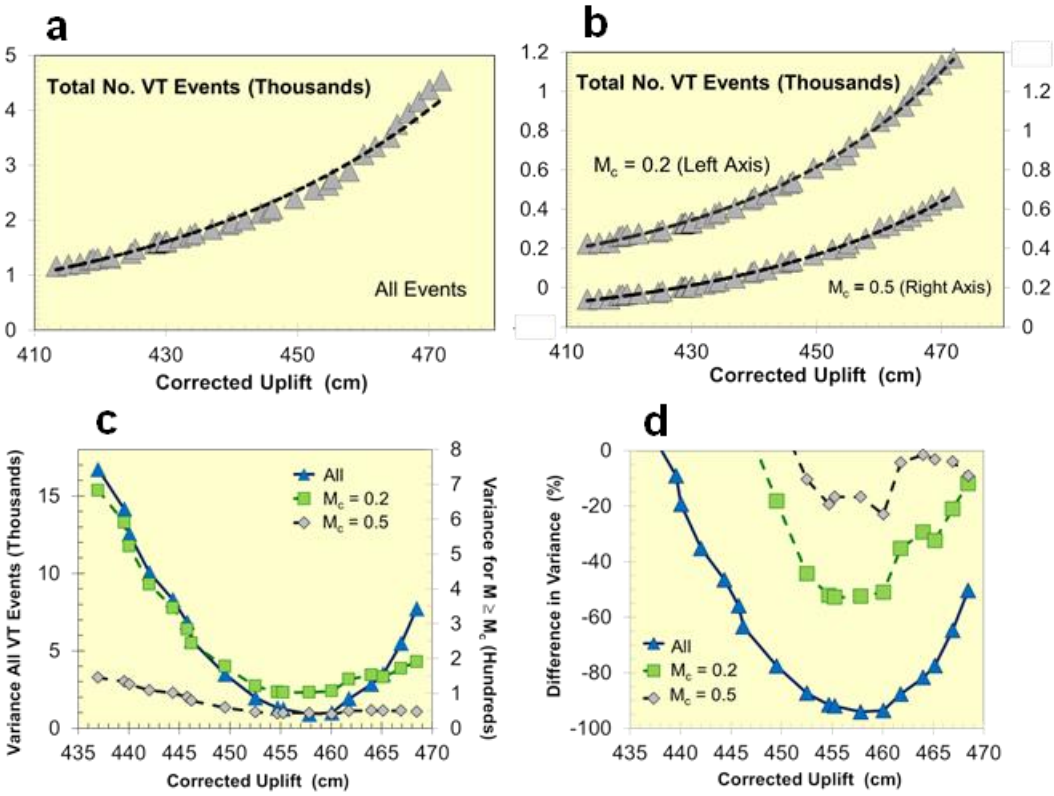
Supplementary Information

Supplementary Methods

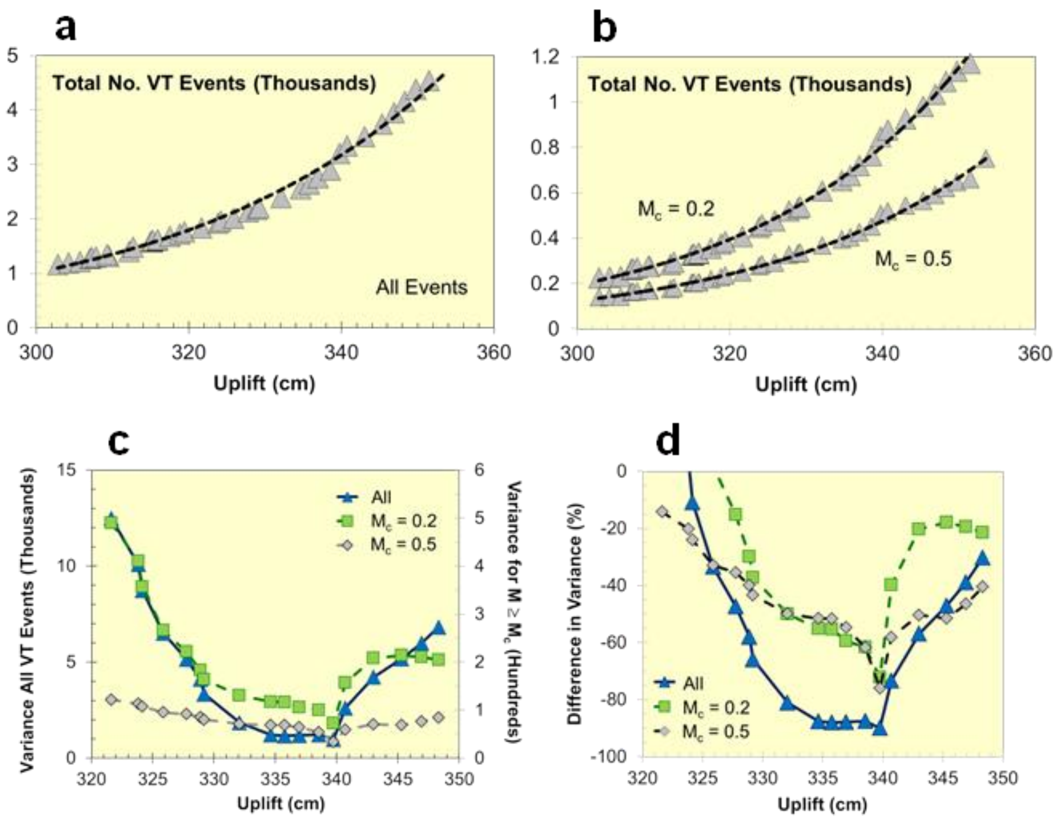
Analysis of Variance

Visual inspection suggests that the relation between VT seismicity and corrected uplift at Pozzuoli changed from exponential to linear at a corrected uplift of c. 460 cm (Sup. Figs. 1a & b, which repeat Figs 4b & c in the main text). Although a single exponential trend could also be proposed for VT events with magnitudes greater than 0.5 (Sup. Fig. 1b), the same does not hold for trends for all events (Sup. Fig. 1a) or for events with magnitudes greater than 0.2. In contrast, our interpretation of a change from exponential to linear trends after a corrected uplift between 455 and 460 cm satisfies all three data sets.

The quality of the alternative interpretations can be quantified by comparing the variance of the observed data around the model trends. S.D. and N.A.P. performed the analysis. The method calculates the variance of a combined exponential-linear fit by (1) increasing the number of data points on an assumed linear trend, moving back from the most recent data point, and (2) applying a exponential trend to the earlier data that remain. The results show that the variance of the combined trend is smaller (better fit) than for a single exponential trend at corrected uplifts greater than 435 cm (Supp. Fig. 1d). The smallest variance (best fit) occurs when the linear trend begins at a corrected uplift between 455 and 460 cm, in agreement with visual inspection (Figs 10c & d). The result applies to all VT events, as well as to subsets with minimum magnitudes of 0.2 and 0.5 (Sup. Figs 1c & d). Exponential-linear trends also show a superior fits to the data when observed uplift is used instead of corrected uplift (Sup. Fig. 2).



Supplementary Figure 1. Preferred fits to VT-corrected uplift trends. (a & b) Best fit exponential trends to the VT-corrected uplift data in Fig. 4, for all VT events and for VT events with completeness magnitudes (M_c) set at 0.2 and 0.5. The trends are described by total number of VT events, Σ*N* ⍰ exp (h_{cor}/44) (All), ⍰ exp (h_{cor}/34.6) (M_c = 0.2) and ⍰ exp (h_{cor}/36.4) (M_c = 0.5). Their corresponding variances are 15565, 217 and 52. For all VT events and those with M_c = 0.2, visual inspection suggests systematic shifts to values above the exponential trend at corrected uplifts greater than c. 460 cm. **(c)** Analysis of Variance confirms the shifts do occur for all three trends. The variances of the exponential-linear trends decrease to minimum values for corrected uplifts of 455-460 cm. **(d)** At corrected uplifts greater than 435, 448 and 450 cm (All, M_c = 0.2 and M_c = 0.5), the two-trend interpretations show variances smaller than the exponential variance by as much as 94, 53 and 23% respectively.



Supplementary Figure 2. Preferred fits to VT-uplift trends. (a & b) Best fit exponential trends to the VT- uplift data for same time interval as Sup. Fig. 1 and for all VT events and for VT events with completeness magnitudes (M_c) set at 0.2 and 0.5. The trends are described by total number of VT events, ΣN □ exp (h_{cor}/35) (All), □ exp (h_{cor}/28) (M_c = 0.2) and □ exp (h_{cor}/29.5) (M_c = 0.5). Their corresponding variances are 9791, 261 and 146. **(c)** Analysis of Variance confirms that shifts to linear trends when the uplift reaches 335-340 cm. **(d)** The two-trend interpretations show variances smaller than the exponential variance by as much as 90, 72 and 76% (All, M_c = 0.2 and M_c = 0.5).