Seismological Institute: Current State and Needs in The Dominican Republic.

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The Seismological University Institute: ¿What is it?

- It is a dependence of the Faculty of Sciences of the Autonomous University of Santo Domingo. It has the responsibility of monitoring the local seismicity since 1948.

Functions

- To administer and develop the seismic national network.
- To register and analyze the national seismicity.
- To offer the information to the National Comission of Emergencies.
- To promote the seismological research in the country.
- Education and orientation to the population on prevention of disasters caused by earthquakes.
- It is an integral part of the national system for the prevention, mitigation and response to disasters, according to the law 147-02 on Management of Risk.

Organization

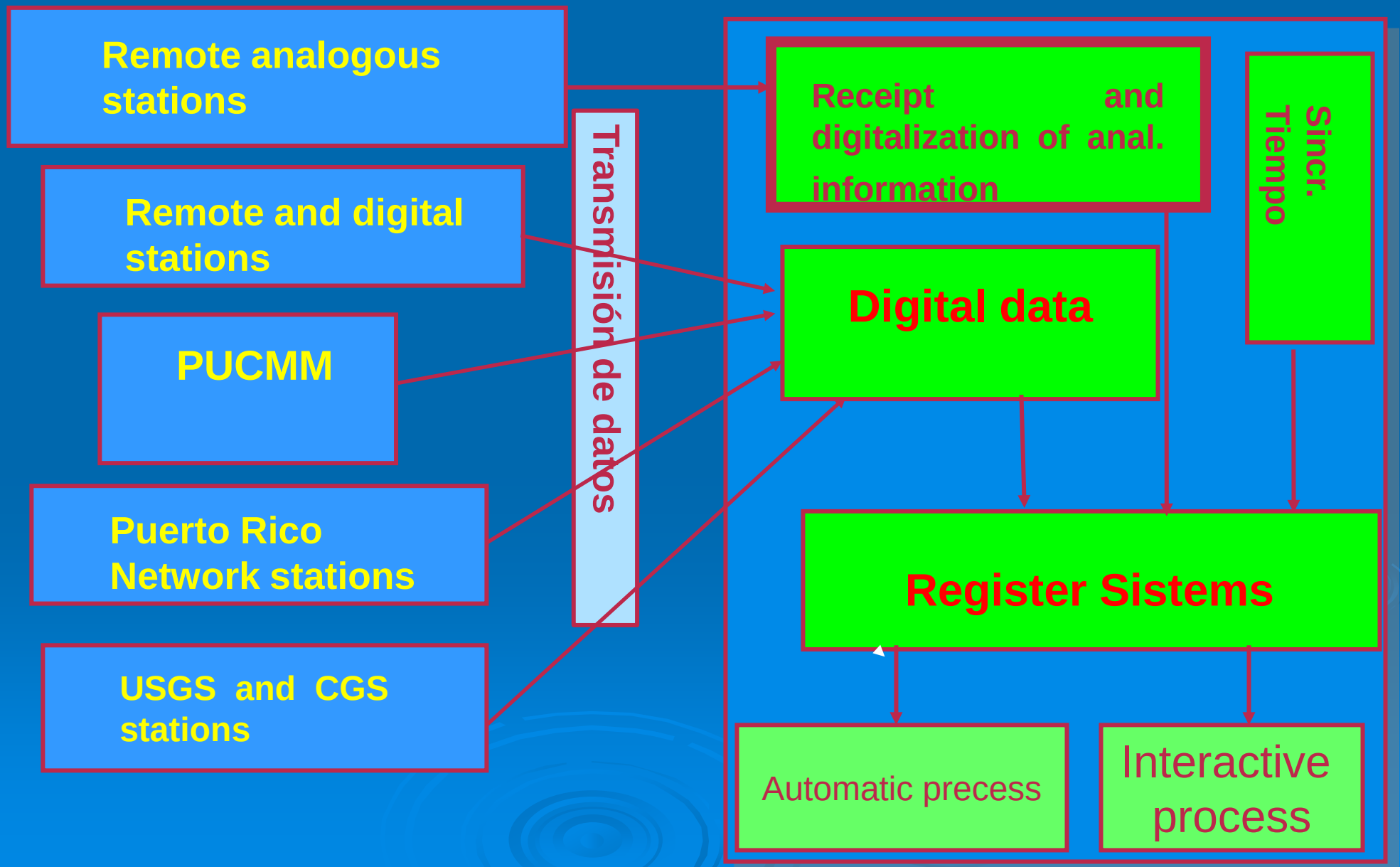
- Direction.
- Research
- Education and Outreach
- Instrumentation and Maintenance.
- Data Analysis.
- Administration

Estructura Funcional del Sismológico

Role of the Collaboration

- The collaboration has been the key for the scientific and technical personnel and the seismic network.
- Thanks to the University of Puerto Rico, the Seismic Network of Puerto Rico, the USGS, IRIS, the UNAM of Mexico, etc.

Composition of the seismic network

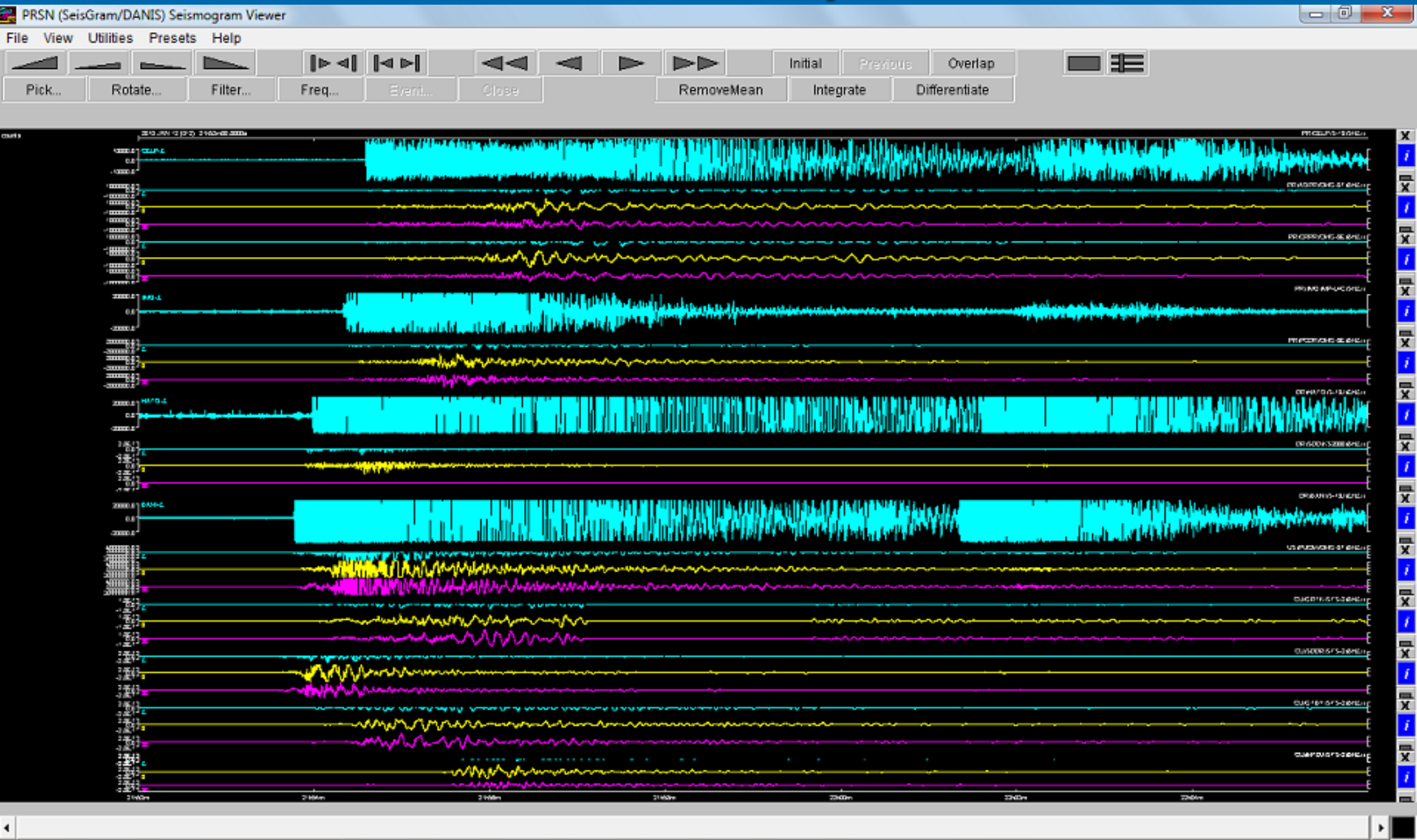


Seismic Station used at the ISU

Data Analysis

- EARTHWORM.
- Automatic Location: EARLYBIRD.
- Interactive analysis. PRDANIS and SEISAN.

Haiti earthquake



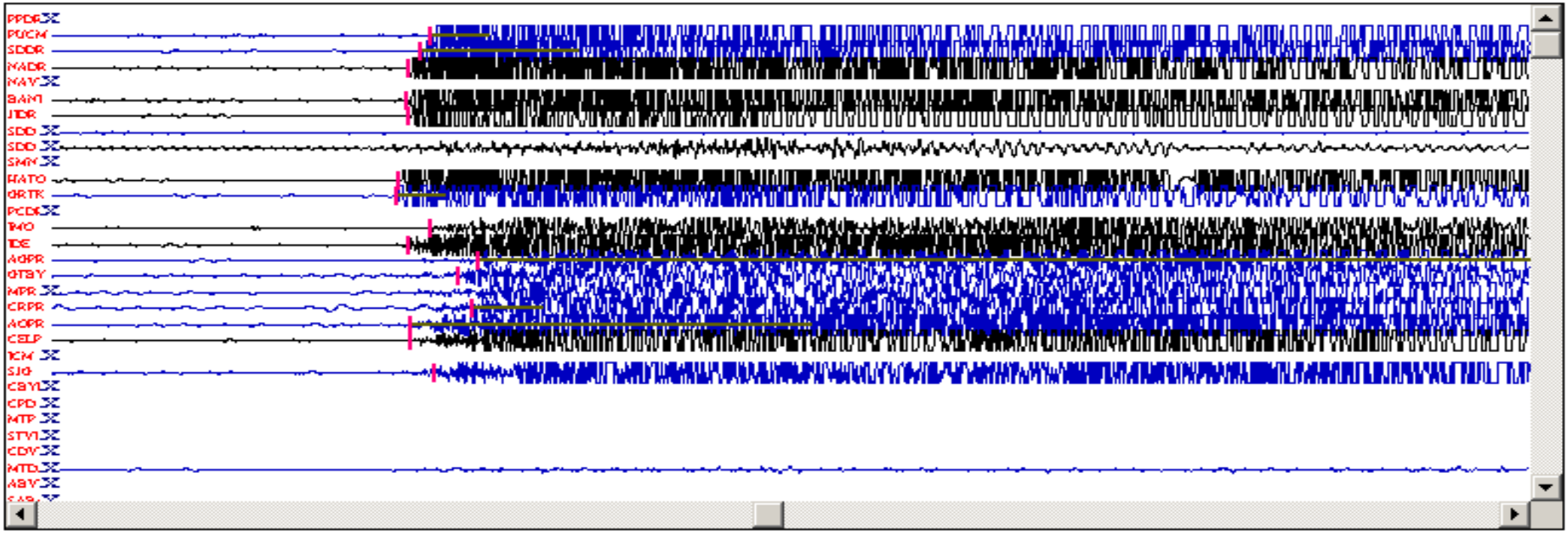
Automatic Analysis

Hypocenter Display

Force Location Mwp Display Recompute Mwp Refresh

Date	O-time	Lat.	Lon.	Dep	Res	Azm	#Stn	ID	Ms	Mw	Mwp	Mb	Ml
03/22	11:24:32	18.7N	69.6W	67	0.7	212	8	0465-04			4.5-00?		3.6-03
03/22	02:53:50	19.7N	71.0W	1	1.6	247	14	0414-09			4.7-03		4.6-08
03/21	11:49:41	19.1N	67.9W	43	1.2	131	5	0298-02					2.8-01
03/21	02:44:48	18.7N	71.5W	54	1.3	60	5	0206-03			3.6-00?		3.3-01
03/20	21:59:20	19.6N	74.8W	23	0.7	150	5	0187-03			4.5-00?		3.6-04
03/20	18:08:05	20.4N	75.7W	23	1.3	120	13	0156-08			5.3-04		5.9-07
03/17	05:10:02	18.2N	68.6W	100	0.9	178	14	3695-06					3.5-07
03/16	00:09:43	20.0N	75.5W	23	1.1	158	8	3483-05			4.6-03		4.2-06
03/15	23:26:14	17.1N	70.7W	20	1.0	52	6	3469-03			3.8-00?		3.3-04
03/15	17:25:48	18.9N	69.7W	97	0.5	265	16	3435-11			3.8-03		4.0-10

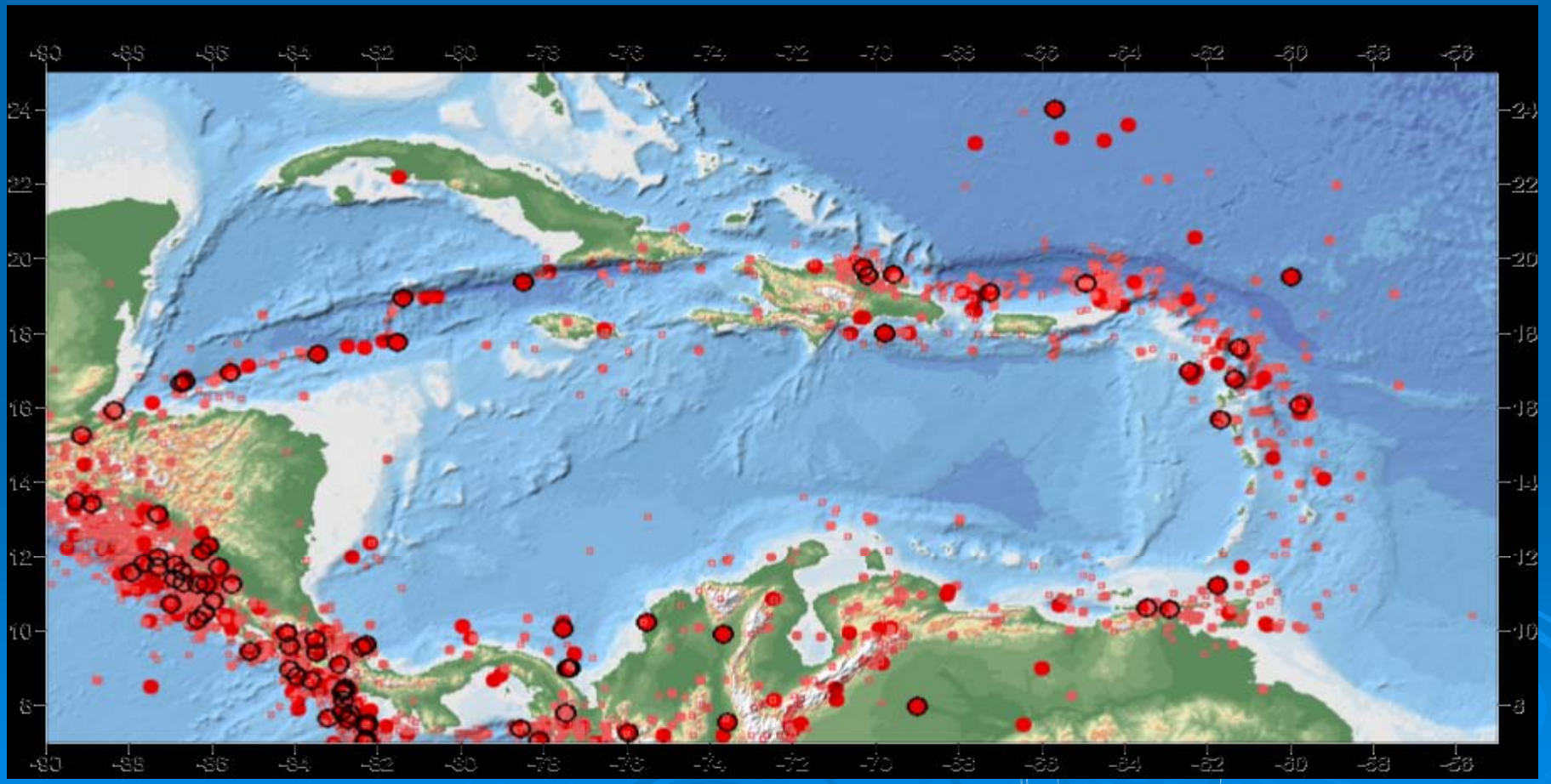
Ml = 4.6 DOMINICAN REPUBLIC REGION



Causes of Earthquakes in Dominican Republic.

- The main causes of earthquakes in the world, is the interaction between tectonic plates and between the blocks that form the geological faults.
- Dominican Republic is located in the northern Caribbean plate, where it interact with the North American plate. Also, has several important systems of geological faults.

Moderate earthquakes h<50 Km. 4.5<m<6.5, Cortesy of McCann, 2008.



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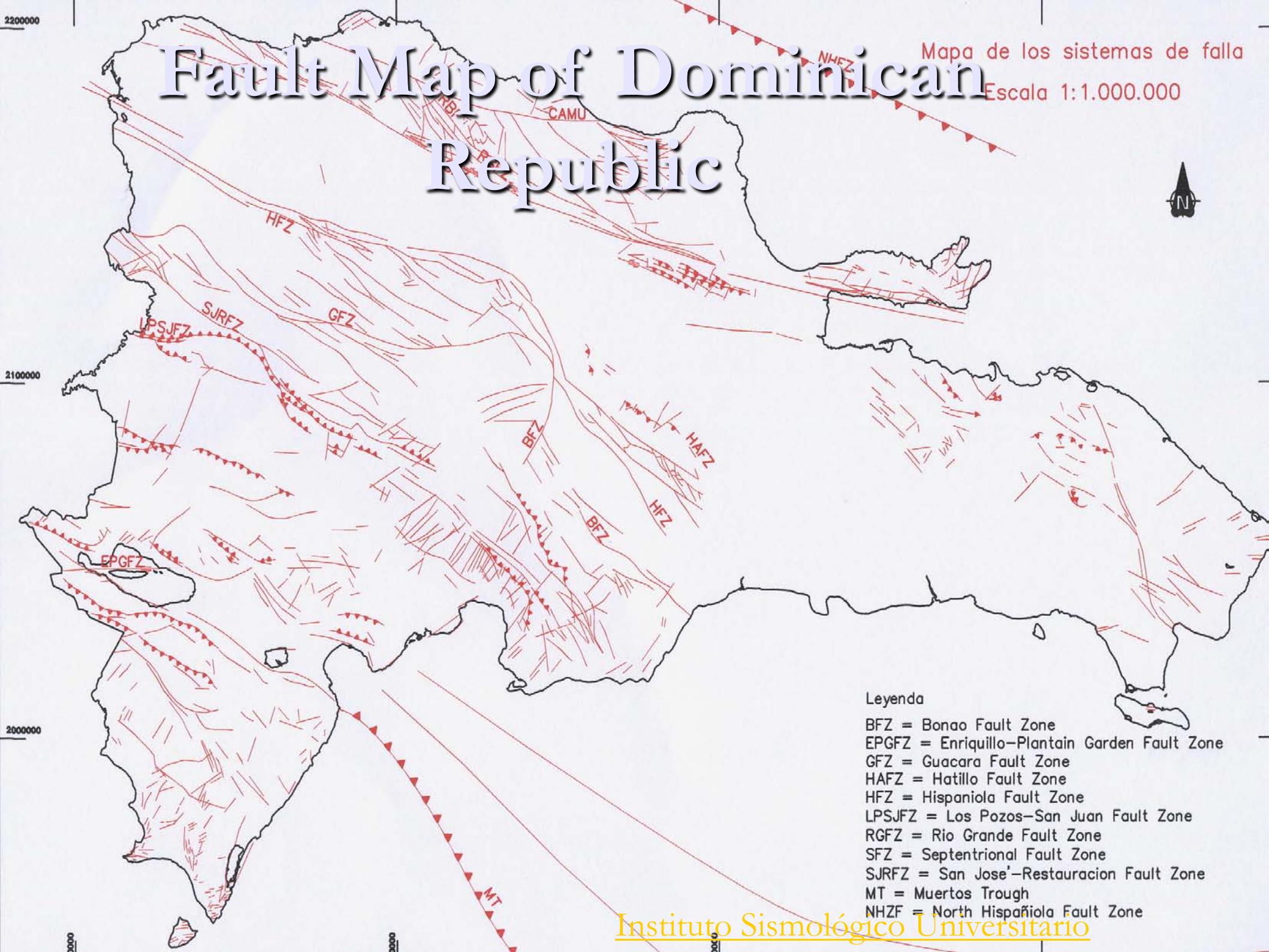
Fault Map of Dominican Republic



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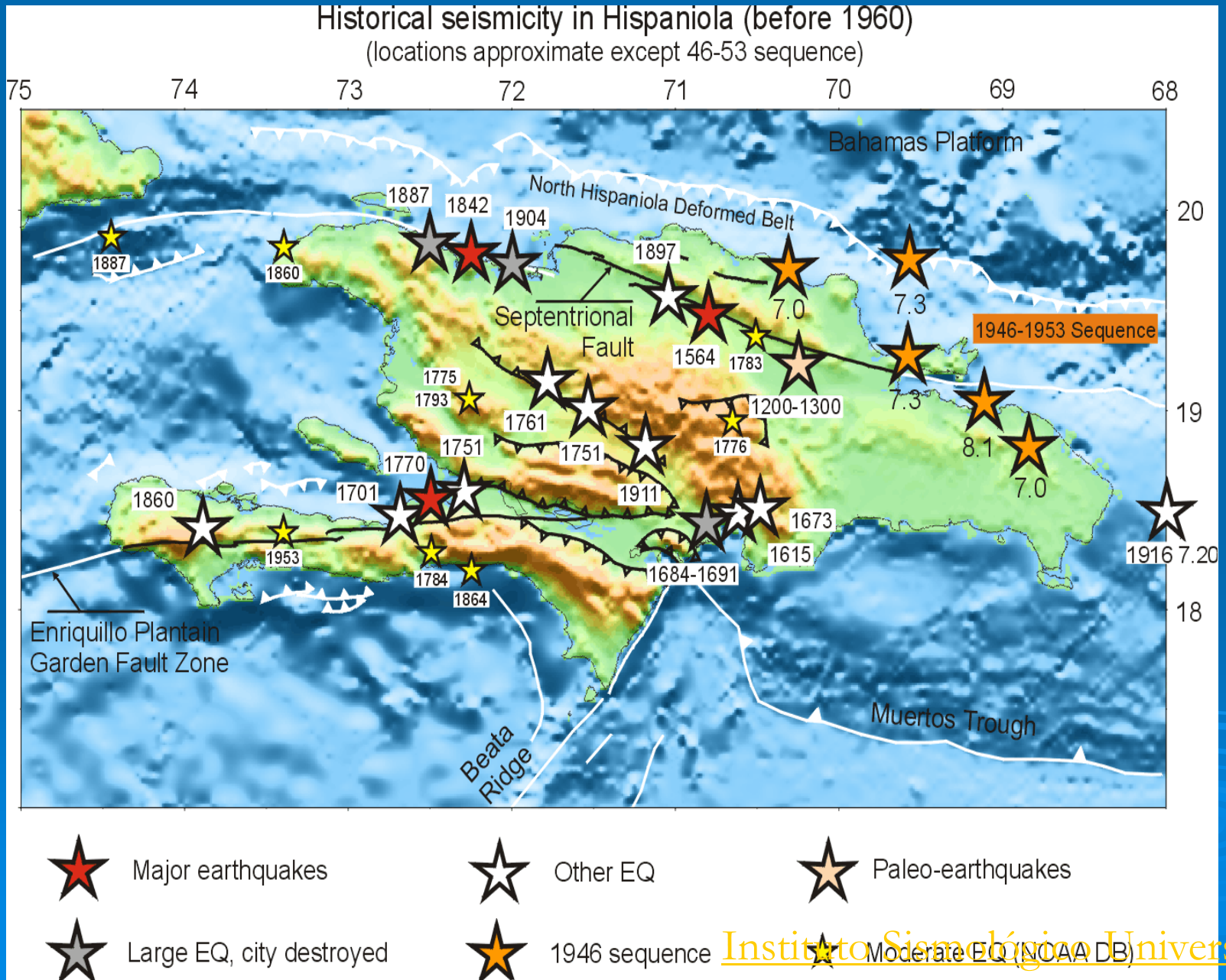
Earthquakes in The Dominican Republic.

- Dominican Republic has been the scene of large earthquakes with known history since the arrival of Cristopher Columbus to the island, Several cities were destroyed as Azua, La Vega, Santiago. In addition, several cities have suffered damage as Santo Domingo, Puerto Plata.

Historical Earthquakes in Dominican Republic. (Cortesy of Eric Calais)



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Earthquakes in D.R.....

- The last major earthquake occurred on August 4, 1946, with a magnitude of 8.1 on the Richter scale. It caused a tsunami that destroyed the community of Matancitas and considerable damage in much of the country.

Earthquakes in D.R...

- Other earthquakes that have occurred in the country are: Ocoa 1962 (6.5), 1971(6.5) southeast of Santo Domingo.
- Several moderate earthquakes have occurred: 1984, 1987, 1988, 1998.

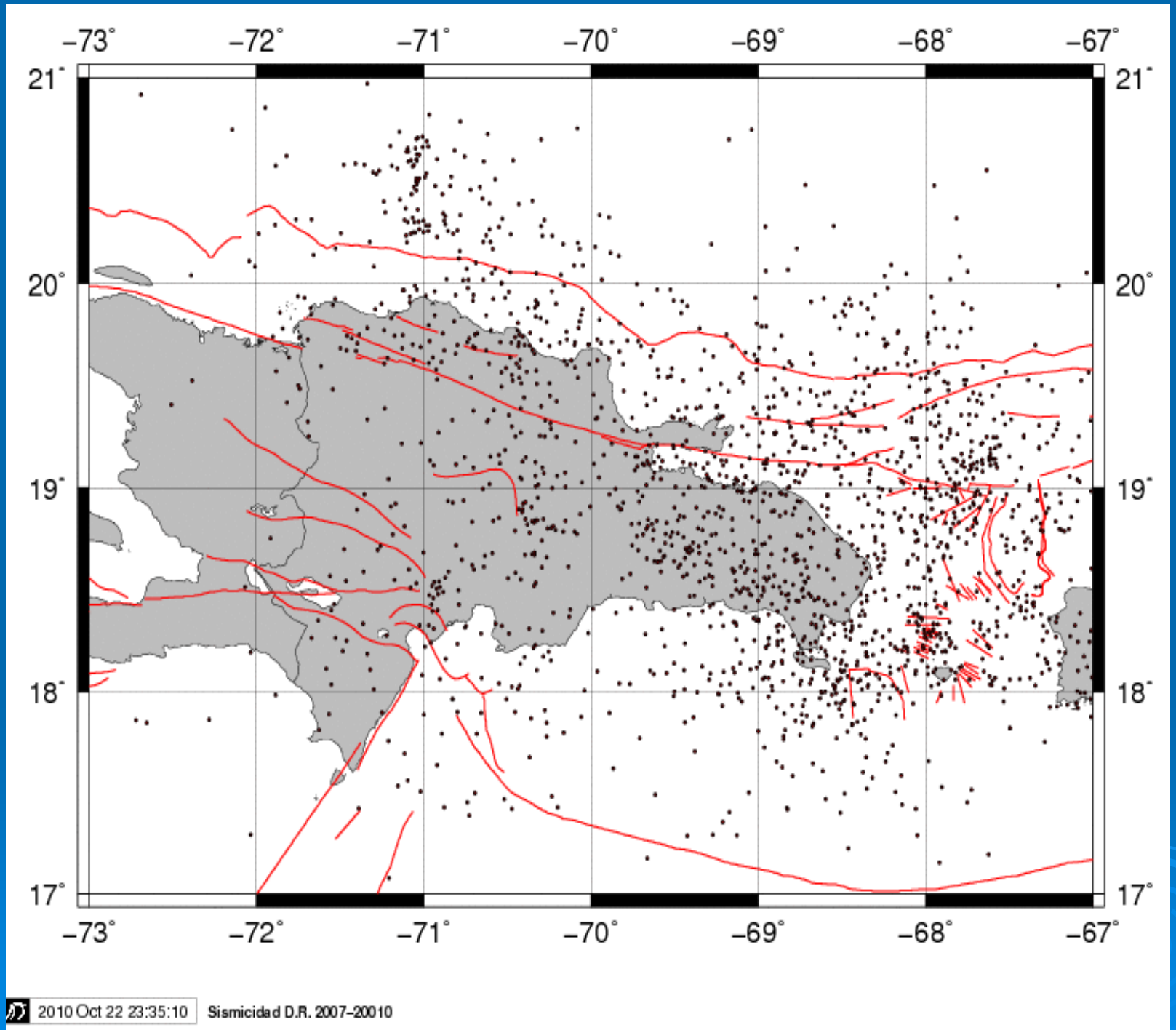
Earthquakes in Dom. Rep…

- On September 22, 2003, occurred an earthquake of 6.5 degrees that affected Puerto Plata and Santiago. It was felt throughout the Dominican territory.

Figura 7: Liceo José Dubeau, vista general.

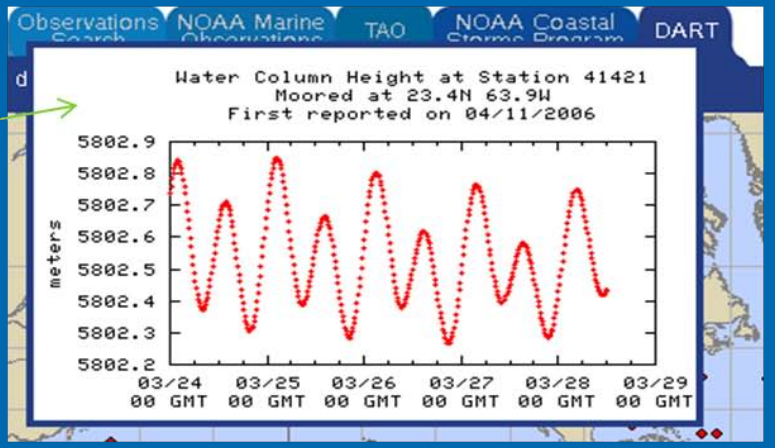
Figura 8: Liceo José Dubeau, parte colapsada.

Figura 3: Escuela Reforma, piso colapsado.


−73°
−72°
−71°
−70°
−69°
−68°
−67°
21°
20°
19°
18°
17°
2010 Oct 22 23:35:10
Sismicidad D.R. 2007-20010

Tide Gages and Dart Buoys

DART and Tide gauge.



Boca Chica
(en construcción)

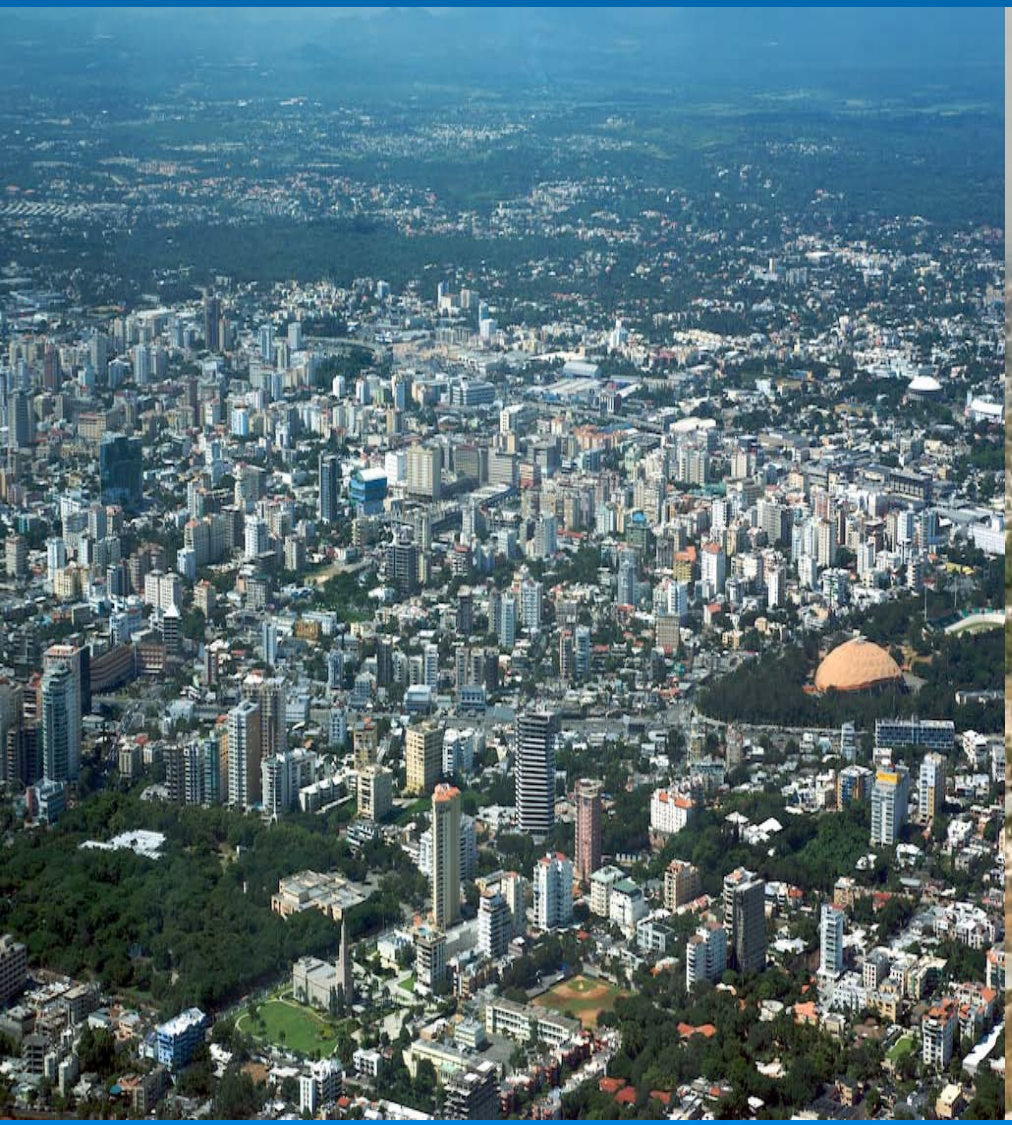
Risk in Dominican Republic

- Undeniably, the seismic risk in Dominican Republic is quite high.
  - High seismic potencial.
  - Growning vulnerability

Elements that determine vulnerability to earthquakes in the country.

- 1.- Lack of awareness about earthquakes.
- 2.- Few experiences of occurrence of earthquakes.
- 3.- Fraudulent buildings, old and poor quality.
- 4.- Chaotic growth of urban areas.
- 5.- Large unplanned urban sites and in areas of risk.
- 5.- Lack of control over land use.
- 6.- Low level of education on prevention.
- 7.- Low preparation to face earthquakes. Lack of plans.

Development of urban areas.



http://personal.globered.com/fotografiasdominicanas

Our great challenge.

- Undeniably, the seismic risk in Dominican Republic is quite high.
- The great challenge is to reduce this risk, reduce the vulnerability, curbing the rapid growth of the vulnerability.
- The country as a whole (authorities and general population) has to face reality with decision, responsibility and courage, since the problem is very serious.

Needs .

- a) It is necessary to promote and develop research projects to determine the degree of existing seismic threat, assess the degree of vulnerability.
- b) Zoning risk.

It is necessary .

- c)Check fraudulent buildings and urban sites in areas at risk.
- d) Undertake a program of education to the population.
-
- All the above is essencial for planning and carrying out the safe development of the nation.
-

What are our Needs?

- Expansion and densification of the seismic network.
- Accelerograph network.
- Develop research projects.
- Estimation and Zoning of the seismic risk.
- GPS permanent network
- Education Programs to the public.
- Increase the technical and scientific capacity.
- Alert Systems.
- Improve Computational Capacity
- To help to elaborate a building seismic code according to the local reality.
- Collaboration with Haiti.
- To Get help to convince our authorities about the seismic risk problem.

We cannot achieve this if we do not possess the collaboration of the institutions and of the countries brothers.

Thanks for your attention.

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