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Pitfalls and Reality in Global and Regional Hazard and Disaster Risk Assessments

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Abstract

Last years natural disasters brought enormous economical losses and caused hundreds of thousand deaths, which make the problem of disaster risk reduction (DRR) one of priorities for all countries and nations. The results of such investigations are very important as they distinguish the "hot spots", i.e. the most vulnerable areas and the most dangerous phenomena, characteristic for specific areas. Unfortunately these efforts sometimes lead to erroneous conclusions, which can be explained by using imperfect or just erroneous local inventories on disasters. In the present paper authors try to analyze some of pitfalls in Global and National Disaster Risk Assessments and in particular those related to South Caucasus region and Georgia. Hazards and risks in Georgia are recalculated using representative local data.

1. Introduction

The problem of disaster risk assessment is quite complicated as it integrates many quantities, which are evaluated very approximately (ADRC, 2006; Beer, 2010; CAC DRMI, 2009; MunichRe, 2010; CRED, 1991; CRED, 1994; Dilley et al, 2005; Push, 2004; UNDP, 2004; ISDR/UNDP, 2004;)

The main issue is that in the many cases there is not corresponding well grounded physical and mathematical model/theory of disaster. As the methodology of hazard and risk assessment is essentially based on the statistical approach, the question of the uncertainties, both alleatory and epistemic, are decisive for obtaining reliable results.

The most vivid example demonstrating difficulties in disaster risk evaluation is the problem of seismic hazard and risk assessment. Even the approved methods of Seismic Hazard Assessment (SHA) such as SEISRISK III, EF RISK, Open SHA etc contain a lot of quite crude approximations. This is evident from comparison of predicted by Global Seismic Hazard Assessment Program, GSHAP (Giardini et al, 1999) and other standard programs with observed data on the Peak Ground Accelerations of recent strong earthquakes (Table 1):

Table 1.

Expected according to GSHAP (with probability of exceedance of 10% in 50 years) and observed PGA (g) for recent strong earthquakes

EQ location	Date	PGA expected	PGA observed
Kobe	17.01. 1995	0.40-0.48	0.7-0.8
Gujarat	26.01. 2011	0.16- 0.24	0.5-0.6
Boumerdes	25.05.2003	0.08-0.16	0.3-0.4
Bam	26.12.2003	0.16-0.24	0.7-0.8
E-Sichuan	12.05.2008	0.16-0.24	0.6-0.8
Haiti	12.01. 2010	0.08-0.16	0.3-0.6
Japan	11.03. 2011	0.32-0.40	1.0-2.9

It is evident that the observed PGA values are much larger than predicted by the Probabilistic SHA (Cornell, 1968; Field, E.), which means larger number of deaths and larger economic losses than expected.

The sources of some of these errors can be epistemic: for example, another methodology, namely, Deterministic Seismic Hazard Assessment (DSHA) and especially so called new DSHA (Panza et al, 2008) predicts PGA values, which are closer to observed ones. Another source of errors can be the wrong choice of distribution function:Gutenberg-Richter magnitude-frequency distribution of earthquakes is the basis of accepted SHA technique, but it is quite possible that seismic process follows statistics of extremes (Gumbel distribution), which leads to different predictions of strong events. The problem of correct prediction of extreme events is especially important for critical structures (dams, NPP-s, large bridges and pipelines) for which the statistics of events with long recurrence time should be used.

On the other hand quite often the reason of big discrepancies between predictions and observations is not the wrong methodology, but just using incorrect input data.

In the present paper mainly the second source of pitfalls in natural hazards and risk assessment will be analyzed.

2. Pitfalls in the global level disaster risk assessment: discord in hazards' shares in losses.

The problem of disaster risk assessment is quite complicated as it integrates many quantities, which are evaluated very approximately; often it is necessary to use expert estimations, based on short observation periods and insufficient data.

Some discrepancies arouse from differences in the disasters lists. As a rule, the main disasters are included in all lists, but their classification by separate organizations differs significantly. For example, according to UNISDR terminology on disaster risk reduction (UNISDR, 2009) there are two classes of natural hazards, geological and hydrometeorological. Geological hazards include earthquakes, volcanic activity and mass movements: landslides, rockslides, surface collapses and debris and mud flows. Tsunamis are difficult to classify: although they are triggered by undersea earthquake, they are essentially oceanic processes. Hydrometeorological hazards include tropical cyclones, thunderstorms, hailstorms, tornadoes, avalanches, floods including flash floods, droughts, heatwaves and cold spells. Hydrometeorological factors also influence such geologic processes as mass movements.

The insurance company MunichRe gives the following classification: Climatological events (Extreme temperature, drought, forest fire), Hydrological events (Flood, mass movement), Meteorological events (Storm), Geophysical events (Earthquake, tsunami, volcanic eruption).

C. van Westen (2009) suggests the following classes: Meteorological (Drought, Dust storm, Flood, Lightning, Windstorm, Thunderstorm, Hailstorm, Tornado, Cyclone, Hurricane, Heat wave, Cold wave), Geomorphological & Geological (Earthquake, Tsunami, Volcanic eruption, Landslide, Snow avalanche, Glacial lake outburst, Subsidence, Coal fires, Coastal erosion). This classification also singes out Ecological, Technological, Global environmental and Extraterrestrial hazards.

Naturally, all this leads to a big scatter in risk assessments. For example:

i. German Committee for Disaster Reduction presents the following distribution of economic damage from natural disasters worldwide 1980-2003 (total – 1,260 billion US$): 28% - floods, 32% - storms; 22% - earthquakes, 15% - heat waves, droughts, wildfires.

ii. UN report- Living with Risk: A global review of disaster reduction initiatives , (2002**,** Geneva) gives distribution of losses due to natural hazards occurred in XX century; according to this UN report 51% of losses come from EQ-s.

iii. According to disasters data for 1975-2006 from CRED-EM DAT: two thirds of losses are due to meteorological disasters (wind storms and floods) and around 30% of losses are caused by earthquakes.

iv. World Meteorological Organization (http://www.wmo.int) in one of brochures gives following economic loss assessments: Floods – 37 %, Windstorms – 28%, Droughts and famines – 9 %, Earthquakes – 8 %, Forest fires – 5 %, Avalanches and landslides – 6 %, Extreme temperatures – 5 %, Volcanic eruptions - 2 %.

v. MunichRe gives the following numbers for great natural catastrophes in 1950-2009: 7% -

Climatological events (Extreme temperature, drought, forest fire), 23% - Hydrological events (Flood, mass movement), 38 % - Meteorological events (Storm), 32% - Geophysical events (Earthquake, tsunami, volcanic eruption).

It is evident that different sources present quite different assessments of disaster consequences (economic losses and mortality) on the global scale. For example, the contribution of earthquakes in total losses according to different sources varies from 8% (WMO) to 51% (UN report- Living with risk, 2002, Geneva). The reasons of these discrepancies are plenty. If the assessments are done for a short time interval (of order of years) the more frequent disasters, such as storms, floods and other hydrometeorological events, which occur every year or even several times per year will dominate in economic losses/mortality calculations. On the other hand, if the rear event, such as strong earthquake, occurs in the chosen short interval, the analyzed area will appear as the utmost vulnerable one. For example, in World Bank publication "Central Asia and Caucasus Disaster Risk Management Initiative (CAC DRMI, 2009)" the vulnerability of Armenia appears extremely high, because just in the 20-years interval, chosen by authors for loss analysis, the disastrous Spitak earthquake (M=6.9) stroke. It caused 25 000 deaths and around 12 billion economic losses. At the same time it should be taken into account that such strong evens in Armenia occur once in thousand(s) years. The normalization of losses and mortality to the recurrence period seems to be a correct procedure, but for earthquakes the recurrence period is greatly irregular; even in regions with large recurrence period nobody will risk to abandon seismic code demands after a strong earthquake hoping that it will not occur for thousand years (by the way many seismologists were sure that after Spitak EQ the seismic potential of Caucasus is depleted for centuries, but the strongest Racha EQ (M=6.9-7) occur in less than three years after Spitak), which can be explained by additional impact of Spitak event to Coulomb stress distribution in the region .

Thus the problem of risk assessment for rare extreme events seems to be far from solution.

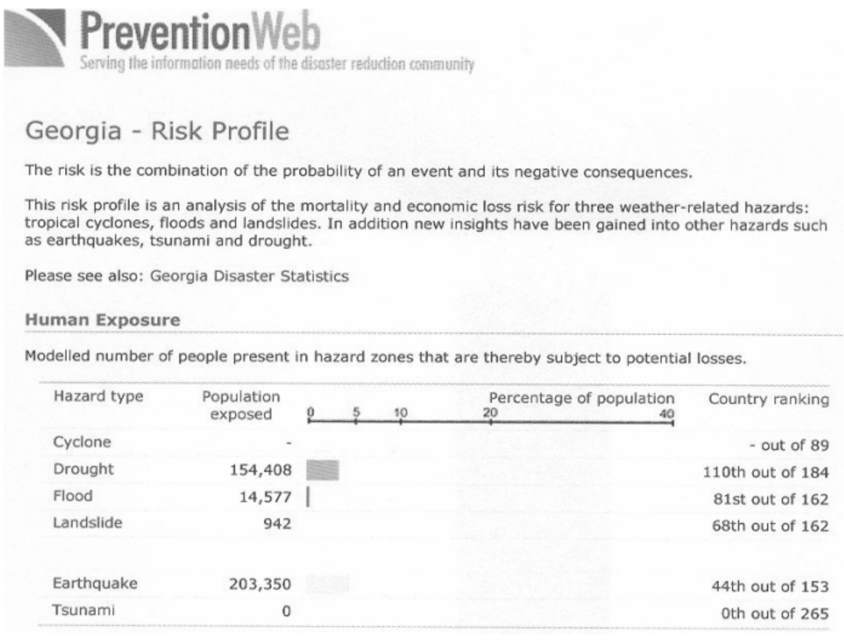
We conclude that the procedure of natural disaster risk classification, assessment and ranging should be standardized/adjusted taking into account the complexity of catastrophic processes. To us the classification suggested by MunichRe seems to be most rational: by introducing the term geophysical hazards the problem of tsunami classification, which is neither purely geological nor purely hydrometeorological is solved.

3. Pitfalls in global databases at the country level: PreventionWeb.net information

The sources of information used by global databases are quite often unreliable. For example, Fig. 1 presents risk profile of Georgia according to PreventionWeb (citation for August 2011).

Again, the information placed on the PreventionWeb is wrong: i. population exposed to landslides is much more numerous than 942 and according to (Javakhadze, Tsereteli, 2010) amounts to 200000; ii. population exposed to earthquakes is much more numerous than 203,350 – only the population of Tbilisi, which is in the zone of intensity 8 and really suffered from the Tbilisi EQ of 2002 exceeds 1.5 million.

The rating of the economic exposure is more or less close to truth, though the absolute values can be different: for example only the Racha 1991 earthquake invokes losses of the order of annual GDP (approximately 5 billion USD). This question will be analyzed in more detail later on.


PreventionWeb
Serving the information needs of the disaster reduction community

Georgia - Risk Profile

The risk is the combination of the probability of an event and its negative consequences.

This risk profile is an analysis of the mortality and economic loss risk for three weather-related hazards: tropical cyclones, floods and landslides. In addition new insights have been gained into other hazards such as earthquakes, tsunami and drought.

Please see also: Georgia Disaster Statistics

Human Exposure

Modelled number of people present in hazard zones that are thereby subject to potential losses.

Hazard type	Population exposed	Percentage of population (0 5 10 20 40)	Country ranking
Cyclone	-		- out of 89
Drought	154,408		110th out of 184
Flood	14,577		81st out of 162
Landslide	942		68th out of 162
Earthquake	203,350		44th out of 153
Tsunami	0		0th out of 265

Fig.1

4. Pitfalls in global databases at the country level: 2005 Natural Disaster Hotspot Map

In 2005 International Bank of Reconstruction, World Bank and Columbia University compiled the set of global disaster risk maps for several types of hazards called Natural Disaster Hotspot Map – Fig. 2 (http://www.ldeo.columbia.edu/chrr/research/hotspots/).

Fig 2. Natural Disaster Hotspot Map (www.ciesin.columbia.edu/documents/globalhotspots.pdf)

The World Bank and the team of distinguished scientists (Dilley et al, 2005), which were involved in compilation of this pioneer map have carried out very important job. Unfortunately, this work contains some errors, which somehow discredits obtained results. This remark is in particular related to the economic and mortality assessments in the region of South Caucasus (Chelidze, 2006). According to the Hotspot Map, the Southern Caucasus (SC) is prone only to hydro-meteorological hazards, whereas the Northern Caucasus (NC) in subject to both Geophysical and Hydro-disasters. Geophysical hazards include earthquakes (EQ), volcanoes and landslides. The landslide risk for the both parts of Caucasus is approximately the same and the seismic activity of Southern Caucasus is larger than in the North. The sources of Hotspot Map assessments were GSHAP maps for PGA (Giardini, D et al. 1999) and database of EQ of M>4.5 occurred in 1976-2002 from the Advanced National System EQ Catalog. It is easy to see that GSHAP map gives for the PGA in the North mainly in the range 0.2-0.3 g and for the South – in the range 0.2-0.4 g. Besides, the number of EQ of M>4.5 is three times larger in Southern compared to Northern Caucasus. The infrastructure exposure, population density and vulnerability in Southern Caucasus are larger or at least equal to that in the North, so the difference cannot be prescribed to these components of risk either.

The mortality assessment for Southern Caucasus by Hotspot map is entirely wrong: only the Spitak EQ of M=6.9 (1988) victims' number (25 000) exceed many times the human losses of all other kinds of disasters in the North Caucasus for centuries. The direct economic losses from Spitak and Racha (M=6.9, 1991, Georgia) earthquakes amount to 18 billion USD, which is much larger than losses from hydro-meteorological hazards in the country for many years.

Unfortunately, the error is not corrected up to now, despite many attempts of one of the authors. For example, at present the Hotspot map is placed on the home page of GRIP (http://www.gripweb.org) and is included in many other publications. The last publication, which reproduced the uncorrected Hotspot map is the monograph "Geophysical Hazards" (Beer, 2010), issued in 2010. In the map of mortality from EQ-s, published by UN in (2009 "Global Assessment Report on Disaster Risk") the error is partially corrected and Armenia is marked as relatively high risk area, but even in this report on the global map the disastrous Ashgabat EQ (Turkmenistan) with 100 000 victims is neglected as well as Shemakha EQ in Azerbaijan with 80 000 victims.

Thus we conclude that during compilation of the Hotspot map the local input data were not analyzed correctly and the map needs serious revision in Caucasus as well as in other regions. Evidently, the new projects related to seismic risk re-assessment (Global Earthquake Model - www.globalquakemodel.org, Earthquake Model of Middle East - www.emme-gem.org) will improve the situation.

In addition we can mention the information published by the WHO Collaborating Centre for Research on the Epidemiology of Disasters or CRED (www.emdat.be, www.cred.be), which quite correctly tells us that economic losses in Georgia and Armenia are caused mainly by EQ-s, though the number of floods and droughts exceeds number of EQ-sand which is in agreement with the data presented by C. Push (2004), according to which average annual economic loss in Georgia is mainly due to EQ-s (Fig.3).

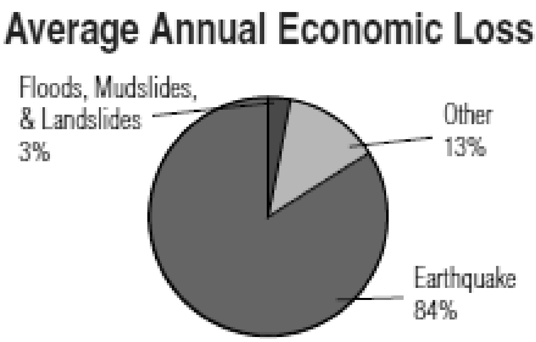


Fig.3. Average annual economic losses in Georgia: 84% of economic losses come from EQ-s (Push, 2004)

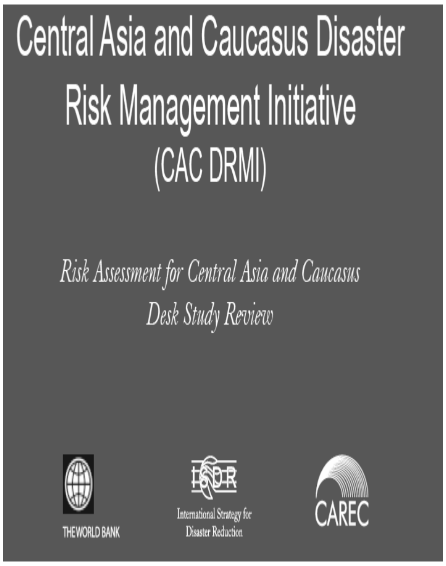
5. Pitfalls in Racha Earthquake's (M=6.9, 1991) loss evaluation and its role in national/regional economic assessments

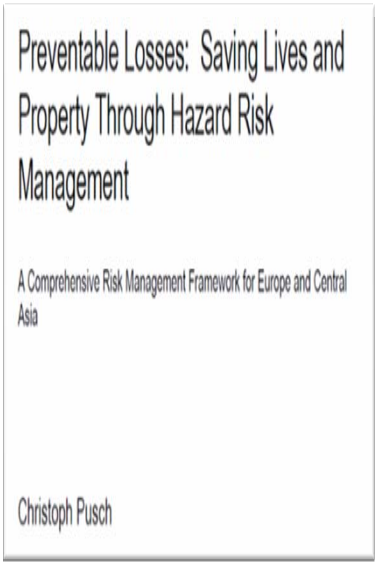
The unfortunate tradition of mistakes in Global Disaster Hotspot Map (2005) is continued in the recent publication: "Central Asia and Caucasus Disaster Risk Management Initiative (CAC DRMI)", published in 2009 by World Bank, ISDR and CAREC (Fig.4a): this publication contains an error, related to direct economic loss from the major Racha earthquake 1991 in Georgia. On the page 33 is written: "magnitude 7 earthquake in the Racha-Imereti region on 29 April 1991 killed 100 people, left 100,000 homeless and caused an economic loss of $10 million", which is borrowed from the UNDP information on Georgia (UNDP Georgia, Disaster Management, Risk Reduction, and Recovery, see website: http://www.undp.org/cpr/disred/documents/publications/corporatereport/europe/georgia.pdf and which is wrong in assessment of economic loss.

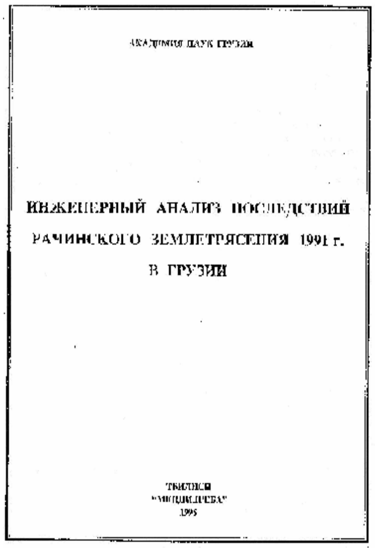
The original local data presented in "Engineering Analysis of Consequences of Racha Earthquake 1991 in Georgia" (Gabrichidze, Ed. 1996) issued in Tbilisi in 1996 (Fig.4c) tell us that the direct economic losses were evaluated as approximately 10 billion roubles (see pages 131-132 in Gabrichidze, 1996). 24 April 1991 the National Bank of Georgia established official course of 100 $ USA to Russian rubles was 59.55 and commercial course – 178.65. So the economic losses from the Racha EQ are around 5.5 billion USD by commercial course and 16 USD billion by official course. This was of the order of annual GDP of Georgia in these years.

Besides, another publication of the same World Bank (C. Push, Preventable losses: saving lives and property through hazard risk management, 2004) gives correct assessment of EQ losses in Georgia as 84% of total losses (Figs. 3, 4b). Evidently, here the Racha EQ losses were counted correctly.

Munich Re Group (Globe of Natural Hazards, 2009) gives a lower number for Racha EQ losses than fixed by Georgian engineering seismologists, namely 1700 million USD, which, of course is much more realistic than UNDP and CAC DRMI assessments.







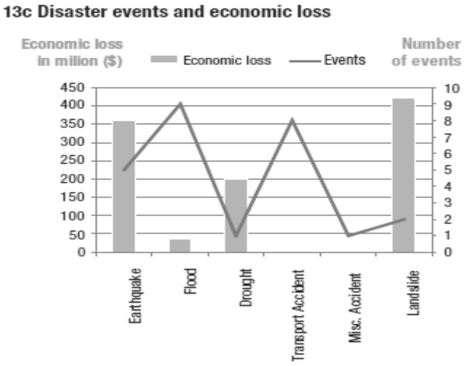
a. b. c.

Figure.4. a,b.c. The recent publications on disaster risks, containing assessments for Georgia; a. Central Asia and Caucasus Disaster Risk Management Initiative (CAC DRMI), 2009.; b. Push, 2004; c. Monograph “Engineering Analysis of Consequences of Racha Earthquake 1991 in Georgia“, Tbilisi, 1996, Publishing House “Metsniereba”

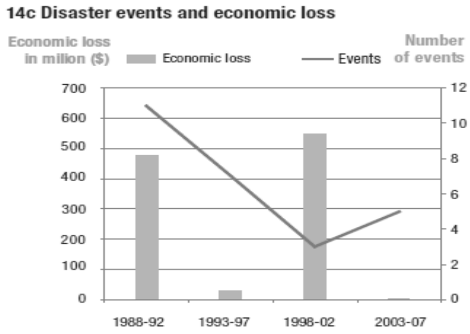
According to Fig. 5 from CAC DRMI the economic losses from EQ-s in Georgia amounts to 30% of total disasters losses, when C. Push (2004) gives 2.5 times larger number – 84 %. Fig. 13c from CAC DRMI (2009) tells us that the EQ losses are around 250 million; but this is the loss from Tbilisi 2002 EQ only! Racha EQ, which causes an order larger loss, is practically ignored.

Unfortunately, the Racha EQ occurs in the very complicated period of the country, when Georgia declared its independence from USSR so the statistics of total losses were not investigated in detail. Nevertheless, the data published in (Gabrichidze, 1996) are reliable, because this report is the result of serious investigations carried out in the epicentral area immediately after EQ by experienced local earthquake engineers. It is possible to re-calculate losses from the data on damage, presented in the report (Gabrichidze, 1996, p. 132): according to it, 46 000 residential houses were destroyed or very heavily damaged. Exactly, 41% of dwellings have damage of category I, 31% - of category II and 28% - of category III. The total area of damaged dwellings is 6.4 mln sq.meters. Thus, accordingly, total damaged area for I, II and III categories are 2 624 000, 1 984 000 and 1 792 000 m^2. The reconstruction of 1 sq.m of I, II and III category dwellings was estimated by State Statistic Committee of Georgia as 300, 700 and 1500 roubles accordingly in course of 1991. These data allow calculation of direct losses due to damage of residential buildings, which amounts to 4 863 000 000 roubles. Thus, only direct losses due to damage of dwellings amounts to 4 863 000 000 roubles. But, besides dwellings, 1000 public buildings, lifelines, railway and highways were also damaged, which roughly amount to additional 100% or more of direct losses. Thus, only direct losses from residential houses and infrastructure damage are of order of 10 billion roubles (or around 5.5 billion USD by commercial course and 16 billion by official course of the National Bank of Georgia for 24 April 1991) as it is correctly given in (Gabrichidze, 1996).

From above remarks it follows that the Fig. 5 a, b (Fig. 13c from CAC DRMI, 2009) should be corrected as is shown in Fig. 5 c, d: the difference is striking.



a



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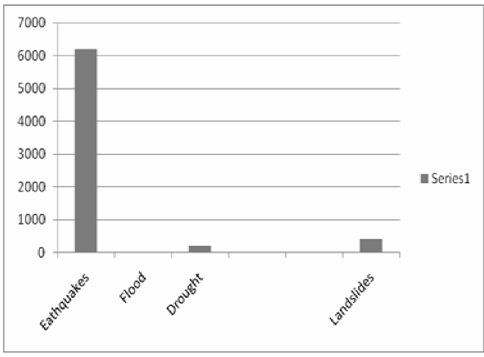
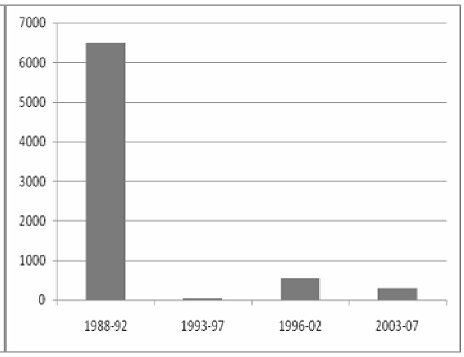




d

b

Fig. 5 a, b, c, d. Disaster events and economic losses in Georgia according to Central Asia and Caucasus Disaster Risk Management Initiative (CAC DRMI, 2009), for disaster classes (a) and time intervals (b), note that according to CAC DRMI in Georgia EQ-s invoke only 30% of losses (due to error related to Racha EQ); corrected diagrams of disaster events and economic losses for classes (c) and time intervals (b), taking into account of local engineering observation data after major Racha earthquake (Gabrichidze, 1996); note that corrected values of EQ losses account for 75-80% of economic losses, which coincides with data of Push (2004).

This gross error affects also all regional and national assessments of relative economic losses given by (CAC DRMI, 2009) – instead of 200 million USD losses from EQ-s there should be at least 5.5 billion USD (Fig 5 a, b, c, d).

The source of error in the CAC DMI seem to be the information placed on the web-page of UNDP, which was cited above, as no independent additional studies were done to estimate real losses from Racha EQ after investigation, presented in (Gabrichidze, 1996). It seems that the value of total damage of 10 million USD in the UNDP text cited above and which was automatically replicated by CAC DMI appeared as a result of inaccurate translation of the number (10 billion was translated as 10 million) or just mechanical erratum.

6. Recalculation of hazards and risks in Georgia/South Caucasus

The confusion in risk assessment of Georgia/South Caucasus calls for reassessment of hazards and risk in above region using local inventories on disasters and the methodology used by authors of Hotspot Map (2005). The task was quite complicated as the data were mainly on the paper and some documents were destroyed or lost. Besides, some data necessary for accurate risk calculation (say GDP of separate administrative units) just do not exist as the state does not request them. That is why the indirect data were used to assess economical losses.

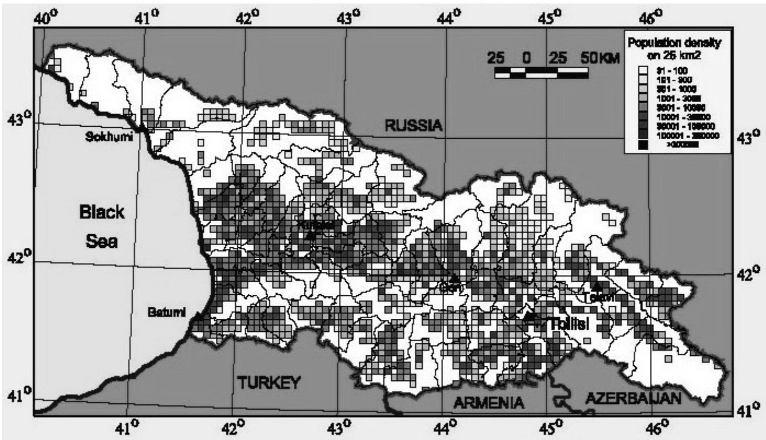
For assessment of economic risk the data of GDP (Gross Domestic Product) per unit area is needed. At the national level GDP measures the annual market value of final goods and services produced by a country. The national macro-economic parameters were calculated by the Ministry of Economical Development of Georgia in 2005. For unit areas (grid cells) of Georgia the GDP is not available: the data are only for subnational units and territorial entities. That is why for indirect GDP calculation in cells the poverty mapping data were used. The poverty headcounts *(PH)* in districts was estimated by UNDP in Georgia (Labbate et al, 2003). *PH* measures the share of the population for which consumption or income is less than the poverty line. As GDP for Georgia is applied to the territorial entities, we decided to take into account the *PH* for districts multiplied by the GDP of territorial entities by the parameter $(1 - PH_n)$, where '*n*' denotes the districts. This allowed the estimation of GDP for district centre units.

Population density map was compiled using the description of population in 2004.

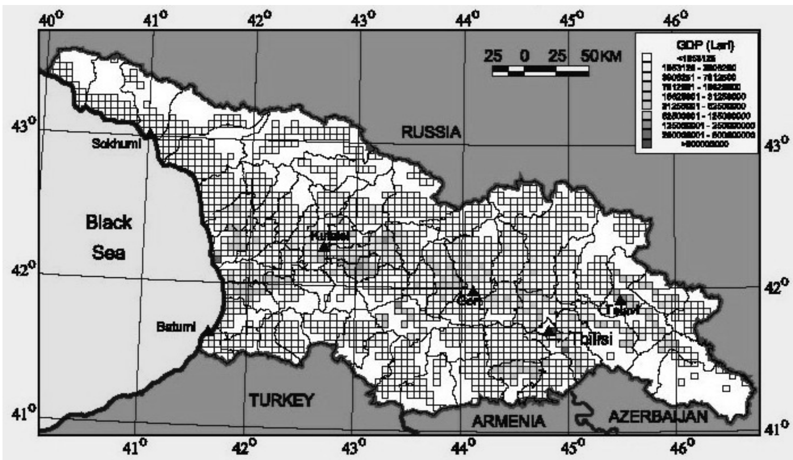
As a result, the following maps of GDP and population density were obtained (Fig. 6 a, b).

For each hazard the magnitude frequency relationship was estimated. So for each cell we have both the frequency and exposed area, admit economic loses the same for each hazardous event and consider the rate of economic loses the same for each even on the bases of GDP map and frequency the economic loss deciles were estimated for each hazard (Varazanashvili et al.2011, Varazanashvili et al., in press).

Economic losses were estimated for six natural hazards. They are: Earthquake (for 19 events, totally 147 events with intensity $I>6$ at MSK-64 scale); flash flood (for 43 events, totally 302 events); drought (for 42 events, totally 269 events), hail (for all events from 1973 to 2007, totally 217 events), hurricane (for 75 events, totally 1760 events); frost (for 41 events, totally 1388 events). Standard statistic analysis was used to calculate the main statistical parameters such as: multiple linear correlation coefficient *R*, level of significance α, standard errorε. The period of time for calculating losses was 1961-2007. Details of calculations are presented in (Varazanashvili et al.2011, Varazanashvili et al., in press).



a.



b.

Fig. 6 a, b. Maps of Population Density (a) and GDP (b) in Georgia.

8. Economic loss risk and multiple risk calculation for six natural hazards in Georgia

For economic loss risk (ELR) calculation the technique developed by the Columbia University group (Dilley et al. 2005) during compilation of the Map of Global Natural Disaster Risk Hotspots was used.

The ELR for these six hazards are expressed in USD. Average value of GDP by grid was calculated. The values of economic losses exceeding 70 percent of this average value were chosen for calculation of the summary multi-hazard risk (Fig.7). The economic loss risk was not estimated for some regions of Georgia such as Abkhazeti and South Ossetia.

It is evident from re-calculation that the most economic losses come from geological hazard, though the occurrence rate of meteorological and hydro hazard is much higher (Fig. 7). There is practically a single cell on the map, where the dominant losses come from hydro-meteorological hazards only and such hazards are always accompanied by geological hazards.

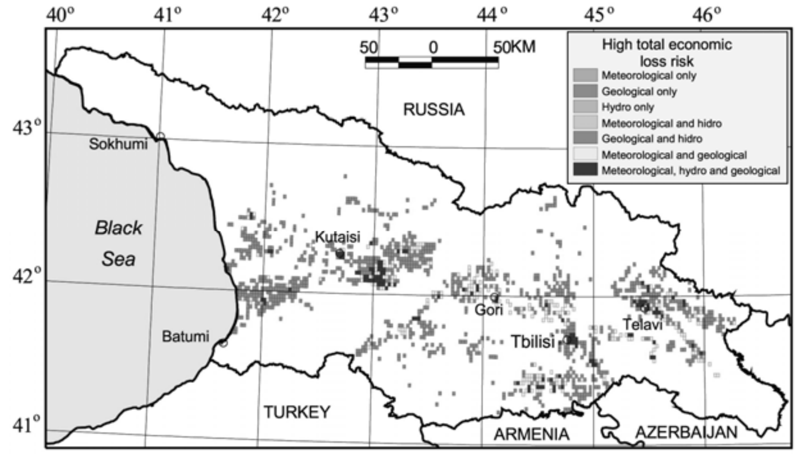


Fig.7. Economic loss risk for different natural hazards in Georgia. Note that in contrast with the Natural Disasters Hotspots map (Dilley et al, 2005), geological hazards are dominant in the country (Varazanashvili et al.2011).

This quantitative recalculation confirms the common sense assessments, given in section 4, namely that the statement of Natural Disasters Hotspots map (Dilley et al, 2005) that the Southern Caucasus (SC) and Georgia in particular is prone only to hydro-meteorological hazards is wrong and should be corrected in future (Varazanashvili et al.2011, Varazanashvili et al., in press). This conclusion is confirmed by the recently compiled “Atlas of Natural Hazards and Risks in Georgia” (2012).

9. Conclusions

- Different Global Hazard Maps give different assessments of hazards and risks for the same region. It is necessary to develop a standardized accounting of hazard events and losses for the nation.
- Information on economic losses and mortality global and regional hazard/risk maps is often misleading due to erroneous input information, used for compilation of such maps. One example of such discrepancies is Caucasus, where the World Hotspot Map predicts mainly hydrogeological risks, which is wrong. That means that information on local losses and mortality should be thoroughly checked by realizing close (direct) contact with local scientists, involved in hazard/risk estimation.
- A vivid example of significant errors in regional/national risk assessments is underestimation of losses caused by a strongest in Caucasus Racha earthquake (M 6.9-7) due to ignoring of local information, collected by local seismologists and earthquake engineers immediately after event and wrong information of UNDP on losses placed on internet, which become widespread in the world.
- Re-assessment of economic losses has been done for Georgia using well grounded local data. These recalculations show that the largest economic losses come from geological hazard, despite the fact that the frequency of meteorological and hydro hazards is much higher.

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Просчеты и реальность в глобальных и региональных оценках риска катастроф

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Резюме

В последние годы природные катастрофы привели к огромным экономическим потерям и сотням тысяч человеческих жертв. Поэтому правильная оценка риска природных катастроф очень важна для выявления «горячих точек», т.е. наиболее уязвимых областей для той или иной опасности. К сожалению, часто имеют место ошибочные выводы из-ва использования неполных или неправильных локальных данных о происшедших катастрофах. В настоящей статье автор попытался проанализировать некоторые просчеты в глобальных и региональных оценках риска катастроф в особенности относящихся к Южному Кавказу и Грузии. Опасности и риски для Грузии пересчитаны с использованием представительных локальных данных.

შეცდომები და სინამდვილე კატასტროფების რისკების გლობალურ და რეგიონულ შეფასებებში

თამაზ ჭელიძე

რეზიუმე

ბოლო წლებში ბუნებრივი კატასტოფების გამო მსოფლიოში უზარმაზარი ეკონომიკური ზარალი და ასიათასობით მსხვერპლი დაფიქსირდა. ამიტომ ძალზე მნიშვნელოვანია ბუნებრივი კატასტროფების რისკების სწორი შეფასება, რათა გამოვლინდეს „ცხელი წერტილები“, ანუ ამა თუ იმ საშიშროებისათვის ყველაზე მოწყვლადი უბნები. სამწუხაროდ, ხშირად ავტორები მცდარ შეფასებებს აკეთებენ, რაც აიხსნება მომხდარი კატასტროფების შესახებ არასრული ან არასწორი ლოკალური ინფორმაციის გამოყენებით. წინამდებარე სტატიაში ავტორი შეეცადა გაეანალიზებინა ზოგიერთი შეცდომა, რომელიც დაშვებულ იქნა კატასტროფების რისკების გლობალურ და რეგიონულ შეფასებებში, განსაკუთრებით სამხრეთ კავკასიასა და საქართველოში. საშიშროებები და რისკები საქართველოსთვის დათვლილია ხელახლა წარმომადგენლობითი ლოკალური მონაცემების გამოყენებით.