Referee 1: Additional Comments concerning the Cellulose Source(s):

Green plants are a vast reservoir of cellulose. However understanding the processes of mobilization of fine particles from this reservoir seems to be quite underdeveloped, and there is no wonder about this, as only a few groups started to analyze and investigate the atmospheric cellulose phenomenon.

According to the figure of Riebeeck and Simmon (2001) "Diagram of the Fast Carbon Cycle" (https://earthobservatory.nasa.gov/features/CarbonCycle - accessed Dec.9, 2021) the annual Carbon (CO2-C) emission from "microbial respiration and decomposition" mainly of leaf litter amounts to 60 Gt/yr. The total biomass on land is estimated to around 550 Gt. As the area of Europe is around 7% of the global land – a very rough estimate of plant biomass in Europe would be 40 Gt (including below ground parts and stems).

Bar-On et al., PNAS 2018 (https://doi.org/10.1073/pnas.1711842115) gives more details of the plant parts, with estimated 320 t C biomass above ground and 70% stems, then foliage would be yield around 100 Gt C. For 7% of land we can estimate for Europe around 7 Gt C from foliage – including crops, flowers, etc. existing above ground.

And this fits well with 4,2 Gt C from decaying plants in Europe (7% of the 60 Gt/yr) in the Riebeek and Simmon diagram.

The estimate of atmospheric particles (below 10 µm) mobilization from Winiwarter et al. Atmos. Env. in Europe is 230 Gg/yr, with around 1/3 of cellulose based particles, i.e. 70 Gg/yr or 7x10^-5 Gt/yr. This gives an impression of the reservoir/source relationship – around 10 ppm of the foliage plant mass of 7 Gt C gets mobilized somehow.

There seems to be an interesting hint about different source terms (cold versus warm season) from an experiment of comparing two different plant source indicating parameters: plant waxes vs. cellulose: Kotianova et al., Atmos. Env. 2008 (doi:10.1016/j.atmosenv.2007.12.048) - see copy below and discussion in the article.

Plant waxes – predominantly at the surfaces of the leaves – show a strong seasonality with a warm season maximum. The cellulose concentration shows a weak seasonality.

Keep in mind that the plant polymer cellulose requires a diminution process – may it be wind-force, insect and microbes action, anthropogenic forces (agro-activity, mowing), car traffic – grinding, demolition, ….). And consider, that resuspension will be depending on the cleaning-state of the street – starting with lower particle loads after rain, increasing during dry time. Consider highly sporadic events like cease blooming, seeds expelling, as well as the human activities of harvest, mowing, tree cutting etc.

For this reason there might a coinciding source of street dust suspension, and cellulose suspension from streets. A correlation of a fugitive source – from resuspension – with an exhaust source – independent of street "debris" is not expected.

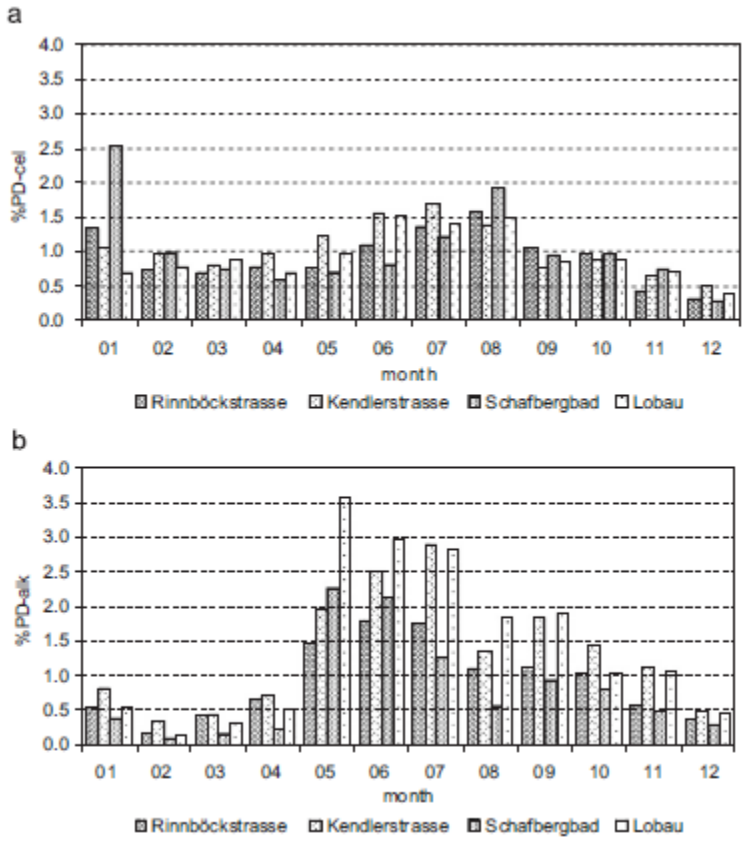

Fig. 6. (a) Plant debris as a percentage of PM10 determined via cellulose. (b) Plant debris as a percentage of PM10 determined via *n*-alkanes.

Note: The site Lobau is a wilderness type National Park with "Auwald". The sites indicated here are identical with the Vienna "Caseiro" sites, which are actually "AQUELLA" sites – Caseiro did not run "own sites".

An All-Europe site map of the sites discussed in the cellulose article would be advisable.