

4.3 INTEGRATING REAL-TIME WEATHER INTO AN INTERNET LEARNING ENVIRONMENT: WW2010 CURRENT WEATHER PRODUCTS

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1. INTRODUCTION

Many university courses utilize Internet resources to supplement lecture material and/or provide a laboratory setting for learning outside the classroom, but often find 'web-books' containing only text with few or no examples. The problem with this – especially within meteorology – is that accurate, useful, and if possible, real-life examples of weather phenomena are necessary to best enhance the educational process.

The implementation of current weather products into the Weather World 2010 (WW2010 – <http://ww2010.atmos.uiuc.edu/>) web server (example product in Figure 1) offers such real-life examples of educational material in the atmospheric sciences. Furthermore, WW2010 places this useful reference information one click away from each weather product. This creates a unique interrelationship and provides a visual learning experience to the learner.

2. EDUCATIONAL MATERIAL

WW2010's educational content includes online case studies, instructional modules spanning topics from the hydrologic cycle to satellites to El Niño, and weather map tutorials. Each of these contain text content supplemented with examples in the form of movies, diagrams, and photographs – offering instructors and students alike an ideal Internet learning environment (Bramer, *et al.* 1998).

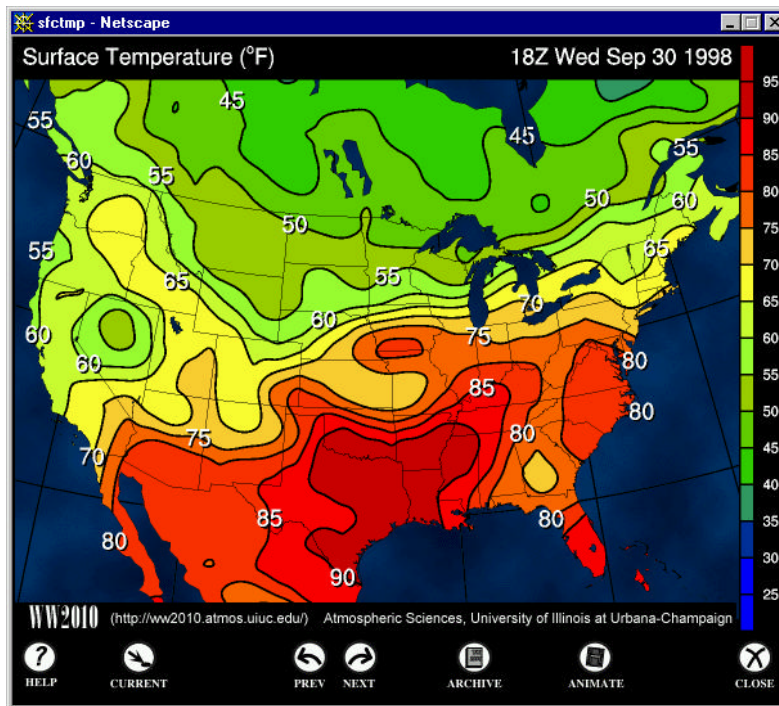


Figure 1. Example Current Weather Product

2.1 Helper Pages

Each of these instructional modules is self-contained, yet all are cross-linked through intermediate helper pages. These helper pages are part of the user-friendly navigation in WW2010. Users can access definitions, illustrations, and examples of meteorological keywords that are found in another part of WW2010 without getting lost; offering the opportunity to return to the original page if desired or to continue in the new area of WW2010.

2.2 Advancements in Multimedia Technology

WW2010 developers have made strides to further push the envelope of technology within the educational framework. Streaming videos can explain atmospheric observations, forces, and processes. Advancements have been made in creating a web-based virtual-reality learning

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environment (VRLE) as a means to further enlighten teachers and students by offering 3-D explorable environments of atmospheric phenomenon. More details on this subject can be found in two companion papers (Ramamurthy, *et al.* 1999; Plutchak, *et al.* 1999).

3. CURRENT WEATHER PRODUCTS

The new current weather products developed by WW2010 are simple in design yet very effective. They are meant for anyone interested in weather, and are easy to utilize. However, advanced products are also available to the most avid weather enthusiast.

3.1 User Interface

The current weather products have a front-end interface (example in Figure 2) that offers the user various choices in product selection. He or she can choose from various types of weather maps – ranging from surface to upper air; from satellites to forecasts. Also, a separate list of novice selections is available to give introductory students a smaller and simpler set of choices.



Figure 2. WW2010 Current Weather Interface

3.2 Product Features

Choosing a product from the selection list generates the desired map within a new browser window. Special buttons have been placed below the map to allow user-navigation through time or

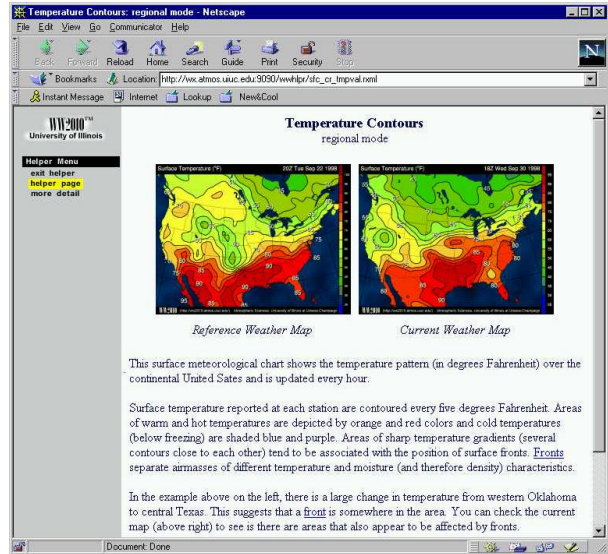


Figure 3. Example current weather product helper page

create a recent animation. Each subsequent product the user requests emerges within a new browser window. This allows multiple products to be displayed simultaneously. Clicking the exit button can terminate the product window. More details on the products themselves can be found in a companion paper (Wojtowitz, *et al.* 1999).

4. TWO-WAY INTEGRATION

The integration of WW2010 weather products into this environment creates a dynamic two-way effect where a student can use the available educational content as a reference for the weather products and vice versa.

4.1 Products linked to WW2010 Learning Modules

Under each weather product is a help button. This is to be pressed if the learner wants to understand more about what he or she is observing, or what they should be looking for. Clicking on this button launches a new browser window with one of WW2010's helper pages. An example helper page is shown in Figure 3. The current weather map is placed side-by-side with an example map and descriptive text below. The text instructs the user about potential features to look for. The example is described briefly in the text, and the current image is shown next to it so the student can see if there are similar features at the present time. In short, clickable access from real-time weather maps to the helper pages allows

instructors and students easy access to the definitions, explanations, and examples they need.

4.2 Learning Modules Linked to Products

However, even more useful -- and unique to WW2010 -- is the ability to provide weather products as real-world examples linked to the instructional materials. Scattered throughout the WW2010 educational material on relevant pages, there are markers in the navigation menu (Figure 4, bottom left). Upon clicking these markers, a new browser window opens with the relevant weather product inside. For example, on a page that discusses how infrared satellite images are interpreted, one click can present the latest infrared satellite image on the screen.

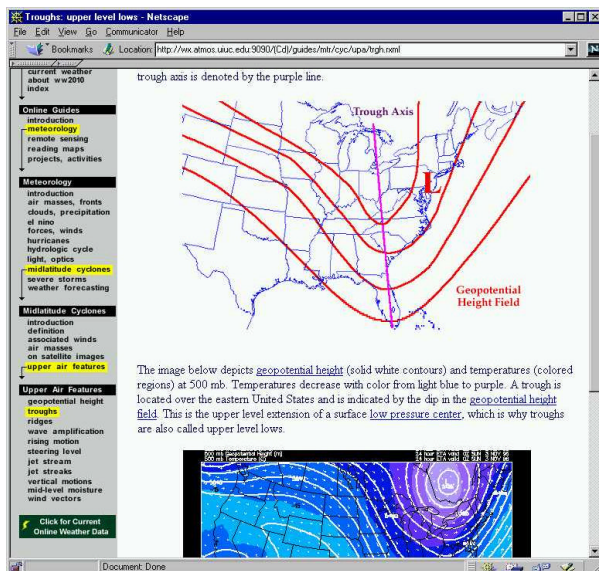


Figure 4. Example of WW2010 page with current weather link at bottom left

5. APPLICABILITY TO THE WW2010 CD-ROM

This new technology is still compatible with our already existing CD-ROM. Students can access the current weather from their CD-ROM over the Internet, and return to the local computer for information and insight into the weather products. At all times, a user of the CD-ROM will have the ability to access the instructional pages on these weather products from their local disk.

6. FUTURE WORK

Future plans include building a current weather example section that will provide simple pages of recent weather in the news -- accessible

also from relevant educational pages. This gives students the ability to cognitively translate between educational topics and current events, such as hurricanes and severe storms.

Future work is also intended to create an interactive environment where teachers and students would be able to customize and create their own weather maps. This environment would possess the same ability to link to WW2010 educational helper pages that the current weather products have. This highly interactive environment will provide the learner with an even more hands-on approach to viewing weather maps.

7. CONCLUSION

The combination of WW2010's previously existing educational framework and the new current weather products will increase the learner's level of understanding in the atmospheric sciences. This integration will be effective in classroom and laboratory settings within university introductory level courses and laboratories, as well as to others interested in learning more about the science behind the weather maps.

8. ACKNOWLEDGMENTS

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