

# **CLOUDS, STORMS AND DROUGHT**

Ronald Stewart  
McGill University

with

*Erin Evans, William Henson, Kit Szeto*

# **OBJECTIVES**

- ***To better understand the flow of water vapour into and through clouds and precipitating systems to the surface within and adjacent to drought regions***
- ***To apply these advances to prediction capabilities and to surface and sub-surface water issues***

# **SPECIFIC ISSUES**

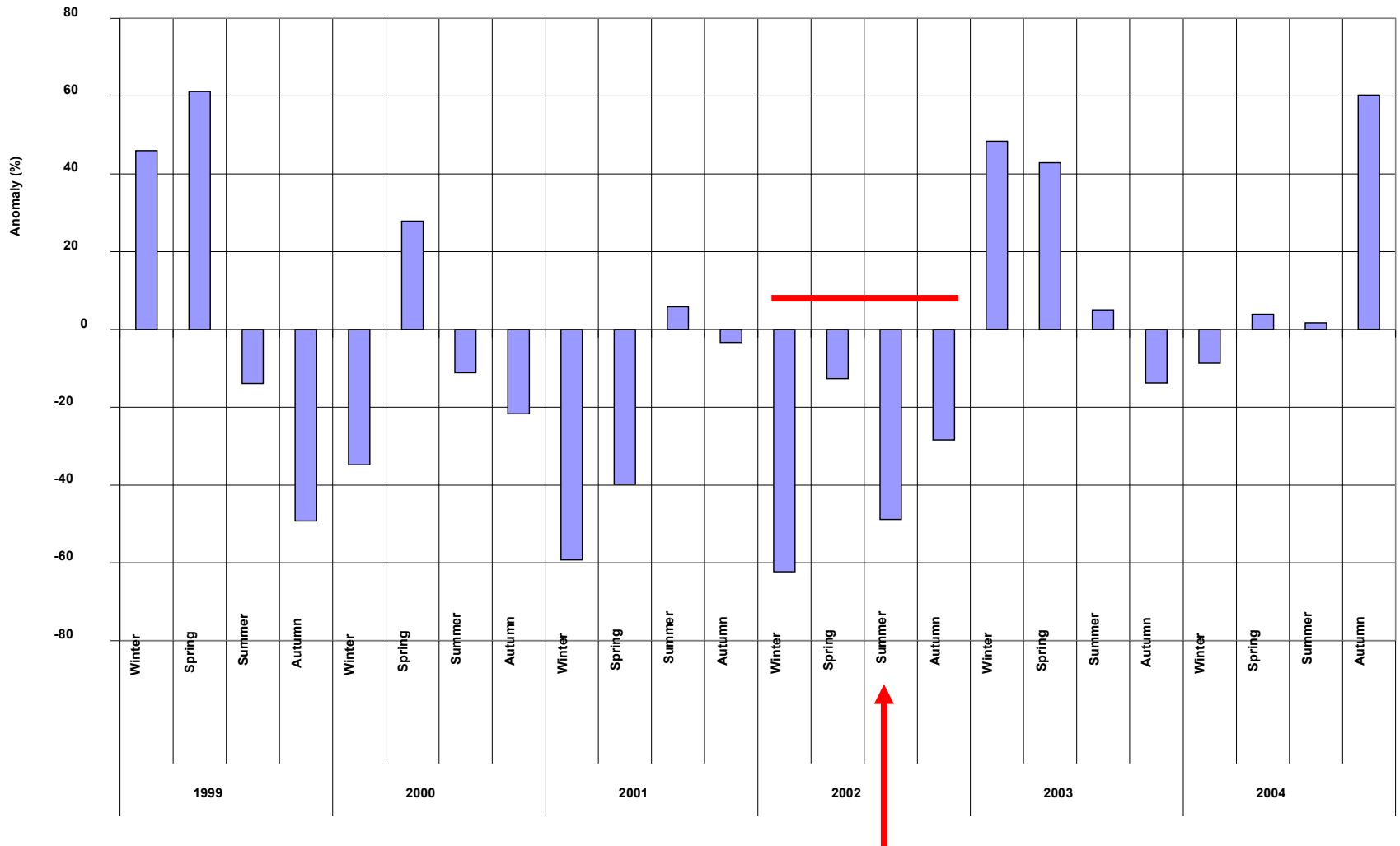
## **Cloud and precipitation features during the drought**

- **episodic events producing heavy, widespread precipitation**
- **cold season warm periods and associated precipitation**
- **light' precipitation and virga**

# TODAY'S TALK

- To explore some of the features of light precipitation and virga occurring during the recent drought

# PRECIPITATION ANOMALY EDMONTON



# EDMONTON

- Fraction of Precipitation as 'Light' (< 10 mm/day)

Year-long

climatology	56%
2002	73%

Summer only (J, J, A)

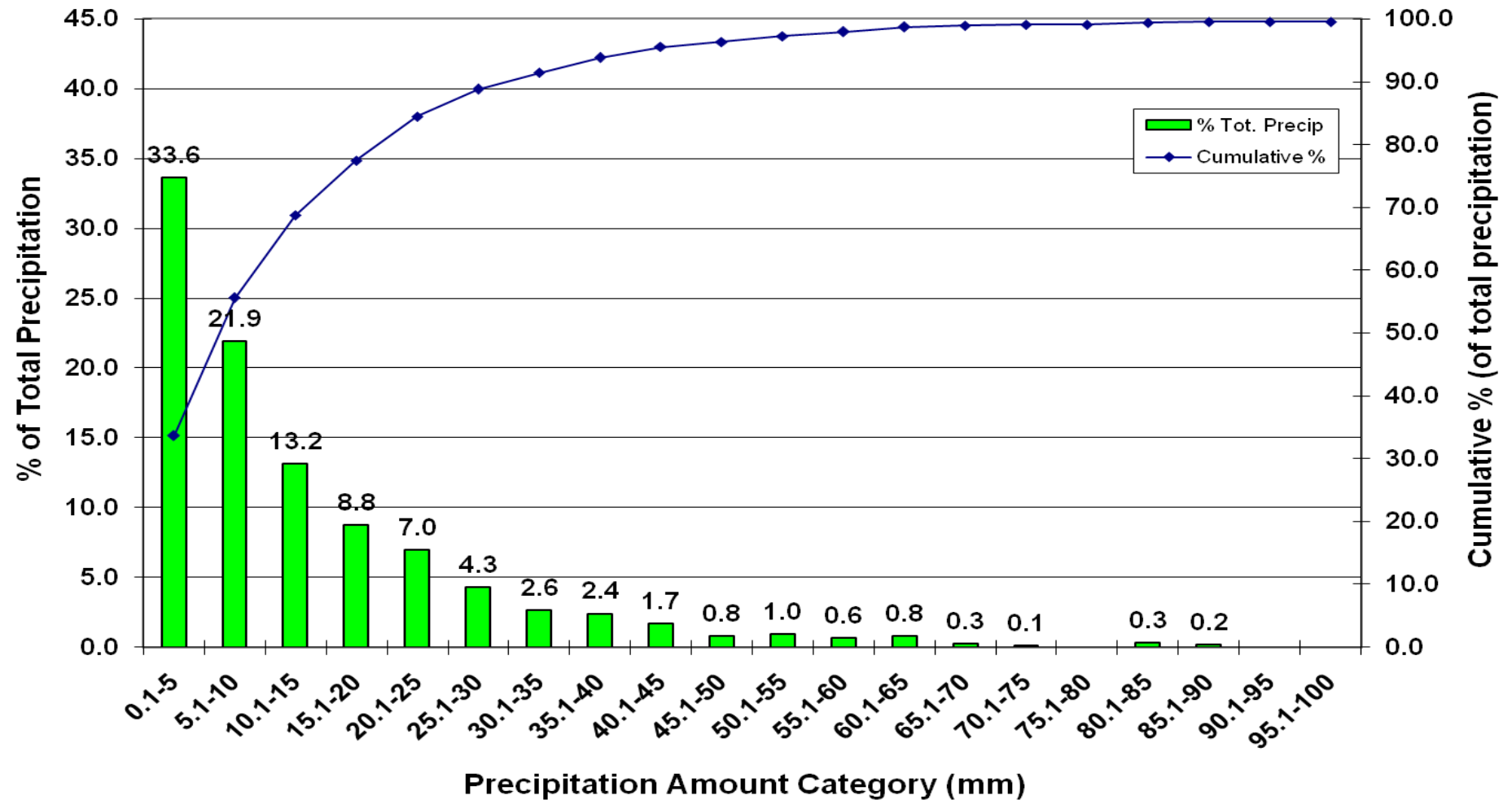
climatology	40%
2002	53%

- Summer Days with Precipitation (J, J, A)

climatology	55%
2002	50%

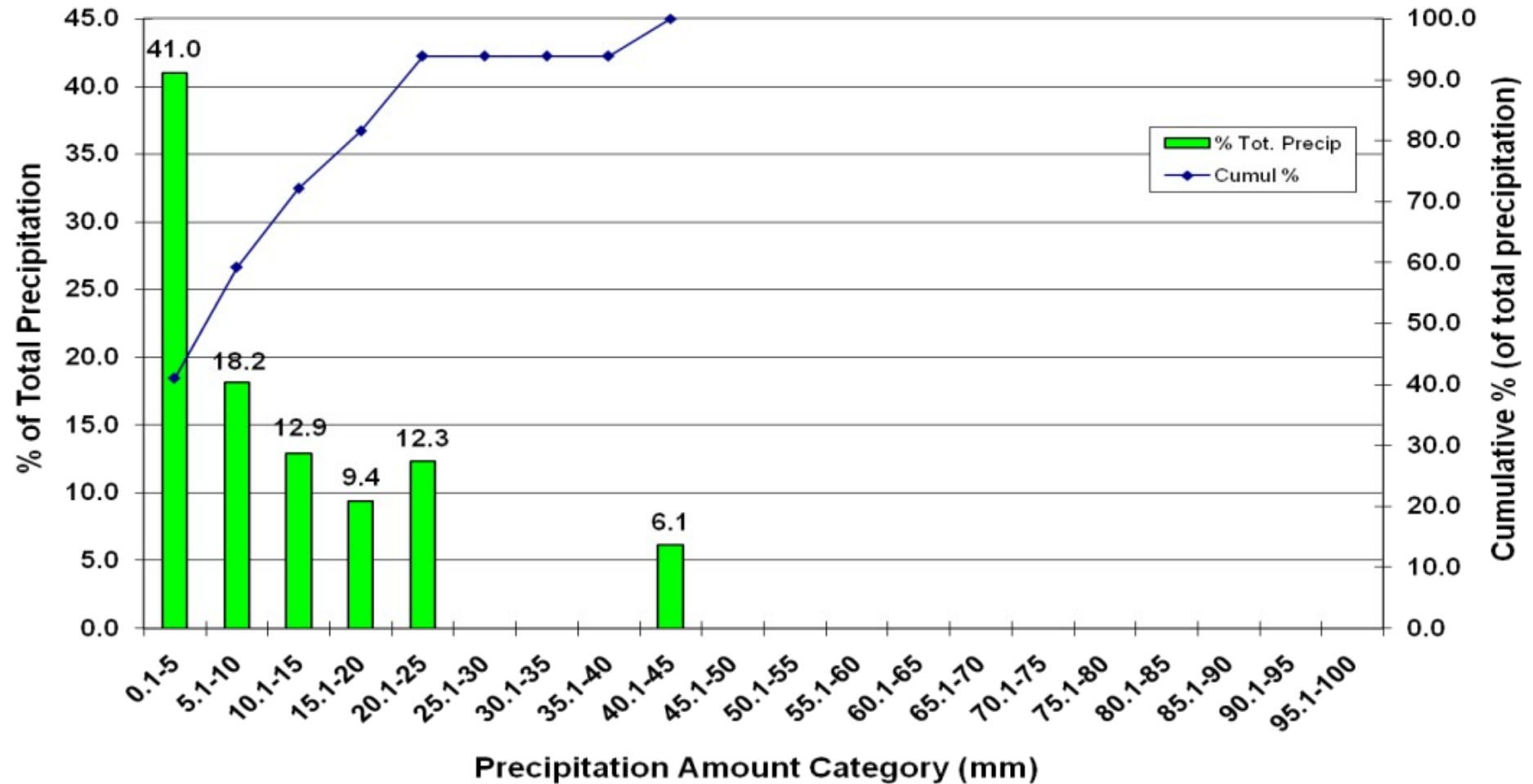
# CLIMATOLOGY

## Edmonton



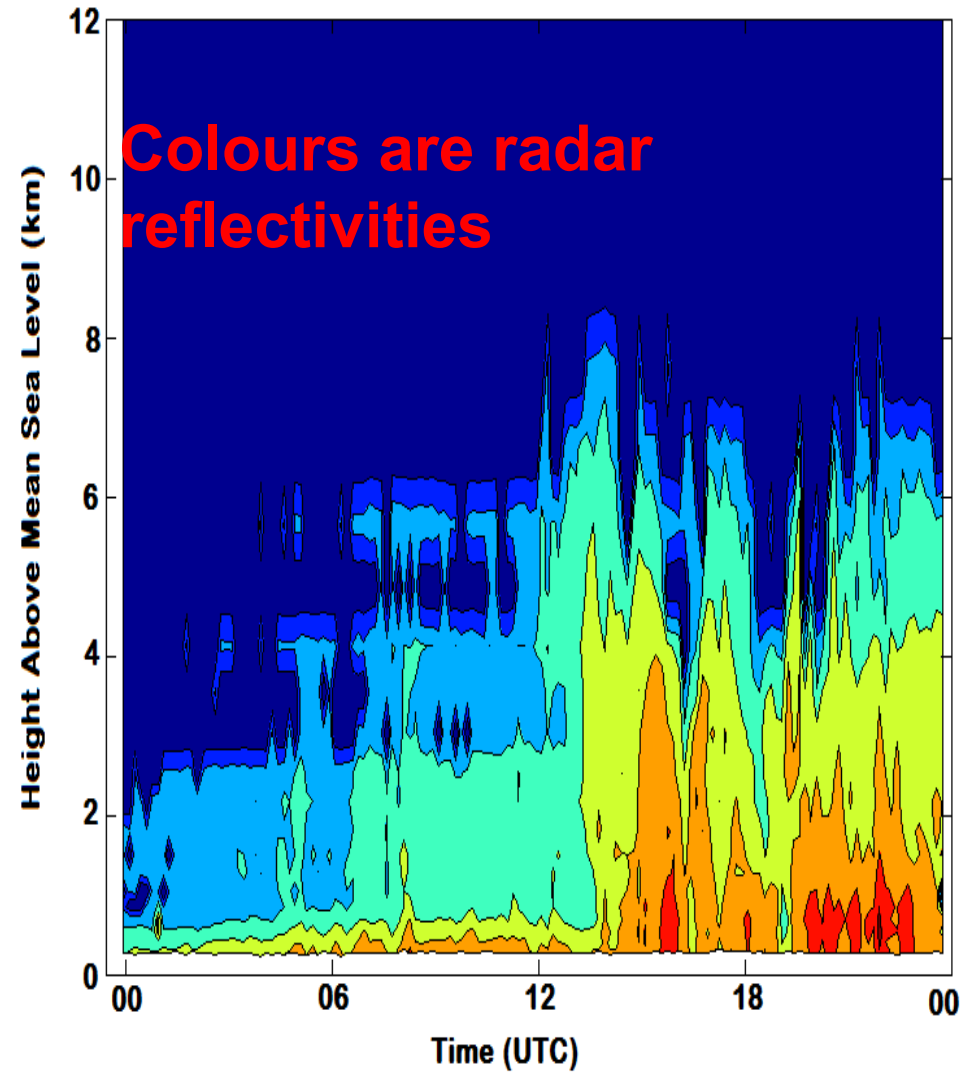
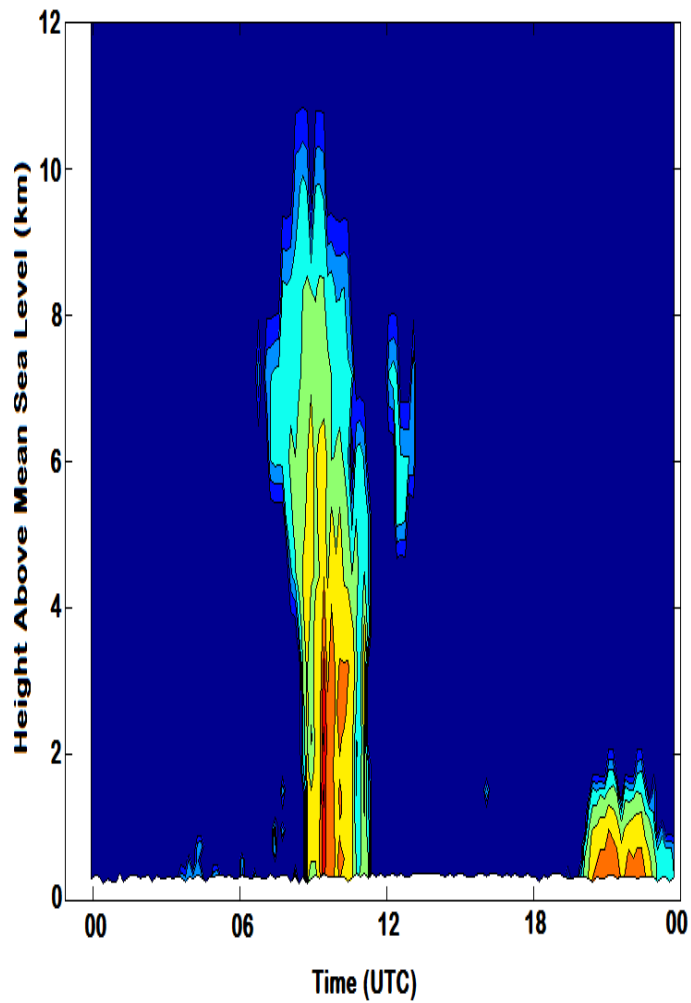
# SUMMERS OF 2001 and 2002

## Edmonton





# CONVECTIVE AND STRATIFORM PRECIPITATION

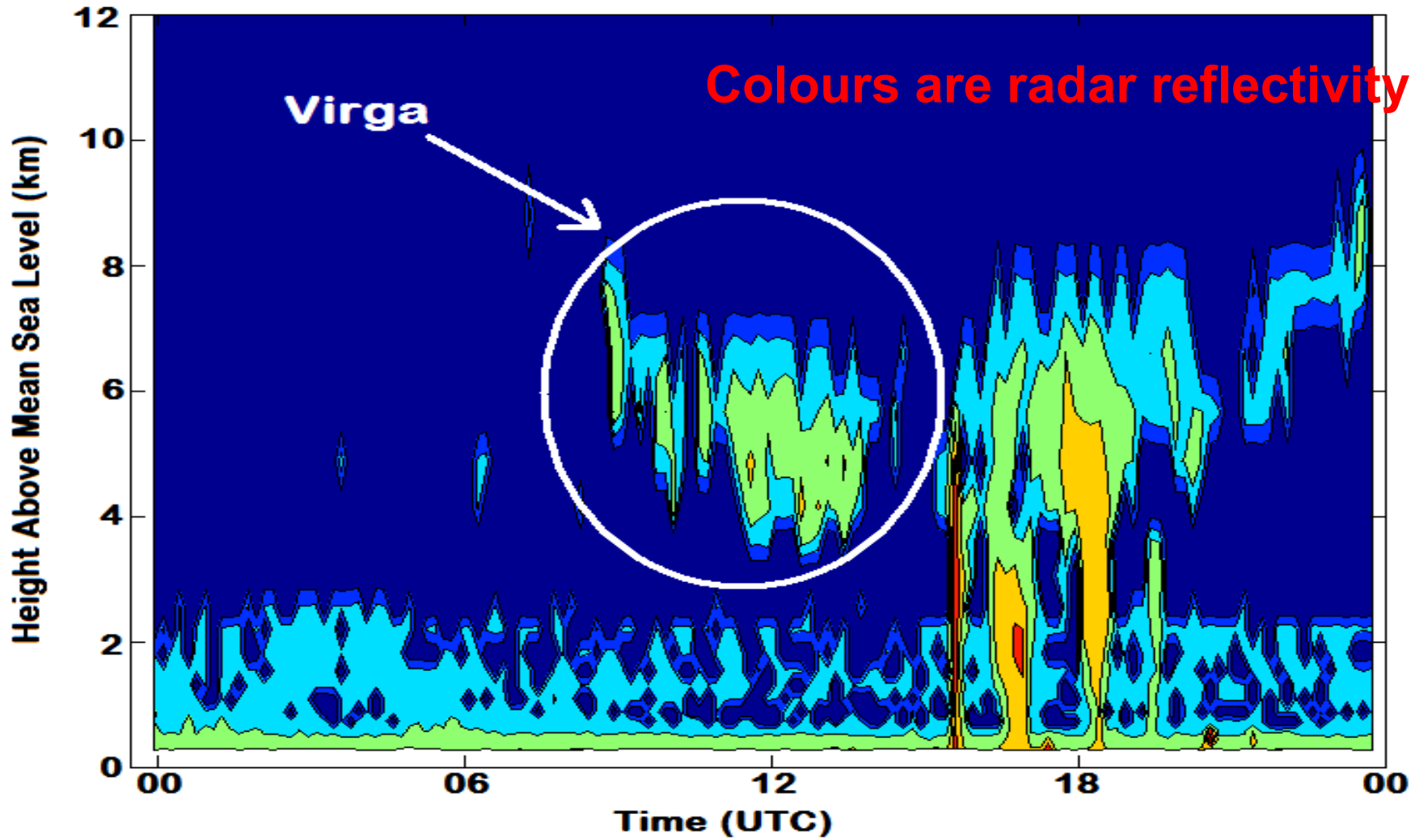


# VI RGA



Courtesy of Barrie Bonsal

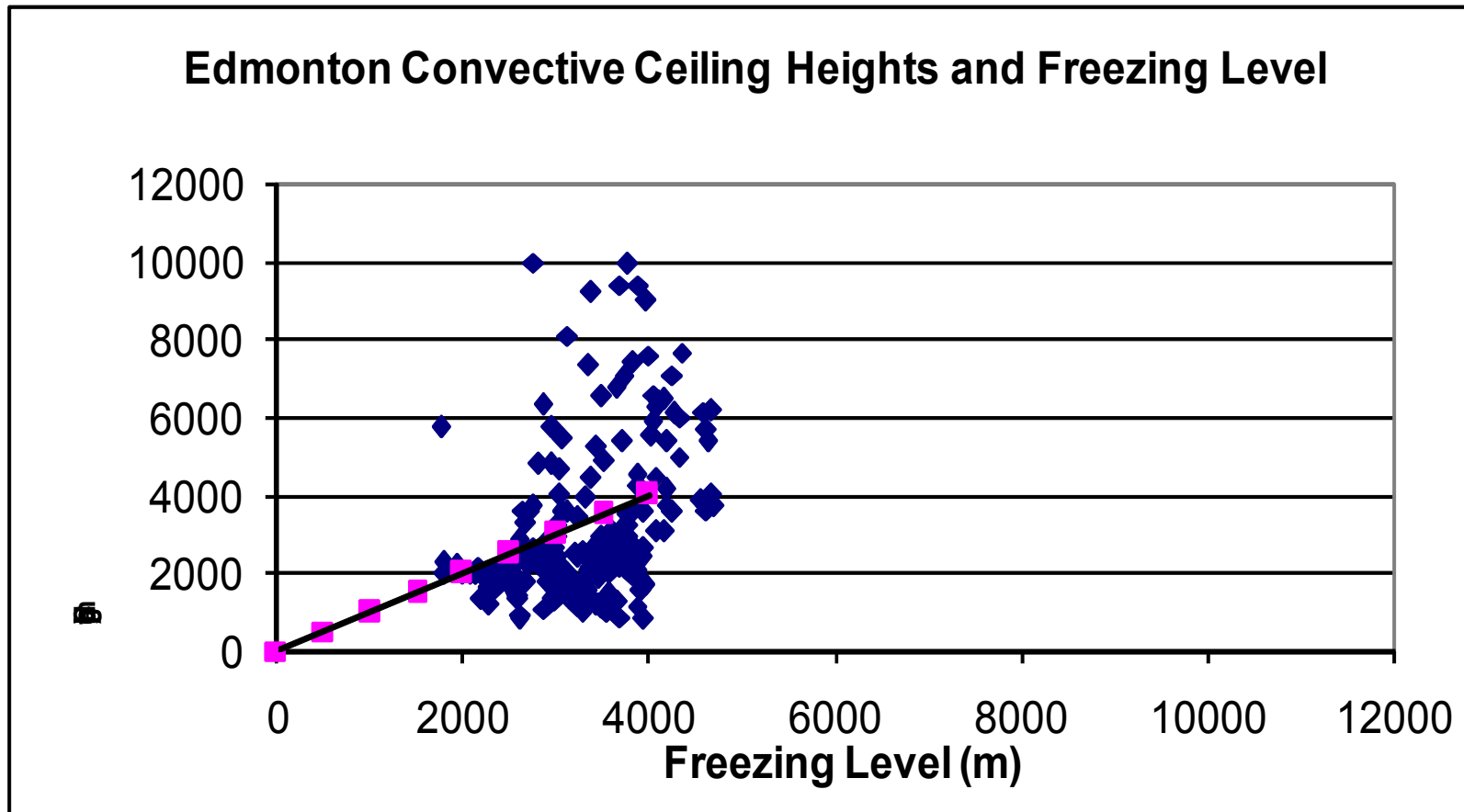
# VI RGA



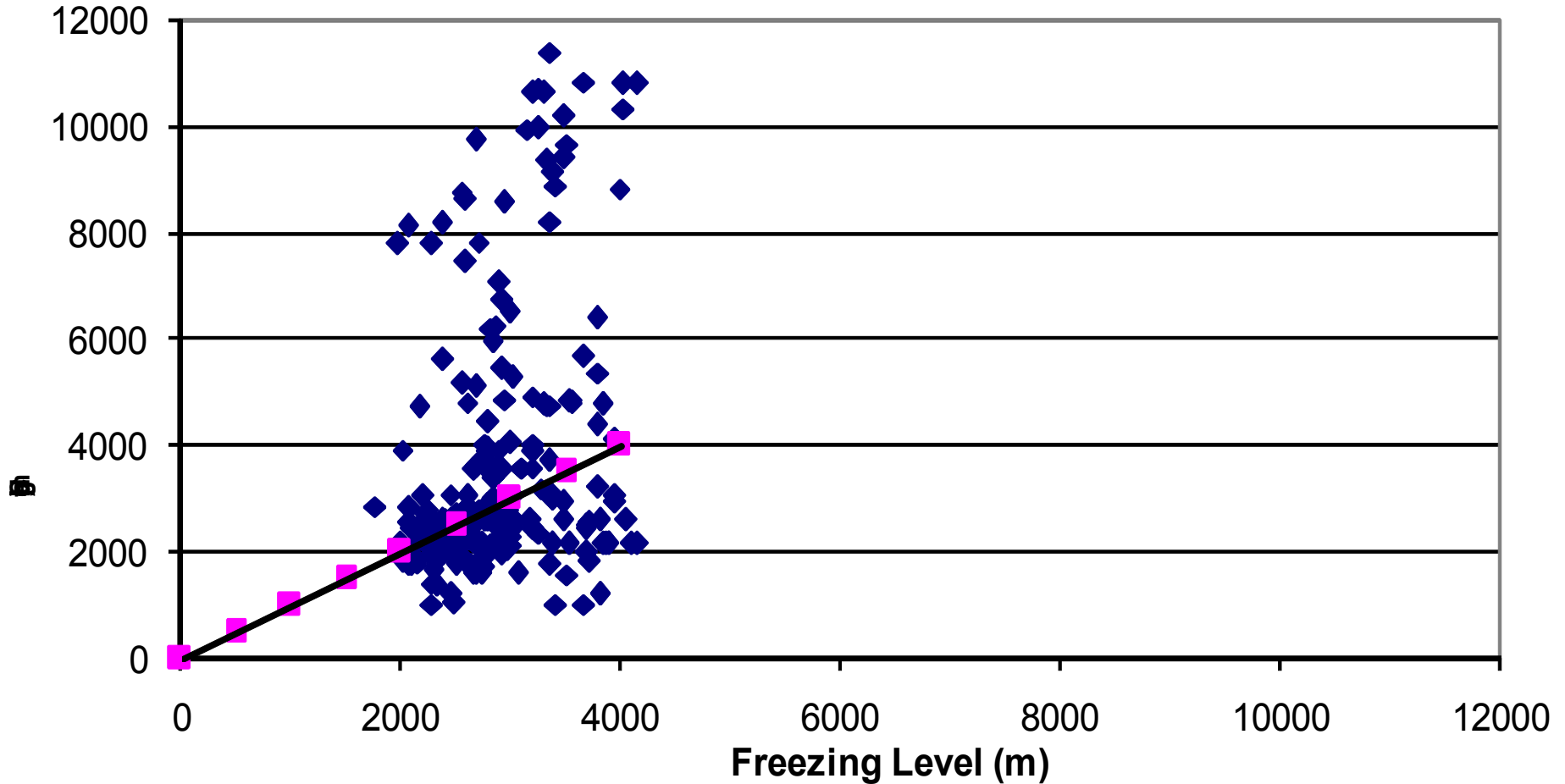
# DURATION

- For Edmonton in summer 2002
- Duration of
  - < 10 mm/h events      123 h
  - virga                      130 h
  - > 10 mm/h events      4 h

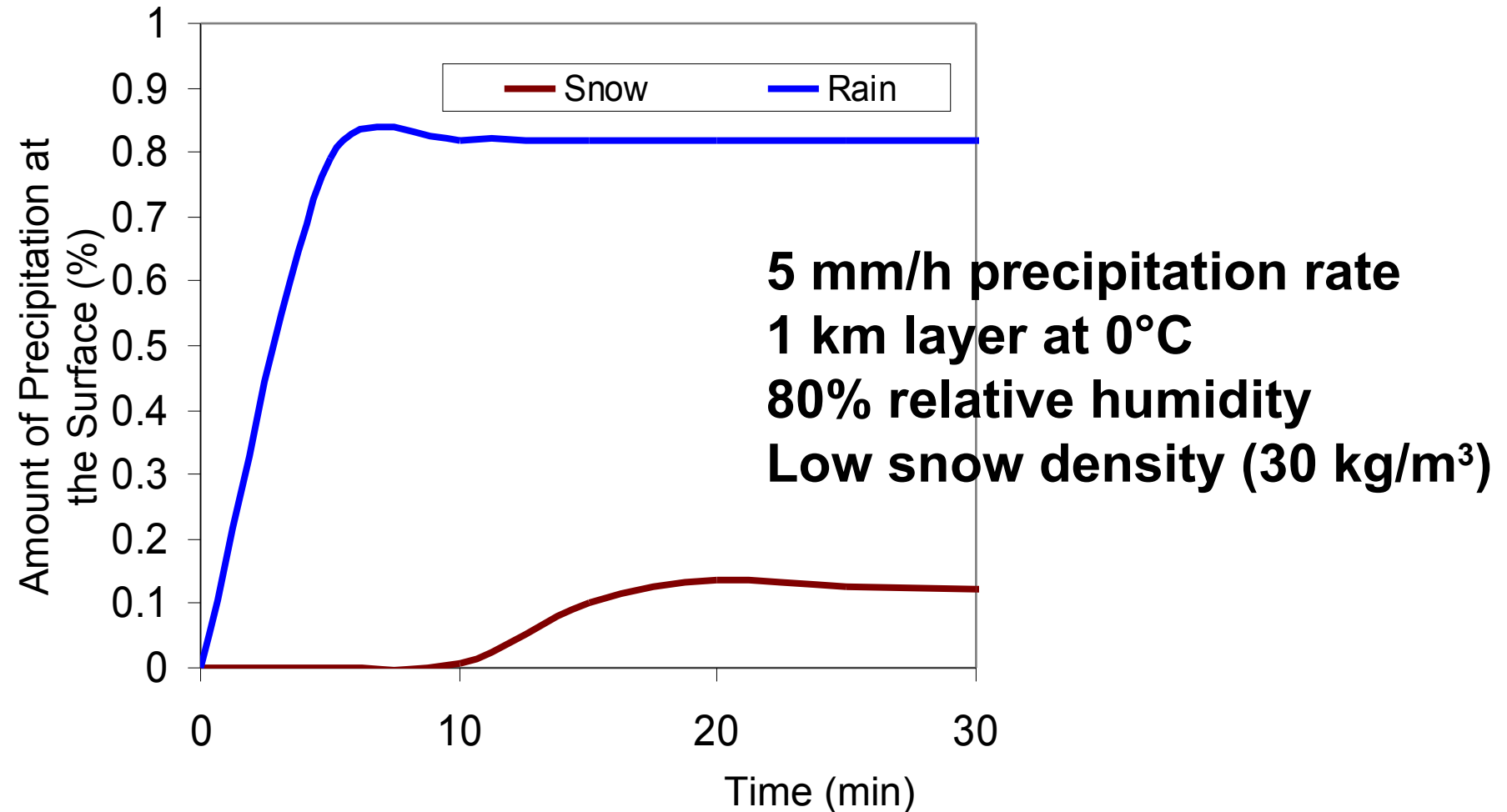
# CONVECTION ... NARR



# VI RGA ... NARR



# SUBLIMATION OR EVAPORATION



# **MORE SURFACE DRYING?**





# CONCLUDING REMARKS

- With a focus on light precipitation and virga:
- Light precipitation sometimes still occurs during drought
- These instances are produced through convective and stratiform processes
- Precipitation/virga is sometimes linked with evaporation alone, sublimation alone, or both
- Although speculative, such instances 'may' sometimes act to enhance surface evaporation