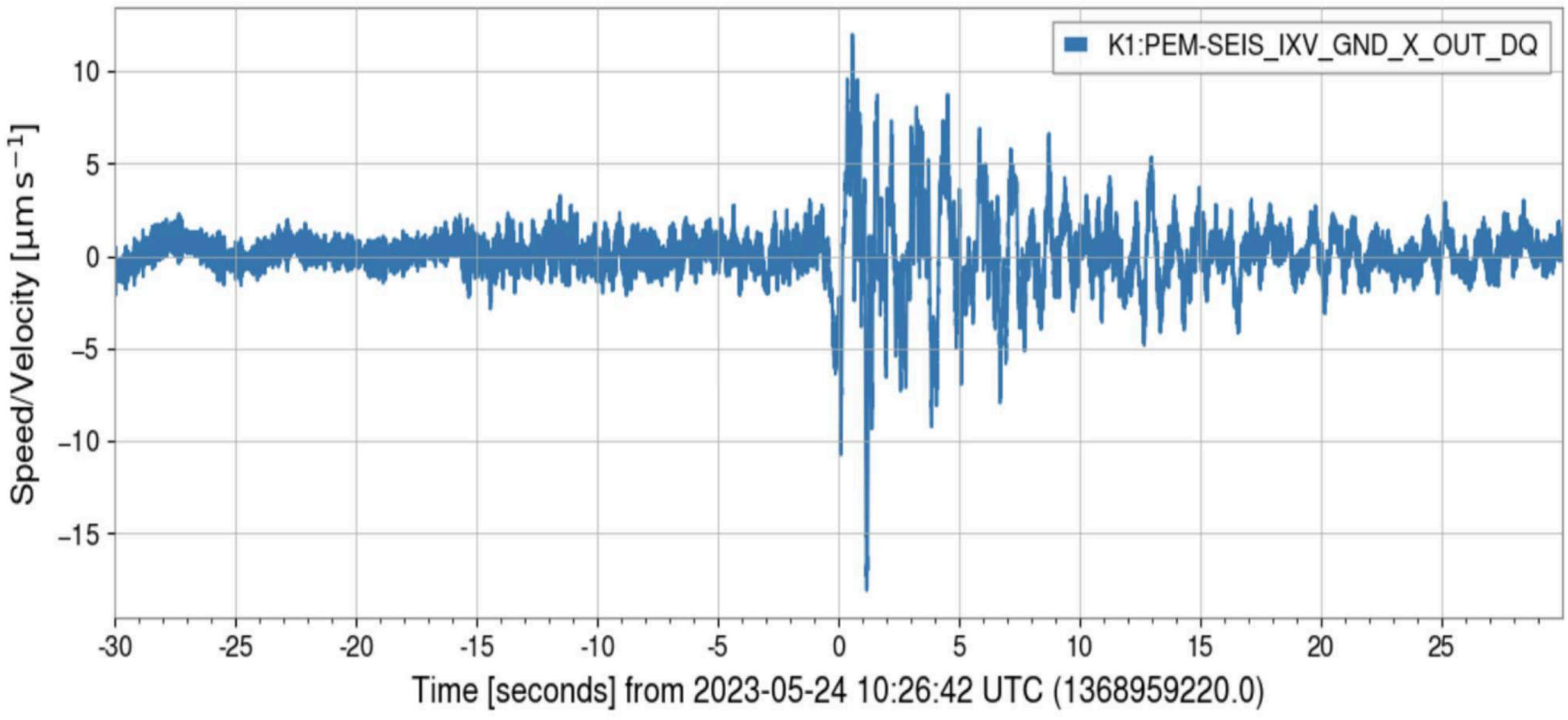
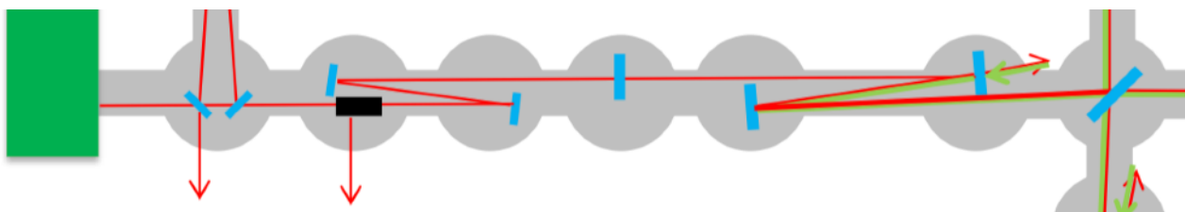
Kick off meeting for the KAGRA earthquake



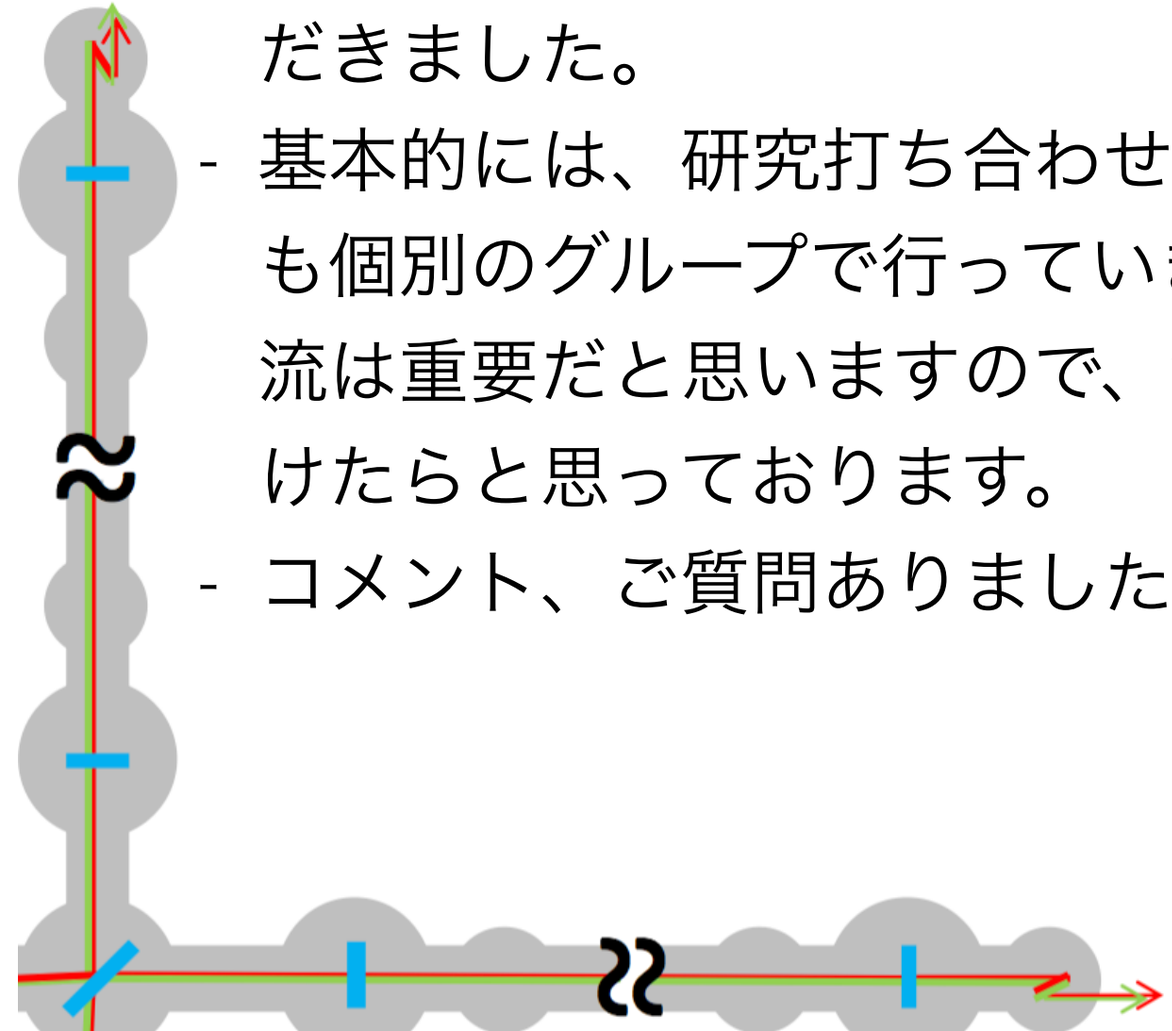
2025/01/16

横澤孝章(東大宇宙線研究所)

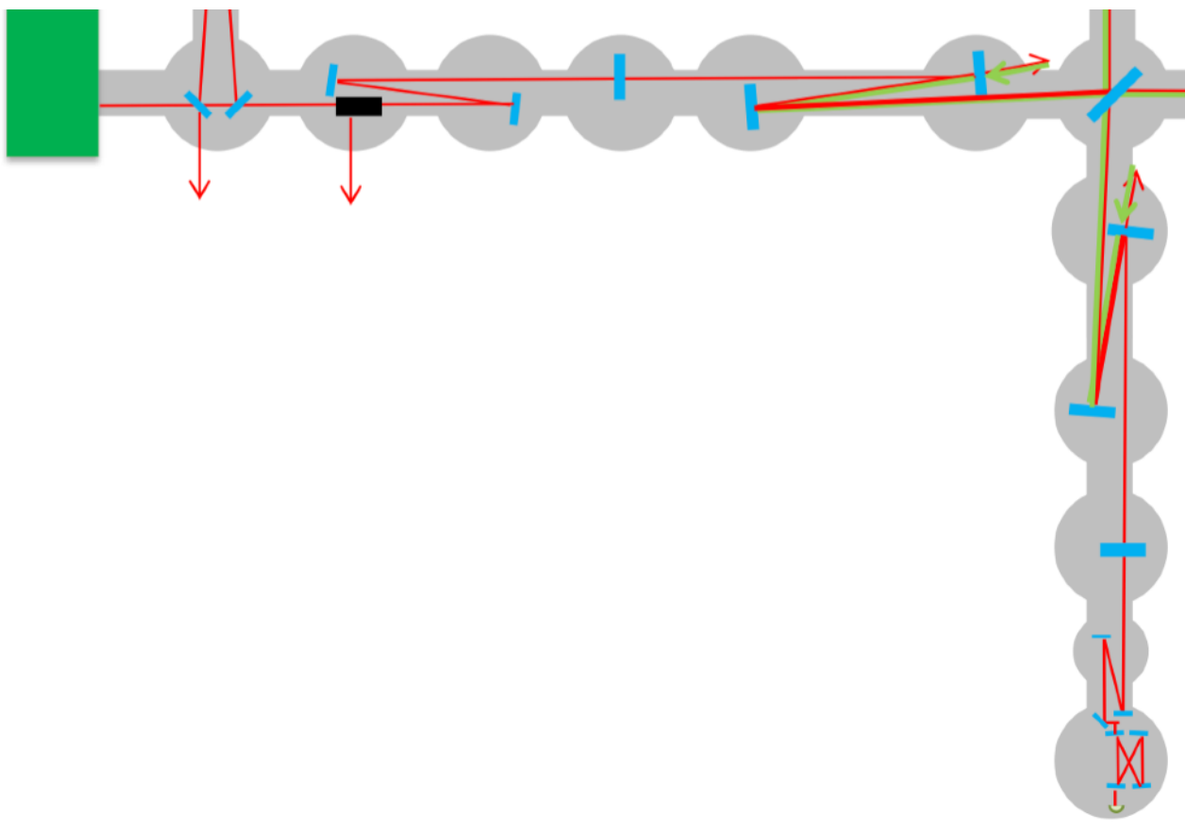
本会議の目的



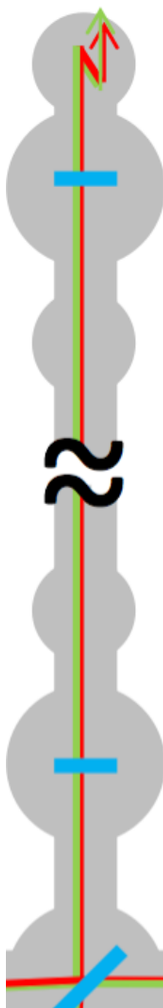
- 新年明けましておめでとうございます。本日は、KAGRAの地震計を用いた地震に関する研究に興味がある学生さんが集まったということで、顔合わせを含めてkick off meetingを開催したいと昨年12月のF2F meetingの際に思いましたので、皆様にお集まりいただきました。
- 基本的には、研究打ち合わせは本メンバー全員で集まるというよりも個別のグループで行っていきたいと思いますが、情報や結果の交流は重要だと思いますので、気軽なコミュニケーションをとっていけたらと思っております。
- コメント、ご質問ありましたら遠慮なくお願いいたします。



自己紹介



- KAGRAオンサイトの環境雑音グループ
  - 横澤孝章 (東大宇宙線研究所)
  - 鷲見貴生 (国立天文台)
- 東大地震研究所
  - 新谷昌人
  - 高森昭光
  - 室伏龍真 (地物干渉計, 能登地震, 雑音評価)
- 東大RESCEU
  - 道村唯太
- お茶の水女子大学
  - 藤田智弘
  - 小原彩嘉 (世界地震、到来時間予測(?))
- 青山学院大学
  - 山崎了
  - 田中周太
  - 尾崎龍弥 (近傍地震)



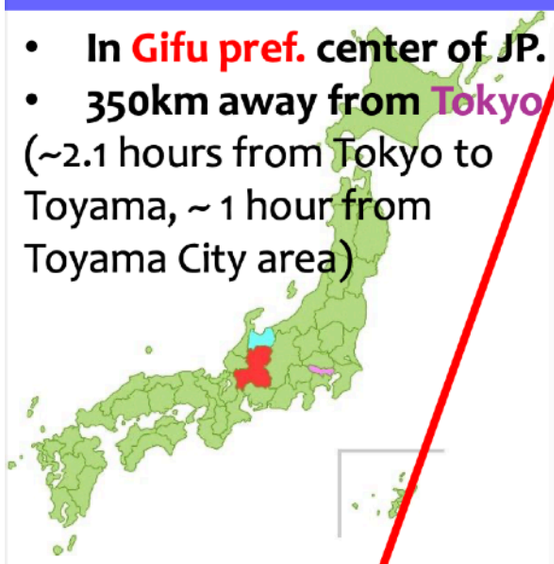
KAGRA facility

https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/private/DocDB/ShowDocument?docid=8224

KAGRA Site (in Rock and Snow)

- In Gifu pref. center of JP.
- 350km away from Tokyo

(~2.1 hours from Tokyo to Toyama, ~ 1 hour from Toyama City area)

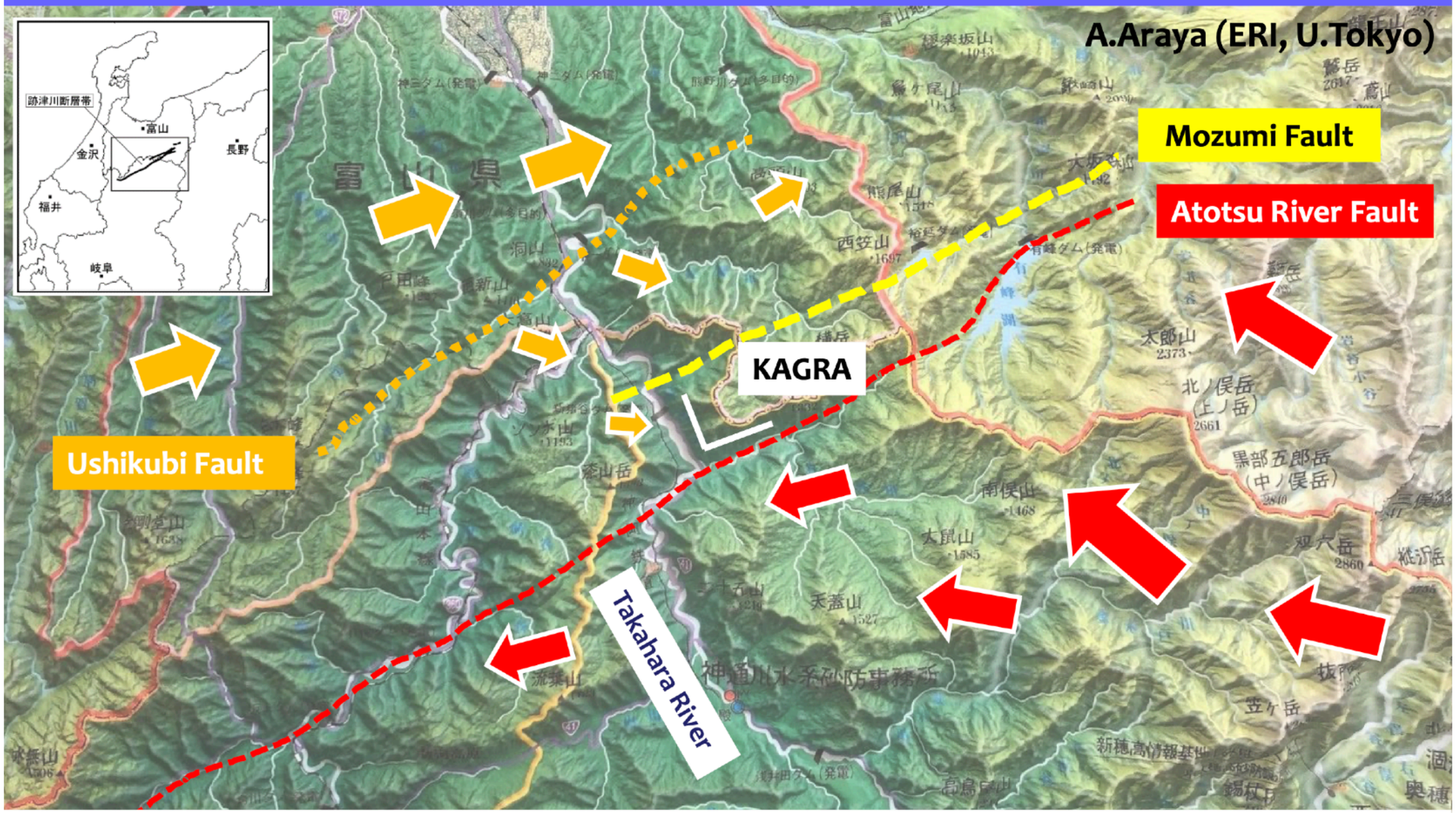


The border area between Gifu and Toyama

KAGRA facility

https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/private/DocDB/ShowDocument?docid=8224

KAGRA between Two Faults



- 1 mm /year slip or creep for 3 million years.
- It made crank shape of “Takahara” river near KAGRA.

GWADW2018, Alaska, May 15th 2018

KAGRA facility

https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/private/DocDB/ShowDocument?docid=8224

In Lucky Position Protected by Mountains

2016/11/22 05:59 JST

KAGRA is protected by something (Mountains Line.)

地震情報 22日05:59

2018/5/12 10:29 JST

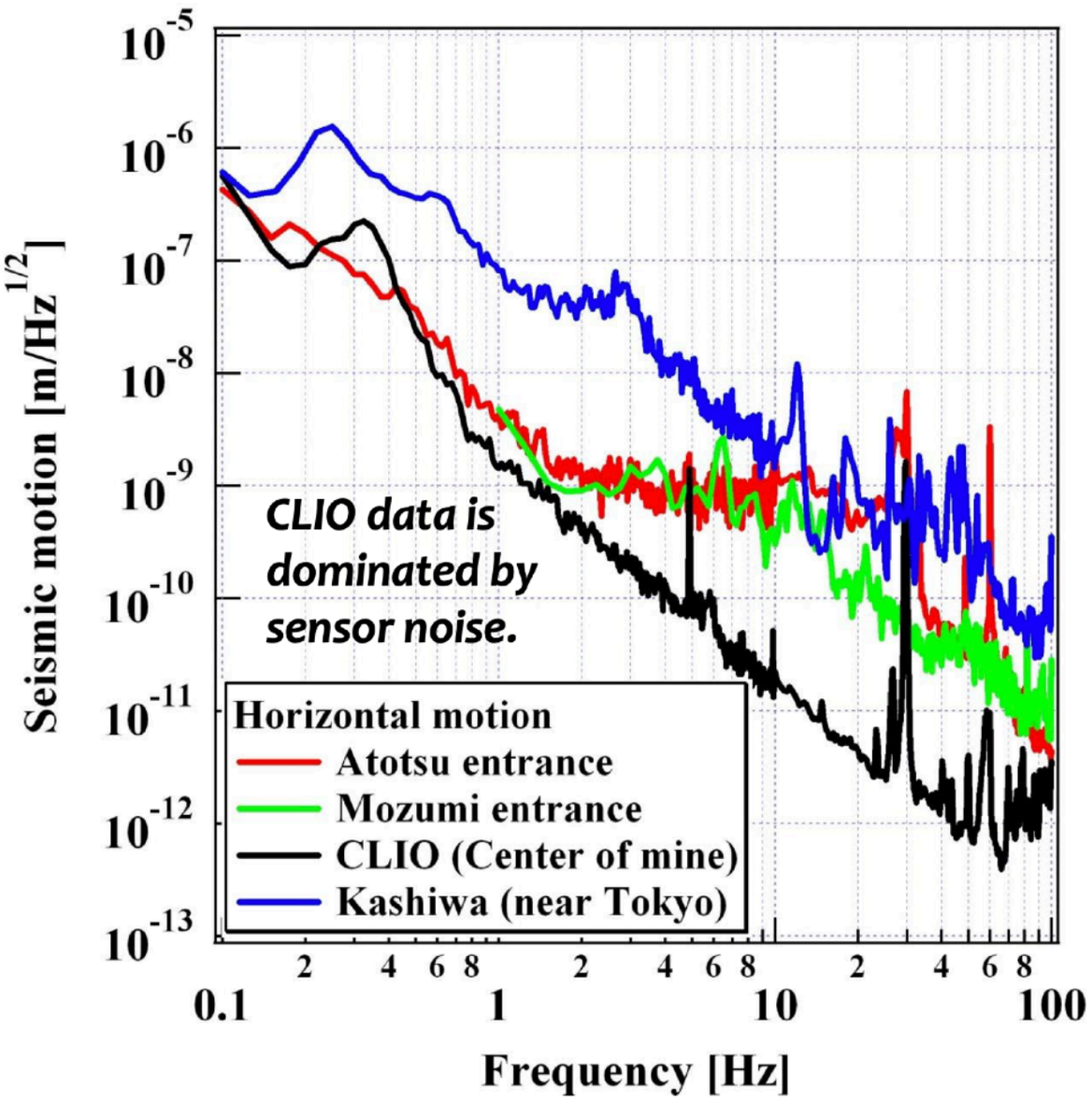
地震情報 12日10:29

GWADW2018, Alaska, May 15th 2018

KAGRA facility

https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/private/DocDB/ShowDocument?docid=8224

Seismic Noise Comparison around KAGRA



- ***f* < 1Hz**

Outside(Moz,Ato) = CLIO

- **1Hz < *f* < 10Hz**

Outside(Moz,Ato) > CLIO

- ***f*>10Hz**

Outside(Moz,Ato) = Tokyo

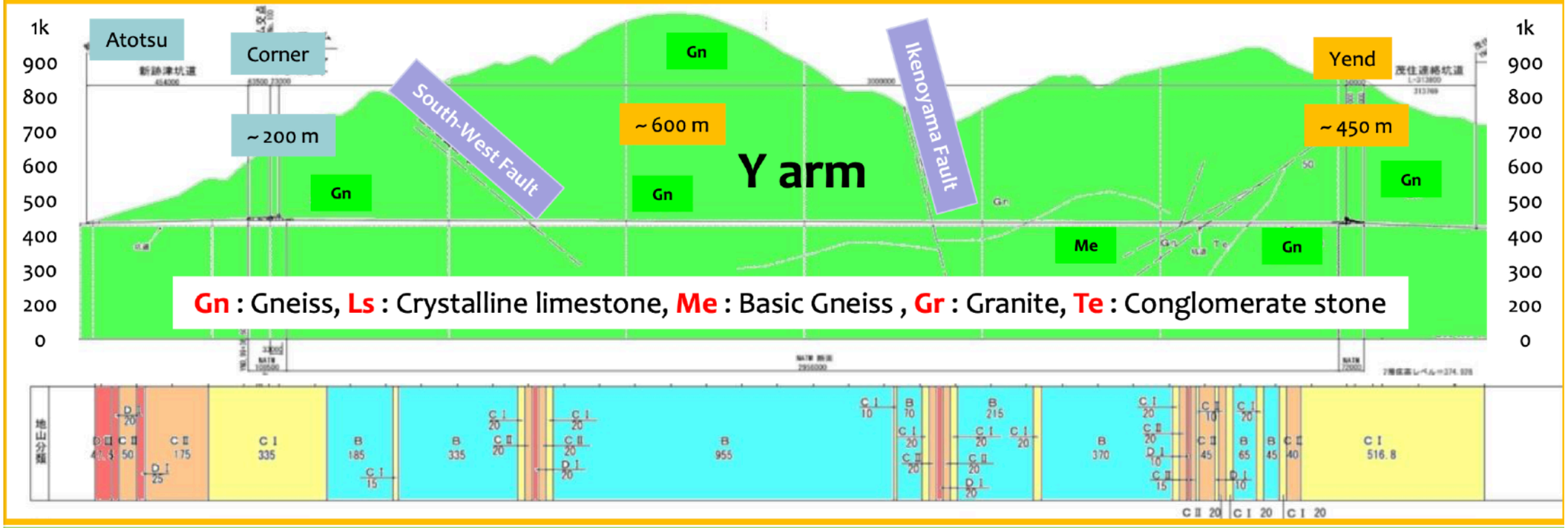
This shows that natural events such as atmospheric and ocean events dominate the seismic noise above ~ 10Hz, while human activity dominates it below ~10 Hz .

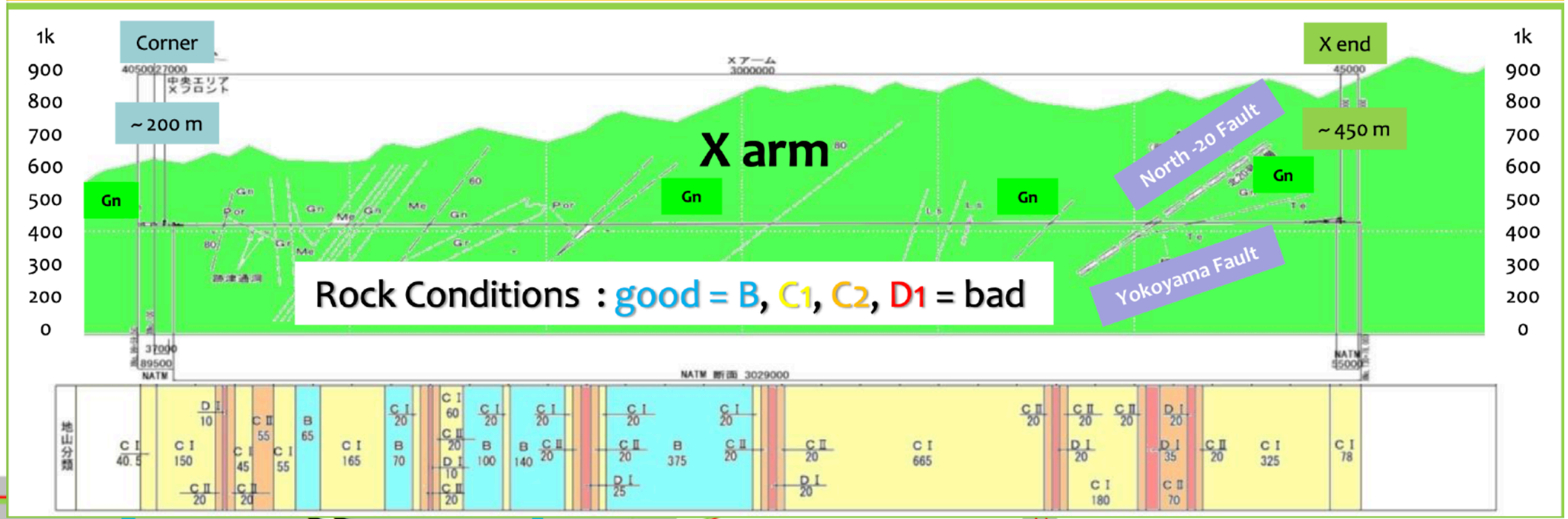
K. Yamamoto (U-Tokyo)

KAGRA facility

https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/private/DocDB/ShowDocument?docid=8224

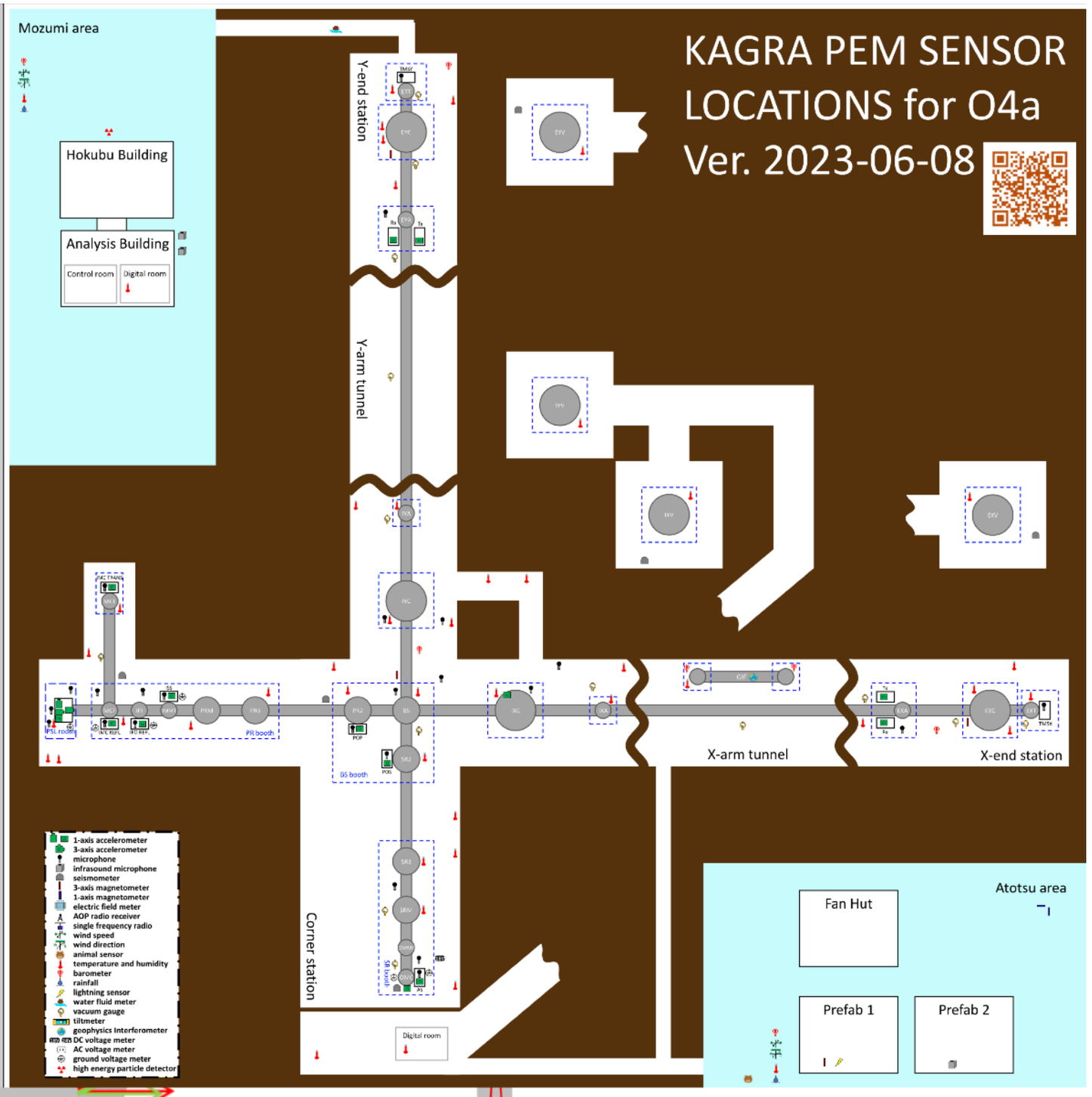
X, Y arm Tunnel Depth and Rock Conditions



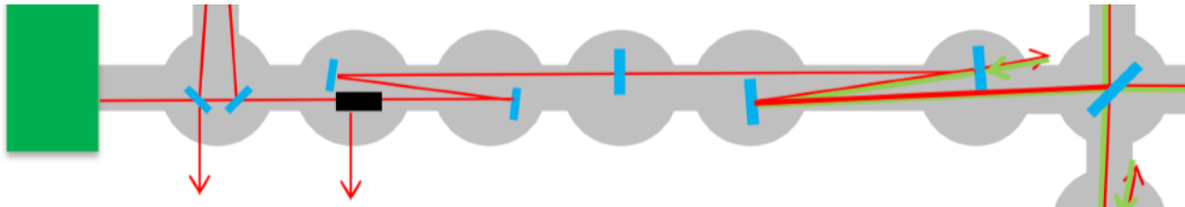


KAGRA環境センサー

https://www.icrr.u-tokyo.ac.jp/~washimi/KAGRA/PEM/PEMmap/archives/O4a/

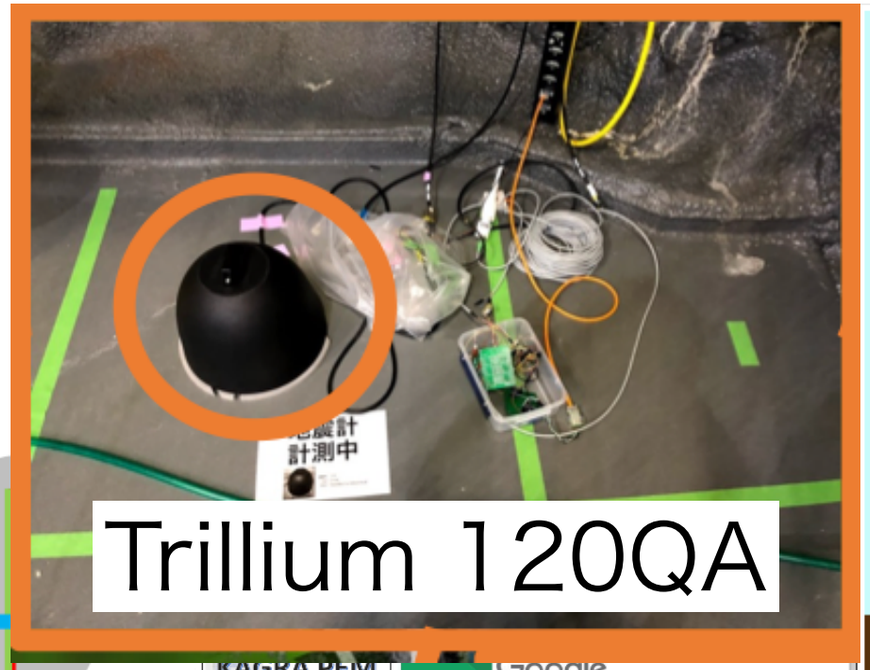


地震計



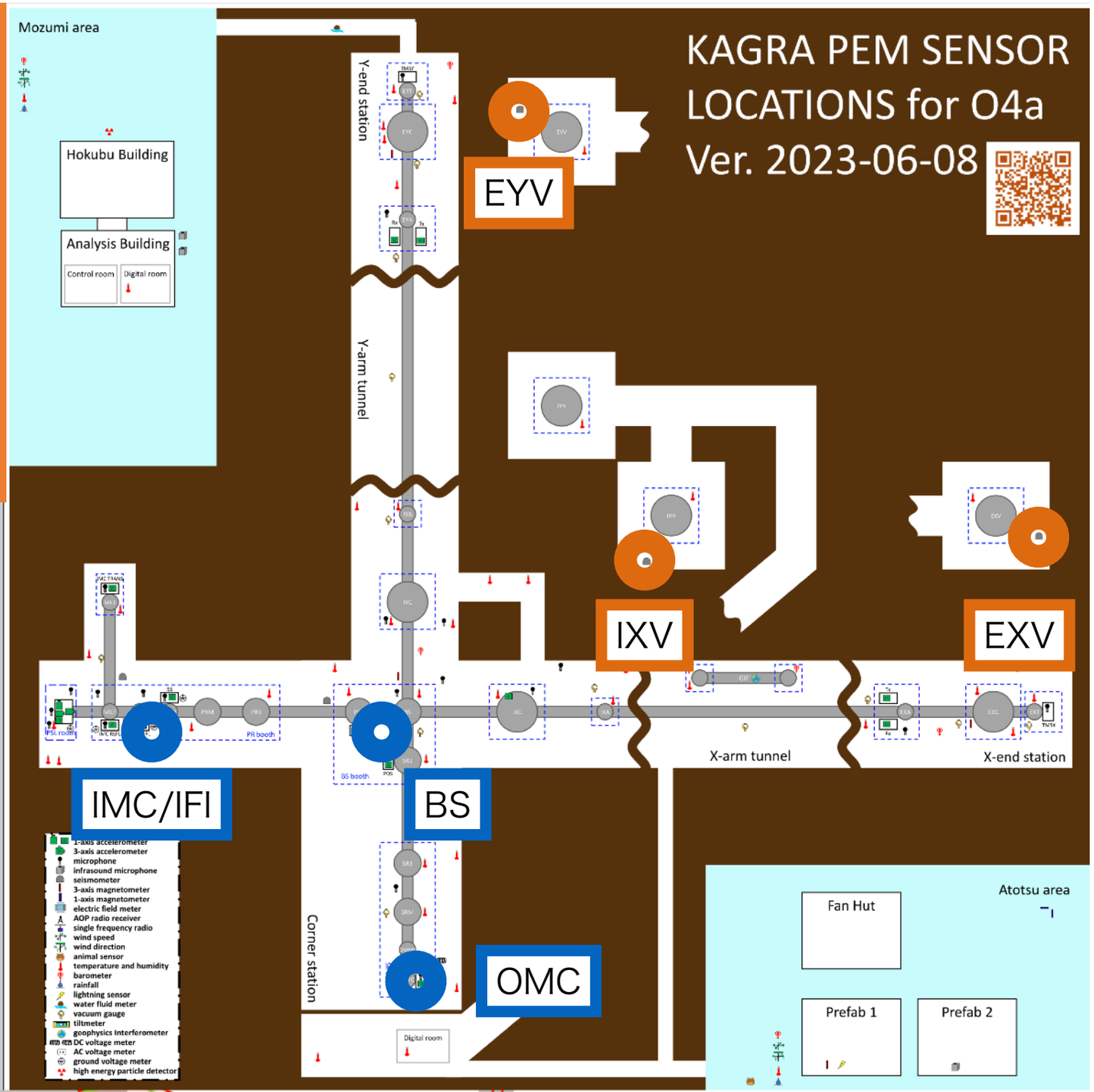
https://www.icrr.u-tokyo.ac.jp/~washimi/KAGRA/PEM/PEMmap/archives/O4a/

- 2018年ごろから安定したデータを取り続けている



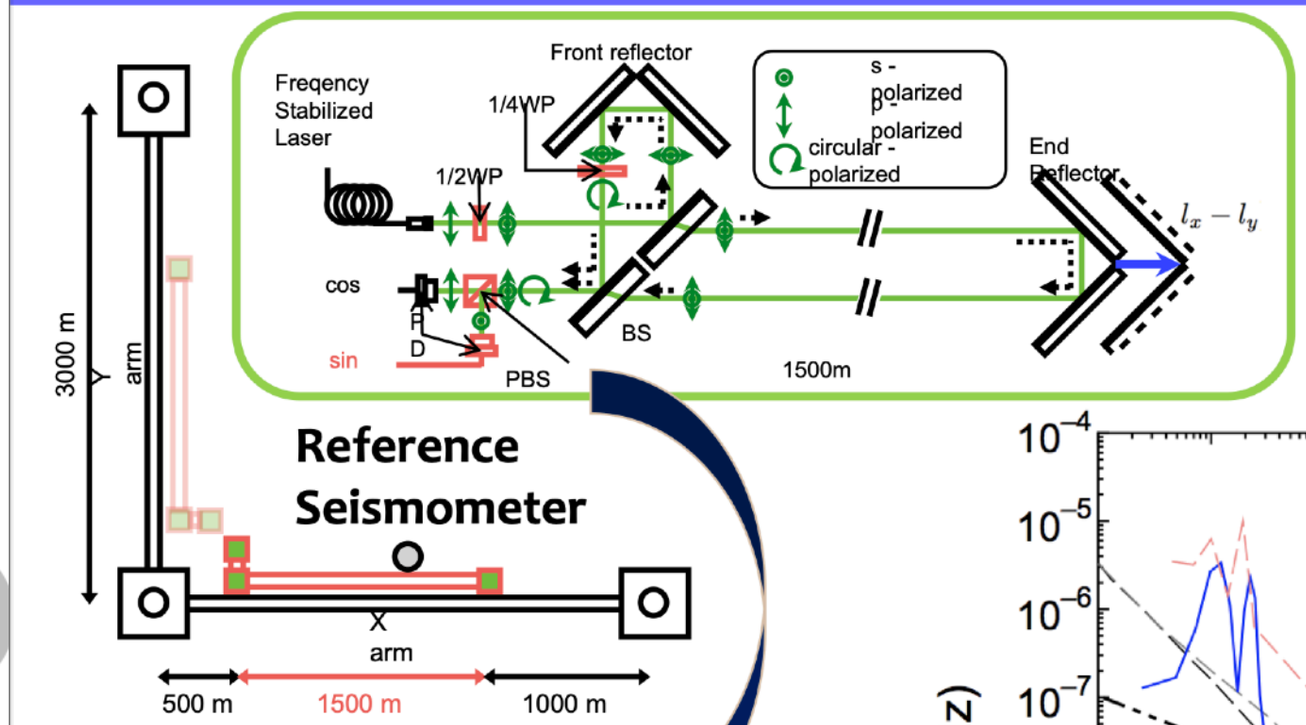
KAGRA PEM Wiki page

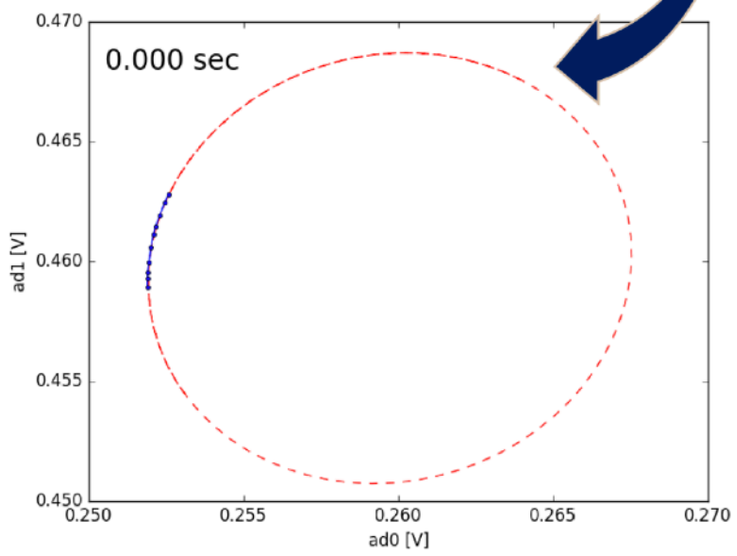
Google Sheets



地物干渉計

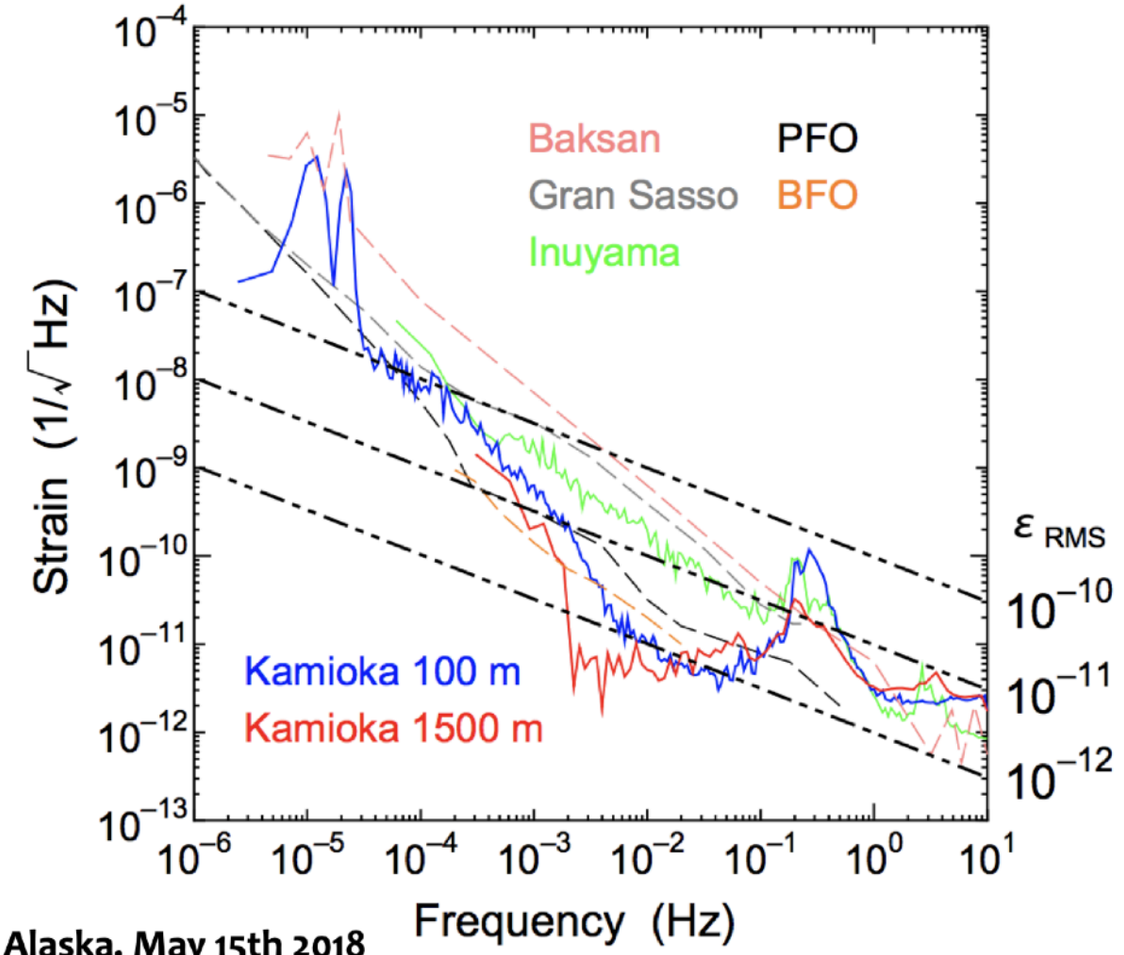
1500m Strain Meter in X arm



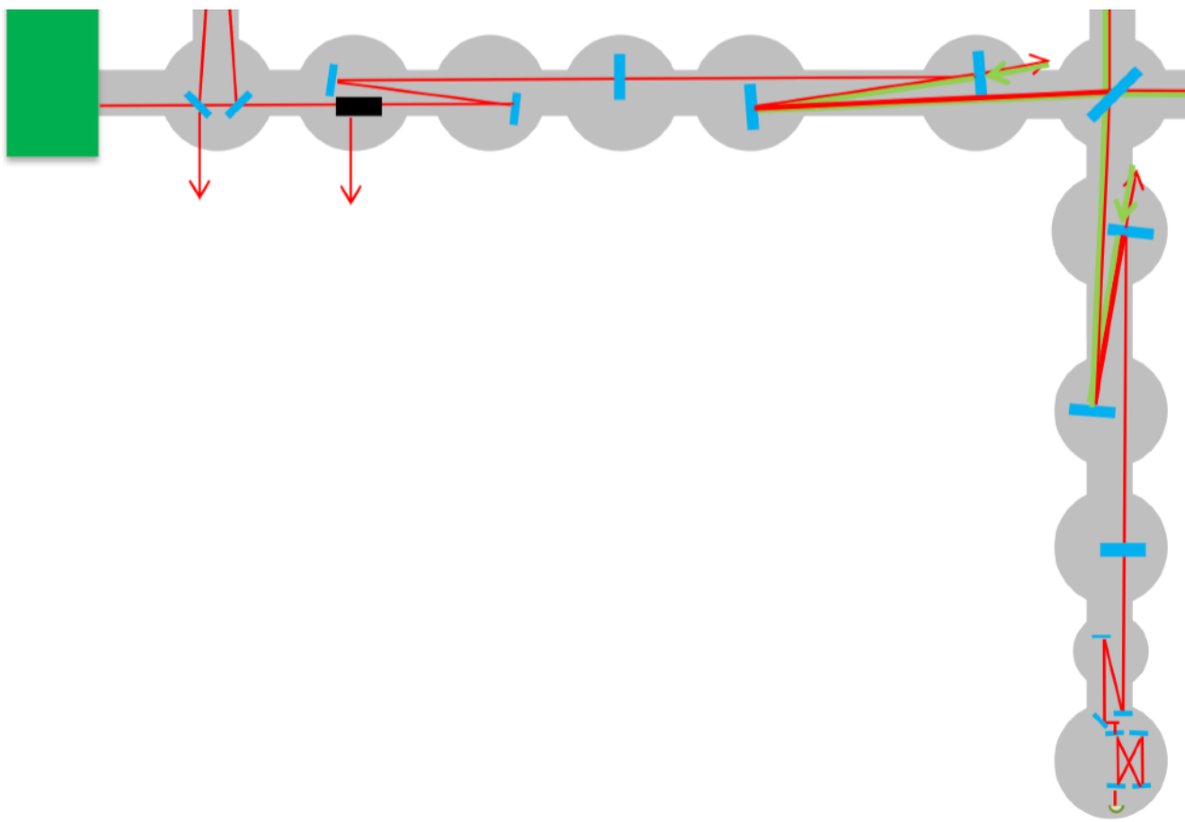


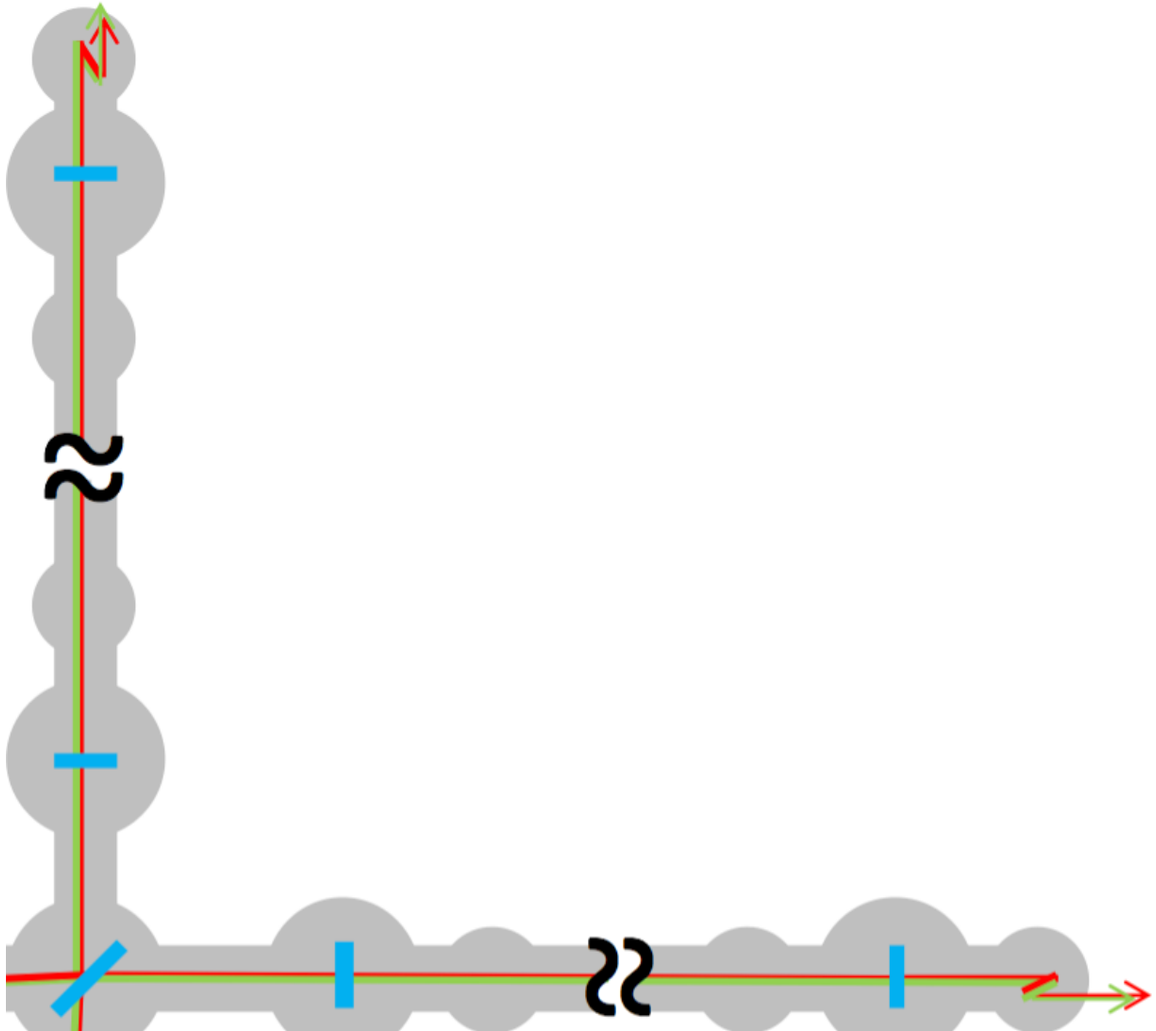
K. Miyo (U-Tokyo)

Strain meter senses differential motion between BS and a Xend mirror.

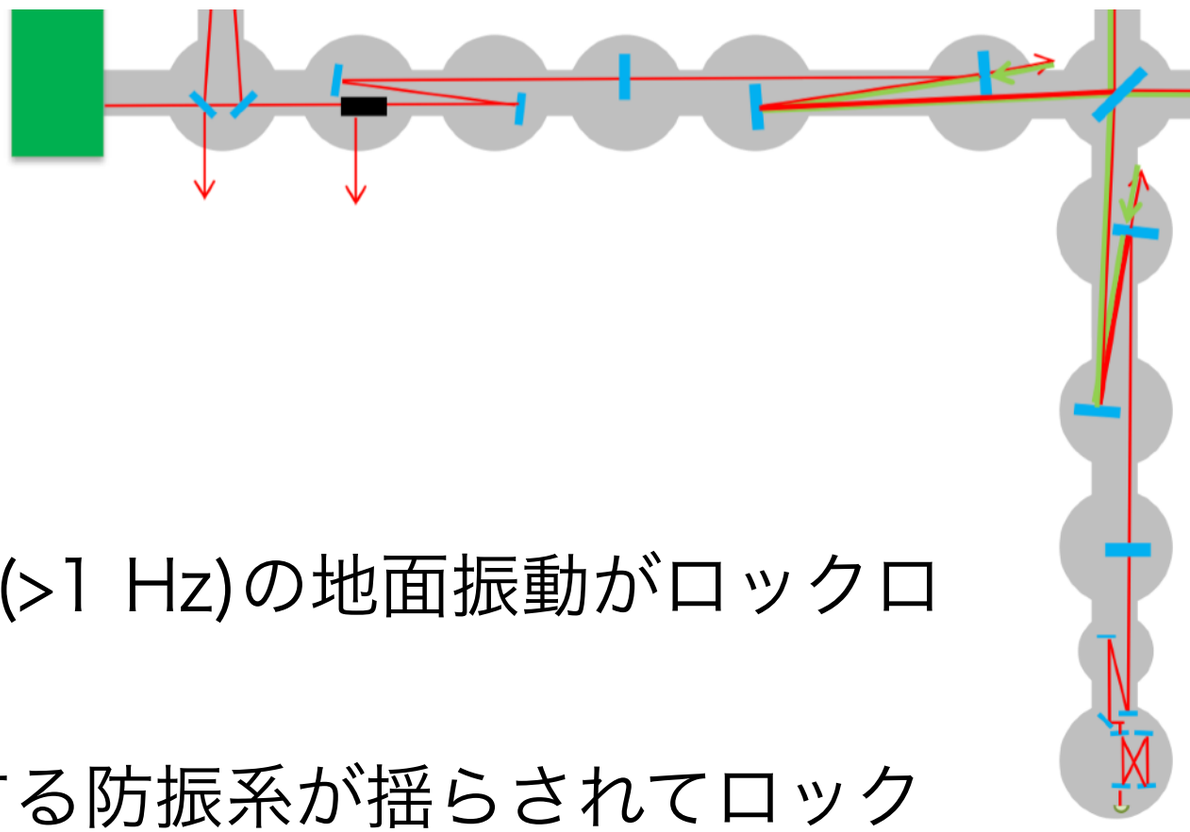


近傍地震の研究

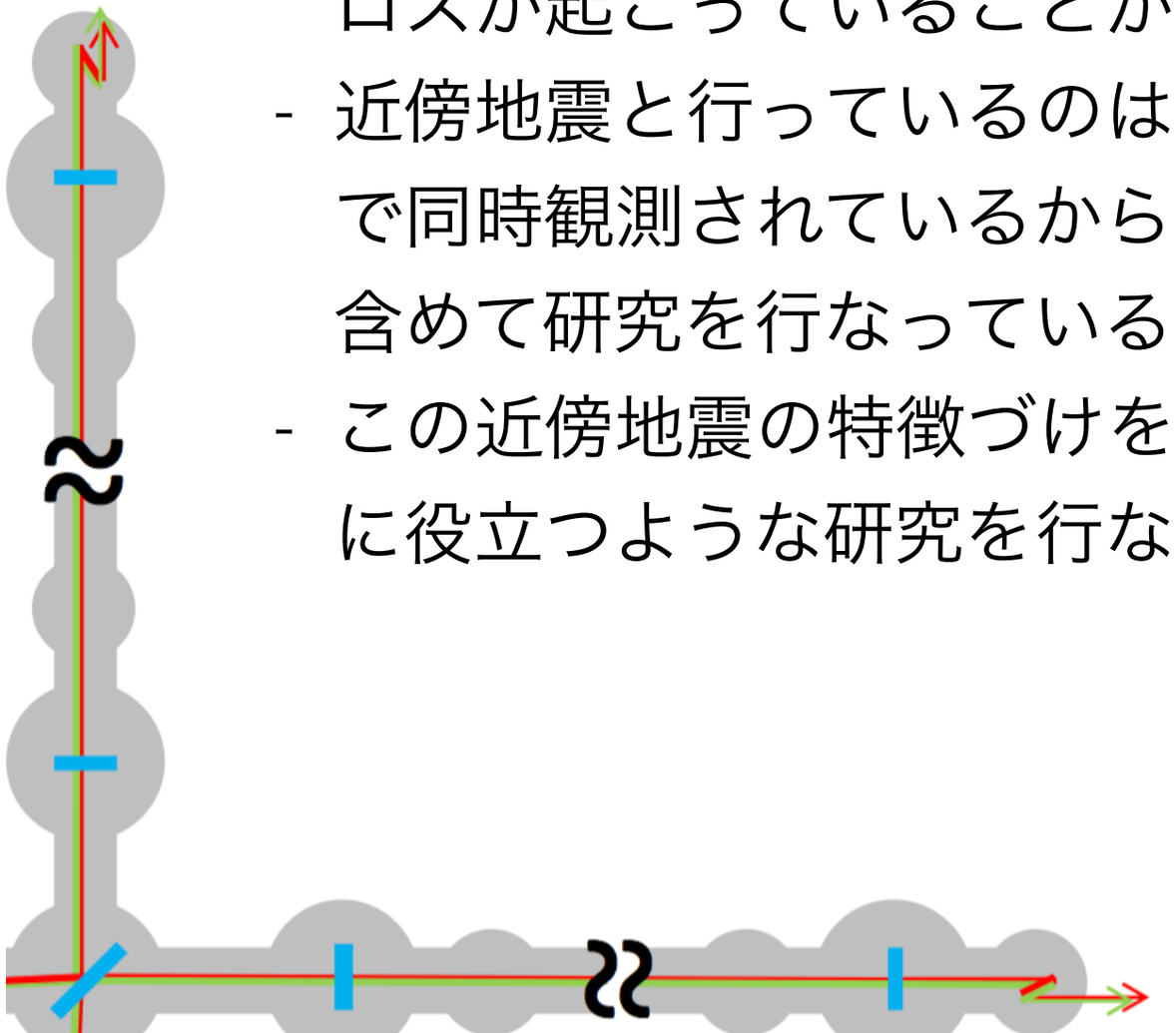




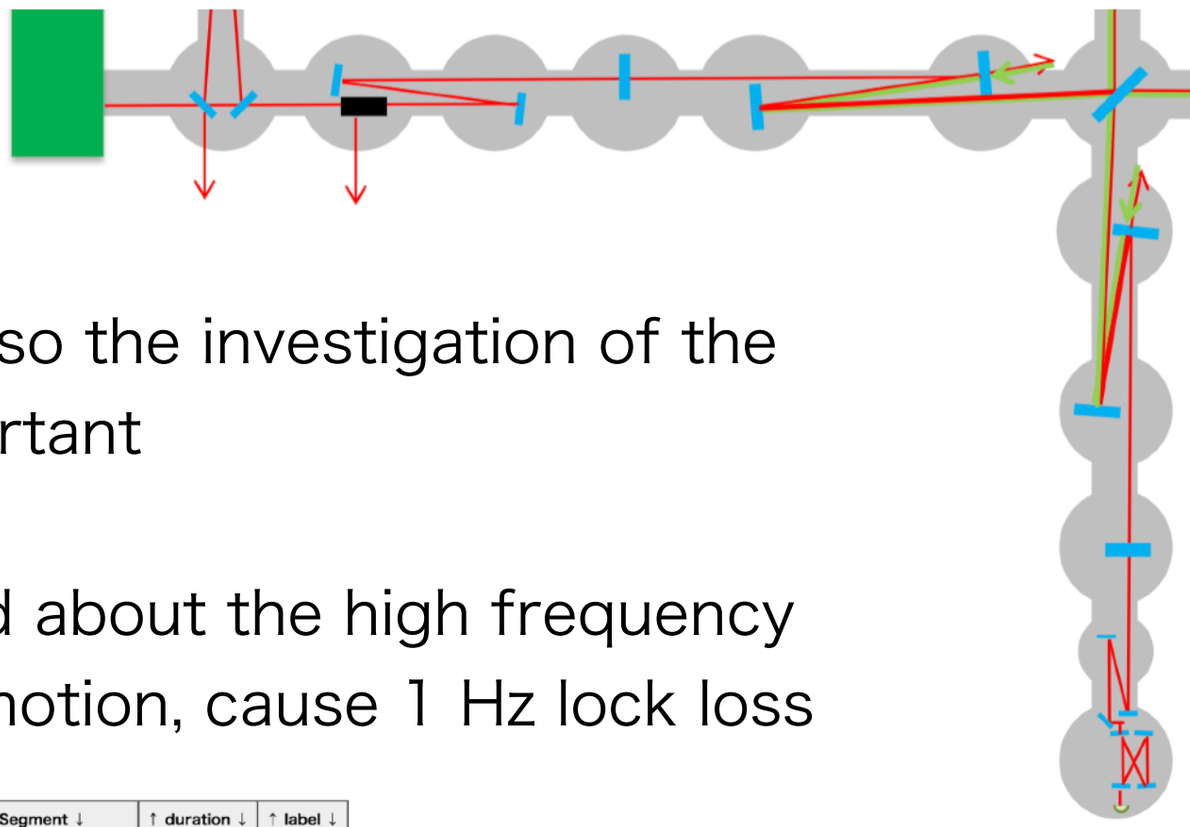
モチベーション



- 過去の観測において、比較的高周波(>1 Hz)の地面振動がロックロスを起こすことが問題となっていた
  - 最近の研究により、IMCを構成する防振系が揺らされてロックロスが起こっていることがわかってきた
- 近傍地震と行っているのは高周波の地面振動が、IXV, EXV, EYVで同時観測されているからそうかなと言っている、その検証を含めて研究を行なっている
- この近傍地震の特徴づけを行うことで、将来のロックロス現象に役立つような研究を行なっていくことを計画している。



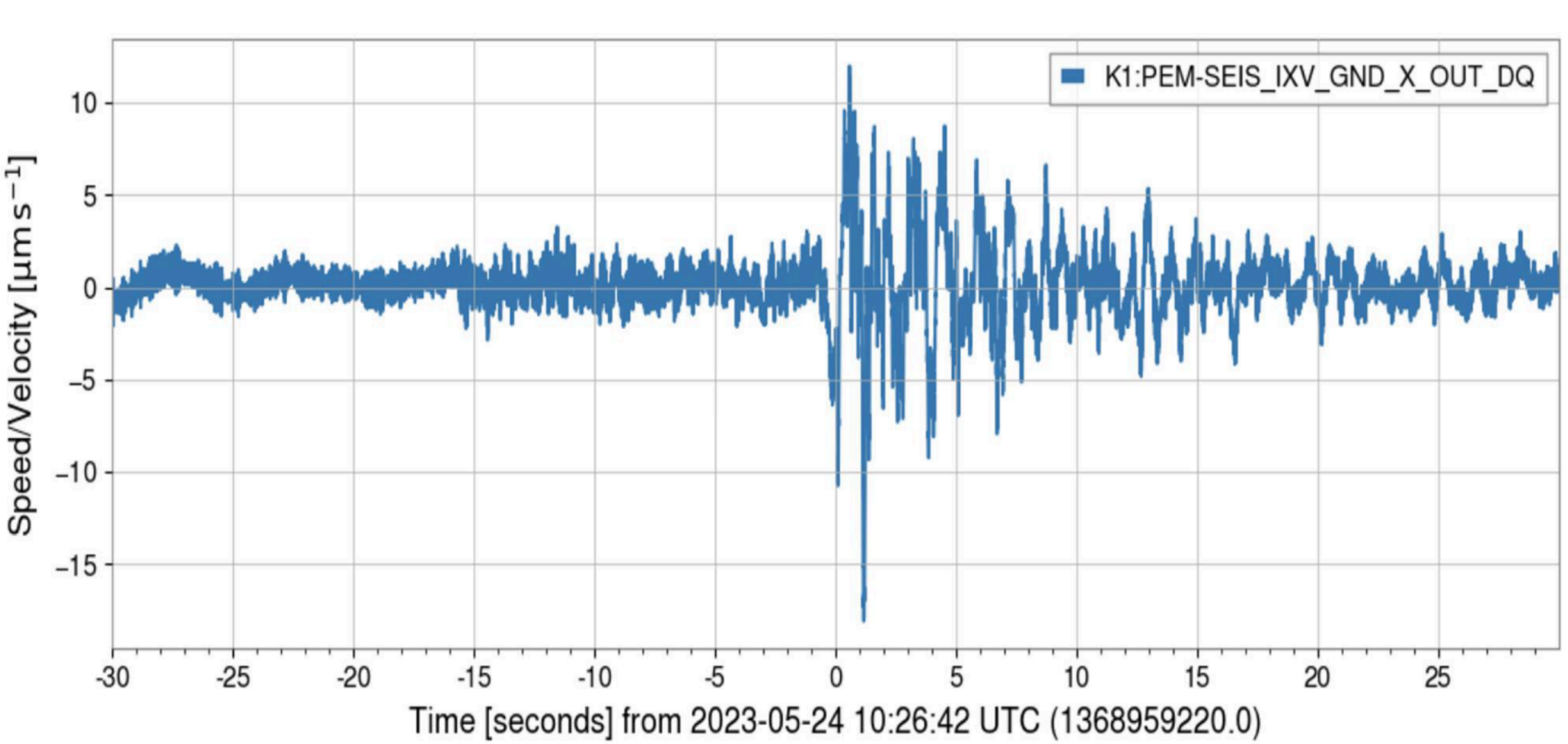
Ground motion



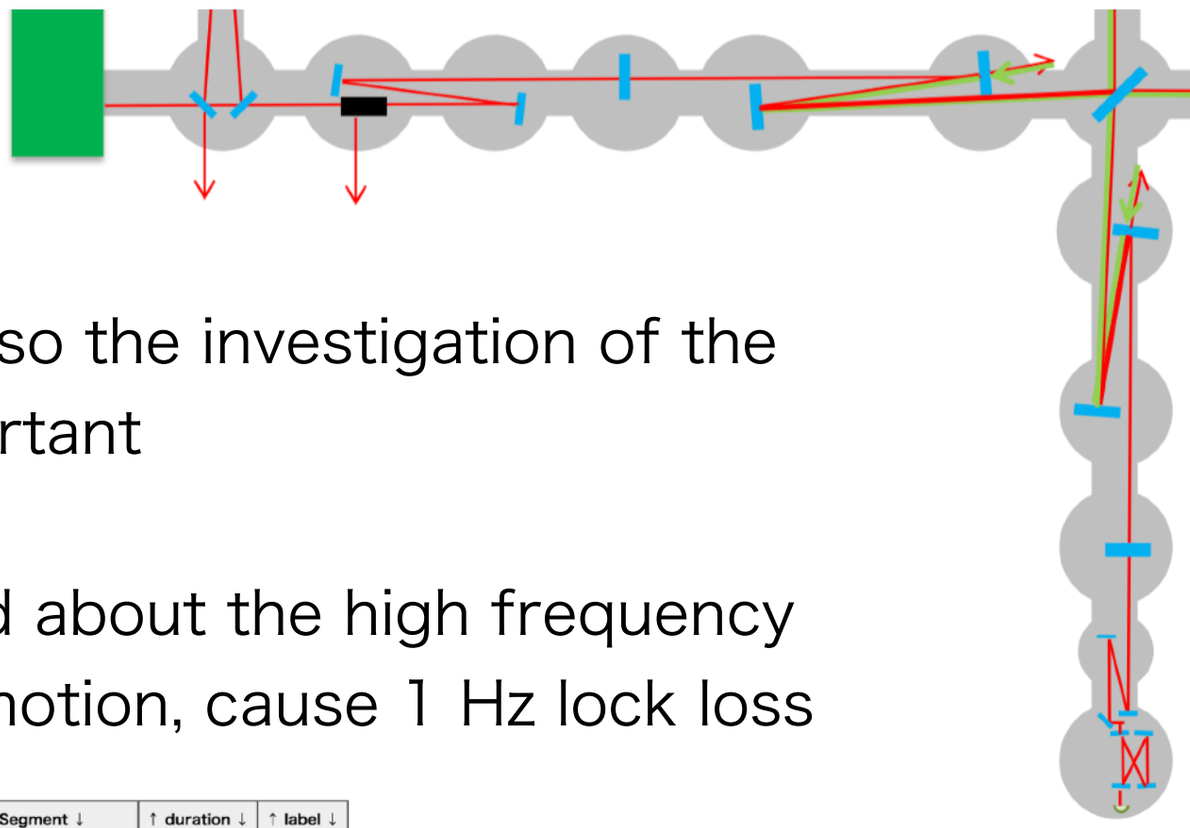
- KAGRA constructed in underground, so the investigation of the ground motion at KAGRA site is important
  - Ground motion from fault (?)
    - Now, Ozaki-san(Aogaku) studied about the high frequency ground motion, so called fault motion, cause 1 Hz lock loss

ID:1

↑ ID ↓	↑ lockloss GPS ↓	↑ JST ↓	↑ Segment ↓	↑ duration ↓	↑ label ↓
1	1368959220	2023-05-24 19:26:42 JST	1368957619,1368959220	1601	1Hz



Ground motion



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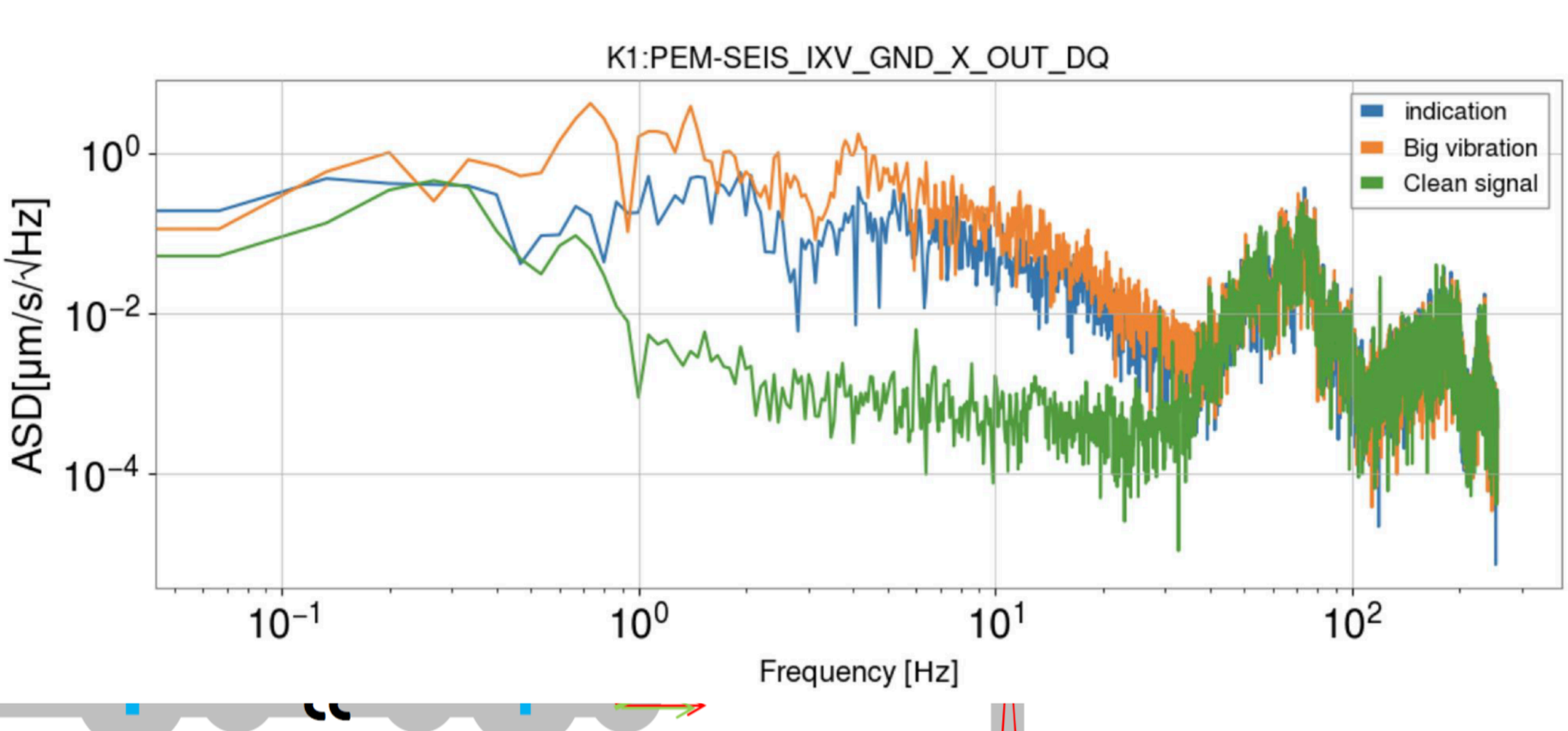

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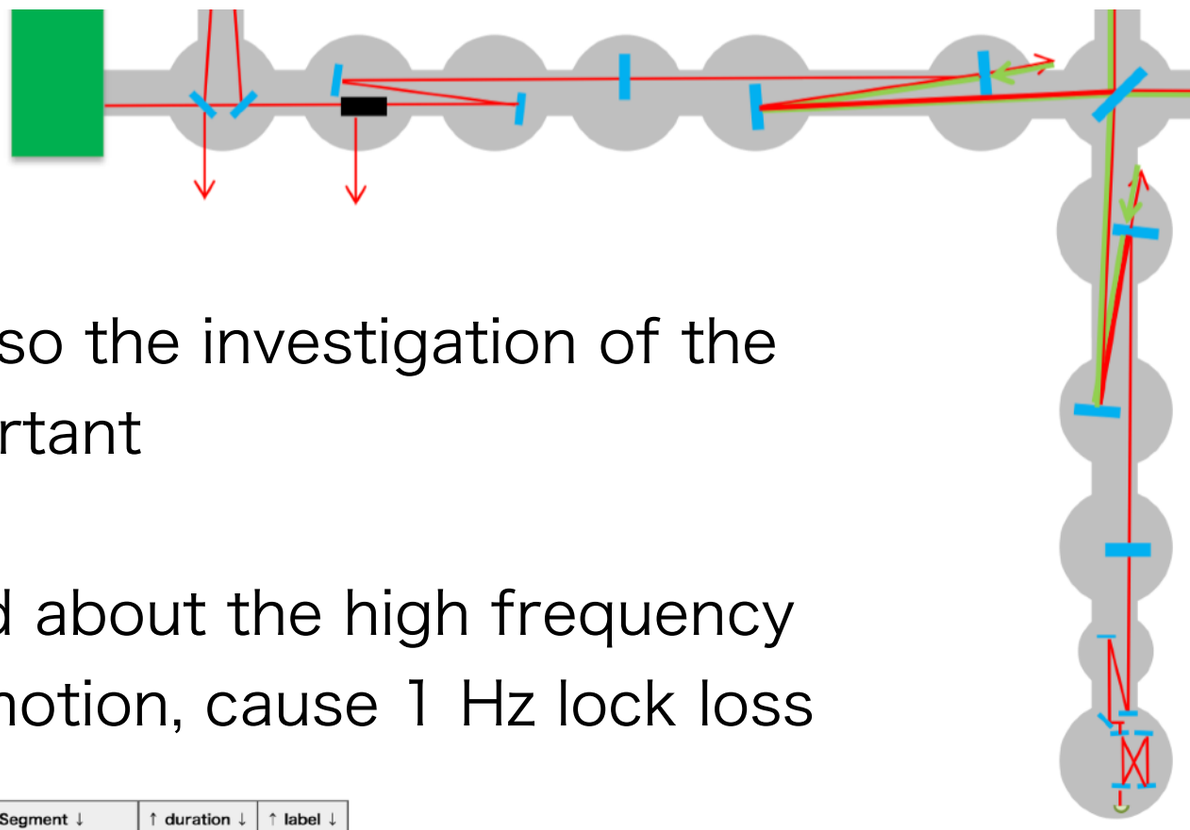

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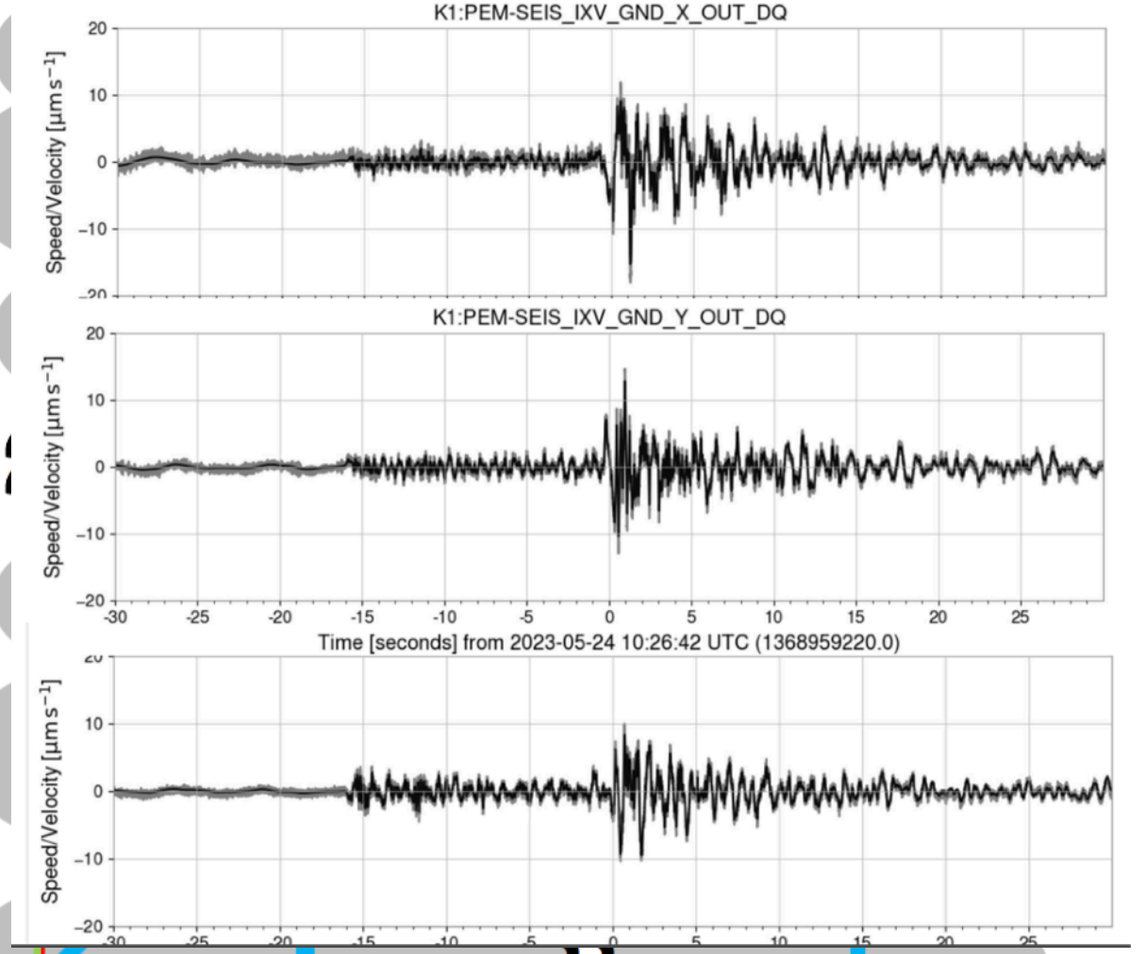

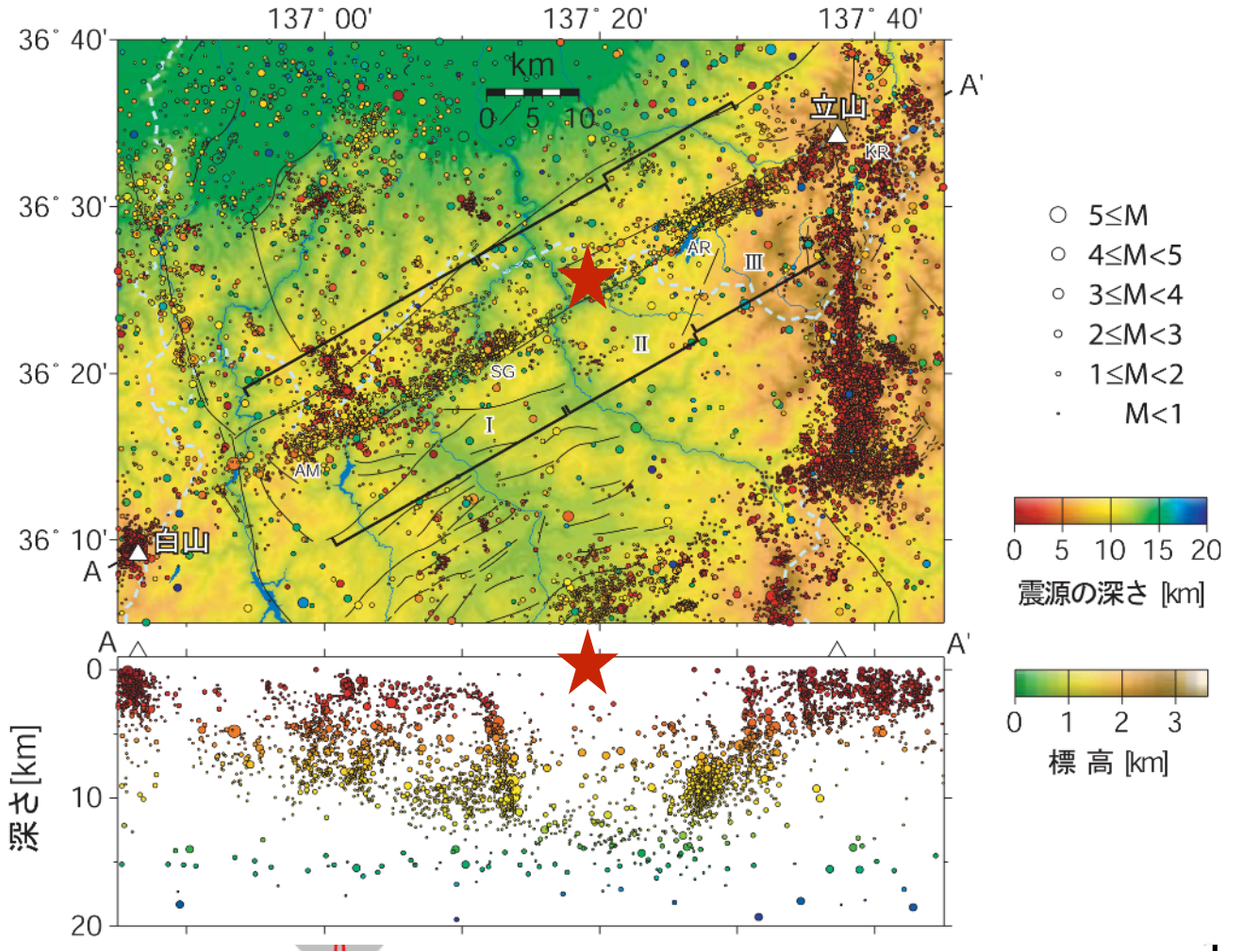

https://www.bousai.go.jp/kyoiku/kyokun/kyoukunnokeishou/rep/1858_hietsu_jishin/pdf/8_chap1-3.pdf