

Improving PM_{2.5}/10 modelling results through development of the new hourly temporal emission profile

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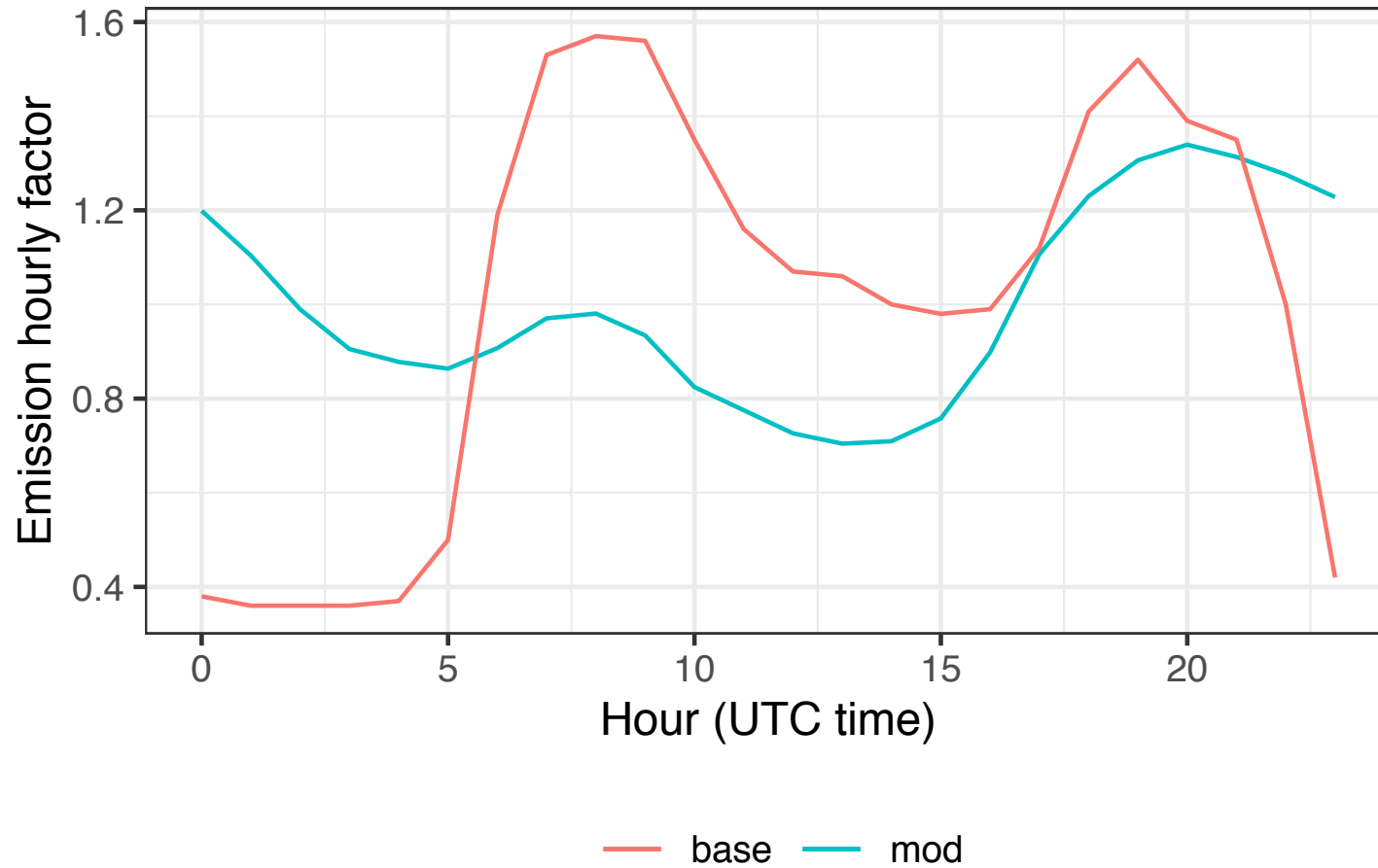
Aims

- Develop the hourly emission profile for residential heating emission using hourly measurements of PM2.5 and PM10
- Run the EMEP4PL model with default and new emission profile and compare the results

Methods & data

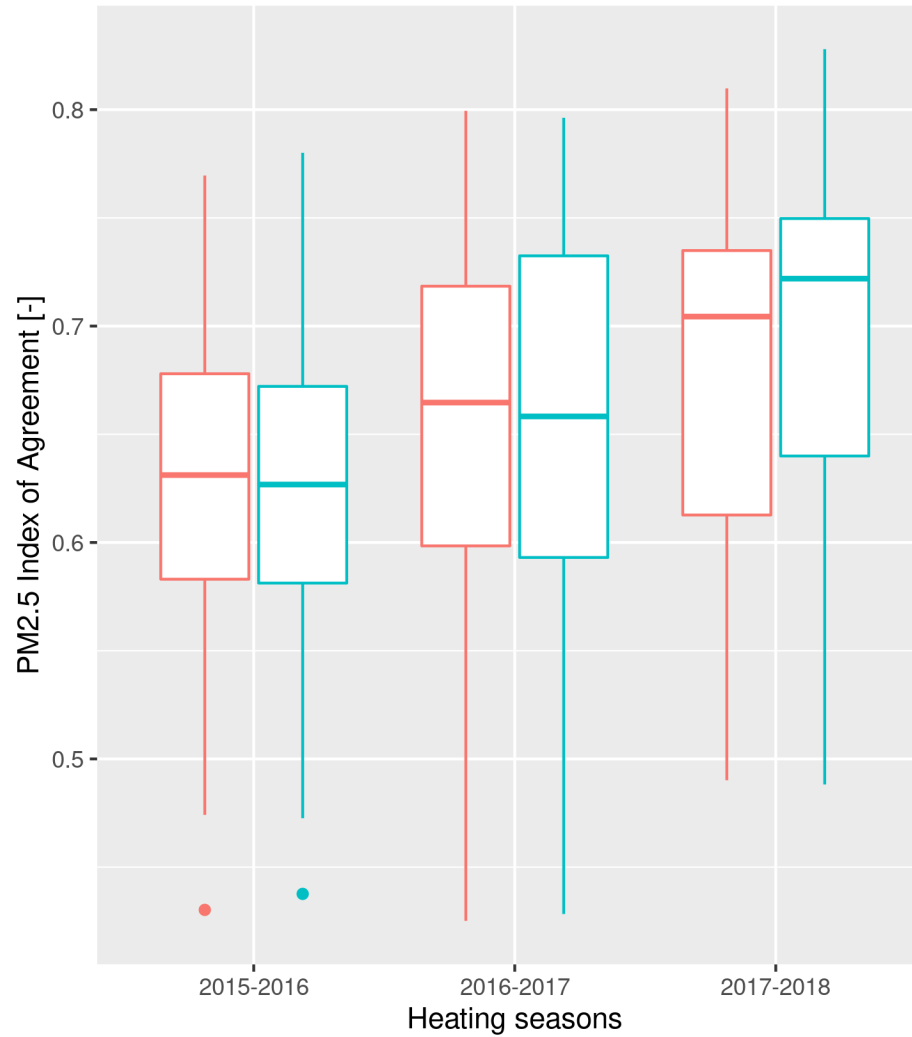
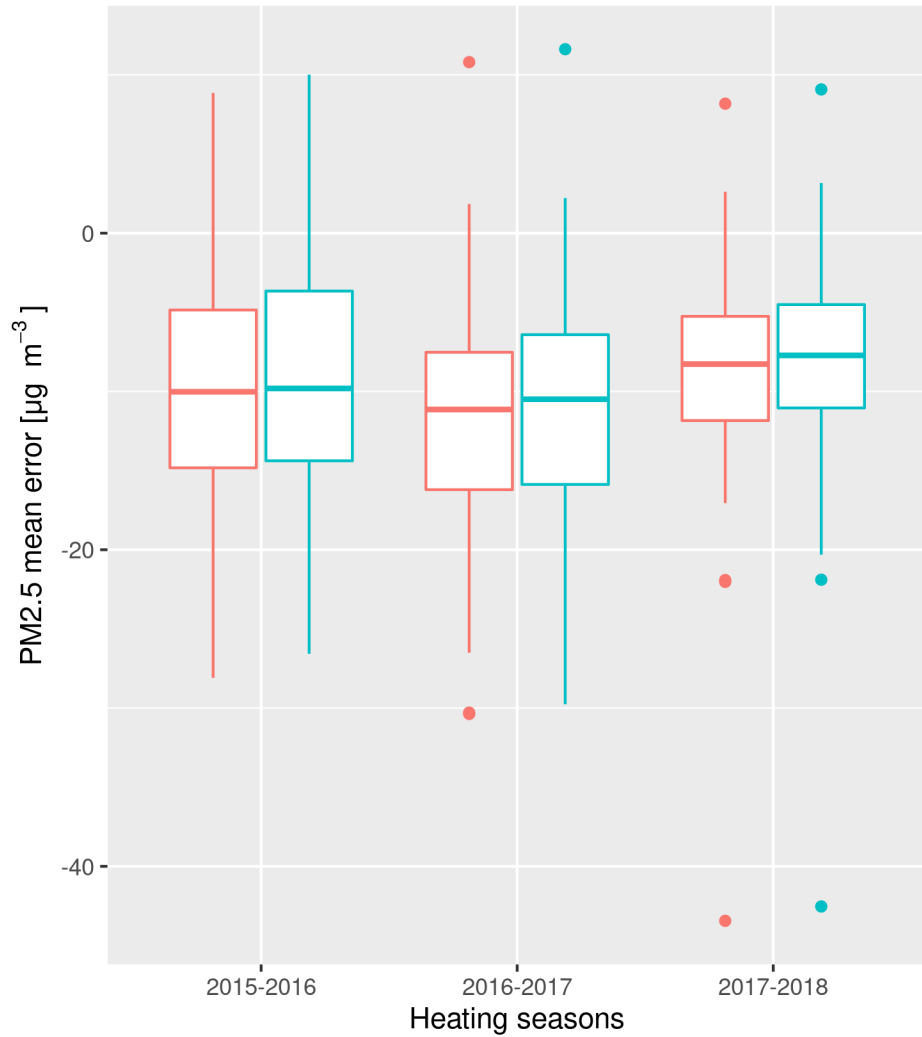
- New profile development:
 - PM10 measurements heating season: Oct 2017 to Mar 2018 (HS) and warm season: Apr – Sep 2018 (WS).
 - Calculate mean HS and WS concentration and select 25% of stations with the highest HS/WS ratio
 - For each selected station, for each hour divide sum of PM10 concentrations for a given hour by sum of PM10 concentrations for a given station for HS
- EMEP4PL runs & tests
 - Tests for 2015/2016, 2016/2017 and 2017/2018 heating seasons
 - EMEP4PL run with default (base) and new (mod) hourly emission profile
 - EMEP4PL modelled PM2.5 and PM10 concentrations compared with measurements

Results – default and new profiles



- Base and modified profiles with peaks for the same hours
- Modified profile is more flat, especially for the morning peak
- Night time emission is higher for the new profile

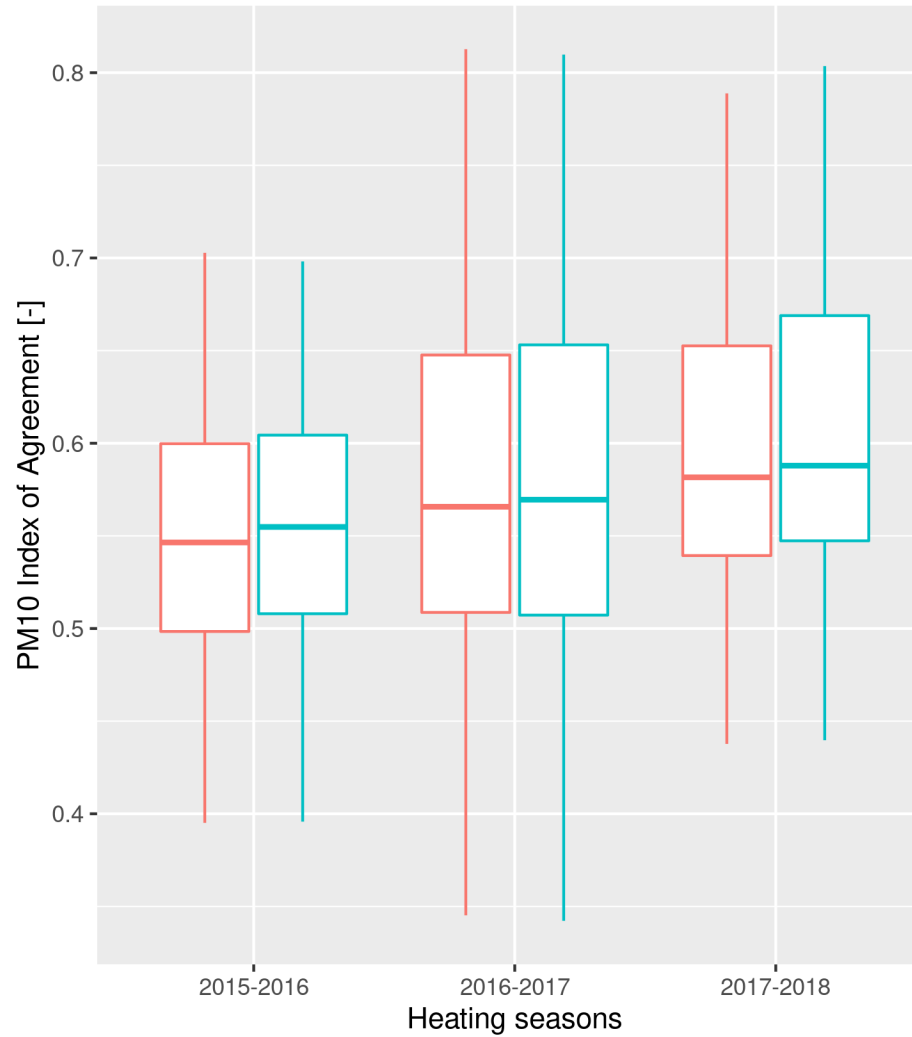
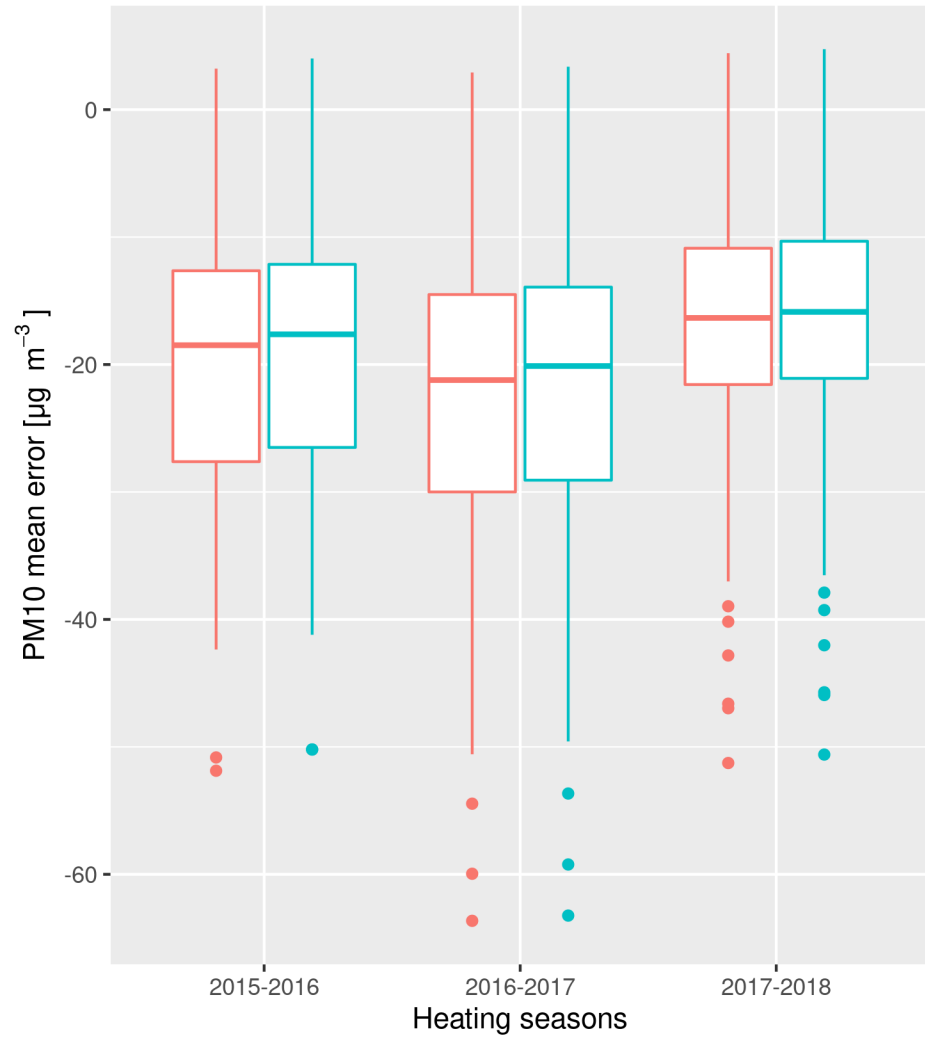
Results – PM2.5 concentrations



Each box summarizes model performance for all stations and a given heating season.

base mod

Results – PM10 concentrations



Each box summarizes model performance for all stations and a given heating season.

base mod

Summary & conclusions

- New hourly emission profile for residential combustion has been developed using hourly measurements of PM10 in Poland
- New profile is more flat if compared to the default EMEP4PL profile, but show peaks for the same hours
- Application of the new profile:
 - Reduces mean error for PM2.5 and PM10
 - Has limited impact on Index of Agreement, except for the 2017-2018 HS for PM2.5

Acknowledgements

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