



EUROPEAN COMMISSION
JOINT RESEARCH CENTRE
Institute for Environment and Sustainability
Land Management & Natural Hazards Unit



MEETING MINUTES **1st EUROCLIMA meeting – Drought & Desertification** **6-7 April 2011, Santiago de Chile, Chile**

Organizers:

European Commission (EC), Joint Research Centre (JRC), Institute for Environment and Sustainability, Land Management & Natural Hazards Unit;

Water Centre for Arid and Semi-Arid Zones in Latin America and the Caribbean (CAZALAC).

Project:

EUROCLIMA

Place & Organisation visited:

CAZALAC, Santiago de Chile, Chile

Date and duration of the mission:

4th to 7th April 2011, 4 days

Participants:

Dr. Andrés Ravelo (CREAN), Dr. Olga Penalba (Universidad de Buenos Aires), Dr. Roberto Seiler (Universidad Nacional de Río Cuarto), Dr. Humberto Barbosa (Universidad Federal de Alagoas), Dr. Magalí García Cárdenas (Universidad Mayor de San Andrés), Andrés Fernández Barrera (Universidad Católica de Valparaíso), Antonio Yaksik Soulé (Comisión Nacional Emergencias Agrícolas), Carolina Herrera (Dirección General de Aguas), Cesar Morales (CEPAL), Ing. Enrique Muñoz (Universidad de Concepción), Felipe Riquelme (Universidad de Concepción), Francisco Riestra (Dirección General de Aguas), Guido Soto (CAZALAC), Guillermo Dascal (CEPAL), Jorge Espinosa (Universidad de Concepción), Jorge Nuñez Cobo (CAZALAC), Laura Meza (FAO, Chile), Wilfredo Alfaro (CONAF), Ernesto Rangel (IDEAM), Ing. Berny Fallas López (ICE), Roberto Aroche (Instituto de Meteorología), Ing. Fanny Friend Montesdeoca (CIIFEN), Ricardo Zimmermann (Centro de Información Climatológica y Agrometeorológica), Luis Herrera (Comité Nacional del PHI de Guatemala), Ing. Tania Peña Paz (Servicio Nacional de Medio Ambiente), Dr. Aldo Ramírez Orozco (Centro del Agua para América Latina y el Caribe), Lic. Francisco Guerrero M. (INETER), Gladys Villareal (ANAM), Dr. Joel Rojas Acuña (Universidad Nacional Mayor de San Marcos), Agustín Giménez (INIA), Guadalupe Tiscornia (INIA), Ing. Franklin Paredes (U. de los Llanos Ezequiel Zamora), Jason Giovannettone (ICIWARM), Paulo Barbosa (JRC), Michael Cherlet (JRC), Hugo Carrão (JRC), and other local participants to the workshop.

Purpose of the Meeting:

- 1st EUROCLIMA Workshop: Regional Analysis of Precipitation Frequencies based on L-Moments – Robust Estimation of Meteorological Drought Frequencies
- 1st EUROCLIMA meeting – Drought & Desertification

Agenda (Spanish):

CURSO CAPACITACION
**ANALISIS REGIONAL DE FRECUENCIA DE SEQUIAS
BASADO EN L-MOMENTOS**

Estimación robusta de la frecuencia de sequías meteorológicas

Lunes 4 y Martes 5 de Abril, Santiago de Chile, 2011

Programa

Capacitador: Jorge Nuñez Cobo

Día 1: Lunes 4 de Abril 2011

09:00 – 09:15 Palabras de Bienvenida (Guido Soto, Dir. Ejec. CAZALAC; Paulo Barbosa, Coordinador EUROCLIMA Sequía y Desertificación)

09:15 – 10:00 Introducción a la hidrología probabilística (Jorge Nuñez)

10: 00-10:30 Ejemplo de cálculo periodo retorno mediante procedimiento convencional (Jorge Nuñez)

10:30-11:00 RECESO

11:00-13:00 Introducción a los L-momentos y Análisis Regional de Frecuencias (Jorge Nuñez)

13:00-14:30 RECESO ALMUERZO

14:30-15:30

Ejemplo de cálculo ARF-LM Etapa 1: Preparación de Datos (Jorge Nuñez)

15:30-16:00 RECESO CAFE

16:00– 18:00

Ejemplo de cálculo ARF-LM

Etapas 2: Identificación de regiones homogéneas (Jorge Nuñez)

Día 2: Martes 5 de Abril 2011

09:00 – 10:30

Ejemplo de Cálculo ARF-LM:

Etapas 3: Determinación del modelo de probabilidad (Jorge Nuñez)

10:30 – 11:00 RECESO CAFE

11:00-11:30 Ejemplo de cálculo ARF-LM

Etapas 4: Determinación de cuantiles (Jorge Nuñez)

11:30-13:00 Ejemplo de cálculo ARF-LM

Etapas 5: Mapeo (Jorge Nuñez)

13:00-14:30 RECESO ALMUERZO

14:30-15:45 Trabajo individual y análisis final de la metodología (Jorge Nuñez)

15:45-16:00 RECESO CAFE

16:00-17:00 Trabajo individual y análisis final de la metodología (Jorge Nuñez)

1a Reunión de EUROCLIMA – Sequía y Desertificación

6-7 Abril 2011

Santiago de Chile, Chile

Miércoles, 6 de Abril 2011

- 08:30 – 09:00** Recepción y inscripción de los participantes
- 09:00 – 09:15** Bienvenida (CAZALAC/JRC)
- 09:15 – 09:45** Presentación de los participantes (Todos)
- 09:45 – 10:00** Presentación de EUROCLIMA (Paulo Barbosa)
- 10:00 – 10:15** La componente sequía de EUROCLIMA (Hugo Carrao)
- 10:15 – 10:30** La componente desertificación de EUROCLIMA (Michael Cherlet)
- 10:30 – 10:50** **Café**
- 10:50 – 11:10** El Atlas de sequía en áreas piloto de América Latina (AL) (Jorge Nuñez)
- 11:10 – 11:30** El Atlas de zonas áridas de América Latina (Dr. Jason Giovannettone)
- 11:30 – 11:50** Sistemas de monitoreo de sequías en AL: Cuba (Roberto Aroche)
- 11:50 – 12:10** Sistemas de monitoreo de sequías en AL: Argentina (Dr. Ravelo)
- 12:10 – 12:30** Sistemas de monitoreo de sequías en AL: Brasil (Dr. Humberto Barbosa)
- 12:30 – 14:00** **Comida**
- 14:00 – 14:20** Sistema de Pronóstico Estacional Oeste y Sur de Sudamérica: CIIFEN (Fanny Friend)
- 14:20 – 14:40** Sistemas de pronóstico estacional de precipitaciones: Colombia (Ernesto Rangel)
- 14:40 – 15:00** Sistemas de pronóstico estacional de precipitaciones: Costa Rica (Berny Fallas)
- 15:00 – 15:20** Impacto de sequías: Honduras (Tania Peña)
- 15:20 – 15:40** Impacto de sequías: Venezuela (Franklin Paredes)
- 15:40 – 16:00** Impacto de sequías: Nicaragua (Francisco Guerrero)
- 16:00 – 16:20** **Café**
- 16:20 – 16:40** Experiencia de la Dirección General de Aguas en la gestión de sequías en Chile: DGA (Francisco Riestra)
- 16:40 – 17:00** Las sequías frente al cambio climático: México (Aldo Ramirez)
- 17:00 – 17:20** El impacto de cambio climático en los Andes Bolivianos y sus efectos en el incremento de las sequías: Bolivia (Magalí García)
- 17:20 – 17:30** Resumen de la sesión (JRC/CAZALAC)

Jueves, 7 de Abril 2011

- 09:00 – 09:15** Propuesta de colaboración con EuroCLIMA en el tema de la sequía (JRC)
- 09:15 – 10:45** Discusión sobre la colaboración en el tema de la sequía en el marco de EUROCLIMA (Todos)
- 10:45 – 11:00** **Café**

- 11:00 – 12:10** Discusión sobre la colaboración en el tema de la sequía en el marco de EUROCLIMA (Todos)
- 12:10 – 12:30** Presentación del proyecto Atlas Mundial de Desertificación (WAD): JRC
- 12:30 – 14:00** Comida
- 14:00 – 14:20** Sistema Nacional de Gestión de Riesgos Agroclimáticos: Chile (Antonio Yaksic)
- 14:20 – 14:40** Presentación de actividades relacionadas con la monitorización de la desertificación en América Latina: Argentina (Andrés Ravelo)
- 14:40 – 15:00** Presentación de actividades relacionadas con la monitorización de la desertificación en América Latina: Chile (Wilfredo Alfaro, Punto Focal UNCCD Chile)
- 15:00 – 15:20** Sequía por satélite en Perú y el proyecto cátedra concytec "Teledetección de la Sequía y Desertificación": Perú (Joel Rojas Acuña)
- 15:20 – 15:40** Atlas de Tierras Secas y Degradadas: Panamá (Dr. Gladys Villareal)
- 15:40 – 16:00** Los impactos económicos de la degradación de las tierras ante escenarios alternativos de cambio climático en Centroamérica: CEPAL (Cesar Morales)
- 16:00 – 16:20** Propuesta de colaboración con EUROCLIMA en el tema de la desertificación (JRC)
- 16:20 – 16:40** Café
- 16:40 – 17:40** Discusión sobre la colaboración en el tema de desertificación en el marco de EUROCLIMA (Todos)
- 17:40 – 18:00** Conclusiones (JRC/CAZALAC)

Topics:

EUROCLIMA is a DG DEVCO funded initiative (DCI-ALA/2009/021-126) aiming at improving the knowledge of Latin American (LA) decision makers and scientific community on issues and consequences of climate change. The JRC thematic activity is part of the EUROCLIMA initiative. The DESERT Action of the JRC is the scientific responsible for the activities on Desertification, Land Degradation and Drought (DLDD).

As foreseen by the EUROCLIMA Initiative project, a first regional LA meeting on DLDD was organized by JRC, and co-organized by the Centro del Agua para Zonas Áridas y Semiaridas de America Latina y el Caribe (CAZALAC), and took place in Santiago, Chile on 6-7/04/2011. Meteorological, agro-meteorological, drought and land degradation experts from nearly all (*) LA Countries participated very actively to this meeting (at the last moment the expert from Paraguay could not join). National ministerial representatives of Chile as well as regional Latin American organisations were also represented: CAZALAC, United Nations Economic Commission for LA Countries (UN-ECLAC), FAO, and the Centro Internacional para la Investigación del Fenómeno de El Niño (CIIFEN).

(*) 16 Countries: Argentina, Bolivia, Brasil, Chile, Colombia, Costa Rica, Cuba Ecuador, Guatemala, Honduras, México, Nicaragua, Panamá, Peru, Uruguay and Venezuela.

Linked to the organization of the 1st EUROCLIMA regional LA meeting on DLDD, and conform to the EUROCLIMA objective of stimulating South-South cooperation, the meeting was preceded by a two-day intensive training workshop (4-5/04/2011) on "Regional Analysis of Precipitation Frequencies based on L-Moments". In the workshop, taught by CAZALAC, there were about 30 people from the 16 Latin American countries participating in the meeting, as well as several researchers from different Universities in Chile. The workshop was very useful and most of the participants plan to introduce this new methodology in their countries for the analysis of drought frequencies at the national and local levels. The presented regional analysis methodology is an added value to standard approaches when the length of the precipitation time-series collected at individual ground stations is insufficient (or discontinuous) for fitting sound probabilistic distributions to the data. The workshop was felt to offer a very good potential for harmonizing and integrating already existing information and approaches at national or regional levels, while promoting the cooperation between the numerous participants. Indeed, based on the workshop contacts, a network of LA institutions started to be established to support the implementation of the proposed methodology in the 16 LA countries participating in the meeting.

The 1st EUROCLIMA meeting began with the welcome given by Guido Soto (Director of CAZALAC) and Paulo Barbosa (EUROCLIMA Coordinator of Drought and Desertification component). In the sequence, Paulo Barbosa (JRC) presented the EUROCLIMA initiative, Hugo Carrão (JRC) the EUROCLIMA drought component and Michael Cherlet (JRC) the EUROCLIMA desertification component. Next, and following the proposed meeting agenda, each of the participants presented the work on drought and desertification developed within their countries and institutional organizations. The meeting provided an excellent platform for regional networking and exchange in experiences and data. The meeting covered the drought aspects, as well as the desertification and land degradation aspects. All participants were extremely interested and dedicated to make optimal use of this EUROCLIMA

platform to combine efforts, harmonize methods and data, and exchange results. The meeting was assessed as a success in bringing together real experts from all those countries.

For the Drought part it was agreed that CAZALAC would further liaise in the region with all partners and be the focal point for coordinating data exchange. For the Desertification/Land Degradation part, it was agreed that ECLAC would further liaise with (a) Prof. Elena Abraham for arid, semi-arid and sub-humid areas and (b) directly with the experts for the other countries. The EUROCLIMA desertification/land degradation platform will be an integral part of the New World Atlas of Desertification (WAD). Under the EUROCLIMA initiative, DESERT will provide regional datasets on drought and desertification indicators, and a web based platform to facilitate the access to regional and national harmonized datasets.

In the following paragraphs, we resume the works on drought and desertification presented by each of the countries and institutions participating in the EUROCLIMA meeting (please see the Agenda above), as well as the foreseen contribution of each institution to the EUROCLIMA initiative.

- **El Atlas de sequía en áreas piloto de América Latina (AL) (CAZALAC, Dr. Jorge Nuñez)**

The representative of CAZALAC sensitized the meeting audience to the problem of “What is the worst drought ever?”, because since 1968 until today there are yearly recurrent media broadcasts about new “worst droughts” in Chile. In the sequence, to demystify those media alerts, he showed how CAZALAC deals with the drought frequency problem and its magnitude. The data they use are offer by the Water Directorate and the Meteorological Service of Chile.

The contribution of Jorge Nuñez’s presentation to EUROCLIMA initiative was two-fold: a) the computer-aided instruction on regional analysis of meteorological ground stations for estimating more robust and less biased probabilistic distributions of monthly precipitation totals; b) the computer-aided instruction for estimating drought returning periods for drought management at regional scale.

- **El Atlas de Zonas Áridas de América Latina (Dr. Jason Giovannettone)**

The representative of the International Center of Integrated Water Management introduced the “Shared Vision Planning”, an approach to improve the economic, environmental and social outcomes of water management decisions. (<http://www.sharedvisionplanning.us/>). In the sequence he explained that the US National Drought Atlas started from a study on drought carried out between 1989 and 1994, just after the big US drought in 1988. The drought frequency, severity/Intensity and duration are the most important elements for regional managing and planning of water resources. It is also important to estimate the drought returning periods with baseline statistics computed from different time-series and analyse the difference in the values to evaluate the impact of the different time-series in the results – if there is no tendency in the results, then we can use larger time-series to compute baseline statistics instead of shorter “official” time-series (e.g. WMO 1961-1990).

- **Sistemas de monitoreo de sequías en AL: Cuba (Dr. Roberto Aroche)**

INSMET is producing numerous near-real-time products as part of an integrated system for monitoring drought in Cuba and neighbouring countries. Indeed, the institute already established formal contracts with some Caribbean countries for a regional cooperation. The representative of INSMET presented an innovative method, based on spectral and sub-spectral analysis, for weather forecast, the drought risk index (*Indice de Peligro de Sequias*) currently used in Cuba, and the drought monitoring system of Camaguey.

In the framework of EUROCLIMA, there is the change that INSMET can contribute with raw data (gauge precipitation measurements) and drought products for Cuba. The main difficulty is that the focal points for DLDD in Cuba and INSMET belong to different Ministries. Thus, it may be necessary to promote a formal meeting to get an official cooperation between INSMET and the EUROCLIMA initiative. The representative of INSMET also suggested using the server of the institute to facilitate the sharing of products (e.g. SPI for the whole country) and other documents.

- **Sistemas de monitoreo de sequías en AL: Argentina (Dr. Andres Ravelo)**

The representative of CREAM is working on the 3-month forecast of precipitation with neural networks and developing an integrated index with data from different sources (e.g. ground stations and satellite images).

In the framework of EUROCLIMA he suggests to do a study that combines the SPI retrieved from meteorological ground stations data with MODIS satellite images data (as we are doing in the framework of EDO) for South America (or for Argentina in his specific case).

- **Sistemas de monitoreo de sequías en AL: Brasil (Dr. Humberto Barbosa)**

The representative of Brazil presented the EUMETCAST and GEONETCAST systems that he is coordinating in Brazil. These systems offer SPOT-VG and MSG9 images for the whole Brazilian community linked with his network (33 stations receiving data every 15 min). Indeed, this EUMETCAST network receives satellite images (MeteoSat, 4-5km) covering the whole South America (except countries near the Pacific coast). Regarding drought and desertification, Humberto is performing a regionalization of the Brazilian territory with PCA and VARIMAX techniques (using the biomass estimated with the NDVI and the Coefficient of Variation derived from EUMETCAST images as input variables), and detects the fraction of vegetation cover within image pixels to evaluate drought extension and intensity. Please see more detail of project LAPIS.

In the framework of EUROCLIMA project he suggests to use the Brazilian EUMETSAT network to provide regional, national and local drought monitoring products to the South American community. Known Brazilian institutions, such as EMBRAPA and INPE, are in one of his projects and he can contact them to evaluate the possibility of getting some national products related with drought for the EUROCLIMA initiative. In May 2011 there is a METEOSAT meeting to discuss about the products that are offered in the network and would be interesting to get someone of EUROCLIMA there; in August 2011 he will give a workshop on METEOSAT capacity building and he will promote the participation of 5 or 6

representatives of this EUROCLIMA meeting; the EUROCLIMA name should appear as a sponsor of the workshop and in the invitation email to be sent to the participants (for us this can be an open door to increase the visibility of EUROCLIMA project in the framework of drought and desertification initiatives in South America).

- **Sistema de Pronóstico Estacional Oeste y Sur de Sudamérica: CIIFEN (Dr. Fanny Friend)**

The representative of CIIFEN showed the institution's climatological database and their 3-month temperature/precipitation forecasting services for LA region. Their work is carried out using the data produced by the several national institutions (CIIFEN does not collect the data directly; each country produces forecasts with the Climatic Prediction Tool - CPT). This regional centre compiles meteorological information for the whole East Pacific region and sends forecasts by email to more than 15 000 users worldwide, for prevention and mitigation of natural hazards.

In the framework of EUROCLIMA, they will promote the computation of regional statistics with L-moments and provide this information to the platform to be developed by CAZALAC. Because they already have a regional network, they can establish a contact for this new objective with the involved institutions, and make new contacts and the coordination of their work. Indeed, CIIFEN promotes the cooperation between LA institutions and the development of common research projects.

- **Sistemas de pronóstico estacional de precipitaciones: Colombia (Dr. Ernesto Rangel)**

The representative of the Colombian Meteorological Service made a clear distinction between prediction and prognosis, as well as between dynamic and statistical models. In the sequence, it was explained that this institution uses the CPT model for precipitation prediction, because this model is the one that gives the best results for the country. He also explained that in Colombia the Meteorological Service is the institution responsible for monitoring and forecasting drought and that they have all the drought related products.

In the framework of EUROCLIMA, this institute is ready to offer the climatological data of 170 ground stations scattered all over the country (they just need to know the format, the pre-processing, etc. for the data to be delivered); the institute also have some additional products (SPI, risk maps, etc.) that can offer to EUROCLIMA as case studies.

- **Sistemas de pronóstico estacional de precipitaciones: Costa Rica (Dr. Berny Fallas)**

The *Instituto Costarricense de Electricidad* (ICE) produces weather forecasts from several oceanic and atmospheric indices derived from the PCA of in-situ precipitation and temperature measurements. The drought of 2006-2007 was the one that most affected the country in the past years, as there was a deficit of 40% in the water storage levels. The Institute is part of the Central American Water Resource Management Network (CARA), which is collecting national climatological data in the region to develop a regional database for supranational water management.

In the framework of EUROCLIMA, ICE can provide the climatological data that is going to be offered to the CARA database (~170 stations; 30 years of observations).

- **Impacto de sequías: Honduras (Dr. Tania Peña)**

The talk of the representative of Honduras was about the difficulties in developing a drought monitoring system in the country without the support of the Government (the automatic data collectors are obsolete, the informatics systems and networks are limited, the personnel of the institute is not technically specialized). At this moment, with the help of CAZALAC, they are starting to implement a drought observatory in the country.

The Honduran EUROCLIMA meeting participant will get in contact with the focal points of the country and discuss about the involvement within this European Commission initiative. In addition, they will compile the metadata of the available information on climatological variables for the country and return us the coordinates of the respective provider institutions and access conditions.

- **Impacto de sequías: Venezuela (Dr. Franklin Paredes)**

The representative of the Centro de Investigaciones Hidrológicas y Ambientales de la Universidad de Carabobo (CIHA-UC) presented a regionalization methodology for drought assessment and monitoring that is alternative to the L-moments (currently used by CAZALAC).

In the framework of EUROCLIMA, Franklin suggested to upload in the web platform, as a case study, the results attained for Venezuela with this methodology. In addition, he can offer data from ~650 national ground stations (30 years of observations) to the EUROCLIMA initiative, as well as the probabilistic forecasting precipitation product that they compute. In the same way, the papers and reports describing these methodologies can also be uploaded in the platform and disseminated among the EUROCLIMA community.

- **Impacto de sequías: Nicaragua (Dr. Francisco Guerrero)**

The *Instituto Nicaraguense de Estudios Territoriales* – INETER is producing drought risk maps from precipitation anomalies for the mitigation of drought impacts. Nowadays, they are introducing the SPI as an official index (computed from the data of 100 ground stations with at least 30 years of observations) and use the Argentinean SPI risk classes that better fit the data in their region.

The Institute is part of the Central American Water Resource Management Network (CARA), which is collecting national climatological data in the region to develop a regional database for supranational water management. In this sense, they can provide us the climatological data that is going to be offered to the above mentioned database.

- **Experiencia de la Dirección General de Aguas en la gestión de sequías en Chile: DGA (Dr. Francisco Riestra)**

In this presentation it was introduced a broad vision of the operational application of drought indices for water management in Chile. In detail, the representative of Water Directorate (DGA) introduced the way these indices are used to classify periods of extremely drought in the different Chilean regions, and the economic, social and environmental impacts of drought occurrences. Presently, the DGA is working in the computation of SPI and flow indices for the country (the research and development programs are in charge of an investigation centre).

The Institute is available to collaborate with EUROCLIMA by providing the precipitation data of more than 600 ground stations scattered over the country, and the new SPI and flow indices.

- **Las sequías frente al cambio climático: Mexico (Dr. Aldo Ramirez)**

Mexico has a network of ~6 000 meteorological stations reporting daily precipitation and temperature information since 1905/40 (nowadays only ~4 000 are reporting). The Mexican drought observatory is linked with the one of the United States and Canada. At the national scale and in the framework of programs like the *Programa Hidrológico Internacional*, G-WADI Water and Development Information for Arid Lands – A Global Network, they work at 0.5° spatial resolution. Mexico considers the period between 1961-1990 and the scenarios A1B and A2 (IPCC) as baselines for drought products.

The Mexico representative in this EUROCLIMA meeting belongs to a research group that does not hold the climatological data for the country. However, they have good relationships with the Meteorological Institute and so there is no foreseen issue to get the data for EUROCLIMA. The representative believes that it is important to work together with the focal points of the country and in the next national drought expert meeting (*Comité Americano del PHI*), in May 2011, he will promote the EUROCLIMA initiative to them. He will also apply the L-Moments method to their data. The *Banco Inter-Americano de Desarrollo* (BID) will fund some regional projects on the sustainable development of water resources during August 2011. Because drought is a very important topic in that context, maybe EUROCLIMA countries can submit a joint proposal to be funded.

- **El impacto de cambio climático en los Andes Bolivianos y sus efectos en el incremento de las sequías: Bolivia (Dr. Magalí García)**

The representative of Bolivia introduced the link between drought, land degradation and their impacts in the economic and social development of the country. It was shown the effects of drought and desertification in the traditional agricultural practices used in the country. In detail, it was simulated the impacts of Climate Change in the future production of *quinoa* using the AQUACROP model.

Bolivia will contribute to EUROCLIMA with some biophysical, social and economic data of Bolivia. The representative of the country is also available to: (a) validate in the field some of the regional products to be developed in the framework of EUROCLIMA at the continental scale; (b) to apply the L-Moments regionalization methodology at the national level; and (c) to work in the development of some case studies with socio-economic data to be posted in the EUROCLIMA platform.

- **Comisión Nacional de Emergencias Agrícolas: Chile (Antonio Yaksic)**

The representative of this *Comisión* will promote the compilation of the climatological data available in their database and offer these data to CIIFEN that can afterwards release it among the EUROCLIMA participants. Moreover, the representative of this institution will investigate if the Chilean law on public data transparency could be used in such a way that the data of the Meteorological Services could be easily accessed by CIIFEN.

- **Sequía por satélite en Perú y el proyecto cátedra concytec "Teledetección de la Sequía y Desertificación" (Dr. Joel Rojas Acuña)**

The representative of Peru described some finished, on-going and future projects for monitoring drought with satellite images and vegetation indices in Peru. Between 2004 and 2005 he was the coordinator of the project “Sistema de Vigilancia de Sequia en Peru” and nowadays he is coordinating a 3-years project that exploits the sea water temperature, the salinity rate in the soil and some vegetation indices for monitoring drought in Peru and evaluates its relationship with *El Niño*. For drought and desertification monitoring and assessment purposes in Peru he uses the software *Pacha Ricaj (Mirando la Tierra en Quechua)*, *Timestat* and time-series of satellite images.

In the framework of EUROCLIMA, he offered some papers and Master thesis on drought and desertification to be published in the project future platform; these products can be uploaded in EUROCLIMA platform and be distributed among the scientific community.

- **Atlas de Tierras Secas y Degradadas: Panama (Dr. Gladys Villareal)**

The *Autoridad Nacional del Ambiente (ANAM)* introduced the Atlas of Drought and Degraded Lands in Panama. According to this Atlas, there are four regions currently affected by drought and desertification in Panama, which correspond to 28% of the national territory. The representative of Panama showed the two main reasons that contribute to this situation (i.e. the *El Niño* and the water runoff increment due to forest fires and cuts), as well as some good practices to mitigate the phenomenon.

The Atlas can be published as a South American contribution to the EUROCLIMA platform. Nevertheless, it will be difficult to provide some additional climatological data because this information belongs to a private electric company. The head of ANAM participated in the development of the first Aridity Atlas produced by CAZALAC, so other data from ANAM (e.g. land use/cover maps) will be easily offered to EUROCLIMA. The representative of Panama will inform the focal point of the country about the results of the 1st EUROCLIMA meeting on Drought and Desertification.

- **CEPAL (Cesar Morales)**

The representative of CEPAL reinforced the importance of doing capacity building within this EUROCLIMA initiative and promoted the cooperation between participating countries in drought and desertification monitoring and assessment initiatives. An important contribution of CEPAL to EUROCLIMA will be the study

on the economic impact of drought, desertification and Climate Change in South America.

- **Comité Nacional del PHI de Guatemala (Dr. Luis Herrera)**

The *Comité* can contribute to the EUROCLIMA project with: (a) several computer programs developed in R software for water management; and (b) 55 ground stations recording daily precipitation information (20 of them are part of the Central American Water Resource Management Network (CARA), which is collecting national climatological data in the region to develop a regional database for supranational water management).

- **Coordinador Nacional de la Unidad GRAS – Cambio Climático y Sistemas de Información: Uruguay (Dr. Agustín Giménez)**

This Unit does not collect daily information on precipitation, but has an agreement with the Meteorological Service to get monthly precipitation totals from national ground stations. In the framework of their contract with the Meteorological Service, it is possible that they can provide this information to EUROCLIMA. Nevertheless, they are producing an innovative 10-day index for evaluating the hydric balance in the country, which can be uploaded in the EUROCLIMA web platform as their contribution to this initiative.

- **Coordinador del Centro de Información Climatológica y Agrometeorológica: El Salvador (Dr. Ricardo Zimmermann)**

The representative of El Salvador will inform the Director of the *Ministerio de Medio Ambiente y Recursos Naturales* about the importance for the country to collaborate with the EUROCLIMA initiative. The country is already enrolled with the Central American Water Resource Management Network (CARA), and thus he will try to provide EUROCLIMA the same 30 years' time-series (1971-2010) sets of precipitation data from 20 ground stations. In the meanwhile, the representative will also apply the L-Moments technique to regionalize the country according to precipitation frequencies.

- **Universidad Católica de Valparaíso: Chile (Andrés Barrera)**

This University is available to help CAZALAC pre-processing the regional climatological data provided by the different countries involved in EUROCLIMA initiative. This work can be promoted in the framework of Master thesis and other Institutional activities.