Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC1
https://doi.org/10.5194/amt-2021-121-RC1, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on amt-2021-121

Anonymous Referee #1

Referee comment on "Introduction to the ringing effect in satellite hyperspectral atmospheric spectrometry" by Pierre Dussarrat et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-121-RC1, 2021

The paper by Dussarrat et al. treats the ringing artefacts occuring in underresolved FTIR spectra. The treatment provided by the authors is correct and the added example is useful for demonstration of the effect. However, this effect and the methods for handling it when FTIR spectra are used for atmospheric trace gas analysis are known since decades and are well developed. Generally, the quantitative analysis of the measured spectra involves fitting simulated spectra to the measured atmospheric spectra. To my knowledge the modelling of the ringing effect is a natural component of any state-of-the-art processor dealing with FTIR spectra (so the expected ringing is included in the simulated spectrum). Exemplary sensors (/processors) are ATMOS, Mk IV, MIPAS-Envisat, ACE, and IASI. The community is also well aware of the computational costs imposed by this effect on the operational processing of spectra, so techniques as the application of numerical apodisation and different approaches for efficient convolution schemes are common knowledge.

Etaloning is another well-known effect, the presented joint discussion with ringing does not seem a very useful approach to me (instead, when it comes to etaloning, the effect of unresolved etaloning - which remains undetected in the calibration measurements - on atmospheric spectra would deserve some discussion).

As the paper does not treat any new or at least advanced aspects of the problem (note that the assumption of a wavenumber-independent apodisation function can already be a critical simplification and the modelling applied today is typically more refined in this respect). The submitted article would make a nice section in an undergraduate textbook on FTIR spectroscopy, but is far from being adequate for a scientific journal as AMT, as it fails to present "substantial new concepts, ideas, methods, or data".