SOFIA UNIVERSITY ST. KLIMENT OHRIDSKI

EGU22-9483

KP-06-RUSIA/27.09.2019 & 19-55-18008 Bolg_a

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# UPPER MANTLE STRUCTURE BENEATH BULGARIA OBTAINED BY RECEIVER FUNCTION ANALYSIS

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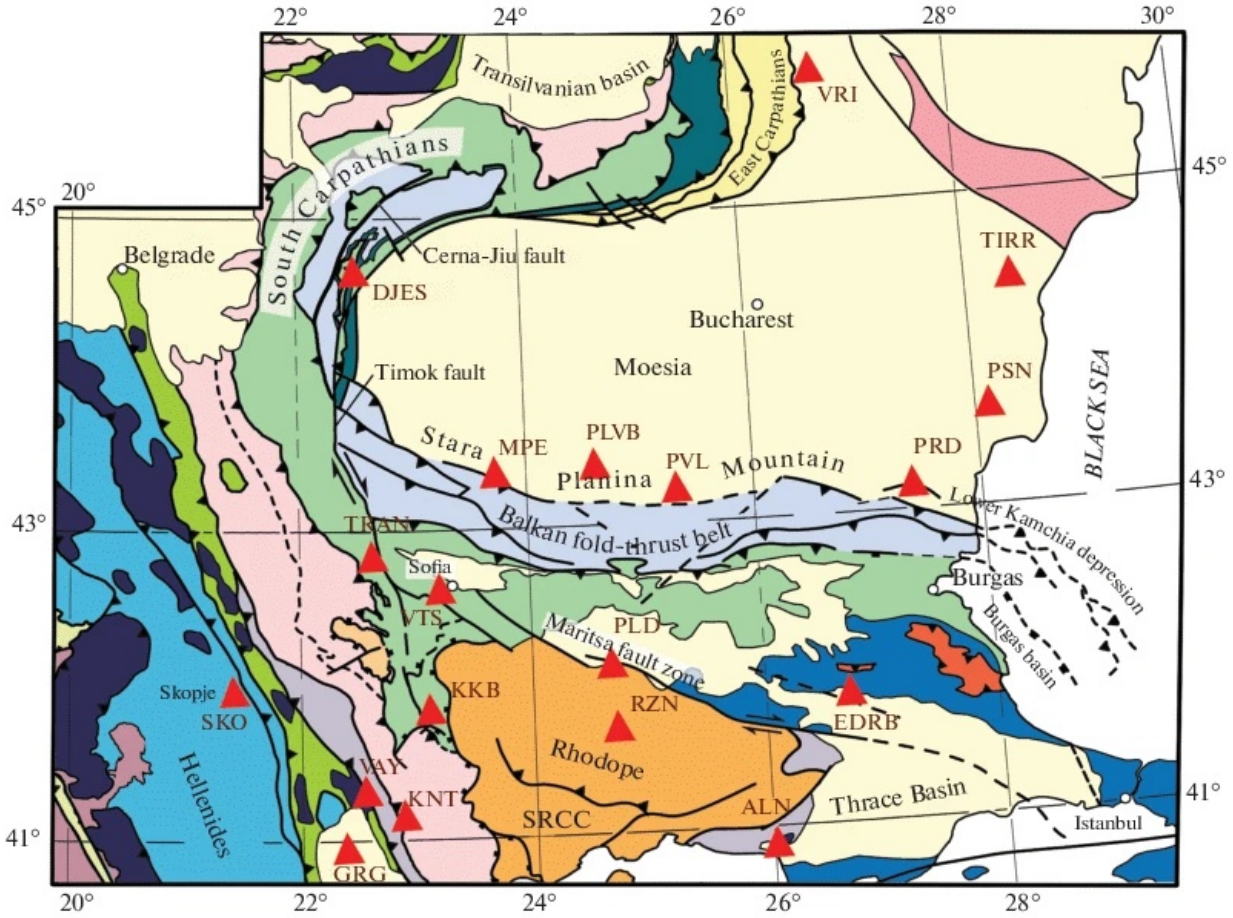
EGU General Assembly 2022

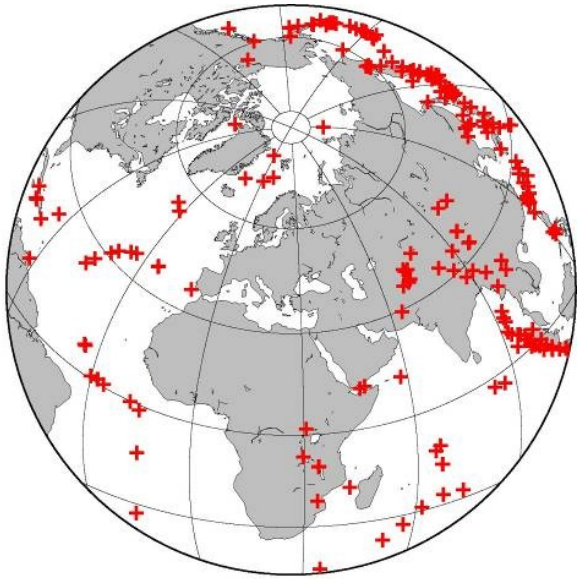
# Study area



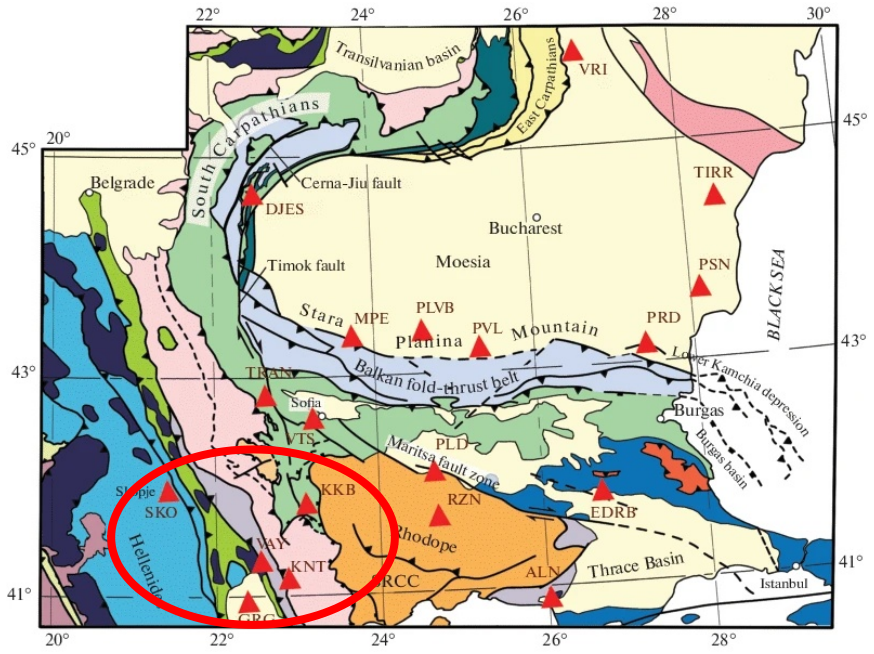

Background map from Kounov et al., 2018

# Data and method

- P- and S-receiver functions;
- Data from 19 broadband seismic stations;
- Epicenters mainly in 0°-100°;



# Seismic stations – group 1

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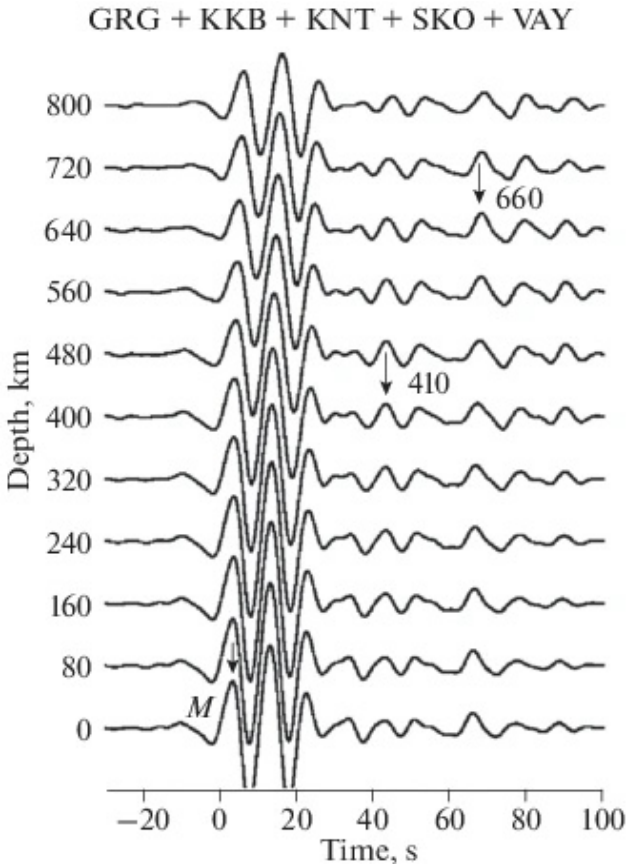
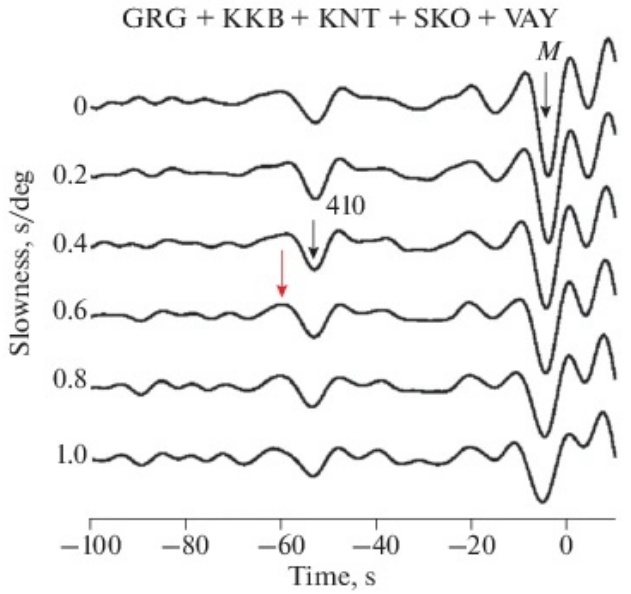



- SRF
- PRF

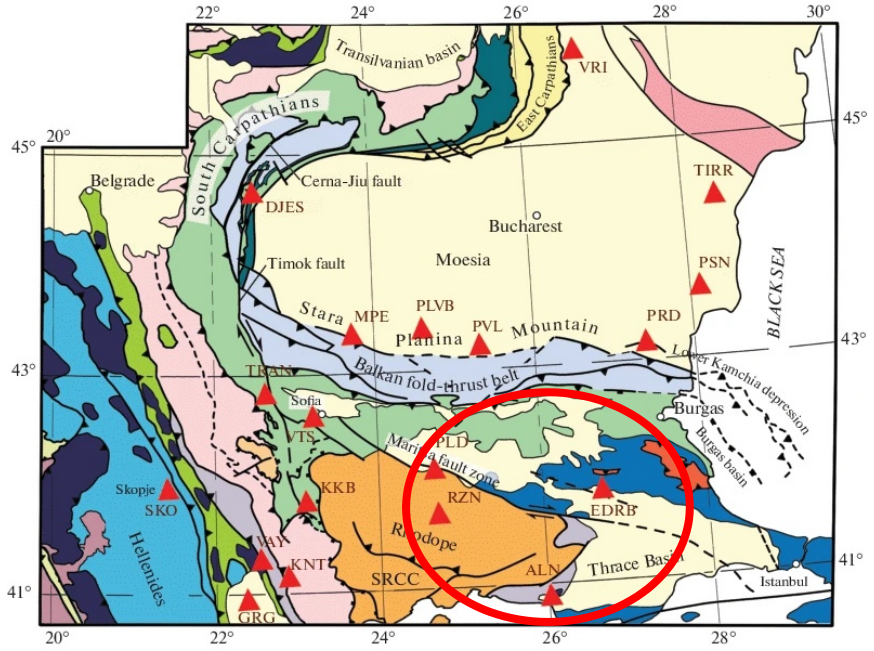
P410 phase arrive earlier by 1 s;

P660 phase arrive later by 0,1 s;

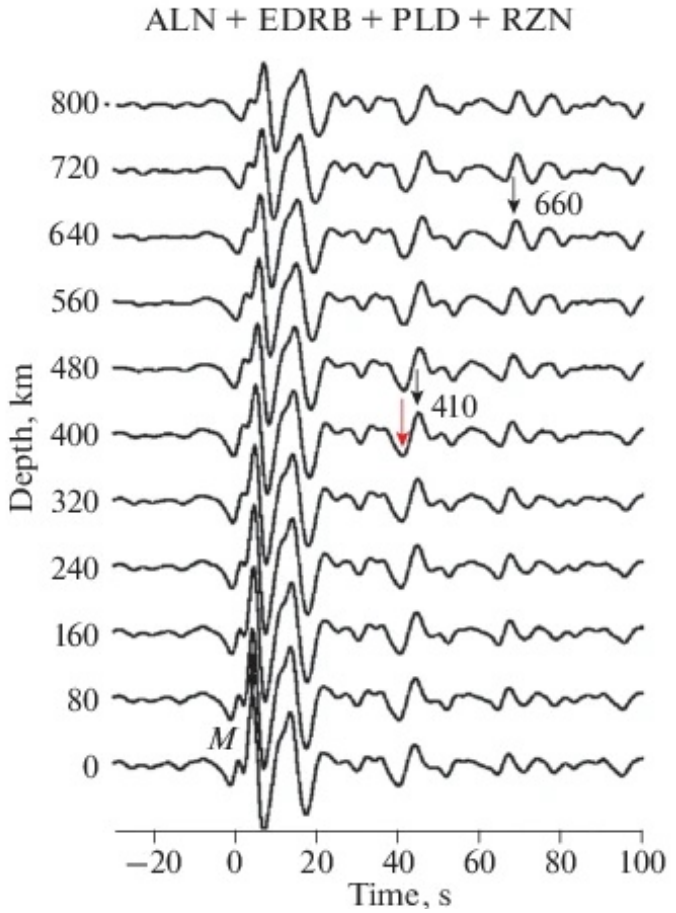
Differential time between P410 and P660 is 1.1 s longer than standard time according IASP91 model.

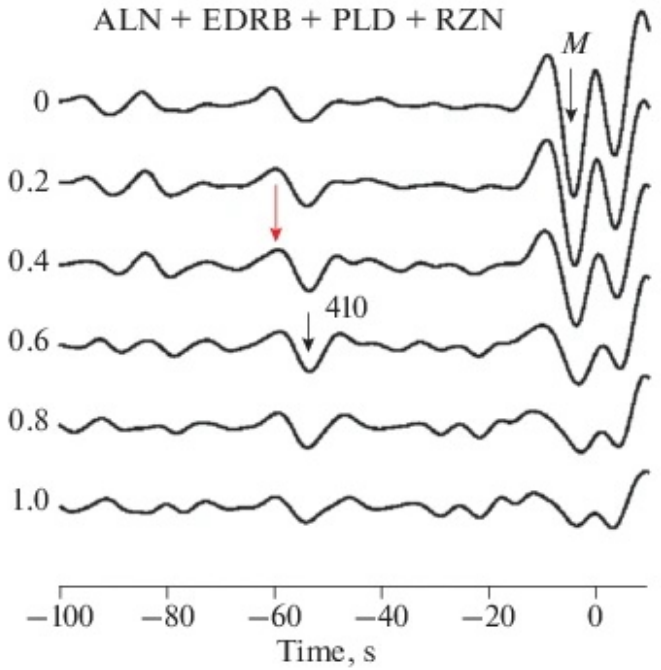
410 km discontinuity is elevated in 10 km;

# Seismic stations – group 2




Background map from Kounov et al., 2018




- SRF
- PRF

P410 phase arrive later by 1 s;

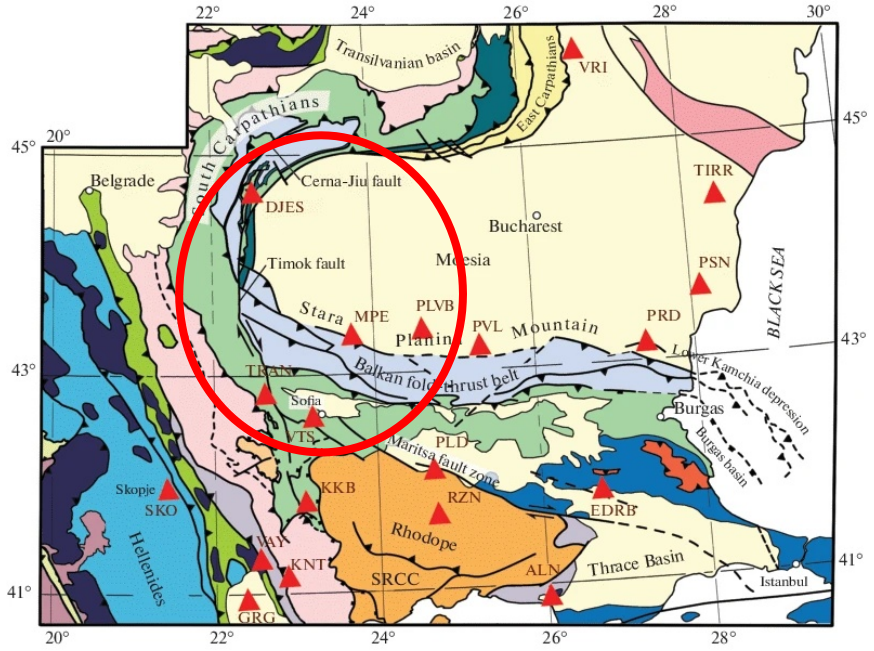
P660 phase arrive later by 1 s;

Differential time between P410 and P660
Equals the standard time according IASP91 model.

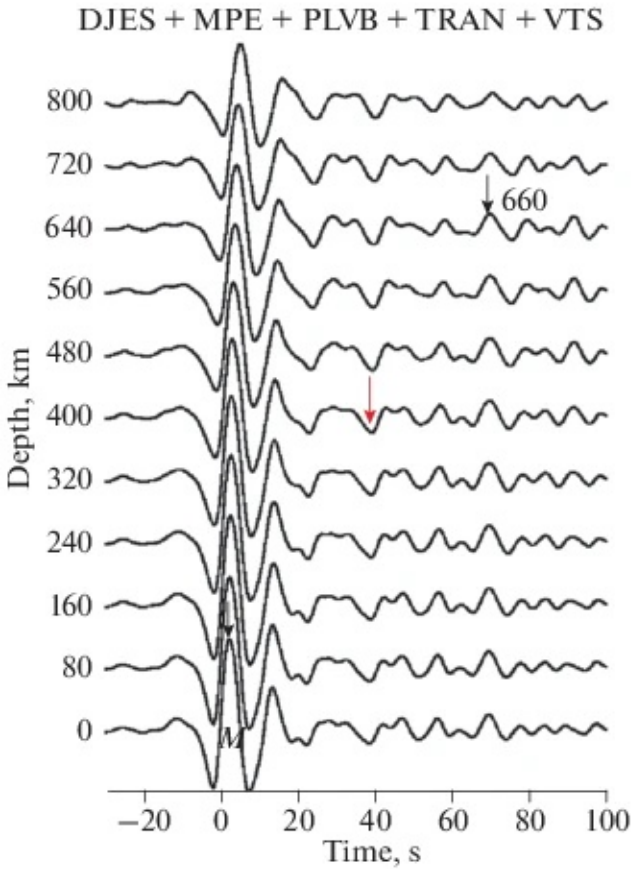
Low Vs under the 410 km;

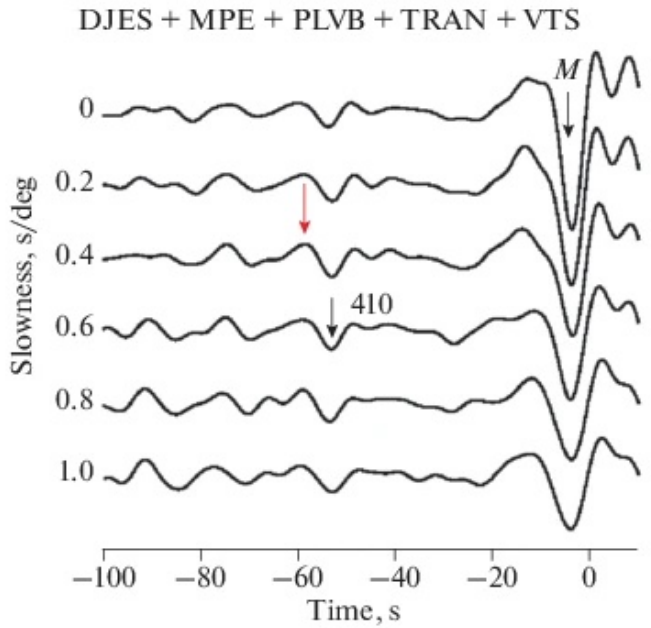
Low velocity layer above the 410 km;

# Seismic stations – group 3




Background map from Kounov et al., 2018



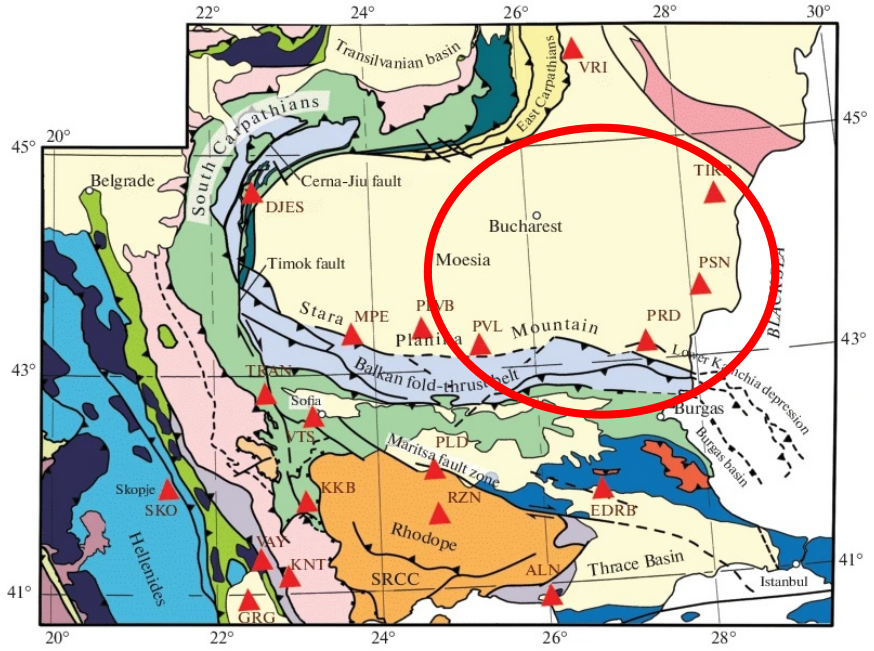

- SRF
- PRF

P410 phase is not detected;

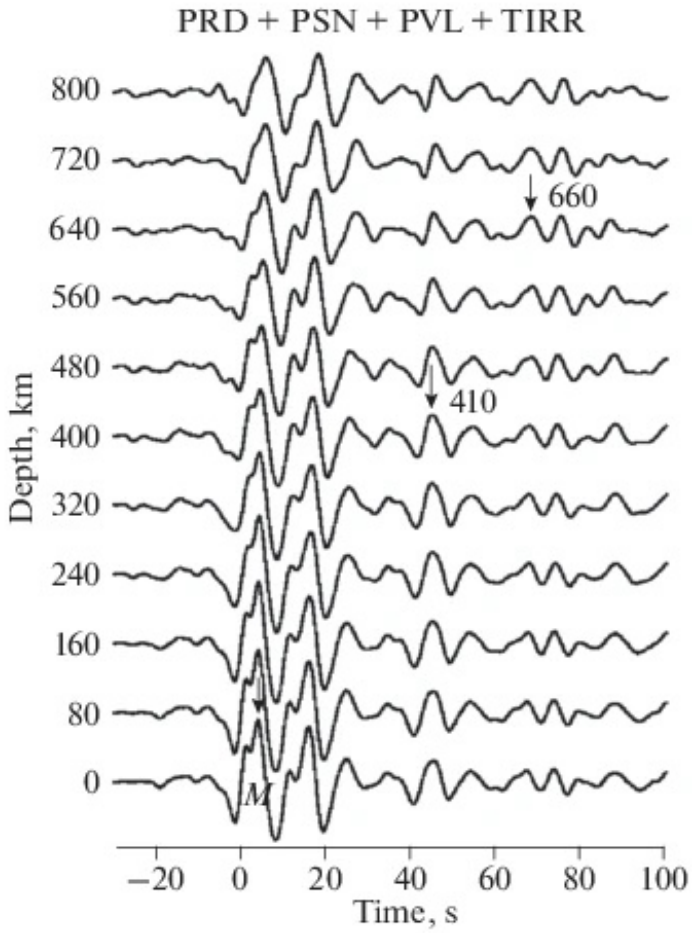
A phase from low velocity layer is detected;

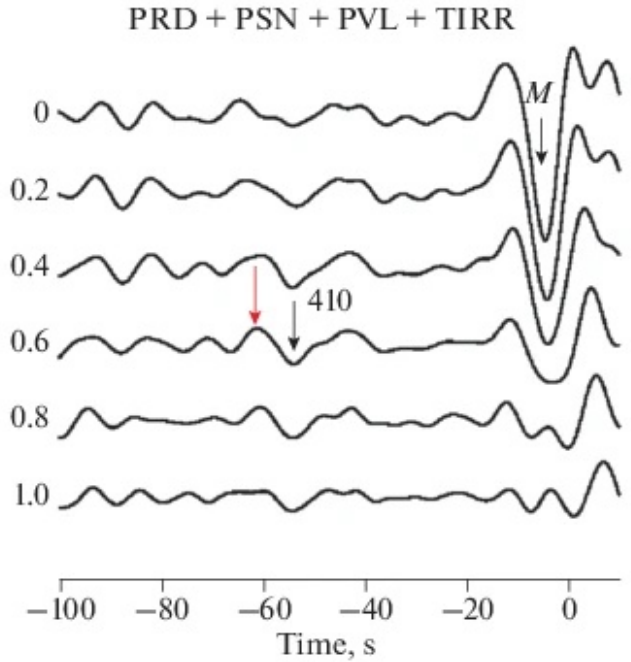
Low velocity layer above the 410 km with upperboarder at 360 km.

# Seismic stations – group 4




Background map from Kounov et al., 2018



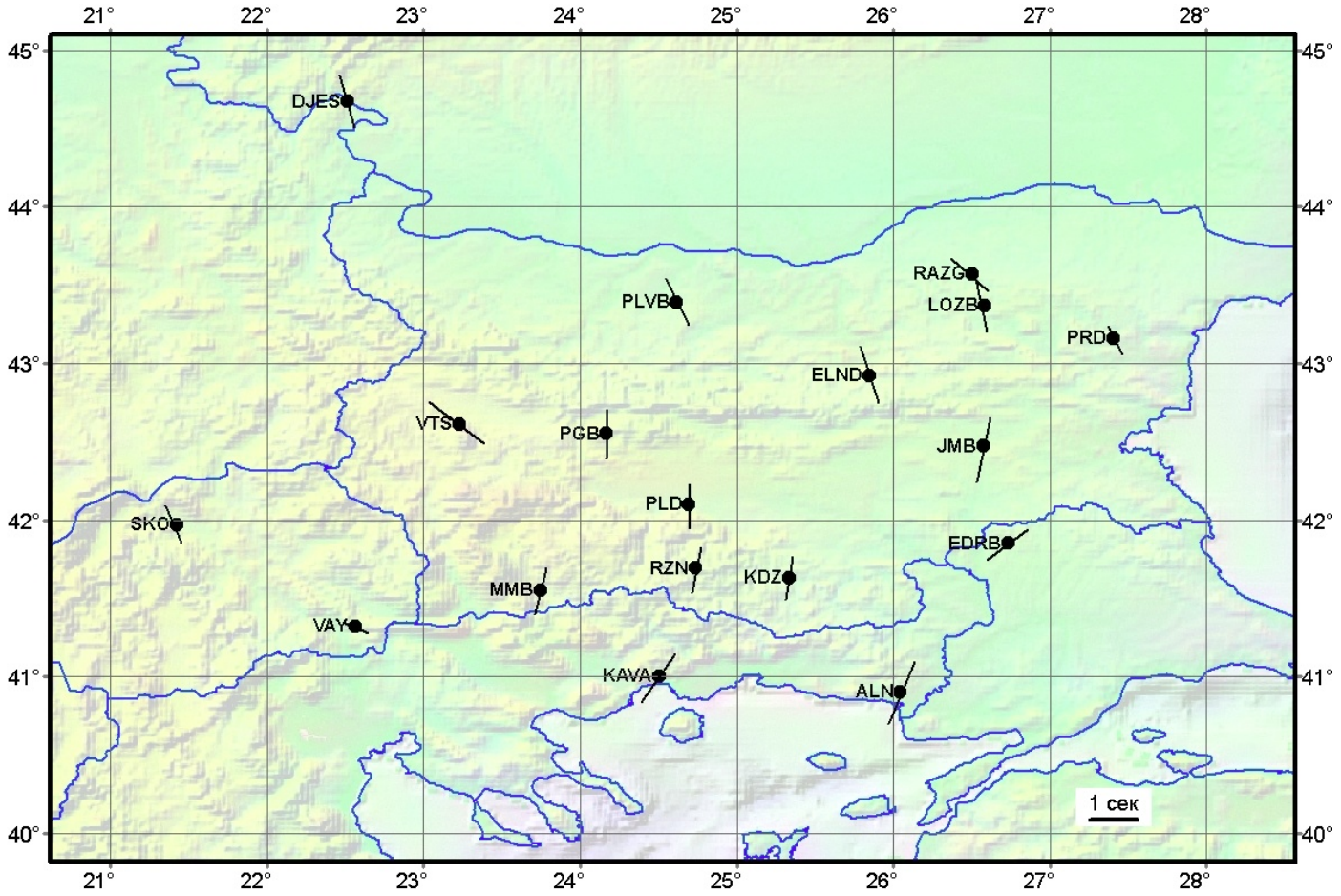

- PRF
- SRF

P660 phase has complex form;

P410 - P660 differential time differential time is 0.5 s less than the standard time.

Sp for groups 2,3,4 – show a phase, formed at the bottom of the low velocity layer, at a depth 450-510 km.

# Azimuthal anisotropy of mantle




Fast wave polarization azimuth:

20° for stations in the south – direction of extension;

- 30° for the stations in the north – probably older processes;

# Conclusions

- 410 km discontinuity is uplifted by 10 km beneath the Rhodopean massif;
- Above the 410 km discontinuity a low velocity layer is present;
- Low velocity layer at depths from 450  to 510 km;
- LAB is detected at depth 40-60 km
- Mantle anisotropy zoning similar to the velocity zoning.

*Vinnik et. al., Izvestiya, Physics of the Solid Earth, 2021, Vol. 57, No. 6, pp. 849–863*

*Georgieva. G., Comptes rendus de l'Acad'emie Bulgare des Sciences, 2015, Vol. 68, No. 6, pp. 755-760*

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