remote sensing

MDPI

Article

Supplementary Material: Application of a Nighttime Fog Detection Method Using SEVIRI Over an Arid Environment

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1. Supplementary material

1.1 Qualitative comparison with RGB composites

We can assess the fog classification qualitatively by comparing it with the RGB color composites. These cases are compared to the false color composite of the night microphysical product from EUMETSAT [1]. In this product, the red channel is the difference between 12.0 and 10.8 μm channels (linear stretch -4 to 2 K), the green channel is the difference between 10.8 and 3.9 μm channels (linear stretch 0 to 10 K), and the blue channel is the 10.8 μm channel (linear stretch 243 to 293 K).

While this cannot be presented for every case, we present a selection of fog classifications in order to show examples of hits, misses, false alarms, and the 06:00 h bias. In most cases the classified fog patch coincides well with the RGB fog patch, which is a false color composite where fog is shown by the light green color. Fog is represented by white on grey color in the classification image. Please refer to captions in **Figure S1** through **Figure S6** for descriptions of each case.

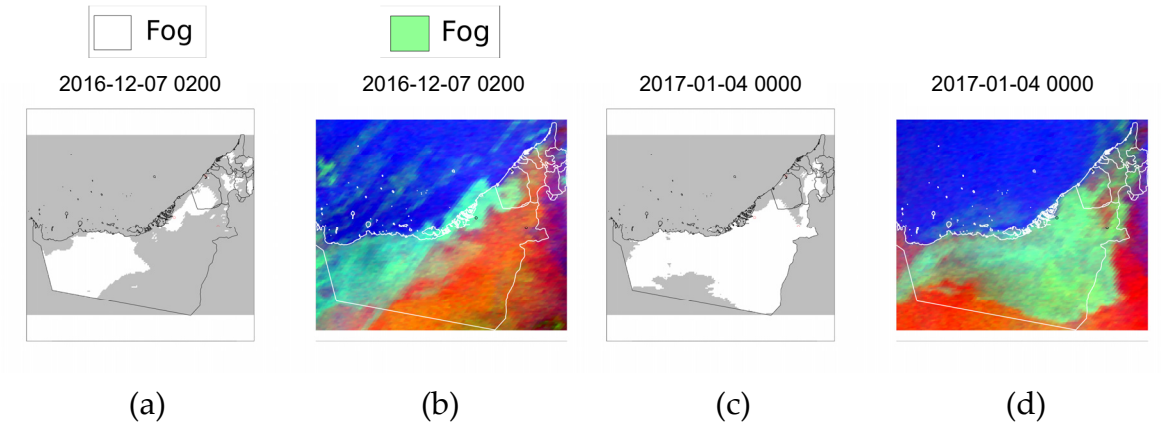

Figure S1. Examples of hits at Abu Dhabi at 2016-12-07 0200 (a-d) and Al Ain at (c-d). Times in UTC.

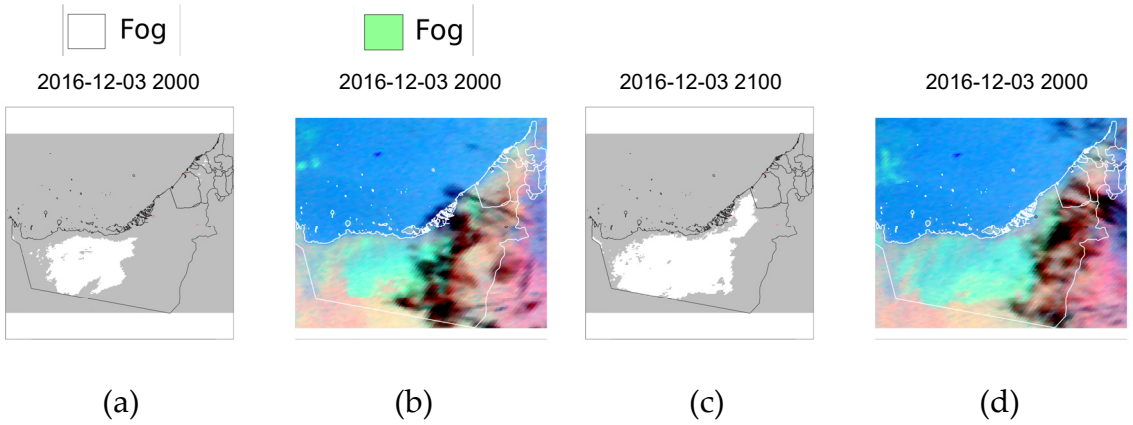

Figure S2. Example of cloud effected fog days. The cloud in the RGB has a ems(3.9) above the threshold value and is not captured in the fog mask. Times in UTC.

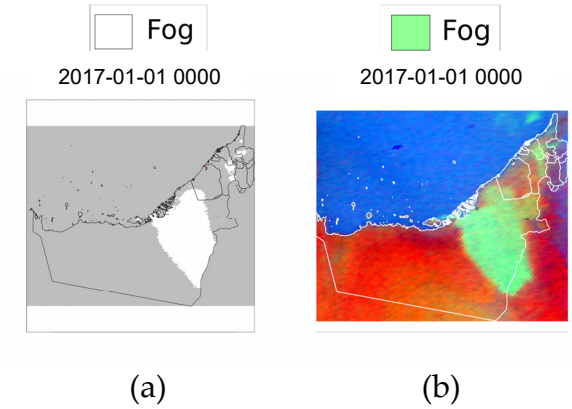

Figure S3. Example of miss at Al Ain. Although this was a miss at one location, the patch was still well represented and will, correctly, form part of the fog frequency map. Times in UTC.

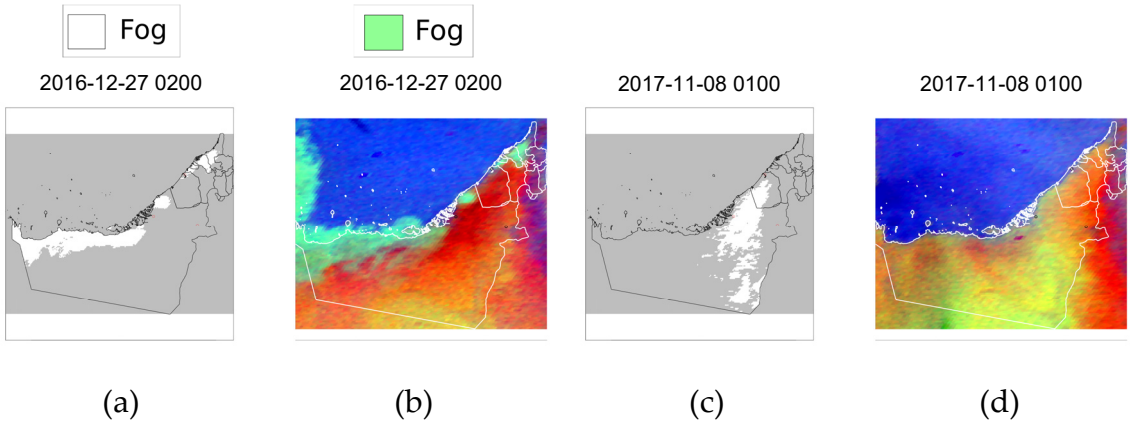

Figure S4. Example of false alarms at Dubai (a-b) and Abu Dhabi (c-d). Although images a-b are false alarms in the METAR, a fog patch is visible in the RGB adjacent to the airport. The patch is well represented and considered correct in terms of the fog frequency. The image c-d has no fog in the RGB and is a total false alarm. Times in UTC.

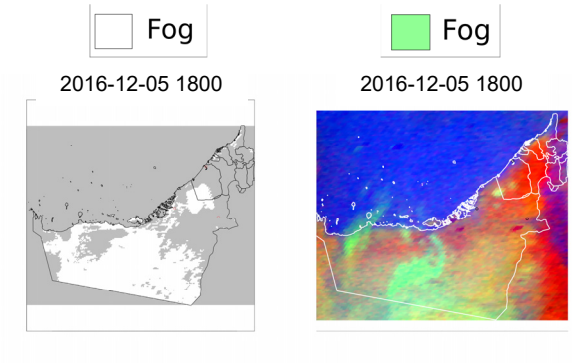

Figure S5. Example of a false classification outside of airports. Although no fog was classified at any of the airports, there is a general over estimate of fog in this scene in the interior. This may contribute to an overestimation of fog frequency. Times in UTC.

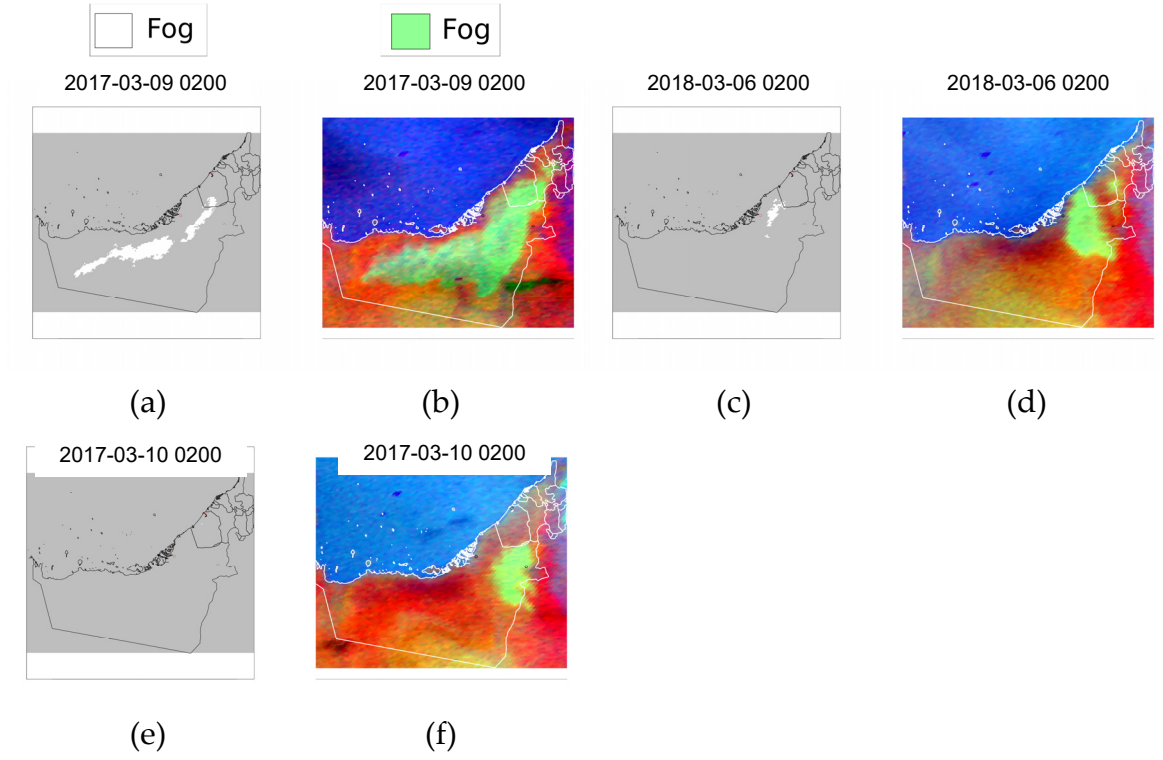

Figure S6. Examples of underestimation of fog at 06:00 h local time (UTC+4). This is most likely due to reflection at the top of the atmosphere just before sunrise. Times in UTC.

2. References

1. EUMETSAT. *Best practices for RGB compositing of multi-spectral imagery*; User Service Division: 2009; p 8.