



Supplement of

Spatiotemporal continuous estimates of daily 1 km PM_{2.5} from 2000 to present under the Tracking Air Pollution in China (TAP) framework

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Table S1. The R^2 of linear regressions between various reanalysis meteorological data products and measurements from local monitors.

| Products | Spatial resolution | Temperature at 2 m | Wind speed at 10 m |
|-----------|--------------------|--------------------|--------------------|
| ERA5-Land | 0.1 degree | 0.94 | 0.30 |
| ERA5 | 0.25 degree | 0.82 | 0.01 |
| MERRA-2 | 0.5×0.625 degree | 0.95 | 0.26 |

Table S2 The types of roads used in this study

| This study | OpenStreetMap | Survey road map |
|----------------|----------------------------------|-----------------------------------|
| High way | Motors | High way |
| Primary road | Trunk and primary road | National road and provincial road |
| Secondary road | Secondary road and tertiary road | County road |

Table S3. Correlation coefficients of comparisons between various road length data

| | Year | Highway | Primary road | Secondary road |
|--|------|---------|--------------|----------------|
| OpenStreetMap and survey map | 2014 | 0.88 | 0.74 | 0.35 |
| OpenStreetMap and estimated OpenStreetMap | 2015 | 0.92 | 0.84 | 0.56 |
| Survey map and estimated OpenStreetMap | 2000 | 0.44 | | |
| | 2004 | 0.83 | 0.75 | 0.31 |
| | 2005 | 0.93 | 0.82 | 0.54 |
| | 2010 | 0.91 | 0.83 | 0.56 |
| | 2012 | 0.93 | 0.83 | 0.51 |
| | 2015 | 0.91 | 0.82 | 0.57 |

Table S4. Validation of the sum road length prediction model at the city level

| | Road type | Correlation coefficient |
|---|-----------|-------------------------|
| By-year cross validation (2013-2019) | High way | 0.68 |
| | Primary | 0.67 |
| | Secondary | 0.73 |
| Four-year cross validation (2013-2015) | High way | 0.64 |
| | Primary | 0.64 |
| | Secondary | 0.76 |

Table S5. Performance of the 2019 model with various meteorological predictors

| R^2 (RMSE) | Out-of-bag | Test data |
|--|------------|-----------|
| Full model | 0.85 | 0.85 |
| Remove precipitation | 0.84 | 0.85 |
| Remove precipitation, wind fields | 0.83 | 0.84 |
| Remove precipitation, wind fields, surface pressure | 0.82 | 0.83 |
| Remove precipitation, wind fields, surface pressure, relative humidity | 0.81 | 0.83 |
| Remove precipitation, wind fields, surface pressure, relative humidity and temperature | 0.80 | 0.83 |

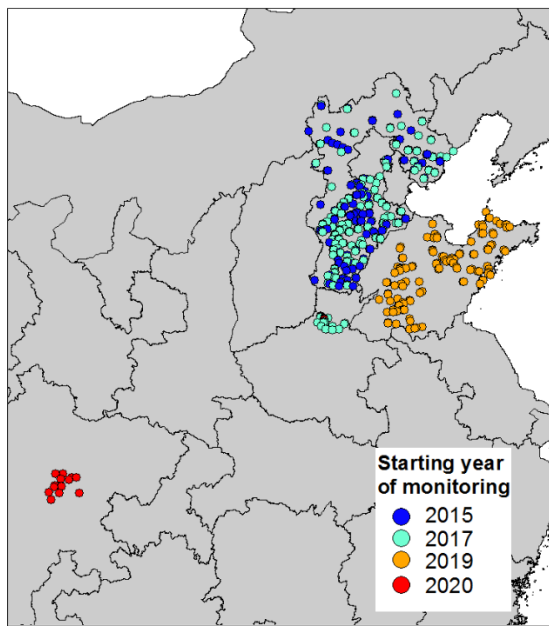


Figure S1. Location of local monitors with the year that monitoring started

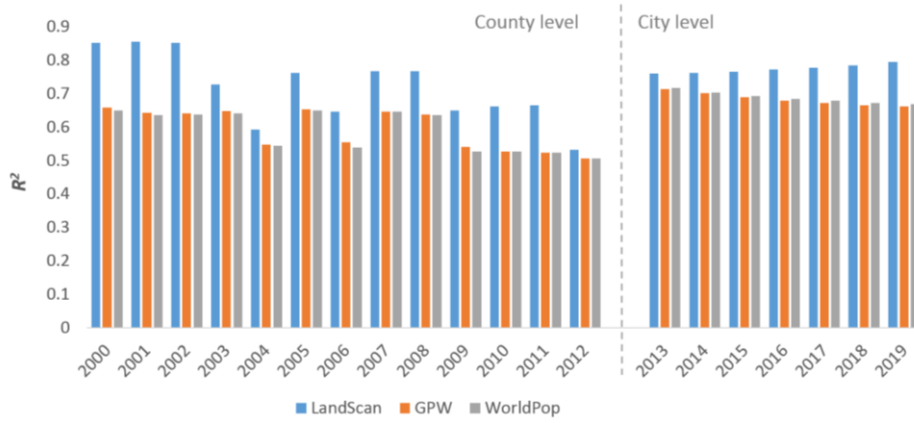


Figure S2. Population distribution dataset performance compared to the yearbook records at the county level (before 2013) and the city level (after 2013).

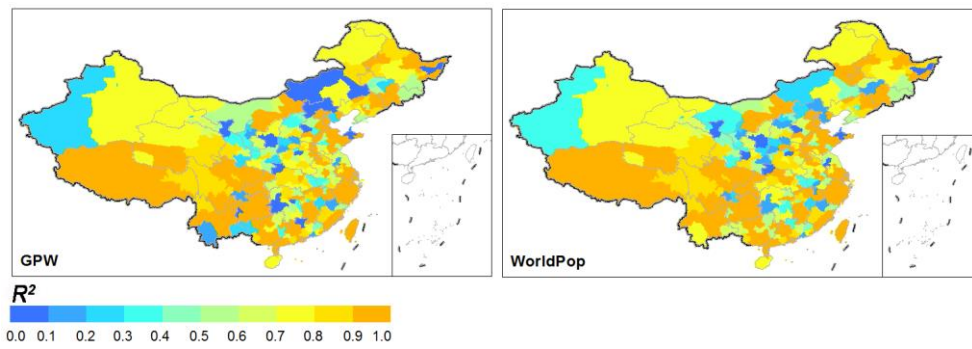
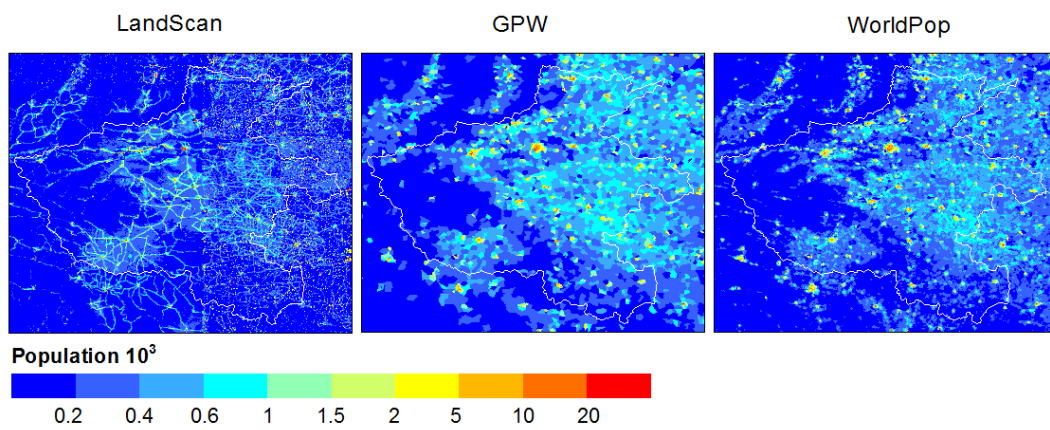
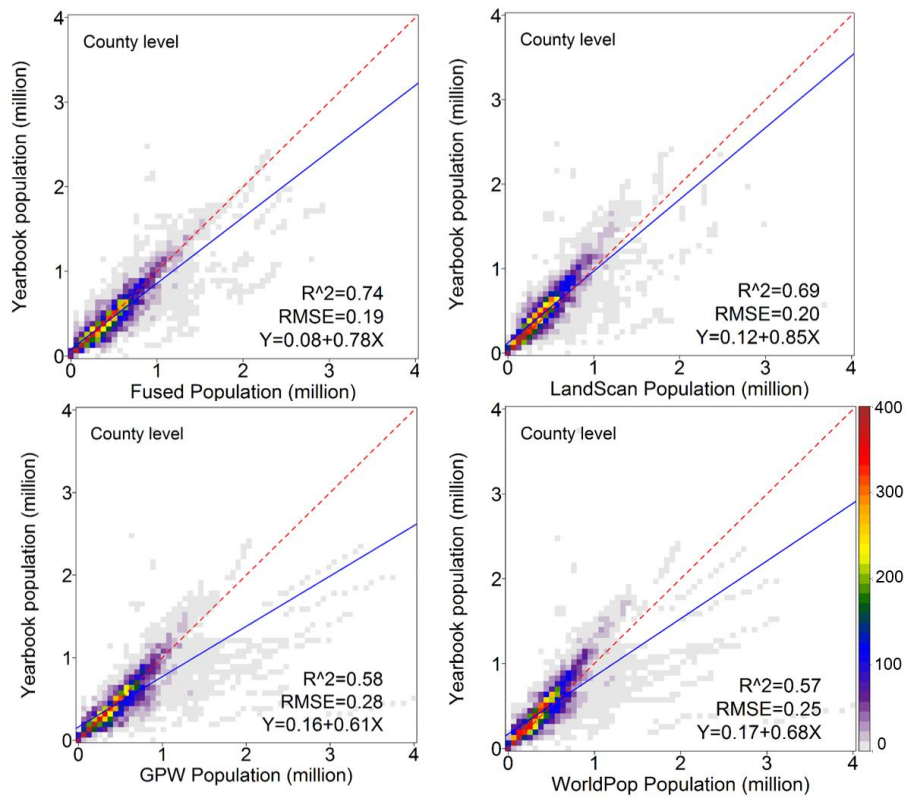


Figure S3. The spatial distribution of the coefficient of determination of the GPW and WorldPop gridded population products.



Supplementary Figure 4. The spatial distribution of population of LanScan, GPW, and WorldPop over Henan province in 2000.



Supplementary Figure 5. The population distribution dataset performance compared to the yearbook records at the county level (before 2013) and the city level (after 2013).