

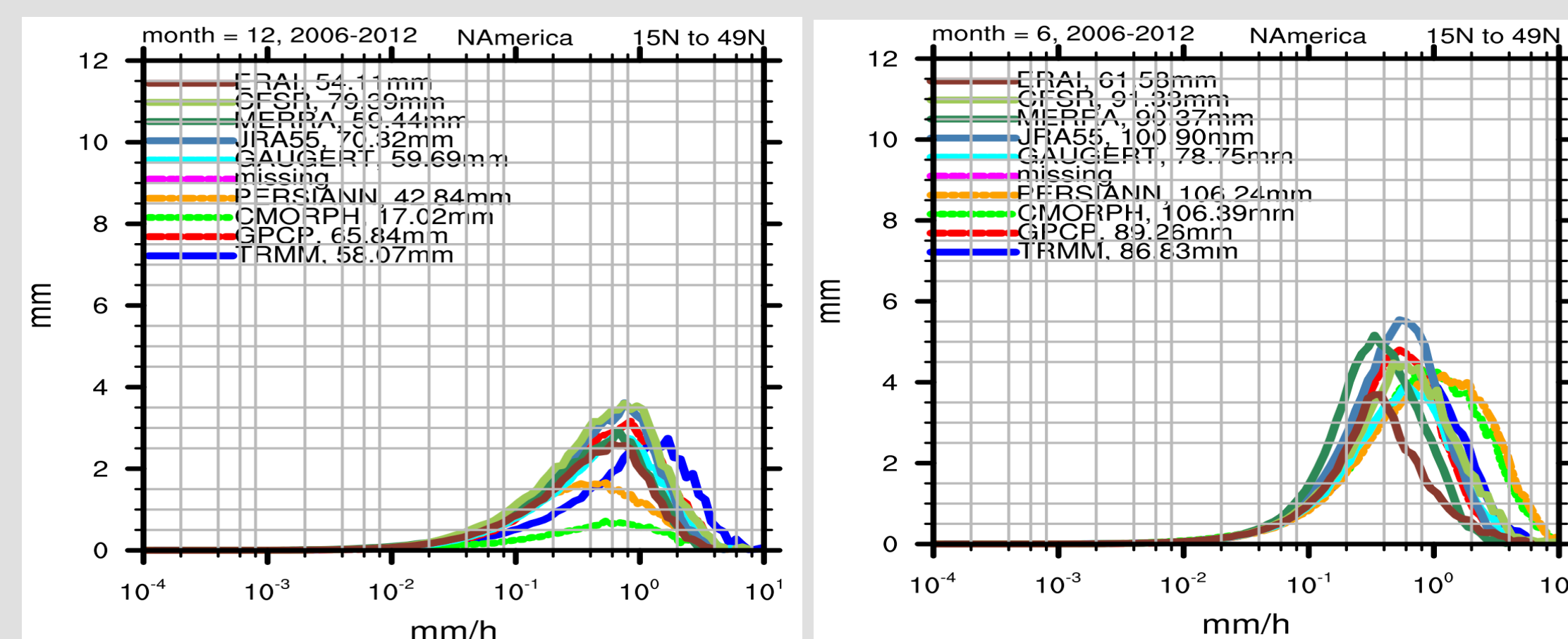
Comparison of Global Precipitation Estimates across a Range of Temporal and Spatial Scales

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Gridded Precipitation Estimates

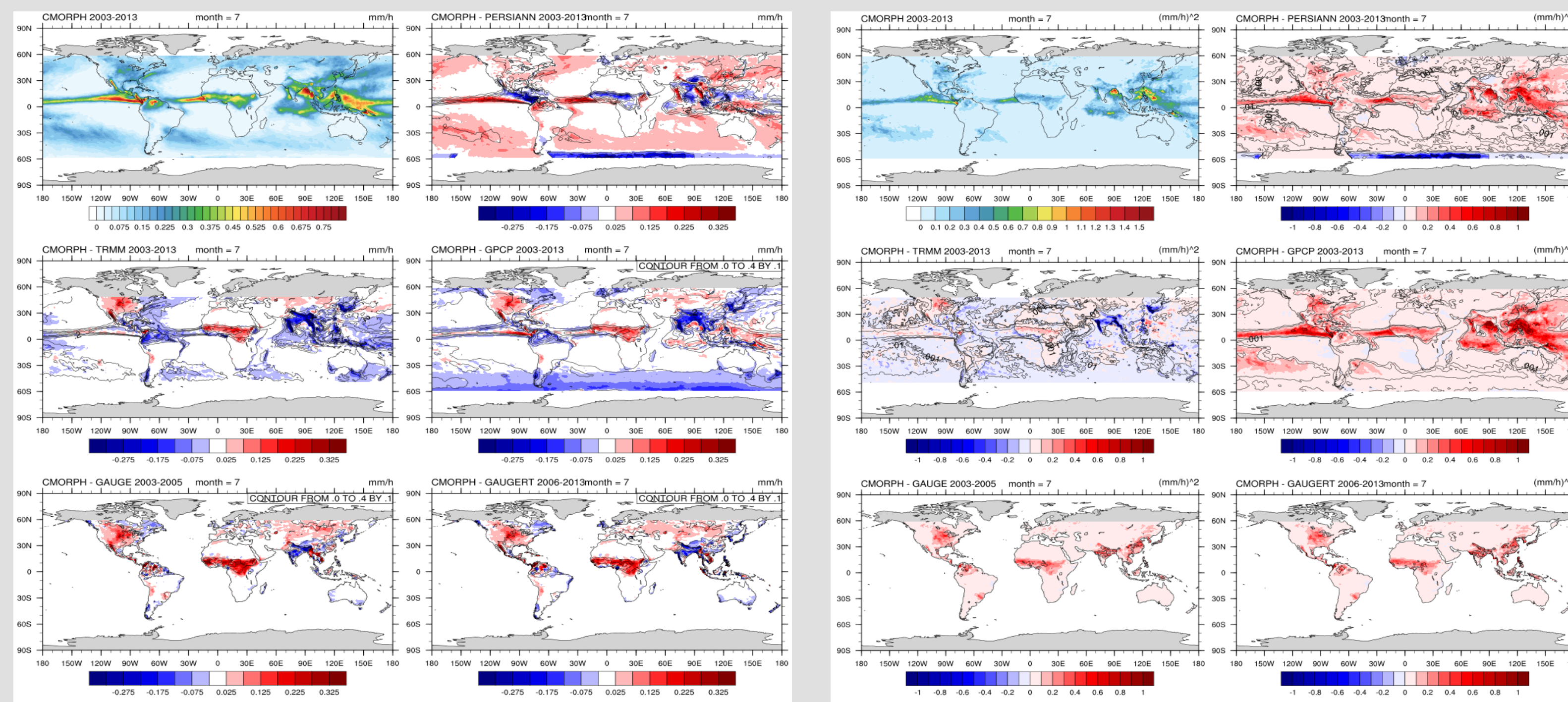
Estimates of global precipitation are becoming more and more necessary. At PSD in particular they are essential for applications such as model validation, input for land surface models, or extreme event characterization.

However, precipitation estimates differ widely in their applications, totals and range of rain rates.

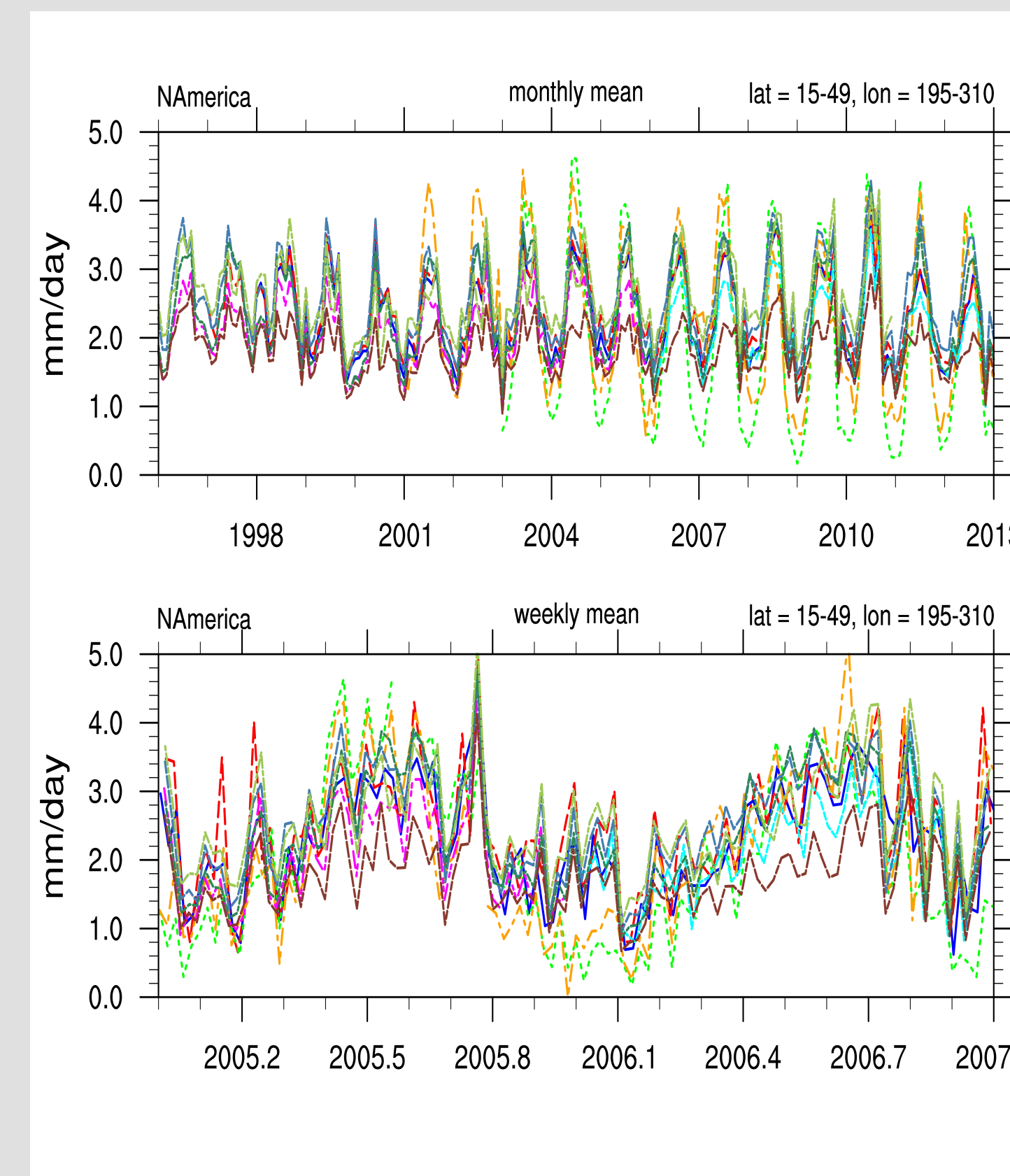


Mean Precipitation and Variance

Spatial patterns of means and variances are consistent among data sets; amounts are not.



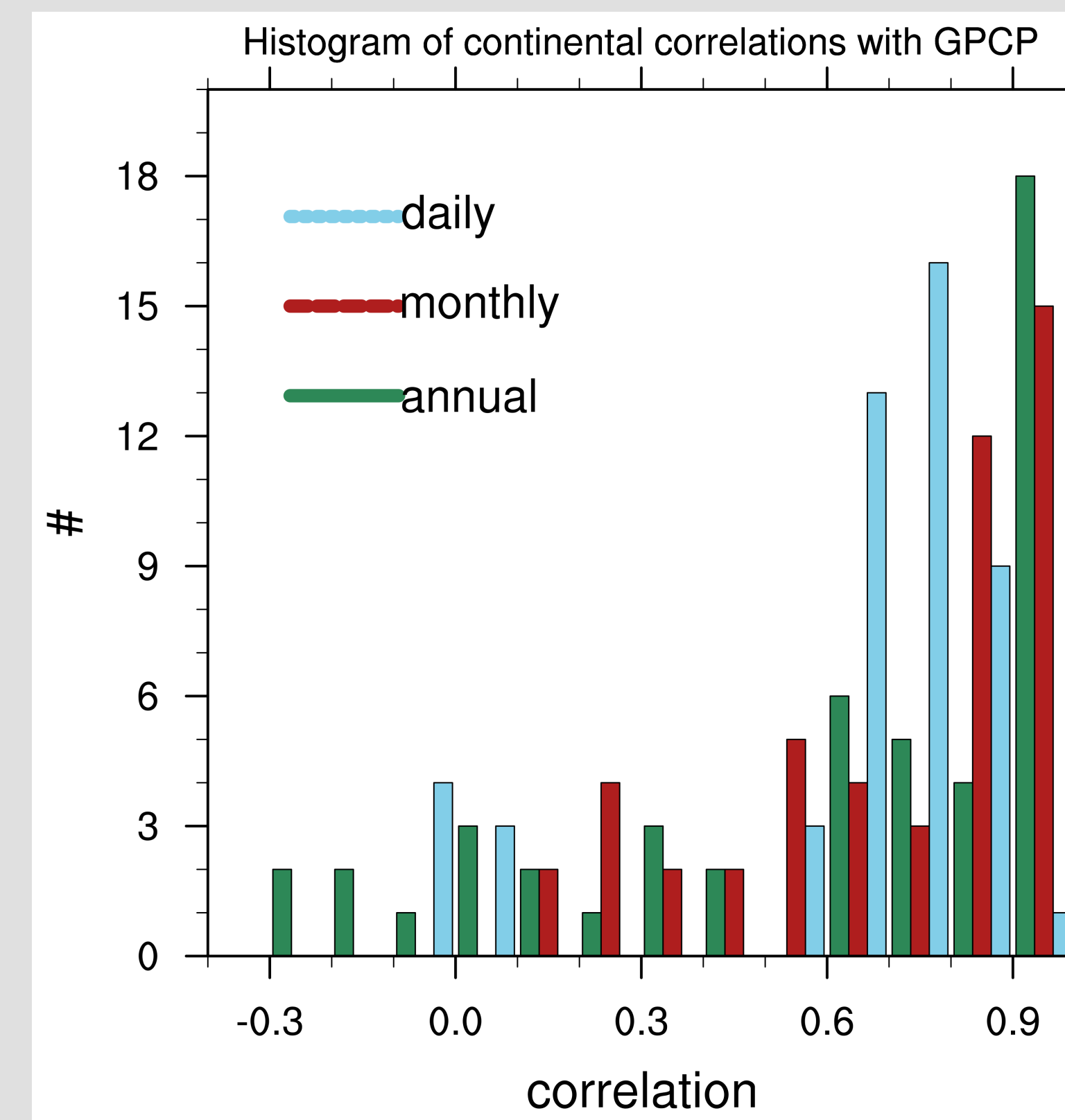
How much does (did) it rain?



- Temporal variability differs widely even on annual mean time scales.
- On weekly time scales it is not uncommon to have differences of up to 2mm/day.
- Interannual variability is captured consistently by most data sets, but not all.

Correlation with GPCP

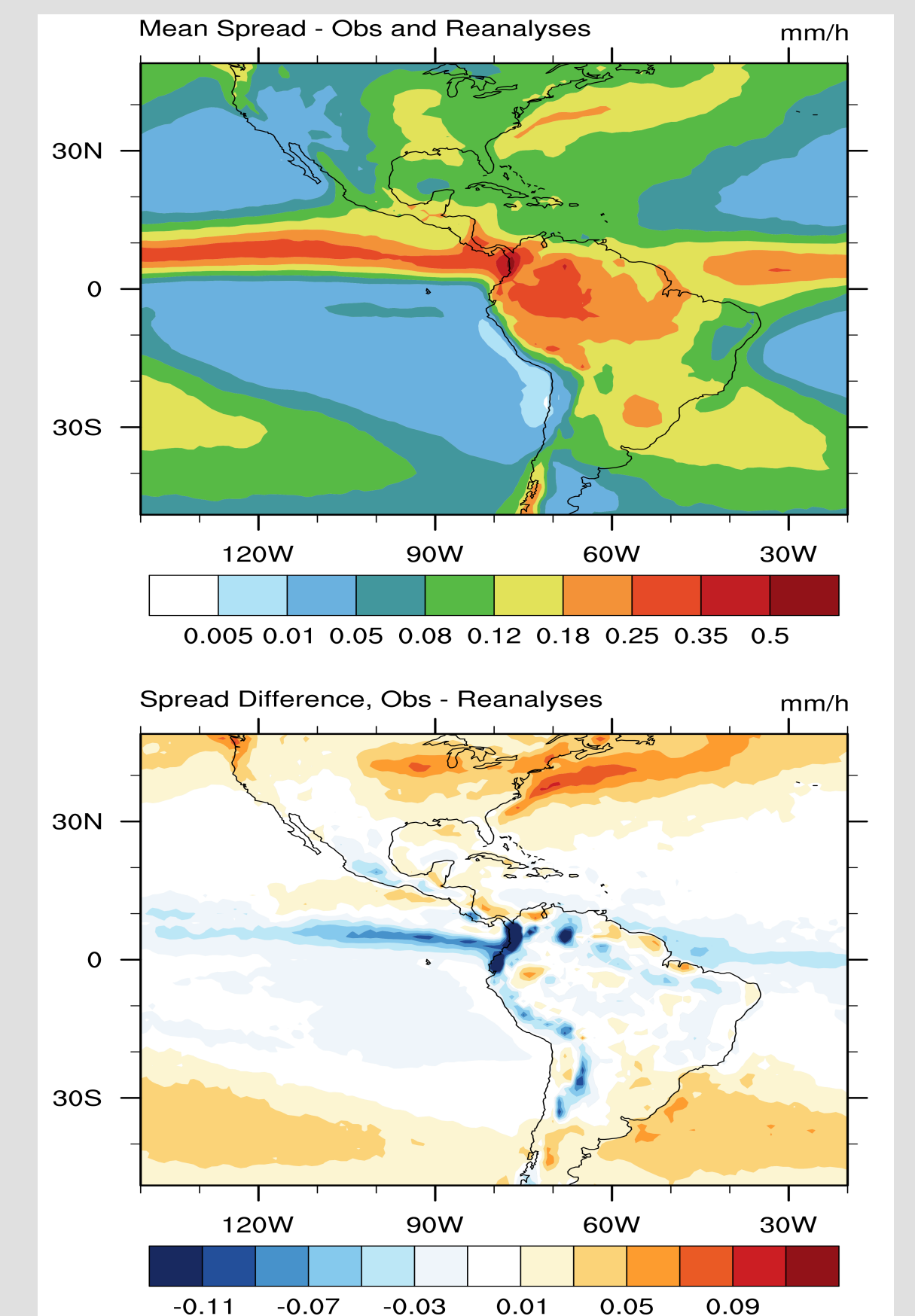
Annual means are highly correlated for some regions/data sets, but distribution has a **long tail**. Monthly means are **highly correlated** with fewer outliers. Daily means show **lower correlations**. Annual cycle seems to be the driver of high correlations.



Spread among data sets

Defined as the average standard deviation among precipitation estimates.

- Spread among observations only is smaller than among reanalyses in the tropics.
- Spread among reanalyses only is smaller (too certain) in the midlatitudes.
- Combined spread among observations and reanalyses results in increased spread globally.



Conclusions and Future Research:

- Spread between data sets is large! (10mm/day in the tropics and 2mm/day in midlatitudes.)
- The precipitation estimates vary widely, even for global averages, highlighting the need for better constrained precipitation products in the future.
- There are systematic biases in some estimates that need to be taken into account.
- Current focus is on improving initial conditions for ensemble forecasts with the GEFS using the uncertainty represented by the spread among precipitation estimates.