

Identification of spikes in continuous ground-based in-situ time series of CO₂, CH₄ and CO: an extended experiment within the European ICOS-Atmosphere Network

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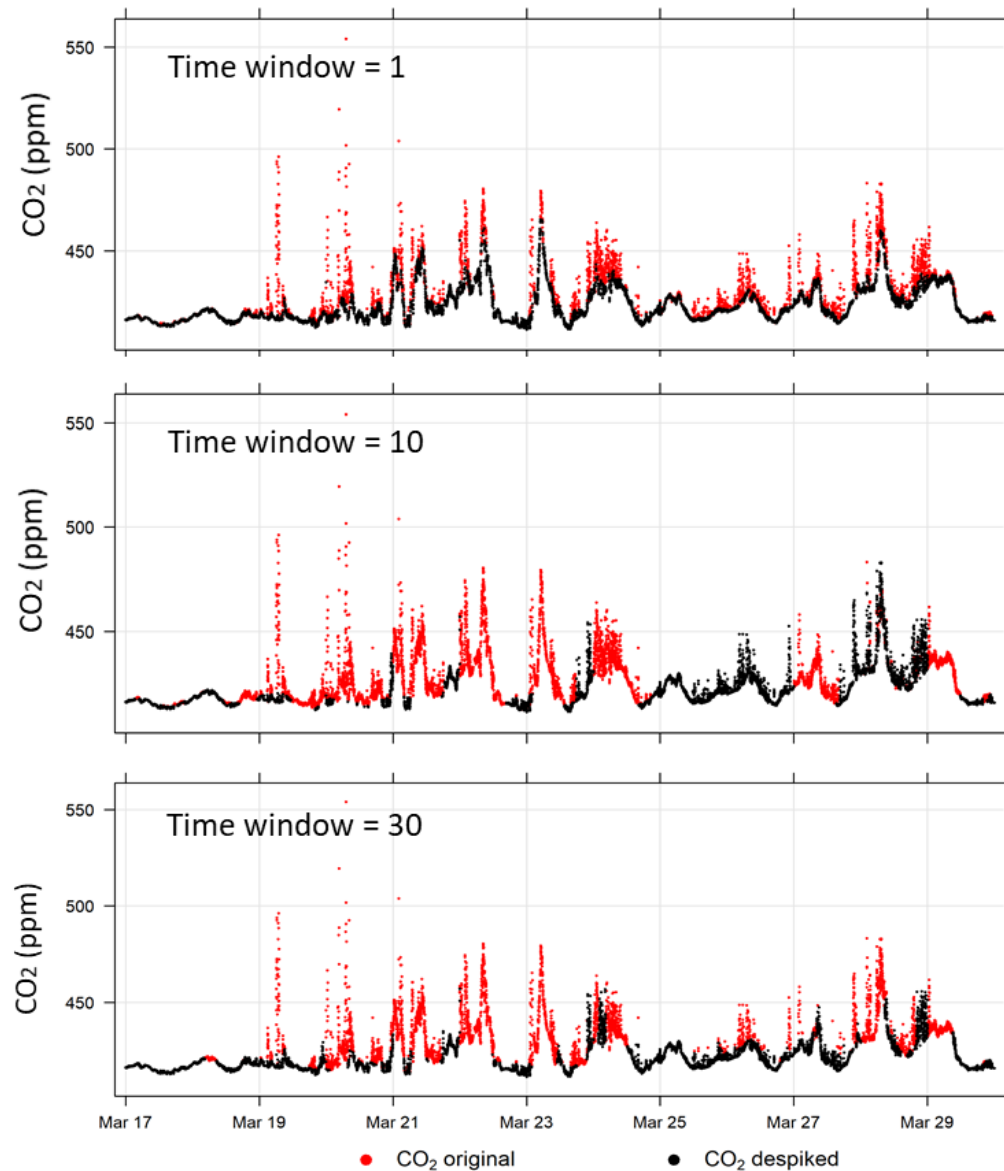
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Supplementary Material

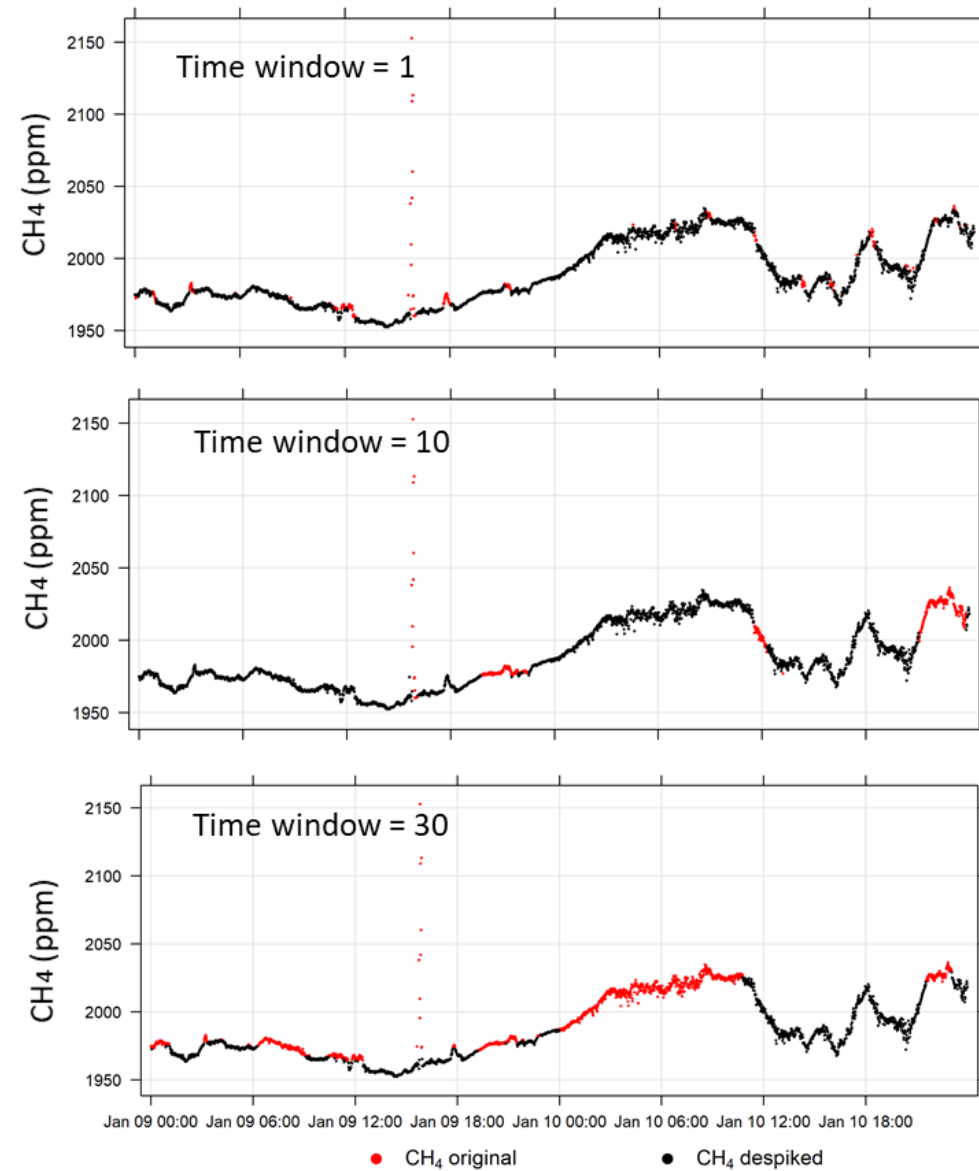
For REBS a test was carried out by increasing to 10 days and to 30 days the temporal window over which the baseline $\hat{g}(t_i)$ was calculated. The test was carried out by using $\beta = 3$ for 8 sites (CMN, JFJ, UTO, IPR, KIT, PUI, SAC, JUS). As descriptive examples, here we reported two case studies for SAC.

The following plot (slide 3) reports CO_2 (17-29 March 2019, left) and CH_4 (9-10 January 2019, right) for SAC. Black data points are the retained measurements; red points represent the data flagged as spikes using REBS methods. Different time windows (1 day, 10 days and 30 days) were applied in the algorithm for the calculation of the baseline.

CO₂-SAC-329 - h. 100.0 - event: 17/03/2019-29/03/2019 REBS beta = 3



CH₄-SAC-329 - h. 100.0 - event: 09/01/2019-10/01/2019 REBS beta = 3



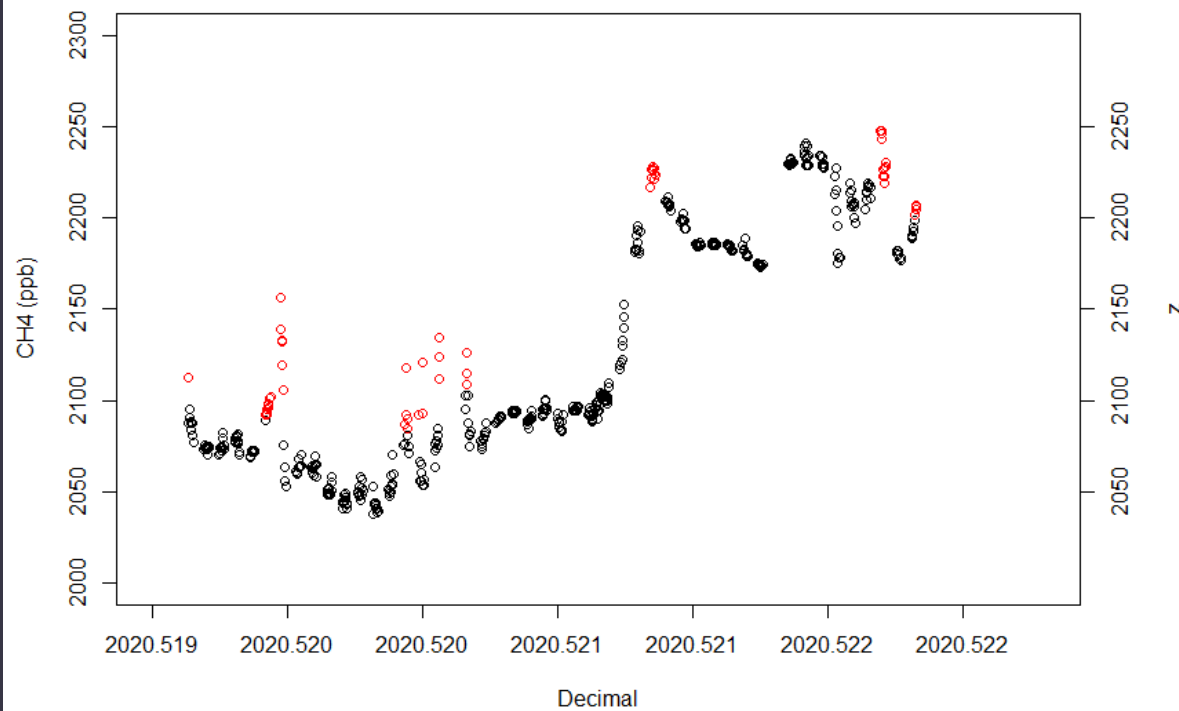
REBS (with $\beta = 3$) was run on the time series of the 1-minute CH_4 standard deviations (instead of on the 1-minute mean averaged values). The aim of this test was to assess the ability of REBS in detecting data characterized by high internal variability at time scales lower than 1 minute.

In the following plots (slides 3 - 10), for each site, we reported examples of the comparison between the results of the REBS application in the standard configuration (left) and by using the 1-minute standard deviation values (right).

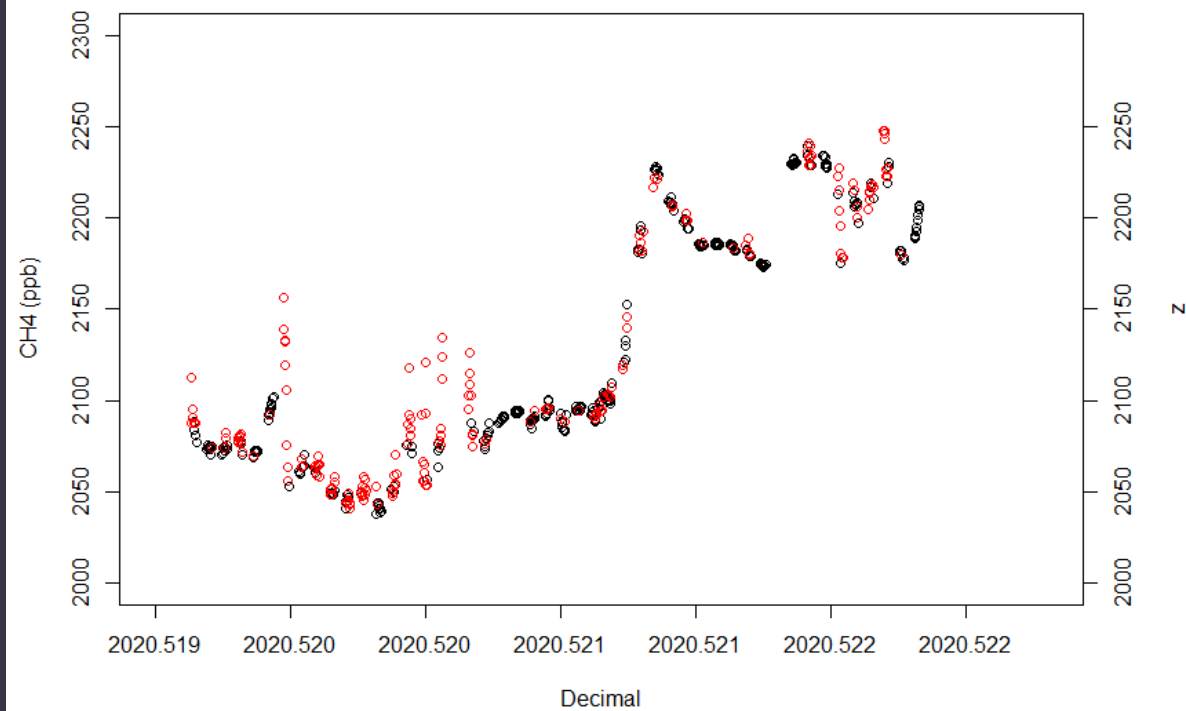
For each plot, black points are the retained measurements; red points represent the data flagged as spikes. The dates of the event occurrences were reported in the plot title. The time reported in the x-axis is expressed as decimal dates.

Ispra(IPR)

REBS_MR-9/7/2020

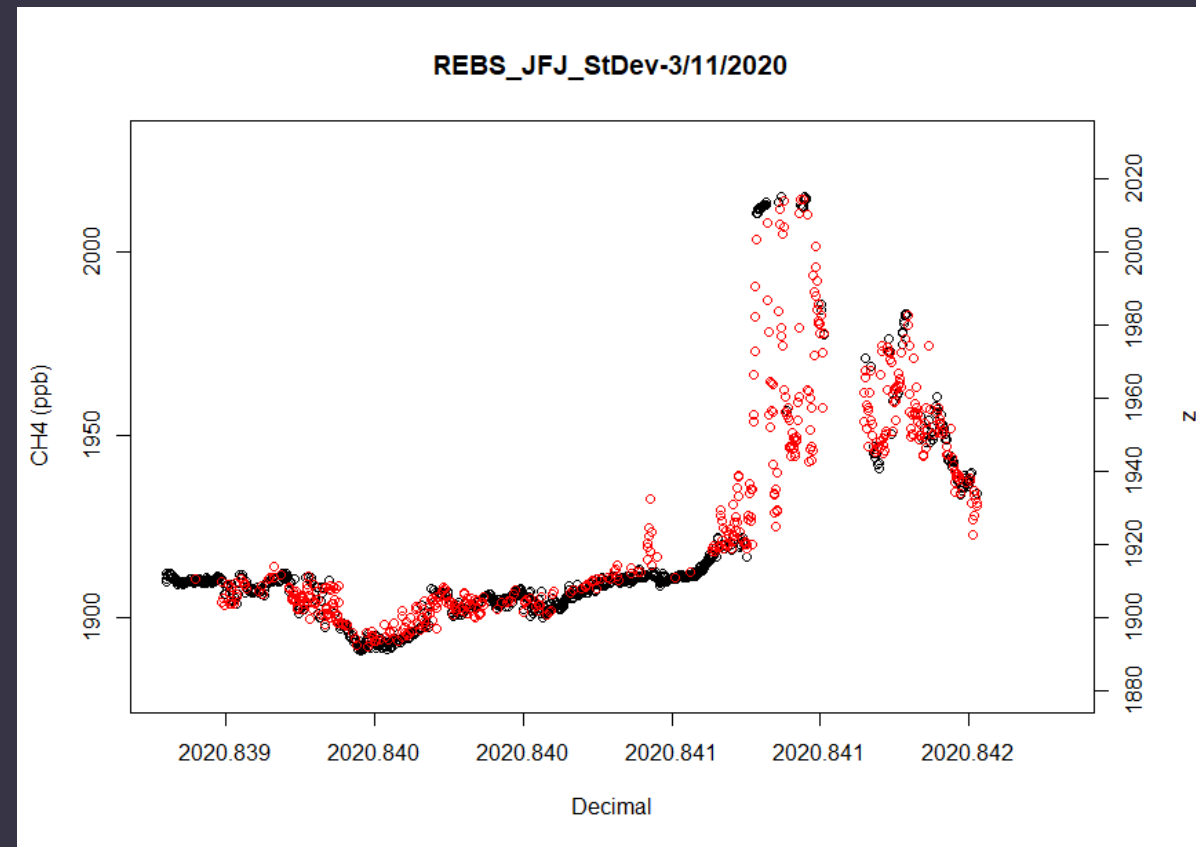
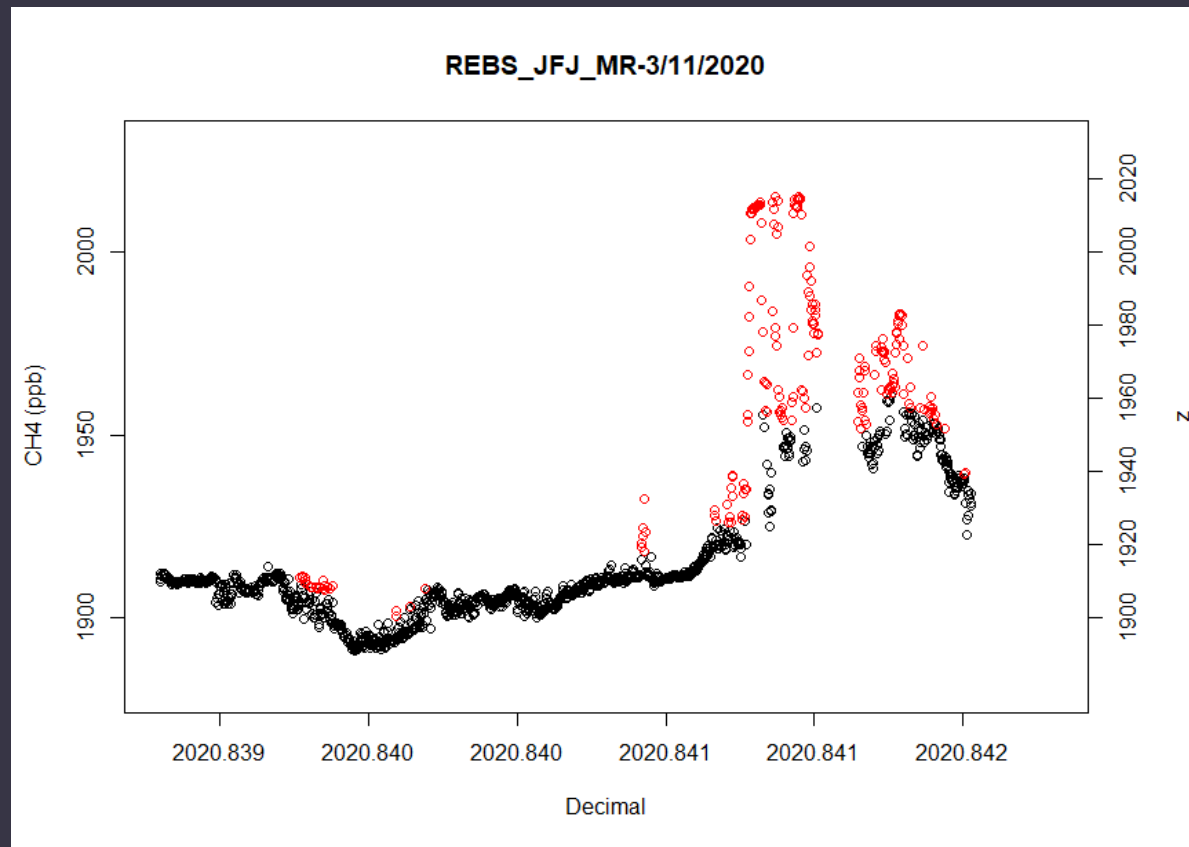


REBS_StDev-9/7/2020



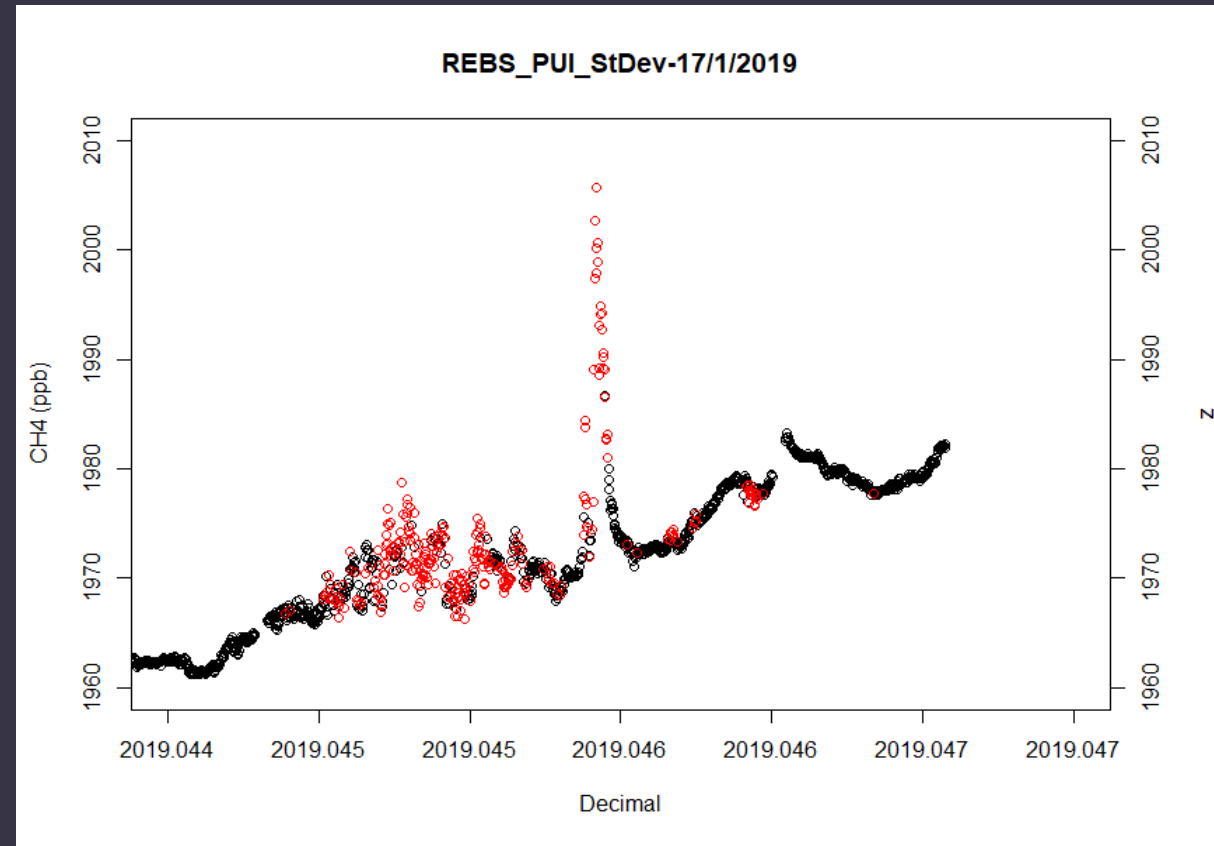
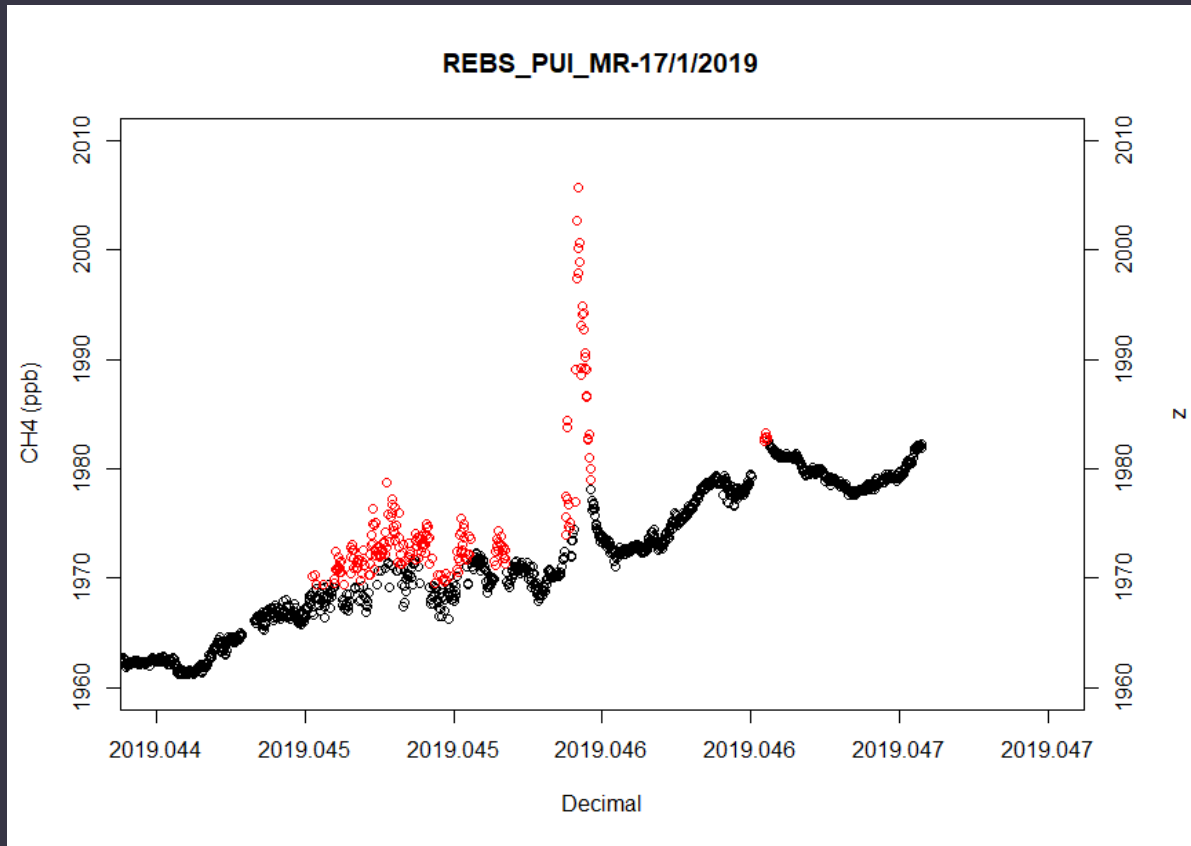
○ No spikes ○ Spikes

Jungfrauoch (JFJ)



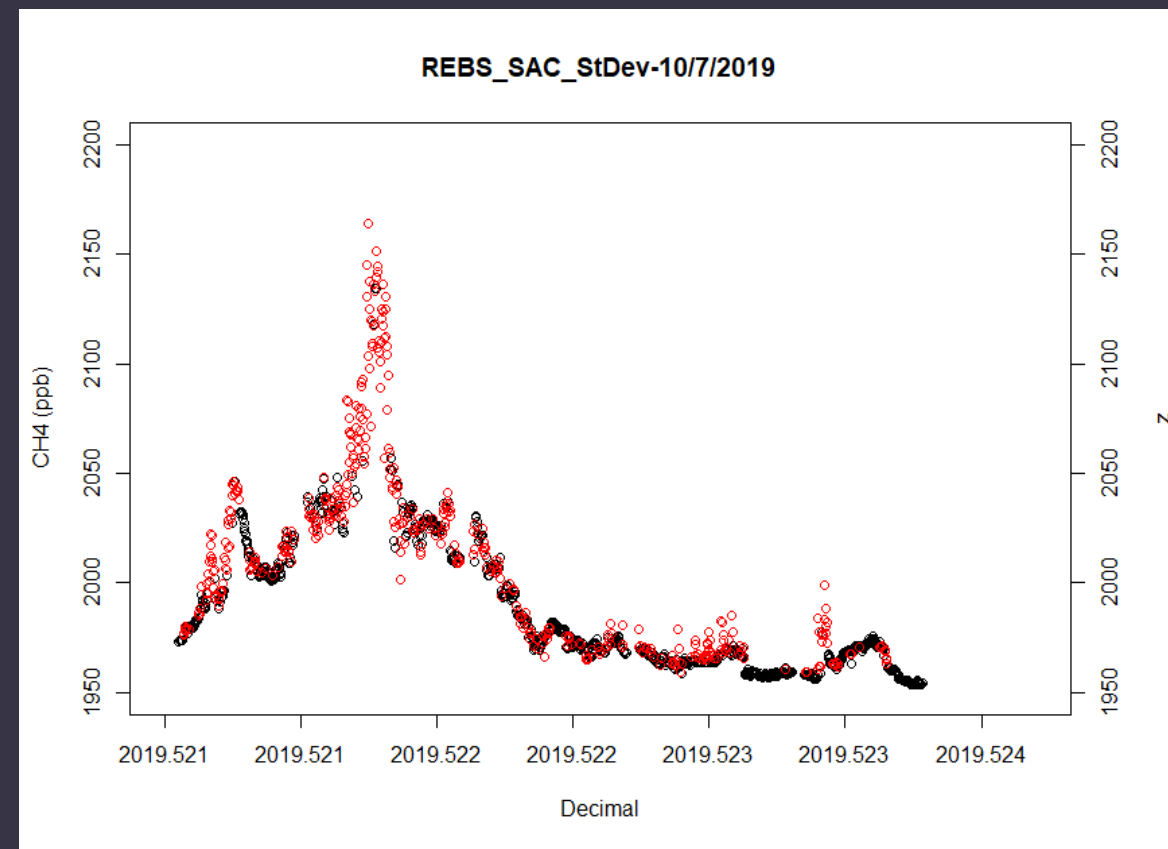
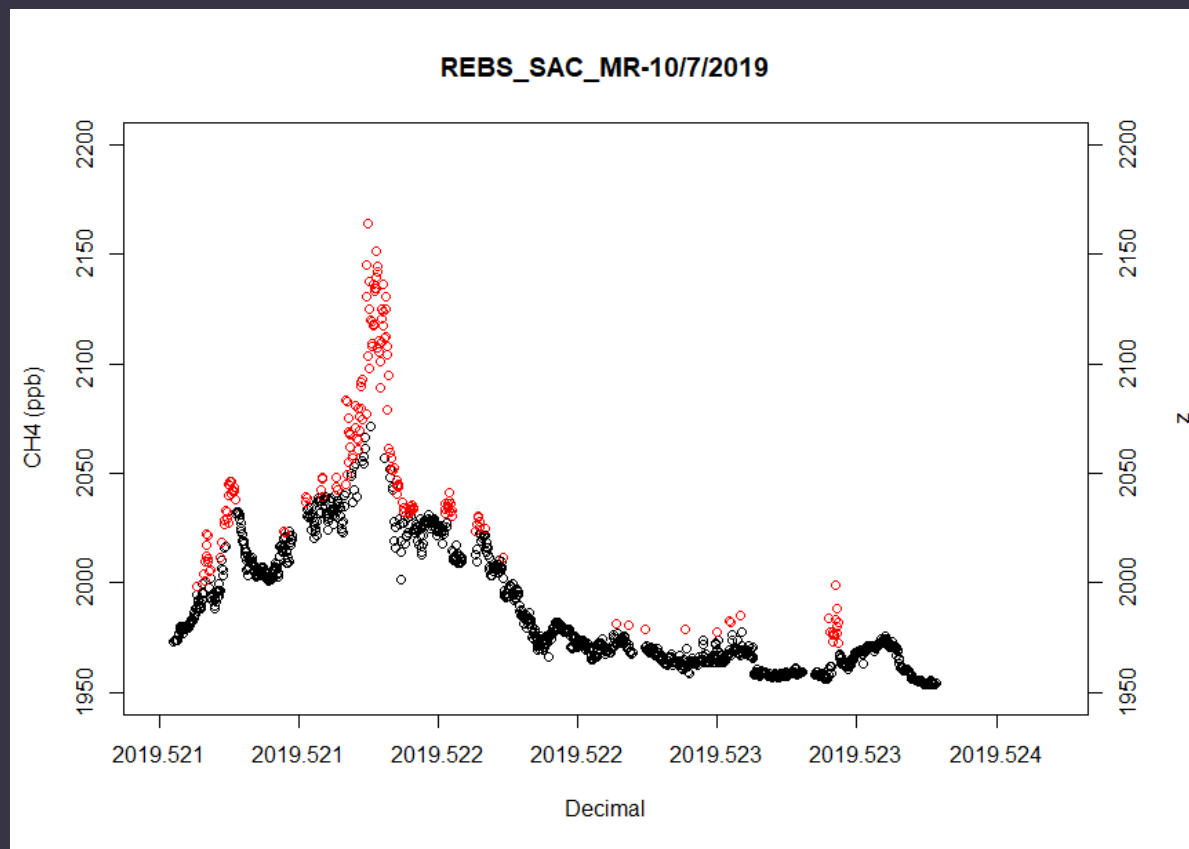
○ No spikes ○ Spikes

Puijo (PUI)



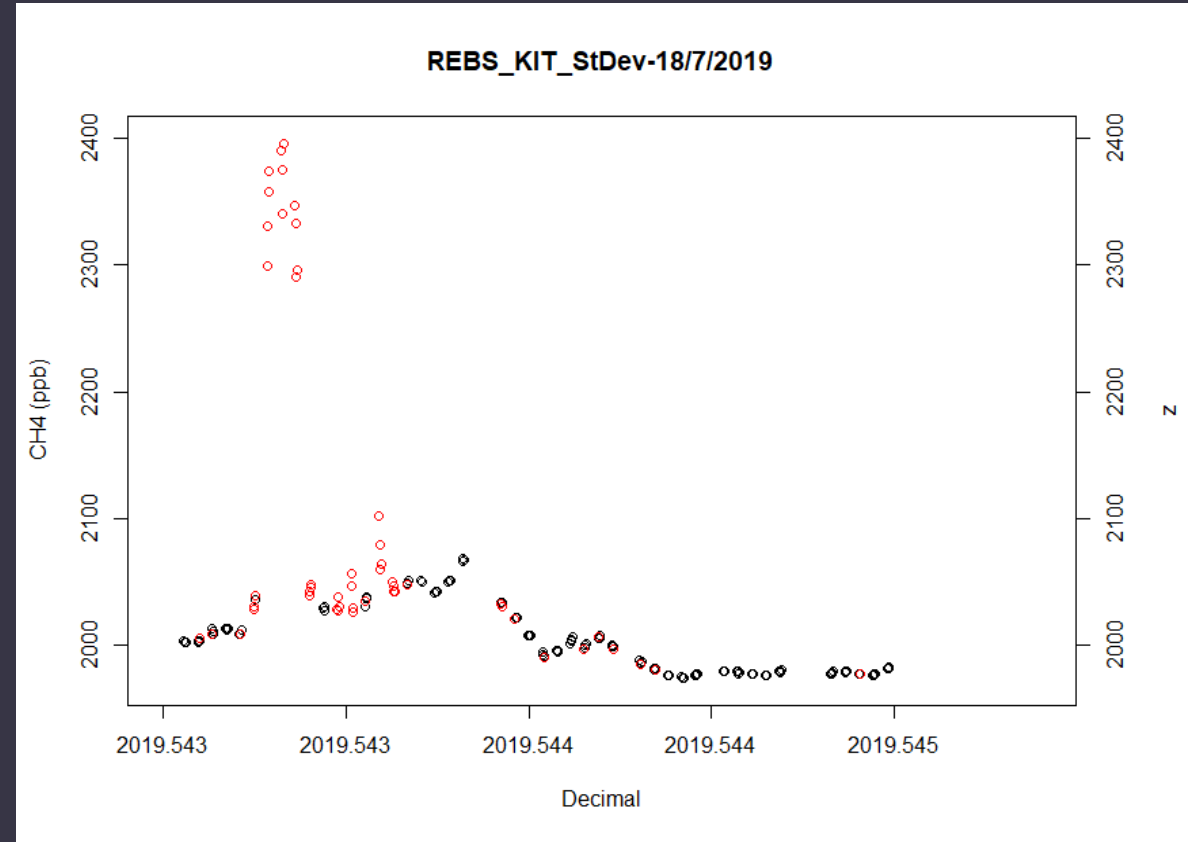
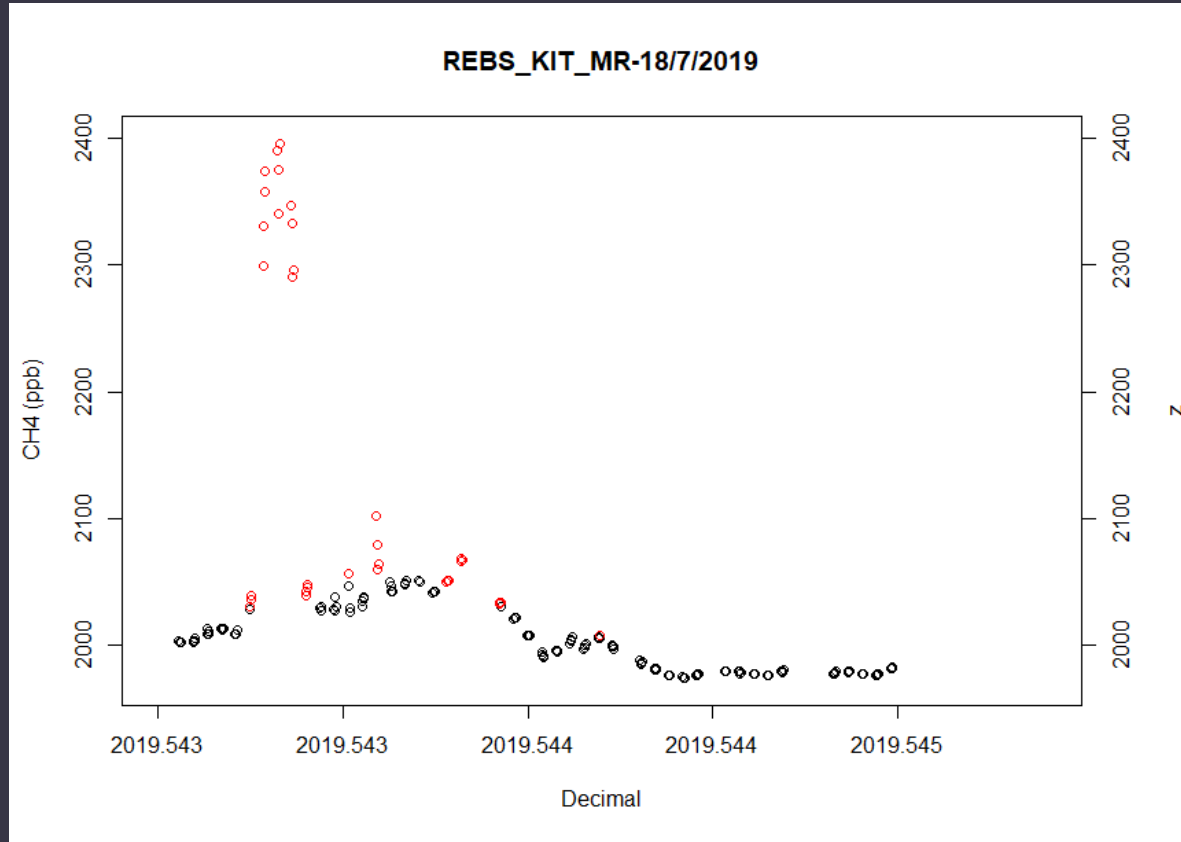
○ No spikes ○ Spikes

Saclay (SAC)



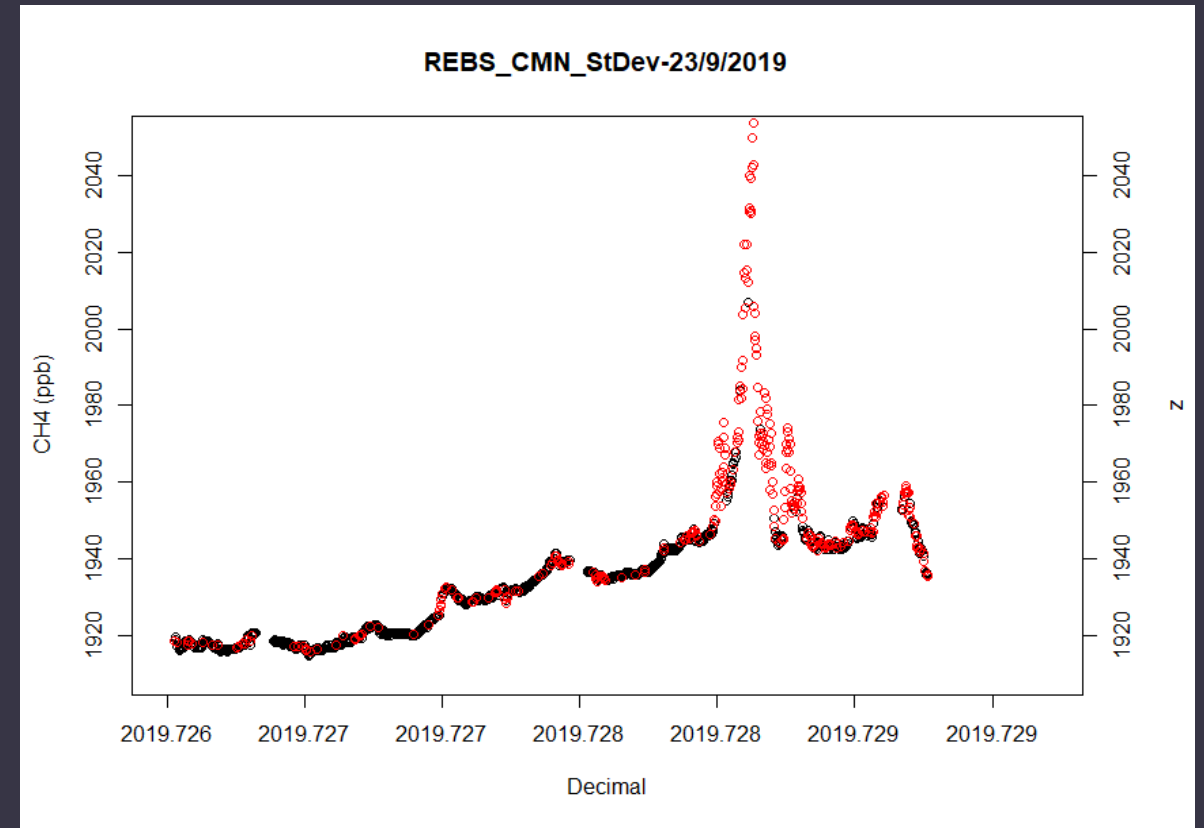
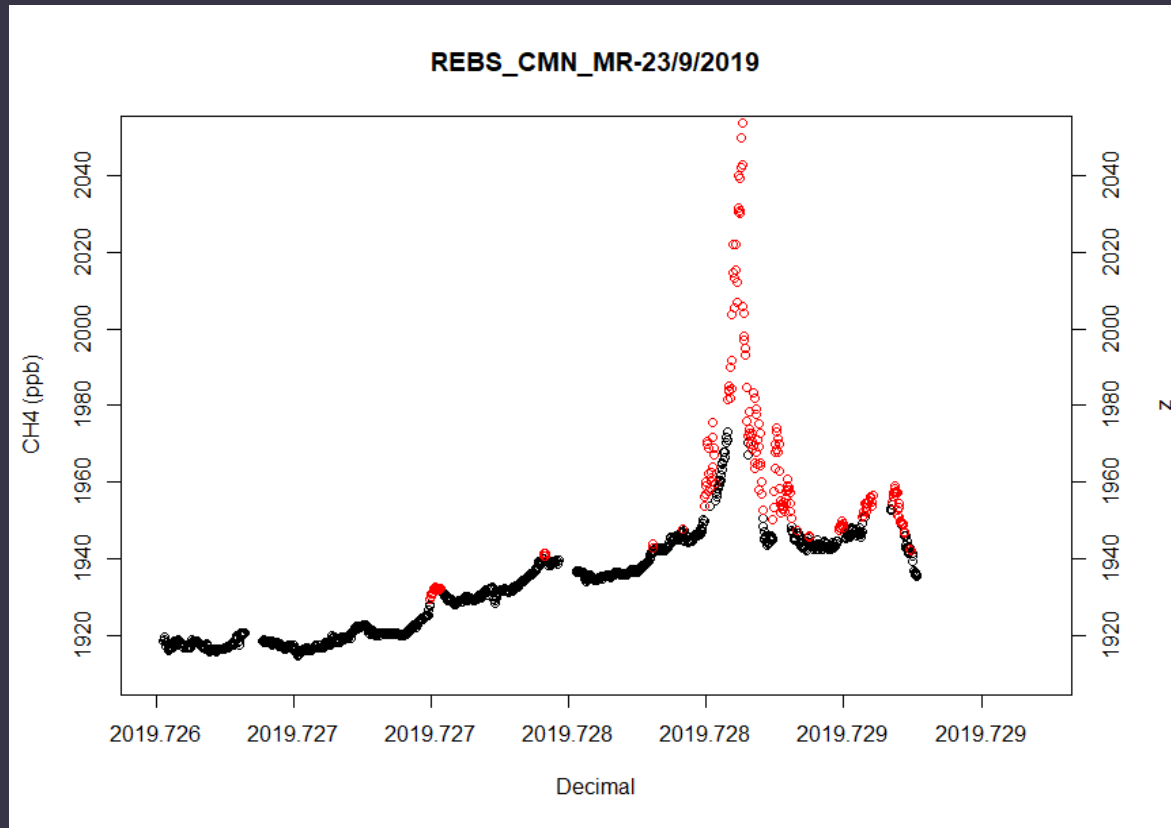
○ No spikes ○ Spikes

Karlsruhe (KIT)



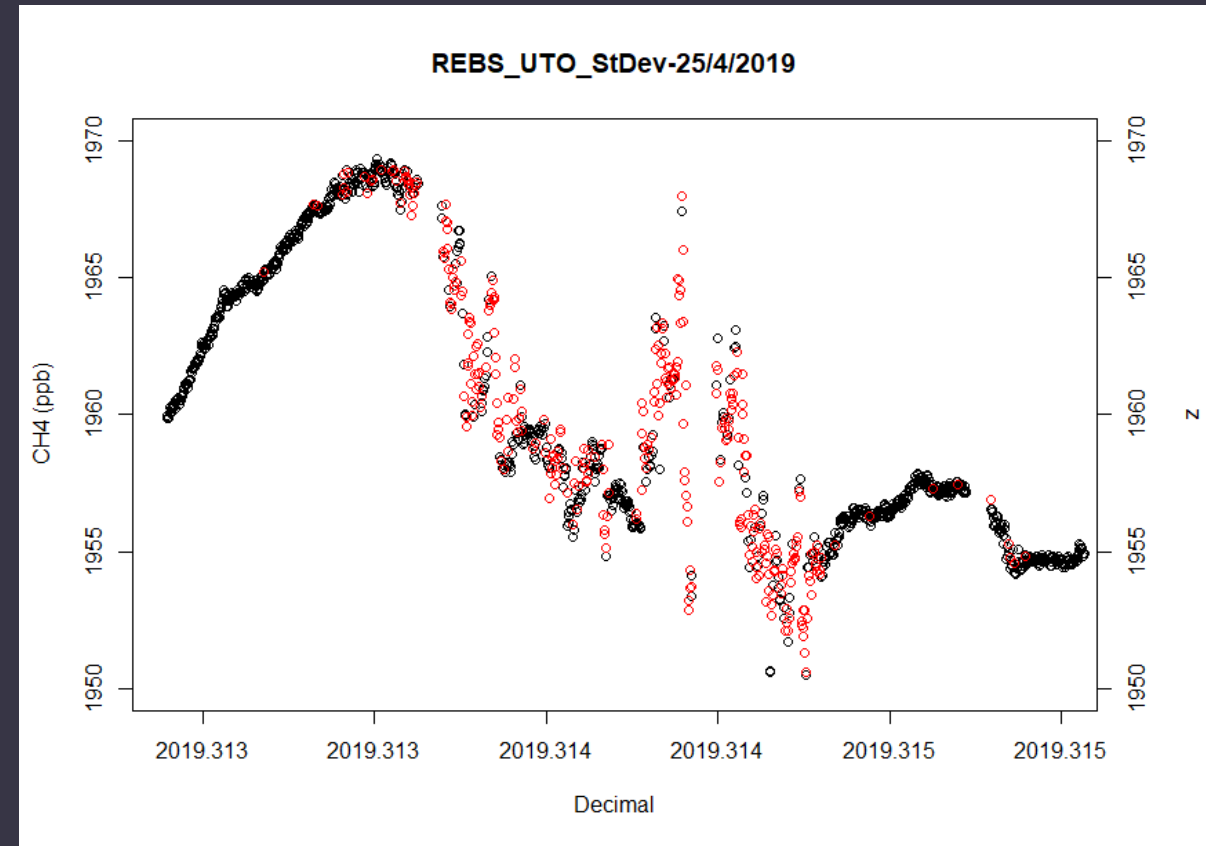
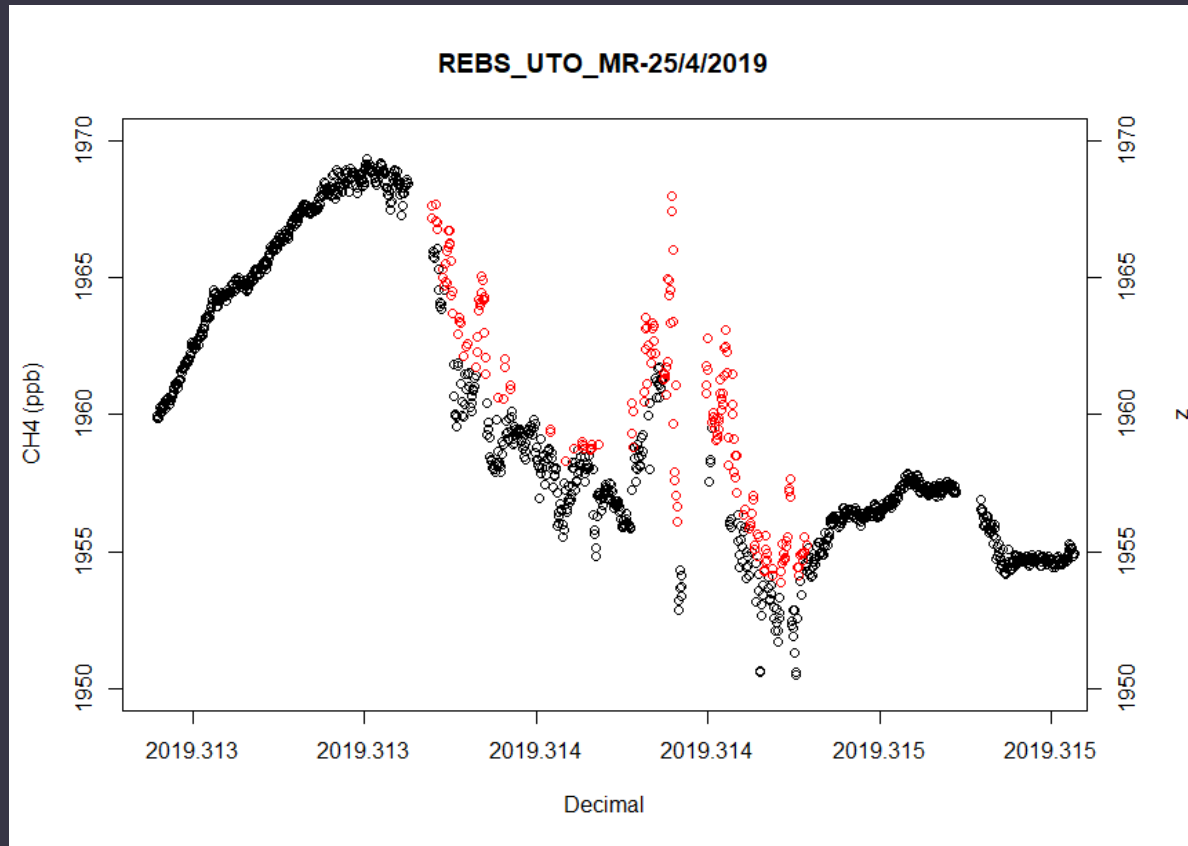
○ No spikes ○ Spikes

Monte Cimone (CMN)



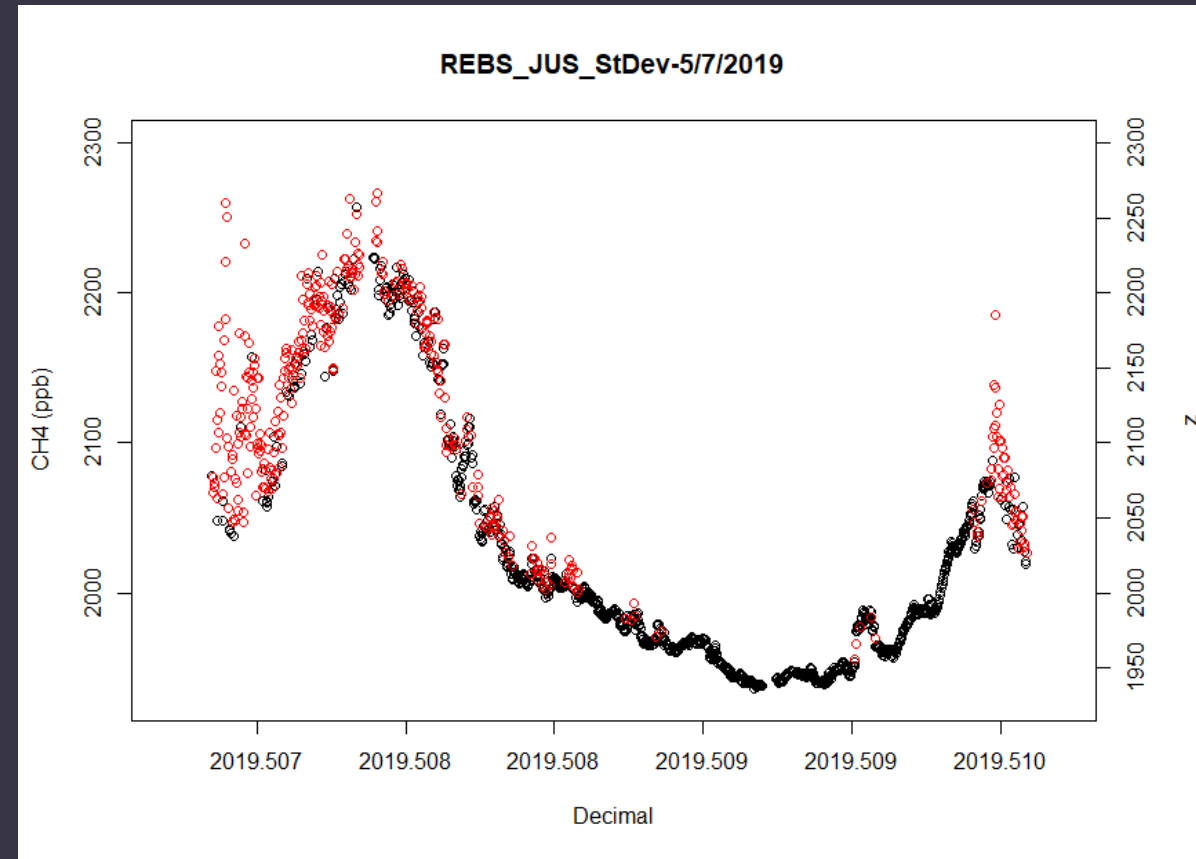
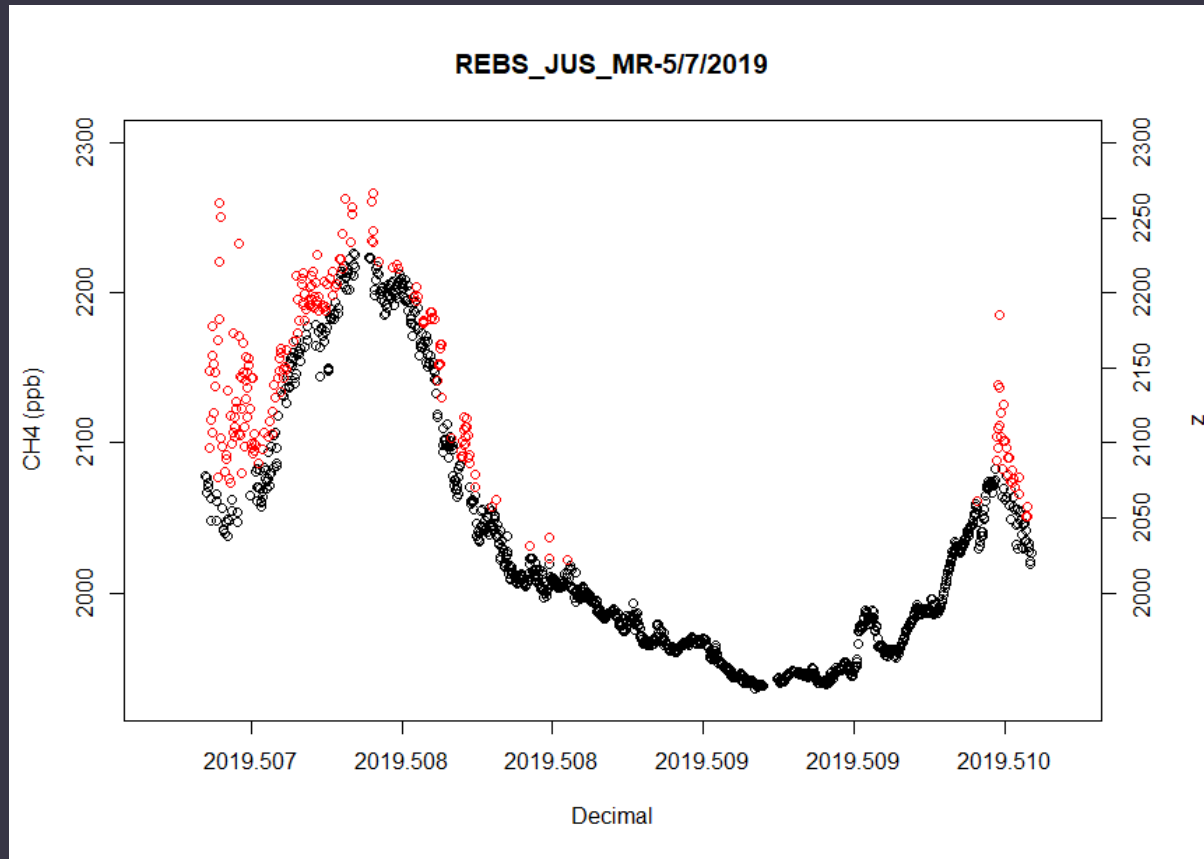
○ No spikes ○ Spikes

Utö (UTO)



○ No spikes ○ Spikes

Jussieu (JUS)



○ No spikes ○ Spikes