

Supplementary Material

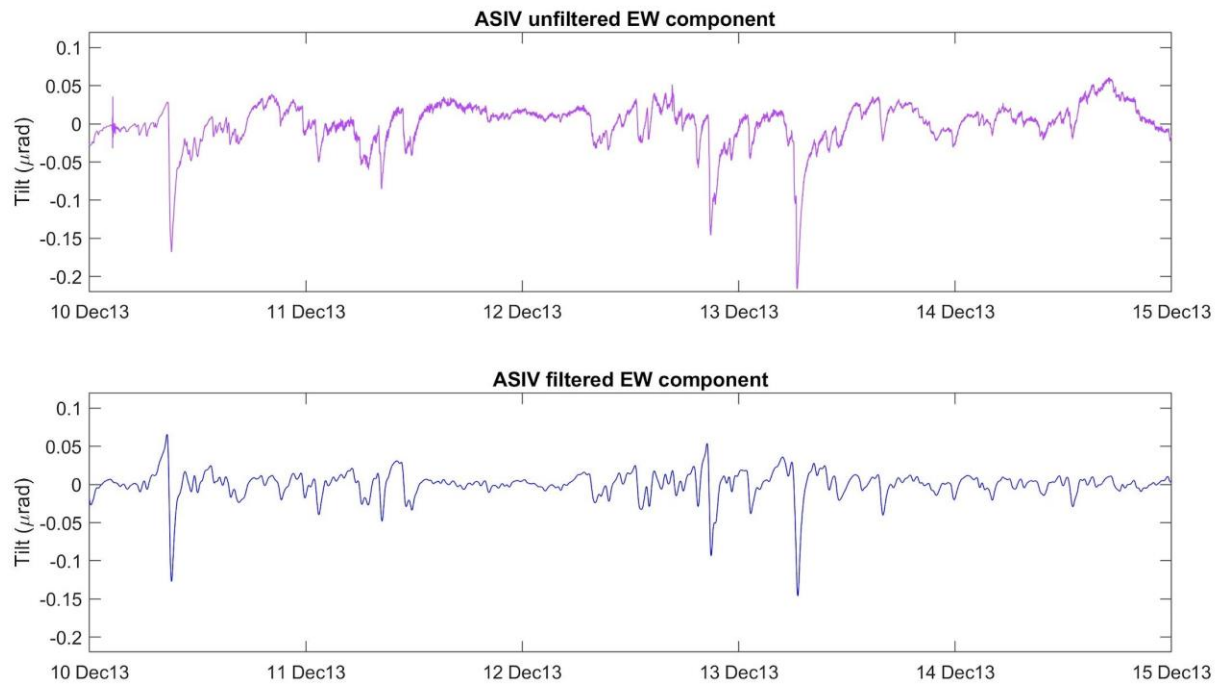


Figure S1. Comparison of the unfiltered (magenta line) and 0.5-8hr filtered (blue line) waveforms recorded at EW component of ASIV tiltmeter. The third-order Butterworth zero-phase filter preserves the overall shape of the original pulses.

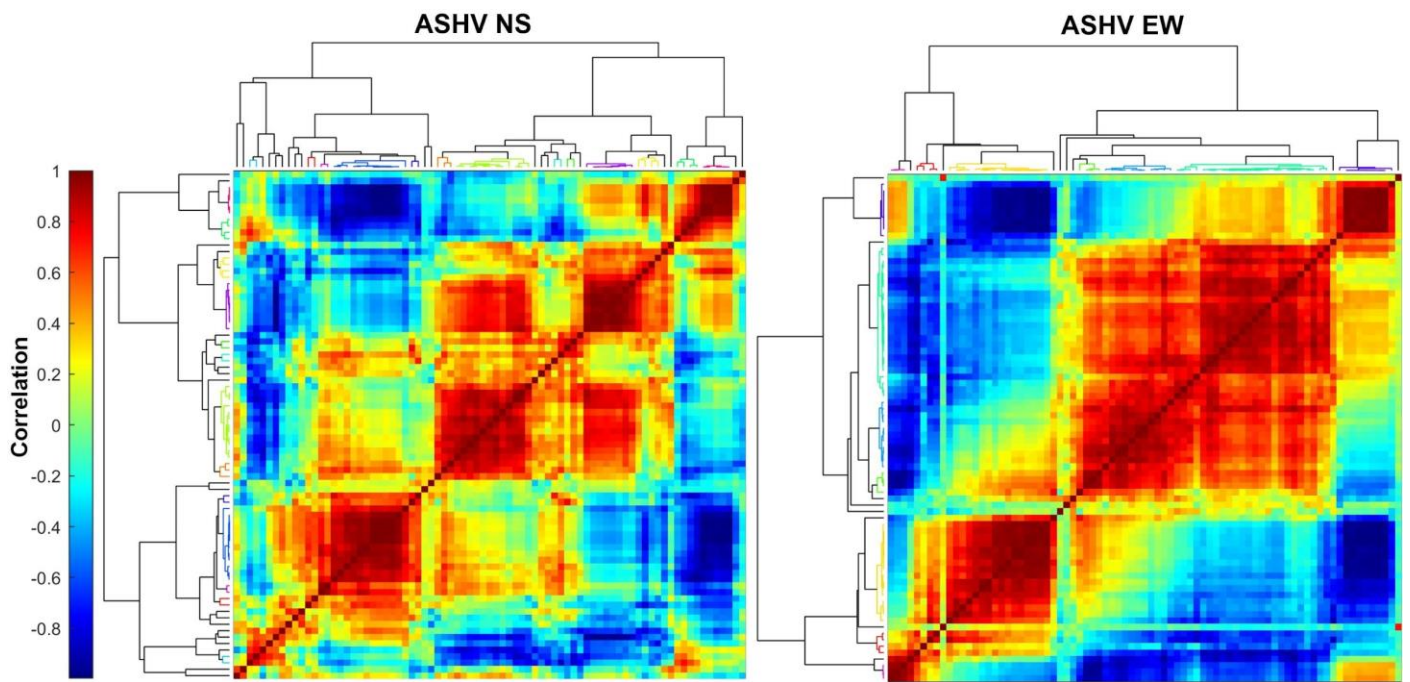


Figure S2. Correlation matrix ordered according to the hierarchical clustering for the NS (left) and EW (right) components of ASHV tiltmeter. The red colour corresponds to the highest values of correlation. The coloured branches of the hierarchical cluster tree (dendrogram) indicate correlation values greater than 0.9; their height is a measure of the correlation between two events or clusters. The cyan dendrogram branches in the right panel correspond to the cluster of 22 events.

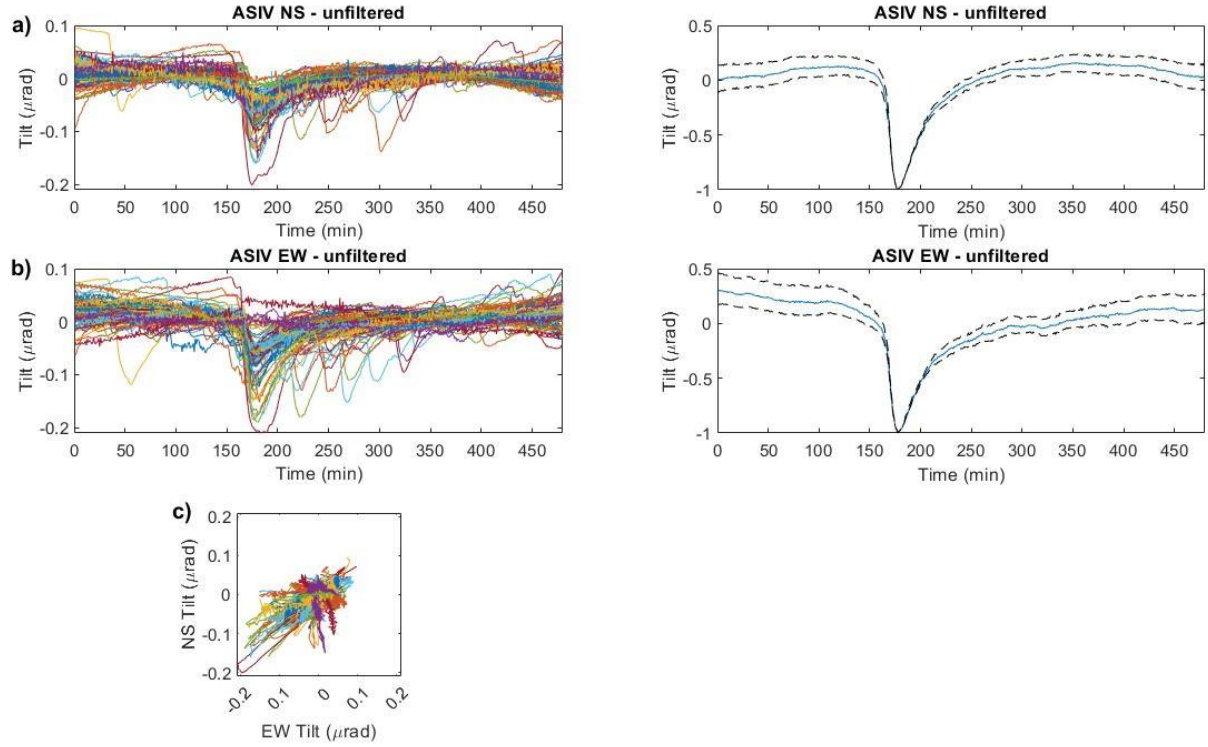


Figure S3. a) Waveforms of the 82 clustered VLTPs (ASIV NS unfiltered component) and stacking of the signals (normalized amplitude) with bootstrap uncertainties at the 95% confidence level. b) The same for ASIV EW unfiltered component. c) Particle tilt on the horizontal plane obtained by the composition of the unfiltered components of the 82 clustered VLTPs.

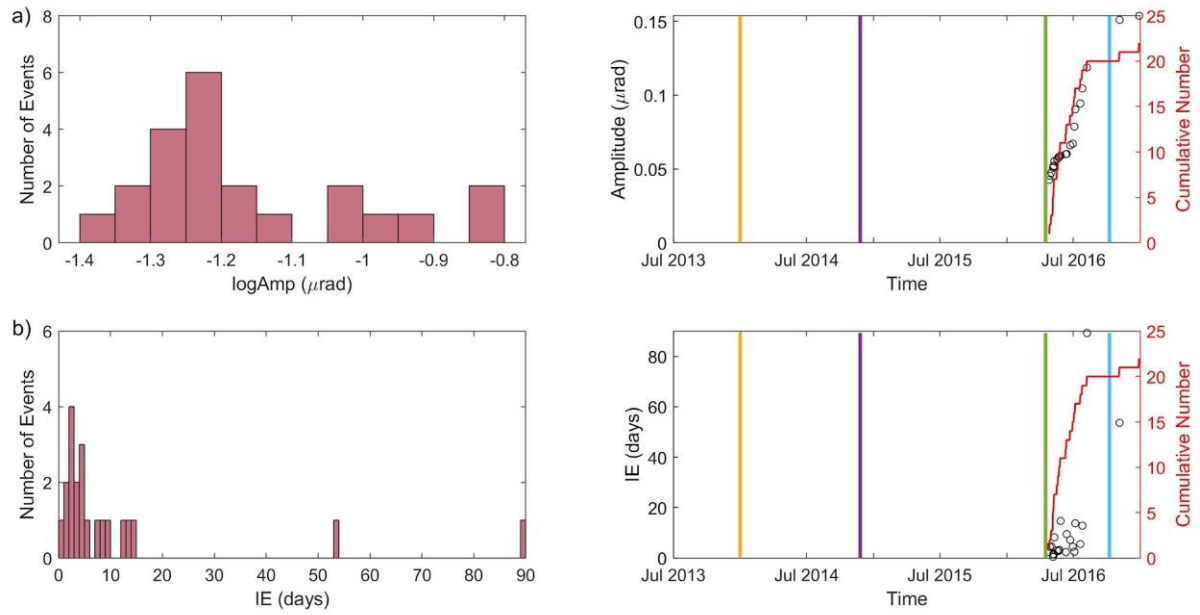


Figure S4. a) On the left, frequency distribution of the amplitudes of 22 clustered events (ASHV EW component); on the right, amplitude and event cumulative number (red line) as a function of time. The yellow line marks the beginning of the phreatic phase in January 2014, the purple line corresponds to the Strombolian eruption of 25 November 2014, the green line marks the Kumamoto M_w 7.3 earthquake occurred on 16 April 2016 and the light blue line corresponds to the phreatomagmatic eruption of 8 October 2016. b) On the left, frequency distribution of the IEs; on the right IE temporal pattern and event cumulative number (red line) as a function of time.