1. Introduction
Winds in the troposphere are an important part of the climate system\(^1\). A new means to monitor winds in a continuous and unattended manner can be a valuable tool for weather prediction models. The aim of this study is to show the feasibility of using a ground-based commercial infrared (IR) camera to monitor wind velocity and direction at cloud-base height.

2. Measurement setup
- Camera on a tripod, pointing at the sky, 90° elevation
- Infrared picture of the sky taken every 6 sec
- Nearby profiling microwave radiometer ASMUWARA\(^2\)

3. Method
(A) IR pictures to wind direction, angular velocity [°/sec]
- Filtering of the pictures, division into 9 subwindows
- Cross-correlation between consecutive pictures
- Extraction of the displacement vector \(\vec{V}\)
- Direction of \(\vec{V}\) gives wind direction
- Length of \(\vec{V}\) gives angular velocity

(B) Angular velocity to metric velocity [m/s]
- The microwave radiometer provides the temperature profile \(T(h)\) and the water vapor profile \(U(h)\)
- \(U(h)\) is used to correct for water vapor emissions
- \(T(h)\) links cloud-base temperature to cloud-base height
- Height and angular velocity yields metric velocity

4. Results
- Case study 10-Sep-2007 in Zimmerwald (CH)
- Single cloud layer

5. Comparison with radiosondes
- Radiosondes launched from Payerne (30km from site) before- (at 12UT) and after (at 24UT) our measurements show good agreement

6. Conclusion
- Case study 10-Sep-2007 shows good results
- Method requires clouds moving with the wind
- Need for measurements with different atmospheric conditions, e.g. several cloud layers, with the possibility of producing a wind profile
- Promising technique

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References:
(2) Martin et al., 2006, ASMUWARA, a ground-based radiometer system for tropospheric monitoring, Meteorologische Zeitschrift, 25, 11-17