

## ***Interactive comment on “A model of mudflow propagation downstream from the Grohovo landslide near the city of Rijeka (Croatia)” by E. Žic et al.***

**Anonymous Referee #1**

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The paper presents an interesting mudflow case study in Croatia, near the City of Rijeka.

The mathematical (numerical) tool used is the SPH depth integrated numerical model, lately more and more frequently used for such purposes.

The SPH model is well presented, though one would expect to have more in-depth review of the past applications of this model for mudflows with extensive discussion what this specific case study brings to the potential users of the SPH model. There is no comparison with other numerical models (e.g. Flo-2D), for example.

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The historical 1908 event is not described into detail, and for new simulations some laboratory data were used for model parameters (Table 1).

No clear distinction is made in the paper between the results of the 1908 event and potential events from the Grohovo Landslide.

More specific comments are the following ones:

1. In Abstract, the main conclusions about the application of the SPH model for the case fo a mudflow from the Grohovo Landslide should be presented. The first part of the Abstract is rather an introduction that should be part of the main text body and should therefore as a part of Abstract be shortened.
2. In Section 4 you talk about the Croatian-Japanese project – be more specific about the monitoring system instead of quoting the project (this may go to the Acknowledgments).
3. The SPH model was validated for the 1908 event? What reconstruction of this event were available nowadays, please specify: delineation of the event, run-out zone, depths, velocity, density? How good is the validation fitting of the SPH model to the 1908 event? On Page 13, line 13, you say that the values of the parameters that were found to best fit the reconstructed event from 1908 are this and that (turbulence coefficient value of 200-500 m/s<sup>2</sup> and friction angle of approx. 27 degrees).
4. On Page 12, line 22 you say that long-term rainfall events and the consequent ground water level rises have been the primary triggering factors for landslide occurrences in the Rječina River Valley in the past. Are there have been any observations for these event so that you may draw such conclusions? You have not presented any evidence and/or field data for selected past (mudflow) events to support these conclusions.
5. You have used different grid sizes (2x2, 5x5, and 10x10 m). Your discussion is not supported by literature on the influence of numerical grid size on the numerical results

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for mudflows or debris flows. You should add more in-depth discussion with regard to the grid size.

The technical corrections are as follows:

Page 1, line 19 – please, add years of these past mudflow events downstream of the Grohovo Landslide.

Page 6, line 3 – why you use the expression The natural groundwater flow rate and then speak of cm/s, you should use the expression velocity instead and specify if apparent velocity is given or you had measured hydraulic conductivity in the field?

Page 6, line 9 – the wording egresses means?

Page 11, lines 27 & 28 – you are talking about the propagation mudflow generated in the past, please, be more specific whether you talk the 1908 case or some others as well – not very detailed data are given about these historic cases.

Page 13, line 30 & 32. . . . – omit non-significant digits; the results are much too precise (e.g. the overall run-out distance is 1743.41 m, but the grid is 10 x 10 m).

Figs 7 & 9 – what is shown by colours? Mudflow depths? Height soil?

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