



Climate changes and technological disasters in the Russian Federation

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Global warming and climate change are responsible for many ecological, economic and other significant influences on natural environment and human society. Increasing in number and severity of natural and technological disasters (TD) around the world is among of such influences. Great changes in geographical distribution of disasters are also expected. The study suggested examines this problem by the example of the Russian Federation. Using data base of TD and na-techs (natural-technological disasters) happened in the Russian Federation in 1992-2008 the most important types of disasters caused by various natural hazards were identified and classified for Russian federal regions. In concept of this study na-techs are considered as TD produced by natural factors. 88 percent of all na-techs occurring in the Russian Federation during the observation period were caused by natural processes related to various meteorological and hydrological phenomena. The majority of them were produced by windstorms and hurricanes (37%), snowfalls and snowstorms (27%), rainfalls (16%), hard frost and icy conditions of roads (12%). 11 types of na-techs caused by meteorological and hydrological hazards were found. These types are: (1) accidents at power and heat supply systems caused by windstorms, cyclones, and hurricanes, snowfalls and sleet, hard frost, rainfalls, hailstones, icing, avalanches, or thunderstorms (more than 50% of all na-techs registered in the data base); (2) accidents at water supply systems caused by hard frost, rainfalls, or subsidence of rock (3%); (3) sudden collapses of constructions caused by windstorms, snowfalls, rainfalls, hard frost, subsidence of rock, or floods (12%); (4) automobile accidents caused by snowfalls and snowstorms, icy conditions of roads, rainfalls, fogs, mist, or avalanches (10%); (5) water transport accidents caused by storms, cyclones, typhoons, or fogs (9%); (6) air crashes caused by windstorms, snowfalls, icing, or fogs; (7) railway accidents caused by snowfalls and snowstorms, rainfalls, landslides, or avalanches; (8) fires and explosions caused by lightning or heat; (9) pipeline ruptures caused by windstorms, subsidence of rock, or landslides; (10) agricultural accidents caused by frost, snowfalls, rainfalls, or storm; (11) accidents with toxic emissions caused by floods and landslides. The map of their distribution within the Russian Federation was created. Climate changes expected until the end of the XXI century will have important consequences for frequency increasing and change in spatial distribution of na-techs in the Russian Federation. The occurrence of na-techs caused by hydro- and meteorological hazards as well as by other natural hazards related to climate change will be more frequent to the end of this century. The area subjected to technological risk will be enlarged essentially.