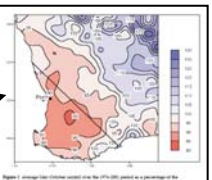
Forschungszentrum Karlsruhe
In der Helmholtz Gesellschaft
Institut für Meteorologie und Klimaforschung (IMK-IFU) Garmisch-Partenkirchen,Germany

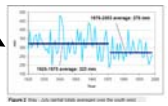
Large scale land use modification and subsequent regional

W. Junkermann[1], J. Hacker[2], T. Lyons[3] and Udaysankar Nair[4]
[1]FZK, IMK-IFU, Garmisch-Partenkirchen, Germany, [2]Airborne Research Australia, Flinders University, Adelaide, Australia
[3]Murdoch University, Perth, Australia, [4]National Space Science Technology Center, Huntsville, Alabama, USA

Background

Regional change of precipitation distribution super-imposing 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

Clouds above natural vegetation

where in the world?

Coarse particles very low <10/cm³ (> 300 nm), ~ 10 fold increase of fine particles above the agriculture

Aerosol sources above salt lakes, not above native vegetation

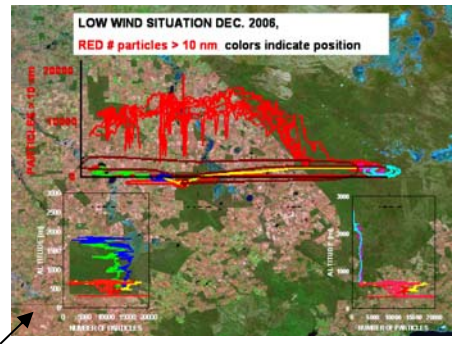
PBL-depth always lower above agriculture (> Surface albedo)

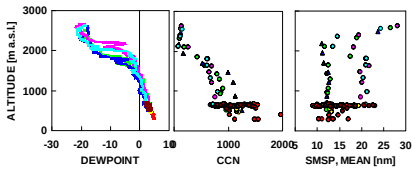
CCN doubled above agriculture

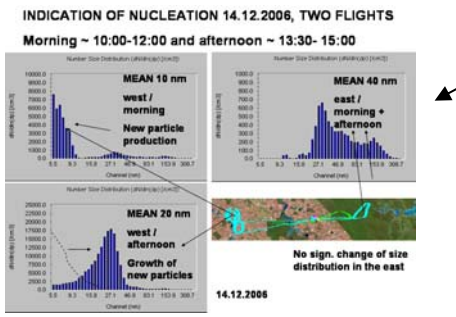
No significant difference between summer (Dec 06) and winter (Aug 07) despite different meteorology and H2O flux and concentration

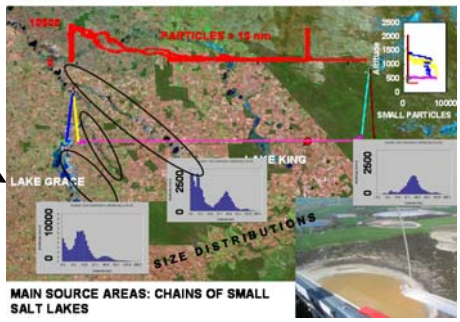
Cloud microphysics (agriculture) -> more and smaller droplets and less liquid water than above native vegetation, below cloud more water

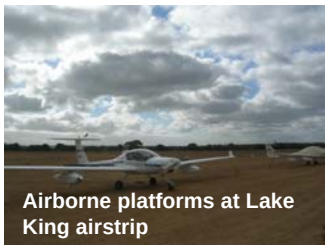
Condensation levels 1300/1800 m

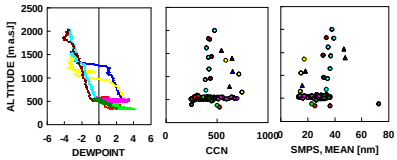








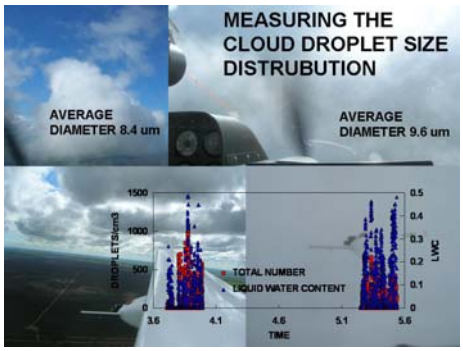




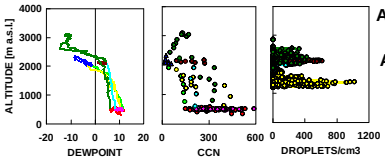
Main factors for regional precipitation

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

Is nucleation activity controlled by groundwater levels?



Numerous small salt lakes, source areas for ultrafine particles,



AVG_LWC_WEST
0.10 g/cm3
AVG_LWC_EAST
0.15 g/cm3