PEAK GROUND ACCELERATIONS IN EXTRA- LARGER CARPATHIAN AREA THAN IN EPICENTER (2)

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The authors are coming with many recorded data which will open up a new challenge to seismologists studying nonlinear site effects in 2-D and 3-D irregular geological structures, leading them to a realistic research subject in earth physics, in nonlinear seismology. Shortly, why are we recording all PGA values much higher than epicenter value? The leading question is, if this is happening only in this area of Europe or WORLD. Vrancea is the site of strong intermediate-depth seismicity, down to 160 – 200 km depth and large magnitudes (M ≤ 7.9 - 8.0) and is one of the most active seismic zones in Europe. The latest strong and deep Vrancea earthquakes occurred on August 30, 1986 (Mw = 7.1; h= 131.4 km, in epicenter: a =162.60 cm/s^2 and at Chisinău:212 cm/s^2;Focsani:310 cm/s^2; Iaşi: 181 cm/s^2; Otopeni: 220cm/s^2 etc.); May 30, 1990 (Mw = 6.9; h = 90.9 km; in epicenter: 157 cm/s^2; Chişinau:189 cm/s^2; Oneşti: 242 cm/s^2;Periş:242 cm/s; Bolintin din Vale:219 cm/s^2; Campina;271 cm/s^2 etc. & May 31, 1990 (Mw = 6.4; h = 86.9 km, in epicenter: a=102 cm/s; Focşani: 162 cm/s^2 ; Baicoi-Ploiesti:246 cm/s^2 both directions etc. There are more than 200 values larger than epicenter ones…Why in this part of Europe/World there are so many peak ground accelerations recorded and are larger than epicenter values? *Surface waves Rayleigh and Love waves are seismic waves which are guided along the surface of the earth and the layer near the surface and they do not penetrate much into the deep interior.*

On the other time, the Alpine Tethys was linked to the Euro-Asian back-arc basins located further east through the Moesia - Dobrogea Transform [G. G. Stampfli; ***http://sp. Lyellcollection.org/ by guest on November 13, 2019***. It is observed along new times that in Dobrogea area the peak ground accelerations recorded in last time are all time **smaller** than epicenter ones and our ***Cernavoda Nuclear Power Plant*** is safe to strong Vrancea earthquakes.

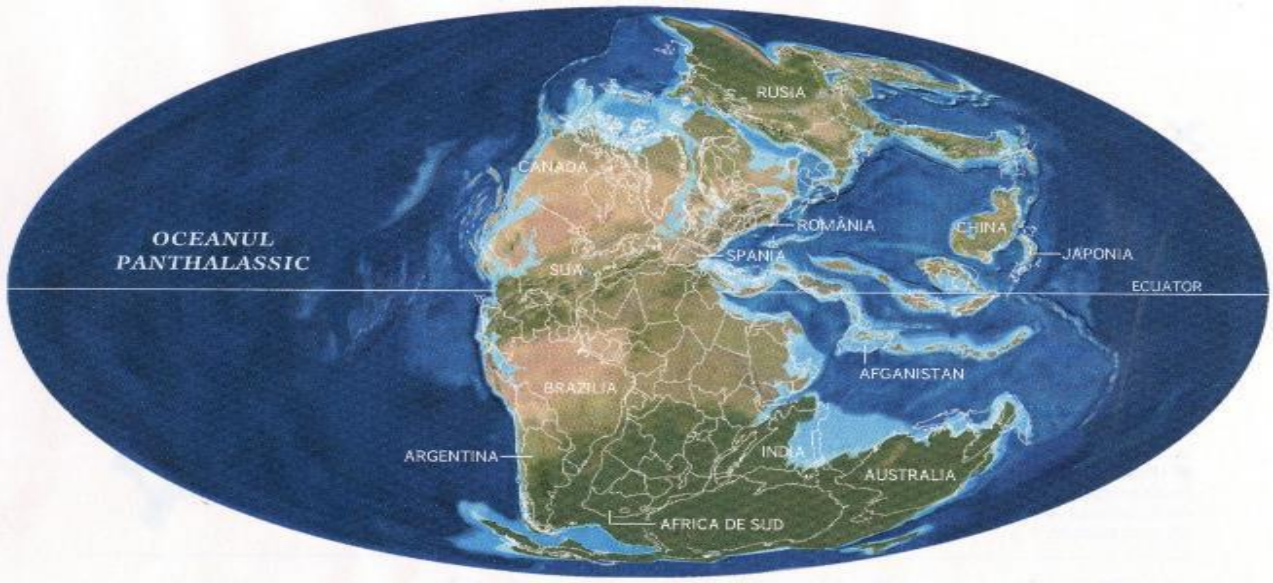

Figure 1. The Pangeea & Tethis ocean-250milions ago

Peak ground accelerations recorded in Muntenia, Moldova and Republic of Moldova & perhaps Ukraine are mainly larger than Vrancioaia epicenter values.

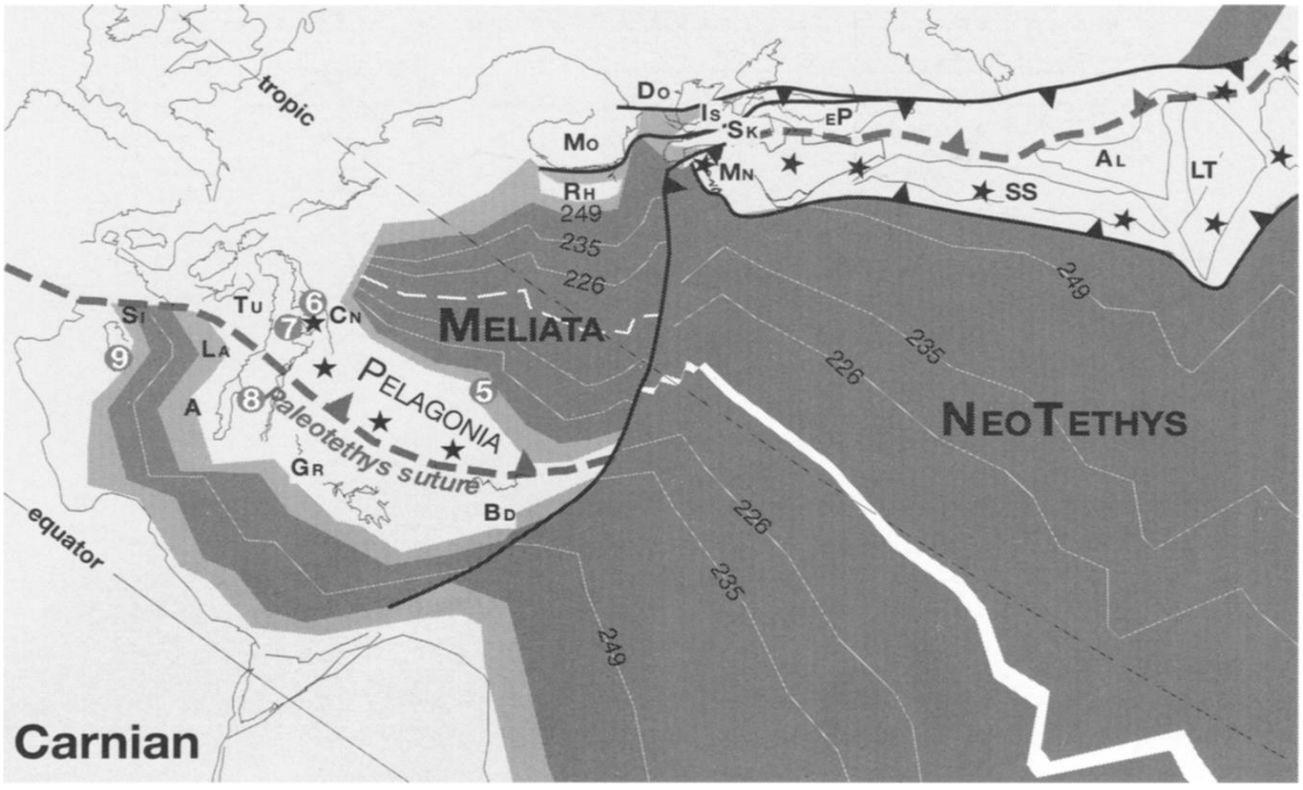

Figure 2.The Carnian, Neo Tethis,Meliata,Dobrogea(Do) & Moesic(Mo)

If we assume Airy type compensation, densities of sea water, crust and mantle of 1.03,2,9 and 3,3 x10^3 kgm^{-3},respectively, and an average ocean basin depth of **5 km**, then a typical **35 km** thick continental crust would be in isostatic

equilibrium with an oceanic crust of **6.6** km in the thickness. ***This rough calculation tells us the important fact that the oceanic crust is one -fifth the thickness of the continental crust***. Althought we generally accept that the crust is chemicalli distinct from the upper mantle and that the Moho likely involves a chemical contrast, additional contributions to the seismically detectable boundary may arise from transitions in shallow mineral structure,and petrographic fabrics of the rocks. The complexities are combined with the complex tectonic history of the surface to provide a remarkably hetreogeneous crustal layer.

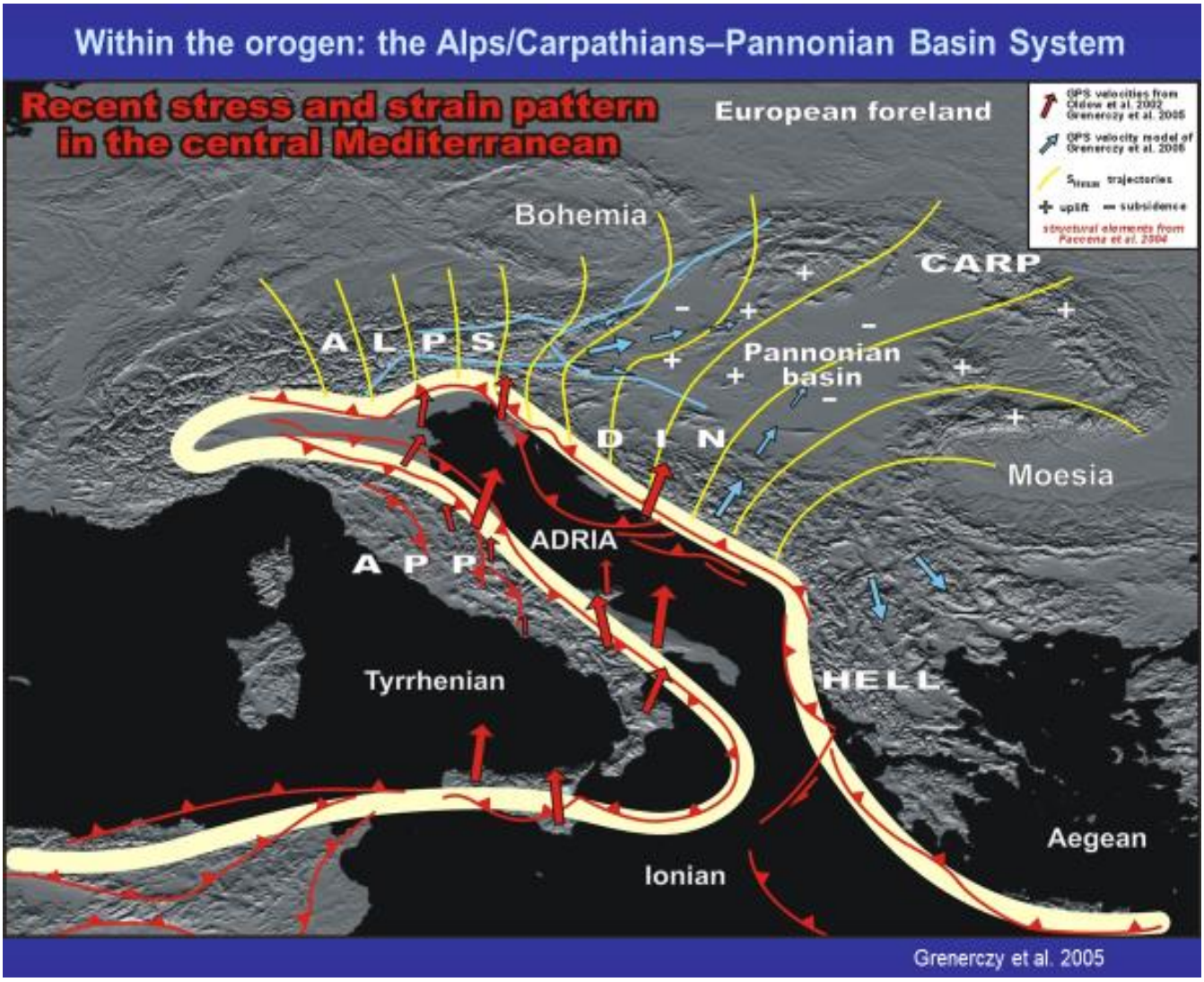

Figure 3.Within the Orogen;the Alps/Carpathians-Pannonian Bazin. Recent stress and strain pattern in the central Mediteranian [3]

Figure 4. Strain trabsfer from the acrtive Adriatic,Aegean and Vrancea deformation fronts throughout the ALCADI-Pannonian system[3]

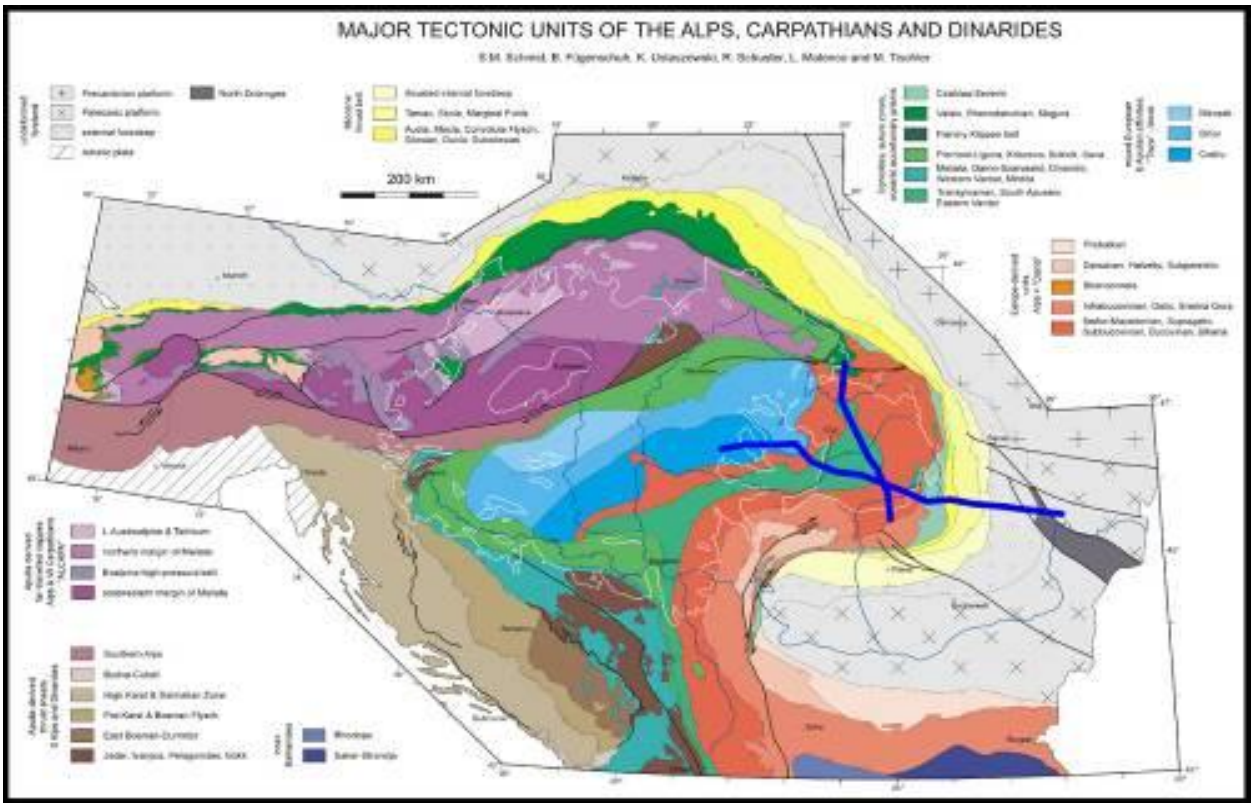

Figure 5.East European shield is starting from Nord East of Moldova[3]

NOTE*:** Bulletin of the Seismological Society of America,Vol.86, No.6.pp.1714-1723, December 1996, (https:www. researchgatwe.net/ publication/260388418) published the following paper: ***The Anomalous Seismic Response of the Ground at the Tarzana Hill Site During the Northridge 1994 Souther Californua Earthquake:A Resonant,Sliding Block ? by Jose Rial,University of North Carolina at Chapell Hill. In abstract we can read: The Northridge, California,earthquake of 17 January 1994(Mw=6.7) caused widespread damage in the San Fernando valley and adjacent areas. In many places, the earthquake motion was amplified or strongly modified by local ground rersponse ,but the most localized and extreme site effects occured at Tarzana , a small hill of gentle topography at the northern edge of the Sanata Monica mountains where strong amplification(horizontal peak acceleration 0f 1.82g) and other unsual site effects to a small area 50 m in radius around the station, beyond which the ground shaking was down to its theoretically expected level. ***If strong ground motion can vary so much in such a small scale, microzonation of urban areas may be an impossible goal at worst or, at best, only reliable at those sites where ground rersponse has previously been meassured.. Hence, to cleary understand the dynamic response of the ground at the Tarzana***

site has become an important problem in earthquake hazard assessmemnt and microzination.7

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2.***National Geographic, nr.141, Jamuary,2015.

3.Cloetingh, Sierd and the ISES team(2007).Coupled deep lithosphere and surface deformation during the post-collisions evolution of the Pannonian-Carpathian system: modes of basin and orogen deformations lithosphere strength and vertical motions. Bucharest, SFB 461-Strong Earthquakes.A Challenge for Geosciences ad Civil engineering,4-6 October 2007.