

Large scale land-use modification and subsequent regional climate change: experimental evidence from airborne studies

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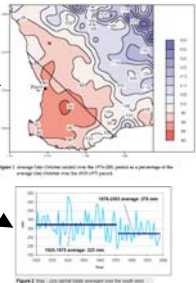
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Background

Regional change of precipitation distribution superimposing large scale negative trends

Possibly caused by: (micro)meteorology, regional transport, aerosol, depending on surface properties

The **BUFEX** experiment: airborne investigations natural laboratory, 2 seasons agriculture <-> natural vegetation



Coarse particles very low <math><10/cm^3</math> (> 300 nm), ~ 10 fold increase of fine particles above the agriculture

Aerosol sources above salt lakes, not above native vegetation

PBL-depth always lower above agriculture (> Surface albedo)

CCN doubled above agriculture

No significant difference between summer (Dec 06) and winter (Aug 07) despite different meteorology and H₂O flux and concentration

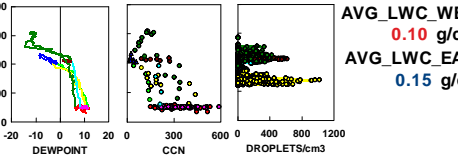
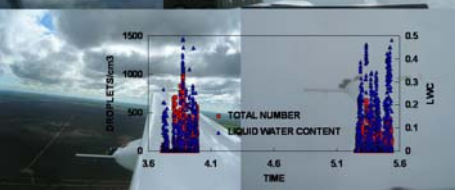
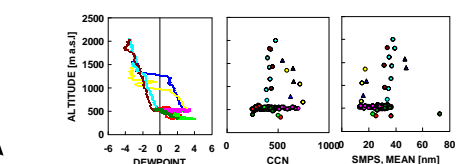
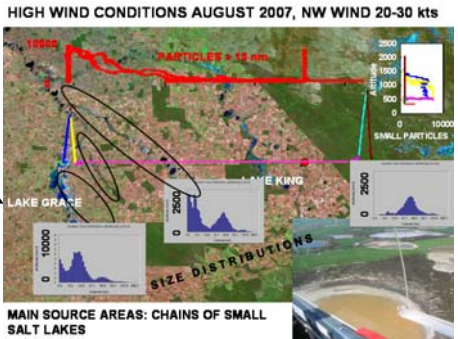
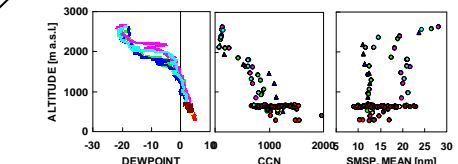
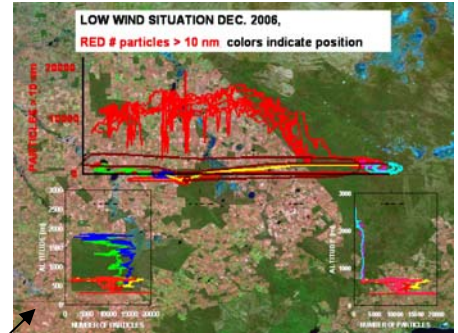
Cloud microphysics (agriculture) -> more and smaller droplets and less liquid water than above native vegetation, below cloud more water

Condensation levels 1300/1800 m

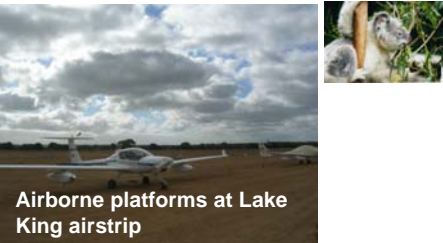
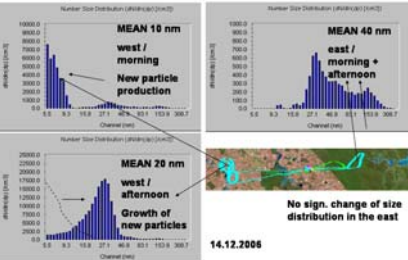
Main factors for regional precipitation

Albedo -> vertical stability, Water vapor -> precipitable water local aerosol production ->CCN and cloud microphysics

Is nucleation activity controlled by groundwater levels?



INDICATION OF NUCLEATION 14.12.2006, TWO FLIGHTS
Morning ~ 10:00-12:00 and afternoon ~ 13:30- 15:00



Numerous small salt lakes, source areas for ultrafine particles,



AVG LWC_WEST 0.10 g/cm3
AVG LWC_EAST 0.15 g/cm3