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PROCEDURES FOR EXCHANGE OF LRF FORECASTS INCLUDING DEFINING PRODUCTS

(Submitted by Mr T. Hart, Australia)

Summary and purpose of document

Development of procedures for the Exchange of LRF forecasts, between potential Centres and Agencies.

Action proposed

The Team is invited to develop its recommendations taking into account the proposals submitted in this document.

Comments on Procedures for Exchange of LRF Products including Defining Products

1. Background

Develop procedures for the exchange of LRF forecasts between potential Centres and Agencies concerned, including defining products (model output, forecast skill, etc.) and defining terms and conditions for experimental exchange.

I will take it that “potential centres and agencies” refers to the proposed arrangements for delivering LRF products to National Meteorological and Hydrological Services and other users from designated Regional Specialized Meteorological Centres (RSMCs) specialising in LRF, either directly or through the proposed Regional Climate Centres. The broad-scale RSMC products could be transformed by the RCCs into meteorological products more closely targeted at specific regions and applied to user requirements.

2. Is there really a problem? Does the Team really need to do anything?

LRF products are currently available on Web sites from many institutions. The WMO World Climate Programme (WCP) web site already has links to Centres providing global and regional products under the World Climate Data and Monitoring Programme (WCDMP). There is a section on Access to Climate System Monitoring Products with links to Centres providing global or regional long-range forecast products, such as:

- *Climate Prediction Centre (US/NOAA);*
- *IRI (US);*
- *Japan Met. Agency;*
- *BoM, Australia.*

- Other agencies and National Meteorological and Hydrometeorological Services (NMHSs) make a variety of LRF products available. So the distribution of LRF products has already begun using the widely available systems and formats of the World Wide Web.

- The whole concept of “exchange” may be outdated. It may be more useful to think of “virtual centres” based on web sites, where many products are pooled and available to users. Web products have the advantage of being accessible by standard and widely available technology. Evolving technology is likely to facilitate distributed information databases and make the products even more accessible.

The field of LRF is also evolving quickly and the type and scope of products are expanding. So any definition of products and procedures may only be short-lived.

Despite these current developments and problems there may be several areas where the current system can be developed.

3. What products are we talking about?

The report of the Inter-commission Task Team (ITT) on Regional Climate Centres (from 30 April to 3 May 2001) includes some very useful comments on user requirements, including some specifications of products (Annex 1 of the ITT report). The report notes that the requirements at the regional level are not well-defined, and that many of the requirements are not deliverable, due to the lack of skill in any predictive technique. Many Organisations make products available – some with no indication of quality or skill. There is a need for complementary verification information.

The ITT report notes that some key requirements are “monthly rather than seasonal forecast averages and the need for information on confidence levels, verification and reliability of forecasts”. There also needs to be rolling reviews of user requirements. One role of the RCCs will be to assess user requirements and feed those requirements to the Centres producing broad-scale products.

In the ITT report the global and broad-scale products are more closely specified than the regional-scale products. They range from simple indices to multi-model ensembles and can be the raw model output or products derived from post-processing to a user-friendly form. They include both forecast and monitoring (analysis) products. Annex 1 of the ITT report also has some suggestions on how information can be included on confidence level, verification and reliability and on documentation of the systems used in deriving the products.

This document seems a very useful starting-point in defining the products and the procedures for exchange.

In relation to information on forecast skill and reliability, there is a project within Commission for Basic Systems (CBS) to establish a Standardised Verification System and make results available to NMHSs and other users. Australia has been designated as a lead Centre to create and maintain a Web site for these statistics, There is an example of a reporting template prepared by Canada on the Global Data-processing page on the WMO Web site.

4. Delivery technology

The delivery technology needs to account for the wide range of products and forms and be appropriate to the facilities of the NMHSs and other users who want to take advantage of the products. Web technology is already widely used in the distribution of LRF products.

Is Web technology suitable for all countries (especially some developing countries)? Hard copy or fax products may be necessary for some countries where Internet access is limited.

Web technology may also not be suitable if an Agency wants to customize the format or combine it with other products (e.g. in multi-model ensembles). Some RCCs may wish to use a nested regional model for down-scaling purposes. Then some digital form of the raw product is required. GRIB2 has the flexibility to handle LRF products, including probabilities, mean fields and ensemble products. There are display packages that handle GRIB. There is a role for WMO in ensuring that its codes can handle the full variety of LRF products. BUFR format (as is being developed for the aviation industry) may have some use in distributing image products in a compressed form to provide a capability for modification by the user. However, there are more widely used and familiar standard image formats, which could serve the purpose.

Another problem for WMO though is the English-centred nature of most Web products. This may be another reason for pushing for the availability of global and regional-scale products in digital format, for a Regional Climate Centre to adapt to its regional needs.

Rather than “exchange” of products it may be better to consider the system as a distributed database. A shared Web site is another possibility, as is used by the RSMCs for Environmental Emergency Response.

5. Conditions for Exchange

Many products are already in the public domain, but not all Centres currently make their products available. There may be many reasons why some Centres are reluctant to publish results – such as the low skill of many LRF techniques, liability issues - given the importance of such products including the commercial value of the products. Some Centres and Agencies outside the WMO system may be willing to make products available to NMHSs and RCCs, within a well-coordinated “public good” framework, which can ensure the integrity of the use and availability of the products.

Some Centres may want to impose restrictions according to **Resolution 40**. For Web technology, registered user or password-restricted access for users can be used.

Centres within the WMO system clearly understand **Resolution 40**, however, those outside the WMO system (as is clearly desirable and requested by the direction provided by WMO), may require elaboration of the conditions for use of LRF products.
