

Interactive comment on “Developing a performance evaluation functional model for cities impacted by a natural hazard: application to a city affected by flooding” by G. Bambara et al.

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Received and published: 6 August 2014

The article proposed by G. Bambara, L. Peyras, H. Felix and D. Serre entitled “Developing a performance evaluation functional model for cities impacted by a natural hazard: application to a city affected by flooding” is of major interest. This article cleverly pair three methods of risk analysis: FMEA, ETM and directed graph dynamic causal model. The FMEA allows identifying failure modes of subsystems of city. ETM consists in determining chaining of events leading to failure modes that is not able to make with FMEA. The directed graph dynamic causal model allows highlighting chronology of events that cannot be done with the ETM. The developed model is operational as it

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is applied to a real case study: urban crisis caused by flash floods for the city of Nîmes. As regarding the whole model, how is insured the generic aspect of the model? How is reduce the number of failure scenarios which may be large? What is the building method and validation method for the functional analysis? Page 4207, line 13, it will be interesting to add a bibliographic reference for the sentence: “three levels of granularity should be differentiated for urban systems”. Concerning the paragraph 2.2.4, how are built the directed graph dynamic causal models? Are there generic models or based on feedback? As regards the paragraph 3.2.1, which is the reason of the intermediate granularity choice? Does the analysis for the two others granularity been made? As mentioned in the conclusion, the developed model (functional analysis, FMEA, ETM and directed graph dynamic causal model) is generic. Which are the adaptations to do in order to apply this model to others cities? As regards the feedback of authors for the application of the developed model: which is the maximal number of subsystem components to consider in order leading the proposed analysis? In the same way, which is the maximal number of function to consider in order leading the proposed analysis? Which is the relevant granularity study? Does this model allow representing the most damageable scenarios for a city that is not subjected to crisis caused by flash floods in the past?

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 4201, 2014.