

## ***Interactive comment on “A Bayesian decision approach to rainfall thresholds based flood warning” by M. L. V. Martina et al.***

**M. L. V. Martina et al.**

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The authors are grateful to the reviewer for his helpful comments on the initial manuscript and have attempted to revise it accordingly. Some of the sections were revised, additional information was added, the text was clarified where necessary and figures were changed as requested.

In response to the general comment The introduction was modified in order to address to the referee's comments. The aim of the paper is to explore the possibility of issuing flood warnings by directly comparing the forecast QPF to a critical rainfall threshold value incorporating all the important aspects of the problem (initial soil moisture conditions as well as expected costs), without the need to run the full chain of meteorological and hydrological/hydraulic real time forecasting models. Although it should not be considered as alternative to the comprehensive hydro-meteorological forecasting chain,

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due to the simplicity of the final product (a couple of graphs), this approach can be an immediate tool for non purely technical decision makers in the case of early warnings and flash floods. The rainfall threshold approach was recently applied beside the traditional flood forecasting systems also in USA and Europe.

In response to specific issues:

(i) Some text was added into section 1.2 to clarify the limitations of the approach regarding the uncertainty. In the conclusion it is now clear that the results obtained are far to be definitive, but only a first necessary step toward the aim of a comprehensive system.

(ii) Some text was added into section 2.4 in order to explain the meaning of the utility function in the context of our work: it is functional to the final objective of providing the decision makers with tools reflecting their risk perception

(iii) In section 5 we dealt with this issue. An explanation to the sudden drop of the skill of the approach is now given; The main reason appears to be the time distribution of rainfall within the forecasting horizon, which is not taken into account by the approach.

(iv) No action.

In response to the specific comments:

1. The referee proposed 'A model-based Bayesian decision-making approach to flood warning based on rainfall thresholds'. We do not think the proposed title is more informative of the previous one and contains a repetition (model-based , based). We prefer to keep the previous one.

2. Figure 3 has been corrected.

3. Some text has been added in sections 2 and 2.1 to better explain the procedure and to clarify that there is a different pdf for each duration and each AMC category.

4. The caption for figure 6 was modified.

5. Section 2.1 has been slightly modified in order to clarify that the forecasting horizon must be decided before the analysis.

6. Title of section 4 was changed into “A framework for testing the procedure.”

7. In the conclusions the word “deterministic quantity” has been change into “known quantity”

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Interactive comment on Hydrology and Earth System Sciences Discussions, 2, 2663, 2005.

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