Designing a state-of-the-art verification system

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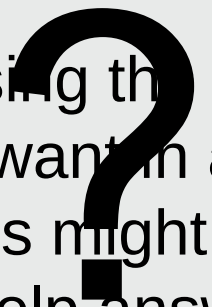
What IS a state-of-the-art verification system

Instead of trying to define “state-of-the-art,” try a slightly different approach:



Who will be using the system?
What do they want in a verification system?
What questions might they want answered?
How can we help answer these questions?
What can we offer of value?
What will they use?

Objectives

- Develop a state-of the-art verification package for evaluating high-resolution forecast systems (i.e. the WRF [Weather and Research Forecast] model)
- Verification package will be used at the Developmental Testbed Center (DTC) for testing and evaluating model techniques
  - Transfer of model techniques from research to operational community
- Will also be available to the entire WRF user community

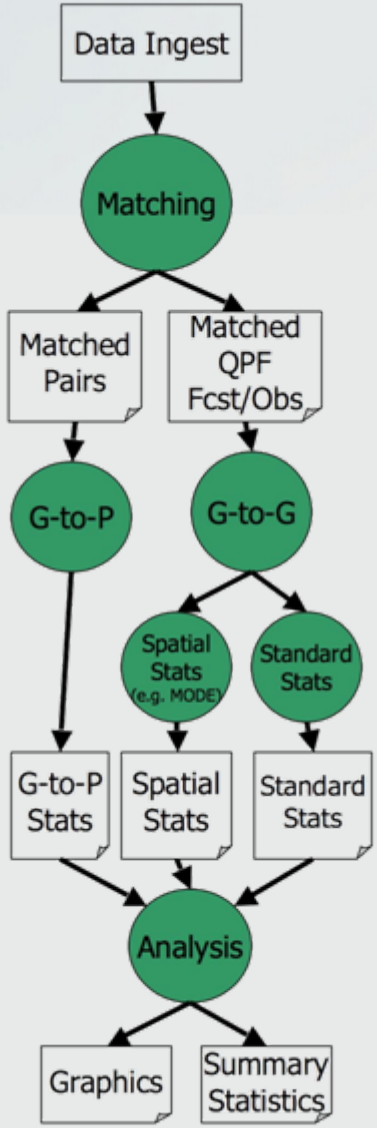
Who are the potential users?

Requirements

- The system must include:
  - standard verification approaches
  - confidence intervals
  - initial capability for object-based techniques
- Maintain code and develop way of implementing additional capabilities
- Will be made freely available to the public
- Upcoming June 2007 release date!

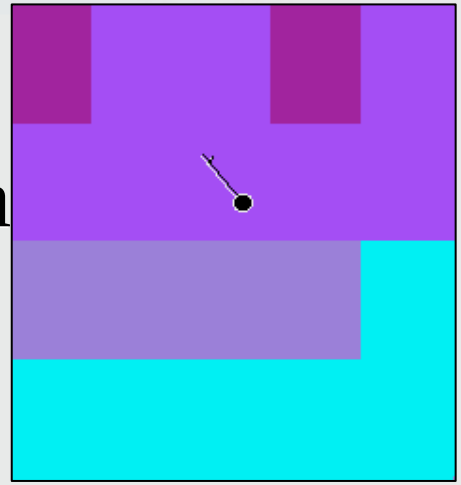
WRF Verification Toolkit (WVT) - Design overview

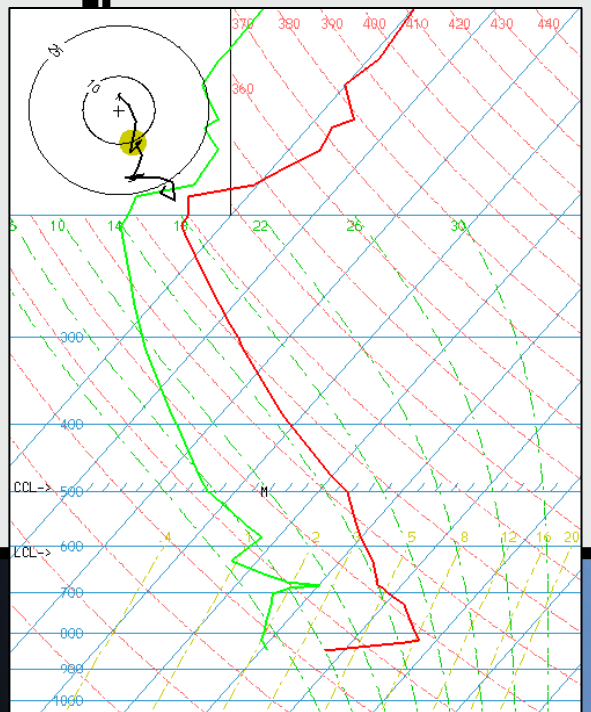
- Modularity
- Flexibility/Configurability
- Availability of both grid-to-grid and grid-to-point methods
- Graphical capabilities



Grid-to-point verification

- Several methods for interpolation available to match point-based data
- Matched pair data





- Option to provide forecast data surrounding grid points
- Data sets selected by the user

Grid-to-grid verification

- "Standard" stats package
- MODE (Method for Object-based Diagnosis and Evaluation) Tool
- Other spatial methods to be included in the future

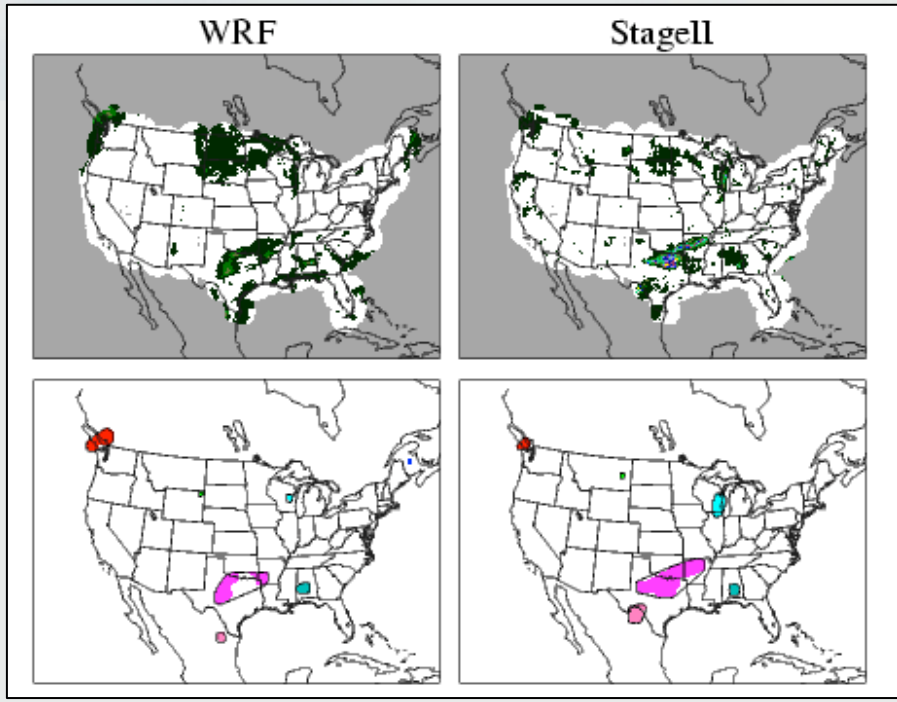


Image: John Halley Gotway

Community Feedback

- WRF User's meeting on the system at AMS in San Antonio (Jan 2007)
  - Less than half respondents were currently using any sort of verification method/tool
  - More than half of respondents said they expected to use verification capabilities on a daily basis!
  - Many interested in object-based/features-based approaches
- Upcoming Workshop in Boulder (Feb 2007)
- Continue development of the verification system with successive version releases

Future Work

- Identify and implement techniques based on user needs and community feedback
  - Limit to techniques/methods that can be implemented with available resources
- Will be included in a system being built at NOAA
- Intercomparison of spatial verification techniques is underway
- Support for additional techniques:
  - Ensembles
  - Extremes
  - Observational error
  - Others

Acknowledgments

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