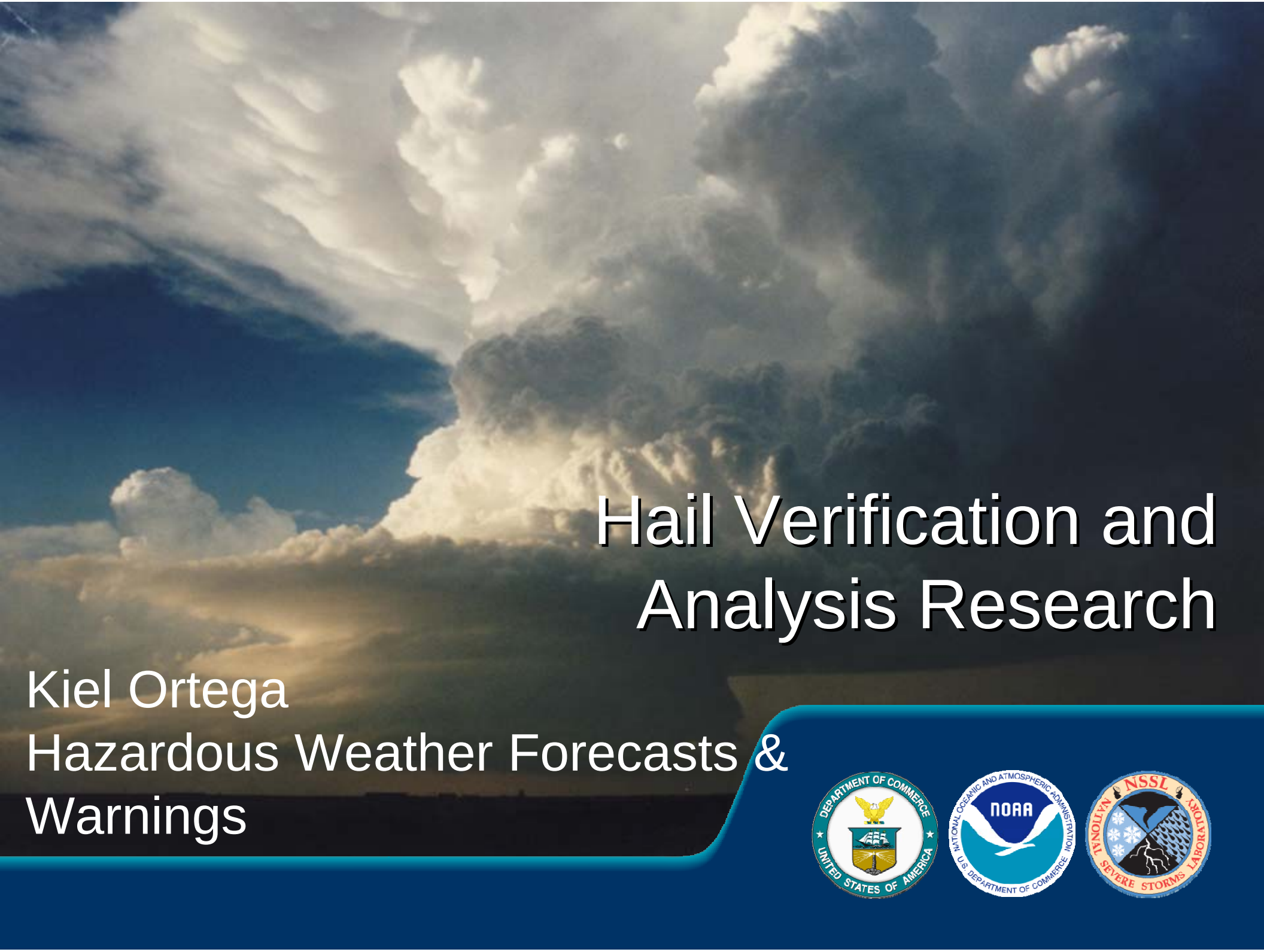
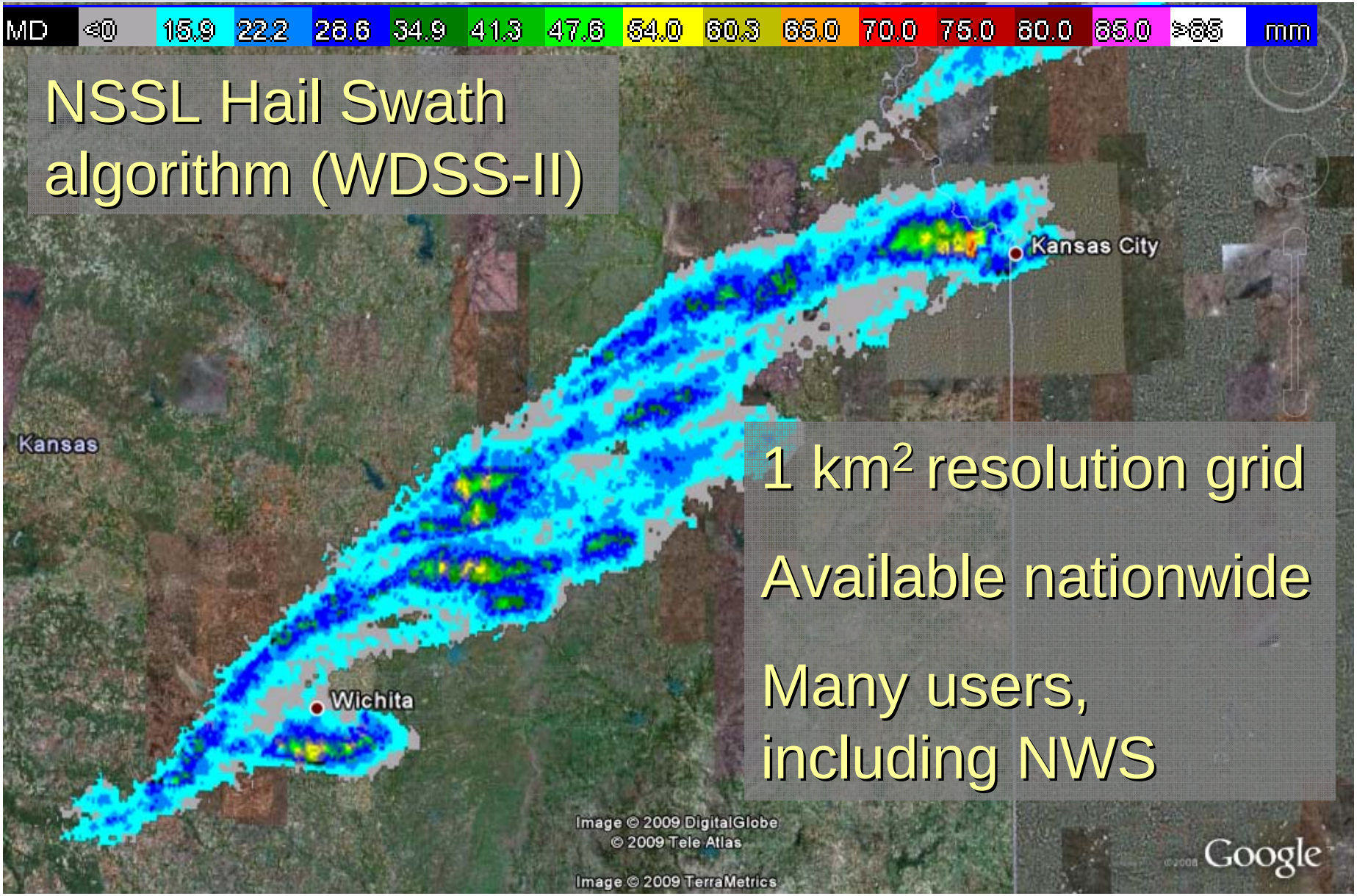


Hail Verification and Analysis Research

Kiel Ortega
Hazardous Weather Forecasts & Warnings

Evaluating a hail algorithm or how many ways can you measure a hailstone?



Historical Hail Verification Collection

Field Projects

NOAA FORM 86-512 (Rev. 2/74)

VOLUNTEER SEVERE WEATHER OBSERVER
NATIONAL SEVERE STORMS LABORATORY

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES

NAME:
Was the weather observed from your home? ☐ Yes ☐ No
If not, where observed?

DATE OF STORM
Times below are accurate to (min): ☐ 1 ☐ 2 ☐ 5 ☐ 10 ☐ 15 ☐ 30 ☐ ___
Describe wind damage (e. g. broken tree limbs, trees uprooted, concrete block wall collapsed, wood frame wall collapsed):

DAMAGING WIND ☐ Yes ☐
Damage to: ☐ Trees ☐ Crops ☐ Buildings ☐ ___

HAIL ☐ Yes ☐ No
Time Began ☐ A.M. ☐ P.M.
Largest Stone Size (diameter in inches): ☐ 1/4 (pea) ☐ 3/4 ☐ 1 1/2 (golf ball) ☐ 1/2 ☐ 1 (walnut) ☐ ___
Most Common Stone Size (diameter): ☐ 1/4 (pea) ☐ 3/4 ☐ 1 1/2 (golf ball) ☐ 1/2 ☐ 1 (Walnut) ☐ ___

Hail Fell For ___ Min.
Hail Fell: ☐ Before rain ☐ After rain ☐ At Same Time As Rain
Largest Hailstones Fell: ☐ Before Smaller Ones ☐ After Smaller Ones ☐ At Same Time As Smaller Ones
Total No. of stones per square foot

RAIN ☐ Yes ☐ No
Time Began ☐ A.M. ☐ P.M.
☐ Heavy ☐ Moderate ☐ Light
Total Rainfall of Storm in inches (if Known)
Was Stone Surface: ☐ Smooth ☐ Spiked
Shape of Hailstones: ☐ Round ☐ Flat ☐ Egg ☐ ___

TORNADOES ☐ Yes ☐ No
Time Observed ☐ A.M. ☐ P.M.
Type: ☐ Tornado aloft ☐ Tornado on Ground
Direction From Which Tornado Moved: ☐ N ☐ NE ☐ E ☐ SE ☐ S ☐ SW ☐ W ☐ NW
Please Sketch Shape of Tornado

LIGHTNING ☐ Yes ☐ No
Direction of Lightning: ☐ N ☐ S ☐ E ☐ W ☐ Overhead
Are Additional Cards needed? ☐ Yes
Was Rotation Visible in the Clouds? ☐ Yes ☐ No
Number of Tornadoes

ADDITIONAL COMMENTS

FIG. 2. Reporting postcard used by volunteer observers.

- Geographic extent
- Safety/cost

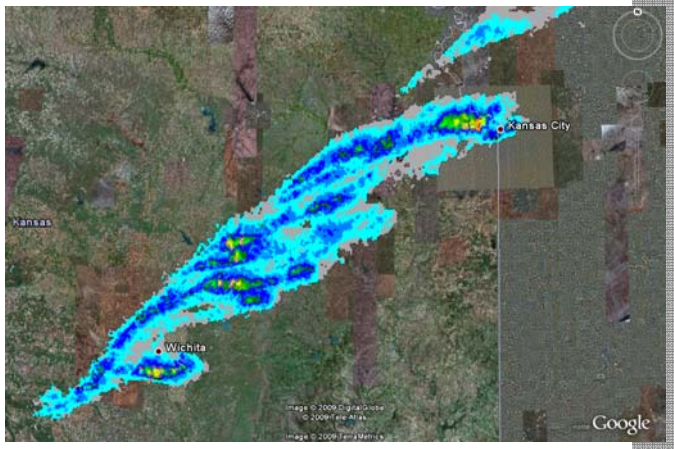
Warning Verification

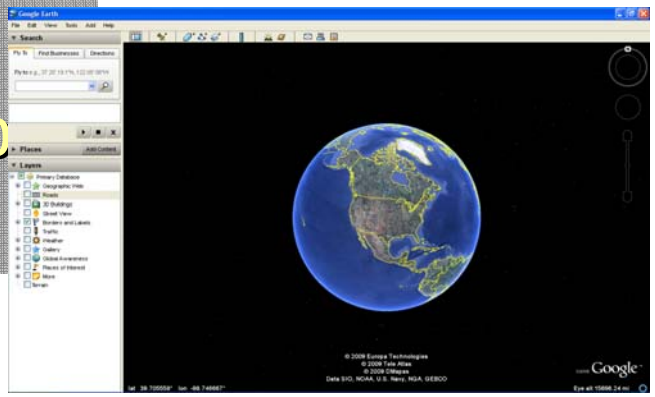
- Only one verification point needed to verify a warning
  - Sparse reports
- Incorrect hail sizes
- Severe reports only
  - Limited evaluation

2006: Leveraging New Technology To Meet Research Needs

Technology

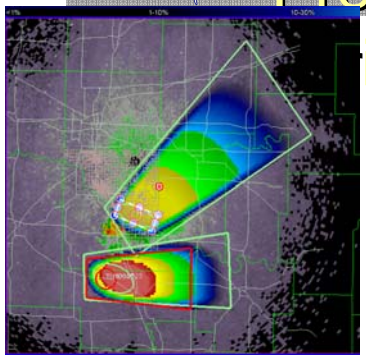
- 2006: Google Earth released
- Overlay WDSS-II data
- Gas stations, fast food, banks, etc. already in Google Earth
- Reverse look-up techniques



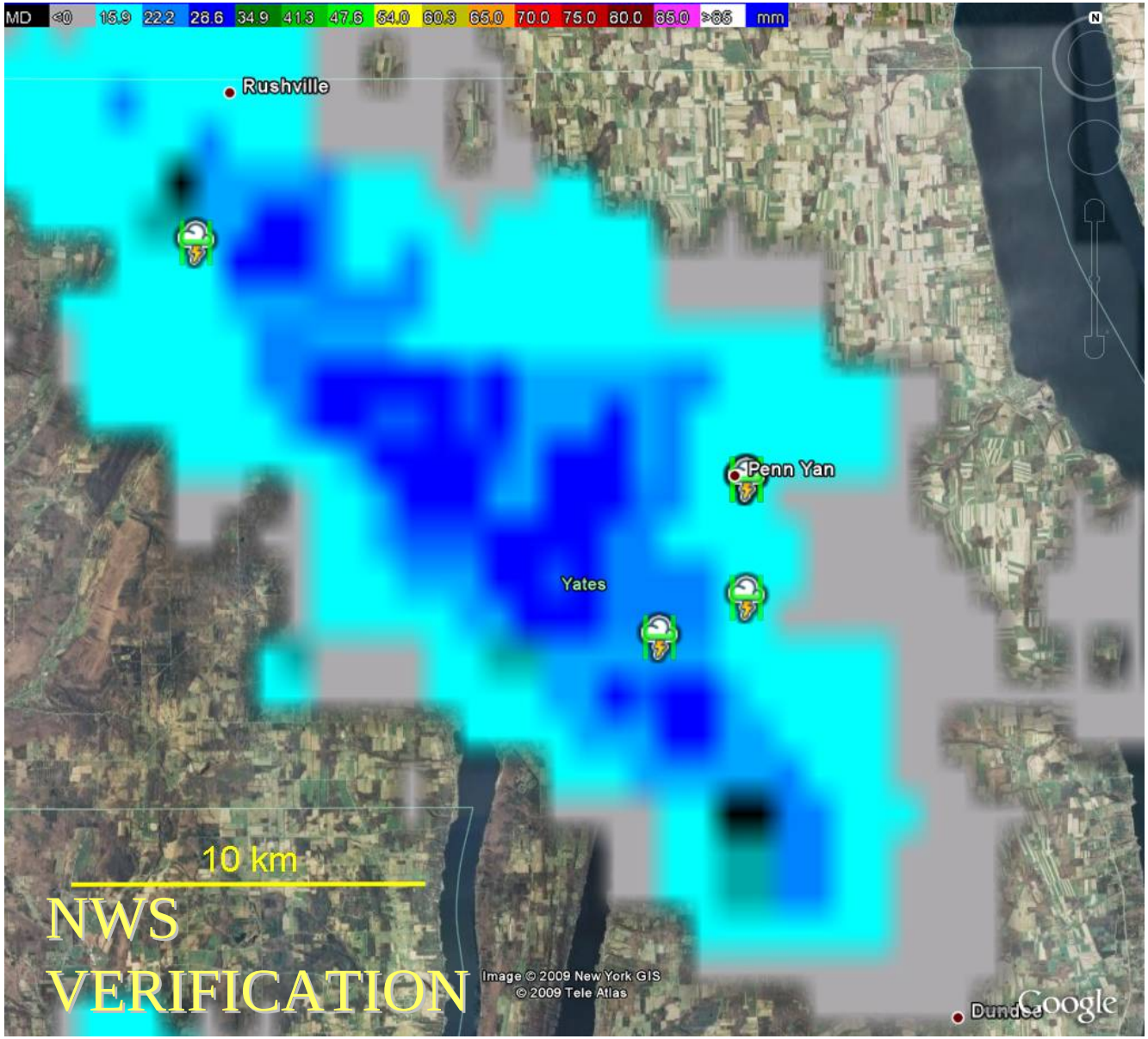


Research

- Algorithm evaluation
  - Accurate verification data
- Probabilistic hazard information
  - Precise ification data

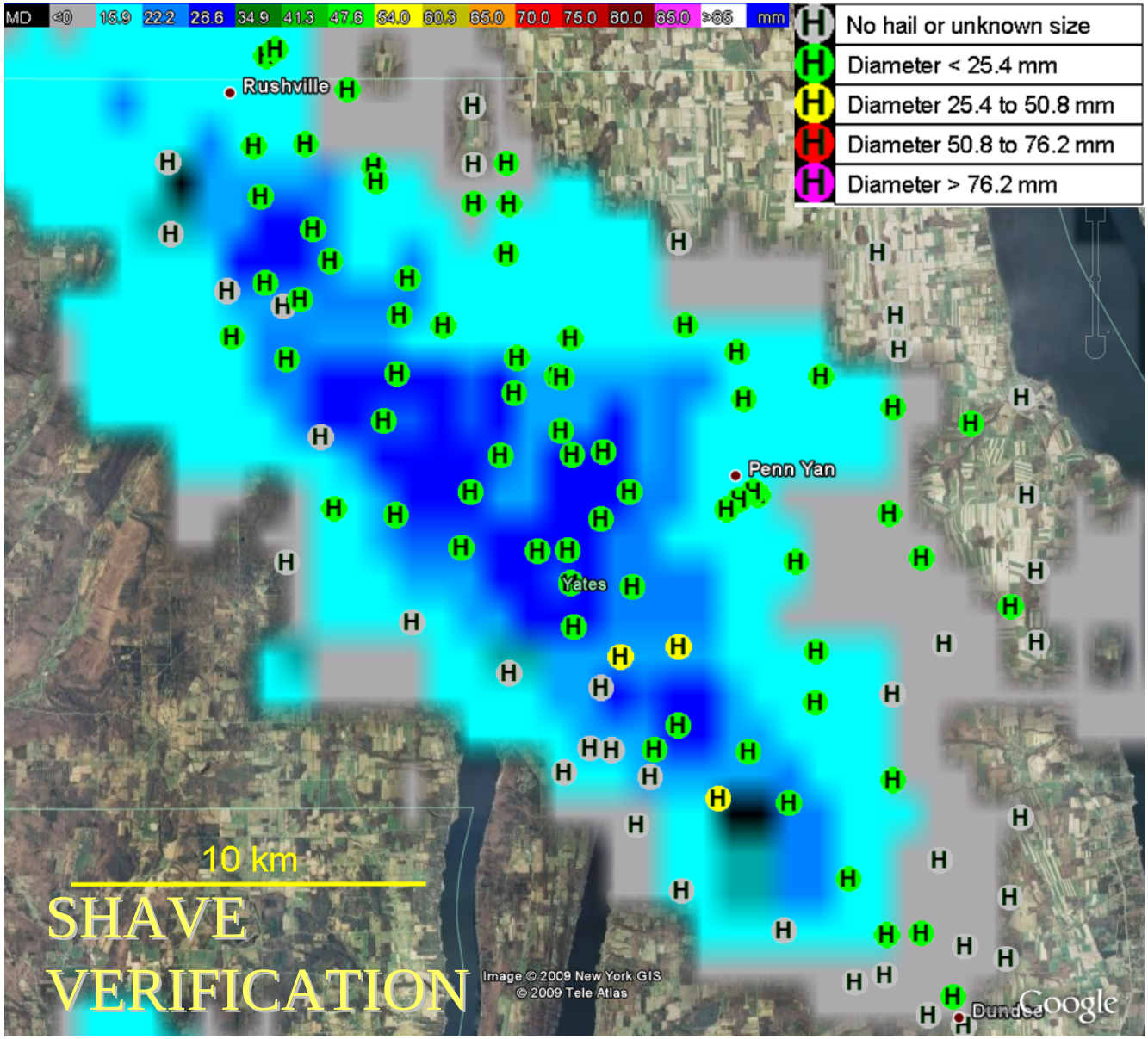


Quick Review: Current Hail Verification



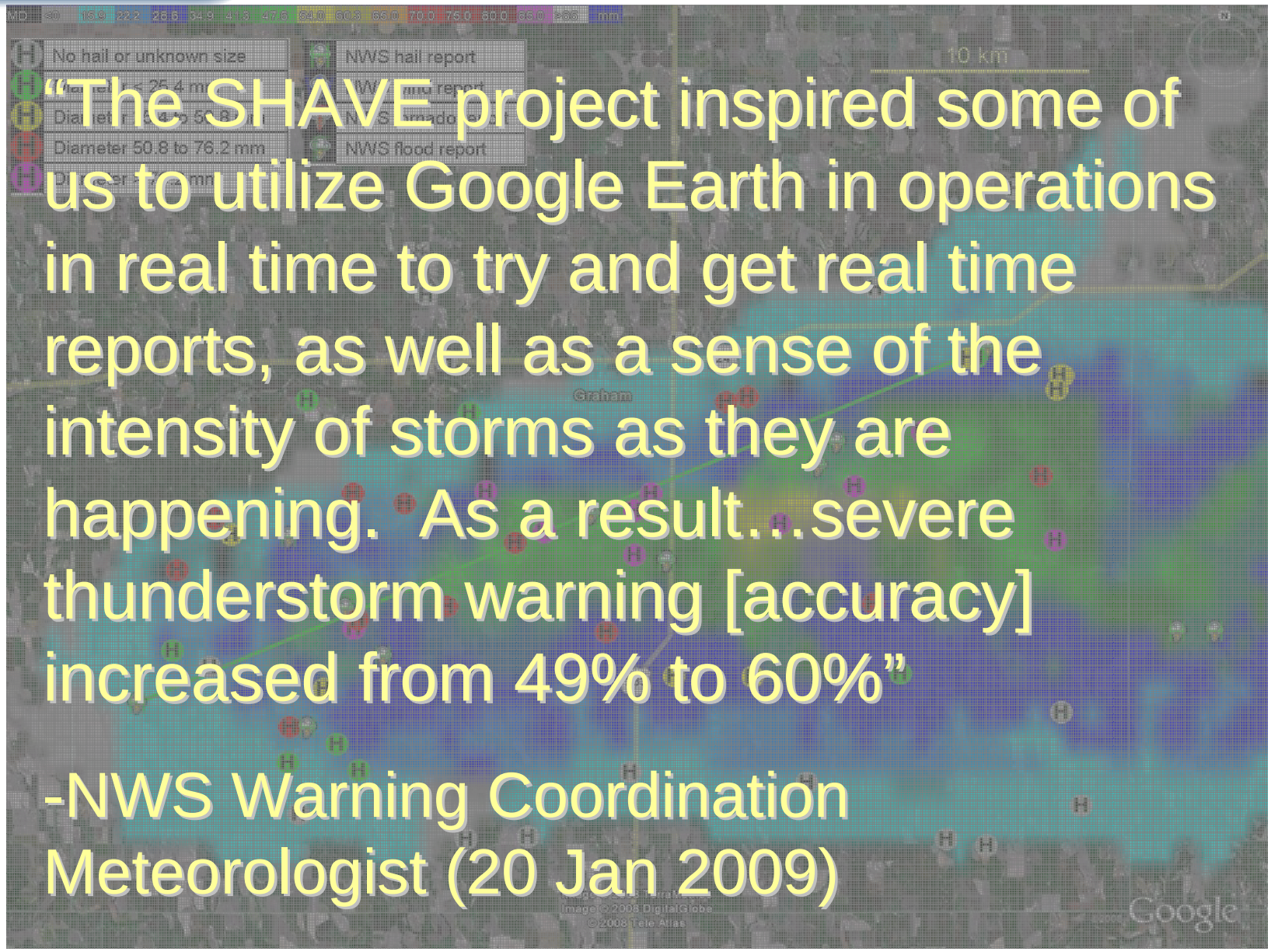
- Sparse
- Only severe reports
  - ¾”+ hail

Severe Hazards Analysis and Verification Experiment (SHAVE)



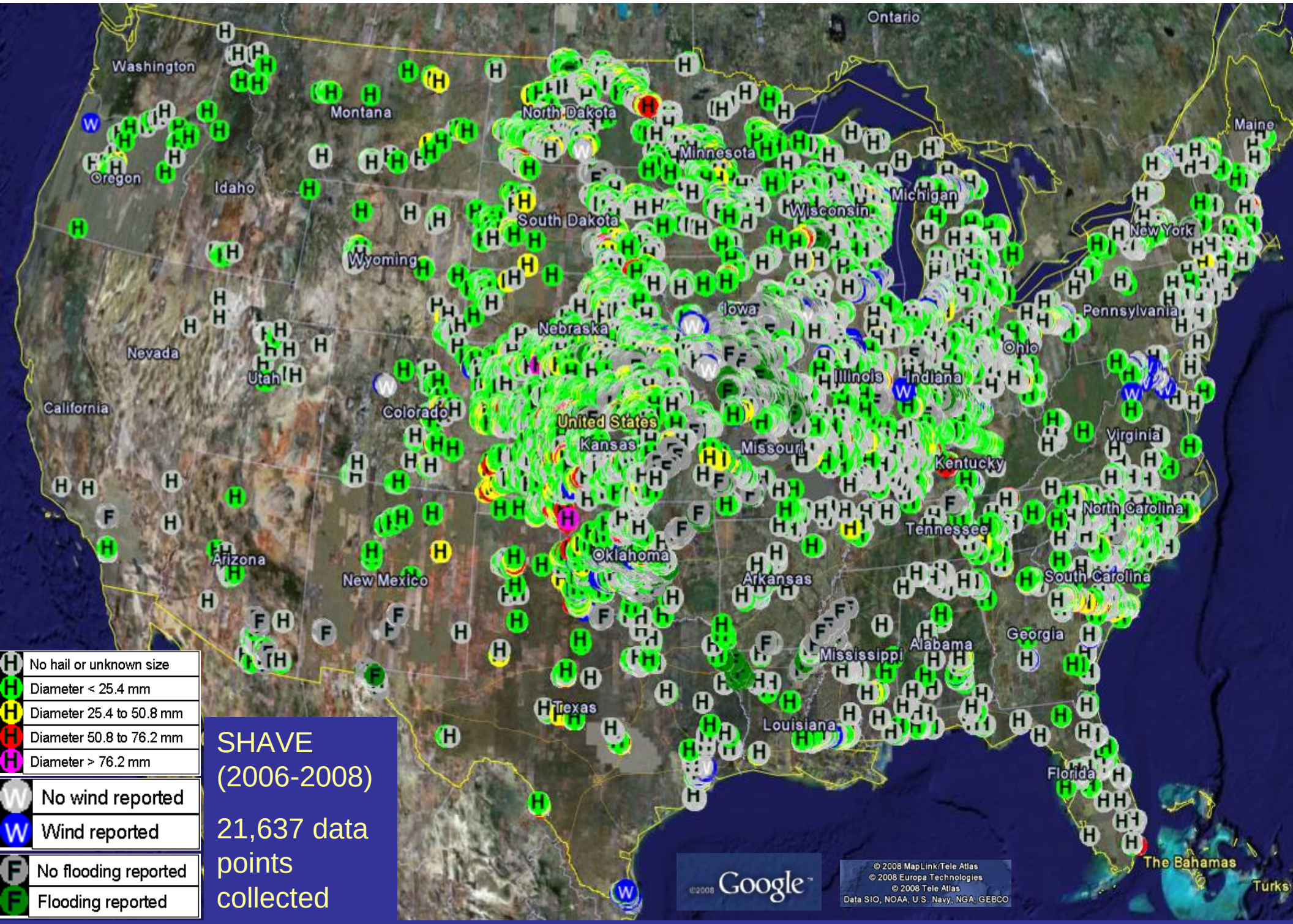
- Phone calls to conduct surveys
- Student-run, student-led
- Remote high resolution verification of:
  - **Hail**
  - Wind damage
  - Flash floods

Informal Tech Transfer: SHAVE to NWS



"The SHAVE project inspired some of us to utilize Google Earth in operations in real time to try and get real time reports, as well as a sense of the intensity of storms as they are happening. As a result…severe thunderstorm warning [accuracy] increased from 49% to 60%"

-NWS Warning Coordination Meteorologist (20 Jan 2009)



http://ewp.nssl.noaa.gov/projects/shave/