



Quicklook of different remote sensing techniques for the detection of the volcanic ash cloud

Anja Hünerbein, Wilfried Baum, Ralf Becker, and Klaus Behrens
Lindenberg Meteorological Observatory, DWD, Germany

The Meteorological Observatory Lindenberg could monitor the overpass of the volcanic ash cloud with different ground-based remote-sensing systems. We present the preliminary results of four remote sensing instruments, whereas three of them are located at Lindenberg. The fourth is the national radiation network of pyranometers from the German Meteorological Service (DWD). On several days in April the instruments could measure independently the overpass of the volcanic ash cloud as follows.

1. The cloud camera could monitor the overpass of the volcanic ash on April 16, 2010, where the change of the cloud/sky color could be clearly distinguished. Additionally on the April 19, 2010, an optical phenomenon, the Bishop's Ring was detected. The phenomenon is caused by diffraction which can only be caused by very small homogeneous dust particle such as results from volcanic eruptions.
2. The aerosol optical depth (AOD) measured with the precision filter radiometer (PFR) shows two significant increases on April 16 and 19, 2010, which is more than double to nominal conditions. The Ångstrom exponent indicates for April 16 larger particles as well as the Ångstrom turbidity coefficient indicates with values higher than 0.4 a hazy atmosphere.
3. On the April 16 the Ka-Band cloud radar MIRA36 measured a cloud system between 09:30 and 10:30 UT at about 6 km height above a stratocumulus layer at lower levels. Notable are LDR values up to -15 dB, which is unusually high for ice clouds at this range.
4. By using the national radiation network with a combination of the global and diffuse radiation as well as sunshine duration and cloud cover on April 17, 2010 we could verify the passage of the volcanic ash cloud from north to south.

A consolidated view of all these measurements indicates that in general it is possible to measure the direct and indirect effects from the volcanic ash particles. However, more work is necessary to interpret the results in detail and to understand the special characteristics.