

Where does nighttime light come from? Insights from source detection and error attribution

Supplementary Materials

1. Refined parcel compared to original

Parcel purity assessed by visualization is not always reliable. Original parcels with various land usage mixed their profiles together (Figure S1a), where it's difficult to extract the land use fractions. In contrast, refined ones are much easier to be unmixed, as (Figure S1b) shows. From Figure S. 1b, still three types are mixed up. Merging these three types into a new type would averagely purify the parcels compared to not being merged. Therefore, types to be merged in the article are selected according to this principle. Besides temporal profiles, temporal violinplots also shows the separability of original and refined parcels (Figures S2 and S3).



Figure S1. Temporal profile of original parcels (a) and refined parcels (b). Each line is plotted according to the temporal average nighttime light values of a certain type. 01 to 05 represents residential, commercial, industrial, transportation and public service land use types as Table 2 shows. L1 represents the Level 1 classification in EULUC-China.

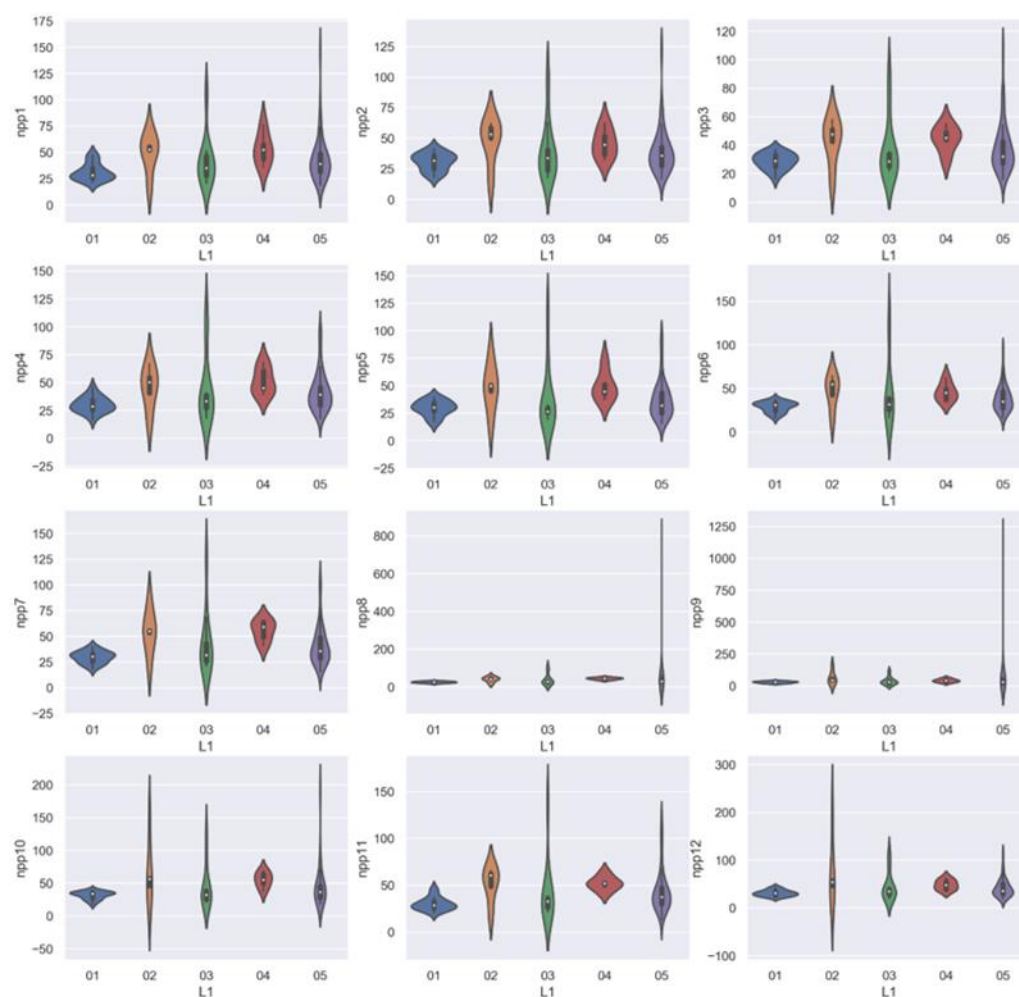


Figure S2. Temporal violinplots of original pixel values throughout twelve month (from left to right and then from top to bottom). Blue, yellow, green, red and purple violin represents residential, commercial, industrial, transportation and public service land use types.

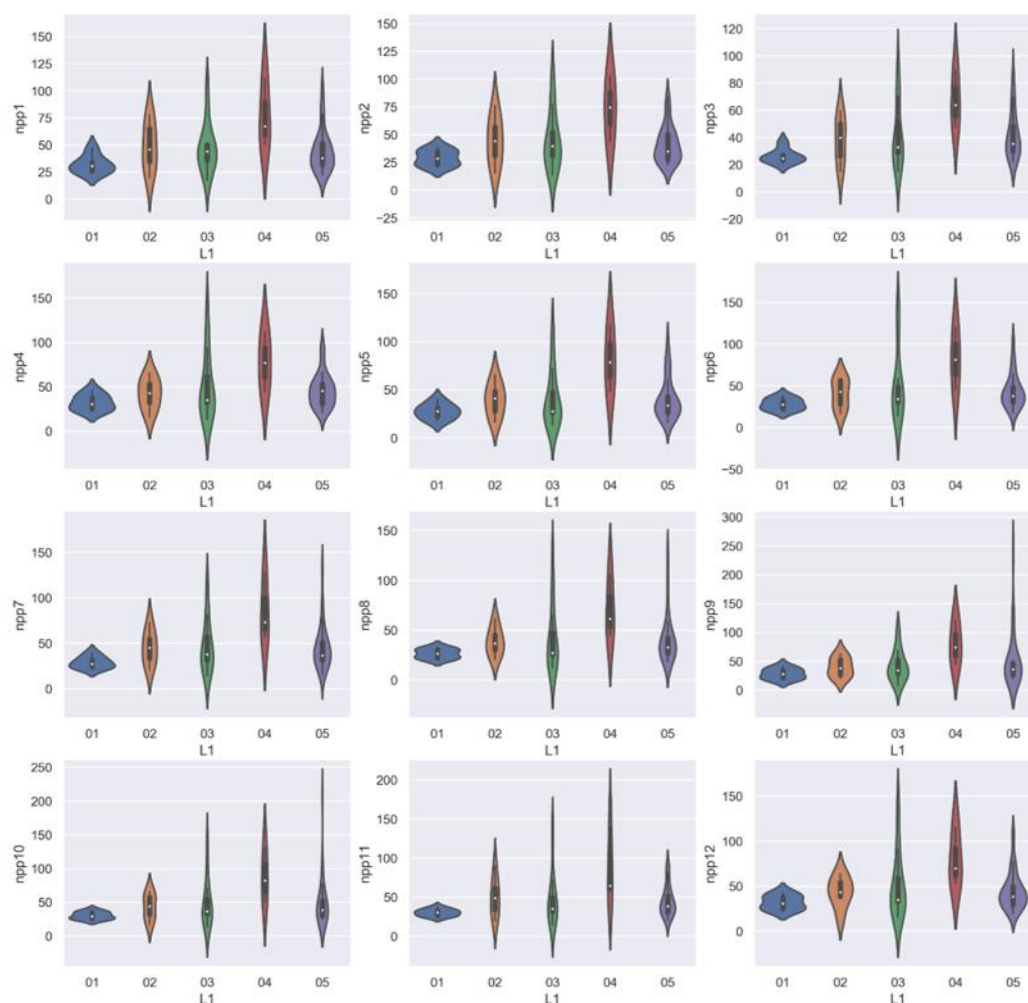


Figure S3. Temporal violinplots of refined parcel values throughout twelve month (from left to right and then from top to bottom). Blue, yellow, green, red and purple violin represents residential, commercial, industrial, transportation and public service land use types.

2 Explaining EULUC's Accuracy by Parcel Purity Class-based Accuracy

Parcel purity index series can not only attribute unmixing accuracy, it can also partly explain the accuracy of EULUC-China products since it shows high correlation with them (Table S. 3).

Table S1. Pearson's correlation between PPCA and class accuracy of EULUC-China 2018 from original parcels.

	Res (%)	Com (%)	Ind (%)	Tsp (%)	Pub (%)	R
POTLUM-SH	67.27	71.12	35.76	34.37	46.92	/
EULUC-UA	76.3	38.9	58.3	100	51.2	0.883
EULUC-PA	63.2	44.9	70.7	100	56.5	0.643