

Seismic noise measures

- Long term data evaluation and seismic criteria – common measures to use in data evaluation
- GWIC 3G document
- Latest results are summarized in

[arXiv:1810.06252](https://arxiv.org/abs/1810.06252)

- methodology
- use of percentiles
- median instead of mode
- $\text{rms}_{2-10\text{Hz}}$ and $\text{rms}_{1-10\text{Hz}}$

[arXiv:1811.05198](https://arxiv.org/abs/1811.05198)

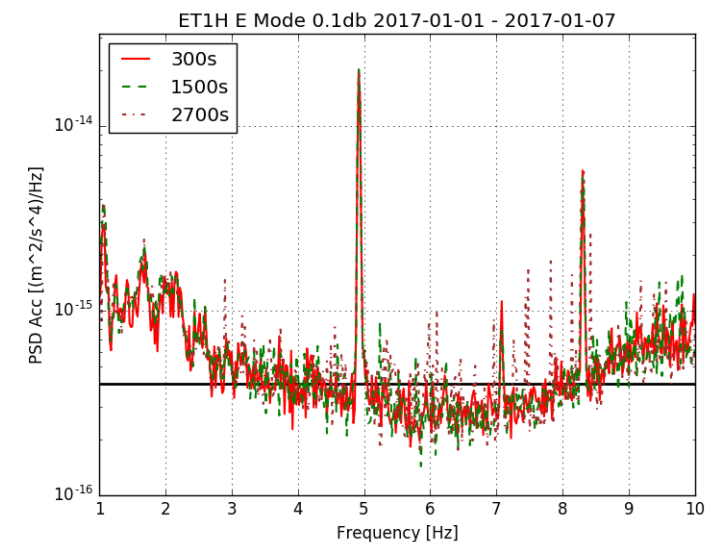
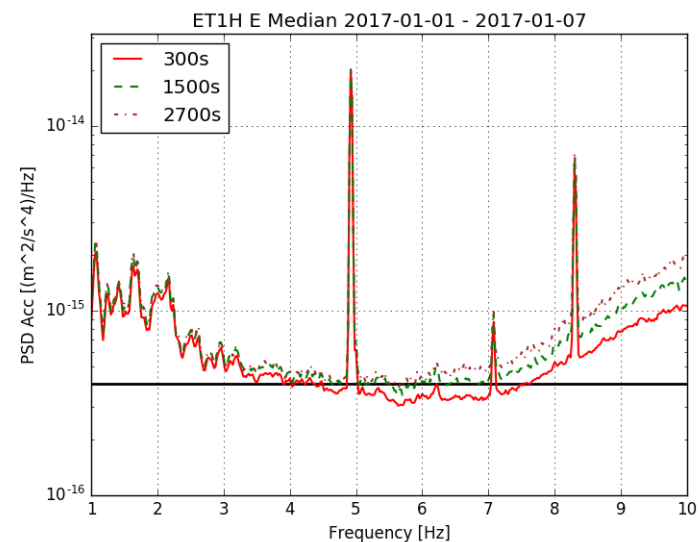
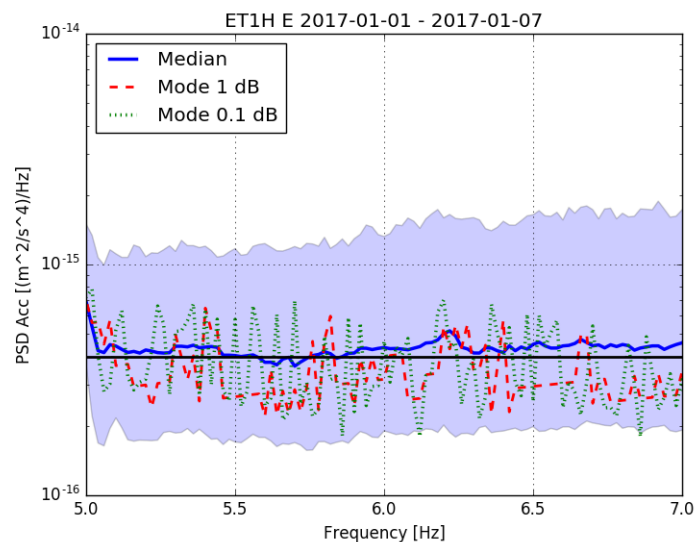
- long term measurements at Mátra
- Warsaw seismometer, infrasound, EM
- More than 2 ys of data

Percentiles and long term data evaluation

- Short time large amplitude peaks are unavoidable. The percentiles of the complete data set naturally filter out the highest and lowest values.
- Short time averages, e.g. 300 s, 1800 s, for data evaluation and Fourier transform. In addition, intermediate averages for long term calculations, to study daily, annual, etc. variations for natural periodicity of data.

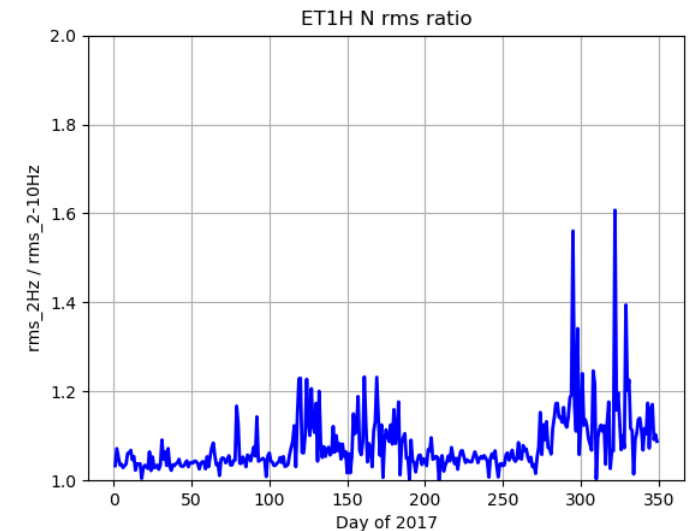
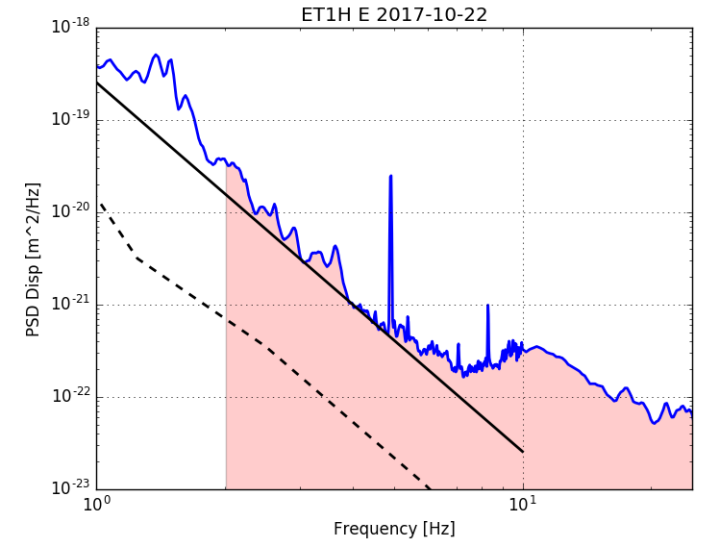
Median instead of mode

- Mode depends on the discretization of the spectrum, and on short time averages.
- Median is not sensitive on short time averages and noise level distribution



RMS values

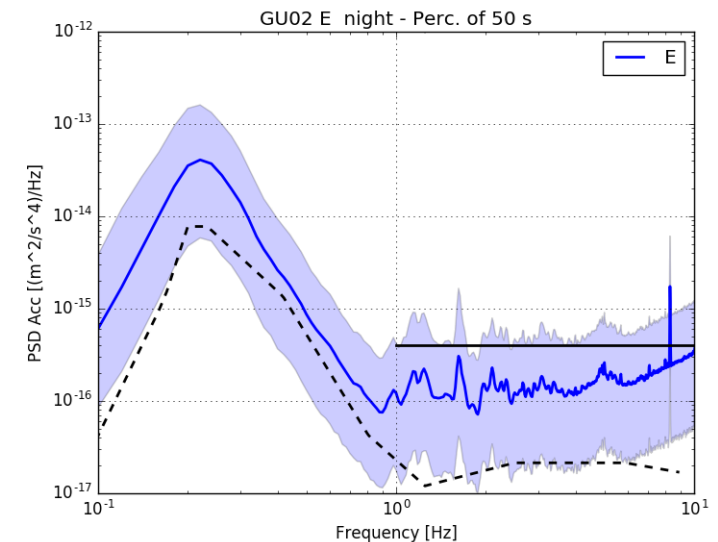
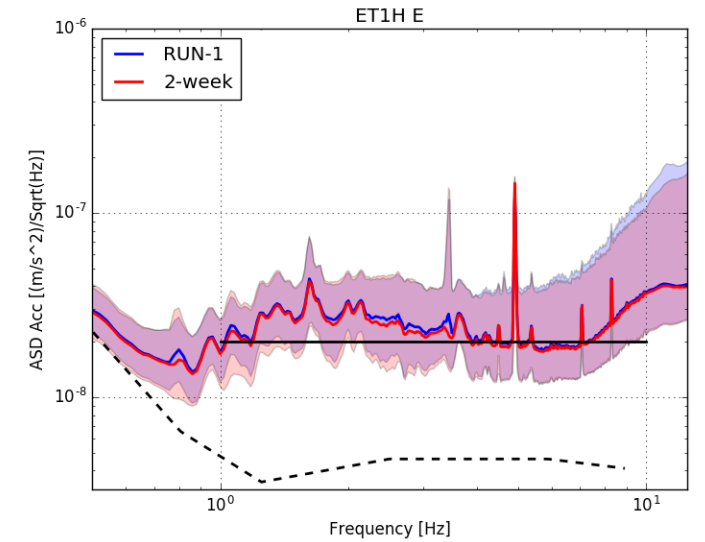
- Cumulative characteristics with $\text{rms}_{2\text{Hz}}$
- For seismic noise the spectrum from 1 Hz can be also important
- $\text{rms}_{2-10\text{Hz}}$ and $\text{rms}_{1-10\text{Hz}}$ values
 - Upper limit: removes irrelevant information for the low frequency operation
 - Lower limit: highlights lower frequency site properties



MGGL results

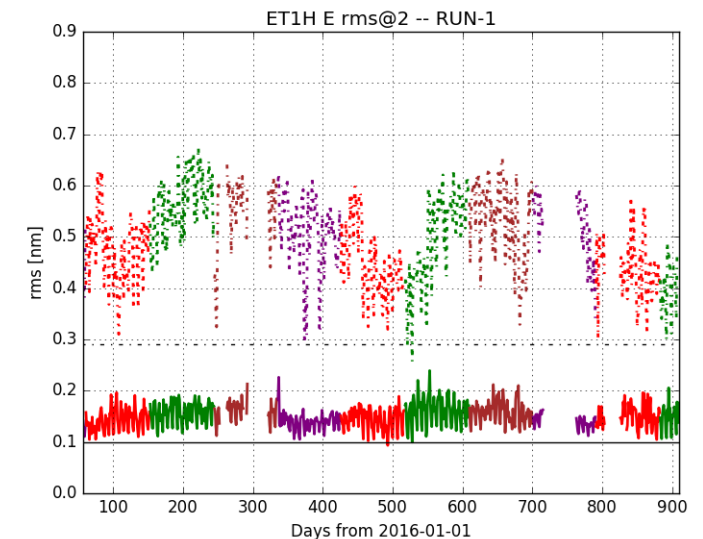
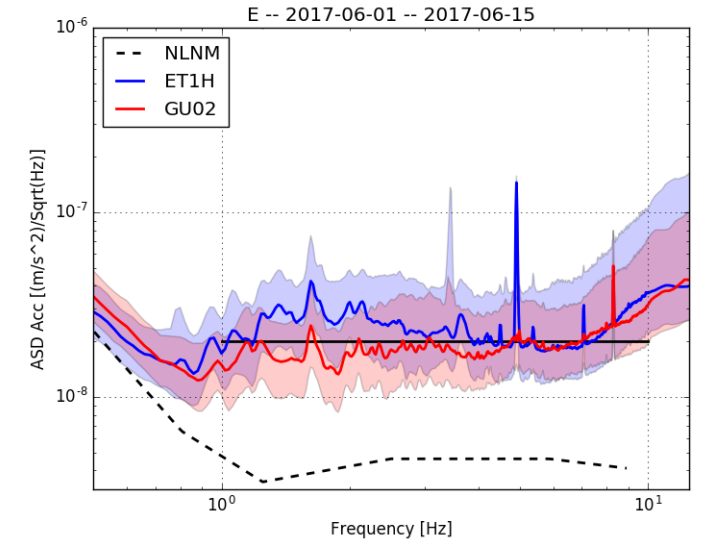
- More than 2 ys of data taking, seismic, infrasound, EM, muon flux measurements, rheological properties of andesite
- Results with WARS seismometer are in accordance with Guralp at low frequencies
- $\text{rms}_{2\text{Hz}}$ [nm] values for the whole period:

Beker	ET1H E	GU02 E	GU02 E night
0.12	0.126	0.0829	0.0748



MGGL results

- Joint 2 weeks observation with two seismometers in June 2017, -88 and -404 m. GU02 represents well the yearly performance
- No significant annual changes, minimal $\text{rms}_{1-10\text{Hz}}$ values in late spring, early summer, not present in $\text{rms}_{2\text{Hz}}$



Conclusions

- For comparison of measurements a common evaluation procedure is suggested
- RUN-1 data are [publicly available](#), we suggest sharing of data
- Recommendations: use of percentiles, median, $\text{rms}_{1-10\text{Hz}}$, intermediate averages for long term results