

Probing the atmospheric boundary layer with Doppler lidar

Katja Träumner, Andreas Wieser and
Christoph Kottmeier

Institut für Meteorologie und
Klimaforschung



The Boundary Layer

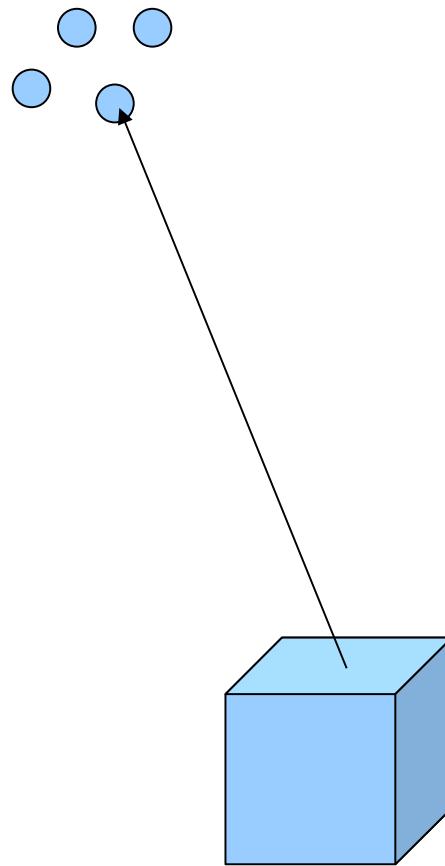
“... can be considered as that layer of the atmosphere that, because of turbulence, interacts with the earth's surface on a time scale of a few hours or less”

D.H. Lenschow

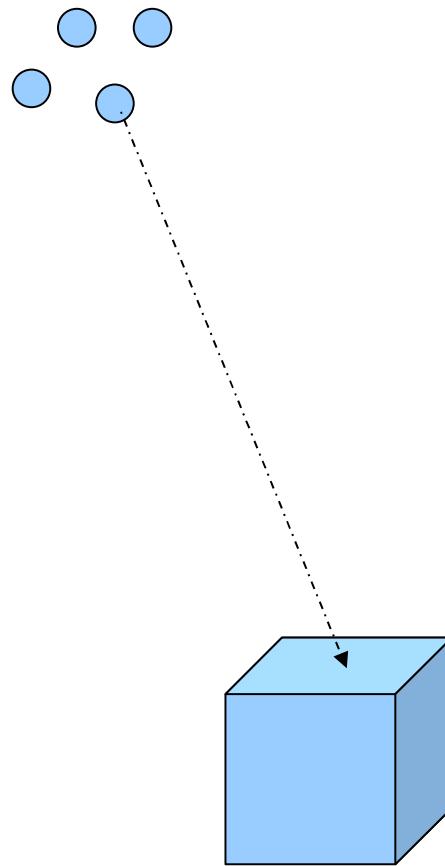


What lidar can do for the boundary-layer meteorologist

LIght Detection ANd Ranging



LIght Detection ANd Ranging



- Aerosol backscatter, extinction
- Depolarisation ratio
- Wind
- Water vapor density
- Temperature
- Concentration of trace gases

The Doppler Lidar Windtracer

Lockheed Martin WindTracer 2 μm Doppler-Lidar MAG 1A Transceiver

Transmitter (Slave Laser)

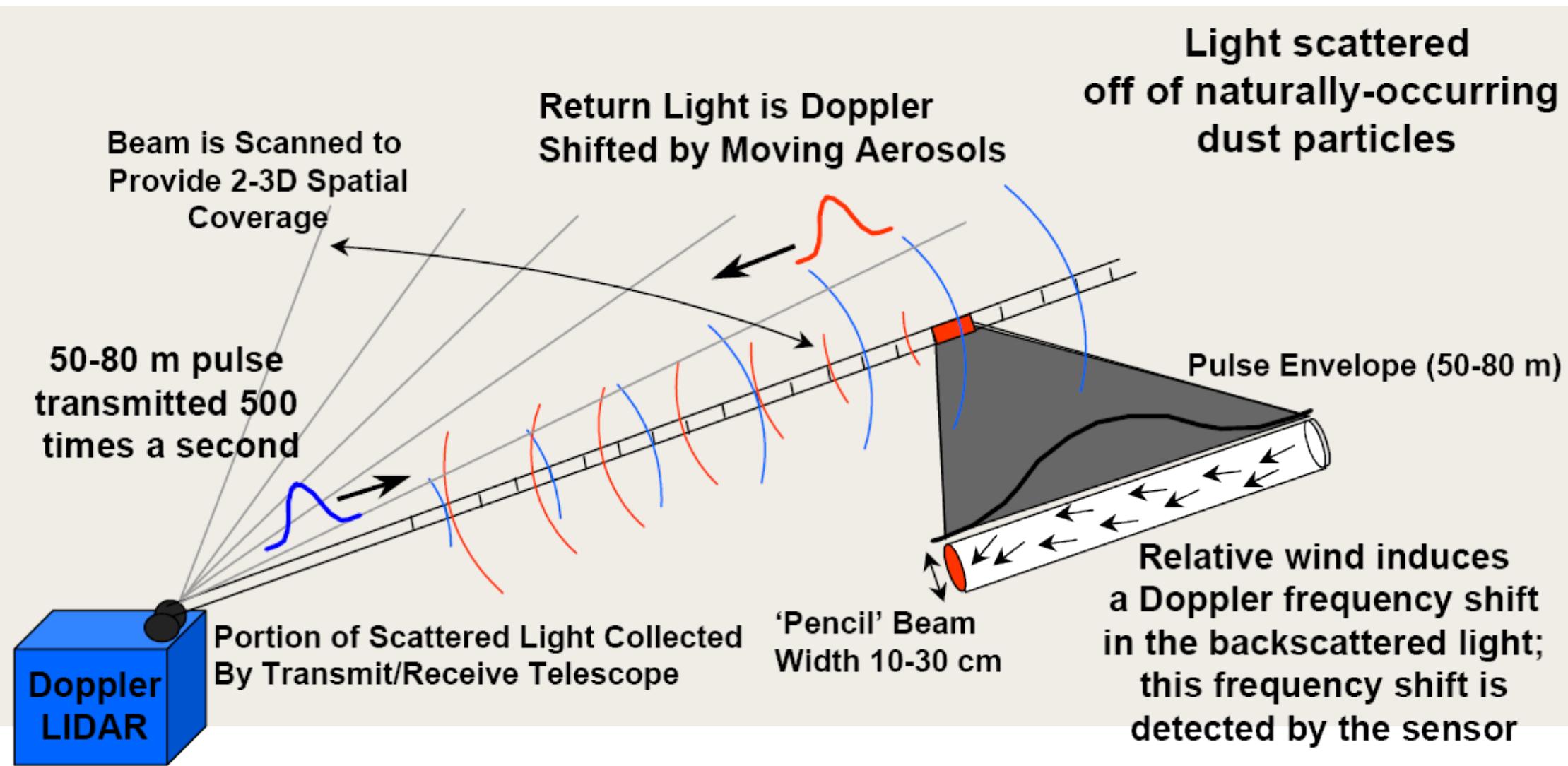
| | |
|----------------------------|-----------|
| Typ | Tm:LuAG |
| Wavelength | 2.0225 μm |
| Pulse energy | 2 mJ |
| Pulse duration | 425 ns |
| Pulse repetition frequency | 500 Hz |

Receiver

| | |
|--------------------|--------------|
| Band width | 50 / 100 MHz |
| Sampling frequency | 100 MHz |

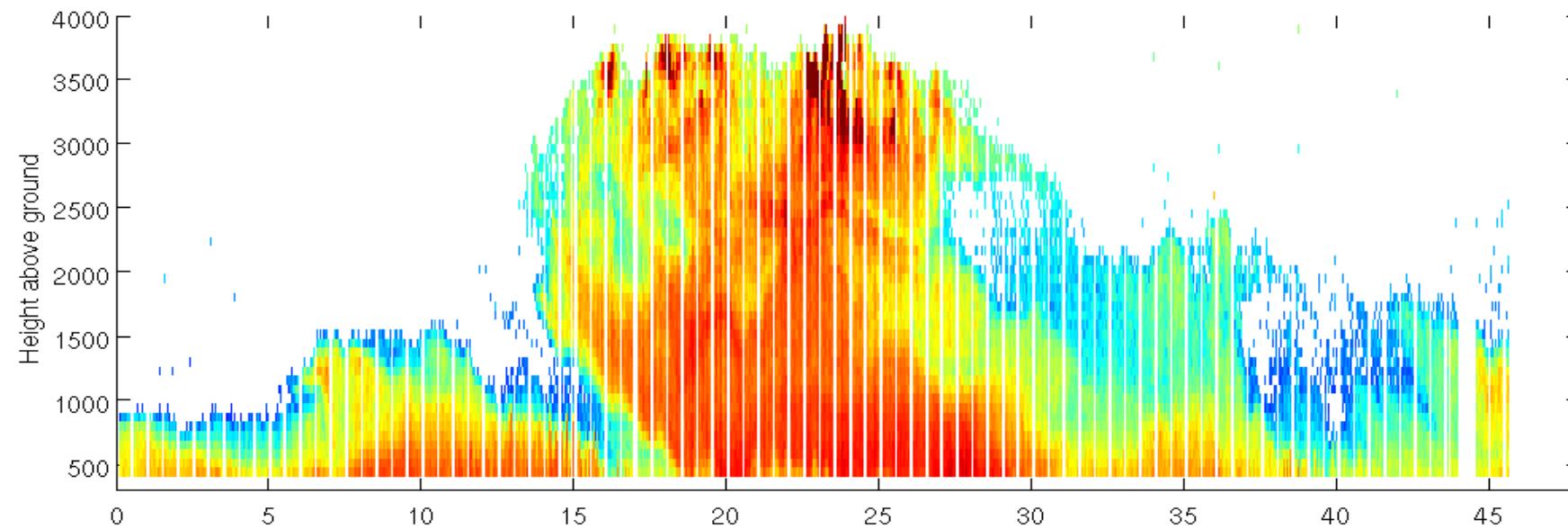


An easy but genius concept

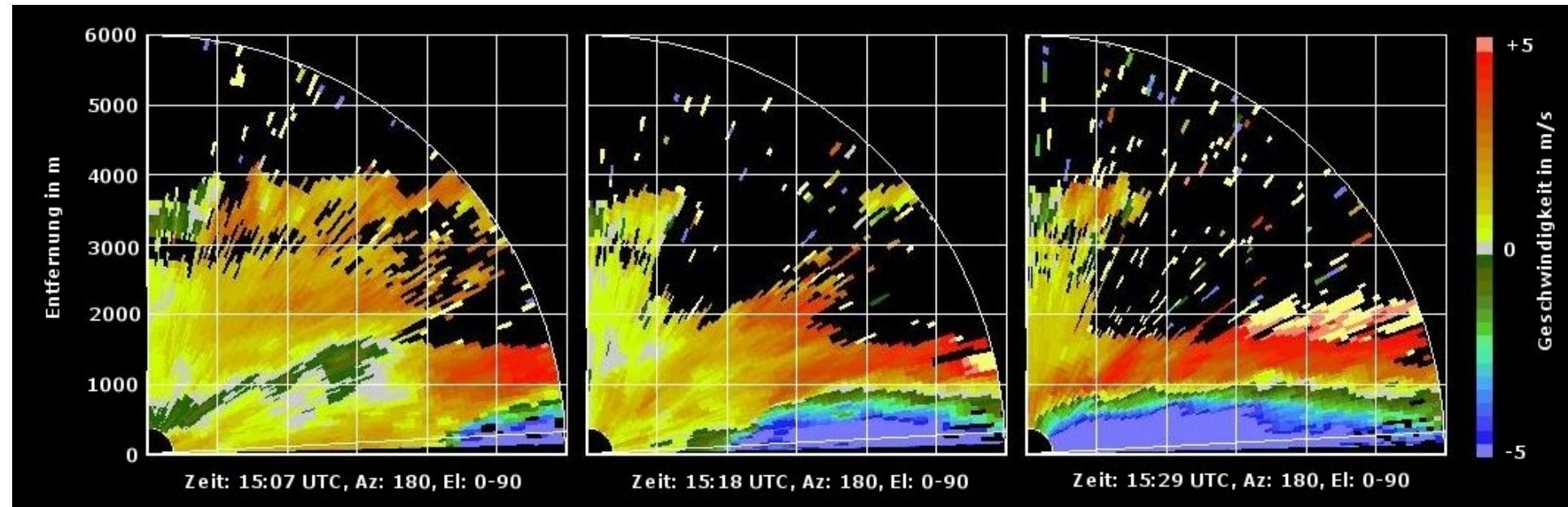
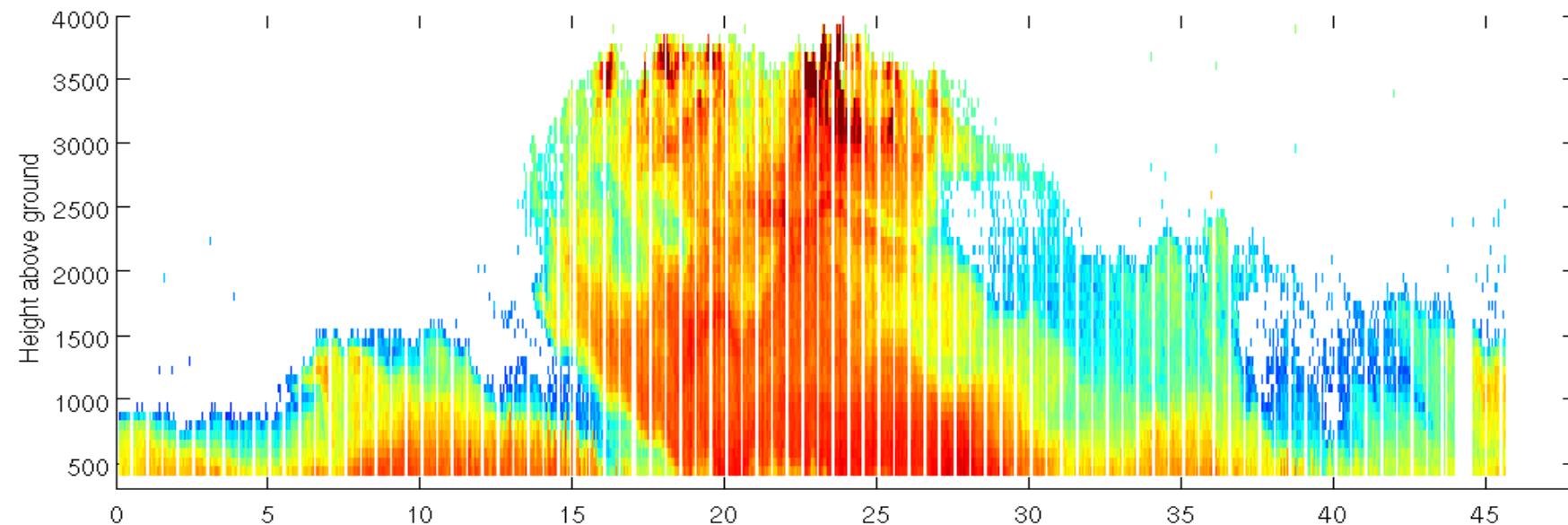


Source: Inc. CLR Photonics, "WindTracer System Operation User Manual", 2003

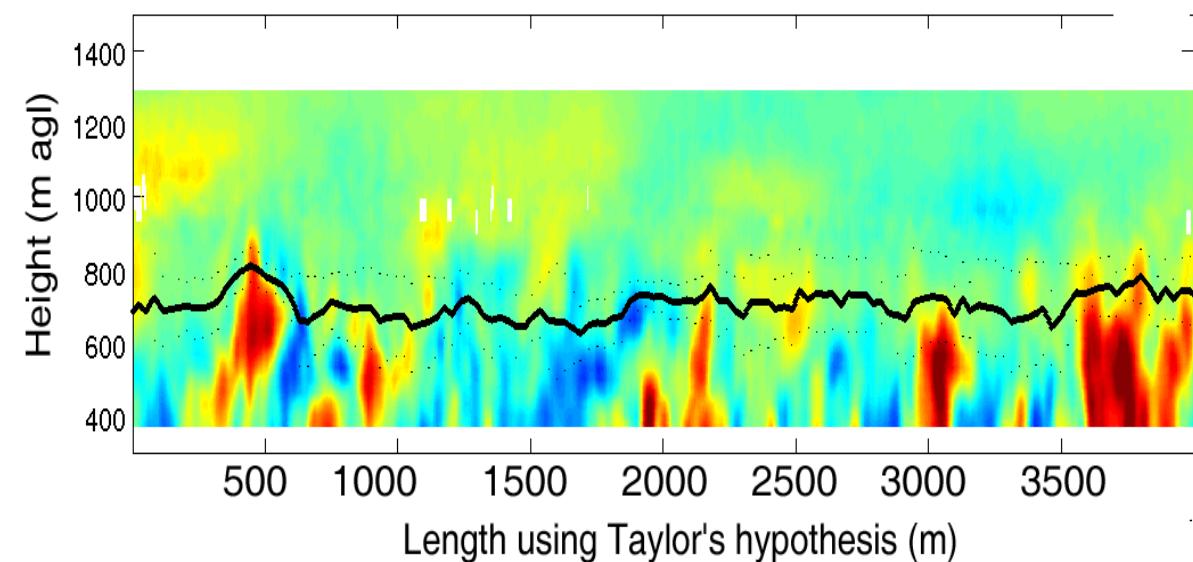
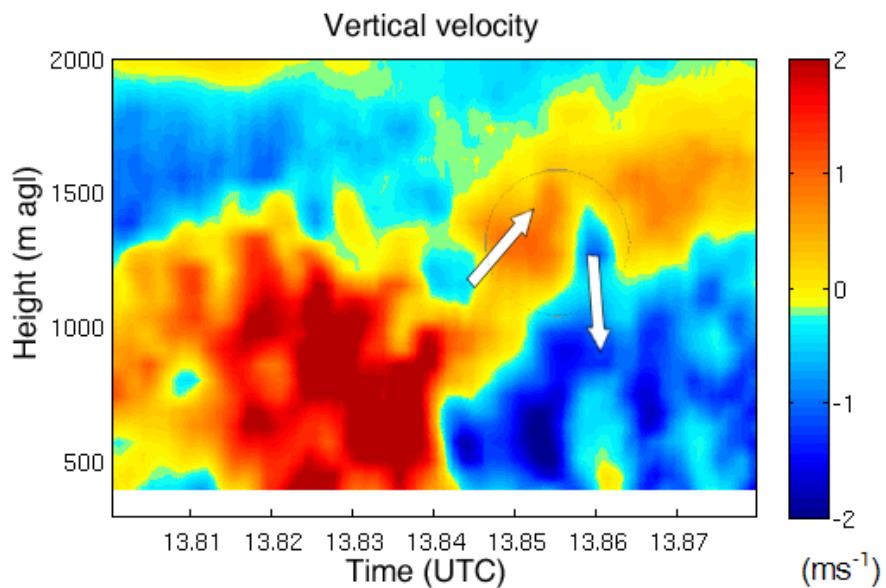
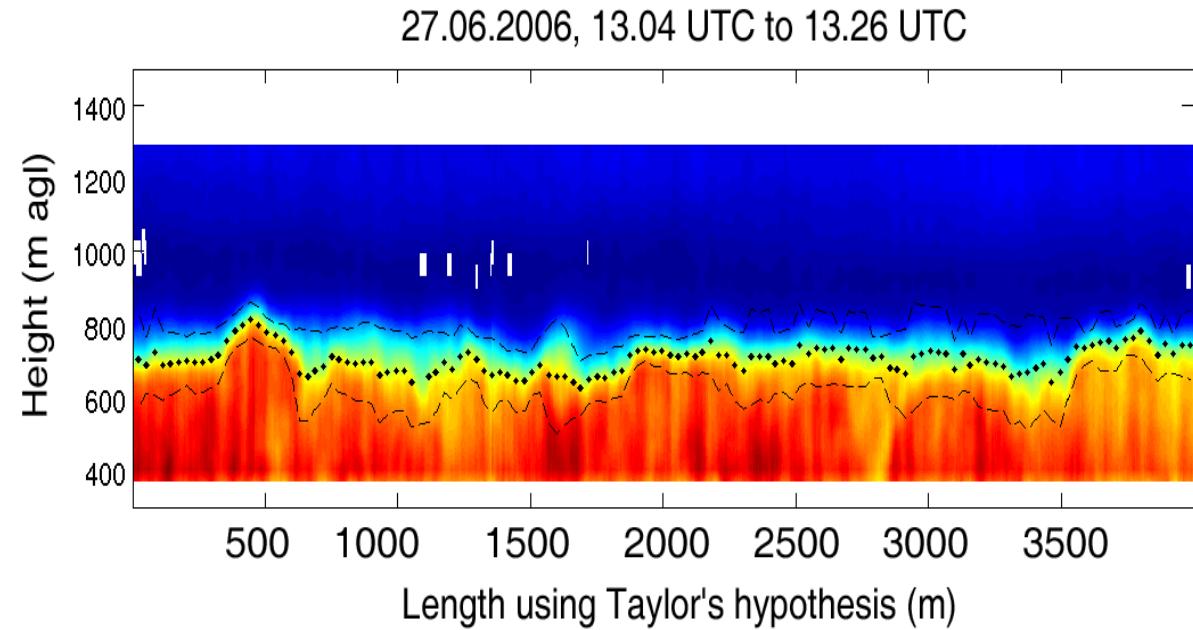
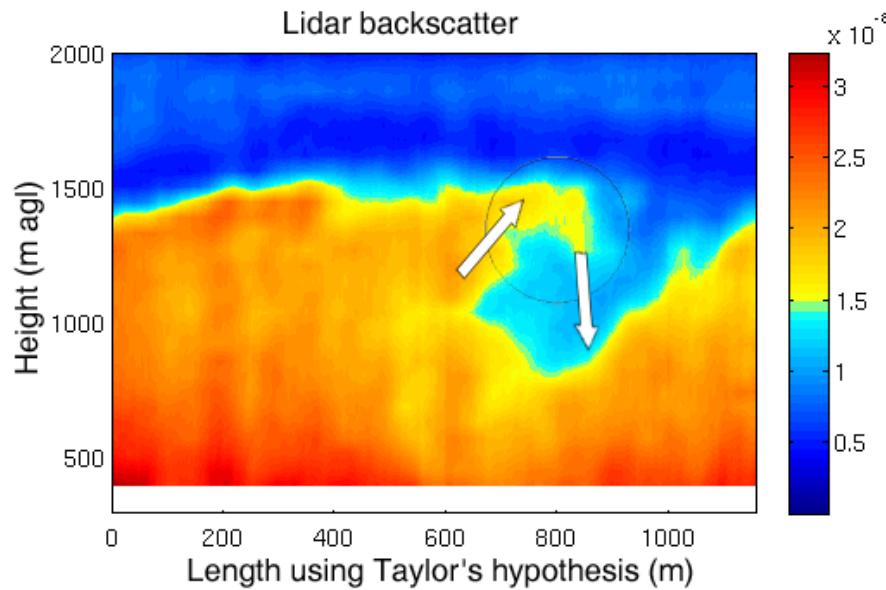
Some pictures



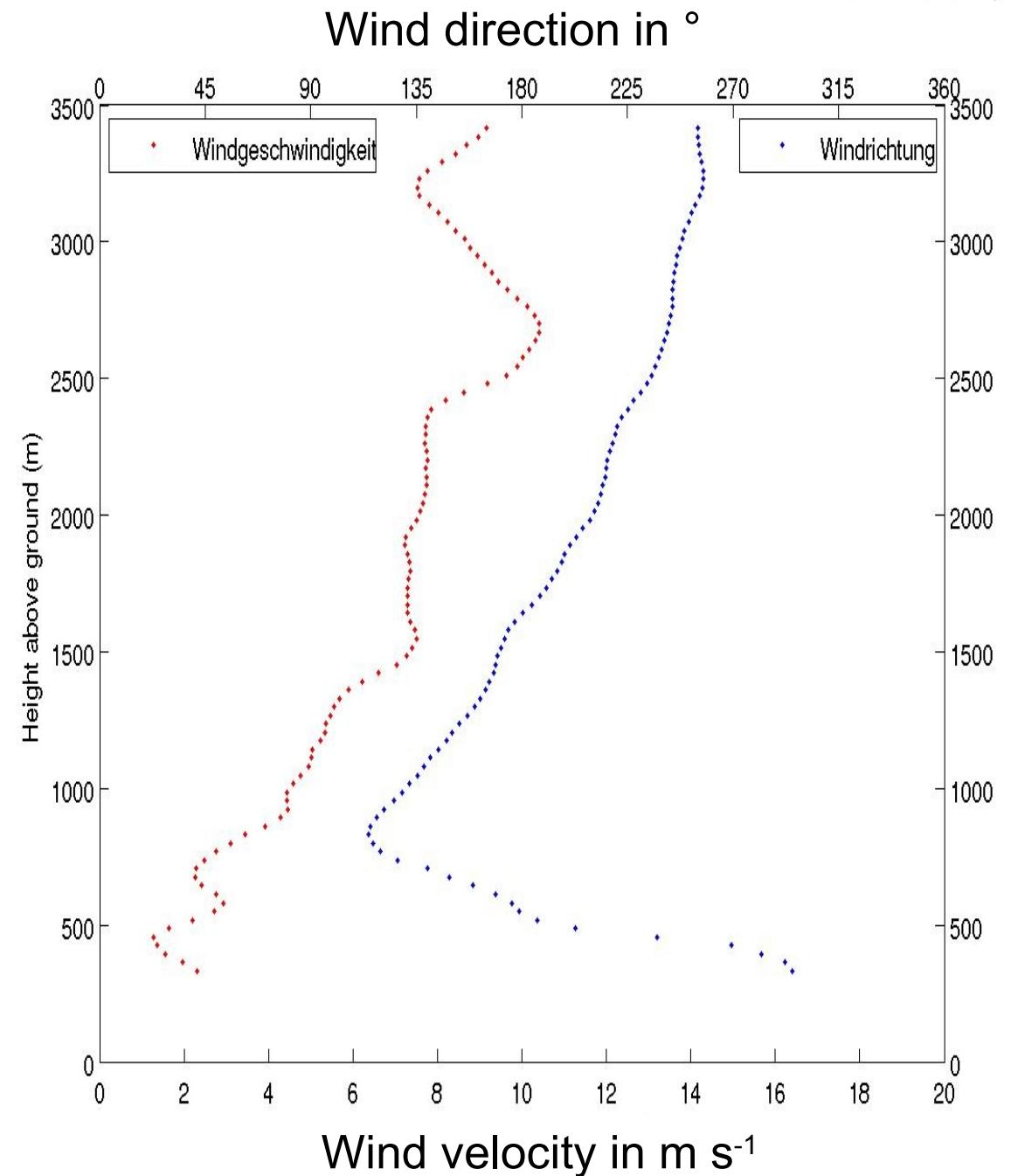
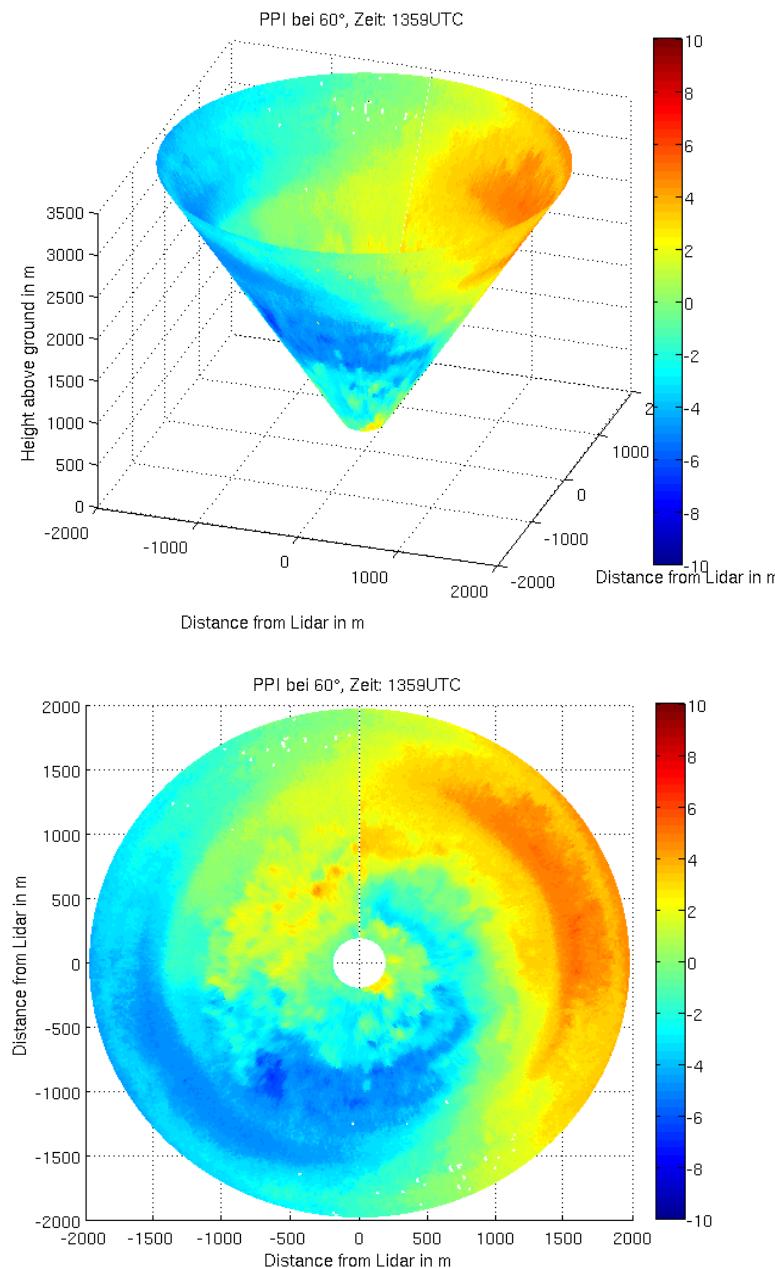
Some pictures



More pictures



And even more pictures



The KIT Cube – our future vision

KIT Atmospheric Cube – a new atmospheric observatory

Radiosondes
Drop Sondes



Towers



Remote Sensing



Surface stations



Soil moisture



Thanks

