



Developing and Evaluating a Lightning Parameterization Based on Observations of Three Colorado Storms During DC3



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Introduction

We introduce a project that will investigate relationships between lightning flash rates and storm parameters for three Colorado storms during DC3. Observed relationships can then serve as flash rate parameterizations to possibly improve the representation of lightning in models. The three storms (6 June, 7 June, and 22 June 2012) all exhibited severe characteristics, including vigorous lightning. We present a preliminary analysis of the dynamics and charge structure of the 6 June storm, including radar reflectivity, Doppler-derived wind fields, Lightning Mapping Array (LMA), and National Lightning Detection Network (NLDN) observations.

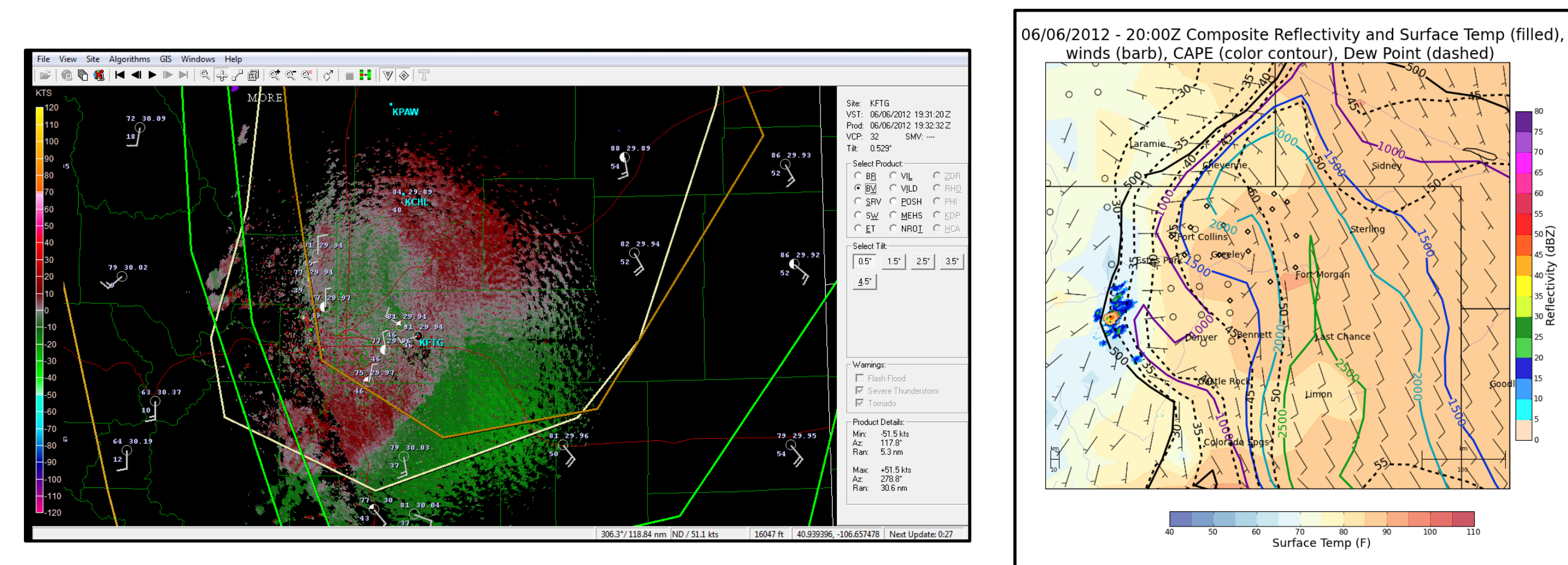
Current Objectives

- Analyze storm structure and dynamics
- Hydrometeor identification
- Analyze charge structure from LMA/NLDN data
- Incorporate aircraft observations to understand lightning impact on storm chemistry

6 June Storm

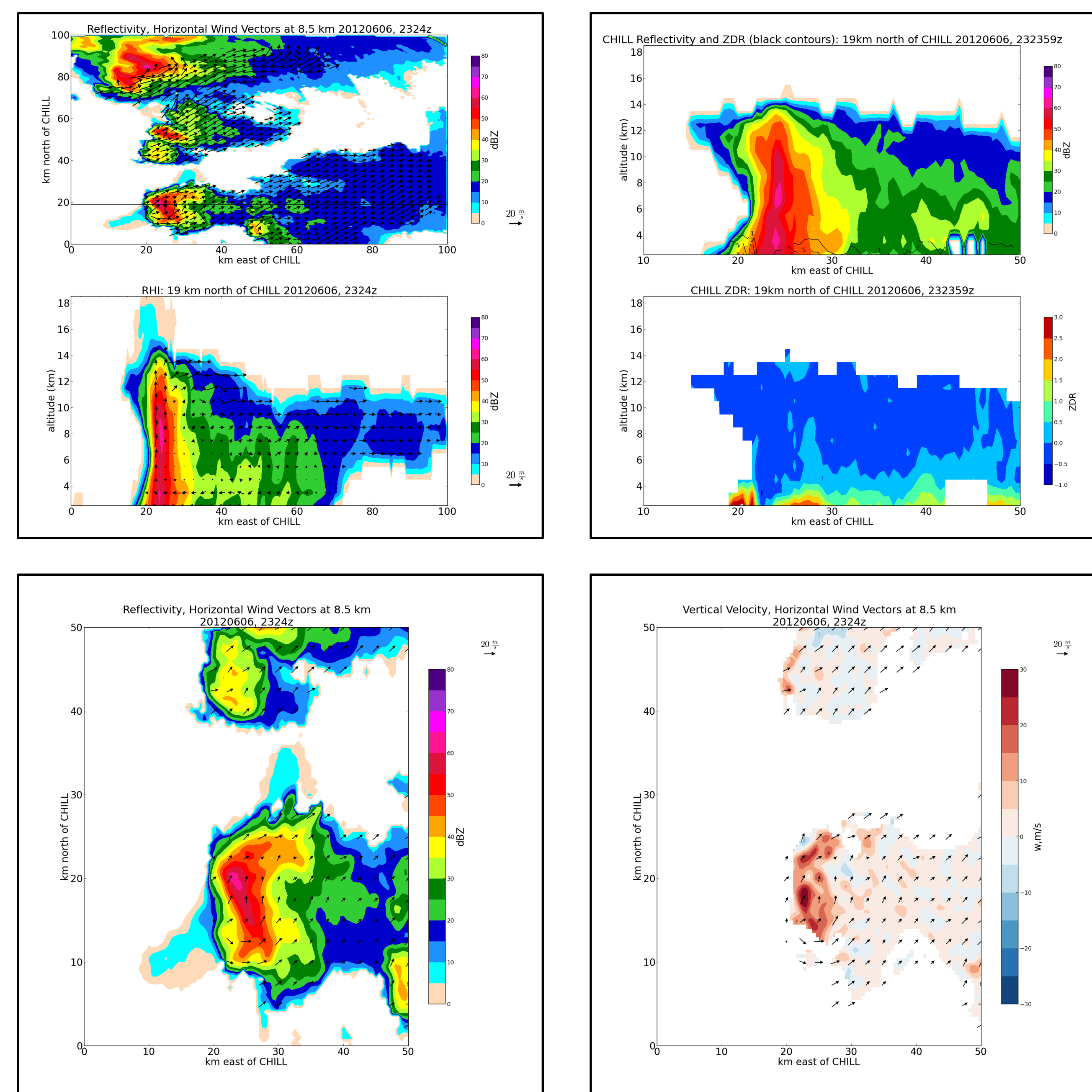
Synoptic Situation

- Vorticity zone, westward moving convergence boundary help to initiate strong convection



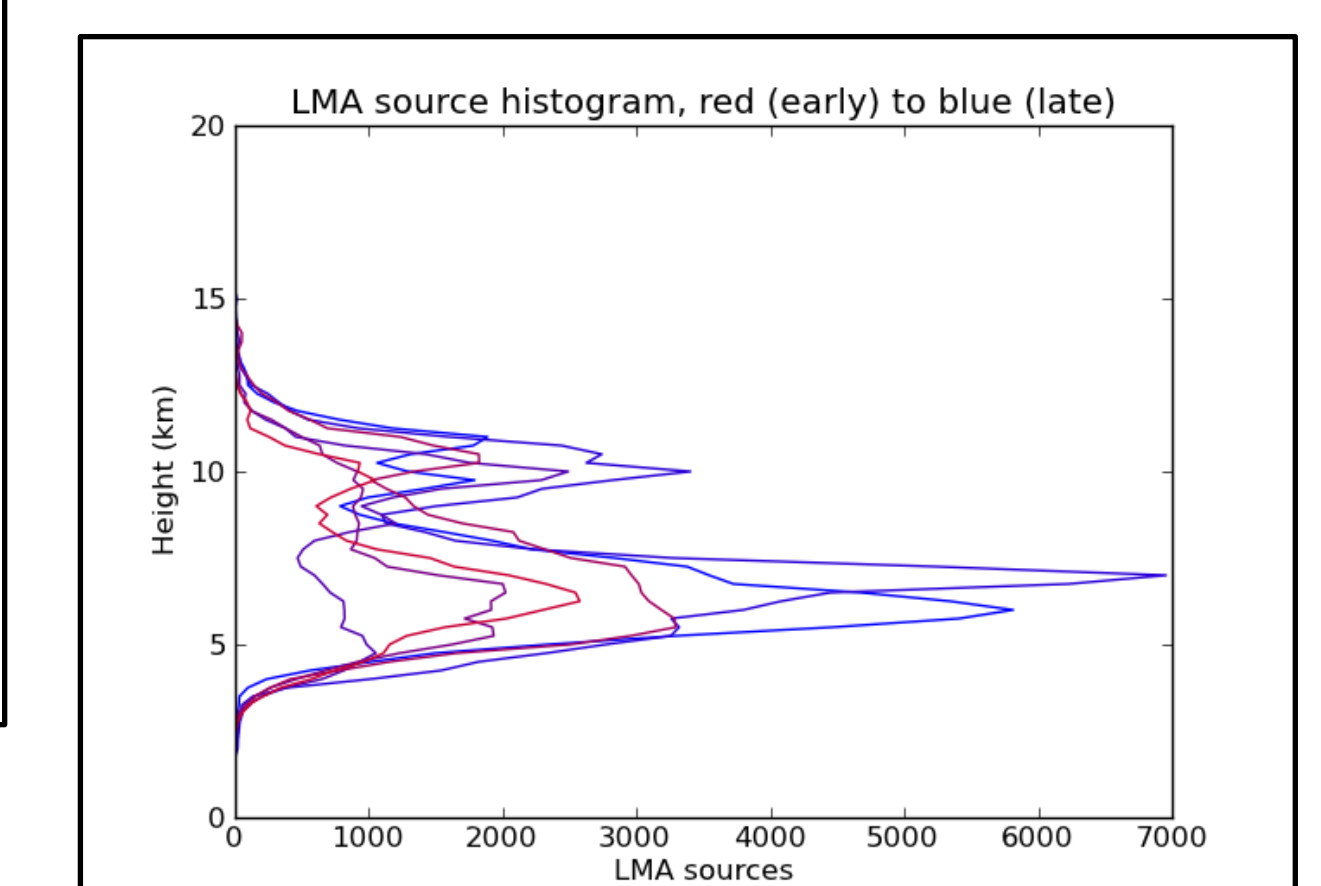
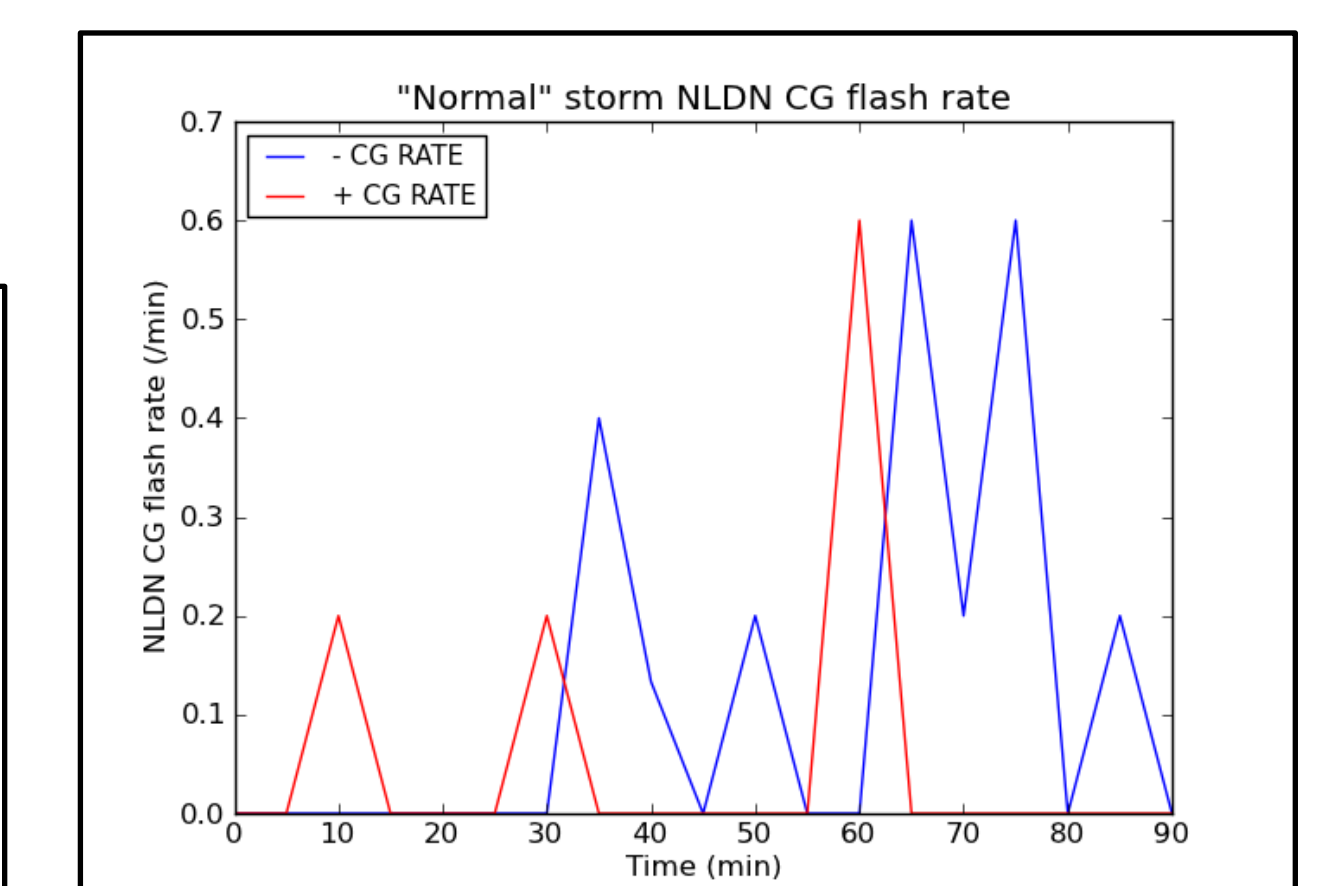
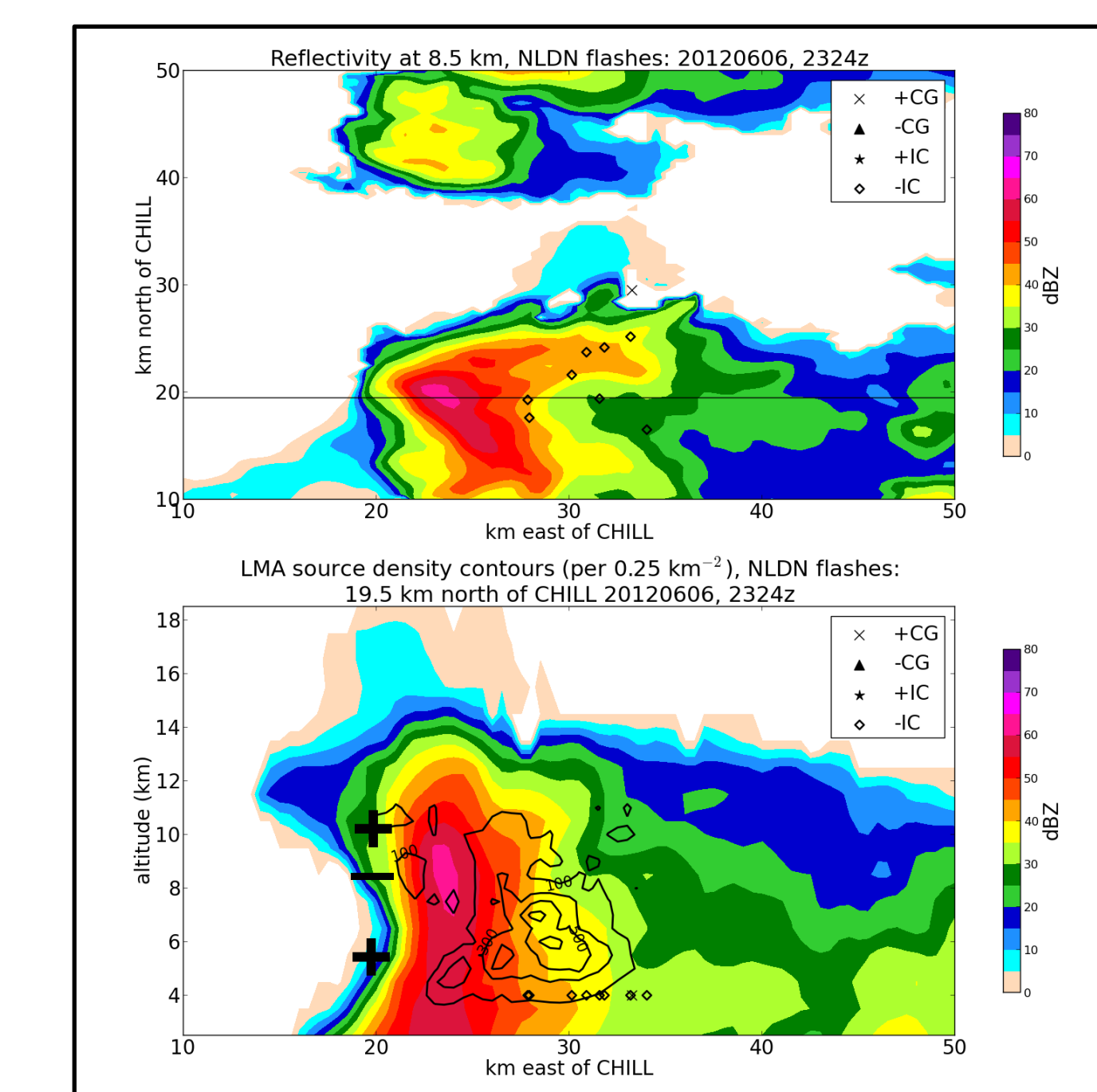
Storm Dynamics and Microphysics

- Early development: strong reflectivity core with hail signature



Charge Structure

- Evolution from normal polarity, low level dipole to normal polarity tripole
- Higher flash rates later on, some positive lightning



Ongoing Research

Understanding the dynamics and microphysics of the 6 June storm serves as a starting point to correlate flash rates to storm parameters. The 6 June storm will be a good case study due to its high lightning activity. A similar analysis of the 7 June and 22 June storms will provide a more robust correlation between flash rates and storm parameters.

This work is supported by NSF grant AGS-1010657.