Summary:

Review of "Global warming will largely increase CH_4 emissions from waste treatment: insight from the first city scale CH_4 concentration observation network in Hangzhou city, China" by Hu et al. 2022 for Atmospheric Chemistry and Physics.

Hu et al. use atmospheric observations and modelling tools (lagrangian) to estimate methane emissions from an important Megacity. Relying on EDGAR V6.0 they analyse the sectorial contribution to atmospheric CH_4 enhancements and then optimize fluxes using a Bayesian framework. The results indicate an overestimate of local emissions by EDGAR V6.0. The seasonal bias between a priori and a posteriori fluxes is attribute to waste sector emissions and a temperature sensitivity is calculated. Using IPCC scenarios the authors than quantify the temperature-specific component of the waste sector emission factor changes for the coming decades.

Overall, the paper is clear and can be followed easily. However, the study lacks some critical assessments around the choice of EDGAR V6.0 and the implications of that choice. Furthermore, the study should be clearer on the fact that the suggested effect could be fully compensated by other parameters affecting the waste sector emission factor. It also would be useful to specify that a single city study should not be scaled globally, but that is surely has an important message for CH_4 emissions in Chinese Megacities. Given the importance of this region for future climate change this study is surely of interest to the wider scientific community and especially ACP readers. After addressing the general and specific comments this manuscript would appear suitable for publication.

Thanks so much for these detailed suggestions and we have made extensive revisions based on these comments.

General comments:

The title implies a global impact; however, it only provides results for one urban region. Also, country-specific waste management strategies (e.g. highly localized waste separation stations) call into question how much the results from this region can be extrapolated beyond Chinese Megacities.

Done as suggested, the global warming will lead temperature increase in China and most part of other countries. Here we only quantified the temperature sensitivity of waste treatment CH_4 emissions, and this sensitivity can be also used both for China and other countries, especially for urban areas.

We finally changed the title as "“Global warming will largely increase waste treatment CH_4 emissions in Chinese Megacities: insight from the first city scale CH_4 concentration observation network in Hangzhou city, China"

Besides, we added more discussion to make clarification as "Considering the temperature sensitivity of waste treatment CH_4 EFs are caused by microbial process at the regional scales, it can represent general conditions of different cities or landfills." on lines 551-553.

This study only assess the influence of temperature on the emission factor for waste although previous work has shown the importance of other meteorological parameters such as atmospheric pressure changes, water content and management strategies. It is unclear that local climate change would not also affect these parameters as well. This could reduce or strengthen the suggest increase in emissions. The authors also do not discuss how relevant temperature is as a parameter when compared to the others mentioned above.

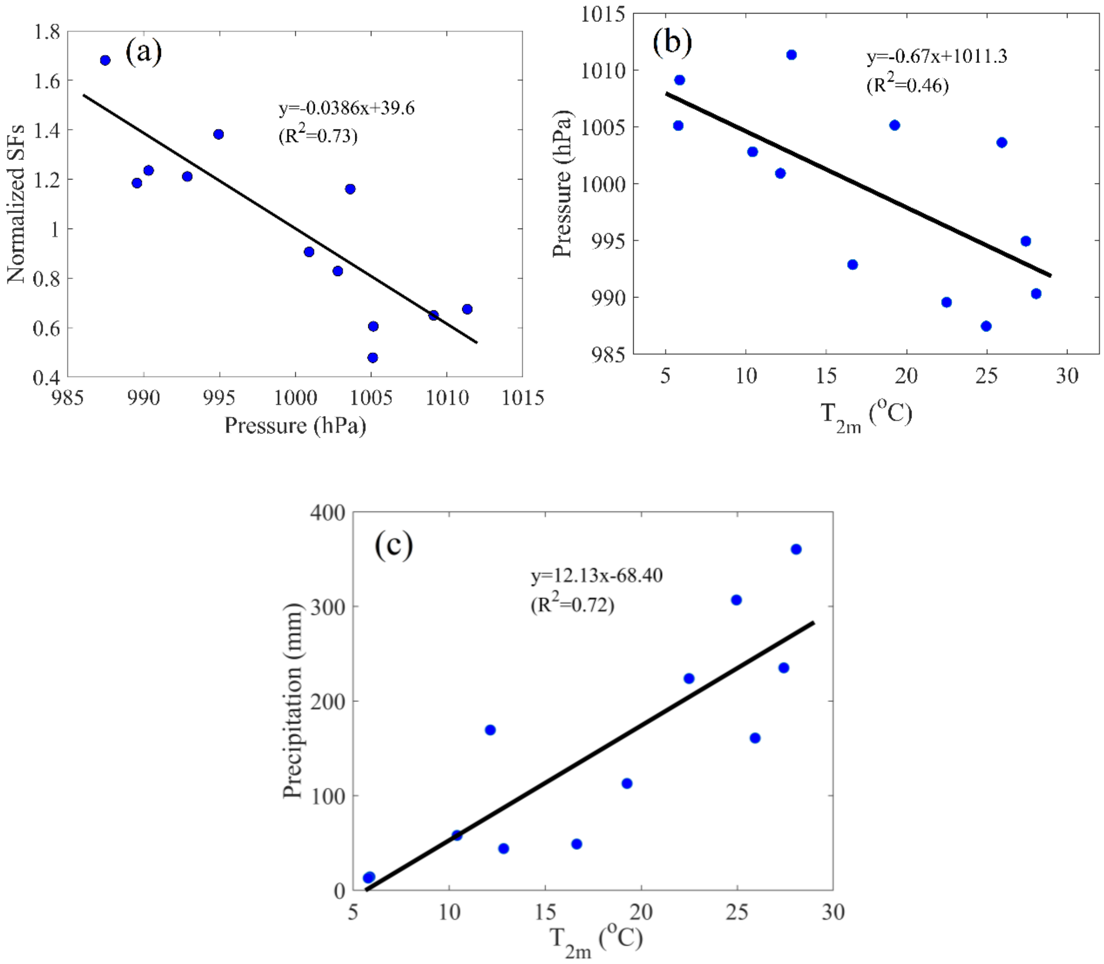

Figure S8. (a) Relationship between monthly averaged atmospheric pressure and normalized SFs, (b) relationship between monthly averaged atmospheric pressure and T_{2m}, and (c) relationship between monthly precipitation and T_{2m}

Done as suggested, we analyzed the relationship between monthly averaged atmospheric pressure and normalized SFs (Figure S8a), and the relationship between atmospheric pressure and T_{2m} (Figure S8b), and relationship between precipitation and T_{2m} (Figure S8c). They displayed positive linear relationship between precipitation and T_{2m}, and negative linear relationship between monthly averaged atmospheric pressure and normalized SFs, and between atmospheric pressure and T_{2m}. Considering air temperature always displays negative relationship with atmospheric pressure as warmer air temperature, lighter air mas and lower atmospheric pressure in summer, and colder air temperature, heavier air mass and higher atmospheric pressure in winter. Hence, the temperature can be used to represent co-influence of both temperature and atmospheric pressure, and we only focus on the influence of temperature on CH_4 emissions and will add more supporting data in following research.

We added this figures in Supplementary file and also added more clarification on lines 549-562 as "We should note the precipitation, soil water content and atmospheric pressure can also have obvious influence on CH_4 emissions, and considering the fact that we have not conducted field measurement in landfills and landfills are usually covered by metal or plastic in China to avoid the spread of odor smell, hence reanalysis data cannot represent real soil water contents in these site scale landfills. Precipitation and atmospheric pressure showed obvious linear relationship with temperature as displayed in Figure S8. They displayed positive linear relationship between precipitation (affect water content) and T_{2m}, and negative linear relationship between monthly averaged atmospheric pressure and T_{2m}. We also found negative relationship between atmospheric pressure and normalized SFs (Figure S8a). Considering air temperature always displays negative relationship with atmospheric pressure as warmer air temperature coincides with lighter air mas and lower atmospheric in summer, and colder air temperature coincides with heavier air mass and higher atmospheric pressure in winter. Hence, the temperature can be used to represent co-influence of both temperature and atmospheric pressure, and we only focus on the influence of temperature on CH_4 emissions and will add more supporting data in following studies.".

As replied in details below, we answered why only using temperature in this study. To make clarification, we added "We should note that new technology and other meteorological variables can also influence waste treatment CH_4 emissions. The reason to only use temperature in this study is mainly for the reason that we only constrained the emission at monthly scale in one year, and derived twelve datasets of *posteriori* CH_4 emissions. Besides, temperature is considered as the main factor in controlling monthly and annual variations of waste treatment CH_4 emissions, and can be used to represent co-influence of other meteorological parameters as atmospheric pressure. We will use multiple years' CH_4 concentration to quantify the influence of new technology and other meteorological variables on waste treatment CH_4 emissions in our following study, and we suggest other tracers (i.e. ethane, $^{14}CH_4$) are also important to separate CH_4 emissions from biological and fossil CH_4 emissions." on lines 677-686.

This study uses EDGAR CH4 without critically assessing its limitations. EDGAR is coarse resolution 0.1x0.1 degree for urban studies and was shown to have biases in some high-density urban areas. e.g. Vogel et al. 2012 (https://doi.org/10.1080/1943815X.2012.691884). Why do you rely solely on EDGAR and why do you believe its spatial disaggregation to be correct?

Thanks so much for this suggestion, the reason to choose EDGAR is that (1) We agree that there are many CH_4 inventories for other developed regions and countries (i.e. France, U.S.A., Germany) with high resolutions, but for all available CH_4 inventories that covered China, the spatial resolution of EDGAR ($0.1^o \times 0.1^o$) is the highest, and the update date for EDGAR is most to date; (2) most of previous studies that constrain emissions by atmospheric inversion studies have chosen EDGAR, and our results can be used to compare with previous studies; (3) our preliminary simulation of CH_4 concentrations showed generally good performance with observations, indicating its spatial distributions in Hangzhou city can be with relatively small bias even with potential large bias for magnitude, which will be constrained by our inversion method. We will apply more inventories in the following study by using multiple years' CH_4 observations as noted in this MS.

To make clarifications, we added "We should note there are many CH_4 inventories for some developed regions and countries (i.e. France, U.S.A., Germany) with high spatial resolutions, the reasons to choose EDGAR as *a priori* anthropogenic emissions are: (1) for all available CH_4 inventories that covered China, the spatial resolution of EDGAR ($0.1^o \times 0.1^o$) is the highest, and it provide most up-to date results; (2) most of previous studies that constrain emissions by atmospheric inversion studies also chose EDGAR, and our results can be directly compared with previous studies; (3) the preliminary simulation of CH_4 concentrations showed generally good performance with observations, indicating its spatial distributions in Hangzhou city has relatively small bias even with potential large bias for magnitude, which will be constrained by our atmospheric inversion method." on lines 246-255.

Specific comments:

Line 36 and line 75:

Please provide a source for the claim that waste emissions contribute over 50% of CH_4 emissions at city-scale. For which cities and regions does this apply?

Done as suggested, we revised this sentence as "Furthermore, its contribution is even larger than 50% at city scale especially for megacities, where both active and closed household waste (including landfills and waste water systems) are located and found as super emitters (Williams et al., 2022; Maasakkers et al., 2022). A large number of Chinese landfills were mainly constructed at the suburban more than 5-10 years ago, and with the urban area expanding in recent decades, the locations of many landfills are now in urban scope (Zhejiang Statistical Yearbook 2018-2019). Besides, the decreasing area of agricultural sector (rice paddies and husbandry) in megacities also makes their emissions ignorable when compared with waste treatment." on lines 74-81. The reference was Maasakkers et al. (2022) and we added this refence here.

Also please provide evidence that most household waste is located in cities and not in landfills outside the cities. In some regions landfills are located outside the city limits.

Done as suggested. As surveyed for local conditions in Hangzhou city and some typical Chinese cities, the landfills were mainly constructed at the suburban more than 5-10 years ago, and with the urban area expanding in recent decades, the locations of many landfills are now in urban regions.

We added "A large number of Chinese landfills were mainly constructed at the suburban more than 5-10 years ago, and with the urban area expanding in recent decades, the locations of many landfills are now in urban regions (Zhejiang Statistical Yearbook 2018-2019)." on lines 77-79.

Zhejiang Provincial Bureau of Statistics, Survey Office of the National Bureau of Statistics in Zhejiang, Zhejiang Statistical Yearbook 2018-2019 (China Statistics Press, Beijing, China, 2019)

Line 75: Please add a critical discussion of the importance of active and closed landfills, waste water systems and household waste in residential areas. Recent work has shown that waste water can be a significant source at urban scale. E.g. Williams et al. 2022 (https://doi.org/10.1021/acs.est.2c06254).

Done as suggested, we added more discussion as "Furthermore, its contribution is even larger than 50% at city scale especially for megacities, where both active and closed household waste (including landfills and waste water systems) are located and found as super emitters (Williams et al., 2022; Maasakkers et al., 2022)." on lines 74-77.

Williams, J. P., Ars, S., Vogel, F., Regehr, A., & Kang, M. (2022). Differentiating and Mitigating Methane Emissions from Fugitive Leaks from Natural Gas Distribution, Historic Landfills, and

Manholes in Montréal, Canada. Environmental Science & Technology. https://doi.org/10.1021/acs.est.2c06254

Line 79-83: this review fails to mention the critical impact of atmospheric pressure changes on emissions. As shown by e.g. Kissas et al. 2022 (https://www.sciencedirect.com/science/article/pii/S0956053X21006310) and references therein. Emissions can be increased by orders of magnitude due to this effect.

Thanks so much for pointing it out, we added "atmospheric pressure" here, and citied this reference of Kissas et al. (2022).

Kissas K , Ibrom A , Kjeldsen P , et al. Methane emission dynamics from a Danish landfill: The effect of changes in barometric pressure. Waste Management, 2022, 138:234-242.

Line 137: Given the strong influence from barometric pressure on landfill CH4 emissions it is critical to discuss the clear-sky bias of satellites here. Satellite observations are too sparse to be up-scaled to estimate annual totals.

Done as suggested, we added "Given the strong influence from atmospheric pressure on landfill CH_4 emissions, satellite observations are too sparse to be up-scaled to estimate annual total because satellite observations are almost conducted in clear-sky conditions and cannot represent atmospheric pressure and CH_4 emissions in cloudy or rainy days." on lines 139-142.

Line 165: The described study can only assess the temperature component of the EF changes but neglects pressure changes as well as all the other factors outlined in line 79-83, e.g. water content oxidation efficiency, landfill gas collection.

As answered below for related questions, to make clarification, we added "We should note the precipitation, soil water content and atmospheric pressure can also have obvious influence on CH_4 emissions, and considering the fact that we have not conducted field measurement in landfills and landfills are usually covered by metal or plastic in China to avoid the spread of odor smell, hence reanalysis data cannot represent real soil water contents in these site scale landfills. Precipitation and atmospheric pressure showed obvious linear relationship with temperature as displayed in Figure S8. They displayed positive linear relationship between precipitation (affect water content) and T_{2m}, and negative linear relationship between monthly averaged atmospheric pressure and T_{2m}. We also found negative relationship between atmospheric pressure and normalized SFs (Figure S8a). Considering air temperature always displays negative relationship with atmospheric pressure as warmer air temperature coincides with lighter air mas and lower atmospheric in summer, and colder air temperature coincides with heavier air mass and higher atmospheric pressure in winter. Hence, the temperature can be used to represent co-influence of both temperature and atmospheric pressure, and we only focus on the influence of temperature on CH_4 emissions and will add more supporting data in following studies." on lines 549-562.

And also added "We should note that new technology and other meteorological variables can also influence waste treatment CH_4 emissions. The main reason to only use temperature in this study is that we only constrained the emissions at monthly scale in one year, and derived twelve datasets of *posteriori* CH_4 emissions. Besides, temperature is considered as the main factor in controlling monthly and annual variations of waste treatment CH_4 emissions, and can be used to represent co-influence of other meteorological parameters as atmospheric pressure. We will use multiple years' CH_4 concentration to quantify the influence of new technology and other meteorological variables on waste treatment CH_4 emissions in our following study, and we suggest other tracers (i.e. ethane, $^{14}CH_4$) are also important to separate CH_4 emissions from biological and fossil CH_4 emissions." on lines 677-686.

Line 273-282: How where these prior uncertainties calculated/determined? They seem to strongly differ from Solazzo et al. 2021 (https://doi.org/10.5194/acp-21-5655-2021)

Here in Solazzo et al. 2021 (https://doi.org/10.5194/acp-21-5655-2021)
, the uncertainty of CH_4 from waste treatment was 30%~50%, which was calculated mainly from activity data and EFs at the country scale, we should note many previous studies also found the uncertainty will largely increase with study region decrease, and also as stated on lines 118-120 "A recent study by comparing waste treatment CH_4 emissions among different inventories also reported that the EDGAR v5.0 and CEDS (Community Emissions Data System) inventories were 21~153% higher than other inventories", and "There was only one recent study by using satellite observations and focused on urban waste treatment CH_4 emissions, it found annual CH_4 emissions from four cities were 1.4 to 2.6 times larger than inventories in India and Pakistan," we finally choose to assign the larger uncertainty to better constrain CH_4 emissions. Furthermore, As found in this study for figure 7a, our research found the *a priori* monthly CH_4 emissions from waste treatment were 1.5-3 times of *posteriori* emissions.

To make clarification, we added "Although previous study derived uncertainty of CH_4 from waste treatment and other categories, which varied between 30% and 50%, these uncertainties were calculated mainly from activity data and EFs at the country scale on annual average (Solazzo et al. 2021). We should also note CH_4 emission uncertainty will largely increase with study region decreasing, as stated above the relative difference among different inventories can reach to 150%. Considering the disaggregation of spatial distributions and temporal variations, CH_4 emission uncertainties can be much larger at urban and monthly scales." on lines 295-301.

Solazzo, E., Crippa, M., Guizzardi, D., Muntean, M., Choulga, M., and Janssens-Maenhout, G.: Uncertainties in the Emissions Database for Global Atmospheric Research (EDGAR) emission inventory of greenhouse gases, Atmos. Chem. Phys., 21, 5655–5683, https://doi.org/10.5194/acp-21-5655-2021, 2021.

Line 287: Please provide a reference for the CCGCRV fitting method.
Done as suggested, we added the reference of "Thoning et al., 1989".

Thoning, K. W., Tans, P. P., and Komhyr, W. D.: Atmospheric carbon dioxide at Mauna Loa observatory 2. Analysis of the NOAA/GMCC data, 1974–1985, J. Geophys. Res.-Atmos., 94, 8549–8565, https://doi.org/10.1029/JD094iD06p08549, 1989.

Line 336: Please provide a reference for the emissions from waste separation stations.
Here we want to express the idea that besides the large waste landfills located in some special locations, the building of high density of waste separation stations will also potentially lead to CH_4 emissions, and we have added the reference which just mentioned the building of high density of waste separation

stations (Tian et al., 2022). but to our best knowledge, we have not found related studies that point out these CH_4 sources.

Tian, J., Gong, Y., Li, Y., Chen, X., Zhang, L., & Sun, Y. (2022). Can policy implementation increase public waste sorting behavior? The comparison between regions with and without waste sorting policy implementation in China. Journal of Cleaner Production, 132401.

Line 344: Please quantify the consistency of the temporal patterns by providing Pearson's r values for all time series shown in Figure 4.
Done as suggested, we added corresponding statistic data as "The mean bias (MB), root mean squared error (RMSE), and correlation coefficient (R) between daily observations and a priori simulations were 64.1 ppb, 129.2 ppb and 0.44, respectively, for Hangzhou site; and were -6.0 ppb, 57.1 ppb, 0.50 for Linan site, 36.2 ppb, 55.6 ppb, 0.54 for Damingshan site." on lines 380-383.

Line 357: The finding that waste dominates emissions here strongly relies on the spatial patterns of EDGER being correct also previous work has shown limitations of EDGAR to capture CH4 emission patterns in urban areas, see e.g. Pak et al. 2021 (https://doi.org/10.1016/j.atmosenv.2021.118319)
Here considering the fact that locations of landfills, which is the largest anthropogenic CH_4 emitter in Hangzhou city, are very close to the core urban area, hence we believe the spatial patterns of EDGAR in study region can be with much less bias as stated in above mentioned reference.

We also added more explanation to make clarification as "Although a few previous studies found limitations of EDGAR inventory to capture CH_4 emission patterns in some urban areas (Pak et al., 2021), here considering the fact that locations of landfills, which is the largest anthropogenic CH_4 emitter in Hangzhou city, are very close to the core urban area and in high consistence with EDGAR, hence we believe the spatial patterns of EDGAR in study region can be reliable.". on lines 363-368.

Pak N M , Heerah S , Zhang J , et al. The Facility Level and Area Methane Emissions inventory for the Greater Toronto Area (FLAME-GTA)[J]. Atmospheric Environment, 2021, 252(9):118319.

Line 424: How much do daytime and all-day average concentrations differ at the Hangzhou site?
The annual averages of daytime and all-day average concentrations were 2112.4 and 2156.0 ppb at Hangzhou site, respectively, and more comparisons between daytime and all-day average concentrations are displayed in Figure 5 for three sites. We added "The annual averages of daytime and all-day average concentrations were 2112.4 and 2156.0 ppb at Hangzhou site, respectively, and more comparisons between daytime and all-day average concentrations are displayed in Figure 5 for three sites." on lines 465-468.

Line 425: Here you are assuming strong changes in waste-related methane emissions, without any references, while EDGAR V6.0, which you used as a prior assumes constant emissions.
Done as suggested, here we first added more clarification on lines 413-416 as "Here as concluded above that the main CH_4 component in Hangzhou city was waste treatment (Figure 3f), which should be highly sensitive to temperature and indicates obvious diurnal and seasonal patterns (Mønster et al., 2019; Kumar et al., 2022).".

And then revised the sentence on line 469 as "which have much smaller diurnal variations than waste treatment as stated above (Mønster et al., 2019; Kumar et al., 2022)."

Line 482: Your study nicely shows the temporal bias of EDGAR V6.0, what about a potential spatial or sectorial bias?

Thanks so much for this positive comment, for the spatial bias and considering there only two sites to be used, we only showed that "and the annual anthropogenic CH_4 emissions were largely overestimated by 36.0% in Hangzhou city but underestimated by 7.0% in the larger region of the Zhejiang Province or YRD area."

And the sectorial bias has already be list in Table 1 and Figure 7 for main categories, we also added one more figure (Figure S7) in supplementary file, and added more discussions as "Besides, the annual mean *posteriori* SFs varied between 0.87 and 0.94 for rest total anthropogenic categories (excluding agricultural soil), and were 0.97 for PRO (fuel exploitation) and 0.91 for RCO (energy for building), respectively; the annual mean *posteriori* SFs and were 1.05 and 1.05 for wetland (including agricultural soil and natural wetland). These *posteriori* SFs for the rest anthropogenic categories and wetland indicated much smaller bias than waste treatment. The monthly *posteriori* SFs for PRO and RCO also illustrated obvious seasonal variations, but were still smaller than the *a priori* seasonality in inventory (Figure S7)." on lines 477-483.

Table 1. The *posteriori* SFs for different categories in three cases, where wetland: natural and agricultural wetland, Waste: waste treatment, PRO: fuel exploitation, RCO: energy for building, Others: the rest anthropogenic emissions.

	Case 1			Case 2					Case 3		
Month	Wetland	Waste	Others	Wetland	Waste	PRO	RCO	Others	Wetland	Waste	Others
1	1.00	0.29	0.83	1.00	0.34	0.90	0.80	0.93	1.00	0.40	0.72
2	1.00	0.20	0.89	1.00	0.26	0.97	0.83	0.93	1.00	0.30	0.77
3	1.03	0.39	1.04	1.02	0.46	1.07	0.80	0.97	1.02	0.46	0.95
4	1.10	0.46	0.96	1.08	0.48	1.01	0.95	0.93	1.08	0.49	0.91
5	1.12	0.62	0.99	1.10	0.64	1.06	0.97	0.92	1.11	0.65	0.95
6	1.22	0.59	1.09	1.18	0.64	1.05	0.97	1.03	1.18	0.64	1.05
7	1.10	0.88	0.96	1.09	0.88	1.00	1.00	0.94	1.09	0.89	0.94
8	1.05	0.62	0.95	1.01	0.66	0.99	0.97	0.95	1.01	0.67	0.91
9	1.04	0.71	1.01	1.02	0.73	0.96	0.98	1.04	1.02	0.74	0.98
10	1.06	0.60	0.94	1.06	0.61	0.92	0.96	1.00	1.06	0.62	0.90
11	1.01	0.27	0.86	1.00	0.32	0.91	0.85	0.93	1.00	0.37	0.75
12	1.00	0.31	0.70	1.00	0.33	0.75	0.79	0.91	1.00	0.43	0.58

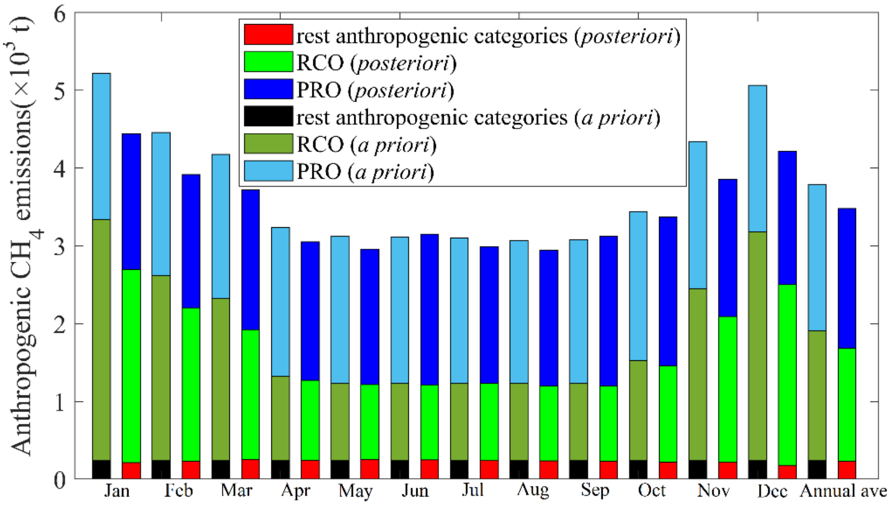

Figure S7. Comparisons of anthropogenic CH_4 emissions between *a priori* and *posteriori* results, PRO: fuel exploitation, RCO: energy for building, the rest anthropogenic emissions: excluding waste treatment, PRO, RCO and agricultural soil.

Line 493-496: Have you investigated the correlation of monthly CH_4 emission changes with soil water content, precipitation or other parameters you listed in line 79-83?

Done as suggested, we added "We should note the precipitation, soil water content and atmospheric pressure can also have obvious influence on CH_4 emissions, and considering the fact that we have not conducted field measurement in landfills and landfills are usually covered by metal or plastic in China to avoid the spread of odor smell, hence reanalysis data cannot represent real soil water contents in these site scale landfills. Precipitation and atmospheric pressure showed obvious linear relationship with temperature as displayed in Figure S8. They displayed positive linear relationship between precipitation (affect water content) and T_{2m}, and negative linear relationship between monthly averaged atmospheric pressure and T_{2m}. We also found negative relationship between atmospheric pressure and normalized SFs (Figure S8a). Considering air temperature always displays negative relationship with atmospheric pressure as warmer air temperature coincides with lighter air mas and lower atmospheric in summer, and colder air temperature coincides with heavier air mass and higher atmospheric pressure in winter. Hence, the temperature can be used to represent co-influence of both temperature and atmospheric pressure, and we only focus on the influence of temperature on CH_4 emissions and will add more supporting data in following studies." on lines 549-562.

Line 508: Please clarify that this is only the temperature component of the EF and does assume no changes in technology or other meteorological variables.

As answered above and to make clarification, we added "We should note the precipitation, soil water content and atmospheric pressure can also have obvious influence on CH_4 emissions, and considering the fact that we have not conducted field measurement in landfills and landfills are usually covered by metal or plastic in China to avoid the spread of odor smell, hence reanalysis data cannot represent real soil water contents in these site scale landfills. Precipitation and atmospheric pressure showed obvious linear relationship with temperature as displayed in Figure S8. They displayed positive linear relationship between precipitation (affect water content) and T_{2m}, and negative linear relationship between monthly averaged atmospheric pressure and T_{2m}. We also found negative relationship between atmospheric pressure and normalized SFs (Figure S8a). Considering air temperature always displays negative relationship with atmospheric pressure as warmer air temperature coincides with lighter air mas and lower atmospheric in summer, and colder air temperature coincides with heavier air mass and higher atmospheric pressure in winter. Hence, the temperature can be used to represent co-influence of both temperature and atmospheric pressure, and we only focus on the influence of temperature on CH_4 emissions and will add more supporting data in following studies." on lines 549-562.

And also added "We should note that new technology and other meteorological variables can also influence waste treatment CH_4 emissions. The main reason to only use temperature in this study is that we only constrained the emissions at monthly scale in one year, and derived twelve datasets of *posteriori* CH_4 emissions. Besides, temperature is considered as the main factor in controlling monthly and annual variations of waste treatment CH_4 emissions, and can be used to represent co-influence of other meteorological parameters as atmospheric pressure. We will use multiple years' CH_4 concentration to quantify the influence of new technology and other meteorological variables on waste treatment CH_4 emissions in our following study, and we suggest other tracers (i.e. ethane, $^{14}CH_4$) are also important to separate CH_4 emissions from biological and fossil CH_4 emissions." on lines 677-686.

Line 529: Agreed that this is beyond the scope, but it seems prudent to mention that changes in management and technology can have a strong influence emissions in the future.
Done as suggested, please see the reply to comment above.

Line 570: What was the predicted emission change due to changes in activity data and management in the cited studies? How does you reported temperature sensitivity compare?
For the mentioned three cited studies (USEPA 2013; Cai et al., 2018; Spokas et al., 2021), USEPA (2013) and Cai et al. (2018) only predicted emission change due to changes in activity data and management technology. And the CH_4 emissions for year of 2030 by Cai et al. (2018) was 23.5% lower than USEPA (2013) estimation, which was caused by the consideration of new policies (NP) and low-carbon (LC) policy scenarios. And Spokas et al. (2021) modeled the CH_4 emission changes with increasing air temperature, where CH4 emissions did not show obvious changes even with temperature increased by ~5°C at the end of year 2100.

We added more explanation for clarification as "For the mentioned three cited studies, USEPA (2013) and Cai et al. (2018) only predicted emission change due to changes in activity data and management technology. And the CH_4 emissions for year of 2030 by Cai et al. (2018) was 23.5% lower than USEPA (2013) estimation, which was caused by the consideration of new policies and low-carbon policy scenarios. And Spokas et al. (2021) modeled the CH_4 emission changes with increasing air temperature, where CH_4 emissions did not show obvious changes even with temperature increased by ~5°C at the end of year 2100."

Line 606: Large parts of the conclusion sections are actually a summary.
Done as suggested, we revised this conclusion sections and deleted some sentences.