water

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*Supplementary materials*

# Geochemical Evolution in Historical Time of Thermal Mineral Springs at Campetti Southwest (Veii, Central Italy) through Geoarcheological Investigation

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**Figure S1.** Votive inscription to Hercules and the Springs found in Veii Campetti Southwest site (modified from[1]).

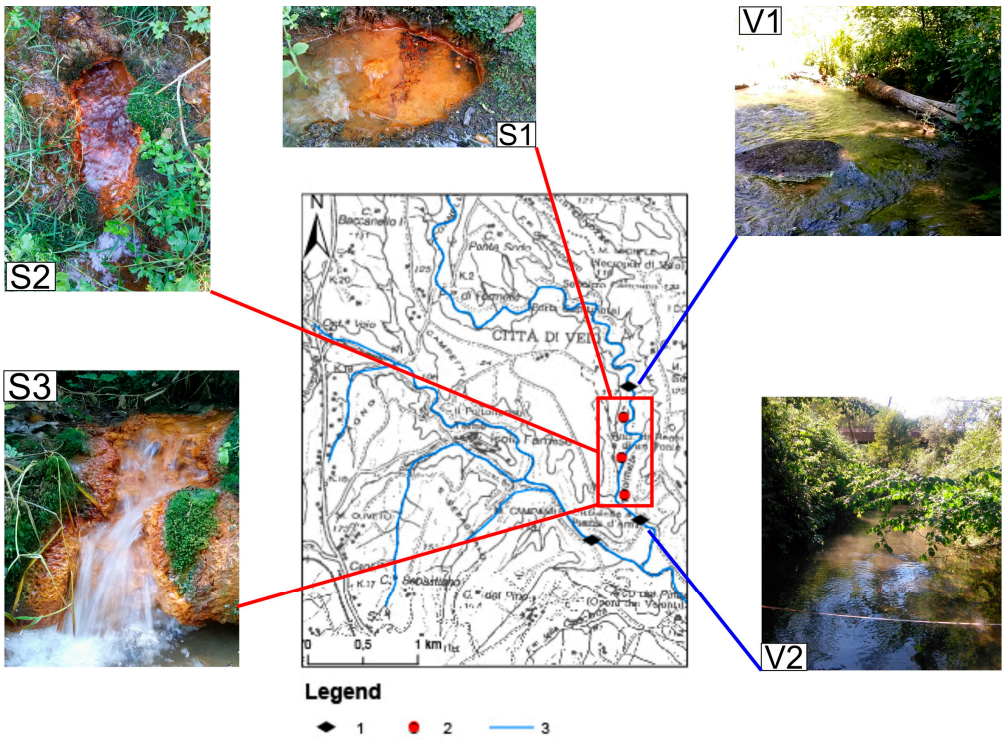


**Figure S2.** Pictures and locations of the studied springs and the discharge measurements along the Valchetta River. Legend: (1) Discharge measurements; (2) Thermal-mineral springs; (3) Streams.

**Table S1**. Chemical composition of water sampled in the southeastern sector of Sabatini Volcanic District. *[2]; **[3]; n.a. not analyzed.

| ID | Type | T | pH | TDS | $HCO_3^-$ | $F^-$ | $Cl^-$ | $NO_3^-$ | $SO_4^{2-}$ | $Na^+$ | $K^+$ | $Mg^{2+}$ | $Ca^{2+}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *°C* | | *g/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* |
| **64*** | Spring | 23 | 6.6 | 1393 | 598 | n.a. | 107 | n.a. | 211 | 87 | 122 | 21 | 154 |
| **65*** | Spring | 29 | 6 | 3671 | 1281 | n.a. | 231 | n.a. | 955 | 239 | 321 | 72 | 450 |
| **66*** | River | 19 | 7.8 | 1311 | 537 | n.a. | 73 | n.a. | 283 | 76 | 99 | 16 | 166 |
| **67*** | Spring | 23 | 6.9 | 1087 | 461 | n.a. | 62 | n.a. | 202 | 62 | 95 | 14 | 124 |
| **68*** | River | 18 | 7.6 | 552 | 299 | n.a. | 42 | n.a. | 26 | 37 | 28 | 9 | 66 |
| **69*** | Spring | 32 | 7 | 3621 | 1647 | n.a. | 415 | n.a. | 394 | 294 | 386 | 48 | 340 |
| **83**** | Spring | 17 | 7.1 | 407 | 177 | 0.3 | 26 | 41 | 23 | 30 | 17 | 14 | 39 |
| **84**** | Well | 14 | 6.9 | 2564 | 1708 | 0.2 | 74 | 1 | 13 | 116 | 347 | 57 | 193 |
| **90**** | Well | 25 | 6.6 | 1195 | 555 | 2.7 | 78 | 7 | 158 | 74 | 120 | 18 | 134 |
| **102**** | Spring | 27 | 6.2 | 3041 | 1470 | 2.3 | 142 | 1 | 486 | 189 | 289 | 62 | 340 |
| **161**** | Well | 11 | 7.2 | 419 | 226 | 0.7 | 21 | 22 | 17 | 33 | 11 | 12 | 43 |
| **165**** | Well | 18 | 7.5 | 469 | 293 | 0.6 | 22 | 0 | 22 | 28 | 16 | 12 | 57 |

**Table S2**. Chemical composition of rock samples.

| | FR | XX | ON | TB | TG | TV |
|---|---|---|---|---|---|---|
| | *wt%* | *wt%* | *wt%* | *wt%* | *wt%* | *wt%* |
| **$CaCO_3$** | 52.6 | 68.5 | nd | 63.5 | 97.1 | 93.3 |
| **CaO** | - | - | 28 | - | - | - |
| **$Na_2O$** | 0.07 | 0.25 | 0.82 | 0.28 | 0.35 | 0.04 |
| **MgO** | 0.68 | 1.98 | 0.46 | 2.32 | 0.74 | 0.28 |
| **$K_2O$** | 0.36 | 1.74 | 3.18 | 2.06 | 0.64 | 0.19 |
| **$SiO_2$** | 6.93 | 15.1 | 30.9 | 21.5 | 1.9 | 3.68 |
| **$Al_2O_3$** | 0 | 0.11 | 6.14 | 0.21 | 0 | 0.08 |
| **MnO** | 0.69 | 0.53 | 1.86 | 0.14 | 0 | 0.64 |
| **$Fe(OH)_3$** | 41.7 | 10.8 | 31.8 | 4.42 | 0 | 0.29 |
| **Total** | 103 | 98.9 | 103 | 94.5 | 101 | 98.5 |

| | FR | XX | ON | TB | TG | TV |
|---|---|---|---|---|---|---|
| | *ppm* | *ppm* | *ppm* | *ppm* | *ppm* | *ppm* |
| **Ti** | 55 | 634 | 1218 | 1182 | 0 | 93 |
| **V** | 0 | 70 | 256 | 52 | 0 | 0 |
| **Cr** | 5 | 9 | 22 | 27 | 5 | 7 |
| **Co** | 0 | 7 | 18 | 6 | 0 | 0 |
| **Ni** | 5 | 2 | 17 | 10 | 0 | 8 |
| **Cu** | 0 | 3 | 24 | 5 | 0 | 0 |
| **Zn** | 18 | 22 | 52 | 20 | 0 | 0 |
| **As** | 784 | 15 | 496 | 12 | 22 | 5 |
| **Rb** | 9 | 98 | 69 | 110 | 7 | 15 |
| **Sr** | 751 | 969 | 382 | 1091 | 314 | 14 |
| **Zr** | 0 | 18 | 328 | 26 | 0 | 0 |
| **Nb** | 0 | 0 | 25 | 6 | 0 | 0 |
| **Mo** | 0 | 0 | 19 | 0 | 0 | 0 |
| **Te** | 6 | 5 | 15 | 8 | 4 | 6 |
| **Cs** | 1 | 6 | 11 | 9 | 1 | 2 |
| **Ba** | 43 | 412 | 1016 | 348 | 7 | 168 |
| **Pb** | 16 | 10 | 69 | 21 | 0 | 0 |
| **U** | 1 | 2 | 25 | 3 | 0 | 3 |

## References

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