***Supplementary Material***

1. **Supplementary Data**

FTIR analysis of maxtrix glasses from layer P1 obsidians.

Sample Absorbance data

 CO2 H2OTOTa H2Omb OH-c thickness

 (µm)

P1L-A 0.024 - 0.018 0.052 296±6

P1L-DDD - 0.865 - - 299±1

P1L-F - - 0.034 0.054 332±18

P1L-FFF 0.020 1.024 - 0.020 277±7

P1L-GGG - - 0.038 0.039 262±5

P1L-H - 0.896 - - 201±5

P1L-II - - 0.028 0.043 223±4

P1L-JJ - 0.486 - - 214±4

P1L-QQQ 0.017 - 0.018 0.026 190±10

P1L-UUU 0.014 0.704 - - 141±2

P1L-X - 0.859 - - 310±12

P1U-F 0.036 - 0.033 0.045 226±15

P1U-FF 0.038 - 0.033 0.048 239±3

P1U-II 0.004 - 0.027 0.036 237±11

P1U-L 0.034 0.156 - - 179±4

P1U-N - 0.509 - - 295±5

P1U-S - 0.730 - - 197±6

P1U-SS - 0.718 - - 160±19

P1U-V 0.004 0.431 - - 187±6

- Not measured

a absorbance resulting from total H2O at ~3550 wavenumbers.

b absorbance resulting from molecular H2O at ~5200 wavenumbers.

c absorbance resulting from hydroxyl OH- at ~4500 wavenumbers.