

# Correlations between EEG and blood glucose metabolism: *A pilot study*

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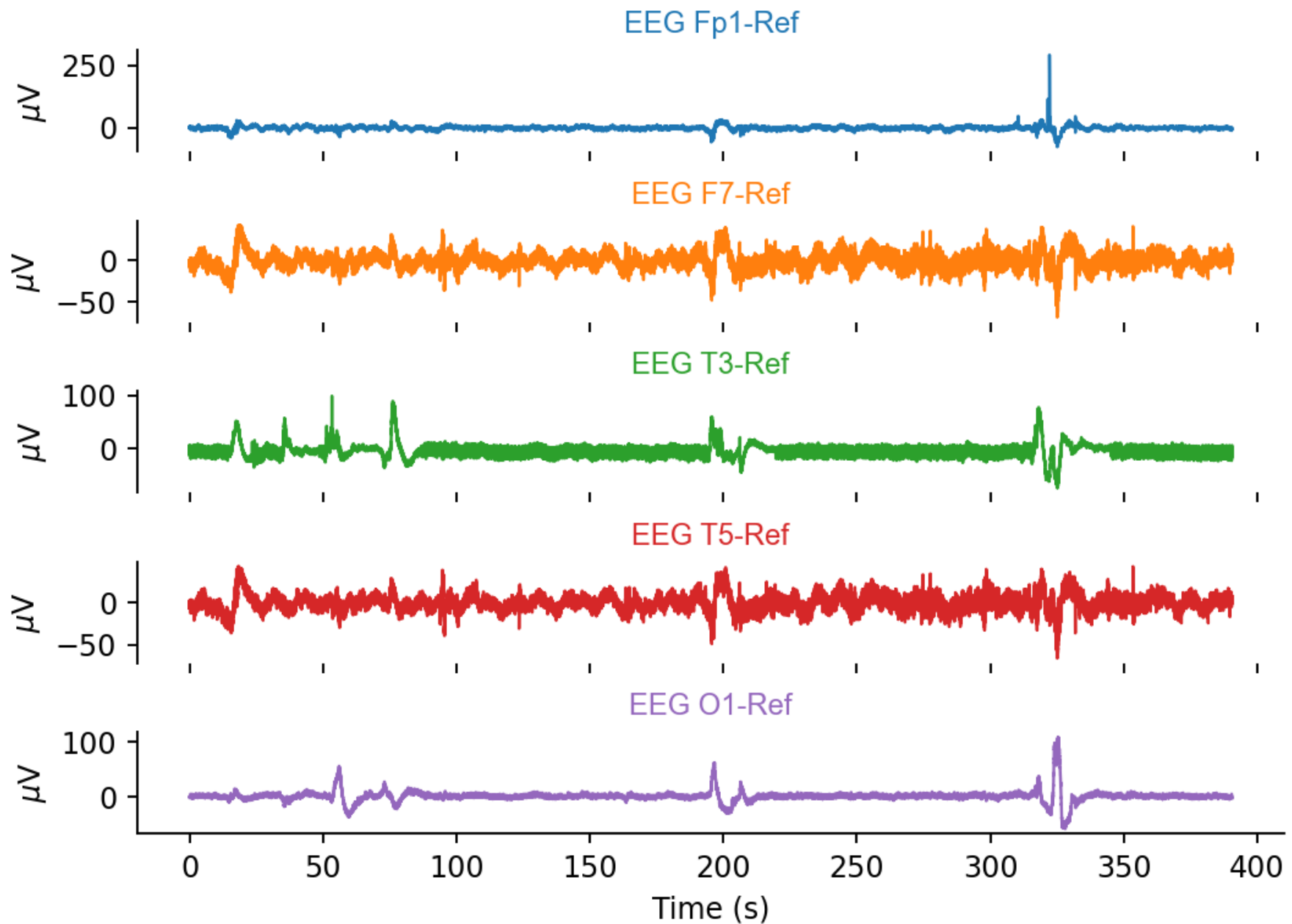
# Aims of the project

Explore potential correlations between EEG and blood glucose

Find features that exhibit high correlation with the target signal

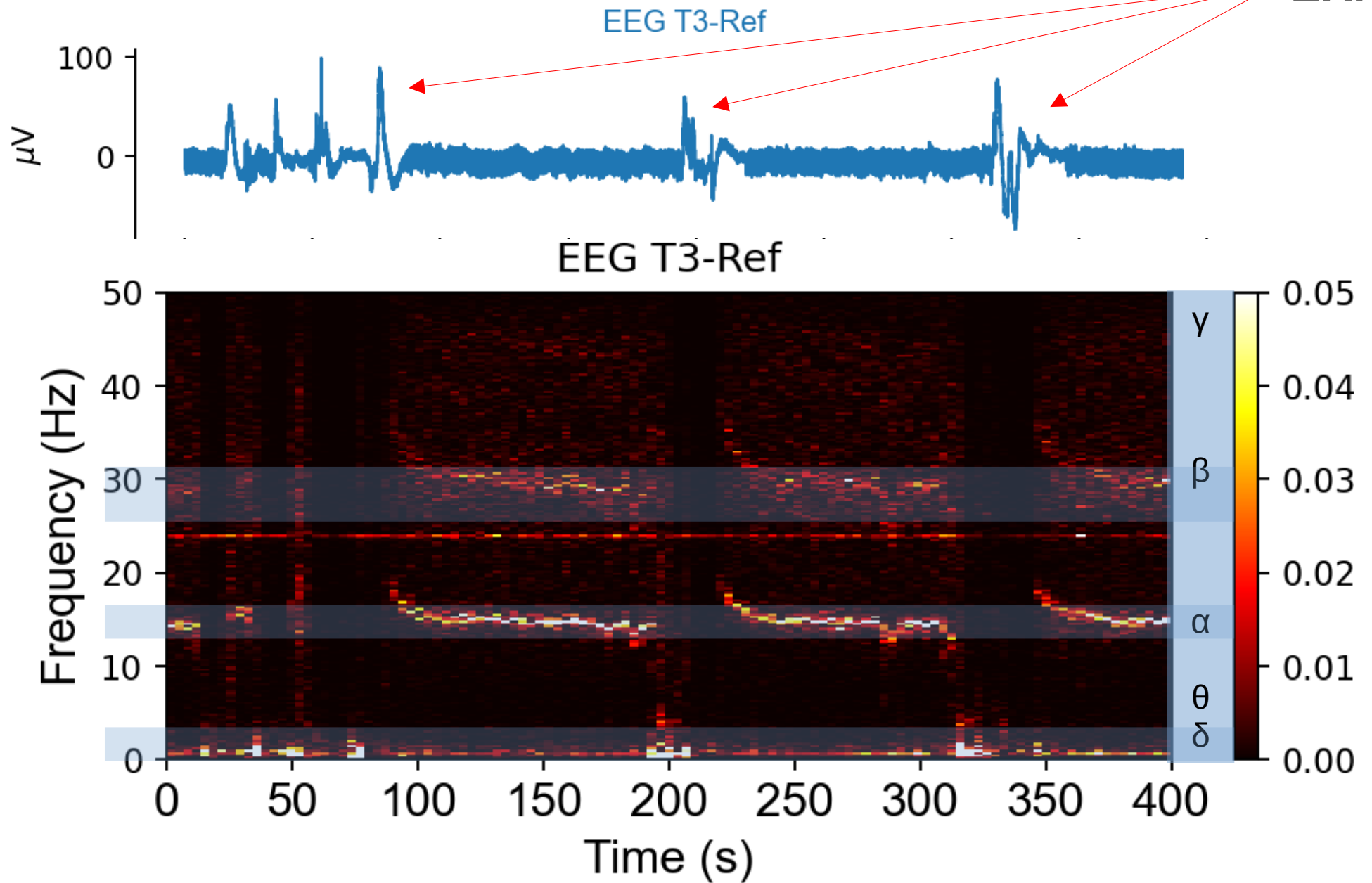
Visualization for easy interpretation and understanding by clinicians

# Preprocessing and visualizing EEG

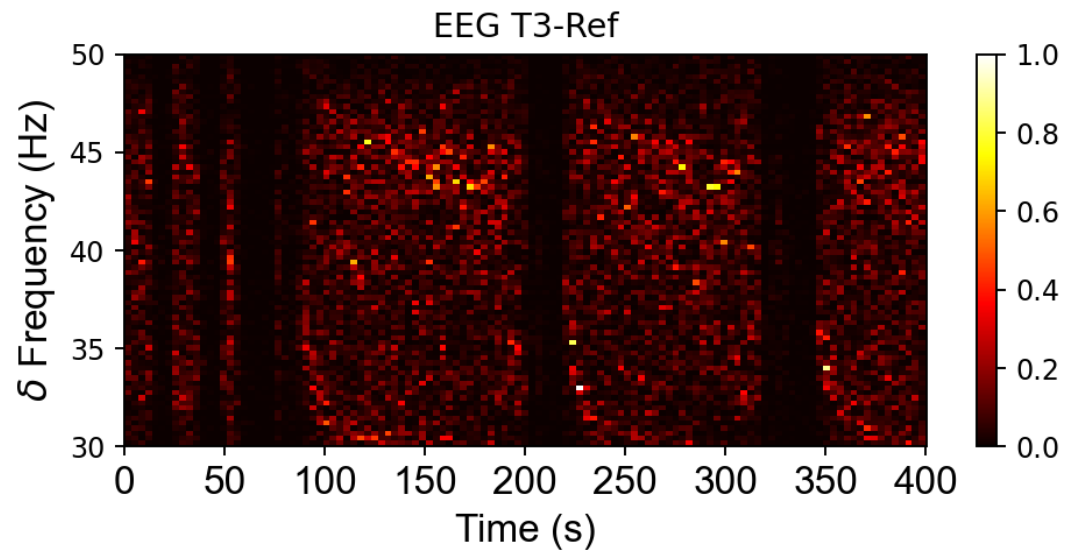
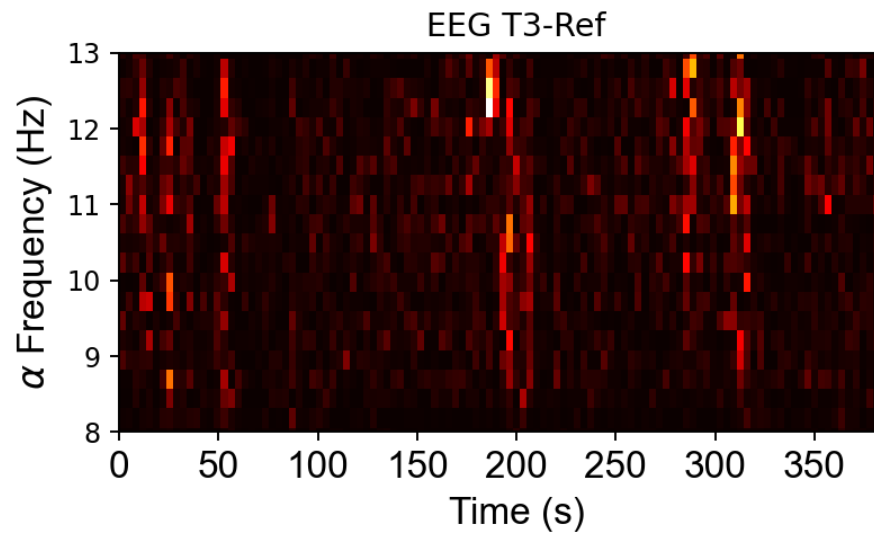
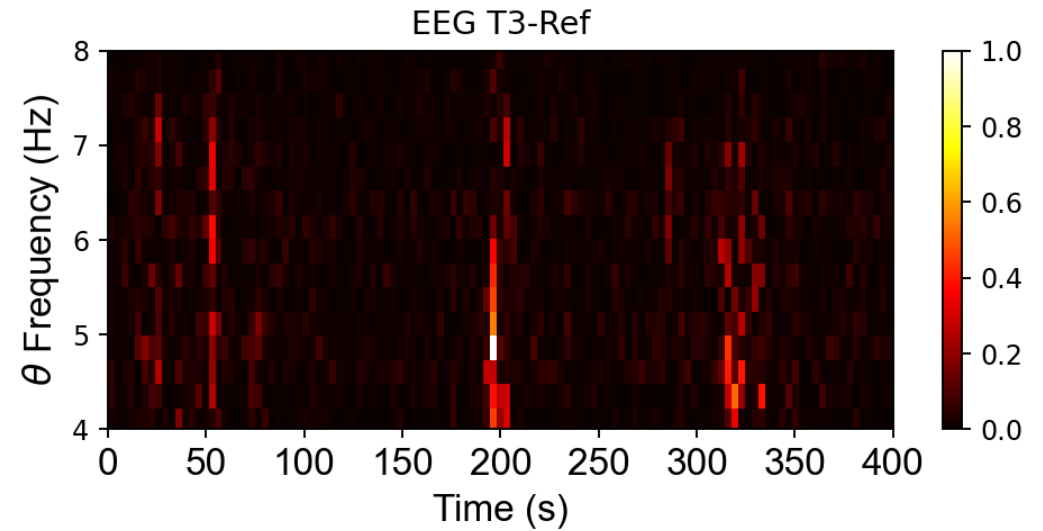
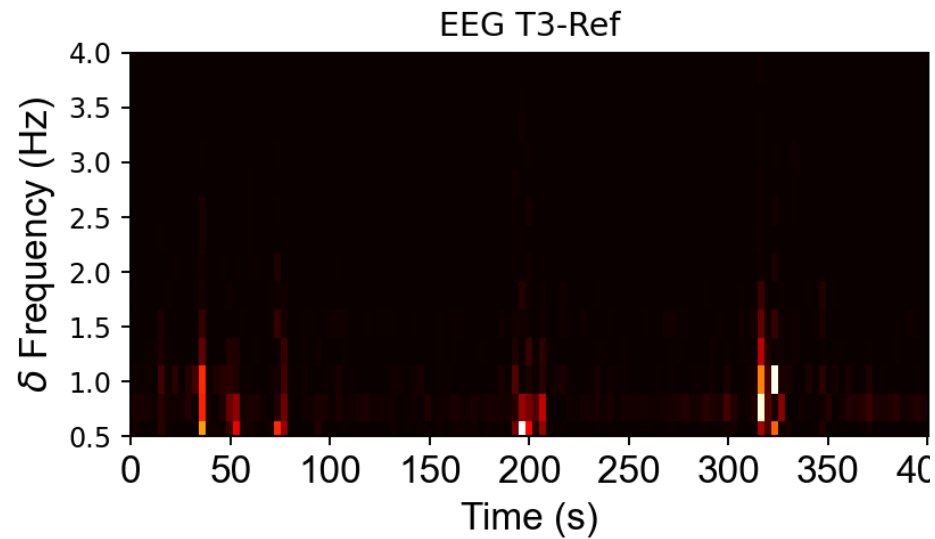


# EEG spectrogram

**ERPs**

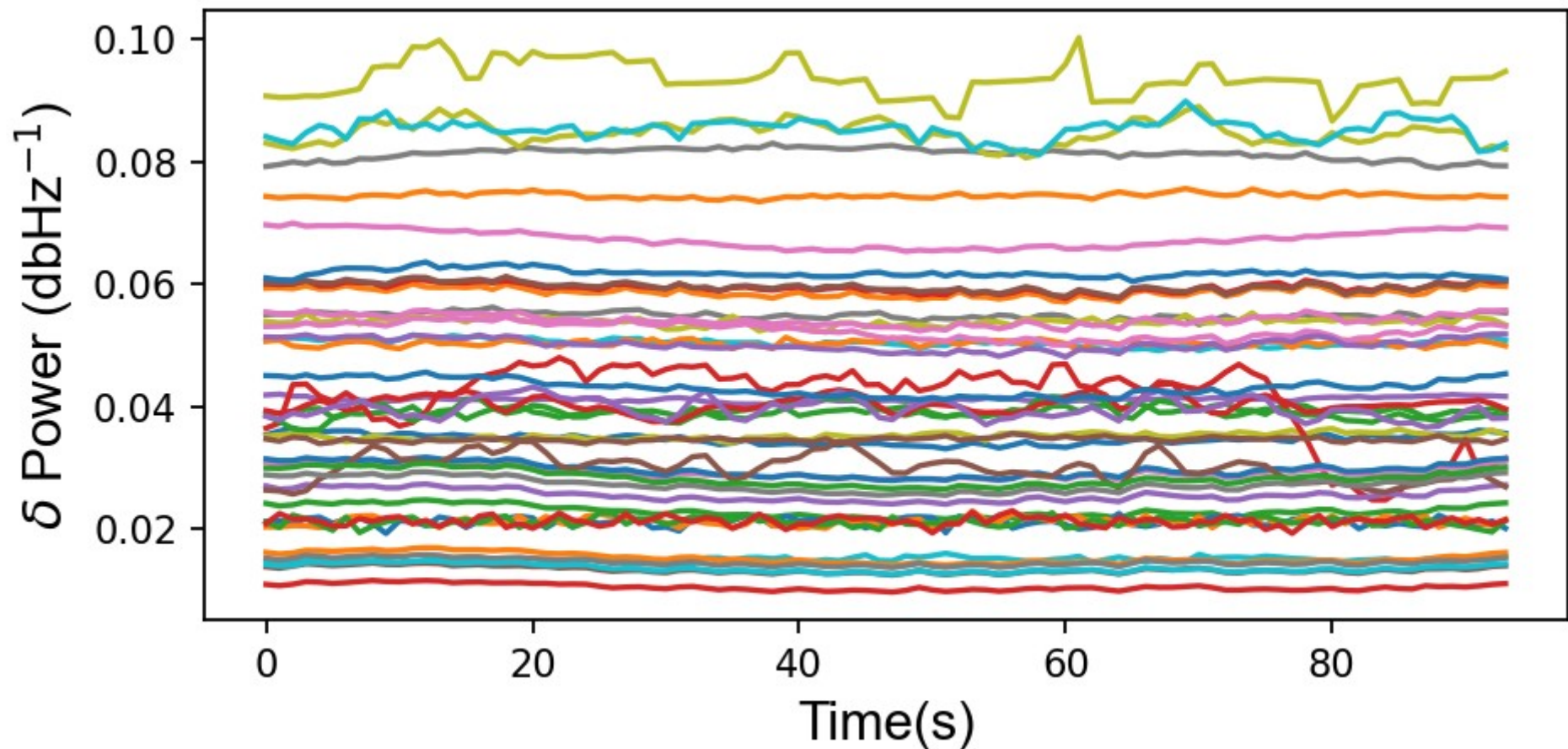


# Visualizing EEG power in different frequency bands



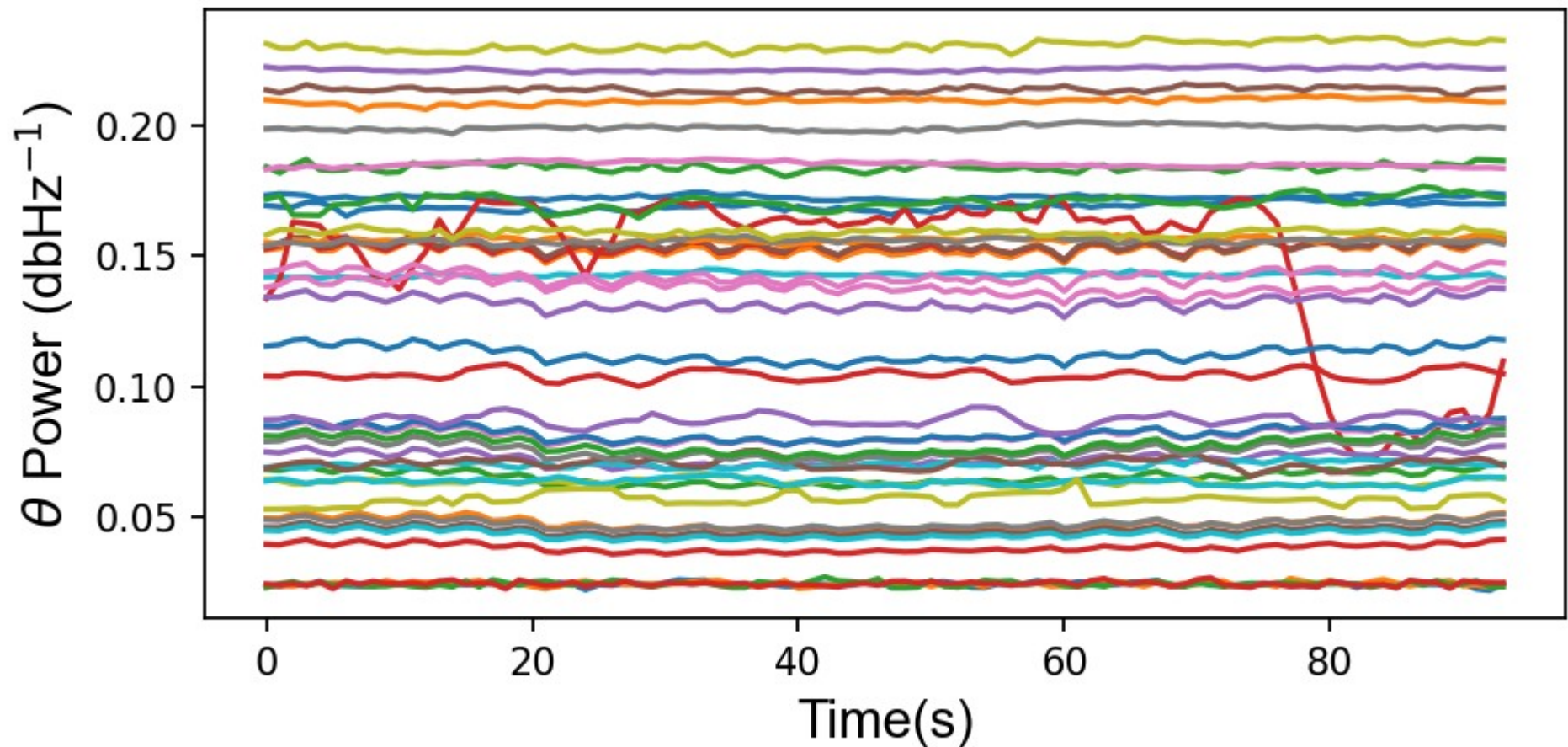
Visualizing the time evolution of signal power  
in different EEG channels

## Delta



Visualizing the time evolution of signal power  
in different EEG channels

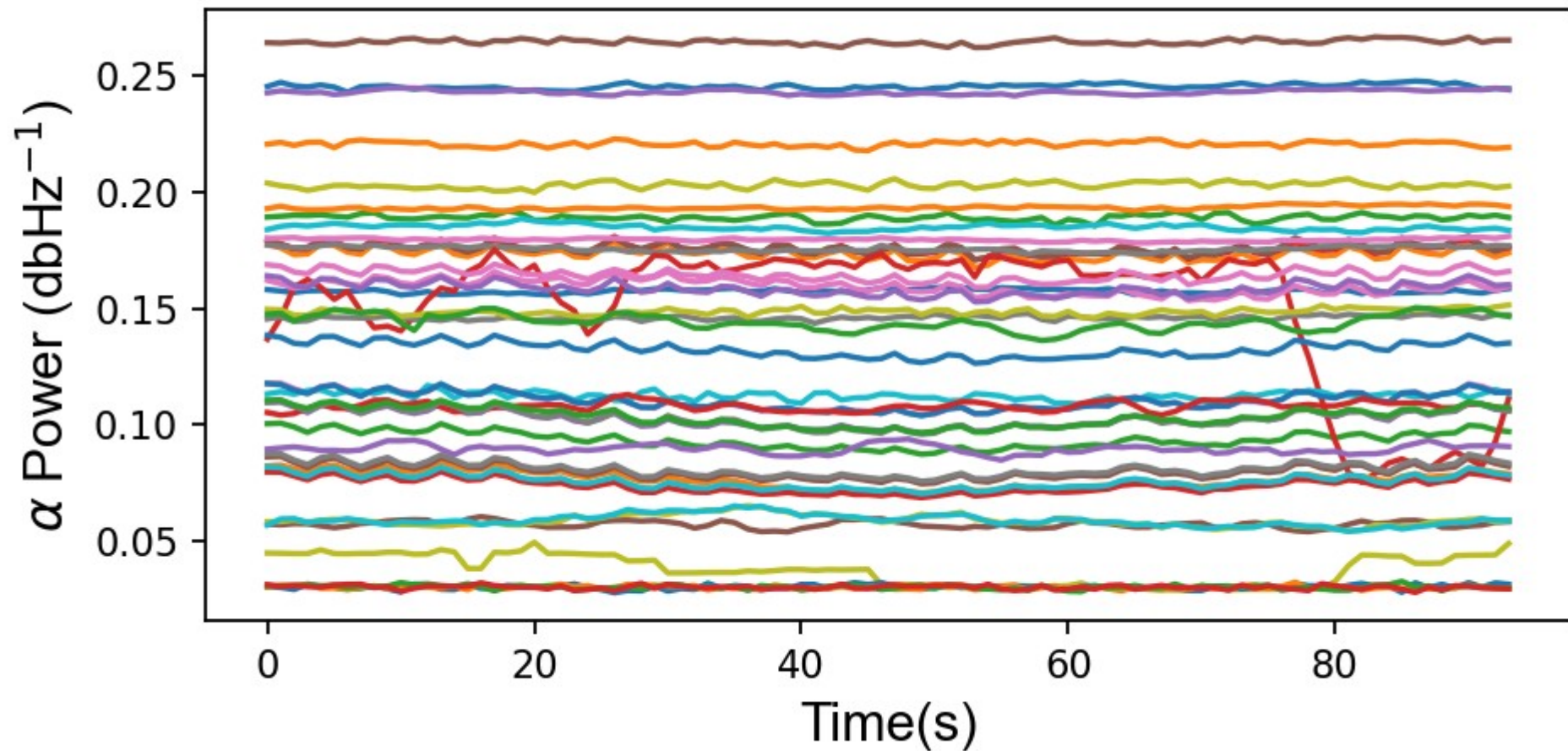
## Theta





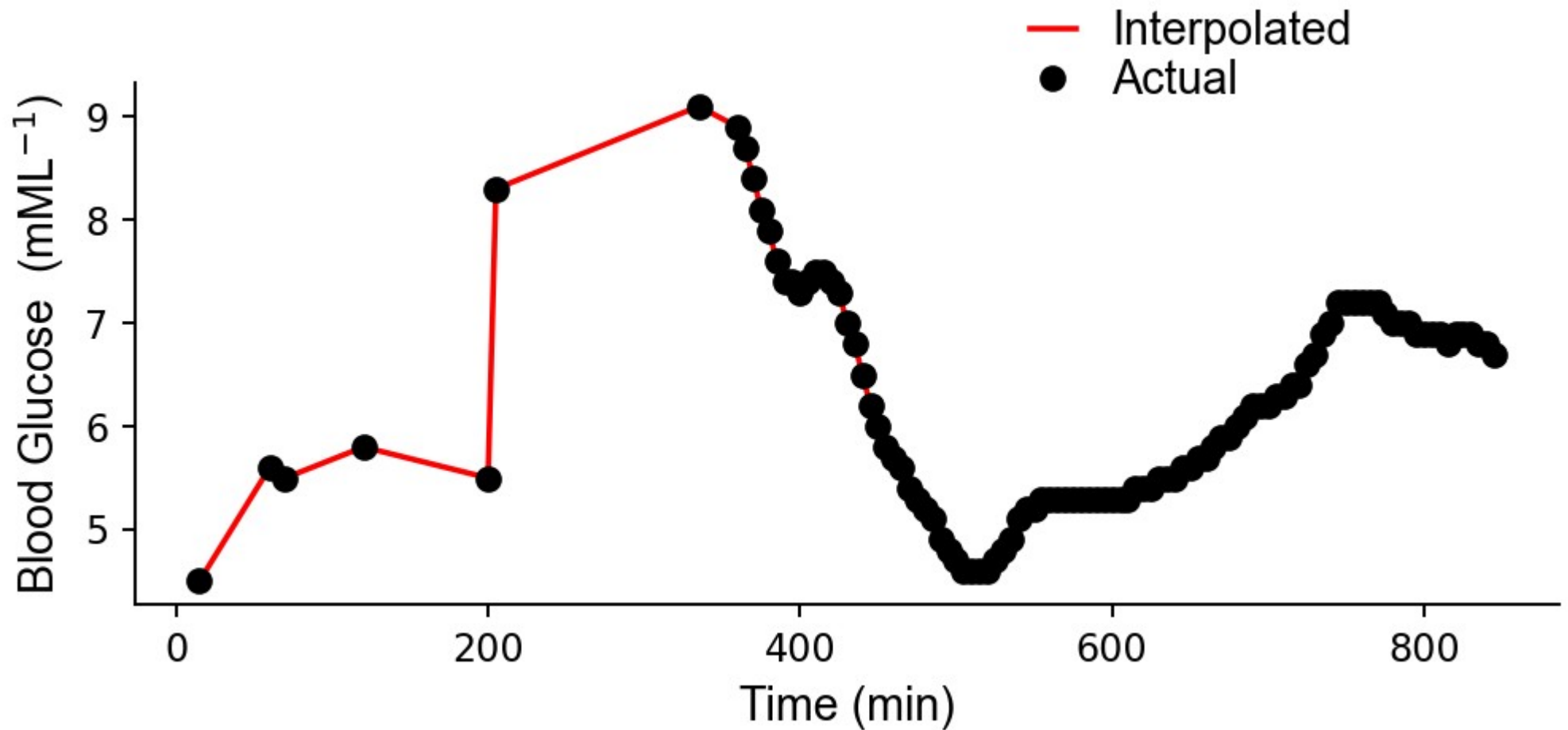
Visualizing the time evolution of signal power  
in different EEG channels

## Alpha

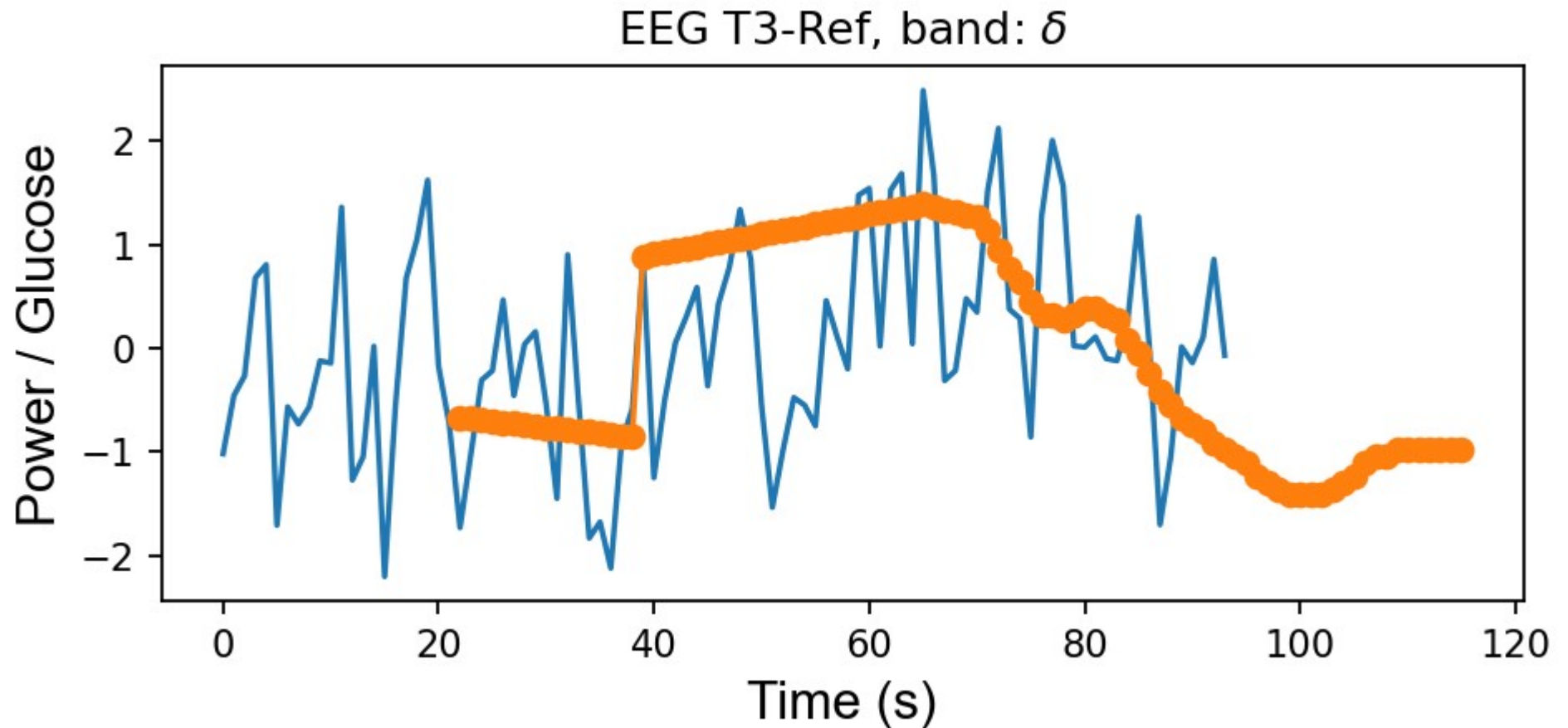




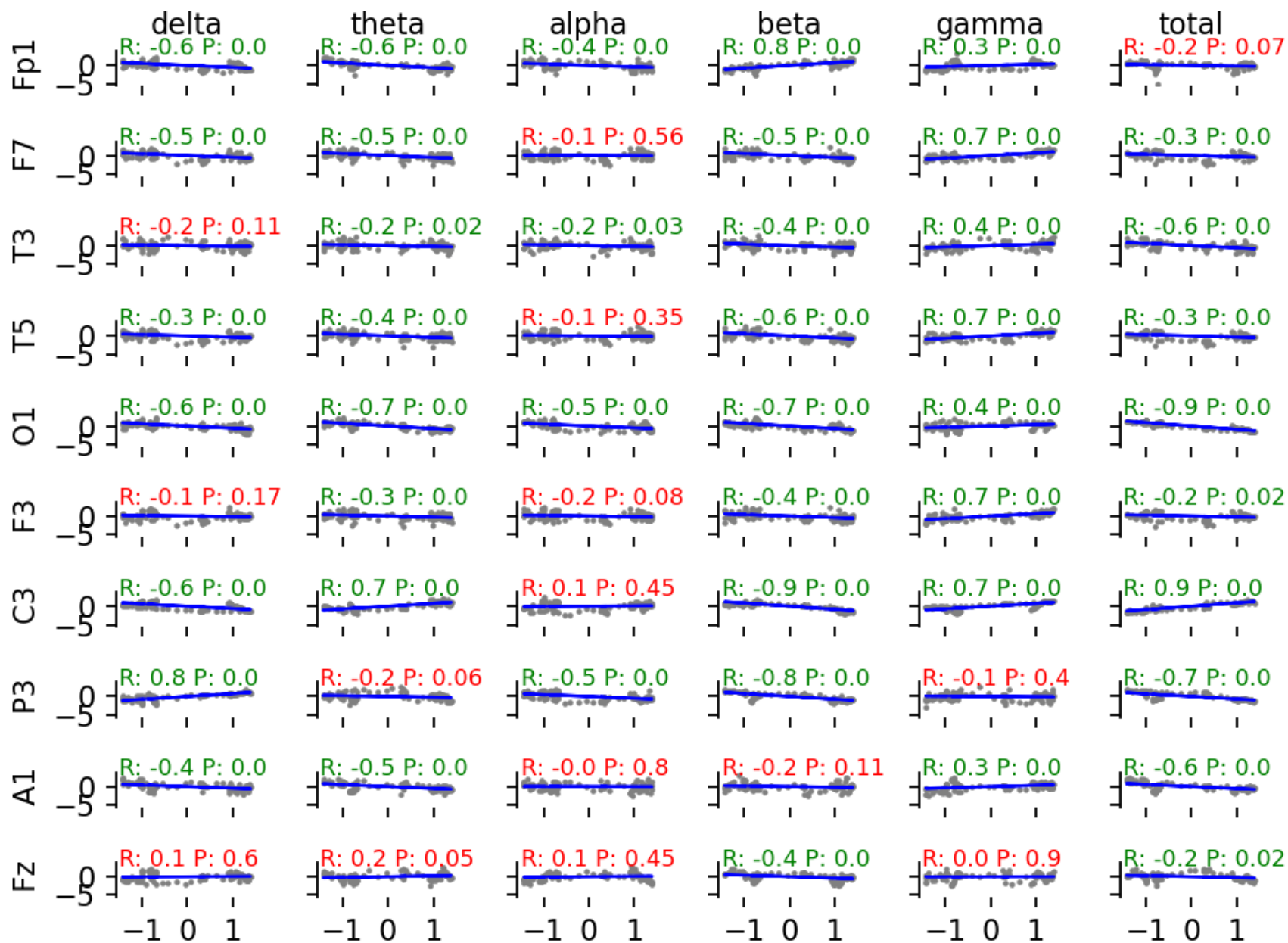
# Blood glucose levels measured during EEG



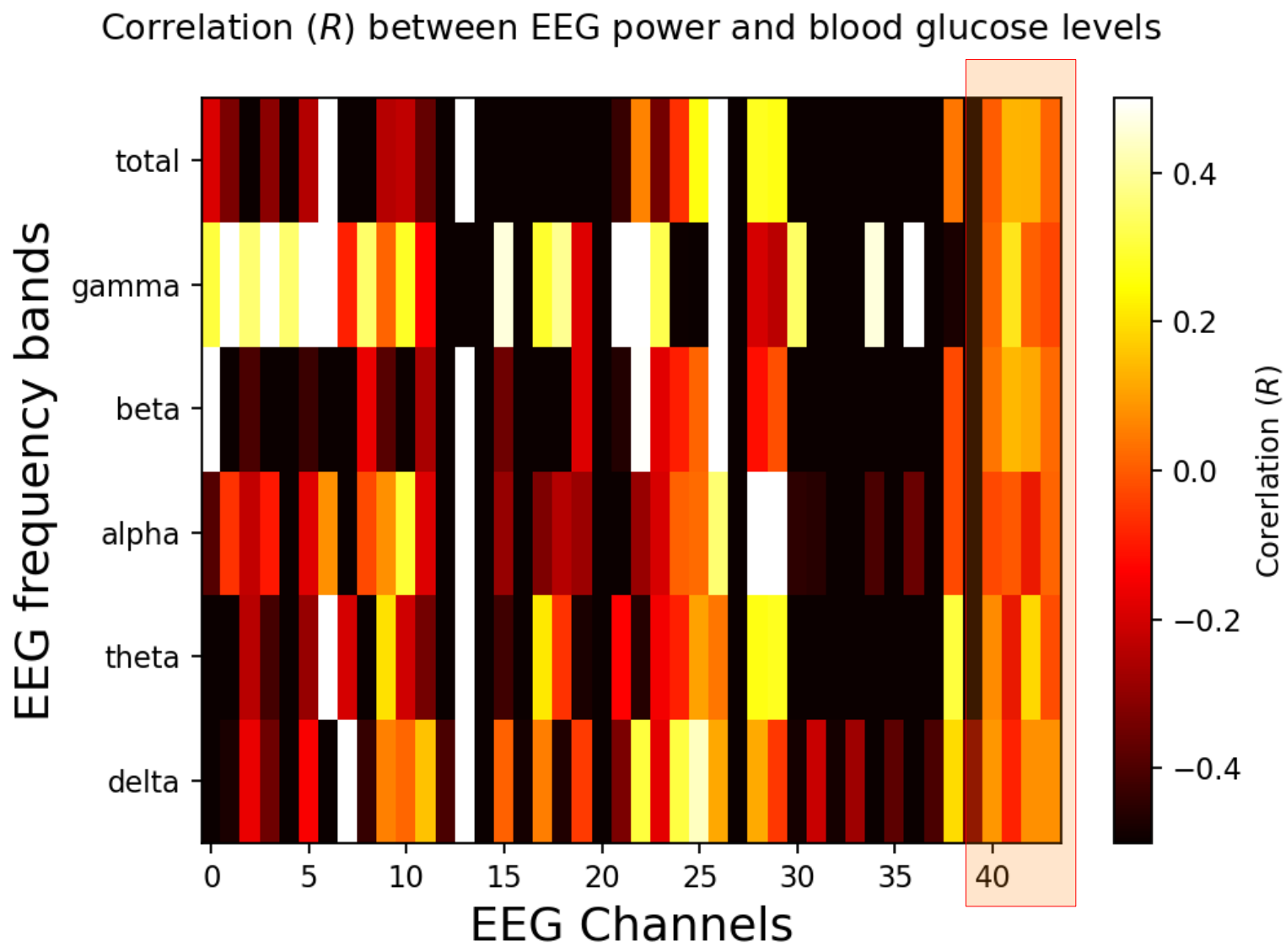
# Correlating Z-scored EEG with blood glucose levels



# Linear correlation between EEG powers in different channels & blood glucose levels



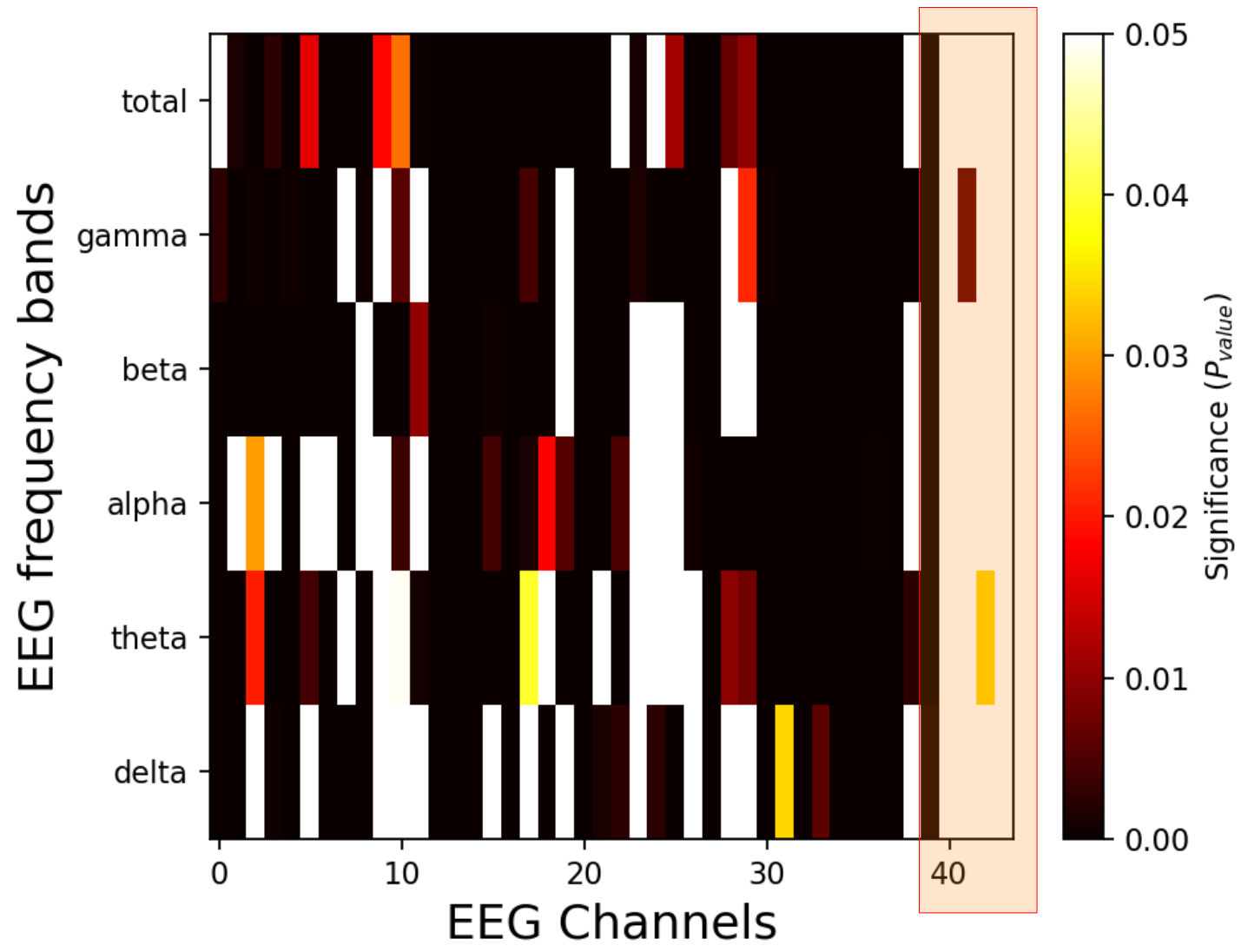
# Visualizing EEG versus blood glucose correlation using a heatmap



Positive correlation of DC potentials with blood glucose levels

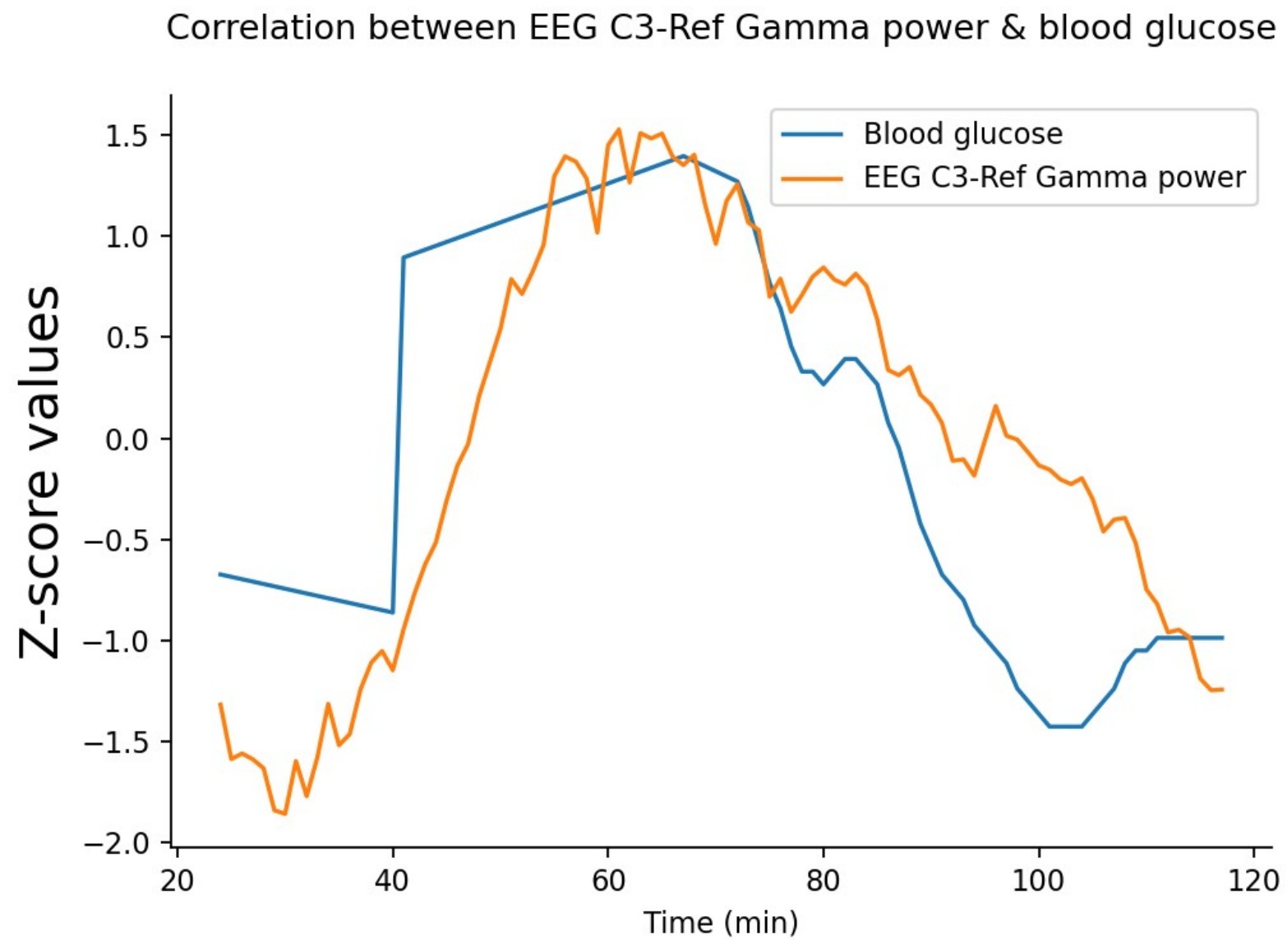
# Inspecting the statistical significance of correlations across all EEG Channels

Significance for correlation ( $R$ ) between EEG power & blood glucose



Strong correlation of DC potentials with blood glucose levels

# EEG gamma power from C3 was found to be significantly correlated with changes in blood glucose levels





## **Conclusions & Future directions**

Significant correlations were observed with EEG and blood glucose measurements

Review methodologies for analyzing and quantifying ERPs with behavioral aspects such as perception and attention

Explore different machine learning techniques with EEG data

Explore deep convolutional networks for signal classification

Continue the more detailed analysis by making use of public EEG repositories containing labeled data