

Interactive comment on “Version 2 of the IASI NH₃ neural network retrieval algorithm; near-real time and reanalysed datasets” by Martin Van Damme et al.

Anonymous Referee #2

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Van Damme et al. present the version 2 of the IASI NH₃ neural network retrieval algorithm (ANNI-NH₃-v2). This version is an improved version of previous developed and published, version 1 (Whitburn et al., JGR, 2016). The main improvements concern: separated land and sea neural networks, extended training dataset (including more representative scenes for high thermal contrasts and low latitudes), and change in the NN output to avoid overtraining the low sensitivity scenes. Thanks to the expertise acquired with the previous NH₃ algorithms developed by the ULB group, improvements and simplifications of the input parameters have been made as well as for the post-filtering process. Performances of the new version are compared to the previous version and recommendations for use are made. Finally, the authors present another

C1

version of the ANNI-NH₃-v2, ANNI-NH₃-V2R-I. This version allows the correction of errors and biases introduced by changes in the EUMETSAT version of meteorological parameters needed for the NH₃ retrieval. These changes introduce discontinuities in the NH₃ timeseries. To avoid this, the authors based their retrievals on the ECMWF ERA-Interim reanalysis for temperature profiles and the development of a NN for surface temperature retrieval. They discuss the implication of the changes in the meteorological parameters on the NH₃ retrieval and recommend the use of ANNI-NH₃-v2R-I for long timeseries analyses, when the product will be available. The paper is well written and structured with detailed discussions of the major changes in the algorithm and their implications in terms of NH₃ retrieval for both the versions ANNI-NH₃-v2 and ANNI-NH₃-v2R-I. This work is suitable for AMT publication and the recommendations made for the use of the different products is very useful for the users, especially considering the warning and improvements for the long timeseries. I recommend this paper for publication in AMT after the following comments are addressed. - The authors should consider introducing a table summarizing the changes between the 2 versions 1 and 2 and listing the different inputs parameters and their description used in the NN (page 5). - Page 7, lines 27-33: it would be interesting to show series for one or more regions to illustrate the discontinuities and to show how the ANNI-NH₃-v2R-I reduces these discontinuities. - In the data availability statement, it would be useful for the readers/users to have the information about the period from when the authors expect that the new data will be publicly available. Technical comments: - Page 2, line 20-21: “detailed” and “introduced” should be inverted.

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C2