

P- AND S-WAVE RECEIVER FUNCTION STUDY OF THE CRUST AND MANTLE STRUCTURE BENEATH THE TRANSBAIKALIA

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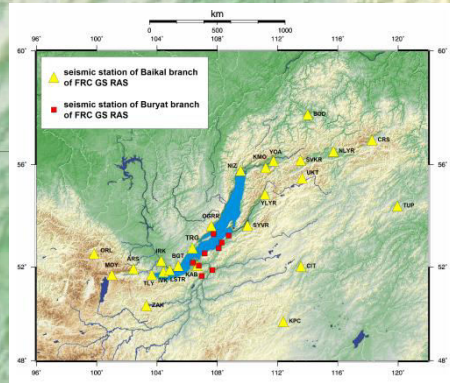
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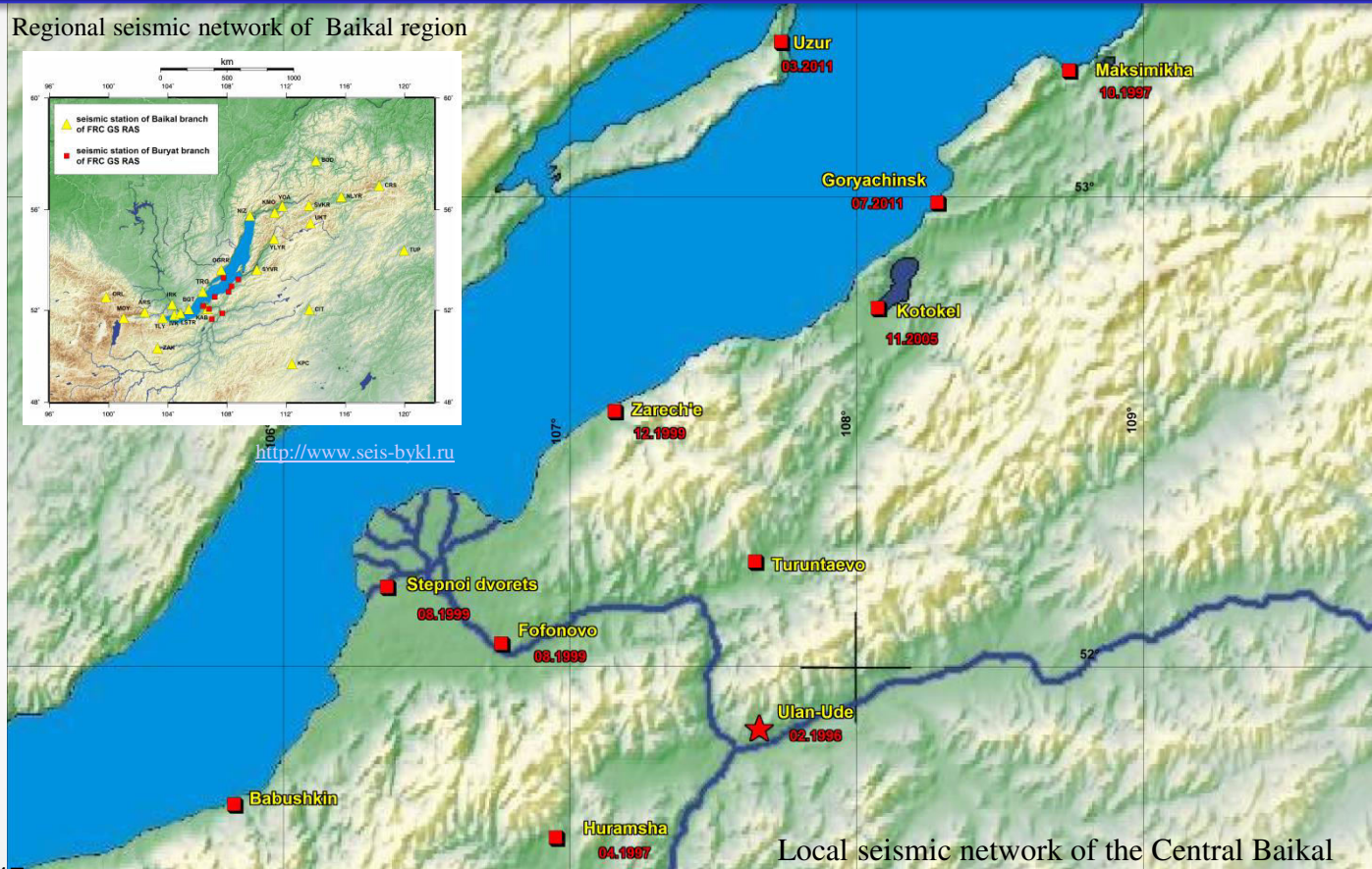
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26-30 June 2017 Vienna, Austria

Regional seismic network of Baikal region



<http://www.seis-bykl.ru>



Local seismic network of the Central Baikal

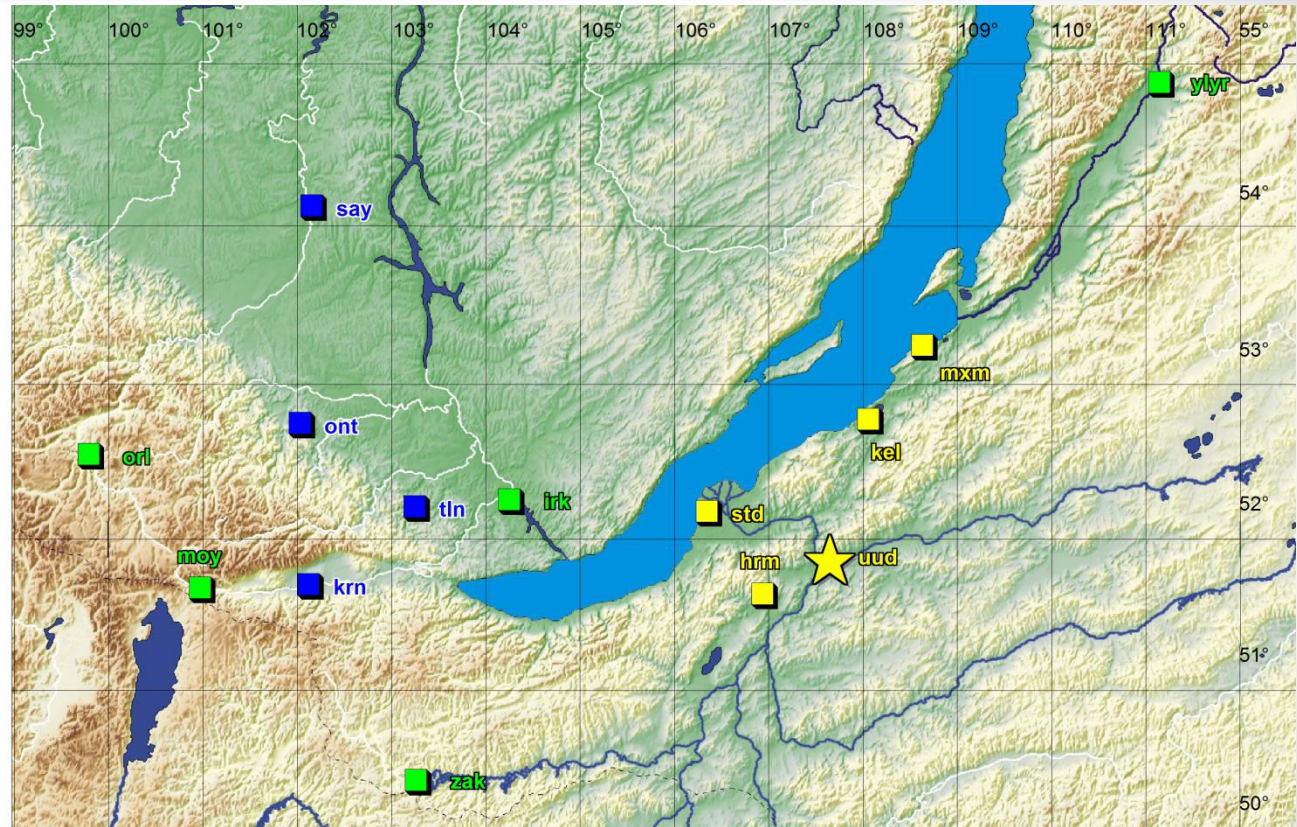
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Location map of broadband seismic stations in the region

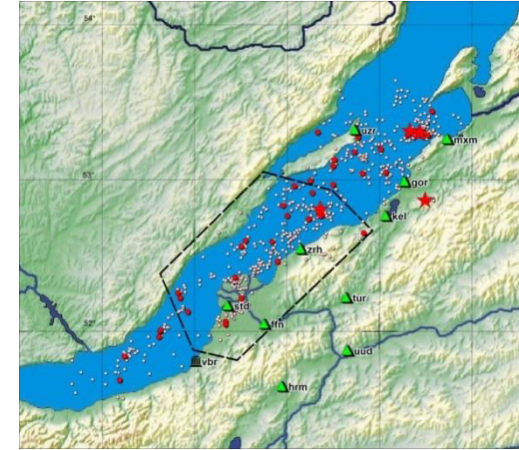
-  Broadband seismic stations of Geological Institute of SB RAS
-  Broadband seismic stations of Baikal Branch of FRC GS RAS
-  Broadband seismic stations of Institute of the Earth's crust of SB RAS

- Seismic local network lies within polygon 51° - 54° N, 105° - 109° E;



Purpose of research:

To study the Earth's crust and mantle with P-and S-wave receiver functions' method in the vicinity of seismic station "UUD"



Tasks:

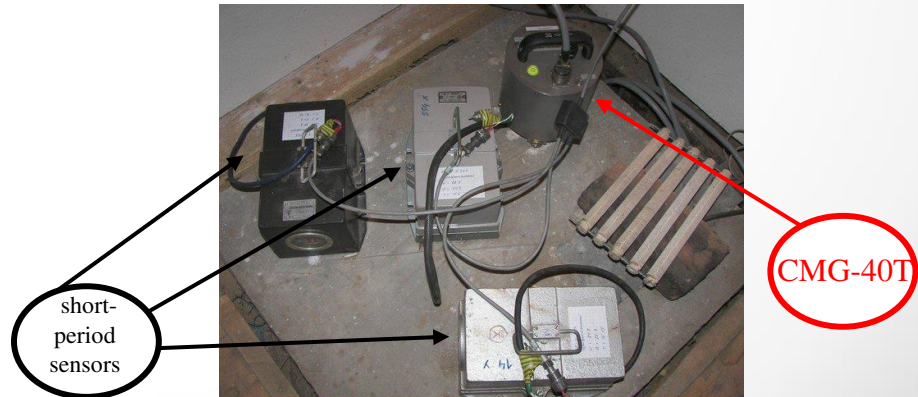
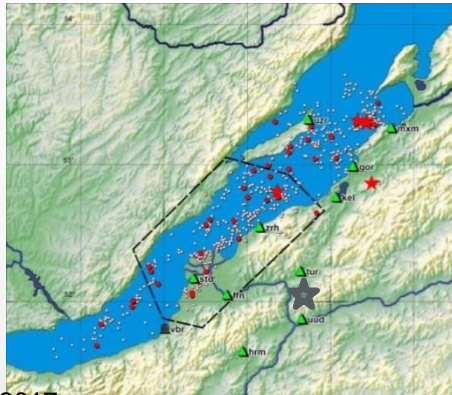
1. Selection of seismic events;
2. Extraction of P- and S-receiver functions from records of seismic events;
3. The choice of initial parameters for the solution of inverse problem from receiver functions;
4. Result of inversion: constructing an one-dimensional P- and S-velocity cross-sections in the vicinity of the station "UUD" by the method of selection.

Seismic station UUD

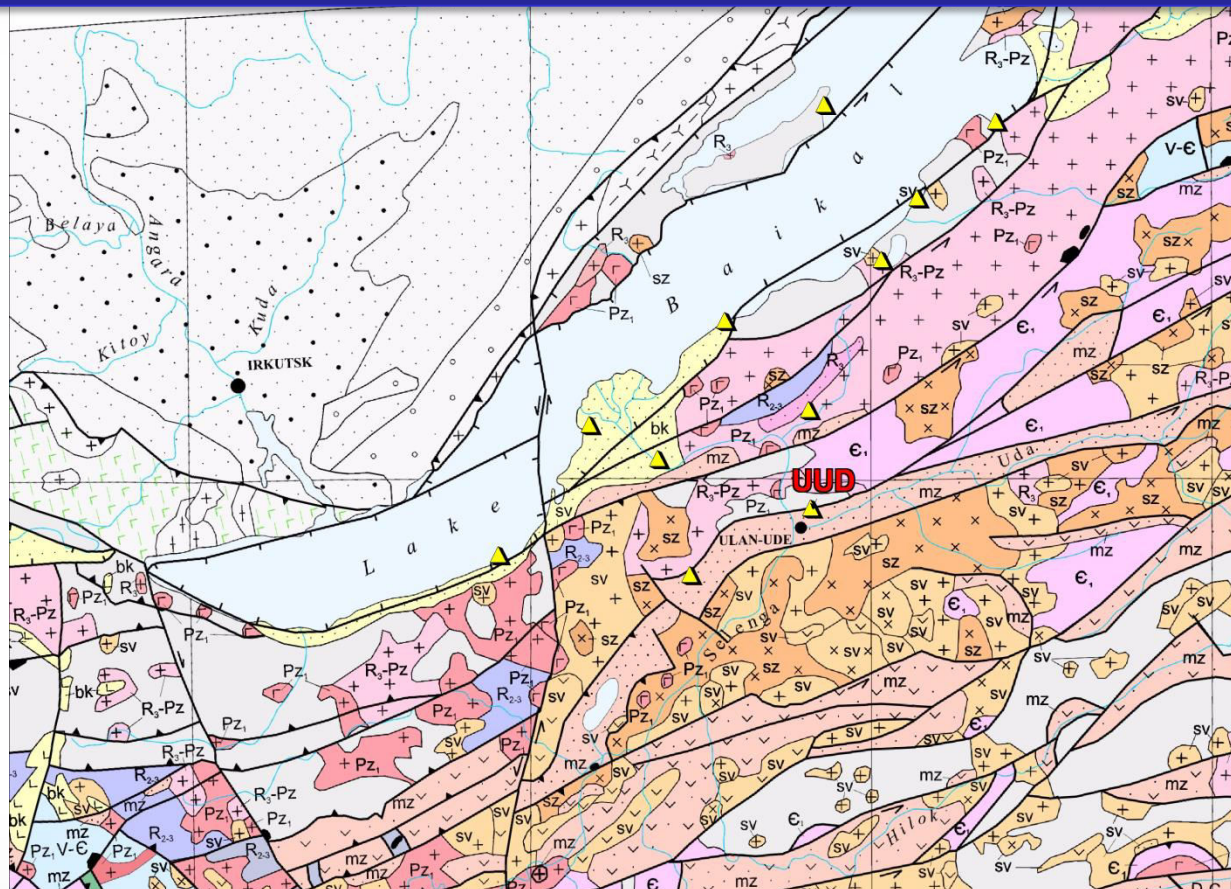
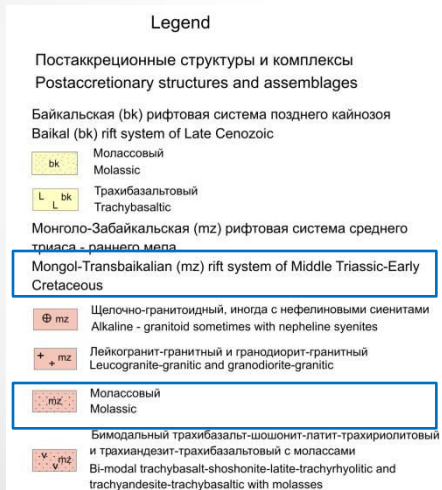
Opening date: 1996 year Location: 51°52'6.53"N , 107°39'47.62"E

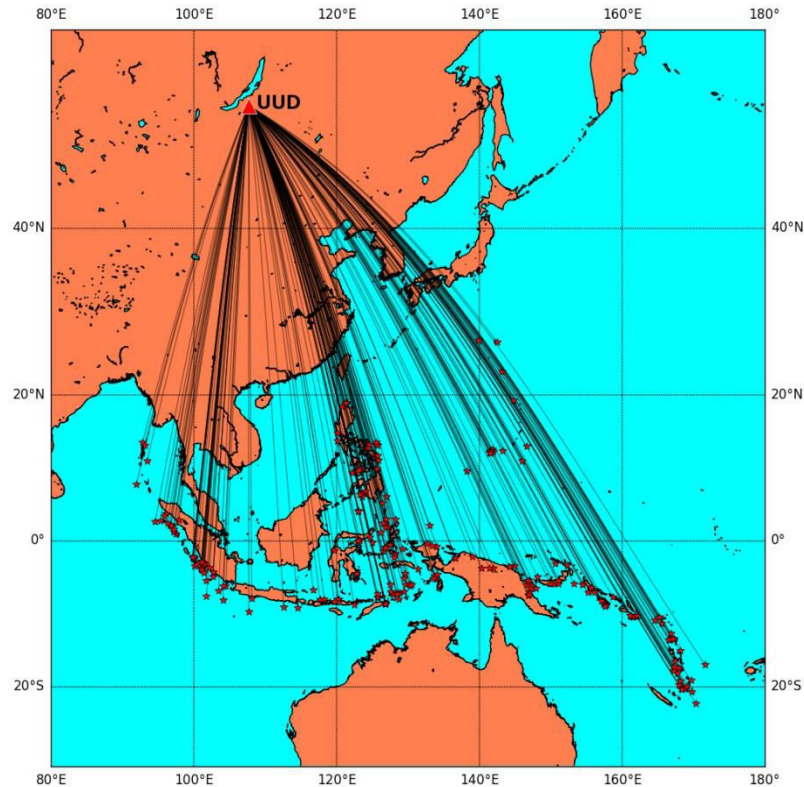
Seismic station is situated in the vicinity of Ulan-Ude city

Station			Type of ADC and seismometer	Channels	Frequency range, Hz	Sampling frequency	ADC
Name	Code	Coordinates					
Ulan-Ude	UUD	51.87 107.66	SeisComp, CMG-40T	ZNE	0.033 – 25	0.02	24



Geodynamic map of the Baikal region and adjacent territories,
Bulgatov A.N., Gordienko I.V.
and et al., 2003



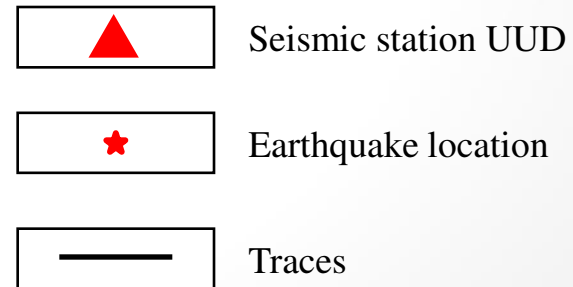


Selection of events from global seismological network NEIC

<http://earthquake.usgs.gov/regional/neic/>,
<http://www.ncedc.org/annc/catalog-search.html>

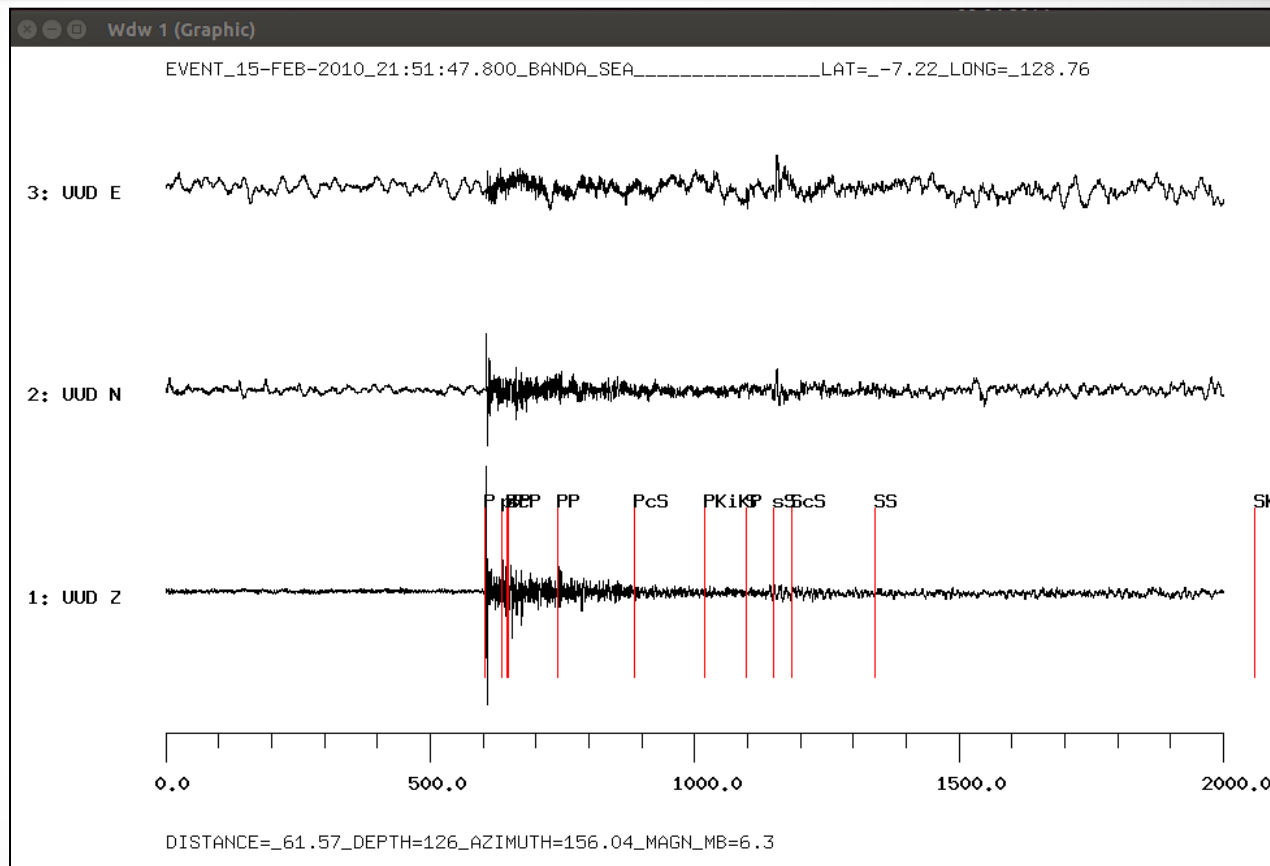
Selection parameters:

1. Epicentral distance [35° - 90°];
2. $M_b > 5.5$;



Example: UUD for 15.02.2010

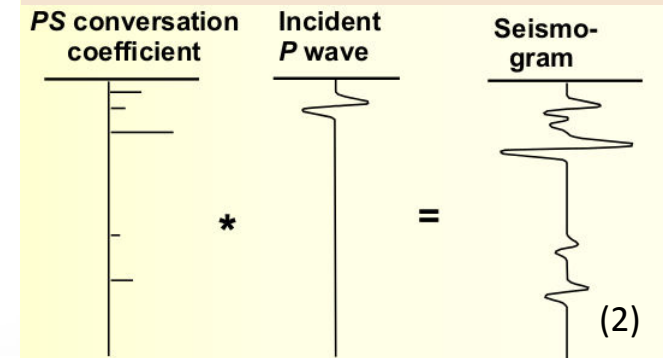
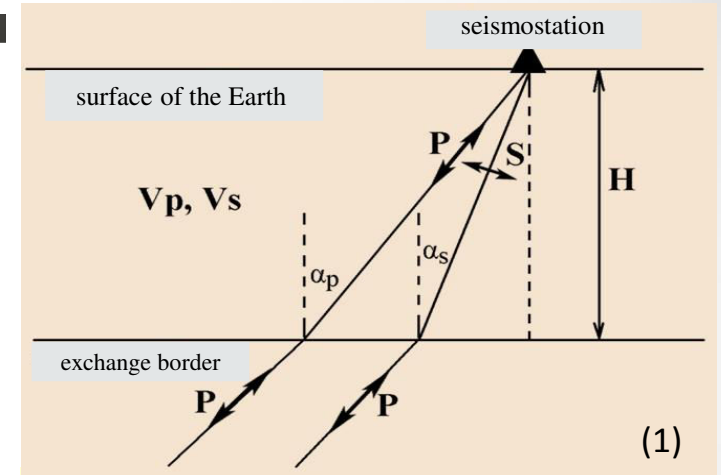
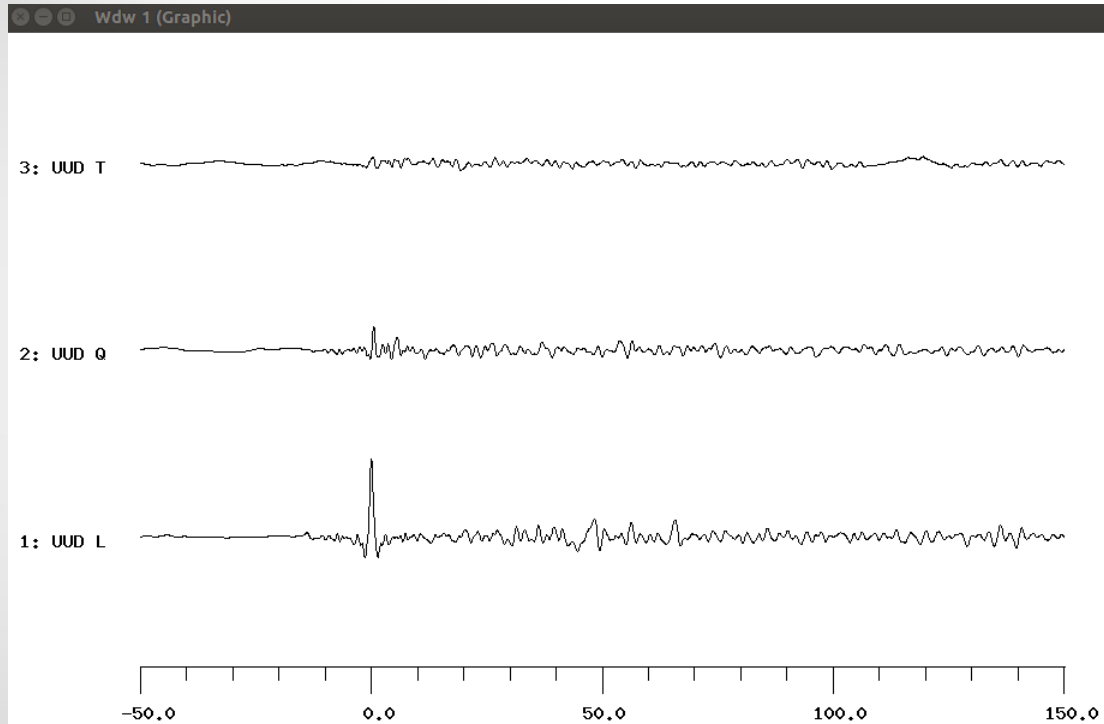
All processing was
conducted in the
software package
Seismic Handler in the
operating system Linux
(Ubuntu 12.04)



We used P receiver function modification

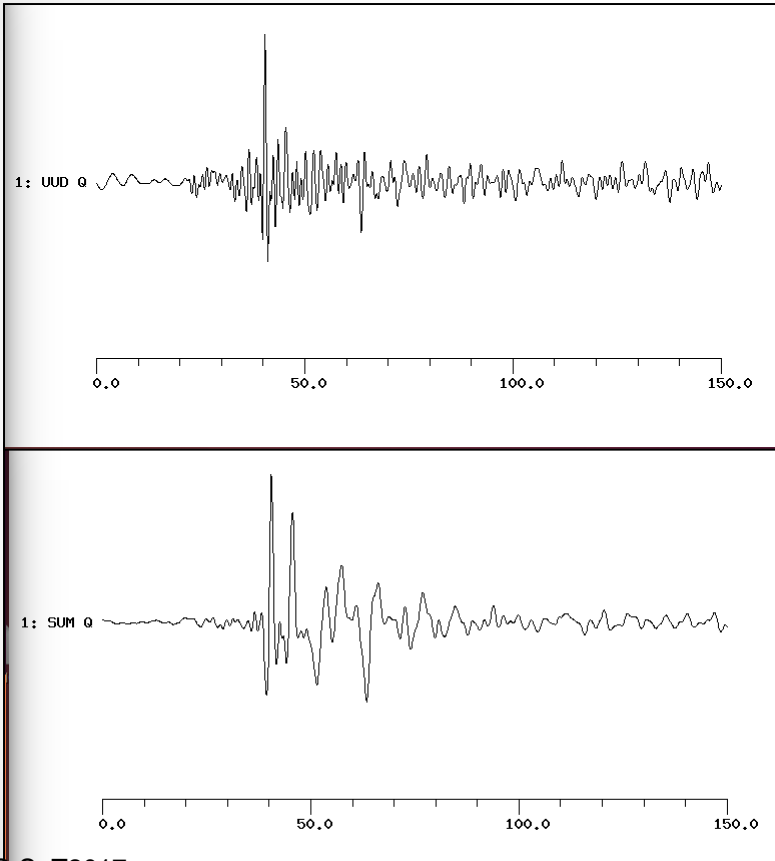
(Vinnik, 1977; Kosarev et al., 1993)

The Schmidt Institute of Physics of the Earth of RAS



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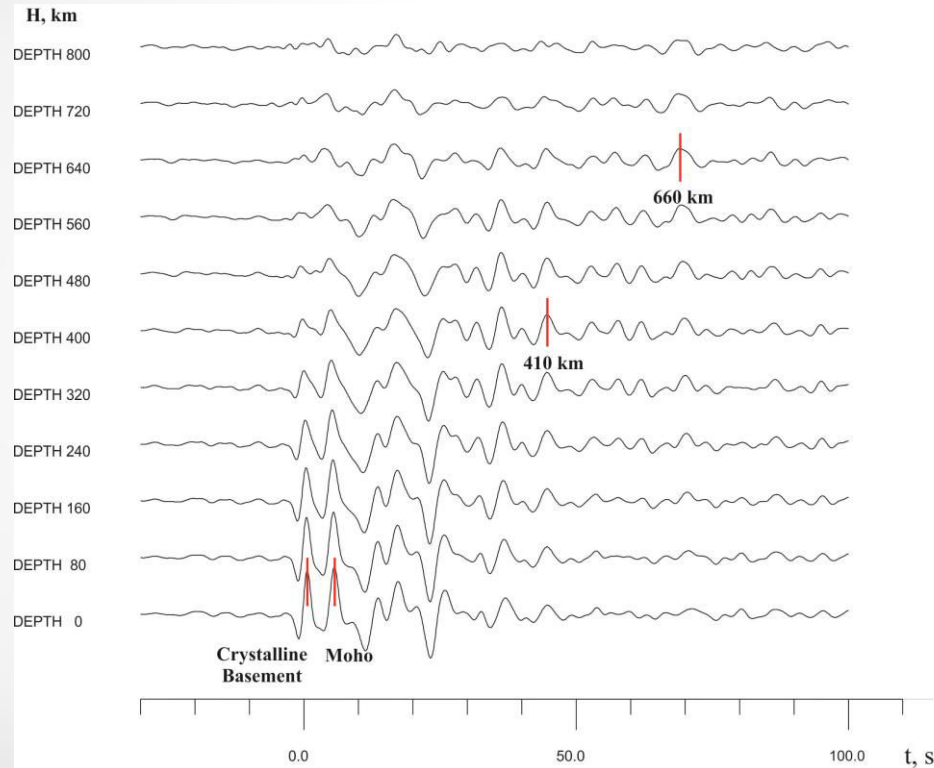
(1) The transformation of the coordinate system; (2) Deconvolution; (3) Normalization at Lmax



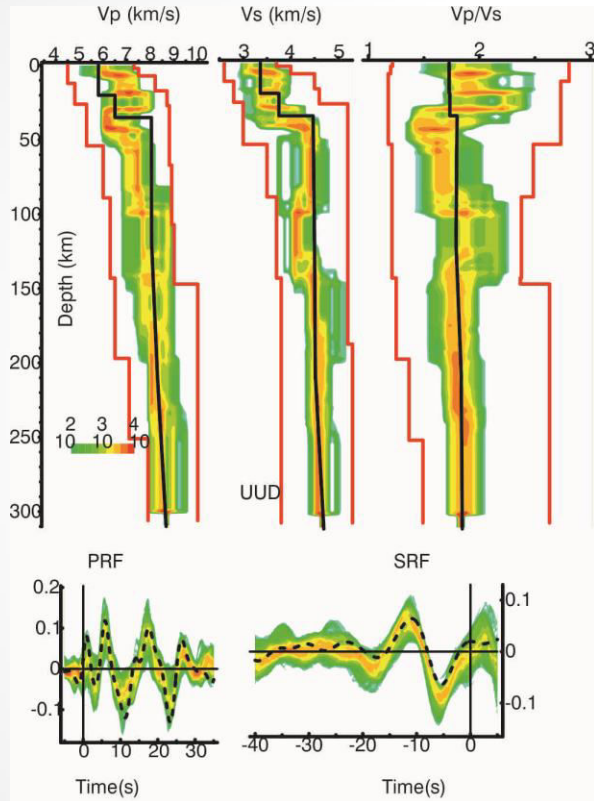
LQT components' comparison
of a single event

and a 259 events' summary
receiver function

STACK



	T(Moho)	TPs410	TPs660
UUD	5,60	44,70	69,00
IASP	-	44,00	67,90



The features of the received model

- Moho 35-40 km;
- Lithospheric wedge by V_s -model 40-100 km;
- Boundary between lithosphere – asthenosphere 100 km;
- The layer of low velocities in the upper mantle from 100 to 140 km.

Conclusions:

The main result is receiving a model of velocity distribution of seismic waves in the crust and uppermost mantle of the vicinity of the seismic station UUD.

Network development of seismic stations in the Baikal region will allow us in the future to build a number of two-dimensional velocity models and maybe three-dimensional model.

Using of the obtained results with the geological data and with data of gravimetry and magnetometry will help us to develop a geodynamic concept of formation and development of the Sayan-Baikal region.

***Thank you for your attention**