Benchmarking Simulated Precipitation in Earth System Models

Precipitation Variability across Time Scales in CMIP 5 and 6 Models

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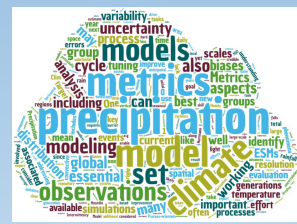
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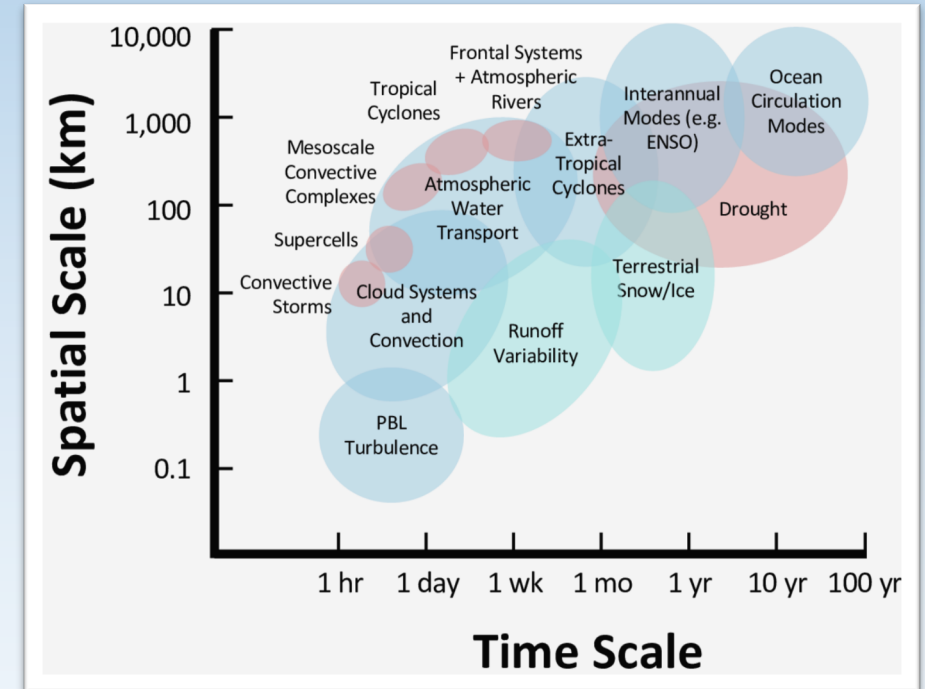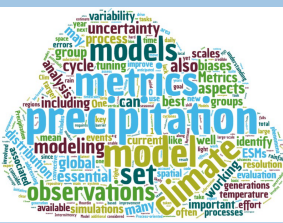# Precipitation variability across time scales

Motivation

- Representation of the various precipitation variability is one of the most important challenges for ESMs

- Lack of well-defined benchmarks to measure precipitation variability across time scales
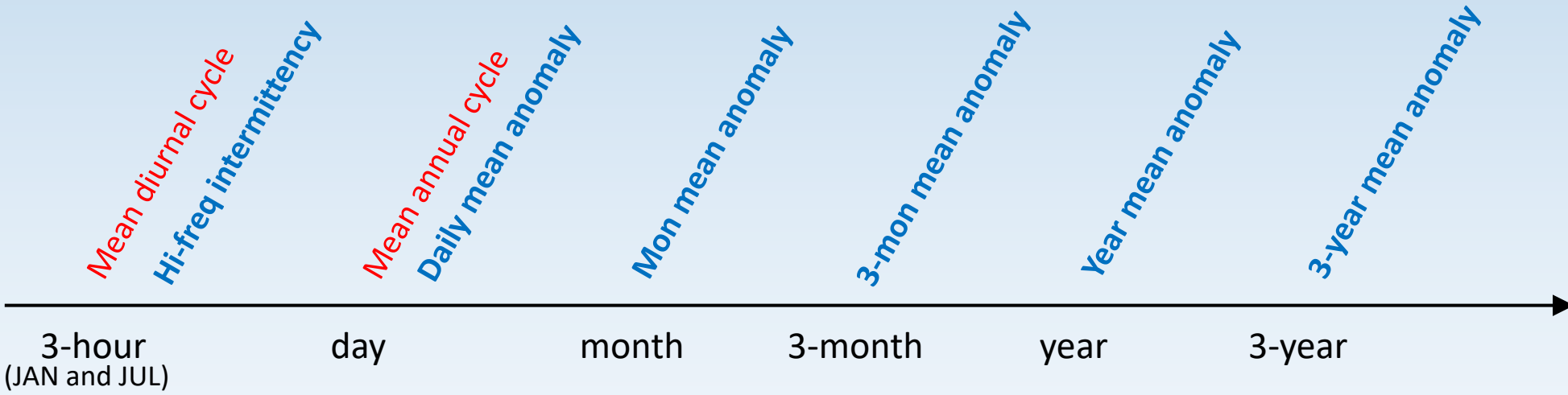
Goals of this work

- Objective comparison of observed and simulated precipitation variability across time scales

- Evaluation of multiple-generations of CMIP models

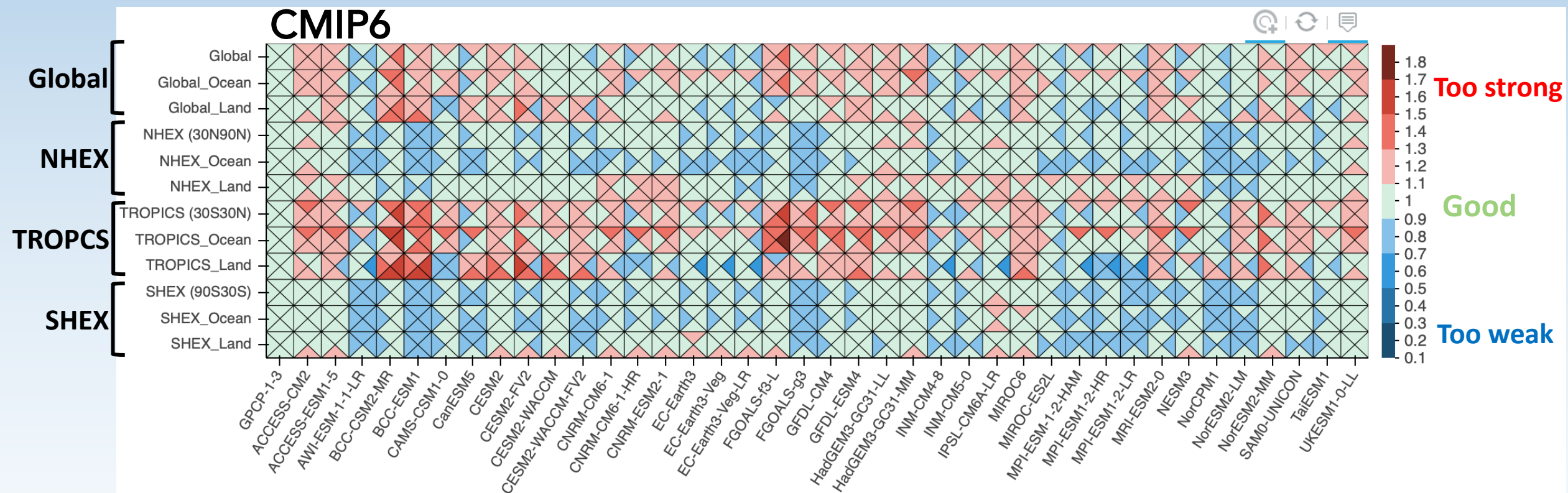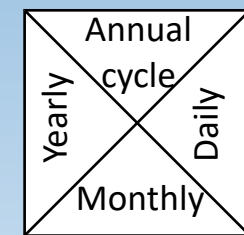Earth System Model
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Benchmarking precipitation variability across time scales

Partitioning of **forced variability (solar)** and **unforced variability**

- This requires use of high-frequency (3-hourly and daily) simulation and observational data
- The variability is evaluated with 12 domain averages (Global, Tropics, NHEX, and SHEX with Land/Ocean)

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# Ratio of domain averaged variability (STD_{model}/STD_{ref})

- (Preliminary) Many CMIP6 models **overestimate tropical variability** and **underestimate extratropical variability**

# Ratio of domain averaged variability (STD_{model}/STD_{ref})
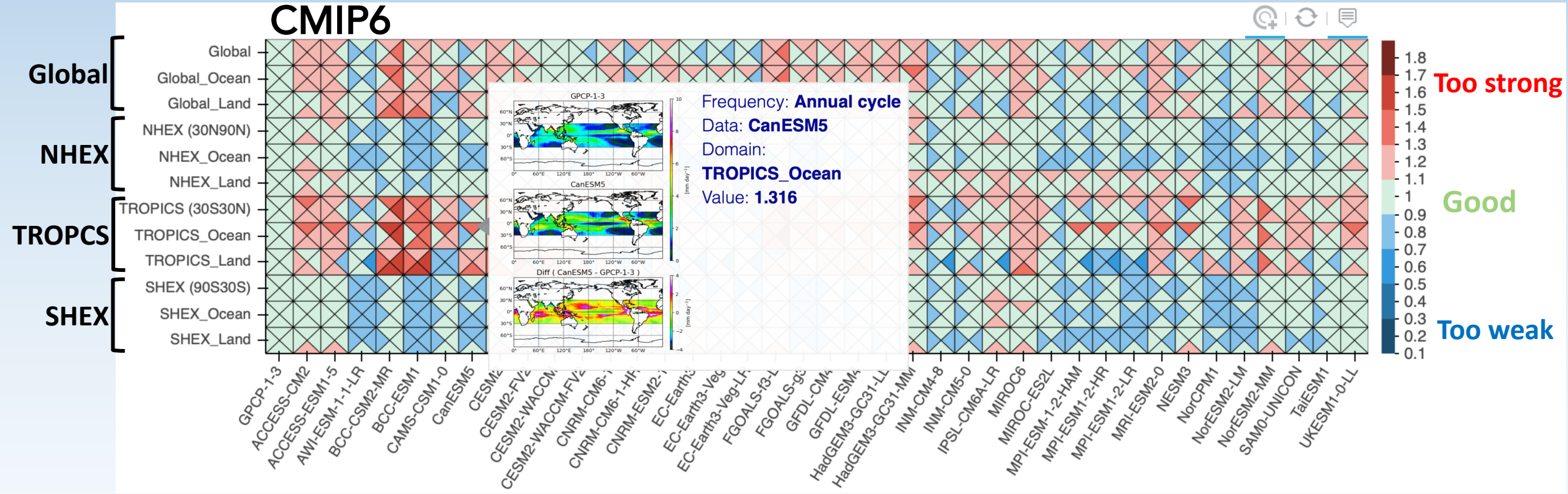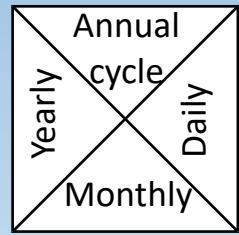
- (Preliminary) Many CMIP6 models overestimate tropical variability and underestimate extratropical variability

- In the webpage (https://cmec.llnl.gov/results), the plots interactively provide underlying diagnostics

Summary (Preliminary)
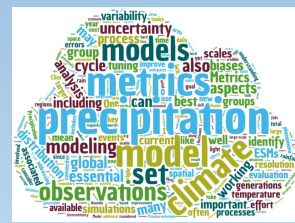
CMIP6 models show **overall improvement in extratropical variability**, but **little improvement in tropical variability**

Number of good variability models across time scales
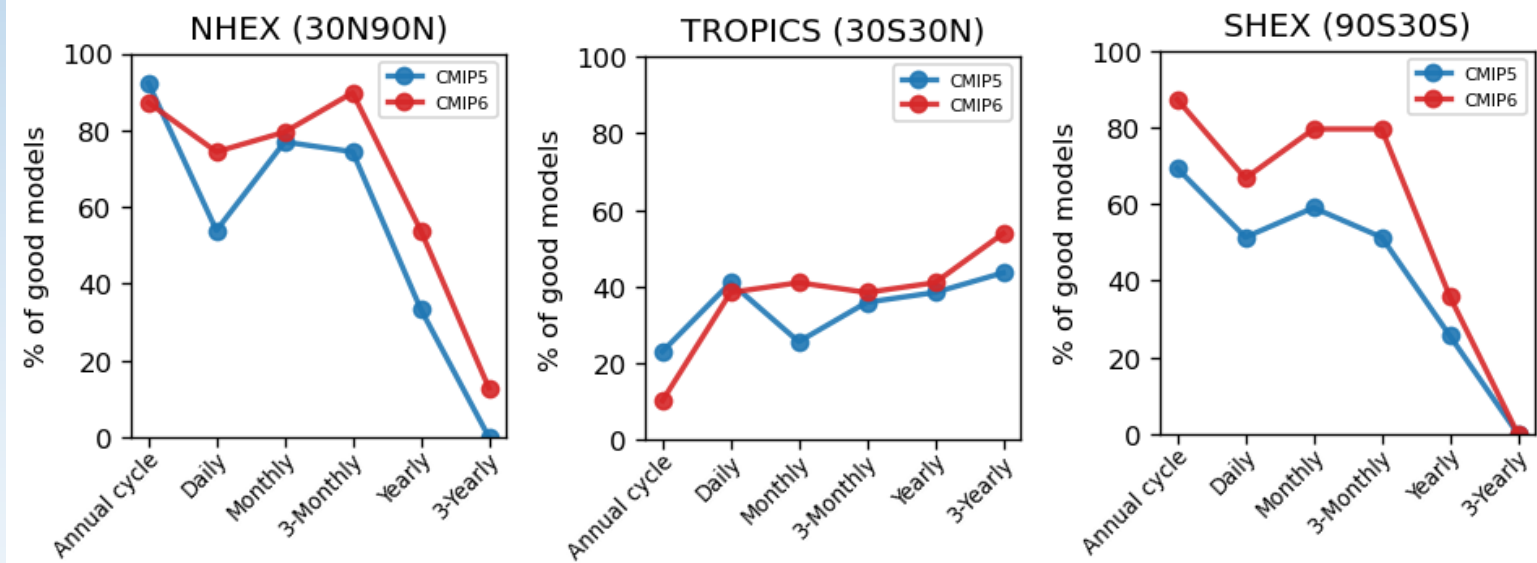
- Detailed results are being added to the PCMDI's online simulation summaries

- Benchmarking simulated precipitation overview: Thu 14:30 pm

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