P1.45 USE OF NWP DEVELOPER-USER LIAISONS IN FORECASTER PROFESSIONAL DEVELOPMENT TRAINING

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1. INTRODUCTION

In the early 1990s, COMET developed NWP teletraining in the form of laser disks for use at the U.S. National Weather Service's (NWS) Weather Forecast Offices (WFOs). This fixed medium was good so long as the Numerical Weather Prediction (NWP) models (or NWP methods) did not change. In 1998, it was recognized that this unchanging paradigm for NWP was not valid, particularly for operational NWP models, and the NWP professional development series (PDS) was ''born'.

Out of the NWP PDS development came what we call the "staff liaison" approach. The rest of this extended abstract will briefly summarize NWP PDS development, the "staff liaison" concept, and advantages and limitations to the liaison approach. Conclusions will follow.

2. THE NWP PDS

The NWP PDS was developed to answer the need for more flexible training of NWS operational forecasters on the intelligent, science-based use of NWP products. To be operationally relevant, the training must include: 1) detailed knowledge of the components of the NWP system, and how those components interact to affect the forecast and associated output products, 2) an understanding of operational needs, constraints, and existing uses of NWP products, 3) the conveyance of information about the modeling system in a timely manner relevant to forecaster application and understandable to operational forecasters, 4) providing operationally-oriented tutorials and background information so that forecasters have a framework for understanding and using the model-specific information.

The NWP PDS assumes a multimedia approach to training, through web-based products, webcasts, teletraining, and participation in meetings related to operational forecasting. Discussion of this approach may be found elsewhere in these proceedings (Jascourt and Bua, 2003). Initially, development concentrated on general web-based training on NWP. Once that phase of the project was completed, COMET's attention turned to the specifics for operational models used by the NWS, including models from other operating centers available at NWS WFOs.

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3. THE STAFF LIAISON APPROACH

In order to meet the many training requirements for NWP noted above, the Cooperative Program for Operational Meteorology, Education, and Training (COMET) has stationed two key members of its NWP training team at the National Centers for Environmental Prediction (NCEP) to serve as liaisons between the model developers and the National Weather Service (NWS) weather forecast offices (WFOs). This is in contrast to other approaches, such as training teams stationed at remote training facilities or technical subject matter experts providing lectures.

3.1 Information Gathering and Dissemination

Each staff is dedicated to an NCEP NWP model (GFS and Eta, respectively), and has continuous contact with NCEP staff involved with all aspects of model development. Tasks of the two COMET staff may also cross over to areas of general and model-specific NWP based on their expertise.

The liaisons attend numerous meetings at NCEP that involve their area of training, including those held at the branch, multi-branch, and sub-branch (e.g. land surface modeling and data assimilation groups) levels. Additionally, the liaisons attend NCEP seminars on model formulation, physical parameterization, data assimilation, and other relevant NWP issues.

In summary, the liaisons act as two-way conduits for information from modelers to the field meteorologists and vice versa. A schematic outlining the information flow through the liaisons, and the communication techniques used can be found below.

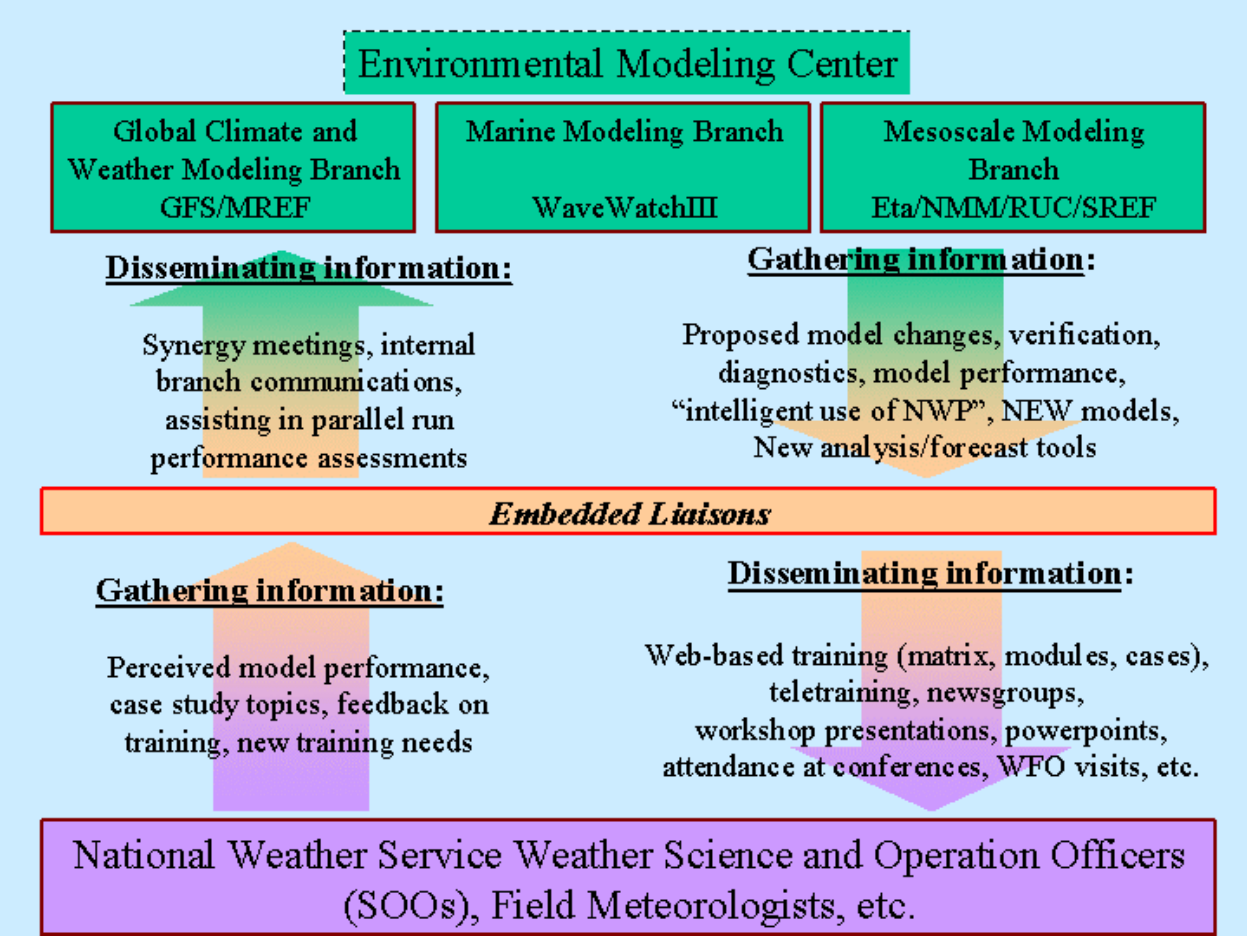

Figure 1: The COMET NWP liaison approach in schematic form.

3.2 Development of Training Instrument at COMET

Besides their involvement with NCEP modelers, the liaisons work with COMET Internet technology and educational design staff on the development of training. The amount of time required of these COMET staff depends on the complexity of the information being disseminated and the needs of the NWS. Relatively simple case studies require little time from COMET staff except for quality control; time from submission to publication of such web documents typically requires only a few days. However, large web-based modules may take a few weeks or longer from submission to publication, because of more intensive graphics and design requirements.

4. IMPACT OF STAFF LIAISON APPROACH

4.1 Advantages

By collocating the COMET staff responsible for NWP training with NCEP modelers, a number of advantages accrue to COMET, NCEP and the WFOs:

- COMET has its own resident NWP experts at NCEP
- COMET NWP staff are
    - Integrated into COMET's structure, procedures, resources, etc.
    - Dedicated full-time on NWP project
    - Share NWP information with other projects that have an NWP-related component
    - Have easy access to model data for training and case study development
- Relationships are directly established with NWP modelers at NCEP/EMC
- Relationships between WFOs and COMET NWP resources are more easily established
- Rapid forecaster-oriented communication occurs with field offices about model-related operational concerns
- The NWP liaisons can, as time allows, investigate model problems, assisting in EMC's efforts to correct these.

Many of these advantages relate to the behind-the-scenes process of developing training, the professional

development learning of the trainers, good will established that promotes flow of information and networking, and tangential advantages that are not training-related per se, such as helping to correct numerical model problems.

4.2 Challenges

The biggest challenge to the staff liaison paradigm to date has been the physical distance of the staff from the COMET facility providing support and the supervisor to whom we report. This was particularly acute once the first phase of the project was completed and the NWP team was reduced from several additional staff at COMET providing support, down to the two liaisons, as the workload became smaller.

However, these communication problems have been significantly addressed. VPN Software has been installed for both liaisons so that they can be at COMET "virtually" via computer workstations. This helps in delivering materials for publication on a timely basis. Periodic teleconferences are held with management at COMET to apprise them of progress on NWP training. Finally, the liaisons travel to Boulder, CO fairly frequently to present training at workshops, and while there, interact with management to deal with existing training and logistical issues.

4.3 Assessment of Success

Ultimately, the question is, does the liaison method prove more successful than the standard arrangement of using an academically-oriented subject matter expert working with training-oriented COMET staff? This can be difficult to assess. While our work has been favorably received and we think the liaison approach has contributed positively to that in many ways, we simply do not know exactly how the outcomes would be different if we were stationed at COMET in Boulder.

However, one key training element is communication of complex technical information in a way that is both understandable and of practical use to the trainees. We think we have been able to bridge this knowledge gap more effectively than under the standard arrangement, because:

- We connect both ends of the process ourselves, and
- We have good communication with the NCEP modelers essential to us bridging the knowledge gap.

Additionally, because operational NWP is constantly evolving, our close interaction with NCEP better enables us to anticipate future training needs and directions, rather than having to "catch up" upon finding out about model changes after the fact.

5. CONCLUSIONS

In response to the need for flexible, timely NWP training, COMET has developed a training paradigm involving staff liaisons between NCEP modelers and field meteorologists. The liaisons are collocated with the operational NWP modelers at NCEP. In this location, it is relatively easy to gather information on current and anticipated future model configuration and performance, field NWP model questions from the end users of the NCEP NWP model products, and act as the NWP experts for COMET and the WFOs. Additionally, the liaisons can be involved in model testing, assessment, and troubleshooting as time permits.

The main challenge thus far has been logistical, and relates to the physical distance between the COMET facility and the liaisons. These have been addressed through virtual workstations that allow the remote liaison staff to work as if they are at COMET, and through regular teleconferencing and face-to-face meetings when the liaisons are presenting training at the COMET facility.

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7. REFERENCES

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