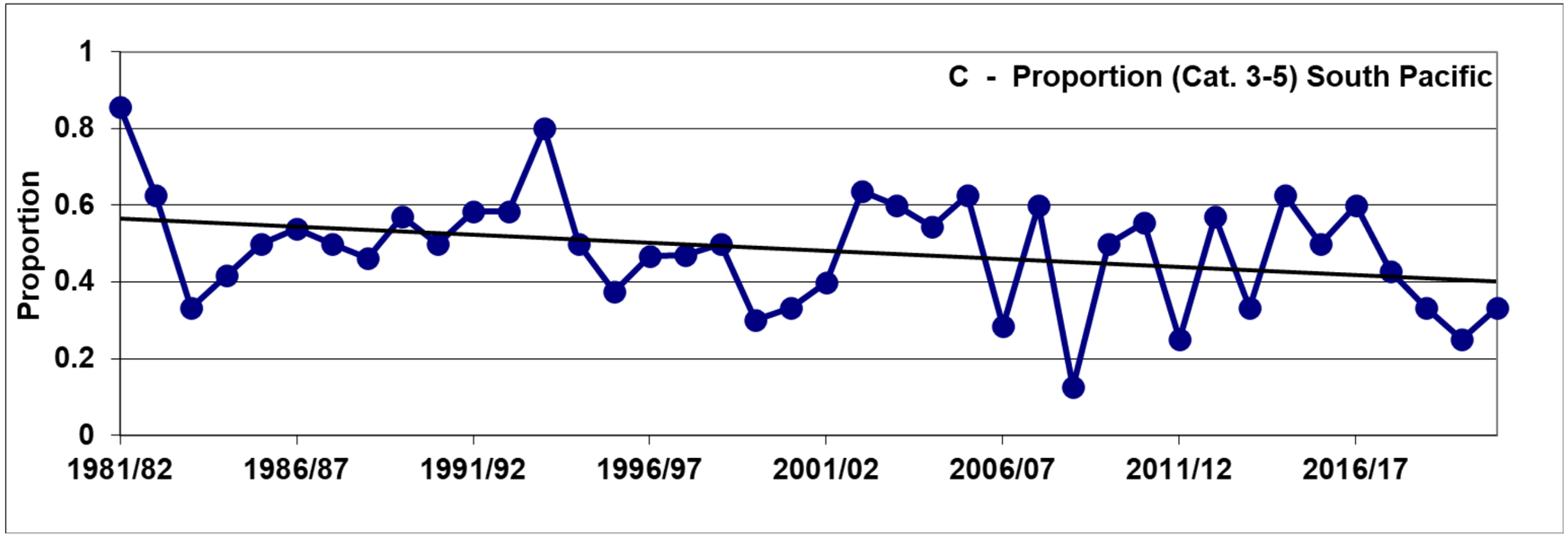


For the total numbers of severe TCs (Cat. 3-5), the trend is -0.83 (-1.30, -0.36) TCs/decade.

There has been a decline in the numbers of severe TCs over the last 42 seasons.

Average: annual TC occurrence 4 (970 hPa)

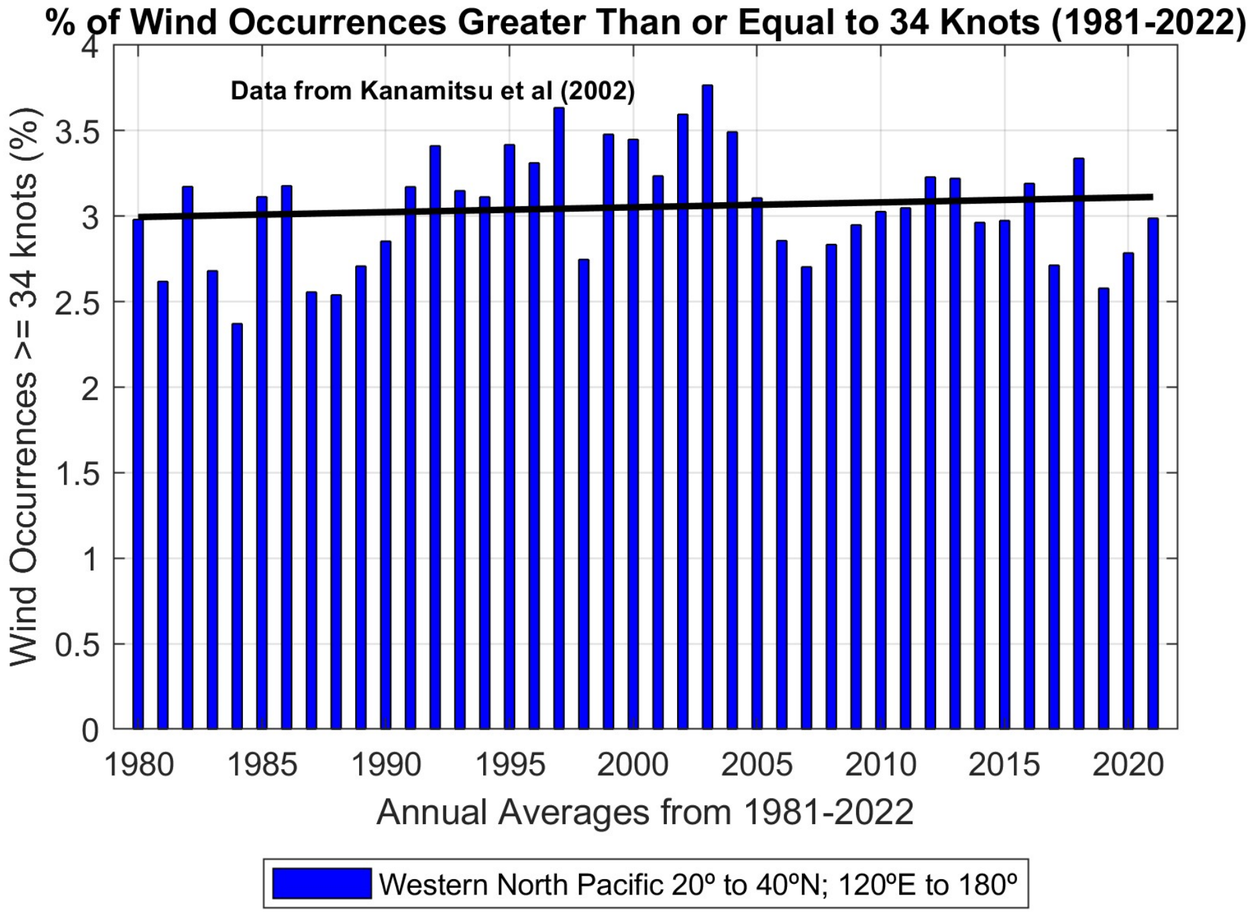
Southwest Pacific Ocean – Proportion Cat. 3-5 TCs



For the proportion of severe TCs, the trend is -0.04 (-0.08, -0.00) TCs/decade.

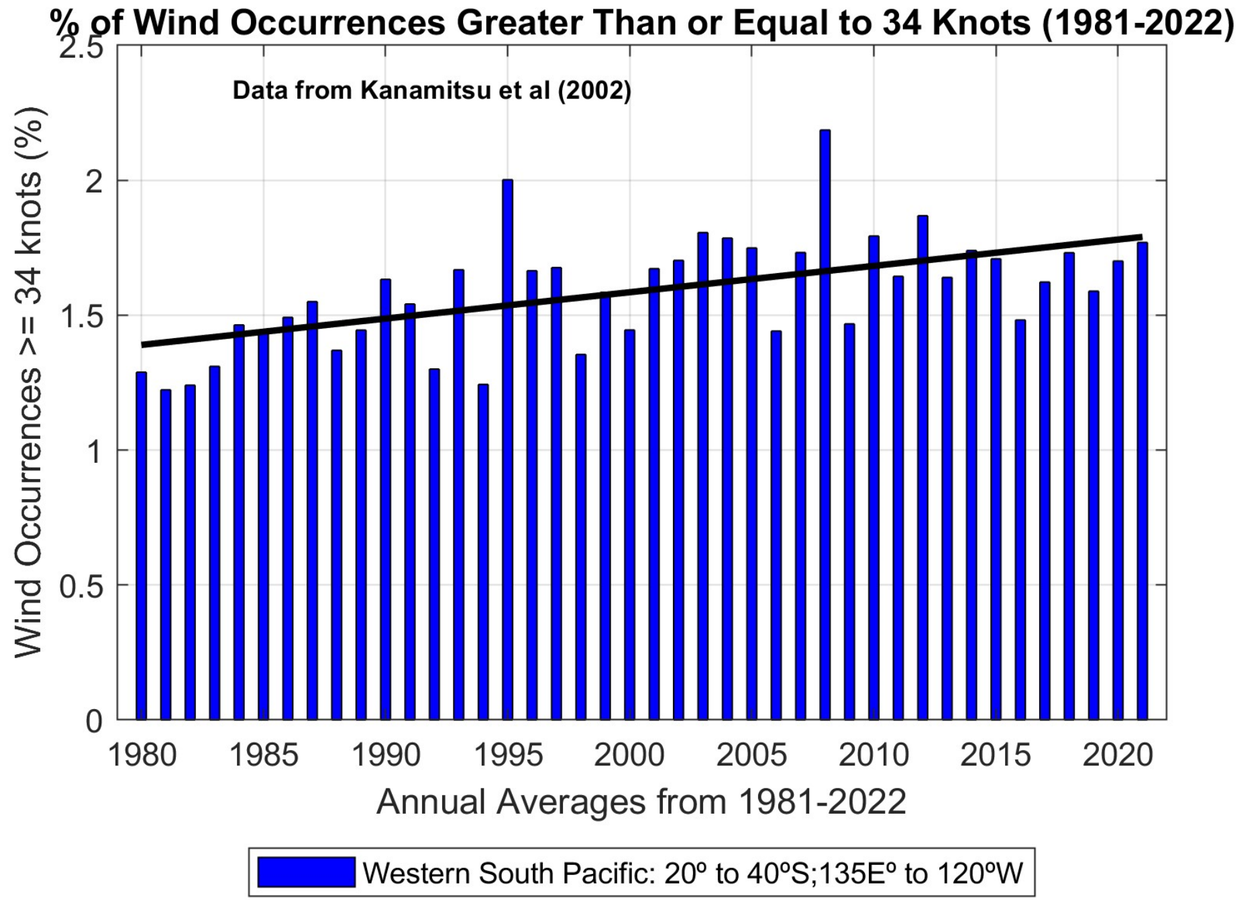
There has been a decline in the proportion in TCs becoming severe TCs over the last 42 seasons.

Subtropics Western North Pacific Ocean



Trend is +0.003 (-0.006, +0.011) %/year (P-value 0.50)

Subtropics Southwest Pacific Ocean



Trend is +0.010 (+0.005, +0.014) %/year (P-value <0.01)

Summary

Trends in tropical cyclones (TCs) have been examined for the Western North Pacific over 1981 to 2022 seasons and the Southwest Pacific for the 1981/82 to 2022/23 seasons. The Northwest Pacific basin analysis is limited to TCs west of the Date Line.

For both hemispheres in the Pacific region, there has been a decline in the total numbers of tropical cyclones and a decline in numbers of severe TCs (Category 3-5). In the Southwest Pacific the proportion of TCs that become severe TCs has also declined.

Trends in the most severe TCs (Category 5) at a sub-regional scale and numbers of TCs within national EEZs have not been examined as there are insufficient numbers TCs in the historical record to produce a reliable trend.

There has been a strong increase in the percentage of wind occurrences greater than or equal to 34 knots (cyclone intensity) in the subtropics of the south Pacific. The same does not apply to the northwest Pacific subtropics.

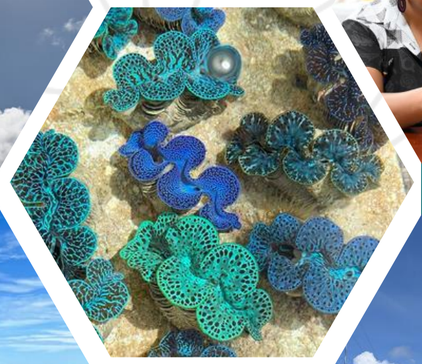
Contact

My Email
simon.mcgree@bom.gov.au

My Website
http://www.bom.gov.au









Thank You

PACIFIC METEOROLOGICAL COUNCIL

WORLD METEOROLOGICAL ORGANIZATION

ClimSA

SPREP
Secretariat of the Pacific Regional Environment Programme

Pacific Community
Communauté du Pacifique

Australian Government
Bureau of Meteorology

CSIRO

NIWA
Taihoro Nukurangi

APCC
APEC CLIMATE CENTER

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE