The study by Ylivinkka et al. presents a comprehensive analysis of particulate matter (PM) measurements from 2005 to 2020, employing three distinct methods to derive PM mass—an approach that adds significant value to the work. The authors transparently address the limitations of their methodologies, which is commendable and not often seen in similar studies.

The key finding—a declining trend in PM_1 mass at a high-latitude station with historically low PM levels—is noteworthy and merits publication. However, several issues should be clarified and revisions made before final acceptance.

We thank the referee for the encouraging feedback and the valuable insights on how to improve the manuscript quality. The given feedback is written in black, and our responses are in red color.

Major Points

1. **Size-Resolved PM Trends**: Two of the three methods allow for the segregation of PM mass into $PM_{1–2.5}$ and $PM_{2.5–10}$. This valuable data could help determine which size fraction drives the observed decline and to what extent. Given that these methods generally agree, such an analysis would strengthen the study's conclusions.
   Figure S14 shows the trend of PM1 to PM2.5 and PM2.5 to PM10 ratios. The slope of PM1 to PM2.5 is 24 % steeper than the slope of PM2.5 to PM10, indicating that small particles are decreasing faster. We added discussion of this in section 3.3 (l. 517-525).

2. **Annual vs. Seasonal Trends**: While the authors discuss seasonal variations, they should also present **total annual trends** for a more complete picture. A summary table (similar to Table S1) with annual and seasonal trends—for at least one method, if not all three—is critically missing.
   We thank the referee for the comment. We calculated the annual trends and added them as well as seasonal trends in Table 3.

3. **Introduction Focus**: The introduction heavily emphasizes the role of PM components (organics, sulfate, nitrate) in influencing PM levels, which, while relevant, deviates from the manuscript's focus on PM mass. Instead, I recommend including:
   - A discussion of long-term PM trends from other locations.
   - Key findings from prior studies at the same site (e.g., Laakso et al., 2003; Keskinen et al., 2020) that focus on PM.

The focus of the introduction has been revised. We removed the discussion on EU legislation from the second paragraph to avoid overlapping information in the introduction. The discussion on EU legislation has also been shortened and focused on PM (l. 84-100). The three paragraphs describing aerosol composition (organic, sulfate and nitrate aerosol) have been condensed into one paragraph (l. 74-82). Additionally, we added a paragraph on describing previous findings in Finland and Europe (102-111).

Minor Points

- **Comparative Analysis** (Lines 378–386): The discussion should be expanded to compare SMEARII with other regional stations in Europe or elsewhere. Comparison against heavily polluted sites does not add value.
  We thank referee for the comment. We removed the comparison with polluted sites and added references including measurement data regional background sites in Europe (l. 428-432).

- **Comparative Analysis of trends:** What is critically missing is a comparison of the declining trends reported in this work, with those observed in other sites. A summary table (if feasible) would greatly enhance the study's context.
  We added a comparison table as Table 4. It contains trends measured in Finland and elsewhere in Europe.

- **Language & Clarity**: Grammar and vocabulary need refinement in several sections (e.g., Lines 48, 59, 70, 346).
  Sentences are revised:
  L48: The PM mass concentrations in the size fractions are the total mass of particles below these limiting sizes.
  -> The PM mass concentration in these classes is the total mass of particles below the limiting size. (l. 54)
  L59: In the climate perspective, the most relevant particles have a diameter larger than about 50–100 nm, since they can act as cloud condensation nuclei and scatter or absorb radiation (IPCC, 2021).
  -> In climate perspective, the most relevant particles are larger than about 50–100 nm, since those can act as cloud condensation nuclei as well as scatter or absorb radiation (IPCC, 2021). (l. 61-62)
  L70: These eventually grow to larges size ranges contributing significantly to the accumulation 70 mode and thereby to PM1.
  -> These particles eventually grow to larger sizes, contributing particularly to the accumulation mode, and thereby to PM_1. (l. 71-72)
  L346: Additionally, pollen and other biological particles add up especially coarse mode particle mass at SMEAR II (Manninen et al., 2014).
  -> Furthermore, pollen and other biological particles contribute especially to coarse mode particle mass at SMEAR II from late spring to early autumn (Manninen et al., 2014). (l. 394-395)

- **Misleading Statement** (Lines 372–373): The claim that Figure S5 demonstrates evidence of long-range transported pollutants is misleading. While it shows air mass origin frequency, it does not establish a direct link to PM mass. Local sources could still dominate pollution levels, even if air masses originate from specific regions.
  We thank the referee for pointing out this mistake. We changed it to: "Air mass source area analysis shows that winters with higher fraction of easterly air masses (Fig. S5) were colder and had also higher PM levels, although we acknowledge that this analysis does not reveal the actual source of the measured PM." (l. 420-422)

- **Figure 4**: Each subplot should be clearly labeled with its corresponding season for easier interpretation.
  We modified the plot to make it easier to read.