Climate Information and Prediction Services

(CLIPS)

-Curriculum-

THE CLIMATE INFORMATION MODULE

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THE CLIMATE INFORMATION MODULE

- general structure :

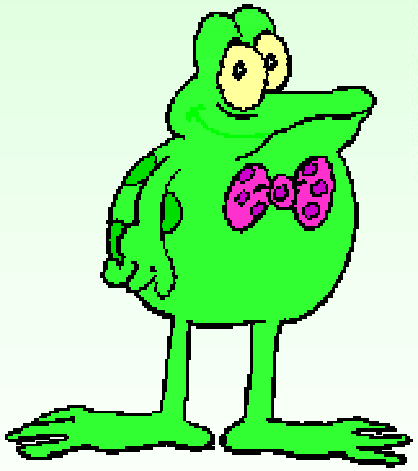
1. Scope of the Module
2. Basics of data collection for climate information purposes
3. Climate data management
4. Aspects of presentation and provision of climate information
5. The role of the user

1. Scope of the Module

- ... to explain basics of climate information generation
- ... to show examples of ‘state-of-the-art’ climate information
- ... to provide background of climate information services

“Climate Information” is -in this context- seen as the ‘state-of-the-art’ exploitation of past climatological records as well as contemporary climate monitoring activities

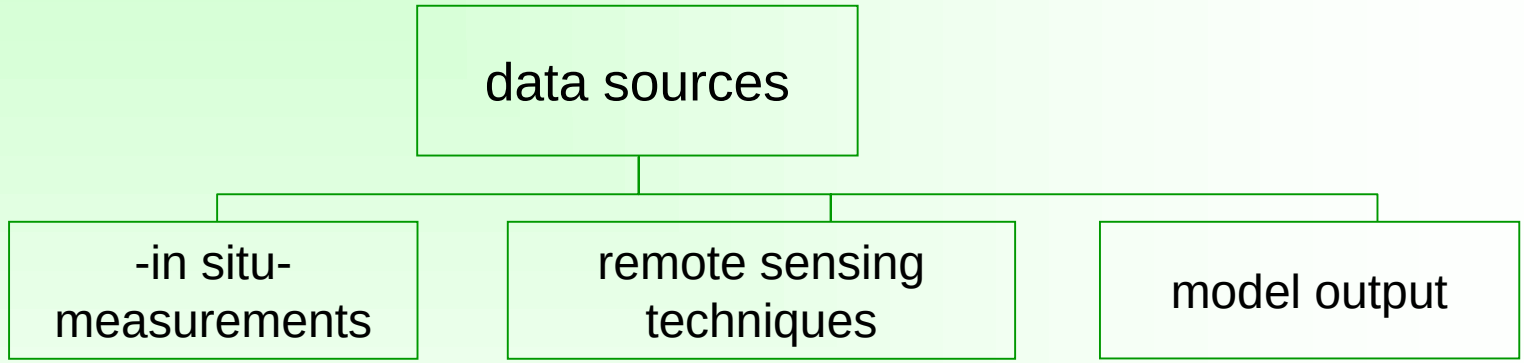
2. Basics of data collection for climate information purposes



„ . . . a key law of climatology is that there won't be any data where you want it. "

Dr. R. Basher
in
Report from the Meeting
of Experts on CLIPS
WCASP-32

2. Basics of data collection for climate information purposes



e.g.:
- traditional station networks
- special observation sites
- radiosondes

e.g.:
- satellites
- RADAR
- wind profiler
- lightning detection

e.g.:
- operational NWP-models
- simulations with climate models

2. Basics of data collection for climate information purposes

to continuously document characteristic climate conditions

to achieve (homogeneous) time series on special sites (≥ 30 years)

scientific

requirements

technical

to take care of appropriate Metadata documentation

to follow WMO-standard rules

to ensure appropriate maintenance service

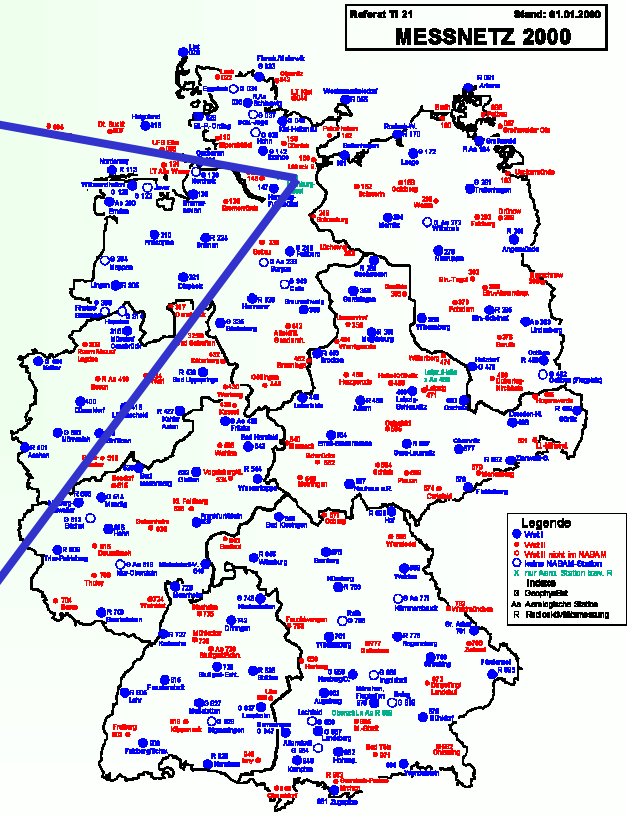
2. Basics of data collection...

- the traditional method

climate elements	* temperature (Max/Min), precipitation,... * upper air elements
observations	* ideally at least twice a day (about 0800 and 1800 LST), should coincide with SYNOP
instruments	* long-term accuracy, maintenance * infrastructure
stations	* site criteria * training of observers
networks	* network design/density * operational aspects/infrastructure

2. Basics of data collection

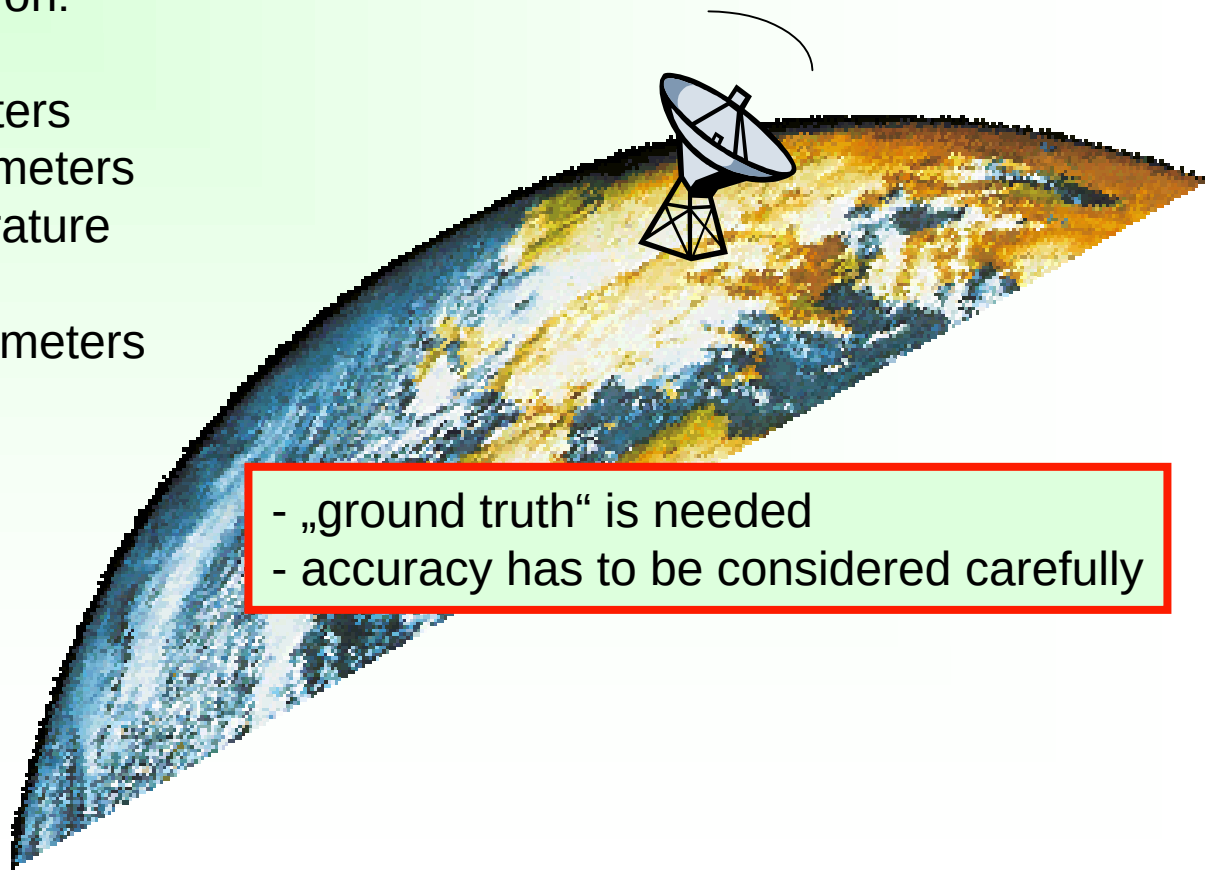
- the traditional method



2. Basics of data collection

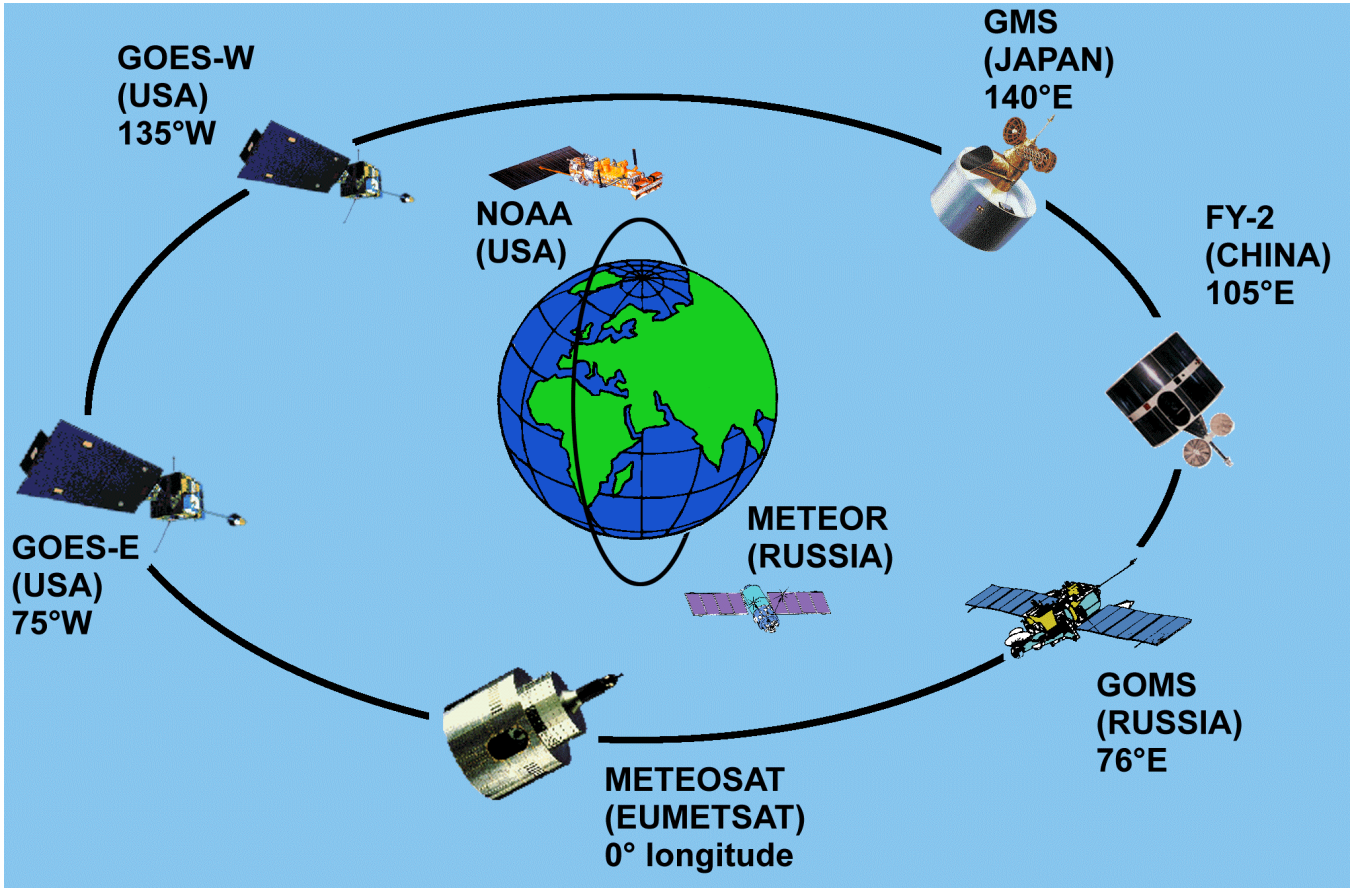
- the advanced method

spatial information on:
- cloud parameters
- radiation parameters
- sea surface parameters
- profiles of temperature and humidity
- precipitation parameters
- etc.



- „ground truth“ is needed
- accuracy has to be considered carefully

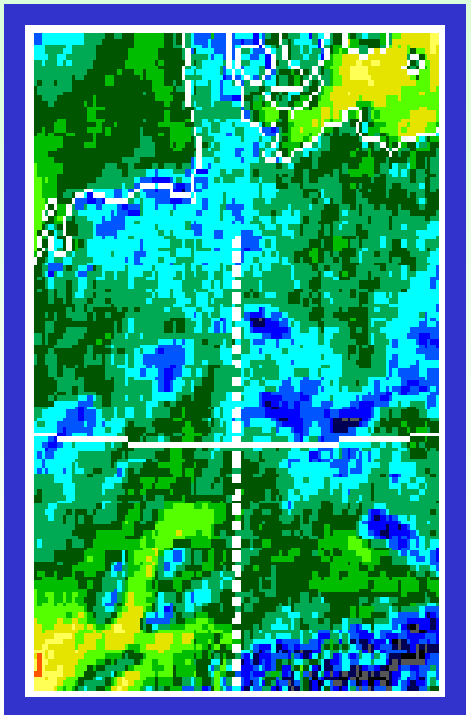
Global Observing System

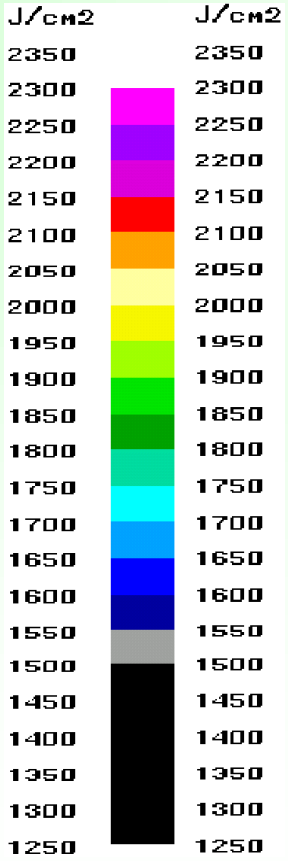


Downward Surface Short-wave Radiation

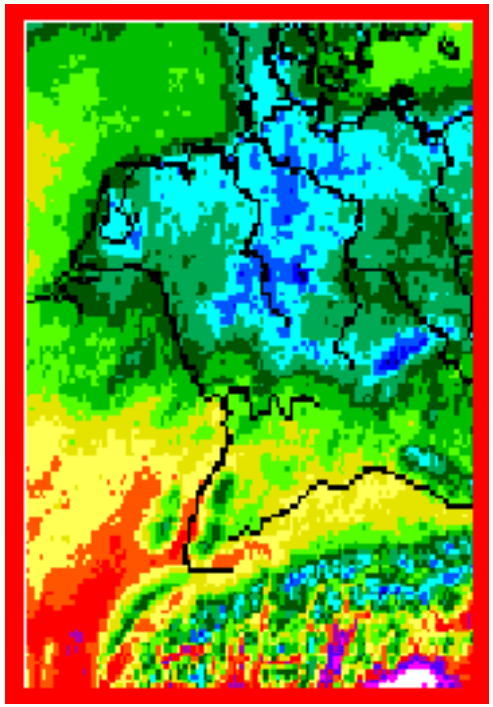
over Germany

JUN - AUG 1986



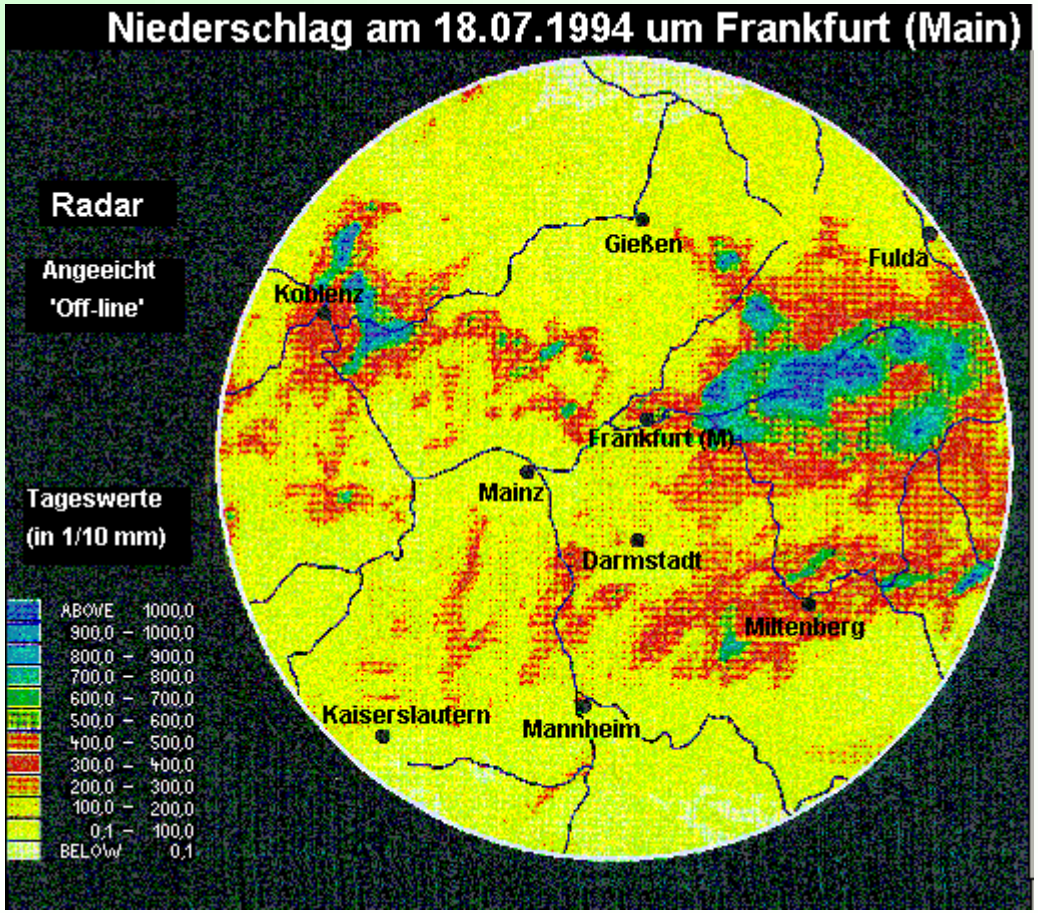


JUN - AUG 1996



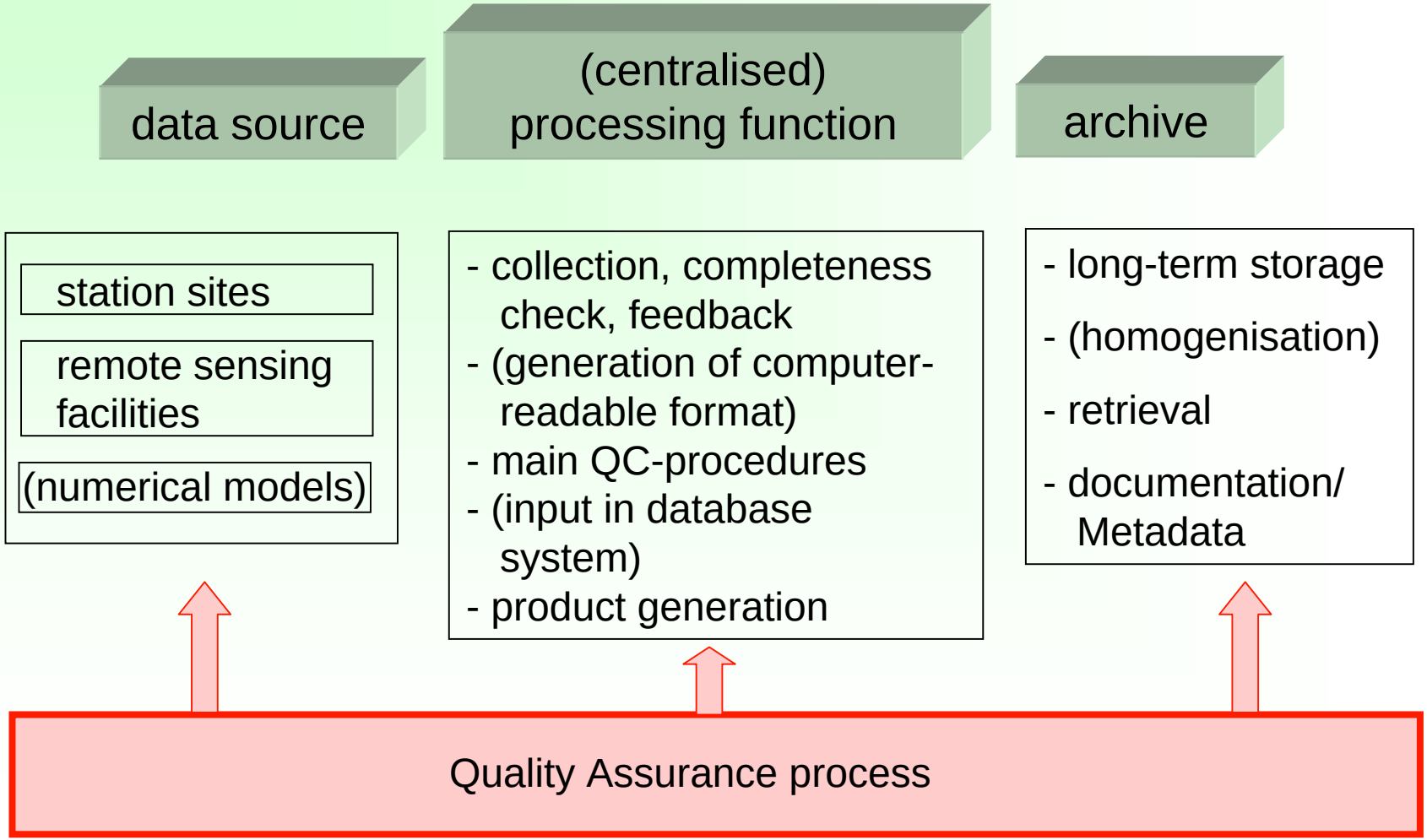
Total amount of precipitation of 18 July 1994

derived from RADAR device Frankfurt Airport /Germany



3. Climate data management

- overview



3. Data management - Metadata

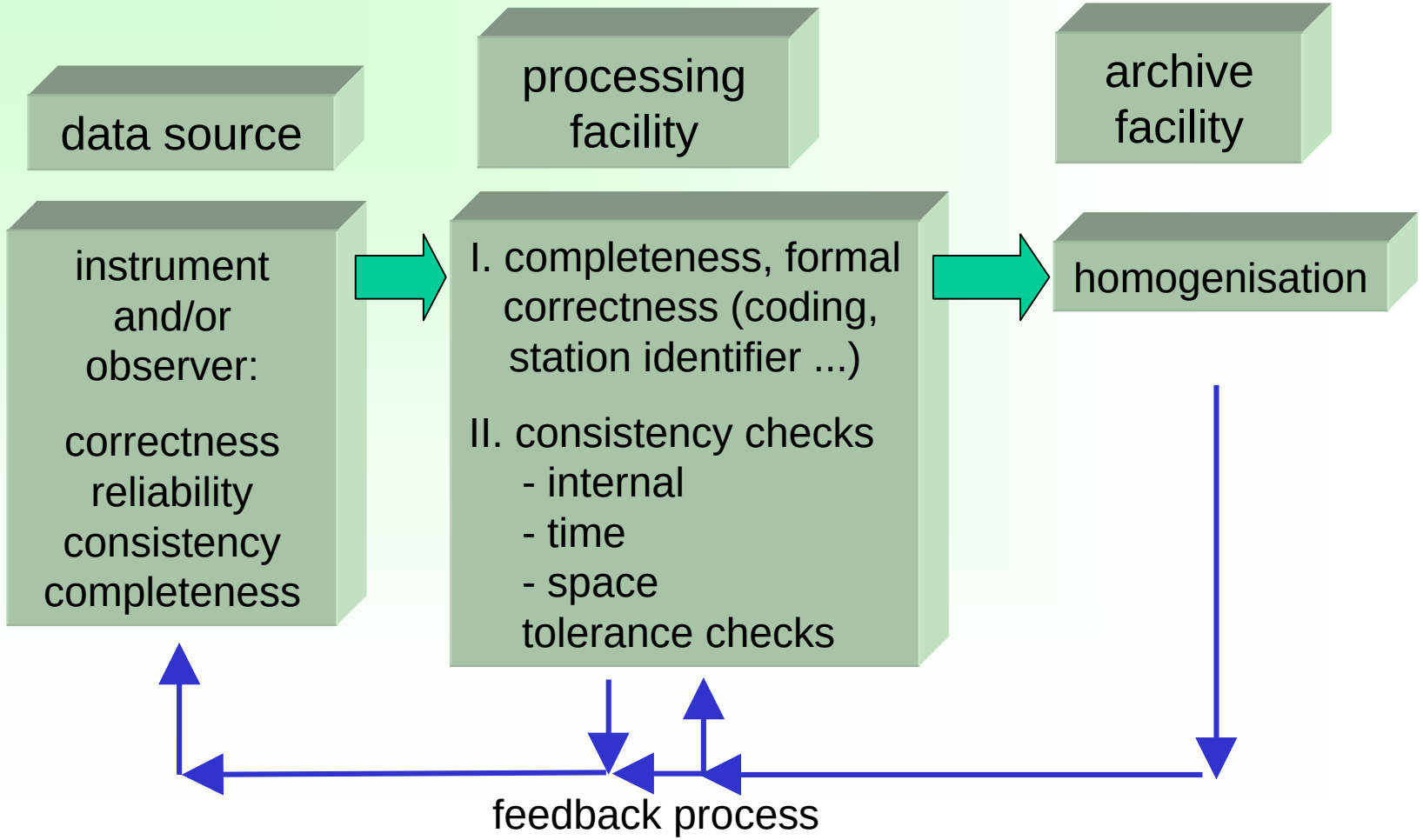
In order to ensure sufficient long-term usage of climate data it is absolutely necessary to document as completely as possible the data history (station site characteristics, instruments, QC-status etc.) as well as any change which might influence the long-term behaviour of data series.

3. Data management - Quality Assurance (QA)

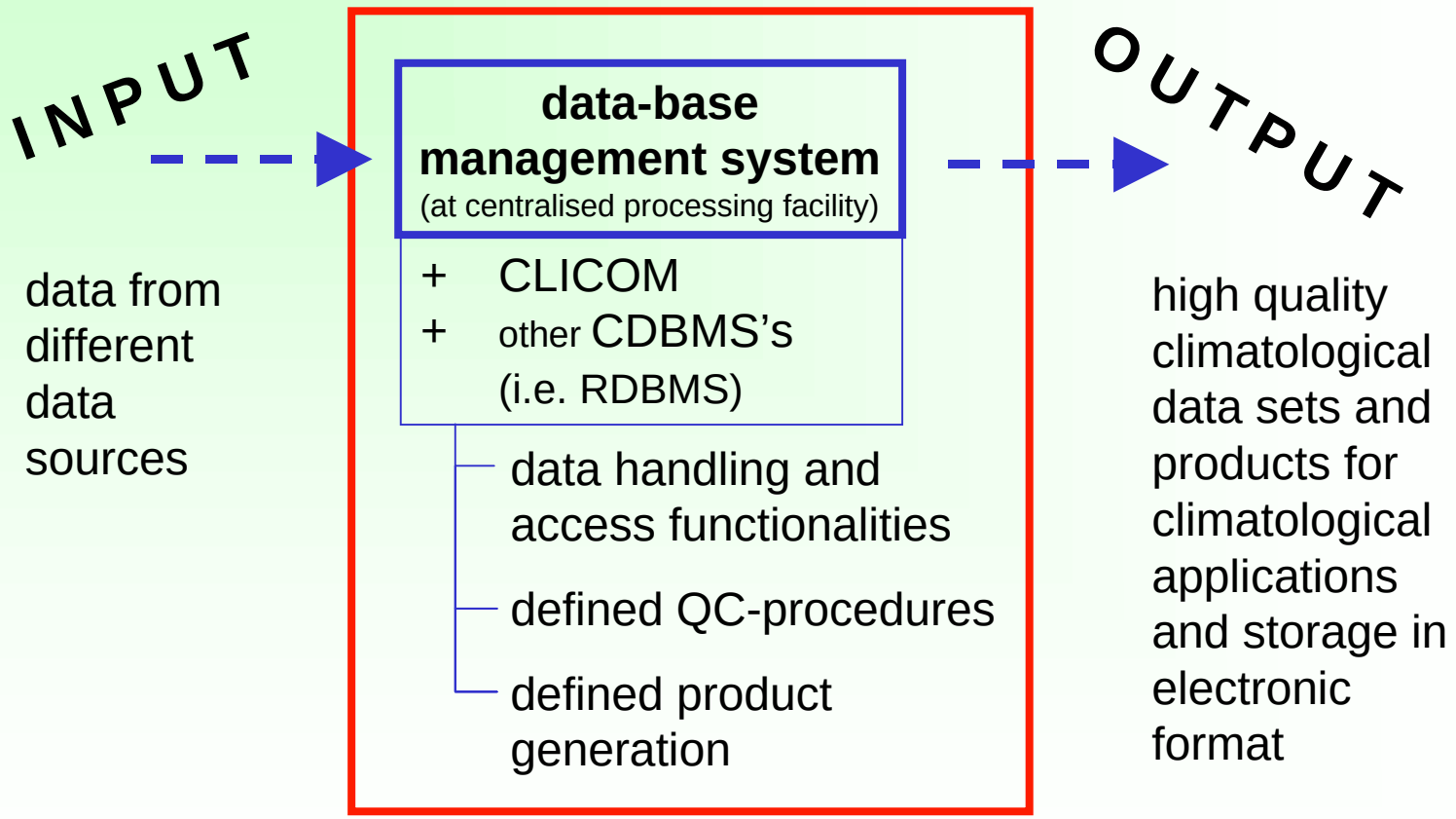
Aim: to achieve reliable climatological data sets for subsequent product generation and applications as well as for eternal storage

General rules:
- quality assurance procedures to be applied on each step of data management
- each data has to be clearly assigned to a certain level of quality (quality flag)

3. Data management - Quality Assurance



3. Data management - data base management systems



3. Data management - archiving

purpose

to ensure a comprehensive and accessible long-term documentation of climate conditions

methods

storage of documents/print-outs etc., microfilms; electronic formats: magnetic tapes, CD-ROMS, state-of-the-art hardware

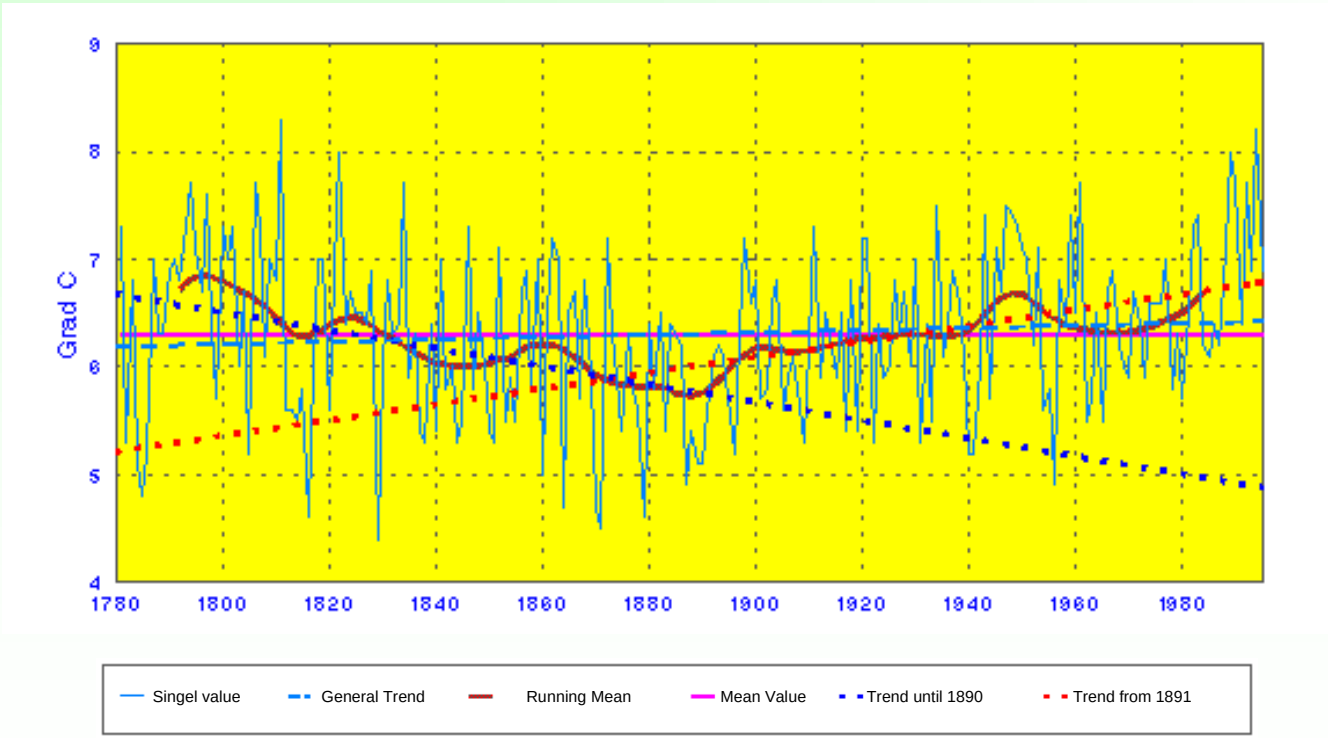
remark

crucial aspects: data rescue, security and accessibility of stored data, documentation of stored data, assignment to Metadata information (incl. QA-status)

4. Presentation of climatological data

- examples

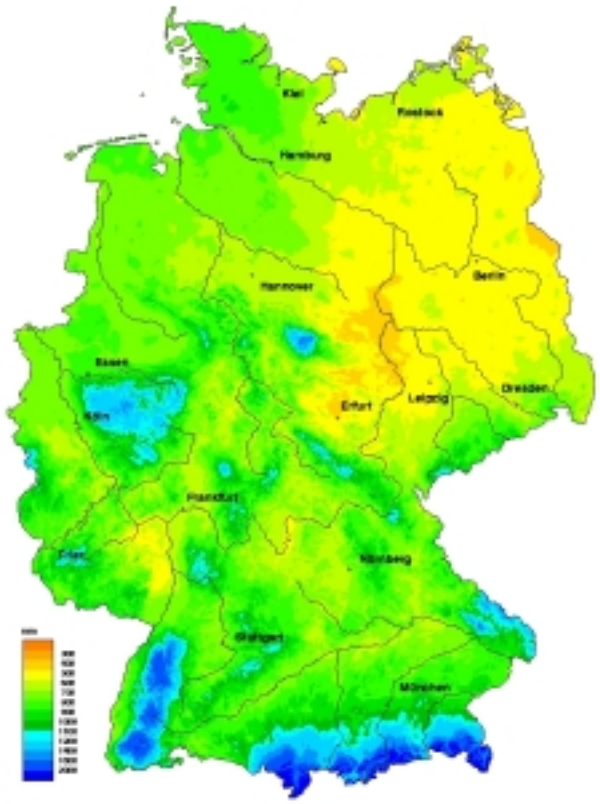
Mean Annual Temperature
Hohenpeissenberg 1781 - 1995



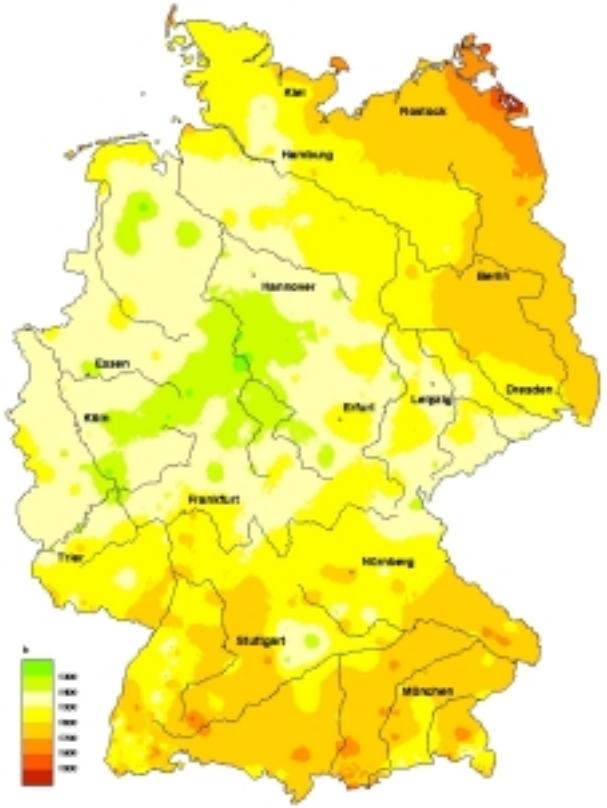
4. Presentation of climatological data

- examples

Mean annual amount of precipitation
1961 - 1990

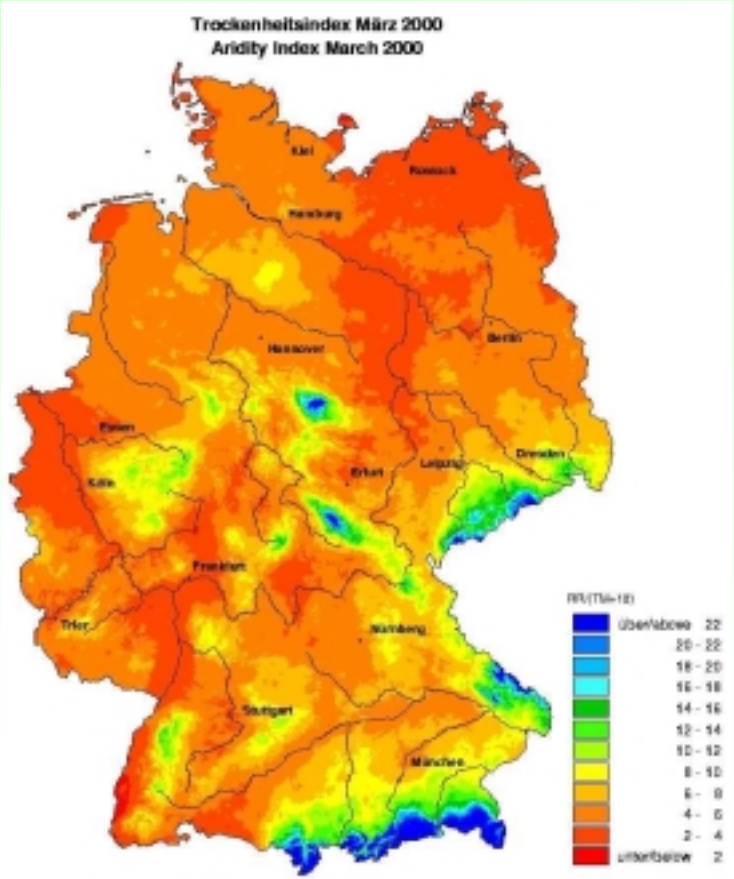


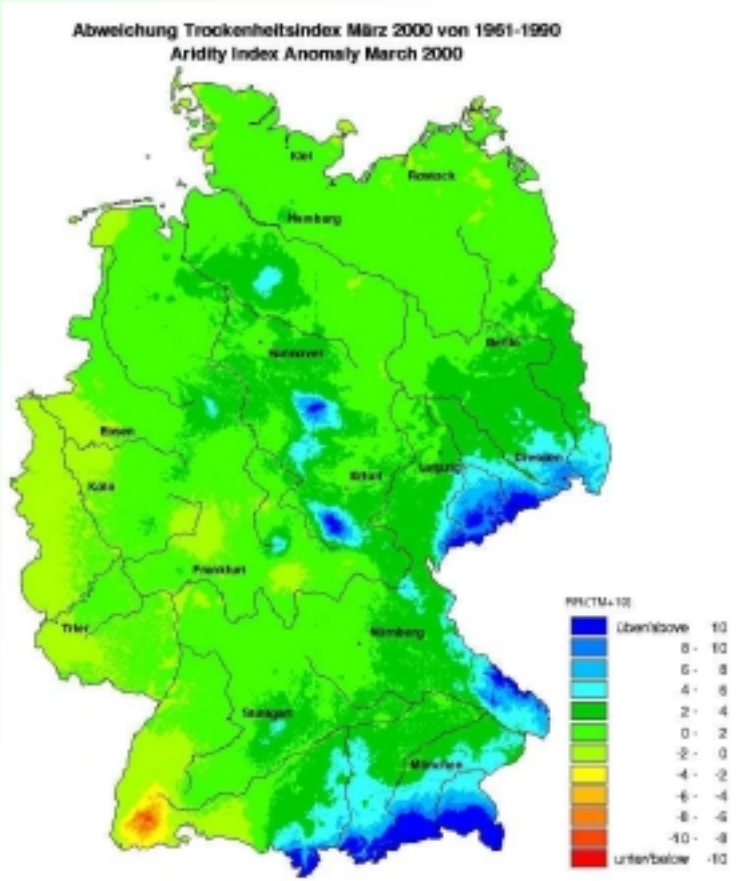
Mean annual sunshine duration
1961 - 1990



4. Presentation of climatological data

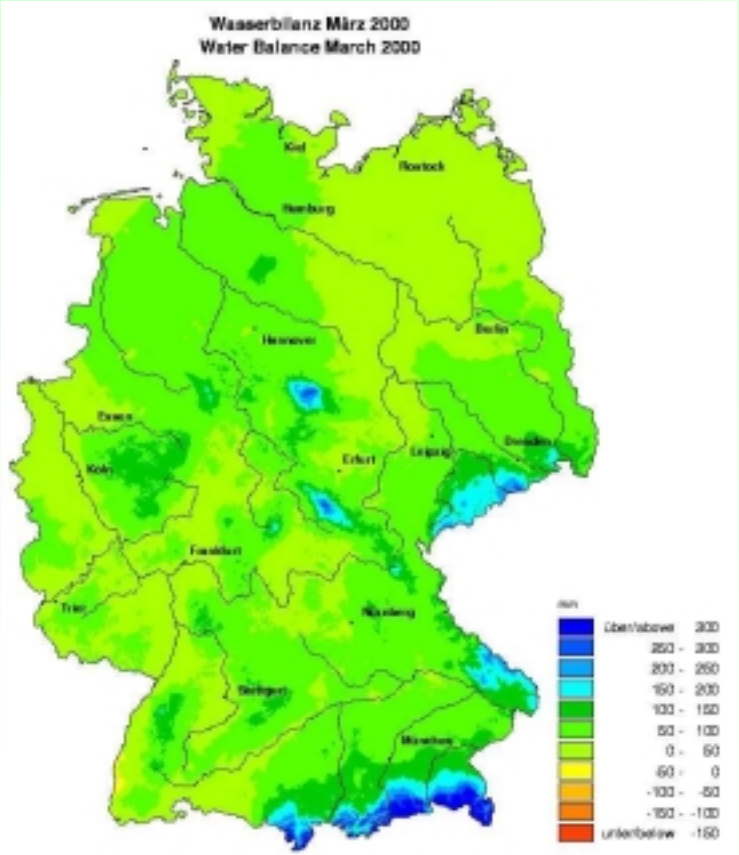
- examples

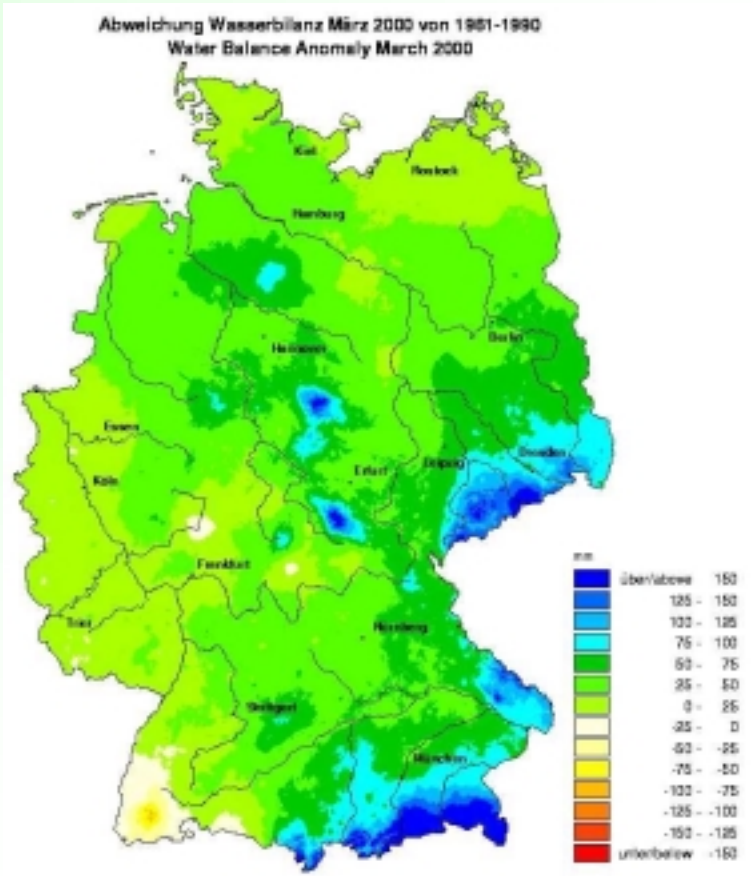




4. Presentation of climatological data

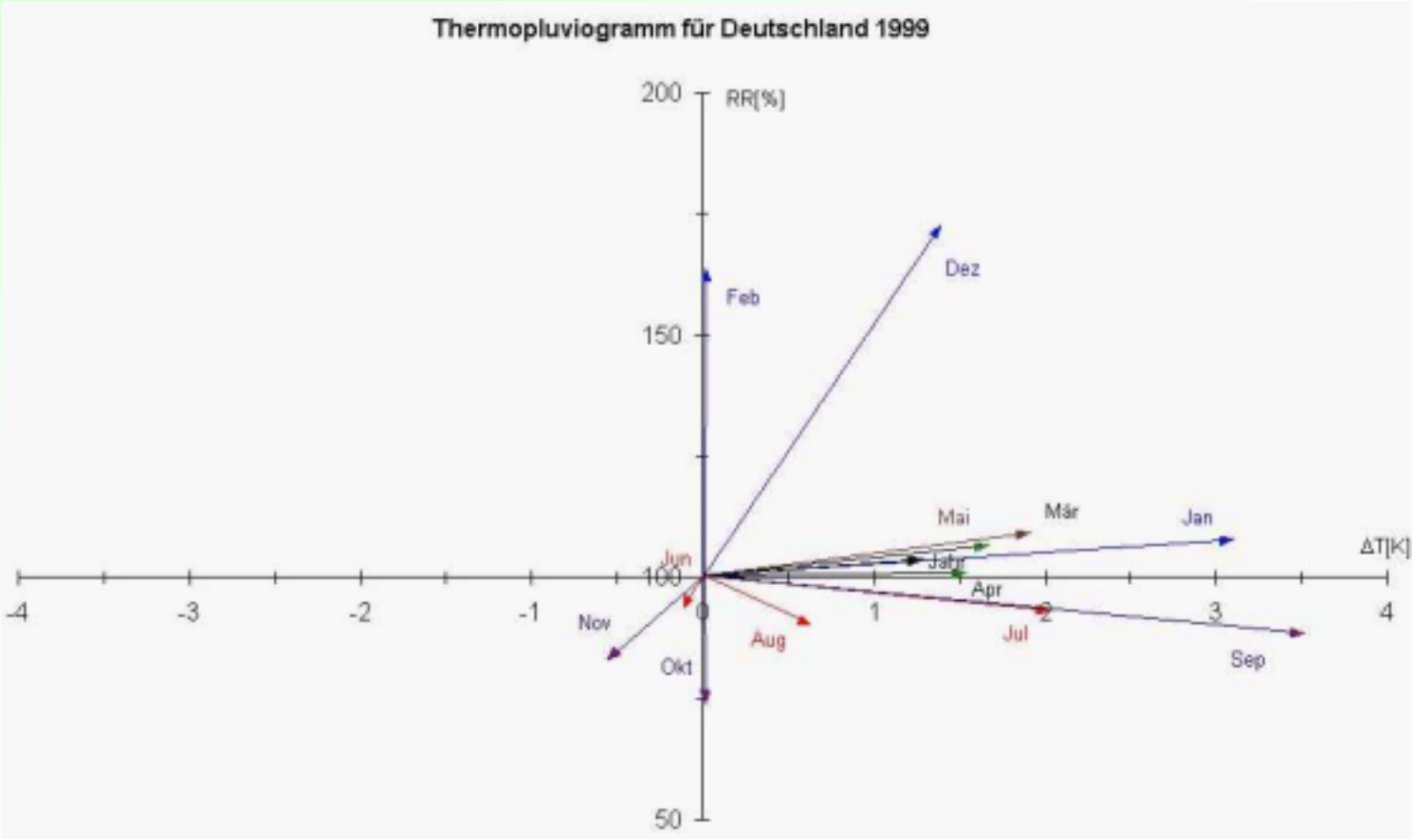
- examples





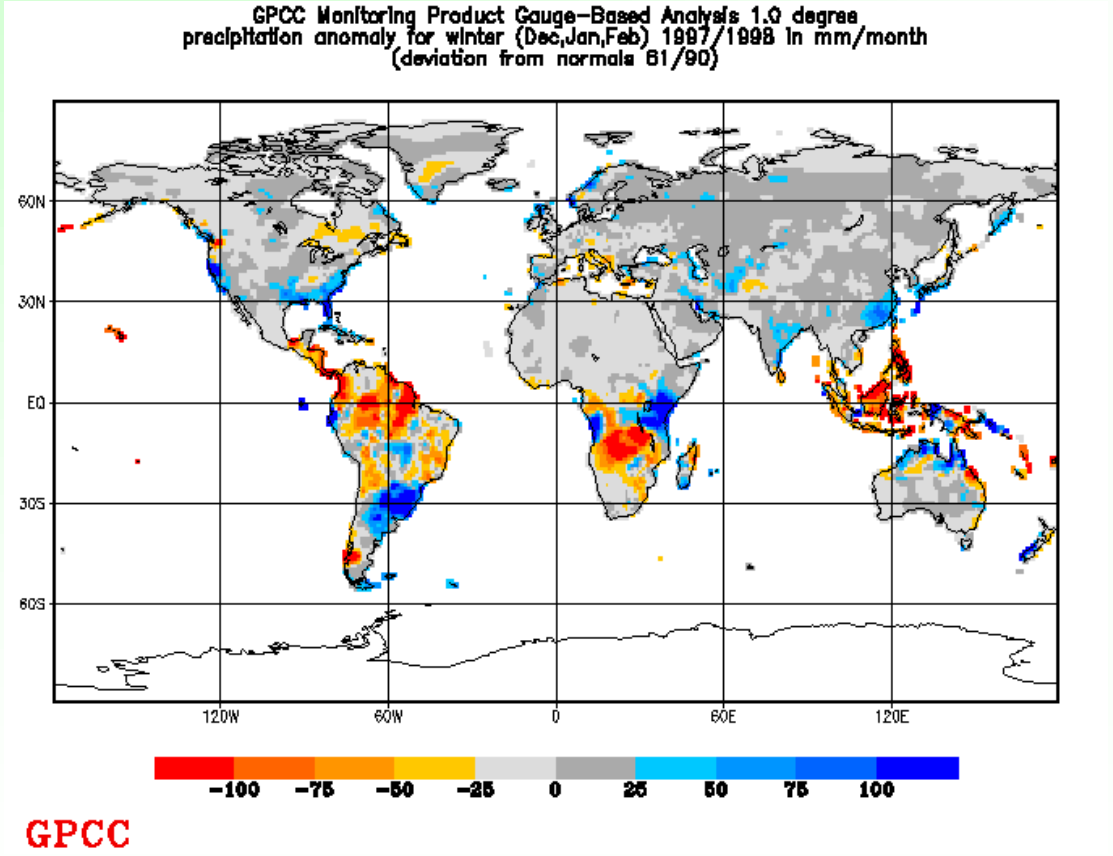
4. Presentation of climatological data

- examples



4. Presentation of climatological data

- examples



4. Presentation of climatological data

- examples

Wind Speed and Direction

Station: **Calvi** Dépt.: **20 CORSE**
Alt: **57 m** Lat. Lon.: **42°31' N 8°47' E** Période: **Période 1981-1990**
Hauteur anémo: **10 m** **Valeurs trihoraires entre 00 et 21 heures UTC**

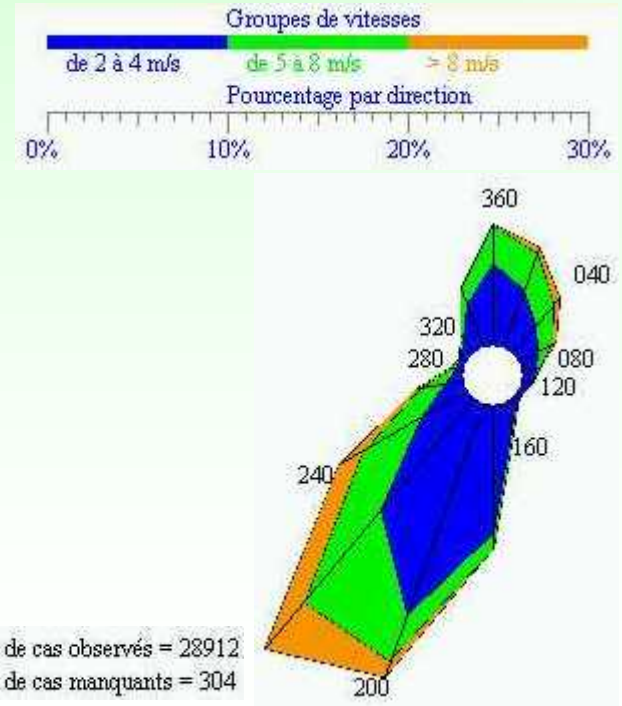


Tableau récapitulatif (en %)

dir	2-4	5-8	>8	total
020	3.42	2.21	0.35	6.00
040	1.97	1.69	0.44	4.11
060	1.16	0.89	0.26	2.33
080	0.74	0.19	0.03	0.97
100	0.50	0.08	0.00	0.59
120	0.28	0.02	0.00	0.30
140	0.40	0.03	0.00	0.43
160	1.52	0.18	0.00	1.71
180	7.04	0.92	0.02	7.98
200	12.45	2.78	0.83	16.07
220	8.12	6.61	3.42	18.16
240	3.05	3.72	1.49	8.28
260	1.10	1.31	0.26	2.68
280	0.48	0.38	0.05	0.91
300	0.40	0.11	0.01	0.54
320	0.93	0.29	0.00	1.24
340	2.62	1.01	0.01	3.65
360	4.57	2.16	0.05	6.79
total	50.85	24.66	7.30	82.82

Fréquence des vents < 2 m/s = 17%

Source: „Le Climate de la France“ - Meteo France

4. Presentation of climatological data

- standard publications

... towards global data exchange

Monthly Climatic Data of the World

World Weather Records

Climatological Normals

... towards national users

weekly/monthly bulletins

yearly reports/yearbooks

reports on extreme events (occasional)

climate assessments/reviews (occasional)

4. Presentation of climatological data

- methods

tabular and graphical presentation

- tables of observed values/mean values/variations etc.
- frequency tables (e.g. frequency of occurrence)
- return periods

etc.

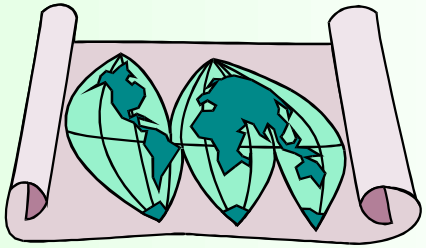
- time series
- vertical distribution
- frequency distribution
- scatter diagrams
- isopleth diagrams
- vector quantities

etc.

4. Presentation of climatological data

- methods

maps and atlases

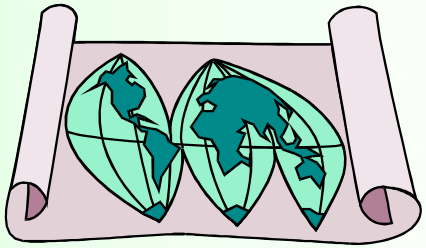


Maps are an effective and efficient means of summarising and communicating a great deal of data and information while at the same time stimulating interest in the climate elements displayed

4. Presentation of climatological data

- methods

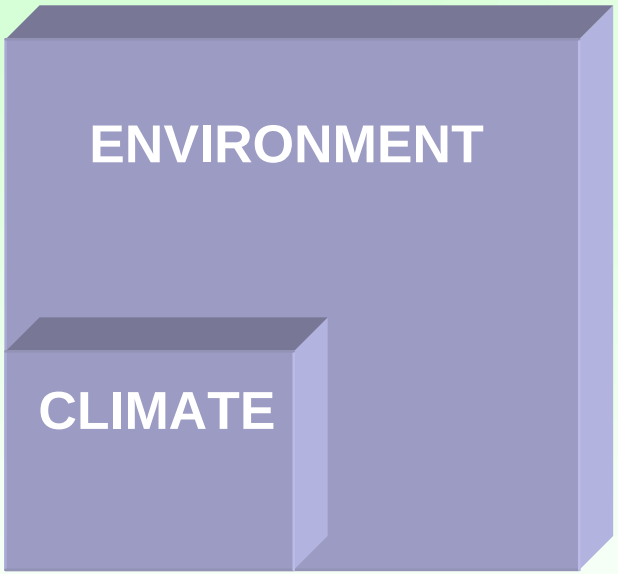
maps and atlases



- choice of map projection/scale/elements
- preparation of data/uniformity
- choice of appropriate method
- control procedures

4. Presentation of climatological data

- the environmental dimension



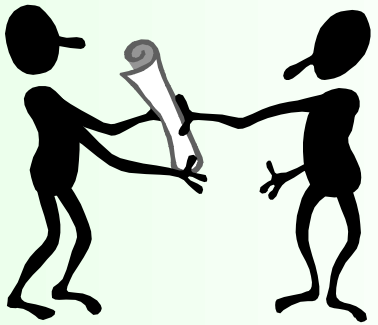
- recognise the environmental dimension of our climate
- include climate analysis in environmental studies; consider compatibility of data and products

Climate information are developing as powerful tools to assist planning and management across all socio-economic activities.

4. Provision of climatological data

- data policy of WMO

Resolution 40 (Cg-XII)



As a **fundamental principle of the WMO**, and in consonance with the expanding requirements for its scientific and technical expertise, WMO commits itself to broadening and enhancing the free and unrestricted international exchange of meteorological and related data and products.

4. Provision of climatological data

- data policy of WMO

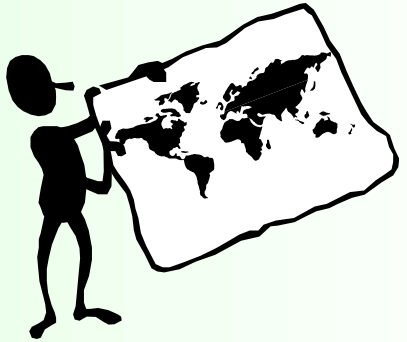
Resolution 40 (Cg-XII)

free and unrestricted exchange of **essential** data and products necessary for the provision of services in support of the protection of life and property and the well-being of all nations, particularly those required to describe and forecast accurately weather and climate, and support WMO Programmes;

4. Provision of climatological data

- data policy of WMO

Resolution 40 (Cg-XII)

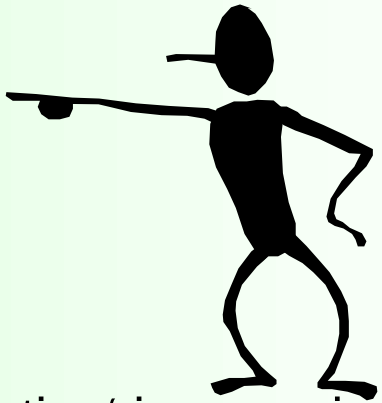


Provision of **<u>additional</u>** data and products which are required to sustain WMO Programmes at the global, regional, and national levels; WMO Members may be justified in placing conditions on their re-export for commercial purposes outside of the receiving country;

Provide to the <u>research and education communities</u>, for their non-commercial activities, free and unrestricted access to all data and products exchanged under the auspices of WMO

5. The role of the user

R E M I N D E R :



The provision of ‚climate information' is a service to different user groups !

Close collaboration between service providers and users is essential to provide ‚climate information' services successfully and efficiently!

Concluding summary:

The generation and provision of ‘climate information’ is as successful as the quality and reliability of each of the processes described:

- data collection
- data management
- data and product presentation and provision
- user interface