## Rapid Evolution of Debris Signatures in Tornadoes Karen A. Kosiba<sup>1</sup>, Paul Robinson<sup>1</sup>, Joshua Wurman<sup>1</sup>, Don Burgess<sup>2</sup>, Christopher Schwarz<sup>2</sup>, Ted Mansell<sup>3</sup> and Daniel T. Dawson II<sup>3</sup>

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## 24 May 2011: Canton Lake, OK

The DOW7 and NOXP radars collected data on an EF3 tornado that crossed Canton Lake, OK on 24 May 2011. Peak winds measured by the DOW7 radar were ~83 m s<sup>-1</sup> at a height of 45 m above ground level and ~85 m s<sup>-1</sup> by NOXP. An extensive ground-based damage survey was conducted immediately following the event, which resulted in the EF3 rating.



Damage survey resulted in the EF3 rating.





hallow water equation for wave propagation V ~ (gD)1/2







DOW scanned debris ball every 14 seconds

**Debris ball develops** rapidly at landfall, as evidenced by increase in Z and decrease in **RHO-HV** 



z

RHO-HV



13 June 2010

Debris ring as a function of height at 2216:51 (05 June 2009)

Z = 10 m

**Examples of Rapid Debris** 

evolution in other tornadoes



Z = 75 m



Z = 145 m

05 June 2009: Arc of debris as ring forms, 7 second updates





+ 14 se

2213/24 + 0 se