

FIGURE 1S. Di (diopside) vs. Hd (hedenbergite) diagram showing the compositions of clinopyroxenes from (1) the original calibration dataset of Armienti et al. (2013), (2) the new calibration dataset from this study, and (3) the natural products erupted at Mt. Etna volcano.

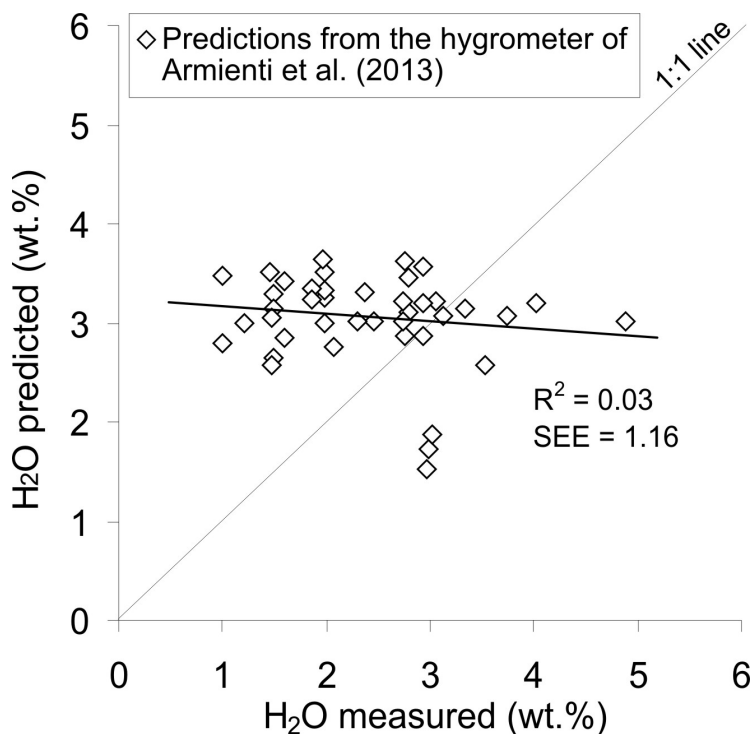


FIGURE 2S. The clinopyroxene compositions from the new calibration dataset have been used as input data for the hygrometer of Armienti et al. (2013). The regression fit of measured vs. predicted H_2O concentrations yields low correlation coefficient ($R^2 = 0.03$) and high standard error of estimate ($\text{SEE} = \pm 1.16$).

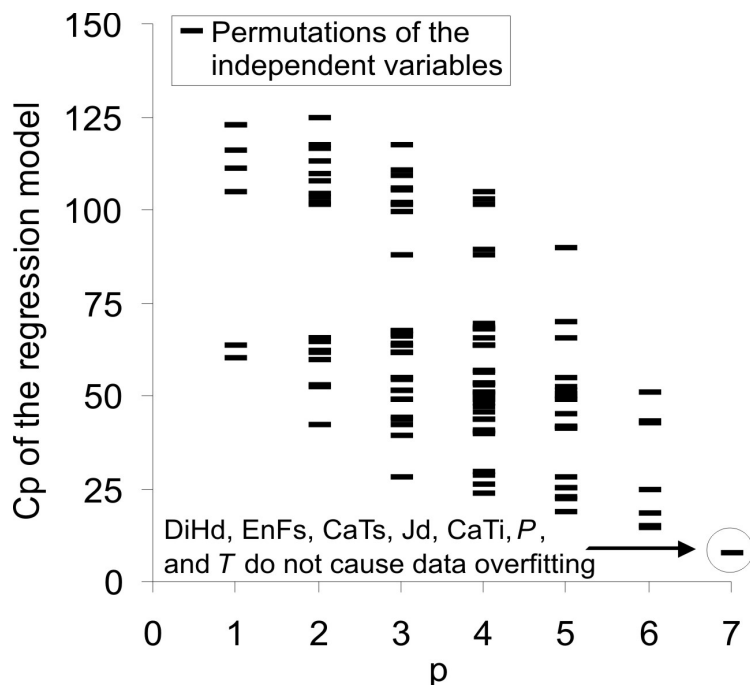


FIGURE 3S. The C_p vs. p diagram shows that the lowest Mallows' C_p value corresponds to the regression fit in which all the independent variables (i.e., DiHd, EnFs, CaTs, Jd, CaTi, P , and T ; see also Supplementary Data Table 2S) are considered as predictors for the regression model. No systematic overestimates or underestimates were due to miscalibration of Eqn. (2) as the result of data overfitting.

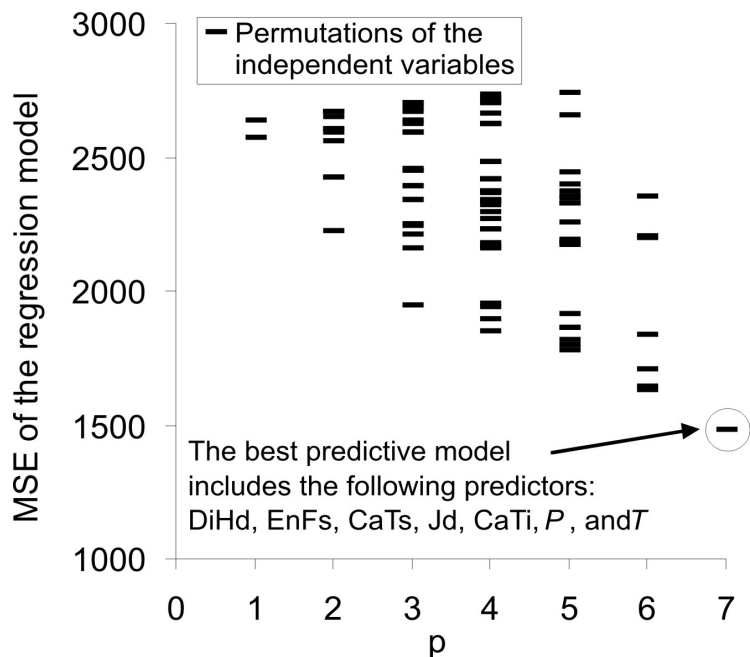


FIGURE 4S. The MSE vs. p diagram shows that the Mallows' C_p criterion demonstrates as the overall use of the independent variables ensures the lowest mean squared error (MSE) for Eqn. (2) with respect to all possible regression fits obtained by permuting the independent variables. The overall use of these independent variables ensures that the refined hygrometer from this study is the best predictive model.