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Interactive comment on "**Bayesian cloud detection for MERIS, AATSR, and their combination**" *by* A. Hollstein et al.

Anonymous Referee #2

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Overall: This paper is well-done. Its topic is relevant to many fields. The CCI project is a major initiative this work is directly related to it. I vote for publication after some comments are addressed. None of these comments are critical to acceptance.

Comments 1. Nice use of Gaussian smoothing to generate completely populated training data based on limited samples.

2. Very high quality figures and tables.

3. The use of reflectance features can be problematic due to the large variation in the magnitude and spectral nature of the surface reflectance. By ignoring surface variations, you essentially optimize for the global mean surface condition (as determined in your training data). Does this explain the skill score pattern in Figure 5? Do you see

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a similar surface-type variation in the false alarm rates? I understand the pitfalls of relying on ancillary data for stratifying your features; it would seem that no stratification is a big assumption too.

4. Section 7.3: With the fine spatial resolution of these sensors, why no spatial features? They would seem to be more robust than spatial features

5. Brightness temperature differences (11-12 micron or 11-3.7 micron) are so common in cloud masks. Did these really not add anything to your feature set?

6. I think Chris Merchant's Bayesian Mask is also run on AATSR? What would that comparison look like?

7. A cloud mask should be judged in the context of its application. What is the application here? For example, are the SST values computed from the clear-sky mask values of high quality? Is the global cloud amount from this product in line with those from the GEWEX Cloud Assessment?

8. Some details that I think are missing.

a. What is the solar zenith angle limit? b. How is glint handled?

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 11045, 2014.

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