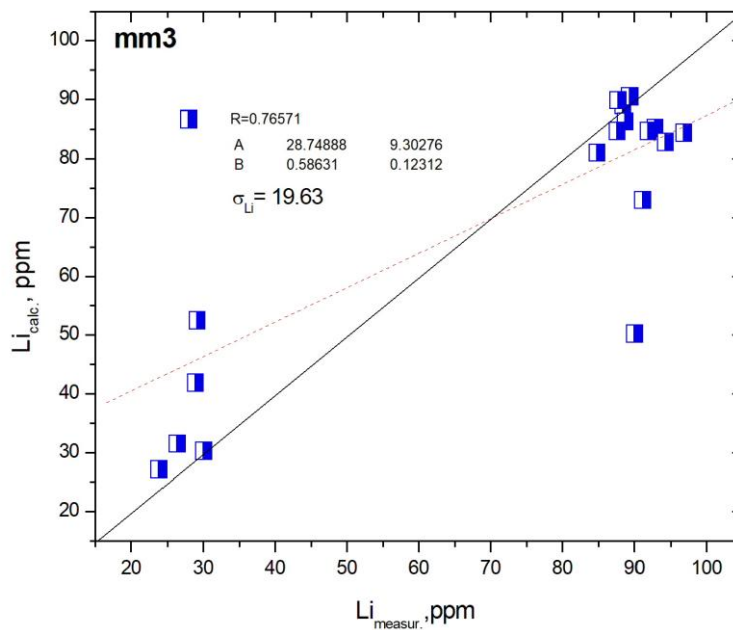


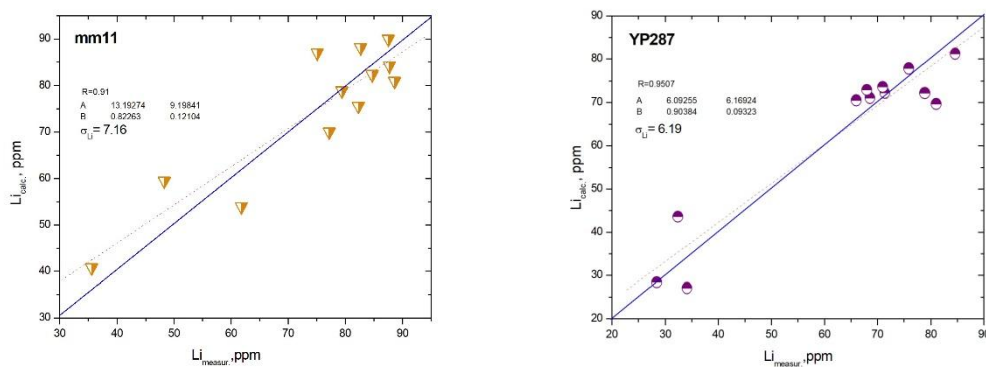
## Supplementary File S2

Quality of representation of  $C_{Li}$  in MI as a linear function of  $C_{CO_2}$  and  $C_{H_2O}$ .

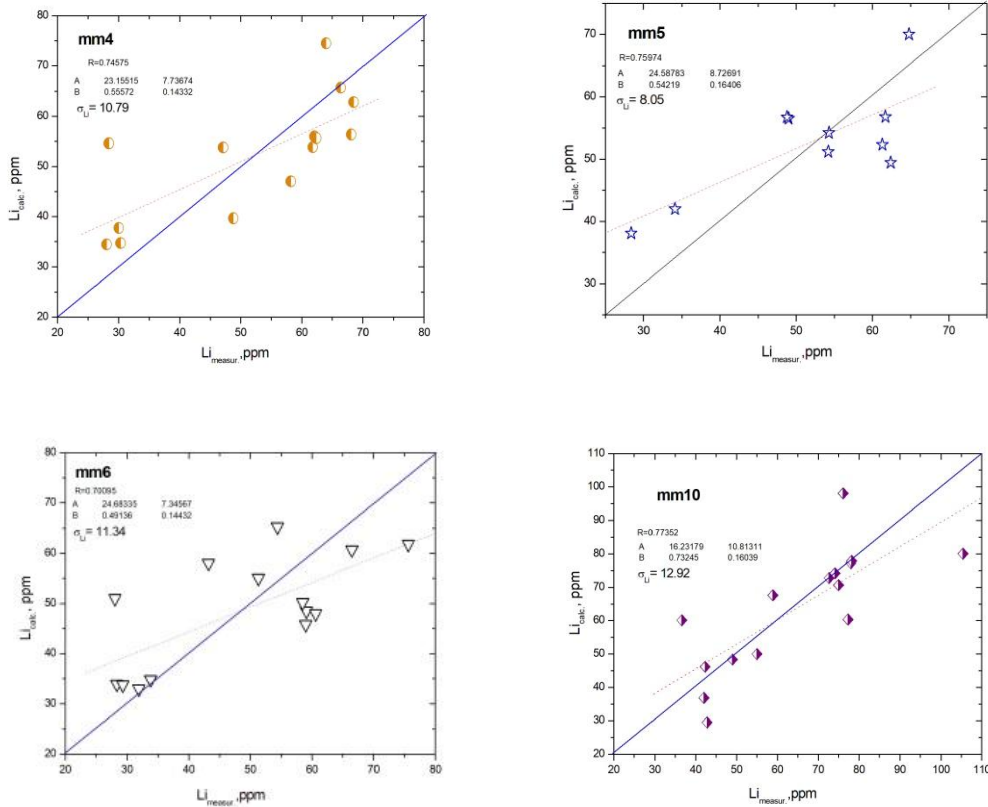
The approximation of Li concentration as a linear function of  $C_{CO_2}$  and  $C_{H_2O}$  is adequate when the measured and calculated values (points  $[C_{Li,meas.}, C_{Li,calc.}]$ ) are on a 1 to 1 correspondence line. In this case, the coefficient b (slope) of the linear regression  $C_{Li,calc.}(C_{Li,meas.})$  is close to 1. The scatter of points around the regression line is reflected in the correlation coefficient R and the standard deviation of the  $C_{Li,meas.}(C_{CO_2}, C_{H_2O}) - \sigma_{Li}$ .



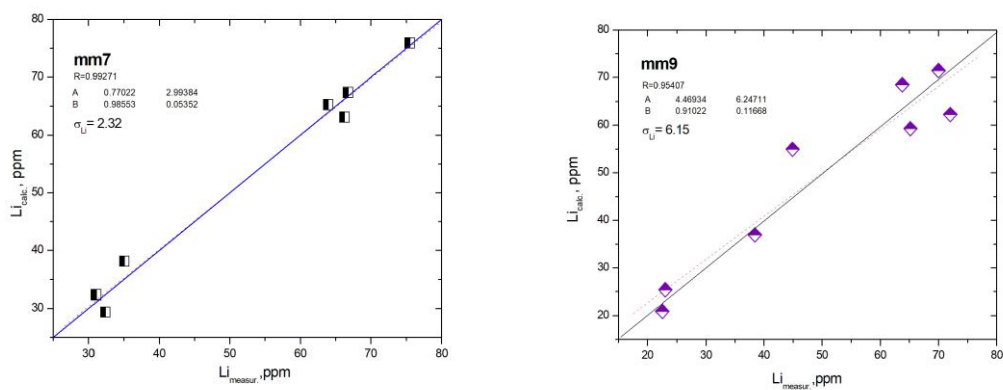
**Figure S2.1.** The dependence  $C_{Li,calc.}(C_{Li,meas.})$  for sample MM3, reflecting the state of the last erupted roof magma a) the complete set contains probes with a contrasting history, the standard deviation  $\sigma_{Li}$  for the least squares presentation is the largest for the entire interpreted data set.



**Figure S2.2.** The dependence  $C_{Li,calc.}(C_{Li,meas.})$  for samples MM11 and YP287, reflecting the state of the magma portions initiating the first and second cycles of eruption. Good representation with linear function  $C_{Li}(C_{CO_2}, C_{H_2O})$ .



**Figure S2.3.** The dependence  $C_{Li,calc.}(C_{Li,meas.})$  for samples MM4, MM5, MM6, MM10; poor data representation by linear function. The points deviate far from a one-to-one correspondence ( $b \approx 0.5$ ) and (or) large standard deviation  $\sigma_{Li} \geq 10$ , correlation coefficient  $R < 0.8$ .



**Figure S2.4.** Dependences  $C_{Li,calc.}(C_{Li,meas.})$  for samples MM7 and MM9, presumably probing the deepest and uppermost levels of the magma reservoir, respectively. Good approximation ( $b \approx 1$ ), small to moderate scatter ( $\sigma_L = 2 \div 6$ ).