An Update from the Severe Hazards Analysis and Verification Experiment (SHAVE)

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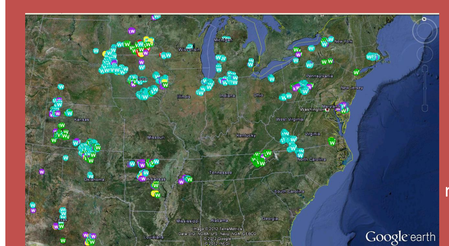
SHAVE Overview

- High-resolution verification effort at NSSL started in 2006
- Leverages digital phone number database, NSSL's WDSS-II system and a Google Maps™-enabled data entry interface
- Largely student-led and student run
- Hazards verified over all years: hail, wind damage, flash flooding and winter precipitation
- 2012: first time SHAVE was tasked for specific projects instead of general verification efforts
  - Winter precipitation: use reports in developing new Hydrometeor Classification Algorithm (HCA)
  - Lightning jump: use reports in verifying a lightning jump algorithm in support of GOES-R

Winter Precipitation Verification



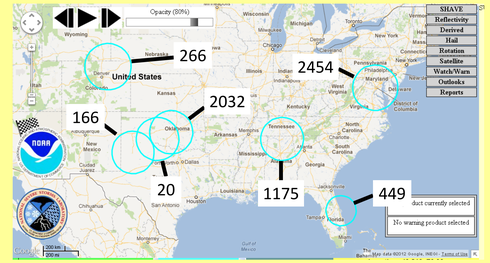
SHAVE Winter Reports
(purple = no precip;
cyan = snow;
yellow = ice pellets;
red = freezing rain; green = rain)

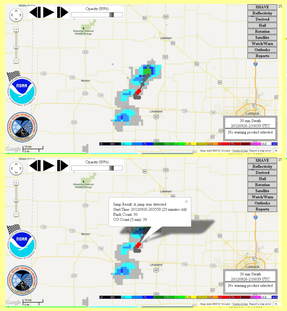
- New HCA for winter precipitation which combines a background model classifier with radar identifications
- Verification, thus far, has been mostly near dual-polarization radars
- Implement new verification techniques to sample different situations
  - Example: Dwell in single areas over long time periods of time to capture transitions
- Need to capture verification at different scales
  - Radar data ~ 100 m while model data ~ 10 km

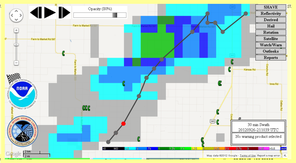
Lightning Jump Verification

- Lightning jump algorithm based on total lightning flash rate
  - Implemented through WDSS-II's k-means segmenting and tracking algorithm
  - Storm tracking accomplished on merged reflectivity at -10 C
  - Lightning jump algorithm was the 2σ implementation per Schultz et al. (2009, *J. Appl. Meteor.*)
  - Lightning data were from lightning mapping arrays deployed in several regions of the US
- Supports science for GOES-R's Global Lightning Mapper

Map of the LMA domains across the US (cyan circles). SHAVE has collected 6562 hail reports in the domains and an additional 970 wind damage reports within the domains.



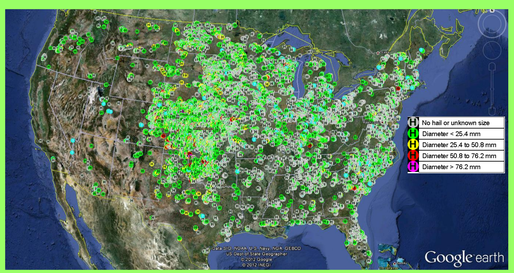


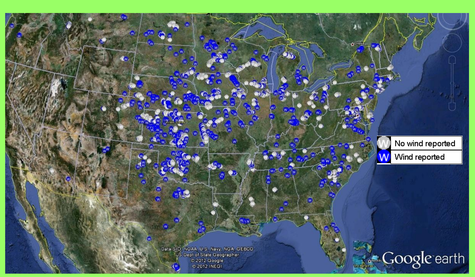


Red dot shows cell location of a lightning jump. Additional information was included by clicking detections. Last 15 minutes of detections are displayed.

Lightning jump information was available student callers and other interested parties. Students would then use time accumulated MESH or VIL for calling guidance.

SHAVE Data Summary





2012	
Days of operation:	81
Total data points:	7133
Hail data points:	5815
Wind data points:	118
Winter data points:	1200

All Years	
Days of operation:	453
Total data points:	56554
Hail data points:	39609
Non-severe hail:	31209
Severe hail:	7332
Sig. Severe hail:	838
Wind data points:	6432
Winter data points:	1200

Continuing Work

- Students currently are reviewing and summarizing cases for events within the LMA networks, near dual-polarized WSR-88Ds and better coverage cases overall
- A quality control effort is also taking place on the data
  - A 00Z-flip day problem was found to be prevalent through the entire database
- Once quality control efforts have been concluded, the dataset will be released
  - Current target: early spring 2013
- Cases in support of MYRORSS are being collected
  - 130+ days covering 200+ storms
- Investigating interest in conducting a warning/storm societal response survey

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