Atmos. Meas. Tech. Discuss., 7, C1492–C1494, 2014
www.atmos-meas-tech-discuss.net/7/C1492/2014/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Cloud mask via cumulative discriminant analysis applied to satellite infrared observations: scientific basis and initial evaluation" *by* U. Amato et al.

Anonymous Referee #1

Received and published: 2 July 2014

Review of Atmos. Meas. Tech. amt-2014-123 Title: Cloud mask via cumulative discriminant analysis applied to satellite infrared observations: scientific basis and initial evaluation Authors: U. Amato, L. Lavanant, L. Liuzzi, G. Masiello, C. Serio, R. Stuhlmann, S. Tjemkes

General Comments The authors present a cloud detection algorithm based on the statistical method of cumulative discriminant analysis. The algorithm is proposed to discriminate between clear and cloudy observations from the METEOSAT Third Generation Infrared Sounder (MTG-IRS), at a hyperspectral resolution of 0.625 cm-1. There will be no visible sensor onboard so the cloud masking system must be stand alone.

Data from the Infrared Atmospheric Sounding Instrument (IASI) is used as a proxy for radiances from the future MTG-IRS. Results are computed from IASI data and compared to cloud masks constructed from AVHRR and SEVIRI data. The weakness in the paper is lack of global testing. The authors state that due to few samples in some areas (climate regimes), only the tropical regions use one IASI data set for training and another for validation. This leads me to think that perhaps the algorithm is not that well understood in the mid-latitudes and that there may be surprises when actually generating an operational mask. It would add understanding of the results if the authors were to discuss the successes and failures (misses and false alarms) of the algorithm a little more. For example, tropical sea surfaces seem to have a high miss rate as well as a high false alarm rate. Do the misses occur for a particular type of clouds? What about the false alarms – perhaps a different cloud type or situation? Perhaps the failures occur during the day more than at night or vice versa?

The manuscript is generally well written and clear and with one exception, the figures and tables are informative and add clarity to the paper. I am recommending the paper be published with minor changes that I detail below in the specific comments.

Specific Comments Line 29: delete "able" Line 62: need a reference for the sentence ending with "instrumentation". Line 92: "radiance" should be plural Line 101: this sentence is confusing, please reword Line 229: Figure 1 seems to convey no useful information to the reader. I recommend deleting it. Line 385: "Tab." Should be "Table" Line 402: Is it 3.9 or 3.7 μm? Table 2 indicates 2700 cm-1 which is roughly 3.7 μm. Line 412: "has to expected" should be "is expected" Line 414: Please use another phrase or definition for "hot" cirrus. Line 498: The meaning of this sentence is unclear. Please rewrite. Line 750: "translated" should be "translated"

Table 3: Please use "Table" instead of "Tab.". Table 6: Why is there no entry for Mid-Lat-Summer SH? I would add an entry with a "âĂŤ" to indicate missing data.

Figure 3: Please correct the last sentence in the caption. It is unclear. Figure 5: Please

link the numbers 1-8 to the tests listed in Table 3 in some way. Perhaps the tests in Table 3 should be numbered as well.

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 5601, 2014.