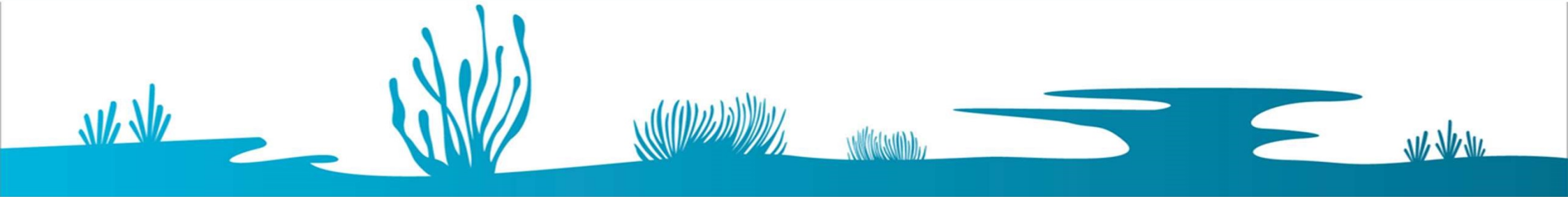
Climate and Oceans Support
Program in the Pacific

ACCESS-S Workshop

MODULE: Pacific Climate



Topics in this module

- Global climate

- Pacific climate
  - Western Pacific Warm Pool (WPWP)
  - Intertropical convergence zone (ITCZ)
  - South Pacific Convergence Zone (SPCZ)

Expected learning outcomes

- Understanding of the general climate in the Pacific

These outcomes are important for understanding and interpreting ACCESS-S outputs and products such as the tropical cyclone outlook and ENSO

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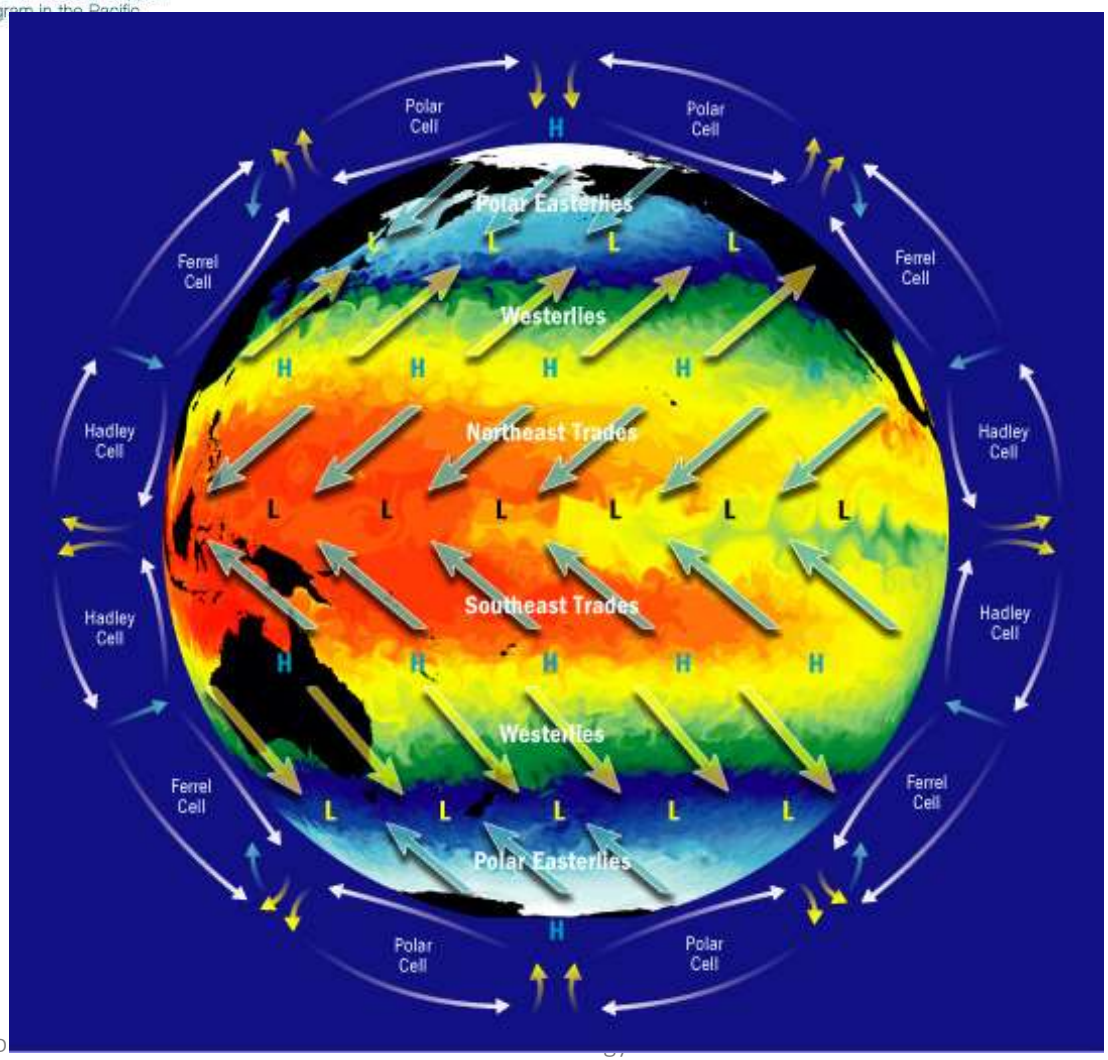
Large Scale Climate Phenomena



General Circulation of the Atmosphere and Ocean

Vertical and horizontal components:

1. Earth is hotter in tropics, cooler at poles
2. Hot air rises at equator, travels towards poles
3. Coriolis effect bends the path of the air stopping it reaching the poles
4. Air starts to sink at 30 ° latitude
5. Air then moves back to the tropics as the trade winds

This is called the **Hadley Cell**

There are other circulations not shown on this slide to be discussed in this module

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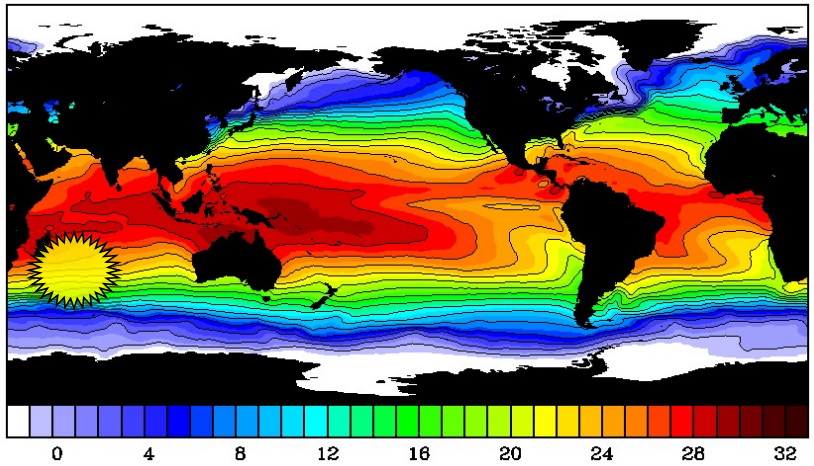
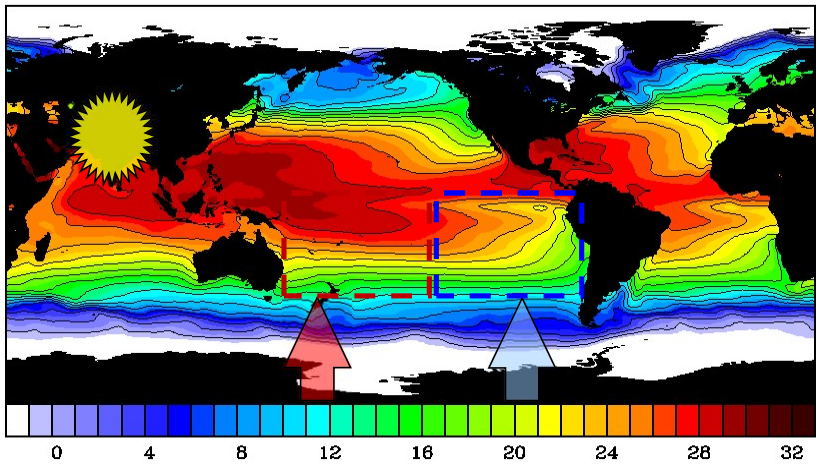
Climate of the Tropics

January ocean temperatures (°C)



July ocean temperatures (°C)



The warmest waters tend to follow the sun

Rain follows the warmest ocean temperatures

West Pacific is usually warmer than the east

- Patterns of wind move north and south with the seasons
- West Pacific is 10°C warmer than east in July
- This contrast creates and east/west atmospheric circulation, which is influenced by El Niño or La Niña events
- Areas of warm and cold water can affect rainfall patterns

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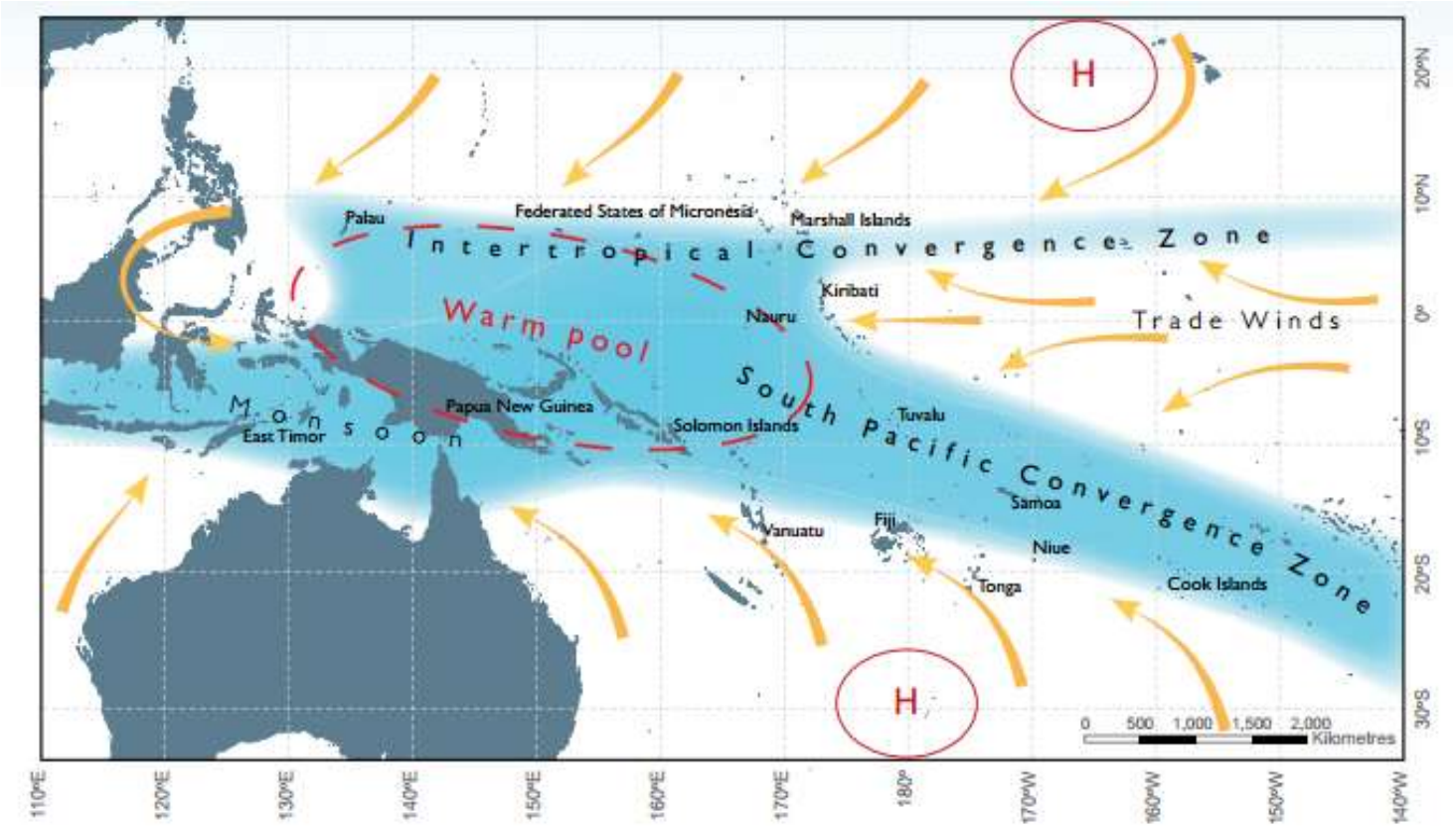
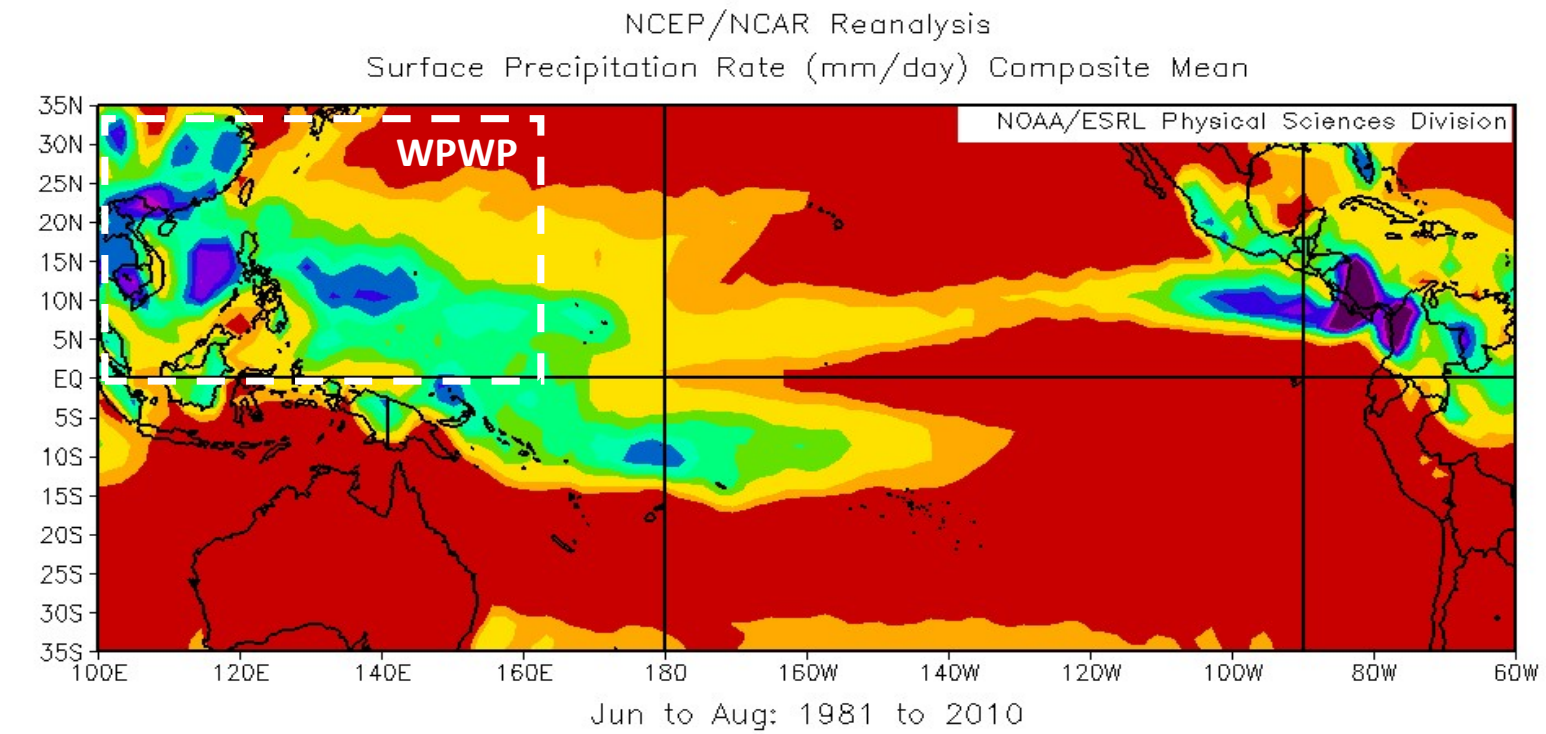
Climate of the Tropical Western Pacific



- Trade winds
- Western Pacific Warm Pool (WPWP)
- Intertropical Convergence Zone (ITCZ)
- South Pacific Convergence Zone
- Monsoon

Western Pacific Warm Pool



Northern Hemisphere Summer

The **Western Pacific Warm Pool** (WPWP) and **East Asian Monsoon**

- Warmest ocean waters (often > 28 °C)
- Trade winds push warm equatorial water to the west
- **Warm pool and trade winds bring lots of rainfall in region**

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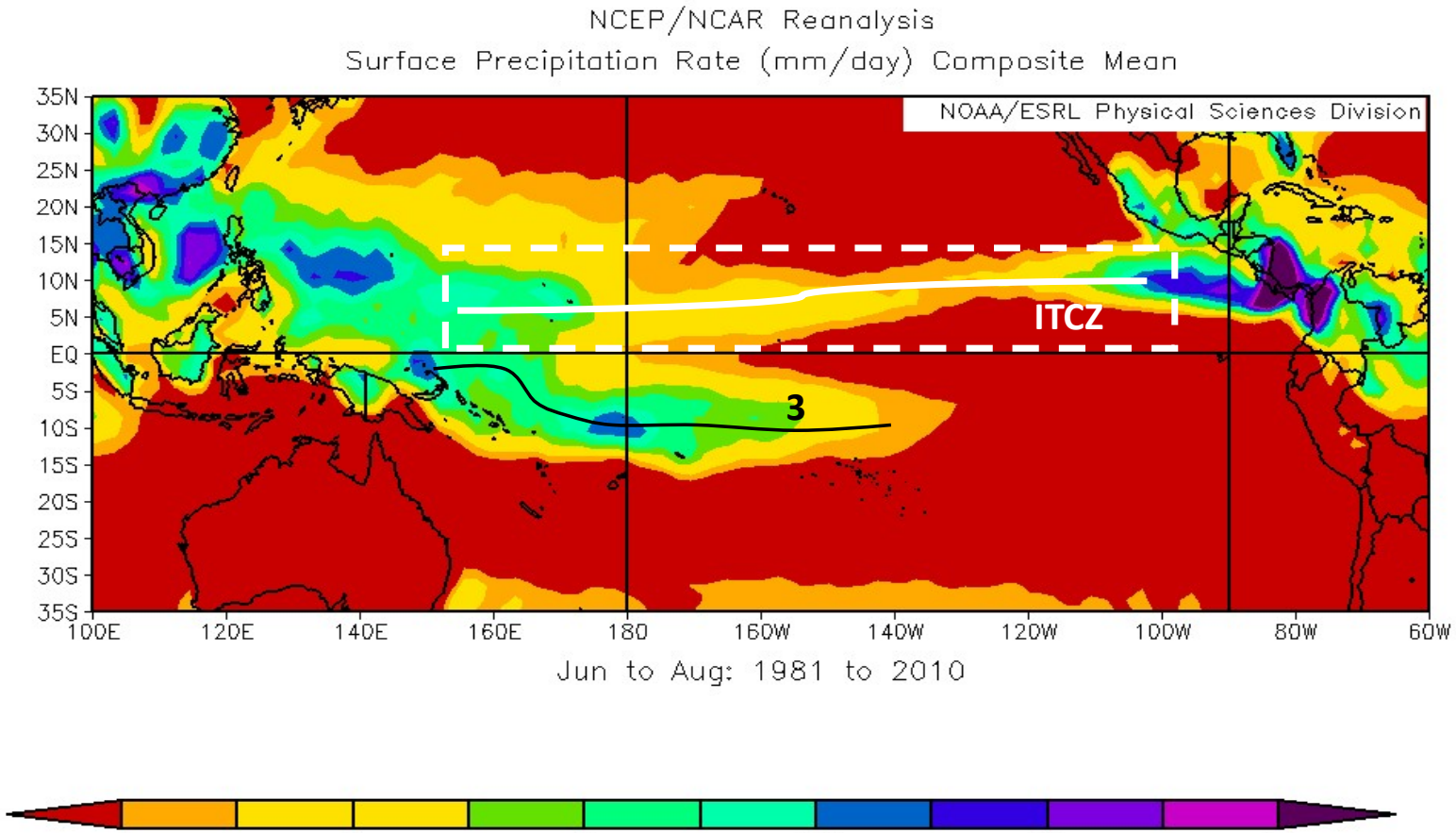
Intertropical Convergence Zone



Northern Hemisphere Summer

The **Intertropical Convergence Zone** or **ITCZ**

- **A zone of high rainfall and cloudiness**
- Trade winds converge here
- ITCZ moves north and south with the seasons
- ITCZ can have "spurs"

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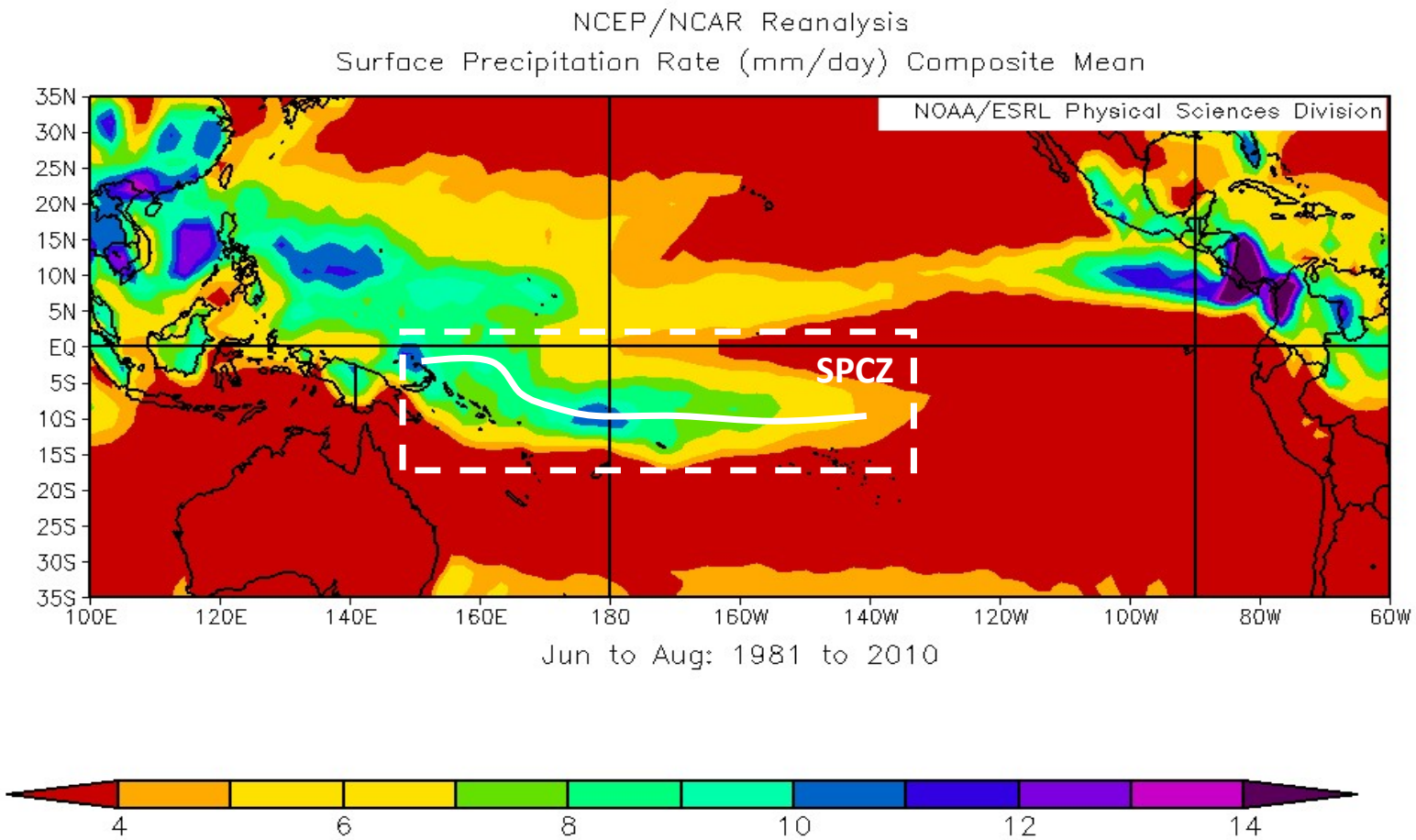
South Pacific Convergence Zone



Northern Hemisphere Summer

The **South Pacific Convergence Zone** or **SPCZ**

- **A belt of high rainfall and cloudiness**
- The largest and most persistent “spur” of the ITCZ
- Most active in southern hemisphere summer
- Linked to sea surface temperature maximum
- Stretches from the Solomon Islands to Fiji, Samoa and Tonga

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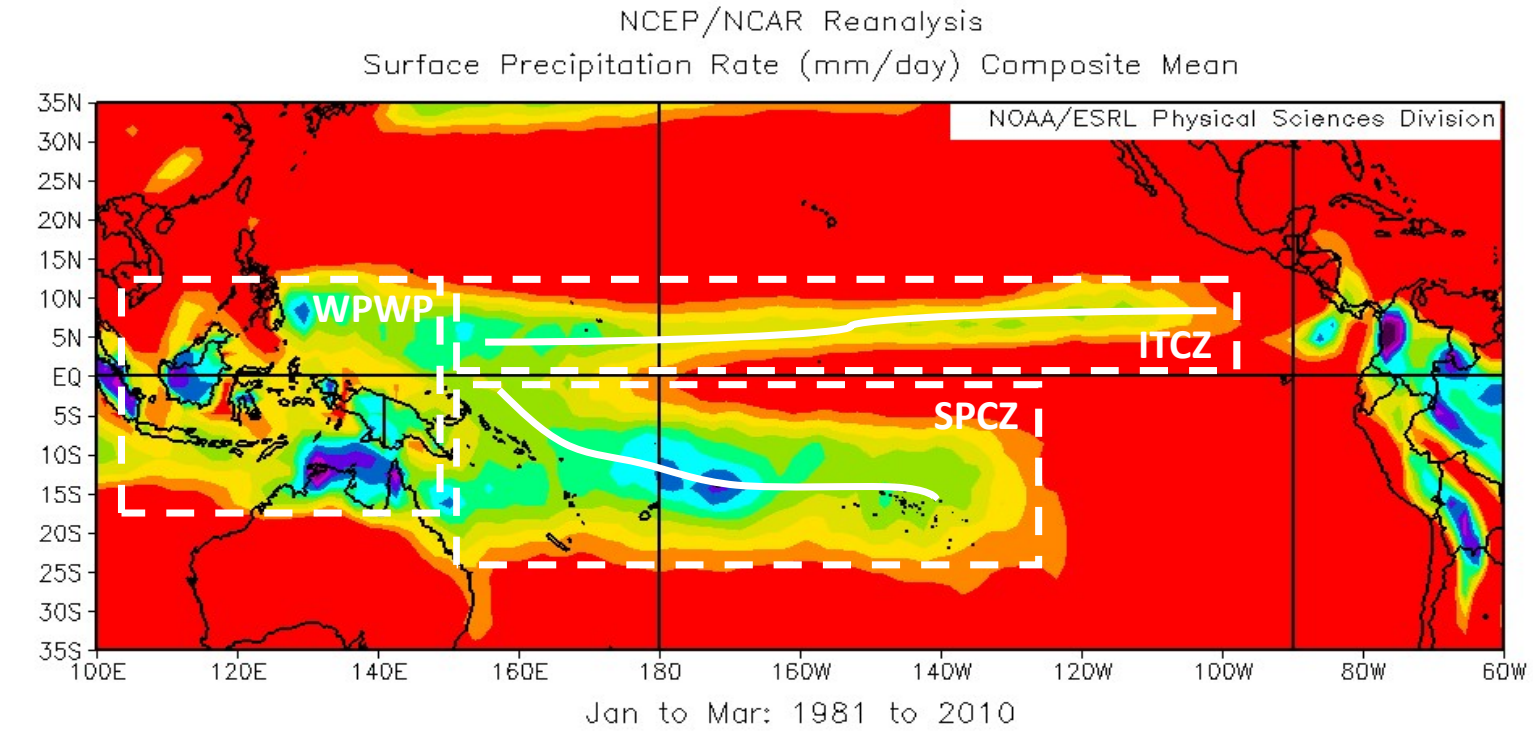
Pacific Climate Southern Summer



Southern Hemisphere Summer

The **WPWP** moves southwest

The **ITCZ** and **SPCZ** are further south

The ITCZ is weaker in Southern Hemisphere summer

The SPCZ is stronger and more rainfall in Southern Hemisphere summer

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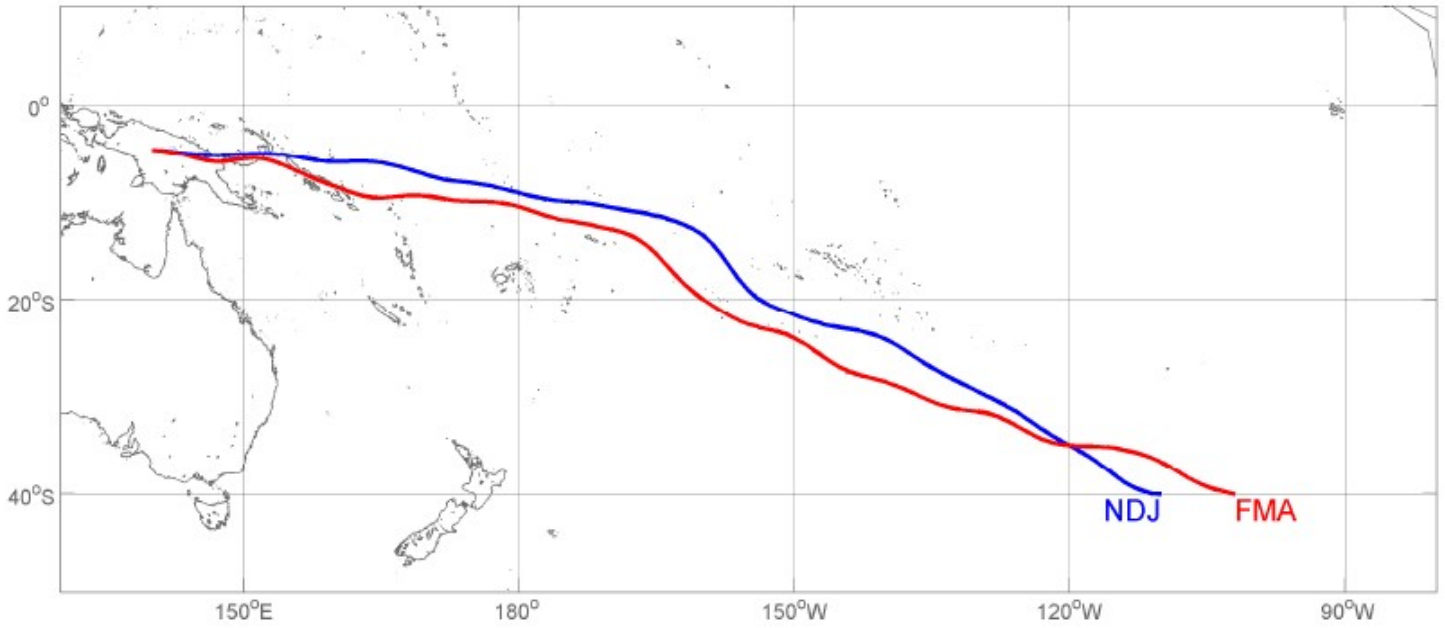
South Pacific Convergence Zone (SPCZ)
(from James Renwick & Brett Mullan, NIWA, N.Z.)

The SPCZ: climatology



- Nov-Jan and Feb-Apr mean position
- Mean position migrates somewhat southwest

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Pacific climate summary

Pacific climate

Topics covered

- Trade winds
- Western Pacific Warm Pool (WPWP)
- Intertropical convergence zone (ITCZ)
- South Pacific Convergence Zone (SPCZ)