GOBIERNO DE ESPAÑA
MINISTERIO DE MEDIO AMBIENTE Y MEDIO RURAL Y MARINO
AEMet Agencia Estatal de Meteorología

Climate Services at AEMET

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Outline

- **Climate Services in AEMET**
- Seasonal Forecasting
- Generation of Climate Change scenarios for Spain
- Climate data management and data provision in AEMET
- Climate monitoring products
- Climate Aplications

Seasonal Forecasting in AEMET

- **Strong demand** of seasonal forecasting products for decision making by institutional and socio-economic sectors
- But, … **low predictability** at mid latitudes. Up to now only viable in “windows of opportunity”
- Currently, seasonal forecasts are only **delivered** to a small number of **governmental authorities** based on **ECMWF, EUROSIP, IRI**
- **Research** activity covers:
  - **downscaling** of global forecasts
  - search of additional **sources of predictability** (e.g., SM)
- **Future** products will rely on combination of models + empirical algorithms

Generation of Climate Change scenarios for Spain: Motivation

- Growing **need of projections of climate change impacts** on different ecosystems and socioeconomic sectors in Spain
  - Urgent requirement of a qualitative and quantitative estimation of the expected changes in the climate system in the XXI century.
  - Provision of some estimation of associated uncertainties
- **AEMET mission** (according to its Statute): periodic generation of Climate Change scenarios for Spain
- "National Plan for Adaptation to Climate Change (PNACC)" (2006): **AEMET is responsible for the coordination of the generation** of regional scenarios of Climate Change for Spain

The Mediterranean Area highly responsive to Climate Change

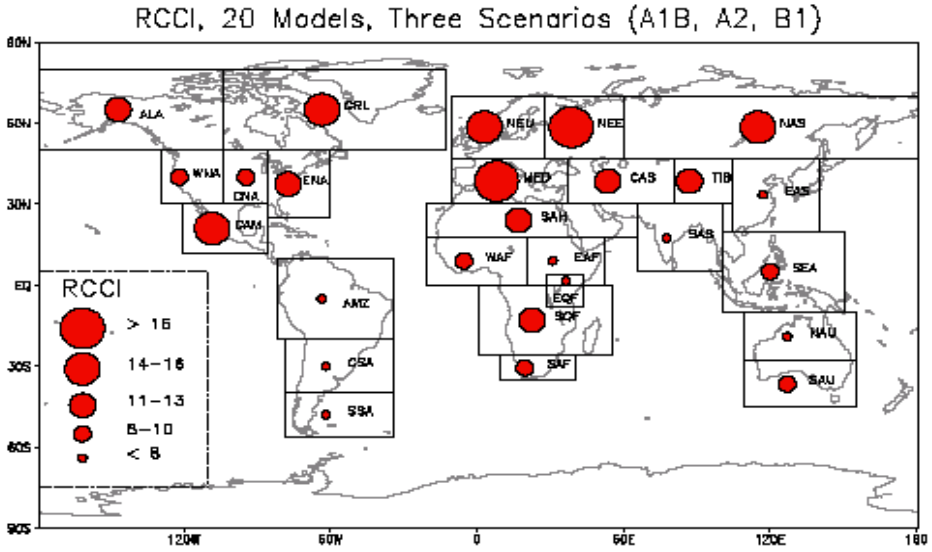

Figure 1. Regional Climate Change Index (RCCI) over 26 land regions of the World calculated from 20 coupled AOGCMs and 3 IPCC emission scenarios (A1B, A2, B1). The models used are BCCR-BCM2-0, CCMA-3-T47, CNRM-CM3, CSIRO-MK3, GFDL-CM2-0, GFDL-CM2-1, GISS-AOM, GISS-EH, GISS-ER, IAP-FGOALS, INMCM3, IPSL-CM4, MIROC3-2H, MIROC3-2M, MIUB-ECHO-G, MPI-ECHAM5, MRI-CGCM2, NCAR-CCSM3, NCAR-PCM1, UKMO-HADCM3. See also Table 1 of GB05a and http://www-pcmdi.llnl.gov.

RCCI based on changes in T, RR y its interannual variability

(Giorgi, 2006)

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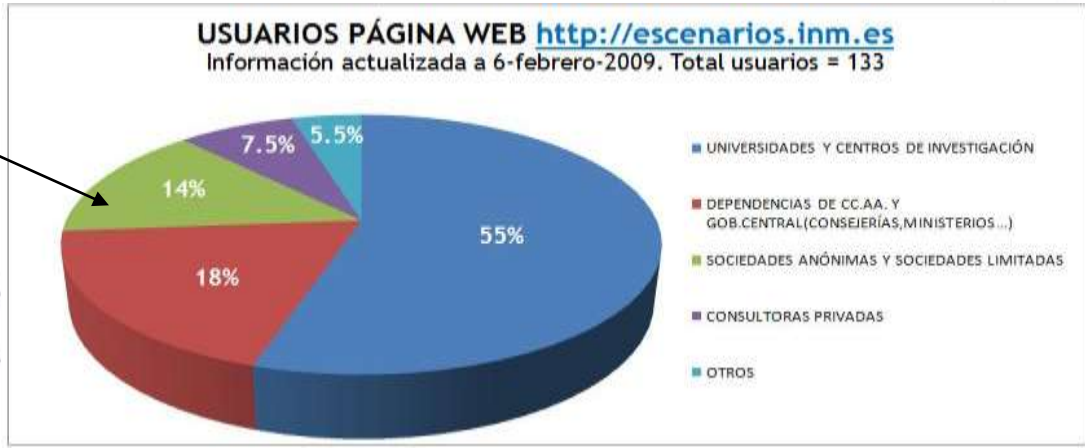
1st Phase (collab. with UCLM y FIC): Final Report and Data

- Usage of already developed methodologies and existing data bases.
- Results obtained in FP5 EU Projects: **PRUDENCE, STARDEX**.
- Duration: 1 year (completed by Dec. 2006)
- Report available from Feb. 2007
- Data available (on a daily basis) through the AEMET web page www.aemet.es



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2nd Phase: A national cooperative effort

- The proposal aims to the coordination of the Spanish scientific community to continuously provide the most likely climate evolution over Spain along the 21st century, in support to the different sectors sensitive to the climate conditions and the adoption of strategic decisions for adaptation to a changing climate.

  The program intends to provide the best scientifically based available information relative to future climate conditions in Spain.
- The final products and results obtained stored in a central data repository available for the community working on impacts and vulnerability, adaptation and mitigation strategies…

Lines of research

(jointly developed by AEMET and Research Projects funded by MARM, MCI)

1. Combination of regional projections obtained with different models and methods.
2. Generation of quality controlled and homogeneous instrumental climate atmospheric and oceanic data bases.
3. Analysis, assesment and validation of the global climate models (AR4-IPCC) in reference observational periods.
4. Dynamical downscaling with Regional Atmosphere Climate Models (RACM)
5. Empirical downscaling with statistical techniques (SDS)
6. Regional Ocean Climate Models (ROCM).

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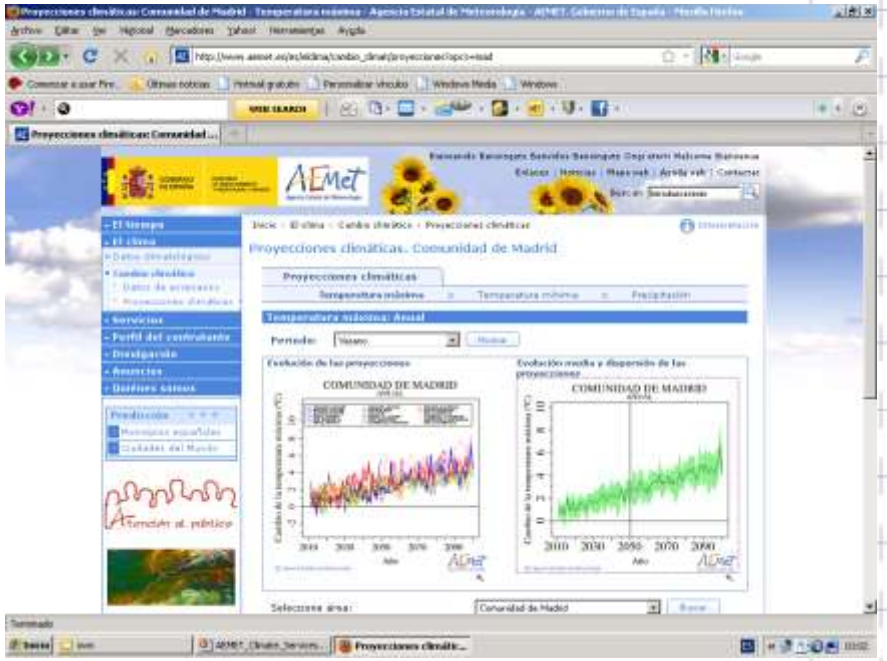
Current services

1. On-line data repository accesible through AEMET web page (previous request of user/password, only for statistical purposes), including daily:
   - downscaled climate change projections over Spain (based on RCMs and SDS),
   - gridded observations

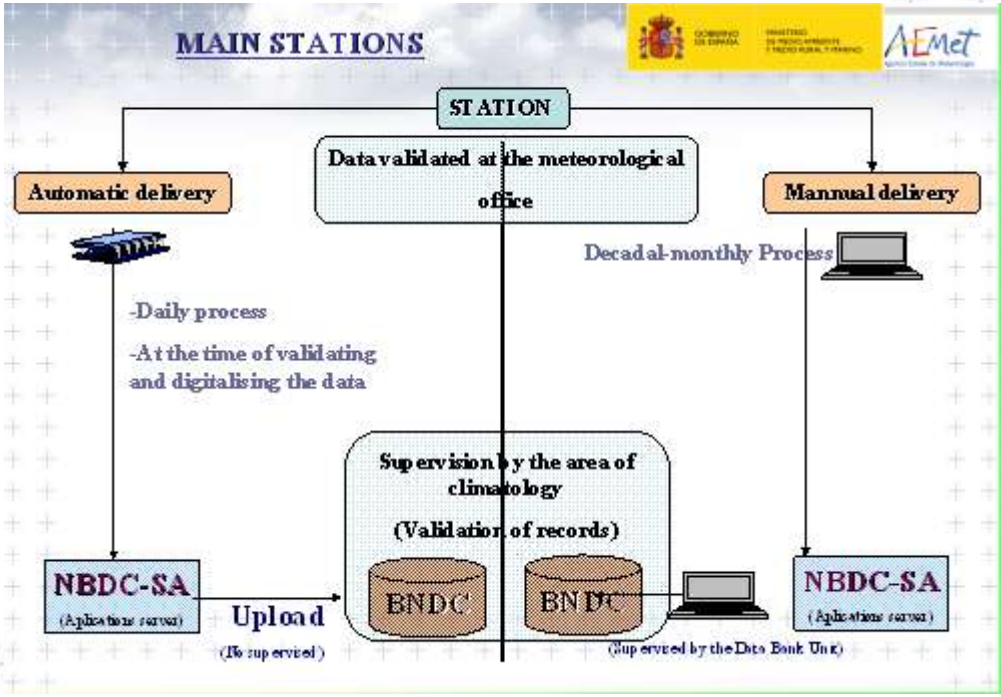
2. Graphical information (accesible through AEMET web page) aggregated by regions.



Climatic Data base in AEMET

The Spanish National Climatic Database is composed by:

1. A centralised Database managed by ORACLE 10g, hosted in a data server SUN FIRE V445 with 4 processors Ultra SPARC.
2. A web server of aplications allocated in a SUN machine.
3. A cartographic server.
4. A Database for developments
5. A Specific ORACLE Database for 10-minutal data that has been recently built-up hosted in the same server that the centralised Database.



Data provision and services

AEMET receives around 10000-15000 climatic data requests from external users by year.

Also some specific climate products are daily provided under contract to some specialised users, in particular:

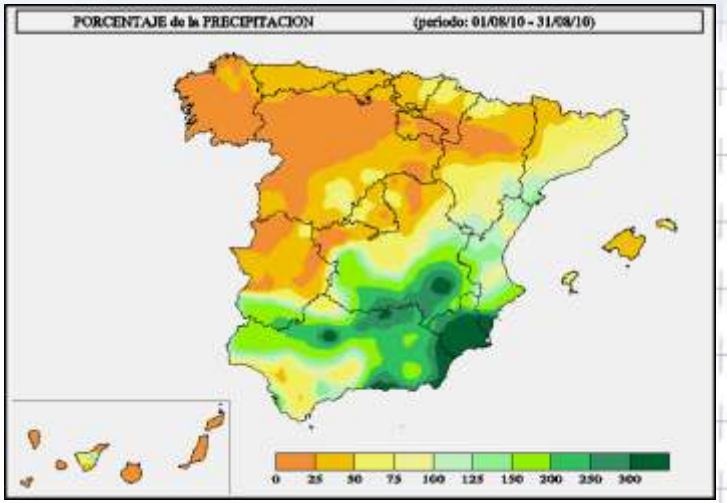
A) Insurance Companies: We produce on demand Certificates and Reports of the ocurrence of some climate conditions.

B) Civil Protection Autorithies

C) Water managers at both central and watershead levels.

D) Health Autorithies

E) The General Direction of Natural Resources Protection

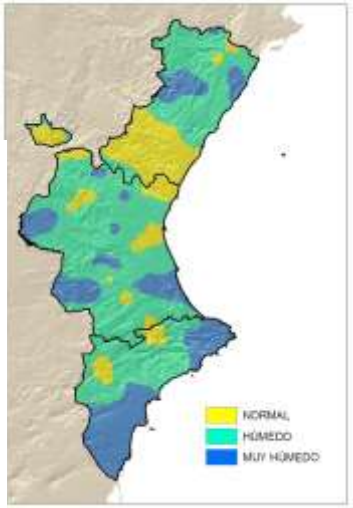


Climate Monitoring Products

A **Climate Monitoring System** based in the Data base information is currently running :

Climate monitoring products for different time scales are routinely issued; some of these products are available at the AEMET Webpage.

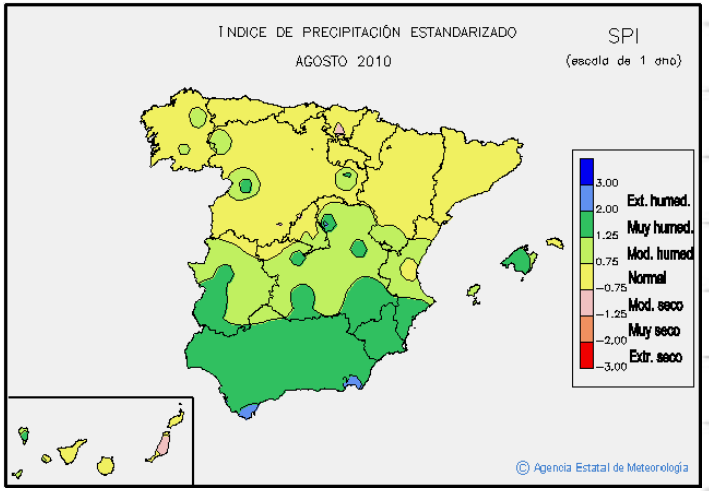
- A) At Daily scale (climate records of the previous day)
- B) At Weekly scale (Ex: weekly reports of precipitation for the Ministry of Enviroment).
- C) At 10-days scale (Ex: Hidryc Balance bulletin)
- D) At Monthly scale (Monthly Climate reports at national and regional scale)
- E) At Seasonal scale (Seasonal Climate reports)
- F) At Annual Scale (Annual Climate reports)

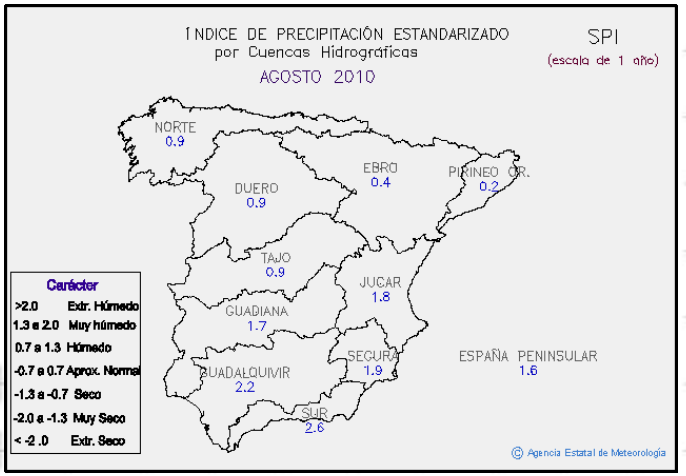


Climate Monitoring Products: Drought Monitoring

A Drought Monitoring System as a part of the Climate Monitoring System is currenlty running :

- Climate data from the NDB as well as daily precipitation data entering in cuasi-real time are the input data.
- The SPI, Mckee et al, (1993) at different time scales is the drought index that is currently used.
- The operational application allows to generate, on a monthly basis a set of graphics and tabulated products related to the SPI for periods ranging from 1 month to 3 years for both national level and watershead scale.



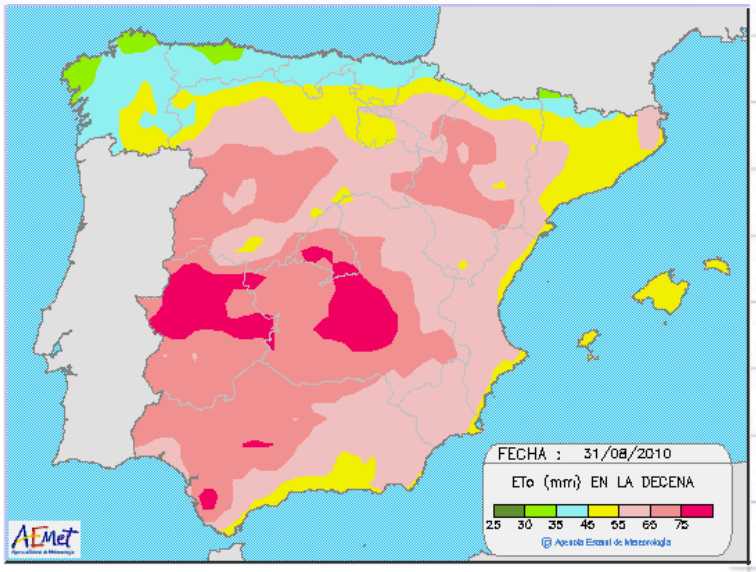


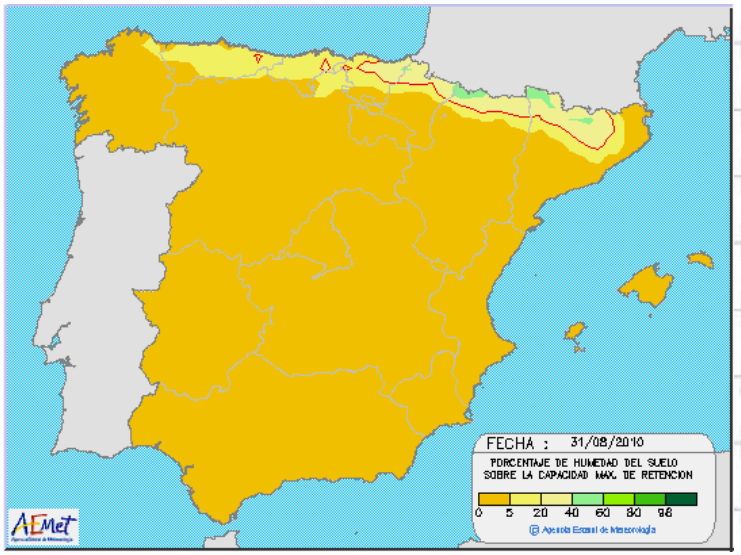
Climate Applications for specific sectors in AEMET

Climate Aplications

Climate Aplications are produced for specific sectors, in particular agricultural and forestry sectors and for water resources managers:

- Some examples :
- **Operational Water Balance**: The AEMET National Water Balance provides a daily assessment of soil moisture conditions, Potential and Real Evapo-transpiration an other parameters on a grid of 0,2° resolution.
- This meets the specific needs of the different users, particularly farmers (irrigation needs evaluation, soil workability, drought assessment and early warning), forestry services (forest fires risk assessment and controlled burning authorisation) and hydrology.
- **Forest fires risk assessment** and Forest Fire Risk Climatology.
- **Specific studies** for Agrarian Insurance Companies concerning the climatological risk of conditions favourable for the development of specific plant pests and diseases.





CISCLIMA: strategic alliance to move forward

1. The *Centro Ibérico de Servicios del Clima* (CISCLIMA) is an agreement between IM (Portugal) and AEMET (Spain) to coordinate, develop and improve climate services

2. CISCLIMA objectives are:

   - improve capacity for delivery climate information,
   - improve data availability,
   - facilitate usage of climate information for decision makers,
   - improve capacity building,
   - activities relevant to adaptation

¡Thanks for your attention¡