



A Scientific Network for Earthquake, Landslide & Flood Hazard Prevention



SciNetNatHazPrev - PROJECT WORKSHOP

Seismic Hazard

Partner's Presentation

*Ukraine : Selected Seismic Hazard Assessment
Methodologies at Regional and Local
Case Studies*

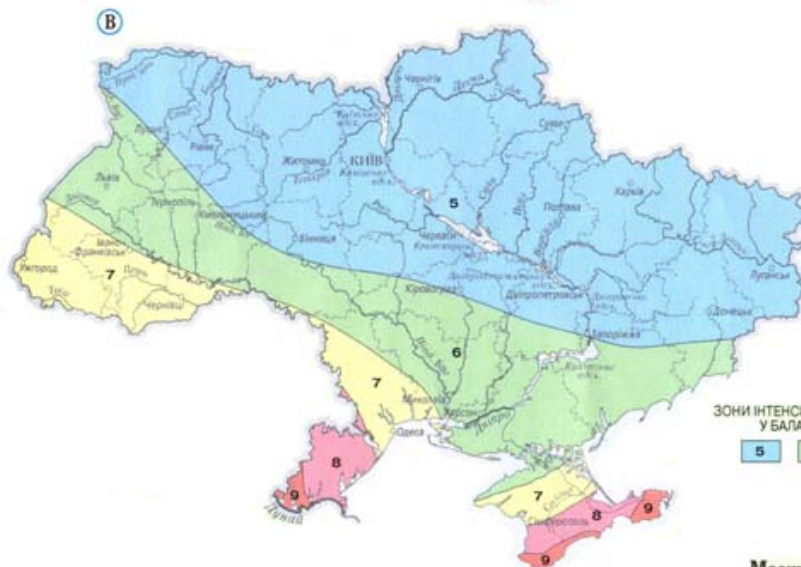
*Vyacheslav Iegupov
Engineer*

Seismic Hazard Assessment

- *Seismic hazard in Ukraine*
- *Seismic events in Odessa region*
- *Seismic micro zoning*
- *Maps of general seismic zoning*

Seismic hazard in Ukraine

The new seismic hazard map 2006



ЗОНИ ІНТЕНСИВНОСТІ СТРУШУВАНЬ НА СЕРЕДНІХ ҐРУНТАХ
У БАЛАХ МАКРОСЕЙСМІЧНОЇ ШКАЛИ MSK-64



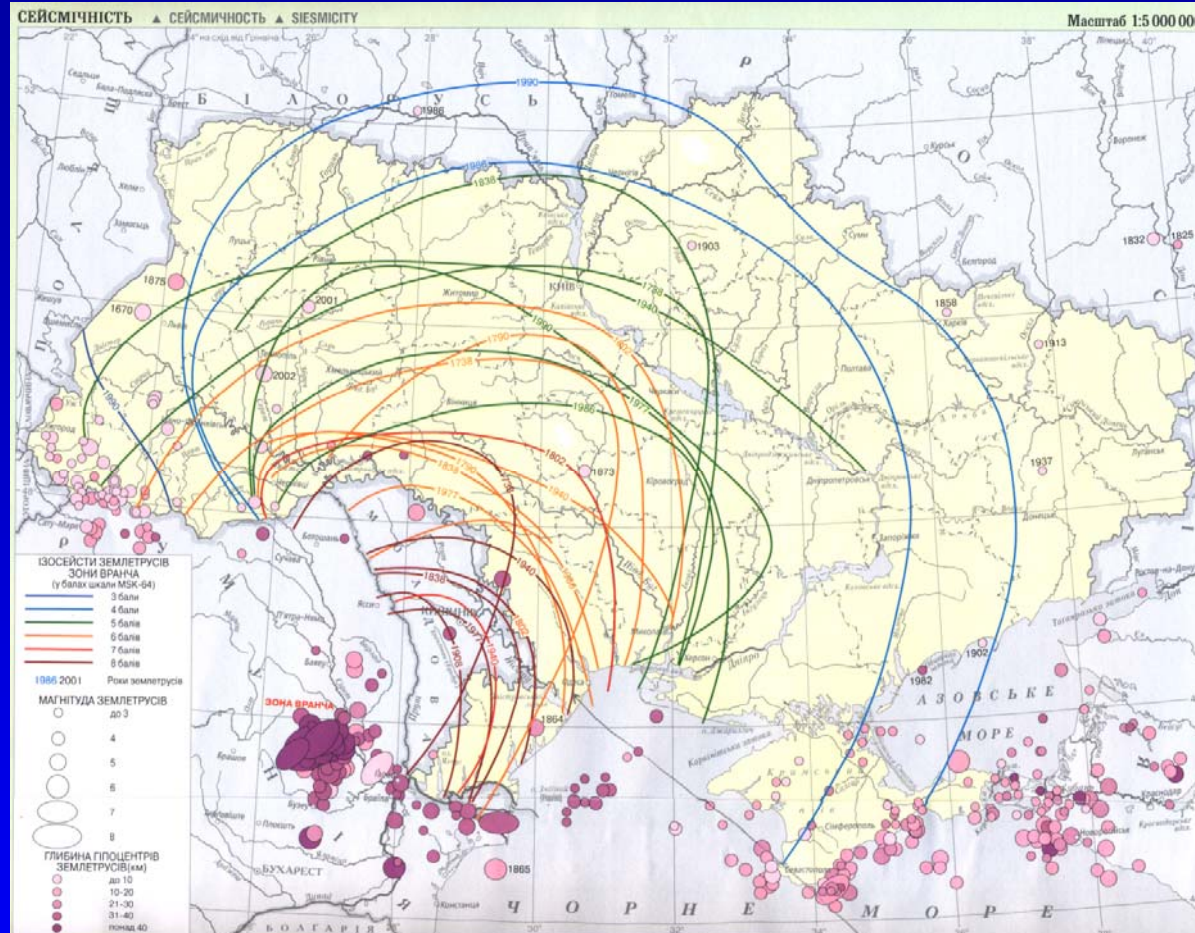
Масштаб 1:10 000 000

Map until 2006



- S. Subbotin Institute of Geophysics of NAS of the Ukraine, Odessa, Ukraine

Seismic hazard in Ukraine



Ukraine Seismicity and seismic intensity distribution shakings of earthquake Vrancea zone (Romania)

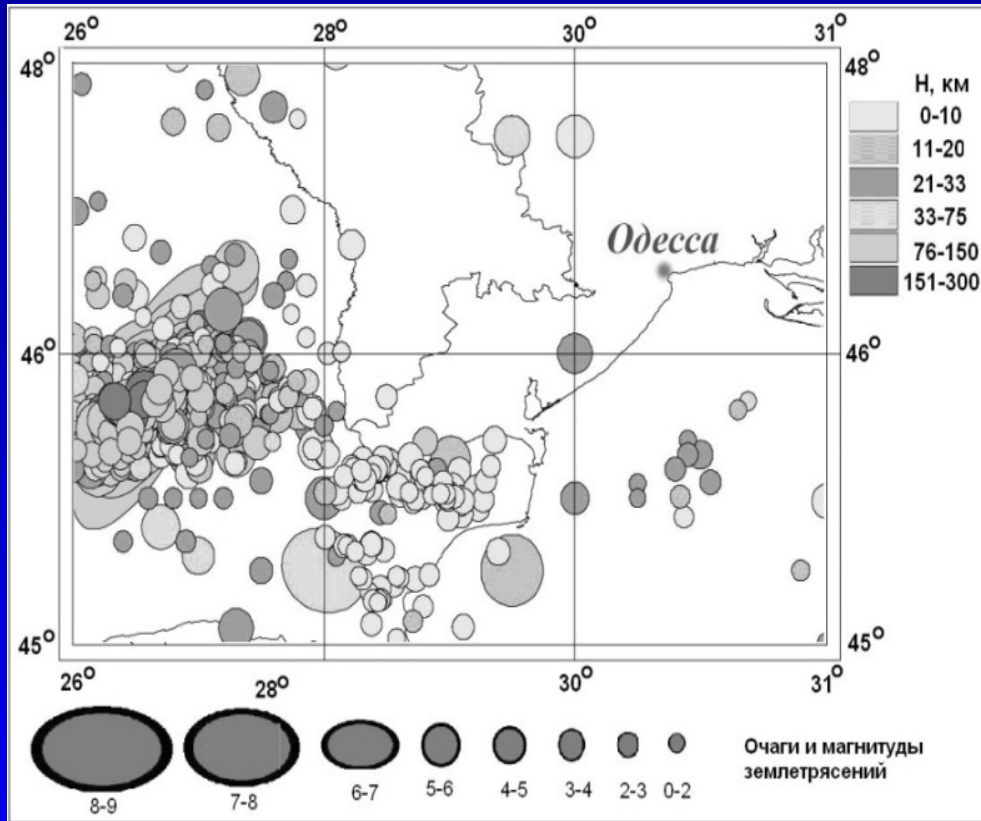
- S. Subbotin Institute of Geophysics of NAS of the Ukraine, Odessa, Ukraine

Ukraine seismic observation network

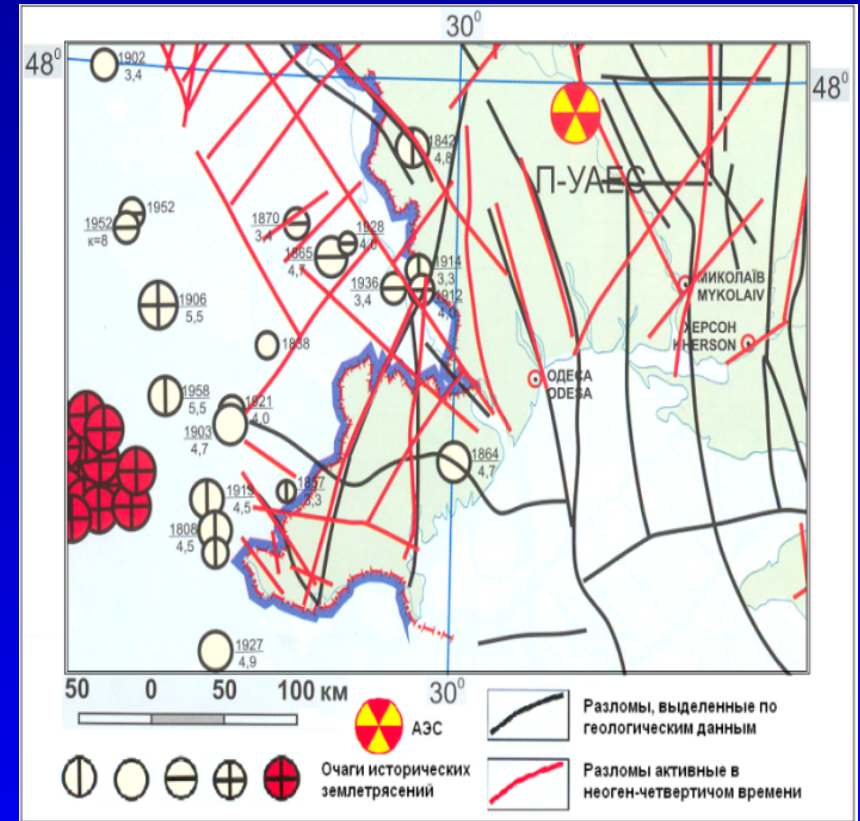


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Seismic events in Odessa region

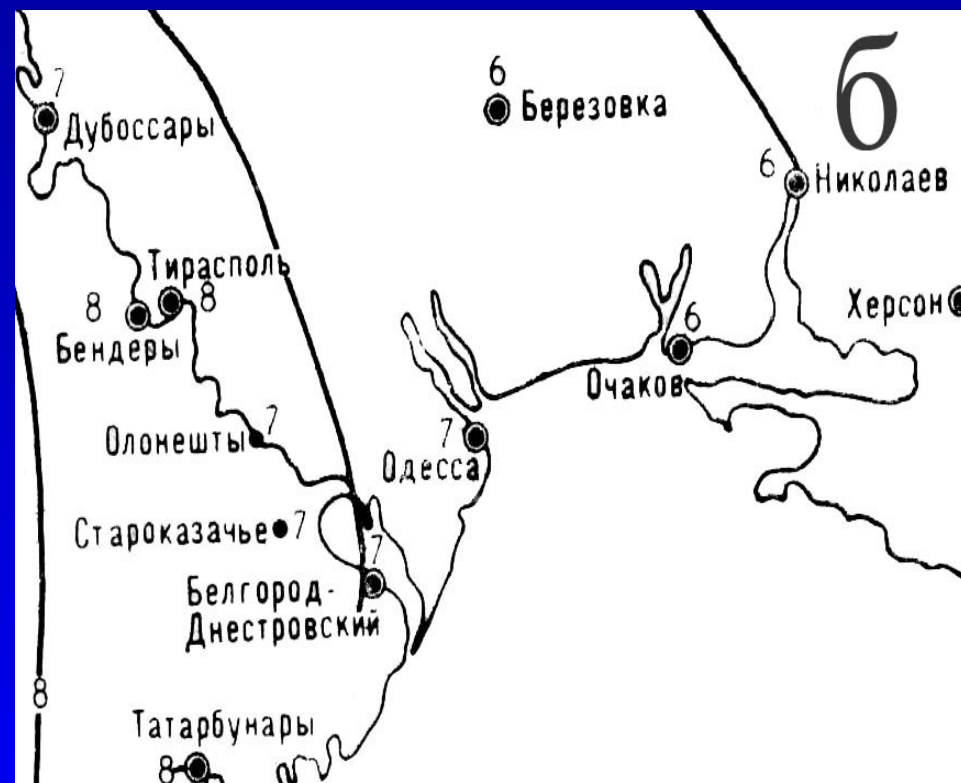
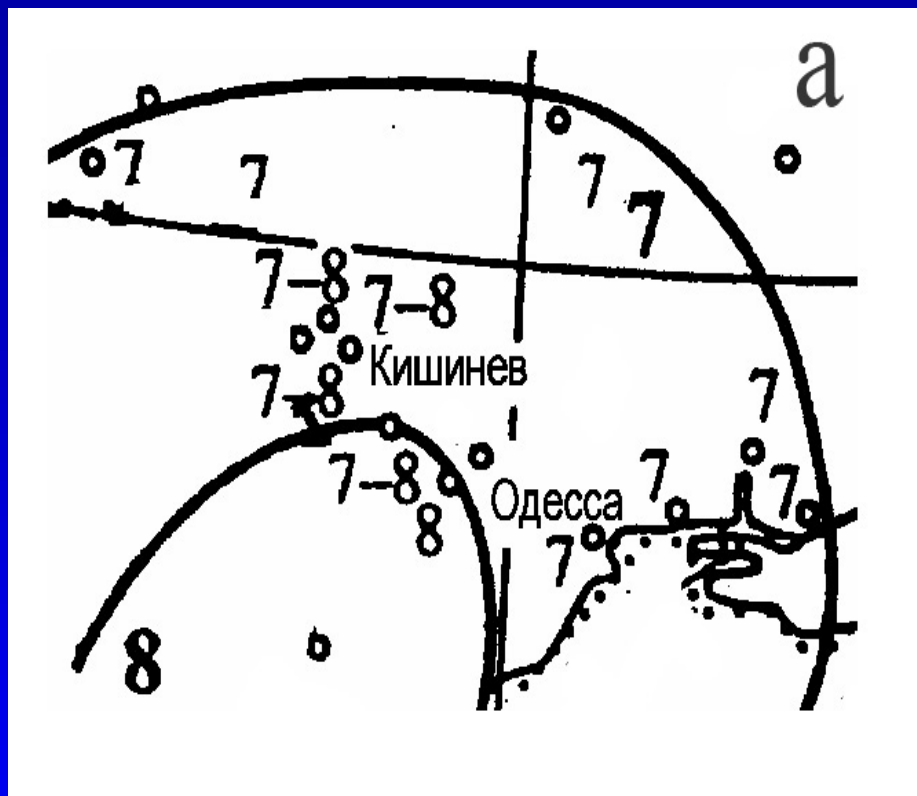


Map of earthquake epicenters in Odessa region and surrounding areas (B. Pustovitenko, 2004)



The fault structure and pockets of historical earthquakes near Odessa (B. Pustovitenko, 2002)

Seismic events in Odessa region

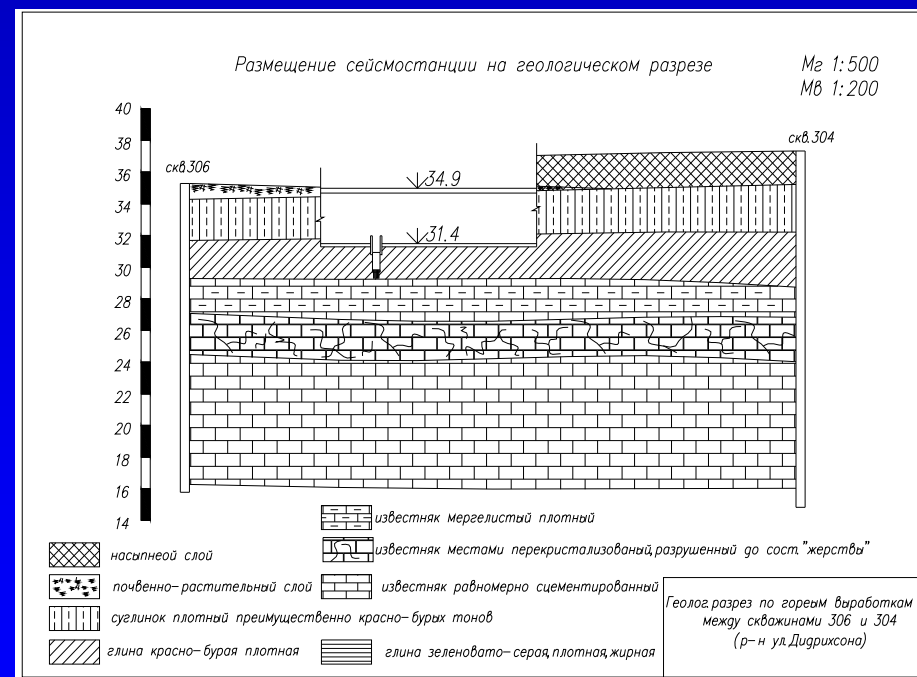


Schematic map isoseismals Vrancea earthquake in 1802 (a) and 1940. (б). The numbers near the name means the observed seismic rating. (A. Nikonov , 1996)

Seismic events in Odessa region

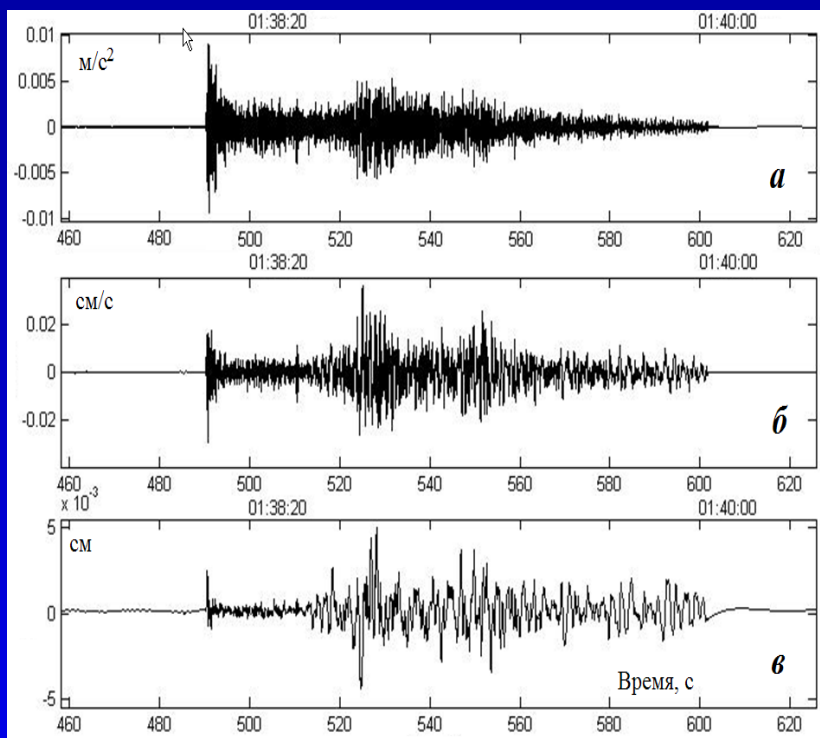
Year	2008	2009	2010	2011	2012	2013	2014	2015
Mag	4.0-5.0	4.0-5.3	4.5	4.0-4.8	4.0-4.6	4.0-5.3	4.0-5.6	4.0-5.0
Number of events	8	8	2	8	14	15	18	10

Seismic events with magnitude >4 of 2008 to 2015 year

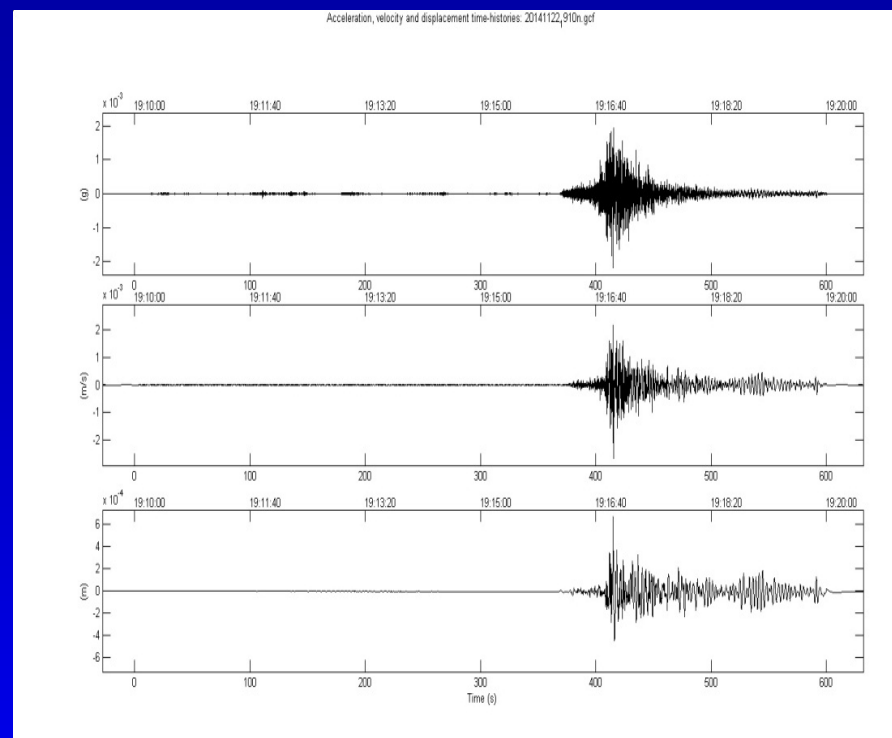


Seismic layout in the basement

Seismic events in Odessa region

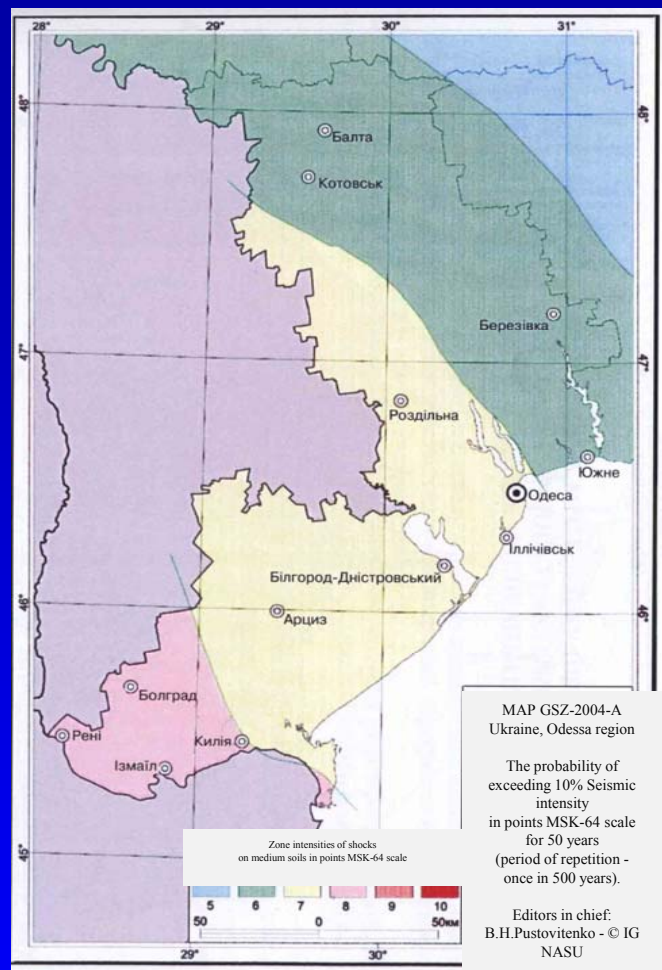


The vertical component of oscillations calculated by recording the earthquake 06.10.2013, of the Vrancea zone, registered by the seismic station "Odessa-city": a - acceleration, b - speed I c - offset. (Mag 4.7)

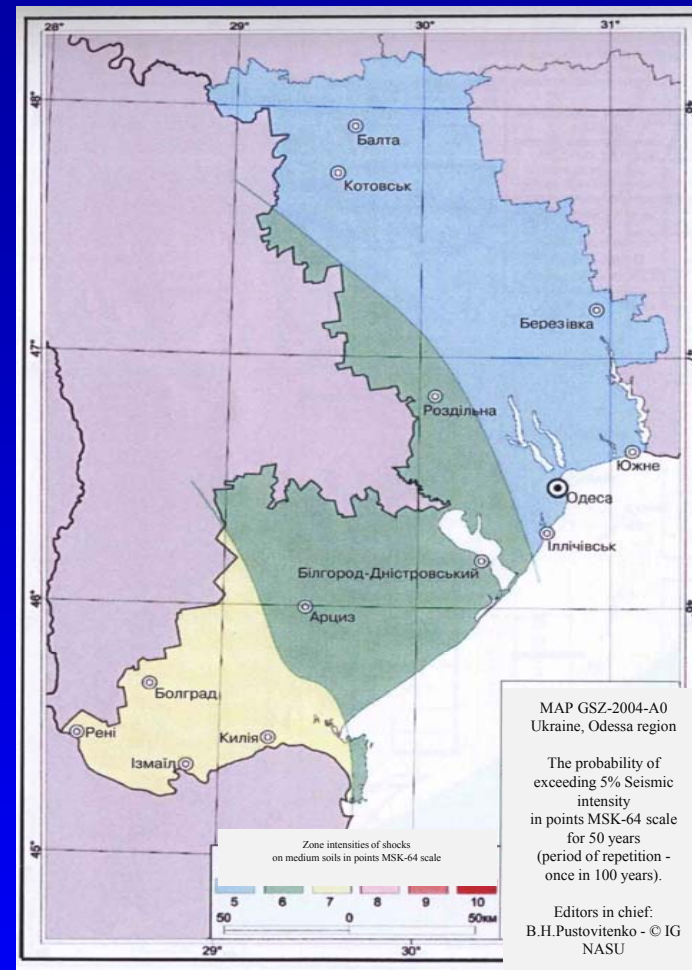


The horizontal of oscillations calculated by recording the earthquake 22.11.2014, of the Vrancea zone, registered by the seismic station "Odessa-city": a - acceleration, b - speed I c - offset, .(Mag 6.3)

Seismic events in Odessa region

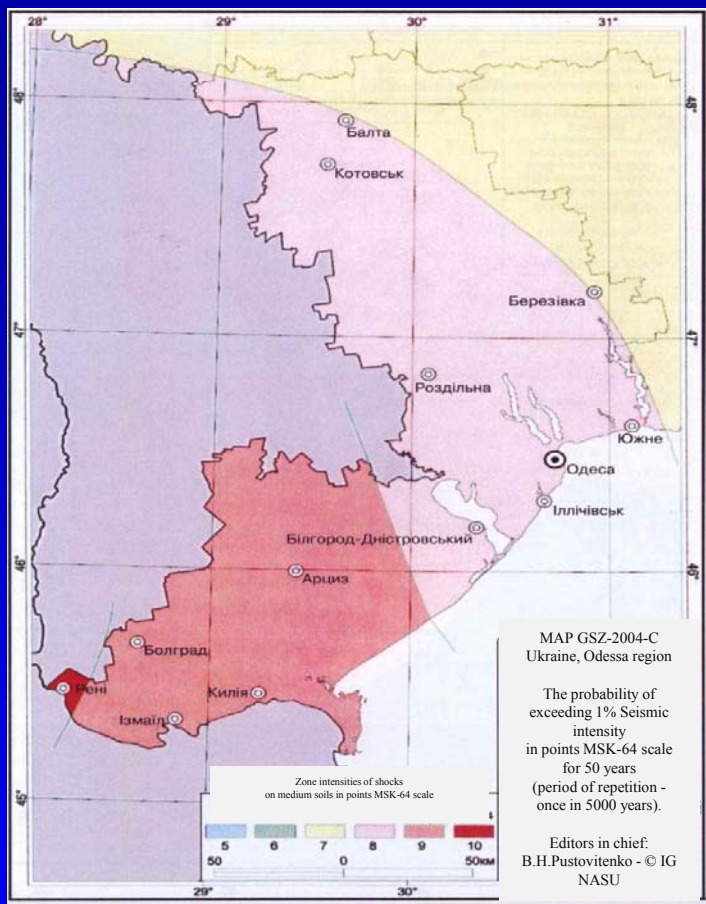


Detail maps GSZ-2004-A.
Odessa region

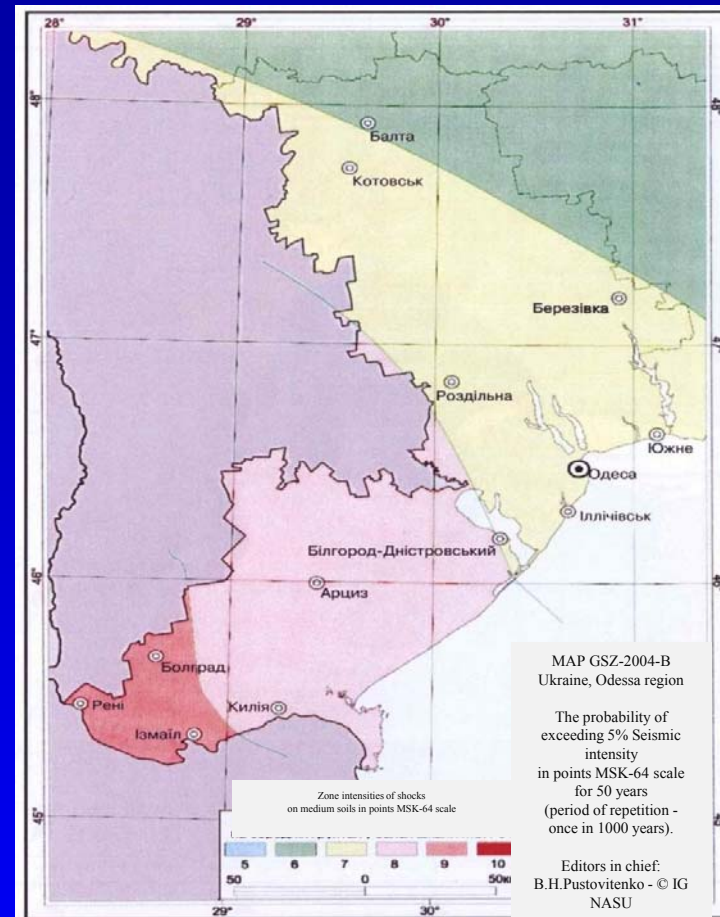


Detail maps GSZ-2004-A0.
Odessa region

Seismic events in Odessa region



Detail maps GSZ-2004-C.
Odessa region



Detail maps GSZ-2004-B.
Odessa region

Seismic micro zoning



Analog converter-digit



Seismic micro zoning

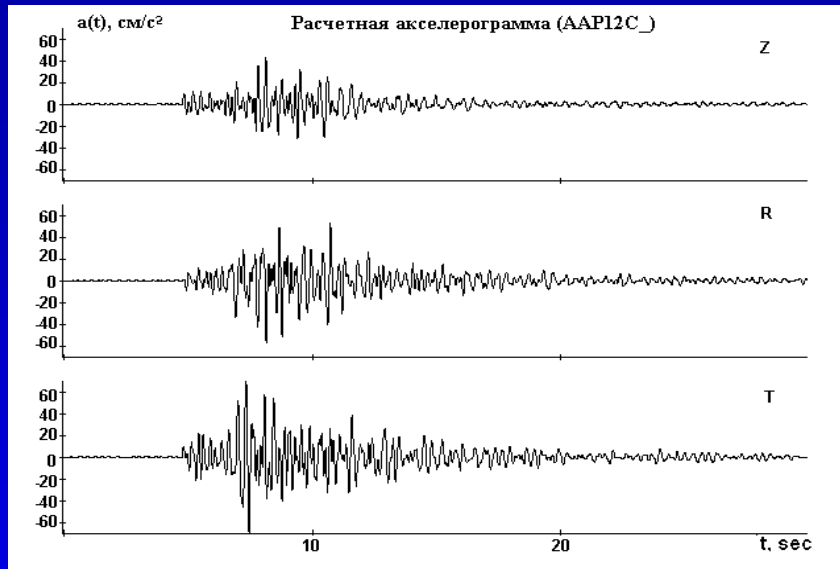


A general view of a digital automatic complex DAS-04

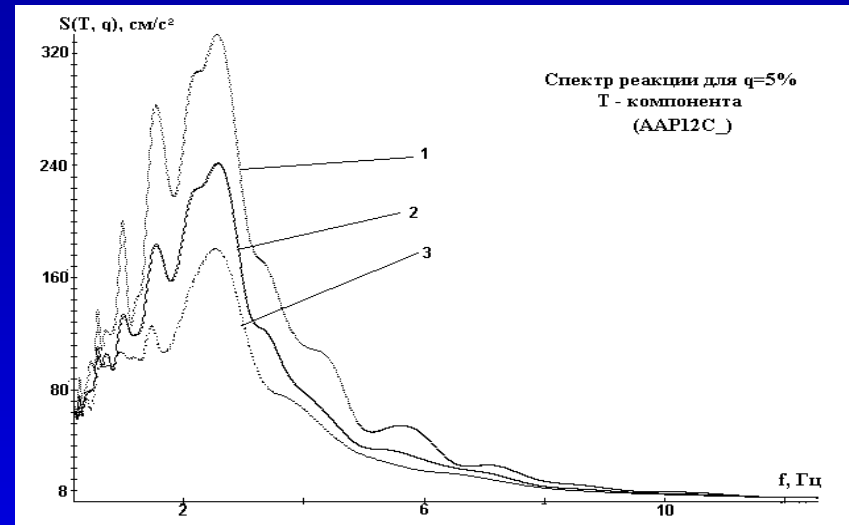
General view of the set of seismic receivers VEGIK mounted on a special platform (right - the controller and GPS)



Seismic micro zoning



Example of the three-component rated accelerograms, modelling rated earthquake of local focal zone on the free surface of the ground one of the sites in the city of Odessa.



Linear response spectra of individual oscillators accelerogram shown in figure 4. Figures 1, 2, 3 correspond with intrinsic attenuation of single oscillators: 2, 5 and 10 percent of critical, f - the angular frequency and $T = 1 / f$.

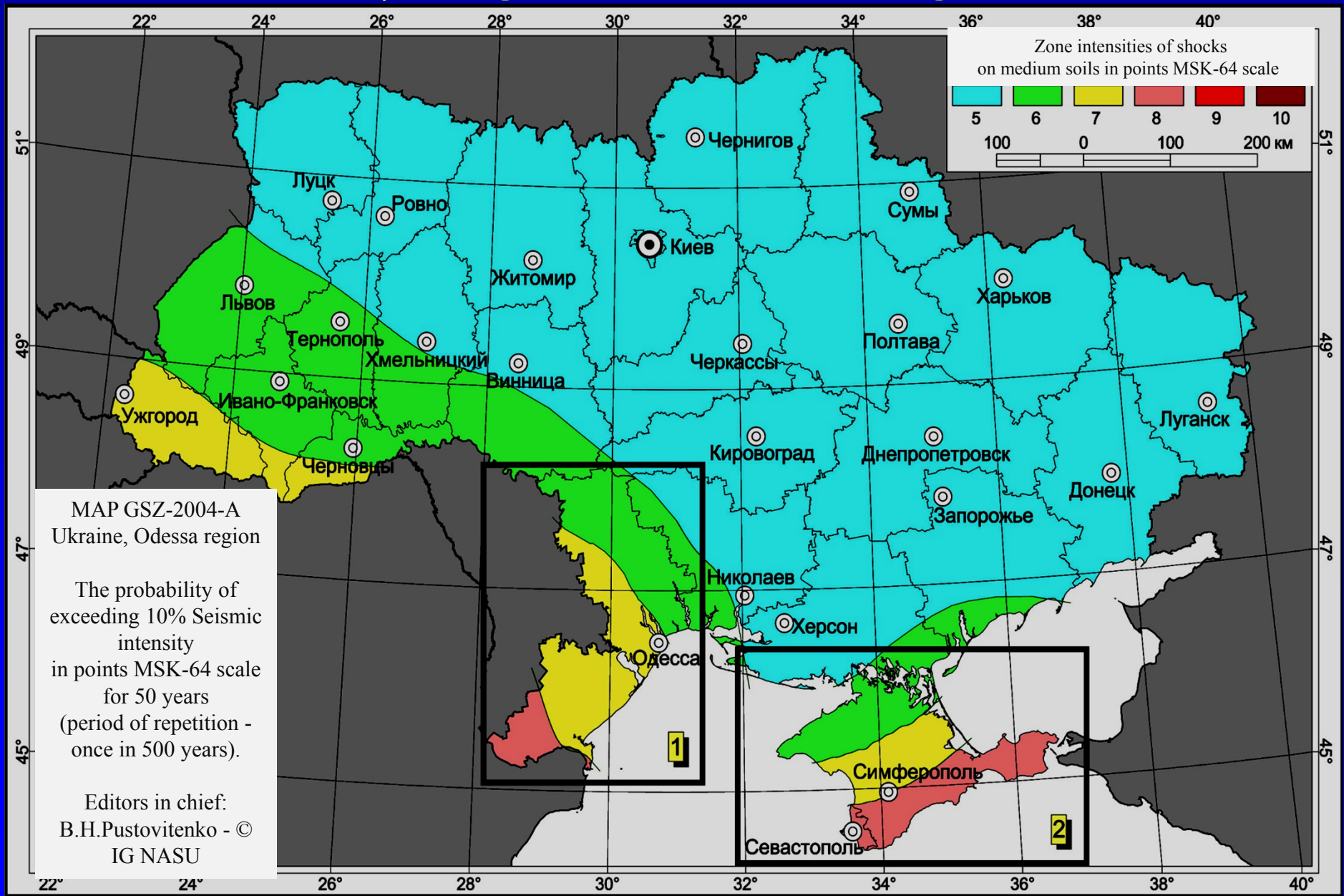
Maps of general seismic zoning

Supplement contains maps of general seismic zoning (GSZ) in Ukraine and Odessa region with periods of recurrence of once every 500 years (Map GSZ-2004-A, Figure B.1), 1000 years (Map GSZ-2004-B, Figure B.2) and 5000 years (Map GSZ -2004-C, Figure B.3) for medium soil conditions and the probability of exceeding the calculated intensity for 50 s 10%, 5% and 1%, respectively.

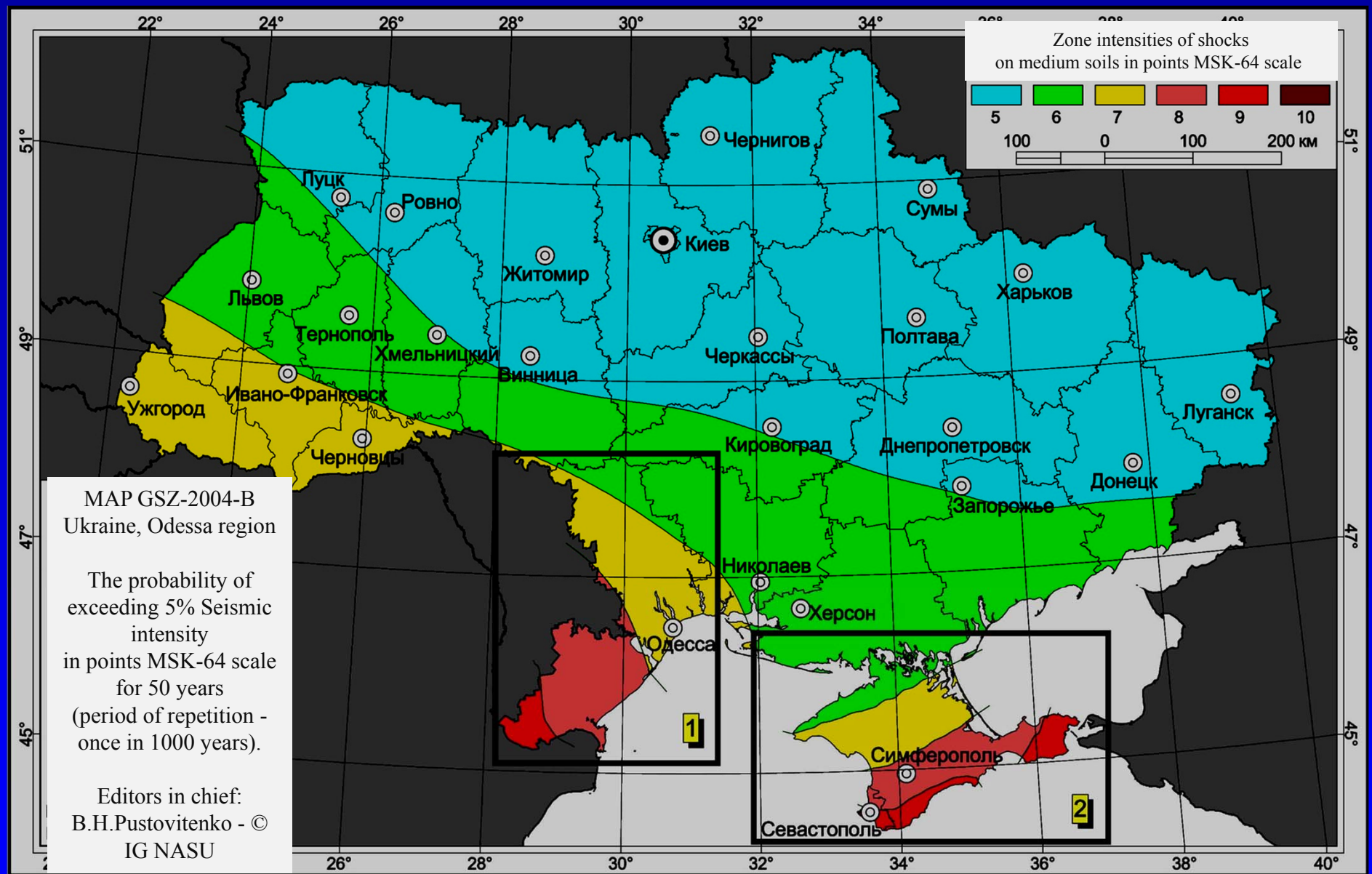
General seismic zoning map of Odessa region, except maps A, B, C, supplemented maps GSZ-2004-A0 (Figure B.4 - B.11) for the average return period of 100 years, and the probability of exceeding a given intensity of 39% for 50 years.

Note. Marked on the map OCP 2004 points for the scale that according to macro-seismic MSK-64 scale and DSTU -B - B.1.1 -28:2010 "Scale of seismic intensity"

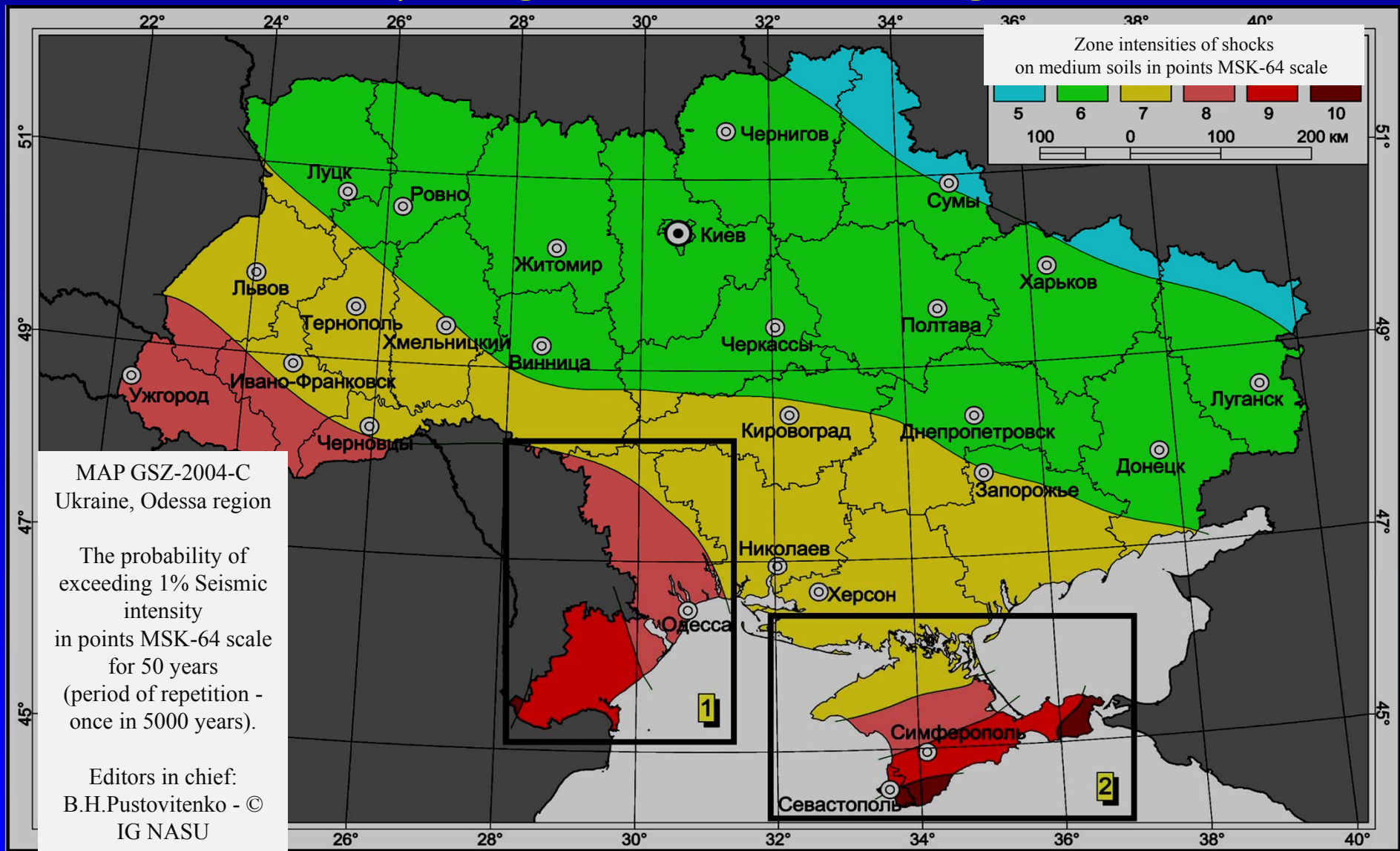
Maps of general seismic zoning



Maps of general seismic zoning



Maps of general seismic zoning



Thank you for your attention