

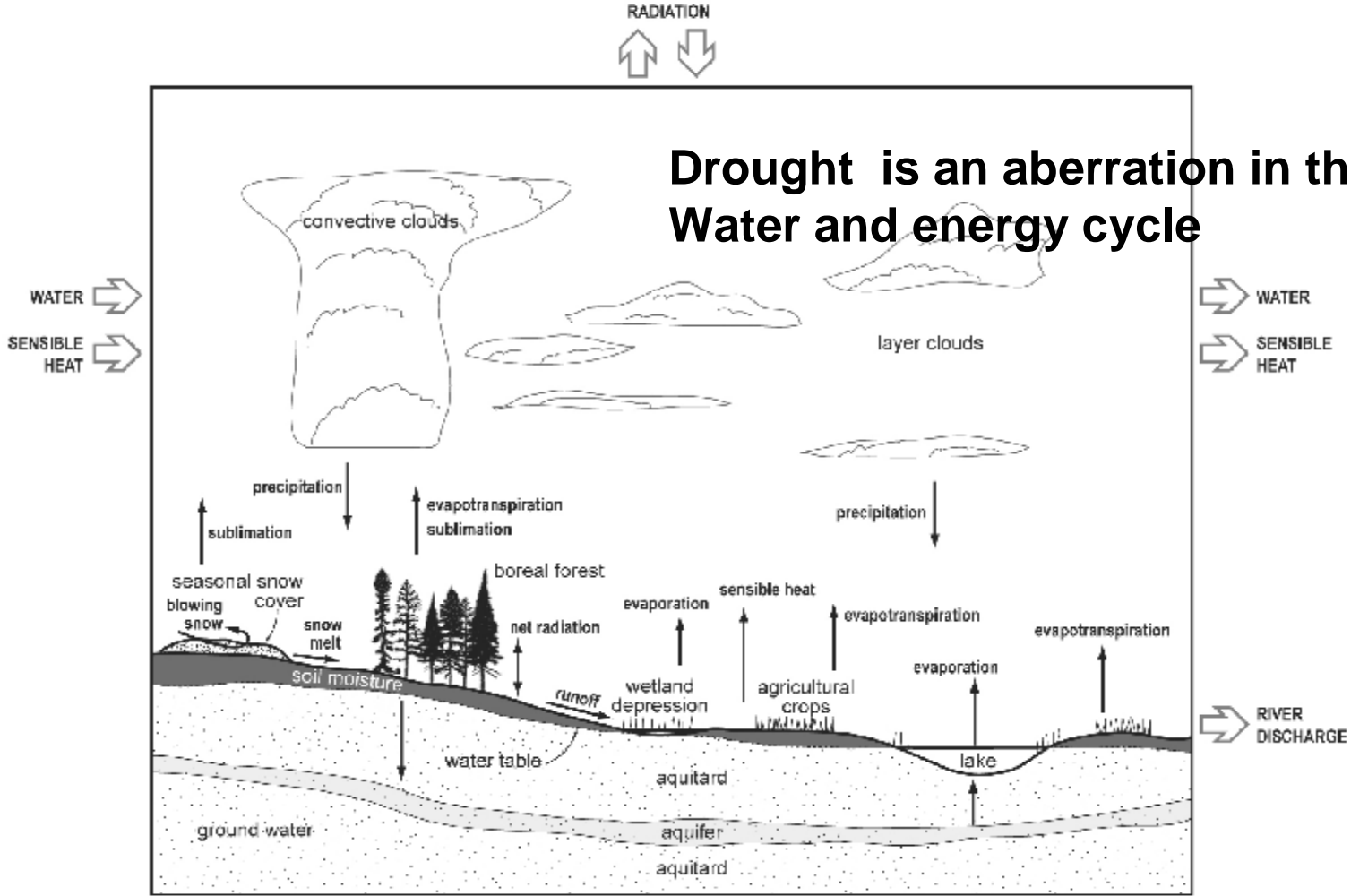
Clouds, Aerosols and Prairie Drought

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Song Guo

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WATER AND ENERGY CYCLING



- Reporting on preliminary results of two studies
 - Possible effect of forest fire aerosol on cloud properties
 - Cloud properties during the recent drought and their differences from previous periods

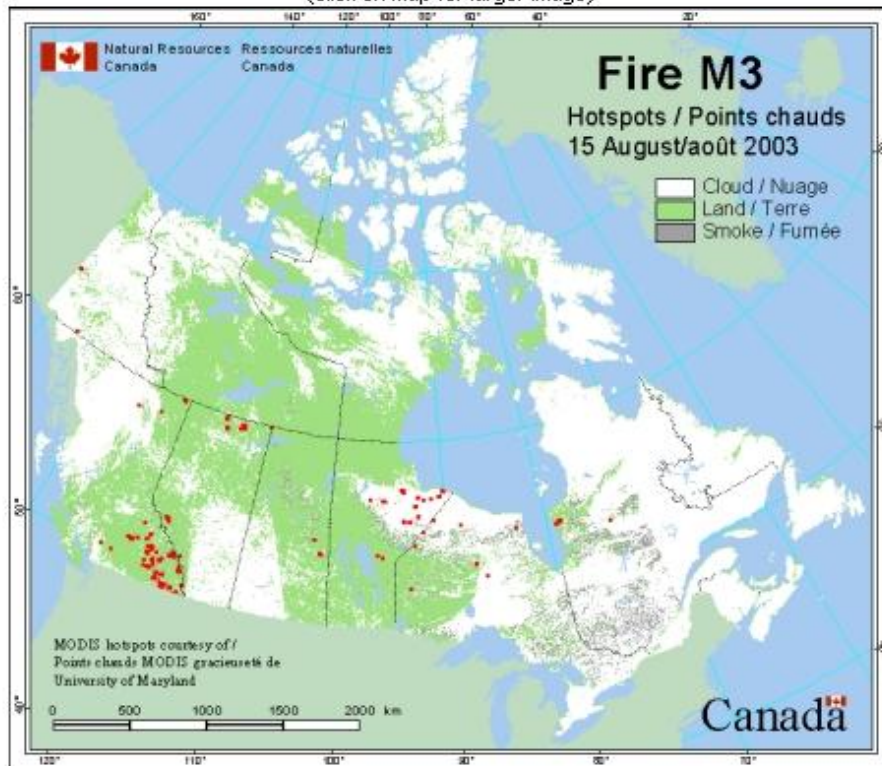
Possible Effects of Aerosols on Cloud properties

- Motivation

- Previous studies in other regions have shown that forest fire aerosol can change cloud cover and/or cloud properties.
- As part of his work for MAGS, Song Guo has demonstrated strong impacts of wildfires on the regional radiation budgets.
- It is reasonable to expect if clouds form in an air mass that contains similarly high aerosol concentrations that the aerosol may impact on the cloud properties.

Canadian Wildfire Images from CCRS

(click on map for larger image)



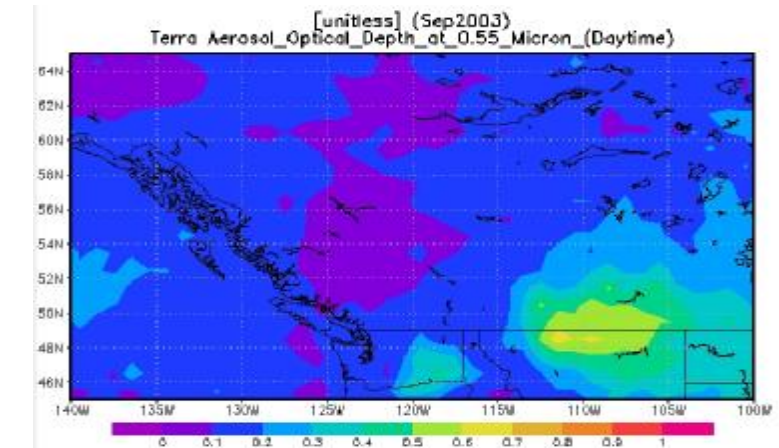
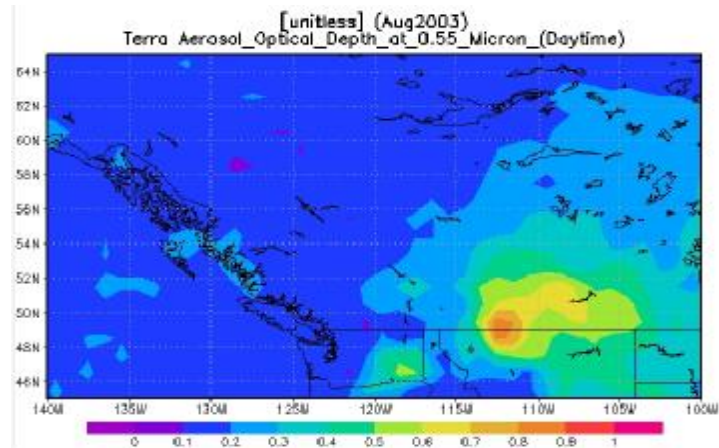
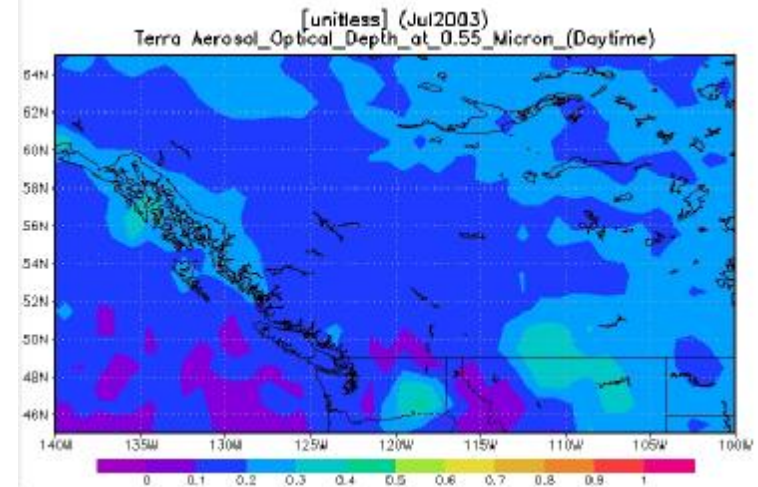
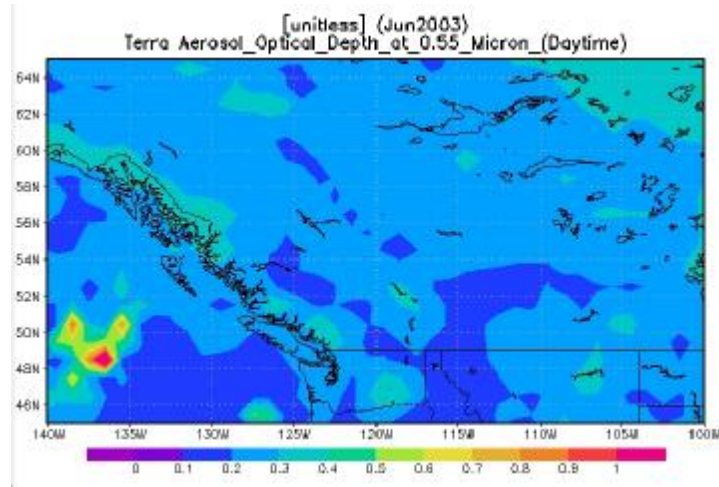
August 15, 2003

(click on map for larger image)



September 2, 2003

AOD (June – September, 2003)



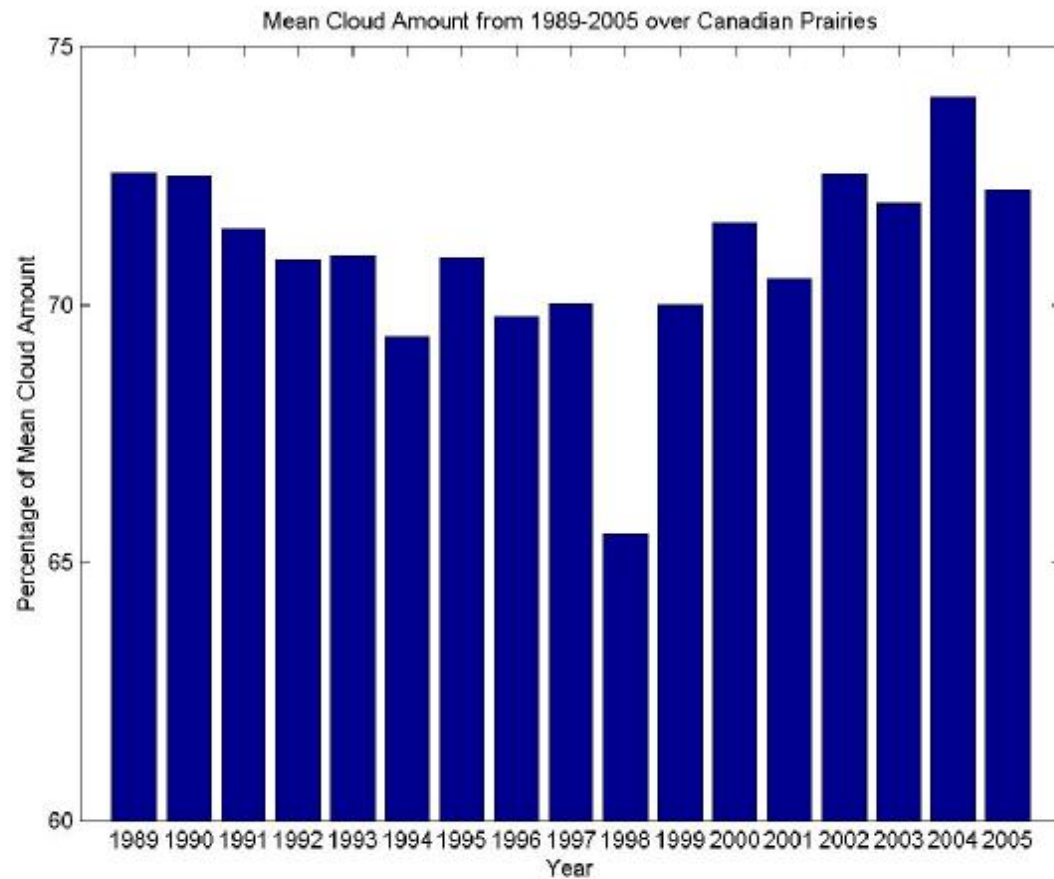
- The plan is to look for signatures in cloud properties (optical thickness, cloud droplet effective radius) that may be linked to the aerosol optical thickness in the cloud vicinity.
- This is not trivial because of the other much more important determinants of cloud optical thickness and effective radius.

Cloud properties during periods of normal precipitation and drought

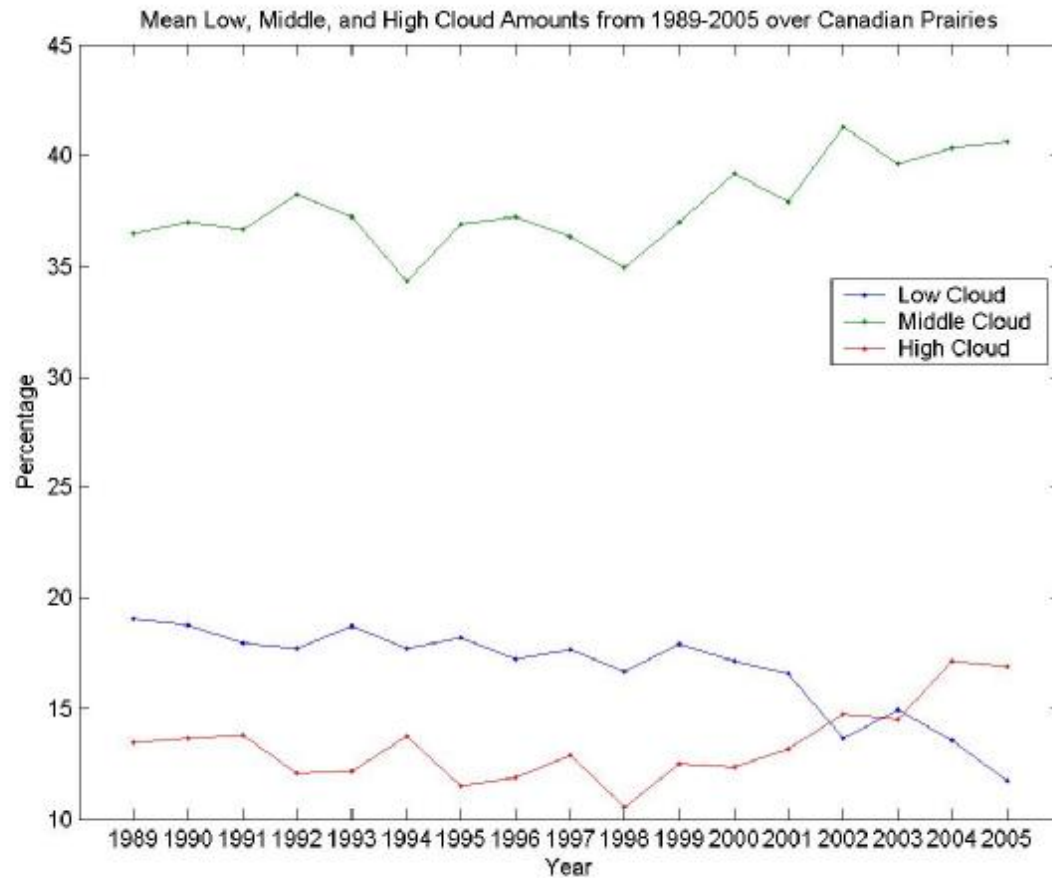
- Cloud properties during droughts must be different than during periods of normal precipitation. Possible differences include:
 - Cloud amount
 - Cloud base height and/or thickness
 - Cloud optical thickness
 - Cloud droplet size distribution
- The goal of this study is to look for such differences in pre-drought and drought period satellite measurements of cloud properties.

- The data are from the International Satellite Cloud Climatology Project (ISCCP)
- Analyse D2 data (3 h monthly averages) over Prairies
- Compare results for pre-drought period 1989 – 98 and drought period 1999 - 2004

MEAN CLOUD AMOUNT



LOW, MEDIUM and HIGH CLOUDS



CONCLUDING REMARKS

Two critical issues related to aerosols and clouds are being studied:

- Aerosols and their radiative impacts
Clouds and their variation during drought
- Future work will lead to a better appreciation of the role of aerosols and clouds on the recent drought