



Forecast/prediction of extreme events: fundamentals and prerequisites of verification

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Contemporary databases allow reformulating more precisely paradigms of predictability of geophysical catastrophes of different nature. Forecast/prediction of extreme events might be a difficult problem. By definition, an extreme event occurs rarely in a sequence of kindred phenomena that implies investigating a small sample of case-histories with a help of delicate statistical methods and data of different quality, collected in various conditions. Many of extreme events cluster and/or have self-similar distribution in space-time that contradicts with a typically accepted simplified model of random occurrence. Such situation complicates search for and definition of precursors, which could be used effectively in a forecast/prediction method. In the frames of objectivism's viewpoint on probability it is not possible to give quantitative and/or probabilistic claims of the efficiency of a method for forecast/prediction of extreme events without a long series of its successes and failures-to-predict that, in turn, is impossible without its long enough testing by forecast/prediction determined in real time. Statistics of the ratio of the number of failures to the total of successes and failures and the relative measure of the space-time volume of alarms, obtained during such testing, is necessary and sufficient for the assessment of reliability and potential of a method as of a forecast/prediction instrument, as well as it provides basic information for its improvement. Let us note that potential of usage is problem specific, i.e., it depends on a problem, and requires knowledge of a specific cost-and benefit function for the choice of an optimal strategy of forecast/prediction. These simple basics of verification are illustrated on models and by examples of the on-going forecast/prediction of

extreme events in real geophysical and other systems.