

Interactive comment on “Development and intercity transferability of land-use regression models for predicting ambient PM₁₀, PM_{2.5}, NO₂ and O₃ concentrations in northern Taiwan” by Zhiyuan Li et al.

Anonymous Referee #1

Received and published: 24 December 2020

Air pollution exposure estimates are highly dependent on the high-density observational network of atmospheric pollutants. Nevertheless, due to the limitation of factors such as harsh terrain, economic development level, and road accessibility, the routine air quality measurement sites are extremely lacking and calls for novel methods to fill out the data gap. The manuscript by Li et al. attempted to develop land-use regression (LUR) models to estimate several major atmospheric pollutants and to evaluate the transferability of LUR models between nearby cities in northern Taiwan region. To the best of my knowledge, this is one of a kind given its uniqueness in considering the

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predictor variables and forward regression methods applied. Meanwhile, I noticed that transferability of the city-specific air pollutant LUR models exhibit large uncertainties except for NO₂ LUR model, indicating there is still large room to be improved. Overall, this manuscript is logically structured and well written. Therefore, I recommend a minor revision before its acceptance for publication in ACP. The following is my specific comments that need to be addressed. Specific comments: 1. The transferability of LUR models across areas or cities varies greatly, given the large regional variability of predictive performances of LUR models. The authors are encouraged to strengthen the motivation why they developed one model to predict the air quality in northern Taiwan, or highlight/discuss the strengths of their LUR model, compared with previously established model. 2. L33-34: The health effect of aerosol is not adequately cited since air pollution has been well recognized to adversely affect cardiovascular diseases. The authors are suggested to consider citing Sun et al. 2011 (doi: 10.1161/CIRCULATIONAHA.109.893461); Yin et al. 2020 (doi: 10.1021/acs.estlett.9b00735) 3. L39: “estimating” -> “estimate” 4. L213: “Traffic emission is a major source of air pollution in urban areas of the TKMA (Lee et al., 2014; Wu et al., 2017).” Please be more specific regarding the contribution of traffic emission to air pollution in TKMA, e.g., what is the percentage? 5. L317-320: I am confused with the logic that the weak correlation between air pollution LUR model derived results and nearby-station measurements (Figure 6), makes the author believe in the notion that thereby air pollution LUR models may provide more accurate exposure estimates than nearby-station measurements. Please clarify it.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-950>, 2020.

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