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P1.16 Recent Training and Results from the Virtual Institute for Satellite Integration Training

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1. INTRODUCTION

This paper describes the training efforts of the Virtual Institute for Satellite Integration Training (VISIT) developed for the National Weather Service (NWS), focusing on the recent VISIT teletraining sessions. The VISIT project -- with its emphasis on distance learning -- was developed to provide cost-effective training to the operational weather forecaster in the Advanced Weather Interactive Processing System (AWIPS) era.

The NWS has undergone many changes as new remote sensing systems and analysis workstations have been deployed. One of the most dramatic changes has been the satellite data utilization and new satellite products. To address the resulting training need, the National Environmental Satellite, Data, and Information Service (NESDIS) and the NWS have established the VISIT. The VISIT has produced computer-based learning modules to highlight imagery and products from the Geostationary Operational Environmental Satellites (GOES). In addition, interactive teletraining materials addressing the integrated use of data sources in the NWS Warning and Forecast Office (WFO) environment have been developed. The content from VISIT has been integrated into the overall NWS Professional Development Series (PDS) training

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structure. The Integrated Sensor Training (IST) is where most VISIT efforts are directed. In general, PDS efforts are directed at job-specific performance objectives and organized under one "umbrella" (Lamos, 1997). The IST PDS is directed at the efforts to combine information useful to forecasters throughout the range of space and time scales in the forecast and warning process.

The IST PDS teletraining sessions are offered on a regular schedule, brief (about an hour) but with specific educational targets, and centered around operationally-available data sets and issues. Feedback from NWS forecasters has been very favorable on the length and topics addressed. The training sessions provide some background information in addition to examining a case study. This paper summarizes the current teletraining sessions to date as examples of the success that VISIT has demonstrated with interactive distance learning technologies.

2. SPECIALIZED SOFTWARE FOR DATA INTEGRATION TRAINING AND STUDIES

VISIT learning materials have been developed on Internet web sites to allow ready access to these training materials. In an effort to provide improved functionality for interactive learning sessions, many of the current capabilities have been collected into an Internet-based distance learning application called VISITview (Whittaker, 1999). VISITview development and testing have resulted in improved Internet-based capabilities. The new method combines the best features of PC-based training software and improved on critically-needed capabilities to display and inter-use remotely-sensed data sets. Functionality similar to the NWS Advanced Weather Information Processing System (AWIPS) makes the manipulation of modernized data sets available during the training sessions to provide the students and instructors the opportunity to demonstrate the value of advanced techniques with high resolution data sets. This approach requires reliable and quick Internet performance. Some mitigation techniques have been employed to limit the amount of required network traffic. Image manipulation functionality such as fading between images and drawing during animations can be used.

3. RECENT TRAINING

A number of previously-developed and new training sessions have continued to be offered using the VISITview interactive training software. A complete list of training sessions, including web-based versions and talking points, can be found on the VISIT homepage at **www.cira.colostate.edu/ramm/visit/visithome.asp**

Other previously-developed sessions which continued during 2000 included 1) Detecting Low-level Thunderstorm Outflow Boundaries at Night Using GOES, 2) Tropical Satellite Imagery and Products, 3) The Enhanced-V: A Satellite Severe Storm Signature and 4) CONUS CG Lightning.

Newly-developed training sessions for 2000 include 1) Using AWIPS to Detect Surface Boundaries, 2) Diagnosing the Potential for Surface Boundaries to Initiate Convection, 3) Diagnosing Elevated Mesoscale Ascent, 4) Applying Mesoscale Tools and Techniques to Predict and Detect Severe Thunderstorm Development.

The following sections will briefly summarize these training sessions.

4. USING GOES RAPID SCAN OPERATIONS (RSO) IN AWIPS

The goal of this session is to acquaint forecasters with the procedure for requesting and identifying events when GOES RSO would be most useful. A new capability which AWIPS provides to NWS WFOs is the ability to get more frequent interval satellite images. This capability has only recently become relevant to operational forecasters since the delivery of the data has often taken longer than the time interval between images. This change has sparked great interest in learning about and using the GOES RSO imagery at forecast offices. Capitalizing on NESDIS and Regional And Mesoscale Meteorology team experience (Weaver et. al, 1999), an introductory RSO session was developed. This session covers the basic scanning

of the GOES imager during special scanning and how NWS offices can request RSO. Examples of RSO applications at several domains and scales are shown for different regions of the country.

The "Using GOES RSO in AWIPS" training has increased the number of NWS-requested operational GOES RSO periods during calendar years 1999 and 2000 to 143 and 181 respectively. This is in contrast to the 43 RSOs requested operationally during 1998.

5. USING GOES TO DETECT LOW-LEVEL THUNDERSTORM OUTFLOW (LTO) BOUNDARIES AT NIGHT

The goal of this teletraining session is to review the use of the various GOES IR channels and products with other operationally-available data in monitoring LTO boundaries at night. The training begins by showing examples of outflow boundaries that are both familiar and obvious to operational forecasters. A more difficult case is then examined where student interactions are fostered as the use of satellite and other data are discussed. Following a complete review of GOES imager products and the derived fog product (Dostalek et. al, 1997), other data sets and inter-use are demonstrated and related to the satellite interpretation. In this way, forecasters get a more relevant and pragmatic approach to using some of the many data sets that AWIPS makes available in an integrated and interactive manner.

6. TROPICAL SATELLITE IMAGERY AND PRODUCTS

The goal of this session is to show multiple satellite data sources which compliment each other and the existing operational products. The tropical satellite imagery session was developed because of the interest and importance of monitoring hurricanes and tropical weather by satellite and other available platforms. This session covers some of the GOES, Polar Operational Environmental Satellites (POES), Defense Meteorological Satellite Program (DMSP), and Low-Earth Orbiting (LEO) satellite products and their use in the tropics. The analyses and research shown focuses on track and intensity forecasting. Discussions with the operational forecasters have resulted in further questions about the use of satellite data, satellite techniques, and new experimental data sets and analyses.

7. THE ENHANCED-V SATELLITE SEVERE WEATHER SIGNATURE

The goal of this session is to review the appearance of thunderstorm cloud tops in GOES IR imagery. The use of cloud top temperature patterns, maxima, and minima in monitoring storms for their potential to become severe. This session again becomes more relevant to forecasters as satellite imagery is now delivered more quickly via AWIPS.

8. USING AWIPS TO DETECT SURFACE BOUNDARIES

The goal of this new session is to review the basic use of multi-sensor data products in detecting boundaries at all scales. Since boundaries can be a focusing mechanism for convective initiation and severe storms, advantages and disadvantages of the operationally available data sets are reviewed.

9. DIAGNOSING THE POTENTIAL FOR SURFACE BOUNDARIES TO INITIATE CONVECTION

This new session capitalizes on the skills reviewed in the "Using AWIPS to Detect Surface Boundaries" teletraining sessions. The forcing in and near boundaries is shown to be related to the potential for convective initiation in, along and near the boundaries. Advanced topics in boundary analysis are examined with a goal of producing a better short-term convective forecast. Forecasters are shown a variety of examples from across the United States and are asked to determine 1) which boundaries (or parts of boundaries) are important, 2) the effects of boundary-relative flow, and 3) where new convection will form.

10. DIAGNOSING ELEVATED MESOSCALE ASCENT

This new session examines the use of satellite and model data in a winter storm situation. The

importance of various kinds of instabilities and the conditions under which they can be released are discussed. Use of satellite, radar, and terrain imagery in these types of situations is also shown. Feedback from participants has indicated that this is a useful review of concepts for the winter season.

11. APPLYING MESOSCALE TOOLS AND TECHNIQUES TO PREDICT AND DETECT SEVERE THUNDERSTORM DEVELOPMENT

This new session arose from an interaction with the Wichita, KS NWS Science and Operations Officer (SOO). In developing a lecture for regional severe weather workshops, the material gathered covered many operationally-important considerations concerning thunderstorm development and severe weather operations. The goal of this session is to show the importance of using AWIPS for mesoscale analysis in order to strive toward the challenging targets set forth in the NWS Strategic Plan. The presentation sparked unprecedented response from the NWS forecasters and was instructed by the Wichita SOO. Topics covered included storm environments, use of new AWIPS displays/data, and better integration of conventional, satellite and radar data sets. The use of the AWIPS Local Analysis and Prediction System is a new topic that had not been addressed by previous VISIT training sessions. This was an important first amongst the VISIT training offerings because it demonstrated the feasibility of various offices sharing their training with each other remotely. In the past, this capability usually involved travel and in-person presentations or workshops.

12. CONCLUDING REMARKS

Significant interaction with NWS WFOs takes place during the development of and during these training sessions. We look forward to continuing those interactions. The IST team also plans to help coordinate training developed at WFOs and assist in the expansion of distance learning efforts. The software used for the teletraining version of these presentations (Whittaker, 1999) is evolving to meet the needs of the integrated sensor training environment.

13. ACKNOWLEDGEMENTS

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