

Toward complex risk assessment and management based on multisource data statistics of natural and technological disasters

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Abstract

Long-term regional statistics of disasters distributions with consideration of climatic parameters and variations of economic activity have been analyzed. Suitable techniques of observation data regularization for normalization of data reliability are proposed. The technique proposed based on utilization of modified kernel-based nonlinear principal component analysis. Problem-oriented analysis of regional climatic parameters trends has been done also. Correlation matrices for sub-regional distribution of several types of natural (climatological & meteorological, hydrological, geophysical and geological, epidemiological, epizootical, and additionally was analyzed the landscape fires separately) and technological (abrupt destroying of structures, buildings and communications, transport accidents including connected with threat of pollution, accidents on energy systems and structures, accidents on drainage and water-supply systems, anthropogenic derived environmental contamination, fires and explosions) disasters in connection with dynamics of climatic parameters for observation period have been constructed. Form of indexes for analysis of impact of climatic parameters change to disaster emergency is proposed.

As the result of analysis the stable correlations between analyzed distributions have been identified. Basing these correlations the assumptions about driving forces and triggers of most hazardous disasters types were formulated.

In view of obtained results the suitable form of copula for disaster risk analysis and mitigation has been proposed.