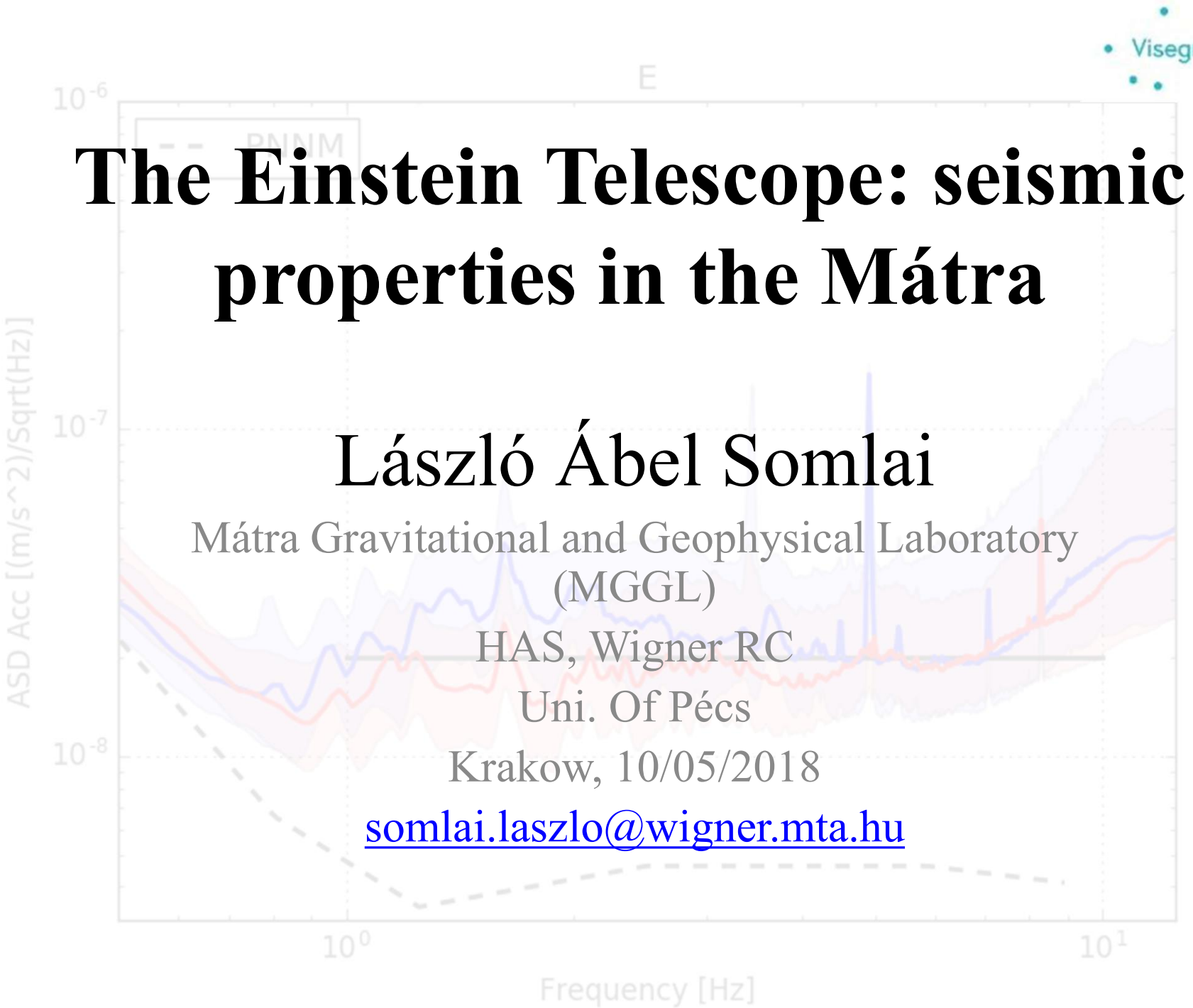


Visegrad Fund

The Einstein Telescope: seismic properties in the Mátra

László Ábel Somlai

Mátra Gravitational and Geophysical Laboratory (MGGL)

HAS, Wigner RC

Uni. Of Pécs

Krakow, 10/05/2018

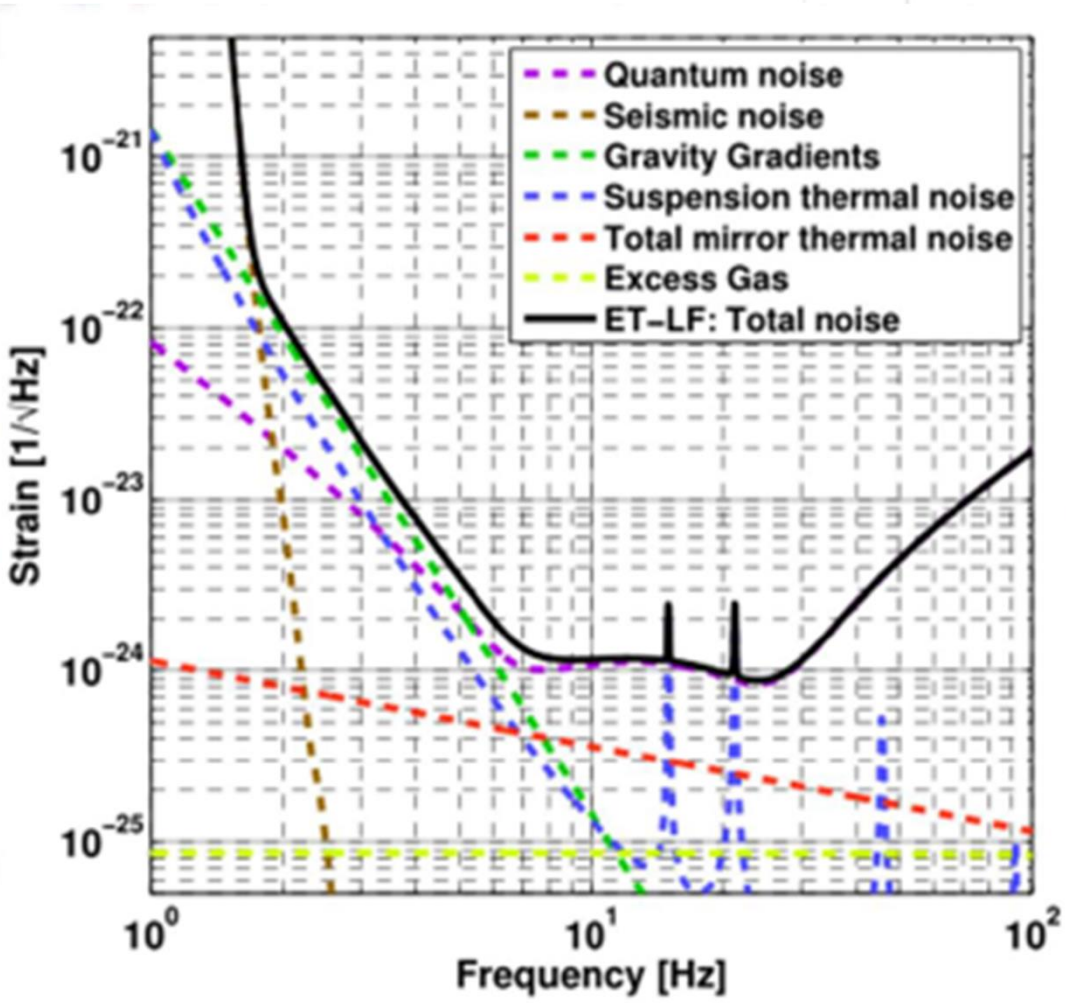
somlai.laszlo@wigner.mta.hu

Outline

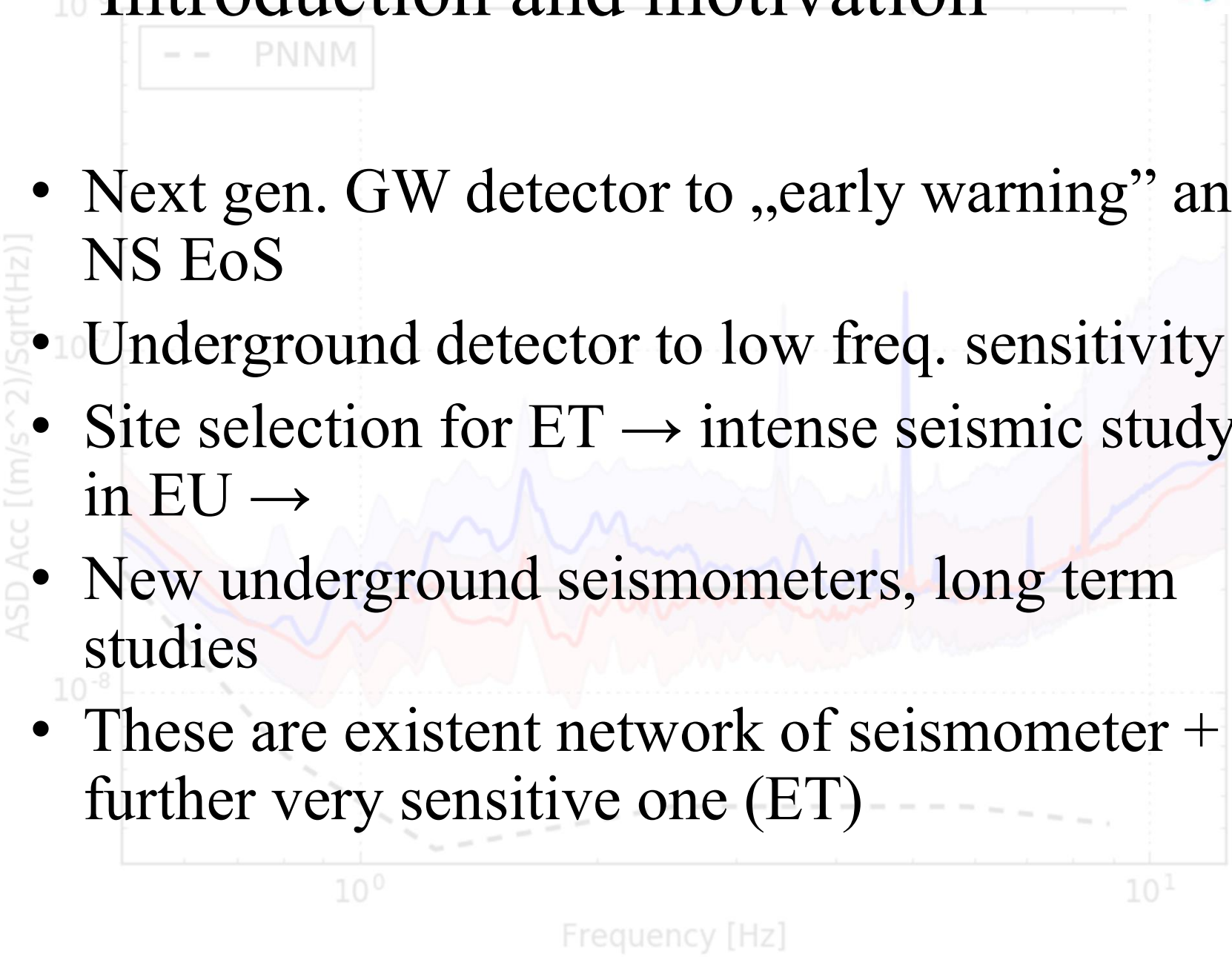
- Introduction and motivation (of ET)
- Einstein Telescope and seismic noises
- Why Mátra? (MGGL)
- Seismic networks
- Connection with CREDO
- Summary

Introduction and motivation

- Next gen. GW detector to „early warning” and NS EoS
- Underground detector to low freq. sensitivity

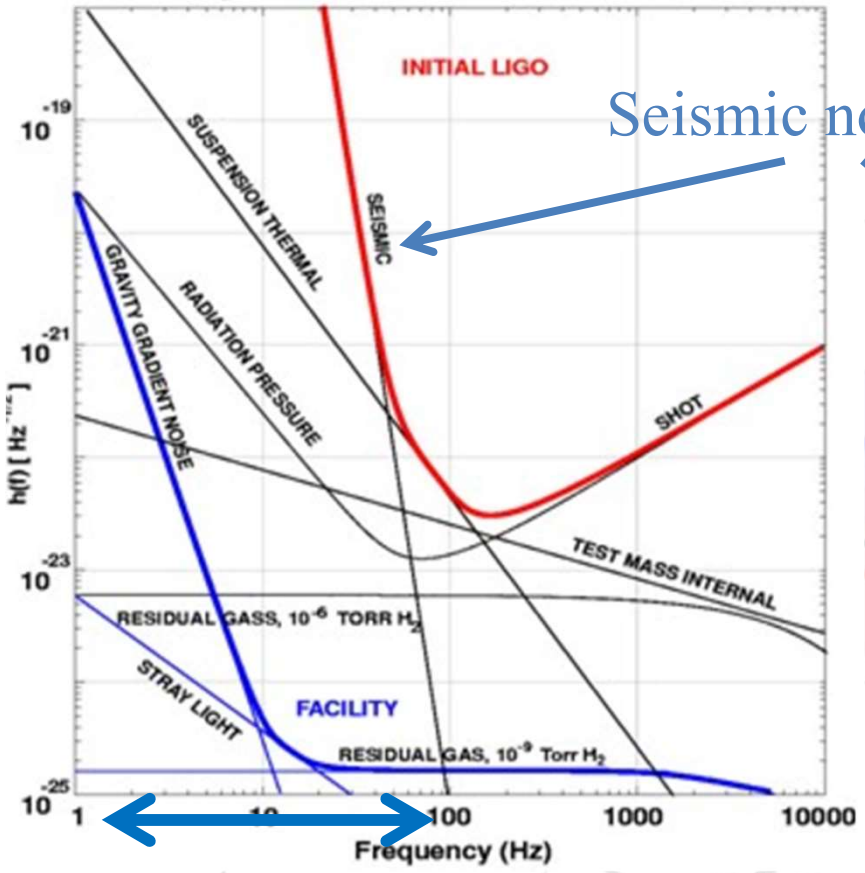


Introduction and motivation

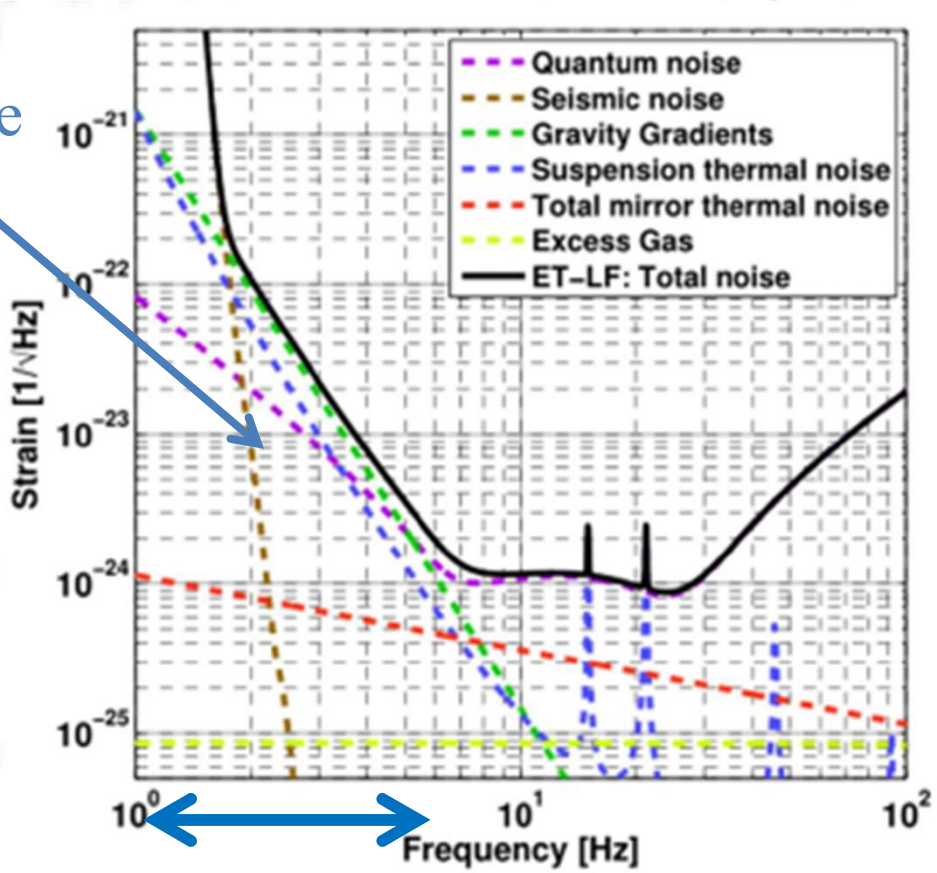


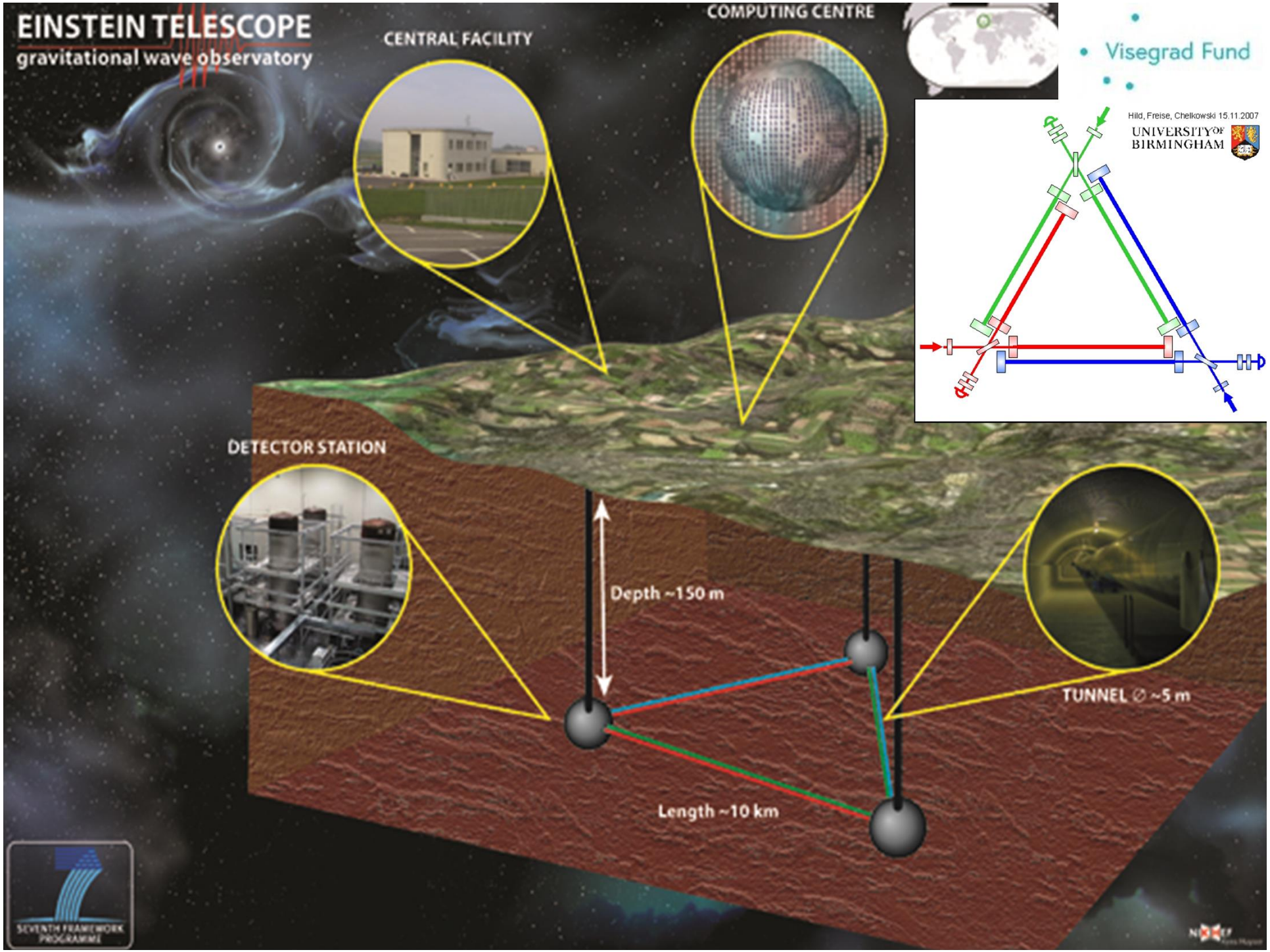
- Next gen. GW detector to „early warning” and NS EoS
- Underground detector to low freq. sensitivity
- Site selection for ET → intense seismic study in EU →
- New underground seismometers, long term studies
- These are existent network of seismometer + a further very sensitive one (ET)

Einstein Telescope and seismic noises



Seismic noise




EINSTEIN TELESCOPE
gravitational wave observatory
CENTRAL FACILITY
COMPUTING CENTRE
Visegrad Fund
Hild, Freise, Chelkowski 15.11.2007
UNIVERSITY OF BIRMINGHAM
DETECTOR STATION
Depth ~150 m
TUNNEL ∅ ~5 m
Length ~10 km
SEVENTH FRAMEWORK PROGRAMME

Why Mátra?

- MGGL collects seismic data in the Mátra mountain range
- Almost 2-year of data has already studied
- This data will be available in this month (-88m and -404m)
- Other detectors
  - Two different types of seismometers (Guralp CMG-3T seismometer and one from the Warsaw Uni.)
  - Infrasound detector
  - Magnetometer
  - Muon detector

German, Belgian, Dutch

Mátra (Hungary)

Site selection of ET

LSC, Canfranc (Spain)

Sardinia (Italy)

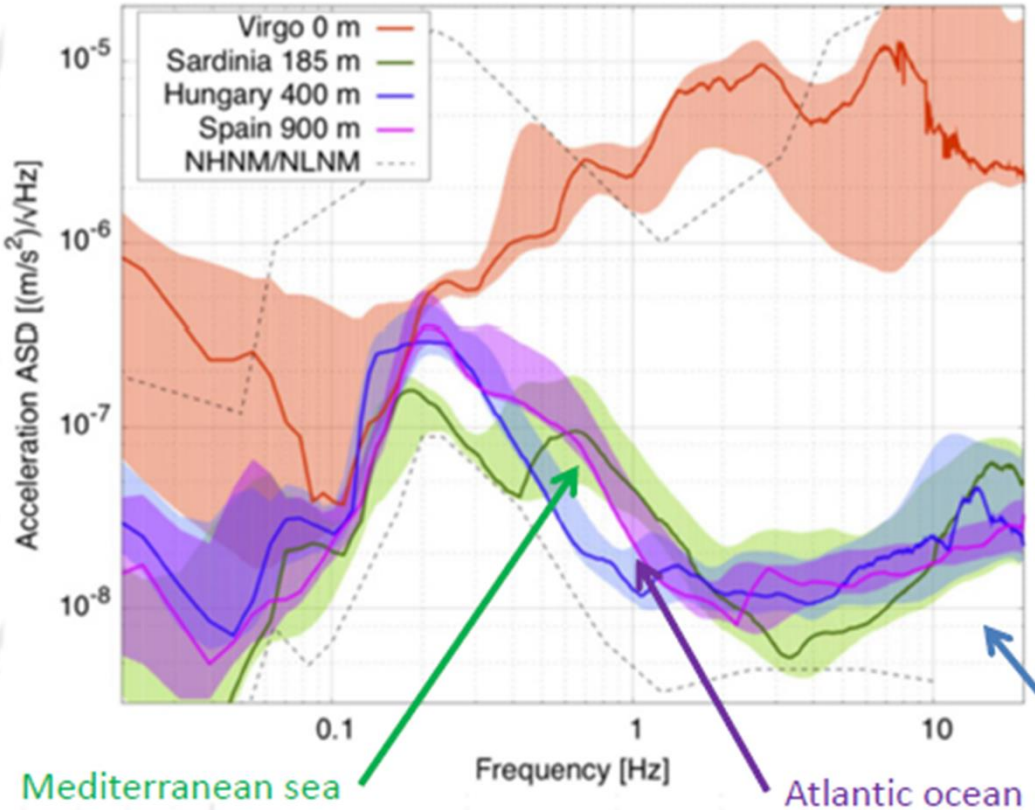
Site selection

Visegrad Fund

Sardinia (Italy)

Mátra (Hungary)

LSC, Canfranc (Spain)



Mediterranean sea

Atlantic ocean

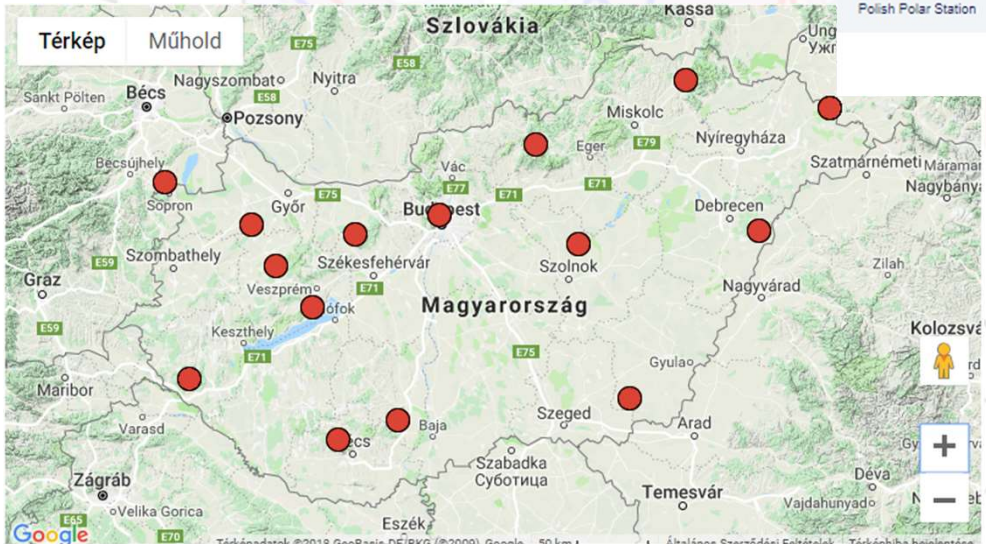
Anthropogenic activity

M. G. Beker, J. F. J. van den Brand and D. S. Rabeling, Class. Quantum Grav. 32 (2015) 025002

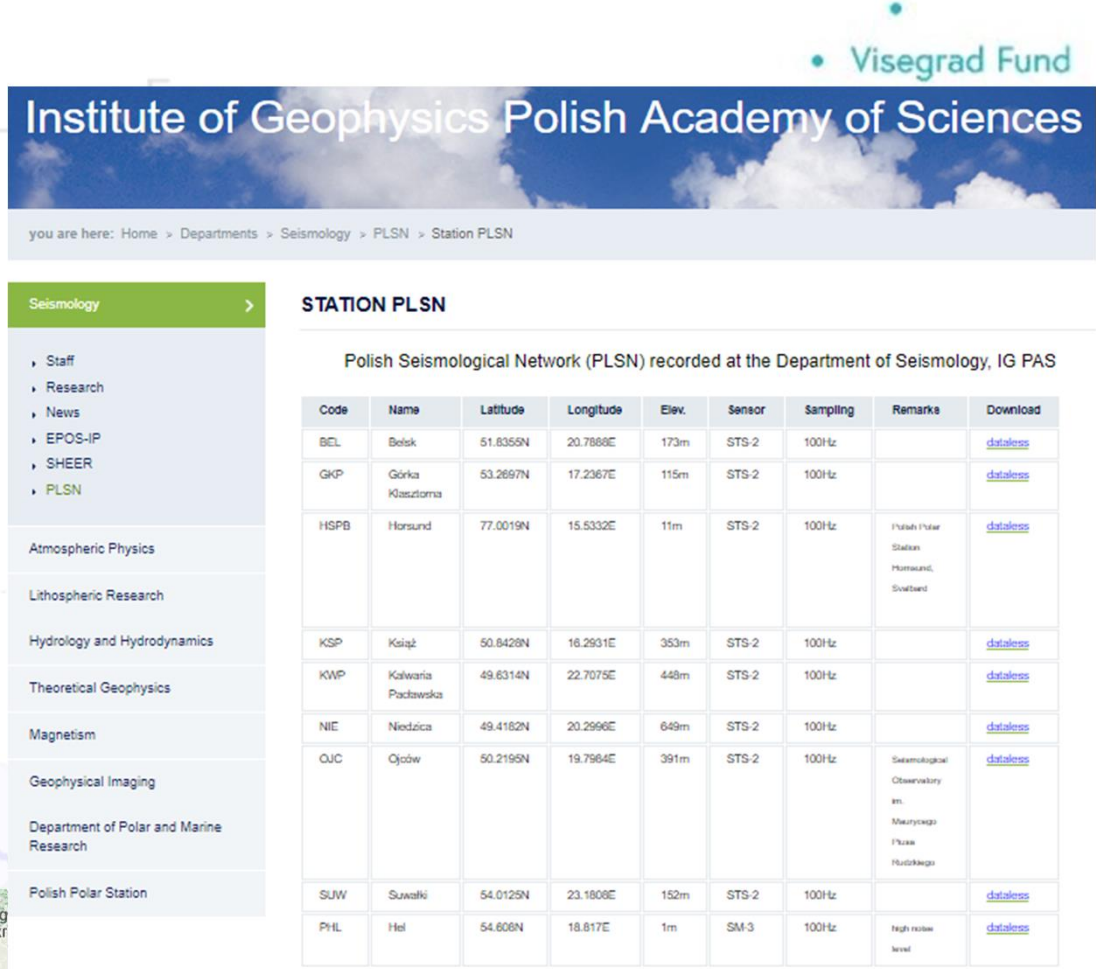
Seismic networks

Visegrad Fund

Hungarian



Polish



Institute of Geophysics Polish Academy of Sciences

you are here: Home » Departments » Seismology » PLSN » Station PLSN

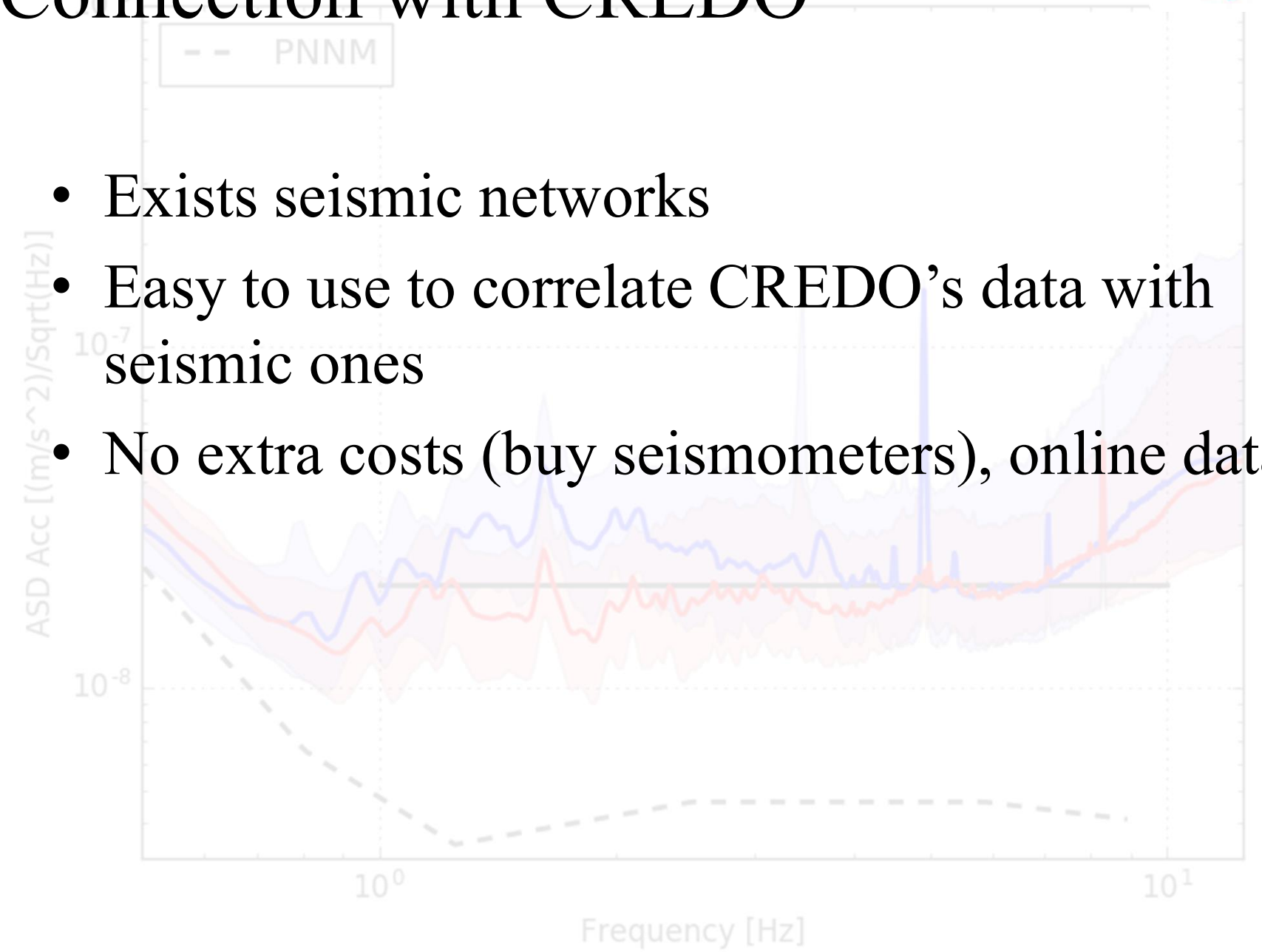
- Seismology
  - Staff
  - Research
  - News
  - EPOS-IP
  - SHEER
  - PLSN
- Atmospheric Physics
- Lithospheric Research
- Hydrology and Hydrodynamics
- Theoretical Geophysics
- Magnetism
- Geophysical Imaging
- Department of Polar and Marine Research
- Polish Polar Station

STATION PLSN

Polish Seismological Network (PLSN) recorded at the Department of Seismology, IG PAS

Code	Name	Latitude	Longitude	Elev.	Sensor	Sampling	Remarks	Download
BEL	Belsk	51.8355N	20.7888E	173m	STS-2	100Hz		dataless
GKP	Górka Klasztorna	53.2697N	17.2367E	115m	STS-2	100Hz		dataless
HSPB	Horsund	77.0019N	15.5332E	11m	STS-2	100Hz	Polish Polar Station Horsund, Svalbard	dataless
KSP	Książ	50.8428N	16.2931E	353m	STS-2	100Hz		dataless
KWP	Kalwaria Pacławska	49.6314N	22.7075E	448m	STS-2	100Hz		dataless
NIE	Niedzica	49.4182N	20.2996E	649m	STS-2	100Hz		dataless
OJC	Ojców	50.2195N	19.7964E	391m	STS-2	100Hz	Seismological Observatory im. Maurycego Pius Hudzikiego	dataless
SUW	Suwałki	54.0125N	23.1808E	152m	STS-2	100Hz		dataless
PHL	Hel	54.606N	18.817E	1m	SM-3	100Hz	high noise level	dataless

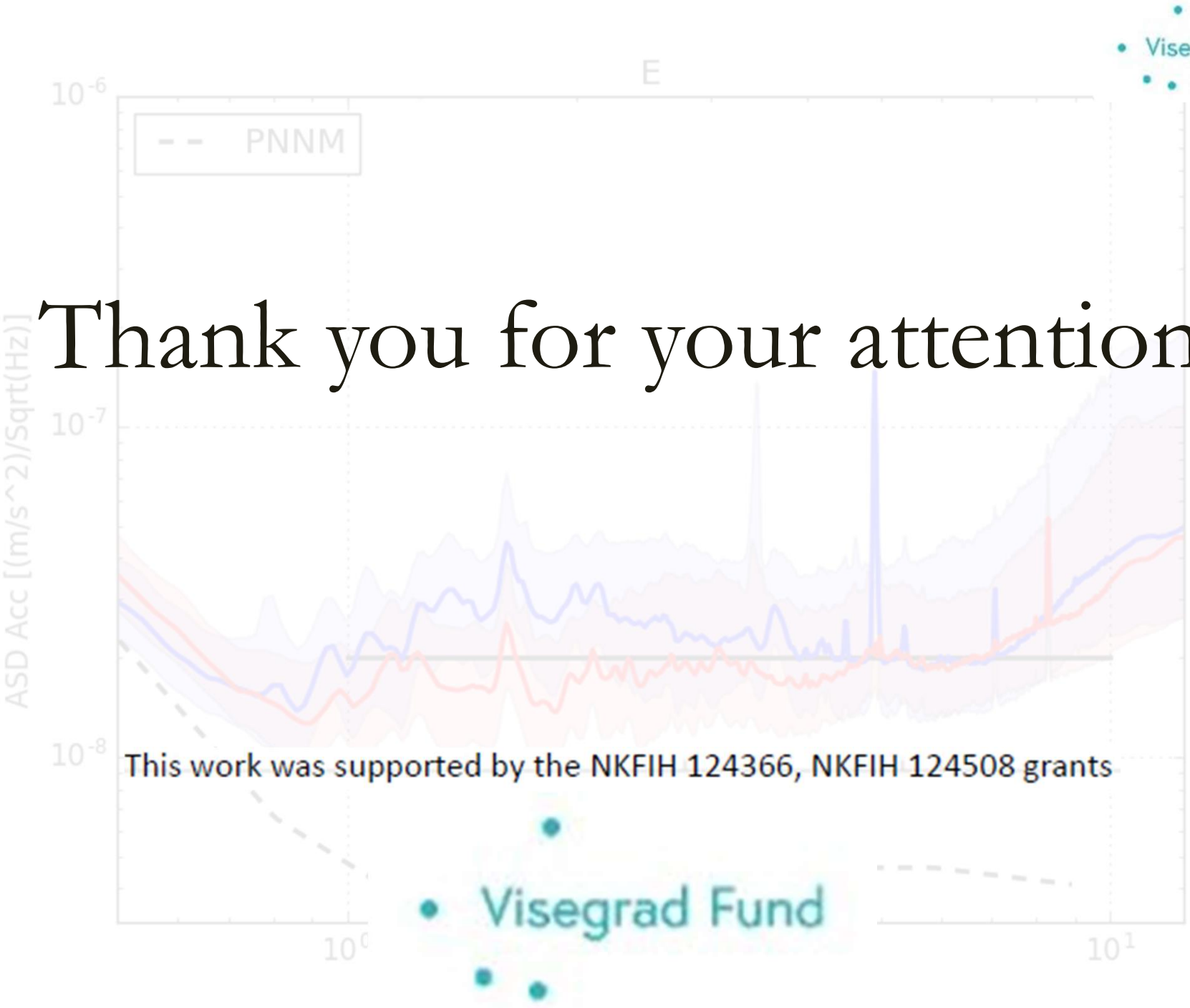
Connection with CREDO



- Exists seismic networks
- Easy to use to correlate CREDO's data with seismic ones
- No extra costs (buy seismometers), online data

Summary

- Local seismic study to ET DS
- If there is any correlation between seismicity and CREDO's data → CREDO could do „early-warning" for ET
- ET will be able to warn CREDO (time periods of detection of GW)



Thank you for your attention!

This work was supported by the NKFIH 124366, NKFIH 124508 grants

Visegrad Fund