

Report on Last Session: Community Involvement in CCMC (Janet Luhmann and Paul Bellaire, Chairs)

Janet Luhmann's part:

In the context of the CCMC workshop discussions, the "Community" consists of three parts: 1) those who develop codes of interest to CCMC for its operational and scientific users, 2) the CCMC personnel who are envisioned as the bridge between code developers and prospective code users, and 3) the potential operational users and research users of the CCMC code library. Each of these groups has a somewhat different view of what CCMC should do and be, as might be expected. Part of the motivation for the workshop was to identify the most valuable and mutually agreeable role(s) that CCMC could contribute toward the multiagency-supported and coordinated endeavor to make both scientific and operational progress in space weather areas.

From the the code developers' perspective, CCMC is in concept a very positive addition to the space weather modeling enterprise. Having their codes available at CCMC makes them more visible, more widely used, and better appreciated by the larger scientific community and the funding agencies. However, now that CCMC has made staff hires who are themselves space scientists, and is beginning to work with the first provided codes, the code developers agreed the time had come to have more formal agreements and regulations in placethat deal with the realities of sharing major research codes still in development. In particular, code developers are anxious to have "Rules of the Road" for both their own interactions with CCMC, and for the general CCMC code library users. A primary concern of the code developers in formulating the rules of the road is that the source codes are at present too complex and minimally documented for others to alter without the developer's involvement. They also need assurances in providing the codes to CCMC and the community-at-large that appropriate collaborations will be forged, and their consultation sought as a means of avoiding code misuse or misinterpretation of results. Toward this end, a draft of suggested "Rules of the Road" is attached to this report. The CCMC Steering Committee needs to work with the user community and the code developers to converge on a version of these rules that ensures a strong and meaningful role for the CCMC, while maintaining certain protections for code developers and equal opportunity for general science community users.

The CCMC perspective on its own role, as expressed in the statement of direction on the CCMC website, and in discussions at the workshop, was deemed very broad for the size and makeup of the CCMC organization. In the forum of the workshop, it was appreciated that a number of the tasks on the CCMC's original plate were in fact carried out in the code developer and research communities. There, close familiarity with the various codes and data sets adds distinct advantages and efficiencies to matters such as code coupling enhancements involving adjustments to the physics described by the source codes. It was the widely viewed that the CCMC should retain the integrity of the donated source codes, instead concentrating on packaging codes for standardized inputs and outputs by nonexpert users. This production of "black box" versions, together with standardized visualization software to view the results, is a contribution thoroughly in-line with the transitioning and public access role that the CCMC is uniquely positioned to fill. Moreover, this type of black box package is exactly what operational users in the RPCs seek. It is also ideal for the related highly desirable job for CCMC of carrying out independent testing and evaluation of the models for the NSWP and RPCs. The black boxes likewise simplify the provision of code and validated results to scientist users, and lend themselves to limited modular "plug and play" scenarios such as L1 solar wind model results used as input to magnetospheric models. In this revised vision of CCMC, the CCMC scientists carry out their research as a separate activity, using the normal channels of scientist-to-scientist collaborations and peer-reviewed proposals and publications, regardless of whether the CCMC model library codes are used or not.

Finally, as noted above, the black box products of CCMC would best satisfy the requirements of the operational users in the RPCs. With their validation against data sets and metrics performed at CCMC, the limits on the most accurate regions of parameter space within which the models perform will be identified. The operational user can then confidently proceed to select the codes they wish to use for creating their operation-specific next generation products for their customers. Similarly, with access to these same evaluations, and standardized inputs and outputs, the scientist user community will more widely make use of this new generation of tools for space physics and space weather research. Like CCMC scientists, general scientist users would seek collaborations with the code developer(s) if an application requiring source code alteration(s) is desired.

Several questions were proposed for this session at the time it was organized, which were discussed in closing, and are pertinent to the above. The first asked how we can ensure continued community input and involvement for CCMC. It was agreed that the present workshop was excellent for promoting a spirit of participation and ownership, and for the essential communication between all three groups of the "Community". Encouragement from the funding agencies in the form of explicit AO and NRA mention of CCMC interactions as a desirable element of a proposal, and favorable consideration of such in reviews and selections, would get attention. In addition, special sessions at Space Weather Week and AGU, plus involvement of GEM, CEDAR and SHINE members are further useful and positive activities to promote.

The second question asked how code developers should be represented. Both in this and earlier sessions it was concluded that the CCMC Steering Committee should have several working groups representing Operations, the Science and Technical aspects (which would include the contributing code developers), and Validations. These would provide advice on the key areas of CCMC's work, and keep code developers as well as code users engaged in ensuring the success of CCMC for all.

A final set of three questions related to CCMC interaction with other space weather programs and enterprises that exist. It was viewed that as in this past year's example of GEM participating in a CCMC-organized magnetospheric model "metrics challenge", CEDAR, GEM and SHINE should continue to help define the metrics for the models and engage the larger research community in CCMC-organized challenges to the models. In relation to the currently ongoing NRC Decadal Survey of Solar and Space Physics, it was noted that the draft report calls for a "transition initiative" that is consistent with the above vision of CCMC's role, though it is not specific about the details of how such an initiative should be carried out. CCMC also relates to the model coupling recommendations in that report in the sense that it does provide for some options of a modular interlinking of model inputs and outputs. As for the NASA LWS Program plans for Theory and Modeling, and the NSWP at large, CCMC can provide the needed clearing-house for space weather models for operational and science community use that both programs need to fulfill the goals set out in their implementation plans.

In summary, this session concluded with a generally held positive view of a specific, targetted set of goals for CCMC. The packaging, validation, and provision of major space weather models for operational and science community use is a critical function that will not be adopted elsewhere, and is a hurdle to overall progress in the space weather enterprise. To carry out such work, the staff at CCMC each need to take on two roles: a service role wherein they provide the above in a manner analogous to a data center - albeit with validation tasks as an important part of their job descriptions, and a separate research role wherein they pursue their interests in the manner of all space science researchers, making them more valuable to CCMC by virtue of their own research experiences. The tested, validated, versions of important research codes, with standardized inputs and outputs, together with visualization tools

for examining the results, are essential contributions that CCMC can provide toward fulfilling our broad visions for the future of the space weather endeavor.

Attachment: DRAFT Rules of the Road:

1. The CCMC Steering Committee, together with its Working Groups for Operations, Science and Technical, and Validation, shall develop and provide the text of two forms: i) an agreement between the code developer and CCMC, and ii) an agreement between CCMC and a user of code(s) in the CCMC library. The user form shall include a disclaimer regarding the user's sole responsibility for use and/or publication of results from the codes. The CCMC shall maintain a file of these agreements, and inform the code developer when their code is transferred to an RPC for operational use. A CCMC code library user handbook shall be developed and results of model validations posted.

2. Source code provided to CCMC shall not be altered for any purpose(s) other than for the construction of "black box" interfaces for input and output (including limits on input and/or output parameters determined by metrics applications and model validation) without the consent of the code developer, written release of the source code to CCMC by the code developer, and/or a statute of limitations of X years (or a period specified by the code developer). If there is more than one lead code developer, releases must be signed by all, or the code version provided limited to that consistent with the contributing code provider's development role. Source code shall not be provided by CCMC to CCMC customers unless specific permission or general release is given on the agreement form.

3. All users of CCMC-provided executable codes, source codes, or code results must submit copies of the abstracts and preprints of their related papers, and the abstracts of oral or poster presentations, to CCMC, who will in turn provide copies to the code developer. Collaborations between code users, CCMC scientists, and code developers are highly desirable and should be encouraged where appropriate. Both the code developer and CCMC should be acknowledged in published work that uses CCMC-provided codes, and reprints/preprints provided by the user(s) to CCMC and the code developer.

4. Code developers providing tailored source code and/or consulting services to CCMC and to CCMC code library users may request supplemental support from agency sponsors during the period of code installation and testing. All research and/or applications of codes shall be supported through the usual competitive peer-reviewed channels, or in the case of operations, by the agencies responsible for the RPCs. This includes research done with the code library by CCMC scientists.

5. CCMC shall ask the code developer to review the results of initial code runs prior to posting them, to ensure the the code is installed and running correctly. CCMC personnel shall then perform independent code testing and evaluation using data comparisons and metrics, and discuss the results with the code developer prior to their release to ensure that the validation results are not affected by user error or misunderstanding. The early results of "runs on demand" from the outside community should be checked with the code developer prior to their release until the validated black box versions include limits on the input and output parameters. If CCMC believes they have identified a solvable problem in the source code they should consult the code developer prior to making any changes.