

THE MEDIAS-FRANCE STRUCTURE, THE MEDIAS NETWORK, ITS ROLE IN AFRICA

J.P. Lacaux, G. Begni *

MEDIAS-France, CNES-Bpi 2102, 18 Avenue Edouard Belin, 31401 Toulouse Cedex 4, France, {lacaux, begni}@medias.cnes.fr

KEY WORDS: Developing Countries, Climate, Ecosystem, Land Use, Cooperation, Impact analysis, Networks, Observations

ABSTRACT:

The MEDIAS network was set up to develop interdisciplinary research on global change issues, its origins and impacts at regional, national and local scales. The main goal of that network is to promote appropriate interdisciplinary studies that address global environmental issues from a regional perspective, to develop long term observing systems, data management, training, analysis and synthesis of results, and dialogue with the socio-economic world, on a collaborative basis at regional scale. It is co-ordinated by the MEDIAS-France structure, in close relationship with such structures as EC/ENRICH, START, ACMAD, OSS. Developing the MEDIAS network activities in Africa is a high priority. Several major issues are addressed through international projects. The most important areas of concern are: palaeoclimatology; seasonal climate forecasting, including water resources availability; dynamics of the African monsoon; tropospheric chemistry; survey of various climate change impacts at regional, sub-regional and local scales; desertification monitoring; diseases propagation. Capacity building actions are led to strengthen the regional scientific community. The MEDIAS network in Africa will develop its activities to better face the socio-economic concerns and challenges linked to regional aspects of climate change issues.

1. MEDIAS-FRANCE, ITS OBJECTIVES AND PARTNERS

"Think globally, act locally", Global change issues are a major scientific and socio-economic concern for the whole mankind. Nevertheless, its origins and impacts are of specific concern at the regional, national and local scales, which bring the actual attention of citizens and policy makers. In fact, addressing these issues need both a multidisciplinary and a multi-scale nested approach, taking into account highly complex scientific research and major socio-economic challenges in a global integrated approach, most often based on the so-called DPSIR (Drivers, Pressure, State, Impact, Responses) model. One of the answers of such a challenge is to set up dedicated regional interdisciplinary scientific networks, closely linked to major international programs dealing with global change issues. The challenge is both scientific and institutional, since natural regions do not always have relevant regional or political structures, and finding a common language between scientists and decision-makers is most often a difficult work. So, having federative structures appear as a relevant solution to help filling these gaps.

Such a leading idea led to develop the MEDIAS network concept and its federative structure, MEDIAS-France. This structure was created in 1994 and consolidated in 2000 as a non-profit organisation ruled by the French law. Its main objective is to bring together scientists and policy makers addressing global change issues, origins and impacts at global, regional and local scales within the so-called international MEDIAS network. The main goal of that network is to promote appropriate interdisciplinary studies that address global environmental issues from a regional perspective, and to develop long term observing systems, data management, training, analysis and synthesis of results, and dialogue with the socio-economic world, on a collaborative basis at regional scale (Hoepffner et al., 2000). From its very beginning, it was

encouraged by such structures as ENRICH (EC) and START (IGBP/IHDP/WCRP), ensuring its Regional secretariat in the Mediterranean region. These key structures could be described in few words.

The overall objective of ENRICH is to pursue a major coherent European contribution to international actions on global change research. ENRICH aims first to support the knowledge base for the development of EU policy objectives, It intends to do so by acting as a clearinghouse for the exchange of information and by promoting co-operation in research and capacity building. ENRICH aims also to encourage the endogenous research capabilities in developing countries mainly, but not exclusively, in Africa and the Mediterranean Basin. ENRICH achieves its objectives mainly by following three fundamental principles underpinning its concept. These are: improvement of communication, collaboration and co-ordination with the aim to increase synergy and coherence; promotion of partnership; and promotion of capacity building in the geographical regions concerned.

The SysTEM for Analysis, Research and Training (START) initiative provides the necessary structure of networks, centres and sites to address the regional aspects of global change. It focuses on training and capacity building to strengthen the much-needed participation of developing countries in global change research. Regional research networks are progressively established and developed in a number of regions which have been defined as a primary basis in terms of scientific needs, biogeographical features and existing regional collaborations. An important effort in developing START activities is directed at the Mediterranean and Africa. MEDIAS-France acts as the START regional Mediterranean secretariat (MEDCOM), and works in close connection with its African counterpart (PASS). MEDIAS-France and START have evolved in close partnership, jointly sponsoring several activities.

* Corresponding author.

In Africa, it should be emphasised that MEDIAS-France has very close links with ACMAD and OSS, which are two pillars of its action.

The goal of ACMAD, an international African organisation, is to implement an operational programme for Africa in the field of climate watch and numerical forecast. Its guidelines are enhancing the capacities of the national meteorological offices, developing new skills and tools, obtaining the regular distribution of its outputs to the member countries in charge of improving and extending them to their own benefit.

OSS, the "Sahara and Sahel Observatory", is also an independent international organisation composed of African and European countries, regional and international organisations, and representatives of civil society. Its mission is to strive to build up an African arena for co-operation and exchange to combat desertification and poverty, promoting a North-South mutually profitable partnership and networking, working with member states and organisations and strengthening their actions, but never acting in their stead. The OSS overall objective is to harness, disseminate and share information to encourage and develop sustainable natural resource management. More specifically, OSS supports the implementation of the Convention to Combat Desertification in Africa.

Presently, MEDIAS-France brings formally together seven institutions: CNES, METEO-France, IRD, CNRS/INSU, UPS, CLS, and SPOT -IMAGE. It acts as the international MEDIAS network co-ordinator. This network brings together some 2300 scientists and policy makers¹, and 1000 various organisations. At its beginning, the Mediterranean basin and subtropical Africa were the sole geographical working areas of the network. Today, some extensions are on the way (notably to the Central Asia area), but these regions remain a top priority in the network activities and concerns. A great attention is paid to Africa, both through overarching research themes such as atmospheric chemistry or paleoclimatology, and more targeted themes such as water resources, land use or desertification.

MEDIAS-France is not a research centre in itself. Its objective is to act as a service structure encouraging scientists and researchers to have a better dialogue, ensure proper synergies, have access to better information tools and training opportunities, have their voice better heard by their own colleagues, international donors and decision makers. The MEDIAS network is primarily what its members want it to be, and is mainly built by their own efforts and contributions. MEDIAS-France provides services, outreach and capacity building activities, in order to assist such a development on an equity basis. Setting up links between developed and less favoured countries is a key word for MEDIAS-France (Fellous and Hoepffner, 1995; Begni, 1998, 2002).

The MEDIAS network scientists and policy makers are involved in a very wide set of interacting domains, building interdisciplinary approaches. Some relevant examples can be presented here.

¹ As an example, figures showing the number of members of the MEDIAS network in some African countries can be given (Feb. 2002): Morocco: 58; Algeria: 55; Tunisia: 44; Egypt: 37; Niger: 53; Burkina-Faso: 21; Senegal: 49; Ivory Coast: 59; Kenya: 101; Tanzania: 7; Congo: 29; RSA: 22.

2. MAJOR ACTIVITIES OF CONCERN TO AFRICA

Even if it does not make a great use of remote sensing and GIS technologies, palaeoclimatology is a key research area. Its historical perspective offers a better knowledge and understanding of past climate evolution, thus paving the way to an improvement of climate modelling on a global and regional, a key issue to consolidate the global change science. Africa is very rich in palaeoclimatic records, which deserve to be open to the widest scientific community, and in priority African scientists within capacity building and technological transfer actions. Two main programmes co-ordinated by MEDIAS-France respond to such objectives. The African Pollen Database (APD) is an international network, which supports the development of scientific research in Africa in the field of past environmental and climate change. The SEARCH programme aims at "Training and capacity building for data information in Support of Euro-African collaboration on Research in global CHange".

These programmes provide tools to maintain and develop efforts for high level research in Africa. They allow to train students and young scientists to assess past biodiversity in Africa and understand its evolution under climatic or human control. This is made by integrating them into well-equipped laboratories for training courses, workshops for scientific and computer training with the appropriate software's, facilitating the participation of African scientists in international research programmes, and distributing products (CD-ROM, data compilation, Web mirrors, etc.).

Seasonal climate forecasting in Africa, or at sub-regional scales such as Maghreb, is a major concern to resource managers. The water resource is scarce. Remote sensing techniques allow to quantify the demand, mainly through agricultural and pastoral resource monitoring, while seasonal forecast allow to better manage the supply side on a short term basis in order to avoid waste and shortages. Of course, longer term projections are also mandatory, and need both socio-economic predictive models, land use projections extrapolating existing knowledge extracted from remote sensing products archives and longer term climate forecasting. Such projects as ELMASIFA, or new initiatives led by ARCE (Algeria) within the post-RICAMARE context are an important step on that complex way. Close co-operation with ACMAD, regional initiatives and national meteorological centres is mandatory to lead such activities in a coherent institutional and technical framework (Bobée et al., 2000; Planton et al., 2001).

Atmospheric chemistry in that complex and thermodynamically active area, its interactions with anthropogenic effects (biomass burning including savannah, forest and domestic fires, etc.) is also a field of research strongly encouraged by such projects as EXPRESSO and IDAF. Coupled use of space observing systems dedicated to land cover observation and its changes on one hand, atmospheric chemistry observation on the other hand (ENVISAT for instance) pave a very promising way in that direction. (Hoepffner et al., 1996; Brocard and Lacaux, 1998; Brivio et al., 1999; Delmas et al., 1999; Ruellan et al., 1999; Galy-Lacaux et al., 2001; Lacaux, 2002).

The survey of various climate change impacts at regional, sub-regional and local scales is also encouraged through several projects at several scales. In such projects, bringing together modelling techniques and land use and cover change observation through remote sensing and GIS technologies is a key issue. A major theme is desertification monitoring and

forecast. Again, remote sensing archives and observations coupled to in situ data, socio-economic models and climate change models are key issues. Most often these studies were (and are) led in close partnership with OSS. The development of scientifically assessed desertification indicators in line with the UNCCD is a key activity in that domain (Mainguet et al., 2001).

MEDIAS-France and UCLM are co-ordinating the RICAMARE project and its follow-on post-RICAMARE action plan. The project aimed at identifying the present the state-of-art and gaps in global change knowledge in the Mediterranean, promoting a priority regional research agenda in the forthcoming years, facilitating capacity building and transfer technology in the basin, and setting up a dedicated regional sub-network (Puigdefàbregas, 2001). The objective of the post-RICAMARE action plan is to fill these gaps. An emphasis is made on some major North-African issues such as land use, water resources assessment, and such resulting phenomena as desertification. Encouraged by MEDIAS-France, synergies do exist between that action plan and activities led within other frameworks, as explained above.

One of the major impacts of environmental change and anthropogenic pressure is the development of new conditions for disease propagation. The MEDIAS network has been recently joined by scientists specialised in medicine and epidemiology. Taking into account proper epidemiological modelling, new projects under development aim at addressing the environmental conditions of some diseases which seriously impact human health and cattle resource in Africa (Rift Valley Fever in Senegal and Mauritania, for instance). Remote sensing of environment and its evolution has been proven a key input in such models (Begni et al., 2000a).

Last but not least, the so-called AMMA project is under development to study the mechanisms and the dynamics of the African monsoon. This very ambitious project is in its very early definition phase. The story is still to be written. Nevertheless, it can be said that, if successful, that project will be a major step in refining our knowledge of the driving forces of the water cycle in Africa.

An overarching consideration has to be underlined here. No regional research can be led if regional researchers are not properly trained. The MEDIAS network brings a contribution of its own to such an effort through dedicated training and capacity building initiatives. Major actions were undertaken in the past (Nairobi and Niamey summer schools). The idea now is rather to focus on less ambitious involvement and develop co-operative actions, targeting well-focussed items, such as in the MEDTRAIN, SEARCH, RICAMARE projects.

3. CONCLUSION: A STORY UNDER VIGOROUS DEVELOPMENT

The regional scientific and policy-makers communities will face a very hard task in the forthcoming years. Taking into account environmental, climatic global change, acting on its sources, mitigating its impacts, finding innovative ways for sustainable development is a very challenging objective. Socio-economic issues raise major concern, especially in Africa, while the equity principle is far from being taken into proper account in worldwide negotiations about global change (Begni et al., 2000b, 2002).

The MEDIAS network has been developed to bring its modest contribution to such a highly challenging objective. If already

proved it could be a proper tool to channel new technologies such as remote sensing (Begni, 1997) and GIS into an interdisciplinary approach and develop properly targeted capacity building and technology transfer actions.

The MEDIAS network is no longer a concept. Successful achievements have been led. African scientists have been on the forefront. Nevertheless, the challenges we are facing are immense. It is quite mandatory now to capitalise upon new technologies and a proper capacity building to have in hands the proper tools to face them successfully.

REFERENCES

Begni, G., 1997. Operational Products Delivered by the VEGETATION Payload on SPOT 4. Space Technology as a Cost-Effective Tool to Improve Infrastructures in Developing Countries, United Nations - International Astronautical Federation Workshop, Turin, Italy. Edited by United Nations Office for Outer Space Affairs.

Begni, G., 1998. RSS'98, Developing International Connections. EARSel Newsletter N° 36, December.

Begni, G., 2002. Developing Countries and Global Change: the MEDIAS Network. Proceedings of the 1st Workshop of the EARSel Special Interest Group on Remote Sensing for Developing Countries, R. Goossens and B.M. De Vliegheer (Eds.), Gent, 13-15 Sept. 2000.

Begni, G., Poirot, N., Hassan, A., 2000a. Prediction of the evolution of environmental diseases: Introduction and case study on Rift Valley Fever (Egypt, Mauritania, Senegal). International EURISY colloquium "L'utilisation des satellites et des technologies intégrées pour les besoins humanitaires", Varese, Italy, Sept. 19 - 20.

Begni, G., Duong, M. Ha, Lacaux, J.P., Lambin, E., Le Treut, H., Morel, A., Raschke, E., Saugier, B., Vellinga, P., Dekker, A.G., Van Der Woerd, H., Gupta, J., Zerbini, S., 2000b. L'initiative Européenne "Suivi Global Pour l'Environnement et la Sécurité" (GMES - Global Monitoring for Environment and Security) et le Protocole de Kyoto. Besoins en matière d'informations et de données associées". Bulletin de la SFPT, 157, pp. 18-35.

Begni, G., Darras, S., Belward, A., 2002. The Kyoto Protocol: Legal statements, associated phenomena and potential impacts. In: Observing our Environment from Space: new solutions for a new millenium, G.Begni (Ed.), A.A.Balkema, Lisse, Netherlands.

Bobée, B, Carsteanu, A., Hoepffner, M., Lang, M. (Eds.), 2000. Climate variability: Seasonal Forecast for Optimal Management of Water Resources. Special issue of journal Stochastic Environmental Research and Risk Assessment, 14 (4), 211-370.

Brivio, P.A., Gregoire, J.M., Cros, B., Galy-Lacaux, G. and Lacaux, J.P., 1999. A rose analysis method relating air chemistry to fire distribution in tropical Africa. Atmos. Res., 50(2), 81-104.

Brocard, D., Lacaux, J.P., 1998. Domestic biomass combustion and atmospheric emission associated in Western Africa. Global Biogeochemical Cycles, 12(1), 127-139.

Delmas, R., Druilhet, A., Cros, B., Durand, P., Delon, C., Lacaux, J.P., Brustet, J.M., Serça, D., Affre, C., Guenther, A., Greenberg, J., Baugh, W., Harley, P., Klinger, L., Ginoux, P., Brasseur, G., Gregoire, J.P., Janodet, E., Tournier, A., Perros, P., Marion, Th., Gaudichet, A., Cachier, H., Ruellan, S., Masclat, P., Cautenet, S., Poulet, D., Bouka Biona, C., Nganga, D., Tathy, J.P., Minga, A., Loemba-Ndembi, J., 1999. Experiment for Regional Sources and Sinks of Oxidants (EXPRESSO). *J. Geophys. Res.*, 104(D23), 30609-30624.

Fellous, J.L., Hoepffner, M., 1995. Global Change Research Networks: the example of MEDIAS. *Adv. Space Res.*, 17(8), 11-16.

Galy-Lacaux, C., Carmichaël, G.R., Song, C.H., Lacaux, J.P., Modi, I., 2001. Heterogeneous processes involving nitrogenous compounds and Saharan dust inferred from measurements and model calculations Region. *J. Geophys. Res.*, 106(D12), 12559-12578.

Hoepffner, M., Lebel, T., Monteny, B. (Eds.), 1996. Interactions Surface Continentale/ Atmosphère: l'expérience HAPEX-Sahel. Actes des Xèmes Journées Hydrologiques, Montpellier, 13-14 September 1994, Orstom Editions, Collection Colloques et Séminaires, 763 p.

Hoepffner, M., Boichard, J.-L., Cubero-Castan, E., 2000. Gestion et valorisation de données sur l'environnement global: l'exemple de Médias-France. IRD: Les données scientifiques: bases de progrès des connaissances: quelle qualité ? Quel partage ? Quel avenir ? IRD Paris, Collection Colloques et Séminaires (on CD-ROM).

Lacaux, J.-P., 2002. Atmospheric deposition in tropical regions. IGAC book (in press).

Mainguet, M., Dumay, F., Begni, G., 2001. Major driving forces of land degradation at the interface between the urban and rural periphery of Nouakchott (Mauritania). Open Symposium on "Change and Sustainability of Pastoral Land Use Systems in Temperate Asia", Ulaanbaatar, Mongolia, June 28 - July 1, 2001 (to be published).

Planton, S., Hanson, C., Viner, D., Hoepffner, M., 2001. Applying climate scenarios for regional studies with particular reference to the Mediterranean. Proceedings of the EU Concerted Action Initiative ECLAT-2 Workshop 4, Toulouse, France, October 25-27, 2000. Published by Climatic Research Unit, Norwich, UK, 96 p.

Puigdefàbregas, J., 2001. RICAMARE Mediterranean Network: Land Use and Land Cover Change and Water Resources. Lucc Newsletter 6, May.

Ruellan, S., Cachier, H., Gaudichet, A., Masclat, P., Lacaux J.P., 1999. Airborne aerosols over central Africa during the Experiment for Regional Sources and Sinks of Oxidants (EXPRESSO). *J. Geophys. Res.*, 104(D23), 30673-30690.

