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Atmospheric Measurement Techniques Discussions

Interactive comment on "Automatic cloud classification of whole sky images" *by* A. Heinle et al.

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The given paper provides a comprehensive description of methods to classify clouds within the field of view of an all-sky imager. A set of features is presented which is able to sort each scene in one out of seven possible classes.
The chosen methods are sound and the paper is well organized, clear and concise. I recommend to accept this article after some minor improvements.

General Remarks

It would be nice to learn something on the limitations of the algorithm. For example, it is based on an analysis of visible light. So it is certainly not working during night

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Interactive Discussion

Discussion Paper

(which is actually a pity). What are the limits in terms of solar zenith angle? Are there more restrictive conditions (aerosols, rain, fog)?

Specific Remarks

Within the introduction (page 271, line 2), the authors mention, that satellite data come 'in a low resolution'. This gives the impression, that the spatial resolution (guessing it don't refer to the temporal resolution) of the cloud classification, proposed here, is somewhat higher. Since the written scheme provides one cloud class for a whole image, I doubt that the reached footprint is smaller than the 1 by 1 km, achieved by common products, derived on the base of space born instruments.

Chapter 2.2 (page 273, line 10). Here it is written, that the acquired data-set 'covers a wide range of possible sky conditions'. This is questionable. The sample is certainly dominated by marine-type air compositions. At different conditions (downwind of urban or industrial areas) with different aerosol types (e.g. black carbon with spectral characteristics, which hamper the color-difference tests) a different algorithm may work better. This should be addressed.

Chapter 3.3 (page 276, line 17ff). The introduction of a spectral difference to replace the spectral ratio: I would expect the threshold to be dependent on the total brightness (e.g. if $R <$ threshold, than the threshold will never be exceeded). The misclassification of pixels close to the sun is probably due to a change in color-composition with viewing angle in relation to the sun. This means, the excess-blue seen away from the sun, is scattered out of the direct beam. If you look more towards the sun you'll see more parts of the unscattered spectrum (the longer wavelengths). Maybe one can get rid of this effect by a threshold, adapted to the difference angle relative to the sun.

Chapter 4.2 (page 284, line 7ff). If it is difficult to separate two classes, which are on the other hand, similar in respect to their properties, then these classes should probably be merged.

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Chapter 5 (page 286, line 7). Miss-classifications due to multiple cloud types in FOV: A different approach to the proposed sectioning of the FOV (which not necessarily solves the problem) would be to generate a new class 'multiple types' or something like that.

Technical Remarks

Chapter 3.4 (page 280, equation 11). Shouldn't the cloudcover simply read $\frac{N_{bew}}{N}$? Otherwise the upper limits should be $N_{bew} - 1$, resp. $N - 1$, since it starts at 0.

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