WORLD BANK GROUP | GFDRR

EUROPE AND CENTRAL ASIA (ECA) RISK PROFILES

Serbia

GDP $36.4 billion*

Population 7.1 million*

	AFFECTED BY 100-YEAR FLOOD	AFFECTED BY 250-YEAR EARTHQUAKE	CAPITAL LOSS FROM 250-YEAR EARTHQUAKE
	$4 billion (12%)	$10 billion (29%)	$1 billion (3%)
	800,000 (11%)	2 million (23%)	500 (<1%)

*2015 estimates

Serbia's population and economy are exposed to earthquakes and floods, with floods posing the greater risk. The model results for present-day risk shown in this risk profile are based on population and gross domestic product (GDP) estimates for 2015. The estimated damage caused by historical events is inflated to 2015 US dollars.

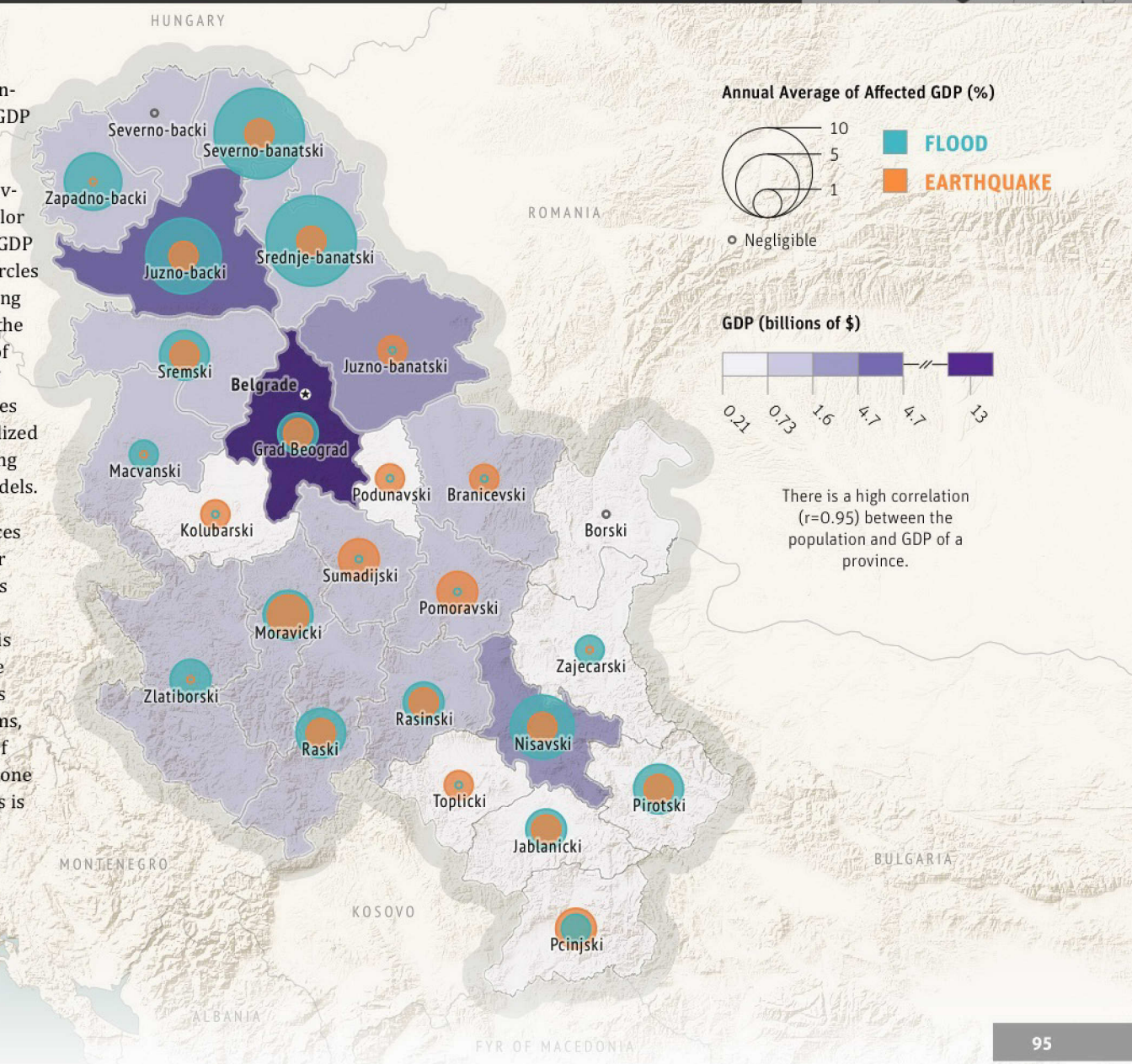
Just over 55 percent of Serbia's population lives in urban environments. The country's GDP was approximately US$36.4 billion in 2015, with about 60 percent derived from services, most of the rest generated by industry, and agriculture making a small contribution. Serbia's per capita GDP was $5,140.

This map displays GDP by province in Serbia, with greater color saturation indicating greater GDP within a province. The blue circles indicate the risk of experiencing floods and the orange circles the risk of earthquakes in terms of normalized annual average of affected GDP. The largest circles represent the greatest normalized risk. The risk is estimated using flood and earthquake risk models.

The table displays the provinces at greatest normalized risk for each peril. In relative terms, as shown in the table, the province at greatest risk of floods is Severno-banatski, and the one at greatest risk of earthquakes is Sumadijski. In absolute terms, the province at greatest risk of floods is Juzno-backi, and the one at greatest risk of earthquakes is Grad Beograd.

TOP AFFECTED PROVINCES

FLOOD ANNUAL AVERAGE OF AFFECTED GDP (%)		EARTHQUAKE ANNUAL AVERAGE OF AFFECTED GDP (%)	
Severno-banatski	14	Sumadijski	2
Srednje-banatski	11	Moravicki	2
Juzno-backi	7	Pcinjski	2
Nisavski	5	Pomoravski	2
Zapadno-backi	4	Kolubarski	1
Sremski	3	Pirotski	1
Raski	3	Rasinski	1
Pirotski	3	Jablanicki	1
Moravicki	3	Raski	1
Jablanicki	2	Podunavski	1



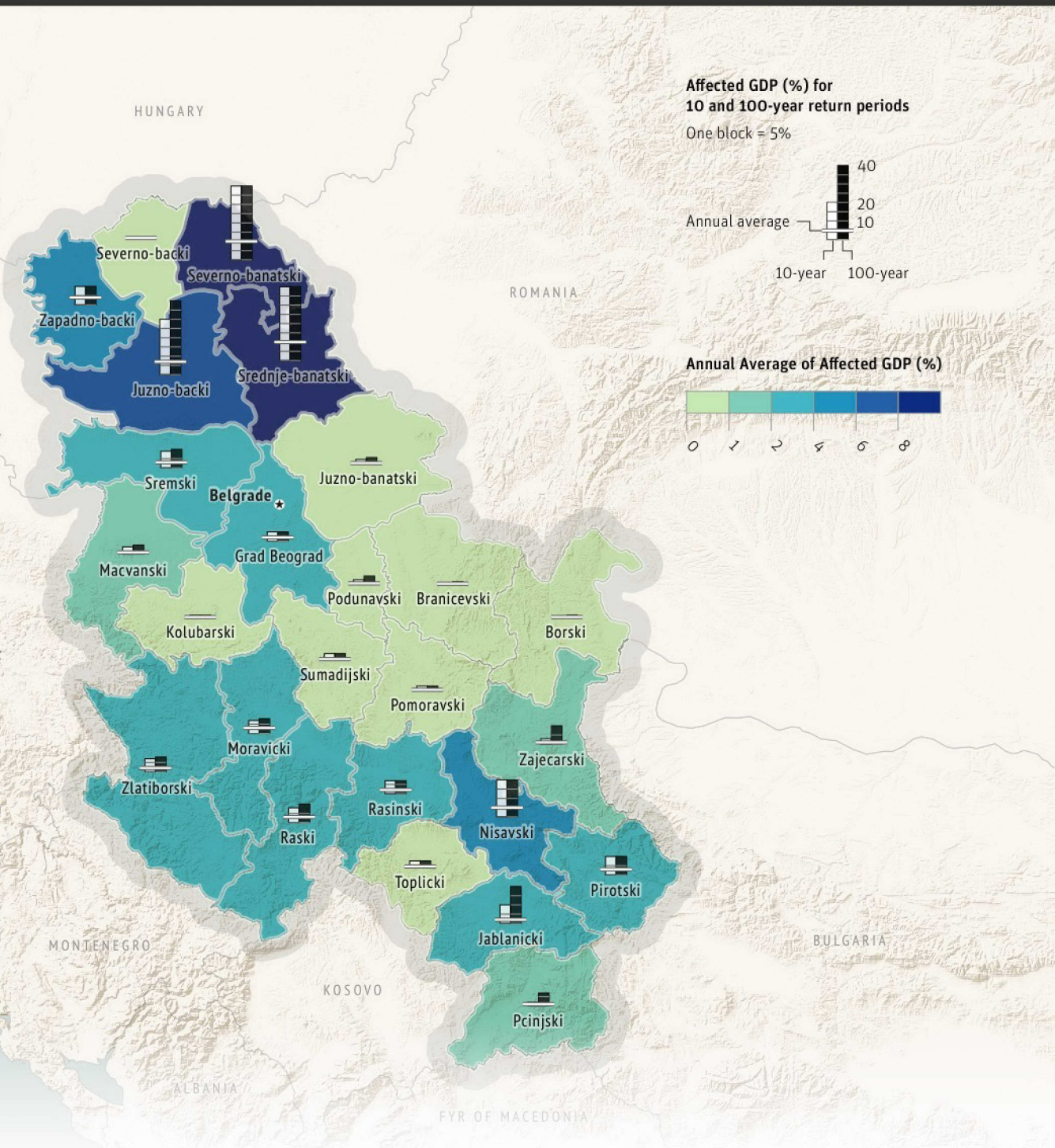
The most devastating flood in Serbia since it gained its independence in 2006 occurred in 2014. It affected over 1.6 million people in 38 municipalities in western and central Serbia, and it caused over 50 fatalities and more than $2 billion in damage. Other major floods took place in 1999, 2001, 2002, 2005, 2006, 2007, 2009, and 2010. All these events highlight Serbia's great vulnerability to floods, and their rapid succession produces a large cumulative effect on the country.

This map depicts the impact of flooding on provinces' GDPs, represented as percentages of their annual average GDPs affected, with greater color saturation indicating higher percentages. The bar graphs represent GDP affected by floods with return periods of 10 years (white) and 100 years (black). The horizontal line across the bars also shows the annual average of GDP affected by floods.

When a flood has a 10-year return period, it means the probability of occurrence of a flood of that magnitude or greater is 10 percent per year. A 100-year flood has a probability of occurrence of 1 percent per year. This means that over a long period of time, a flood of that magnitude will, on average, occur once every 100 years. It does not mean a 100-year flood will occur exactly once every 100 years. In fact, it is possible for a flood of any return period to occur more than once in the same year, or to appear in consecutive years, or not to happen at all over a long period of time.

If the 10- and 100-year bars are the same height, then the impact of a 10-year event is as large as that of a 100-year event, and the annual average of affected GDP is dominated by events that happen relatively frequently. If the impact of a 100-year event is much greater than that of a 10-year event, then less frequent events make a larger contribution to the annual average of affected GDP. Thus, even if a province's annual affected GDP seems small, less frequent and more intense events can still have large impacts.

The annual average population affected by flooding in Serbia is about 200,000 and the annual average affected GDP about $1 billion. Within the various provinces, the 10- and 100-year impacts do not differ much, so relatively frequent floods have large impacts on these averages.



Serbia's worst earthquake since 1900 took place in 1922 in Belgrade, with a magnitude of 6. Another major earthquake occurred in 1740 and damaged Novi Sad. If the same earthquake were to occur today, it would have an estimated death toll of close to 200 and cause about $3 billion in damage. More recently, a 2010 earthquake caused two fatalities and more than $100 million in damage.

This map depicts the impact of earthquakes on provinces' GDPs, represented as percentages of their annual average GDPs affected, with greater color saturation indicating higher percentages. The bar graphs represent GDP affected by earthquakes with return periods of 10 years (white) and 100 years (black). The horizontal line across the bars also shows the annual average of GDP affected by earthquakes.

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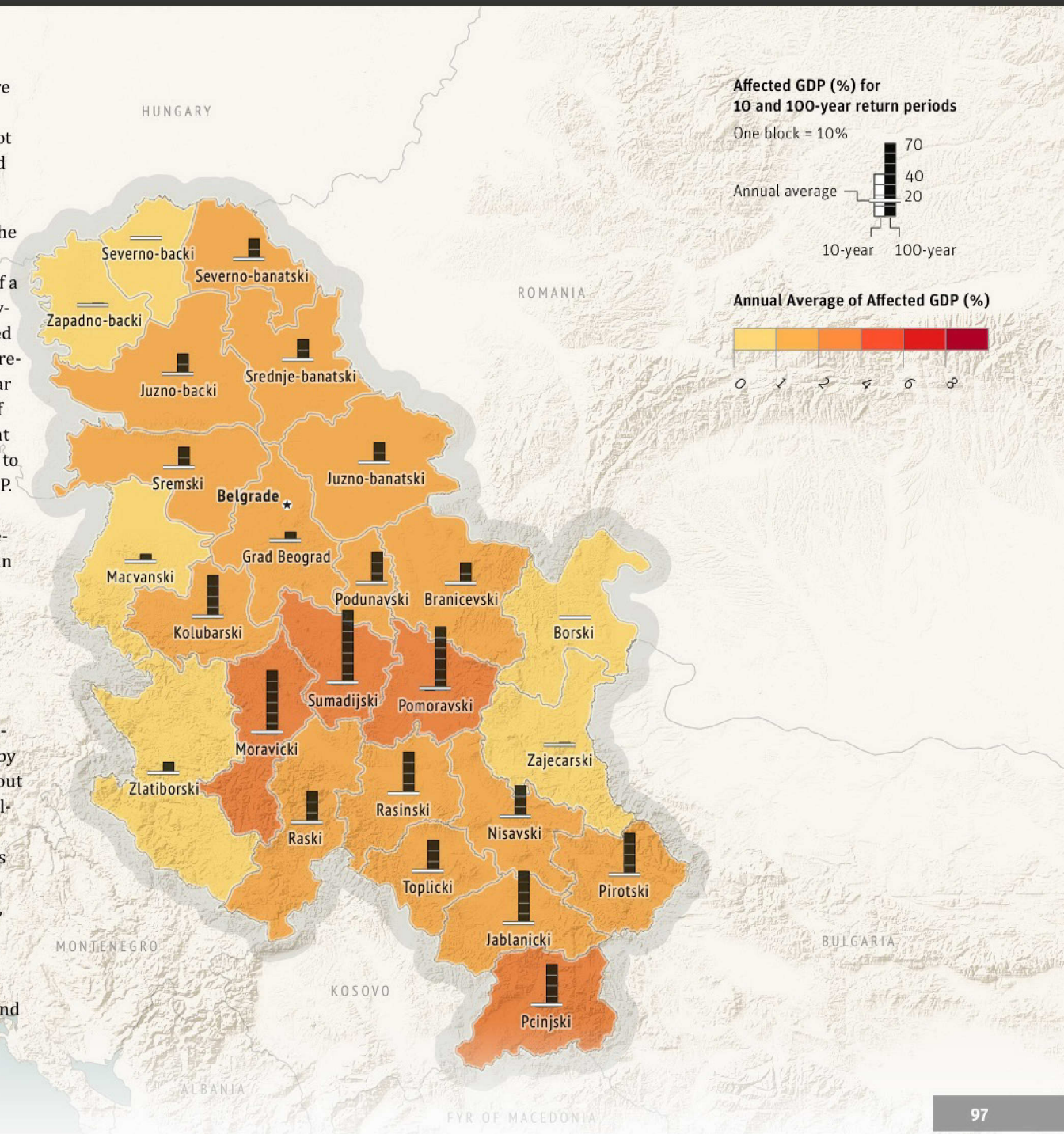
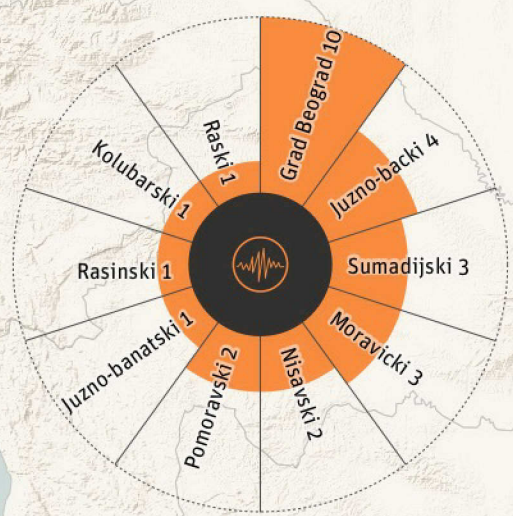
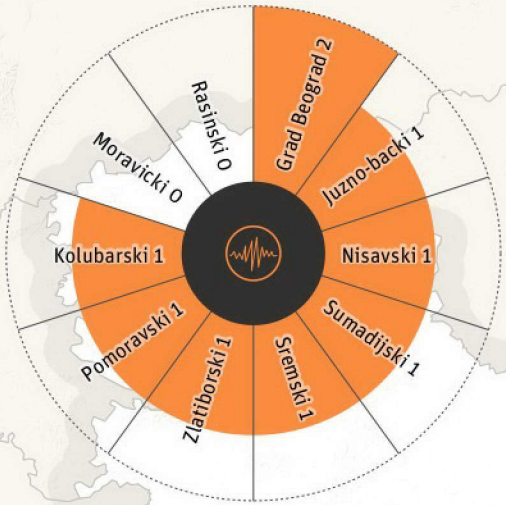
The annual average population affected by earthquakes in Serbia is about 60,000 and the annual average affected GDP about $300 million. The annual averages of fatalities and capital losses caused by earthquakes are about 10 and about $40 million, respectively. The fatalities and capital losses caused by more intense, less frequent events can be substantially larger than the annual averages. For example, an earthquake with a 0.4 percent annual probability of occurrence (a 250-year return period event) could cause about 500 fatalities and $1 billion in capital loss (about 3 percent of GDP).



EARTHQUAKE
ANNUAL AVERAGE CAPITAL LOSS (MILLIONS $)

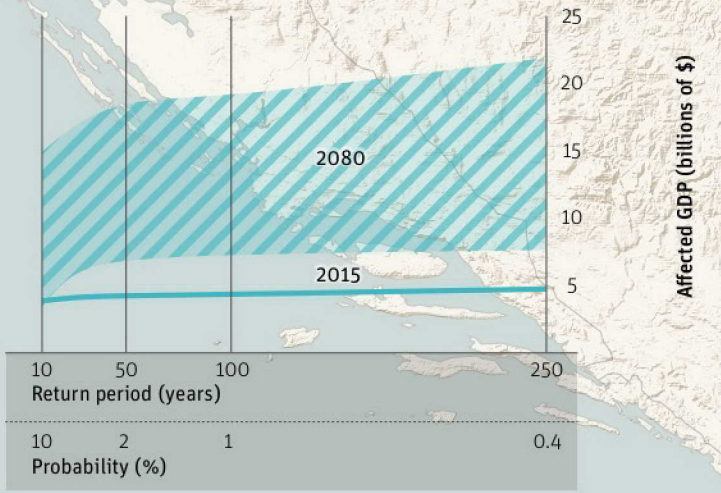


EARTHQUAKE
ANNUAL AVERAGE FATALITIES

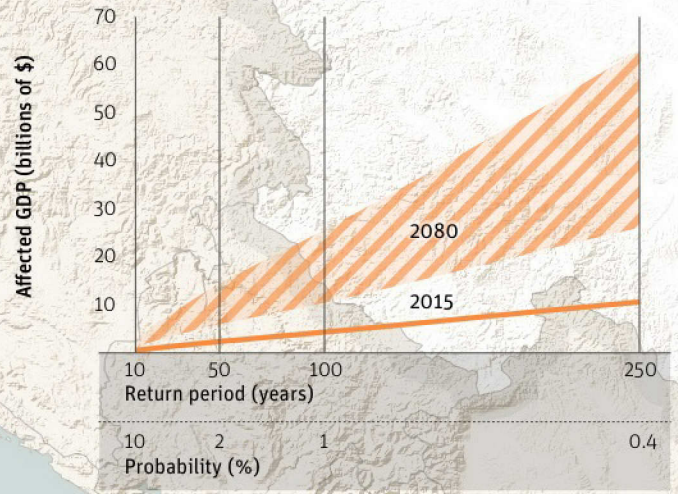


The rose diagrams show the provinces with the potential for greatest annual average capital losses and highest annual average numbers of fatalities, as determined using an earthquake risk model. The potential for greatest capital loss occurs in Grad Beograd, which is not surprising, given the economic importance of the province.

FLOOD
EXCEEDANCE PROBABILITY CURVE, 2015 AND 2080



EARTHQUAKE
EXCEEDANCE PROBABILITY CURVE, 2015 AND 2080



The exceedance probability curves display the GDP affected by, respectively, floods and earthquakes for varying probabilities of occurrence. Values for two different time periods are shown. A solid line depicts the affected GDP for 2015 conditions. A diagonally striped band depicts the range of affected GDP based on a selection of climate and socioeconomic scenarios for 2080. For example, if Serbia had experienced a 100-year return period flood event in 2015, the affected GDP would have been an estimated $4 billion. In 2080, however, the affected GDP from the same type of event would range from about $7 billion to about $20 billion. If Serbia had experienced a 250-year earthquake event in 2015, the estimated affected GDP would have been about $10 billion. In 2080, the affected GDP from the same type of event would range from about $25 billion to $60 billion, due to population growth, urbanization, and the increase in exposed assets.

All historical data on floods and earthquakes are from D. Guha-Sapir, R. Below, and Ph. Hoyois, EM-DAT: International Disaster Database (Université Catholique de Louvain, Brussels, Belgium), www.emdat.be; the National Geophysical Data Center/World Data Service (NGDC/WDS), Significant Earthquake Database (National Geophysical Data Center, NOAA), doi:10.7289/V5TD9V7K; and J. Daniell and A. Schaefer, "Eastern Europe and Central Asia Region Earthquake Risk Assessment Country and Province Profiling," final report to GFDRR, 2014. Damage estimates for all historical events have been inflated to 2015 US$.