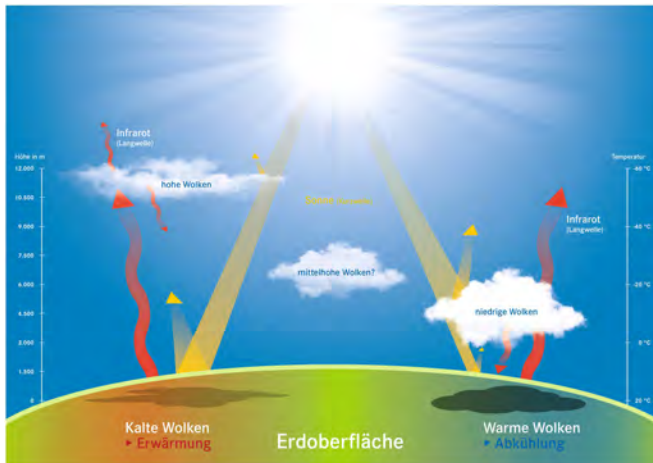
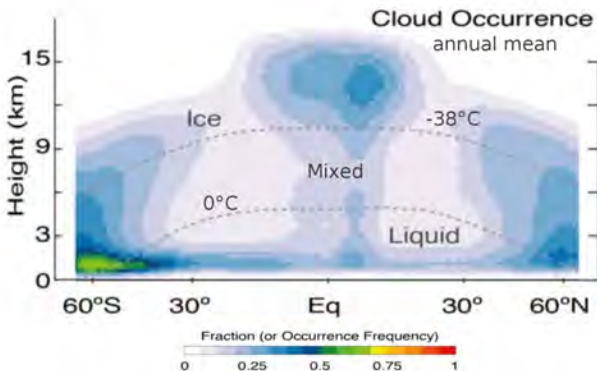


# WOLKEN

## DIE GROSSEN UNBEKANNTEN IM KLIMASYSTEM



# VERTEILUNG DER WOLKEN-ARTEN

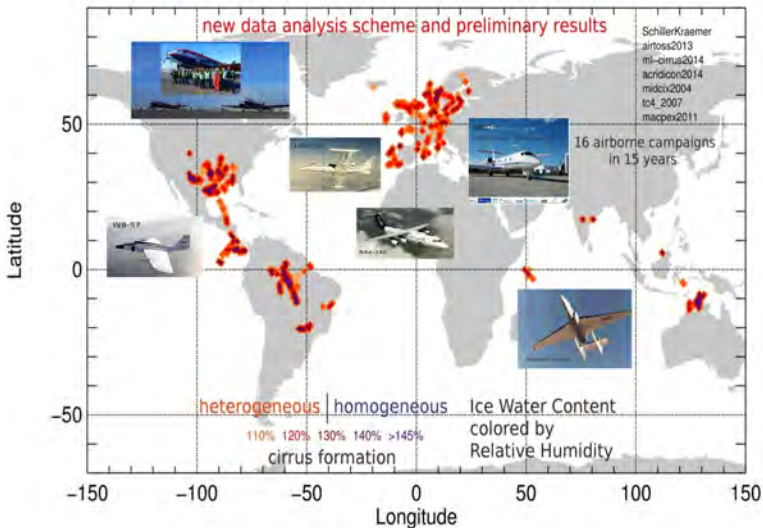


IPCC 2013

from CloudSat/CALIPSO 2B-GEOPROF-LIDAR dataset for 2006-2011; Mace et al., 2009

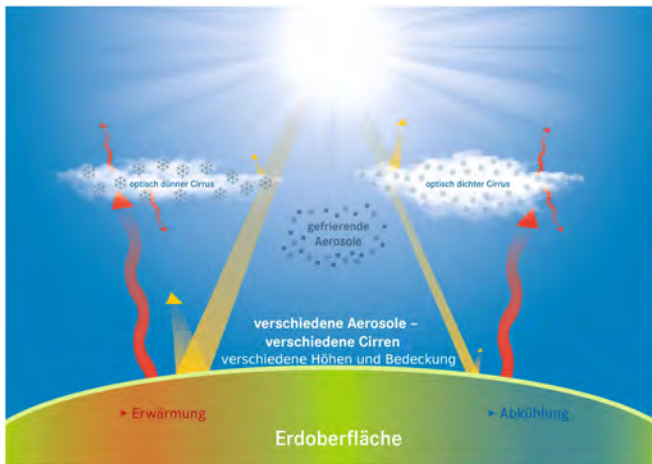
Chapter 7: Clouds and Aerosols (Boucher et al., 2013)

# JÜLICH: MESSUNGEN IN EISWOLKEN AUF FLUGZEUGEN

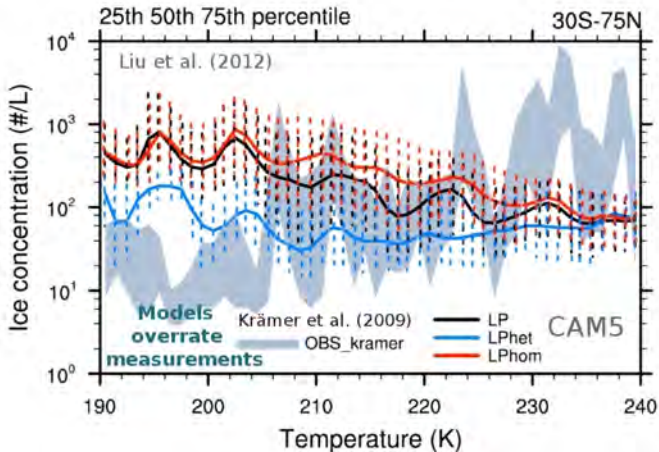


# CIRREN

## STRAHLUNGS-RÜCKKOPPLUNG - KLIMA?



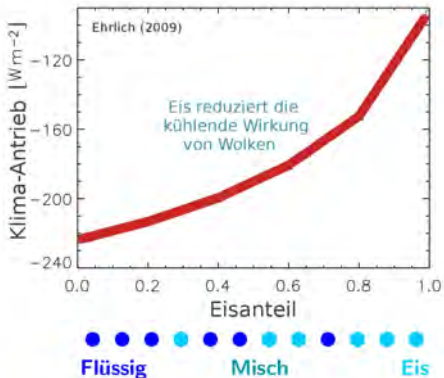
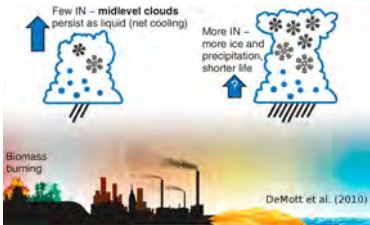
## CIRREN IN GLOBALEN MODELLEN



→ Evaluierung der Modelle durch Beobachtungen

# MISCHWOLKEN

## STRAHLUNGS-RÜCKKOPPLUNG - KLIMA ??



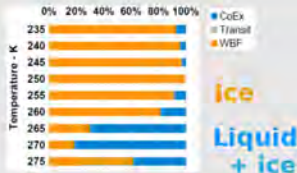
# VERTIKALE VERTEILUNG DES EISANTEILS



## COALESC 2011



- Combined Observation of the Atmospheric boundary Layer to study the Evolution of StratoCumulus
- Exeter, UK
- Mid-latitude campaign
- CAPS@BAE146



BACK

MORE AEROSOL-CLIMATE

JÜLICH-INSTRUMENTS

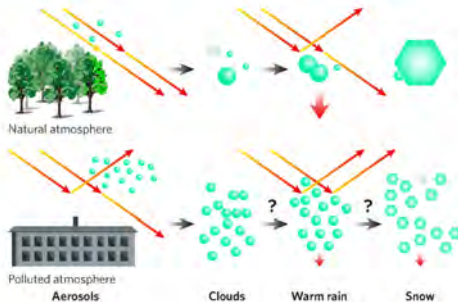
CIRREN - KLIMATOLOGIEN





# WARM CLOUDS

## Aerosol impact on clouds – CCN number



Baker and Peter (2008), Nature

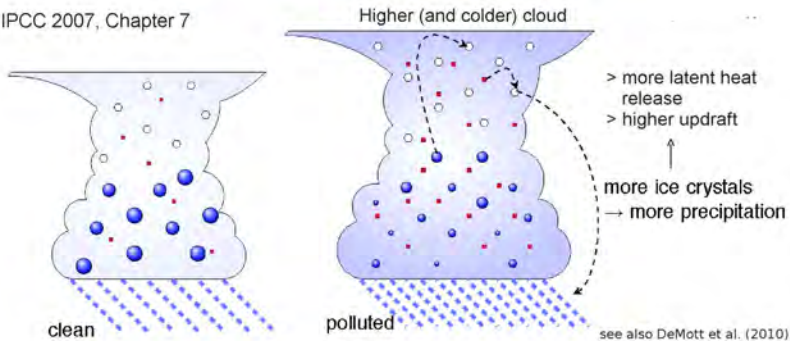
### More CCN

- more but smaller drops (Cloud albedo/Twomey effect)
- higher reflectivity & longer lifetime
- less sun on Earth's surface ➤ Cooling

# MIXED CLOUDS

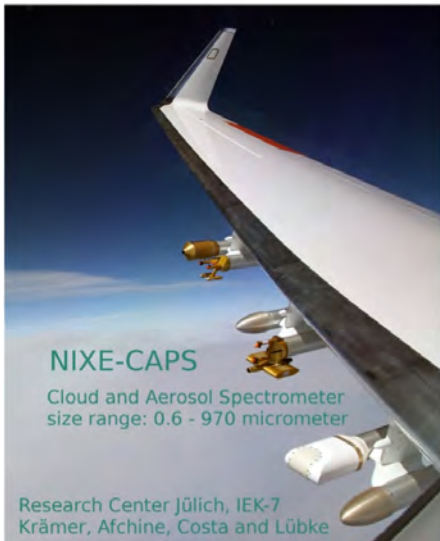
## Influence of het. IN on mixed clouds

IPCC 2007, Chapter 7



➔ climate forcing – cooling (?)

# NIXE-CAPS - CLOUD PARTICLE SPECTROMETER

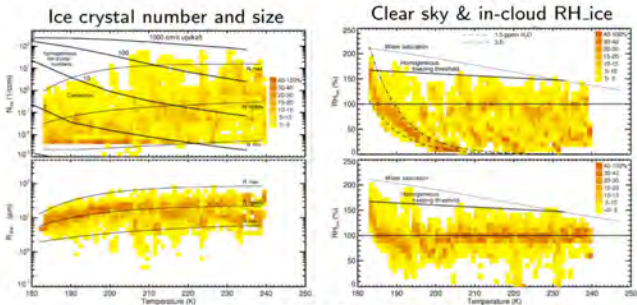


# FISH - HYGROMETER

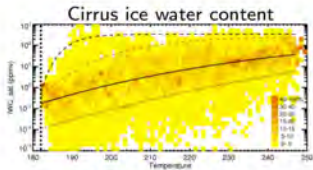
## FISH & HAI @ HALO



# CIRREN - KLIMATOLOGIEN



Krämer et al. (2009), ACP



Schiller et al. (2008), JGR