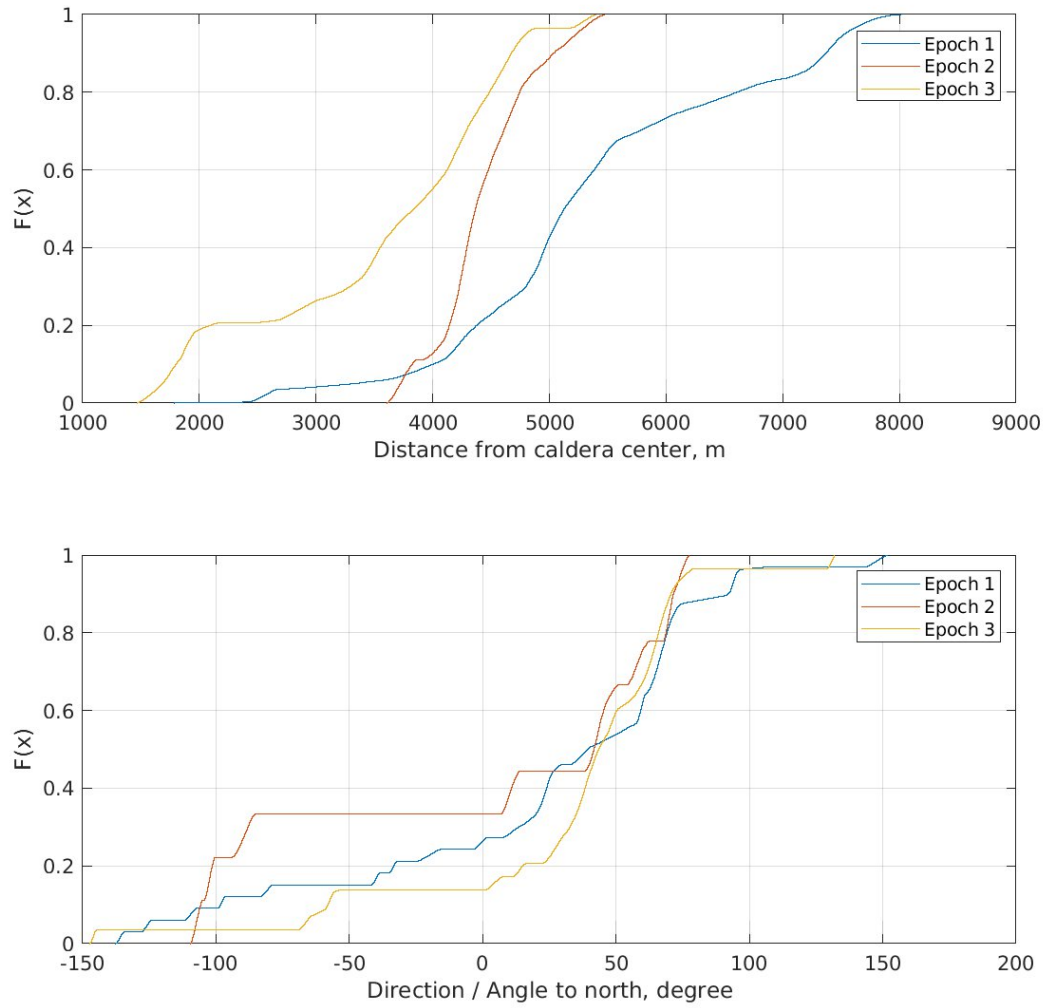
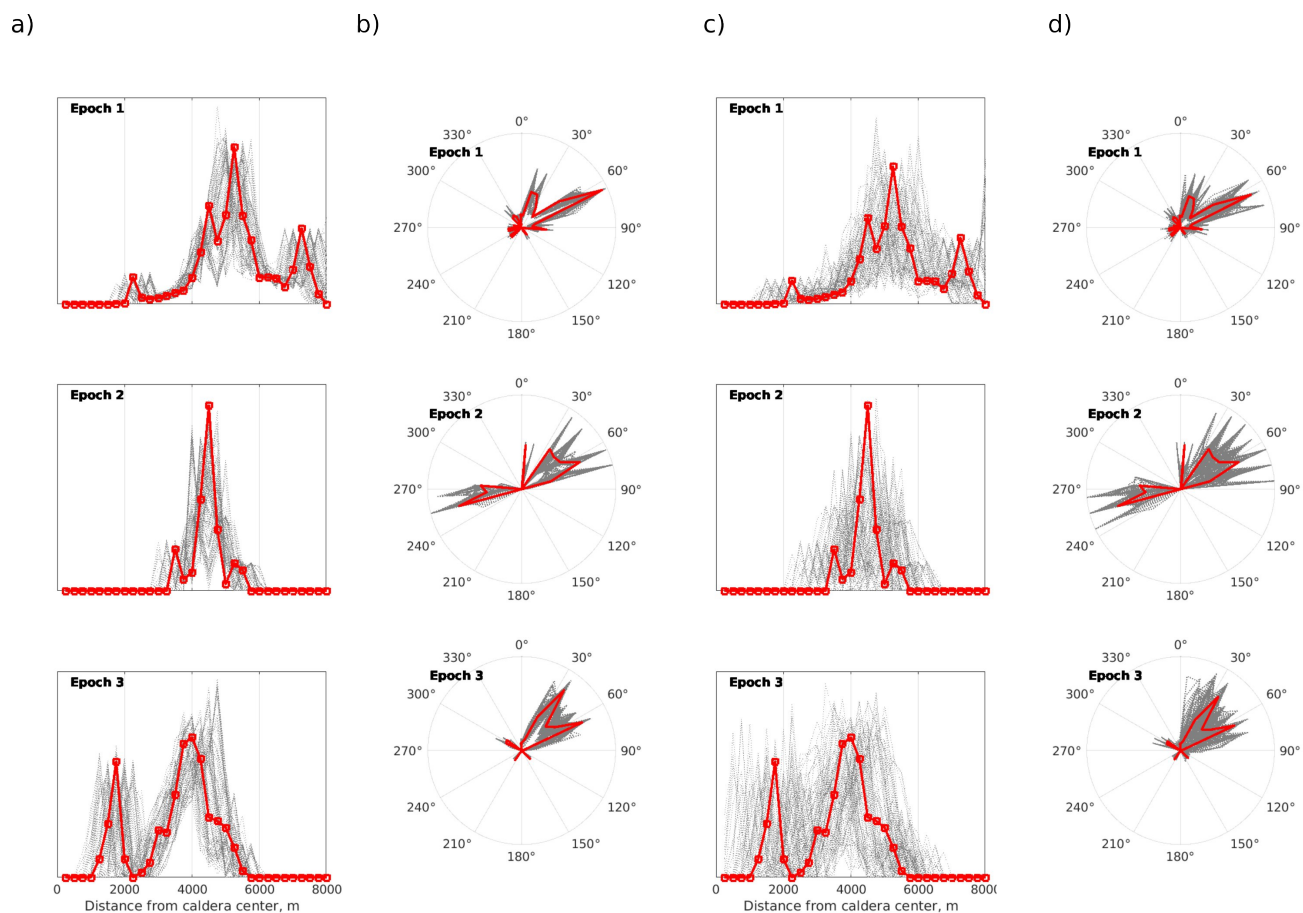


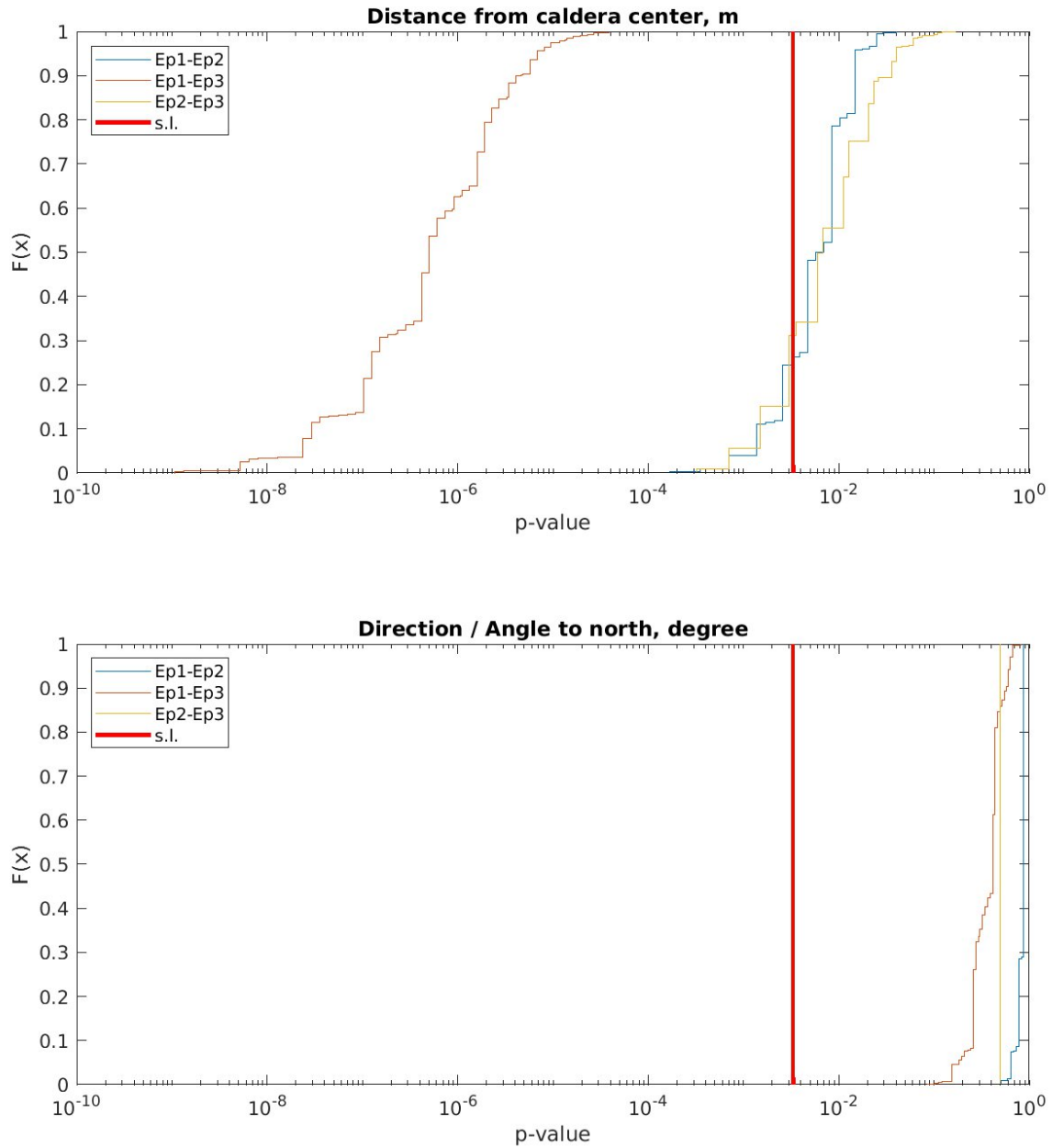
**Figure S1:** (above) 1000 resampled centres of the caldera, considering a variability of 1 and 2 km in both Northing and Easting. (below) Set of 1000 resampled vent locations of past Campi Flegrei eruptions, accounting for the uncertainty on vent location (maps produced in Matlab, with data Esri, HERE, Garmin, USGS, NGA | Powered by Esri)



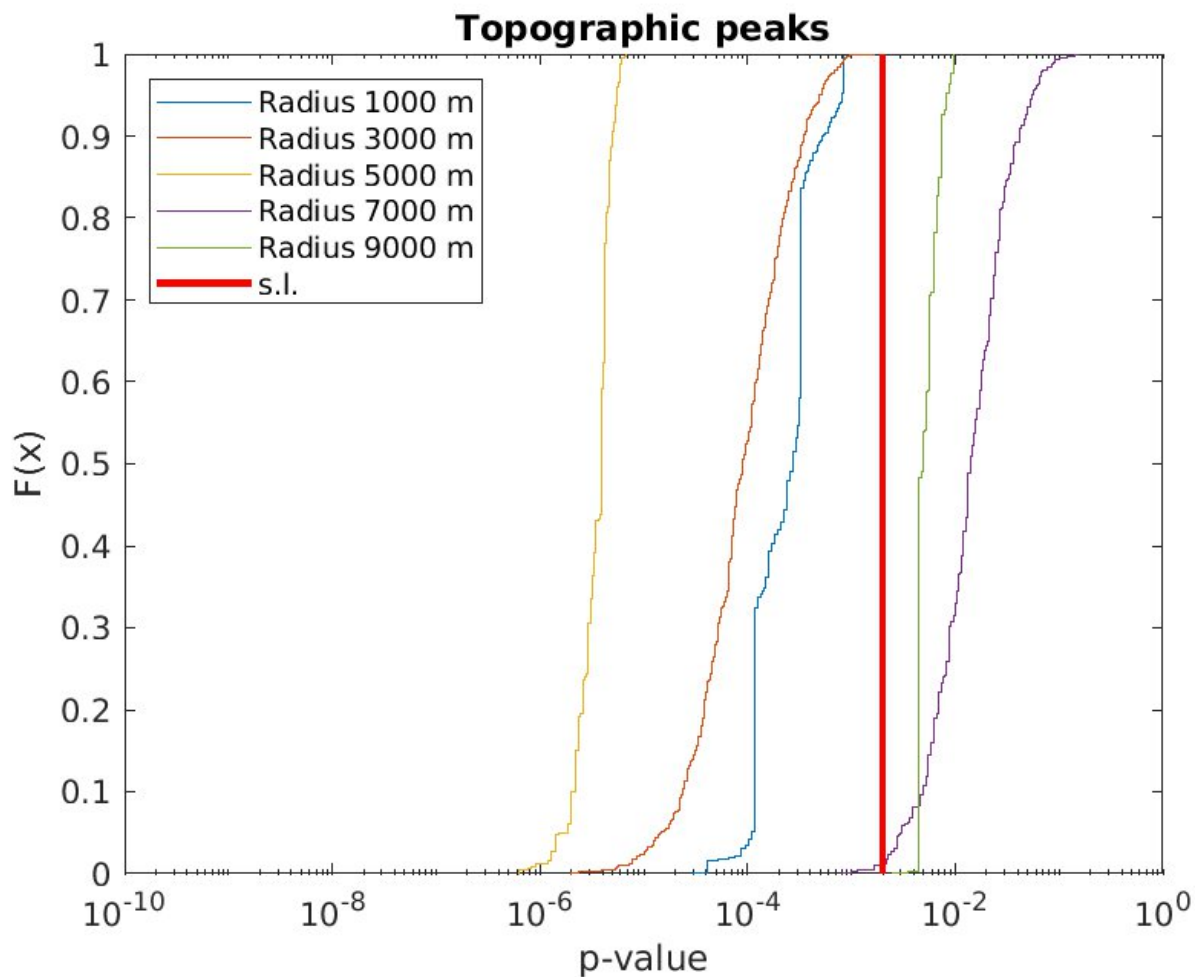
**Figure S2** - Empirical cumulative distribution functions of (above) the distance-from-the-centre of the caldera and (below) azimuth angles, for the 3 epochs of activity .



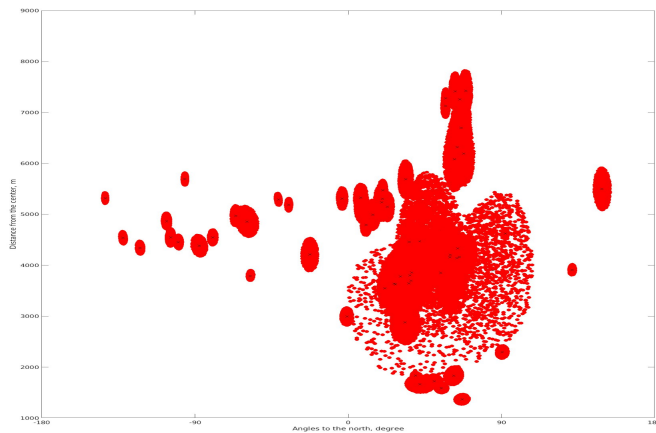
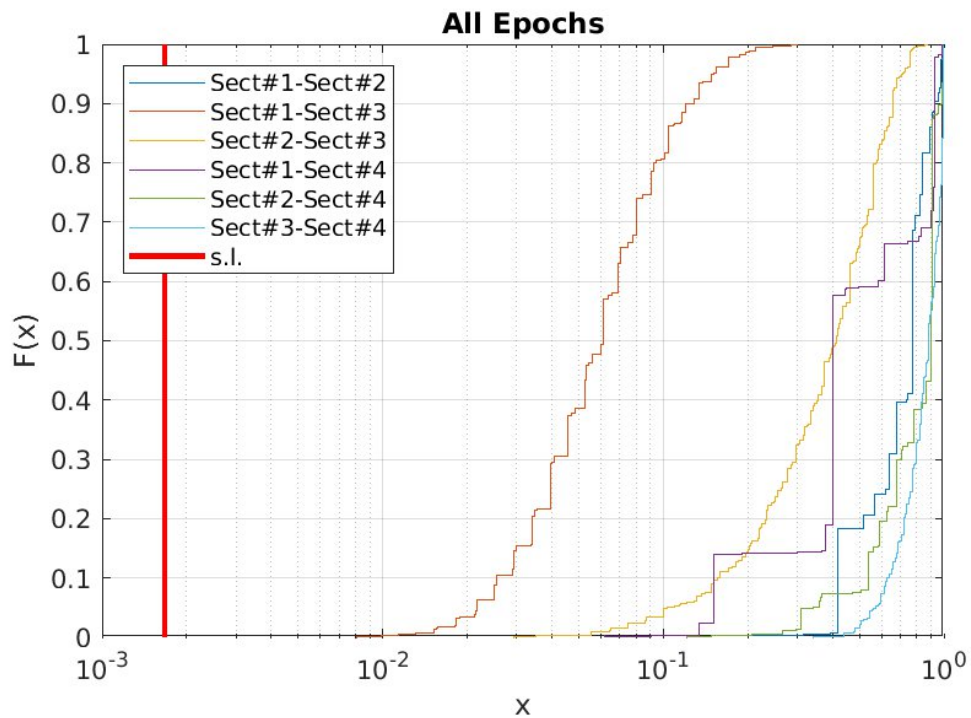
**Figure S3** - Empirical cumulative distribution functions of the distance-from-the-centre of the caldera and azimuth angles, for resampled caldera centers in boxes of 1 km (panels a and b, respectively) and 2 km (panels c and d, respectively) around the selected center (gray lines), compared with the ones obtained with the selected centre (red lines)..



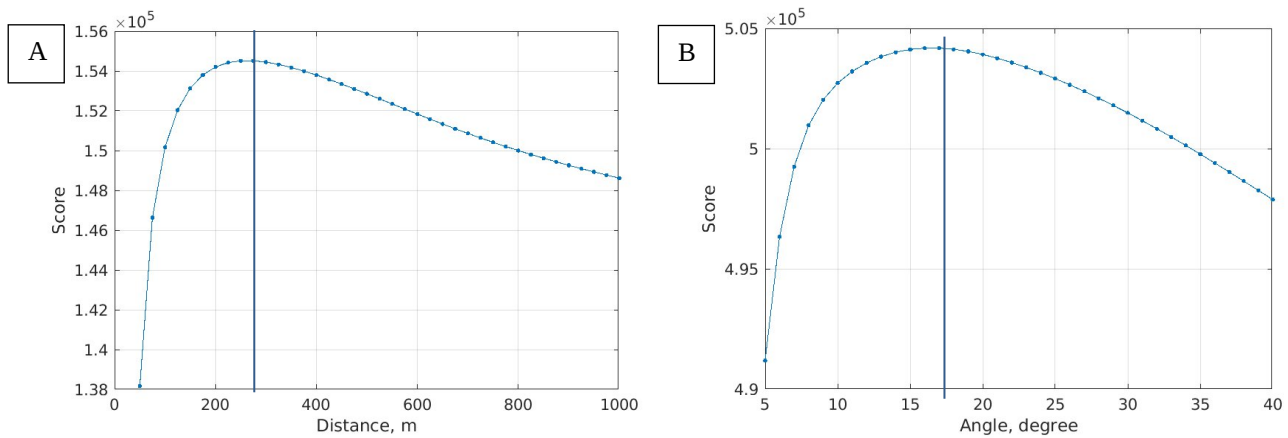
**Figure S4** - Distribution of p-values for the Kolmogorov-Smirnov test comparing distances (above) and angles (below) in the 3 epochs of activity, considering 1000 resampled vent locations of past Campi Flegrei eruptions to account for the uncertainty on vent position. The significance level (red line) is set to 0.01 and it is corrected for multiple testing using the Bonferroni (1936) criterion, that is by dividing by the number of comparisons.



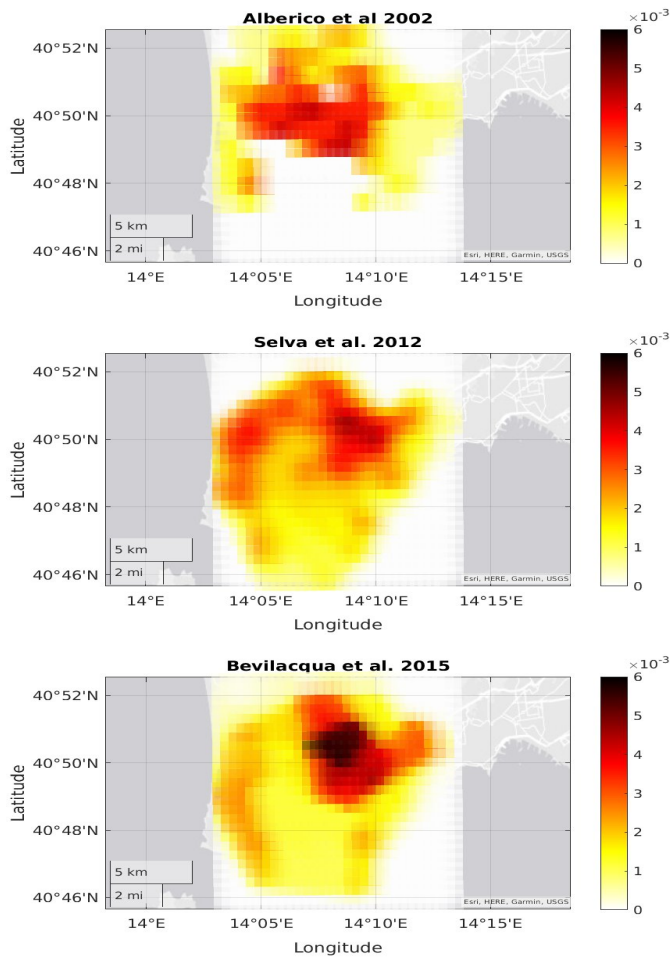
**Figure S5** - Distribution of p-values for the 1-sample Kolmogorov-Smirnov test comparing the angular distribution of eruptions and topographic peaks within different radii from the caldera center. The distribution is obtained considering 1000 resampled vent locations of past Campi Flegrei eruptions to account for the uncertainty on vent position. The significance level (red line) is set to 0.01 and it is corrected for multiple testing using the Bonferroni (1936) criterion, that is by dividing by the number of comparisons.



**Figure S6** - (above) Distribution of p-values for the 2-samples Kolmogorov-Smirnov test comparing the correlation between azimuth and distance, comparing the distance distribution in the four sectors. Sector 1 to 4 correspond to NE, SE, SW, NW. The distribution is obtained considering 1000 resampled vent locations of past Campi Flegrei eruptions to account for the uncertainty on vent position. The significance level (red line) is set to 0.01 and it is corrected for multiple testing using the Bonferroni (1936) criterion, that is by dividing by the number of comparisons. (below) Bi-variate plot of distance vs angles, considering uncertainty of vent location.



**Figure S7** - Results of the leave-one-out technique with a Kullback-Leiber score to select the most appropriate band-width (Connor et al. 2019) for the distance from the center (panel A) and for the azimuth angle (panel B). The most appropriate bandwidth are found for a distance of 275 m and an azimuth of 17 degrees.



**Figure S8** - Rescaled vent probability maps for Alberico et al. (2002), Selva et al. (2012) and Bevilacqua et al. (2015). The scale is the same in the three figures. Maps were scaled to facilitate the comparison with the maps produced here. To this end, the probability values of both Alberico et al. (2002), the one relative to VEI3, with a finer spatial definition of 1 km) and of Bevilacqua et al. (2015, with a spatial definition of 250 m) have been re-integrated in M1/M2 grid, which coincides with the one of Selva et al. (2012) For both Bevilacqua et al. (2015) and Selva et al. (2012), we considered the average maps for epistemic uncertainty. The area covered by Alberico et al. (2002) is further extended toward the north, and those values are not reported here. Maps produced in Matlab, with data Esri, HERE, Garmin, USGS, NGA | Powered by Esri.