

## ***Interactive comment on “User-oriented hydrological indices for early warning system. Validation using post-event surveys: flood case studies on the Central Apennines District” by Annalina Lombardi et al.***

### **Anonymous Referee #1**

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#### General comments

This paper presents an application of two new indexes for flood prediction in central Italy. Indexes are linked to two different flooding sources: a pluvial index and a fluvial flood index. The case study is the November 2013 event that hit Central Apennines in Italy. I found the topic of paper very interesting to HESS readers but some adjustments are needed before publication. The main concern is about hydrological model calibration. Authors mention necessity of calibrating some parameters but it is not clear if the CHyM model has been calibrated before its application.

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#### Specific comments

L50-52: “In the EU Directive 2007/60/CE concerning the “Assessment and management of flood risks”, the realization of a flood risk map is foreseen over river basins with a significant potential risk of flooding (European Parliament, 2007). Prediction of flood events is therefore important to enhance mitigation strategies to face hydrological events.” It is not clear the connection between flood risk map and prediction of flood events. They are two distinct concepts not connected necessarily. Flood risk maps are assessed offline based on scenario events (for given return periods). Flood prediction is used in real time to forecast in advance the arrival of flood. This is not the only possible measure. There are structural measures to consider as well.

L106 Spatial resolution of hydrological model is 90m. Table 4 presents further spatial resolution different according to case study. Please clarify. How model parameters are scaled, if any, when spatial resolution changes?

L146-148. This sentence states that Mn value should be calibrated but the final resulting value is not explained.

L217-220 Is an initial value of water in the two reservoirs considered? This is linked to model spin-up. Are there any parameters to calibrate for infiltration computation?

L 243 Authors stress on the necessity for long time series of flow discharge data and present the proposed approach as a means to overcome that problem. But the presented system is based on the CHyM hydrological model that, in turn, needs calibration, I suppose. Please clarify the real advantages of the proposed approach as regards model calibration.

L242-266. Consider moving this part to Introduction section.

L285-290 It is not clear how corrivation time is computed for CAI computation. It seems the sum of time to pass through different river reaches. It sit the time for passing the longest flow path? How velocity of single river reach is computed? It should change

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with roughness and slope.

L295-300 Authors present three rainfall intensity as warning thresholds and say they are defined with empirical tests. The readers interested in applying this procedure to other sites should know how to define rainfall threshold value. Are they universal for all basins in the world? The same consideration applies for BDD index. At line 404 authors state that “the calibration of the indices thresholds was chosen in order to maximize the hit rate.”, please clarify.

L311 why ordinary index present two values?

L527 Is a spin-up time of 120 hours enough for model initialization? See comment about infiltration model.

L565 Can overestimation be explained by a lack of flood damage information in that area?

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