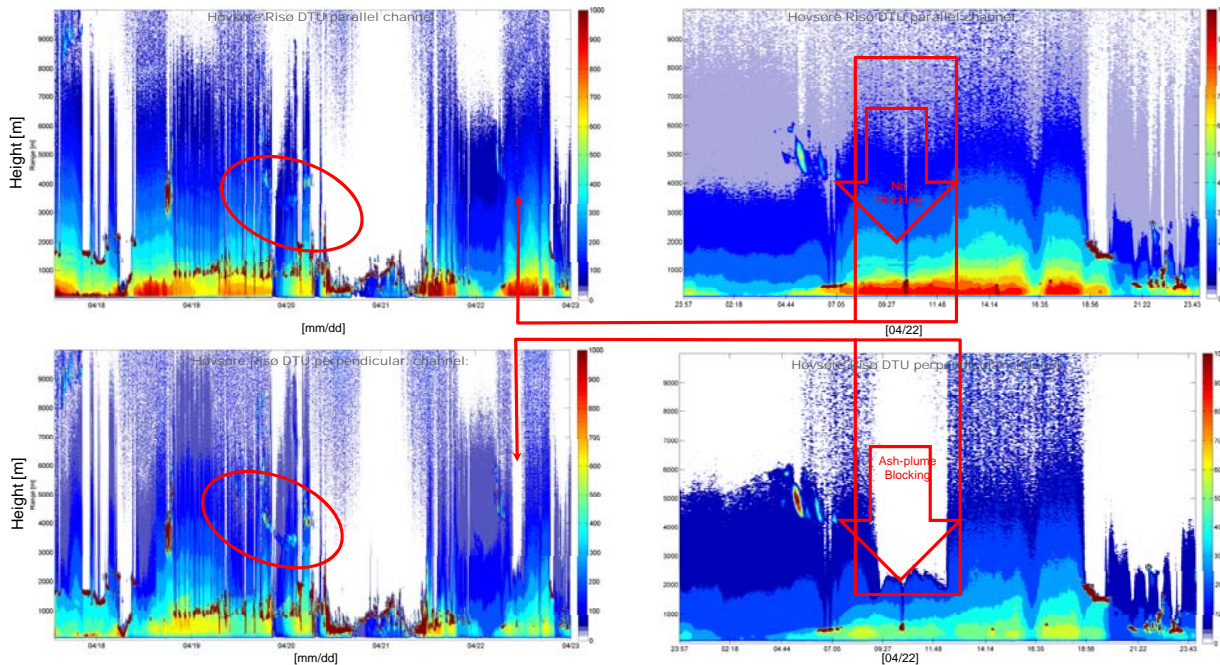


# Lidar observations of ash plumes across Europe

European Geosciences Union, General Assembly, 2-5 May 2010, Vienna, Austria  
 Union Session, US7: Eyjafjallajökull - eruption, plume, and consequences  
 Wednesday 17.30 to 19.00, Hall A

Torben Mikkelsen (1), Laurent Sauvage (2), Sven-Erik Gryning (1), **Charlotte Bay Hasager** (1), Alfredo Peña (1), Simone Lolli (2)  
 (1) Risø National Laboratory for Sustainable Energy - DTU, Wind Energy, Roskilde, Denmark, (2) Leosphere, France



The signals from the lidar, i.e. the color-coded graphs, represents the so-called "range and sky background corrected signal at 355 nm [V m<sup>2</sup>]. Because the lidar is equipped with a depolarization module, the system has two channels ch0 and ch1, representing parallel and orthogonal backscatter, respectively. Upper panels show parallel and lower panels orthogonal.

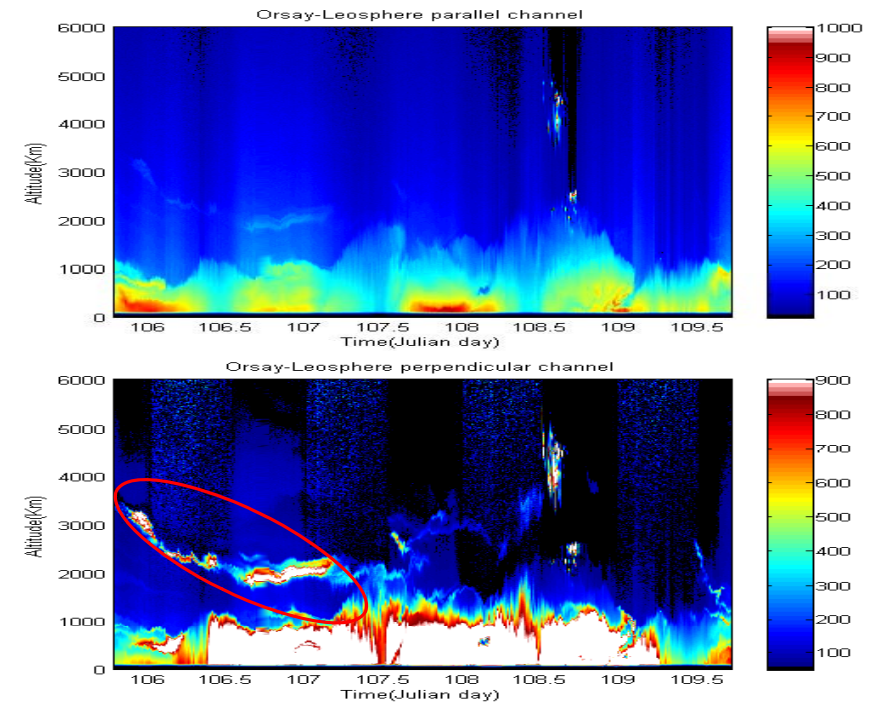
Non-spherical particles, like ash, will change the polarization. The perpendicular returned scatter enables us to discriminate between spherical and non-spherical particles, e.g. aqueous versus silicate particles as pollutants. The bottom range (the first kilometer) shows the atmospheric boundary layer backscatter structures. As seen there is significant amounts of aerosols and dust here. The brown "blobs" are clouds which are sometimes so dense that they are impenetrable to the laser light (white background). The blue background stems from scattering from the atmospheric molecules. The "sinking" cloud which is evident from about the afternoon on 19 April until the following morning (red circles) has been confirmed independently by the Danish Meteorological Institute (DMI) as being the ash cloud. On the 22 April, DMI predicted the return of the ash plume over Høvsøre. This is confirmed by the blocking of the perpendicular backscatter signals in the middle lower panel (cf. inserted red squares frames).



Observations from Høvsøre in Denmark (wind test site)



LEONET Stations



Stations accepting to provide data to the WMO through the UK Metoffice

21/04/2010

Site Name	Lat	Lon	Alt (m)	PI	PI affiliation
Cabazez-KNMI	51.97N	4.9E	0	0	Dave Donovan KNMI
Orsay-LEOSPHERE	48.71N	2.18E	150	150	Simone Lolli LEOSPHERE
Toulouse-MF	43.57N	1.37E	153	153	Alain Dabas Météo France
Bure-Andra	48.5N	5.46E	120	120	Sebastien Coriol Andra
Høvsøre-RISØE	56.48N	8.35E	10	10	Torben Mikkelsen Risø
Zürich-ETHZ	47.4N	8.5E	510	510	Frank Wenzhörd ETHZ
Palaseiro-Sirta	48.72N	2.2E	180	180	Marcel Haefliger Sirta-CNRS
Manchester	Already providing data to UKmetoffice				Geraint Vaughan Univ. Manchester
Chilbolton	Already providing data to UKmetoffice				Judith Agnew Anthony Bingham Univ. Reading

Abstract

Since its eruption on April 14<sup>th</sup> 2010 ground-based lidar instruments in several countries in Europe has observed the ashes dispersed from the volcanic eruption at Eyjafjallajökull in Iceland. Based on atmospheric model results the aviation has been severely affected in recent days. The situation is unprecedented in Europe thus the optimal system for monitoring such an event is not in place but is very rapidly being developed. The many ash dispersion model predictions have not yet been verified (systematically) with lidar-based ash plume observations. However, recent results from ground-based lidars in Europe indicate that some airports may have been closed even though the air above appears clean. The presentation shows lidar observations from Høvsøre in Denmark and Orsay in France collected in real-time during the ash plume event. We encourage to open for a discussion of the future use of ground-based aerosol lidar networks for improved planning and forecasting.