

Next Generation Algorithms for *Clarus*

Andy Stern, Consulting Meteorologist
Road Weather Management Team
Noblis, Inc.
Falls Church, VA

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Contact: astern@noblis.org, 703-610-1754



Benefits of Quality Checking

- For agencies, allows for an assessment of network health, such as
 - Communications (from ESS to agency server)
 - Calibration (if sensors need service)
 - Quality (validity against neighbors and against data from other networks)
- For end users, provides a sense of
 - Data Quality (including any biases)
 - Data Reliability (for use in products)



Background

- Initial Quality Checking (QCh) algorithms for *Clarus* were a compromise between
 - Scientific complexity
 - Processing complexity
 - Need for supplemental data sets
 - Need for complex metadata
 - Ultimately, the desire to complete the initial system and not have QCh algorithms acting as a roadblock



Original QCh Algorithms

1. Sea Level Pressure Test
2. Climate Range Test
3. Barnes Spatial Analysis Test
4. Sensor Range Test
5. Persistence Test
6. Like Instrument Test
7. Step Test
8. Dew Point Temperature Test
 - Plus the Manual Set Flag
 - The Completion Flag



Next Generation QCh Algorithms

- Quality checking & comprehensive metadata are two strengths of *Clarus*
- Stakeholder Task Force recommended changes
- New task orders/contract extensions are being finalized for Mixon/Hill & NCAR to collaborate on improving selected algorithms
- Noblis will be tasked to perform an assessment of the QCh capabilities of data sharing networks as well as quality control within NOAA's National Centers for Environmental Prediction (NCEP)



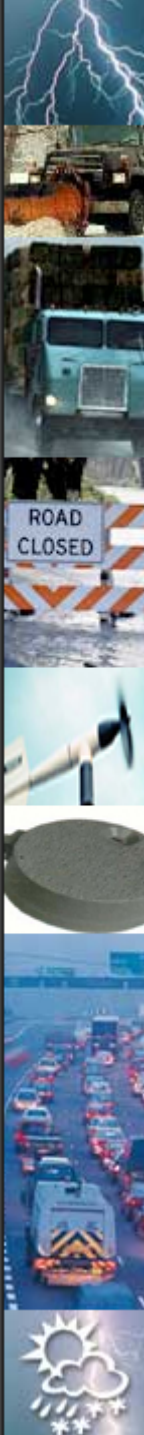
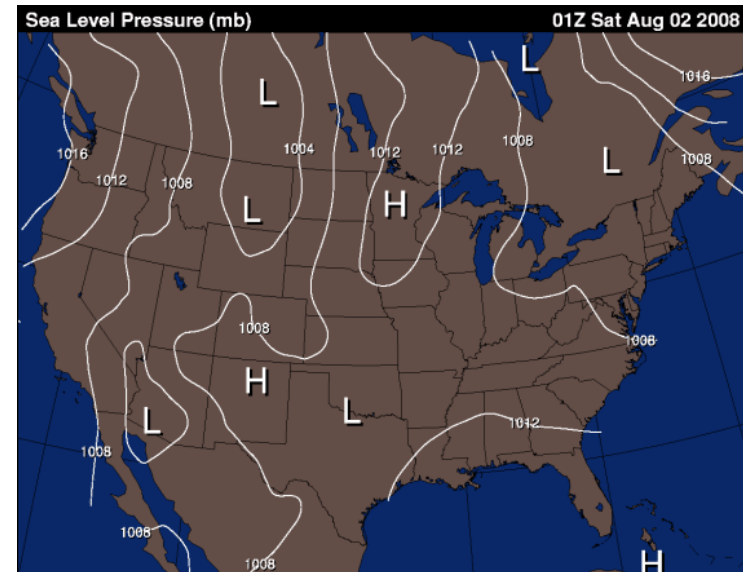
QCh Algorithms under Review

1. Sea Level Pressure Test
2. Climate Range Test
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Improve Existing Algorithms

- Sea Level Pressure: Current method is not optimized for use in complex terrain
 - Conduct research to test and compare different reduction techniques
 - Test the result in areas such as Alaska
 - Validate against other established observations (e.g. ASOS/AWOS)



Improve Existing Algorithms

- Climate Range: Current technique compares nearly all elements against climate metadata
 - Limits in climate metadata accuracy (both atmospheric and pavement)
 - Some elements, such as Relative Humidity or Wind Direction have no climate bounds
 - Carefully selecting NTCIP 1204 elements will limit processing and reduce labor for metadata compilation & entry



Improve Existing Algorithms

- Spatial Analysis: Shown to have reliability problems in mountainous terrain or along coastlines
 - Should another technique be used in the problem areas?
 - Should a background field be used to improve reliability?
 - Should additional observations (coastal marine, AWOS, etc) be added?



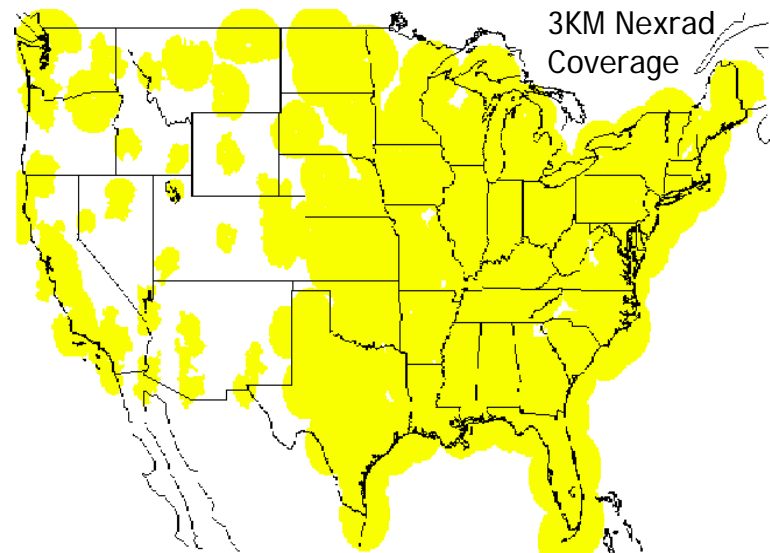
Improve Existing Algorithms

- Persistence Test: Currently can only perform checks with data 60 minutes apart.
 - Modify so that the test can be performed on observations that are received at any time interval



Potential New Capabilities

- Precipitation Estimation
 - Currently no test for precipitation occurrence of any type
 - Many ESS do not have rain gauges or heaters
 - Perform research to determine feasibility of using mosaicked radar products to create radar-based precip algorithms



Potential New Capabilities

- Pavement and Subsurface Algorithms
 - Current tests are limited to checking against predetermined thresholds
 - Conduct research to determine if
 - satellite-based or model-based insolation values can be used as a comparison
 - Long Term Pavement Performance historical data can be used to improve quality checking
 - Real-time Mesoscale Analysis or Land Information System data can be used



Documentation

- Documentation of all algorithms will include descriptions, illustrative examples, input/output formats, customizable parameters
- Assessment will be made for
 - System computational load balancing
 - Communications bandwidth capabilities
- Acceptance test period & evaluation before sharing with the community



Time Line

- Next Generation QC Task scheduled to begin around 1 Oct 2008
- Algorithm updates to be completed by the end of CY 2009
- System acceptance tests 1st Quarter 2010
- Decision to switch to upgraded system:
~April 2010

