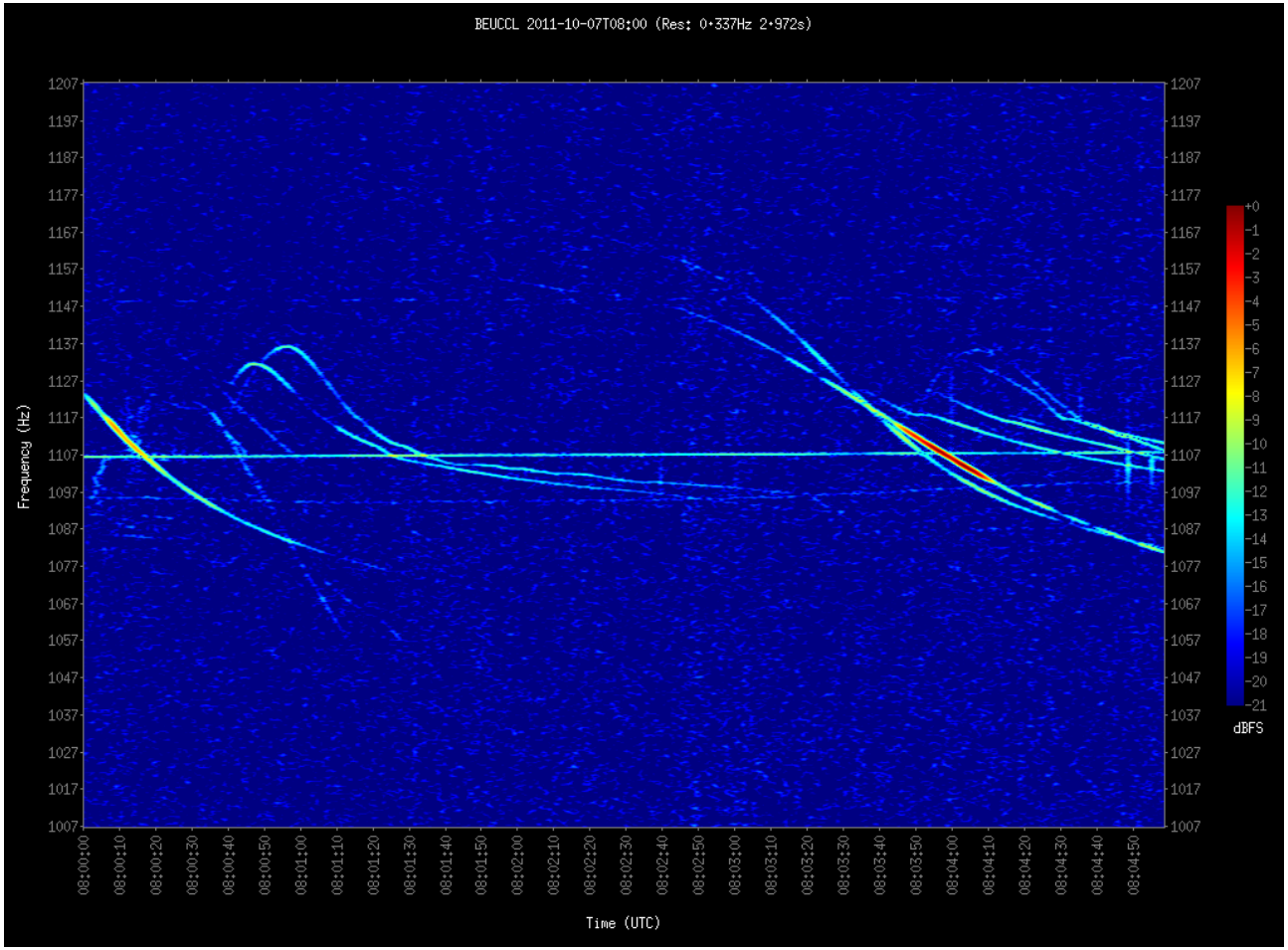
Analysis of the noise in spectrograms

Initial idea : filter the noise by measuring it in a region of the spectrogram with no meteors / planes / beacon & apply the criterion « mean (noise) + 3 std dev (noise) »

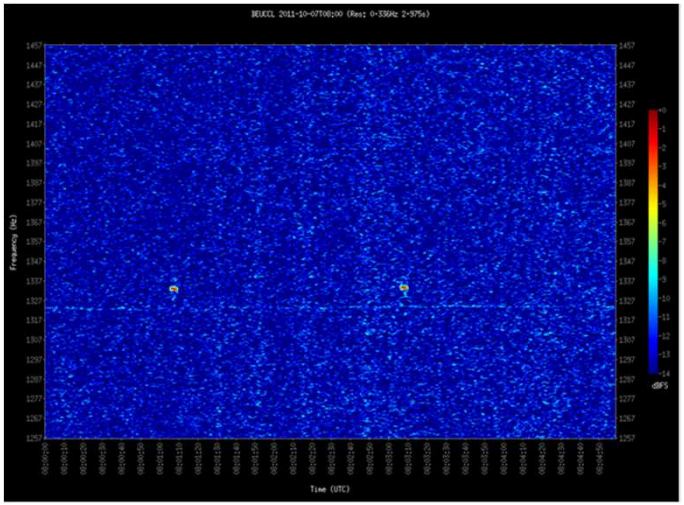
Analysis of the noise in spectrograms

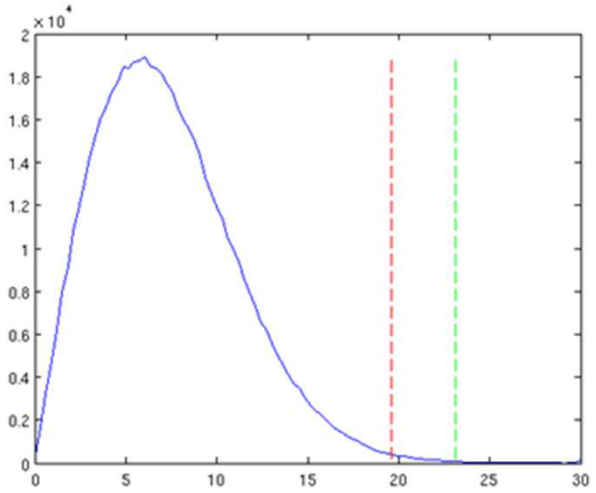


BEUCCL – 2011/10/07 – 08:00 UT

Analysis of the noise in spectrograms

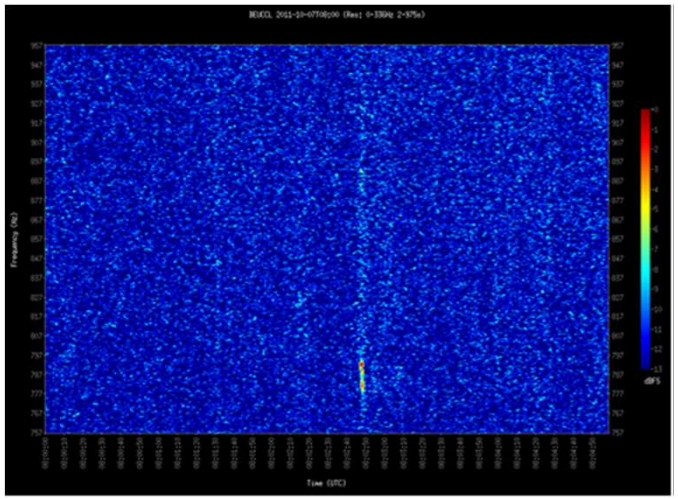
150 Hz above

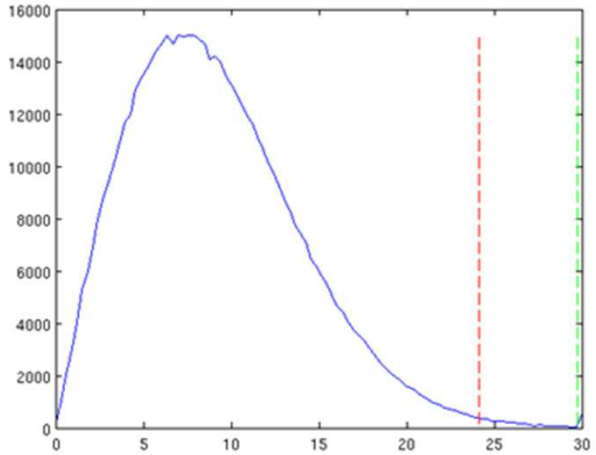




Mean + 3 std dev

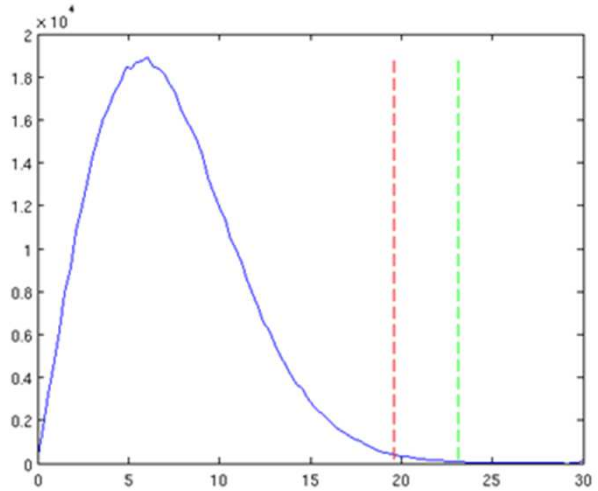
150 Hz below



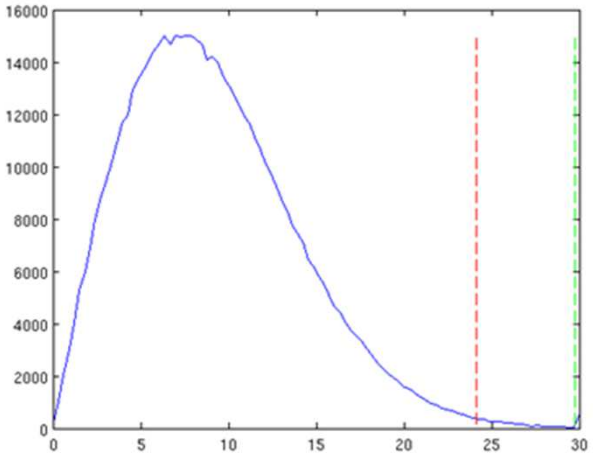


99.9 % percentile

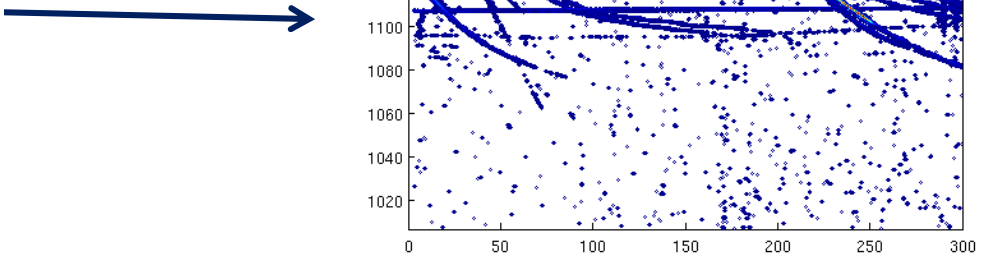
Analysis of the noise in spectrograms

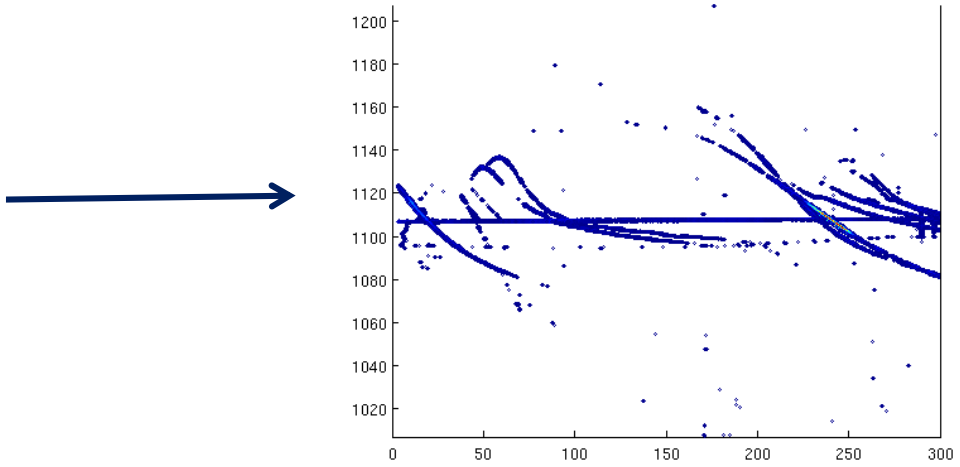


Y_1



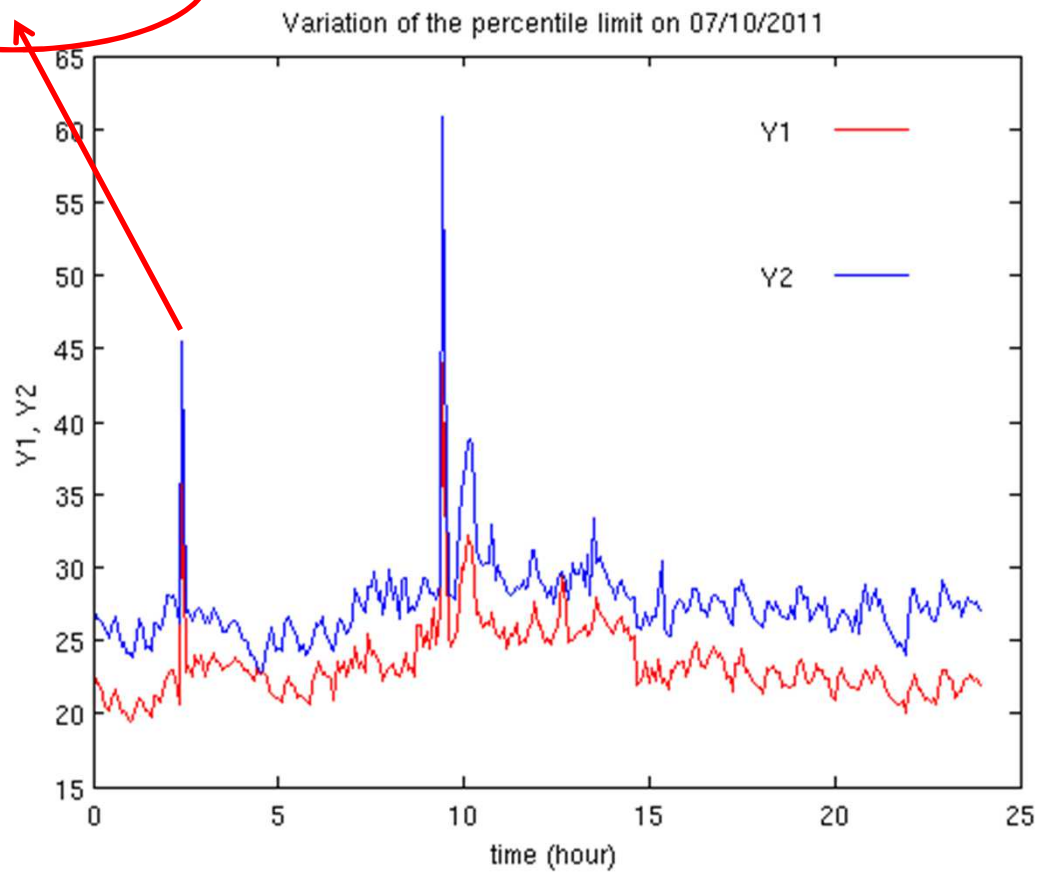
Y_2





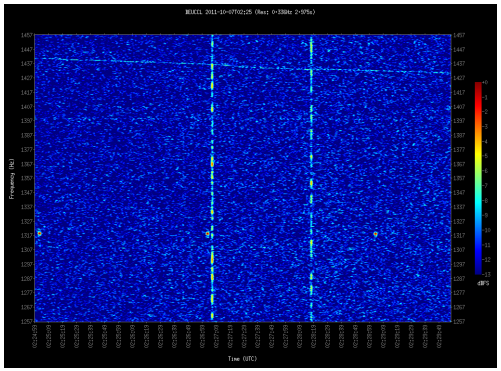
Analysis of the noise in spectrograms

Origin of the peak?

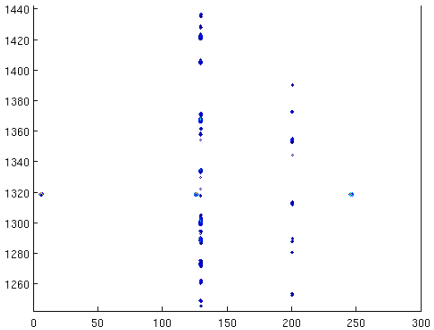


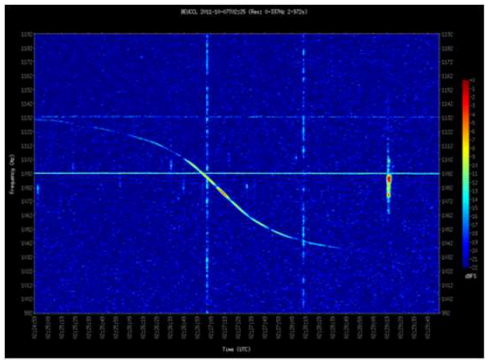
Noise below always > noise above

Analysis of the noise in spectrograms

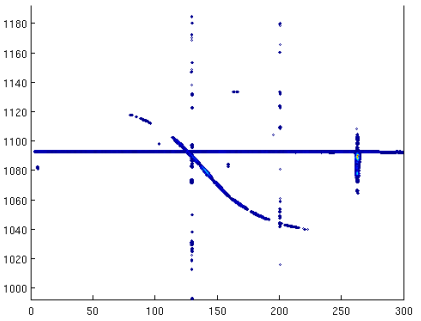


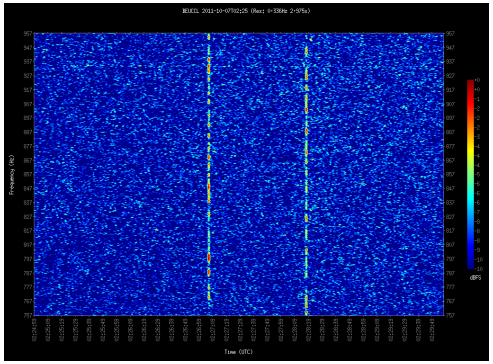
Y_1



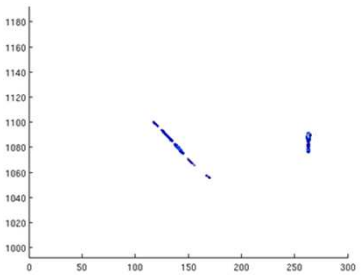


Y_1



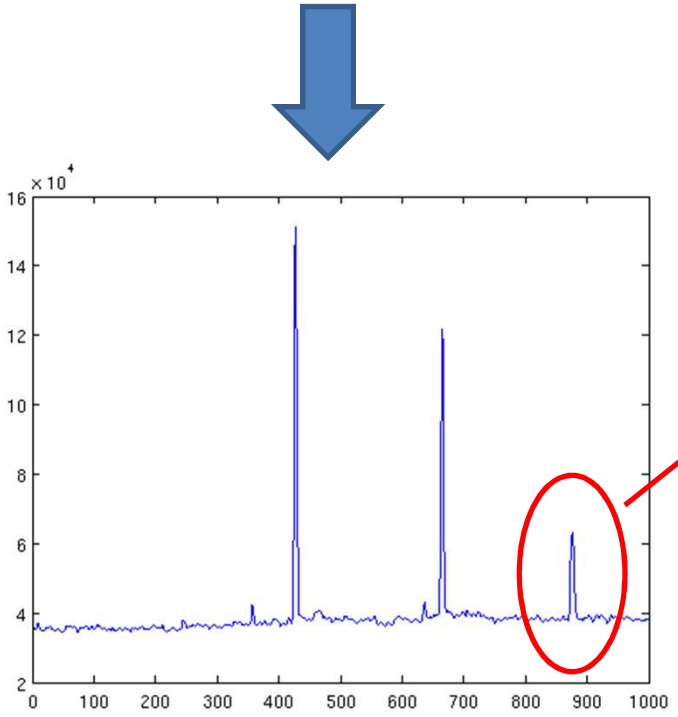


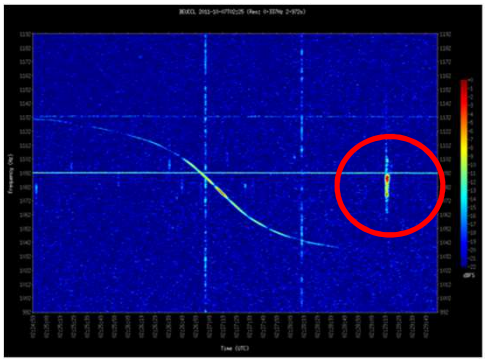
Y_2



Solution : filter the broadband signals

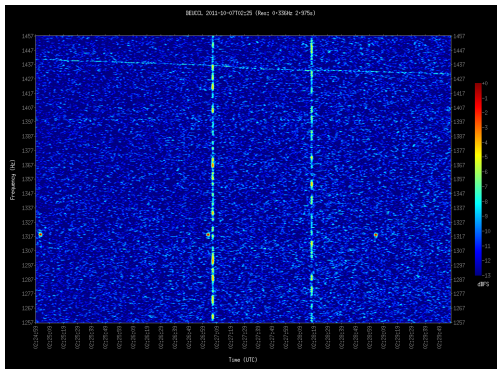
Sum over frequencies (columns) then criterion « mean (sum) + 3 std dev (sum)



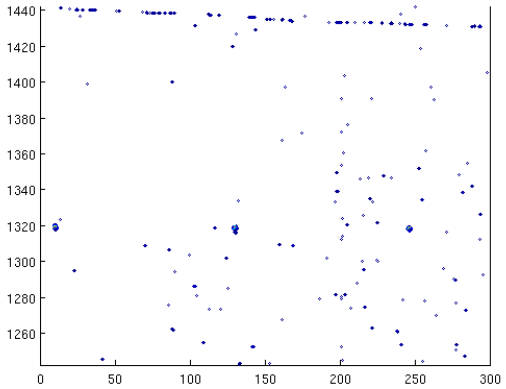


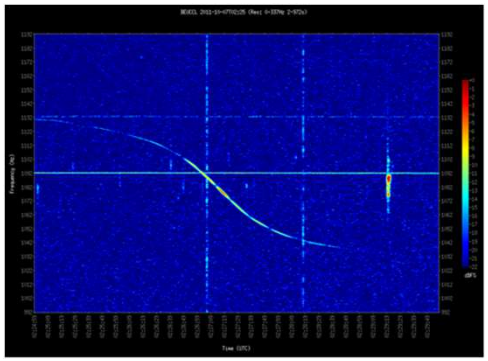
Sum over all frequencies except around the beacon

Solution : filter the broadband signals

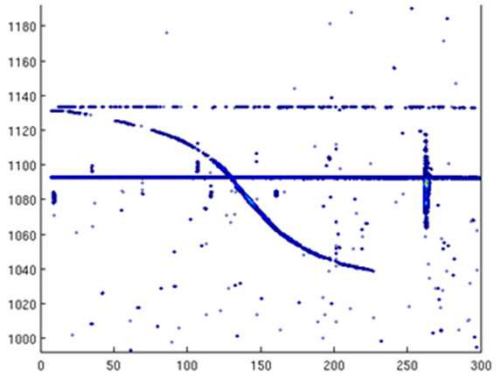


Y_1



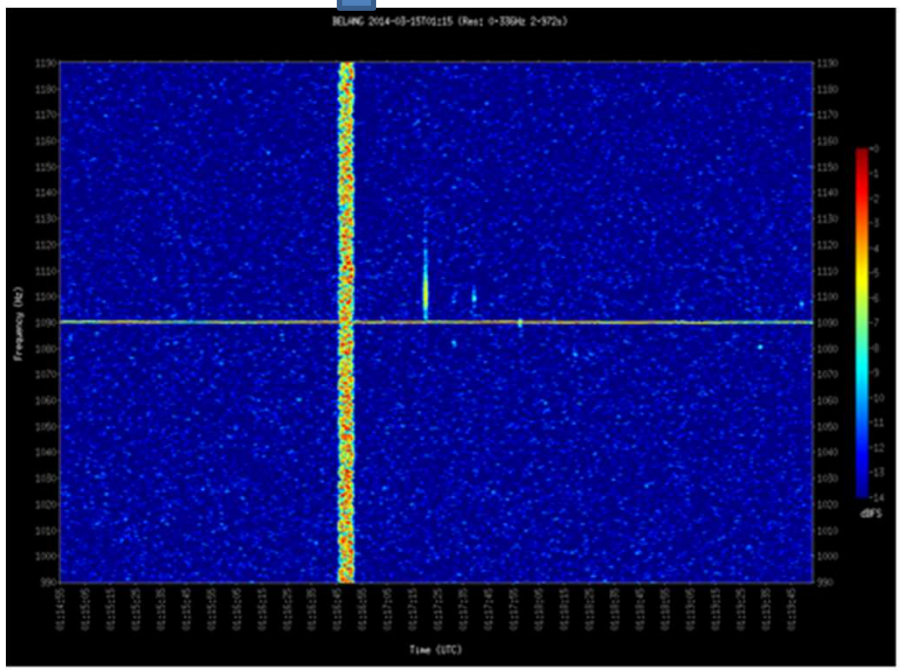


Y_2

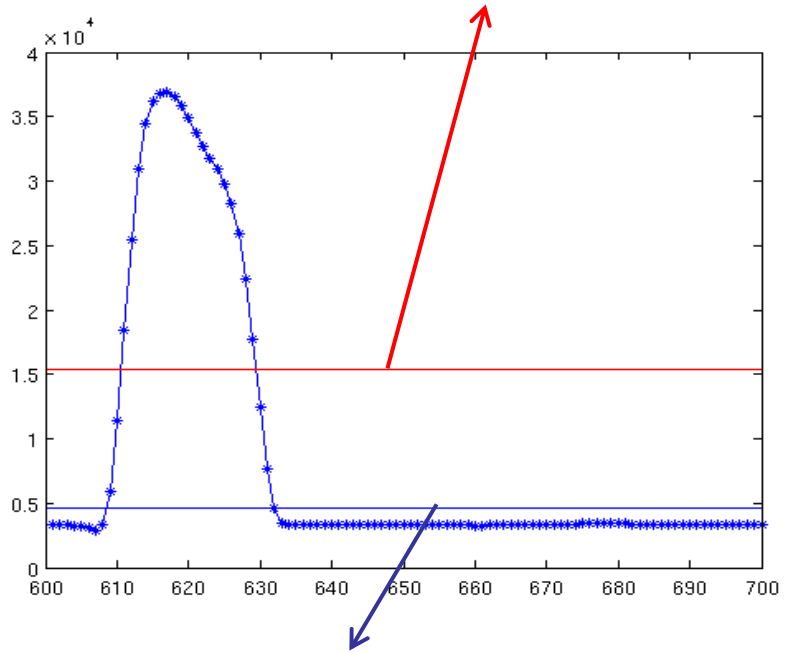


Longer broadband parasitic signals

BELANG
15/03/2014
1h15 UT



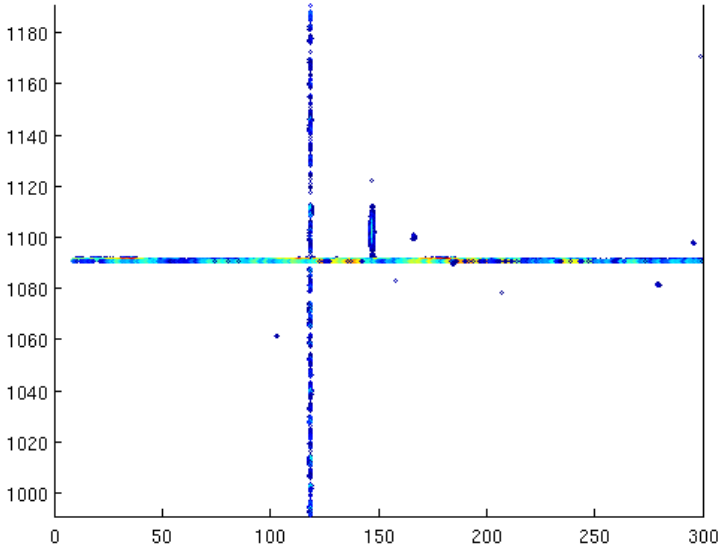
Mean (sum) + 3 std dev (sum)



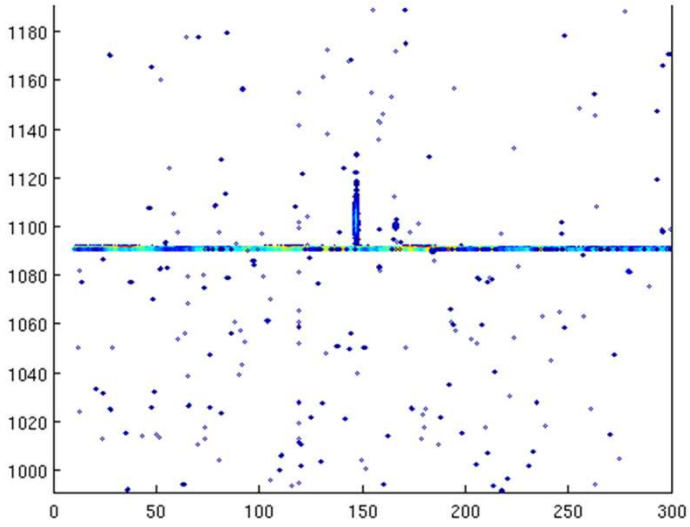
Mean (sum) + 3 std dev (sum) – peak values

Longer broadband parasitic signals

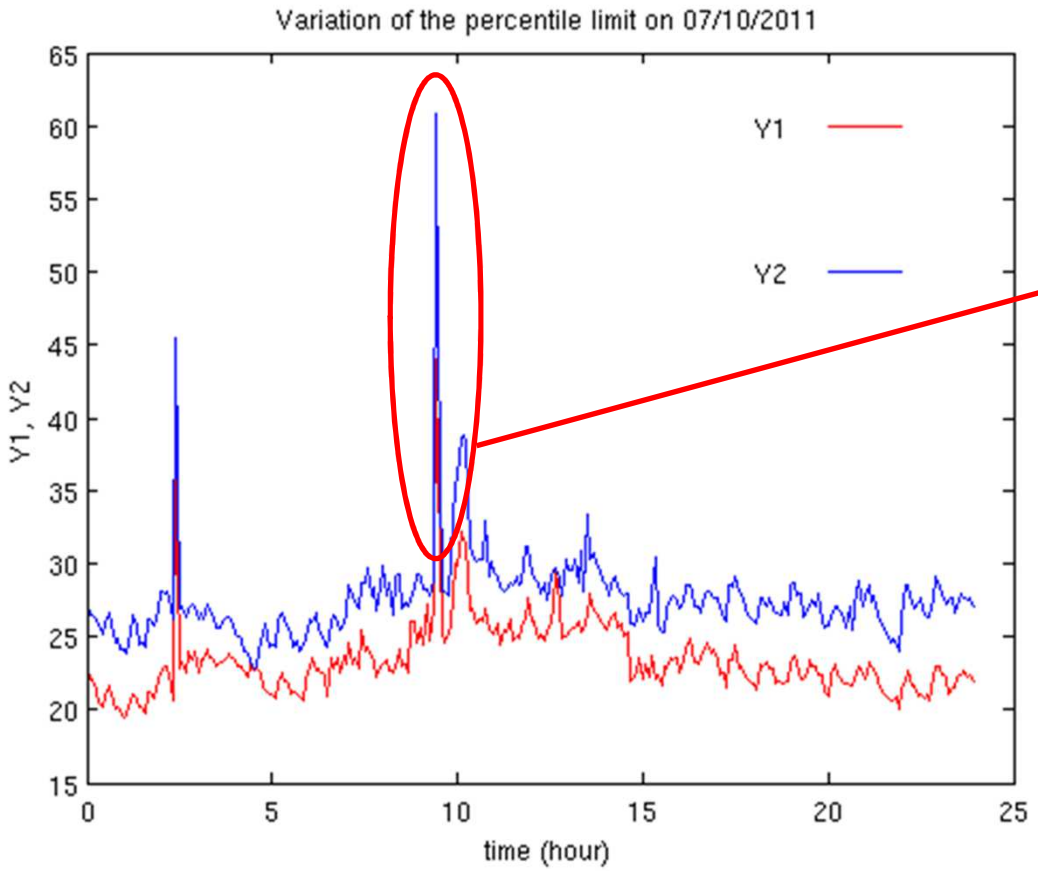
Mean (sum) + 3 std dev (sum)



Mean (sum) + 3 std dev (sum) – peak values

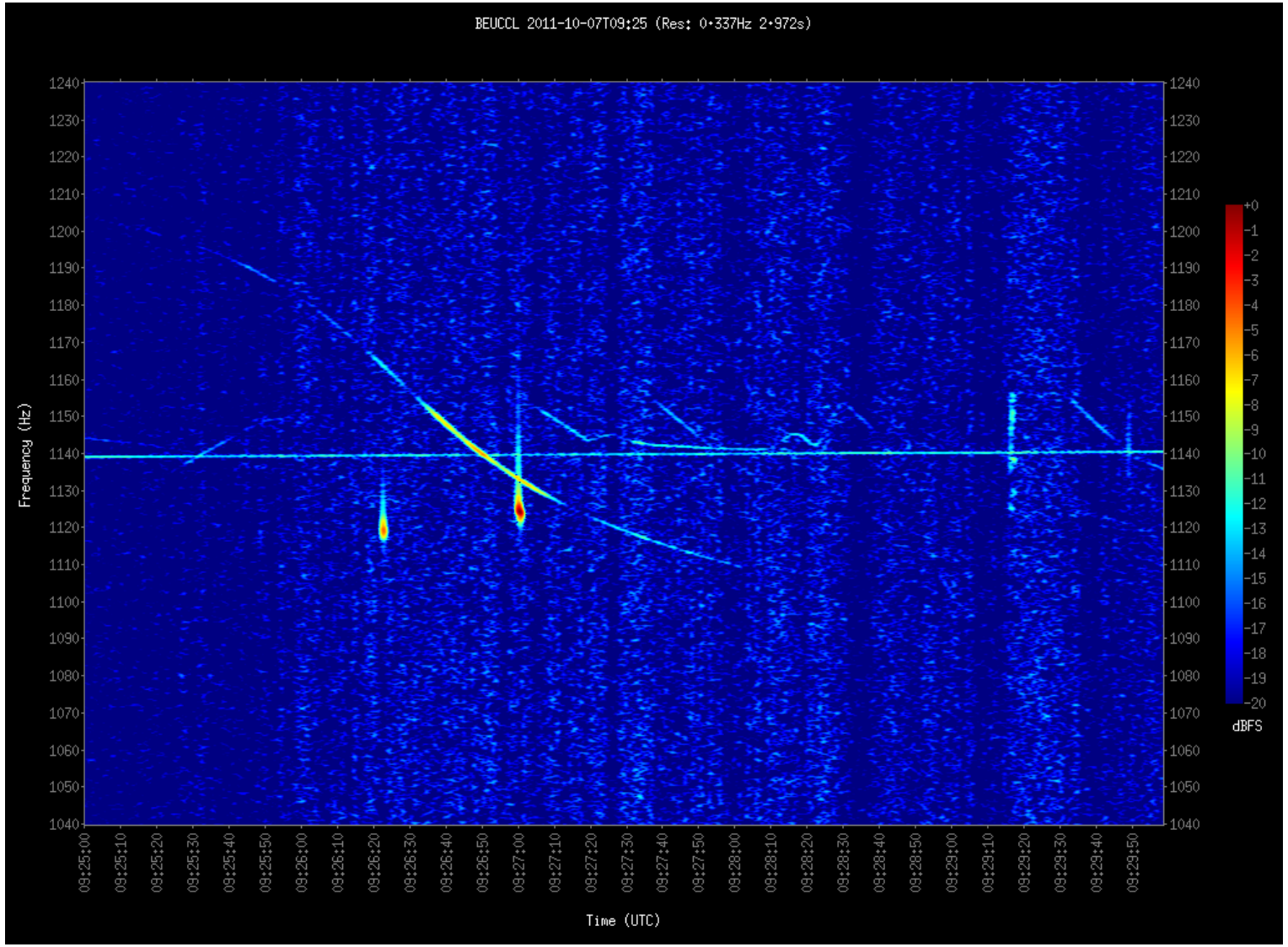


Analysis of the noise in spectrograms



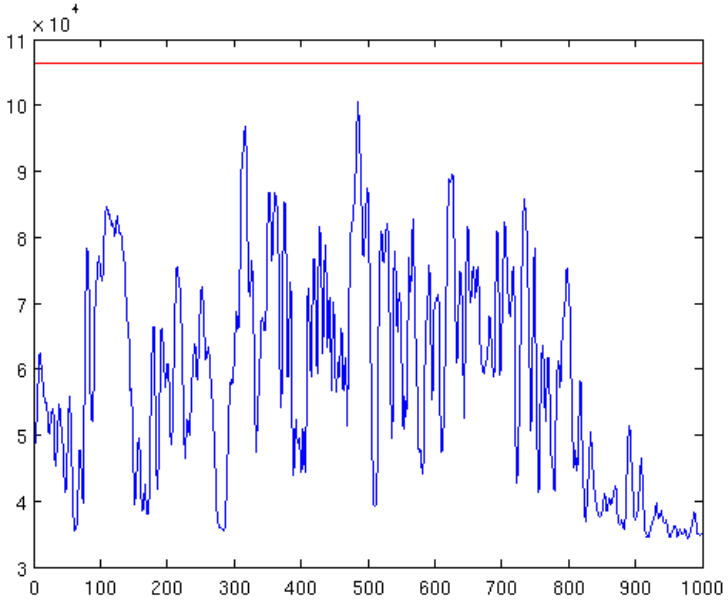
Origin of this other pic?

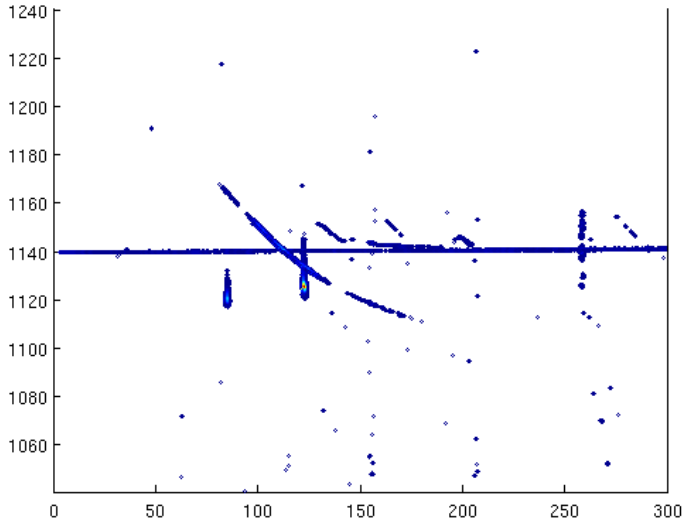
Analysis of the noise in



In this case… method fails!

Mean (sum) + 3 std dev (sum)

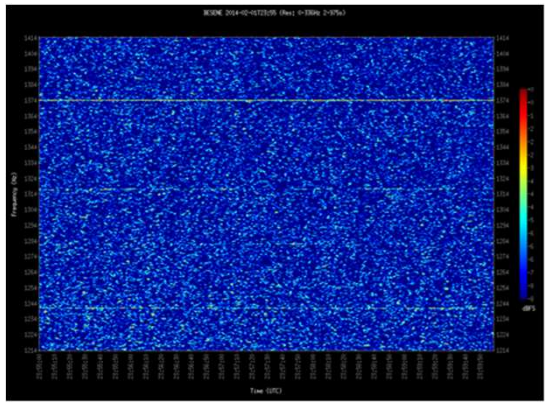




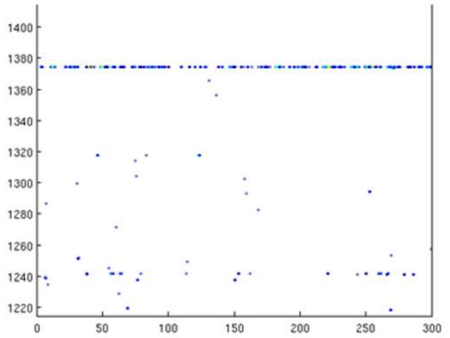
Nothing is actually filtered …. but …

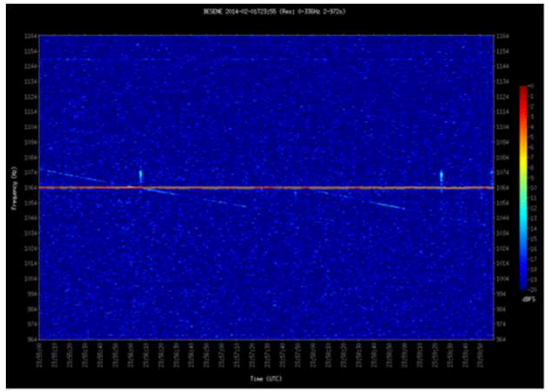
result is not so bad !

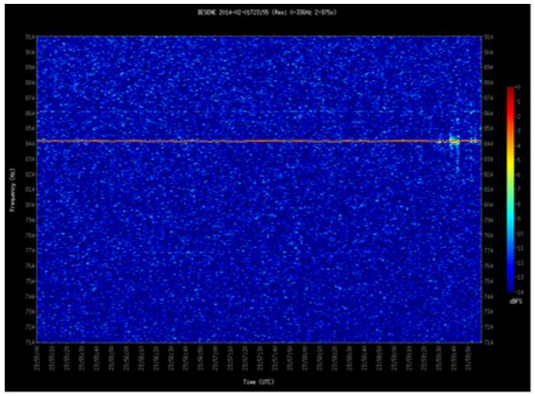
Horizontal parasitic signals



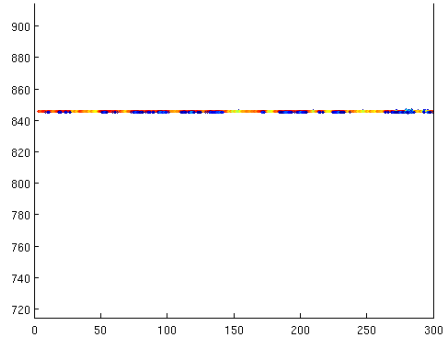
Y_1





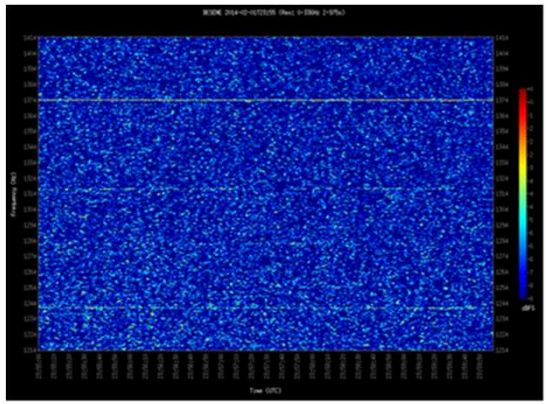


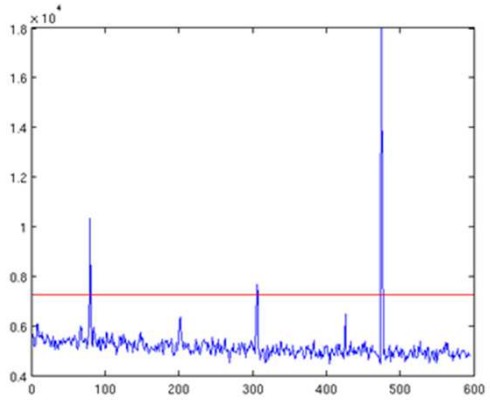
Y_2

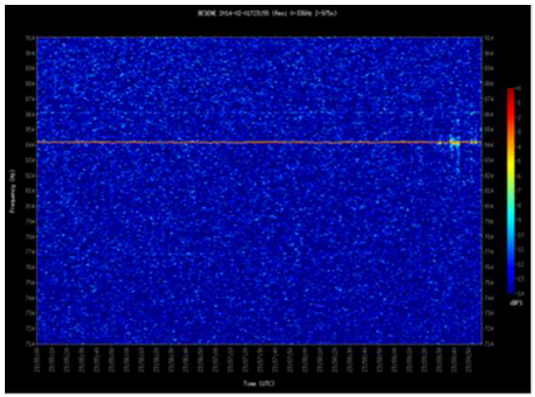


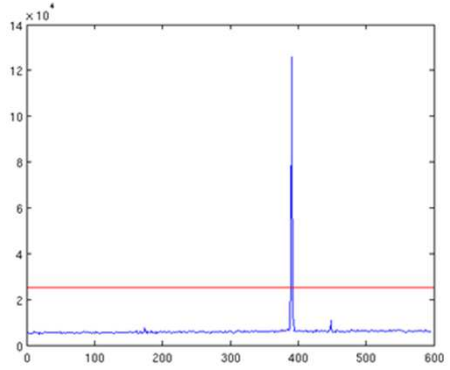
Solution : « filter » these signals

Sum along lines (time) & apply a criterion « mean (sum)+3 std deviation (sum)

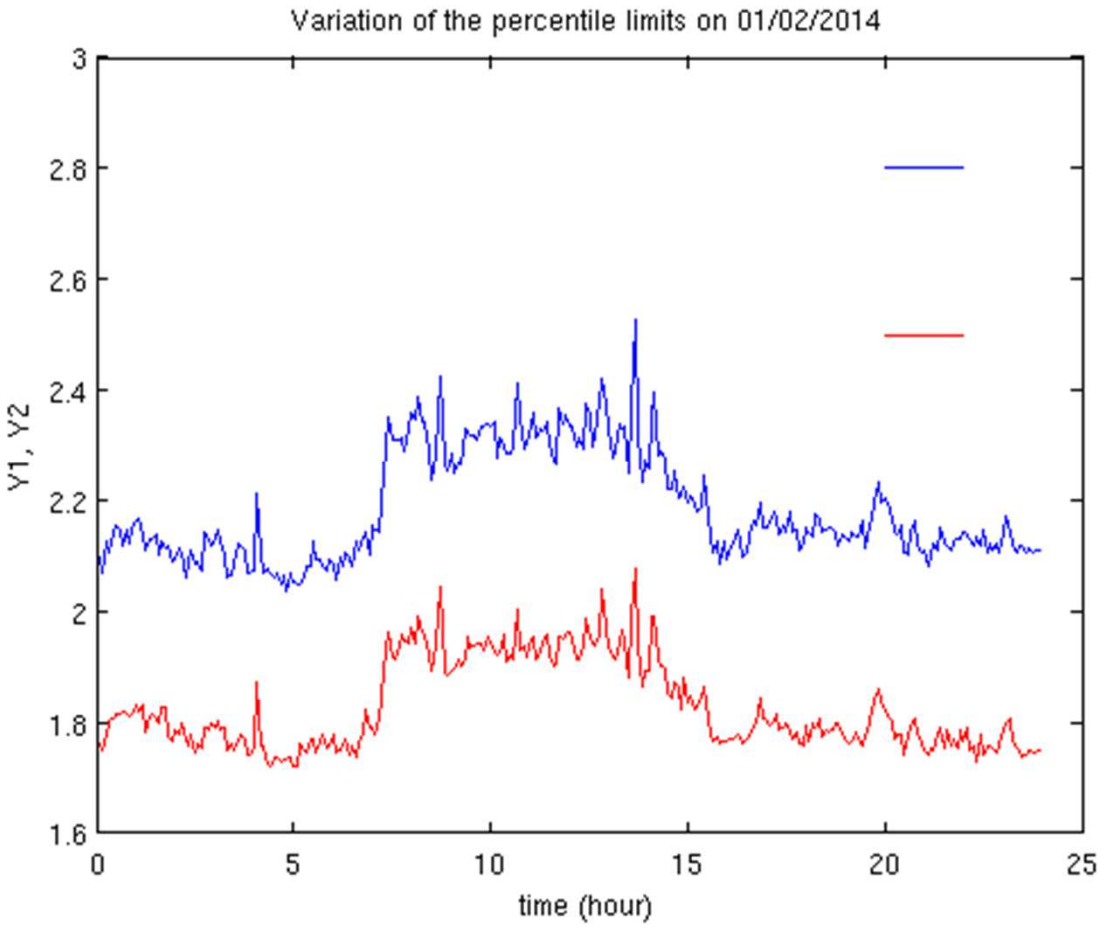




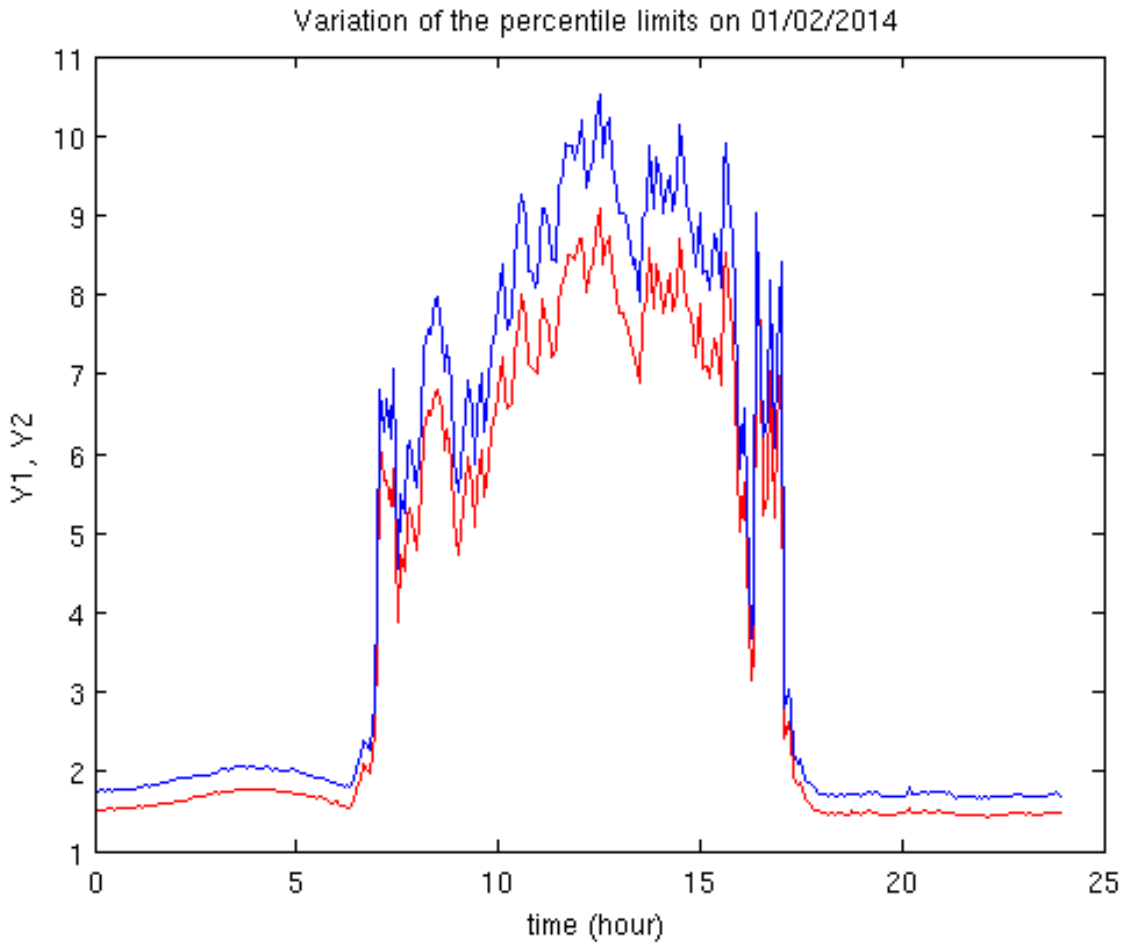




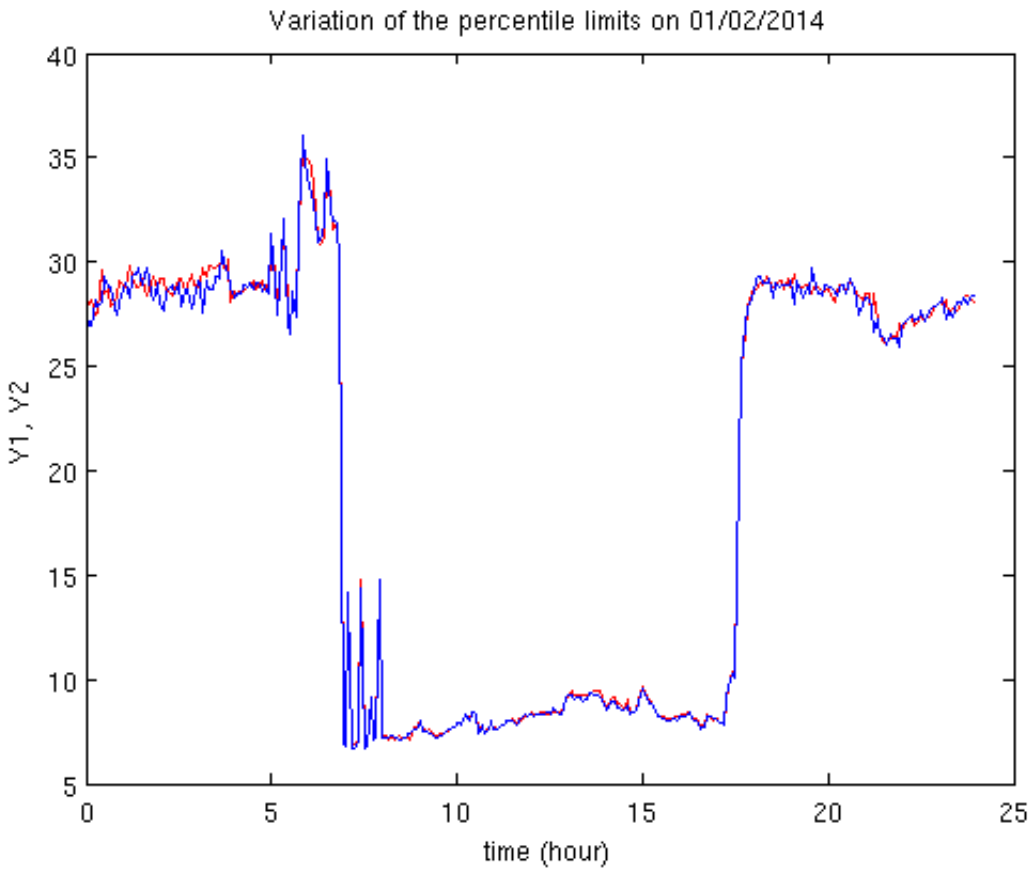
Results for BEKAMP



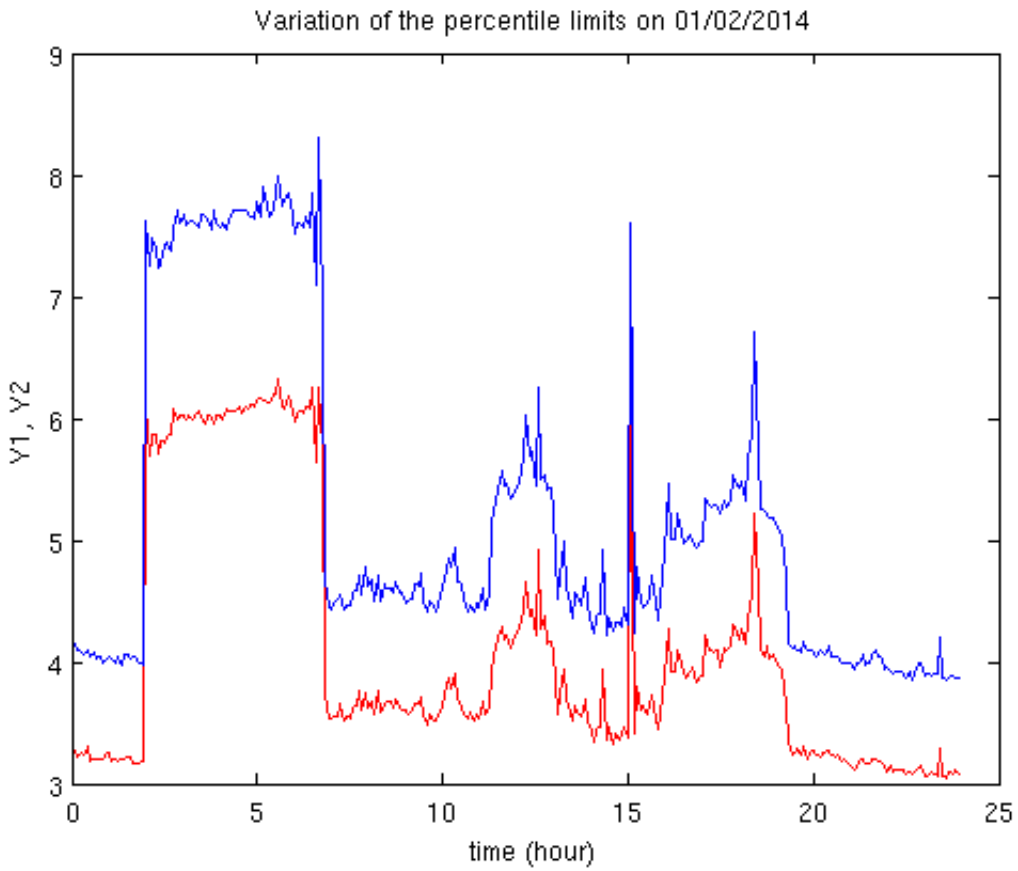
Results for BELANG



Results for FREPIN



Results for BEJALH



Preliminary conclusions

- Method seems to work to select mostly signals
- Remaining noise is mostly isolated pixels (can be filtered with a surface criterion)
- Criterion : mean(sum) + 3 std dev (sum) could be improved (replaced by a percentile as well)
- Interquartile range instead of 99.9% percentile?
- Test with head echoes