Introduction

- Forecasters have difficulty predicting "random" afternoon thunderstorms during the summer months.
- Differences in soil characteristics could be a contributing factor for storms. The NASA Land Information System (LIS) may assist forecasters in predicting summer convection by identifying boundaries in land characteristics.
- This project identified case dates during the summer of 2009 by analyzing synoptic weather maps, radar, and satellite data to look for weak atmospheric forcing and disorganized convective development.
- Boundaries in land characteristics that may have lead to convective initiation in central Alabama were then identified using LIS.

Background

- Alabama has a diverse selection of soil and vegetation types.
  - Clays, Silt, Loam; Forests, Grasslands, Crops
  - Black Belt located in southern Alabama (consists mostly of clay soils)
  - Urban areas (Birmingham, Huntsville, Montgomery, etc.)
- Soil and vegetation aid the transfer of moisture and energy into the atmosphere.
- Increasing latent and sensible heat fluxes
- Affect diurnal heating rates
- Thunderstorms can be initiated due to disparate or favorable heat fluxes from the surface.

Conclusions and Future Work

- LIS shows the effect of increased sensible heat flux from "Urban Heat Islands" on downwind convection.
- Convection favored at skin temperatures > 44 °C
- Convection favored along gradients in land characteristics and surface fluxes as winds become perpendicular to these gradients.
- Flow from lower to higher latent/sensible heat fluxes and skin temperatures
- Differences in soil and vegetation types
- Continue study on convective initiation and correlations with land characteristics.
- Transition LIS model into operational forecasting to assist with short-term thunderstorm prediction.

Acknowledgements

- To the North Carolina Space Grant for providing funds for this research project and residence in Huntsville, AL for the summer of 2010.
- To the National Mosaic & Multi-sensor QPE Composite Radar Reflectivity for providing radar and satellite images of the summer of 2009.
- To Plymouth State University for providing an archive of surface and upper-air weather maps for the summer of 2009.
- To Jessica Showers for photographing and allowing the use of the background picture for this poster.