

## ***Interactive comment on “A meteo-hydrological modelling system for the reconstruction of river runoff: the case of the Ofanto river catchment” by Giorgia Verri et al.***

### **Anonymous Referee #3**

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#### General comments

The paper deal with a hydro-meteorological modelling system in order to simulate the river runoff in the Ofanto basin in the Puglia region, Southern Italy during two episodes: one between January and March 2011 and the second between November and December 2013. I found the paper interesting to be publish in the NHESS journal. The use of WRF-Hydro is wide spreading in the scientific community and I appreciate also the effort to describe in the appendix A and B mathematical formulas of algorithm and processes. However, a major review has to be done; in particular, the authors have to better clarify some parts that are not clear and are missing in the text (see below).

C1

#### Specific comments

The paper is readable and understandable, but I suggest to take care about punctuation marks and changing of the paragraph, since some sentences are not linked between each other, see for instance P2 L25-28, P5, L1-3, P7 L 18-21. Furthermore, some parts in the text are not clear, for instance: P4, L25: Have you ever carried out a calibration and validation with this hydro-meteorological chain in previous years? Or, as it seems, you calibrate and validate only and during these two events? P8, L23-24: Why did you not maintain equal the lead time of forecast? As also reported in table 2, where it is written that for the event 1 the simulation starts 2 days before the main peak and for the event 2 on the same day? How do you conclude that “the WRF needs to be re-initialized approximately 1.5 days earlier”? Is there anything that, for the sake of brevity, it is not reported in the text? P9, L17-24: Here, you compare the results of your experiments with values of other researches carried out in different areas, basins, etc. I did not understand this comparison: have you tried the 3D-Var assimilation on the Ofanto river basin? P10, L24: In which period did you carry out the calibration? I would clarify better these parts in the text. Take care that there are lots of parameters and variable you introduced in your analysis: maybe it is better to focus on a few of them? Finally, a general check to the figures and tables is strictly recommended.

#### Technical Corrections

P1, L11: Add a comma after “however” and please the same in rest of the text P1, L20: remove “in” P2, L1: Please, choose to write Apulia or Puglia in the whole text P2, L4: replace “with” with “between” P2, L7: I suggest: “...validation procedures, but they need...” P2, L9: In addition, ... P2, 10: ...catchments, but... P2, L13: The term embed is it appropriate? I suggest “take into account” P2, L16: I suggest to replace “end result” with “final result” P2, L19: ...and, thus, ... P2, L22: Finally, ... P3, L9: Remove “thus” P3, L14: I suggest: ...river runoff, and the evaluation... P3, L15: I suggest: predictions P3, L16-19: I would not begin a new paragraph P3, L22: I suggest: The Ofanto river basin P3, L22: What do you want to mean with “relocatable”

C2

P3, L25: dry season, but may. . . P3, L27: Please, add a space between numbers and units. Check it in the rest part of the paper. P3, L28: I would write 720 mm without year, since you wrote it is an annual mean rainfall P3, L32: I suggest: “. . .a small village, located at 715 m above the sea level.” P4, L6: I suggest “four” in letters and not in number and in rest of the paper as well. P4, L8: In particular, the Calitri gauge. . . P4, L8: Replace “and” with “which” P5, L2: I would not begin a new paragraph P5, L12: after “thus”, “overall”, “in addition”, “however”, please add a comma in the text P5, L31: replace “in” with “on” P6, L18: I suggest: “. . .precipitation is crucial for the reconstruction. . .” P8, L10: I suggest “these” instead of “both” P8, L16: initialization time in small letters P9, L9: please add here a reference after Yucel and Senatore P9, L17: The acronym for the WRF-ASS, it is not introduced P10, L17. I suggest: “. . .0 and 1.0, where values equal to 1.0 mean that. . .” P12; 32: I suggest: The study also highlighted. . . P13, L15: Please change with “hydro-meteorological variables” P15, L6: I suggest: “. . .coefficients: the first. . . P16, L22: Please, add a space after “section”. P16, L28: area not ar,ea P16, L29: remove “is” P24, Figure: the font of letters is too small. Please, increase it. The legend of the top panel goes from 0 to 4000 m a.s.l., but it seems that the highest altitude is much less: please review it. Then, is t worth to show the right panel? I cannot appreciate colours in the figure. P25, Figure 3: The hydro-meteorological modelling chain. P26, Figure 5: The coloured spots are the all available rain gauges previously shown in figure 2? Can you add the basin contour line? P27, Figure 6: I would use “dam” as unit of the geopotential height instead of “m/10” and °C instead of Cdeg. The same for Fig. 7. P28, Figure 8: replace “or” with “and” P29, Figure 9: Validation of the Ofanto discharge. . . P30, Figure 10: I would repeat in this figure as well the problem of missing data. The legend font is too small, also in figure 12 and 13.

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