

Itemized Reply for Reviewers #2 (minor revisions)

Manuscript No: egusphere-2025-5977, "Near Real-Time & Benchtop XRF Intercomparison for PM Elemental Analysis on Quartz and Teflon Filters: A Case Study Across Three European Cities"

We would like to thank the editor for the feedback and minor corrections. We fully agree that framing the ACTRIS guidelines as an absolute limitation may contradict the successful application of our own methodology. We have revised the text to explicitly clarify that the ACTRIS recommendation serves as a suggested operating procedure for network comparability, rather than a strict methodological impossibility. Furthermore, we have softened the language regarding attenuation effects on quartz substrates. We now explicitly acknowledge that while attenuation is a challenge, the required correction factors are comparable to the slopes derived empirically, and that numerous studies have successfully performed XRF on quartz filters for light elements using opportune calibrations. We have additionally incorporated the suggested literature provided by the editor (Yatkin et al., 2012; Gupta et al., 2021; Dinoi et al., 2024; Potì et al., 2025; Unga et al., 2025) into the revised paragraph to reflect this.

Revised Manuscript Text (Section 3.1, Paragraph 3)

Replaced the entire 3rd paragraph of Section 3.1 with the following: *"When using quartz fiber filters, attenuation effects impact the measurement of light elements by weakening low-energy X-rays. Aerosol particles that penetrate the porous quartz matrix experience filter attenuation, as the emitted low-energy X-rays are absorbed by the thick filter material before escaping. Additionally, the substantial Si matrix from quartz fiber filters not only hinders the precise measurement of lighter elements (Na, Mg, and Al) but also enhances the spectral background and peak overlaps. While these matrix effects and batch-to-batch filter variations pose analytical challenges, the required correction factors are often comparable to the slopes derived from empirical intercomparisons. Furthermore, several studies have successfully demonstrated that with opportune calibrations and correction protocols, ED-XRF can be reliably performed on quartz filters, even for light elements (Yatkin et al., 2012; Gupta et al., 2021; Dinoi et al., 2024; Potì et al., 2025; Unga et al., 2025). Regarding network standardization, the recent ACTRIS/GAW standard procedures for aerosol in-situ measurements (CAIS-ECAC: ACTRIS, 2024) suggest the use of thin PTFE or polycarbonate filters for XRF, reserving quartz fiber filters for inductively coupled plasma (ICP) measurements. It is important to note, however, that this is a suggestion for a standard operating procedure within a research network aimed at maximizing comparability, rather than an absolute methodological limitation."*