

Cell Reports, Volume 42

Supplemental information

**Time-resolved correlation of distributed brain
activity tracks E-I balance and accounts for
diverse scale-free phenomena**

Aditya Nanda, Graham W. Johnson, Yu Mu, Misha B. Ahrens, Catie Chang, Dario J. Englot, Michael Breakspear, and Mikail Rubinov

Supplementary Figures

Supplementary Figures 1-4. Properties of time-resolved measures.

These figures show histograms of time-resolved mean, variance, and correlation, pooled across all recordings in each modality. They also show scatter plots and Spearman correlation coefficients between these quantities, for a representative recording in each modality.

Supplementary Figures 5-8. Extension of Figure 5.

For completeness, these figures show results on dynamical stability for all models across all four macaque electroencephalography recordings.

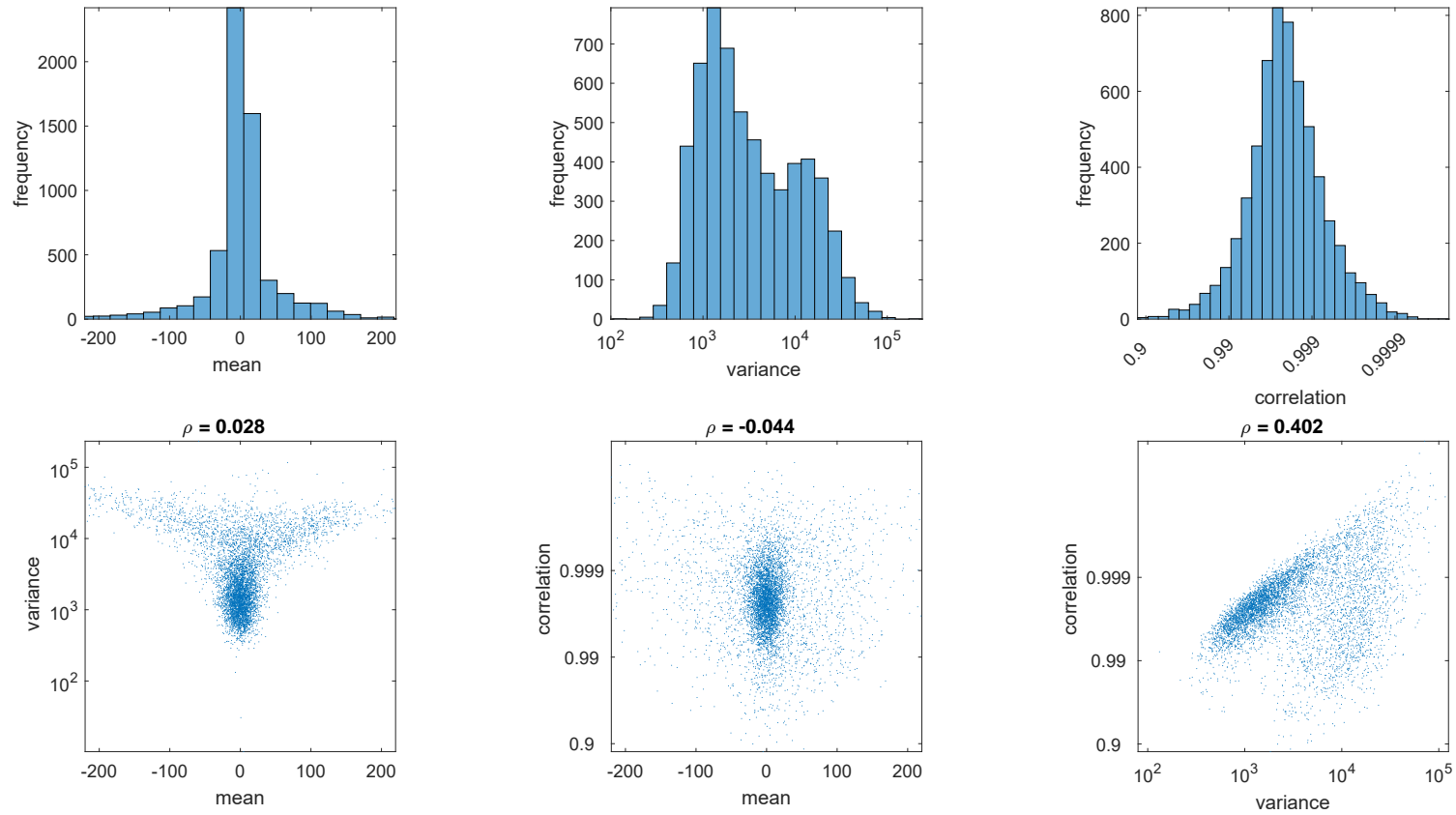
Supplementary Figures 9-20. Extension of Figure 6.

For completeness, these figures show results on $1/f$ spectra and long-range temporal correlations for all models across all intracranial EEG recordings, with five randomly chosen channels in each recording.

Supplementary Figures 21-33. Extension of Figures 7-8.

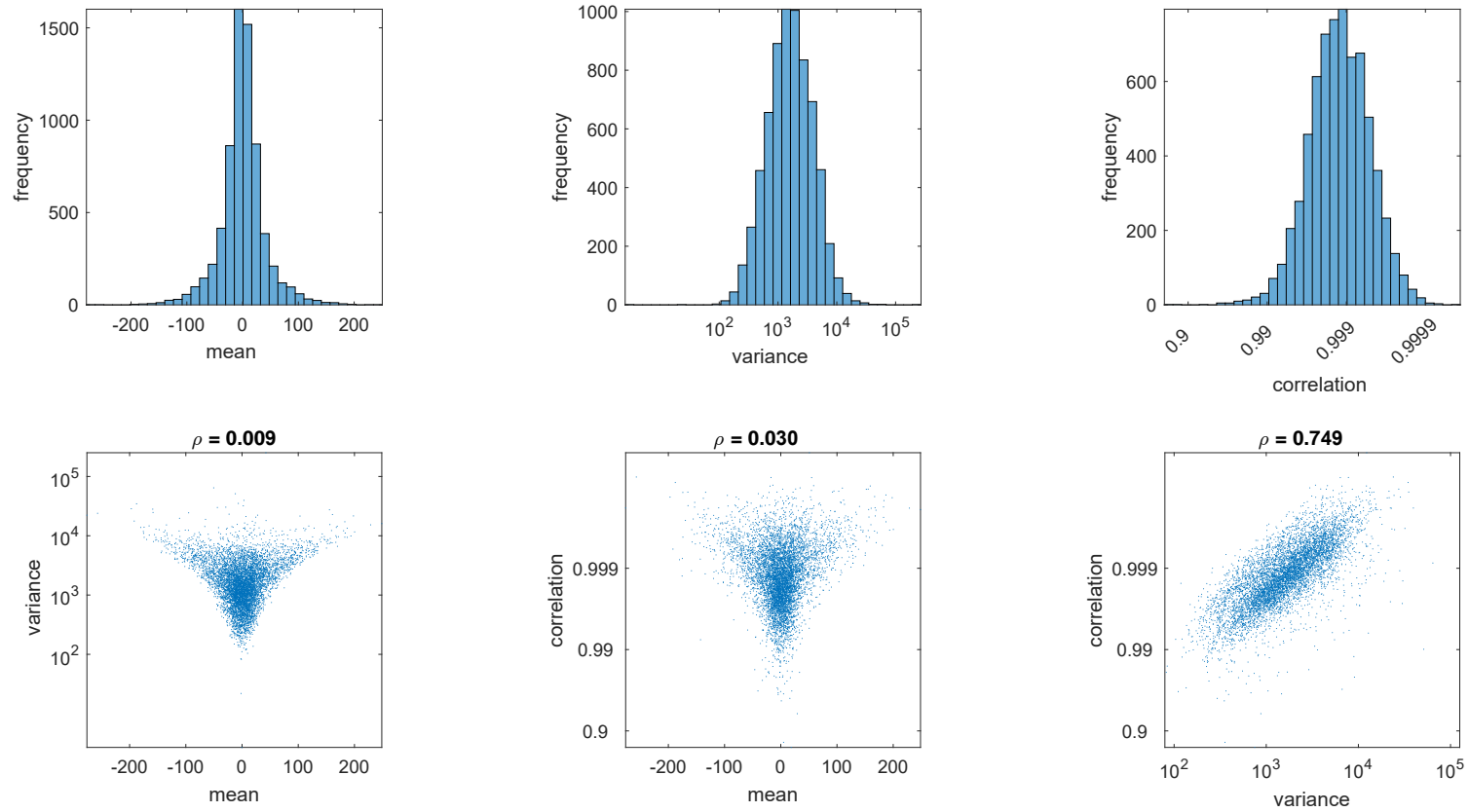
For completeness, these figures show results on avalanche statistics (avalanche sizes, durations, size-duration scaling, and shape collapse) for all models across all recordings.

Properties of time-resolved measures in human stereotactic EEG



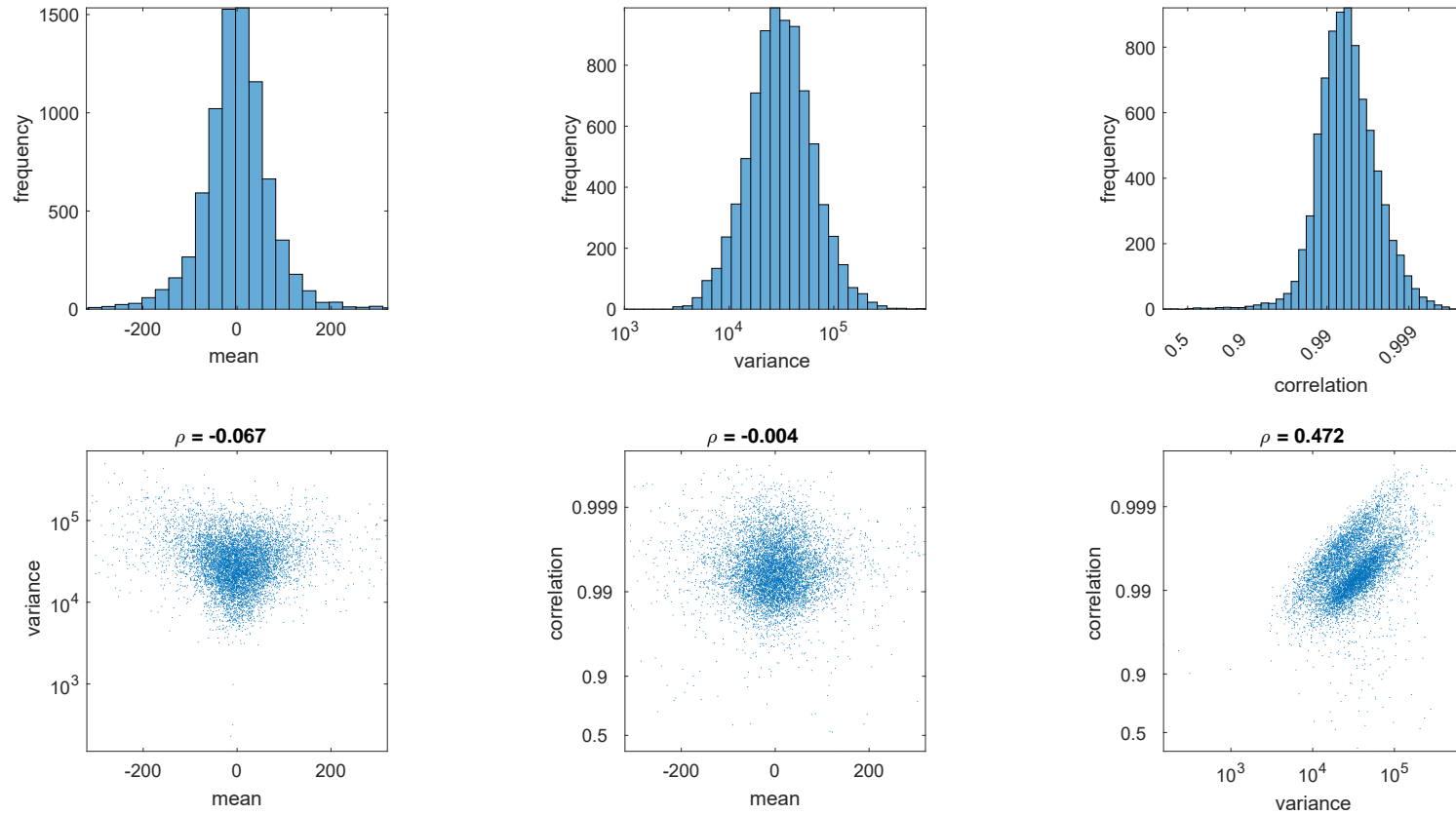
Supplementary Figure 1: Histograms and scatter plots of time-resolved mean, variance, and correlation. ρ denotes Spearman correlation coefficient.

Properties of time-resolved measures in human intracranial EEG



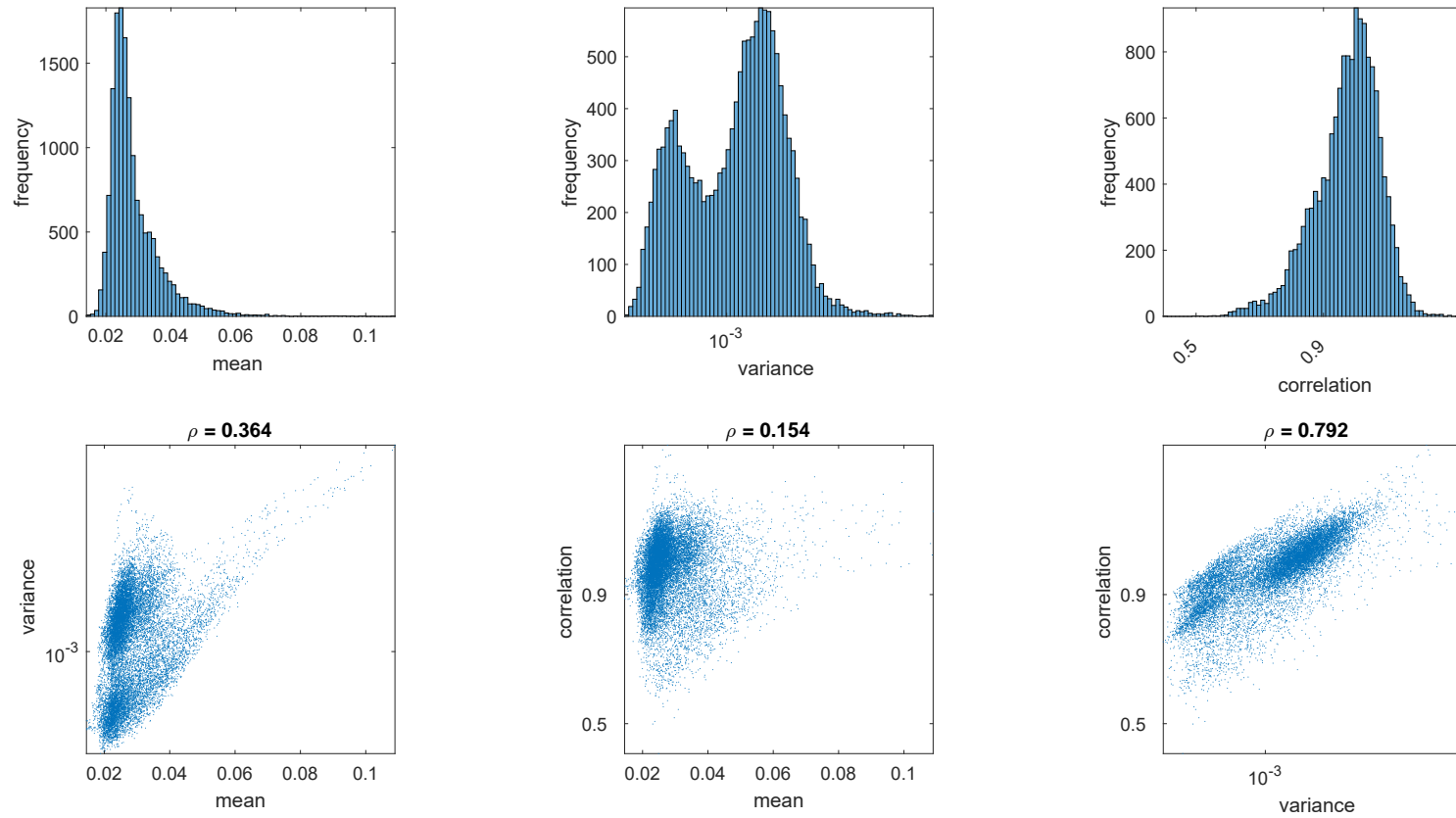
Supplementary Figure 2: Histograms and scatter plots of time-resolved mean, variance, and correlation. ρ denotes Spearman correlation coefficient.

Properties of time-resolved measures in macaque electrocortigraphy



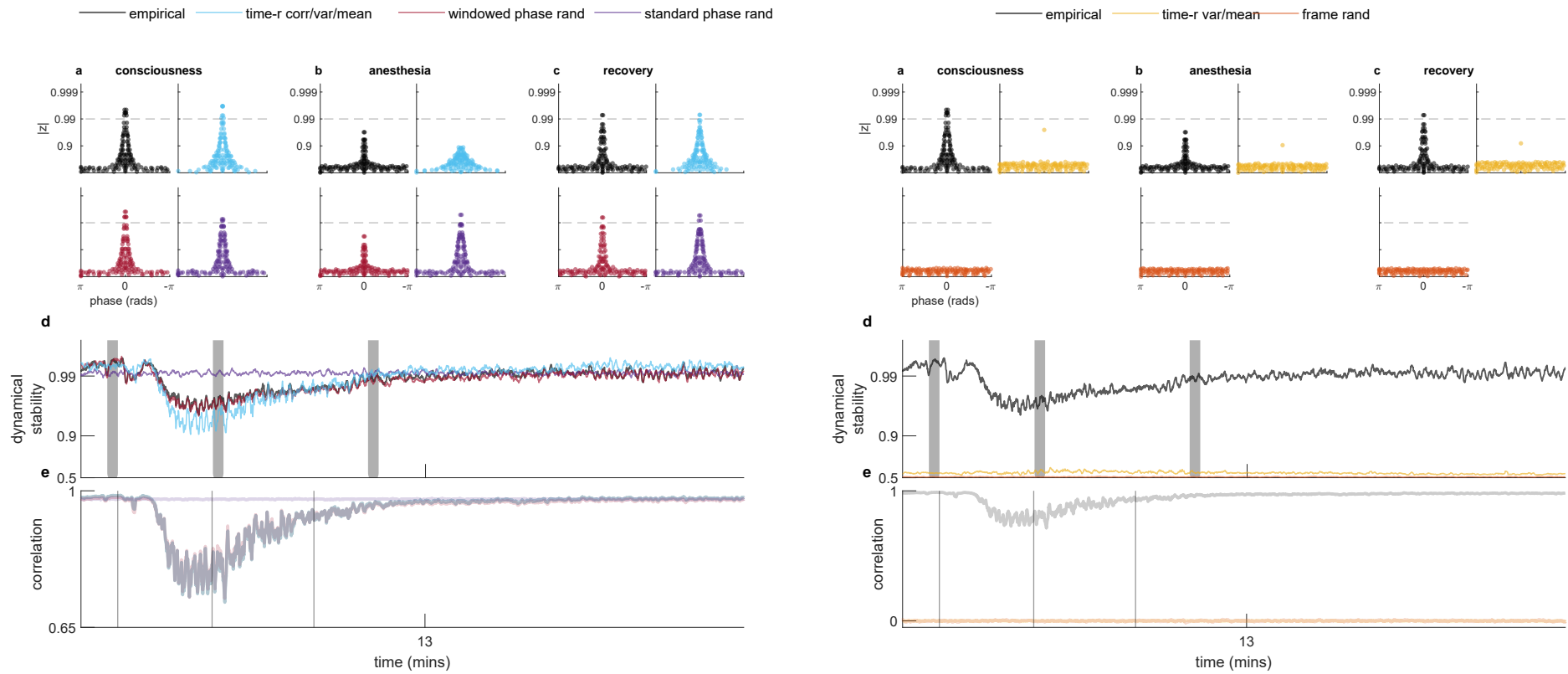
Supplementary Figure 3: Histograms and scatter plots of time-resolved mean, variance, and correlation. ρ denotes Spearman correlation coefficient.

Properties of time-resolved measures in zebrafish calcium imaging



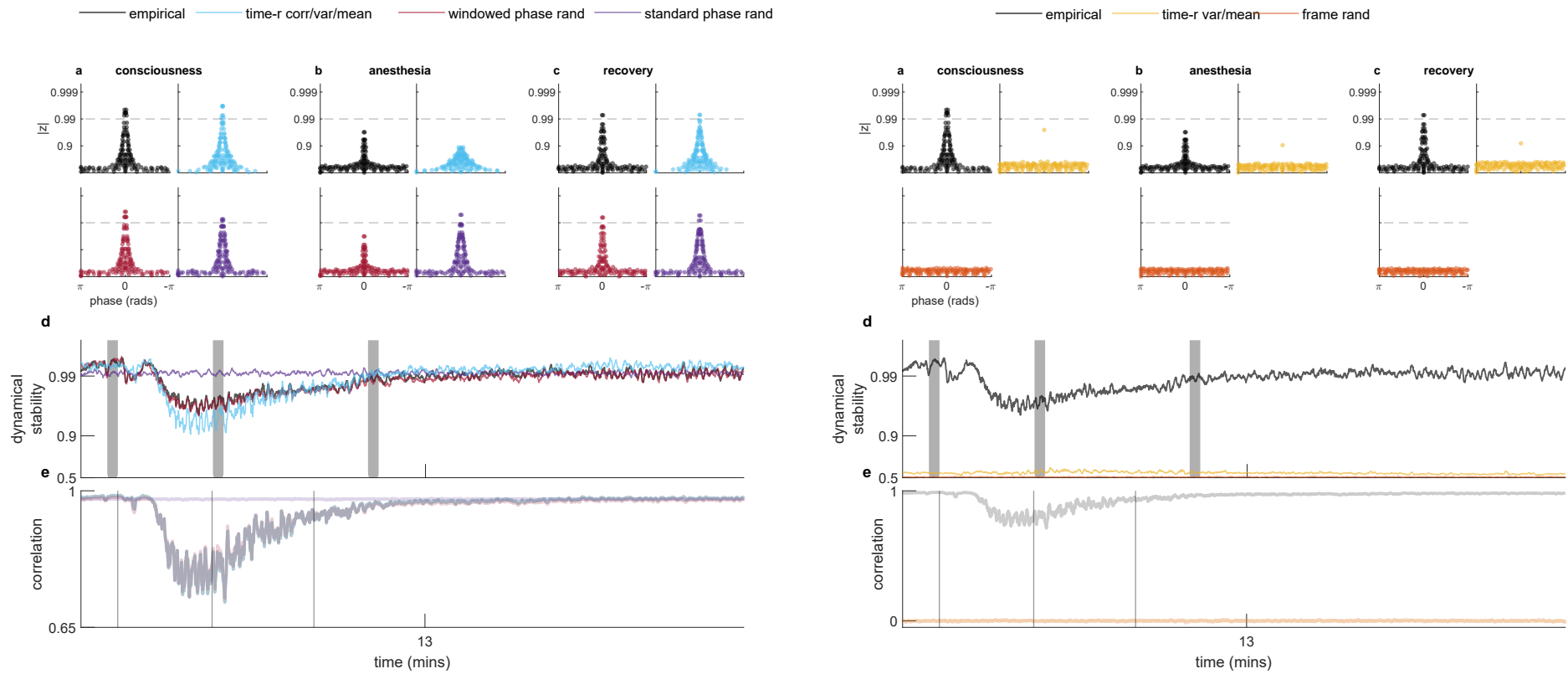
Supplementary Figure 4: Histograms and scatter plots of time-resolved mean, variance, and correlation. ρ denotes Spearman correlation coefficient.

Weakly stable dynamics — macaque 1/session 1



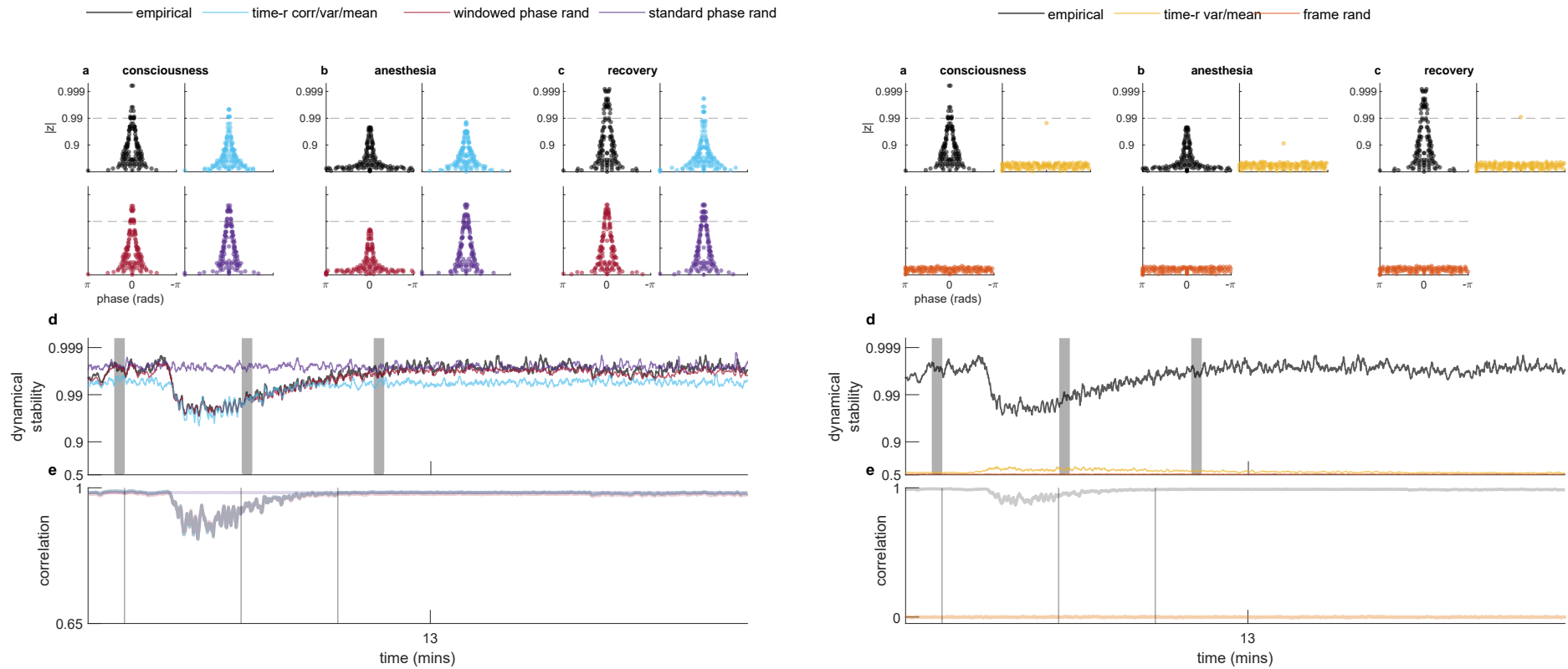
Supplementary Figure 5: See Figure 5 caption for details.

Weakly stable dynamics — macaque 1/session 2



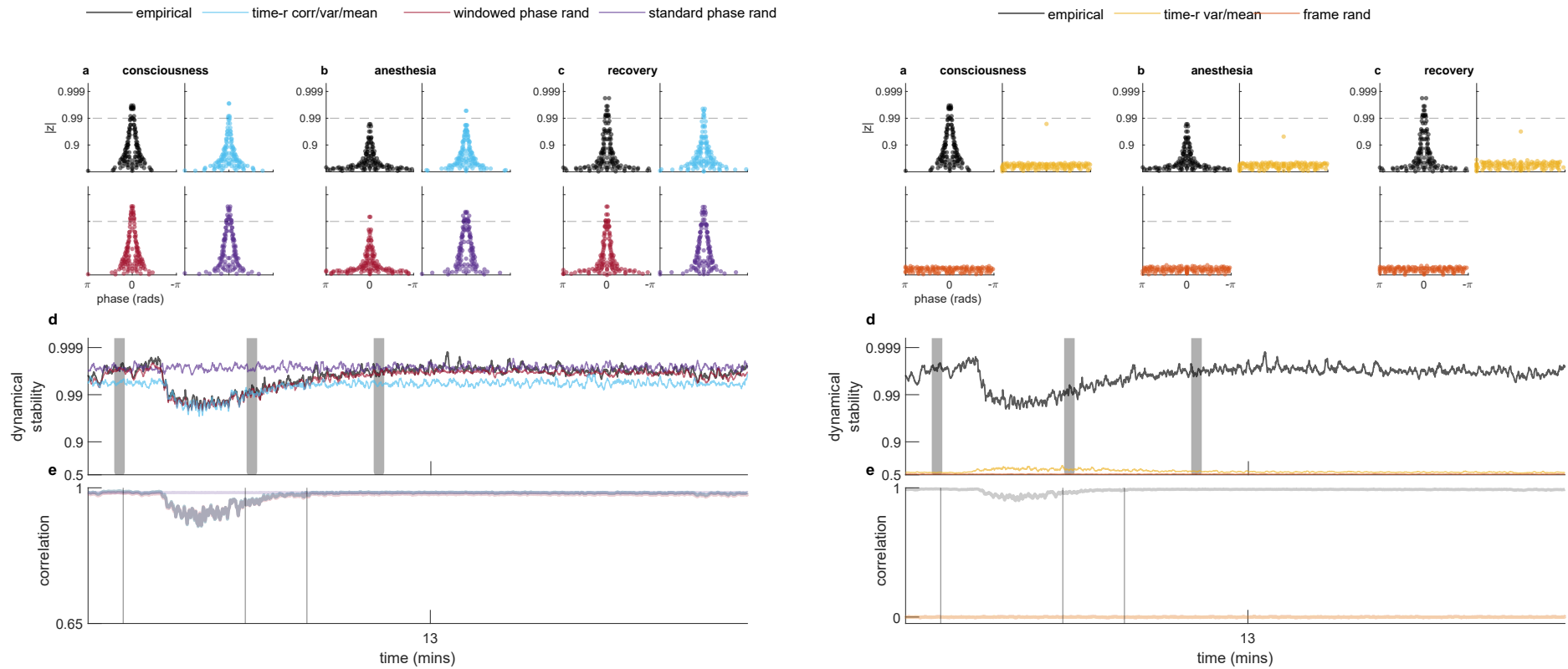
Supplementary Figure 6: See Figure 5 caption for details.

Weakly stable dynamics — macaque 2/session 1



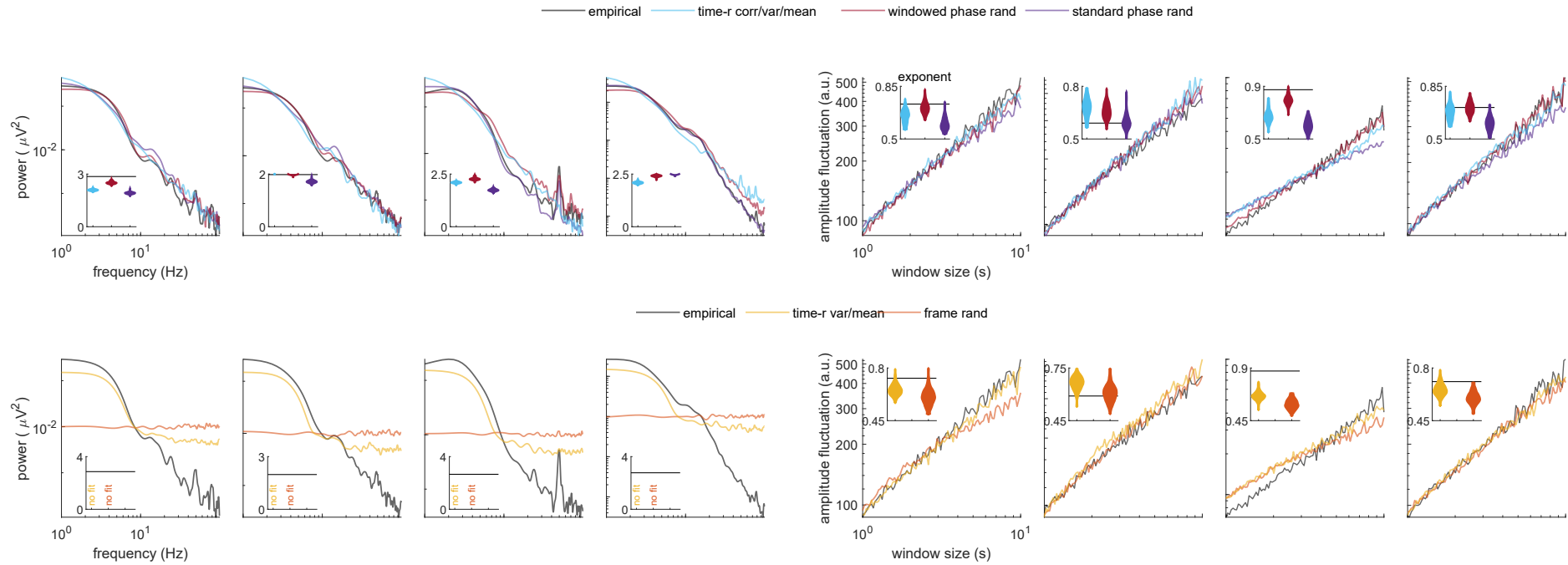
Supplementary Figure 7: See Figure 5 caption for details.

Weakly stable dynamics— macaque 2/session 2



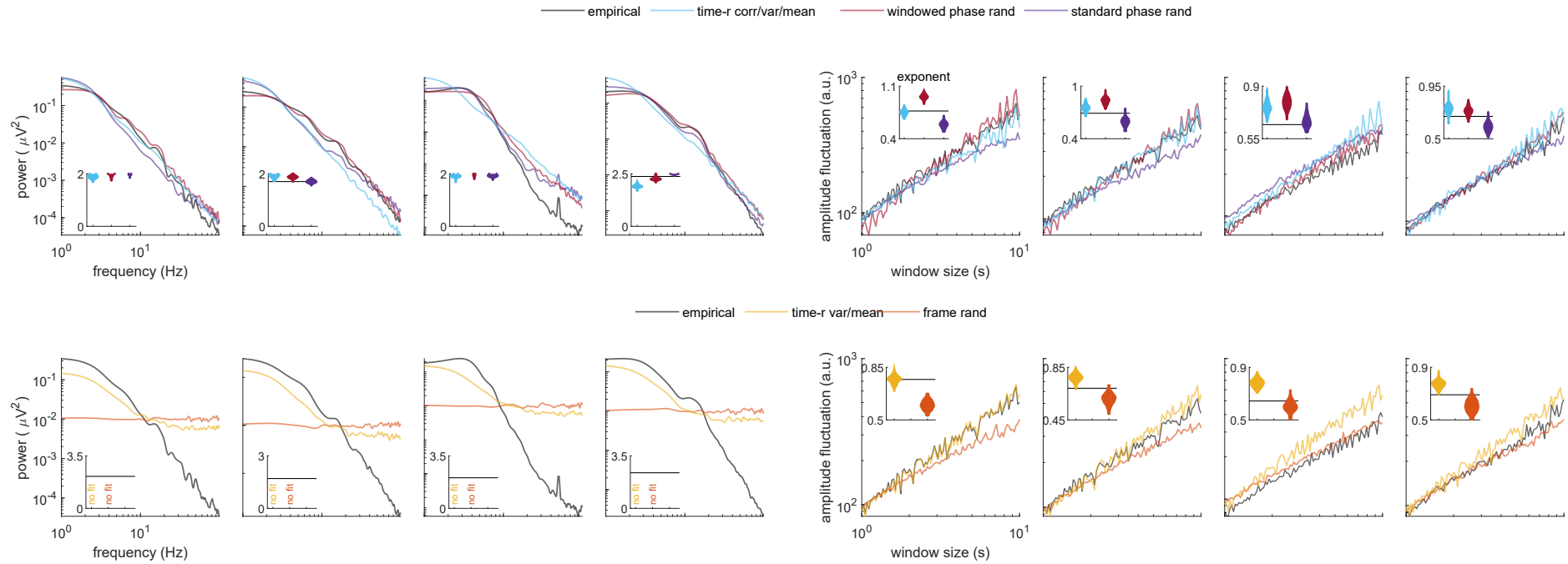
Supplementary Figure 8: See Figure 5 caption for details.

Scale-free statistics — macaque 1/session 1



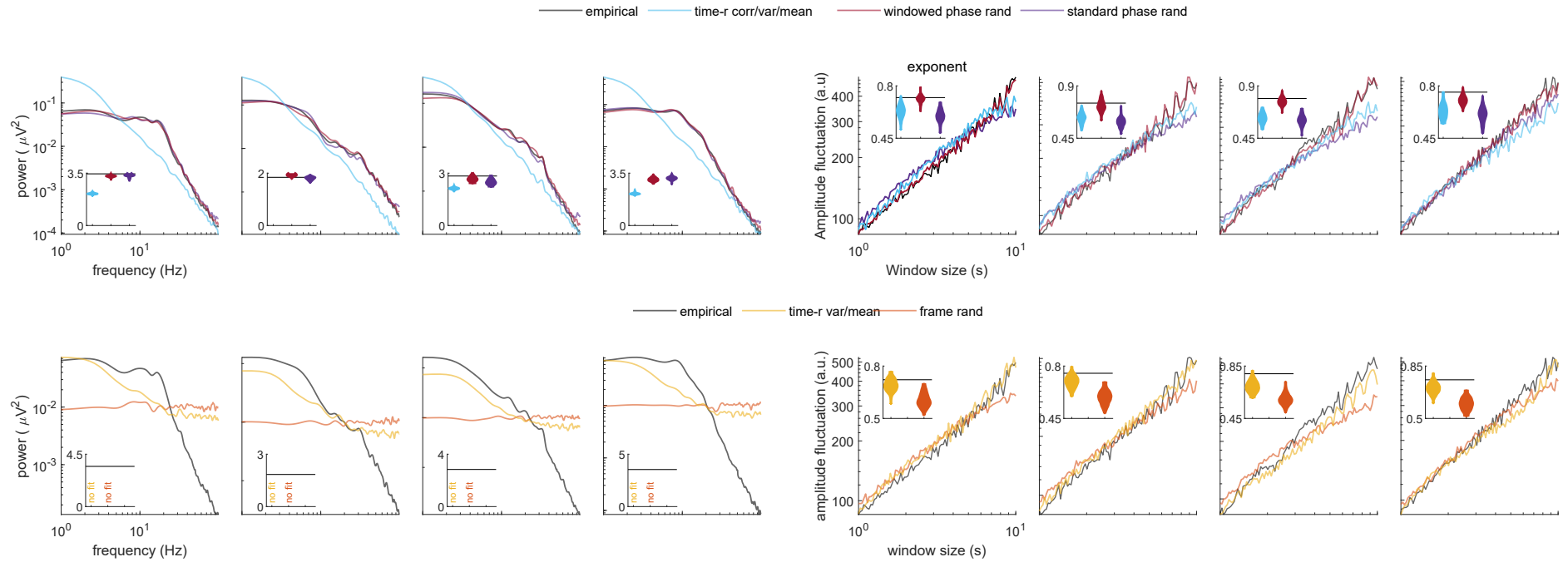
Supplementary Figure 9: See Figure 6 caption for details.

Scale-free statistics — macaque 1/session 2



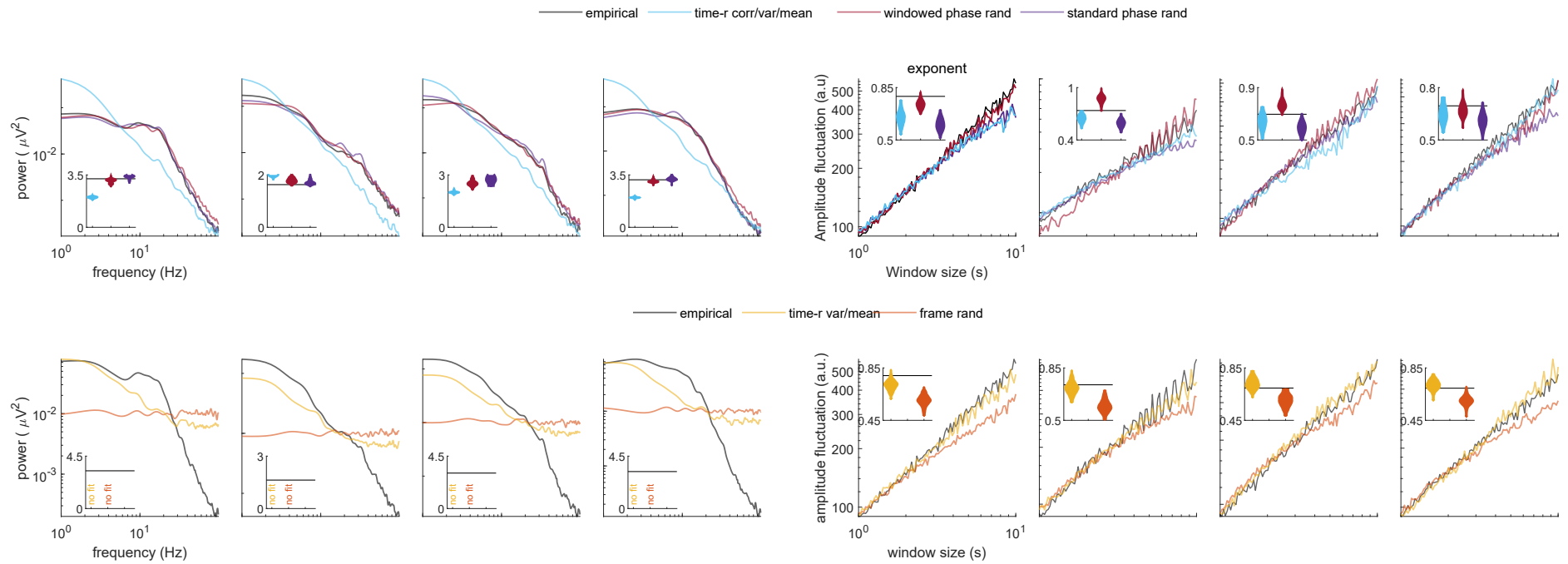
Supplementary Figure 10: See Figure 6 caption for details.

Scale-free statistics — macaque 2/session 1



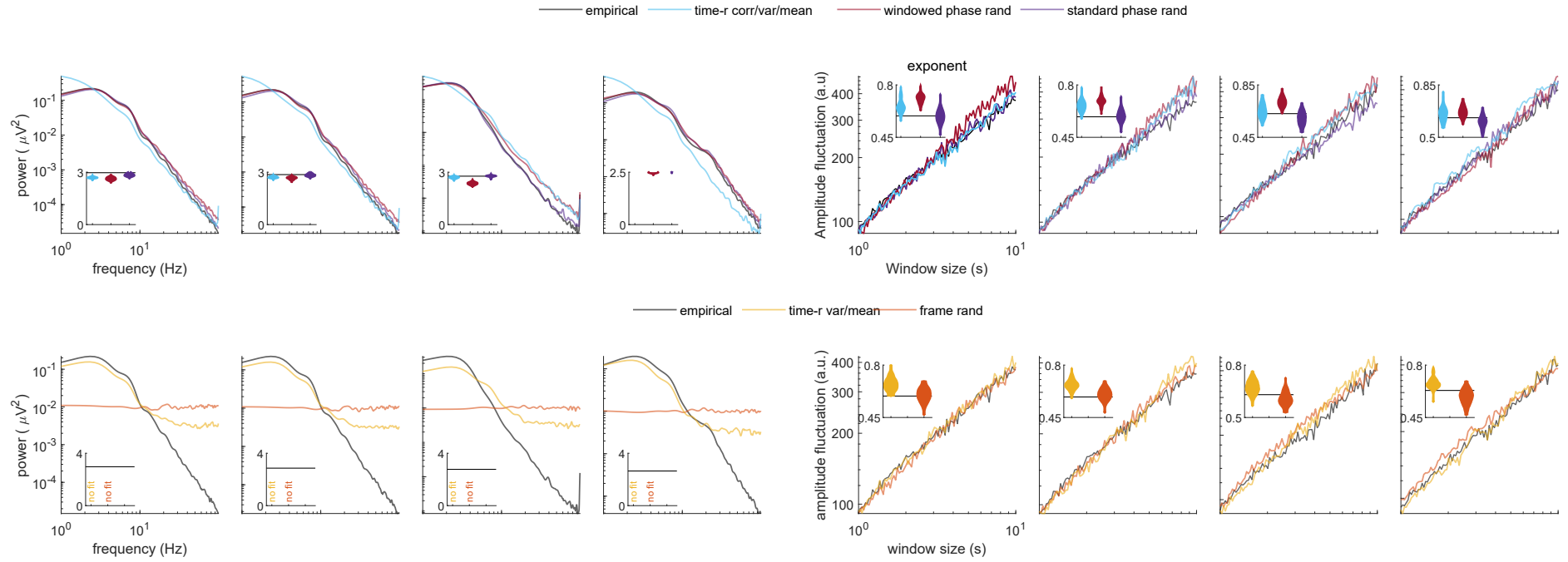
Supplementary Figure 11: See Figure 6 caption for details.

Scale-free statistics — macaque 2/session 2



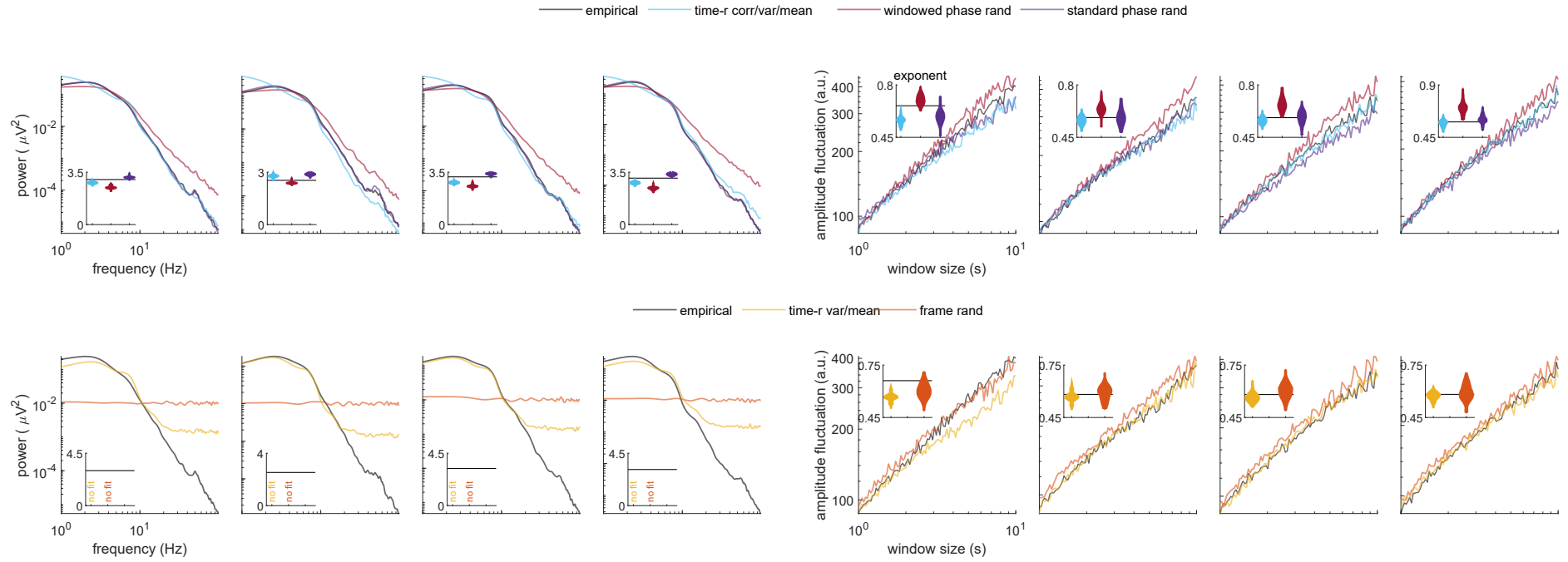
Supplementary Figure 12: See Figure 6 caption for details.

Scale-free statistics — human intracranial EEG dataset 1



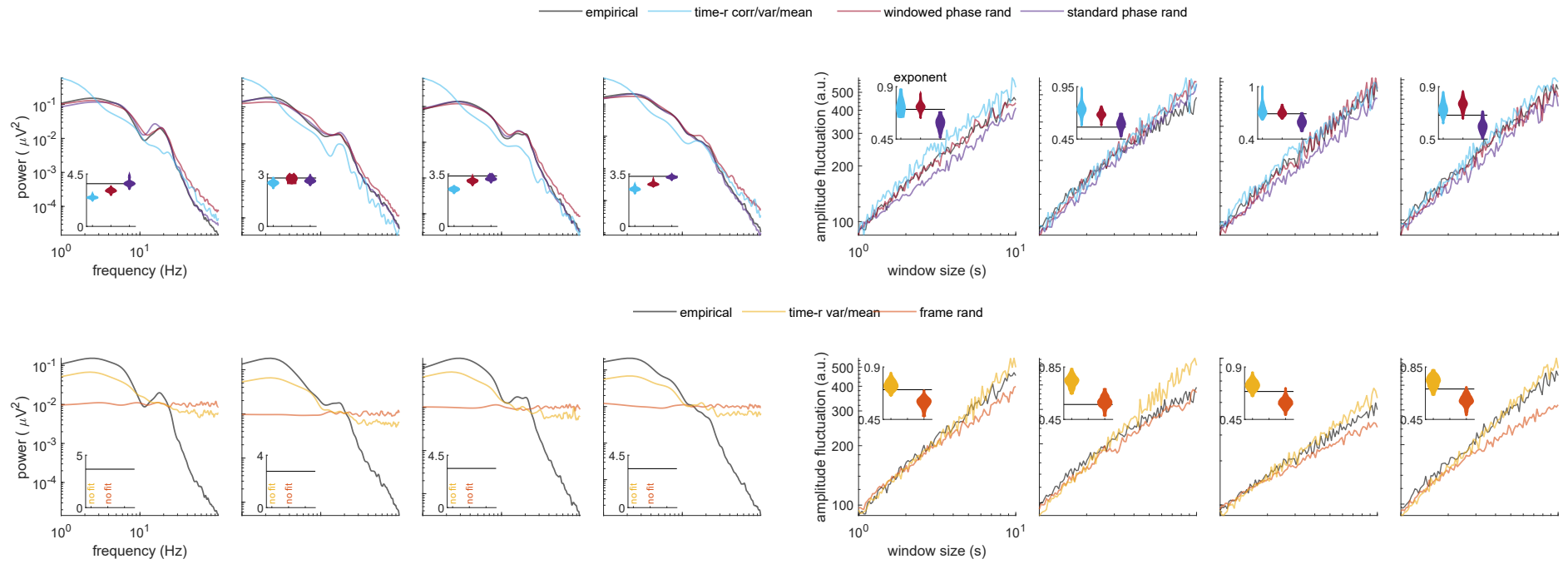
Supplementary Figure 13: See Figure 6 caption for details.

Scale-free statistics — human intracranial EEG dataset 2



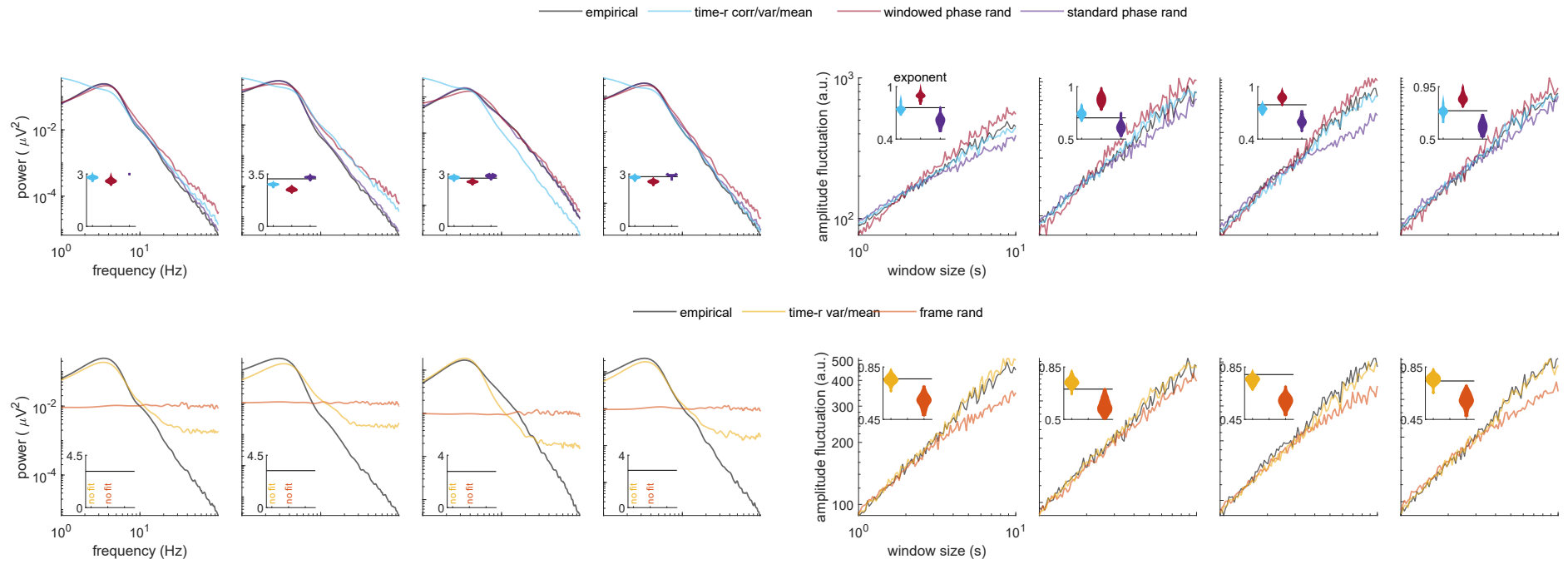
Supplementary Figure 14: See Figure 6 caption for details.

Scale-free statistics — human intracranial EEG dataset 3



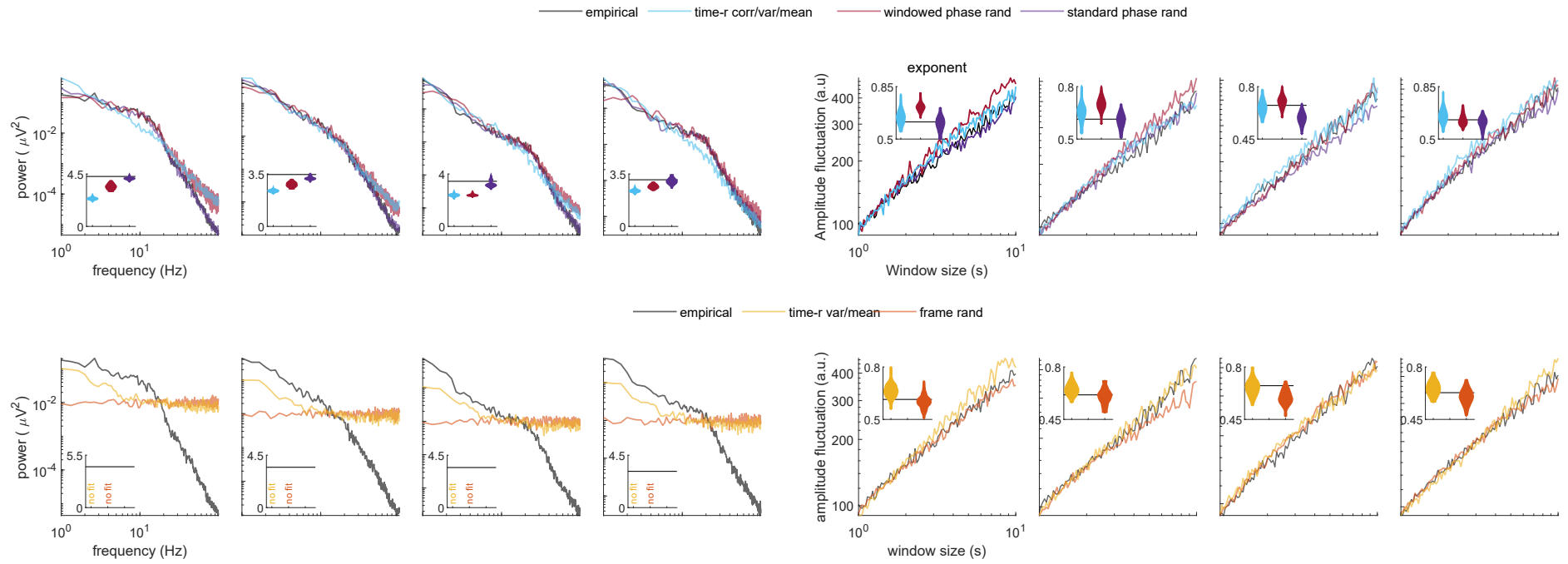
Supplementary Figure 15: See Figure 6 caption for details.

Scale-free statistics — human intracranial EEG dataset 4



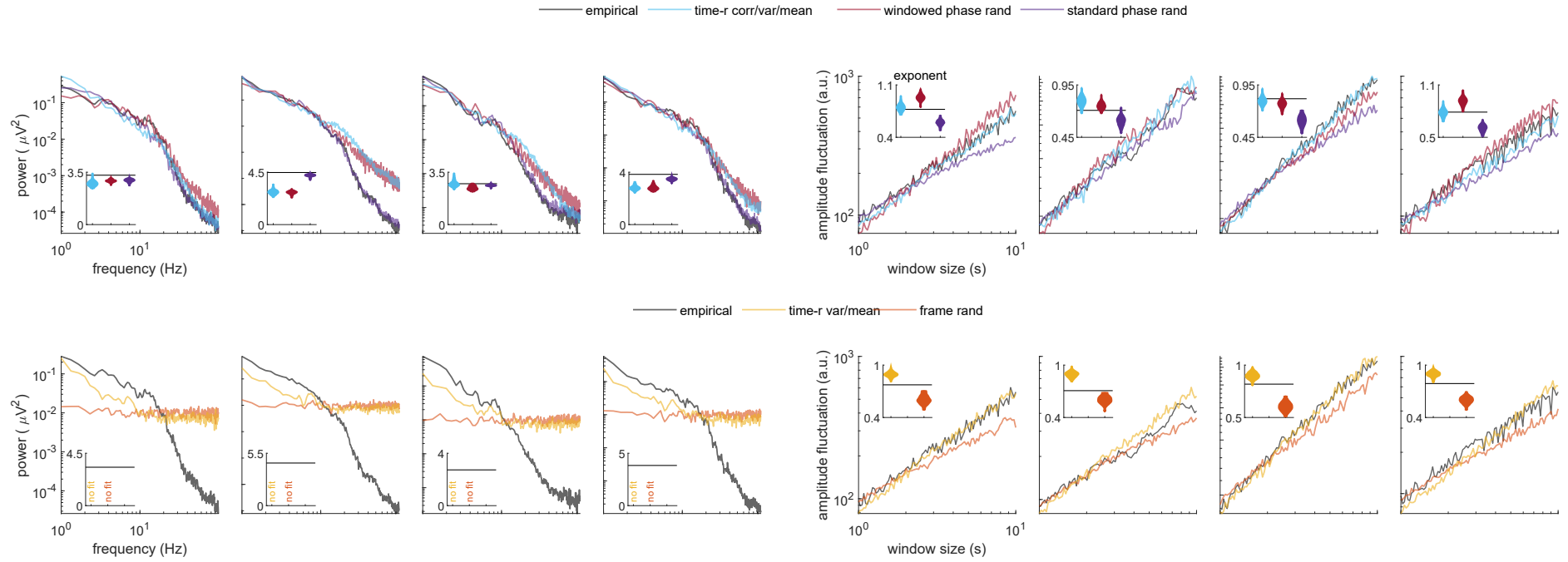
Supplementary Figure 16: See Figure 6 caption for details.

Scale-free statistics — human stereotactic EEG dataset 1



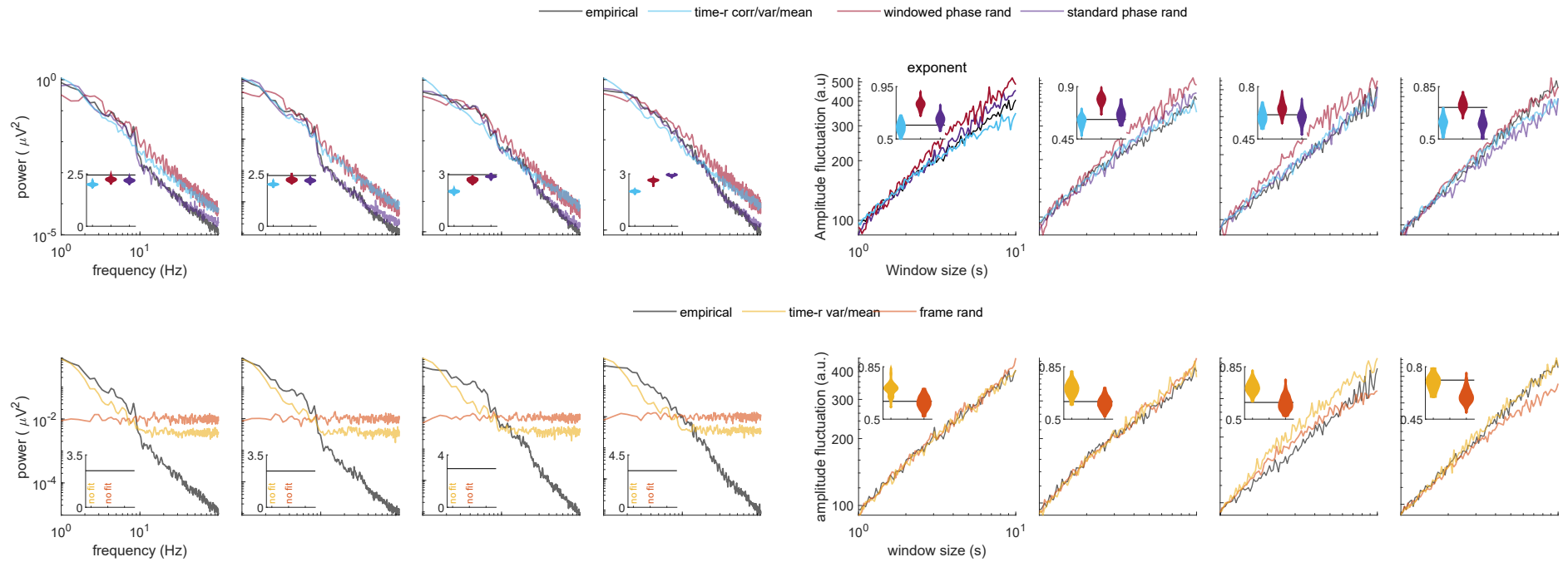
Supplementary Figure 17: See Figure 6 caption for details.

Scale-free statistics — human stereotactic EEG dataset 2



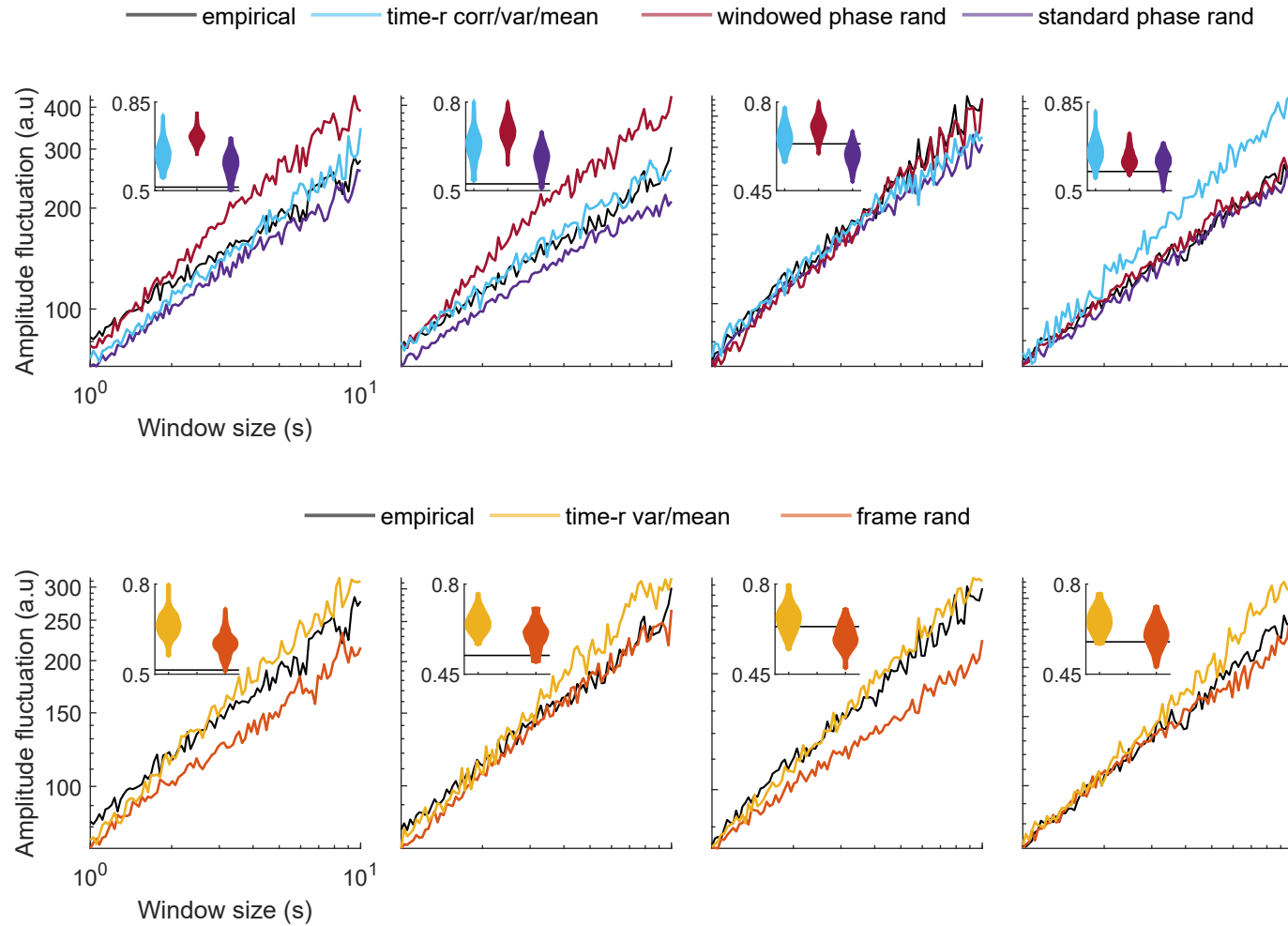
Supplementary Figure 18: See Figure 6 caption for details.

Scale-free statistics — human stereotactic EEG dataset 3



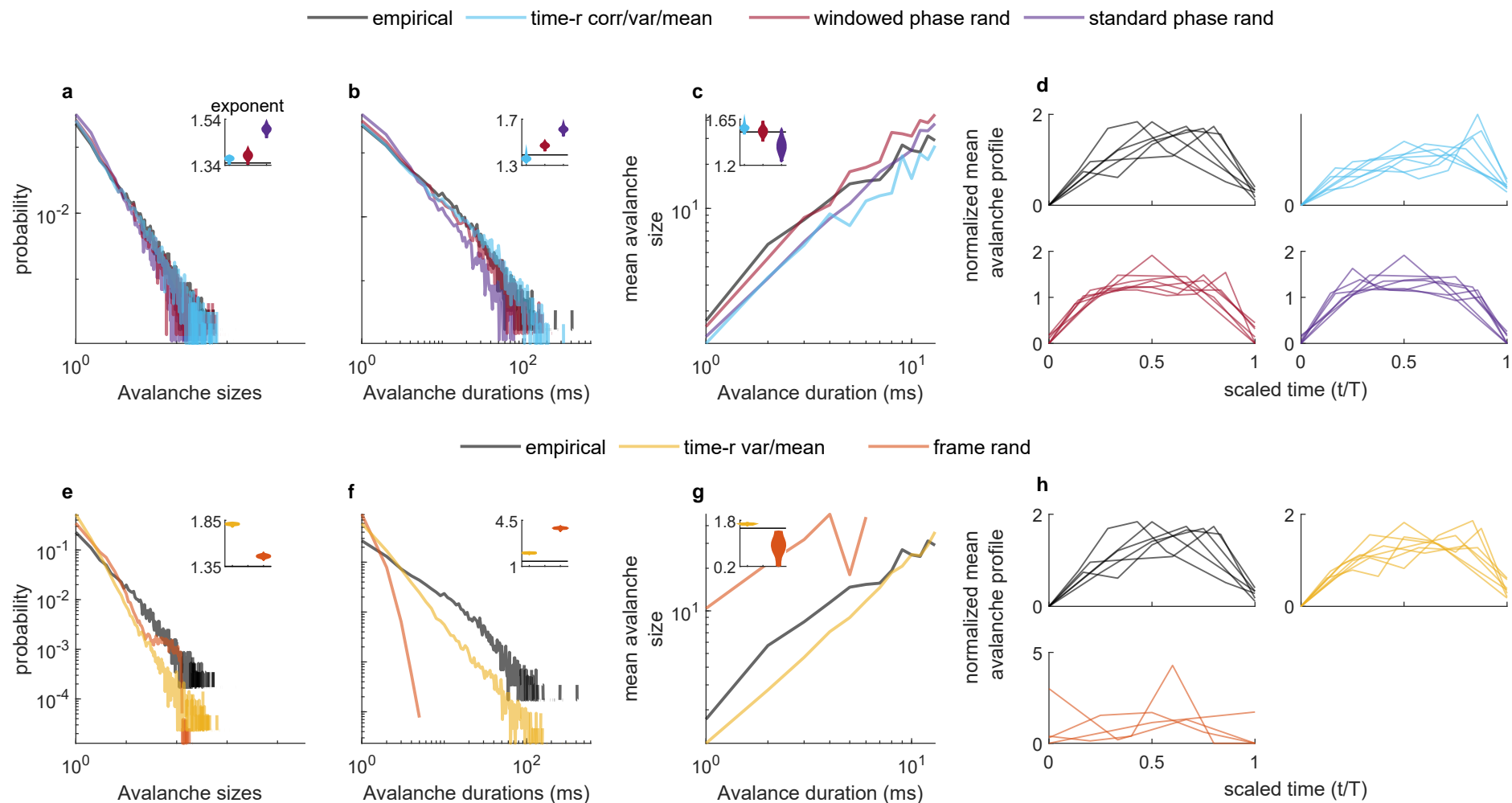
Supplementary Figure 19: See Figure 6 caption for details.

Long-range temporal correlations (beta band) — human stereotactic EEG dataset 1



Supplementary Figure 20: Long-range temporal correlations in the beta band for one representative dataset. See Figure 6 caption for details.

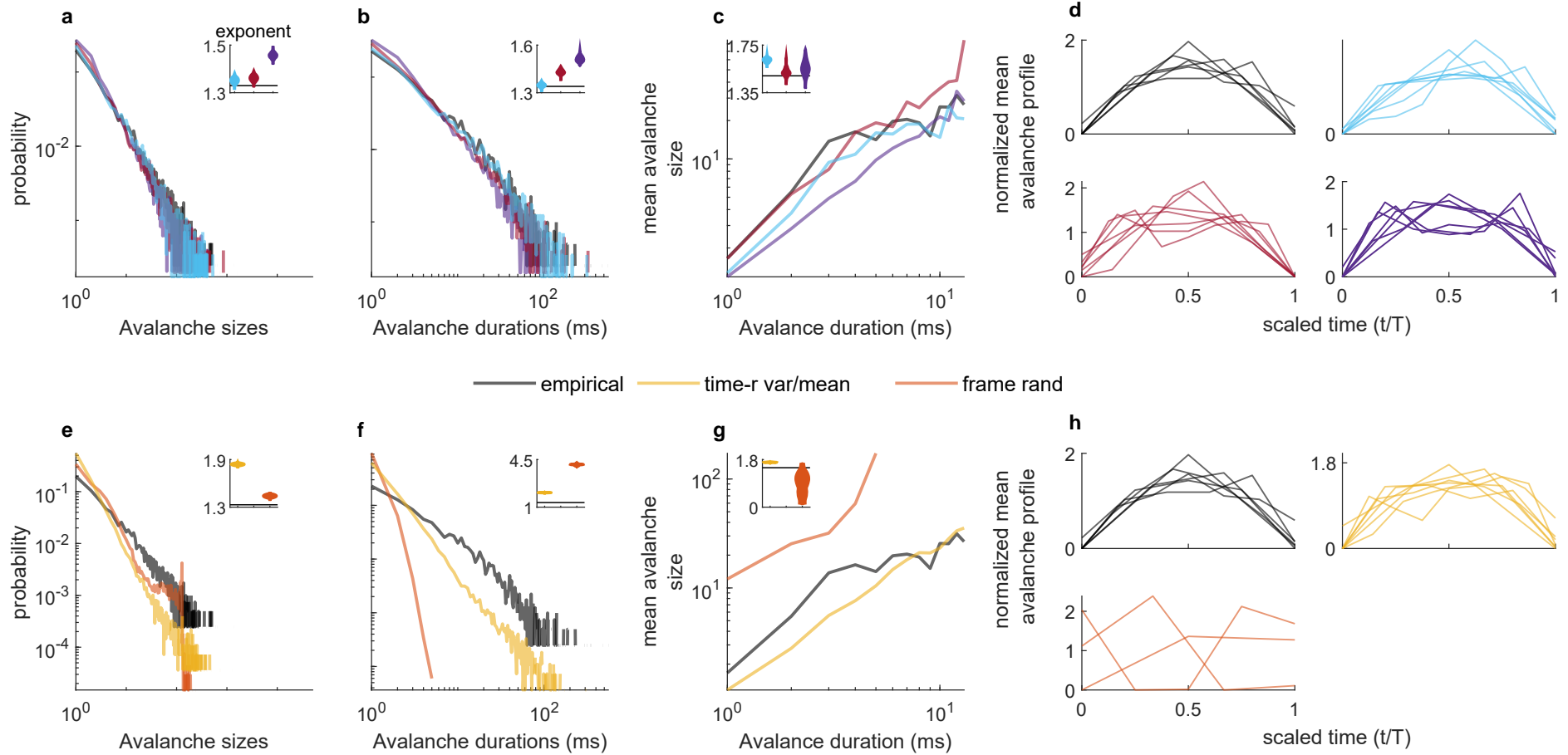
Avalanche statistics — macaque 1/session 1



Supplementary Figure 21: See Figures 7-8 caption for details.

Avalanche statistics — macaque 1/session 2

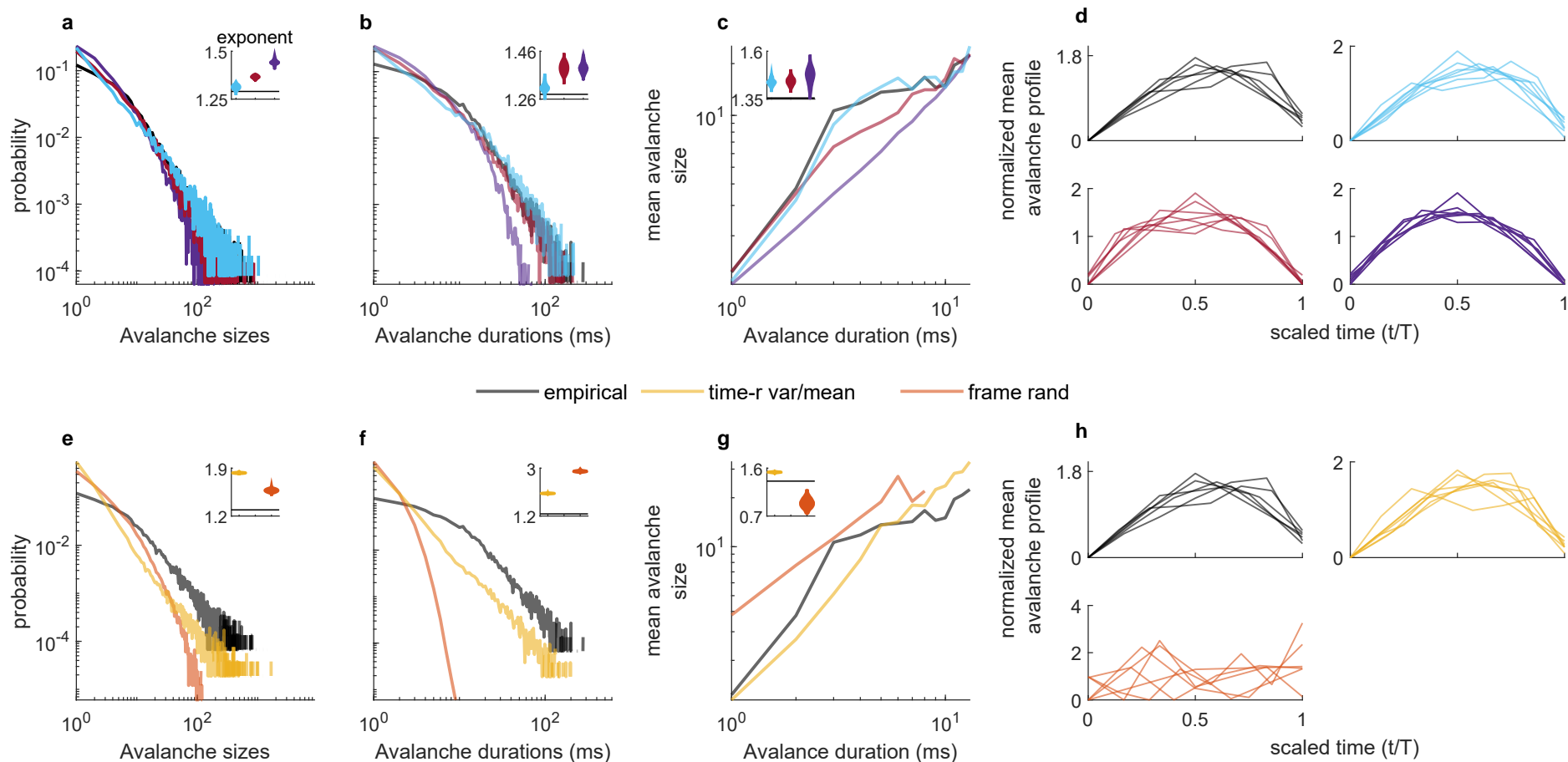
— empirical
 — time-r corr/var/mean
 — windowed phase rand
 — standard phase rand



Supplementary Figure 22: See Figures 7-8 caption for details.

Avalanche statistics — macaque 2/session 1

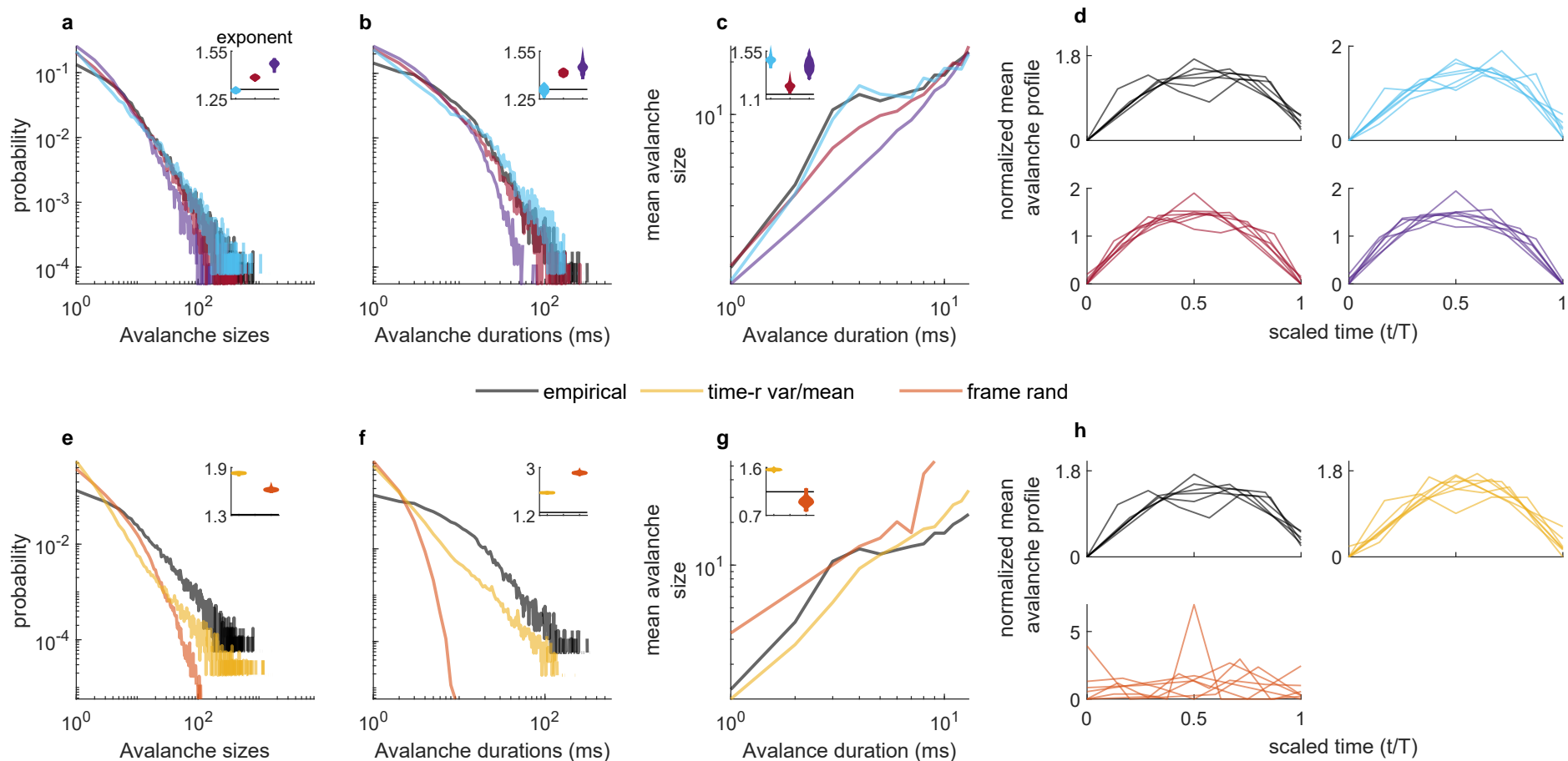
— empirical
 — time-r corr/var/mean
 — windowed phase rand
 — standard phase rand



Supplementary Figure 23: See Figures 7-8 caption for details.

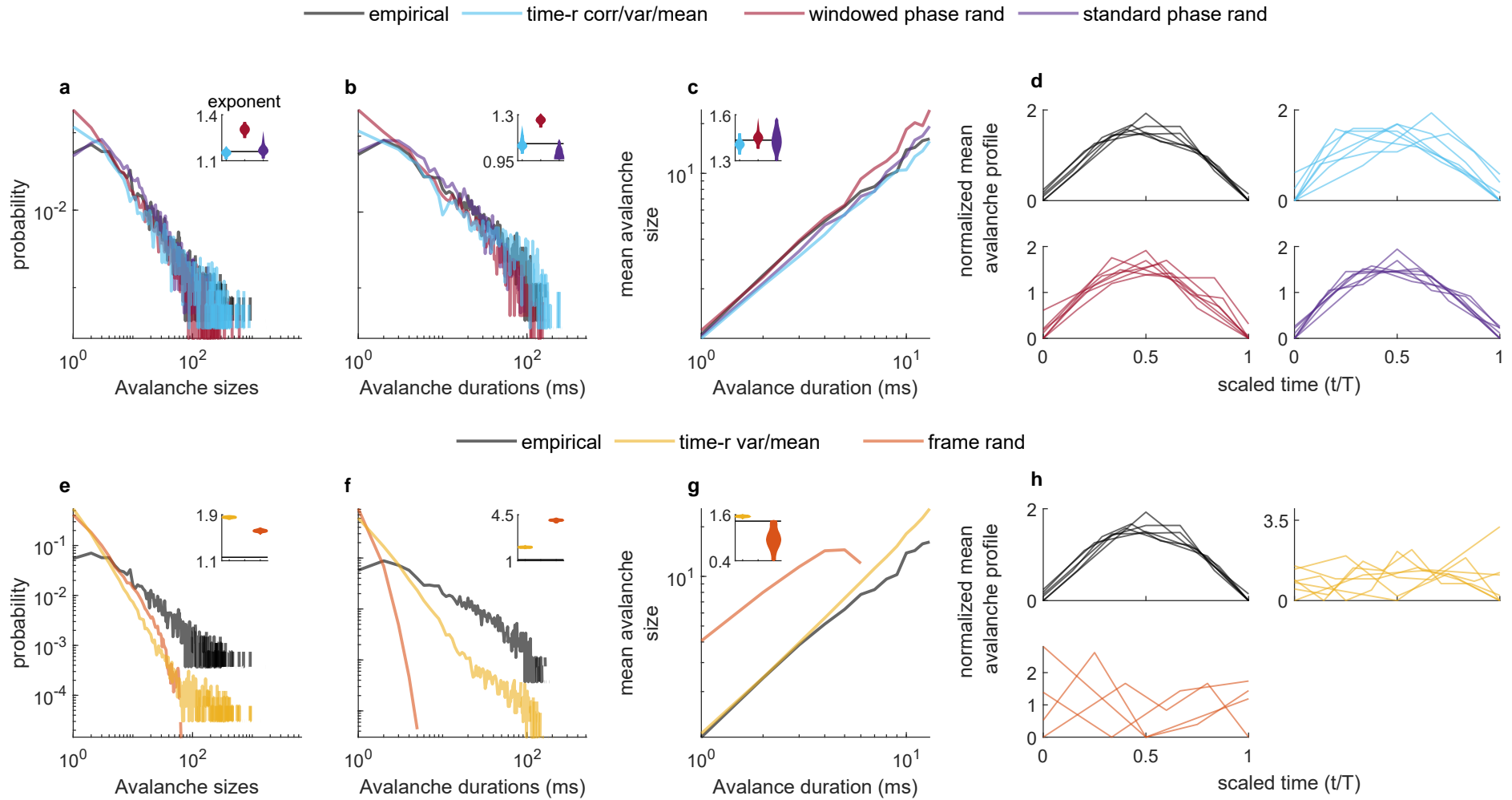
Avalanche statistics — macaque 2/session 2

— empirical
 — time-r corr/var/mean
 — windowed phase rand
 — standard phase rand



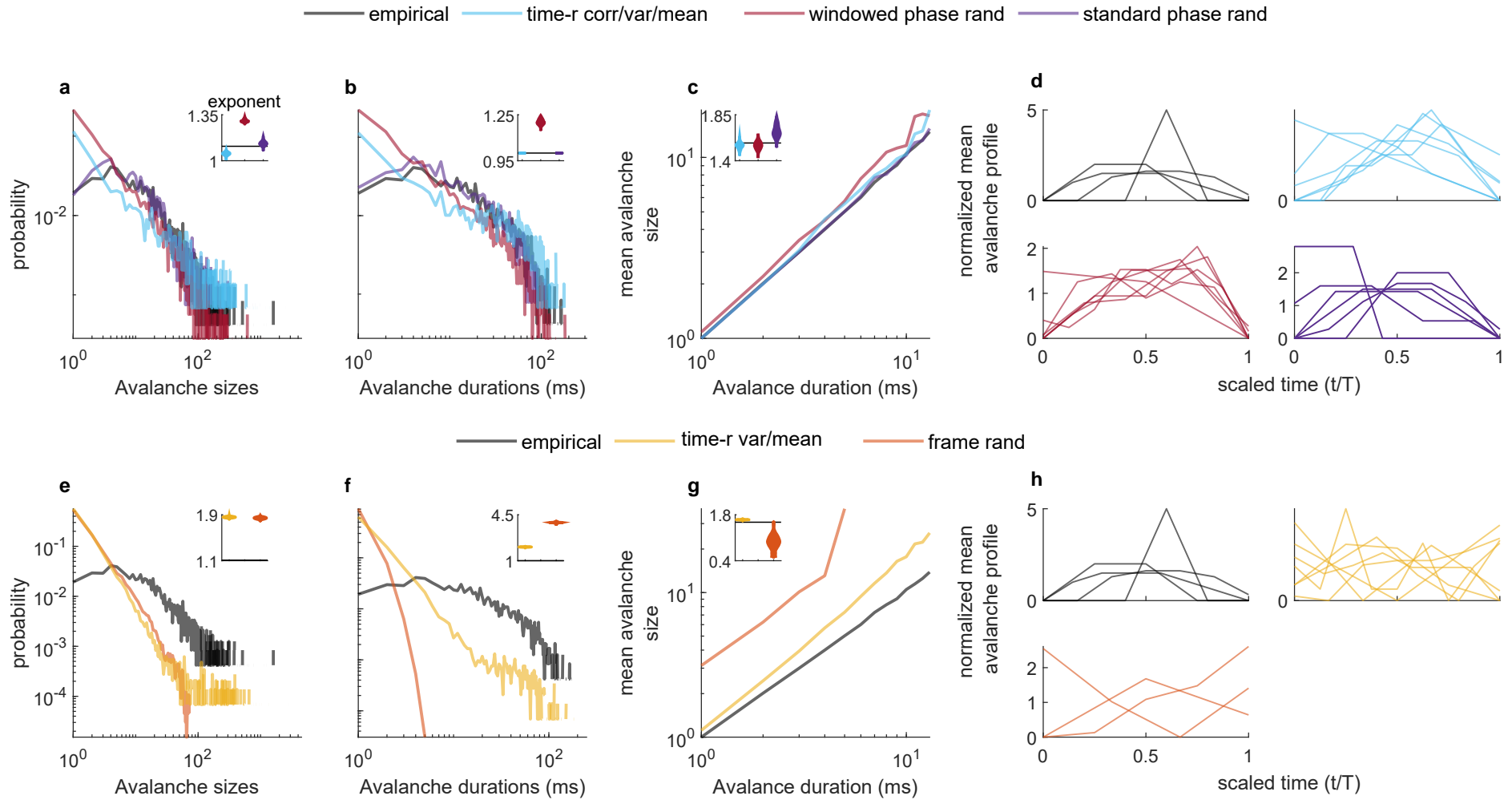
Supplementary Figure 24: See Figures 7-8 caption for details.

Avalanche statistics — human intracranial EEG dataset 1



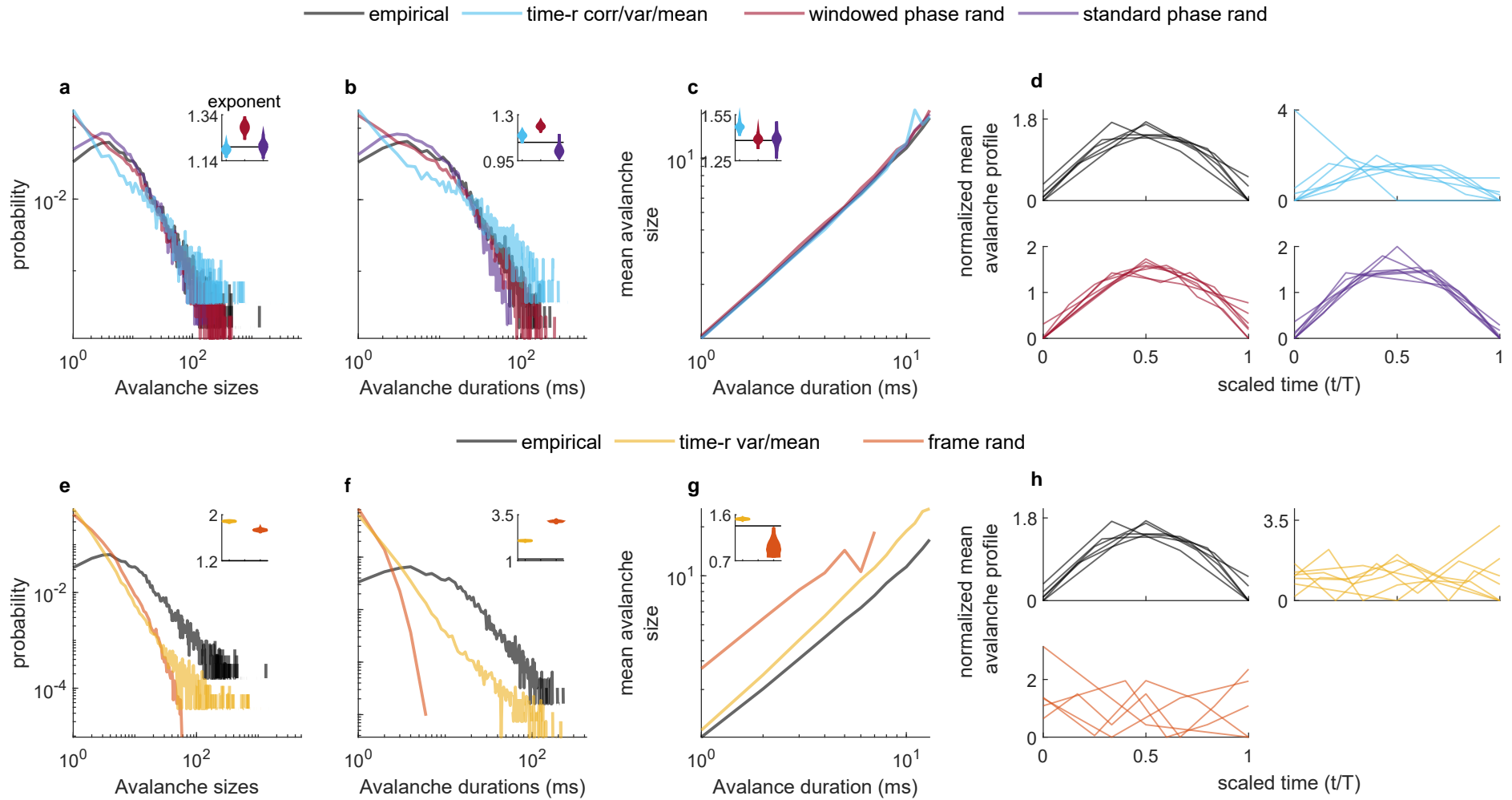
Supplementary Figure 25: See Figures 7-8 caption for details.

Avalanche statistics — human intracranial EEG dataset 2



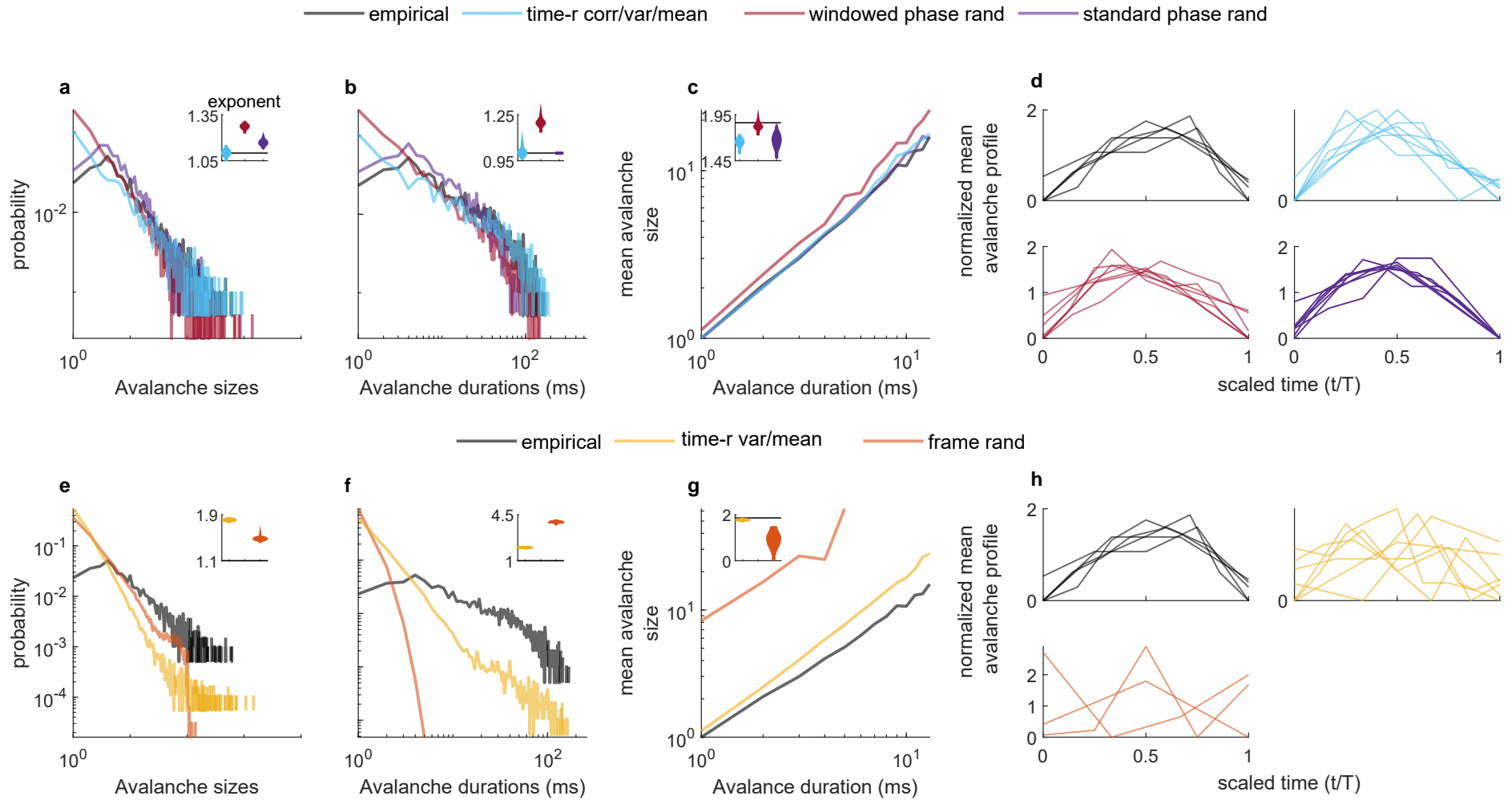
Supplementary Figure 26: See Figures 7-8 caption for details.

Avalanche statistics — human intracranial EEG dataset 3



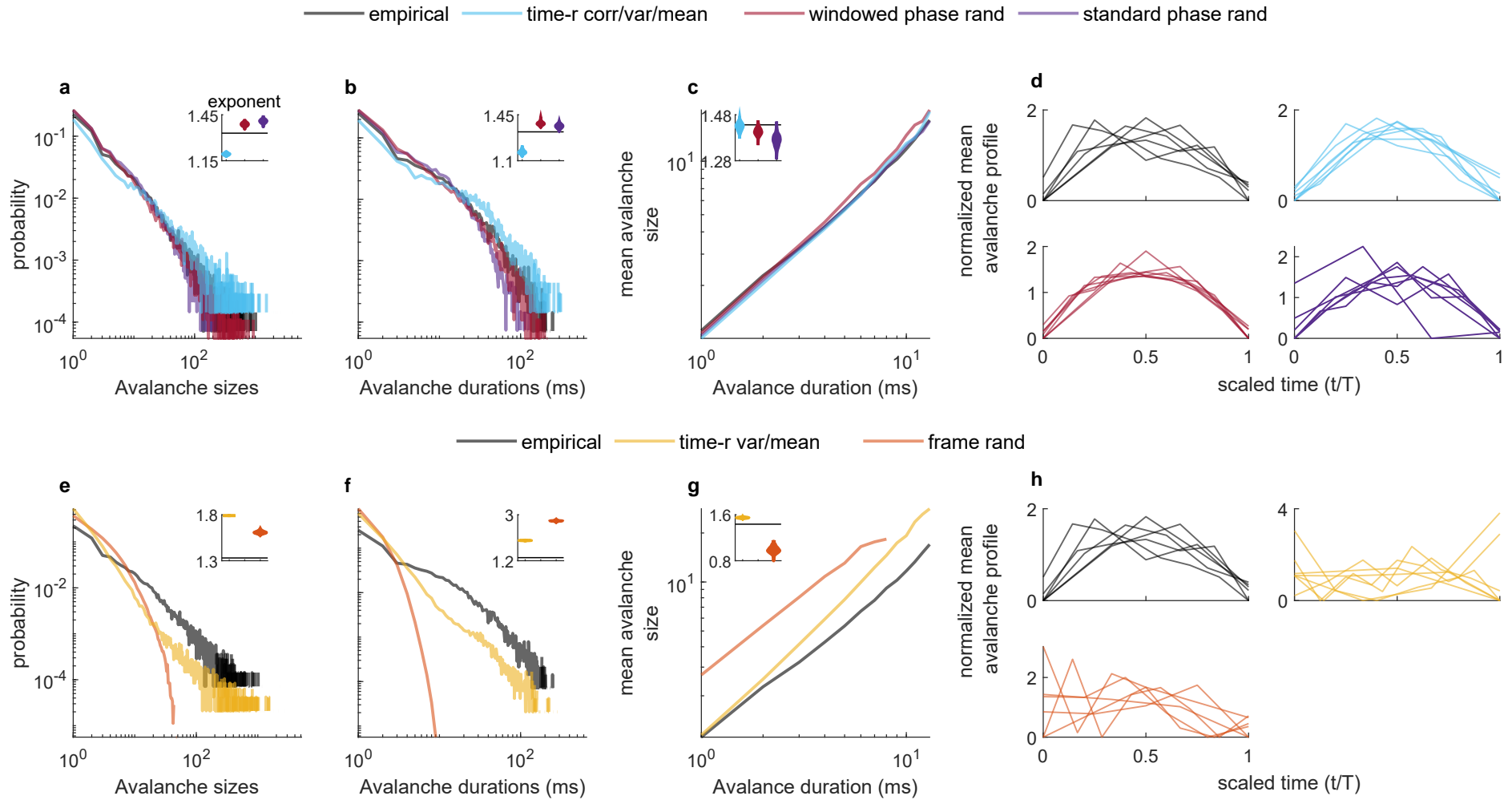
Supplementary Figure 27: See Figures 7-8 caption for details.

Avalanche statistics — human intracranial EEG dataset 4



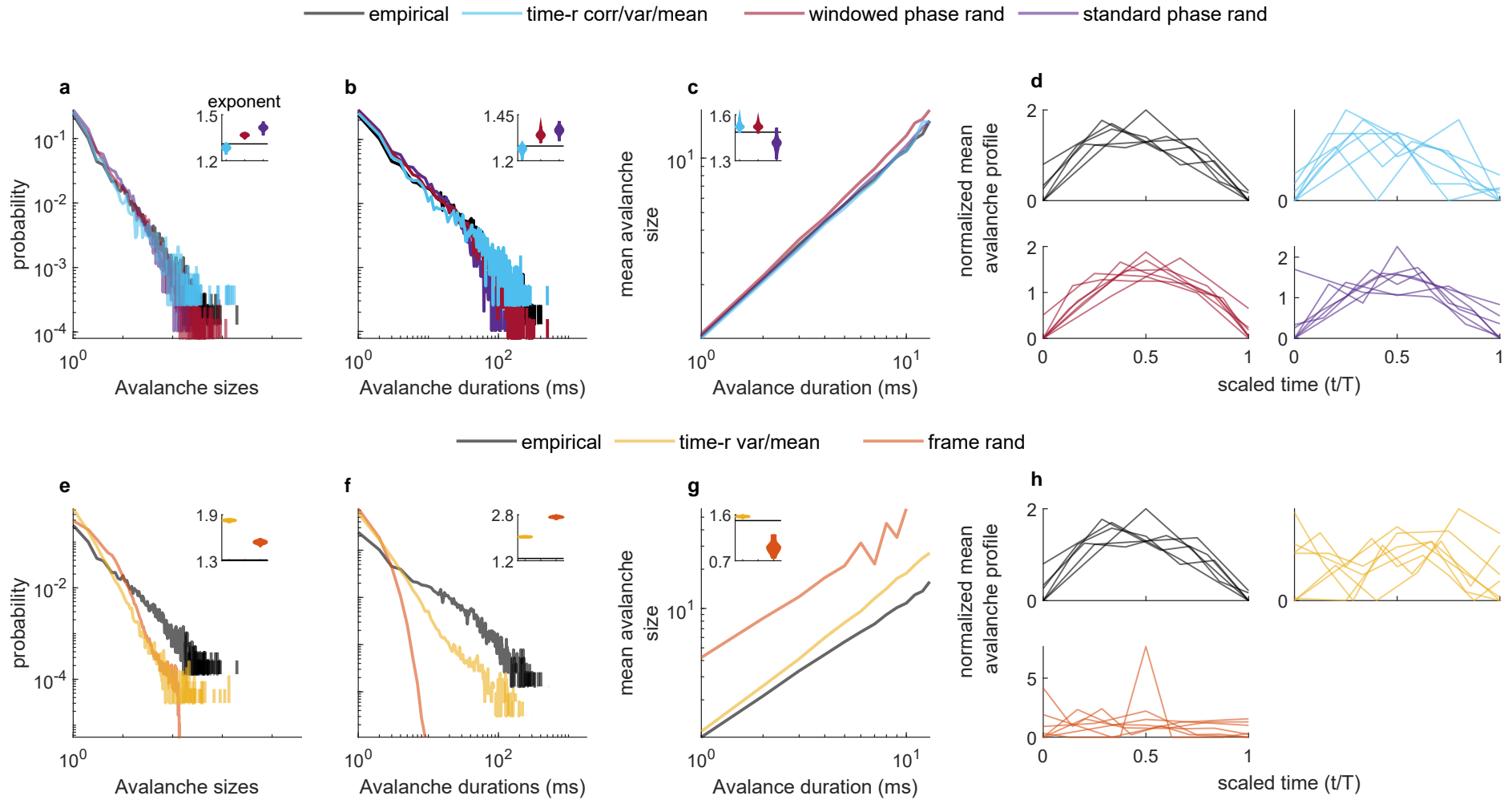
Supplementary Figure 28: See Figures 7-8 caption for details.

Avalanche statistics — human stereotactic EEG dataset 1



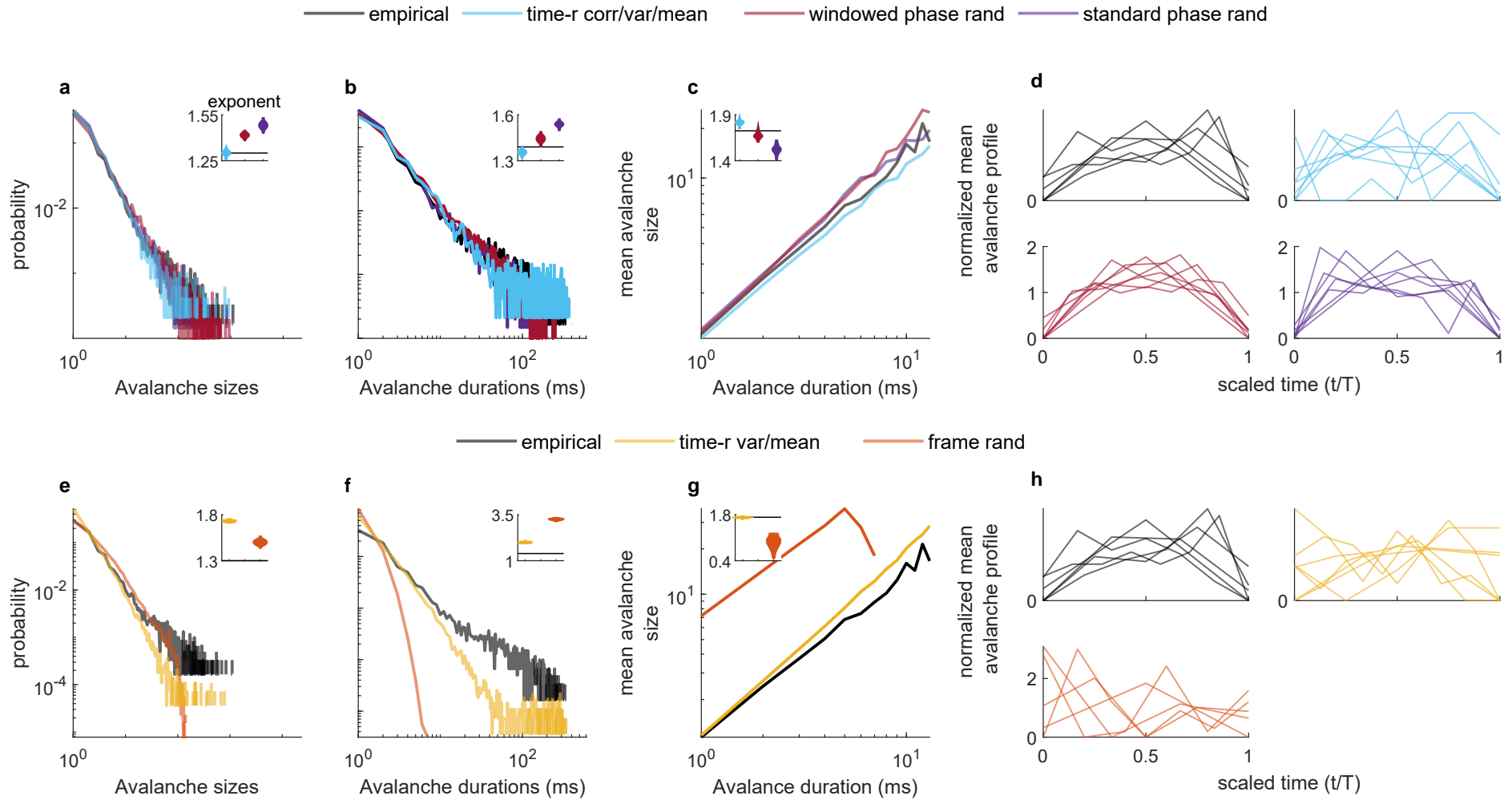
Supplementary Figure 29: See Figures 7-8 caption for details.

Avalanche statistics — human stereotactic EEG dataset 2



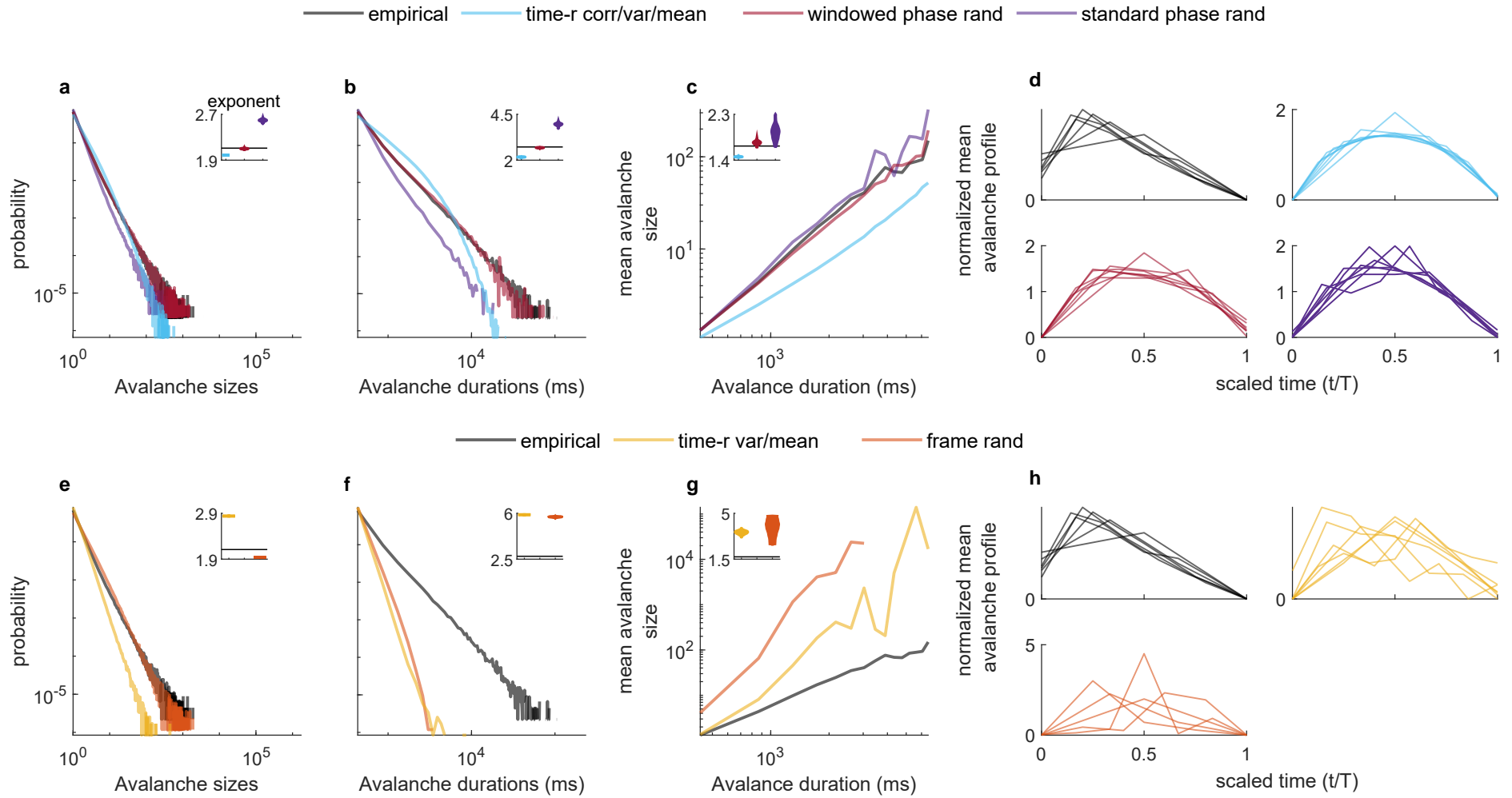
Supplementary Figure 30: See Figures 7-8 caption for details.

Avalanche statistics — human stereotactic EEG dataset 3



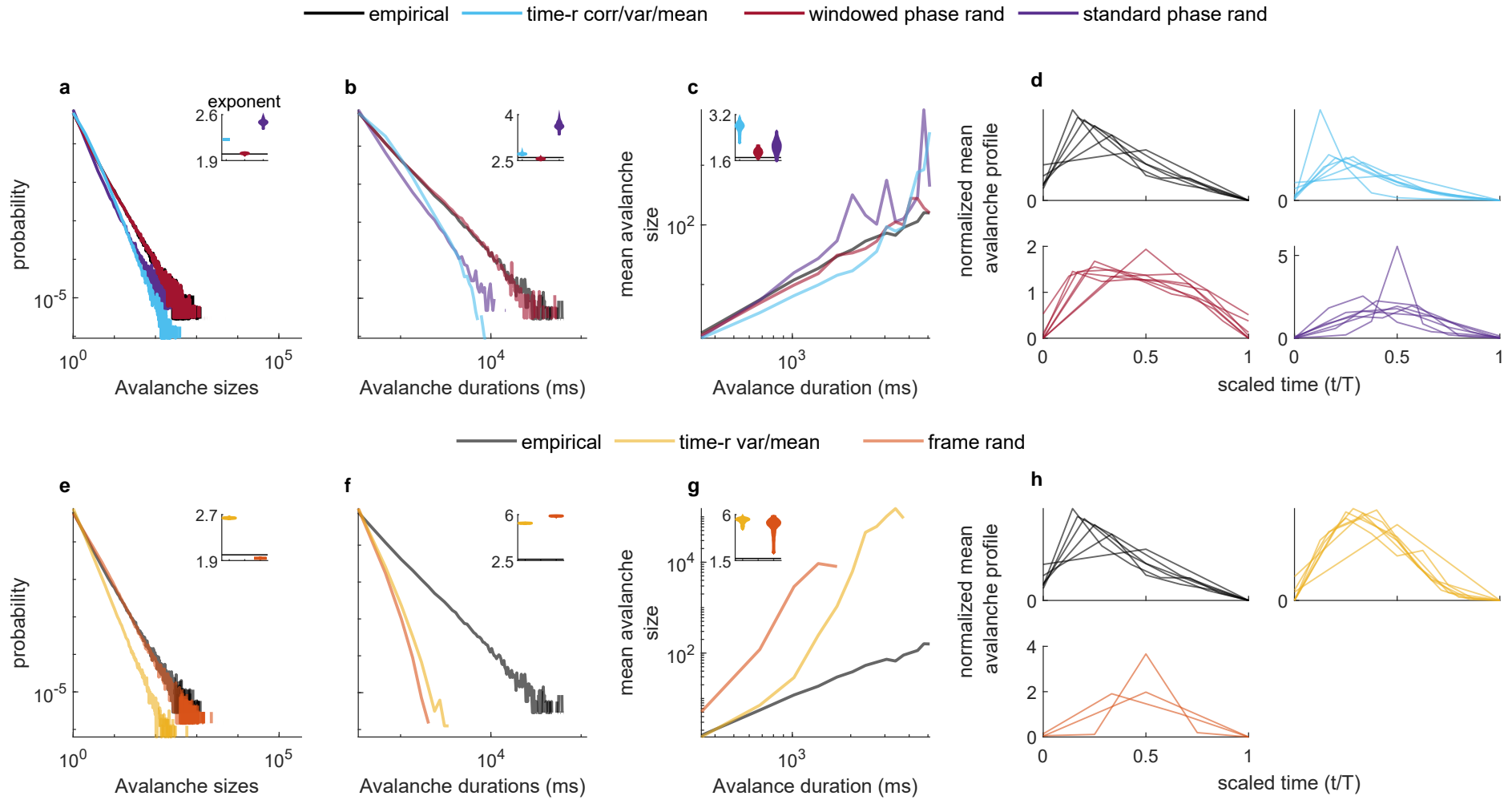
Supplementary Figure 31: See Figures 7-8 caption for details.

Avalanche statistics — zebrafish dataset 1



Supplementary Figure 32: See Figures 7-8 caption for details.

Avalanche statistics — zebrafish dataset 2



Supplementary Figure 33: See Figures 7-8 caption for details.