

This paper reports a new MAX-DOAS profiling algorithm detailedly. The algorithm is based on a scientific and reasonable method. The results have good correlation with the results from the other instruments. In general the scientific topic is meaningful.

Specific comments:

- 1, The title of this paper is about a NEW algorithm, so you should highlight what is really NEW and innovative in your algorithm, and what are the advantages comparing to the other MAX-DOAS profiling algorithms. These points should also be included in the Abstracts.
- 2, In the chapter about CINDI-2 campaign, the results are compared with the results from other instruments. However, it is also important to compare with the MAX-DOAS result from the same instrument but retrieved with the other algorithms.
- 3, In the description of the algorithm, it is better to use the symbols that are commonly used in the related papers. For example, in Equation (1), it is better to use "AMF" instead of "A", "SCD" instead of "S", and "VCD" instead of "V". In other equations, they have the same problem.
- 4, How accurate is the retrieval results when the distribution of aerosol and trace gases is high (i.e. 3km). In addition, it will be better if the aerosol and trace gases profiles retrieved using MAPA are validated by corresponding profiles measured using other instruments (i.e. air balloon).

Minor comments:

- 1, In Figure7 and 8, "mixing ratio [ppb]" => "Mixing ratio [ppb]"
- 2, page4 line1, "to be retrieved first as prerequisite for trace gas inversions" => "to be retrieved first as a prerequisite for trace gas inversions"
- 3, page5 line6, "increase from ground to h" => "increase from the ground to h"
- 4, Page 5 Line21, "aerosol profiles, and trace gases", "comma" and "and" can't be used together. Delete comma.
- 5, Page 18 Line19, "cloud, and no sequence", "comma" and "and" can't be used together. Delete comma. Correct this mistake throughout your manuscript
- 6, Page 7 Line25, "if lowest R is" to "if the lowest R is"
- 7, Page 15 Line12, "we focus of variations of" to "we focus on variations of"
- 8, Page 18 Line30, "cloud scenes still remains" to "cloud scenes still remain"
- 9, Page 19 Line21, "Currently, an MAX-DOAS" to "Currently, a MAX-DOAS"