

# **The 3<sup>rd</sup> World Conference on Disaster Risk Reduction**

**(14-18 March, 2015, Sendai, Japan)**



**Working Session:  
«Lessons from Mega Disasters»**

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# Natural disasters



**NATURAL CATASTROPHES** - a loss of stability of the natural, naturally-anthropogenic or anthropogenic system, which happens as a result of change of its internal and/or external functional descriptions-parameters. The system, outliving a catastrophe, can not be fully restored to an initial state as the old system collapses and a new system forms.

## **NATURAL DISASTERS:**

Geological: earthquakes, tsunami, volcanism, mountain shocks etc.

Hydrometeorological: droughts, dust storms, hurricanes, typhoons, floods, fires etc.

Natural phenomena in mountains: rock falls, landslides, mudslides, snow avalanches etc.

## **Countries' indexes of vulnerability to natural disasters (ND) in relation to Japan**

Countries	Amount of ND per unit area	GNP* per unit area	Population density per unit area	Damages caused by ND, per GNP* unit	Number of victims of ND, per 1 million people	Losses per one ND	Damages per one ND
Western Europe	0,55	0,39	0,52	4,10	1,70	10,00	20,0
USA	0,27	0,07	0,08	8,00	7,70	350,0	420,0

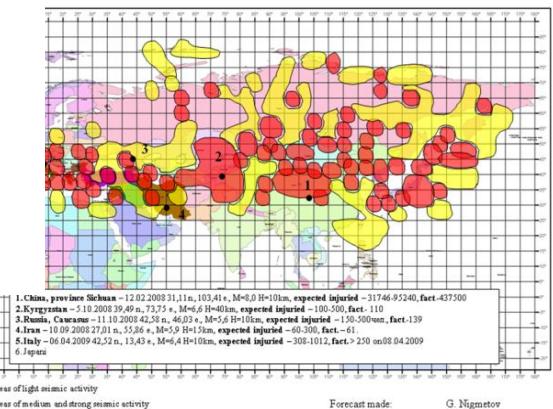
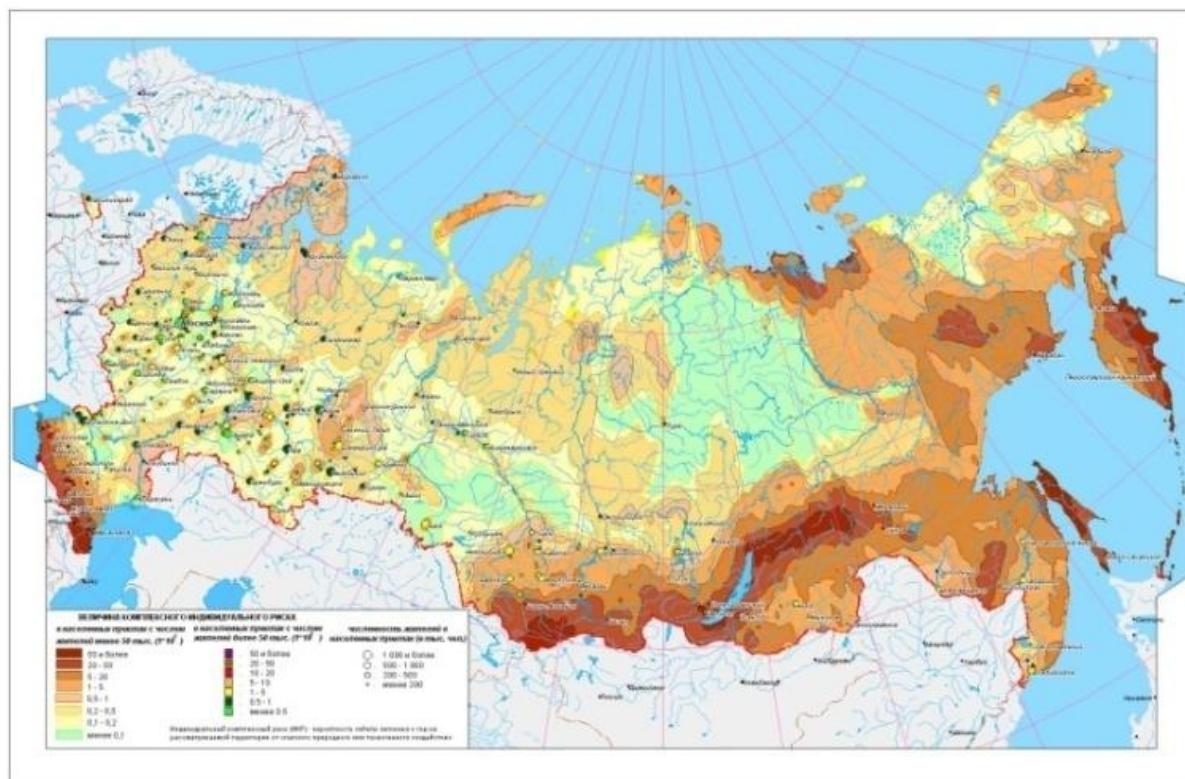
\*GNP – gross national product

# Mega-disasters of the 2005-2015



<b>No</b>	<b>Date and place of the disaster</b>	<b>Type of disaster</b>	<b>Number of victims</b>	<b>Number of injured people</b>
1.	December 26, 2004 Indonesia, Sumatra	Earthquake (magnitude 9 on the Richter scale)	230 thousand people	-
2.	May 12, 2008 China, Sichuan Province	Earthquake (magnitude 7,8 on the Richter scale)	70 thousand people	374 thousand people
3.	January 12, 2010 Haiti island	Earthquake (magnitude 7 on the Richter scale)	200 thousand people	300 thousand people
4.	February 27, 2010 Chili	Earthquake (magnitude 8,3 - 8,8 on the Richter scale); Tsunami (after the shocks there was a massive tsunami wave, its height reached up to 3 meters)	800 people	2 million people
5.	March 11, 2011 Japan islands	Earthquake (magnitude 9 on the Richter scale)	15 thousand 703 people	hundreds were injured
6.	March 11, 2011 Japan islands	Tsunami (wave height up to 33 m)	25 thousand people	-
7.	2009 Samoa archipelago	Tsunami (wave height up to 98 m)	189 people	-
8.	December 26, 2004 Indian Ocean	Tsunami, caused by underwater earthquake in the Indian ocean (wave height up to 98 m)	150 thousand people	230 thousand people

# Russian Federation map with designated levels of earthquakes and tsunami risks



# Estimation of the level of buildings' seismic stability by using mobile diagnostic complex "String"



Total station



Digital camera



GPS



Laser roulette



Ultrasonic «UK 1401»



Dynamic complex  
«STRING-3»



Seismic surveys station  
«Lakkolit - 24 M2» и «RZG-2»



Thickness  
gauge «A1209»



Ultrasonic tester  
«Pulsar-1.2»



Metal hardness  
tester «Uzit-3»

# Geographic information system of forecast of catastrophes' aftermaths - GIS "Extremum"

**МЧС РОССИЯ**  
ФЕДЕРАЛЬНЫЙ ГОНСО ЦДС

**Данные по землетрясению**

Исходные данные	
Регион	Java
Дата	26.05.2006
Время	22:53:57.1
Долгота	110.4
Широта	-7.96
Глубина, км	10
Магнитуда	6.2

Медицинская обстановка	
Население в 6-бал. зоне, чел.	1236313
Общие потери, чел.	1586-4501
Безвозвратные потери, чел.	463-1071
Санитарные потери, чел.	1123-3480
из них крайне тяжелые	134-847
тяжелые	154-876
легкие	835-1707

Инженерная обстановка	
Доля зданий, получивших повреждения	56.932
в том числе легкие (1 степень)	34.841
средние (2 степень)	16.102
тяжелые (3 степень)	5.23
разрушения (4 степень)	0.712
обвалы (5 степень)	0.047
Количество пожаров	12-1091567616
Количество аварий на КЭС, ед.	4-1113063424
Относительный материальный ущерб	0.599

Settlements in zone of the earthquake with intensity more than 6:

- Baki
- Bakungan
- Bangsalan
- Banjarejo
- Bantul
- Banyumeneneng
- Barobudur
- Bukit

**Закрыть**

**Прогнозирование последствий**

Европейские последствия	
Characteristics	Value
Region	Region population
Magnitude	0.6959
Depth, m	60000
Temperature	20 °C

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# Russian tsunami early warning system



## Схема информационного обмена в службе предупреждения о цунами



## Existing tsunami warning system consists of:

- 11 specialized broadband digital seismic stations, 6 of which are auxiliary, while 5 others have basic seismic micro-groups;
- 16 stations of registration of strong motions;
- 3 regional seismic information-processing centers;
- 25 automated coastal level posts;
- 3 territorial tsunami warning Centers;
- 2 bottom hydrophysical stations in the mid-ocean, high-speed channel of collection and dissemination of information, modern technologies and tsunami risks warning (*facilities*) mechanisms.



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## Working Session Risk Identification and Assessment «Lessons from Mega Disasters»

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14-March-2015-11:00-14:00-Hagi-Hall-прем. Сосурова—Это название у каждого спас

14-march-2015-11:00-14:00, Всесоюзный-зал-№1