3.7   MYWXMAP: A NEW APPRAOCH TO WEB-BASED
METEOROLOGICAL AND OCEANOGRAPHIC (METOC) CHART DISPLAY

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1. INTRODUCTION

MyWxmap, already a winner of a "Technology Excellence in Government" award, is the next generation of FNMOC's highly successful Web-based WxMAP program.   WxMAP, which itself won a "Government Technology Leadership Award" (Dean, 1999) allows a quick look at weather and ocean parameters worldwide, as well as comparisons between output from different numerical models (Thormeyer, 2001).   However, the very popular WxMAP does not permit client customization on scene; in particular, charts and geographical areas are limited to those pre-selected at the central server site.   Additionally, today's WxMAP displays are designed more with scientists and operational forecasters in mind than for casual users.   MyWxmap addresses the two most requested improvements over the current WxMAP approach - improved visualization, and the ability to select the geographical area of display at the client site.

As FNMOC customer support becomes more Web-centric, a more flexible and visually appealing user-driven meteorological and oceanographic (METOC) chart display system has become essential.   Web-centric systems allow users to access products with only a generic Web browser resident on their PCs (i.e., a "thin" client). Technology improvements now allow us to implement customer control over product output which was previously available only through use of custom software on user PCs (i.e., a "thick" client).   Thus, Web-centric systems such as MyWxmap can be enhanced and maintained without the requirements of software delivery or installation.   Further, improvements in visualization techniques can be brought to bear which reduce user fatigue and improve usability.

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2. THE MYWXMAP PROCESS

MyWxmap employs emergent client-server technology using a Beowulf system, also known as "commodity clusters", to minimize expense while maximizing METOC product access and manipulation capability (Ravid and Lowder, 2000; Ravid, *et al.* 2001).   With MyWxmap, authorized customers can define geographical areas of interest, choose from a gallery of weather and ocean charts, and choose from available forecast times.   The system is capable of delivering charts produced from multiple numerical model sources, both global and regional and from both Navy and NOAA.   Additionally, there is a standard chart gallery available for numerous geographical "thumbnails" with worldwide coverage - these are available to anyone with Web access.

MyWxmap customers are primarily those desiring a "quick look" at existing and forecast weather patterns in a specific area of the world. These customers include operational military meteorologists worldwide, civilian government meteorologists and emergency planners, pilots and merchant seamen, and the general public. Authorized MyWxmap users (primarily military and government) can apply for a unique account (Figure 1), and if the account is authorized, are permitted to define a configurable number of unique geographical areas for routine receipt of METOC displays (Figure 2).   These unique areas are in addition to routine access to the standard thumbnails described above (Figure 3).   Once an area is defined, the account holder then selects the charts of interest and the forecast times desired from a larger menu (Figure 4).   This permits efficient data downloads without unnecessary overhead from unneeded charts. Some additional MyWxmap capabilities which are available today include:

- Mercator and Polar projections
- Availability of Navy global and regional models, and NCEP global model output
- Animation capability for all chart sequences
- Visual indicator showing when charts become available for display

- Model comparison for same forecast hour
- Switch between map types for same forecast hour and model
- Comparison of forecast and verifying analysis (up to seven days)

A sample product is shown in Figure 5.

3. MYWXMAP FUTURE DEVELOPMENT

The next phase of MyWxmap development will be to expand the Web-based user interface to include such features as the following:

- Expanded menu of available charts
- Capability for user-defined chart combinations
- Capability for user-selected color combinations
- Capability for user-selected display options, such as:
  - o User-controlled contour intervals
  - o Contouring vs. shading of a given parameter
  - o Wind barbs vs. streamlines vs. arrows for vector parameters
- Capability to plot observational data or satellite imagery over numerical analyses

4. SUMMARY

MyWxmap achieved initial operational capability in April 2002. Full operational capability (FOC) is expected by early calendar year 2003, and is defined as the functional replacement of WxMAP with MyWxmap, including all of the capabilities listed in paragraph 2 above. Once MyWxmap FOC is achieved, WxMAP will be discontinued. MyWxmap serves a wide variety of military customers worldwide, from the large regional center to the independent operator in the field or at sea. The remainder of Government benefits from MyWxmap by having access either through the FNMOC public Web page (www.fnmoc.navy.mil), or with an authorized password-protected account. In cases when the National Centers for Environmental Prediction (NCEP) is unable to produce numerically-based weather and ocean charts for any reason, the FNMOC Web site will serve in a backup capacity for Weather Service forecast offices nationwide. The general public benefits from the routine availability of a chart set for pre-selected geographical thumbnails; however this service is a "spin-off" and could be temporarily or permanently interrupted at any time for any reason.

5. REFERENCES

Dean, Joshua, 1999: The IT Pioneers - The 21 Winners of the Eighth Annual Government Technology Leadership Awards Forge the IT Future. *Government Executive Magazine,* Vol. 31 No. 12, 56-68.

Ravid, Earl and S. Lowder, 2000: High Volume METOC Chart Production using Beowulf Technology. *Preprints, Sixteenth International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography and Hydrology (IIPS),* Long Beach, CA, Amer. Meteor. Soc., 136-138.

Ravid, Earl, K. Saylor and K. W. Stroh, 2001: CWxMAP - Customer-Driven Interactive METOC Charts via the WWW. *Preprints, Seventeenth International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography and Hydrology (IIPS),* Albuquerque, NM, Amer. Meteor. Soc., 395-398.

Thormeyer, C. D., 2001: Navy Weather and Ocean Charts Available to Educators via the Open Internet for use in Classroom Training. *Preprints, Seventeenth International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography and Hydrology (IIPS),* Albuquerque, NM, Amer. Meteor. Soc., J13-J14.
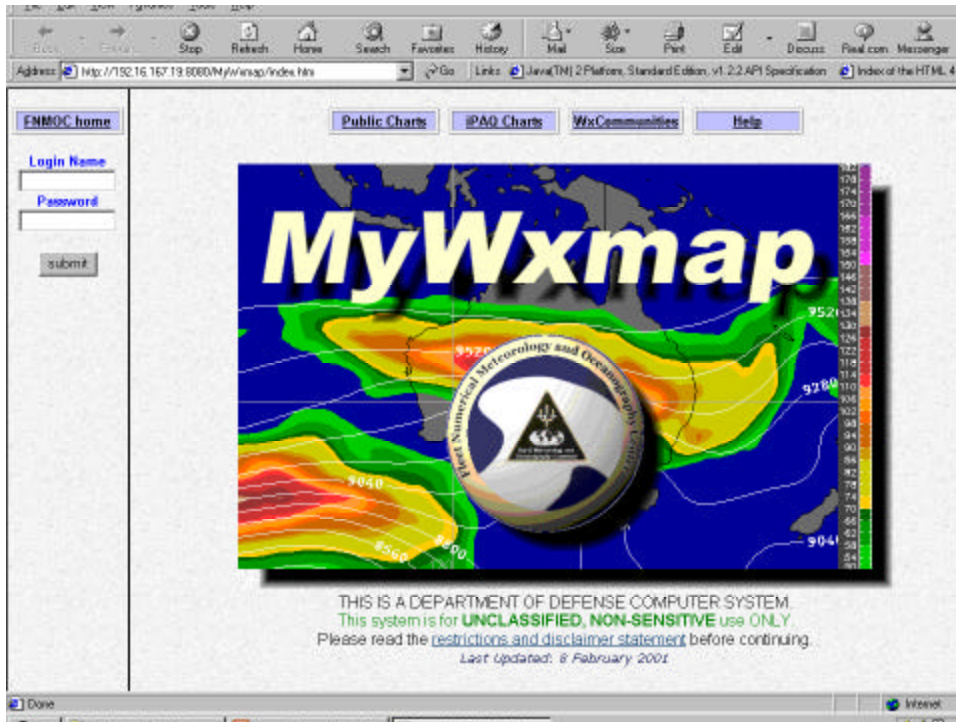
Figure 1.   Opening MyWxmap screen showing both account access (left hand side of screen) and public access ("Public Charts" link).
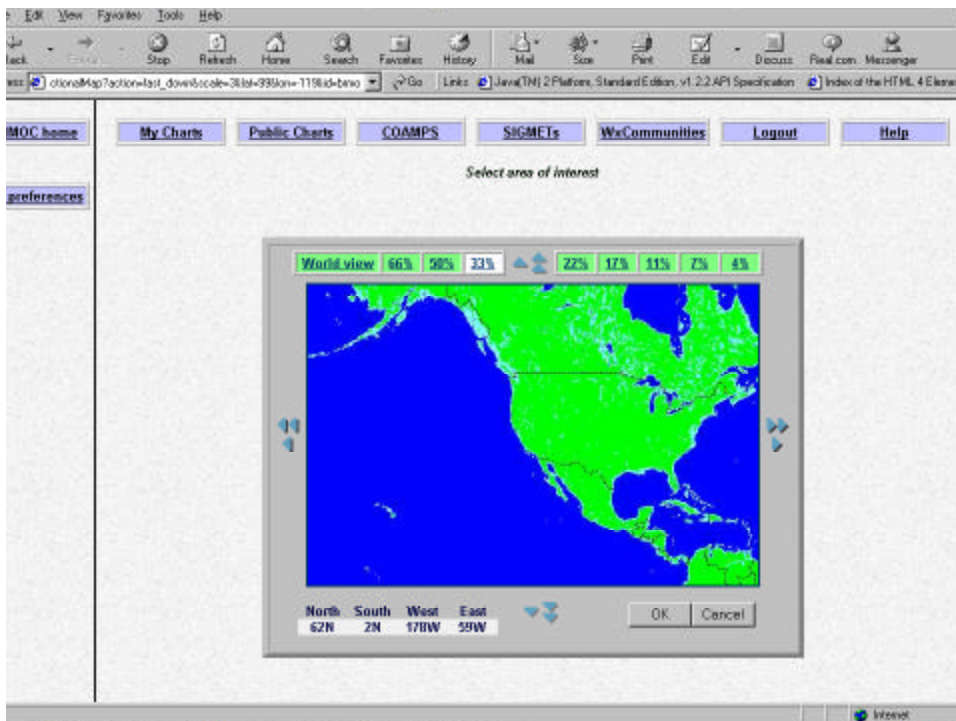

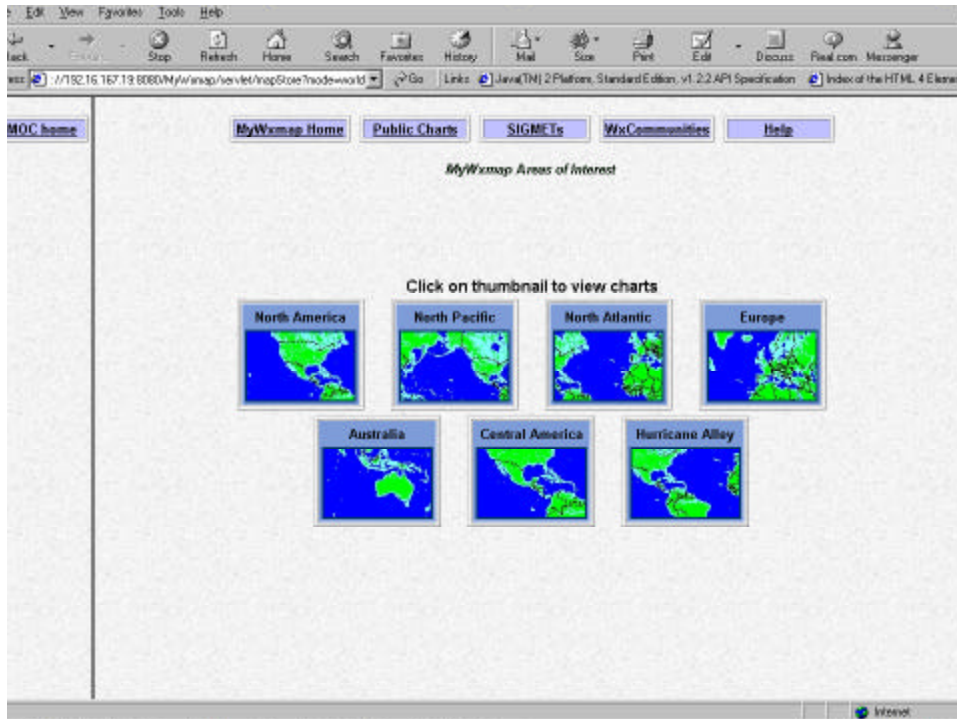Figure 2.   Sample MyWxmap user-defined geographical area.

Figure 3.   Typical standard MyWxmap thumbnails accessible without an account.

Figure 4.   Typical chart and forecast time menu.   Green indicates charts currently available for display, red indicates charts selected but not yet available for the selected model run, while gray represents available charts which have not been selected for routine download.
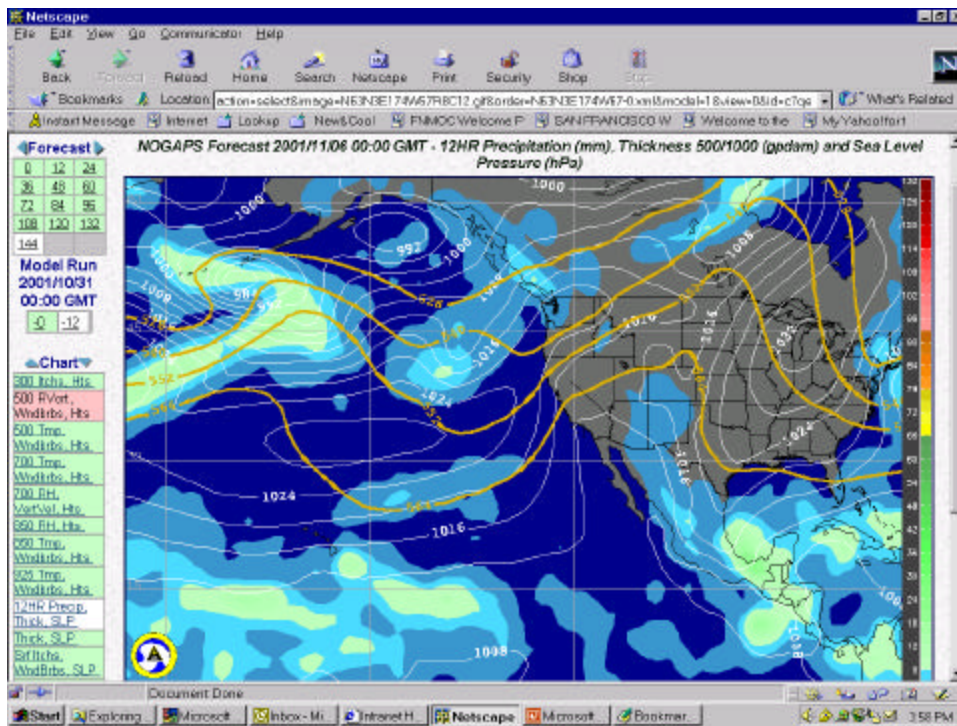
Figure 5.   Typical chart display showing forecast sea level pressure, 12-hour accumulated precipitation, and selected 500-1000mb thickness contours.   Note the ability to quickly select other parameters and forecast times from the left-side panel.