Natural Hazards
and Earth System
Sciences

Discussions

Interactive comment on "Towards an Automatic Early Warning System of Flood Hazards based on Precipitation Forecast: The case of the Miño River (NW Spain)" *by* José González-Cao et al.

Anonymous Referee #1

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General comments

The authors present an Early Warning System (EWS) for Flood Hazards and its application to a watershed in Spain. This is an interesting topic within the scope of NHESS. EWS have been identified as an efficient approach for increasing resilience against flood damage reductions.

The paper is well structured and clearly written. The methodology is in general well described although some aspects (mentioned in the Specific comments) need some clarification.

As mentioned by the authors in the introduction, EWS have been implemented in re-

cent years at different scales and using different approaches. The authors should mention the differential aspects of the proposed Early Warning System (EWS) with respect to other systems that have been proposed, some of which are mentioned in the introduction (lines 45-75).

More details about the model implementation at the Miño basin should be given in lines 169-176. Some details that might be of interest to the reader are: infiltration model and parameters, formulation and parameters used to compute rainfall-runoff transformation, formulation and parameters used for runoff propagation in the stream network, number and size of subbasins, estimated characteristic times of the watershed and subbasins(as lag time or concentration time), is it baseflow considered? With which formulation?

Specific comments

HEC-HMS is a semi-distributed hydrological model, not a distributed model as stated in line 166. With the implementation of the authors (the whole watershed of 2200 km2 is divided in only 3 sub-basins) it should even be considered as an aggregated model.

How is the hydraulic inundation model initialised at the beginning of the flood hydrograph (with which discharge and/or water depths)?

In section 4.1. the authors discuss the accuracy of the precipitation forecasts. This is very interesting since it is one of the main reasons that might explain the performance of the whole system. The authors evaluate the accuracy for a rainfall aggregation time of 24 hours. I guess they have chosen this aggregation time taking into consideration the concentration time of the watershed. However, it would be interesting to show the accuracy of the precipitation forecasts for smaller aggregation times, as for instance 12 h, 6 h, 1 h, since those times are more relevant for smaller basins.

How does the calibrated Lag Time in Table 3 relate to empirical formulas based on the basin size and slopes?

Figure 7 shows a comparison between the water depth measured and computed at certain locations that are shown in Figure 6. Were those field values measured (and how)? Or are they values estimated by visual observation and/or photographs of the inundation? At what time during the flood were they measured/observed? Are they maximum values or values at a specific time? Those questions should be clarified in the paper.

In Figure 7 the authors present a range of variation of the numerical values, but this ranges are computed rather arbitrarily (3 times the standard deviation of the water depths from 12 am to 4 pm). Why has this criterion been chosen and how does it relate to model output uncertainty? If this is not discussed, the range bars shown in Figure 7 are meaningless for model evaluation since they can be as large or small as one wants by just changing the criterion.

How is the error in Table 5 defined and which is the probability of the real depth being inside the intervals given?