# 5.5 THE PSC WEATHER CENTER WEB PORTAL

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## 1. INTRODUCTION

The Plymouth State College (PSC) Weather Center web page went online in April 1994 (Koermer, 1998). At this time, it was one of only a handful of college/university sites offering online access to real-time weather maps and there were only a few machines on the PSC campus that could access and display the data.

Initially the offerings were quite limited—primarily consisting of a few satellite images, surface maps, Manually Digitized Radar (MDR) summary maps, forecast charts, and some text products. PSC uses Purdue University's Weather Processor (WXP) software package for generating nearly all the products. McIDAS AREA files were used for the satellite images and most other data came from an Alden DDPLUS satellite data system. There were no animations and users were limited to accessing only the most recent data.

Over the years as hardware costs have decreased, hardware and software capabilities have increased, and new data types and sources have become available at PSC, where the site has undergone steady growth and evolution. Today, the portal contains an expanded variety of pre-built current weather products, extensive interactive capabilities that allow users interactively to retrieve both recent and some longer-term archived data, tutorials, and a relatively complete backup of the American Meteorological Society's (AMS) DataStreme pages. The PSC Weather Center (http://vortex.plymouth.edu/) has truly become a web portal for meteorological information.

## 2. DATA SOURCES

Form many years, Alden satellite data systems provided PSC with a reliable source for DDPLUS and McIDAS data. Later, McIDAS data were transmitted via the Unidata Internet Data Distribution (IDD) system. Although you could also get DDPLUS data via IDD, the transmission was often unreliable because of non-campus network problems, so PSC still relied on the Alden system and used the IDD source as backup.

Fortunately in late 1999 just before the demise of Alden, the PSC Meteorology Program acquired a Unisys 4-channel NOAAPORT system that greatly increased the quantity of data available. Today, the reliable NOAAPORT system is the primary source of data for PSC web pages, although PSC still depends on IDD for some unique McIDAS products and as a (now) fairly reliable backup data source.

PSC has constantly sought to share these data and to make them available throughout the Unidata community by providing a McIDAS ADDE server support. These data have also been made available to a much wider audience through the PSC Weather Center web portal.

Since August of 1998, PSC has been archiving all hourly surface data and 00 and 12 UTC upper air data. Additional data have since been added including sea-surface temperatures (SST), Radar Control Message (RCM) radar data. PSC also retrieved North American radiosonde data from the National Climate Data Center (NCDC) and Forecast Systems Laboratory (FSL) to extend the upper air archive back through July 1957. Some upper air data from the NCEP/NCAR reanalysis series has also been extracted and reformatted providing additional global data for 00 and 12 UTC from 1953 through 2000. All of these archived data are available online and discussed in more detail by Koermer (2003).

## 3. WEB LAYOUT AND NEW FEATURES

PSC Weather Center web pages are generally designed with simplicity and fast loading in mind. Glitz is kept to a minimum to improve performance. The main access page shown in Figure 1 is in a two-frame format with extensive links to products or other pages in the narrow left frame and with the current PSC weather observation and an interactive radar/satellite overlay map. Clicking the anywhere in a state, will yield the latest hourly decoded observations and state forecast summary in the right frame. There is also a link button to provide some general instructions and tips for a neophyte user.

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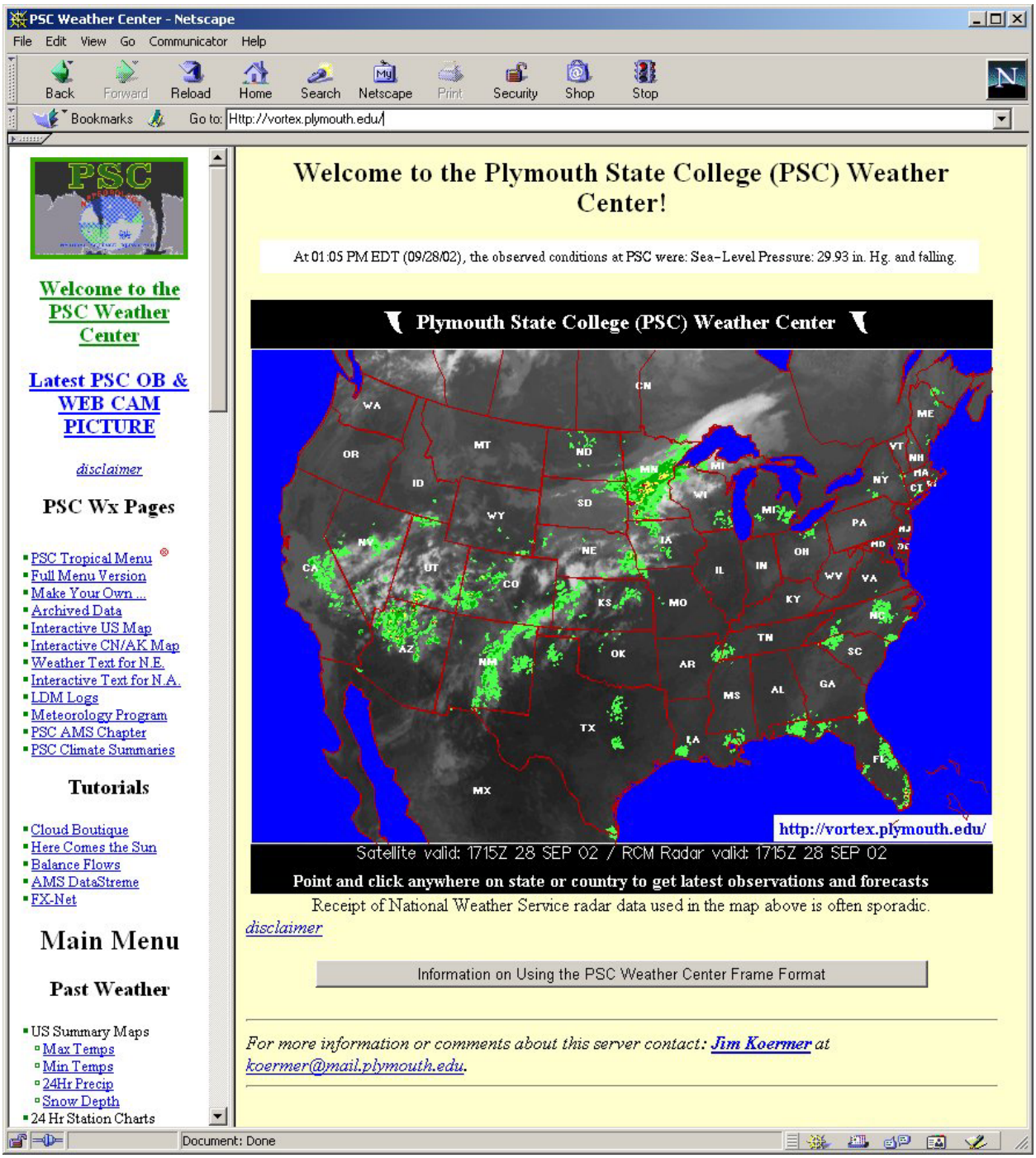



**Figure 1**. The PSC Weather Center web portal page.

Clicking on either the PSC logo or the "Welcome to…" link on the top of the left index frame will return a user to the initial interactive map display frame in the right window. Most of the other maps or text outputs, selected from the menu items will display in the right frame, unless an image would generally be too large or the link is to another page. In these cases, it will occupy the full bowser.

The basic details of this portal page were covered by Koermer (1998). This paper will primarily concentrate on the newer products and

interactive features that provide users with an extremely wide variety of data retrieval and display capabilities that include access to a large portion of NOAAPORT data. Many of the new maps and displays now available are not pre-built, but are custom made based on user inputs.

"Make Your Own…" is the prefix given to most of these primary interactive web pages. The selection of this link from the Main Menu yields a page with a frame format similar to the PSC Weather Center page and is depicted in Figure 2.


**Figure 2.** **"**Make Your Own … Product Generator for Real-Time Data" interface page.

The menu on the left of this page offers a wide variety of possible products. Users can go backwards in time to recall recent data—anywhere from at least the previous 24 hours back to as much as 7 days (e.g. NEXRAD products). There is also a special "Make Your Own …" access page (Koermer, 2003) for an archived subset of these data and some additional information that goes back from the previous day to (in some cases) January 1953. Most product interfaces have user selectable options or entries. Figure 3 is an example of the "Make Your Own … McIDAS GINI Satellite Images/Loops" interface for display GINI data using McIDAS display software.

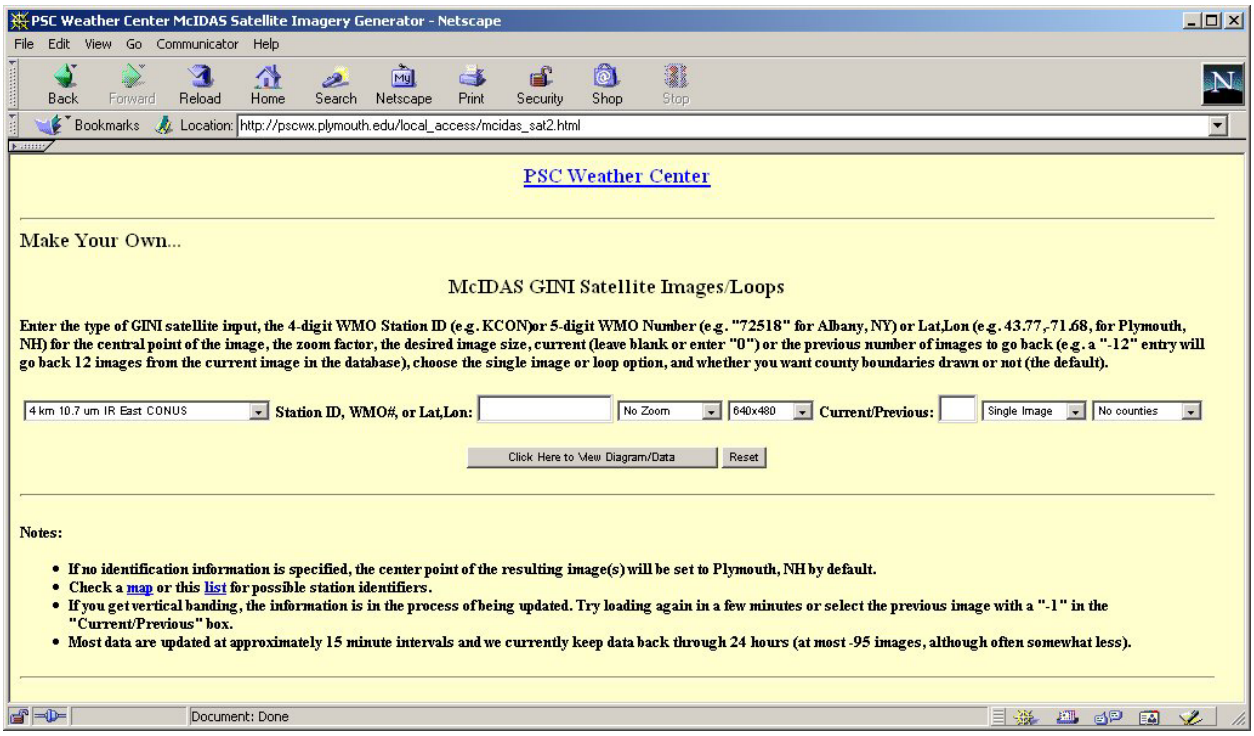



**Figure 3.** Interface page to display GINI satellite data from GOES-E or GOES-W NOAAPORT channels.

On the above page, the users selects the GINI product from a list with 48 possibilities; enters the center location for the image with a WMO identifier, WMO number, or a latitude/longitude; sets a zoom in or out factor, output image size (4 choices), number of image files to go back, single image or 3-hour loop option, and whether county boundaries are to be displayed. Clicking the large bar will display the map. As of this writing, only 24-hours of GINI data are usually available because of the large storage requirements. An example display from setting options to 1-KM GOES-E visible imagery and setting location to center of tropical storm Lili is shown in Figure 4.

The "1-KM Composites" under the NEXRAD portion of the menu has a similar interface. This allows a user to display near-real-time data or data back through several days. These composites datasets are assembled by Unidata and transmitted via IDD. Figure 5 shows an example of a McIDAS display of a base reflectivity composite for tropical depression Isidore when its center was moving through Northern Mississippi.

The complete set of NEXRAD data (17 products) available over NOAAPORT for each of the 154 NEXRAD sites (including CONUS, Alaska, Hawaii, Guam, and Puerto Rico) are available online back through 7 days by using the "NIDS Maps/Loops" option under the NEXRAD header. This interface also features pull down options and space to indicate the NEXRAD station identifier. Loops or single images can be generated. NEXRAD base reflectivity (248 NM range) and base radial velocity (124 NM range) data for New Orleans/Slidell (LIX) were retrieved at the time that this paper was being written (29 September 2002) for the time that Isidore was making landfall, which was several days earlier (Figure 6).

The latest NEXRAD data can also be selected via separate interactive maps for CONUS (also points to Puerto Rico), Alaska, and Hawaii

(also points to Guam). Pointing anywhere on these maps, will display the base reflectivity of the nearest NEXRAD site, but it also features a radio button set of options for selecting alternative products and whether the user wants a single image or a 2-hour loop (using every third available image). There is also an option to go back to the original chooser map to select another station. All processing is done in real-time. The CONUS chooser map is shown in Figure 7 and a sample output for a site is shown in Figure 8.

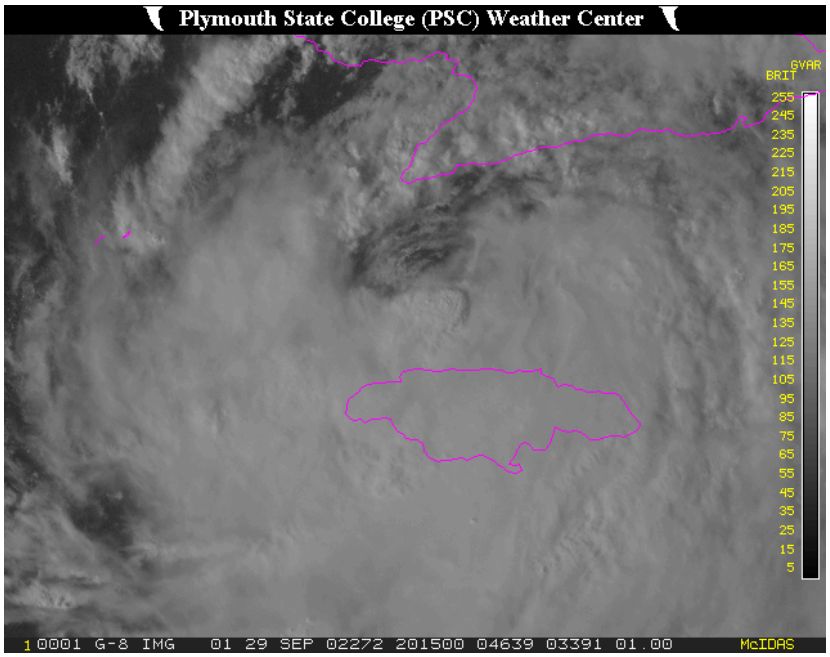



**Figure 4.** McIDAS-generated GOES-E GINI 1-KM satellite image for 29 September 2002 at 2015 UTC retrieved using the McIDAS GINI interface.

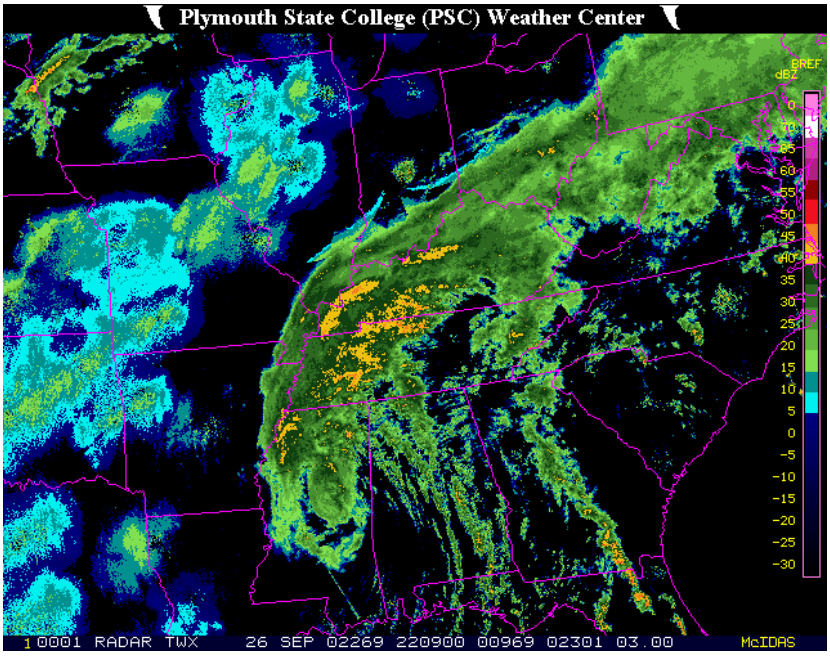
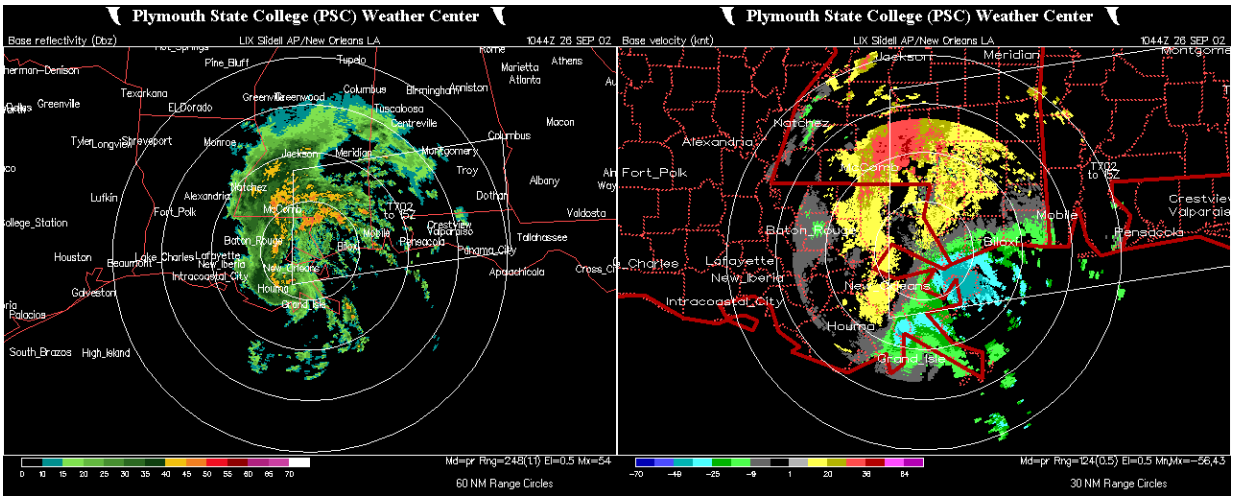



**Figure 5.** McIDAS-generated NEXRAD base reflectivity composite for 26 September 2002 at 2209 UTC using Unidata composite data from the IDD.




**(a)** **(b)**

**Figure 6.** WXP-generated NEXRAD 248 NM base reflectivity and base radial velocity displays for New Orleans/Slidell (LIX) at 1044 UTC on 26 September 2002, which is around the time that Tropical Storm Isidore made landfall.

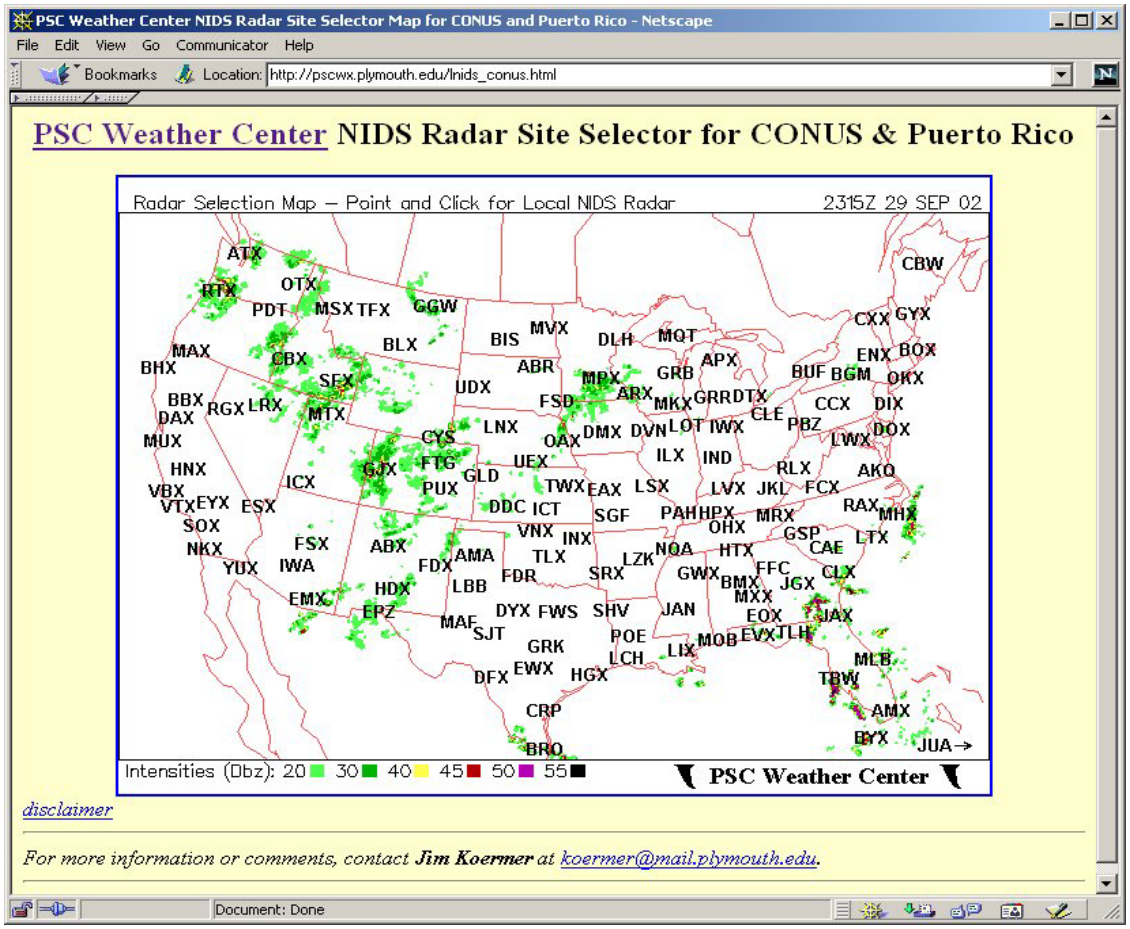



**Figure 7.** Chooser map for selecting nearby CONUS sites or Puerto Rico (JUA on lower right). Clicking on near GJX in western Colorado yielded the window in Figure 8.

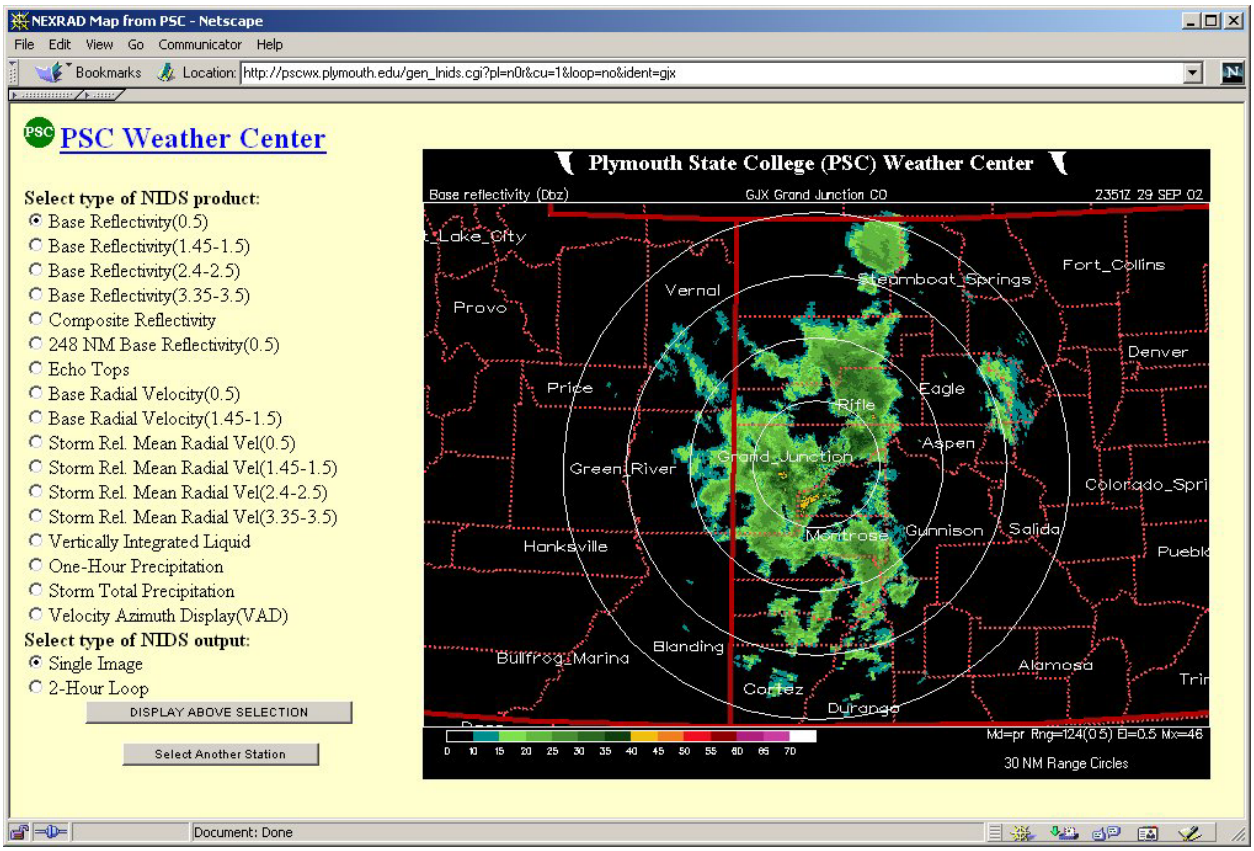



**Figure 8.** WXP base reflectivity (124 NM range) map for Grand Junction, Colorado, at 2351 UTC on 29 September 2002. Other options that can be selected for this site are included in the menu to the left of the image.

Access to and display (via WXP) of current and recent (back to 7 days) NLDN data is also available to local users through an interactive interface.

There is also a page to access current and recent numerical model data that come in over the NWSTG circuit. This is similar to the interface for NCEP/NCAR reanalysis data discussed more fully by Koermer (2003). Users can overlay two fields from different models, different times, or different variables. This feature is very useful for performing model comparisons.

## 4. MOST POPULAR PRODUCTS

Perhaps, the PSC Weather Center most frequently accessed offering is the “PSC Tropical Menu” and its associated links. Naturally, this occurs during hurricane season, especially when active systems are near or projected to make landfall, During the two-week period in September 2002, featuring Hurricanes Gustav and Isidore and Tropical Storm Hanna, the web server received over 3 million accesses and for one 3-day period averaged nearly 4 requests per second. This page offers zoomed in visible an IR satellite images of the storms, plotted maps that include past and forecast positions along with a list of positions and wind speeds; and links that are set to provide the latest tropical advisories, probabilities, etc. as soon as the data arrive over NOAAPORT. There are also seasonal summaries for the past five years that contain track maps, satellite images near maximum storm intensity, and satellite loops over the entire life cycles of the system.

Other frequently accessed items include the “PSC Cloud Boutique” and the “Here Comes the Sun” tutorials on cloud types and solar /terrestrial relationships, respectively. Many educational sites from all over the world link directly to these pages.

Satellite data are also frequently mined by other sites and users, since there are a wide variety of display formats and coverage that are offered.

## 5. FUTURE DIRECTIONS

As time and resources permit, there are several areas planned for development or enhancement as follows:

- Longer-term satellite data storage with some limited archive and retrieval capability,
- Overlay and looping options for some datasets where they are not currently available,
- GEMPAK-generated products via a "Make Your Own…" type interface.
- Update online help options

The first item would be keeping all GINI data available for at least a week. For archive, PSC already has nearly 10 years of hourly GOES-E and GOES-W images and wants to set of an interface to access these images.

The second item involves adding overlay features to other contouring options for surface and upper air data. Another area would be to provide an interactive capability to overlay contours over plotted data, satellite data, radar data, etc.

PSC would also like to adapt GEMPAK to a web-interactive format in order to add additional capabilities. GUI interfaces for various packages like McIDAS and GEMPAK make it easier for students to use them, since they often do not have the time to become proficient in using the direct scripting commands from these packages. However, the GUIs need to run on UNIX workstations of which there are a limited number on the PSC campus. Many students have PCs in their dorms and a web interface makes it easier for them to get most of the advantages of these visualization tools with little to no learning curve.

Finally, the PSC Weather Center has a "Full Menu Version" in a non-frames format. Links on this page are described in greater detail and there are a number of "[Info]" links that provide background information for the uninitiated into the meanings of various symbols, terminology, etc. This page needs a comprehensive review and additional help links.

## 6. SUMMARY

The PSC Weather Center provides a web portal to a wide variety of meteorological data. Users can access a large assortment of current or historical weather information. They can access pre-built products or interactively run WXP or McIDAS software to generate an infinite array of outputs. They can also access several tutorial offerings. This portal continues to be a popular weather stop on the Internet.

## 7. REFERENCES


Koermer, J.P., 1998: The PSC Weather Center. Preprints, *14th International Conference on Interactive Information and Processing Systems (IIPS) for Meteorology, Oceanography, and Hydrology*, Amer. Meteor. Soc., Phoenix, 400-401.

Koermer, J.P., 2003: Easy web access to a variety of archived meteorological data. Preprints, *12th Symposium on Education,* Amer. Meteor. Soc., Long Beach, 7 pp., submitted.