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**STATUS OF THE WIGOS DEMONSTRATION PROJECTS**

***Demonstration Project KMA***

# Building a System for Shared Access to Meteorological Observation Data

*(Submitted by Yun Bok Lee, KMA)*

**Summary and Purpose of Document**

This document contains the information on the progress and main issues related to the Demonstration Project KMA.

***ACTION PROPOSED***

The session will note the progress in the implementation of the Project.

# Building a System for Shared Access to Meteorological Observation Data

(WIGOS Demonstration project of the Republic of Korea)

**Korea Meteorological Administration**

## Abstract

In Korea, observation of meteorological elements including rainfall is conducted at approximately 3,600 observation sites, which are managed by 27 agencies including the Korea Meteorological Administration. KMA has recognized that by compiling and sharing meteorological observational data produced by the different organizations in the country, it could make the most of the data in fields ranging from weather monitoring to research. To this end, KMA is implementing stepwise strategies in the following three areas.

The first project seeks to systematize the observation conditions, namely, to control the basic observation conditions so as to ensure the representativeness of weather data in the production stage. KMA has enacted a statute for standardizing meteorological observation and has initiated measures to systematize observation in a number of organizations that produce observational data. This statute recommends that each organization create and maintain standardized observational conditions for meteorological apparatus it installed for its respective purposes, and prescribes that calibrated equipment be used.

The goal of the second project is to check the quality of observational data, that is, to secure access to quality-proven data by conducting standardized quality testing of meteorological observational data. KMA is administering quality testing appropriate for each meteorological element through its real-time quality control system (RQMOD) so as to facilitate prompt and accurate data entry.

The third project proposes to build a system for shared access to observational data. KMA is offering a web service that integrates meteorological observational data collected from multiple organizations for shared access. A large number of disaster prevention agencies, as well as agricultural/ hydrologic/environment/national park management agencies in Korea rely on this service.

Such efforts by the Republic of Korea concur with the 3 levels of integration of WIGOS, and the above three activities embody our interpretation of the WIGOS concept

## Background

Korea has four distinct seasons and is visited by a variety of meteorological phenomena as well as meteorological disasters. In Korea, a number of organizations including the Korea Meteorological Administration—KMA—have installed and are operating meteorological sensors for numerous purposes, and are using the data from such observation. Beside KMA, among the examples worth mentioning are the precipitation network of the Ministry of Land, Transport and Maritime Affairs (MLTM) and the observing facilities of autonomous local governments. While the data produced and utilized by these observing organizations each serve a purpose, given that each of the organizations is responsible for observing part of the meteorological phenomena materializing on the Peninsula, integrated utilization of all such observations would improve efficiency in many respects.

The Republic of Korea aspires to an integrated implementation of its meteorological observation system by standardizing meteorological observing facilities including KMA, intensifying quality control, and encouraging co-use of observational data. This talk will introduce several such endeavours by KMA. Even though these projects are specific to Korea, they are expected to provide a useful model for understanding the concept of the WMO Integrated Global Observing Systems—WIGOS.

To effectively utilize meteorological data, KMA performs its duties in light of the following objective and strategies:

The objective is the integration and co-use of meteorological observational data produced

by the various observing agencies in Korea

Strategies: KMA is marshaling step-by-step implementation plans in three areas:

The first strategy concerns the standardization of observation environment. This is to secure the representativeness of observation in the acquisition stage of raw data. The second, data quality management, is for managing and coordinating data quality in keeping with WMO guidance. Third, as regards co-use of observational data, KMA acts as a data exchange hub for data sharing and utilization via internet or dedicated lines.

**Standardization of observation environment**

Let us look at the standardization of observation environment first. KMA recognized early on that an integrated approach was essential to the utilization of meteorological data, and has been developing a system for data collection for more than ten years. The data gathered by other organizations may cover areas that KMA cannot reach, or have to do with elements in whose observation KMA is not actively involved. However, most of the data do not go beyond meteorological elements that KMA observes. KMA has been receiving data from other observing agencies. By comparing data received from government agencies or local governments on a real-time or near real-time basis, KMA has identified a number of problems.

The issues are the following. Since various organizations engage in observation for a variety of purposes, shortcomings were not uncommon with the maintenance of observing equipment or securing a representative meteorological observation environment, and some of the agencies in charge would merely produce and utilize data without the required knowledge. Furthermore, they failed to understand the significance of ascertaining continuity and consistency in the data.

Numerous questions arose in the course of examining the quality of the data received from the various agencies. Are the data representative? Is the meteorological equipment standardized? KMA thus felt the need for a national standardization project to address issues such as observation cycles or standard data formats.

With these facts in mind, KMA instituted a framework for standardization and has launched organized efforts for its systematic implementation.

The Meteorological Observation Standardization Law —MOSL— has as its goal precision in meteorological observation. It was instituted so as to provide many with valuable meteorological data for use, through efficient operation of meteorological equipment and shared use of observational data, with effective governmental support in terms of budget and manpower.

In compliance with this law, which was enacted in 2006, KMA has been implementing a standardization project for meteorological observation through its meteorological observation standardization committee. KMA has also created a meteorological observation standardization division, so as to lend assistance in realizing the proper observation environment through training and technological support for agencies involved in observation activities. Each implementation task is being checked against an inspection list every year to ensure timely completion. The performance results so far are as follows. As of 2008, of the relevant meteo-

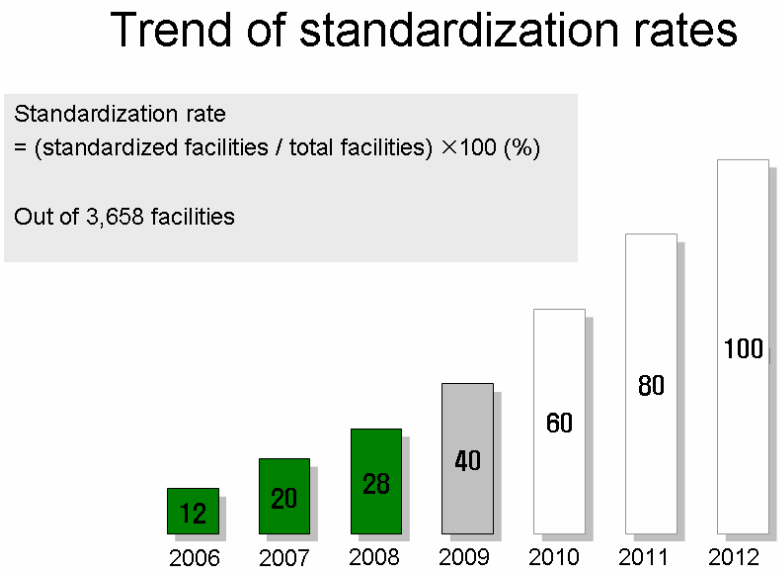


Figure 1 Past and planned annual performance of KMA's meteorological observation standardization project

rological observing facilities amount to 3,658, 28% have met the standardized observation requirements. The target for this year is 40%, and we expect to reach 100% by 2010.

**Quality control of observational data**

KMA's Real-time Quality control system for Meteorological Observation Data—RQMOD—seeks to meet the standards of WMO(2008). This system was developed to control the quality of KMA's observational data, and has been undergoing continuous upgrades so as to build an integrated quality control system among related organizations. All the modules in this system operate in conjunction with an Oracle database. Quality testing consists of physical limit tests, step check (maximum variation), step check (standard deviation), persistency check, internal consistency check, median filter check, climatological limit/range test, spatial consistency (temperature, precipitation) check and the like. The quality control phase comprises on-site quality control as well as central quality control (at the headquarters), the latter of which includes real-time and non-real-time automatic quality testing and manual quality testing.

Such a system facilitates timely quality control of observational data, and hence acquisition and utilization of reliable data. Data that have passed quality control are provided to users for use as the basis for immediate apprehension of meteo- rological conditions or as NWP data.

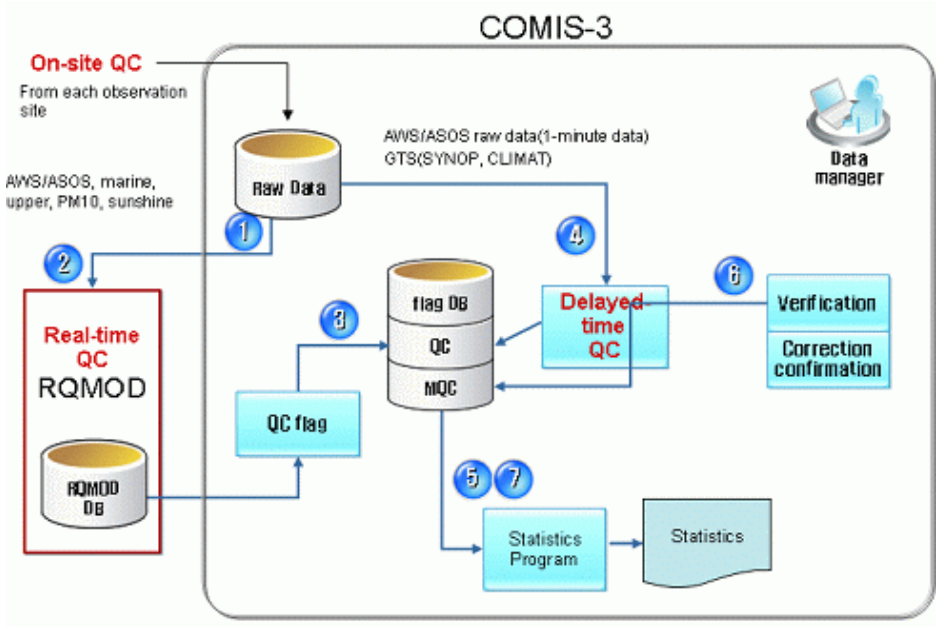


Figure 2 KMA's Data Quality Control System

**Co-use of observational data**

KMA posts its observational/forecast products, which can be viewed by interested users in graphic or text form. It also provides web services that enable active sharing of data with related agencies, alongside data transmission via FTP. In addition to its main website at http://www.kma.go.kr for the general public, KMA also provides a user-specific website at http://metsky.kma.go.kr with in-depth meteorological products such as observational data, weather charts, satellite/radar data, special reports, and earthquake information for disaster prevention authorities, agencies in charge of hydrology, maritime affairs, fire rescue, and the media. 2800 users from 69 organizations access this specialized website, whose daily provision of data totals approximately 2.4 terabytes.

Our web service is an applied service based on diffusion components that can be registered, searched, and invoked through API standards published on the web . Through this web service, public institutions can utilize real-time meteorological products (such as weather forecast, special weather reports, ground/Asian dust/GTS/radar/satellite/lightning/upper-air data, basic meteorological products, weather charts) in a variety of formats. Institutional clients can use KMA's meteorological information database like their own on a real-time basis, which allows reduction of the budget for information system building as well as internet synchronization of data in the database without installing a separate dedicated line. 72 accounts from 35 organizations are currently active users of this service.

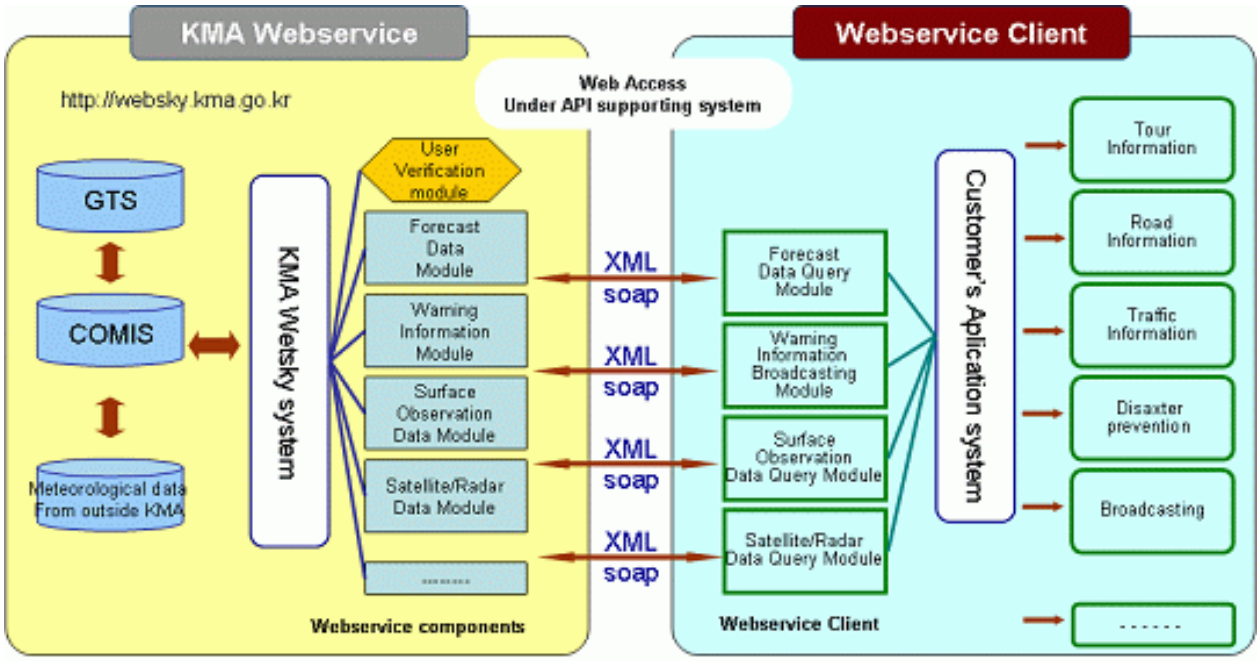


Figure 3 Illustration of KMA's user-central data distribution system

Through its close cooperation with WMO, Korea has improved its observation technology, and applied advanced information infrastructure technology to the shared utilization of observational data. Such activities by Korea coincide with the 3 levels of integration of WIGOS, and these three activities could be seen as a concrete example of our understanding of the WIGOS concept.

**Acknowledgement**

We wish to thank WMO WIGOS team for giving us the opportunity to introduce the above activities at KMA.