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How can we accommodate uncertainty of natural events?; natural science and disaster reduction

Norio Maki^{1*}

¹DPRI, Kyoto University

It needs long time for disaster reduction efforts against mega disaster such as Tokai, To-Nankai, and Nankai earthquake. National government tells probability of To-Nankai, Nankai earthquake within 30 years. It says that To-Nankai would hit Japan with 70% possibility and Nankai with 60%. Chart of cumulative probability is used to explain the probability to show the probability in each year. If the probability density function chart is used, we can distinguish the most probable year of the event. For effective disaster reduction management, we should make strategic disaster reduction plan which contains the strategic time line, goals, and operation procedure. From planning view points, the most probabilistic time of the event is preferable even though that information has problems from natural scientific perspective. This paper discusses about how uncertainty of scientific analysis were accommodated in disaster reduction planning from experiences for disaster reduction planning of Kochi city, which suffers from long term flooding for ground subsidence induced from plate movements.

Multi-lateral collaborative research among seismologists, engineers, planners, and practitioners were conducted for disaster reduction planning for Kochi city against Nankai-earthquake. Used techniques for each researcher were not advanced one, but compiling knowledge of various background researchers, unique results about damage and loss from Nankai earthquake were acquired. 2,500 people lives in long term flooding area, and flooding continues for at least one month, as a results 2,500 people would suffers from long term evacuation, and 10,000 interim housing are necessary. Based on those social impacts analysis, contents of post-events countermeasures were also clarified.

Scientific research is usually motivated by inquisitive of individual researchers. However, researches on natural disasters are asked to get useful results for disaster reduction. And natural scientists say eliminating uncertainty of natural phenomena or high accuracy of analysis would work for disaster reduction countermeasures, though requests from practitioners are not clarified. If the scientific research results would really be useful for disaster reduction, goal of disaster reduction research should be set by disaster reduction practitioner. However it would be different from natural scientific research motivation. Uncertainty of research results were accommodated through discussion among researchers in Kochi experience. Collaboration of researchers with advance research results in each field could work to managing uncertainty of research results in specific field. Not working in individual field but multi-lateral collaboration would work to get fruitful results for disaster reduction with securing research interests of each scientific field.

Keywords: Tokai, Tonankai, Nankai Earthquake, Kochi City, Ground Subsidence