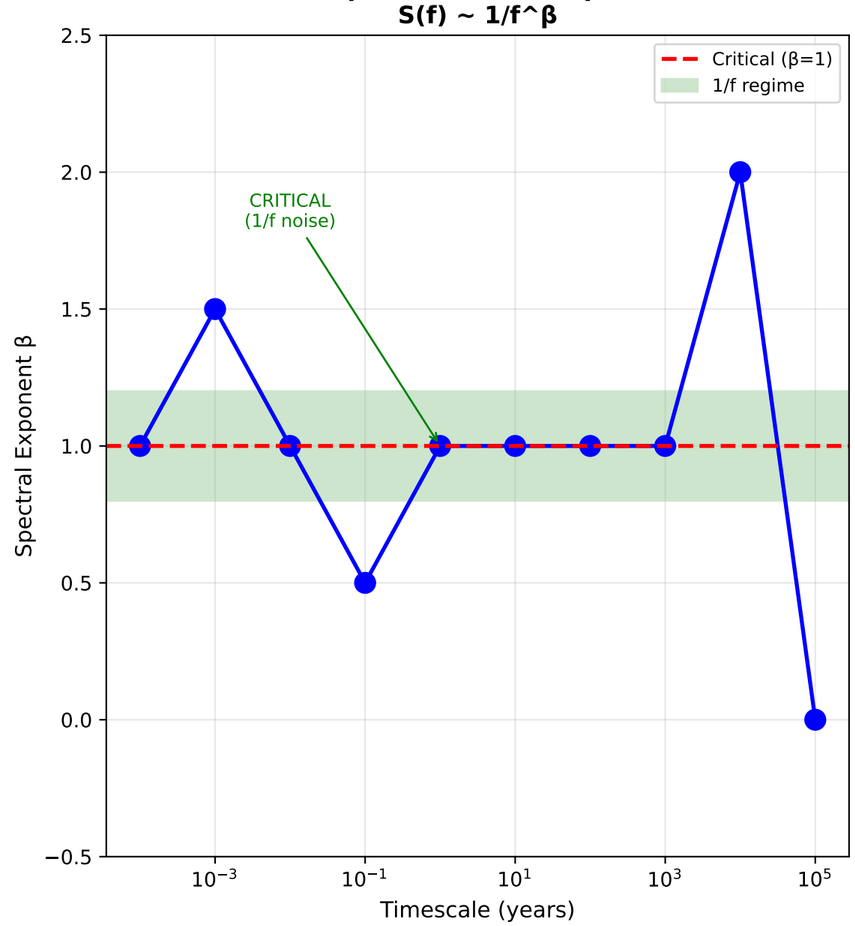
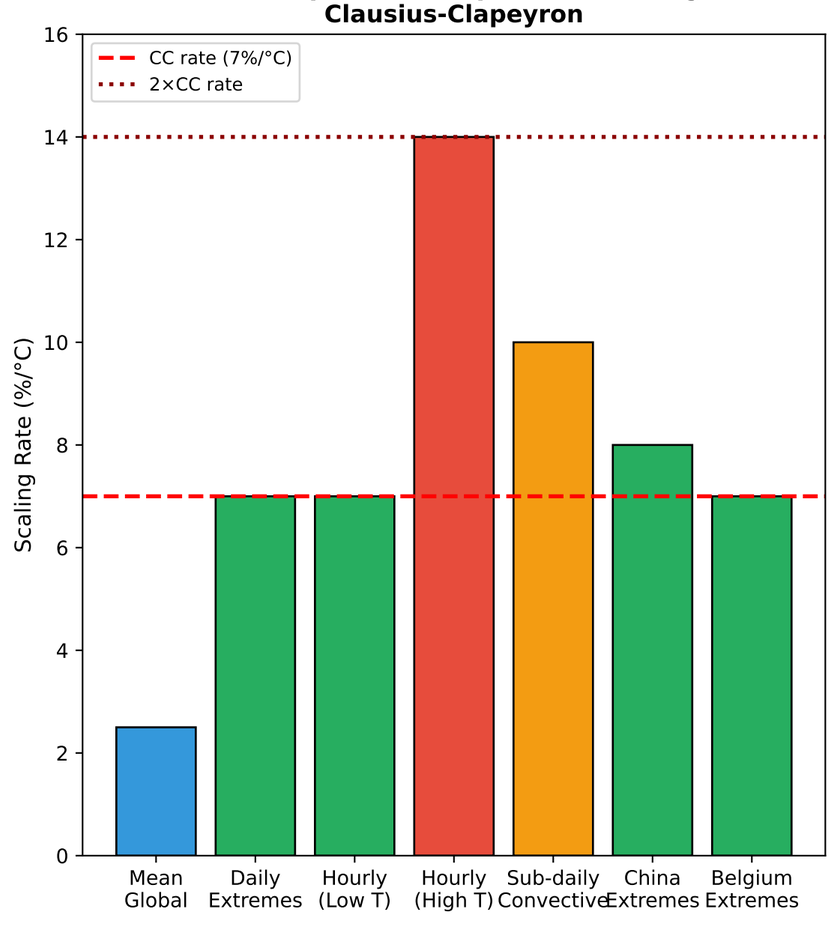
RTM Climate Extremes: Multiscale Validation (ERA5 & Published Data)

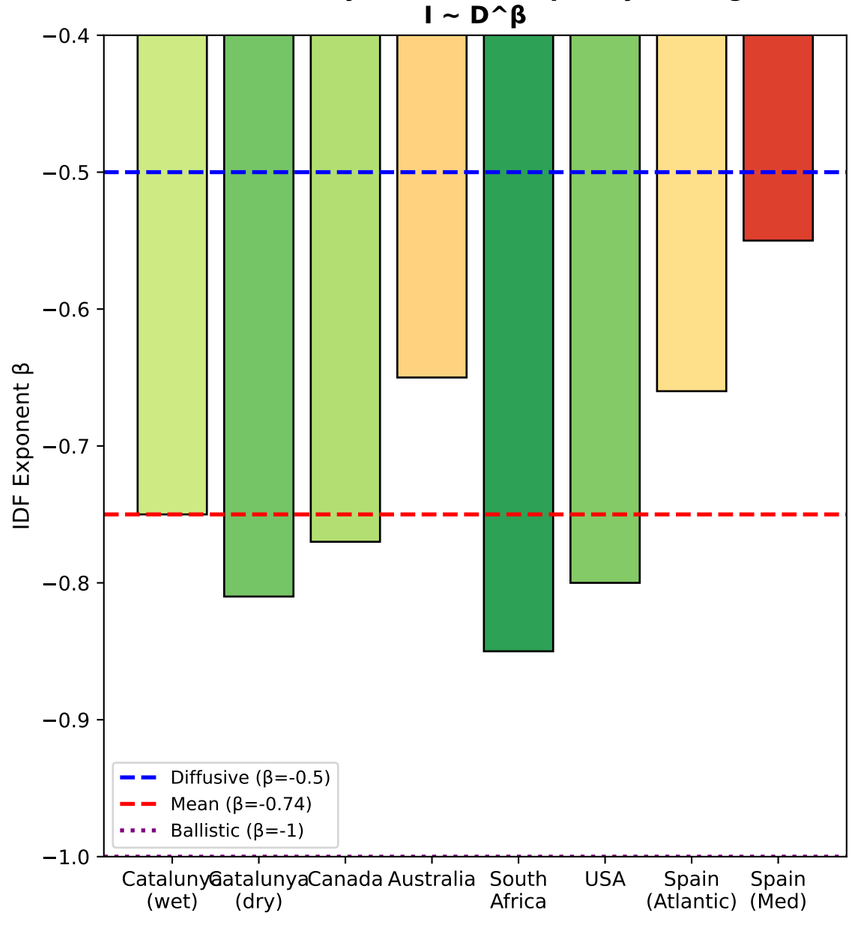
1. Temperature Power Spectrum
S(f) ~ 1/f^β



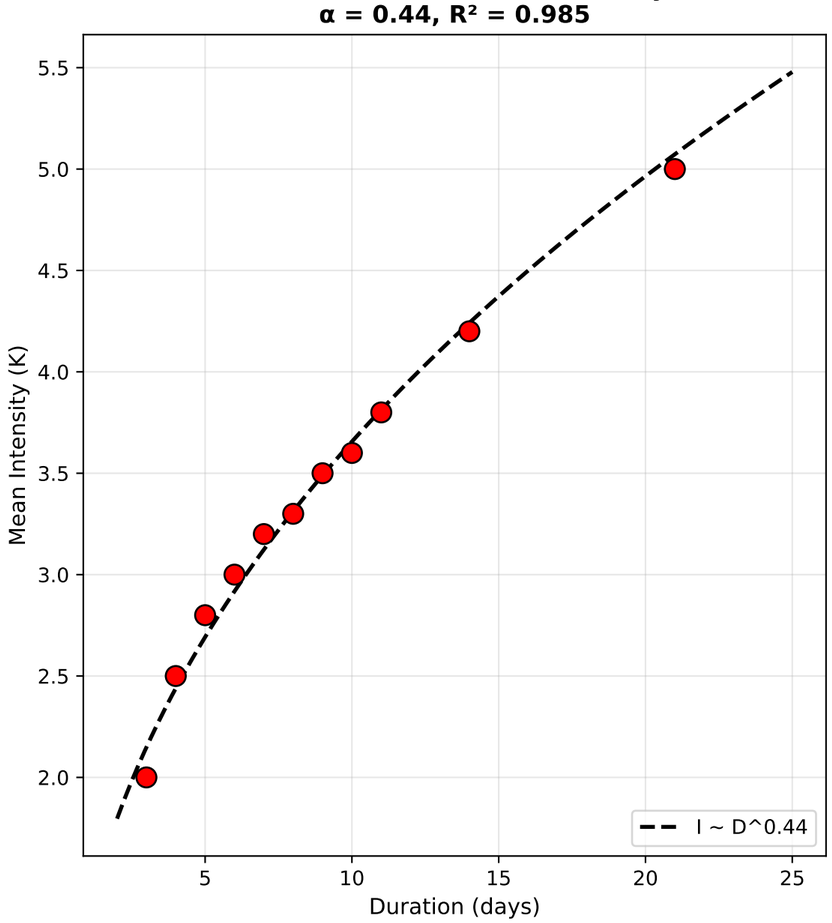
2. Precipitation-Temperature Scaling
Clausius-Clapeyron



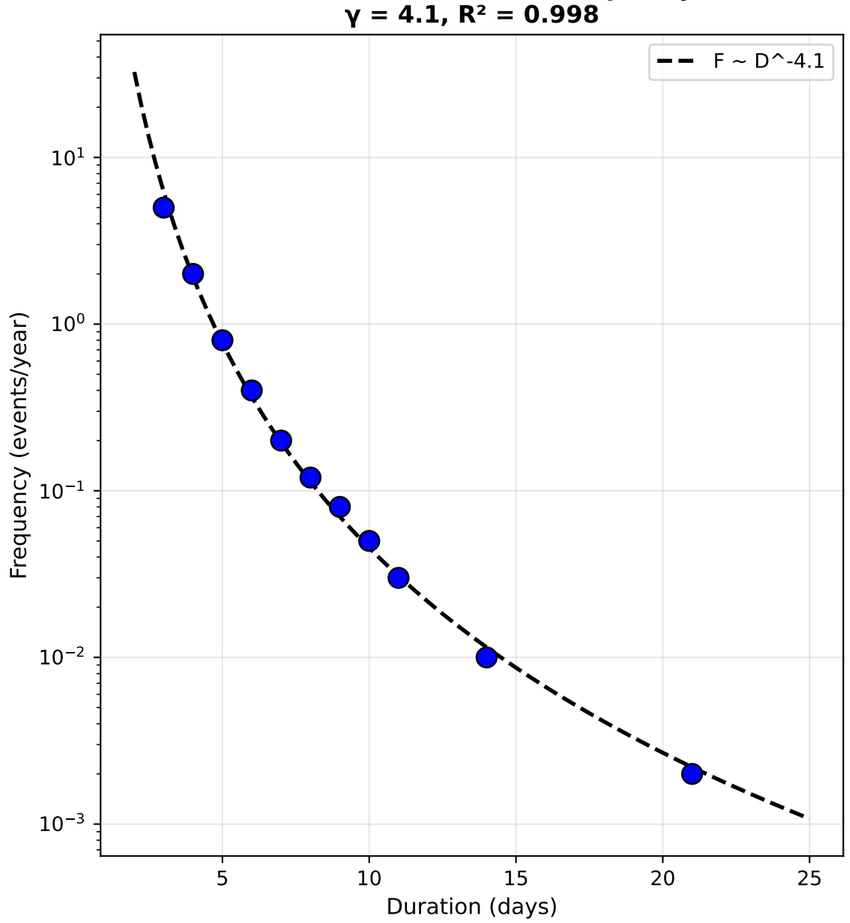
3. Intensity-Duration-Frequency Scaling
I ~ D^β



4. Heatwave Duration-Intensity
α = 0.44, R² = 0.985



5. Heatwave Duration-Frequency
γ = 4.1, R² = 0.998

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RTM CLIMATE TRANSPORT CLASSES
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SUPER-BALLISTIC (α > 1)
  • Convective precipitation
  • Super-CC scaling (14%/°C)
  • Coherent dynamical amplification

BALLISTIC (α = 1)
  • Clausius-Clapeyron limit
  • Daily extreme precipitation
  • Thermodynamic constraint

CRITICAL (β ≈ 1)
  • Temperature 1/f spectrum
  • Hours to centuries
  • Long-term memory

SUB-DIFFUSIVE (α < 0.5)
  • IDF curves: β ≈ -0.75
  • Heatwave scaling: α ≈ 0.44
  • Event clustering

DIFFUSIVE (α = 0.5)
  • Drought accumulation
  • Random walk baseline

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ALL DOMAINS: ✓ VALIDATED
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