

3. OBJECTIVE ANALYSIS SYSTEM

3.1 Summary

Three kinds of objective analyses for atmospheric fields are performed at JMA: global analysis for the Global Spectral Model (hereafter GSM), regional analysis for the Regional Spectral Model (RSM) and mesoscale analysis for the Meso-Scale Model (MSM). Specifications of the JMA analysis system are summarized in Table 3.1.1. All the analyses are performed by using the procedures shown in Fig. 3.1.1.

The following is a brief description of the major components of the analysis system.

(i) Observational data are received from the GTS, Internet and dedicated network. They are decoded according to their code forms. If typhoons exist in the western North Pacific, typhoon bogus profiles are created.

(ii) Various pre-analysis procedures, such as quality control, data selection and bias correction, are applied to the decoded observational data. In the pre-analysis process, first guess fields retrieved from forecast system are used.

(iii) The four-dimensional variational method is adopted: the global analysis, the regional analysis and the mesoscale analysis. All the analyses are carried out on the grid of the corresponding forecast models. Analyzed fields created from the objective analysis system are used as initial conditions of corresponding forecast models.

Sea surface temperature field (see 6.2) and snow depth field are also analyzed every day. For climate monitoring, JMA Climate Data Assimilation System (JCDAS) is performed taking over the data assimilation cycle of the Japanese 25-year Reanalysis (JRA-25).

Table 3.1.1 Specifications of the JMA objective analysis system

Analysis Model	Global Analysis	Regional Analysis	Mesoscale Analysis
Analysis time	00, 06, 12, 18 UTC	00, 06, 12, 18 UTC	00, 03, 06, 09, 12, 15, 18, 21 UTC
Data cut-off time	Early analysis: 2h20m (00,06,12,18UTC) Cycle analysis: 11h35m (00,12UTC) 5h35m (06,18UTC)	Early analysis: 2h45m (00, 12 UTC) Cycle analysis: 8h45m (06, 18 UTC)	50m (00,03,06,09,12,15,18,21 UTC)
Horizontal Grid system	Gaussian grid	Lambert projection	Lambert projection
Horizontal resolution	0.5625 deg.	20km at 60N and 30N	10km at 60N and 30N
Number of grid points	640x320	325x257	361x289
Horizontal resolution of inner model	1.125 deg	40km at 60N and 30N	20km at 60N and 30N
Number of grid points of inner model	320x160	163x129	181x145
Vertical coordinate	σ -P hybrid		
Vertical levels	Surface +40 levels up to 0.4 hPa	Surface +40 levels up to 10 hPa	Surface +40 levels up to 10 hPa
Analysis scheme	4-dimensional variational method on model levels		

Global snow depth analysis is carried out everyday on 1x1 degree longitude-latitude grids.

JMA Climate Data Assimilation System (JCDAS) is performed taking over the data assimilation cycle of the Japanese 25-year Reanalysis (JRA-25). (See 3.11)

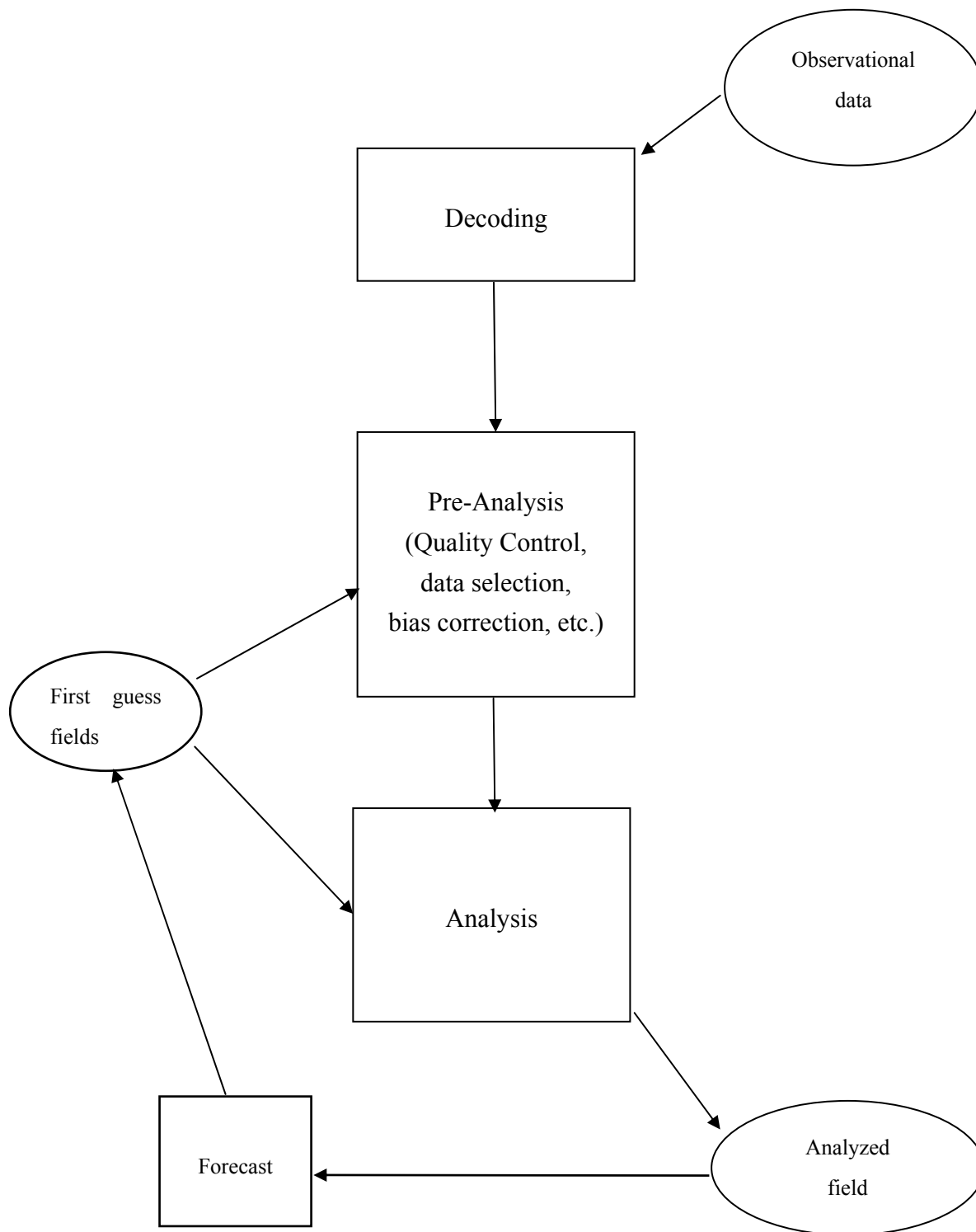


Fig. 3.1.1 Major functional components and data flow in the JMA objective analysis system