



Flood risk on the Black sea coast of Russia

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The data of unique database "Floods in the coastal zones of Europeans part of Russia", developed by authors, are shown, that frequency of floods and damage in the coastal zones are growing. There is most dangerous situation on the Black sea coast of Russia. Here the main part of settlements, resorts and industry is situated in the river valleys and mouths. All main roads and pipelines cross the river channels. The Black sea rivers have flood regime with high intensity of flood formations and huge destructive flood power.

Despite prevalence of floods during the cold period of year the most part of high floods in 100 years of supervision was noted here in the summer-fall (65% in July-October). Usually they were induced by the showers connected with passing of powerful cyclones, atmospheric fronts, and water tornadoes. The insignificant part of floods was connected with snow melting, backwater phenomena, showers in the cities and dam breaks.

Thus shower induced floods here are the most widespread and destructive. Usually they arise within two-three watersheds simultaneously. Formation catastrophic heavy rain flood is possible on any site of a river valley of the Black Sea coast. The wave of a high water moves with very high speed, carrying a large number of deposits and garbage. To the mouth the flood can be transformed into debris flow. The water levels during a high water period rise on 3–6 m in the channels, and up to 11–12 m in the river canyons; the maximum depths of flow on the floodplains are 3 m and more. Flooding depths, induced by slope streams, can be to 0,5 m and higher. Flooding proceeds only some hours. After that water rather quickly flows down from a floodplains to the bed of the rivers and into the sea, leaving traces of destructions, a powerful layer of deposits (to 10–20 cm and more) and garbage. In the mouth river deposits quite often form the river mouth bar which is washed away during next storms.

The damage from river floods on the Black Sea coast is very high. It is proved by recent events in 1991, 2002, 2010 and 2012. Possibly, it will increase in the future, as well as number of high and destructive floods. This tendency is caused by strengthening of climatic and synoptic instability in the region and by the human activity in the watersheds and floodplains development (for example huge constructions for the Olympic Winter Games 2014 near Sochi). But this tendency statistically isn't significant yet.

Decrease of flood risks will be promoted by optimization of system of hydrometeorological monitoring; detailed studying of factors and characteristics of the floods, including flood dynamic modeling and hazard zonation; development of effective methods of the forecast and the prevention of floods; increasing in channel capacity; population resettlement from especially dangerous areas. The scientific basis for these measures is created by authors within large-scale researches on a grant of the Government of the Russian Federation No. 11.G34.31.0007.