

Decomposing Sentinel-1 time series in the Amazon

Abteilung Datengewinnung und -mobilisierung

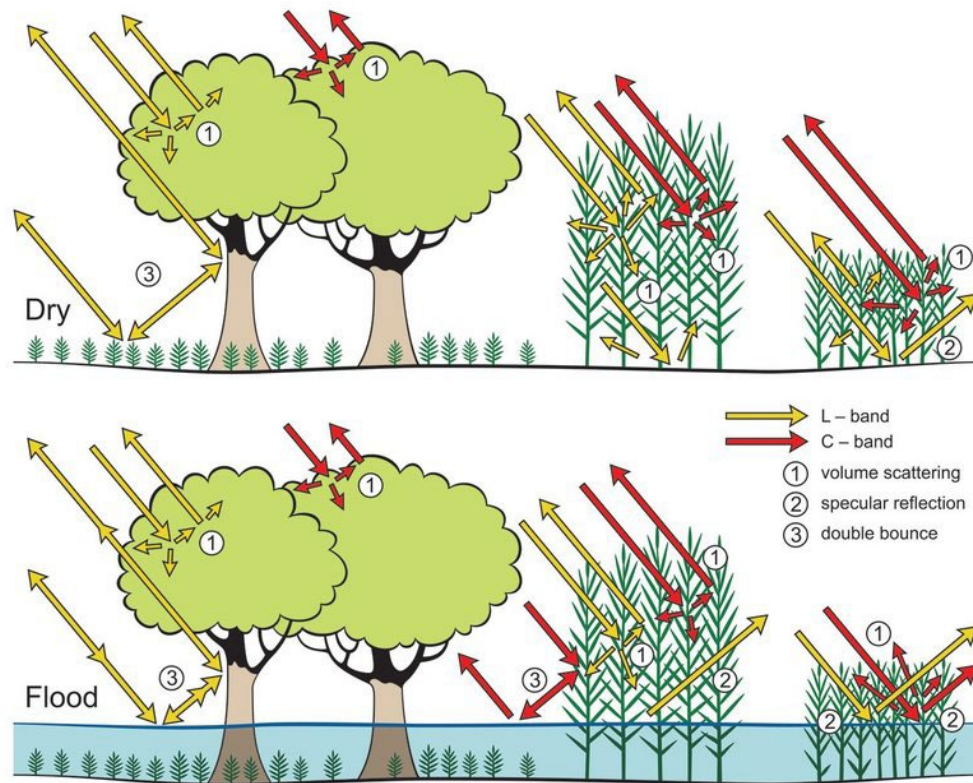
Felix Cremer, N. Linscheid, M.Mahecha,
M.Urbazaev, J.Truckenbrodt,
C.Schmullius, C.Thiel



Wissen für Morgen



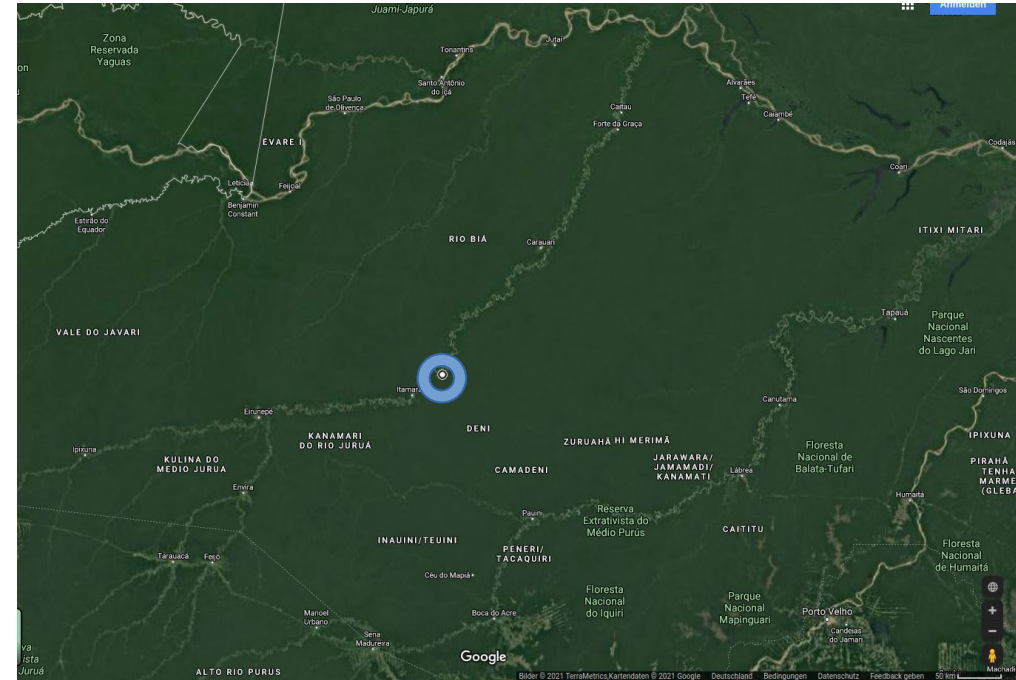
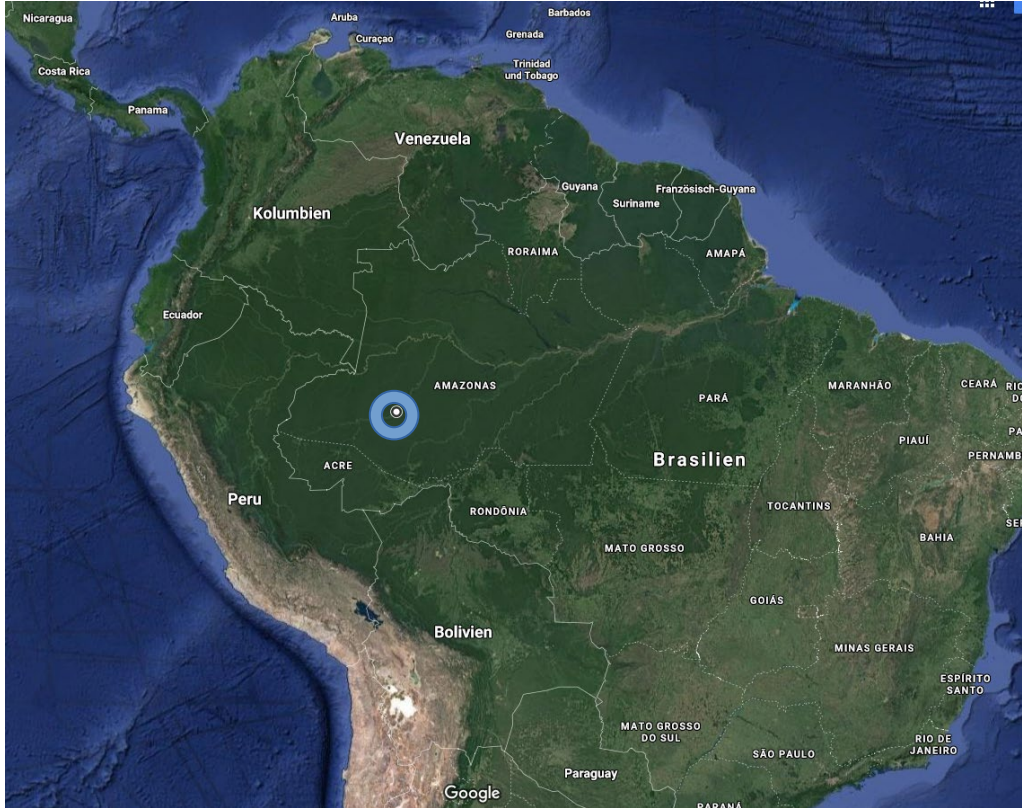
Mental Model for different SAR Frequencies



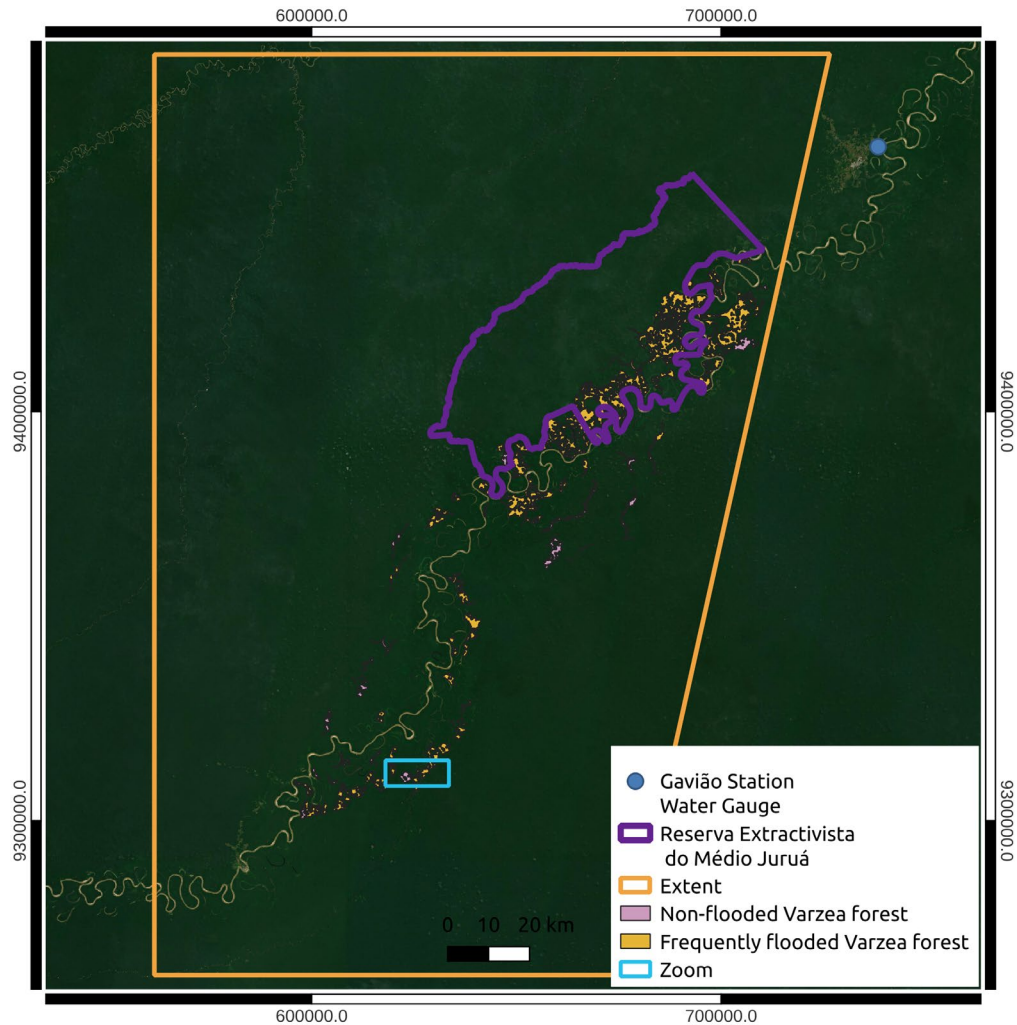
Evans (2013)



Study Area Juruá

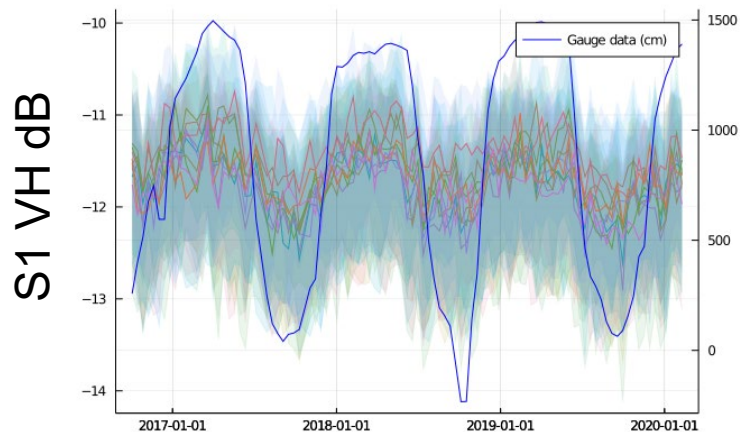


Study Area Juruá

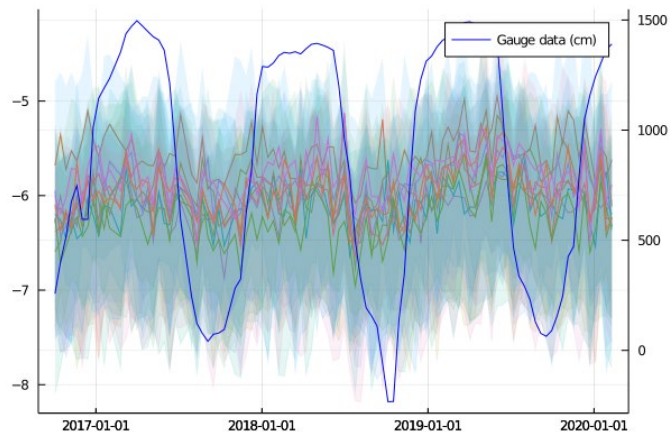
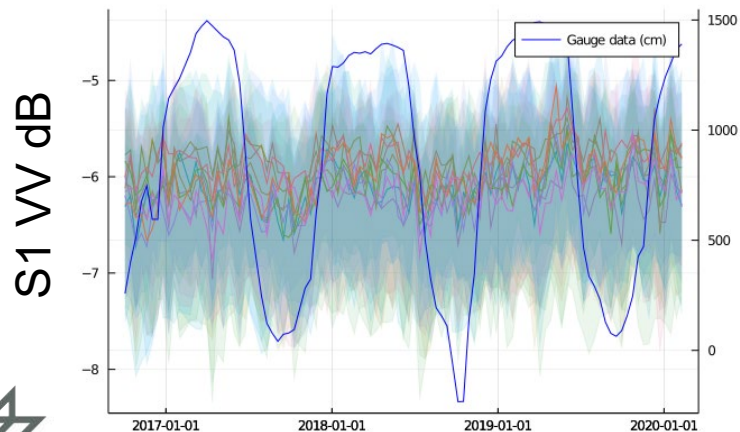


Timeseries of S1 VH show seasonality for flooded forests

Varzêa Flooded Forest



Varzêa Non-Flooded Forest

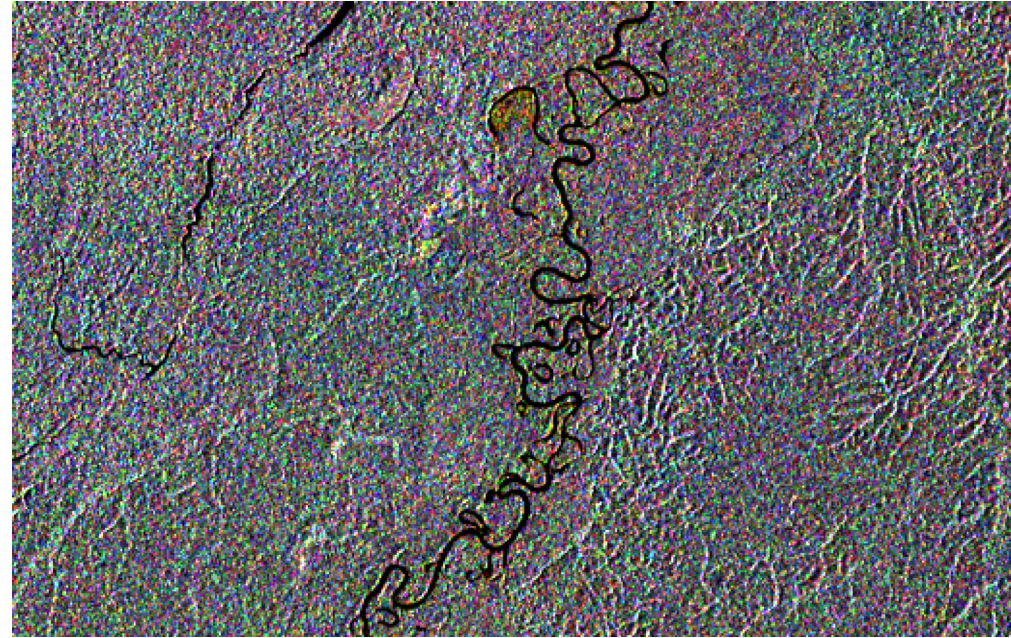


RGB for low, median and high water level

VH



VV



RGB for 5th, median and 95th timeseries quantile

VH



VV

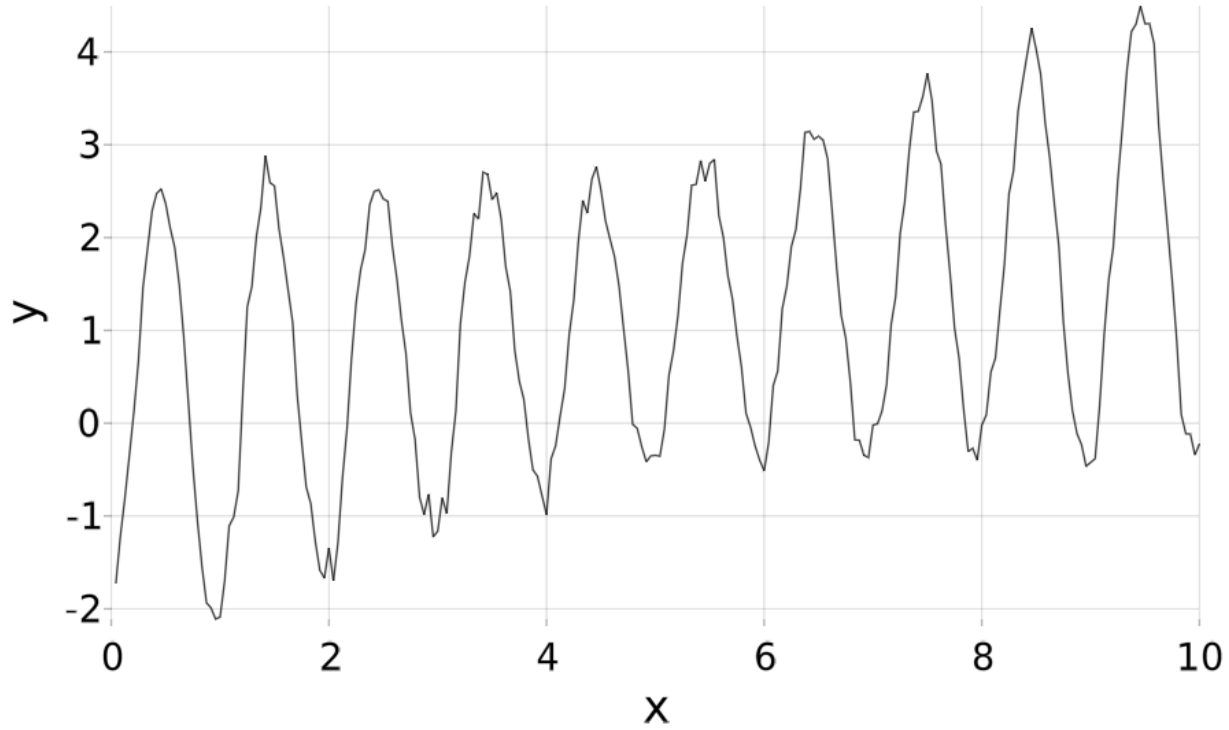


Empirical Mode Decomposition

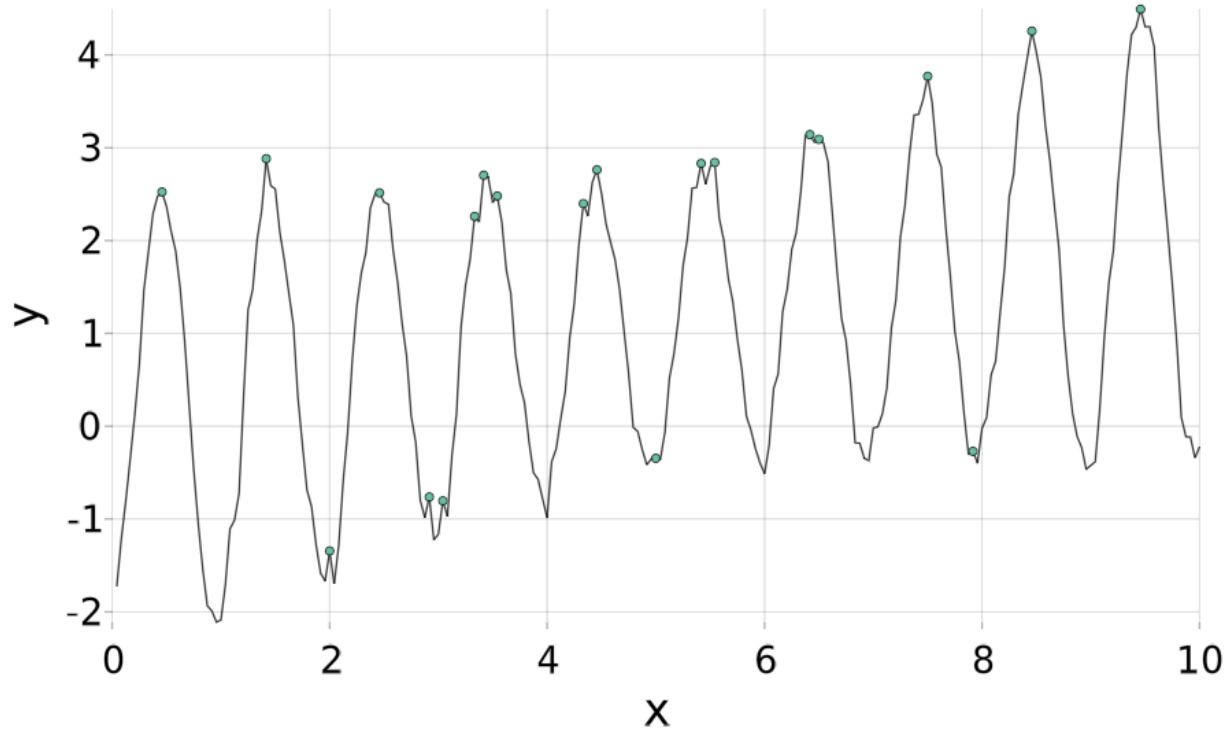
- Alternative to Fourier transform
- Handles non-stationary and non-linear data
- Works with irregular time series
- Decomposes the data into Intrinsic Mode Functions



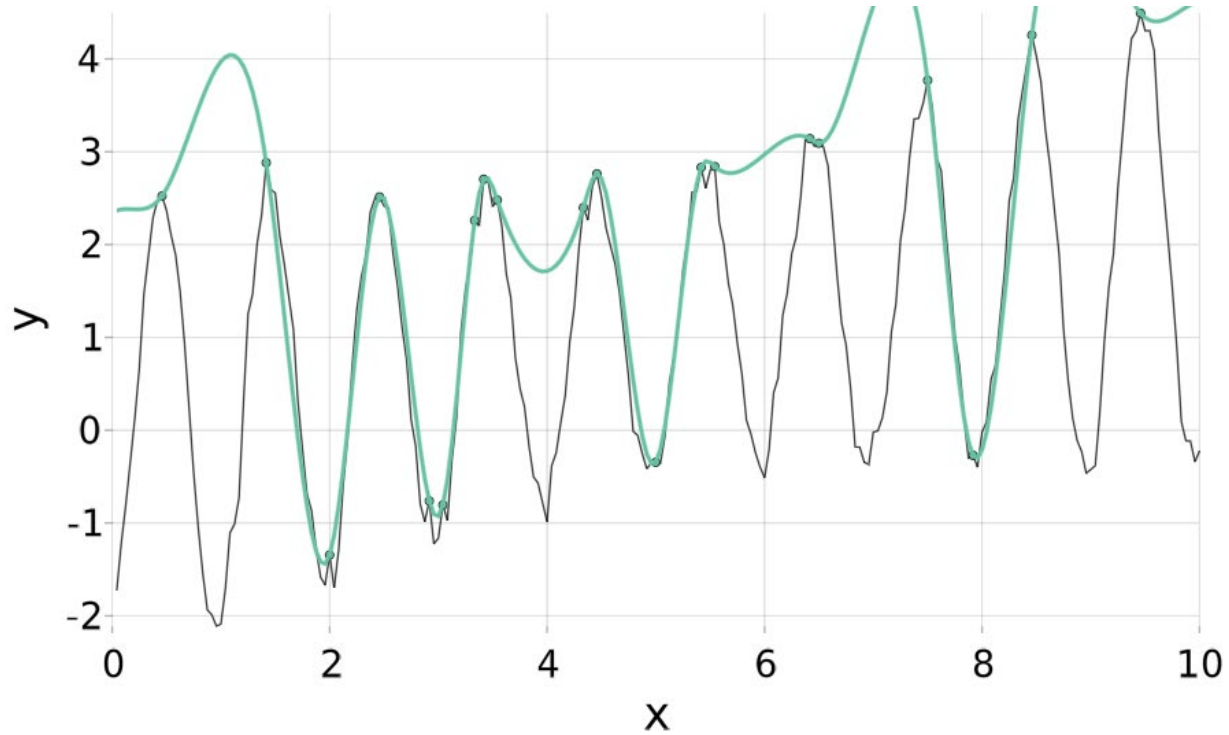
Sifting Process



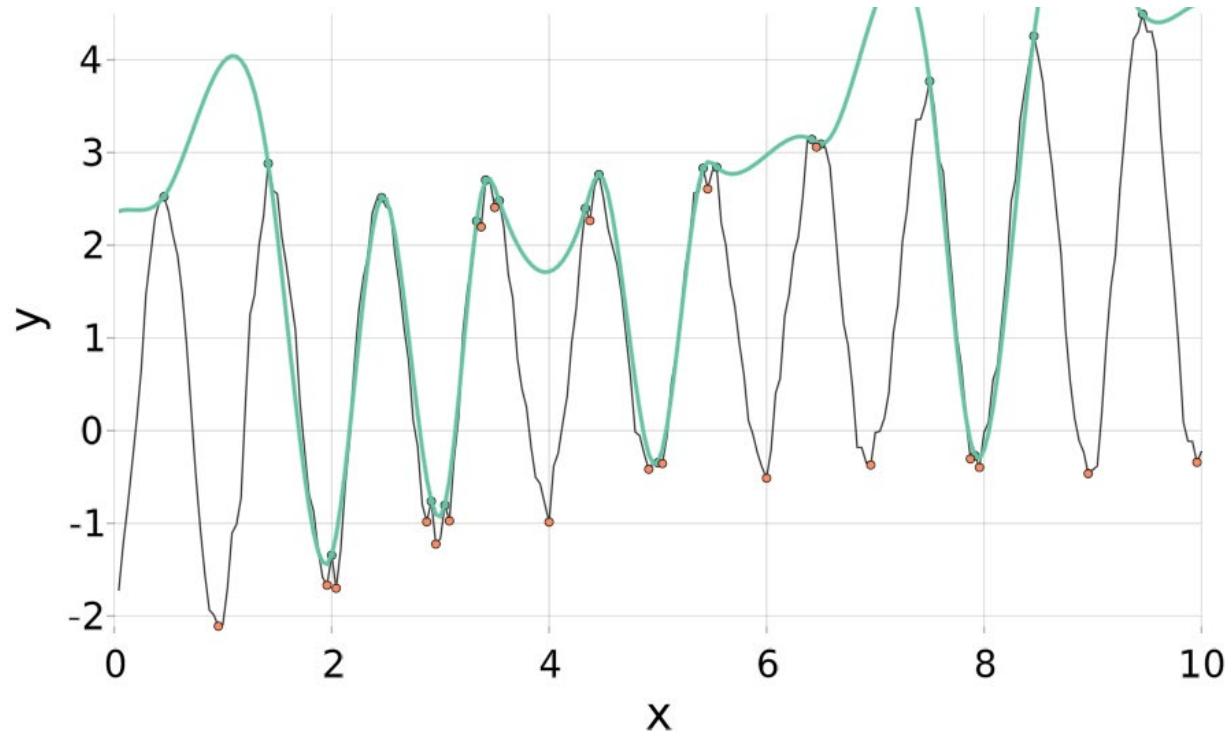
Sifting Process



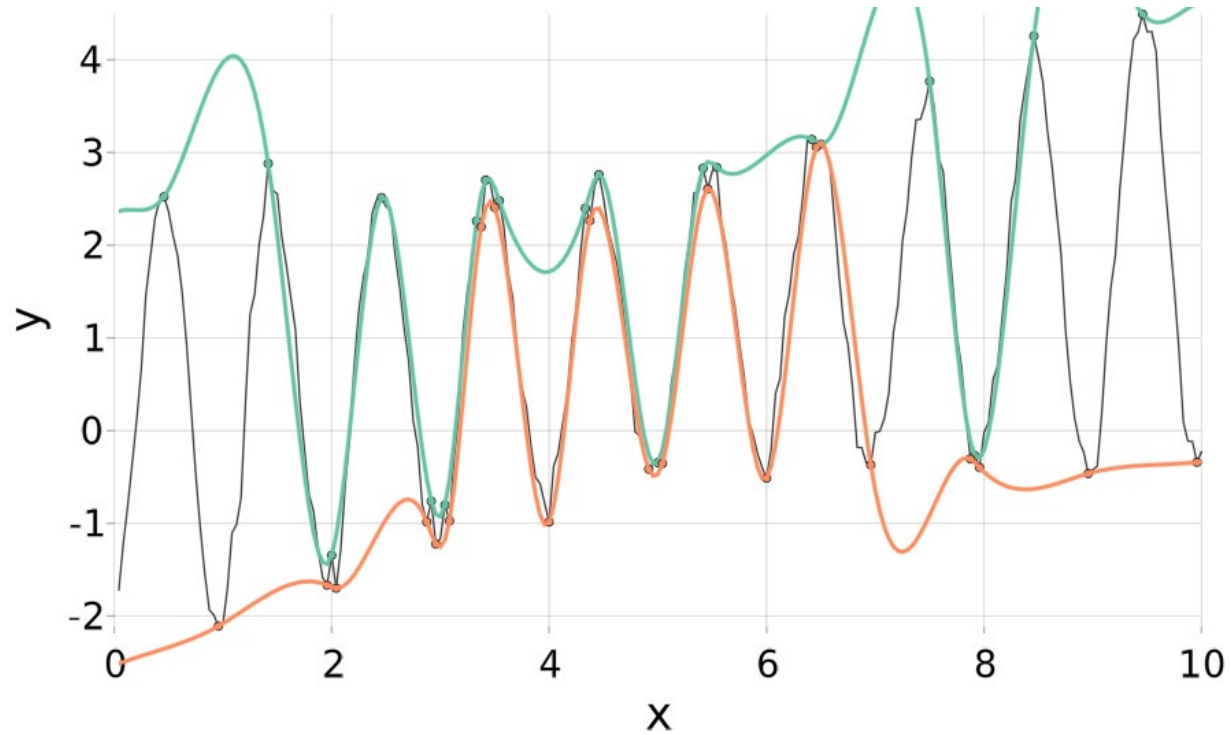
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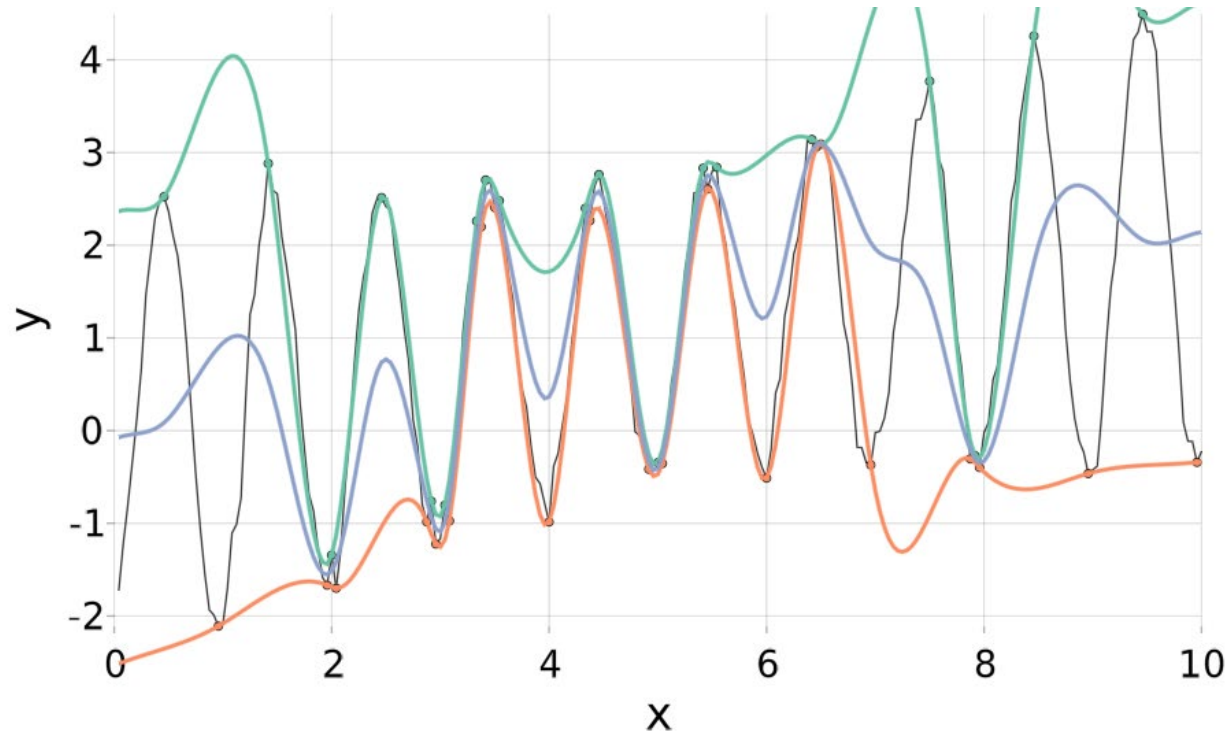
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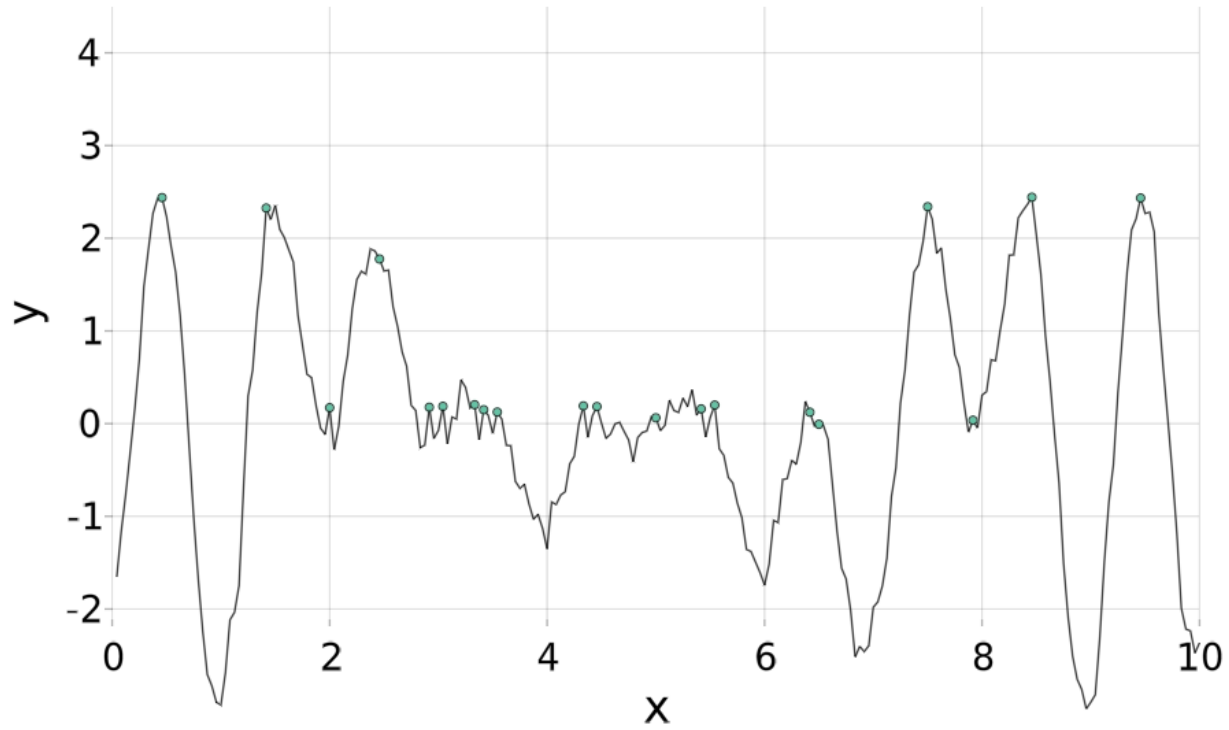
Sifting Process



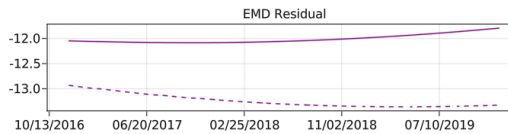
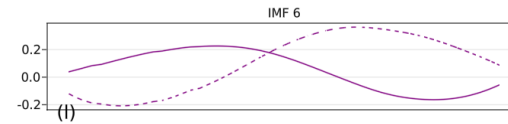
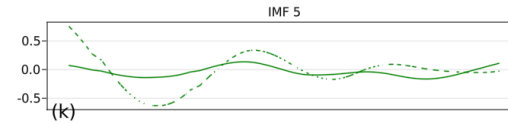
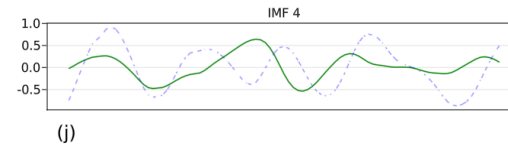
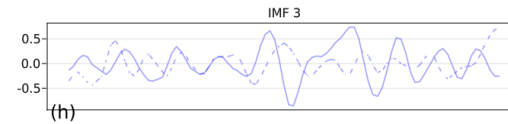
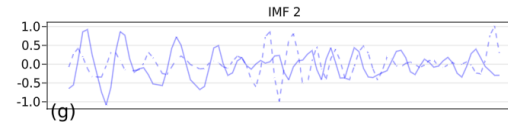
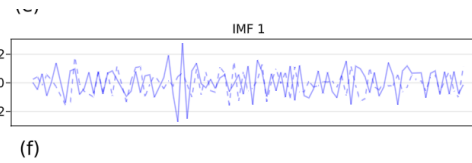
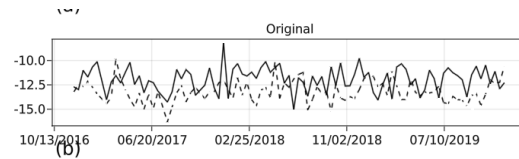
Sifting Process



Sifting Process

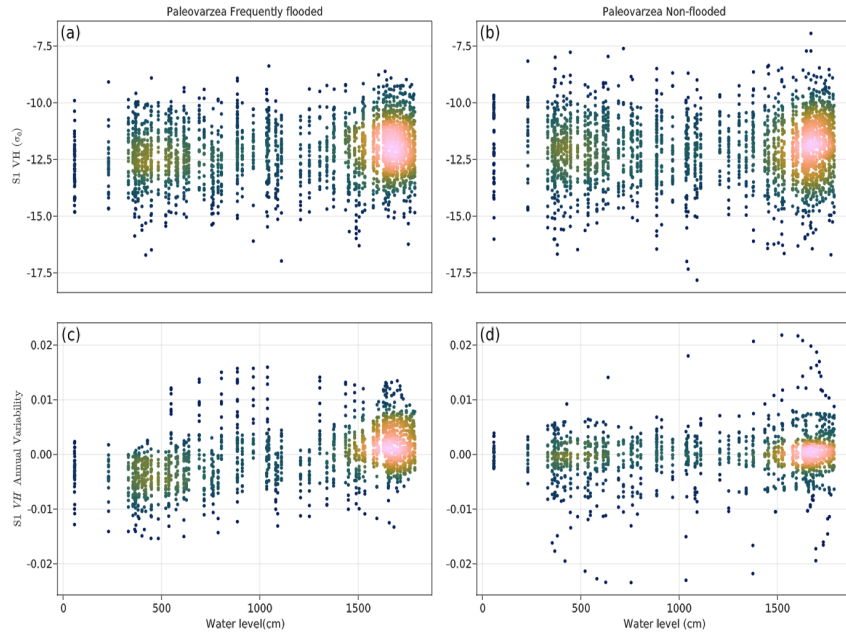


Frequency Binning

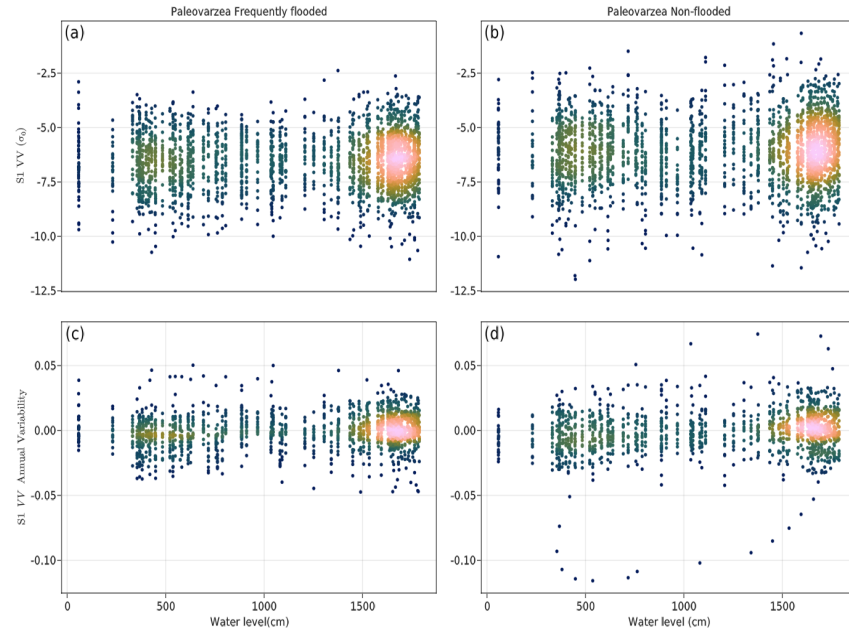


Correlation against the water level

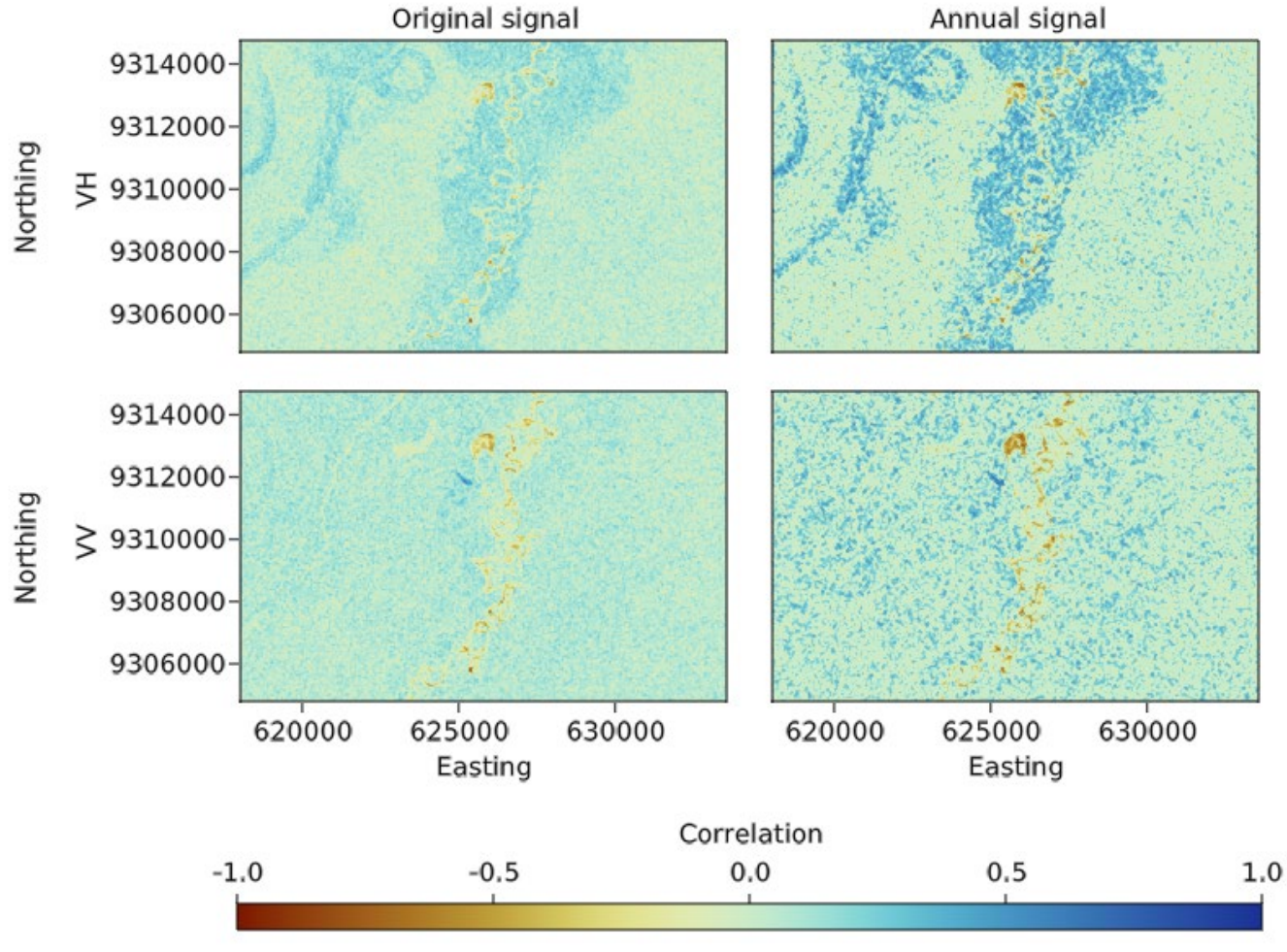
VH



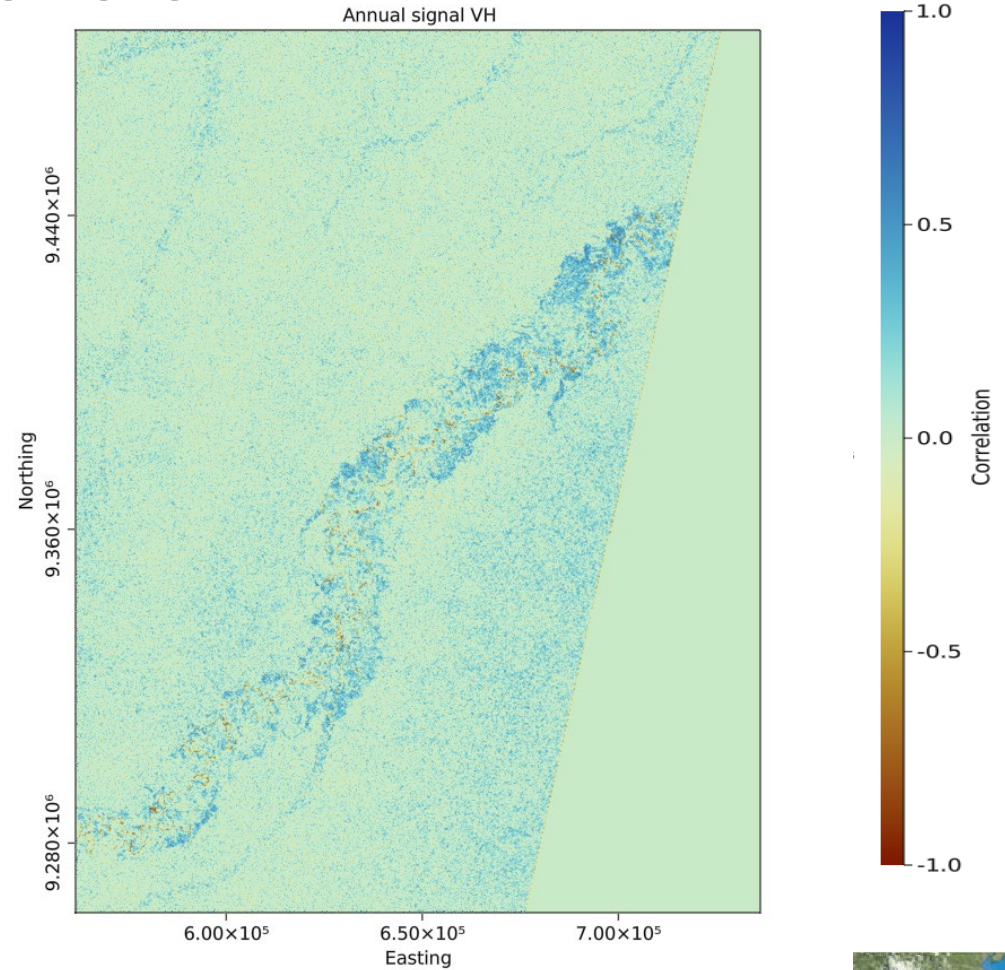
VV



Correlation against the water level



Correlation against the water level



Conclusion

- Flooding in rainforests influence S1 signal
- Decomposition of time series reveal different influences
- Next steps: Apply this method on other ecosystems

