Referee 1

The authors proposed a method to estimate the flood depth using SAR images and DEM data. The results were compared with the aerial photos, filed-based measurement and the results of hydrodynamic modeling. The manuscript was well written. However, the verification is a little weak.

Line 58-59 There are many researches about mapping flood in urban areas, e. g. Nico et al., 2000, Chini et al., 2012. Please add more the state-of-the-art in this part.
We would add the following references to flood mapping works: Horritt 2001; Matgen et al., 2007; Brisco et al., 2011; Henry et al., 2006; Cossu et al., 2009; Martinis et al., 2015; Chini et al., 2012; Dasgupta et al., 2018; Giordan et al., 2018; Nico et al., 2000; Pierdicca et al., 2018

Page 3 Many algorisms of detecting flood depth haven mentioned in the introduction. However, the advantage of the proposed method comparing to the previous algorisms was not clarified
Intense
We would add in the second to last paragraph of the introduction section the following sentence explaining the advantages of the proposed method: *In contrast to many existing methods proposed in the literature, the presented method requires only two inputs (i.e., the flood extent map and a DEM), it is based on a simple yet precise algorithm, it does not require intense manual interaction and strong computing capacity.*

Section 2.1 In the previous study (Cian et al., 2018), two indices (NDFI and NDVFI) were proposed. Why the NDFI was adopted in this study.
We decided to use only the NDFI index, which allows to extract open water bodies, and not the NDVFI, which allows to detect flooded areas in short vegetation, because the latter is still not validated. As described in the cited paper, using the NDFVI we were able to extract flood in short vegetation, however we could not find any reliable source of information to properly validate the result. We believe in its correctness, but we preferred to leave the NDFVI out of this study as long as its quality is not quantitatively assessed.

Section 2.2 The estimation of water surface elevation was carried out in polygon based. What is the minimum size of the valid polygon? Is it time-consuming when the polygon number is large?
At the end of section 2.1 we specify three steps of post-processing employed in the flood mapping methods. Among these, the second says '*exclusion of clusters smaller than 10 pixels*', which basically determines the minimum size of the polygons. Accordingly, being Sentinel-1 pixel size 10x10 m, this equals to exclude polygons with size smaller than $10*100m^2 = 1000\ m^2$.
Of course, the higher the number of polygons, the higher the time needed for the statistical analysis. However, even when we applied the method to areas with more than 100.000 polygons, the task was performed in few hours (at most 3) using a standard desktop computer. If requested, we could add this information in the conclusion section.

Line 256-260 The flooded dates of the three study areas were confused by the description. Please indicate the period of flood in each area.
We thank the Reviewer for this comment; indeed, we realized that the description could in fact lead to confusion. To make it more clear, we would rephrase the beginning of Section 3.1 as: "*Heavy rain concurrent with other adverse effects from October 31 to November 2, 2010, in the Veneto Region (North-East Italy), led to the flooding of 140 km2 of land with major damages on properties and infrastructures.*" The heavy rain started on October 31 and continued to November 2. This led to a flooding on November 1 in Vicenza and later to the other areas as explained in the description. Therefore, the start of the flooding occurred at different dates depending on the specific area. Eventually, we can also specify the starting date of the flood event for each of the investigated areas in Figure 3.

Additionally, to further clarify the its dynamic we would also improve the flood description as it follows:

"The first levee rupture in the study region occurred south of Vicenza in the afternoon of November 1. Afterwards, the flood propagated South-East to Veggiano, where the banks of the Bacchiglione River were broken in the night between November 1 and 2. During November 2 the Bacchiglione banks broke also in the area of Bovolenta, while the area of Saletto started to be flooded due to the rupture of the Frassine River banks on the same day (see Figure 3). Based on the analysis of SAR imagery (Cian et al., 2018), in the area of Vicenza and Veggiano the peak of the flood event was estimated between November 2 (north-west of frame A in Figure 3) and November 3 (placeholder "A1" in Figure 3). Instead, in the Bovolenta (frame B in Figure 3) and Saletto (frame C in Figure 3) areas it occurred on November 4 .

Figure 4 shows the measurements of hydrometers along the Bacchiglione River (hydrometers 1 to 5) and along the Frassine River (hydrometers 6 and 7) (ARPAV, 2010). We can notice how the flood wave moved from Vicenza (hydrometer 1) to Bovolenta (hydrometer 5), in accordance with the analysis of SAR data, which estimated the maximum extent after the highest measurement of the hydrometers. Concerning the Frassine Rriver (hydrometers 6 and 7), we observe a similar behavior."

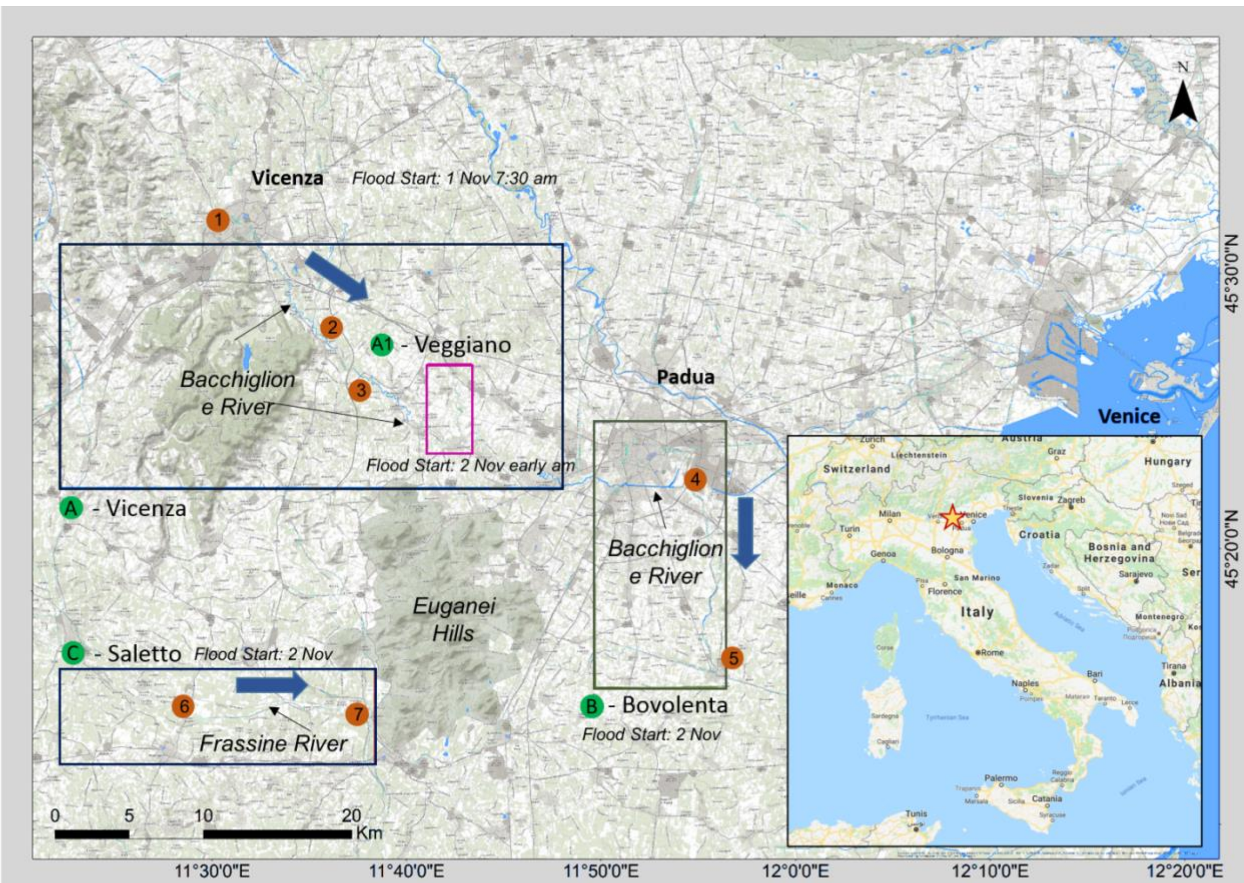


Figure 3 Overview of the area affected by the 2010 flood event occurred in the Veneto region (Italy). The main areas of interests are highlighted by the three frames: A) Vicenza, B) Bovolenta and C) Saletto. Placeholder A1 refers to the Veggiano area covered by the hydrodynamic modeling used for comparison purposes. The numbers in orange circles indicate the location of the hydrometers, whose measurements are reported in Figure 4. For each frame the flood start date is reported along with the direction of the flood wave (blue arrows).

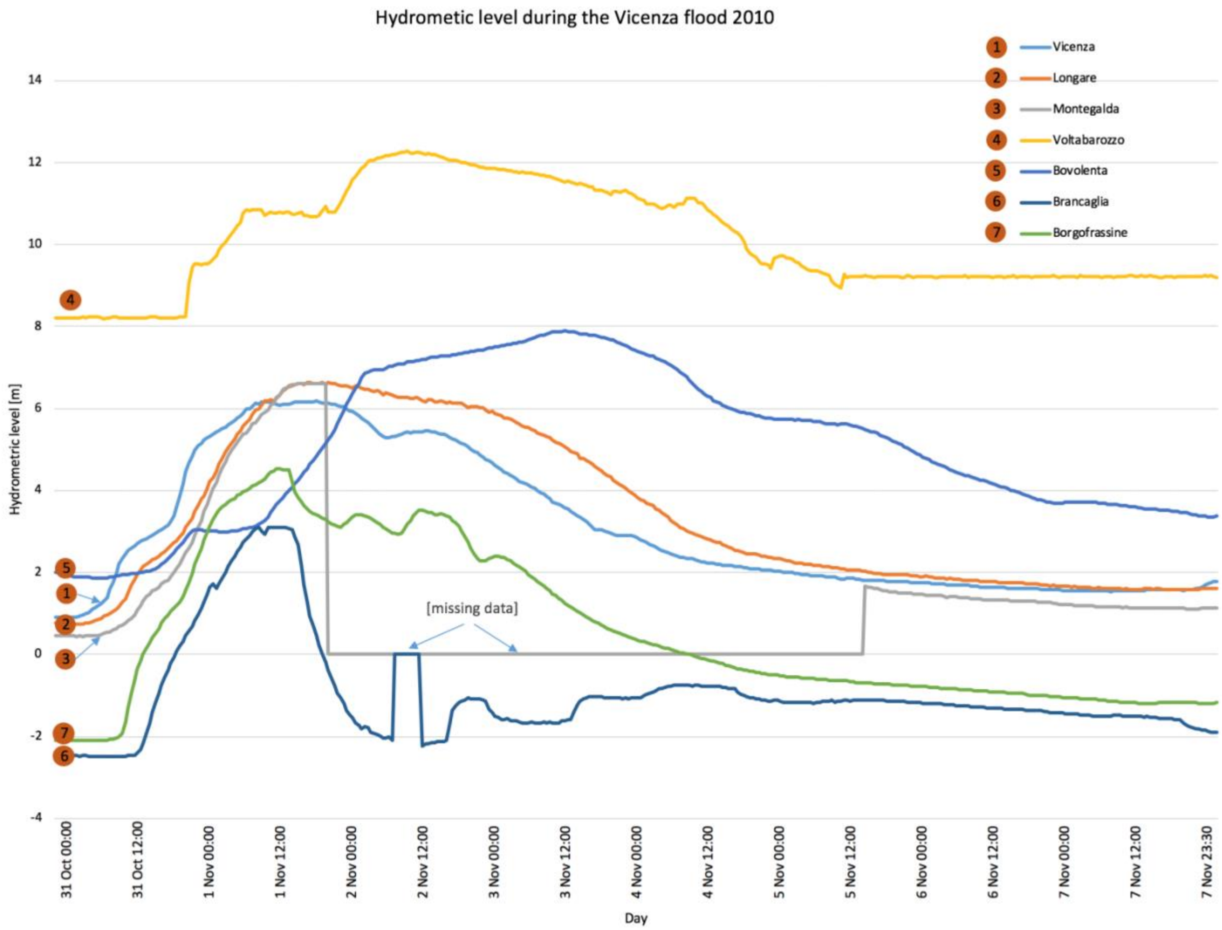


Figure 4 Measurements of hydrometers during the period of the investigated flood event. The flow of the Bacchiglione River (hydrometers 1 to 5) goes towards South-East, i.e. from hydrometer 1 to 5. The flow of the Frassine River (hydrometers 6 and 7) goes towards East, i.e. from hydrometer 6 to 7. In both cases, the measurements show the dynamic of the flood, which followed the stream of the river.

Table 1 Five flooded SAR images were shown in this table. The image on Nov. 1 was counted as flood, however, there is no result shows the flood condition on Nov. 1th.

Yes, we have no results because as indicated in the description, in the study area covered by SAR data the first levee breach occurred in the afternoon of November 1. The SAR image collected on the very same day was actually acquired in the early morning (i.e., 6 a.m. local time) and did not capture the flood. However, to perform a change detection with high reliability, we considered the image as flooded since the high soil moisture at the time of the acquisition could cause critical inaccuracies and because some small areas may have already been flooded (indeed upstream in Vicenza the event started around 7:30 a.m.).

Figure 8 “Wan see by : : :” Do you mean “We can see by: : :”?

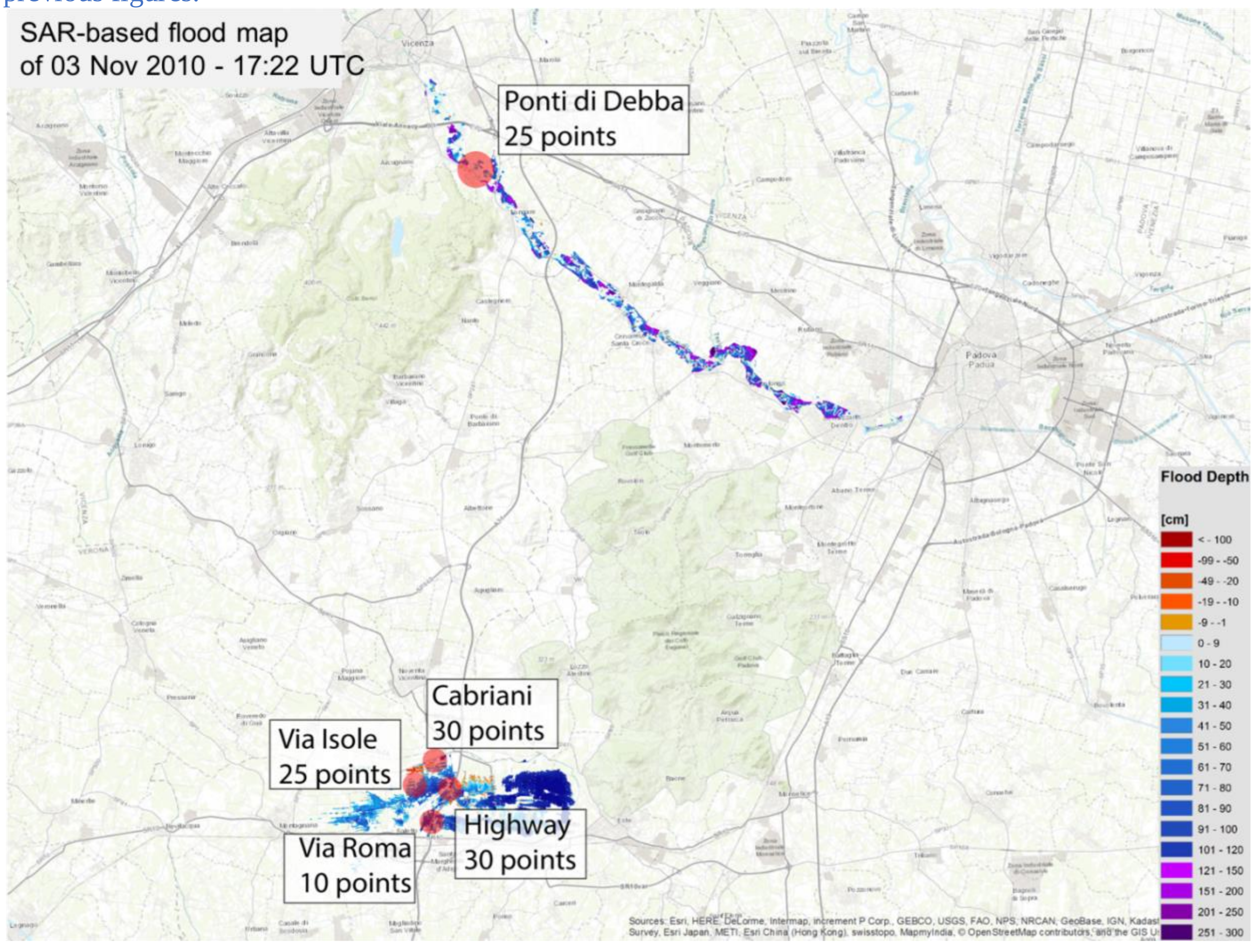
Yes, there was a typo. Thanks for noticing it.

Line 437-440 Why the flood depth decreased in Vicenza and increased in Saletto? Without the description of the whole flood condition, it is difficult to understand these differences.

See the reply to point 5, where we indicated how we would modify the description of the flood dynamic.

Figure 11 Please add more description about this figure. When of the water depth shown in this figure? The color legend should be added.

We would change the image description as: "*Distribution of the validation points selected for flood depth assessment: a total of 120 validation points collected in the Vicenza and Saletto areas (i.e., 25 and 95, respectively) have been selected based on recognizable features in the aerial / fieldwork photos available for November 1 and 2. The reported SAR-based flood depth map used for the assessment refers to November 3*." In the figure we would also add the date and the same color bar employed in all the previous figures.



Section 5.2 As mentioned in the manuscript, the hydrodynamic model needs more information than the proposed method, and its results were overestimated. It is difficult to verify the proposed method by comparing with the results from the hydrodynamic from Table 2 and 3. I suggest to add the quantities comparisons of area and depth in Section 5.1 using the aerial photos and the data of measure points, and remove this section.

We agree with the comment from the Reviewer. Indeed, it is difficult to verify our method by comparing with the result of the hydrodynamic model but we believe that it is very import to show the differences between the two approaches. Accordingly, we would prefer to leave the section as it is. The model is simulating the flood in the exact same moment of the SAR acquisition. We know that the SAR-based flood maps have uncertainties, but we think that it is useful to show a comparison with the results of model (as an example of current real-world practice), which are also affected by uncertainty (in this case evident).

Line 481 I think "Table 2 and" and "Table 3 confirm: : :" are the same paragraph.

Yes, this was an error create in the conversion to pdf.