

The Vaisala Radar-Based Nowcasting System

Evan Ruzanski, Scientist
Vaisala, Inc., Louisville, Colorado
7 Aug 2012

VAISALA



Introduction

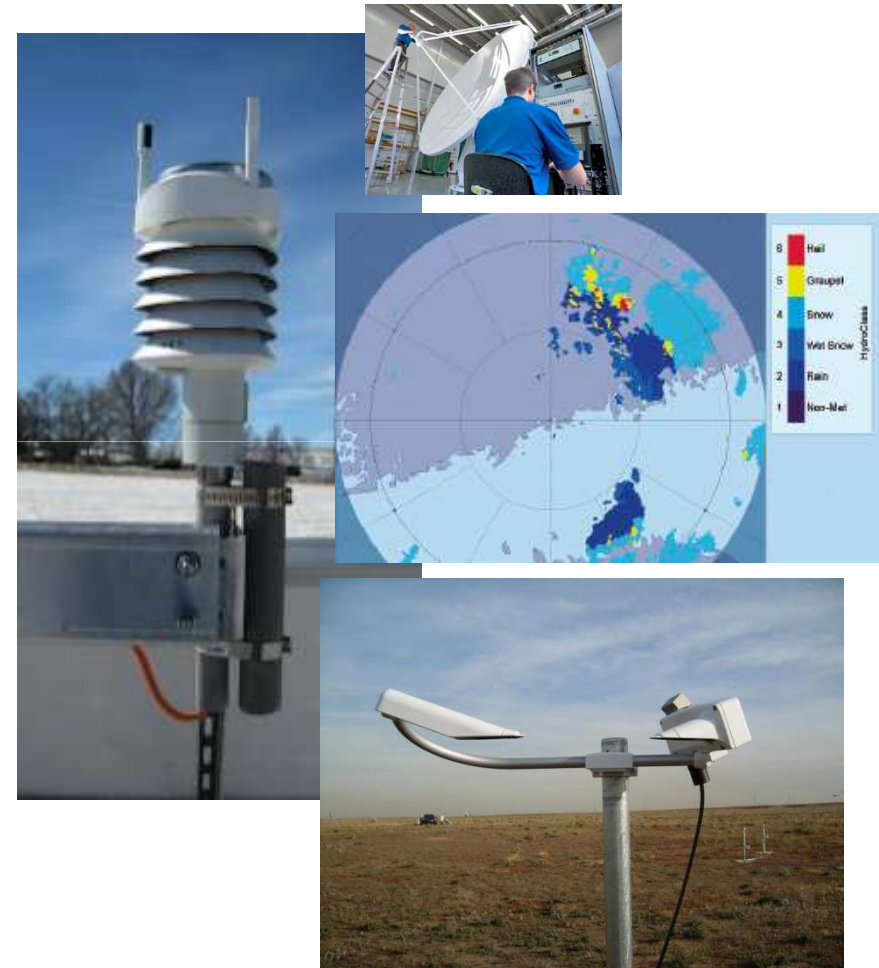


- Motivation
- System overview
 - A modular framework is utilized for targeted 0–1 h applications
- Demonstration
 - Nowcasting using Vaisala C-band (Kerava), FMI composite, and Unisys composite radar data
 - Temporal interpolation of Vaisala radar data
- Future enhancements and applications
 - Improved QPF and hydrometeor classification nowcasting
 - Targeted applications for airports, roads, and new energy

Motivation



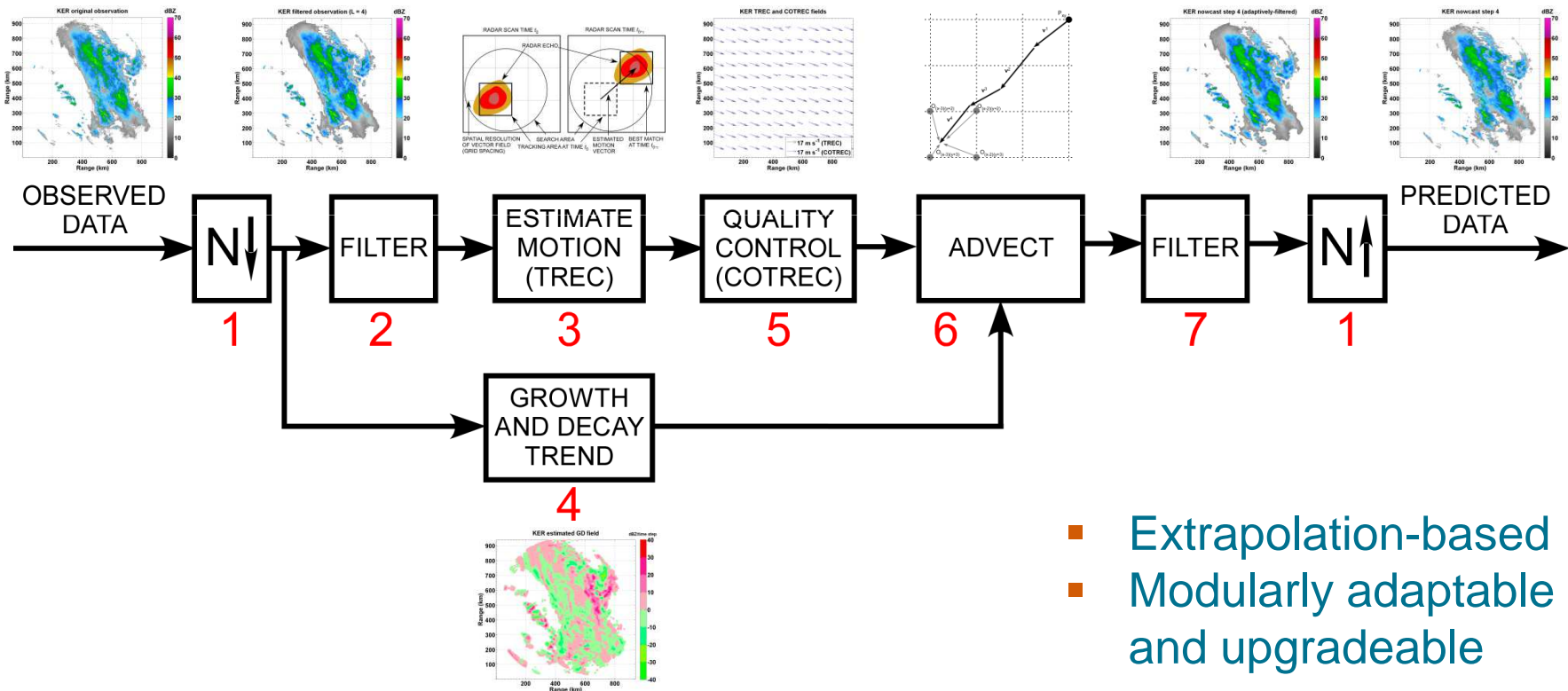
- Provide our customers a total hardware–software package to solve their particular problem
 - Using nowcasting to leverage and enhance the value of our measurement instruments
 - Provide a single framework that can be adapted to a variety of instruments and applications
 - Investigate characteristics of the atmosphere and measurements as we develop these products



System overview

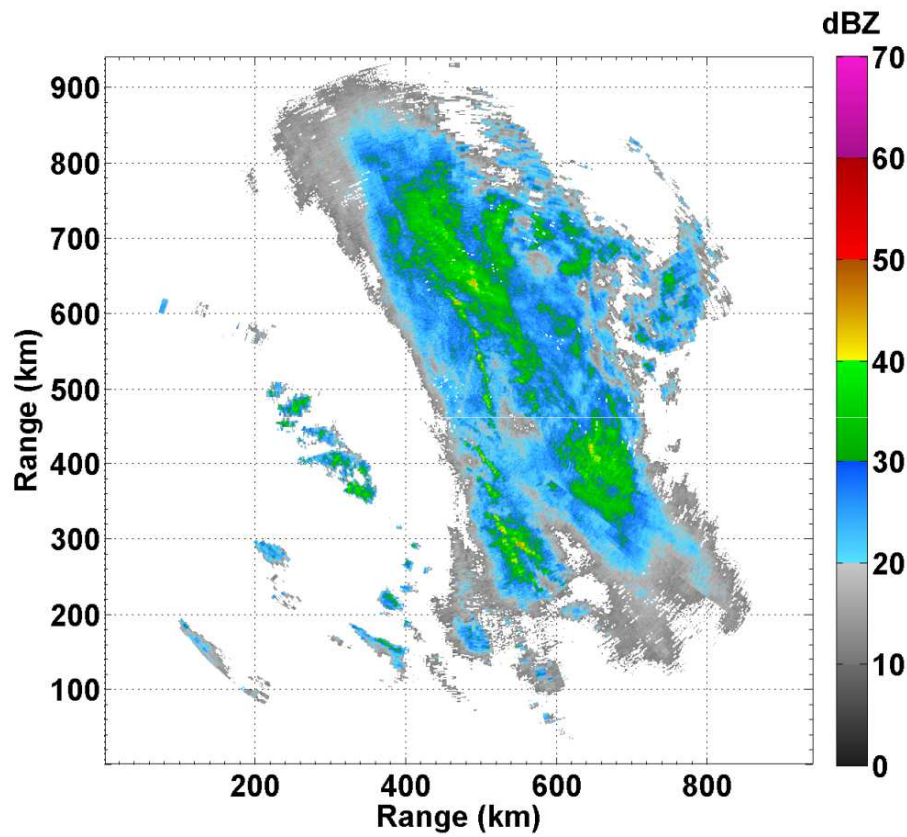


“A modular approach for agile development of targeted 0–1 h applications”

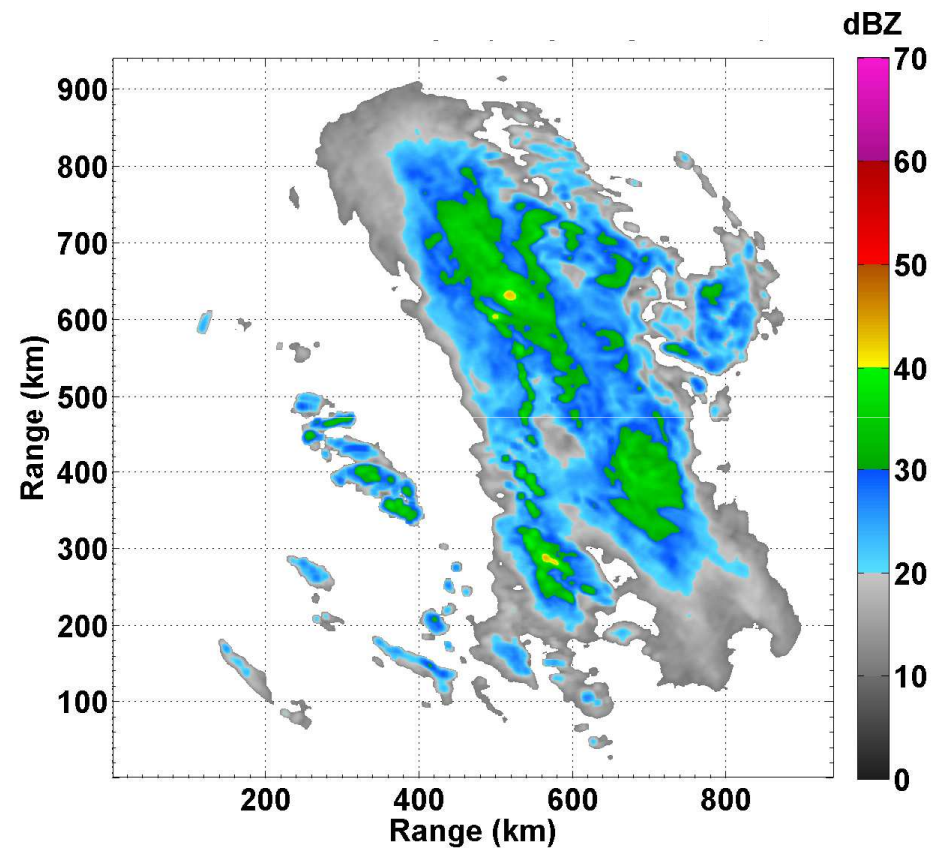


- Extrapolation-based
- Modularly adaptable and upgradeable

Nowcasting Vaisala data

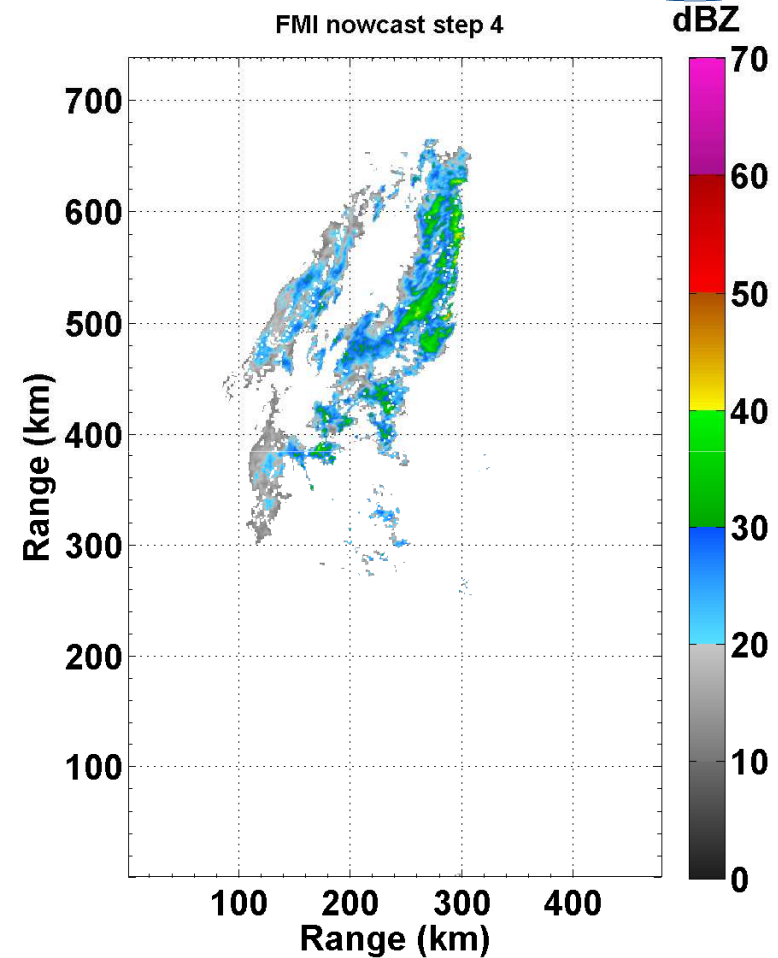
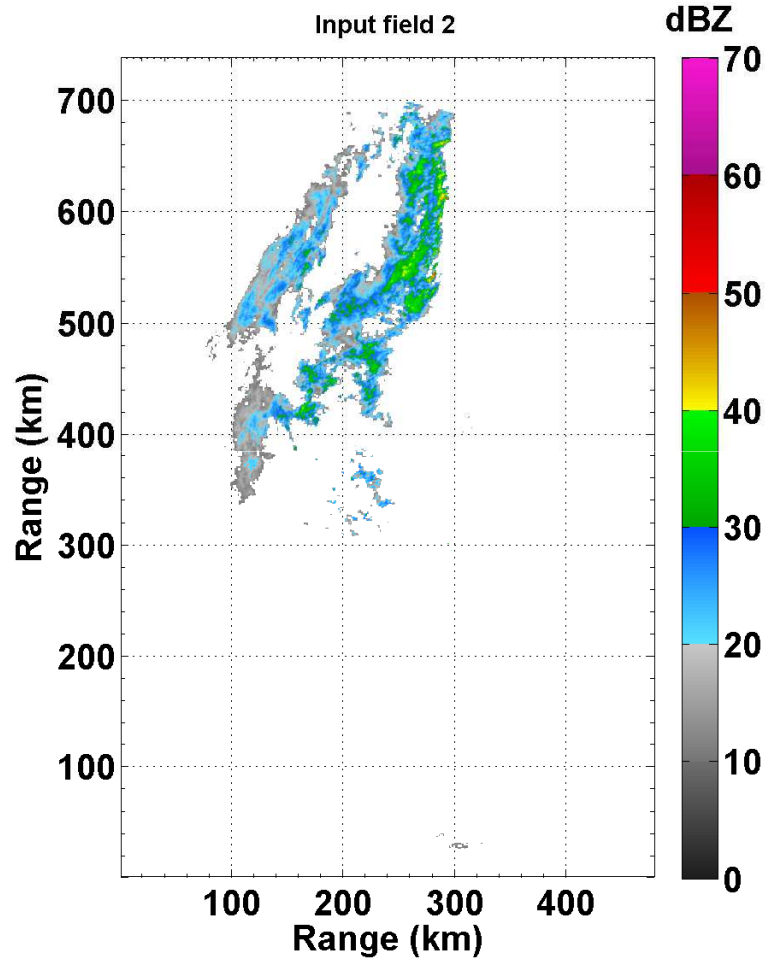


Observation at 04 Sep 08 0400 UTC



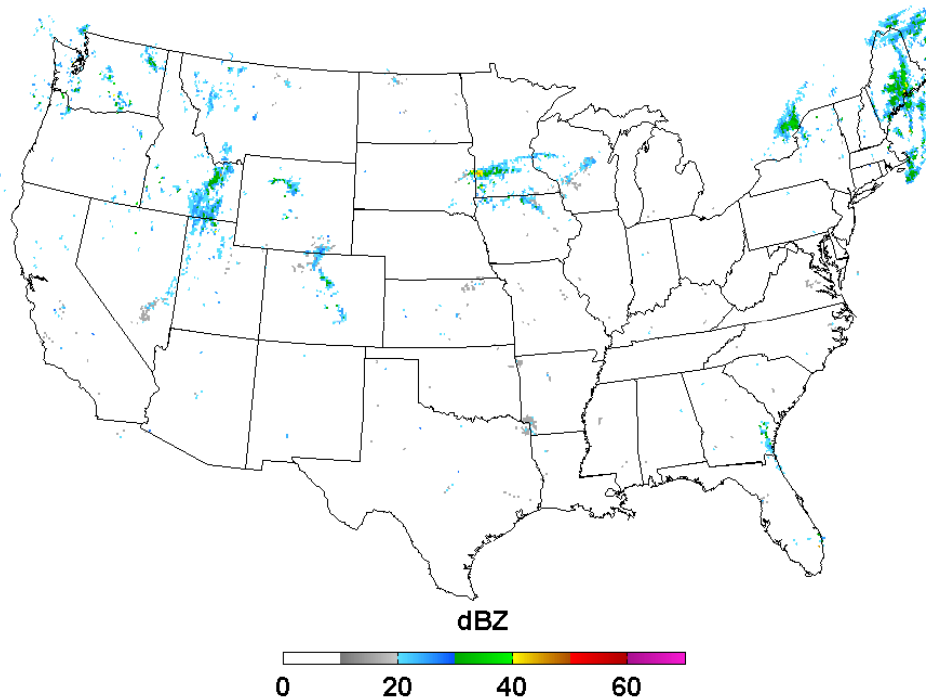
1-h nowcast at 04 Sep 08 0500 UTC

Nowcasting FMI composite data

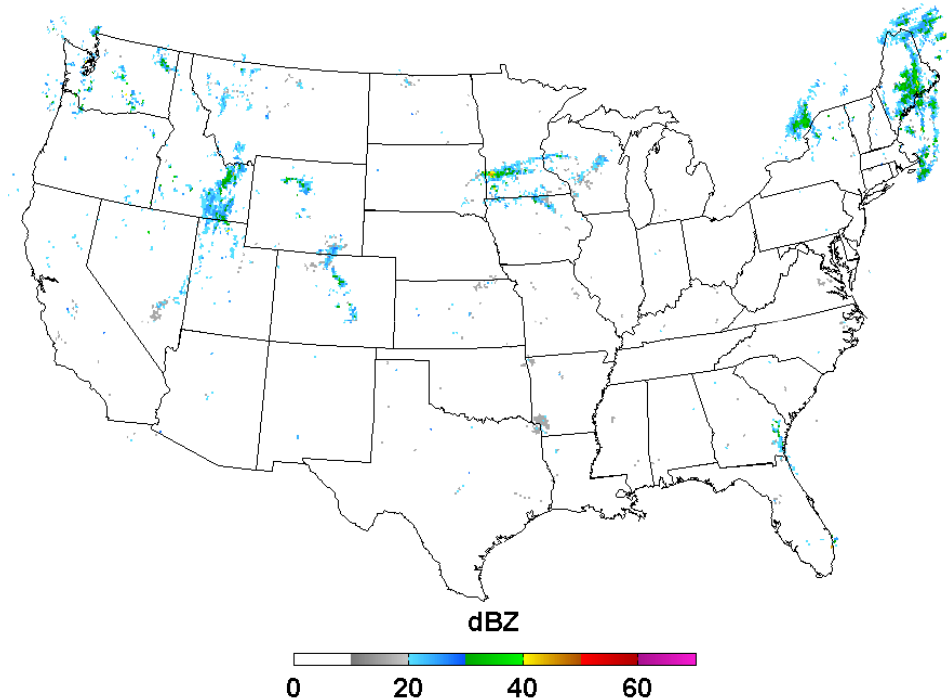


Observation at 23 May 11 0915 UTC 1-h nowcast at 23 May 11 1015 UTC

Nowcasting Unisys composites

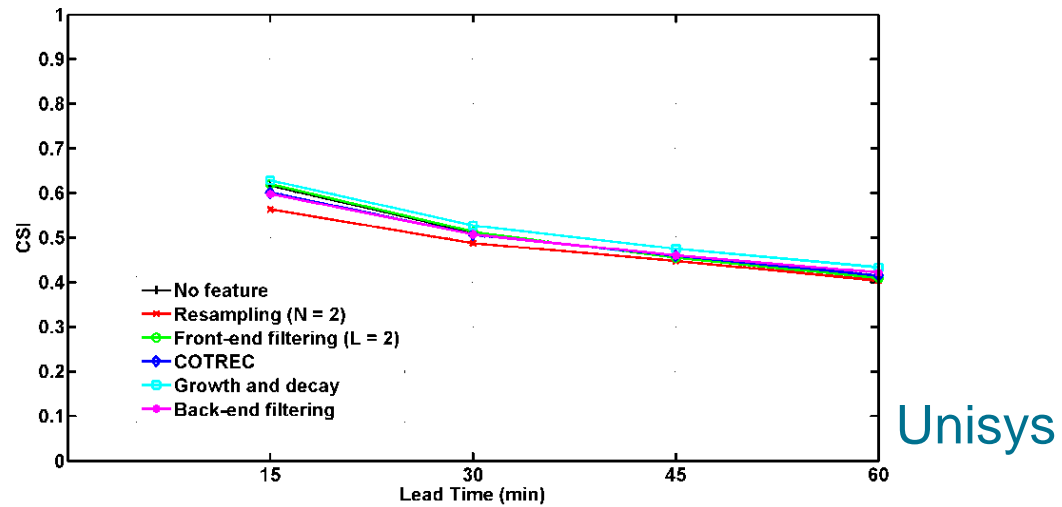
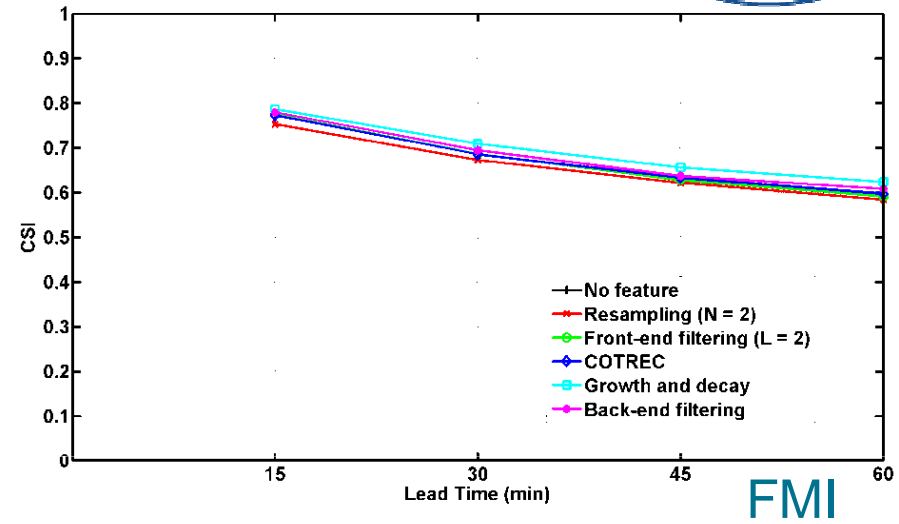
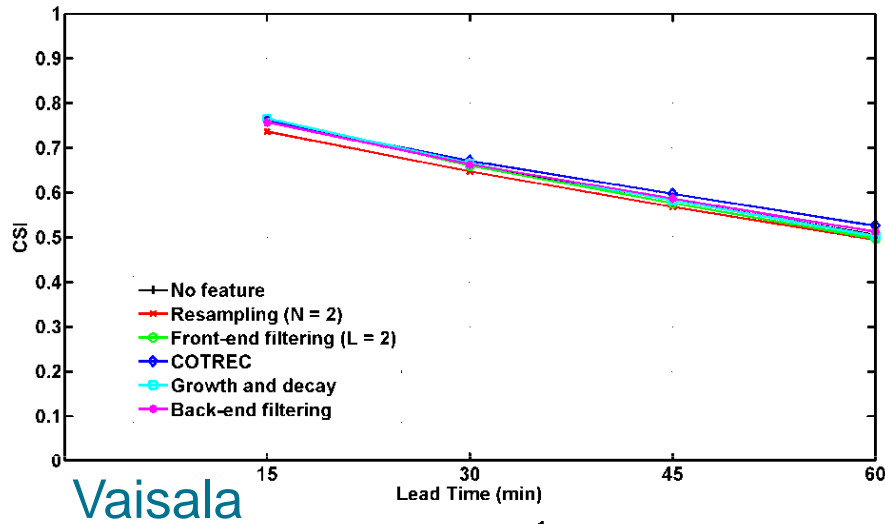


Observation at 14 Apr 11 0114 UTC

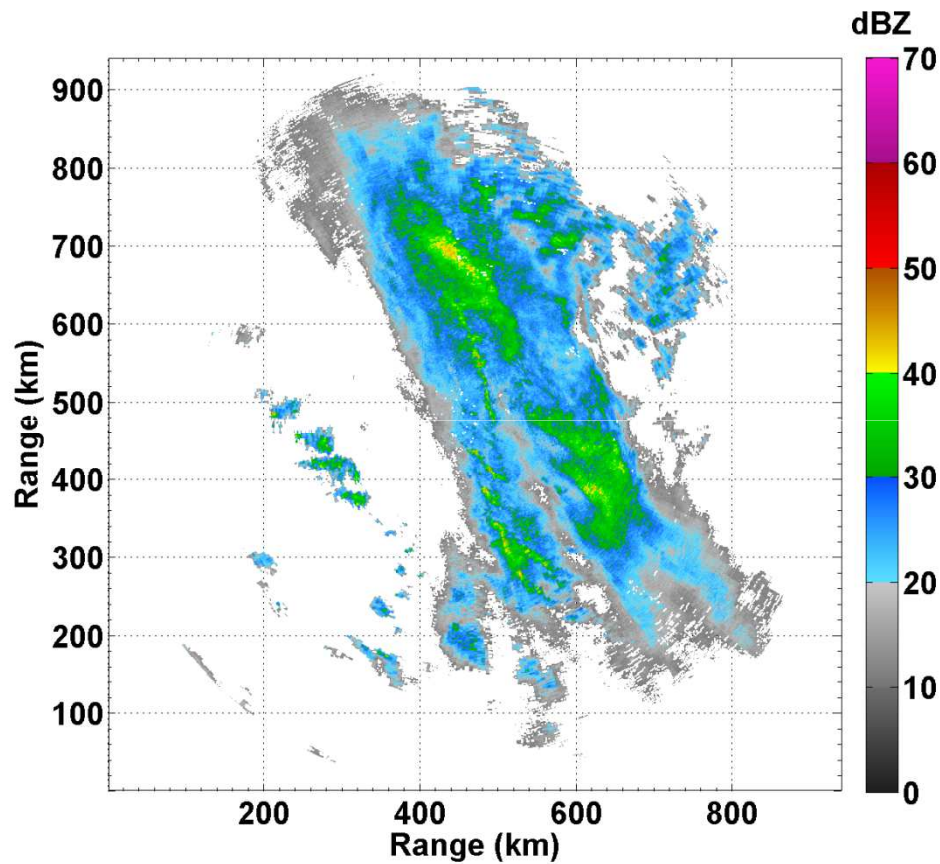


1-h nowcast at 14 Apr 11 0214 UTC

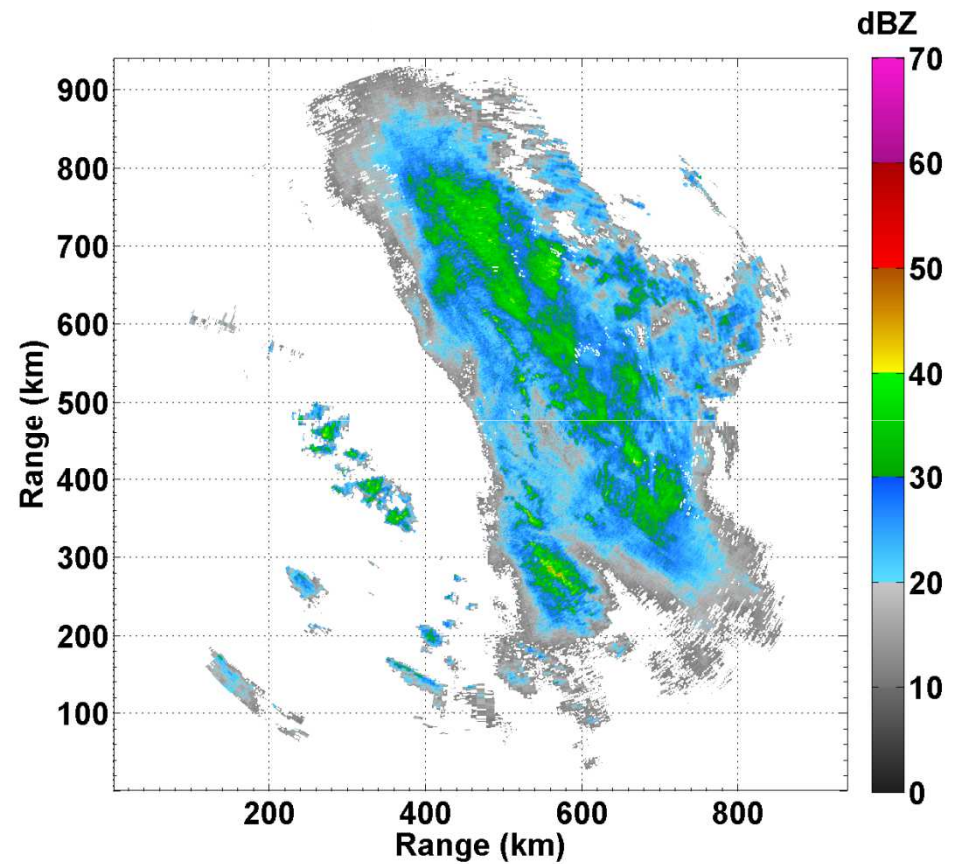
Nowcasting comparison



Temporal interpolation

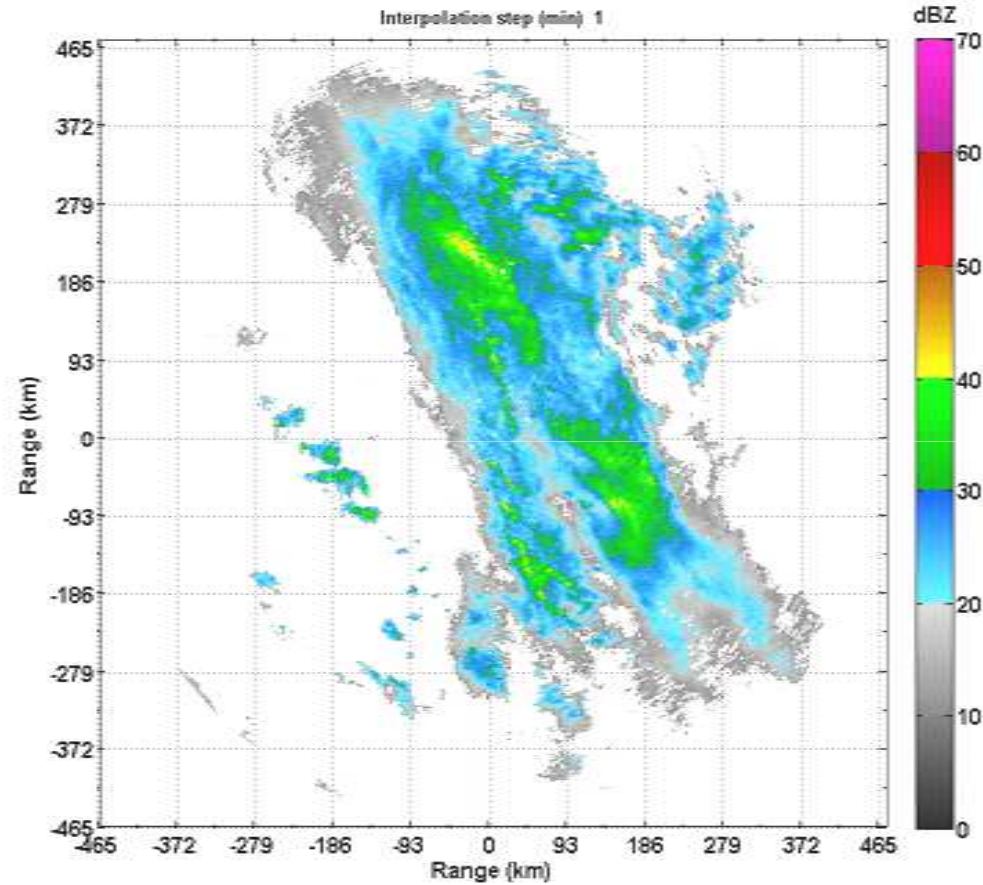


Observation at 04 Sep 08 0400 UTC



Observation at 04 Sep 08 0415 UTC

Temporal interpolation

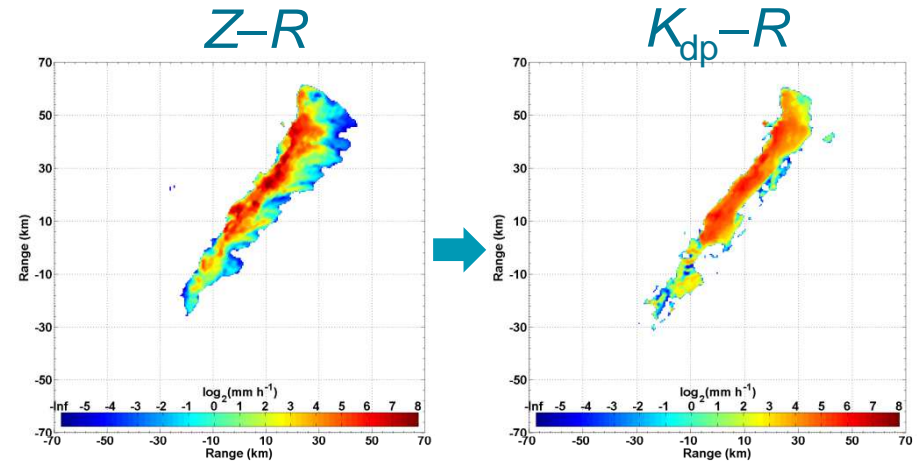


Animation of 1-min interpolation between 04 Sep 08 0345 and 0400 UTC

Future enhancements



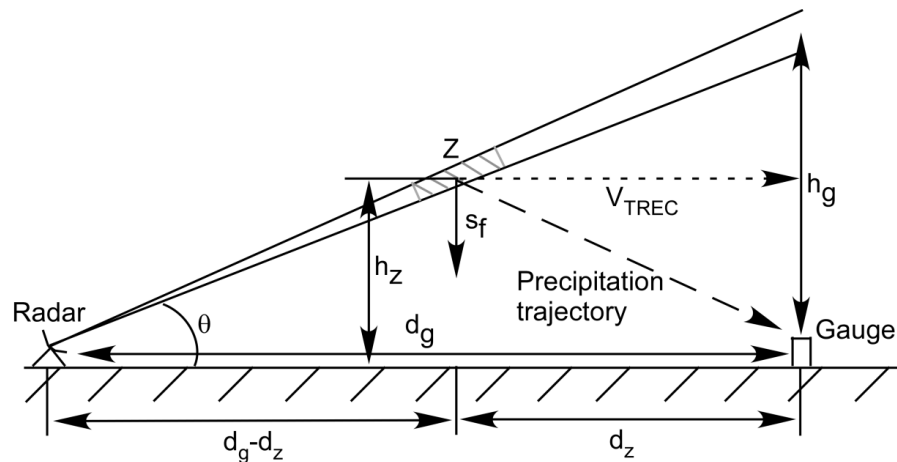
- Improved surface rainfall nowcasts using a new dual-polarization rainfall estimation algorithm for
- Nowcasting precipitation type using Vaisala HydroClass® products for



Future enhancements



- Upgrade the Vaisala AviCast® product with new instruments and nowcasting methodology
 - Technology originally transferred from NCAR WSDDM product



Real-time Z-S calibration and LWE nowcasting

Other potential applications



← Aircraft/runway icing (Vaisala AviCast®), friction index nowcasting

Lightning nowcasting (Vaisala NLDN® and GLD360®) →



← Road weather icing

Wind turbine icing →





Questions?