

2.1.2 **Data collection and product dissemination**

2.1.2.1 **Global Data-processing and Forecasting System centres shall be connected to the WMO Information System (WIS) to ensure suitable exchange of information with other centres.**

2.1.2.2 **World Meteorological Centres and RSMCs shall describe their required products and services according to WMO metadata standards and make them available to other GDPFS centres through WIS in a timely manner for operational use.**

Note: Details on metadata standards are described in the *Manual on the WMO Information System* (WMO-No. 1060).

2.1.3 **Long-term storage of data and products**

Note: The non-real-time functions of GDPFS include long-term (that is, around 10 years) storage of observations, products and verification results for operational and research use.

2.1.3.1 **World Meteorological Centres and RSMCs shall operate an archiving and retrieval system to serve the needs of their continual improvement process; this process shall include the non-real-time assessment of their products and the ability to perform re-runs of their operational production.**

2.1.3.2 Members should ensure that their NMCs archive and retrieve appropriate data originating from their national observing networks and facilities.

2.1.4 **Product verification and the performance of Global Data-processing and Forecasting centres**

2.1.4.1 **The accuracy of forecast products provided by WMCs and RSMCs shall be monitored by objective verification procedures.**

Notes:

1. The goal of the objective verification procedures is to provide consistent standardized verification of the forecast products of WMCs and RSMCs so that users can make best use of these products and so that opportunities for improvement are identified.
2. Detailed procedures for the production and display of a standard set of verification scores are provided in [Appendix 2.2.34](#). A mandatory set will be provided by participating centres. Centres should also provide, if possible, additional statistics as recommended in [Appendix 2.2.34](#).

2.1.4.2 **The Lead Centre(s) for verification shall play an essential role in the coordination of verification and have responsibility for maintaining websites containing verification results and relevant guidance (see 2.2.3), ensuring that users benefit from a consistent presentation of the results.**

2.1.4.3 Global Data-processing and Forecasting System centres receiving RSMC products via WIS should carry out verification over appropriate areas using the standardized measures listed in [Appendices Appendix 2.2.34 to 2.2.38](#) and make these results available to the producing RSMCs.

2.1.5 **Documentation on system and products**

2.1.5.1 **World Meteorological Centres and RSMCs shall make available, on a publically accessible website, documentation on the technical characteristics of their operational systems and on the products they deliver. RSMCs shall ensure that the information provided**

is kept current by updating it as required after every significant change to their operational systems. The mandatory (minimum) information to be provided is specified for every activity separately in section 2.2.

2.1.5.2 Documentation shall use the International System of Units (SI units). If other units are used, conversion equations shall be included.

Note: Addresses of WMC and RSMC websites containing such system documentation are given in Part III of the present Manual [in development].

2.1.6 Training

2.1.6.1 World Meteorological Centres and RSMCs shall provide guidance, including training materials, on the interpretation, performance characteristics, strengths and limitations of their products. They shall ensure that this information is kept current by updating it after every significant change to their operational system.

2.1.6.2 It is possible that WMCs and RSMCs are requested to contribute to specific training activities in support of capacity development and related activities. Products used in such training activities should subsequently be available to users in their own operational working environments.

2.1.7 Reporting on compliance

2.1.7.1 World Meteorological Centres and RSMCs shall provide information about the current implementation of their system.

Note: This information should be available on the same website as that used for providing system and product documentation and described in section 2.1.5.

2.1.7.2 World Meteorological Centres and RSMCs shall report non-compliance between the mandatory minimum specifications and their actual implementation to the WMO Secretariat and make corresponding information available on a website. When this non-compliance is reported to Congress or the Executive Council, it shall reconsider the designation.

2.1.8 Graphical representation of observations, analyses and forecasts

2.1.8.1 World Meteorological Centres and RSMCs that have a mandate of chart-based analysis shall maintain standardized weather forecasting processes, including graphical representation of observations, analyses and forecasts.

2.1.8.2 Standard sets of graphical representation

2.1.8.2.1 The standard set of symbols and styles should be used in graphical representations of observations and analyses. This may also be used for presentation of forecasts.

Note: The set of symbols and styles is given in the *Manual on Codes* (WMO-No. 306), Volume I.1, Attachment IV.

2.1.8.2.2 All colour scales for colour maps should be properly defined to avoid misinterpretation by any category of users, and they should be standardized whenever possible.