

---

**News Archive 2010**

**Data from the volcanic ash layer - work for the next two years**

8 June 2010

**Atmosphere researcher Bernadett Weinzierl investigates the impact on our climate**

The German Aerospace Center's (Deutsches Zentrum für Luft- und Raumfahrt; DLR) Falcon research aircraft flew through the volcanic ash layer a total of 17 times. On 14 of those occasions, Bernadett Weinzierl from the DLR Institute of Atmospheric Physics was in the plane, investigating ash particulates from the Icelandic volcano Eyjafjalla. "We gave a great deal of thought to the question of whether the flights were dangerous," she states. "And of course, we considered what the best and safest measuring strategy for the ash might be." For this DLR scientist, her work on these successful measuring flights is very far from over. In this interview, the atmosphere researcher explains what is going to happen next to the collected data.



Bernadett Weinzierl on board the Falcon

**Question:** As a scientist, could the eruption of Eyjafjalla on Iceland in April this year be described as a lucky break for you?

**Bernadett Weinzierl:** Yes indeed, 'lucky break' about sums it up! You see, it gave us an opportunity to conduct measurements on what are known as airborne aerosol layers, a phrase used to describe the layers of suspended particulates in the atmosphere. Until now, all we had were the data from forest fire and desert dust measurements. The completely new opportunity afforded by the eruption of Eyjafjalla was that we were able, in a targeted manner, to measure ash particles of different ages and in different concentrations. For example, we are now able to investigate how these particles change in the ash over an extended period of time. It is this that makes the phrase 'ash cloud' misleading and inaccurate: in reality, it forms a layer. Many people looked up at the sky at that time and asked themselves: "Where is this cloud?" There was only a clearly defined 'real' cloud close to the volcano. At the time of the first flight on 19 April 2010, the thickness of the ash layer over Germany varied very greatly. Over Leipzig, it was over two kilometres thick, but measured only 500 metres in the skies above Munich. Some of the ash particles had dropped down to the boundary layer, by which I mean into the lowest two kilometres of the atmosphere. It was visible as a kind of light-brown stain in the sky.

**Question:** What influence do these ash particles have on our climate?

**Bernadett Weinzierl:** This depends on the chemical composition of the particles. Volcanic ash has a cooling effect on the ground. Sunlight is no longer able to penetrate the layer of particles, and some of that light is reflected back into space without ever reaching Earth. An exciting feature of our studies involves examining the extent to which these particles might absorb solar radiation. If that were the case, it would mean that the ash layer was capable of heating itself. To date, no one has investigated this effect.



Fine-tuning the measuring equipment

**Question:** You direct a highly talented group at Helmholtz University who are tackling the influence of aerosol layers on the atmosphere and climate ...

**Bernadett Weinzierl:** Yes, and that group is benefiting from all the measurement data collected on our flights. I wrote the application document back in spring 2009. That was followed by a multi-stage selection process, during which international assessors examined the topic and where the subject matter needed to be defended in a lecture. From a total of 223 applicants, 20 were selected to help found a Helmholtz University Young Investigators Group. The 'AerCARE' project was officially launched on 1 May 2010. The university partner for my Young Investigators Group is the Chair of Experimental Meteorology at the Physics Faculty of the Ludwig-Maximilian University in Munich (LMU). Right from the outset, colleagues from LMU have been tracking the ash cloud from the ground using their lidar (light detection and ranging) equipment. In some cases, we flew the research aircraft right over LMU's ground-based lidar station and now have a very nice combined data set which we can work on together.

**Question:** What volume of data is available to you and your Young Investigators Group?



Conversion work on the Falcon

**Bernadett Weinzierl:** I guess we are talking about ten gigabytes of data. On our 17 measuring flights, we have clocked up a total of 52 flying hours, during which we flew over part of the ash layer, and at some points flew into it. During our flights in the ash layer, we measured the number of particles and their size by drawing ash-laden air into the Falcon and conducting analysis work. We heated up the particulate-laden air, evaporating its volatile components – leaving us soot, sea salt, desert dust or, as in this case, ash particles. These data give us an insight into the mix status of aerosol particles within the ash layer. We have also taken filter samples and measured trace gases such as sulphur dioxide, carbon monoxide and ozone. We have recorded aerosol data using a total of twelve different measuring devices. Then we have the data from the lidar instrument which directs laser impulses up from the ground at the underside of the particulate layer, then uses backscatter reflections to determine how many aerosol particles are in the air, and the altitude at which they are located. Simple analyses

can then be conducted rapidly. However, the members of the Young Investigators Group and other colleagues are most certainly going to be spending the next two years on a careful evaluation of all data.

**Question:** To date, what have been the reactions to the measuring flights and to your initial results?

**Bernadett Weinzierl:** Most people are enthusiastic about the fact that it proved possible to install all this equipment in the Falcon in such a short time. It was a small miracle that everything worked, and that we obtained good data. These data were not only significant in relation to the closing or opening of airspace. Over and above that, these data are very useful in our scientific work. We have already delivered a first lecture in Vienna, at the European Geophysical Union in front of about 500 scientists, with whom we then discussed the data. In Leipzig, at the International Transport Forum, I was then able, with the help of a model of the Falcon, to explain clearly to the German Federal Transport Minister, Peter Ramsauer, which instrument in the Falcon actually records what. Most people are genuinely very interested, and many are now finally beginning to understand what it is that I research.



An enthusiastic flyer: Bernadett Weinzierl

**Question:** You are a pilot yourself – would you have enjoyed flying the Falcon through the ash layer yourself?

**Bernadett Weinzierl:** I'm only licensed to fly light aircraft. However, even I was qualified to do so – if I had needed to make a decision between science and flying – I would always have preferred to be on the seat between the measuring instruments – in the aircraft cabin.

*This interview was conducted by Manuela Braun.*

#### **Related Contacts**

##### **Manuela Braun**

Deutsches Zentrum für Luft- und Raumfahrt (DLR) - German Aerospace Center  
Corporate Communications  
Tel: +49 2203 601-3882  
Fax: +49 2203 601-3249  
E-Mail: manuela.braun@dlr.de

---

*Contact details for image and video enquiries as well as information regarding DLR's terms of use can be found on the DLR portal imprint.*