Atmos. Meas. Tech. Discuss., 3, C2111–C2114, 2010
www.atmos-meas-tech-discuss.net/3/C2111/2010/

Atmospheric Measurement Techniques Discussions

Interactive comment on "A novel technique for extracting clouds base height using ground based imaging" *by* E. Hirsch et al.

Anonymous Referee #1

Received and published: 29 November 2010

Overview The Author's present an interesting technique to estimate cloud base height combining thermal infrared with wind profiling data. Some examples are given that demonstrate the utility of this approach. The paper is well presented, and the method seems attractive for a wider application. However, due to the small amount of cases it is difficult to judge how well the proposed approach can be automated. Also further refinements and clarifications on the technical approach may be considered. Overall, the paper presents initial results of a novel methodology, however further substantiation of the results are required.

Technical discussion

A couple of cases that should be discussed further are cases with no wind shear and

multi-layered cloud cases.

1) How do the Author's suggest dealing with cases with no wind shear?

2) In the case of multilayered clouds, the clouds may move in different directions causing the cross-correlation method to provide a compromise solution, or for any single case a multitude of solutions (as many as cloud cases). Here, more sophisticated quality control methods (as used in the derivation of cloud motion winds with satellite data) may help, and actually it may be possible to cluster the derived wind vectors according to the principally derived categories.

With respect to the derivation of the displacement

3) Have the Author's considered sub-pixel determination of the final speed and direction?

4) Why are the CC calculated using the standard deviation? How is this standard deviation calculated (a simple 3*3 local variability?) In other application areas this has not notably improved the CC results. However, it could be used to select suitable tracers (see 5)). In this approach it seems that all possible tracers (pre-defined 40 * 40 pixels) are used.

5) Using the median to determine the final displacement is acceptable, but the following steps may add value:

5a. Consistency checks (temporal and spatial)

5b. Removal of displacement vectors with peaks on the border of the correlation surface

5c. Limiting the calculation of possible solutions to what is possible within the atmosphere

6) Within the satellite wind community the use of the cross-correlation value is often debated. There are cases where a high correlation value does not guarantee a good

result, and more importantly, where fairly low values are still providing excellent winds. Which cut-off value has been used and what type of investigations have been done in this respect?

A short description of cloud based height assignment using satellite data (as used with cloud motion winds) and related shortcomings would be appreciated.

With respect to the general approach an analysis of the errors would be required (e.g. how much does the half a IFOV accuracy contribute to the final error, or the 0.5 h vs 20*10 s, or the distance to the reference profiling station (10 km apart). Finally, the Author's are encouraged to familiarise themselves and to refer to work done in the context of the CGMS International Winds Workshops (http://cimss.ssec.wisc.edu/iwwg/iwwg.html) where all recent Workshop proceedings are available. These proceedings contain a significant amount of relevant information also available in the Review Journal domain e.g.

Schmetz et. Al., 1993, Operational Cloud-Motion Winds from Meteosat Infrared Images. J. App. Meteor., Vol.32, No7., pp 1206-1225

Velden et. al., 1997: Upper-Tropospheric Winds Derived from Geostationary Satellite Water Vapour Observations. Bull. Amer. Meteor. Soc., Vol. 78, No 2, pp 173 – 195,

Holmlund, 1999: The Utilization of Statistical Properties of Satelltie-Derived Atmospheric Motion Vectors to Derive Quality Indicators. Wea. Forecasting., 13, pp 1093 – 1104.

Ebert, 1989: Analysis of Polar Clouds from Satellite Imagery Using Pattern recognition and a Statistical Cloud Analysis Scheme. J. Apll. Meteor., 28, pp 382 – 399).

It may also be worthwhile to consider to present the results at the next upcoming International Winds workshop, which is currently planned for early 2012.

Summary

1. Does the paper address relevant scientific questions within the scope of AMT? Yes

2. Does the paper present novel concepts, ideas, tools, or data? Yes

3. Are substantial conclusions reached? No

4. Are the scientific methods and assumptions valid and clearly outlined? Mainly

5. Are the results sufficient to support the interpretations and conclusions? Initial assessment possible

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? No

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Relevant work in the field of deriving cloud motion winds from satellite data is not referenced. Their own contribution is clearly identified.

8. Does the title clearly reflect the contents of the paper? Yes

9. Does the abstract provide a concise and complete summary? Yes

10. Is the overall presentation well structured and clear? Yes

11. Is the language fluent and precise? Yes

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? Yes, see above

14. Are the number and quality of references appropriate? No

15. Is the amount and quality of supplementary material appropriate? Yes

---

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 4231, 2010.