Microphysics Complexity and Squall Line Simulations

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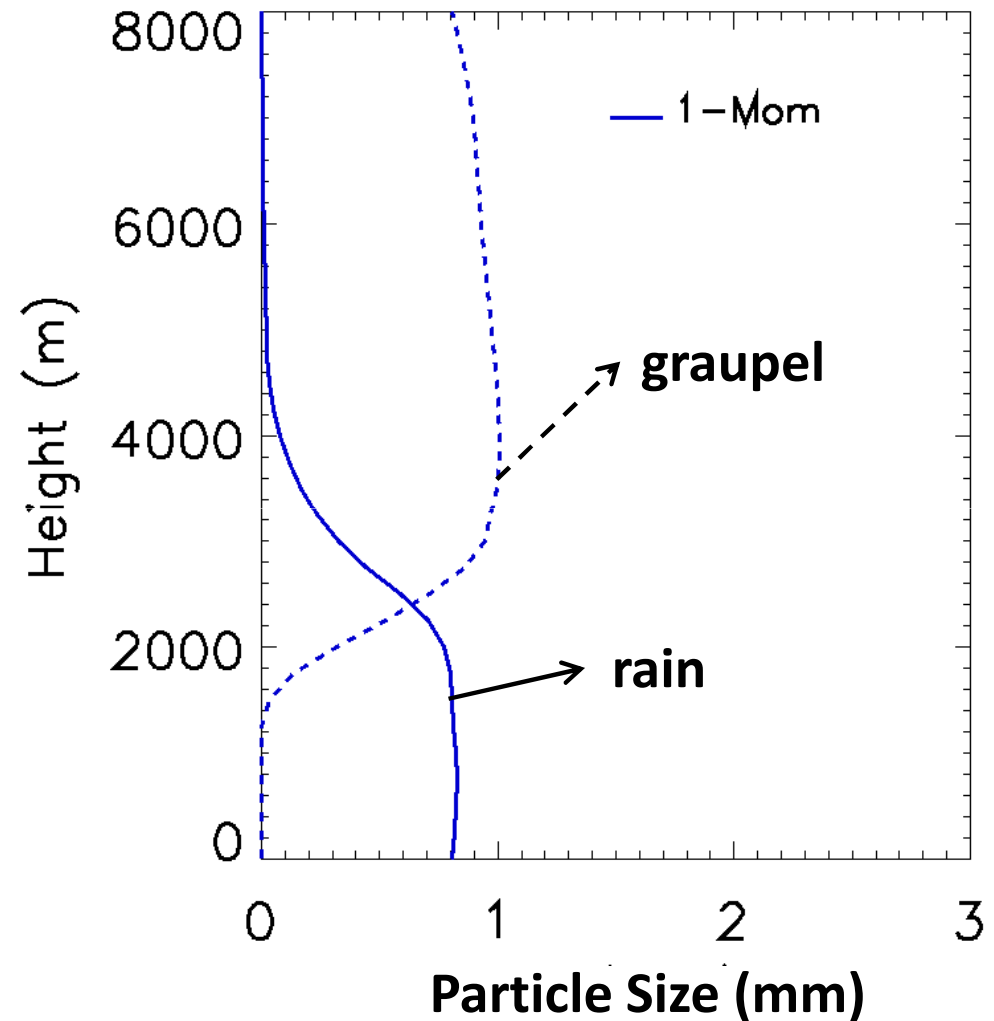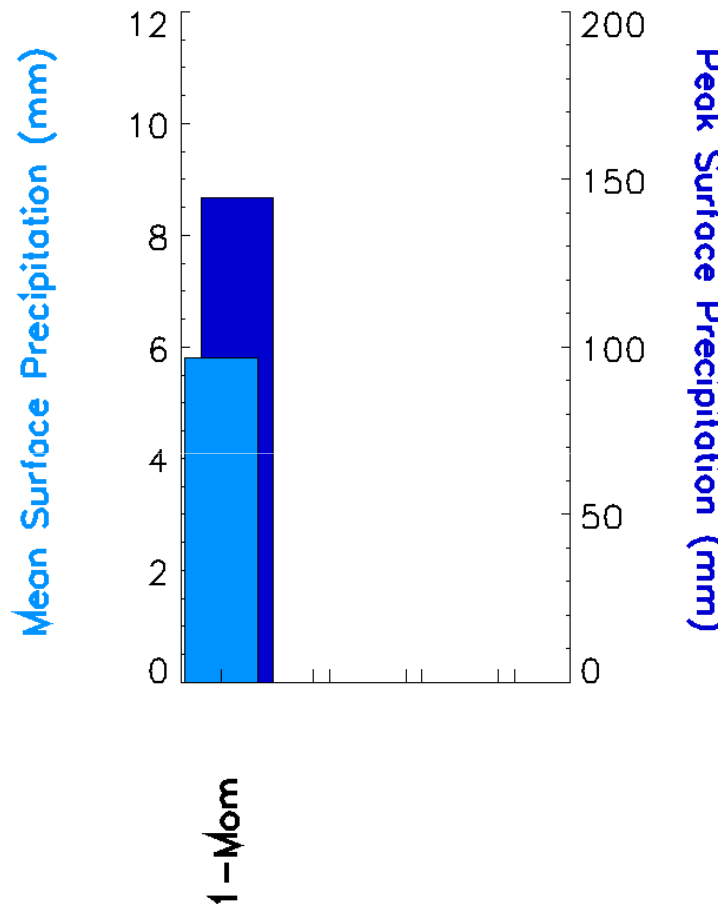
What Level of Complexity is Needed?

Microphysics sensitivity simulations of 2D-squall line using WRFV3.2:

- **How sensitive are simulations to level of complexity?**

    - **Number of predicted moments for each hydrometeor**

    - **Treatment of rimed ice species (graupel/ hail)**

- **What determines difference between equally complex models?**

    - **Morrison versus Milbrandt 2-Moment schemes**

Number of predicted moments

Precipitation extremes sensitive to # predicted moments
  - large drops: faster fallout and less evaporation

Number of predicted moments

Precipitation extremes sensitive to # <u>predicted moments</u>
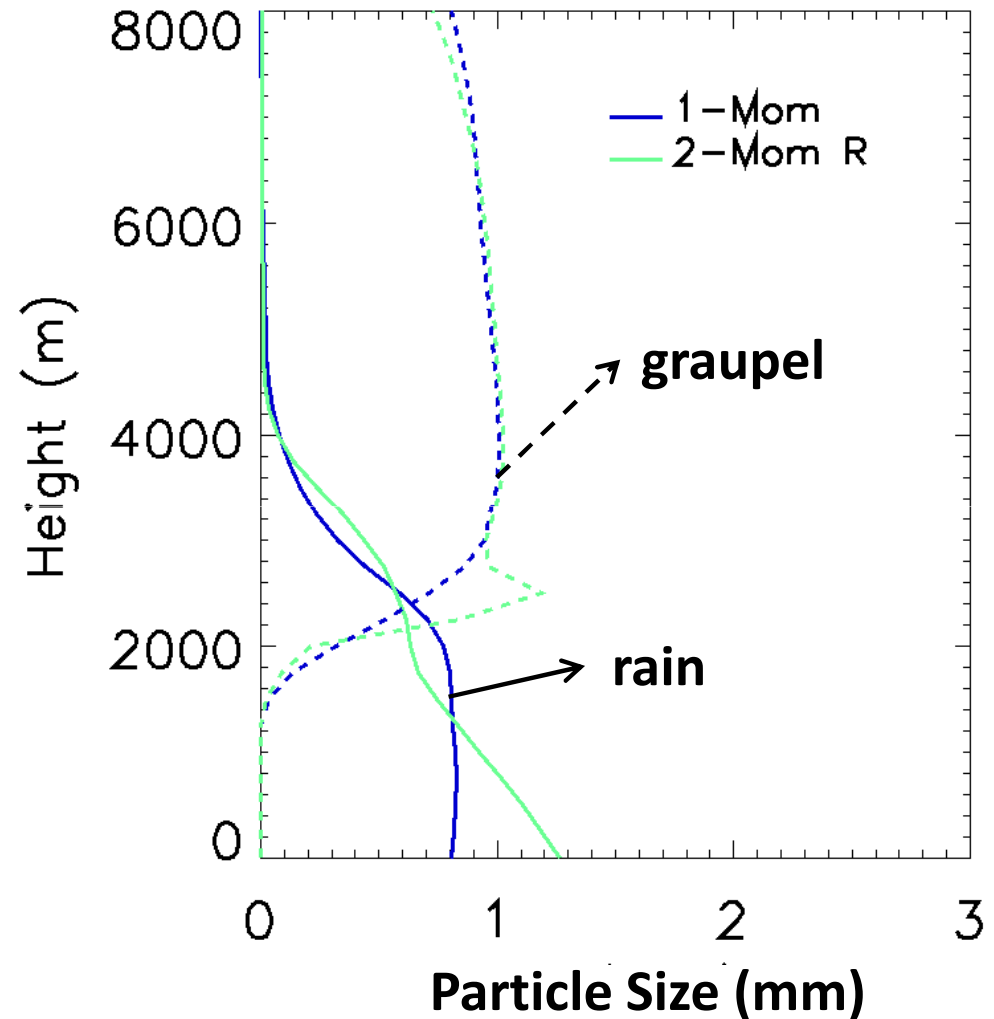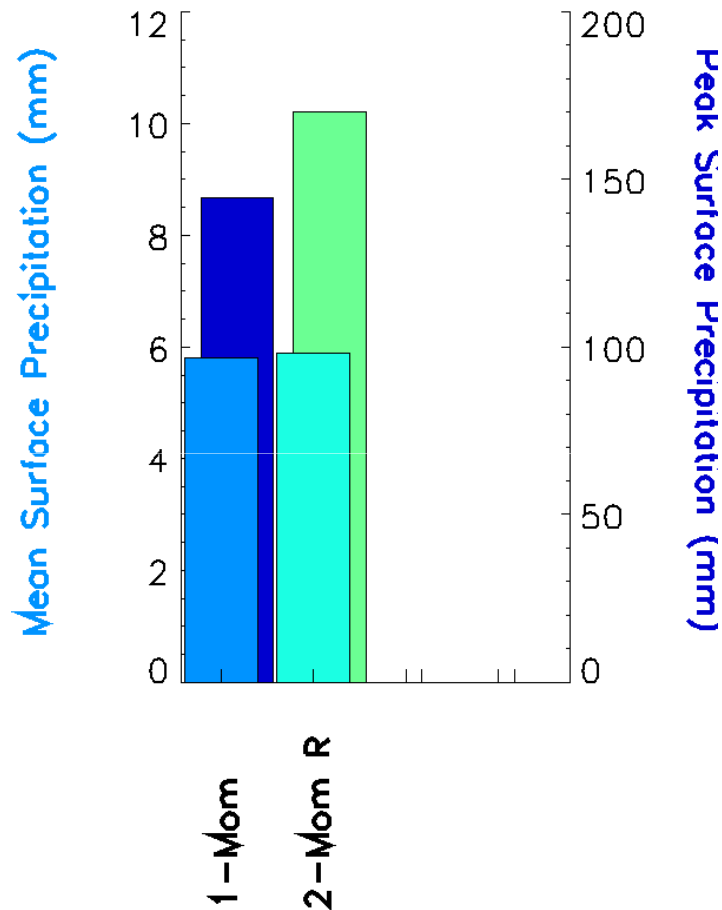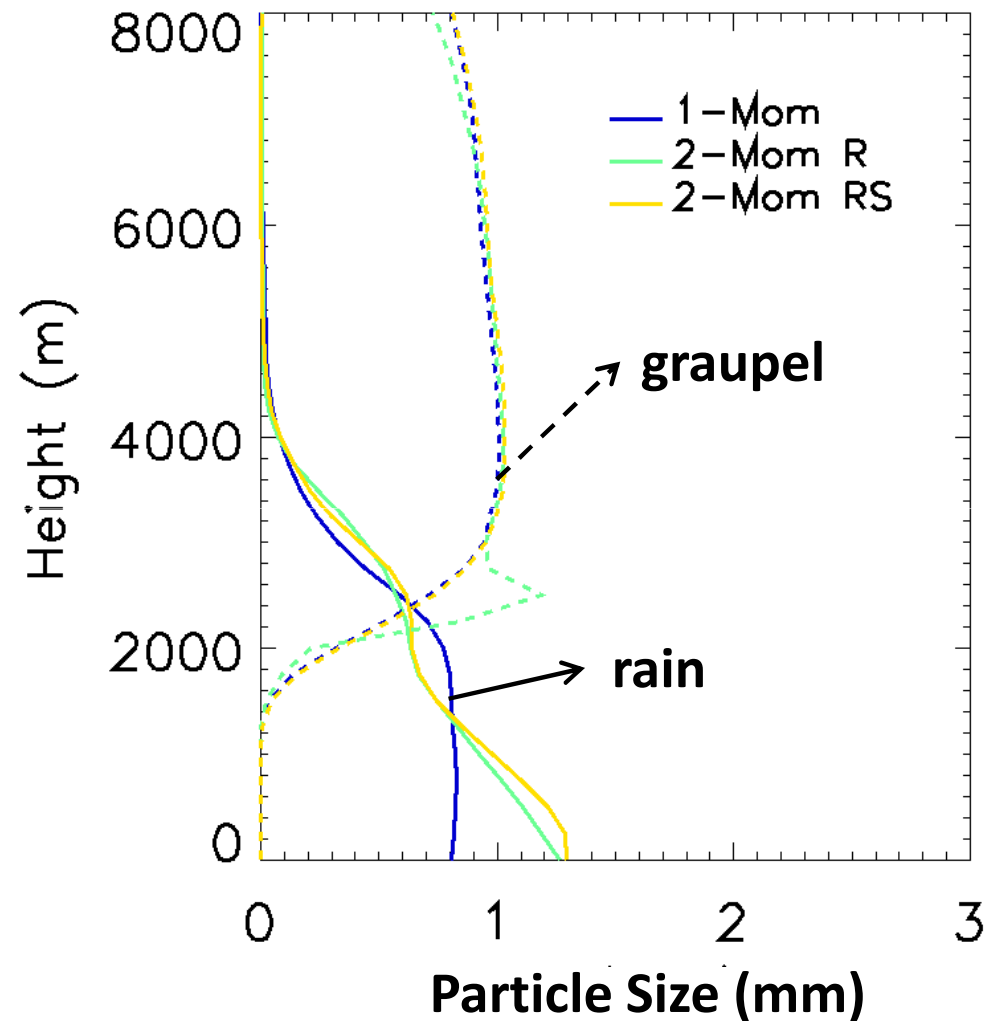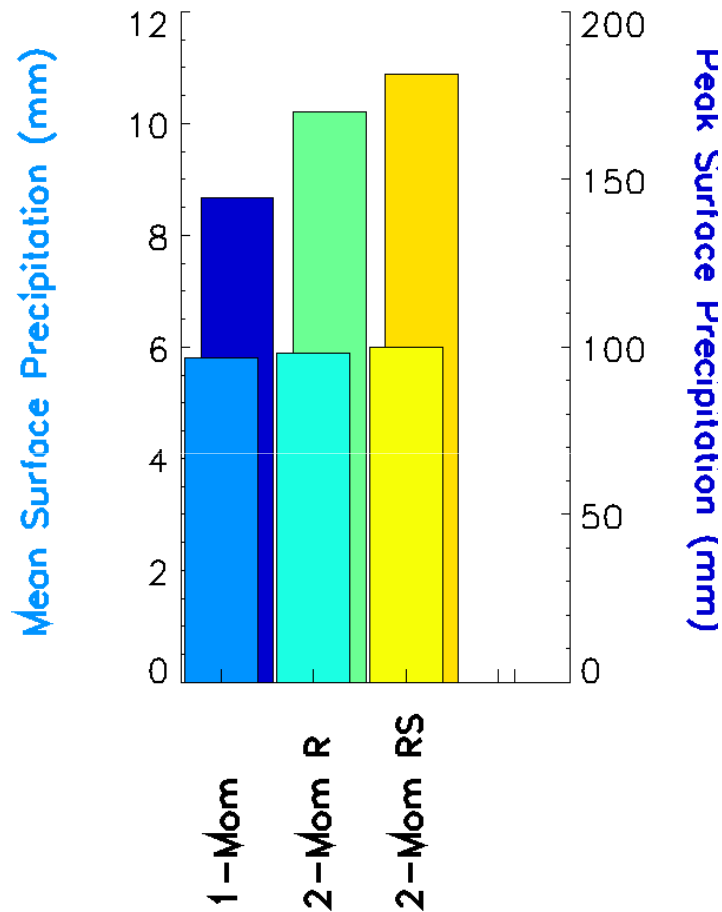 - large drops: faster fallout and less evaporation

Number of predicted moments

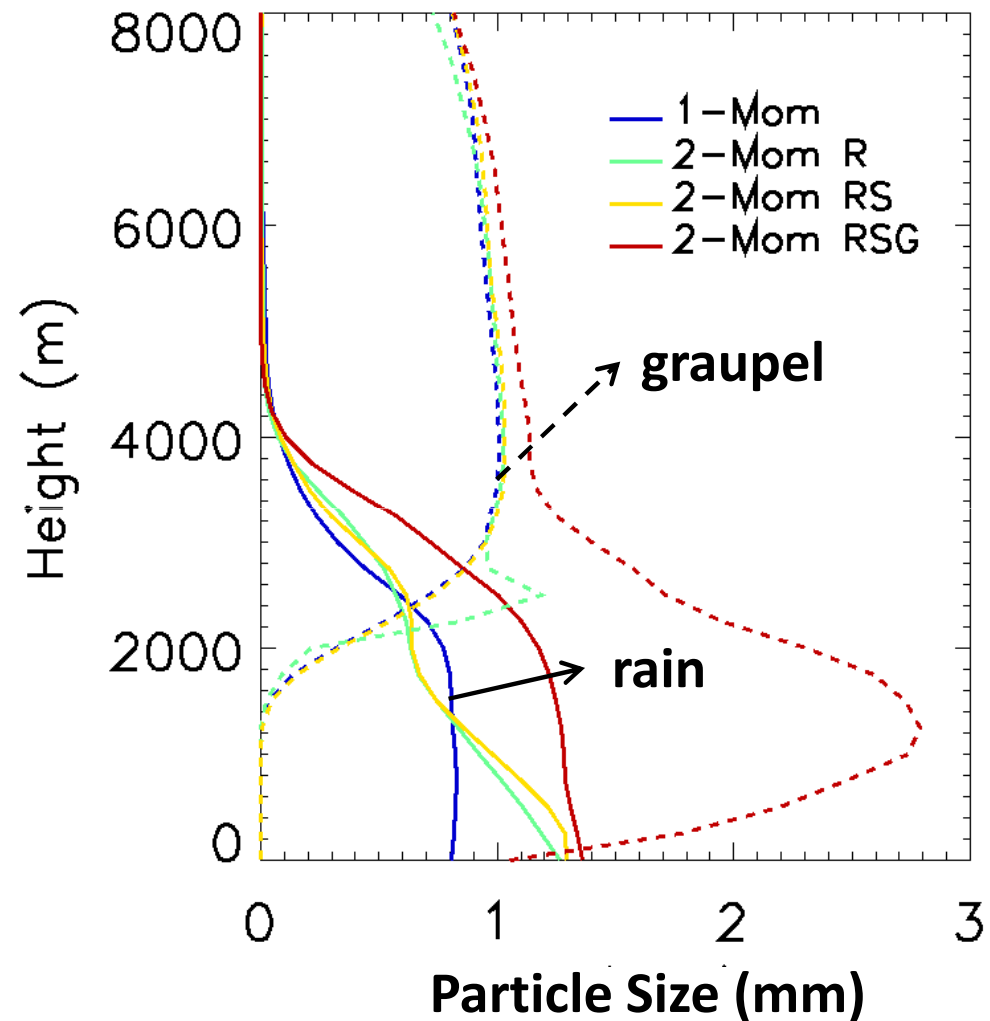**Precipitation extremes sensitive to # predicted moments**
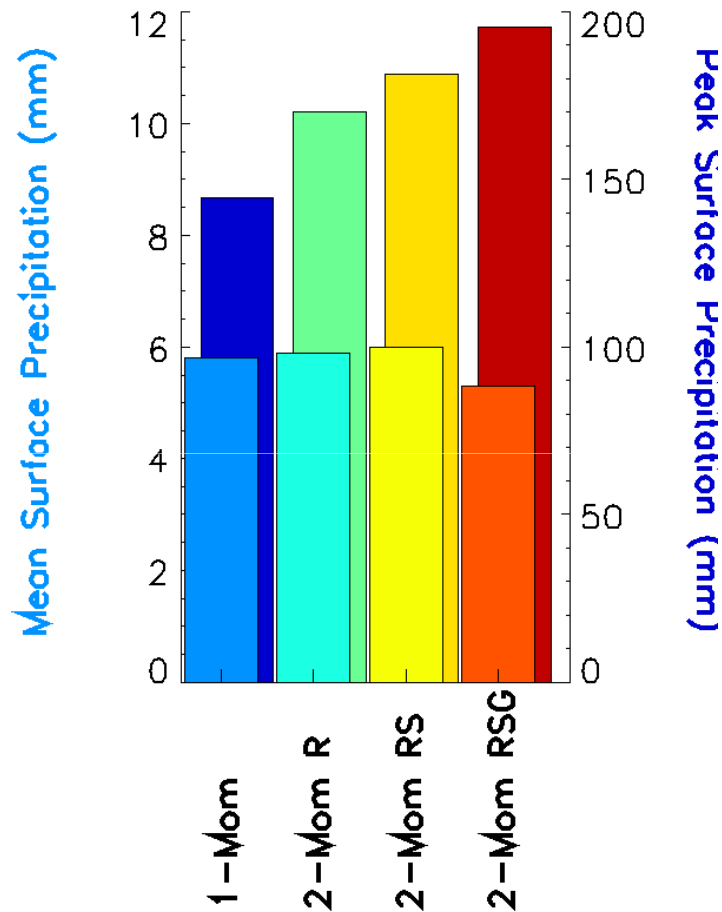   **- large drops: faster fallout and less evaporation**
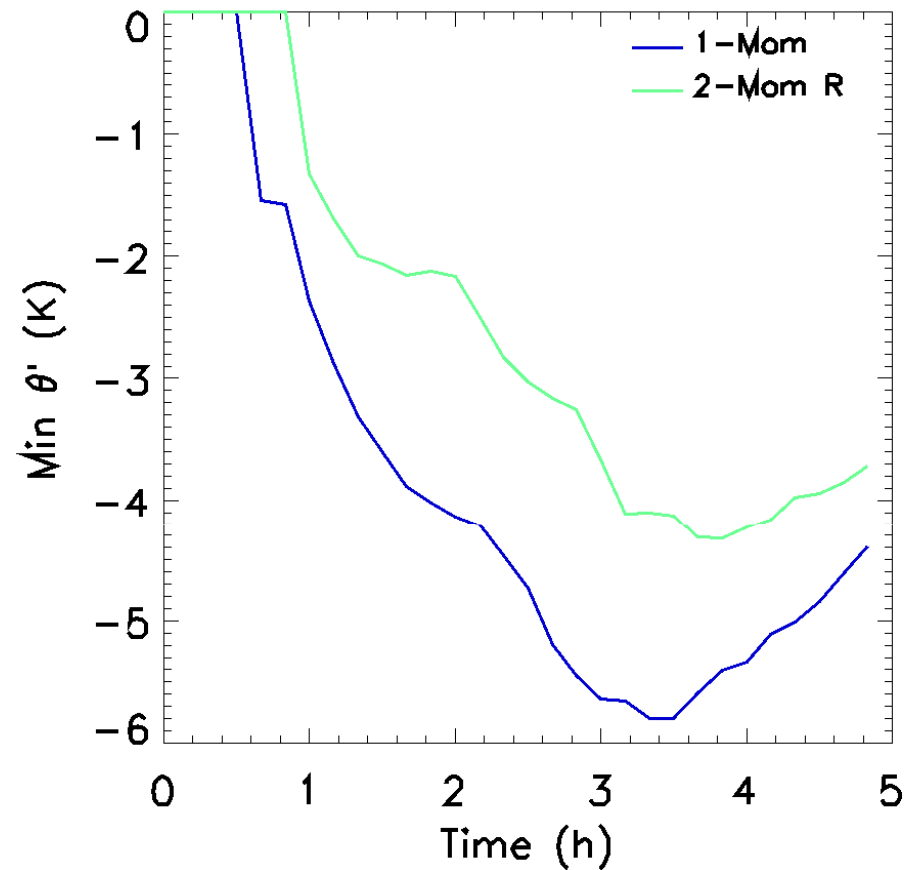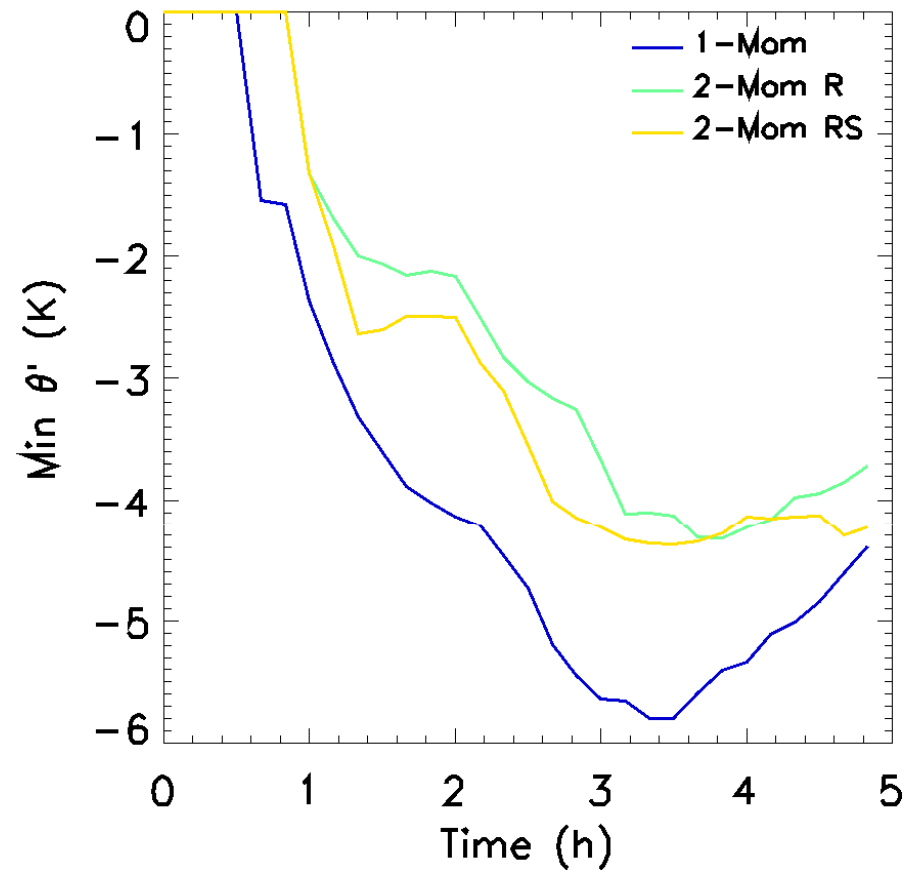
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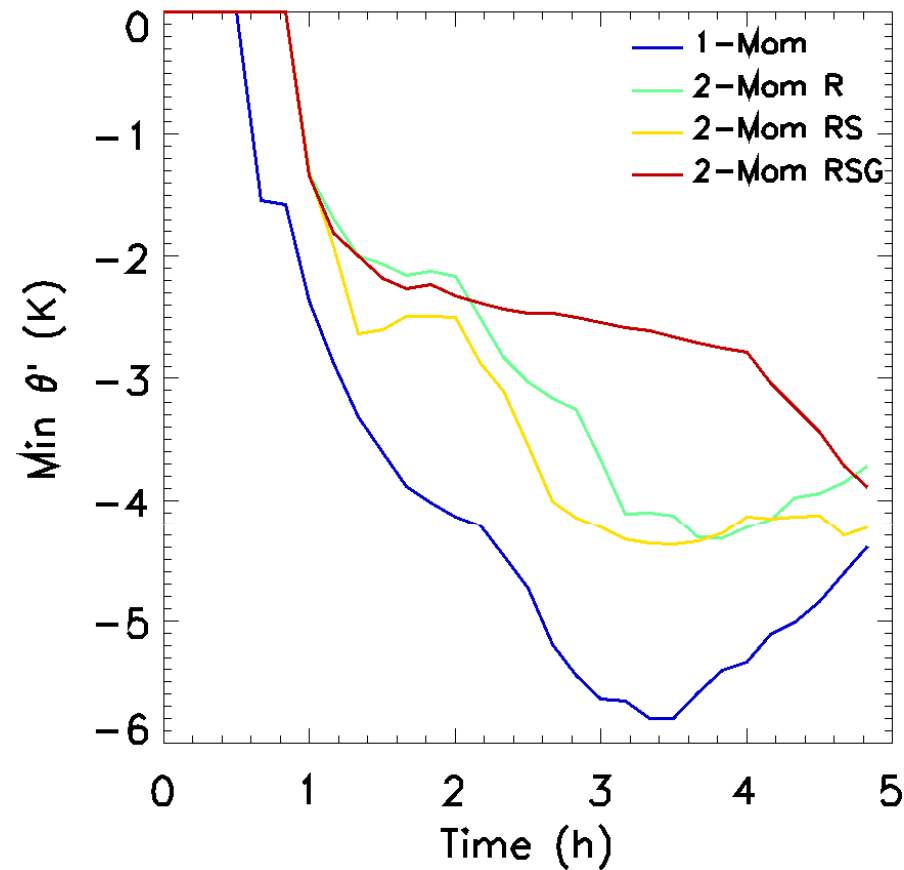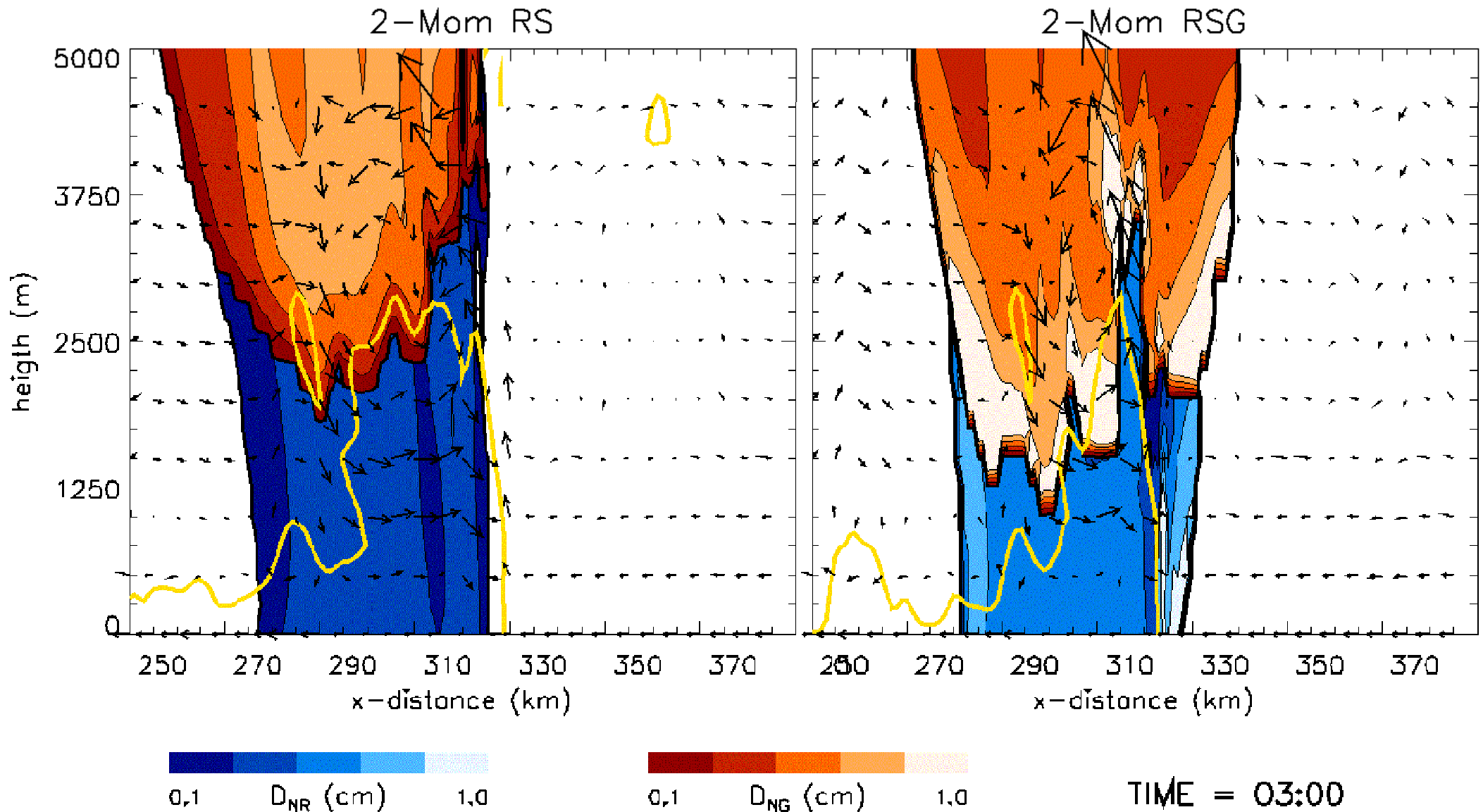**Cold pools sensitive to # <u>predicted moments</u>**
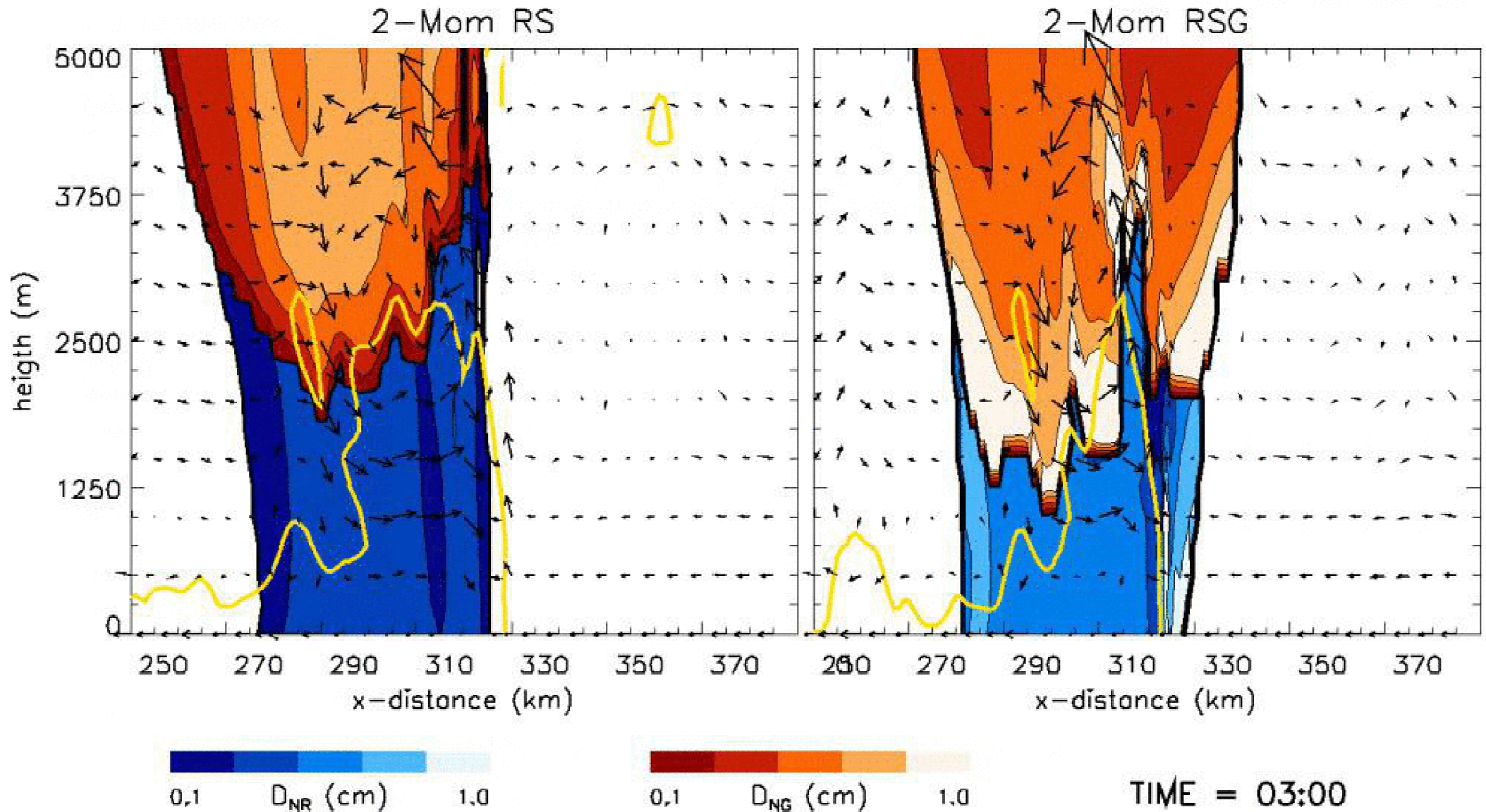
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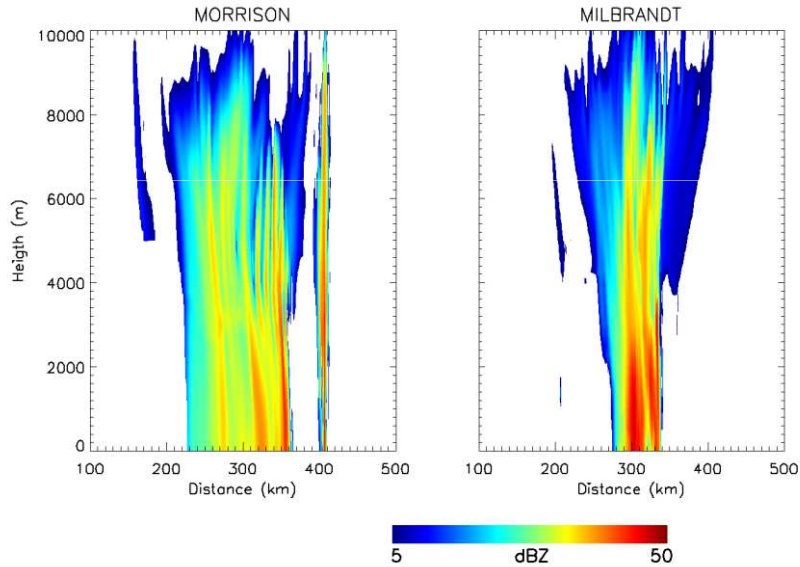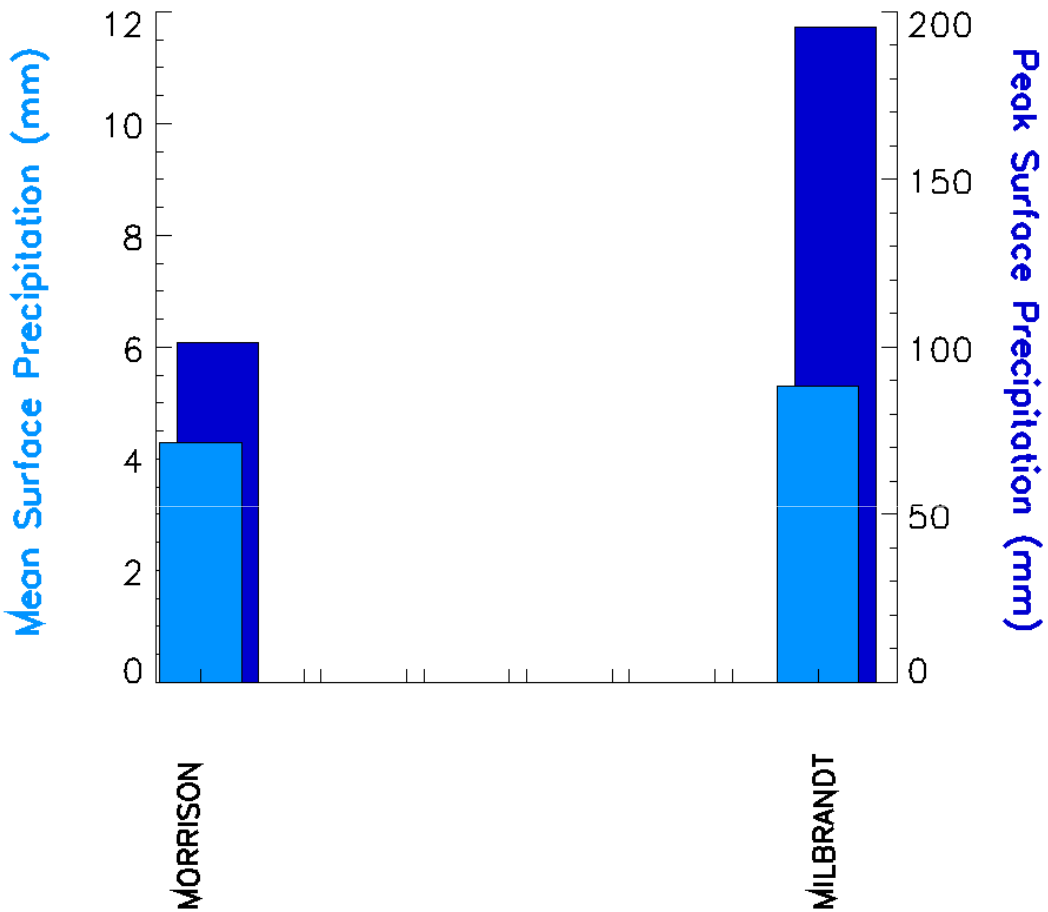
Differences Milbrandt - Morrison

Differences between Morrison and Milbrandt:

Morrison

- Morrison warm rain
- Morrison ice growth
- Morrison collection

Differences Milbrandt - Morrison

Differences between Morrison and Milbrandt: warm rain

Morrison-WM

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- **Morrison ice growth**
- **Morrison collection**
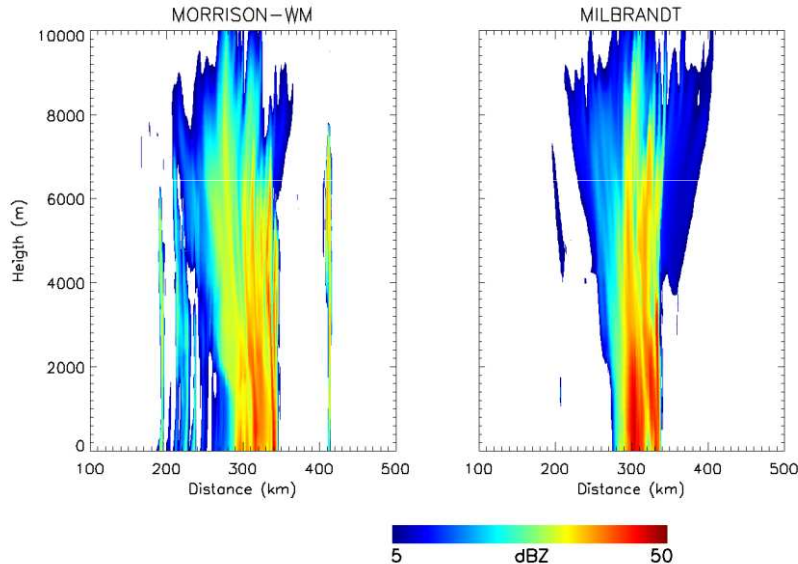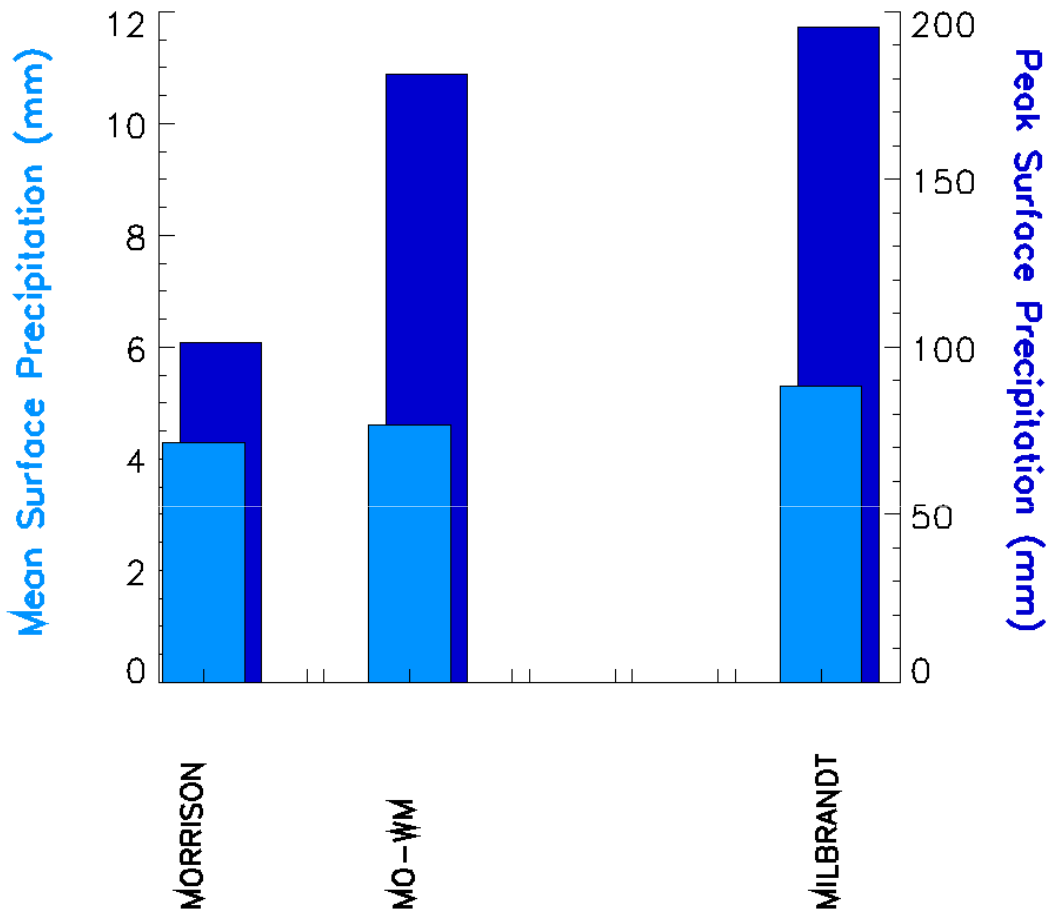
Differences Milbrandt - Morrison

Differences between Morrison and Milbrandt: warm rain (except for breakup)
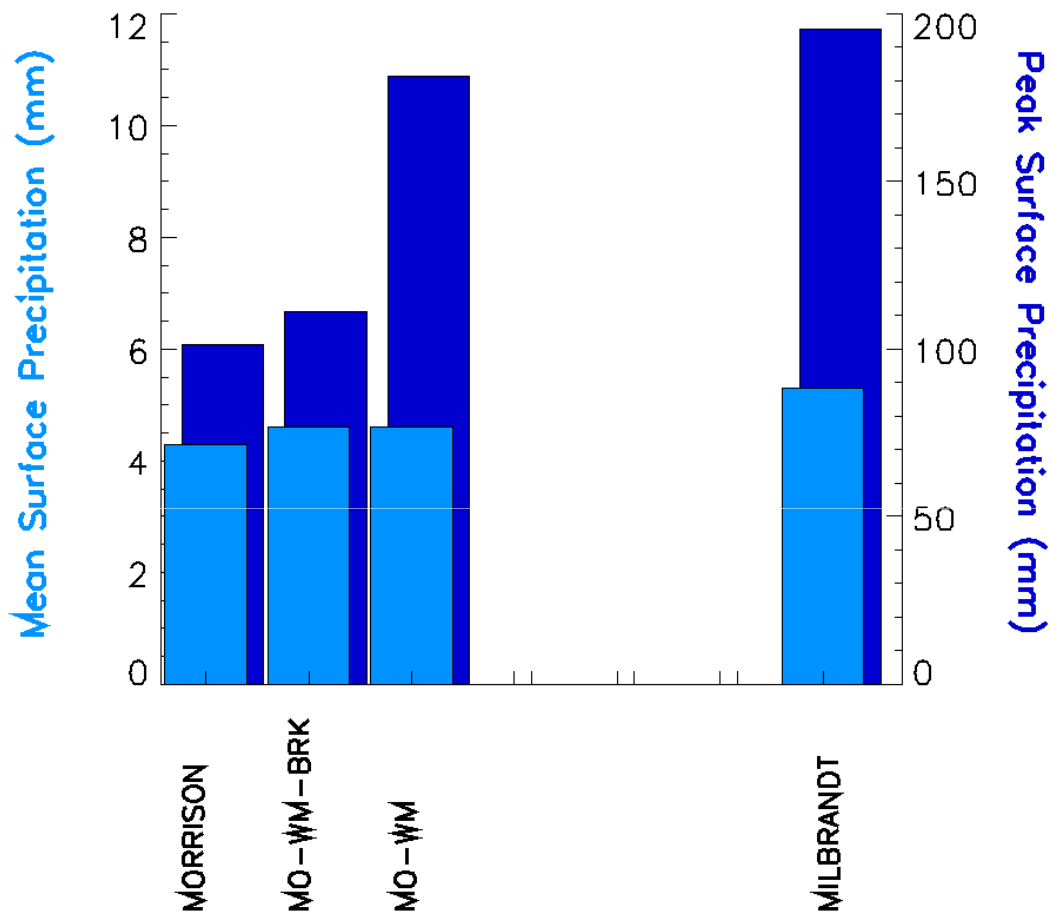
Morrison-WM-BRK

Milbrandt warm rain
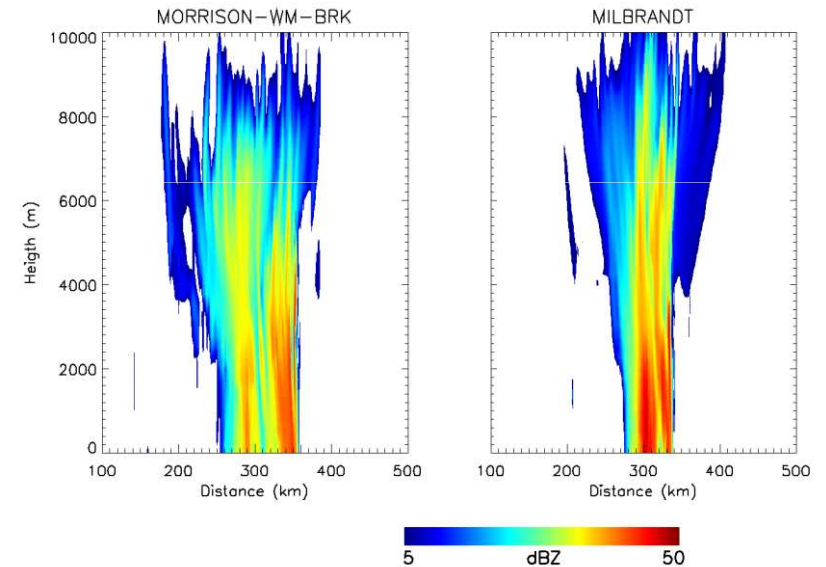
Morrison ice growth

Morrison collection

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Differences between Morrison and Milbrandt: Collection
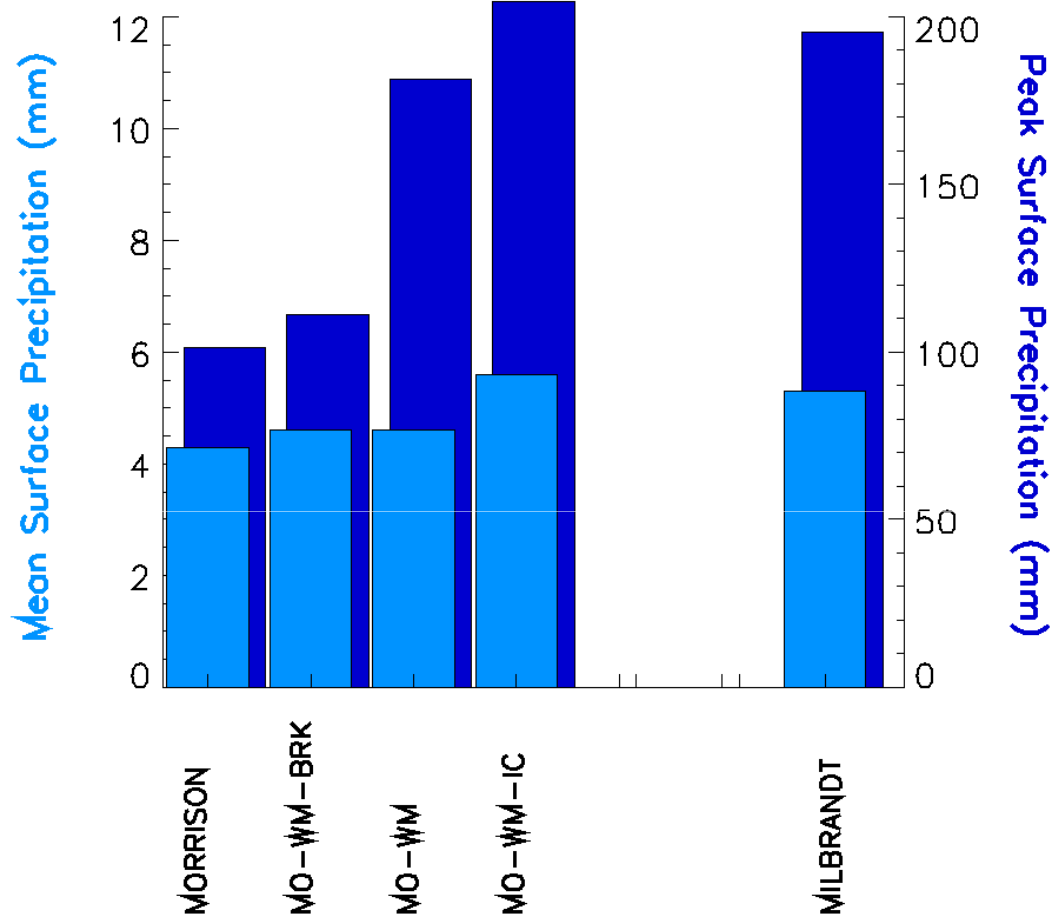
Morrison-WM-ICE-COL

Milbrandt warm rain

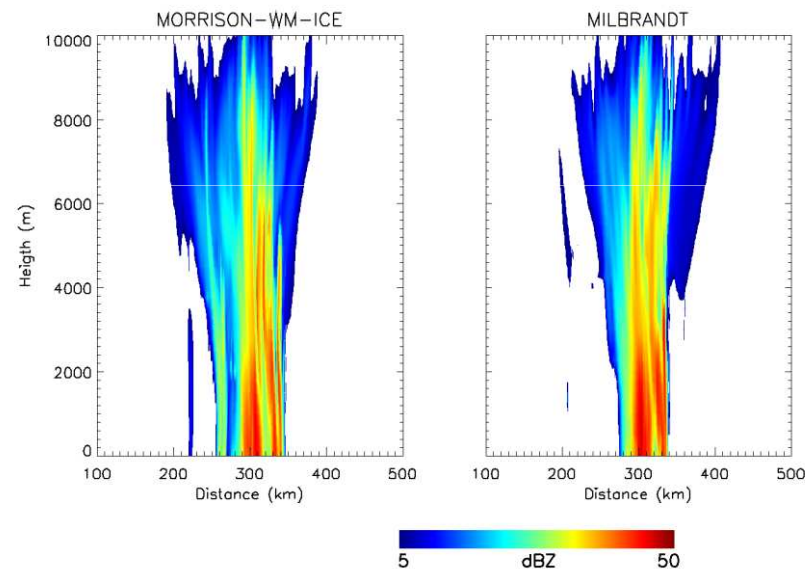Milbrandt ice growth

Milbrandt collection

Conclusions

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- ***Up next:***

  - **Bringing in observations (MC³E, NEXRAD, Dual-Pol, Disdrometers)**