# SPE impact seen in the Ozone balloon data revisited

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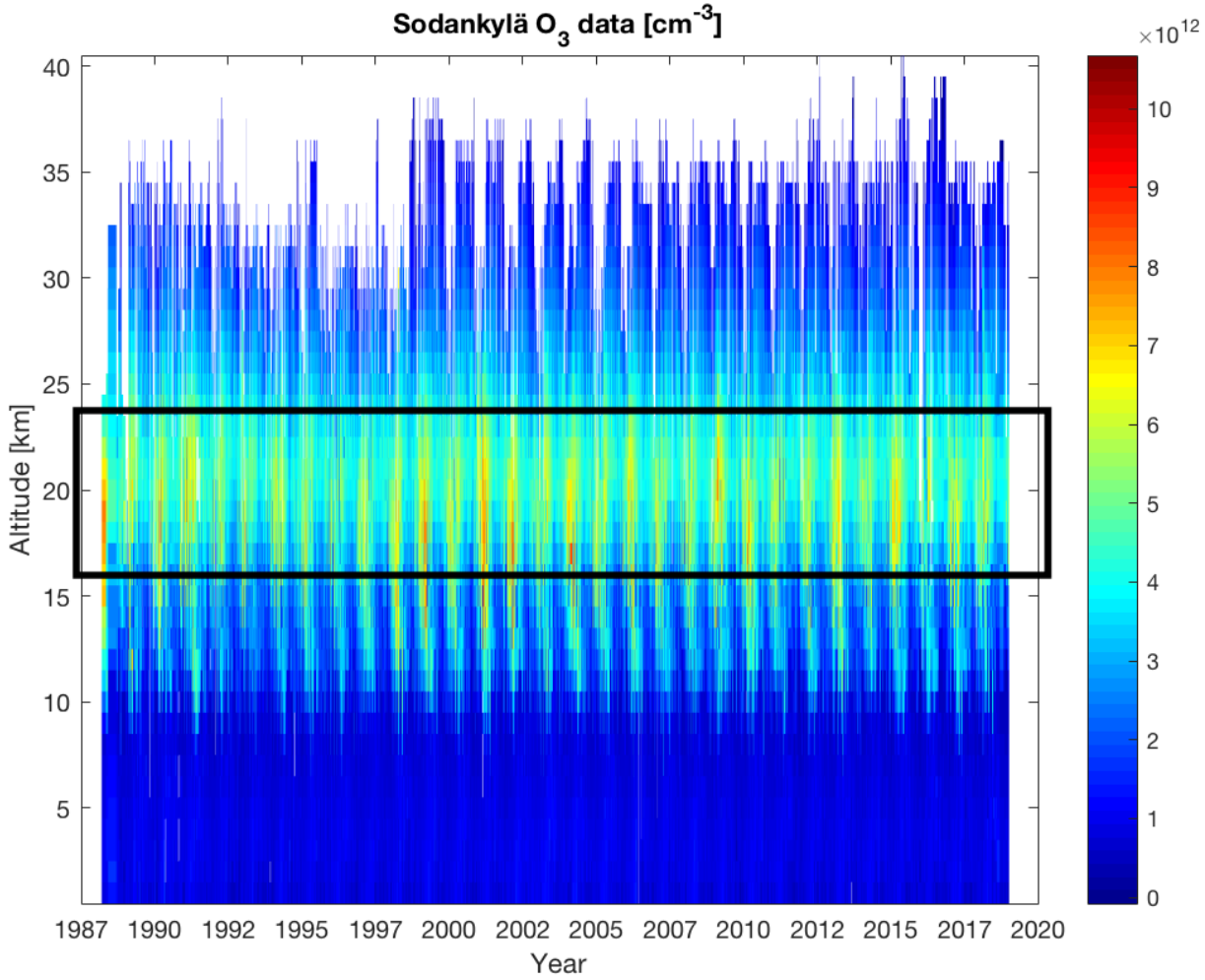
# The Sodankylä Ozone sonde dataset



# SPE impact on the Ozone layer



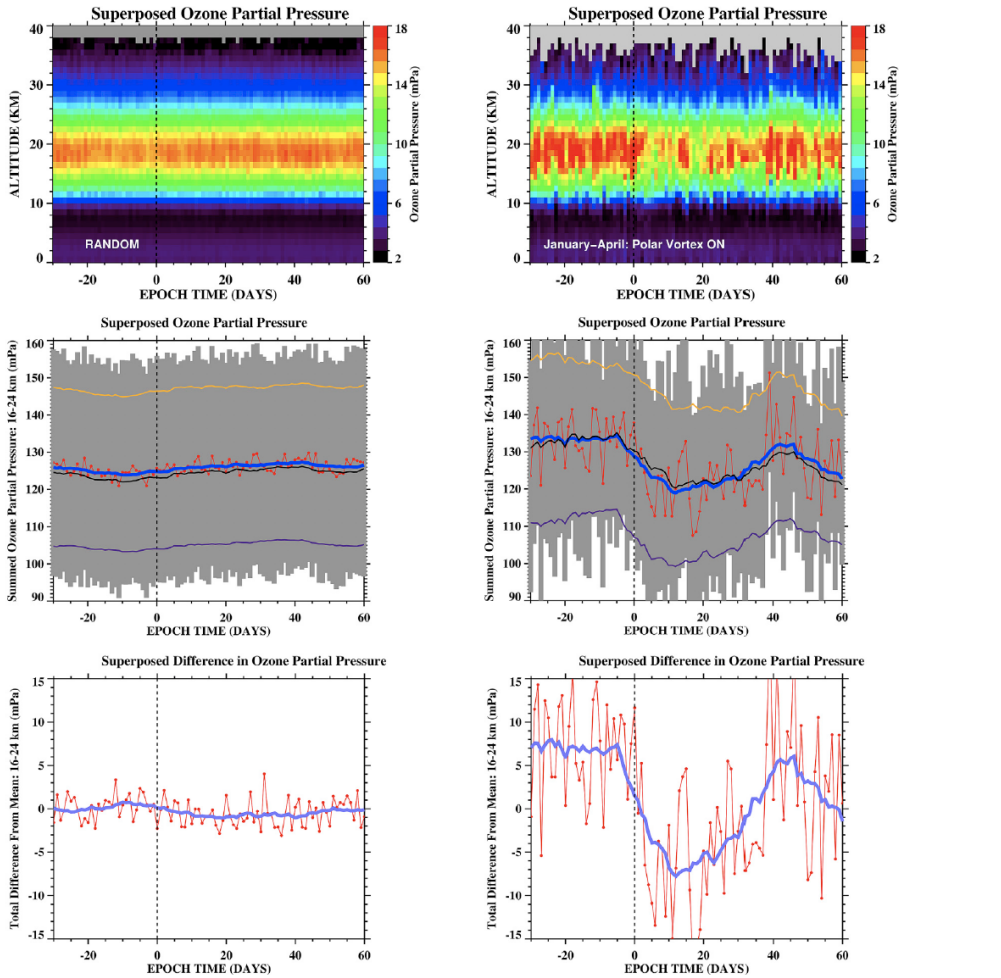
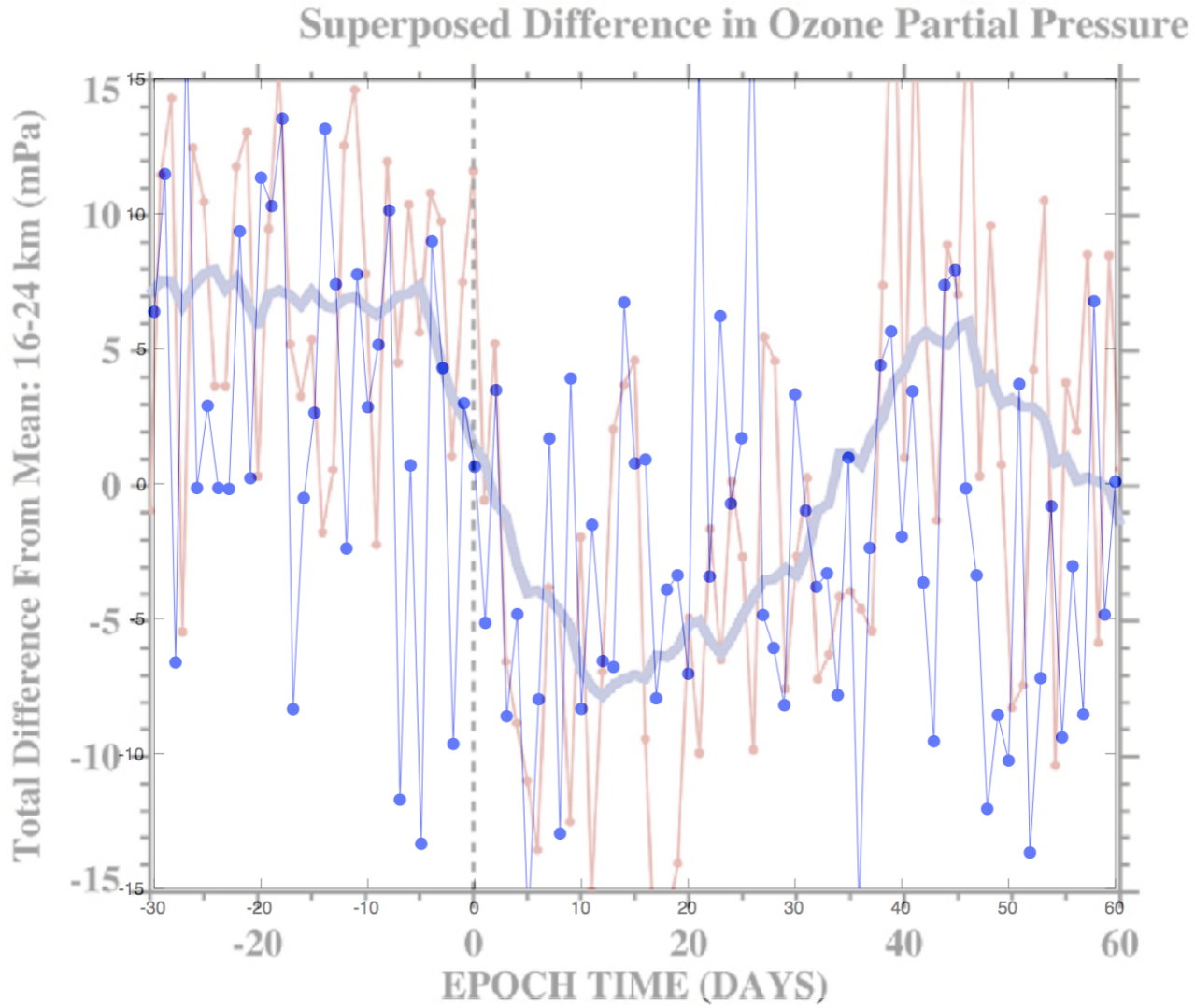
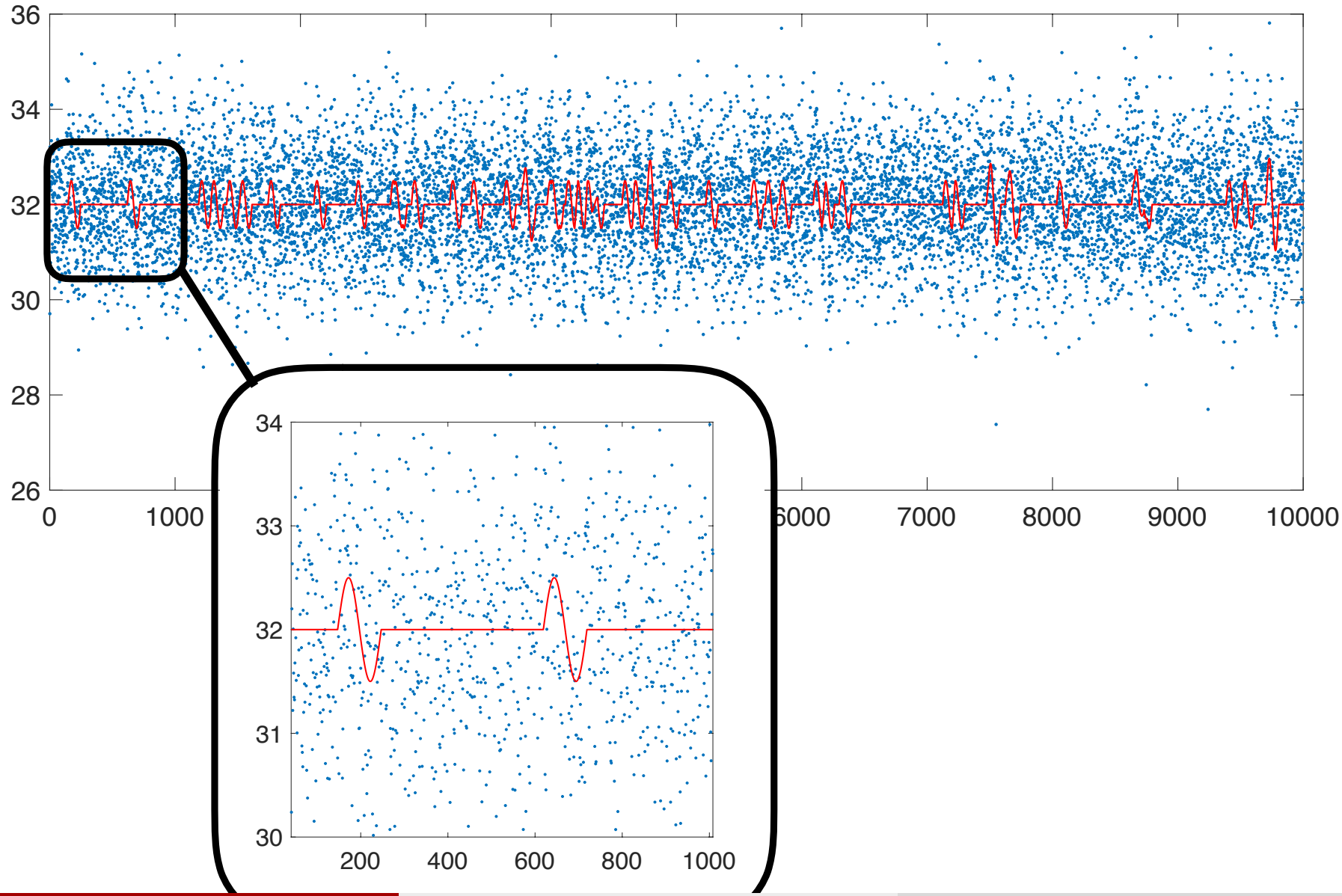



**Fig. 6.** The same format as shown in Figs. 4 and 5, but here data are only plotted for January, February, March and April, when the polar vortex is ACTIVE over Northern Finland. There is a clear trend for a decrease in the stratospheric ozone population following the SPEs.

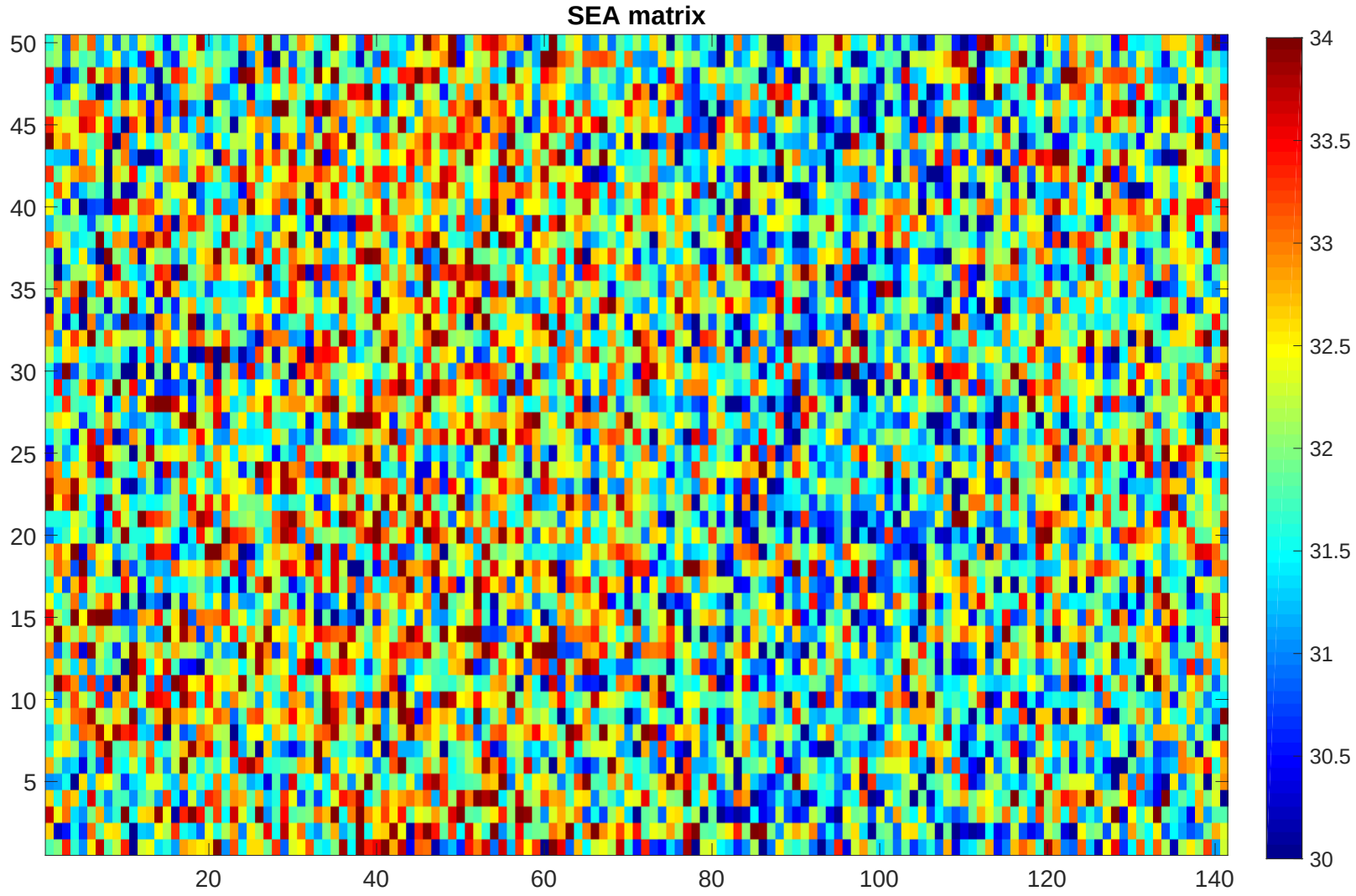
# SPE impact on the Ozone layer: comparison (blue=Antti)



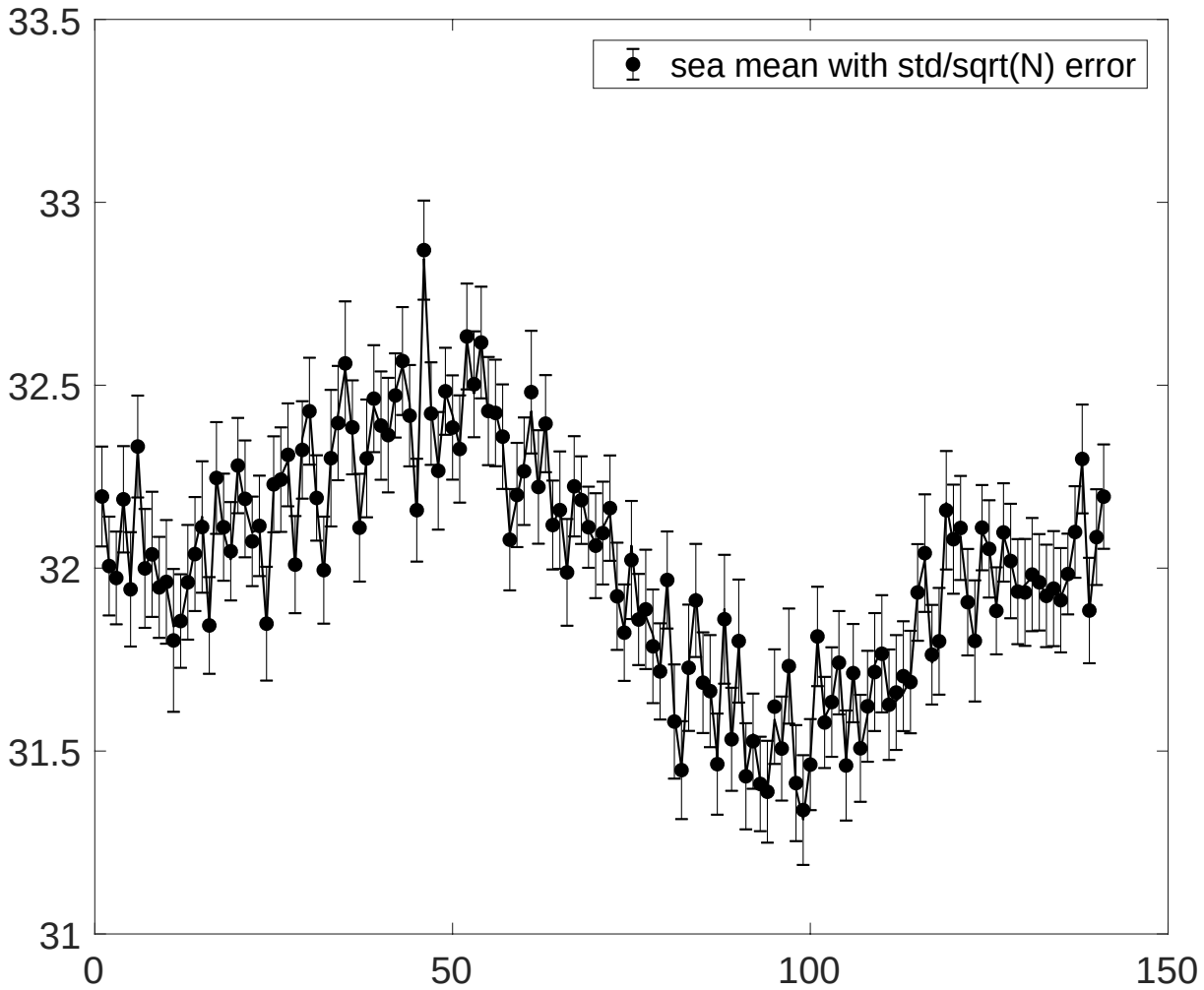
# Superposed Epoch Analysis (SEA): synthetic data



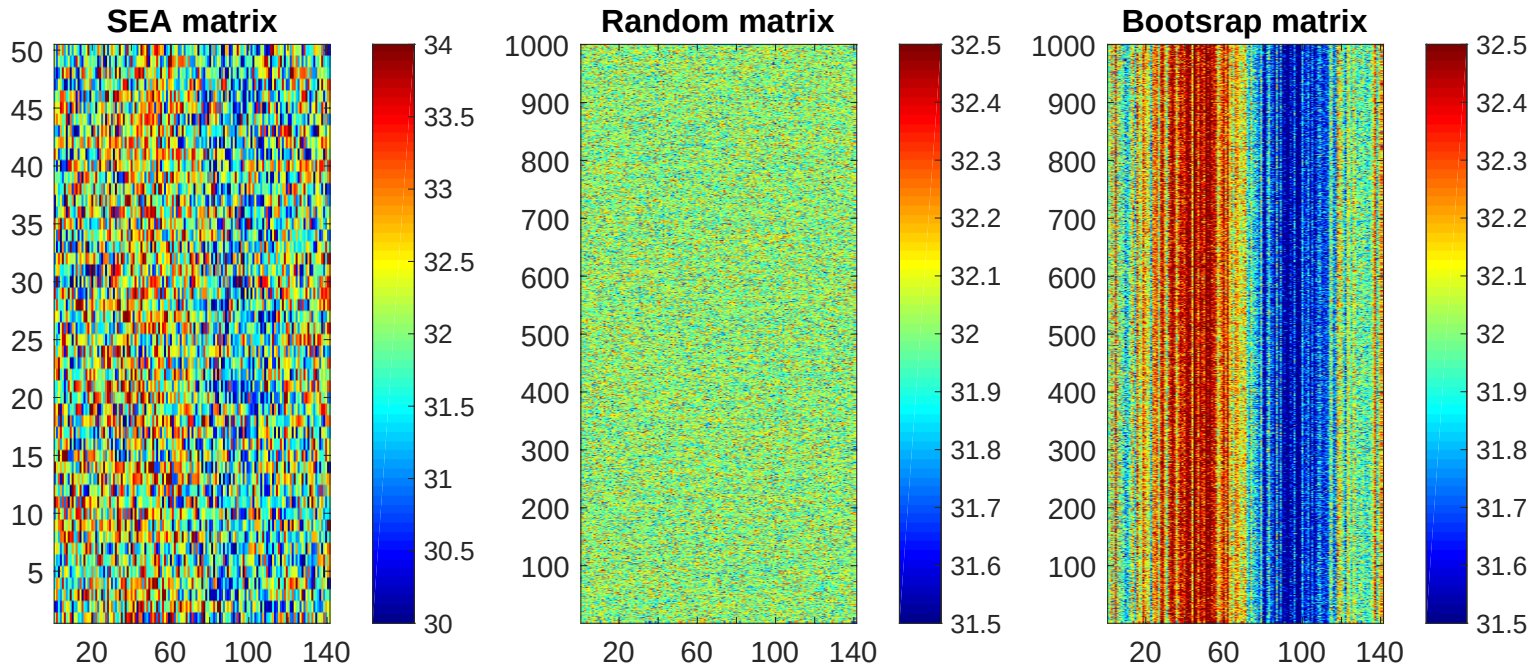
# Superposed Epoch Analysis (SEA): matrix



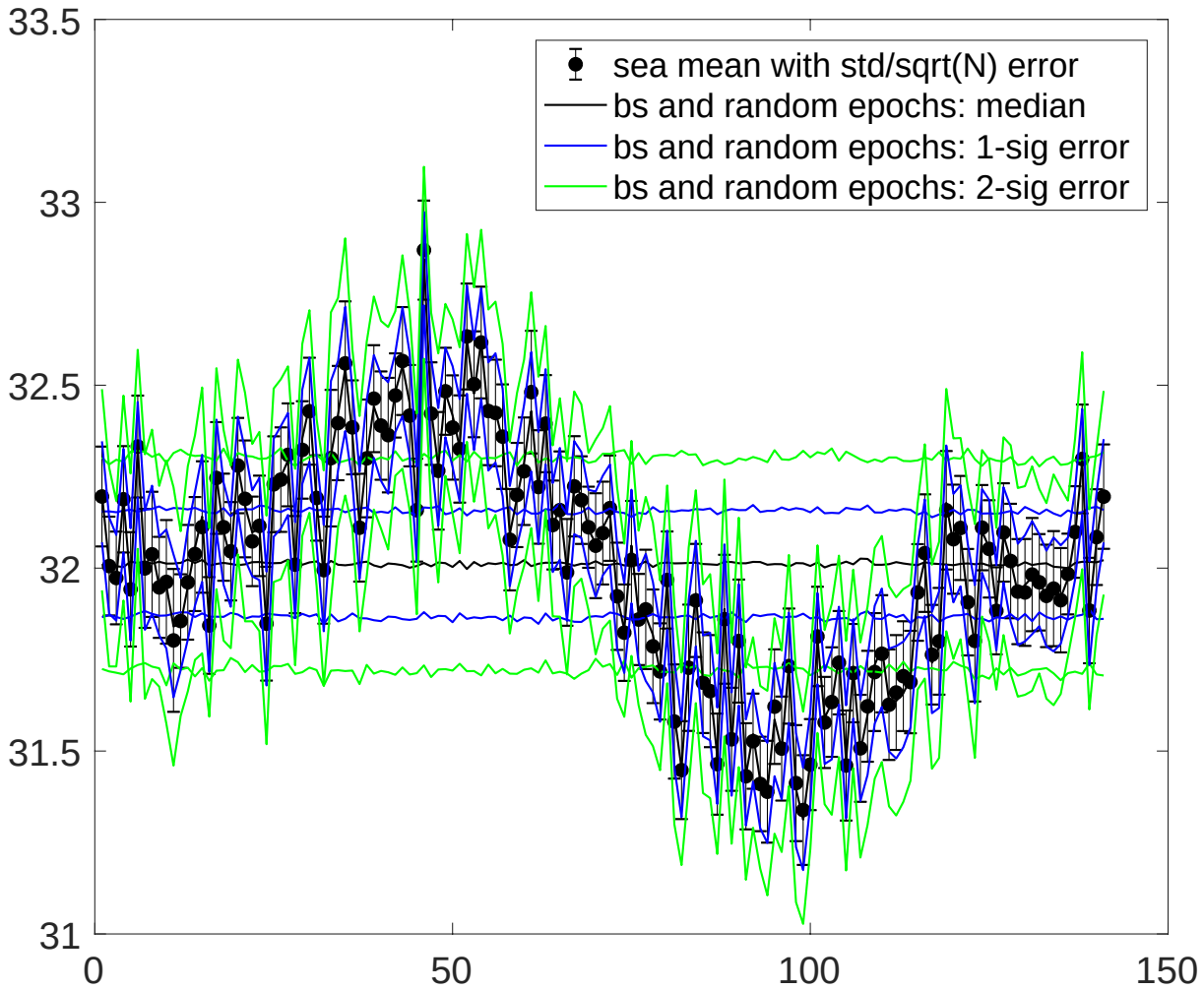
# Superposed Epoch Analysis (SEA): simple mean



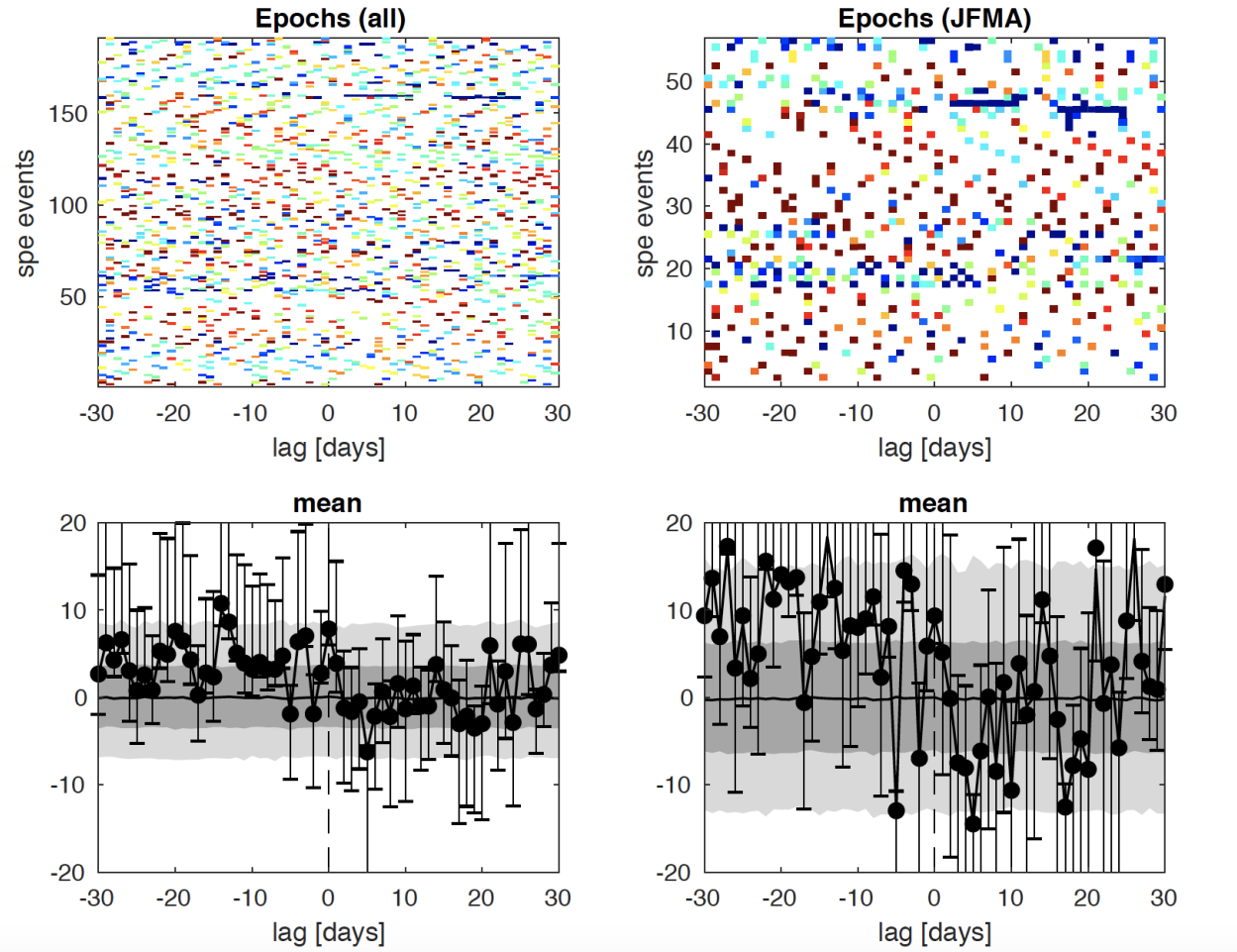
# Superposed Epoch Analysis (SEA) and boostrapping



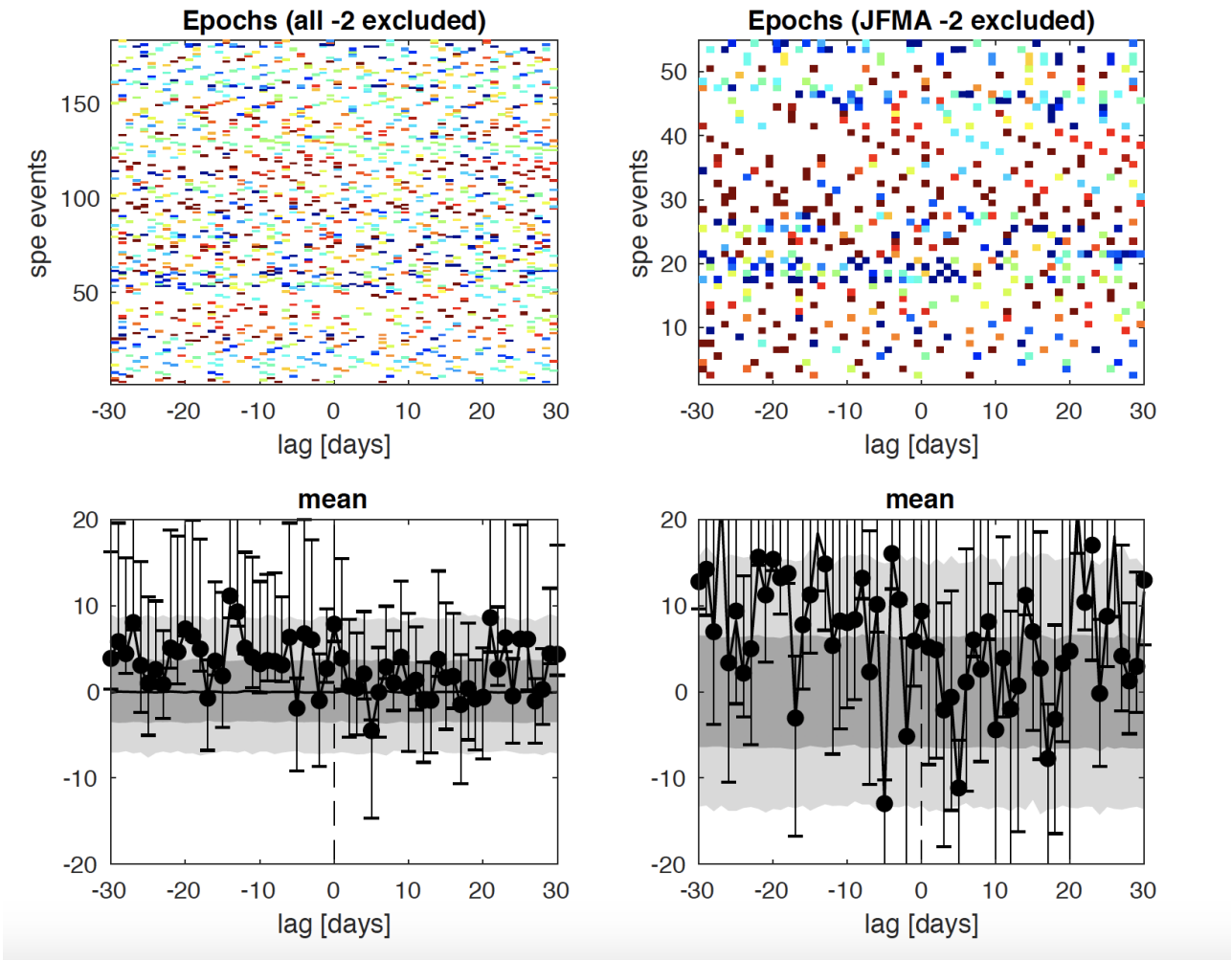
# Superposed Epoch Analysis (SEA) and boostrapping



# The Sodankylä Ozone sonde dataset: SEA



# The Sodankylä Ozone sonde dataset: SEA (-2 epochs)



# Conclusions

- The SEA of mean values of SOD in JFMA is re-visited.
- Statistical significance/robustness is debatable.
- Nothing can be seen in median (not shown in the graphs here).
- These studies must be re-visited within the ISSI group work with identical datasets!