CLIMATE DATABASE MANAGEMENT AT BMKG - Indonesia

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INTERNATIONAL WORKSHOP ON THE DIGITIZATION OF HISTORICAL CLIMATE DATA, THE NEW SACA&D DATABASE AND CLIMATE ANALYSIS IN THE ASEAN REGION
02 - 05 APRIL 2012 CITEKO, BOGOR, INDONESIA
1. Climate data would be *everlasting used*

2. NHMS is a *largest data producer* than another institution

3. The output of all resource of NHMS (human resource, fund, instrument, building, etc.) is *data*……and information

4. Prediction might be *false*, but data *must be absolutely correct*. 
OUTLINE

- Introduction
- Climate Data Resource
- Data acquisition system
- Database Management System Design
- Data rescue
- Meta data
- Data exchange
Introduction

- **Climatology can not be practised without data**! but often the climatologist unfortunately does not have exactly the kind of data he needed to fulfill his task.
- In some countries, climate data is still managed partially and not well integrated in one system, so it is **difficult to get a complete database**. Data quality check and metadata is often not available, data analysis will be misleading.
- Climate data is a set of meteorological data which have been collected for a long time, so it should be managed properly by a system, **Climate Data Management System (CDMS)**.
- CDMS was introduced by World Meteorological Organization (WMO) and should be adapted by National Meteorological Service.
- A Climate Data Management System (CDMS) is a set of tools and procedures that allows all data relevant to climate studies to be **properly stored and managed** (WMO, 2011).
CLIMATE DATA RESOURCE OF BMKG

- 173 Met, Clim, Geo Station
- 192 Automatic Weather Station (AWS)
- 121 Automatic Raingauge (ARG)
- 2500 Volunteer raingauge
- 96 Agromet station
- 14 Agromet AWS
AWS and ARG in Indonesia

KETERANGAN:
- Automatic Weather Station (AWS): 192 locations
- Automatic Rain Gauge (ARG): 121 locations

Balas Propinsi
Target Pembangunan Radar = 51
Lokasi
- Pembangunan Radar Sampai dengan Tahun 2008 = 11 Lokasi
- Pembangunan Radar Tahun 2009 (BA.075) = 3 Lokasi
- Pembangunan Radar Tahun 2009 (BA.999) = 5 Lokasi
- Pembangunan Radar Tahun 2010 (Reguler) = 1 Lokasi
- Pembangunan Radar Tahun 2010 (APBN-P) = 3 Lokasi
- Rencana Pembangunan Radar (Kekurangan) = 28 Lokasi
SATELLITE RECEIVER NETWORK

MEDAN
LAMPUNG
PD. BETUNG
JAKARTA
DENPASAR
PONTIANAK
MAKASAR
JAYAPURA

INDONESIA

: APBN 2006 – 2007 (3)

Data acquisition

- Climate data could be collected from NHMS, other institutions, universities, local utilities, local government, private companies, etc.
- Relevant climate data should be collected by NMHS and should be granted full use of all the climate data without restriction.
- It needs an MoU between NHMS and other institutions/organization.
WEAKNESS:

- No data integration
- Unstandardize format
- Un-validated
- Poor data access
ADVANTAGES:

- Data integration
- Standardize format
- Validated database
- Faster access
DBMS design (to solve the problem)
BMKG DBMS design

(Infrastructure)
BMKG DBMS design (Application)
STEPING OF DBMS DEVELOPMENT

- 2010: system design
- 2011: phase #1 development
- 2012: phase #2 development and testing
- 2013: fully operated
METentry for **single data entry** at all BMKG Stations
MEGASoft
(Meteorological and Geophysical Database Management System)

METentry for single data entry at all BMKG Stations
MEGASoft
(Meteorological and Geophysical Database Management System)

METView for data management and monitoring at BMKG HQ
MAIN OUTPUT OF THE DBMS

- **Level #1 data**: observed data from many parameters with many time-step (10 minutes, hourly, daily), many forms, and many instruments.

- **Level #2 data**: derived data into hourly, daily, weekly, ten-days, monthly for every parameter.

- **Level #3 data**: processed data i.e. average, normal, maximum, minimum, extreme, indice, etc.
Data rescue

- OCR
- Catalog data
- Scanning
- Backup system
- Disaster Recovery Centre
- Data library
FOCUSING ON CLIMATE DATABASE MANAGEMENT

- Historical climate *data rescue* (1860-1960)
- Climate *data recovery* (1961-2010)
- Online climate data transfer with *single data entry* (2011→)
- Data integration (one management)
- Quality check and homogenization
- *Metadata* collection
Data availability of some countries – RAV (Nicholls et al., 2004)

Temperature

Rainfall
Data document (hard copy)

BEFORE

Data storage
Data rescue in process
TARGET OF DATABASE MANAGEMENT SYSTEM

- Digital, valid and long series climate data
- Data continuity
- *Near real time* updated
- Fast access
META DATA

- Collecting data catalogue and information of the historical data from many data resources
- Data reconciliation:
  - to define a unique catalog
  - to define the fact of data history
- Metadata application system:
  - WMO standard metadata
  - Updateable digital metadata
## KATALOG DATA (Me-48)

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RAINFALL DATA CATALOGUE OF EAST JAVA PROVINCE
DATA QUALITY CONTROL AND METADATA

Maximum temperature Jakarta Obs / Kemayoran

- Observation site moved
- Average value increased

Graph showing temperature trends from 1980 to 2008.
THANKS
FOR YOUR ATTENTION