



# MAJOR SAHARAN DUST OUTBREAK 11-16 October 2001

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Hamburg, K hlungsborn, Leipzig, Munich,  
Neuchatel, Palaiseau, and Valletta

## Introduction

A major Saharan dust outbreak took place from 11-16 October 2001.

EARLINET allowed, for the first time, coherent, vertically resolved observations of the spread of Saharan dust over the European continent.

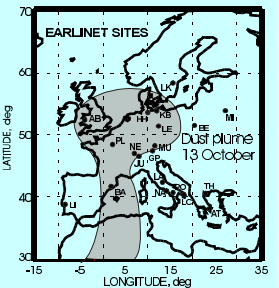
## SeaWiFS (13 OCTOBER 2001)

Saharan dust is transported from northern Africa over the Mediterranean to the east of Spain, France, Germany and up into the North and Baltic seas.

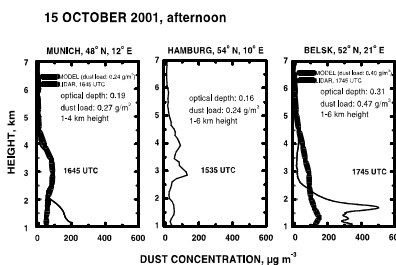
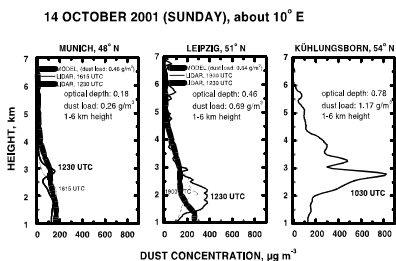
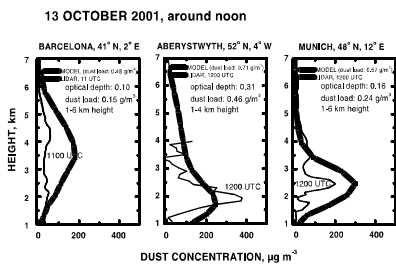
Pollution is transported from southeastern Europe to northern Africa



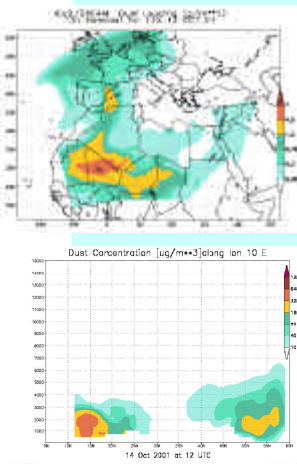
## Lidar network



## Lidar/Model comparison

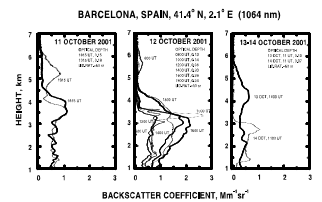


## DREAM: Dust REGIONAL Atmospheric Modeling Nickovic et al. (Univ. Of Malta)

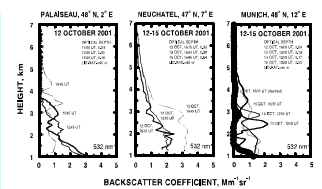


## Lidar observations

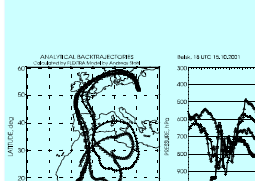
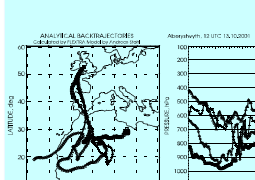
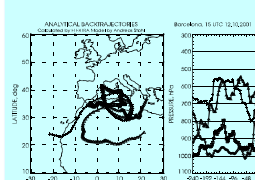
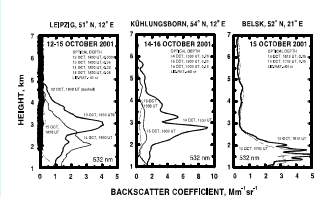
... after 1000-2000 km (of dust transport)



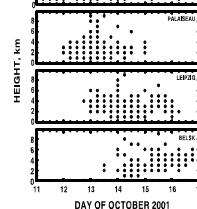
... after 2000-3500 km



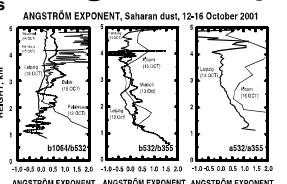
... after 3000-5000 km



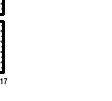
## Dust plumes as indicated by trajectories



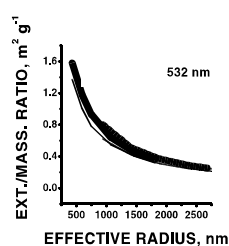
## Angstr m exp.



## BULLET: Trajectory that crossed Africa below 4 km height



Saharan dust: ratio of extinction coefficient to mass concentration

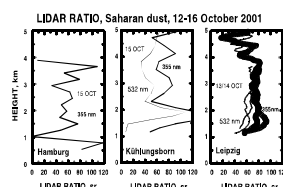


Hess et al., OPAC, BAMS, 1998, bimodal (nuc. acc):  
N1=269.5, N2=30.5,  
r1=70, r2=(200,250,300,390,500,600),  
s1=2.0, s2=1.95  
-- monomodal (acc):  
N1=30.5, r1=200,300,400,500,600,  
s1=2.2  
thin curves: 1/(1.7<sup>eff.radius</sup>)

Size distribution parameters: Hess et al., OPAC, BAMS, 1998  
Refractive index: Patterson et al., JGR, 1977, real=1.56, imag=0.0061

Crucial task: Conversion of lidar-derived optical properties into model-derived microphysical properties

## Lidar ratio



## Depol. ratio

