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Airflow analyses using thermal imaging in Arizona's Meteor Crater as part of METCRAX II

A. Martina Grudzielanek (1), Roland Vogt (2), Jan Cermak (1), Mateja Maric (1), Iris Feigenwinter (2), C. David Whiteman (3), Manuela Lehner (3), Sebastian W. Hoch (3), Matthias G. Krauß (4), Christian Bernhofer (5), and Andrea Pitacco (6)

(1) Ruhr-Universität Bochum, Geography, Climatology, Bochum, Germany (martina.grudzielanek@rub.de), (2) University of Basel, Departement Umweltwissenschaften, Basel, Switzerland, (3) University of Utah, Department of Atmospheric Science, Salt Lake City, Utah, (4) InfraTec GmbH, Dresden, Germany, (5) Technische Universität Dresden, Institut für Hydrologie und Meteorologie, Dresden, Germany, (6) University of Padova, Department of Agronomy, Food, Natural Resources, Animals and the Environment, Padova, Italy

In October 2013 the second Meteor Crater Experiment (METCRAX II) took place at the Barringer Meteorite Crater (aka Meteor Crater) in north central Arizona, USA. Downslope-windstorm-type flows (DWF), the main research objective of METCRAX II, were measured by a comprehensive set of meteorological sensors deployed in and around the crater. During two weeks of METCRAX II five infrared (IR) time lapse cameras (VarioCAM® hr research & VarioCAM® High Definition, InfraTec) were installed at various locations on the crater rim to record high-resolution images of the surface temperatures within the crater from different viewpoints. Changes of surface temperature are indicative of air temperature changes induced by flow dynamics inside the crater, including the DWF. By correlating thermal IR surface temperature data with meteorological sensor data during intensive observational periods the applicability of the IR method of representing flow dynamics can be assessed. We present evaluation results and draw conclusions relative to the application of this method for observing air flow dynamics in the crater. In addition we show the potential of the IR method for METCRAX II in 1) visualizing airflow processes to improve understanding of these flows, and 2) analyzing cold-air flows and cold-air pooling.