

## ***Interactive comment on “Flash flood modeling with the MARINE hydrological distributed model” by V. Estupina-Borrell et al.***

**Anonymous Referee #2**

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The paper can be of interest for the public, but it cannot be published in its present state because of its very poor language. The paper addresses a relevant scientific problem of forecasting flash floods in river basins. The authors mostly use well-known concepts and methods (with some modifications) to develop a computer model for predicting such floods. The model has an advantage of allowing different types of initial data to be used for calculations. A test of the model for a real flood event showed the flood hydrograph forecasted by the model to be in good agreement with field data. The methods used by the authors are mostly valid. The questions that arise in this respect are as follows. The authors generalize the isochrone method to account for the possible nonuniform rain distribution. Formulas (12) and (13) represent the outlet flood hydro-

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graph  $Q(t_2)$  as the sum of contributions of the zones between successive isochrones. These contributions are calculated as the area of the zone multiplied by the net precipitation in this zone at time  $(t_2 - t_1)$ , where  $t_1$  is the wave travel time from this zone to the outlet. There is a contradiction here, because the travel time clearly depends on the water depth and it cannot be evaluated independently for different isochrones with the precipitation assumed to vary in space and time. One more question relates to formula (8), which contains unexplained denotations and undistinguishable vector and scalar variables, and thus requires some efforts to understand. However, if  $m_i$  is water mass within pixel  $i$ ,  $v_j$  is the flow velocity on the boundary between pixels  $i$  and  $j$ ,  $n_j$  is the unit normal to the boundary between them, and the product of these vectors is understood to be the scalar product, the ratio  $m_j/dx$  is the average cross section area of the water body within pixel  $j$  in the direction normal to  $n_j$  and is introduced into the formula to evaluate the flow rate through the boundary. However, it is not clear why only  $m_j$  is used here. The boundary cross section area can be estimated more accurately by using, say,  $(m_i + m_j)/2$ . As was mentioned above, the paper is difficult to read because of its very poor language. The number of grammatical flaws is too large to try to correct all of them here. I will mention only some most typical cases (figures in parentheses are page number - line number). (6-20) Inondation Extrem; (6-23 and farther) "analyze" is often used instead of "analysis"; (6-29) the meaning of the sentence with the word "traduce" is not clear; this word is used in several places in the text; (7-18) "the first one module"; (8-3) "at less"; (18-16) "is validate"; (page 19) almost every sentence needs correction.

Taking into consideration the above facts, it appears reasonable to ask the authors to review their paper and correct it more thoroughly, especially in terms of its language.

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