CUBA
Space Activities

Regional Workshop on the Long-term Sustainability of Space Activities

Costa Rica, 7-8 April 2015

Index

- Space Activities in Cuba 2014.
- Ongoing Projects an beyond.

Some Acronyms

- INSMET: Instituto de Meteorología. Meteorological Institute.
- CITMA: Ministerio de Ciencia Tecnología y Medio Ambiente. Ministry of Science, Technology and Environment.
- InSTEC: Instituto Superior de Tecnologías y Ciencias Aplicadas. High Institute of Applicable Sciences and Technologies.

Some Acronyms

- MES: Ministerio de Educación Superior. Ministry of High Education.
- AMA: Agencia de Medio Ambiente. Environmental Agency.
- BASAL: Bases Ambientales para la Sostenibilidad Alimentaria Local. Environmental Basis for the Local Food Sustainability.

Some Acronyms

- IGA: Instituto de Geofísica y Astronomía. Geophysical and Astronomy Institute.
- PVR: Peligro, Vulnerabilidad y Riesgo. Danger, Vulnerability and Risk.

Space Activities in Cuba 2014

- Space Meteorology.
- Observation of the Earth.
- Space Science.

Space Meteorology

- INSMET/CITMA use data from meteorological satellites for studies and hurricanes forecast and other forecast services.
- Agro-meteorology for improve food production.
- Forrest fire detection.
- InSTEC/MES teach meteorology career.
- InSTEC/MES develop a project: First Cuban´s nano-satellite.

Observation of the Earth

- AMA/CITMA continue with complex research projects related with climate change adaptation and Danger, Vulnerability and Risk (natural and technological) using data of the Earth´s remote observation as a key element.
- Cartography using satellite images for better use of soils in agriculture (BASAL project) having a big impact in the Cuban society, achieving sustainable agriculture through multi layer analysis of the cartographic information resulting in better interpretation (specialist and decision makers) of the proper use of soils.

Space Science

- IGA/CITMA continue with regular observations of the Ionosphere's Vertical Probing Station and the Radio astronomic Station of Havana.
- Cooperation between IGA and UNAM (Mexico) obtaining relevant results in the observations using MEXART.
- IGA/CITMA install an early alert system for electrical storm detection.
- Still functioning a Shumman´s Resonance Station for Sun-Magnetosphere studies.

Ongoing Projects

- Macro project, some results.
- PVR studies and Services.

Main Threat:
Increase of Sea Level

YEAR 2100

Level of the Sea (85 cm)

Level of the Sea (27 cm)

Level of the Sea (2.14 mm/y)

CUBA: Land under Sea Level

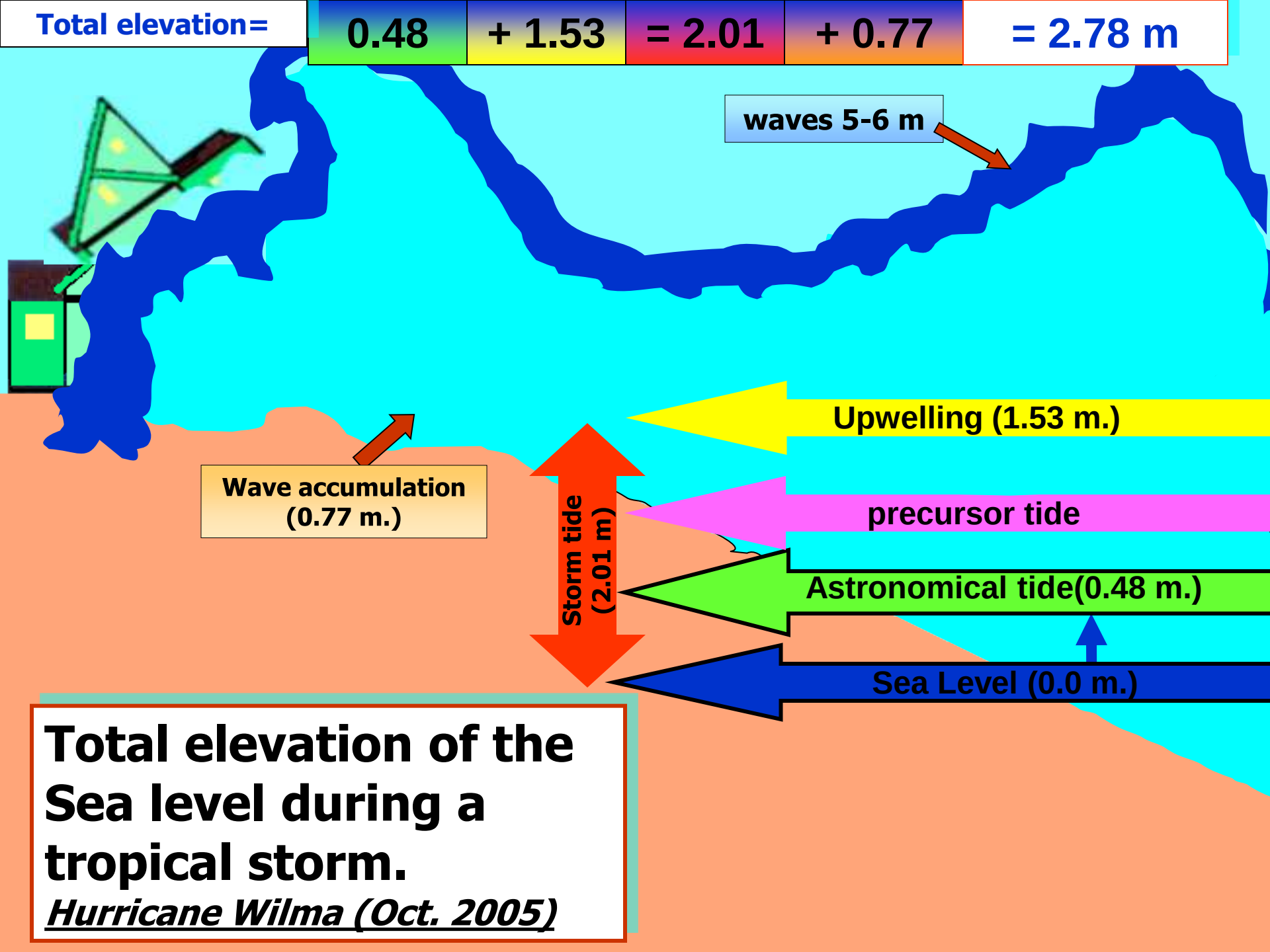
2 550.60 km² (2.32%)

5 994.55 km² (5.46%)

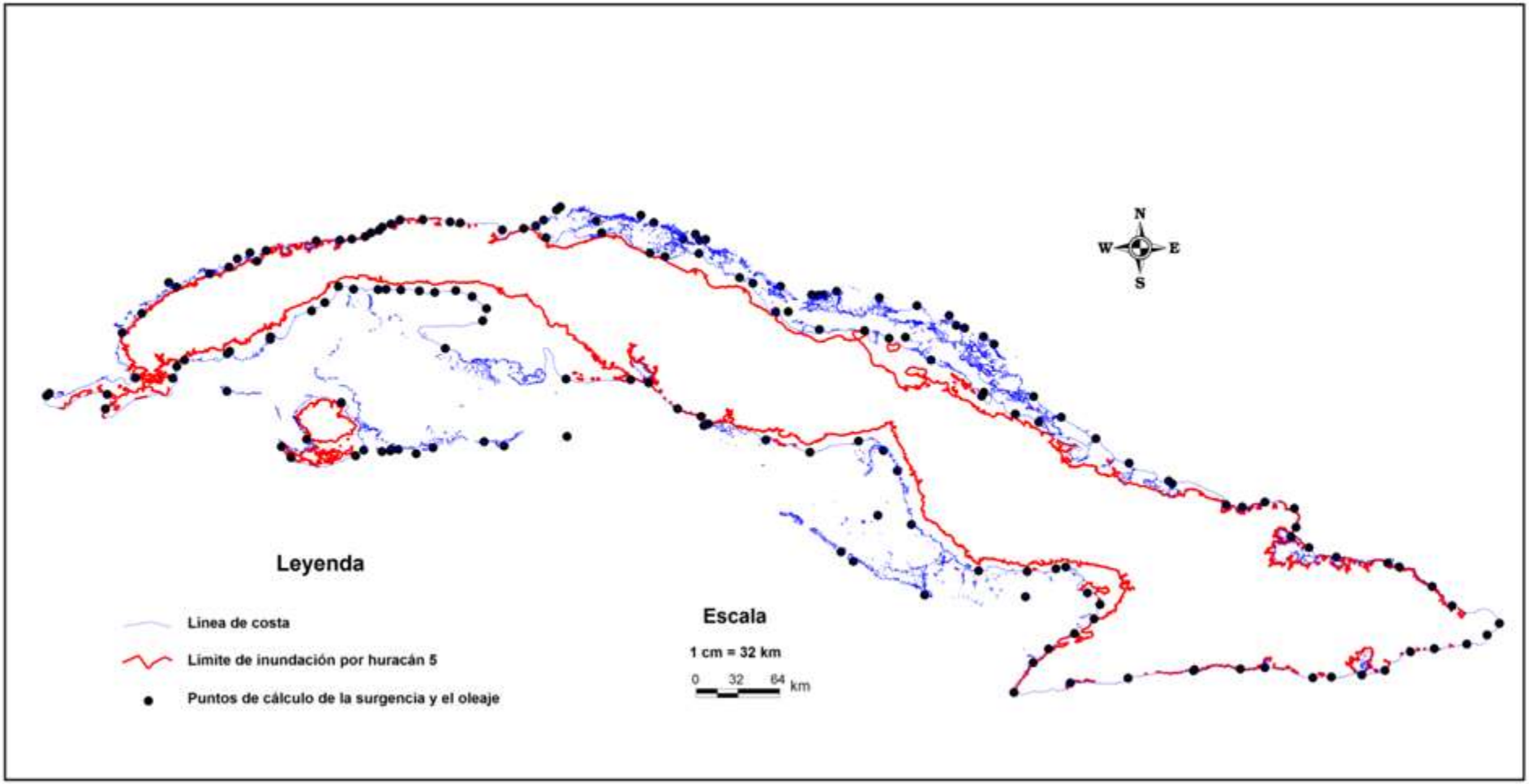
Advance in the salinity of water

Main Danger: Upwelling

Abnormal and temporary elevation of the Sea level, over the astronomical tide, as a result of the strong winds, and in lesser extent by the pressure drop, in a tropical storm.

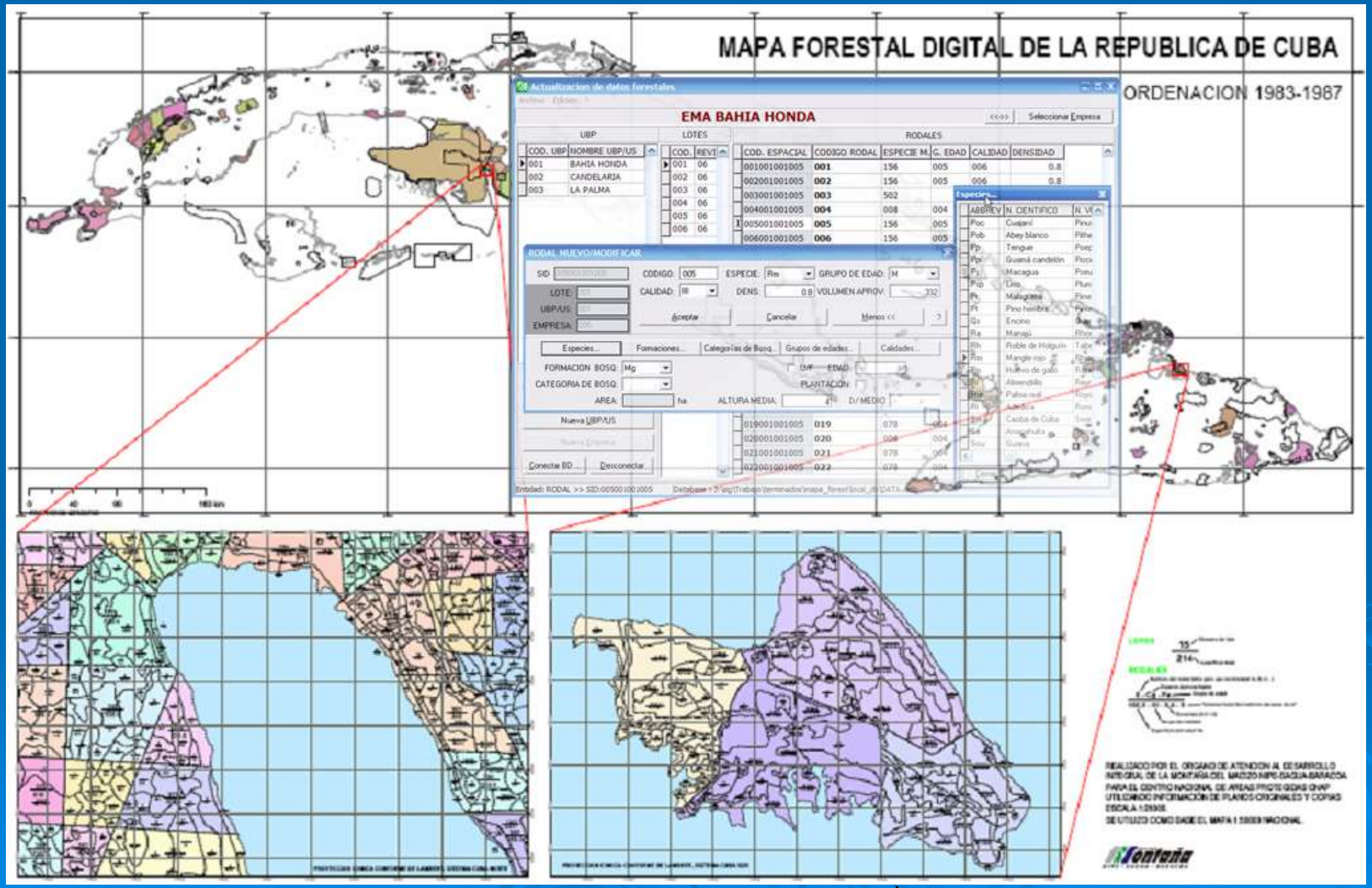

Total elevation=
0.48
+ 1.53
= 2.01
+ 0.77
= 2.78 m
waves 5-6 m
Upwelling (1.53 m.)
Wave accumulation
(0.77 m.)
Storm tide
(2.01 m)
precursor tide
Astronomical tide(0.48 m.)
Sea Level (0.0 m.)
Total elevation of the
Sea level during a
tropical storm.
Hurricane Wilma (Oct. 2005)

Temporary flooding as a Result of a 5 Category Hurricane



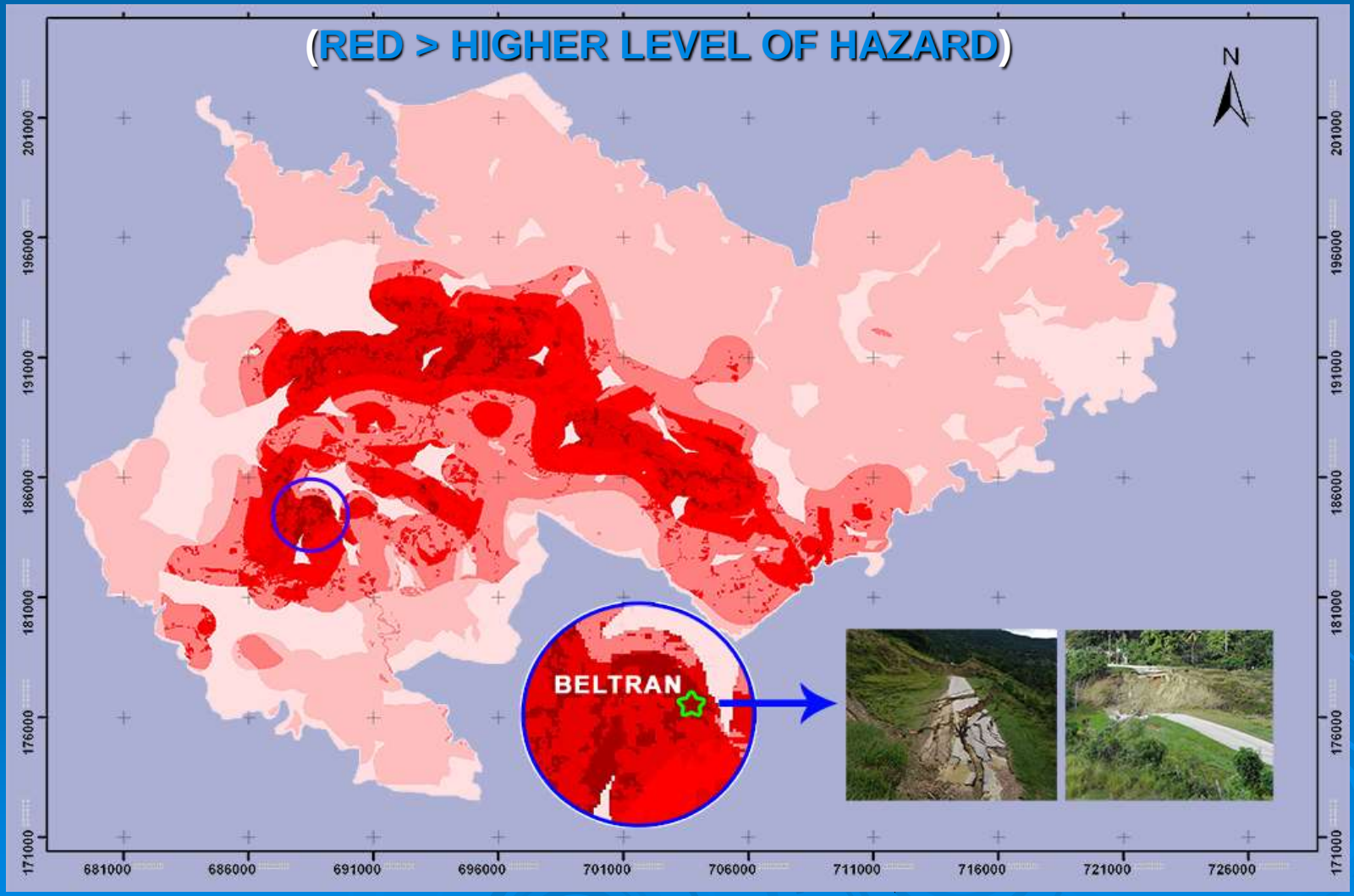
SUCCESSFUL EXPERIENCES

NATION WIDE BASELINE FOR FORESTRY STUDIES. DATA FROM YEARS 1983-86. ALL OFFICES INVOLVED.



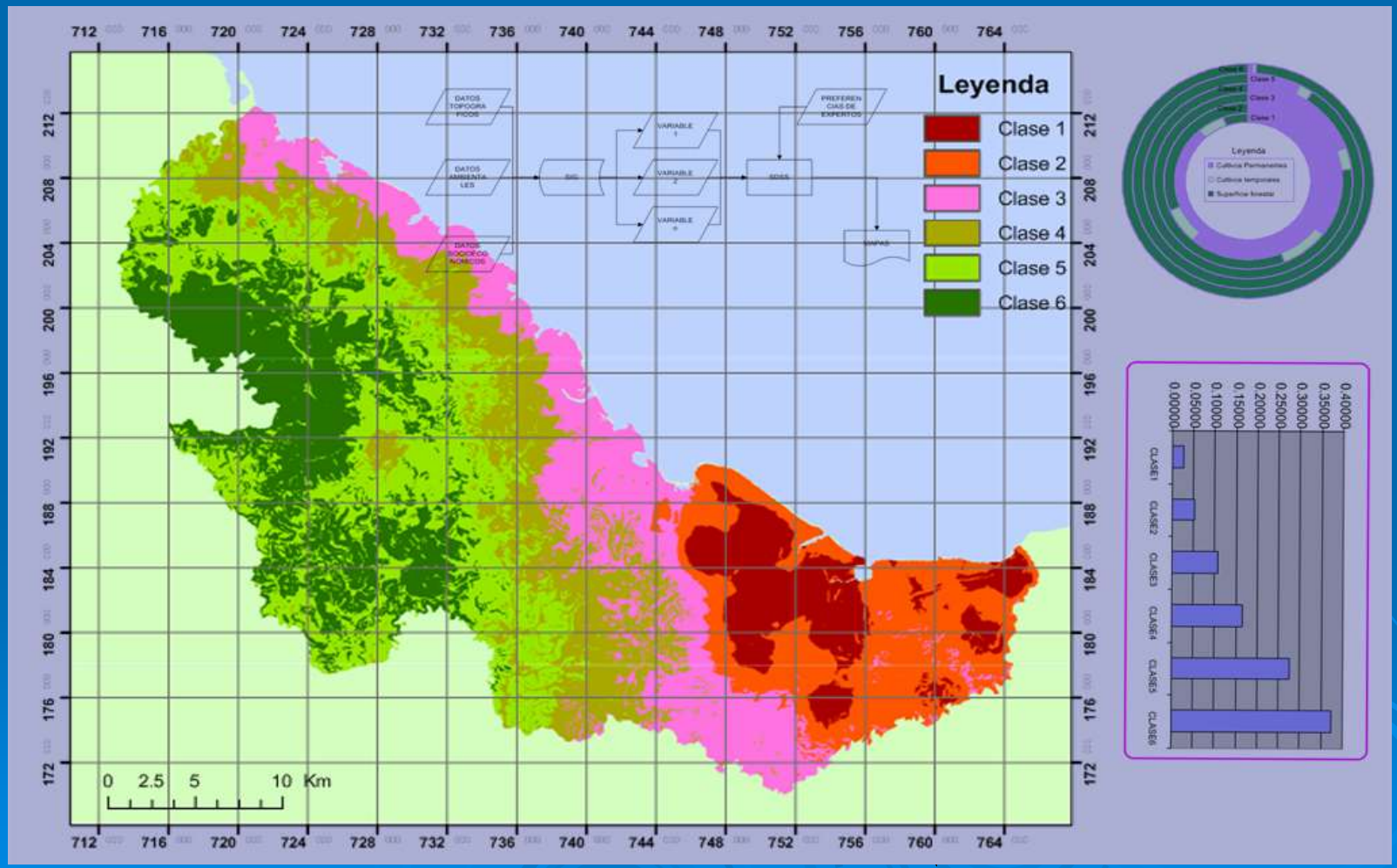
SUCCESSFUL EXPERIENCES

LANDSLIDE HAZARD MAP FOR YATERAS MUNICIPALITY AT GUANTANAMO PROVINCE. NIPE SAGUA BARACOA OFFICE.



SUCCESSFUL EXPERIENCES

EXPERTS ASSESSMENT FOR FORESTRY AREAS SELECTION FOR BARACOA MUNICIPALITY AT GUANTÁNAMO PROVINCE. NIPE SAGUA BARACOA OFFICE



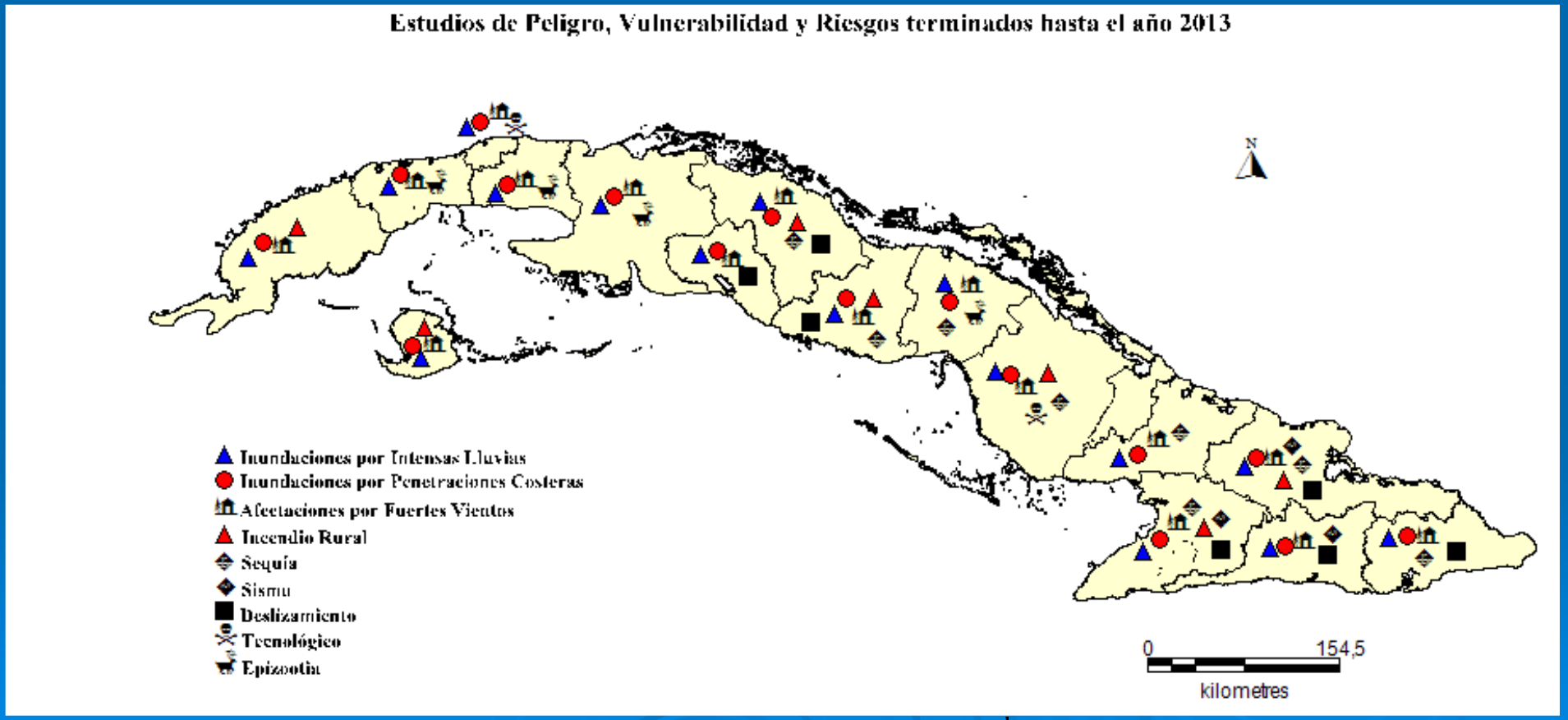
Disaster Dangers in Cuba

By origin

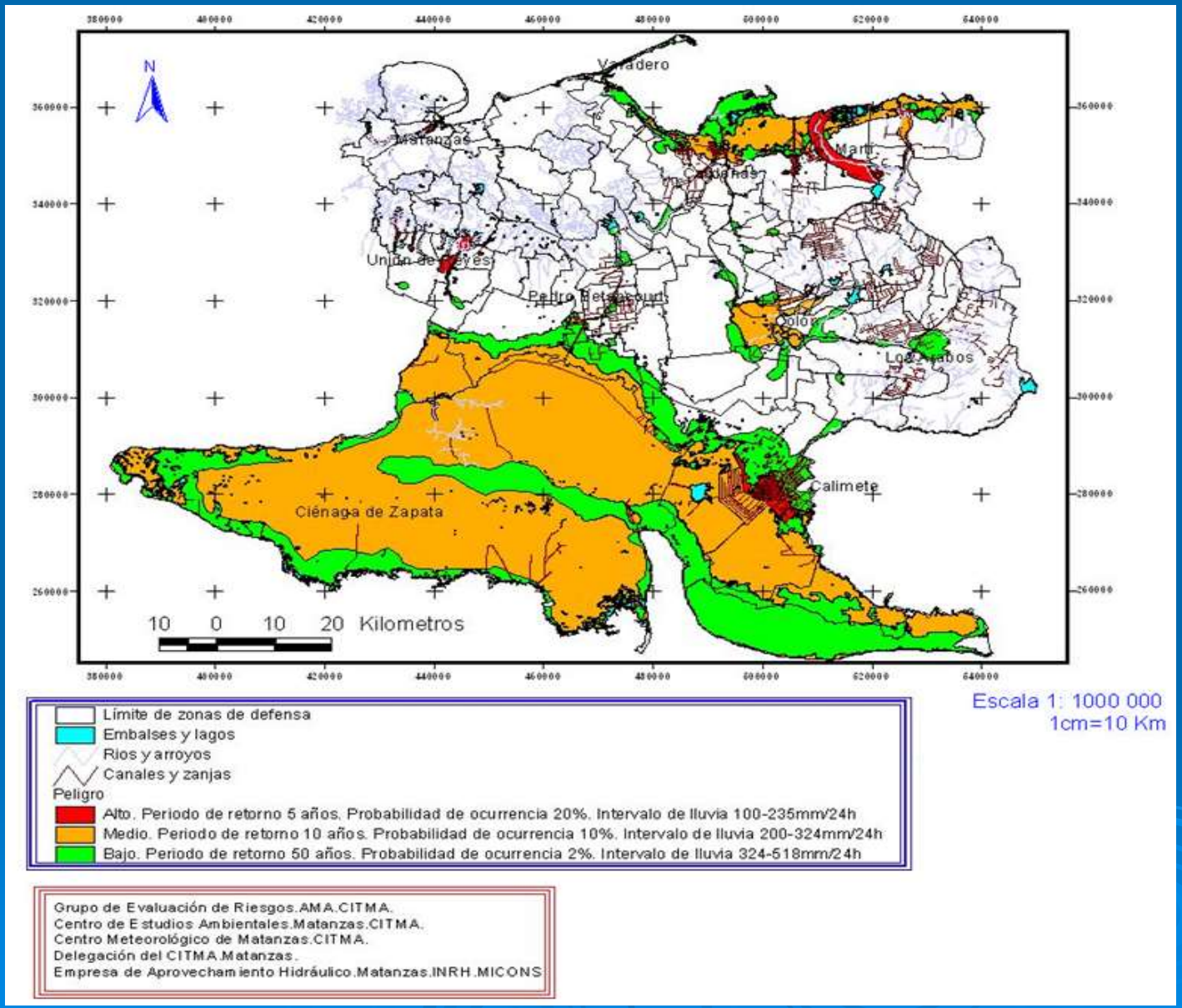
Natural	Technological	Sanitary
Tropical storms, heavy rains, Severe Local Storms, storm surges, landslides, earthquakes, intense droughts, rural fires	Catastrophic transport accidents (land, sea, air), hazardous substances, explosions of large proportions, Oil Spills, large fires.	epidemics, epizootic,

PVR´s studies finished 80

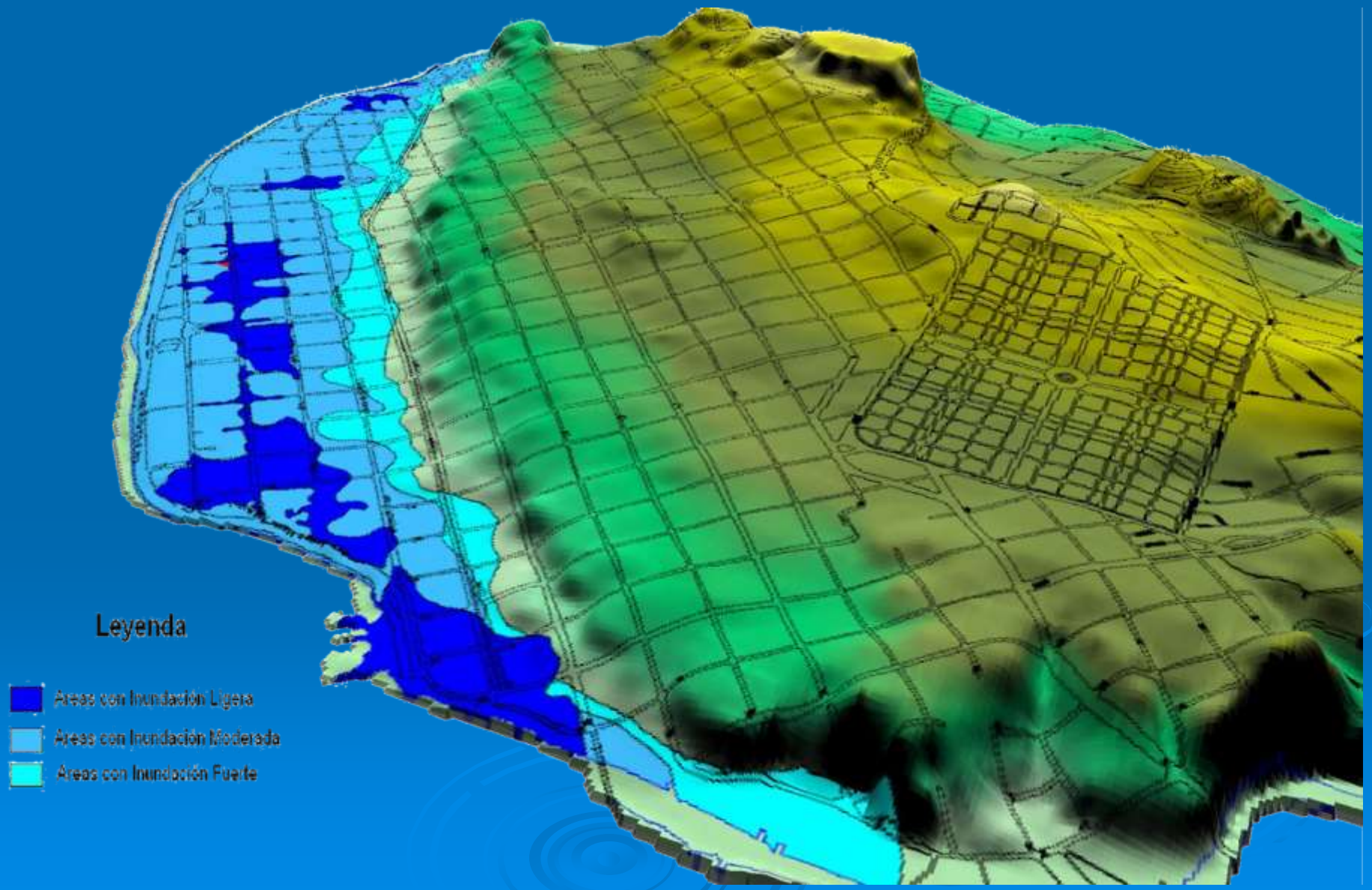
2015: on place: 27, will finished: 18



Flooding for heavy rains: Matanzas province



Flooding for Sea penetration: Plaza municipality



PVR

- Part of the program for adapting to climate change
- Integrated vision of the management of the risk of disasters and climate change adaptation.

Macro project «Sceneries for Danger an Vulnerability of the Cuban costal area, related with the elevation of the sea level for the years 2050 y 2100»

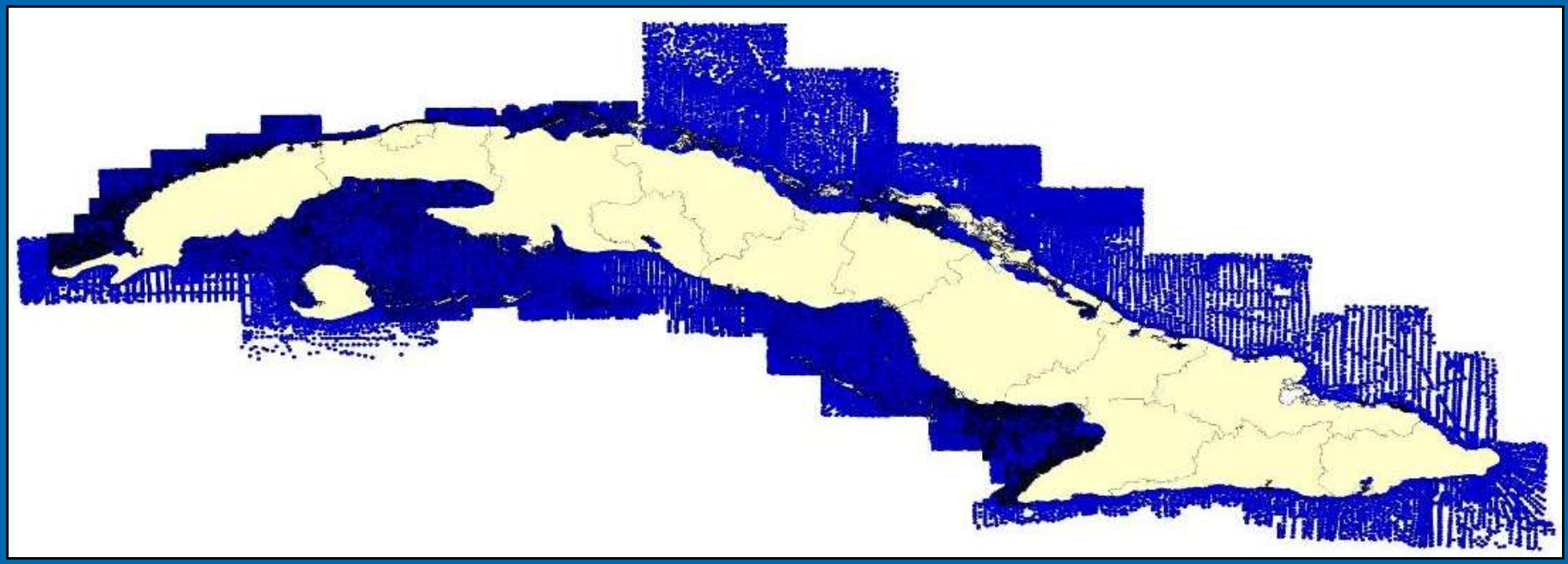
Phase I 2008 – 2012

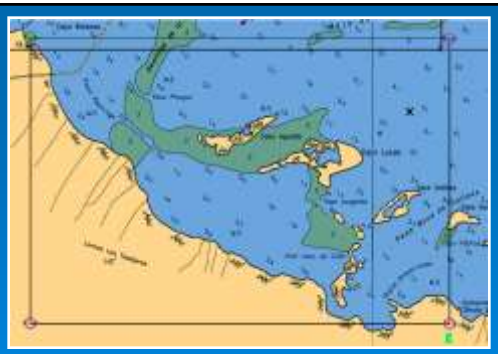
Phase II 2013 - 2016

IES · IPF Instituto de Planificación Física · INSMET Instituto de Meteorología · INRH · Instituto de Oceanología · GEOCUBA Grupo Empresarial · AMA · Instituto de Geología y Paleontología · cedem Centro de Estudios Demográficos Universidad de La Habana

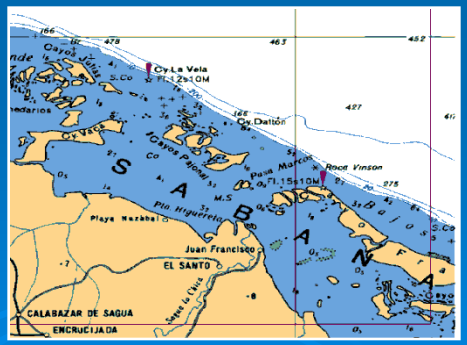
“modulation of coastal flooding scenarios: current, 2050 y 2100”.

Geocuba Maritime Studies

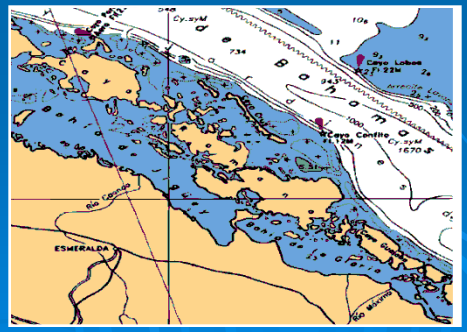




Zona 4



Cayos Dromedarios -Cayo Fragoso



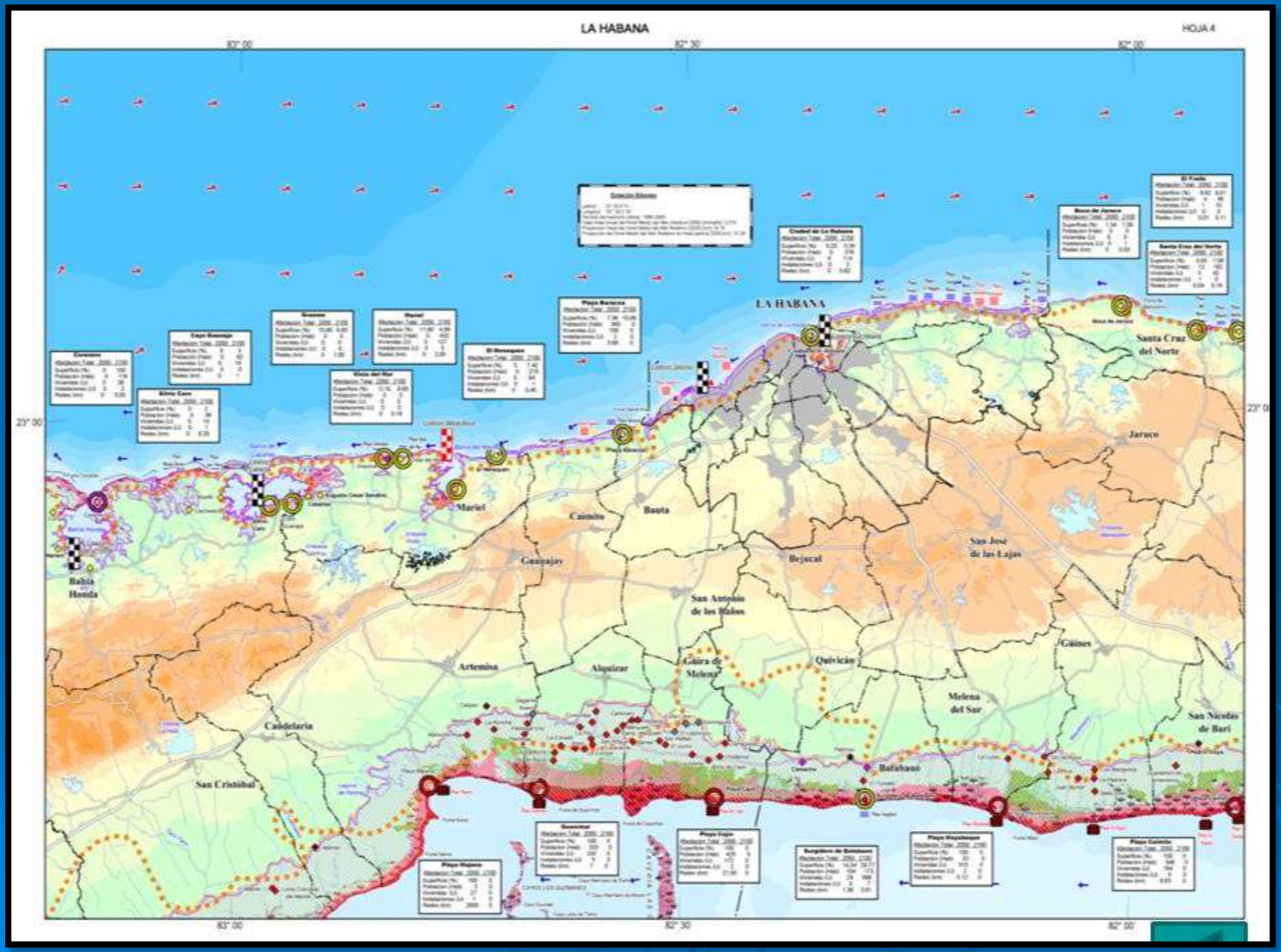
Norte entre Ciego de Ávila y Camagüey

Coastal protection by mangroves.

60 representative plots analysis.

“salinity intrusion” INRH / CIH-CUJAE

Example of an Album sheet



Future ahead

- Cooperation at regional level, for better understanding of the experience with satellites of: Venezuela, Ecuador, Bolivia and others.
- search for a proper way (Technical and financial) to have our own Satellite.

TANK YOU VERY MUCH

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