We thank the reviewer for their considered and insightful review that helped improving our manuscript.

This manuscript presents a detailed analysis of the wavefield excited by tremor and long-period (LP) events associated with the eruptions of Mount Etna, Italy, during August–September 2019. In particular, the authors use an array composed of a rotational sensor and six seismic stations to estimate the back azimuth and phase velocity of seismic waves generated by these events. By comparing the array-derived back azimuths with the source locations of tremor and LP events estimated from INGV-OE routine processing, they demonstrate a high level of agreement during periods of intense tremor activity, whereas discrepancies are observed in the rotational sensor data. The authors attribute these inconsistencies to local structural heterogeneities. Furthermore, combined analysis of the rotational sensor and seismometers reveals that SH waves are dominant in the wavefield of both tremor and LP events. The integration of rotational sensor data with seismic array observations is highly innovative and provides valuable insights for future observations using rotational sensors. Below are several comments that may help improve the manuscript.

Length of the Time Window for Tremor Analysis

In this study, a relatively long time window of 30 minutes was used for tremor analysis. However, the waveform characteristics may vary during such a long period. In cases of non-stationary seismic activity or changes in propagation paths, averaging over this interval may obscure temporal variations. Including supplementary analyses to evaluate the stability of the waveforms within each window would enhance the reliability of the results.

XX We tested different sliding window lengths of 0.5 and 5 minutes for the tremor analysis. We now added a supplementary figure (S3) that shows the comparison of back azimuth and slowness from those time windows. The results of our manuscript are not affected by the window length as trends in changes of back azimuth and slowness remain consistent regardless of the sliding window duration.

Significance of Back-Azimuth Variations

During phases 0–1, the back azimuth is reported to change from 210° to 190°, but the estimation uncertainty is ±10–20 degrees. Considering this margin of error, a change of about 20 degrees may not be statistically significant, and the interpretation based on this variation should be made with caution. In addition, the authors note that the back-azimuth estimates derived from different methods (array, 6C method, and INGV network) show different directions across phases 0–2. However, if all values fall within their uncertainty ranges, emphasizing inter-method differences may not be meaningful. Please clarify whether these differences are statistically significant, or at least interpret the results with due consideration of the uncertainties.

XX The use of denser real-data sampling (0.5-minute sliding windows for tremor and higher overlap for the LP event sliding time windows) enables us to compute standard-deviation-based uncertainties, improving robustness and avoiding the elevated uncertainties due to the long time windows before. These new uncertainties are more accurate, but still reach around 10°. We therefore adapted the text accordingly and thank the reviewer for the comment improving this section.

In Figure 2, the plotted colors for phases P2 and P4 are quite similar, making them difficult to distinguish, especially in grayscale printing or for readers with color vision deficiencies. Consider using more distinct hues (e.g., blue and red) to improve visual clarity.

XX We modified the colors of phases P2 and P4 to yellow and orange, making them separable as well in black and white while still showing a certain similarity between those phases. Vertical bars in b)-d) were added to improve visibility too.

In Figures 4c (array-derived slowness) and 4d (6C-derived phase velocity), uncertainties or confidence intervals of the estimated values are not indicated, making it difficult to assess the reliability of the results. When comparing outcomes obtained from different methods, it is essential to evaluate and display these uncertainties. If possible, please include error bars.

XX We now added uncertainty bars for the array derived slowness and 6C phase velocities obtained by the standard deviation of smaller time window results, as done for the back azimuth.

In Figure 5d, high correlation coefficients are observed not only during LP-event periods but also at other times. It is unclear whether these correlations correspond to real events or to noise signals. Please provide a clear explanation in the text regarding the possible causes of these high correlations.

XX We added more explanation in the interpretation section (5.3). It is likely due to LP event pulses with lower magnitude, from the same direction, which were not picked as LP events in the INGV-OE catalogue.

Figure 6 contains a large amount of diverse information (temporal changes, spatial distribution, directional deviations, histograms, etc.) within a single figure, making it difficult for readers to follow. The following reorganization is suggested:

Arrange panels (a), (c), and (d) vertically to align their time axes and clarify temporal consistency.

Combine panels (f), (g), and (h), which contain statistical information on back-azimuth deviations, into a separate figure.

Enlarge and reposition the maps (b) and (e) for improved readability.

XX We split Figure 6 into two figures, re-arranging the plots and aligning shared axes. Map plots are now larger.

In Figures 7b and 7c, it is not specified which instruments (array or rotational sensor) and which components (e.g., HHZ, HJZ) the running spectrograms are based on. Please indicate this information clearly in the figure captions or in the main text.

XX We clarify that we used the rotational sensor HJZ component to create the spectrograms.