Tropical Rain-Rate Spectral Structures, Modeled and Observed

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Nested Regional Climate Model (NRCM)
Advanced Research WRF (ARW)

Satellite-Derived Rain Rates
GSFC (3B4x)
Nested Regional Climate Model (NRCM)

Advanced Research WRF (ARW)

Tropical Channel ($\Delta = 36$ km)

(30°S ~ 45°N)/ 36 vertical levels (50 mb)

(45°S ~ 45°N)/ 51 vertical levels (10 mb)

$\Delta = 36$ km/ 12 km/ 4 km
(Jan – Jun, 1997)
NRCM
Δ = 36 km/ 12 km/ 4 km
(Jan – Jun, 1997)
Rainfall
hourly outputs
D03 ($\Delta=4 \text{ km}$)
D02 (Δ=12 km)
D01 ($\Delta=36$ km)
Summary:

- Power-law scaling in both space and time
- Dual exponents
- Tightly coupled in space and time
Satellite-Derived Rain Rates

(Δ≈25 km; hourly)

~ NRCM (D01)
Summary:

- Power-law scaling in both space and time
- Dual exponents
- Tightly coupled system in space and time
- Tropical convection: REAL multiscale phenomenon
D01 ($\Delta=36$ km)  
D02 ($\Delta=12$ km)  
D03 ($\Delta=4$ km)