A New Round the Clock Observation Technology to Measure Vertical Profiles of Visibility and Spectral Transmissionin the Mixing Layer (ML)

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Profiles of the relative humidity measured all 6 hours by a new precision Vaisala-Radiosonde (Leiterer et al.) and hourly available humidity profiles provided by the Local Model of the Deutscher Wetterdienst serve as input of a model (Khvorostyanov & Curry) describing the growth of aerosols with the relative humidity. Assuming constant aerosol concentration in the ML simultaneously measured spectral aerosol scattering coefficients at known relative humidity (TSI nephelometer typ 3563) allow the determination of total aerosol scattering coefficients in dependence on the relative humidity in the ML at different heights. The method takes into account instrument corrections concerning the pronounced forward scattering of aerosols and the (weak) aerosol absorption in rural regions. The final product are continuously (day and night) derived vertical profiles of the visibility in the ML (applying Koschmieders formula) . Adding the total scattering coefficients within the ML yields the spectral aerosol optical depth and the transmission respectively. The presented procedure will be tested to be helpful for flying weather prediction.

Literature:

Khvorostyanov V. F.; Curry, J. A.; JGR Vol. 104 No. D2; 2163-2174 (1999)

U. Leiterer et al.; Journal of Atmospheric and Oceanic Technology (JTECH) Vol. 22 No. 1; 18-29 (2004)

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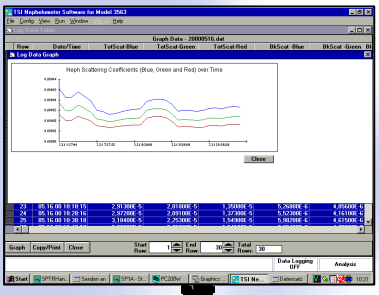

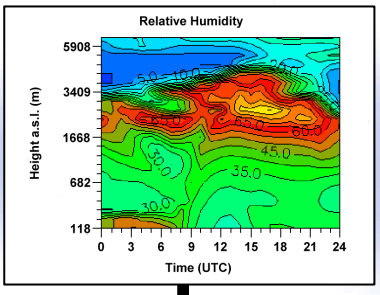

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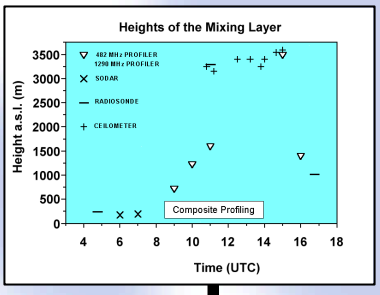

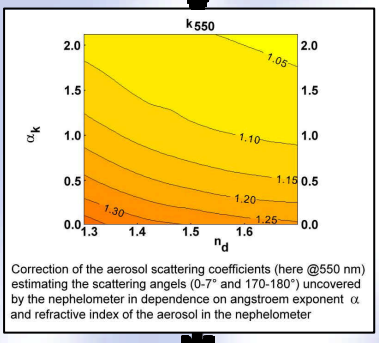

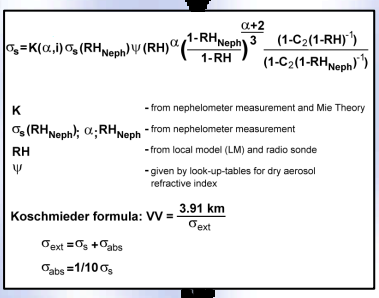

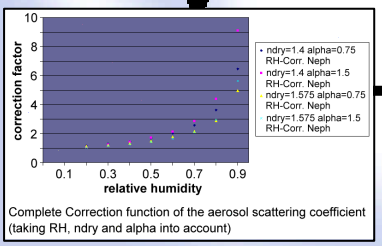

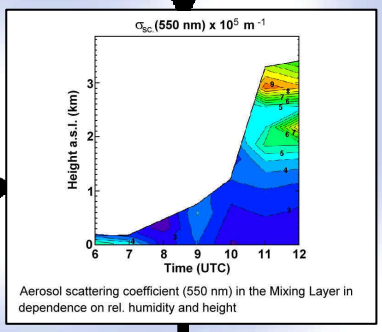

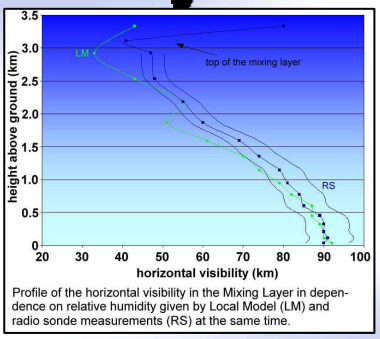

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