

Particulate Matter in an Urban–Industrial Environment: Comparing Data of Dispersion Modeling with Tree Leaves Deposition

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Supplementary Material

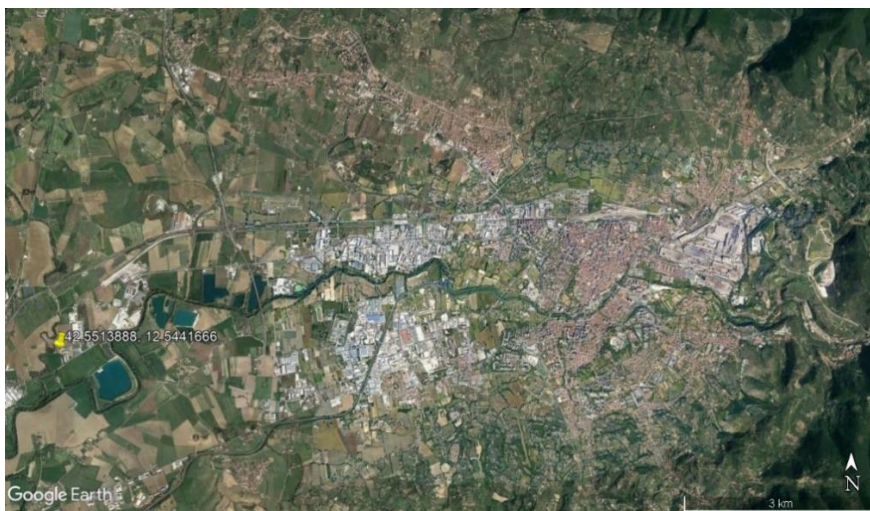


Figure S1 – Narni Scalo (Terni – Italy) Meteorological station position.

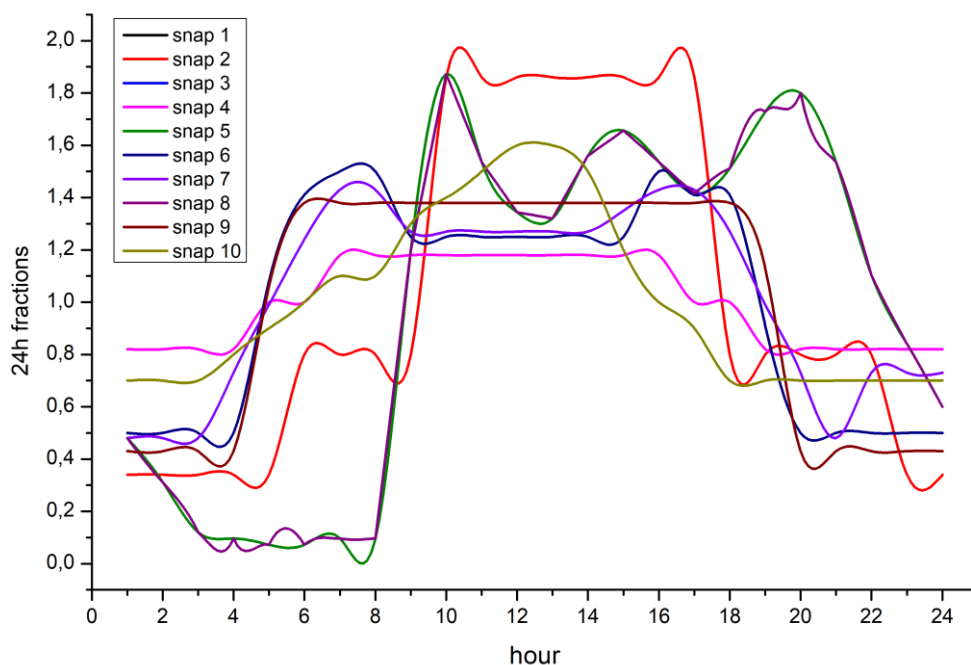


Figure S2 – Daily profile per each macro-sector (SNAPs) adopted for temporal disaggregation process on annual emissions database. SNAPs codes: 1) Power plants; 2) House heating; 3) Industrial combustion; 4) Production process (steel); 5) Solvents; 6) Transport; 7) Other mobile sources; 8) Waste management; 9) Agriculture; 10) Nature.

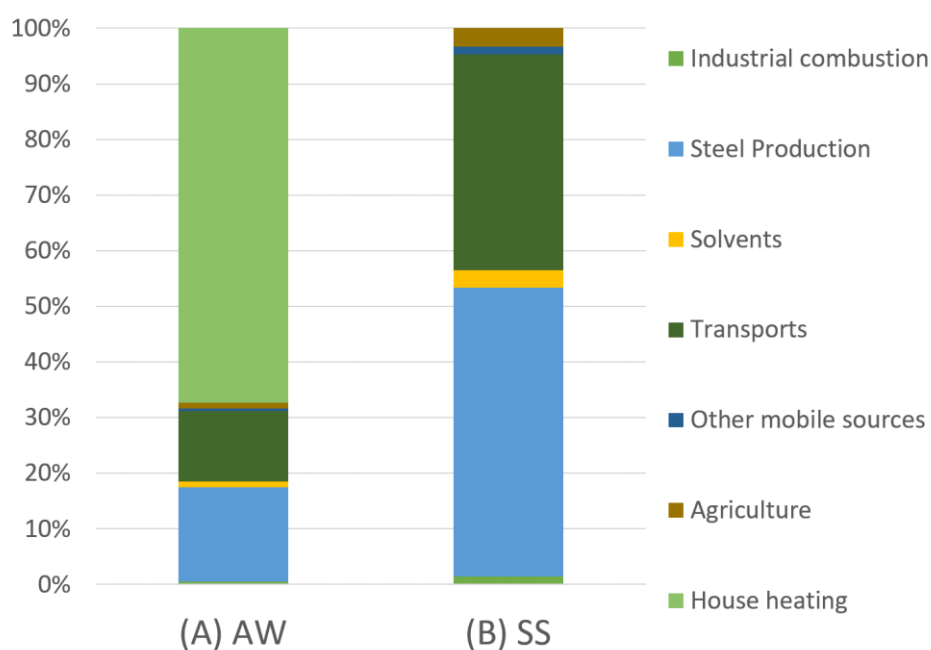


Figure S3 – PM10 emissions contribution (%) for autumn-winter (A) and spring-summer (B) period in Terni area for the main pollutants sectors for 2012 (source: ARPA Umbria).

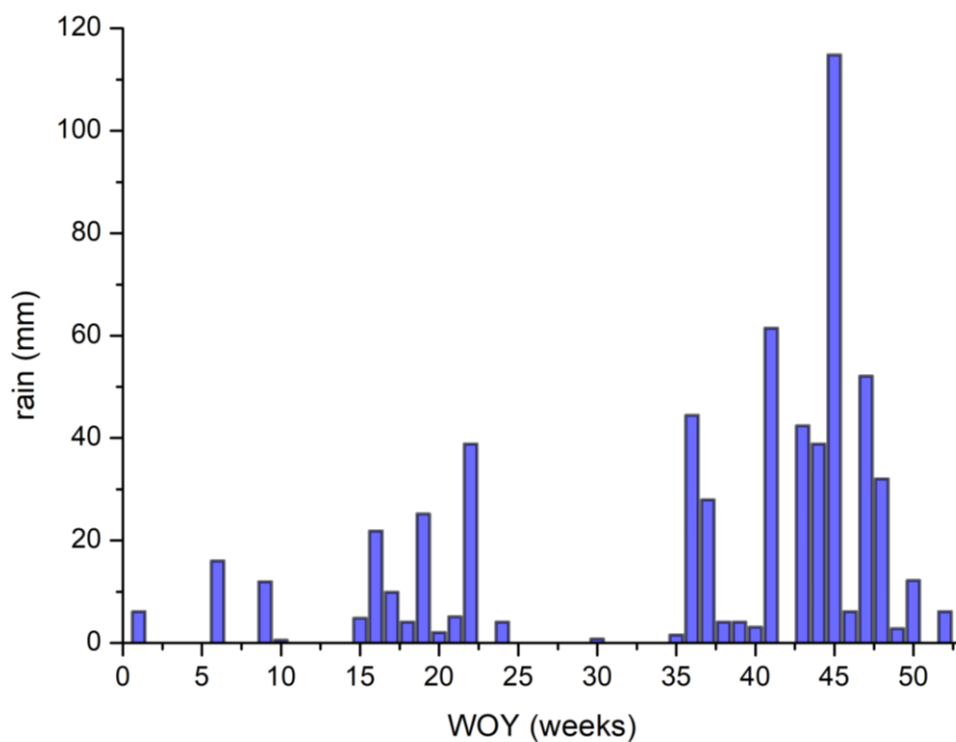


Figure S4 – Rain (mm) fallen weekly in the study area (cumulative daily value).

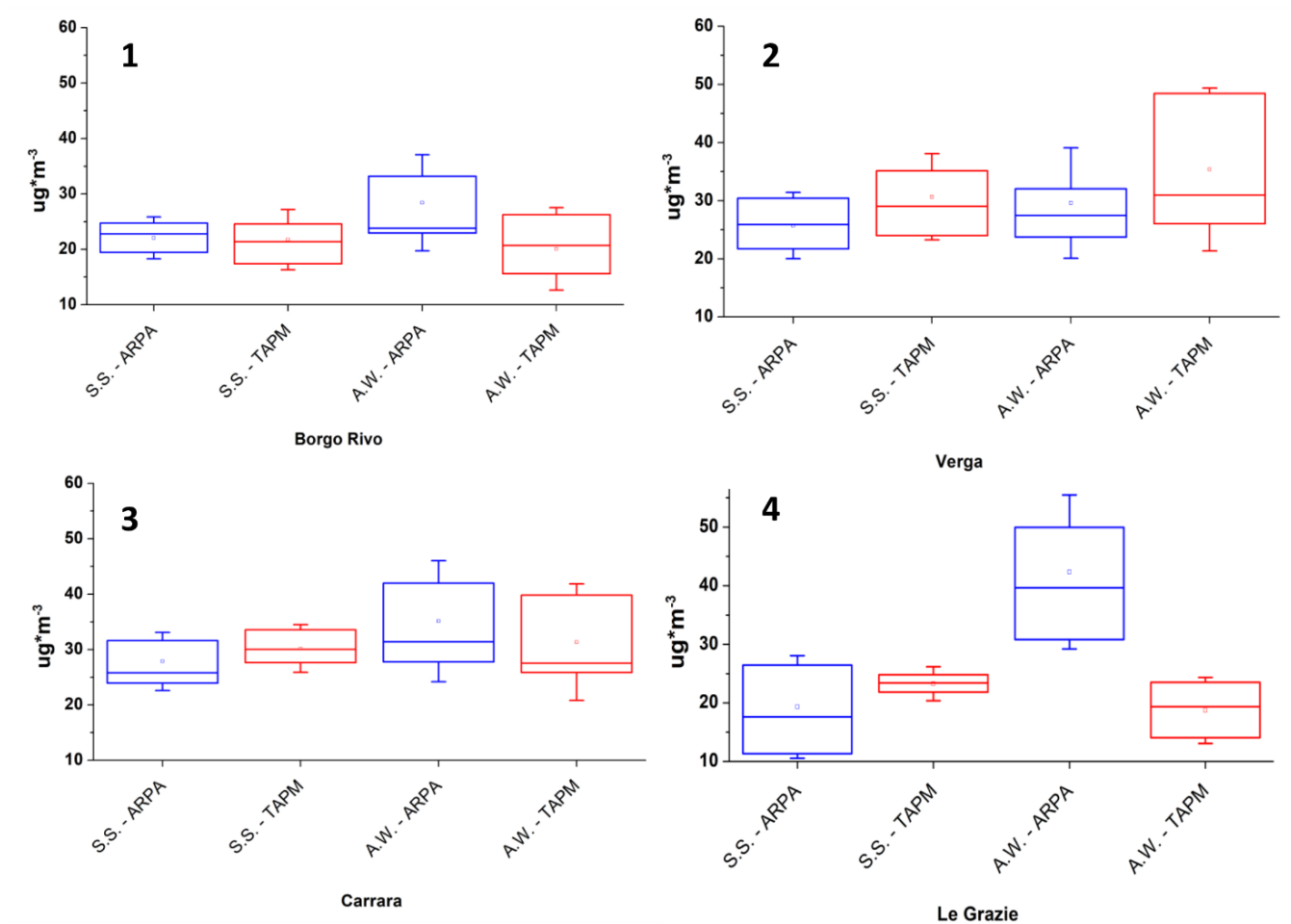


Figure S5 – Boxplot for seasonal average comparison: spring - summer (S.S.) and autumn - winter (A.W.). PM10 air concentration data ($\mu\text{g}\cdot\text{m}^{-3}$) comparison between TAPM model predictions (red boxes) and ECS - ARPA ground data (blue boxes). The four districts are (1) Borgo Rivo, (2) Verga, (3) Carrara, (4) Le Grazie.

Table S1 – Detailed values of averages, and relative standard errors of all results from Leaf sampling data, Environmental Control Stations and Model output.

| | Record | Borgo Rivo | s.e. | Verga | s.e. | Carrara | s.e. | Le Grazie | s.e. |
|--|-------------|-------------|-----------|-------------|------------|-------------|-----------|-------------|-----------|
| LEAF SAMPLING ($\mu\text{g}\cdot\text{m}^{-2}$) | Jan | 23.5 | ± 5.4 | 14.2 | ± 2.6 | 11.1 | ± 3.5 | 23.7 | ± 2.9 |
| | Apr | 11.3 | ± 1.3 | 12.6 | ± 1.8 | 18.5 | ± 1.8 | 28.1 | ± 2.3 |
| | Aug | 25.8 | ± 2.1 | 21.4 | ± 2.2 | 19.8 | ± 1.2 | 25.9 | ± 1.9 |
| | Oct | 17.8 | ± 1.8 | 22.0 | ± 1.3 | 25.9 | ± 2.9 | 25.3 | ± 2.6 |
| | Jan '13 | 15.7 | ± 1.4 | 12.5 | ± 1.6 | 17.8 | ± 1.3 | 19.1 | ± 1.9 |
| | AVG | 18.8 | ± 2.6 | 16.5 | ± 2.1 | 18.6 | ± 2.4 | 24.4 | ± 1.5 |
| ECS (ARPA) ($\mu\text{g}\cdot\text{m}^{-3}$) | Apr | 18.9 | ± 1.6 | 22.7 | ± 5.1 | 22.5 | ± 0.5 | 23.5 | ± 4.1 |
| | Aug | 15.8 | ± 0.1 | 31.7 | ± 0.3 | 32.0 | ± 1.9 | 15.8 | ± 5.0 |
| | Oct | 25.5 | ± 0.2 | 29.0 | ± 3.6 | 30.8 | ± 2.7 | 47.3 | ± 1.4 |
| | Jan '13 | 26.1 | ± 0.3 | 37.5 | ± 10.1 | 44.4 | ± 8.2 | 53.6 | ± 6.4 |
| | A.W. | 27.7 | ± 1.2 | 30.8 | ± 1.2 | 34.3 | ± 1.5 | 40.4 | ± 1.9 |
| | S.S. | 22.9 | ± 1.3 | 24.8 | ± 1.4 | 27.9 | ± 1.7 | 21.2 | ± 2.3 |
| TAPM (MODEL) ($\mu\text{g}\cdot\text{m}^{-3}$) | Apr | 15.6 | ± 1.6 | 22.5 | ± 1.5 | 29.0 | ± 1.0 | 23.1 | ± 0.3 |
| | Aug | 23.8 | ± 0.1 | 28.9 | ± 0.1 | 31.6 | ± 1.5 | 23.8 | ± 1.0 |
| | Oct | 28.1 | ± 0.2 | 42.9 | ± 6.0 | 40.6 | ± 3.2 | 25.4 | ± 0.4 |
| | Jan '13 | 21.3 | ± 0.3 | 53.5 | ± 0.6 | 42.3 | ± 1.6 | 25.3 | ± 1.9 |
| | A.W. | 20.2 | ± 1.0 | 39.7 | ± 1.8 | 34.0 | ± 1.3 | 20.5 | ± 0.8 |
| | S.S. | 21.2 | ± 0.7 | 27.5 | ± 1.6 | 28.1 | ± 1.0 | 21.6 | ± 0.5 |

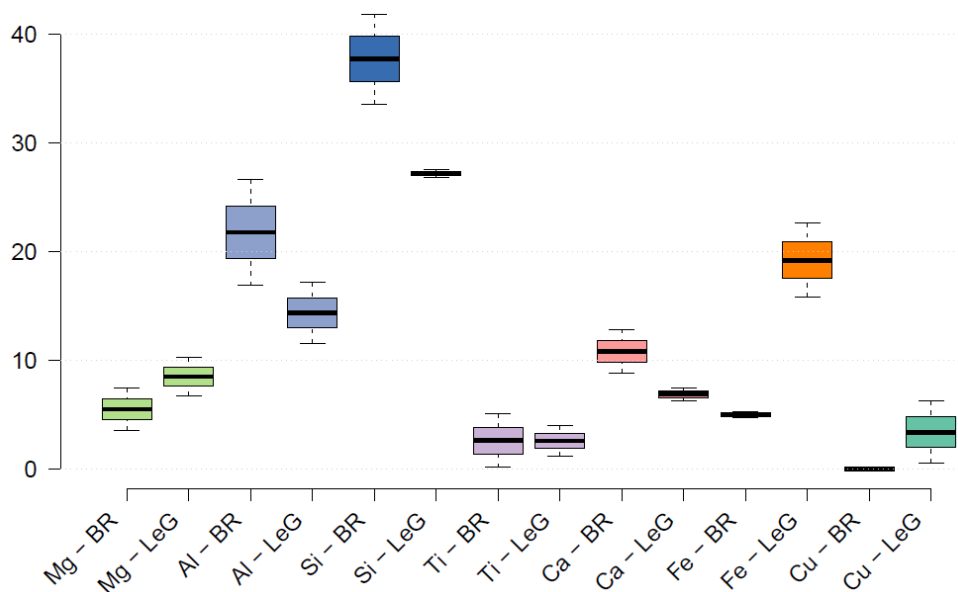


Figure S6 – Elemental composition of PM10 (main elements comparison in percentage - %) on filters from V/F analysis for two districts (BR – Borgo Rivo and LeG – Le Grazie).