



AND EXTREME CLIMATE EVENTS

INSTITUTO DE METEOROLOGIA

**MARCH 10, 2009
CUBA**

□ Climate, as a natural resource, could be used to a sustainable development of our societies.

□ Society must be very carefully in relation with the extreme climate events. They are the most dramatic way through climate variability and climate change can affect society.

□ Adaptation to climate variability and change is also an important frame to the National Weather Services. They can contribute in climate risk assessment and helping in disaster reduction.

**□ MAIN EXTREME CLIMATE EVENTS
OCCURRED IN CUBA DURING THE
LAST THREE DECADES :**

- ***Increase of the hurricane activity since 1995 (including: six major hurricanes since 2001; the very active hurricane season of 2008).***
- ***Heavy rains and floods.***
- ***Increased frequency of drought (including the severe and extended drought of 2003 – 2005).***

□ THE CUBAN EXPERIENCE :

***(Increase of the hurricane activity and
Heavy rains and flood)***

- The hazard assessment of hurricane impact on Cuba, including a review of historical information during the last two centuries, as a contribution to the climate risk assessment.***
- A professional and a well organized National Meteorological Service, including the increased capacity of the national weather watch system.***

□ *THE CUBAN EXPERIENCE :*

***(Increase of the hurricane activity and
Heavy rains and flood)***

- Public education and awareness.***
- The Early Warning.***
- A very accessible information system.***
- A well established and structured
response system: a very good
relation work between the Institute of
Meteorology and the Civil Defense.***

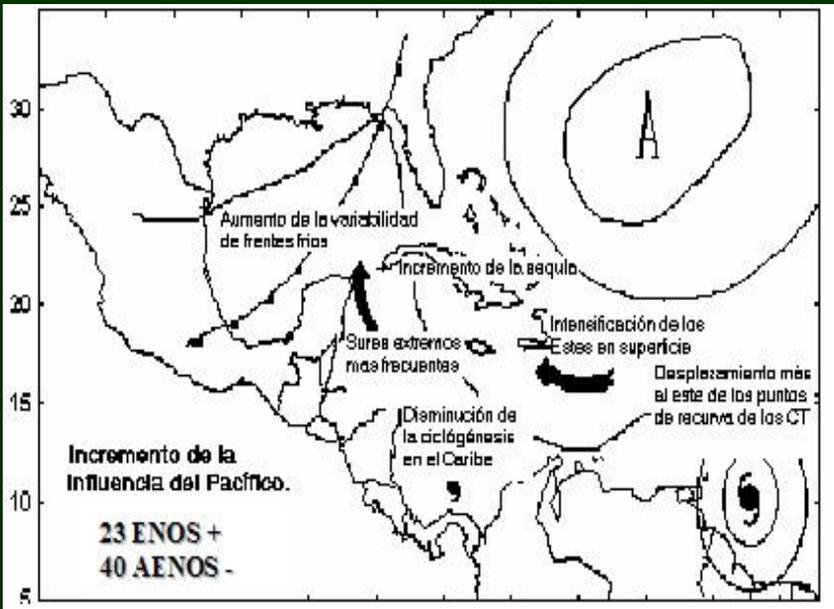
□ *THE CUBAN EXPERIENCE :*

(Increased frequency of drought.)

- *The systematic assessment about the state of the climate, its variations and trends.*
- *The Climate Monitoring System, including the monitoring of meteorological and agriculture drought.*
- *Capacity building.*
- *Collaboration.*

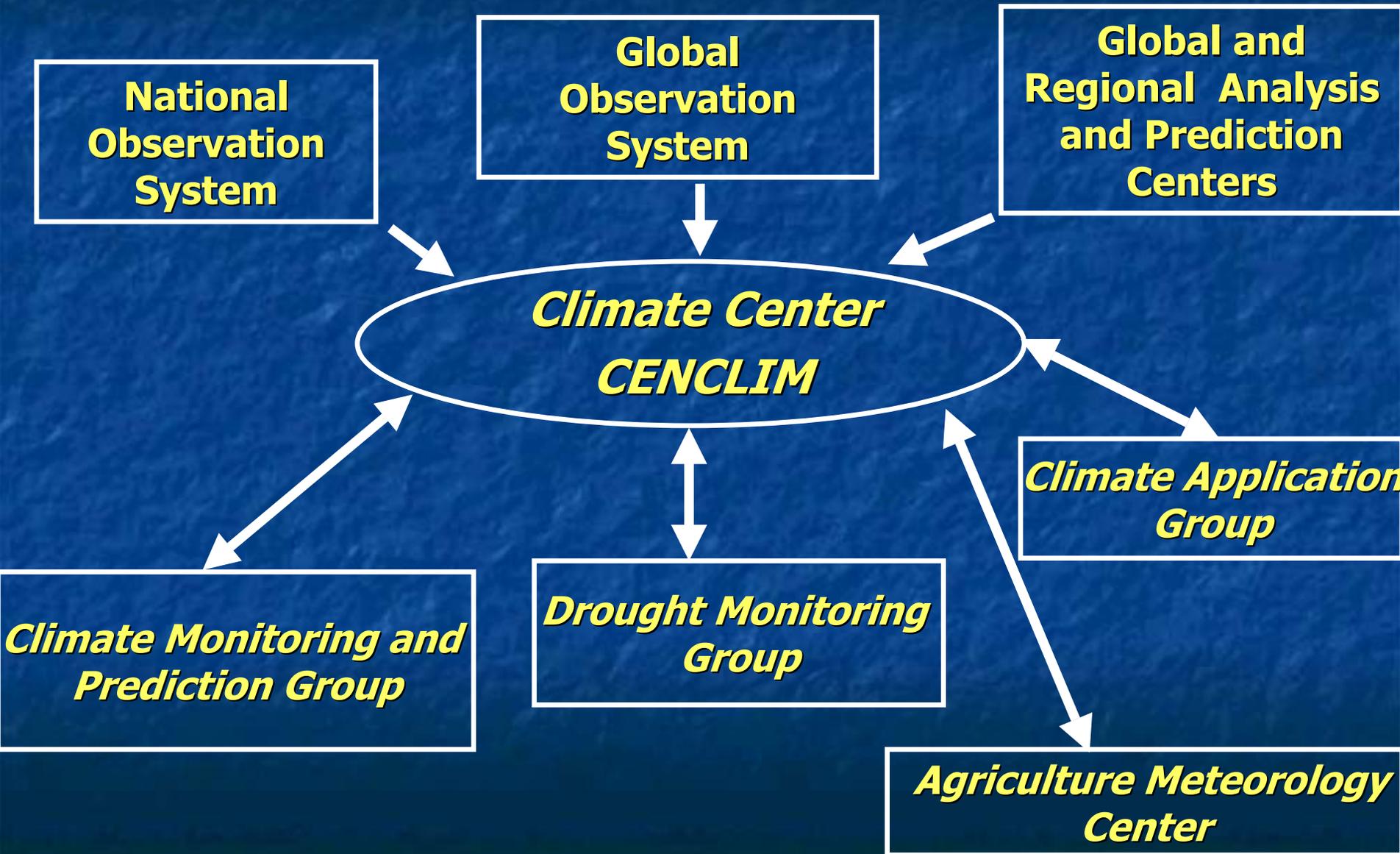
▪ On 1997 the Institute of Meteorology issued an statement about the Cuban climate observed variations:

“...the assessment of the climate observed variations let us to say that the Cuban climate is going to the new state, with similar characteristics to those projected for a climate change.”.



- ✓ **Increase of air surface temperature .**
- ✓ **Reduction of the diurnal oscillation of temperature.**
- ✓ **Increased frequency of lasting and severe drought, mainly during summer.**

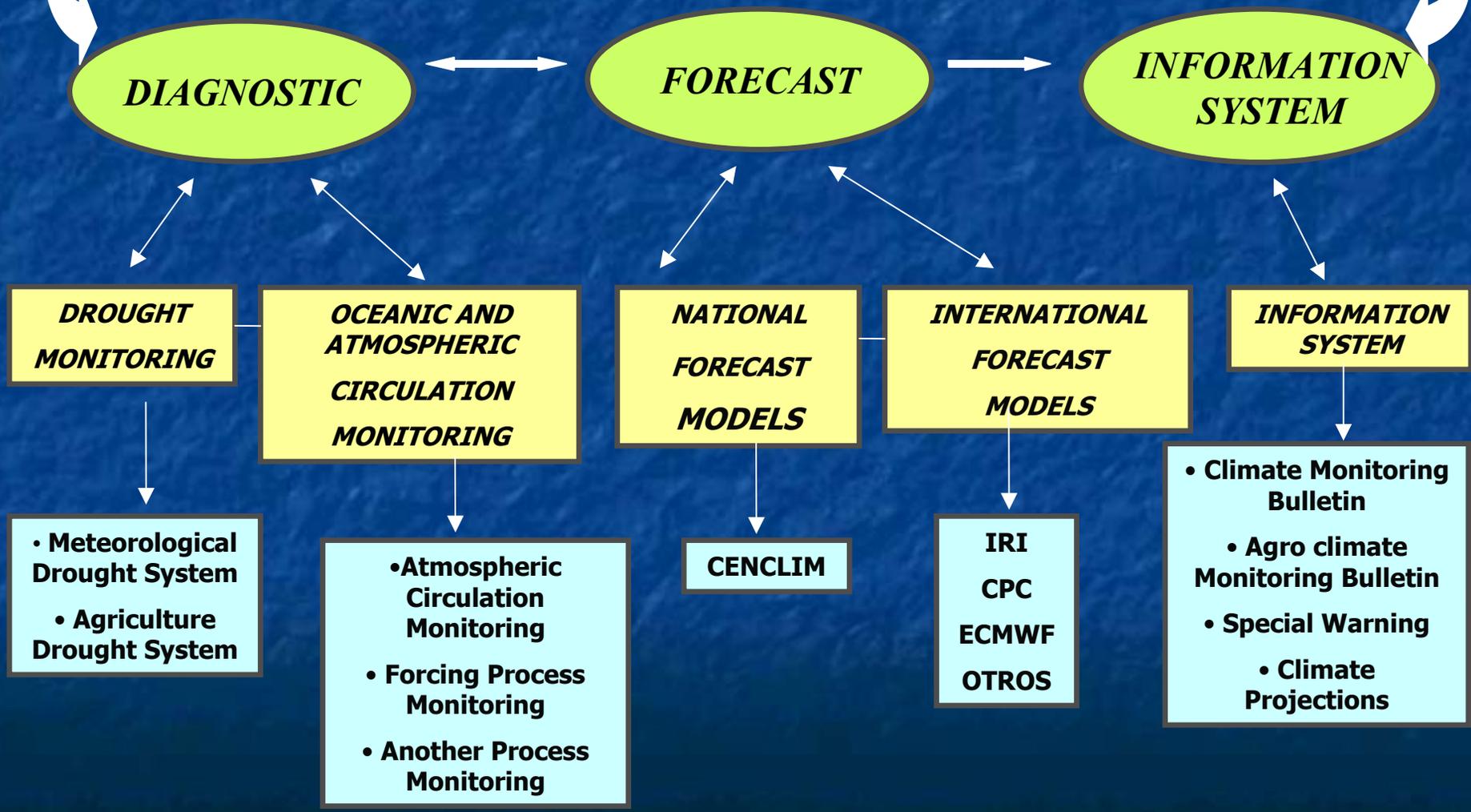
▪ ***THE CLIMATE MONITORING SYSTEM.***



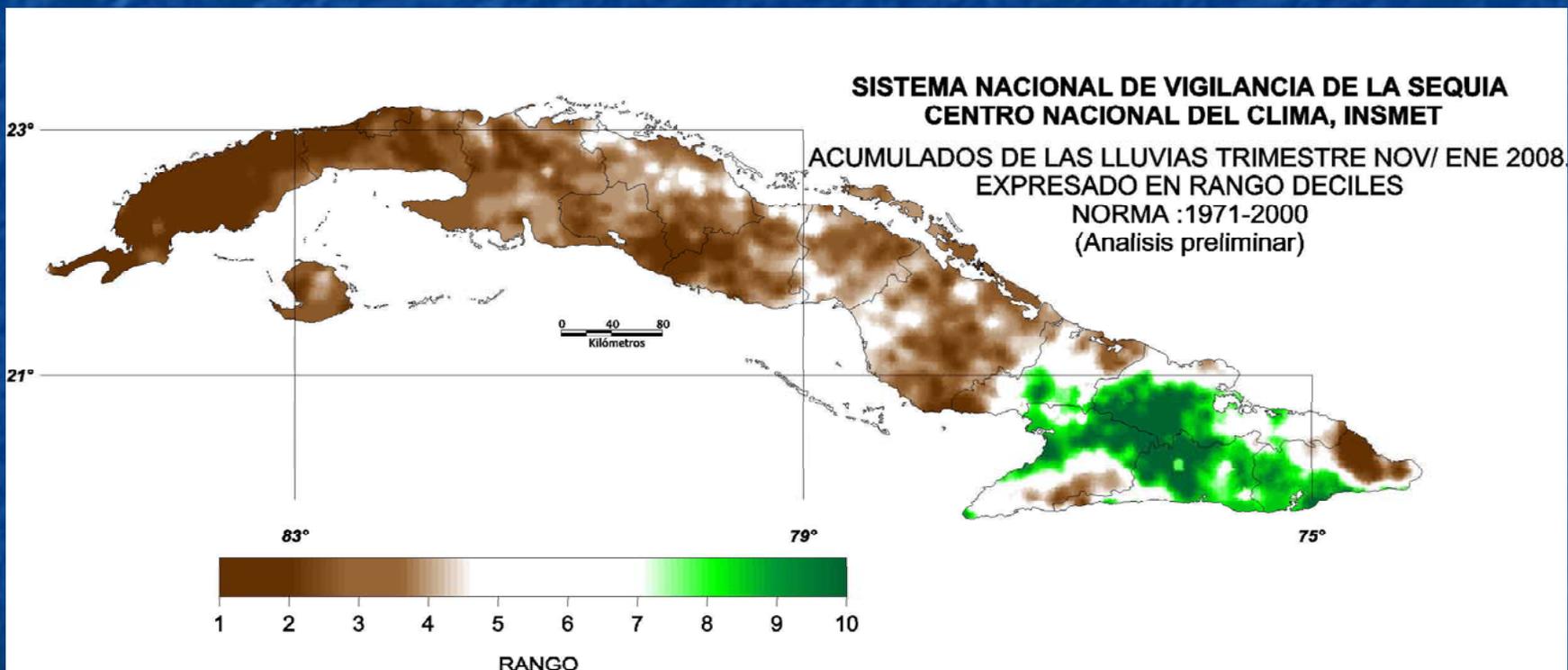
▪ THE CLIMATE MONITORING SYSTEM.

- ***Assess the climate behavior.***
- ***Make the Climate Early Warnings.***
- ***Develop agricultural and human health assessments.***

CUBAN METEOROLOGICAL DROUGHT MONITORING AND EARLY WARNING SYSTEM.



NOVEMBER 2007 - JANUARY 2008 RAINFALL BEHAVIOR

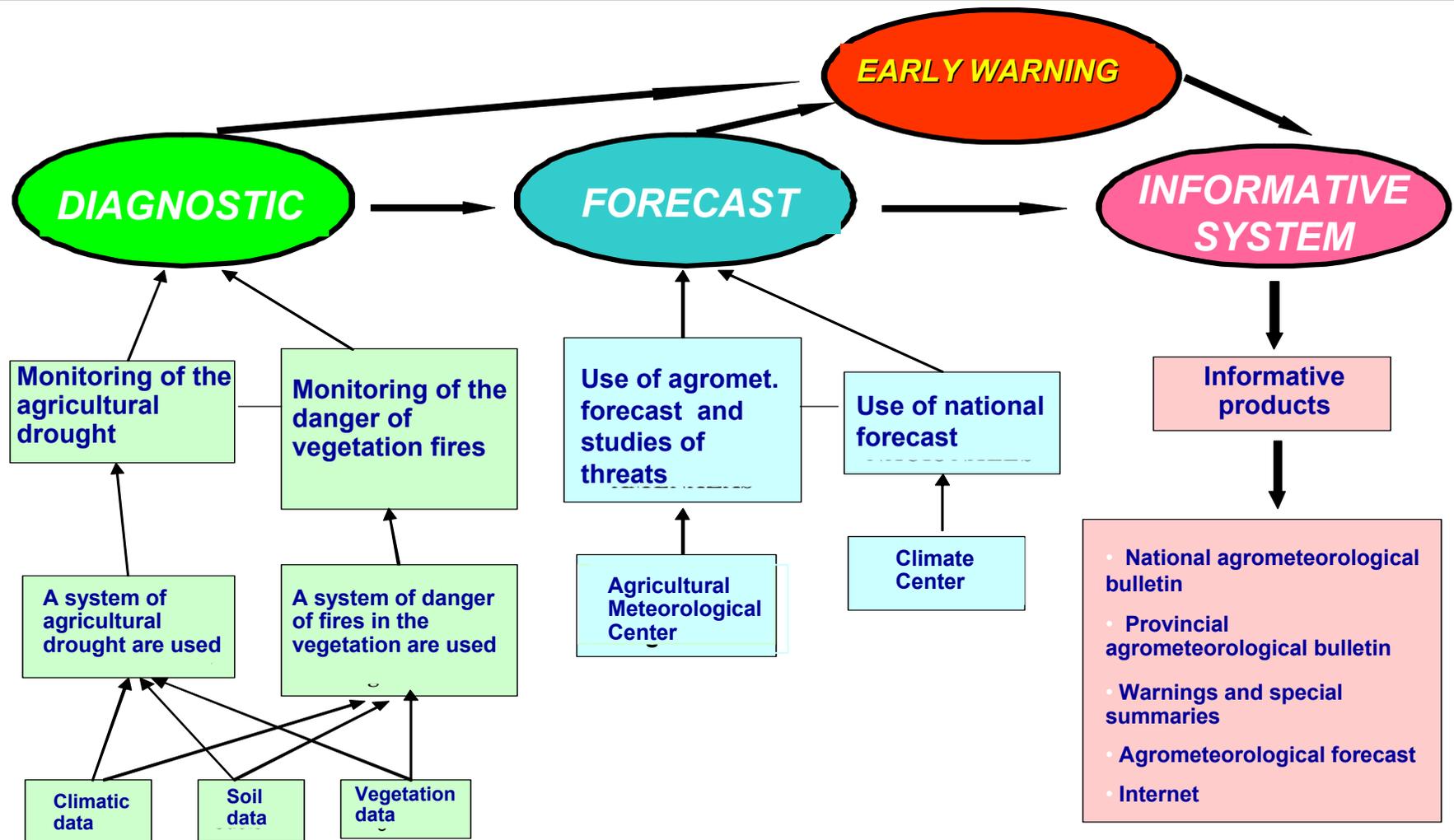


INFORMATION SYSTEM

- ***CLIMATE MONITORING BULLETIN***
 - ***SPECIAL CLIMATE ADVISORY***
 - ***SPECIAL CLIMATE SUMMARY***
 - ***WEB SITE INFORMATION***
(www.met.inf.cu)

System for the surveillance and the early warning of the drought in the Agricultural Meteorological Center

The system is conformed by four components, the diagnose, the forecast, the early warning and the informative system



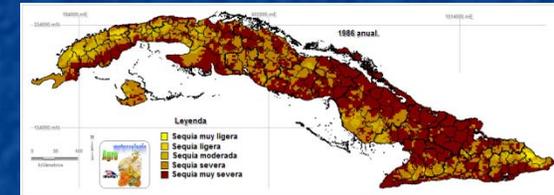
Today we can diagnose

DIAGNOSE

. Status of the agricultural drought



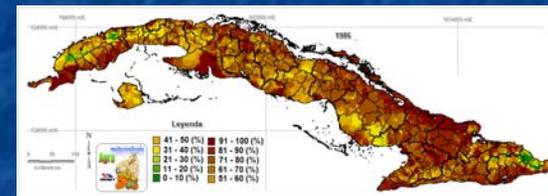
. Intensity of the agricultural drought



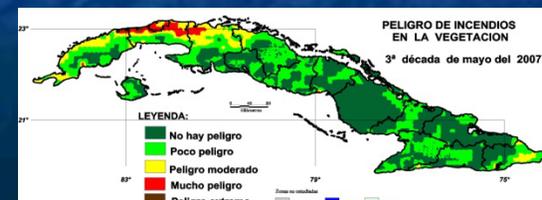
. Spatial extension of the agricultural drought



. Duration of the agricultural drought



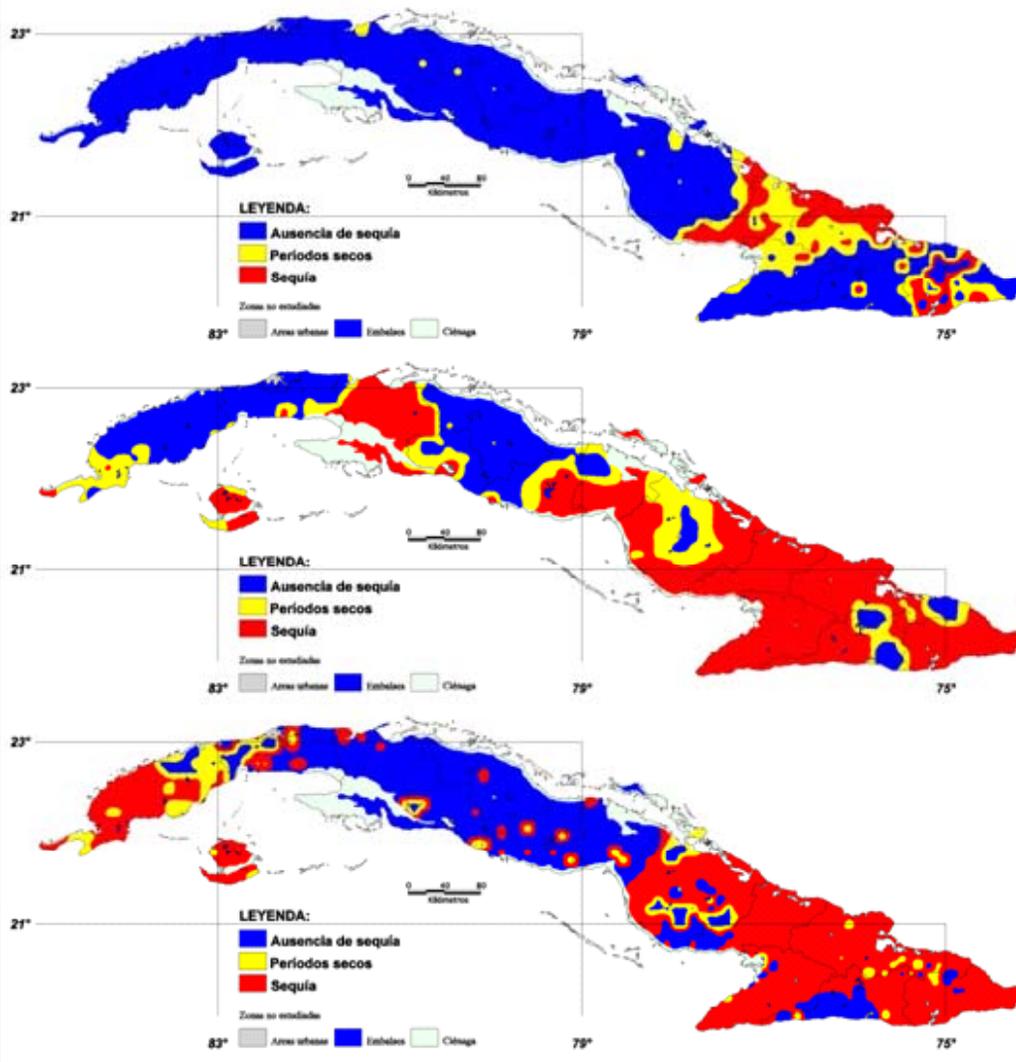
. Potentially dangerous rural fires



We have seasonal forecast

FORECAST

Example of seasonal agricultural drought forecast in Cuba



Agricultural drought conditions in Oct. 31, 2002
Beginning of dry period

Forecast of agricultural drought conditions to Apr. 30, 2003
End of dry period

Real agricultural drought conditions, six months later of forecast date:
Apr. 30, 2003

Accuracy of the forecast: 63%
Evaluates 7 626 pixels

Issuing early warnings....

WARN EARLY

WARNING OF AGRICULTURAL DROUGHT

... Se prevé que la sequía agrícola continúe aumentando en intensidad hasta la primera década de mayo, para comenzar a desaparecer en la zona central de las provincias orientales a mediados de ese mes. Al finalizar mayo aún debe manifestarse la sequía en algunas zonas, fundamentalmente en algunas localidades próximas a las costas.

Para abril pueden esperarse condiciones de severidad más intensas que las registradas durante la sequía agrícola de corto período observada en la misma fecha del año 1998; sin embargo, la extensión debe ser similar a la registrada durante la misma etapa en el año 1999, pero se prevé que su intensidad continúe siendo ligeramente menor.

En extensas zonas del país la vegetación ha estado sometida a estrés hídrico moderado y severo por un período superior a dos meses, por lo cual, la materia vegetal ha continuado perdiendo humedad y ha aumentado su inflamabilidad. Esto trae como consecuencia que sea mayor el peligro de estallidos de fuegos en pastizales, cultivos de secano y vegetación natural, incluidas las áreas forestales.

El estrés hídrico moderado a severo que afecta a la vegetación en condiciones de secano continuará durante lo que resta de abril y primera década de mayo; por ello, debe esperarse:

- Una declinación notable en los rendimientos de los cultivos de secano;
- El aumento del peligro de incendios en pastizales, vegetación natural, cultivos de secano y en zonas forestales.

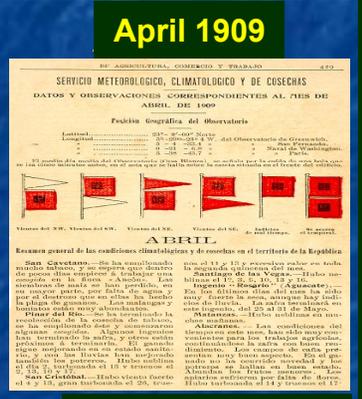


We have an informative system



Diversity of Informative products

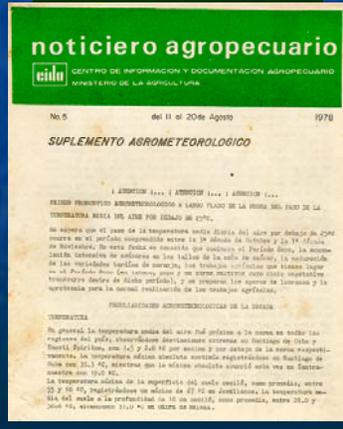
Agrometeorological bulletins



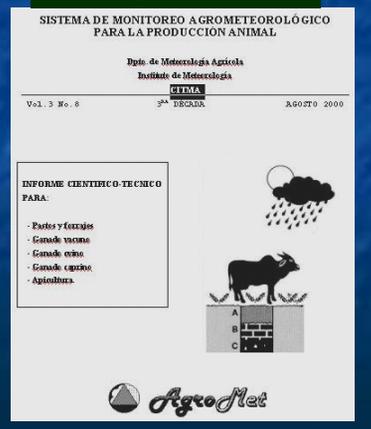
Agrometeorological bulletins

- Agroclimatic summary
- Seasonal forecast
- Special warnings
- Internet

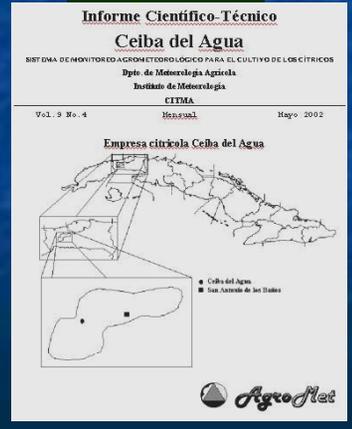
II August 1978



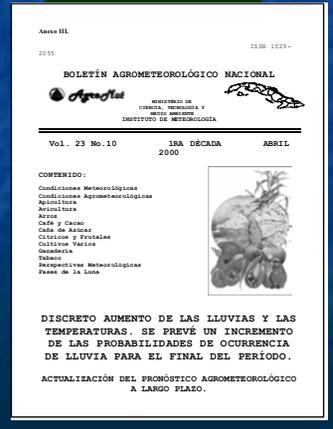
III August 2000



May 2002



I April 2000



Our web page: <http://www.insmet.cu>

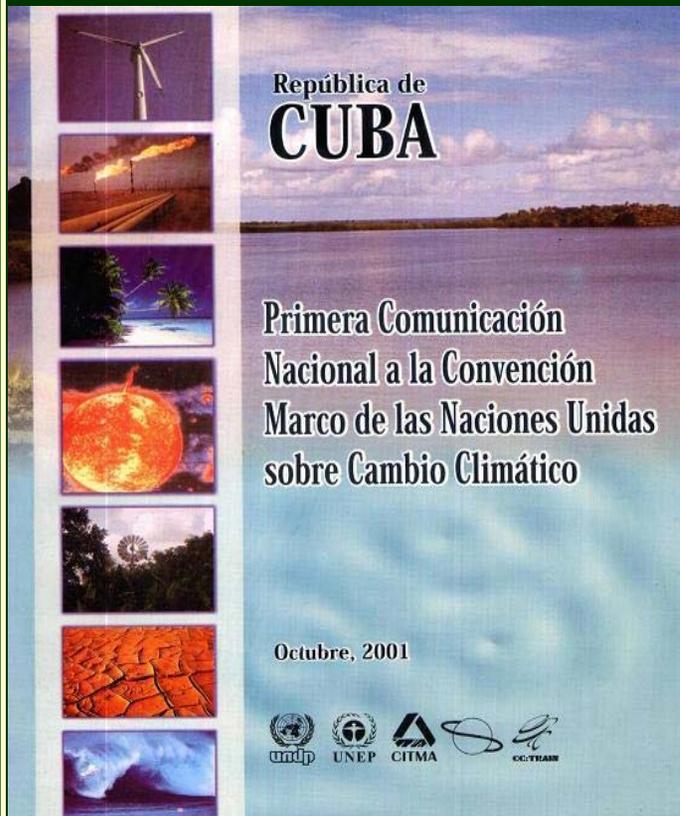
DIAGNOSE

2nd ten days, jun, 2008

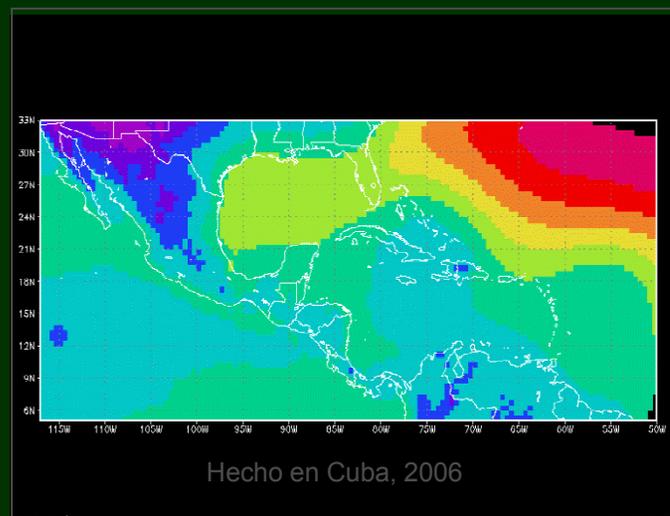
The screenshot shows the INSMET website interface. At the top left is the INSMET logo. The main header includes the text 'Instituto de Meteorología de la República de Cuba' and the date 'Jueves, 26 de Junio de 2008'. A navigation bar contains links for 'Inicio', 'Mapa del Sitio', 'Contacto', and 'Imprimir'. On the left side, there is a vertical menu with categories like 'Quiénes Somos', 'El Tiempo', 'Ciclones Tropicales', 'Clima', 'Agrometeorología', 'Calidad del Aire', 'Biblioteca', and 'Otros Sitios'. Below this menu is a 'Pronóstico Extendido' section for 'Jueves / 26' in 'La Habana', showing a maximum temperature of 32°C and a minimum of 26°C, with a weather icon for 'Aisladas Tormentas'. The main content area features three sections: 'Pronóstico del Tiempo' with a text forecast and a 'ver más' link; 'Pronóstico Climático' with a text forecast and a 'ver más' link; and 'Estado de la Sequía' with a text forecast and a 'ver más' link. Below the text forecasts are three satellite/radar maps labeled 'Satélite', 'Radares', and 'Mapa del Tiempo'. On the right side, there are sections for 'Canal RSS' with an XML icon, 'Otros Sitios' listing various organizations like 'Sociedad Meteorológica de Cuba' and 'Organización Meteorológica Mundial', and 'Boletín Agrometeorológico' with an image of agricultural products. A yellow arrow points from the left towards the 'Boletín Agrometeorológico' section.

National Agrometeorological Bulletin

□ *Capacity building.*



- Professional formation;
- Scientific results of Cuban researcher;
- Integration of several institutions and disciplines to obtain a well defined objectives;



▪ ***COLLABORATION.***

- ***Cuba collaborates with others countries in assessment of climate behavior, impact and adaptation, and would like to continue this collaboration in the future.***

CONCLUTIONS

The climate variability and change impact on society and environment could be extraordinary. Integration of climate information into national programs could help to a better adaptation of humanity to our future climate.

An aerial photograph of a city street completely inundated with floodwater. The water is a murky, greyish-brown color. On the left, there are several multi-story apartment buildings with balconies. In the center, there are green landscaped islands in the water, some with palm trees. In the background, a large statue on a pedestal stands in the water, and a bridge or overpass is visible. The sky is overcast and grey.

**Thank you
very much**