

Interactive comment on “Novel method for fog monitoring using cellular networks infrastructures” by N. David et al.

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We thank the referee for his remarks. We agree with the comment regarding the high values derived for liquid water content. We carried out a new analysis of the event which was presented. We also analyzed an additional case of heavy fog that occurred several years prior. This time, we used a different, more sensitive microwave link system. The system used for the revised paper has a measurement error of 0.1dB (a measuring resolution ten times greater than the previous one). Additionally, we focused on frequencies around the 38GHz range – where the sensitivity to fog effects is greater (Rec. ITU-R P.840-4, 2009). Furthermore, the measurements used were taken simultaneously from tens of different links, of varying length and direction, that were

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operating in the observed area in each of the two cases. The resulting liquid water content values in the new analysis were found to be in the range of 0.5 to 0.8 gr/m³ for each of the two events analyzed. These are high values that match high values measured in field measurements conducted by researchers, using specialized equipment, in different locations in the world (e.g. Klemm et al., 2005, Herckes et al., 2007, Gultepe et al., 2009, Niu et al., 2010). The visibility assessments calculated, are of the same order of magnitude of assessments from specialized instruments, and professional observers in the area. Specifically, the visibility assessment was derived using the warm-fog visibility parameterization (Gultepe et al., 2006) that takes into account the droplet number concentration, and has been found to be more precise (particularly when compared to Kunkel (1984) method).

Specific comments:

" Too much info given in the introduction, please focus on what you need"

Response: We focused and slightly shortened the introduction. That being said, it is important for us to provide the full information as the research is interdisciplinary, and may be of interest to an audience from these different disciplines.

"Section 2.1; concern is not that instruments are not working but areal coverage of each sensor. Instruments usually work fine. Major issue is that they are not available everywhere and they are expensive".

Response: Revised, per the comment.

"cm upper limit for fog is 100 micron, it is too high. See Gultepe et al papers in AMS bulletin paper".

Response: Revised, per the comment.

"Method section should be clearly written and organized e.g. say i) using Kunkel Vis LWC relationship, ii) Using Gultepe et al parameterization. In a paragraph, please explain why Kunkel should not be used. Say somewhere that this work is for warm fog

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conditions."

Response: The main goal of this work is to show the feasibility of the proposed technique, and thus in the revised version we found it useful to focus on one method that clearly presents this point, while citing other work. We concentrated on the warm-fog visibility parameterization by Gultepe et al. (2006) that was found to be more accurate. Per the proposal, we added a paragraph on the subject, and comparing to Kunkel's (1984) method.

Additional comments on section 3.3

"What is time averages? 15 mins? How do you use it for fog prediction?"

Response: The system used in the revised paper is different, and provides a single, instantaneous measurement, simultaneously, from the tens of links deployed in the observed area, once a day (while the observations were taken from the time when the fog events occurred). The procedure is described in the methods section of the revised version.

"T error as 0.1 °C, not acceptable, check Gultepe et al papers, this is about at least 0.5-1 °C"

Response: This number was meant to refer to the measurement resolution of the temperature gauge. We did find that measurements from different gauges in the area differed by a degree or two. We rephrased the sentence to more clearly convey this in the revised paper.

Figures

" Fig.1 how did you get foggy regions? What technique?"

In the current version of the paper, satellite images were produced using CAPSAT- the Clouds-Aerosols-Precipitation Satellite Analysis Tool (Lensky and Rosenfeld, 2008).

" Fig. 5 You need to show Vis versus LWC for each line and compared to these of C3841

earlier works"

Response: This figure is not part of the updated version of the paper (since we utilized a different microwave system). In the revised paper we estimated the liquid water content at the particular time when all the measurements from the system were taken, and derived a single liquid water content estimate for each event based on the measurements of tens of links in the observed area, and the time when the measurements were taken (for each of the events, we collected all of the results into a single table. We also compared the results to field measurements from previous research)

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