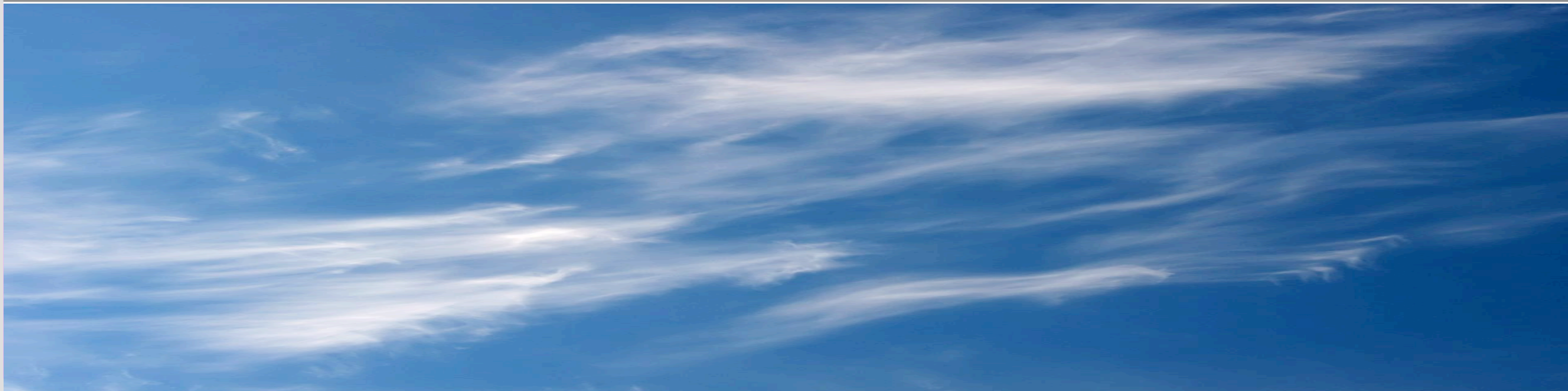


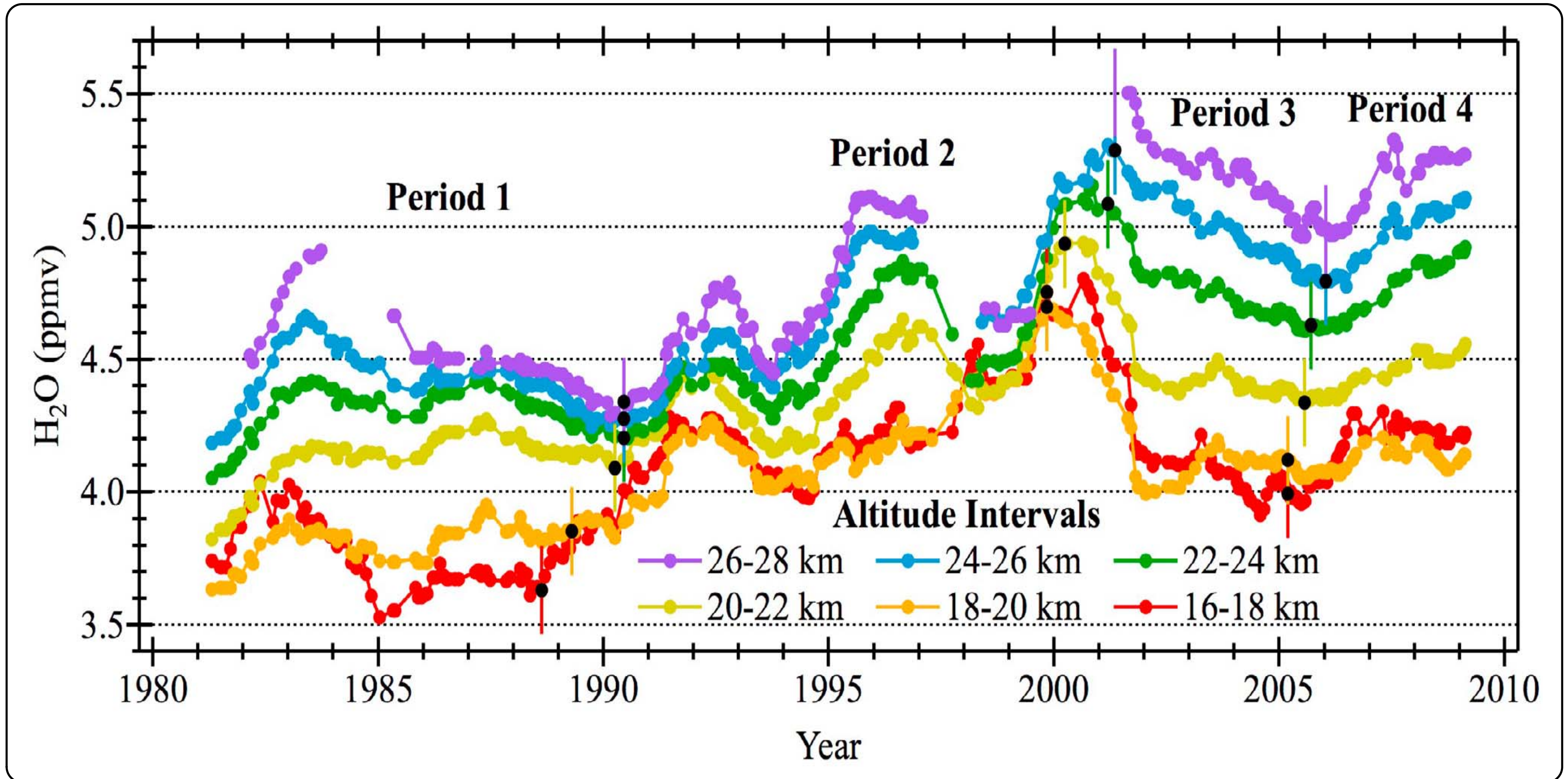
# Variability of stratospheric water vapour: An analysis based on UARS/HALOE and Envisat/MIPAS observations



# Outline

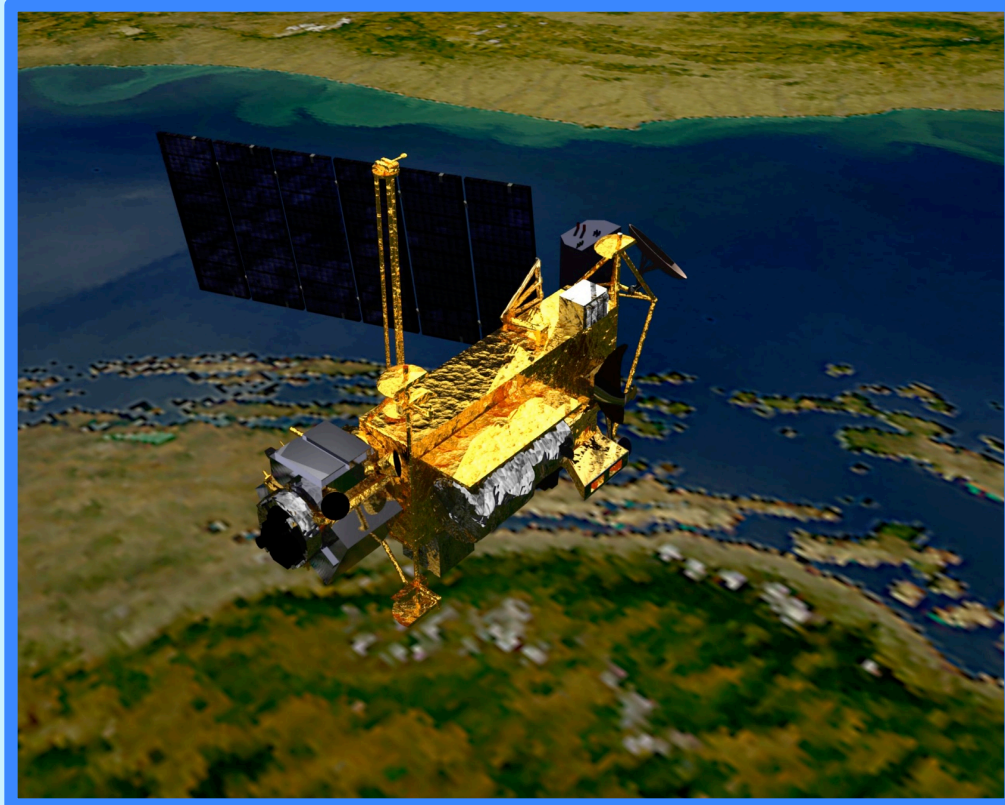
- Methodology
- Results
- Comparisons with other results

# Motivation



*Hurst et al., JGR 2011*

# Data sets



HALOE aboard UARS

observational period  
1991 - 2005

solar occultation  
attenuation of solar light  
30 observations/day



MIPAS aboard Envisat  
nominal spectral resolution

observational period  
2002 - 2004

limb  
thermal emission  
~1300 observations/day

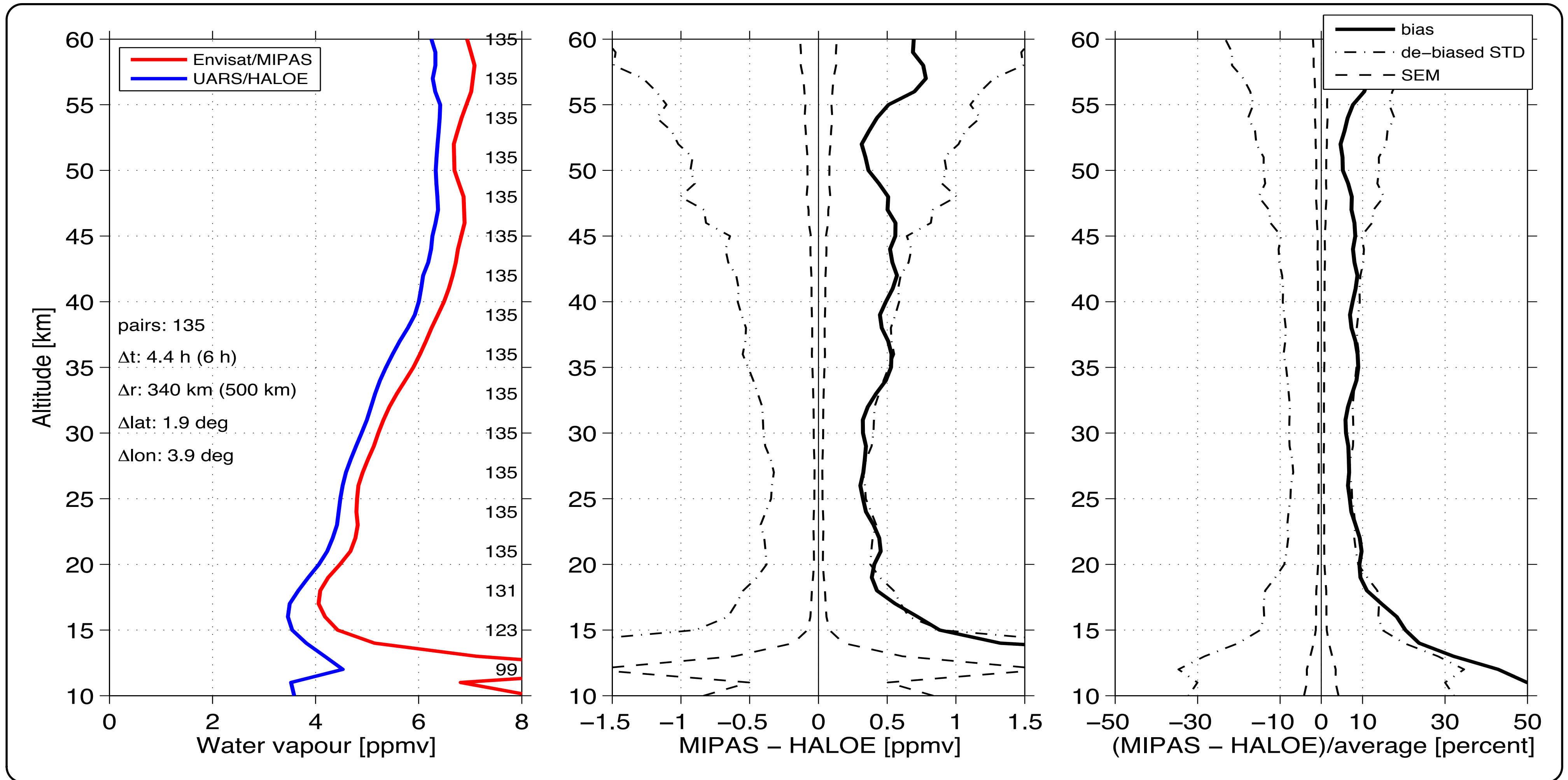


MIPAS aboard Envisat  
reduced spectral resolution

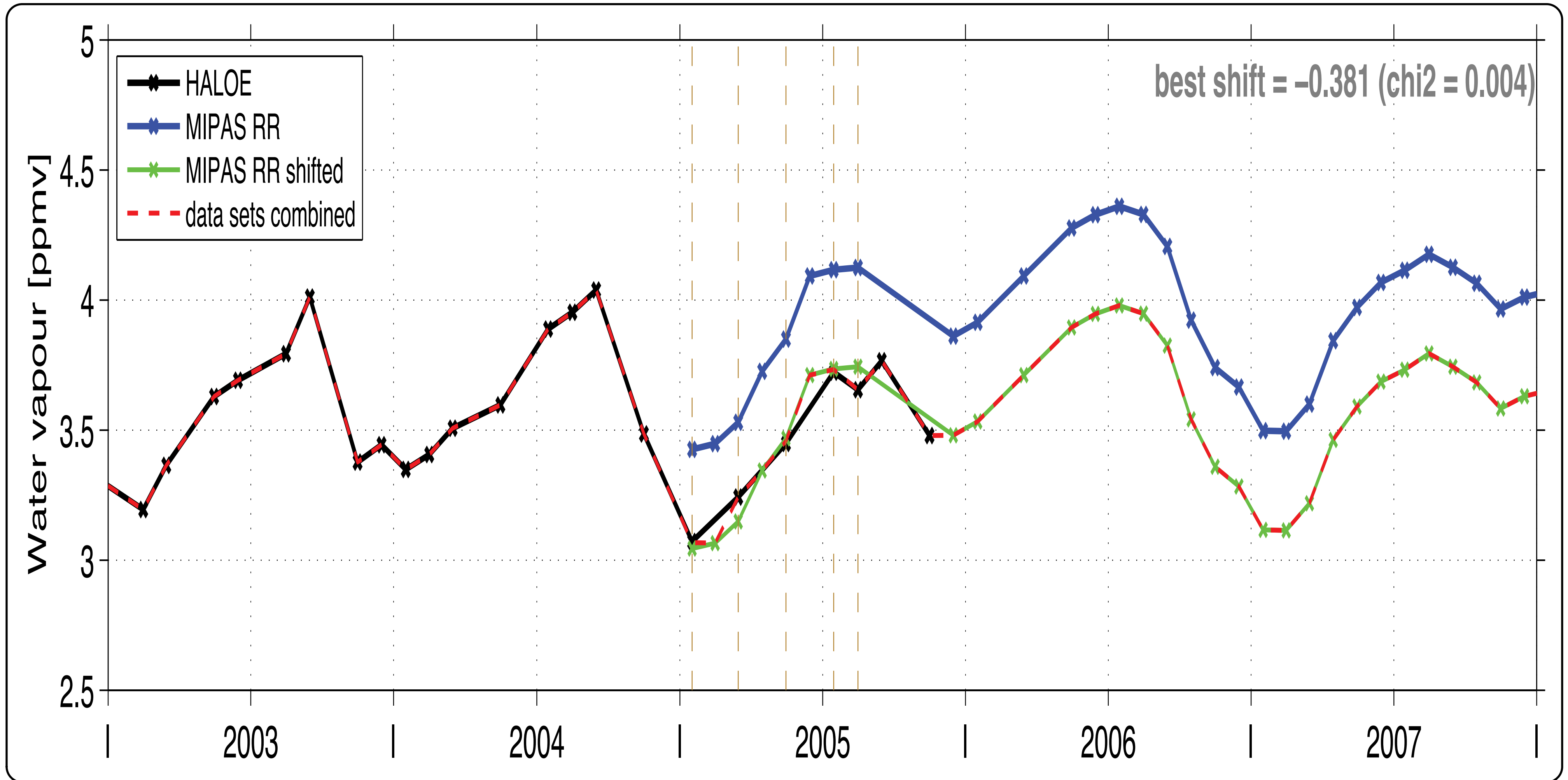
observational period  
2005 - 2012

limb  
thermal emission  
~1300 observations/day

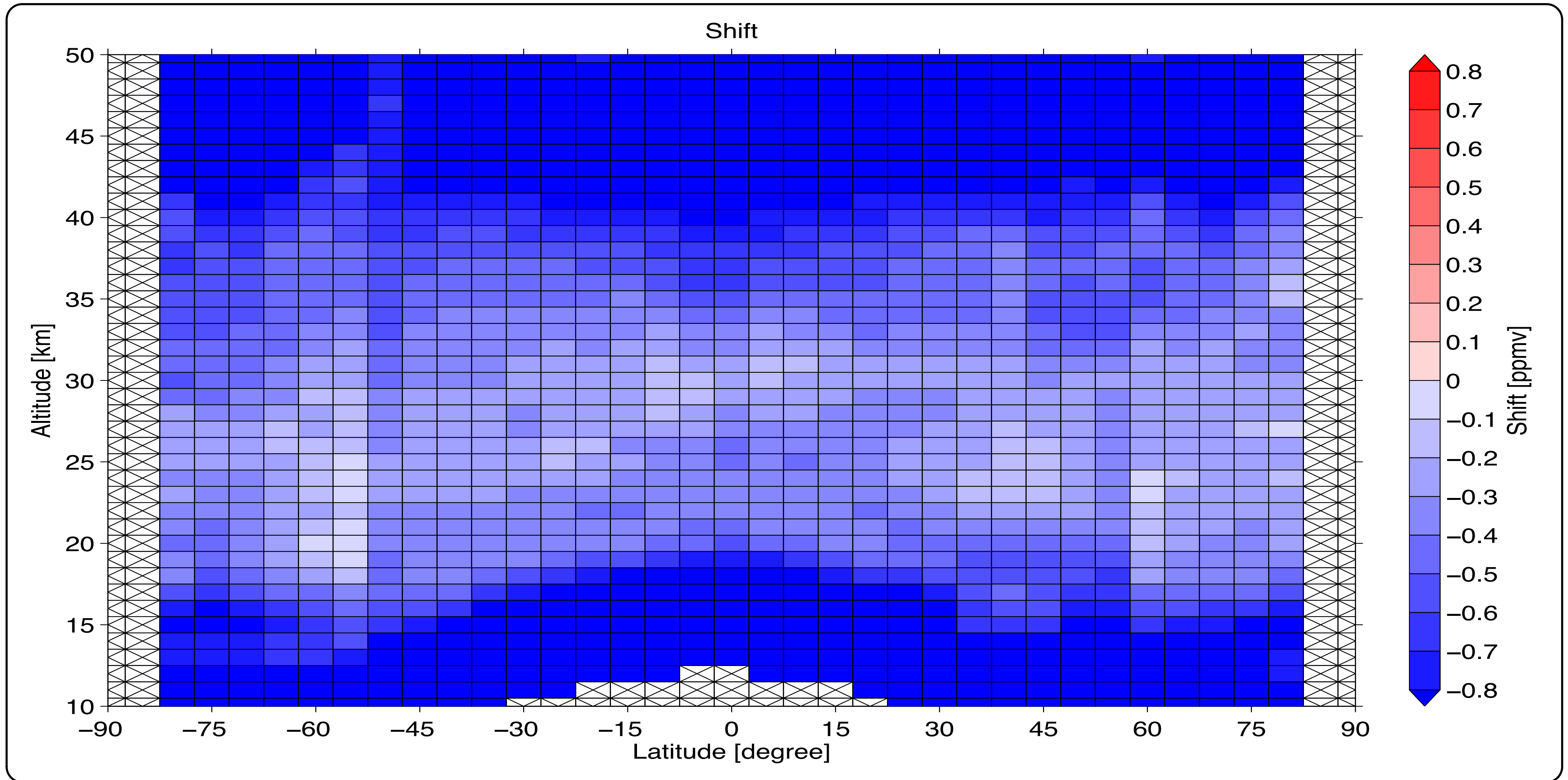
# Data set combination



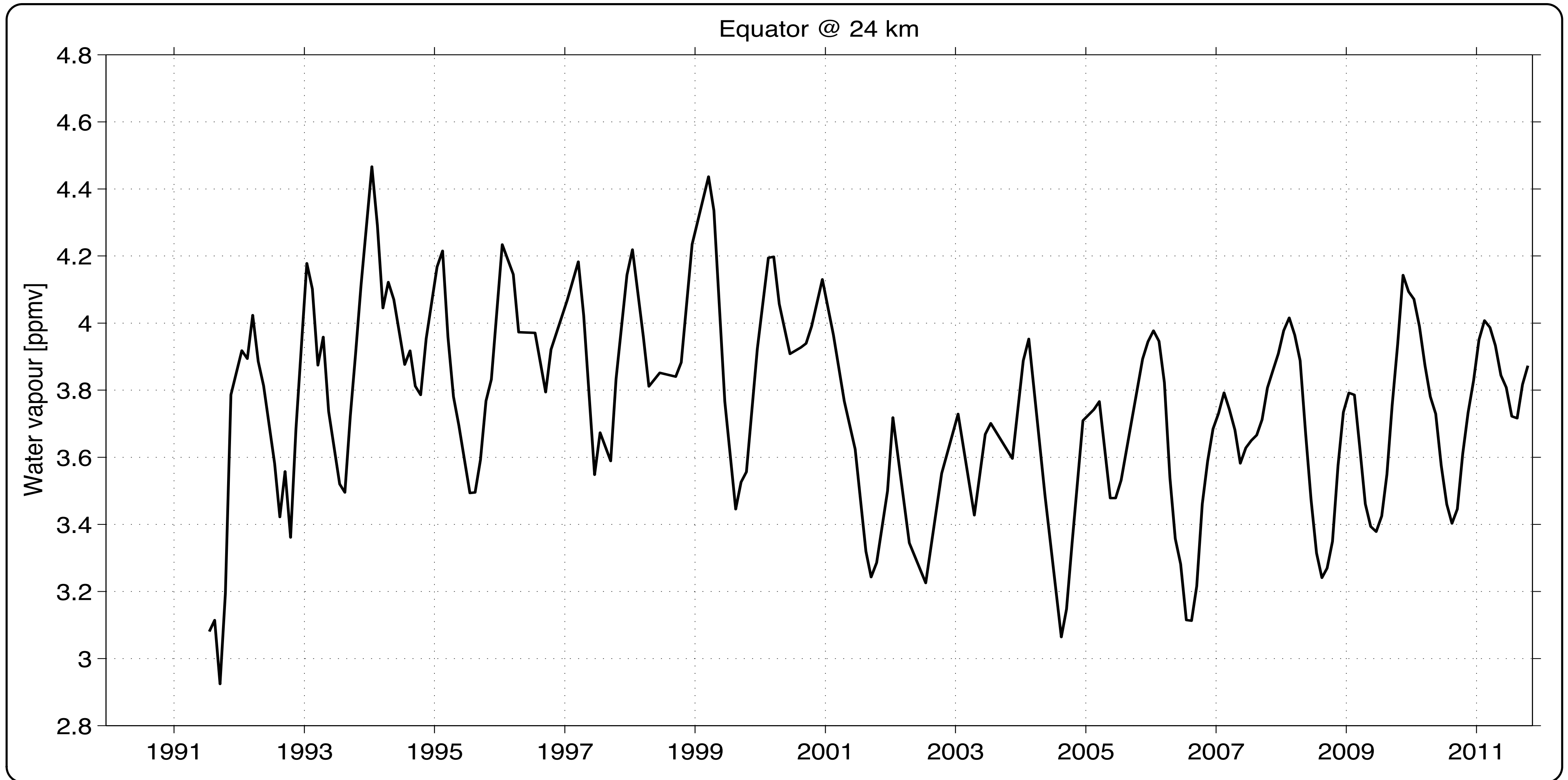
# Data set combination



# Data set combination: HALOE & MIPAS RR

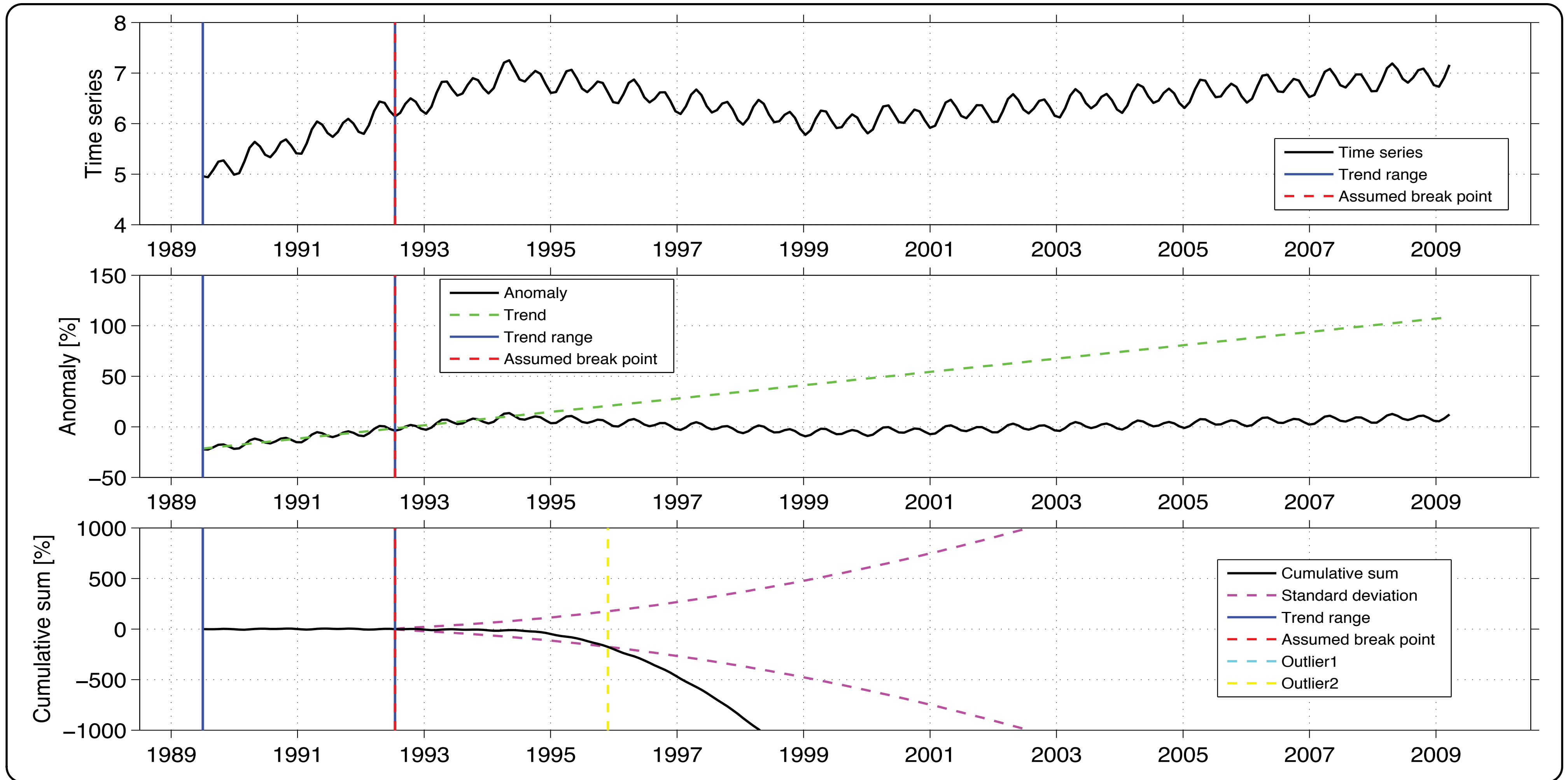


# Time series regression

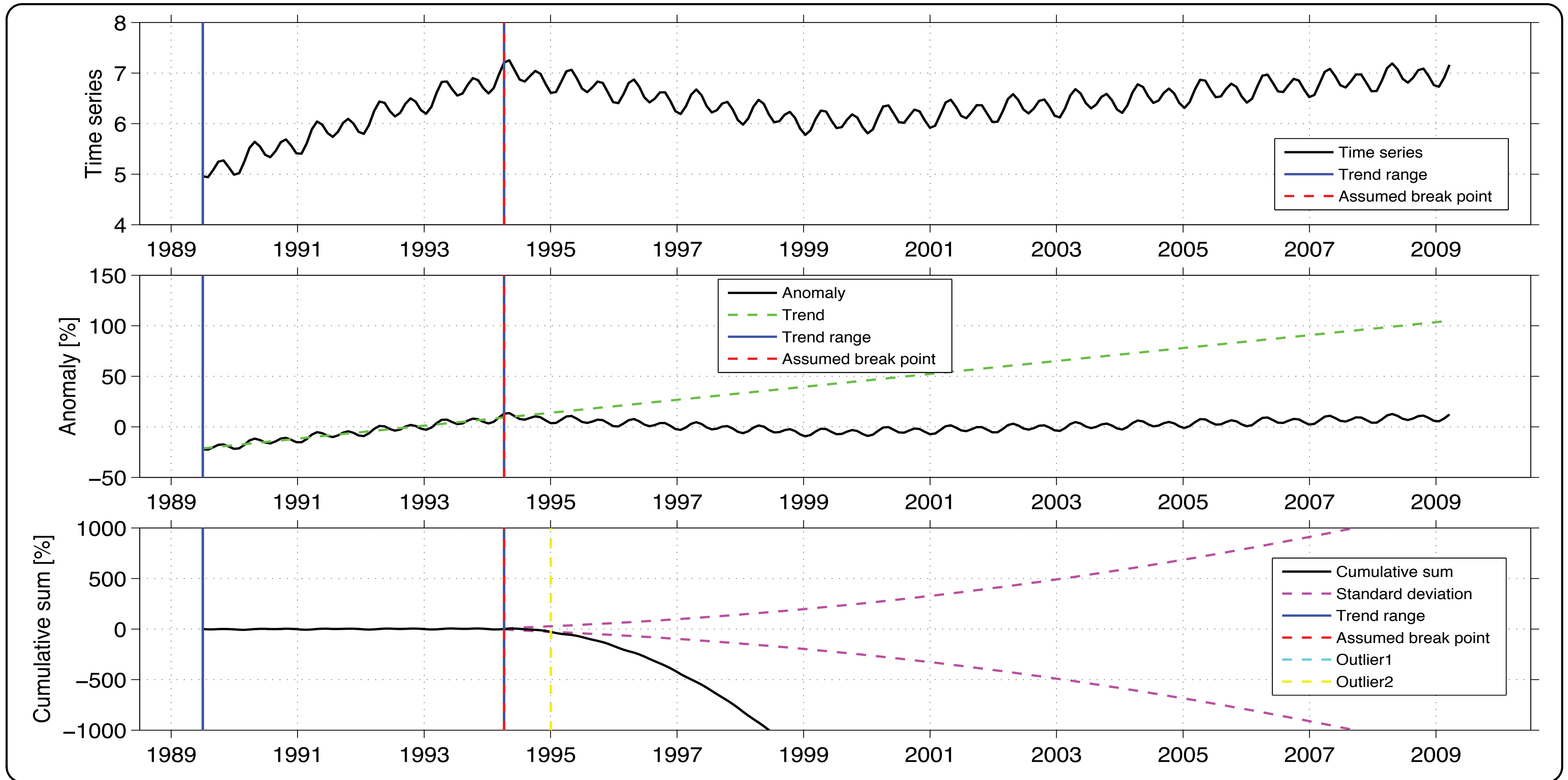




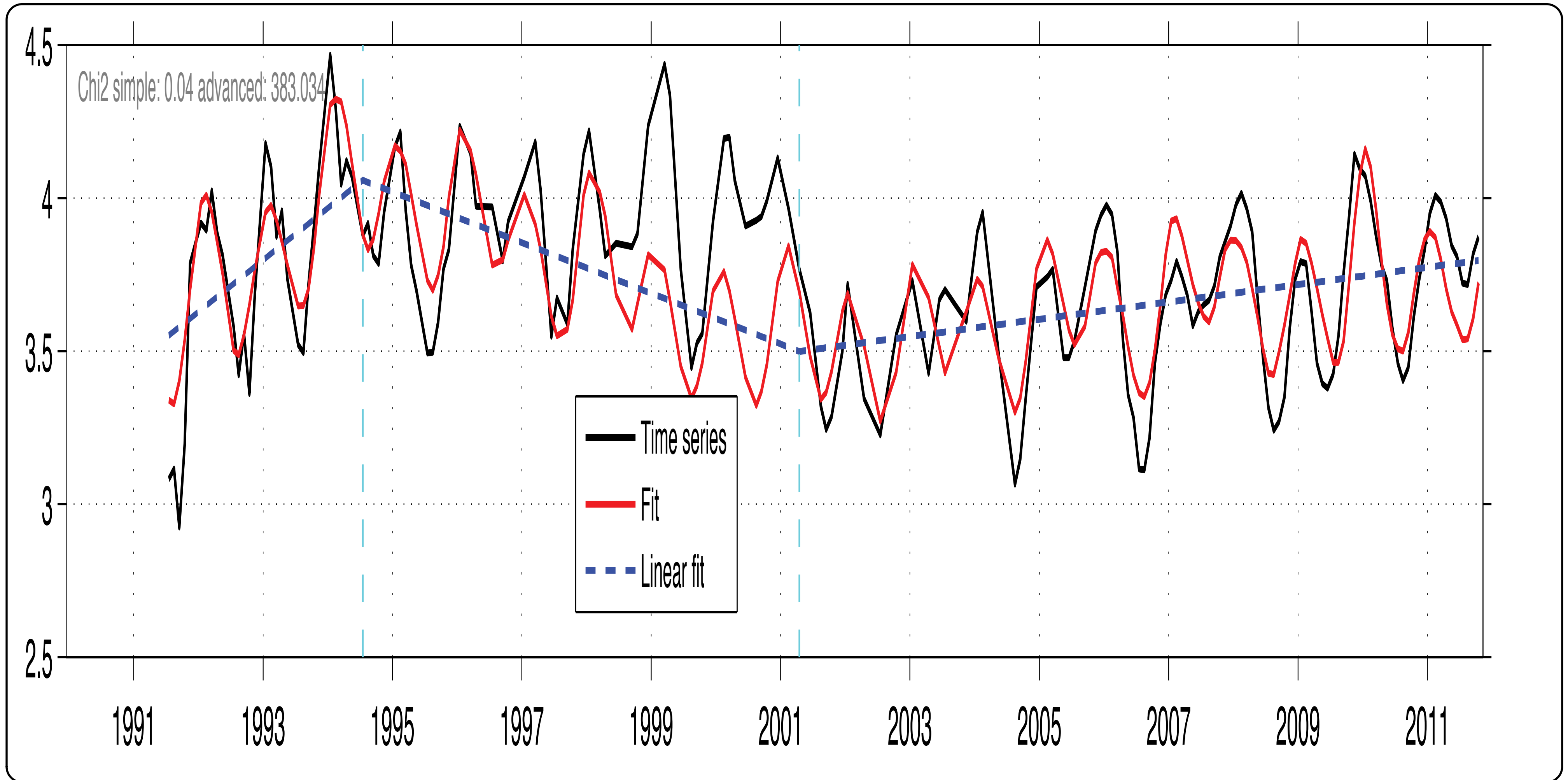
# Cumulative sum



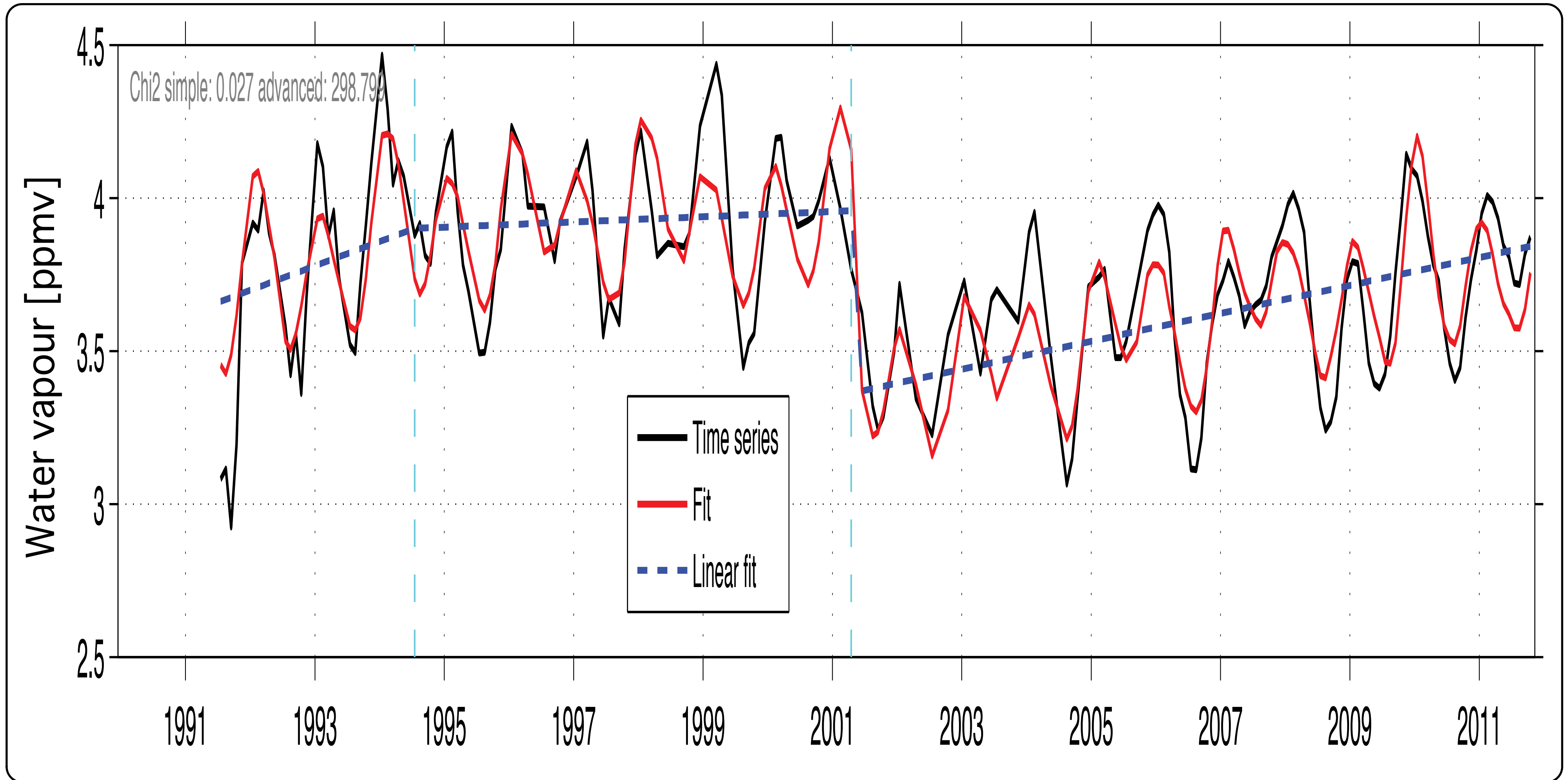
# Cumulative sum



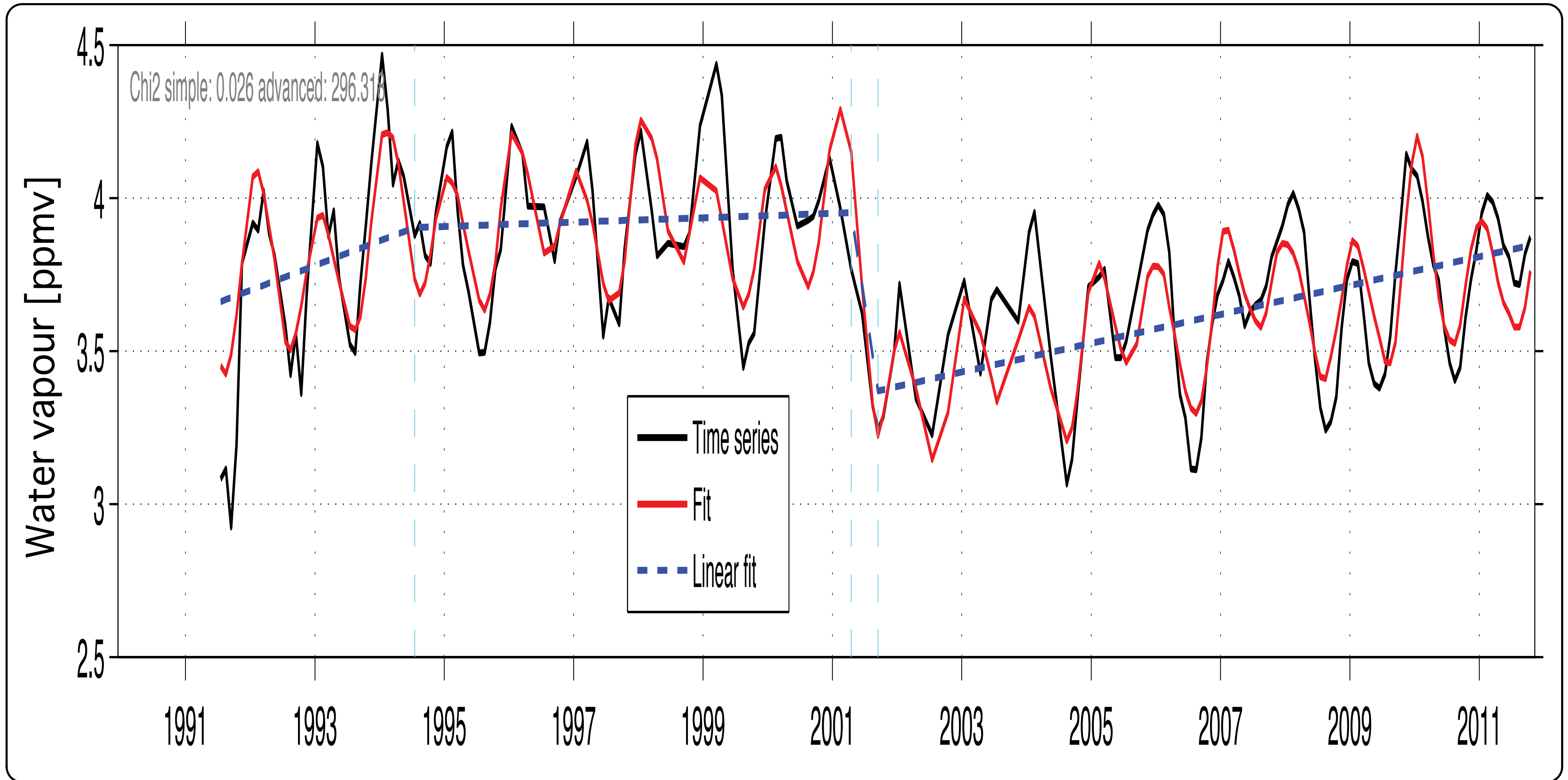
# Time series regression



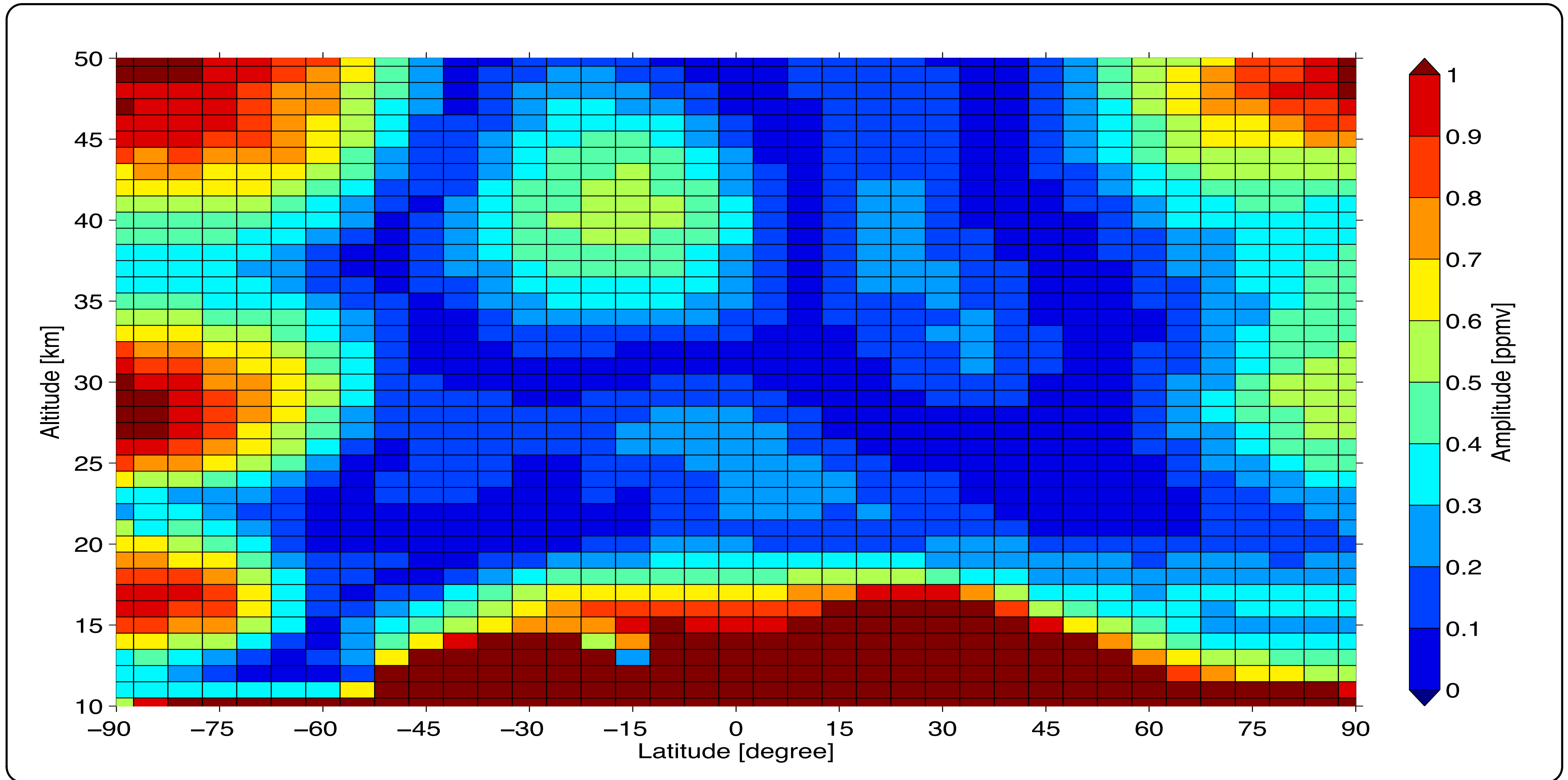
# Time series regression



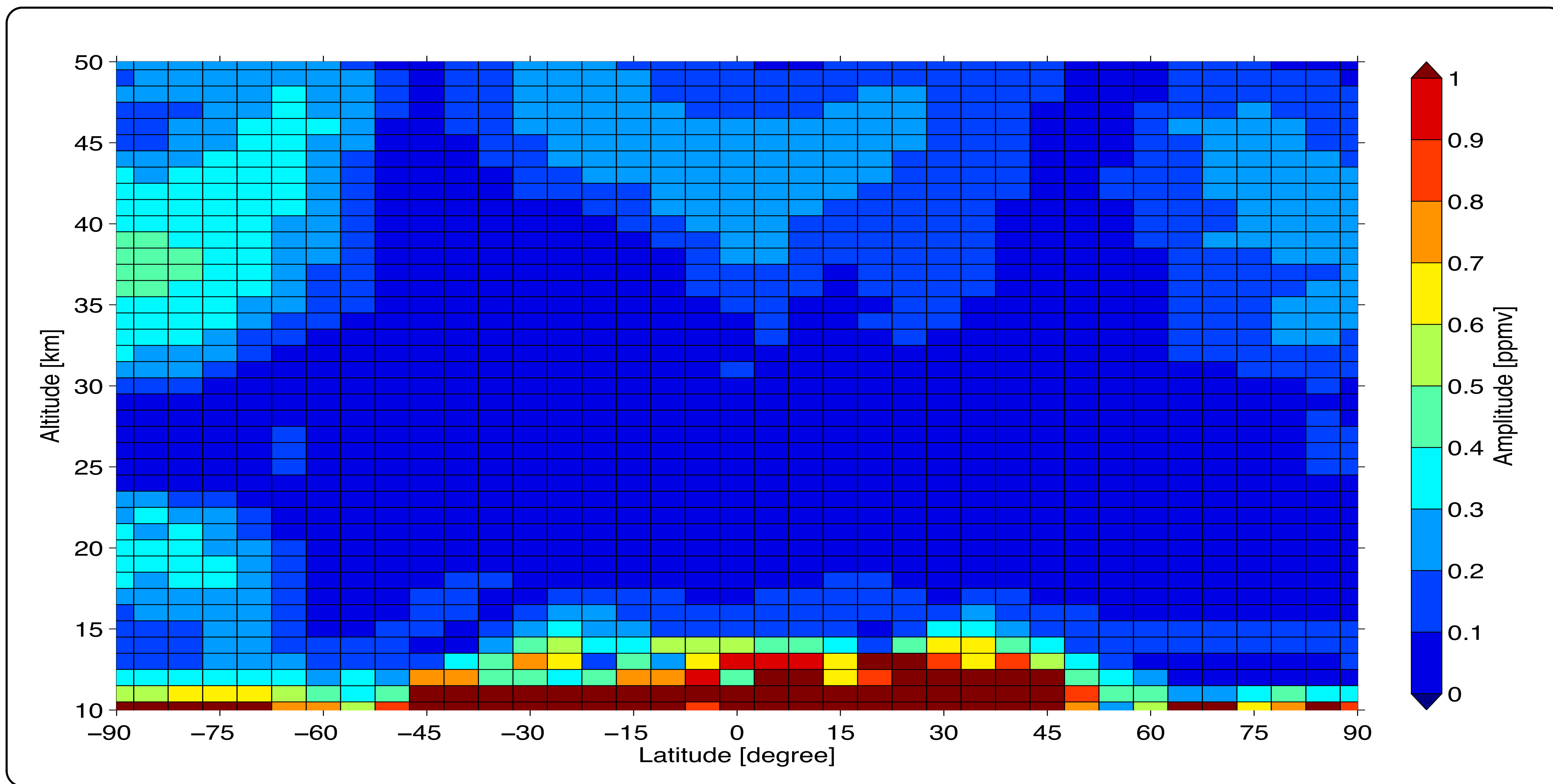
# Time series regression



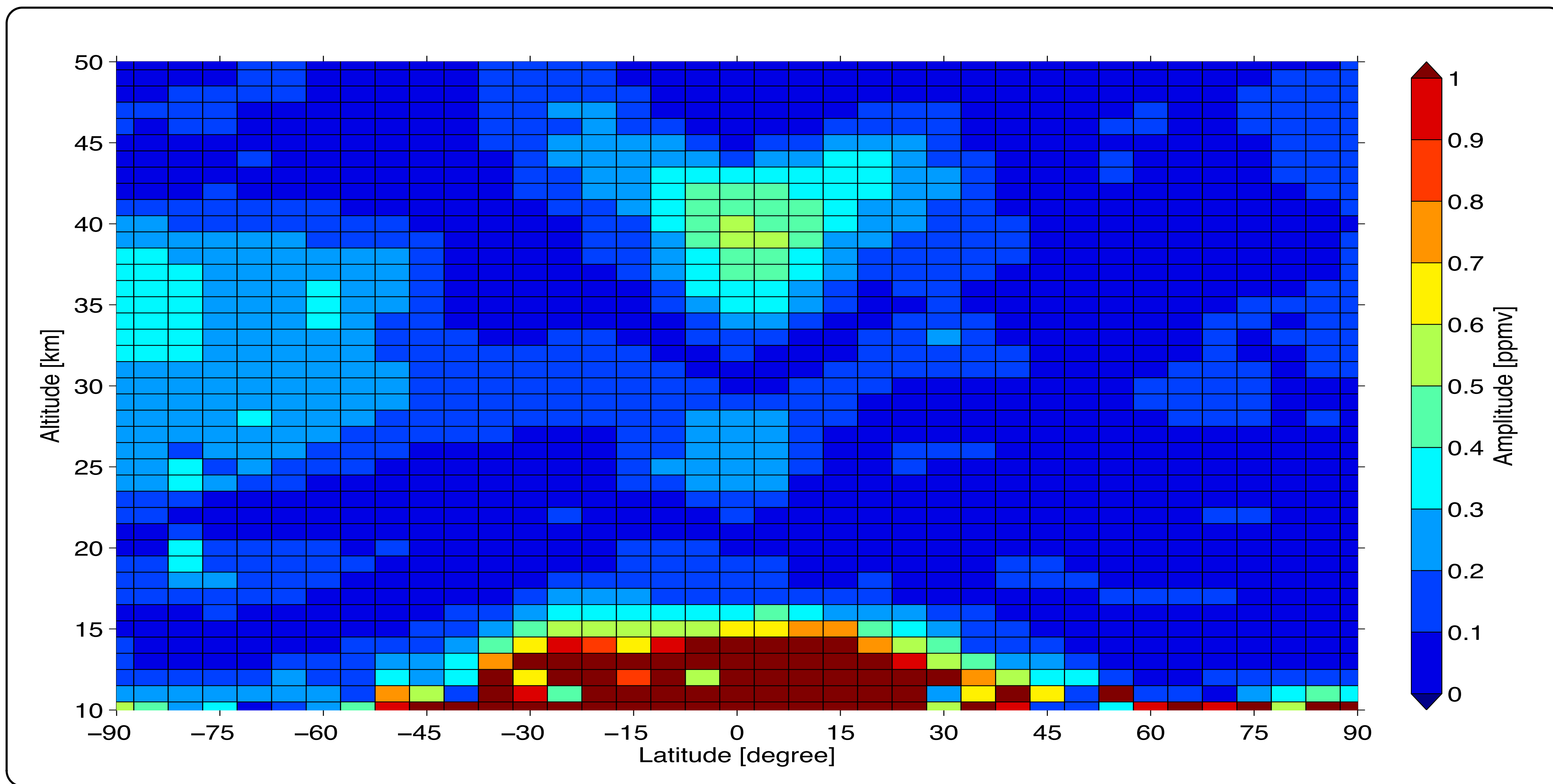
# Time series regression - A0



# Time series regression - SAO

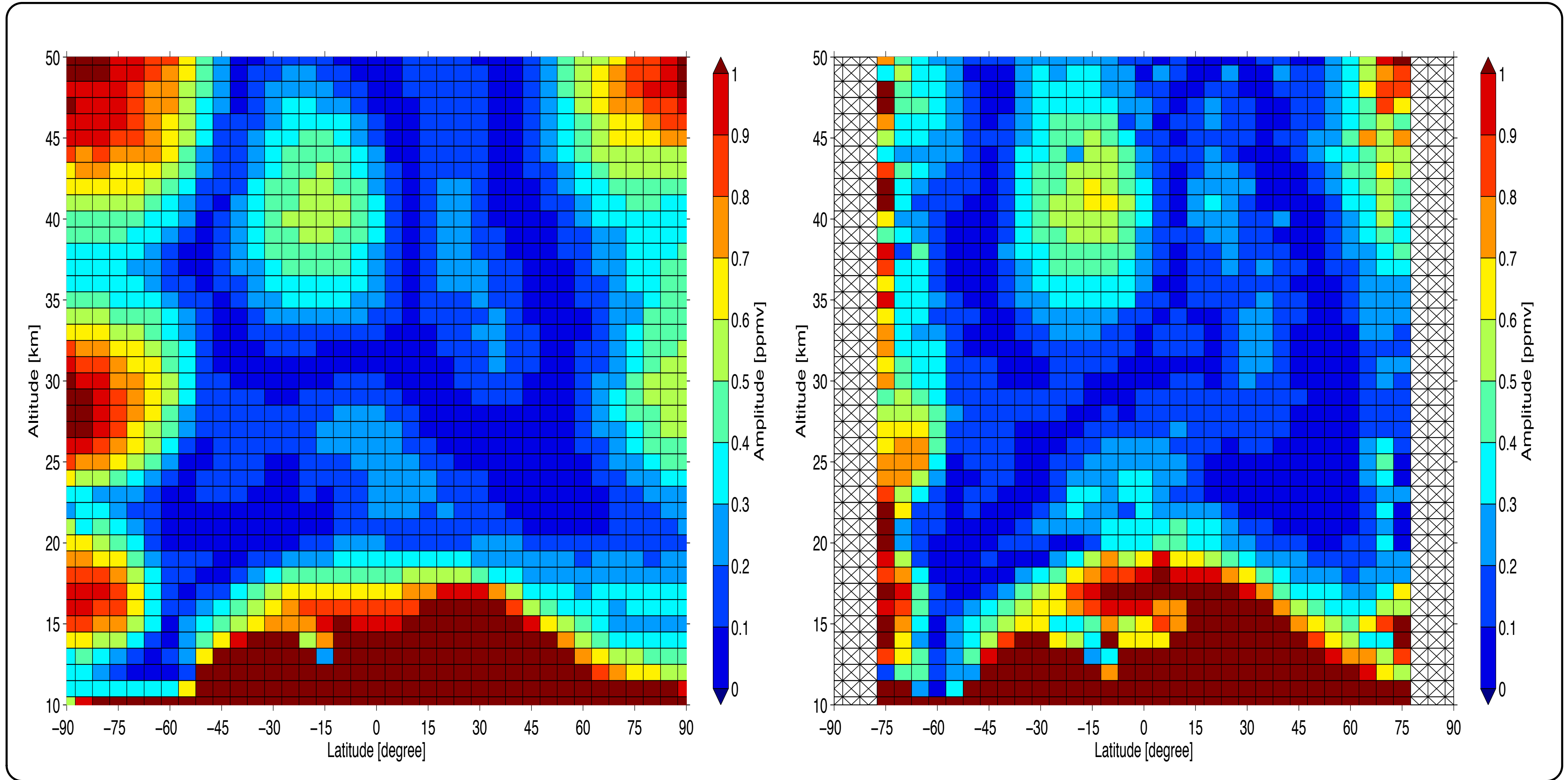


# Time series regression - QBO

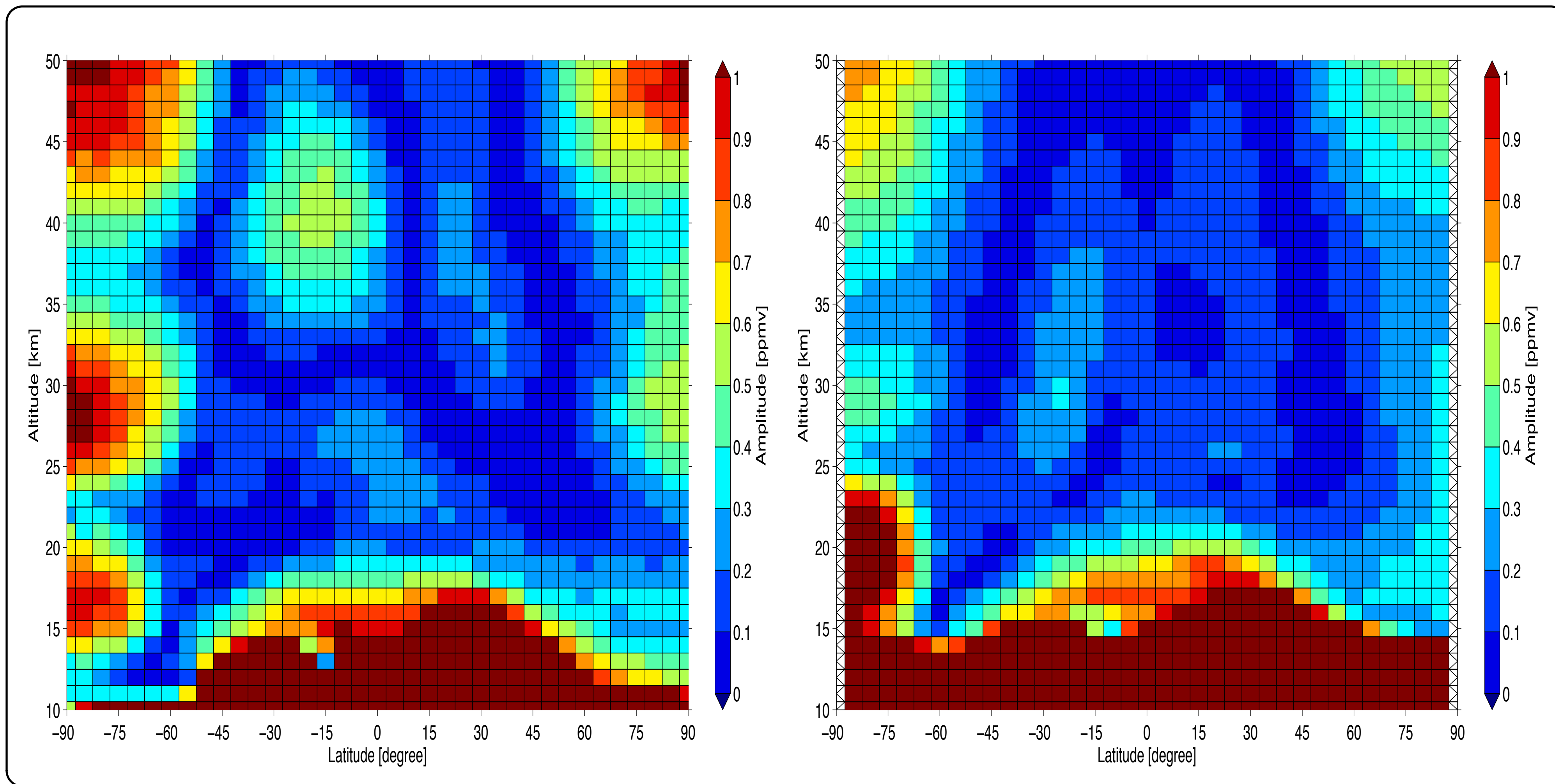




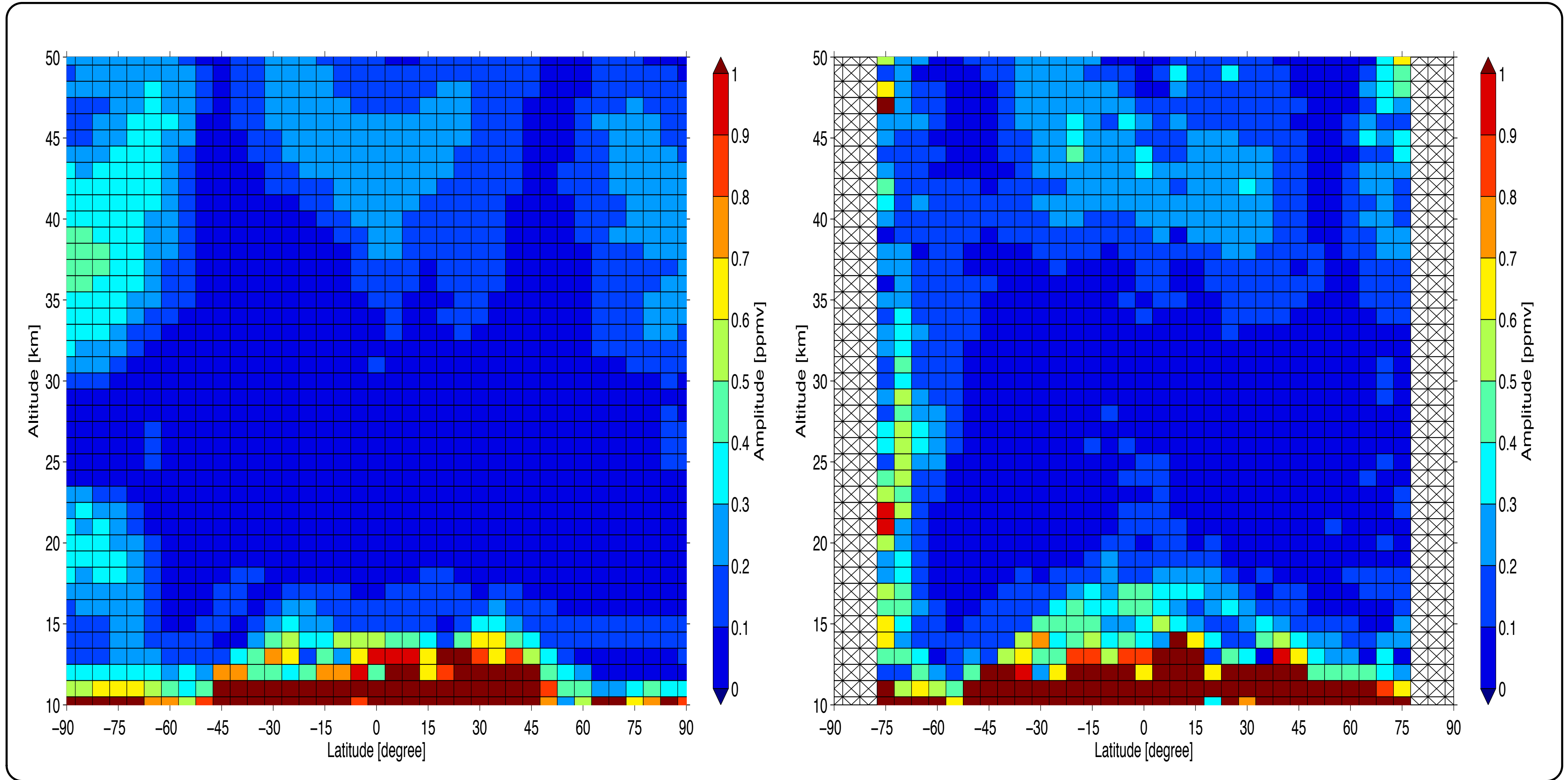
# Comparison to SAGE II - AO



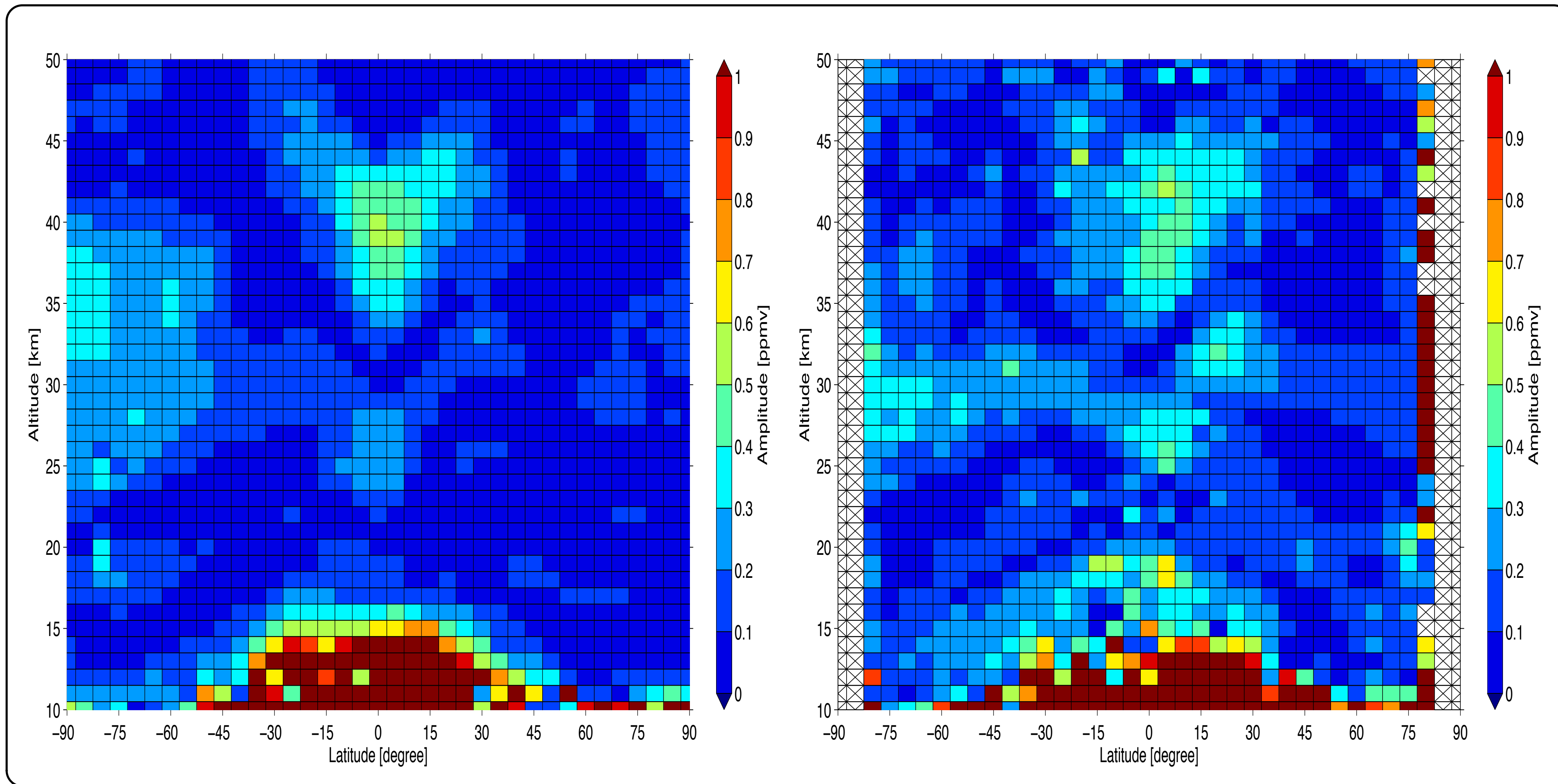
# Comparison to EMAC-FUB - AO



# SAGE II - SAO



# Comparison to SAGE II - QBO



# Summary & Outlook

- The analysis of the stratospheric time series requires the implementation of multiple trend breaks
- The Cumulative Sum method is a useful approach to find changes in long term trends, although not to be used for shorter time spans
- Analysis of linear and solar cycle variations in the future

Thank you for your attention