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Scientists vs. Vesuvius: limits of volcanology

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Recently, Italian newspapers reported the statements of Japanese and American volcanologists which declared the high hazard related to the future occurrence of catastrophic eruption at Vesuvius. Is this a reliable picture from scientific point of view? The evaluation of volcanic hazard is based on a general statistical law for which the chances of an eruptive event increase when energy decreases. This law is constructed on the basis of empirical data. Thus, the possibility that a plinian-like eruption occurs, for each volcano, is rare and further reduced for worst-case scenario. However, empirical data are not supported by a robust scientific theory, experimentally verifiable through an exact forecast of a long-term eruption, both in time limits and in energy. Today, the lack of paradigms able to predict in a deterministic way such a complex phenomena, limit the field of the scientists that cannot go further evaluations of a purely probabilistic nature. From this point of view volcanology cannot be considered an hard quantitative Science. The declaration according to which Vesuvius, sooner or later, will produce a catastrophic eruption, yet apparently obvious if we consider the very high degree of urbanization, is not supported by any experimentally verifiable theory. Therefore, the statement according to which Vesuvius next eruptive event will be catastrophic is false. In probabilistic terms, it is actually the least possible scenario.
Recognizing the cognitive limits in this research field means to encourage research itself towards the determination of more solid paradigms, in order to get more exact forecasts about such complex phenomena. The scientific compromise of defining risk scenarios, rather than deterministic evaluations about future eruptive events, precisely reflects the limits of research that have to be contemplated even by Civil Protection. Having considered these limits, every risk scenario, even the most conservative, will be ineffective in absence of an adequate political program about the reduction of the exposed value of the area and the systemic risk. In such a context, the Vesuvius area, the recent enlargement of the red zone could not represent an effective method of defence from natural disasters.