



Characterizing Ground Markings and Flow of the Rolling Fork MS Tornado

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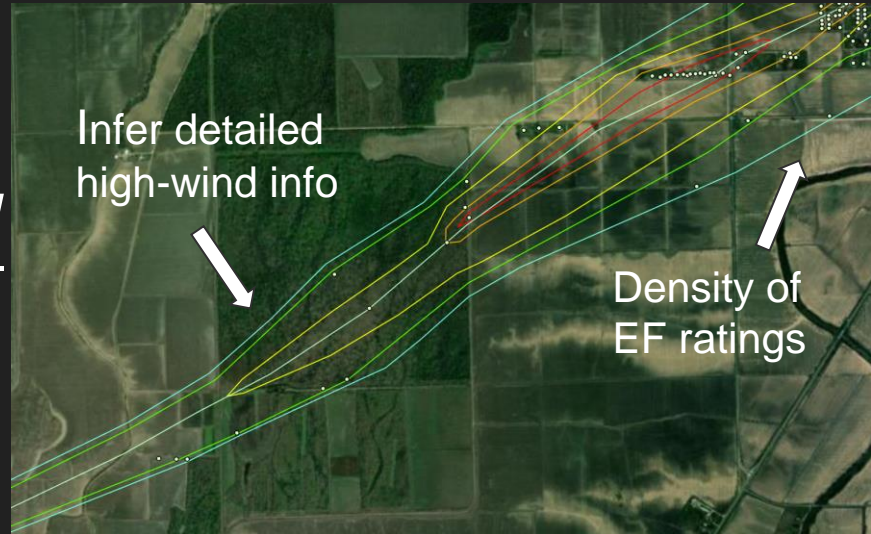
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Science Objectives

Correlate storm signatures observed in radar and in-situ data to damage signatures

Understand the role of land cover and topography in tornado evolution (high-resolution imagery, radar, and simulations)

Focus on rural areas (limited DIs) most emphasis (understanding) of damaging winds in urban areas; *most damage occurs in rural areas*



SW of Rolling Fork, MS

PERiLS IOP 3 Rolling Fork, MS

Focused on Rural Areas

'Ground Scours'

Land Cover transitions

UAS mapping →



Skydio 2

← UAS mapping



Trinity F90+

← UAS mapping

← UAS mapping

- 2 UAS Survey Teams
OU/NSSL/CIWRO/NWS/JSU/MSU
- Scouting videos (Skydio 2)
- Mapping Missions (Trinity F90+)
- Ground Surveys (Ground Truth)

Google Earth

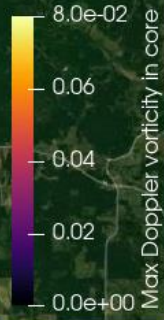
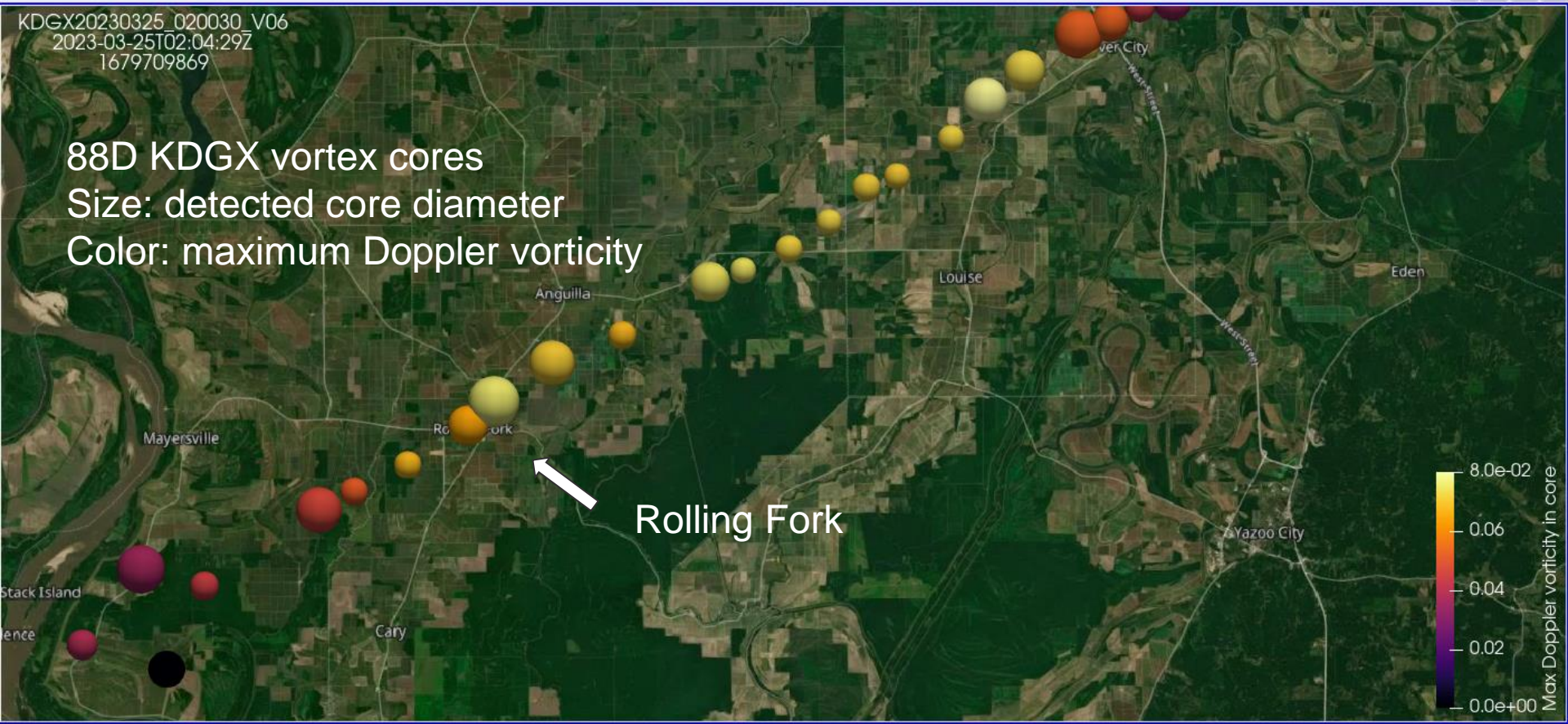
Valley Home Cemetery

4 mi



KDGX20230325_020030_V06
2023-03-25T02:04:29Z
1679709869

88D KDGX vortex cores
Size: detected core diameter
Color: maximum Doppler vorticity



Rolling Fork

KDGX20230325_020030_V06
2023-03-25T02:04:29Z
1679709869

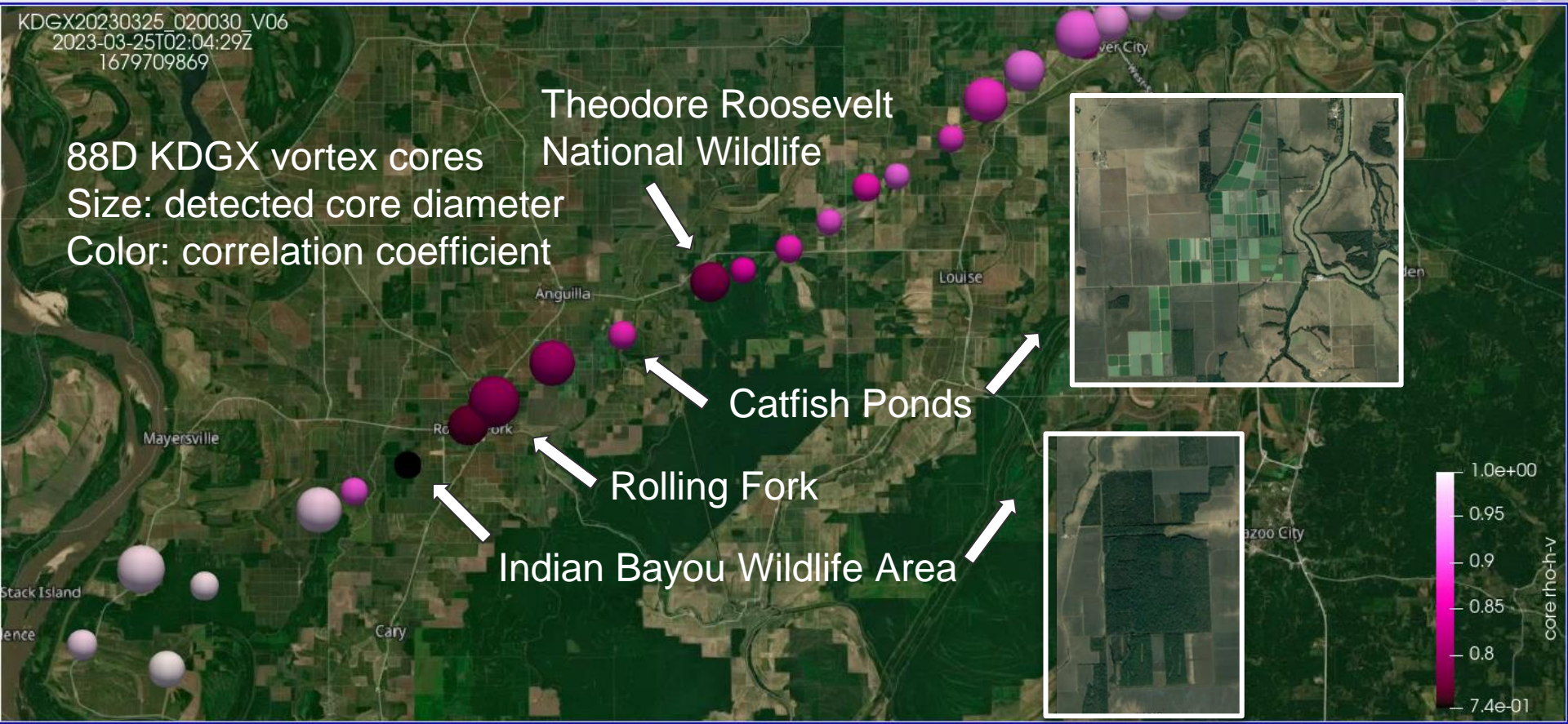
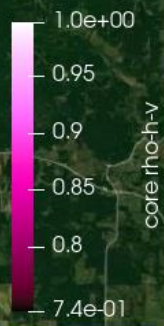
88D KDGX vortex cores
Size: detected core diameter
Color: correlation coefficient

Theodore Roosevelt
National Wildlife

Catfish Ponds

Rolling Fork

Indian Bayou Wildlife Area



Rolling Fork, MS



Rolling Fork, MS



Rolling Fork, MS



Skysat ~50 cm

Rolling Fork, MS



Rolling Fork, MS



Rolling Fork, MS



Skysat ~50 cm

Rolling Fork, MS

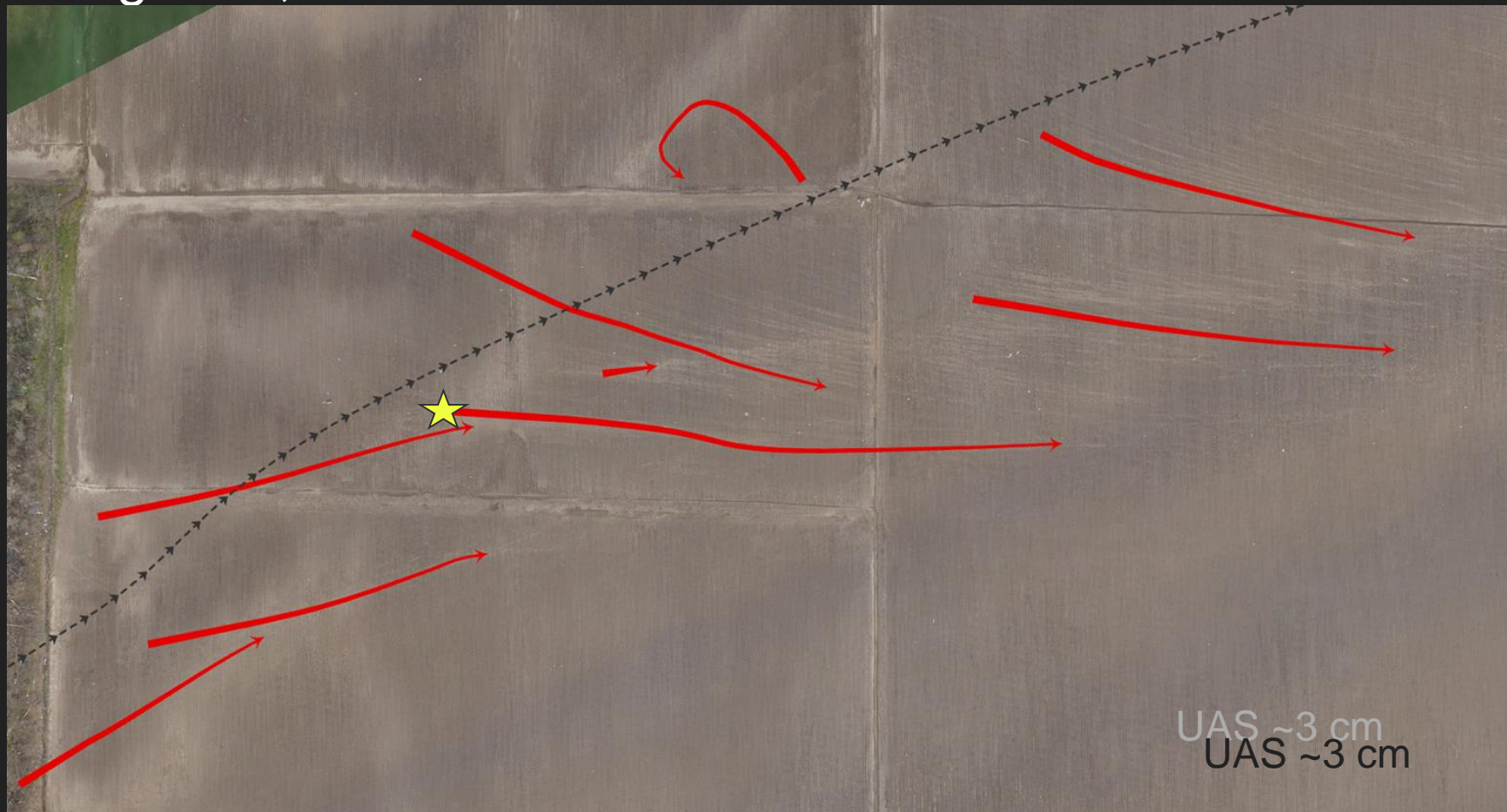


UAS ~3 cm
UAS ~3 cm

Rolling Fork, MS



Rolling Fork, MS

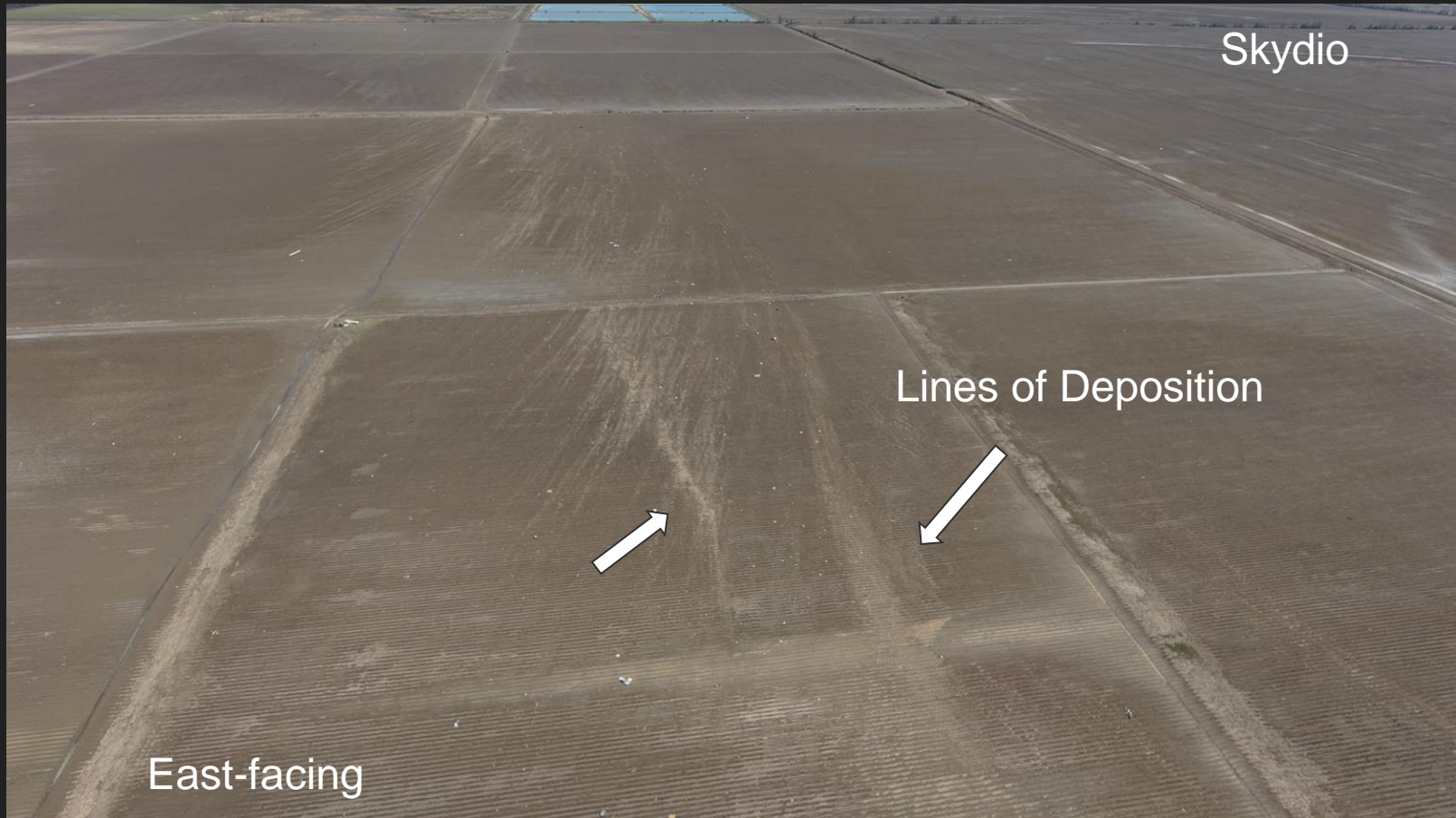


Tornado Mulch

**Ground Truth
Satellite-UAS**

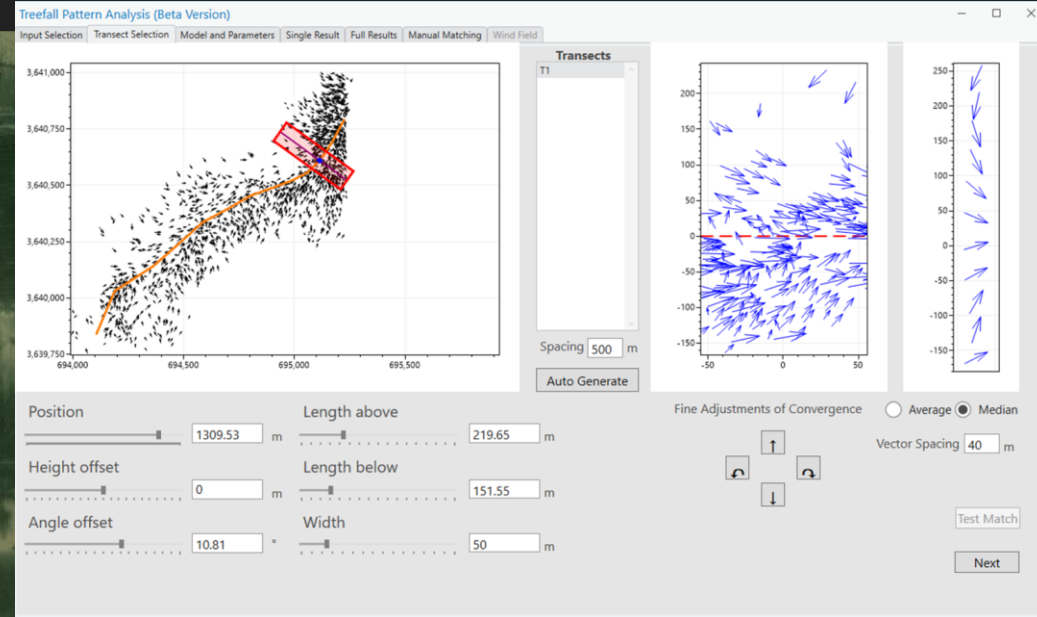
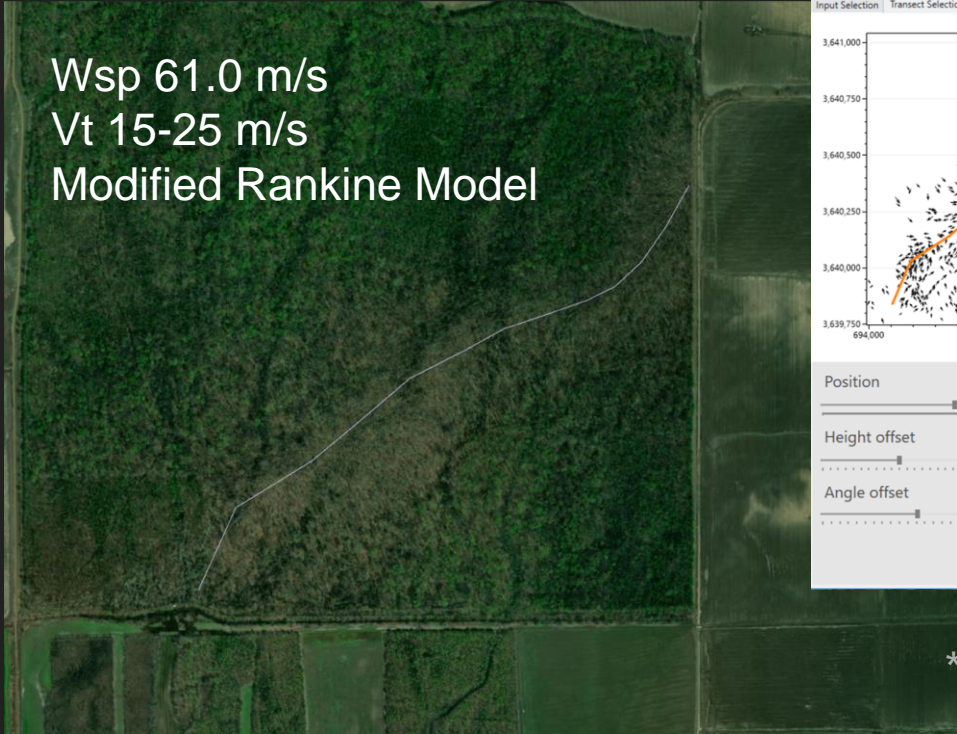


Rolling Fork, MS



Treefall Analysis and Estimated Near Surface Winds

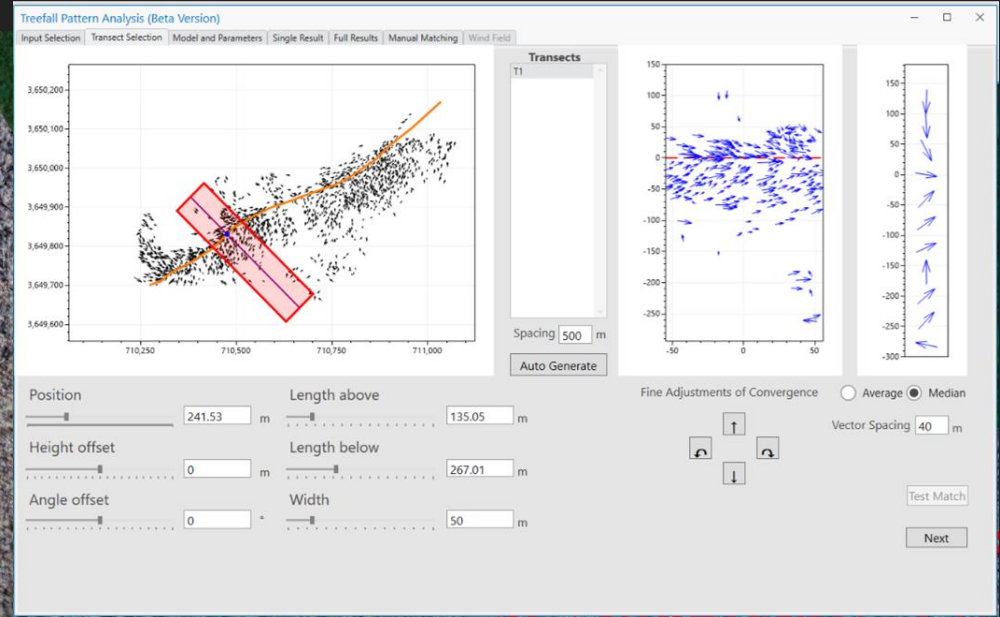
Wsp 61.0 m/s
Vt 15-25 m/s
Modified Rankine Model



*SW of Rolling Fork

Treefall Analysis and Estimated Near Surface Winds

Min Wsp 61.3 m/s
Vt 15-25 m/s
Modified Rankine Model



*NE of Rolling Fork



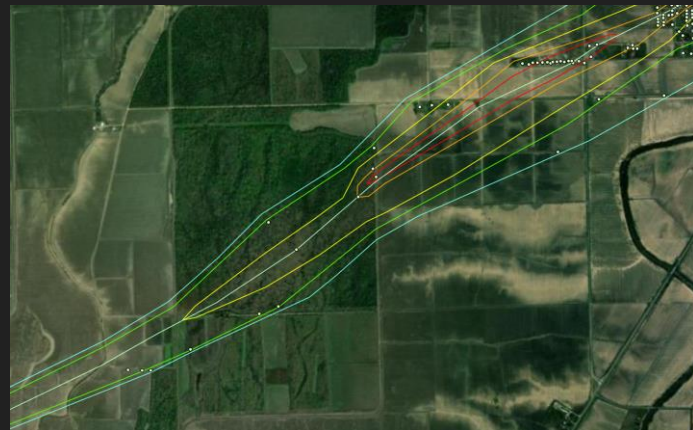
Conclusion and Future Work

Damage pattern is the damage produced by the **SUM** of storm winds: *pre-tornado, tornado, post-tornado flows*

Understand complex flows, land cover, and topography through *high-resolution simulations* (CM1) and *close-range radar*

Longitudinal studies to understand optimal data collection windows (damage response and maximum signature)

Multidisciplinary approach



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**Severe Convective Observations
using UAS, Radar, Simulations**