Update of reverberation time measurement

2019 Aug 20 (Tue.), VK PEM meeting

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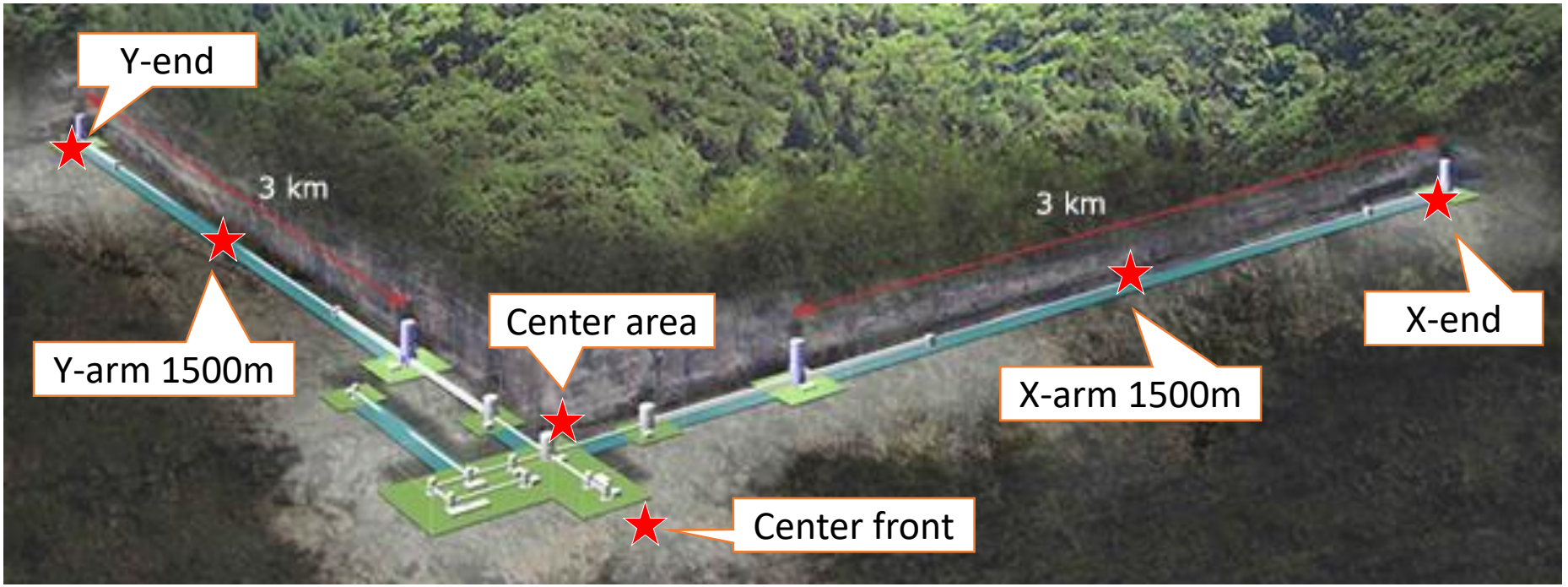
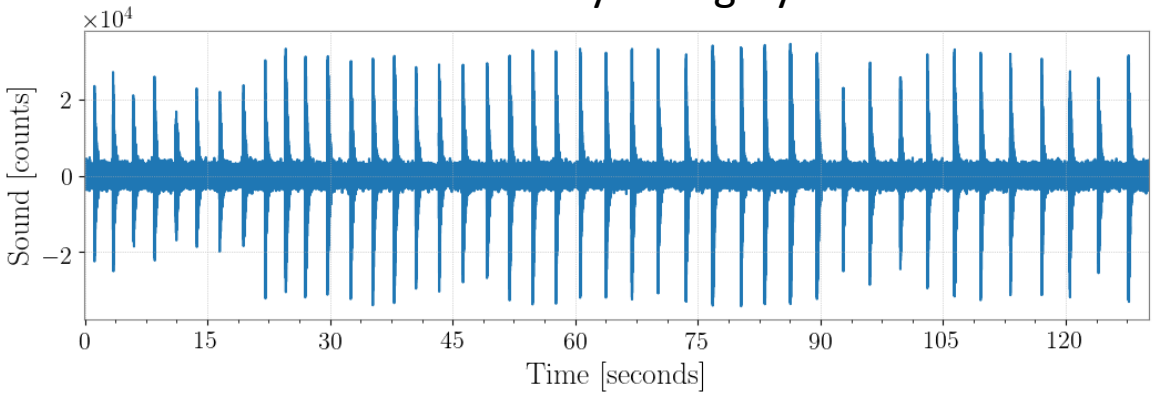
measurement

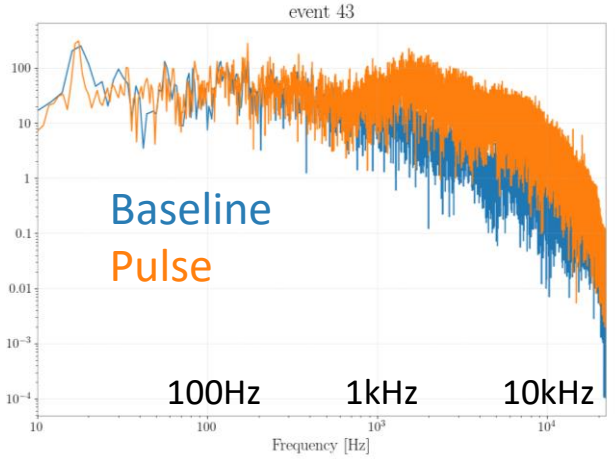
- Source : easy starter
- Microphone : [miniDSP UMIK-1]
- Data acquisition : Chromebook
- Data format : .wav file (44.1kHz)
- Place : ↓

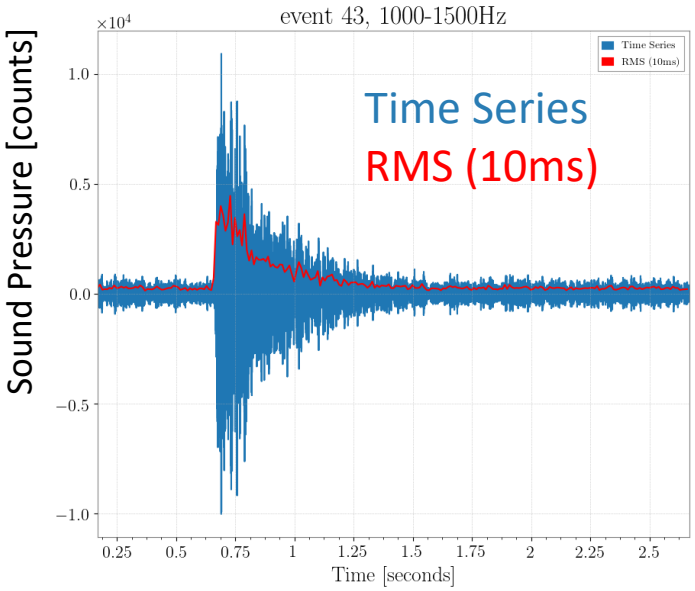


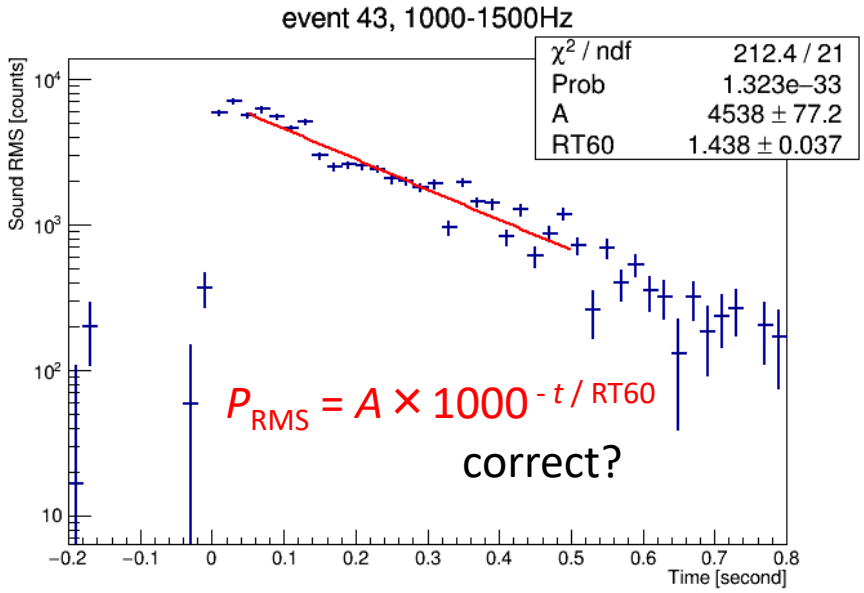
analysis : single pulse event

1. Convert from an audio file (.wav) to a frame file (.gwf) by GWpy.
2. Define a threshold (30% of max) and pick up each pulses automatically.
3. Apply a bandpass filter and calculate the RMS for each 10ms.
4. Evaluate RT60 by fitting by ROOT.



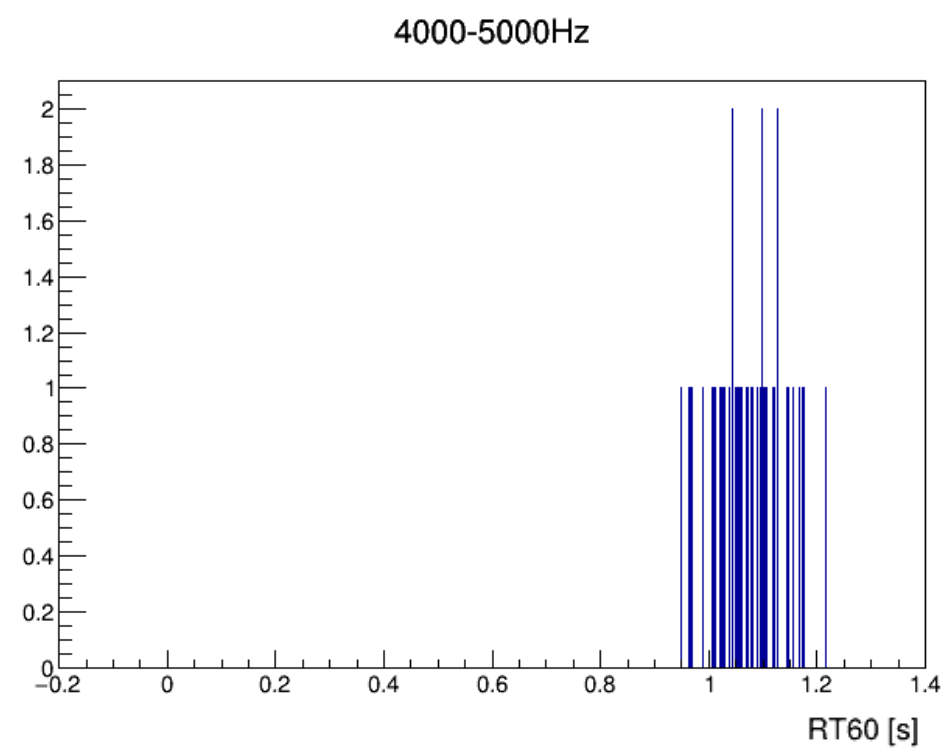


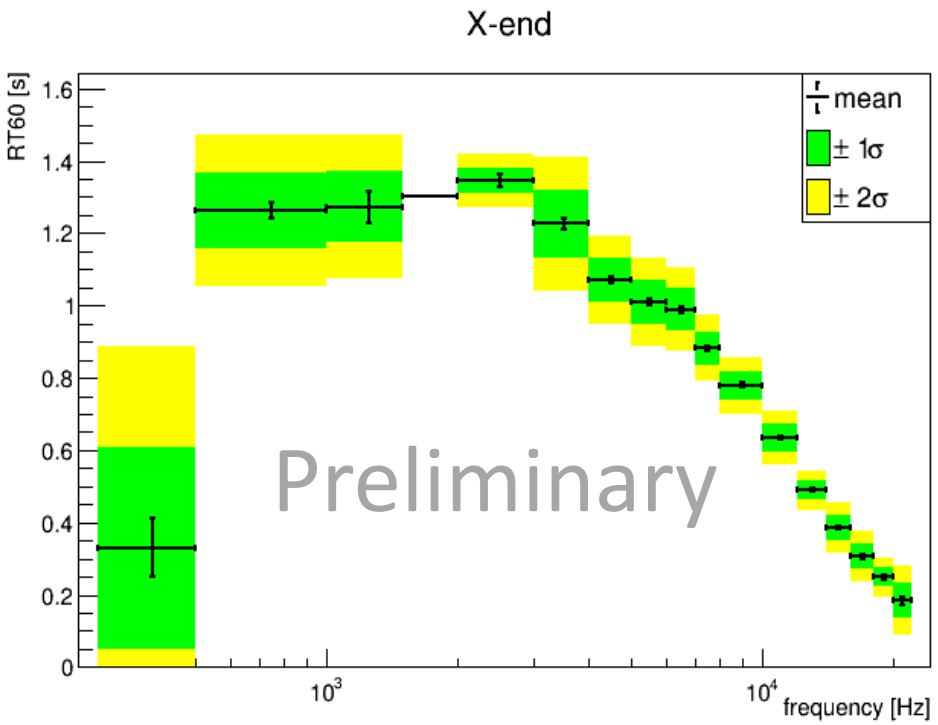




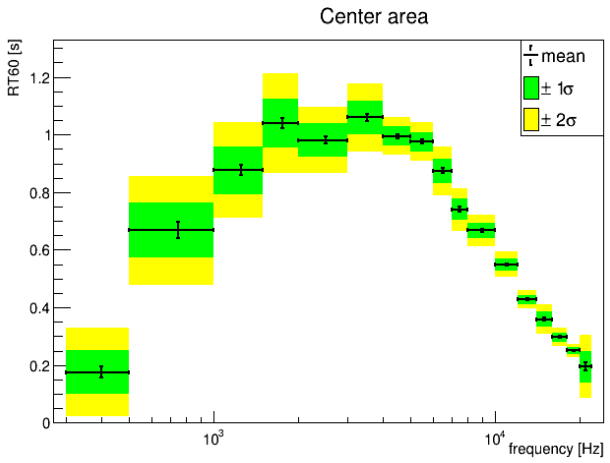
analysis : statistic

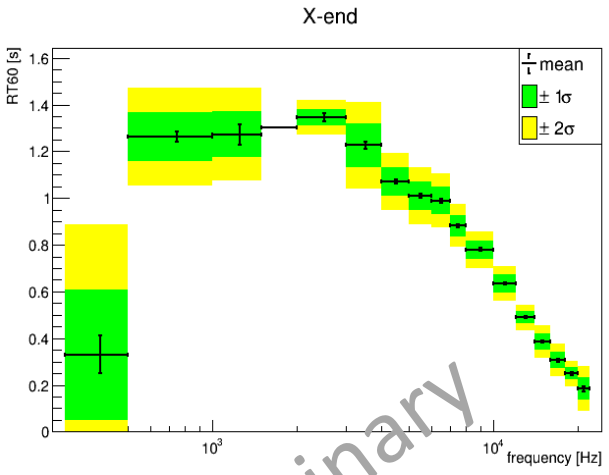
5. Apply 1.-4. for each events
6. Remove the bad events (RT60 < 0.05s or Error/RT60 > 0.15)
7. Get the mean, mean error, and Std dev for this frequency region
8. Apply 5.-6. for each frequency region

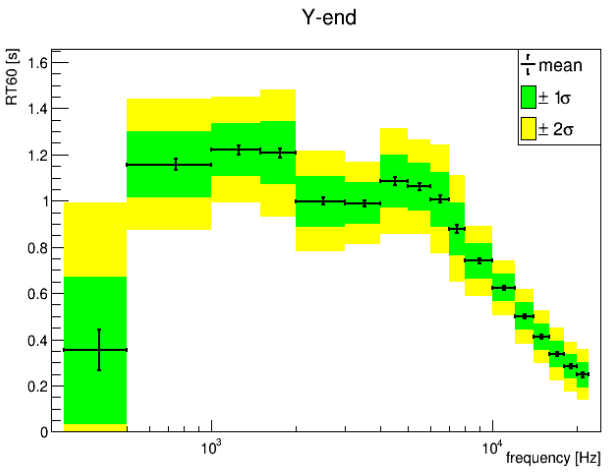


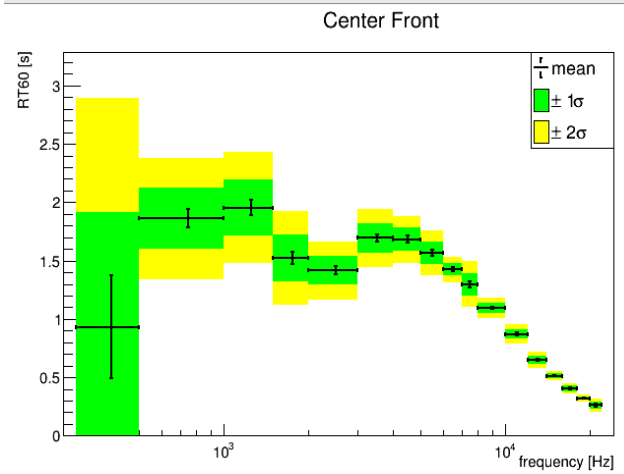


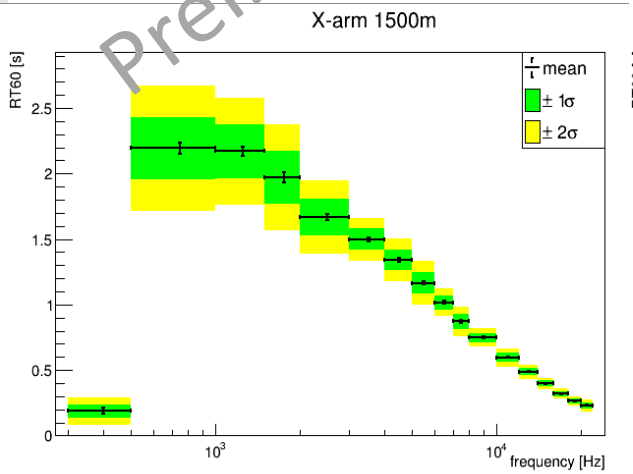
Each place

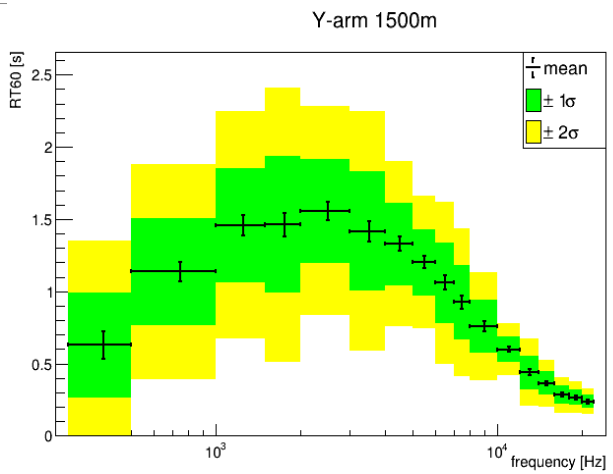




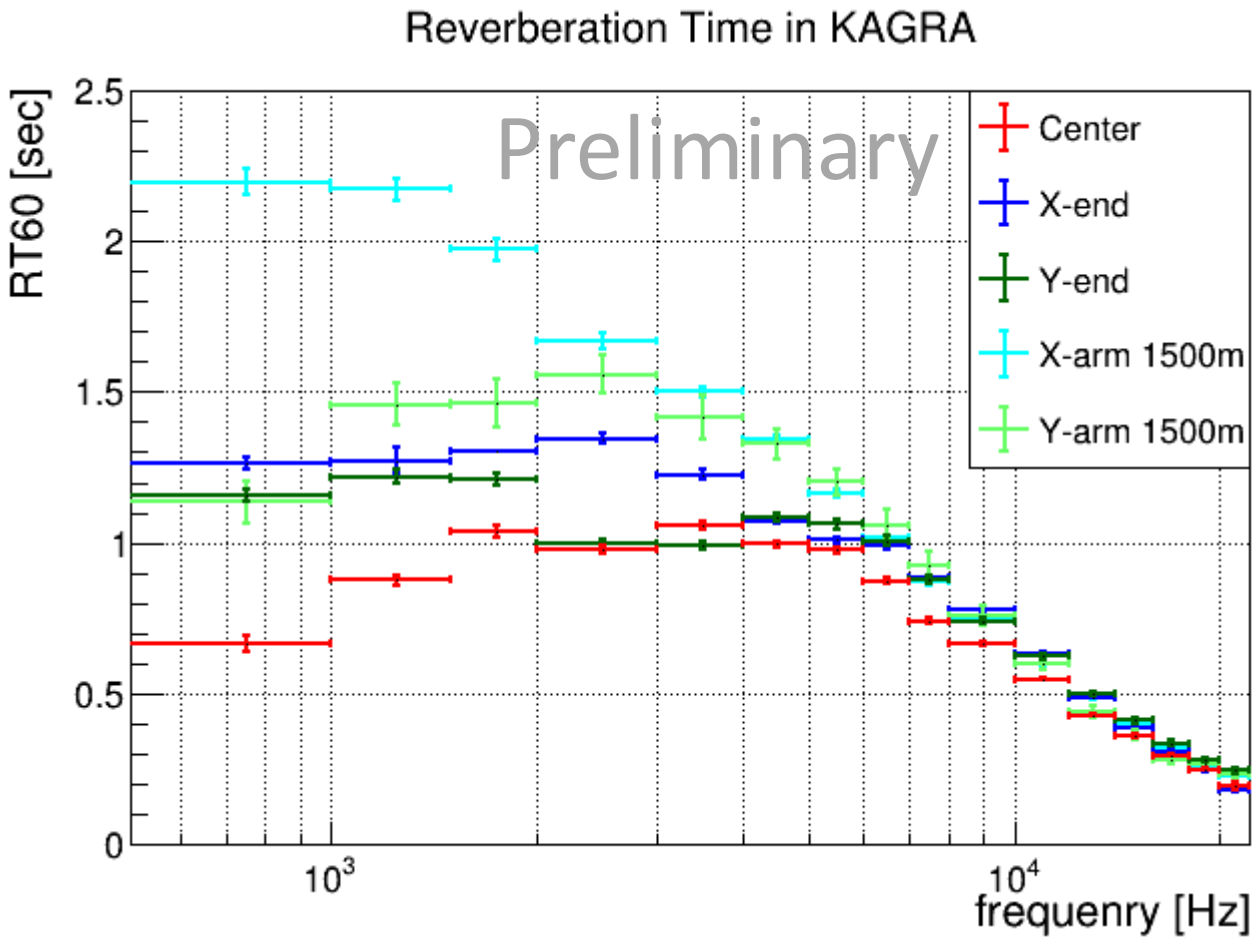








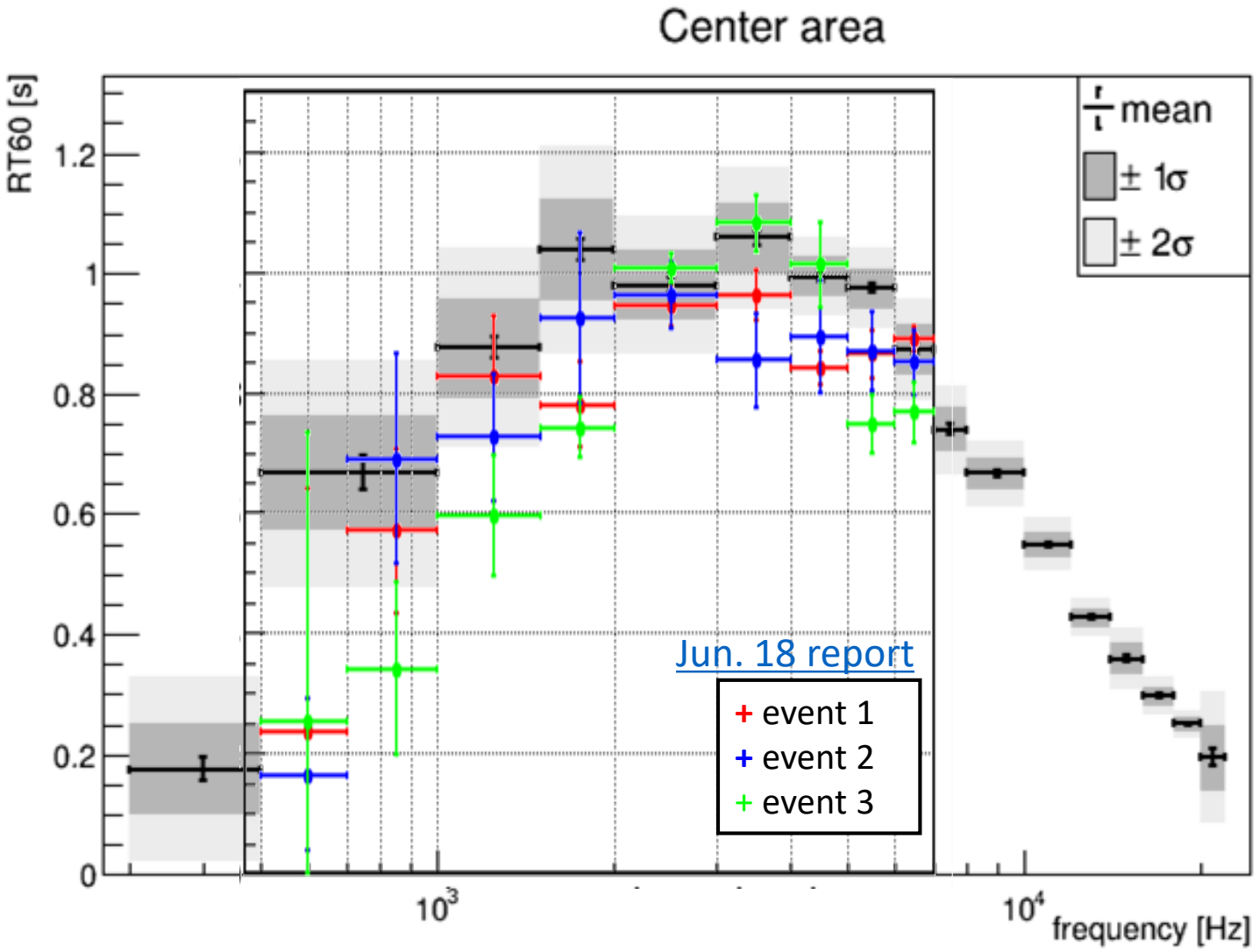
Summary



RT60 value is strongly depend on frequency and place.

- especially at lower frequency region
- in tunnels > in stations
- Why X-arm >> Y-arm?

Comparison to the previous result



Good agreement in the error and deviation

Next step

- Check the absolute value (counts -> Pa? dB_{SPL}?)

- Measurement at lower frequency (<500Hz)
- Calculate the Schroeder frequency

$$f_s = 2000\sqrt{\frac{RT60}{V}}$$

  - What RT60(*f*) value should I use?
- Evaluate the atmospheric NN

- Measurement in Virgo by our setup
  - Our mic vs Virgo mic
  - Easy starter vs Firecracker