



# DNMI-REPORT

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## TITEL

National Climate Services,  
from data collectors to environmental consultants

## BY

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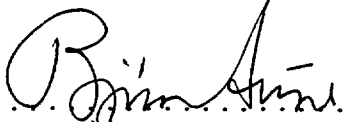
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## SUMMARY

The WMO Commission for Climatology (CCL) sessions include a lecture in memory of Professor Helmuth E. Landsberg.

The report is the text of the lecture held at CCL-XII in Geneva August 11th 1997.

## SIGNATURE

  
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Bjørn Aune  
Head of Climatological Division

## Introduction

The WMO Commission for Climatology (CCI) sessions include a lecture in memory of Professor Helmuth E. Landsberg. Professor H. E. Landsberg, one of the worlds leading figures in climatology, held the office of the President of the Commission between 1969 and 1978. He died suddenly on 6 December 1985 while attending the ninth session of the Commission as observer for the International Society of Biometeorology. The Commission decided at the end of its ninth session that in the programme of scientific lectures at its future sessions, a special lecture should be delivered in memory of Professor Landsberg. I had the honour of holding the memorial lecture at the CCI-XII session in Geneva 4. - 14. August 1997.

Questions and remarks after the lecture showed that the points raised were of general interest, and many said that they would use arguments from the lecture in domestic discussions. I have aslo later got informations from other sources which - at least in my own opinion - support the critical remarks and warnings given in the lecture.

Most national meteorological services (NMS) are responsible for both forecasting and climate services. The **forecasting service** in all NMSs is displayed or marketed both in names of units within the organizations and several times daily in different general and special forecasts through TV, radio, newspapers and other communication methods. The **climate service** in many NMSs is on the other hand hidden in different units with other names, units who also very often in administraive terms are parts of the so called infrastructure, i.e. support units.

This organizational hiding of the climatological activities has at least three negaive effects. The first is that the general public does not apprehend that the NMS do climate services and goes to private companies and others who clearly advertise their services. The Governments react the same way. In Norway several tasks that - at least the way I see it - should have been given to the NMS as a public institution, have instead been given to the Norwegian Institute for Air Research (NILU) whisch is a private foundation for R&D0,.

The second negative effect is that the small special units are to small to sustain and increase the professional standards of the services. The climate field is very large and most services and research projects demands combinations of several professional specialities.

The third negative effect is that by splitting the climate service into pieces and putting the pieces into different parts of the organization the climate services do not have a joint "face" any longer. There is no office or person that can fight for the whole climate service any more. This can of course be a relief for a forecasting-oriented management, but it is a marketing disaster externally, internally and in collaboration with other meteorological services.

Some have said that I paint a pessimistic picture of the future for the national climate services. Yes, I am pessimistic for the services that have been ruined to fit premature information technological and commercial ideas. These services will continue to deteriorate if they are not changed. But I am positive for the climate services that have kept their identity and

versatility. And happily some NMSs have realised their former mistakes and are or at least are thinking of making amendments. There are lots of knowledge and capacities within most national climate services, and they are, if allowed, able to do the best services.

But there is one new main condition that has to be fulfilled. The national climate services have to become more international and cooperate more with each other. That is stressed in the lecture and several incidents have later convinced me of its importance. It is a paradox that in most NMSs we have weather forecasting that is based on international cooperation and climate services that is mainly domestical. Few NMSs have international climate services, and in those cases they are not or only to a small degree results of international cooperation.

Why should climate services be more international? Most services have up to now had little need for it. The main reason for internationalisation is that the professional level of the services are now so high that at least the minor services no longer can have expertise in all services that are demanded from them. So cooperation in professional expertise is needed. An other reason is the combination of economy and information technology. Economical restrictions can be overcome by introducing better technology, and in some cases by sharing technology, both programmes and hardware.

So the future is promising for the NMSs that stand up proactively to the challenges for their climate services. They will be the winners in a harder, more open and more commercial and privatized future with needs for more advanced professional climate and environmental services and fewer independent NMSs.

## **The H. Landsberg Memorial Lecture at CCI-XII**

**National Climate Services,  
from data collectors to environmental consultants**

**by**

**Bjorn Aune,  
Norwegian Meteorological Institute**

I want first of all to thank the President and the Secretariat for asking me to present the Landsberg lecture at this Commission meeting. I hope that I do not disappoint them by talking about the National Climate Services and the situation for the "small climatologists", who are in the front line towards the general public and the research communities. In this WMO Commission and in other fora they are often more or less forgotten. Some of them may, with more or less truth, argue that they are often forgotten also within their own services. At this point I have to admit that by reading through the manuscript after I had written it, I find that a larger part than I thought is about cooperation. I must also admit that most of what I am going to talk about is seen from Europe. But I hope that it is still of value for those who come from other regions. Holding this lecture does not mean that I am a CCI rapporteur on the subject. I have not sent out questionnaires and analysed a large amount of material. What I am going to say is only based on my own experiences during many years of service. Some may not agree to all that I will be saying and that may start a discussion. But if we thereby start a process that will improve some climate services in the future, we act in the spirit of H. Landsberg.

If we compare the weather forecasting services and the climate services we see spectacular differences. The forecasting services have a continuous worldwide cooperative system, produce more or less the same few products and are using large resources, both human and financial. The climate services operate mainly on their own within their national territory, have a large variety of products and are using small resources, both human and financial.

When we look at the climate services of the individual National Meteorological Services we find that they quite naturally differ in size and fields of activity. Most of them have limited resources and work within different degrees of commercialization. A few are using large supercomputers, others have nearly no electronic data processing equipment at all.

We must of course not equate forecasting and climate services. The main purposes of forecasting are security and short term planning, and the main purposes of climatology are environment and long term planning. The basis for both are meteorological data, but from that base - the more advanced they get - the more they move away from each other. But realizing the differences, the National Climate Services should now look in the direction of the forecasting services for ideas of regional and worldwide operational systems of cooperation.

How did it start and what are the main challenges for the National Climate Services today?

Most of us may start with "Once upon a time..." because we represent meteorological services that are up to 150 years old. When these services started, their main task was observations - to systematically make, collect, check and store observations. They stored the original paper report sheets and made monthly and annual summaries. At that time there were no computers, everything had to be done manually. The Chinese had, maybe, an advantage over the rest of us by using the Abacus. The yearbooks started to come, those sacred publications from which scientists could extract data for further use.

When weather forecasting started and developed, it soon took first priority in most meteorological services. That was also partly due to the little practical use of climatological data in those days. In some countries climatological data were used early for agricultural purposes, and that made great impact on both observations and activities. In other countries practical use of climate data came later. In my own country, Norway, the Parliament, following a proposal from the Architects and Civil Engineers Society, in 1894 allocated special funds for precipitation and hydrological measurements in order to determine the potential for hydropower in the country. So in 1895/1896 the Norwegian Meteorological Institute established 263 precipitation stations. These stations were the start of the network of precipitation stations that we have today. But except from the hydropower industry, applications of climatological information started very late in Norway.

Many countries with relatively new National Meteorological Services are also in the same situation. Many of them are situated in parts of the world where general weather forecasting is not the dominant service. So the start was to take new observations and to organize old ones taken by interested individuals, colonial powers and others. When, many years ago, I worked in Zambia at the newly established Meteorological Department, my main task was to organize a large network of observing stations. Everything had earlier been administrated by the Meteorological Service of Rhodesia and Nyasaland. When Northern Rhodesia became independent and took the name Zambia, all meteorological records from earlier Northern Rhodesia were sent up to Lusaka. I was impressed by both the amount of data and the quality of them, but it was very hard work to get everything organized and get the data in usable form with very limited sources. It was not finished during the time I was there!

In the beginning of the 1960s the first National Meteorological Services started using computers, which of course revolutionized their climate services. But although it had a clear positive effect, it was also a mixed blessing. In most cases one had to convert present climatological staff to computer programmers and other computer jobs, and they had to start from scratch developing computer routines. And from then on it has been a continuous battle with new computers, storing medias and programming languages. It is only during the last couple of years of using a computer that one feels that one has progressed from the previous one. The loser in this battle has been the large amount of older data, the data stored on paper in reports and protocols. To get the bulk of them into computer usable form has been way above the budget of most services.

The introduction of computers lead to one negative development for some climate services. Many climate services have been reorganized into units for observing stations, a computer unit including quality controls and storage, and a smaller climate unit. The last one has in some cases

later been further divided into a research unit, an applied unit and different commercial units. This may be suitable for very large services, but for most it ends up in loss of overview and understanding, and in groups that are too small for sustaining any further increases in professional skill.

Except for CLICOM, all or most developments of climatological computer methods have been done without any international cooperation. They have been made within each individual climate service. That is on the one hand understandable since this is the way climate services have always operated, and on the other hand very remarkable bearing in mind that everybody is developing more or less the same.

CLICOM, which is now used by many climate services, is the first organized cooperative action in climate computer systems. But what will happen when today's user nations grow out of it and go for larger related databases. Do they then have to walk alone, as the rest of us have done, or will we get a new and larger CLICOM related database, a CLICOM RELBAS?

This has been discussed during the meeting. The need is there, but is it wise to copy the former way of doing it? The speed of development of commercial databases, the greater demands on operation, maintenance and service, may now demand a completely different approach.

The next major impact on the National Climate Services is the introduction of commercialization. The "small climatologist" must now also be a businessman or woman, discussing prices and sending invoices. Commercialization has led to rationalization of several products and services, which is positive, but it has in many cases changed priorities from long term scientific tasks to short term commercially profitable tasks. Commercialization of governmental institutions have, in Europe, gone so far that the European Union will soon come up with regulations for it. One solution can be that commercial activities must be transferred to private companies and that everyone may, without cost, use public information for further commercial activities. Another solution may more or less fulfill the situation today. But the competition will be hard in the future, and are the National Climate Services ready for that? One thing is certain: We will meet competition on everything that is commercially profitable, from private companies and from other National Climate Services!

The development during the last 10-20 years has not only been greater demands for data, products and services, but also a marked increase in demands for higher quality and more complexity. The customers demand products comparable to their own professional and technical level and the received climate information is more and more used as one part of combined environmental information. That also means that the climate information has to be produced so that it can easily and comparably go into this environmental information package. That again makes demands on the knowledge and equipment in the climate services.

I hope that what I have said up to now has made it clear what I see as the main challenges for the National Climate Services today and in the near future. How will we meet them?

I have on another occasion compared the situation of the European Climate Services as being like an international company with several regional offices but lacking a main office. I think the

situation is the same in other WMO regions or in the whole world. Most of us are sceptical to main Regional Climate Offices or a World Climate Office. None of us wants to be managed by others. I know that we have World Data Centres, but their functions are different.

I have personally, after having worked with Nordic and European collaboration for some years, come to the conclusion that if the National Climate Services do not want to be reduced to be mainly distributors of raw national meteorological data to other national and international governmental or private agencies, they have to collaborate with each other. Most of us cannot continue the way we do today. It is no longer enough to attend the Commission for Climatology every fourth year. Can CCI and the WMO Secretariat be the centre for this collaboration? Maybe, but only after great changes in the way they operate. They should be part of the collaboration system, be a body above it, but not take much part in the actual practical activities.

Because if we are going to succeed, we have to bring in the people who really work with the problems, and not only directors and managers.

Is it possible to organize a practical and operative collaboration without creating a central body?

Yes, I think it is. We have made a try in Western Europe with the European Climate Support Network (ECSN). The climate services have traditionally operated as shown in Figure 1. Everyone operates independently of each other. The idea with ECSN was to create a network for collaboration among all or some of the members and having focal centres for certain specialities. (Figure 2.) There is no head office, but a Board, an advisory group, a secretariat and project leaders. The first attempt that started in 1993 was not perfect, but we learned a lot as we worked about how it should be. We are now in the process of starting a revised ECSN program where we will concentrate more upon the daily tasks of the National Climate Services.

One of the main topics will be long homogeneous data series for use in research, applied services and information. One of the main questions is how we can supply the research communities with data. Up to now this has been very difficult, not to say impossible. There are many difficulties that have to be removed, scientific, political, commercial, thrust, self-esteem. etc.

Another topic will be collaboration in developing databases. One workshop was held in connection with the European Conference on Applied Climatology in Norrköping last year. It was mainly for people who actually worked with the databases, but many others also attended. The workshop proved very clearly that everyone can gain considerably by collaboration. A more united front will also have impact on the producers of database systems. (Figure 3).

Earlier I mentioned demands on how we present information and products. Geographical information systems (GIS) are now more and more common tools. They are costly and demands considerable expertise to operate. Here is one field where we should collaborate not only for gains nationally, but also internationally.

More and more customers are now interested in visual information in electronic form that covers more than one country and that can also be connected with other information. Corresponding GIS systems and programs will make international cooperation easier and more economical.



My conclusion is that the National Climate Services must start collaborating and first on a regional scale. Most of them are small and vulnerable on their own, but together they are large and strong. All National Climate Services will meet strong competition in the years that come, not only from private companies but also from other services. And it may be that the strongest competition will be between National Services. Large sharks eat small sharks, that is one of the laws of nature. It is already clear that we will see changes in the years to come, national borders no longer protect National Meteorological Services. But with collaboration we can hopefully make the changes that may become positive changes.

And since climatology is not an exclusive science anymore, but part of the environment sciences, most services will gain, at least nationally, by starting organized collaboration with other environmental activities.

Climatologists strive for homogeneity. Breaks in homogeneity are not desirable and should be avoided. But some inhomogeneities are unavoidable and some even profitable. And many of the National Climate Services are now at a crossroads where they must choose the way ahead. There are several options, some are good and some are bad. **We are here representing the services, the challenge is ours.**

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Figures 1 - 3 were shown as overheads during the lecture. Other overheads used during the lecture are not copied here.

# Climatological data bases at European NMS's

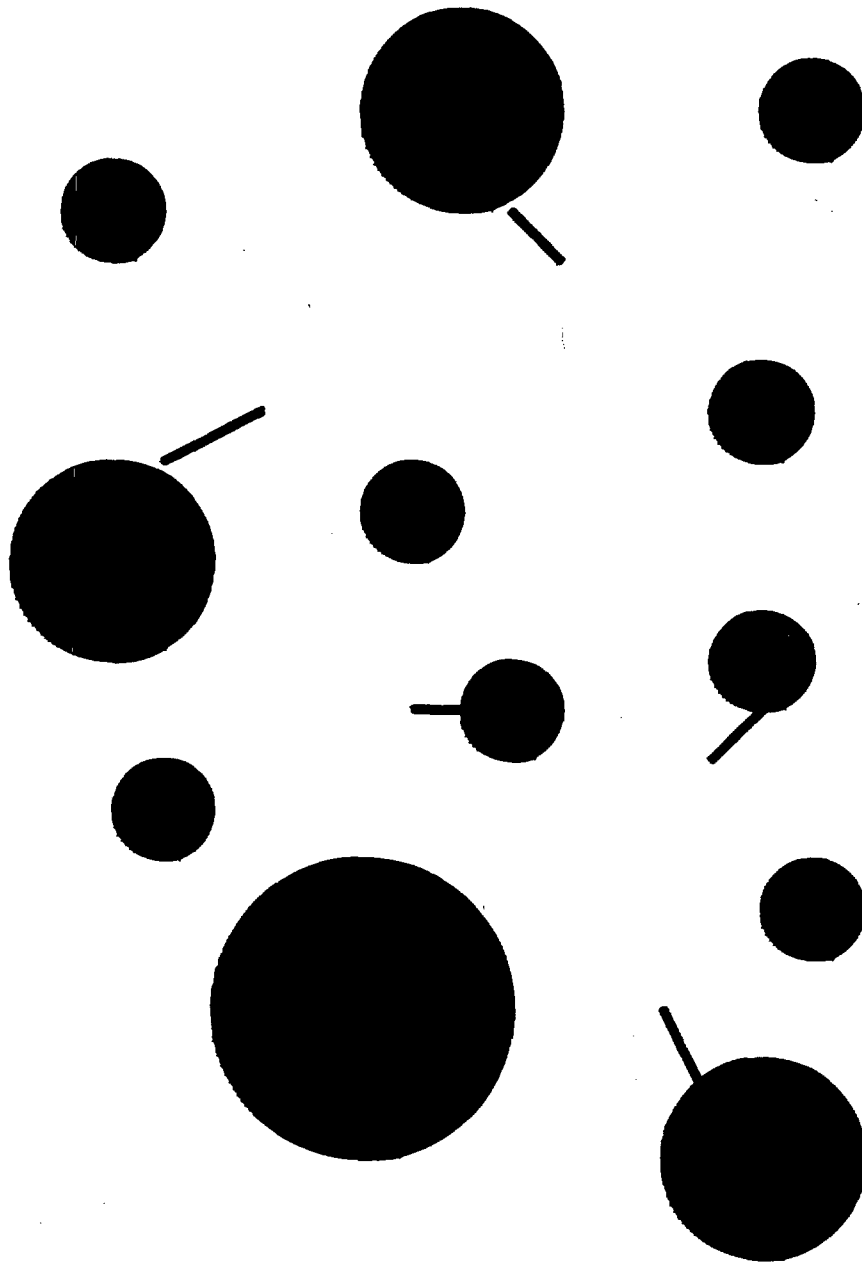


Figure 1. There are no organized links between the national climate services. The figure which has been used earlier, actually shows that there are no organized links between the climatological databases in Europe. Some of them have systems for external access, but for most of them this is arbitrary or impossible.

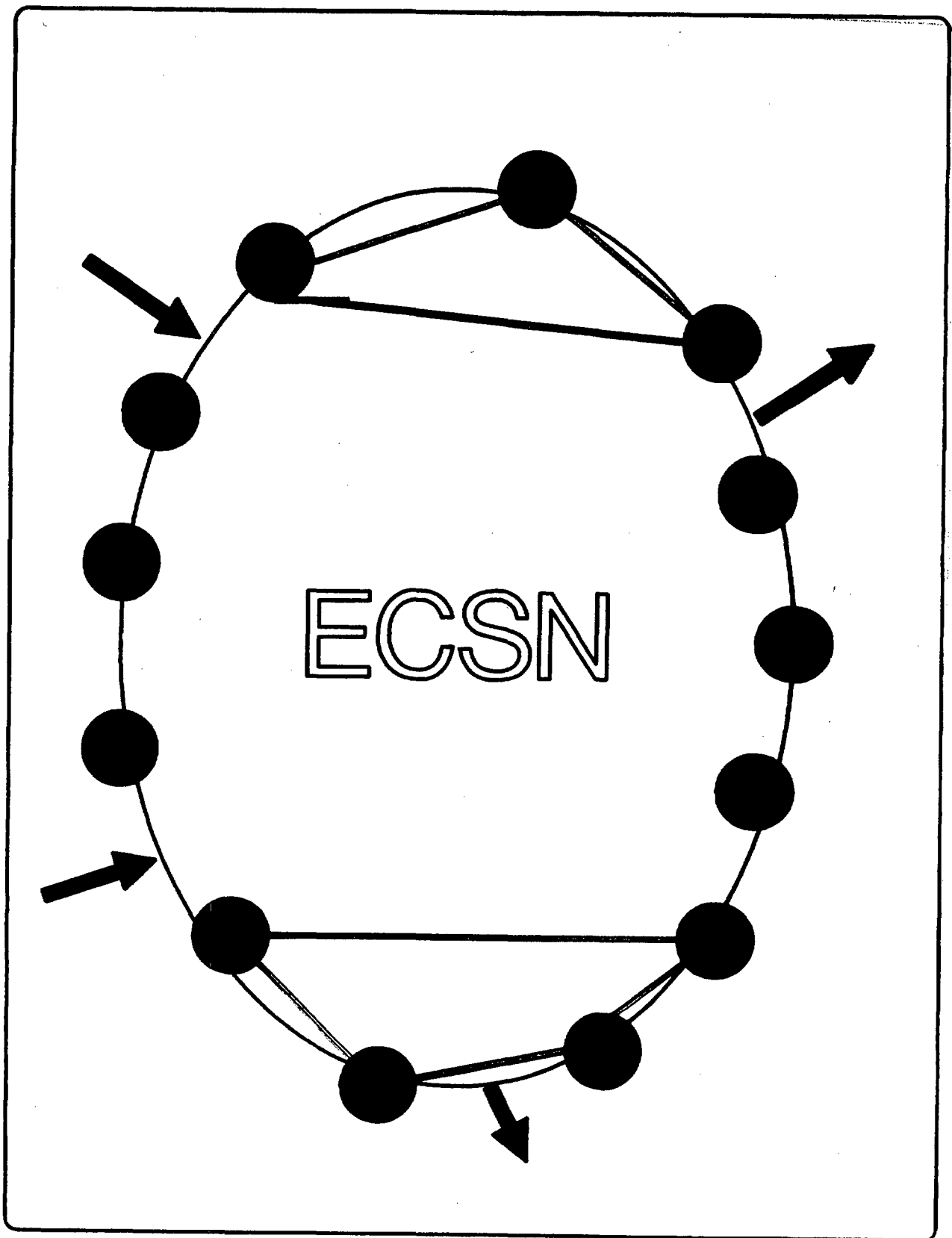


Figure 2. The national climate services works together, in some cases all of them and in other more limited cases some of them. But in both cases is the collaboration within the same organized system.

# **Climatological databases**

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**Different systems**

**Little or no contacts**



**Share and transfer**

**knowledge and experience :**

**philosophy**

**development**

**operation**

**inputs, quality controls, outputs**

**access to data**

**transfer formats**

**etc**

Figure 3. Collaboration about developing, maintaining and using climatological database systems.