



CURRENT STATUS OF THE NATIONAL SEISMOLOGICAL SERVICE AND PLANS

Xyoli Pérez Campos

Servicio Sismológico Nacional

Order by last name:

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Mission

Record, store and distribute data of the movement of the ground to report on the seismicity of the country to the authorities and the population in general, promote the exchange of data and cooperate with other institutions of monitoring and research at the national level and International.

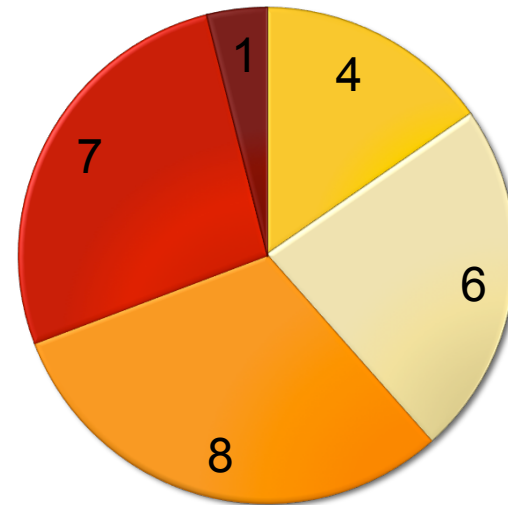
Vision

Be a national and international reference for registration of seismic activity, as well as the diffusion and divulgation of seismological information.

Nombramiento	Número
Academic technician	15
Executive Assistant	1
Administrative technician	5
Contract fee	5
TOTAL	26

Staff

- Support
- Systems and communications
- Instrumentation and maintenance
- Analysis and interpretation of data
- Quality control / diffusion and divulgation



Stations that are sending seismic data

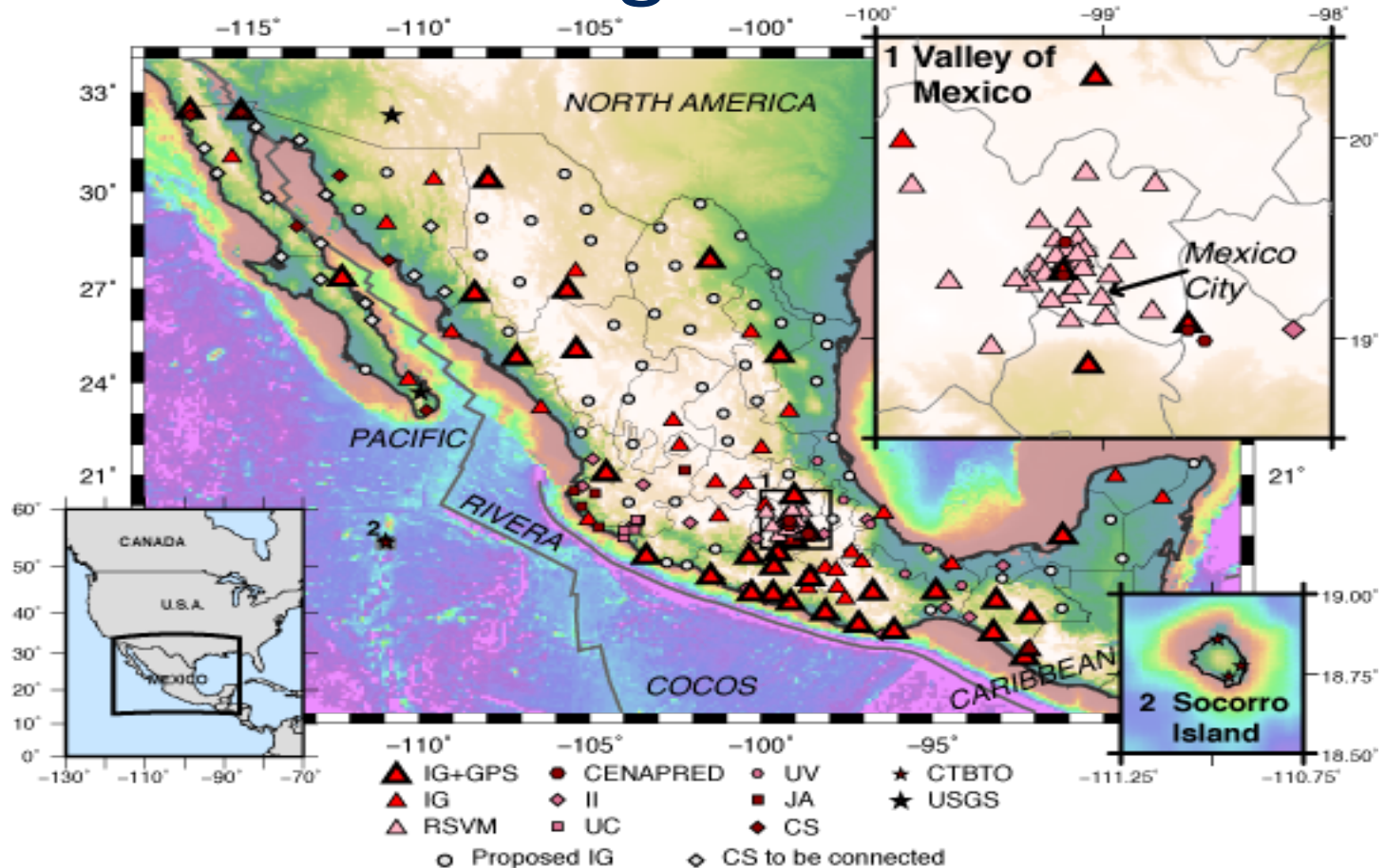
2017

Data from 163 stations:

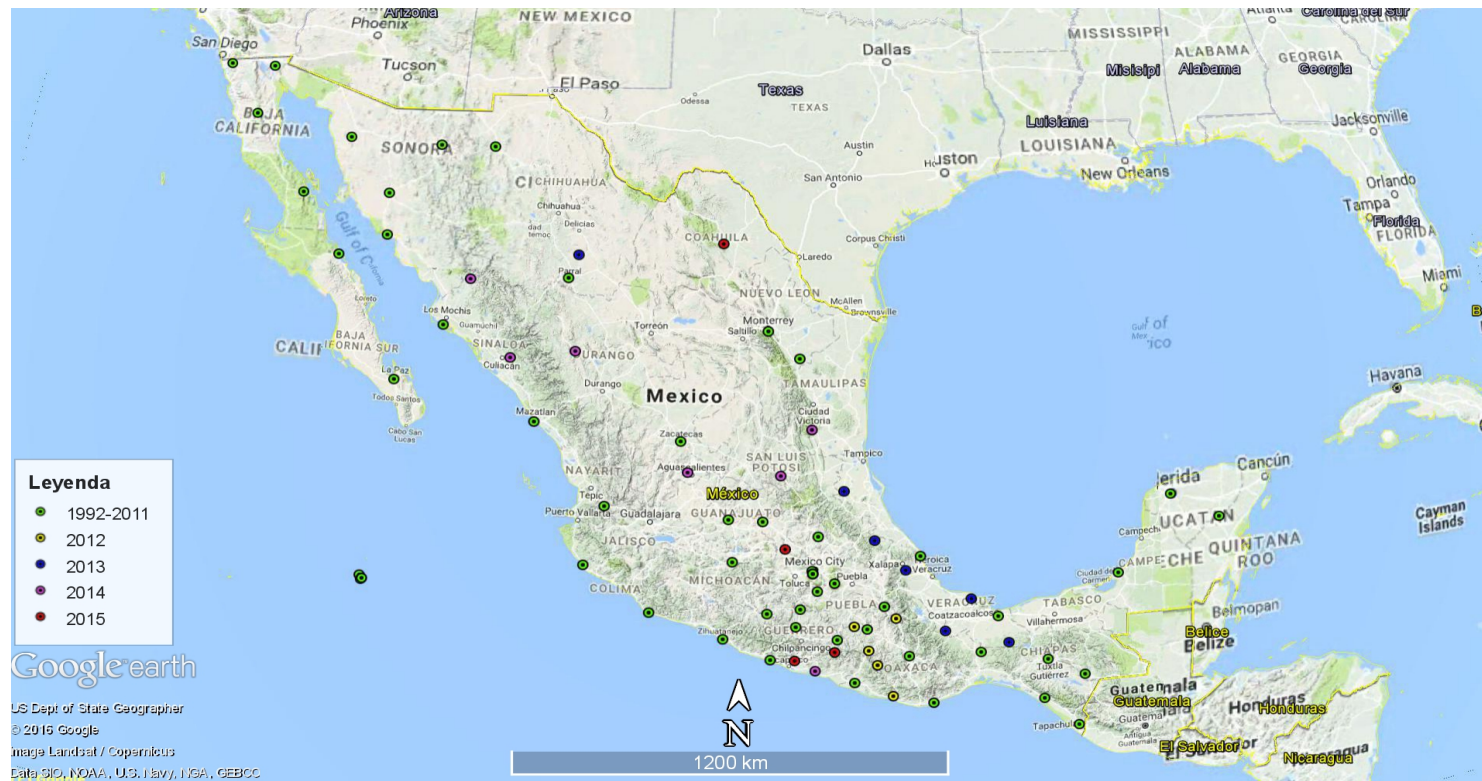
SSN:

- ✓ 63 BB
- 42 GPS
- ✓ 32 VM
- ✓ 3 Tacaná

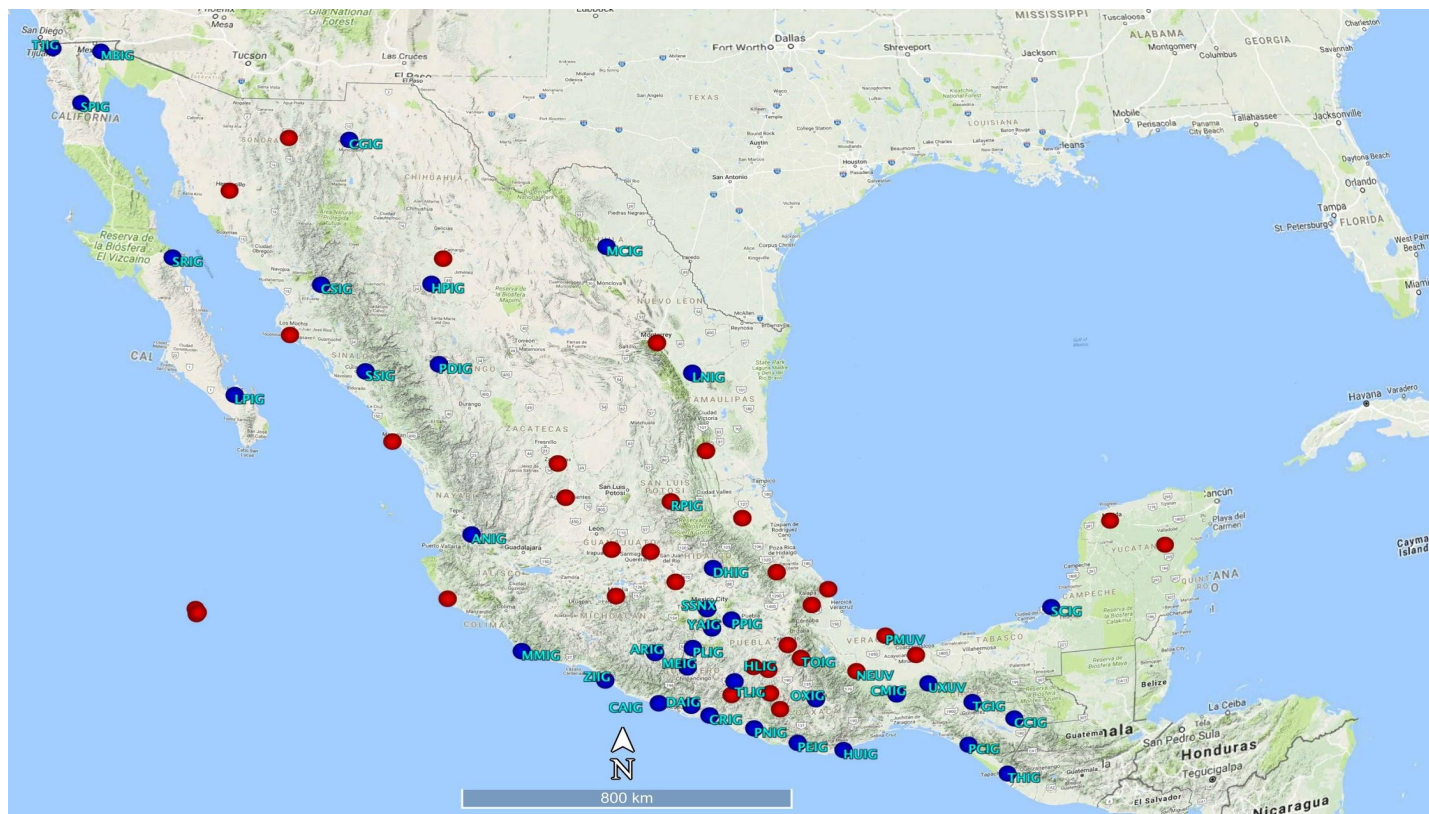
• Other institutions:65



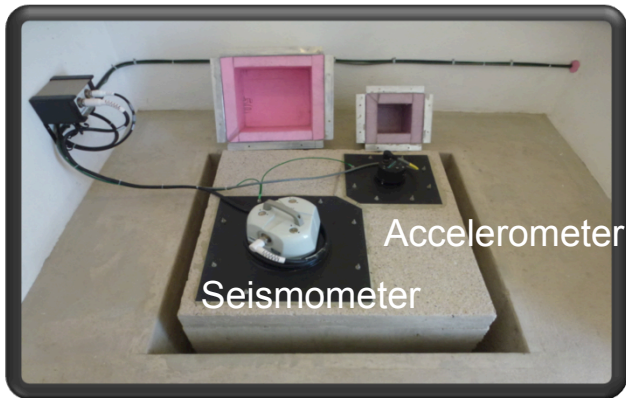
Network evolution



GPS network



Stations from which data are received

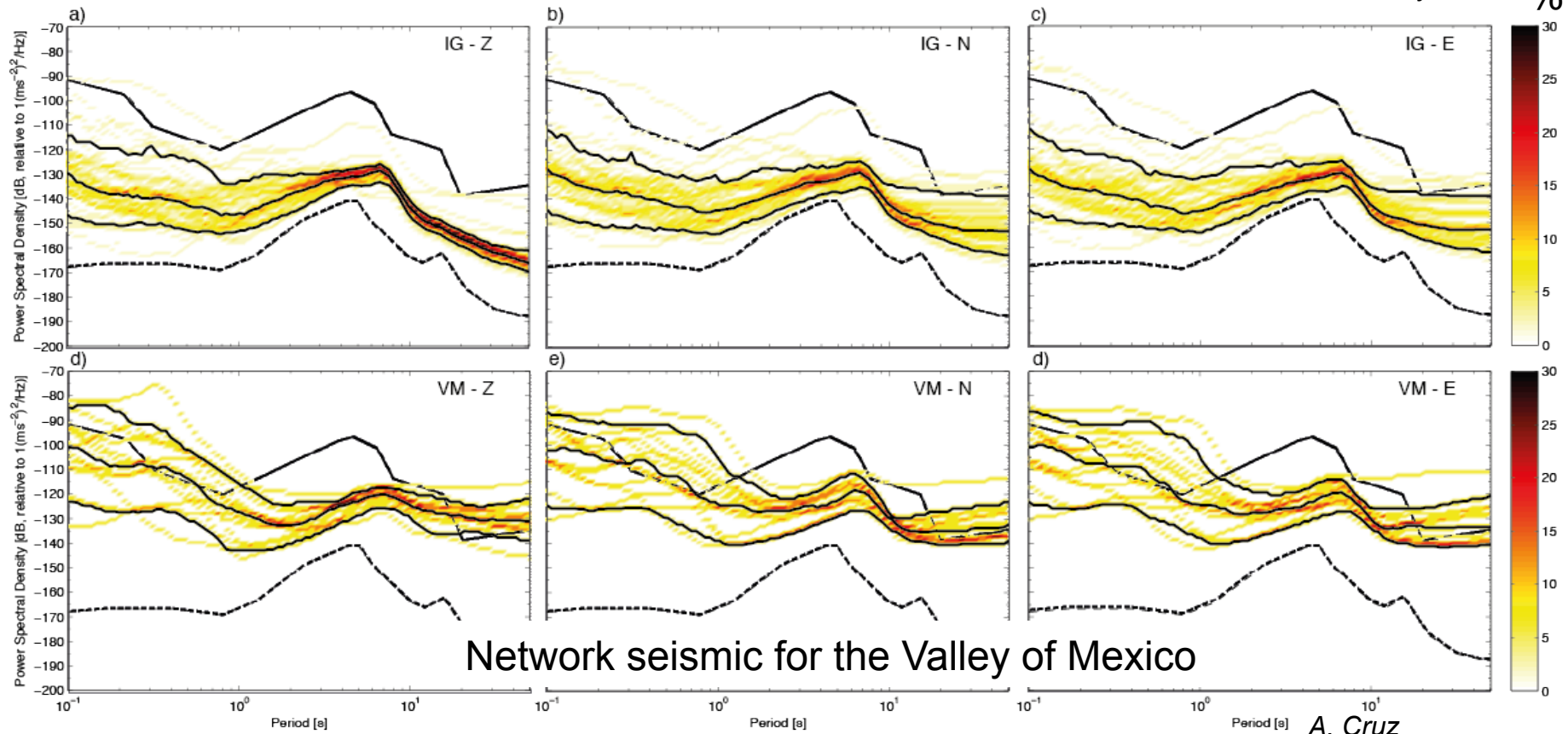


Noise levels

Broadband network

E. Montoya

%

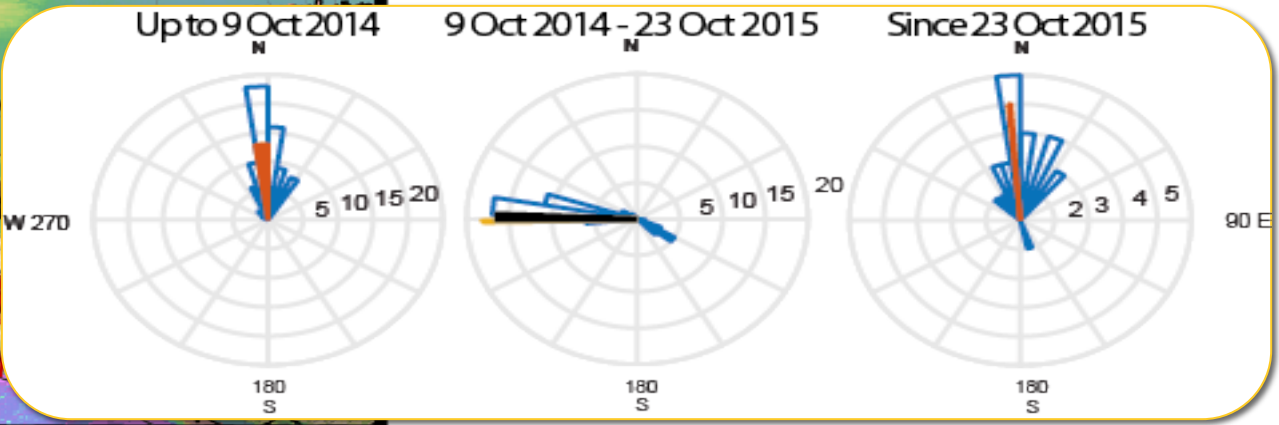
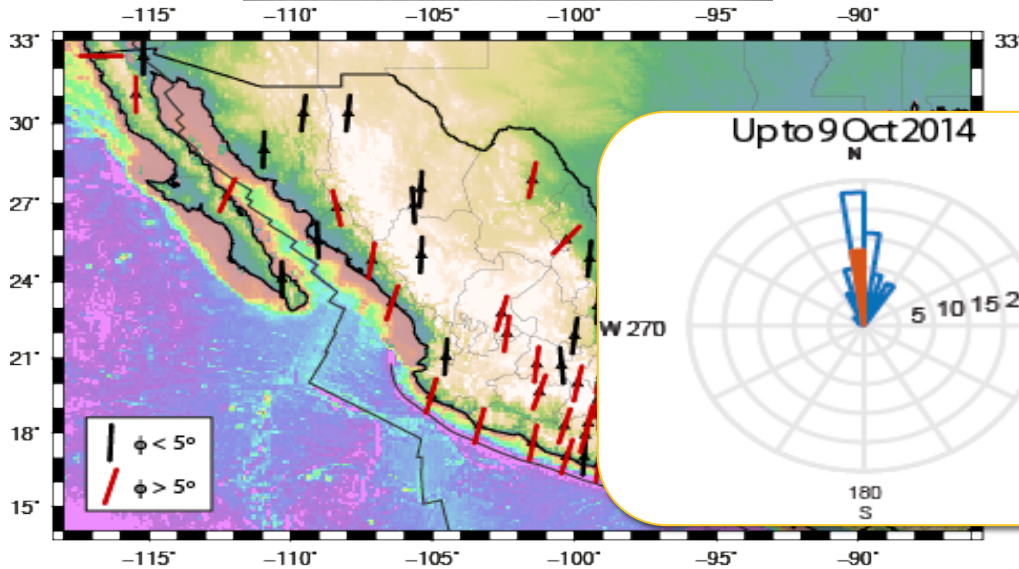
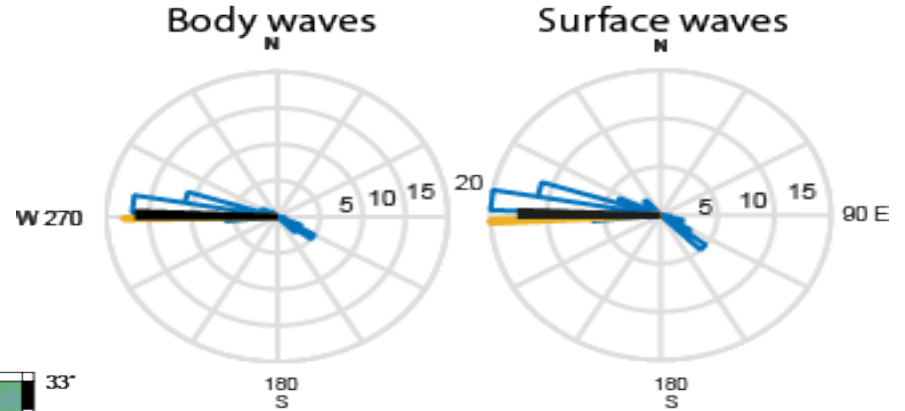
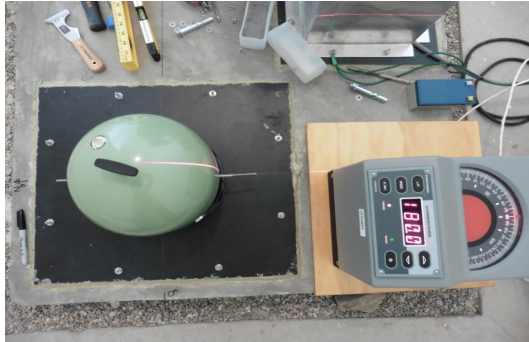


Network seismic for the Valley of Mexico

A. Cruz

Orientation of the sensors

2015-2017



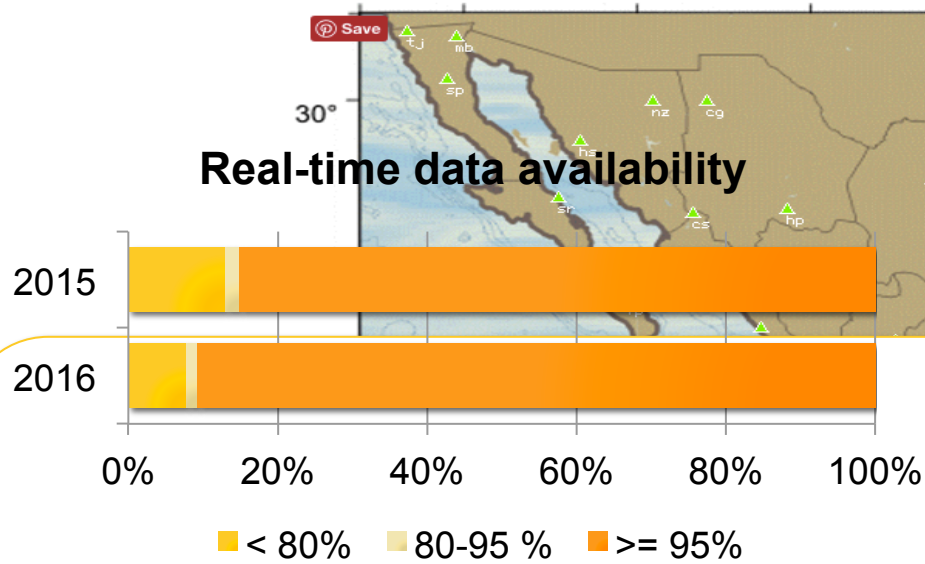
M. A. Velázquez

Monitoring of health status in real time



Ver sismogramas de Estaciones de Banda-Ancha

Real-time data availability



Year	< 80%	80-95%	>=95%
2015	13.0	1.9	85.1
2016	7.8	1.5	90.7



Monitoring of health status in real time

[Comportamiento Historico](#)

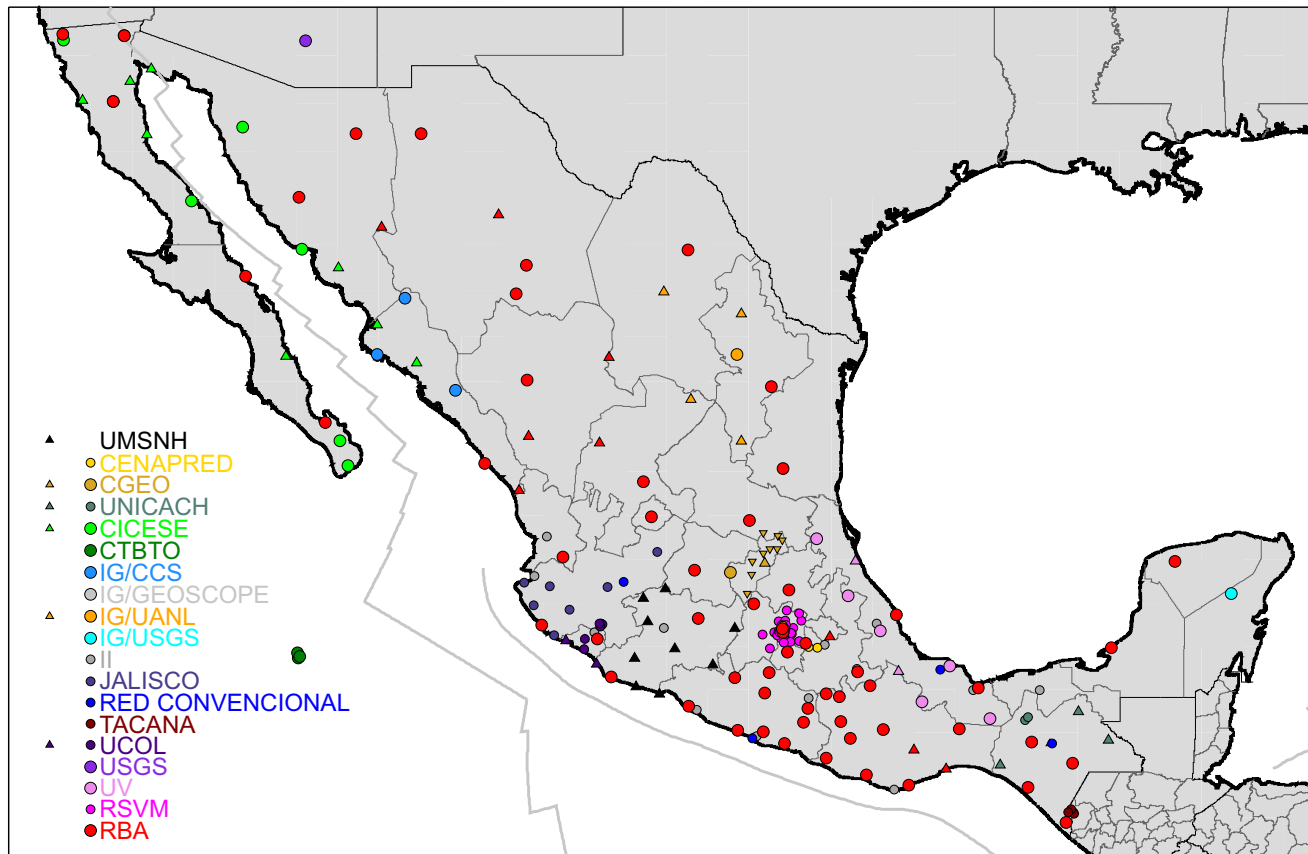
PARAMETROS DE OPERACION Sat Jul 29 13:00:16 2017										
Estación	Estado Actual	Clock Q.(LCQ)	VCO	Sys Temp (VKI)	Antenna C(VEA)	Sys C (VEC)	Input Vol.(VEP)	Mass P1 (VMU)	Mass P2 (VMW)	Mass P3 (VMV)
AAIG	vivo	100.0%	2063.0	30.0C	6.0mA	87.0mA	13.4V	-1.2mV	-0.1mV	1.4mV
ANIG	muerto	2017/6/28 18:01:58								
ARIG	vivo	100.0%	2430.0	34.0C	10.0mA	74.0mA	13.5V	-0.4mV	1.1mV	-2.9mV
CAIG	vivo	100.0%	2406.0	36.0C	7.0mA	78.0mA	13.4V	-0.9mV	-2.5mV	1.7mV
CCIG	muerto	2017/7/26 15:11:38								
CGIG	vivo	100.0%	2353.0	31.0C	6.0mA	79.0mA	13.4V	-3.3mV	2.1mV	0.5mV
CJIG	vivo	100.0%	2228.0	35.0C	4.0mA	76.0mA	13.7V	0.9mV	-0.7mV	-0.7mV
CMIG	vivo	100.0%	2619.0	39.0C	7.0mA	78.0mA	13.4V	-0.4mV	-0.6mV	0.5mV
CRIG	vivo	100.0%	1764.0	36.0C	5.0mA	88.0mA	13.5V	-0.4mV	0.0mV	-0.1mV
CSIG	vivo	100.0%	2009.0	33.0C	14.0mA	80.0mA	13.4V	-0.1mV	0.6mV	0.2mV
CUIG	No hay datos de parametros !									
DAIG	vivo	100.0%	2512.0	35.0C	4.0mA	76.0mA	13.5V	-1.9mV	2.0mV	-1.8mV
DHIG	vivo	100.0%	2062.0	33.0C	5.0mA	83.0mA	13.5V	-0.4mV	1.2mV	0.6mV
FTIG	vivo	100.0%	2140.0	29.0C	4.0mA	78.0mA	13.5V	-0.1mV	0.1mV	0.0mV
GTIG	vivo	100.0%	2114.0	33.0C	5.0mA	85.0mA	13.7V	1.4mV	-0.9mV	-1.6mV
HLIG	vivo	100.0%	2466.0	33.0C	8.0mA	80.0mA	13.2V	0.5mV	0.0mV	-0.3mV
HPIG	vivo	100.0%	2307.0	31.0C	8.0mA	81.0mA	13.2V	-2.0mV	-1.0mV	0.2mV
HSIG	vivo	100.0%	2544.0	38.0C	8.0mA	73.0mA	13.7V	-0.3mV	0.1mV	-0.8mV

[Estado Actual de las estaciones de Banda-Ancha](#)

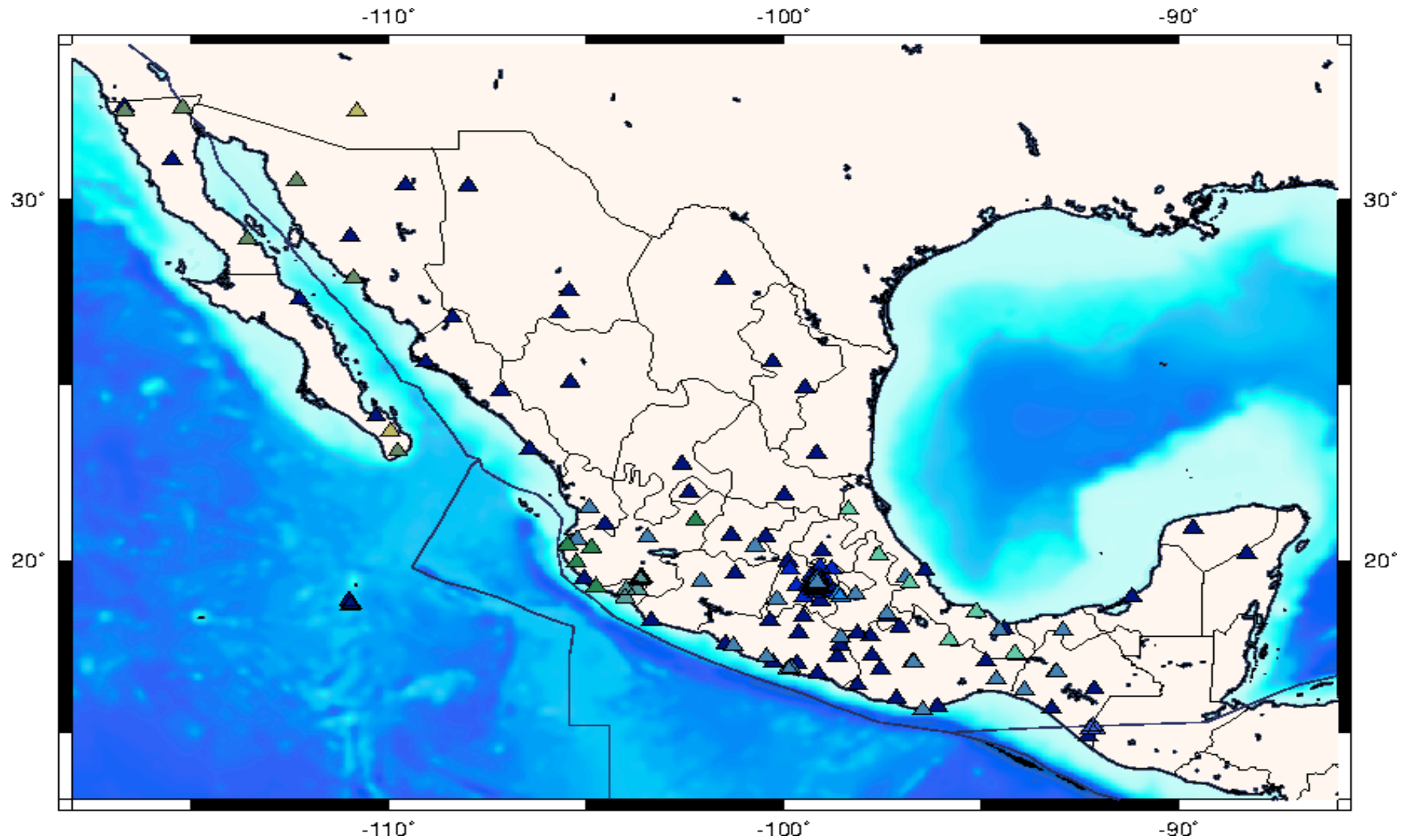
[Parametros de Operación y de Calibración](#)

[Disponibilidad de Datos Continuos](#)

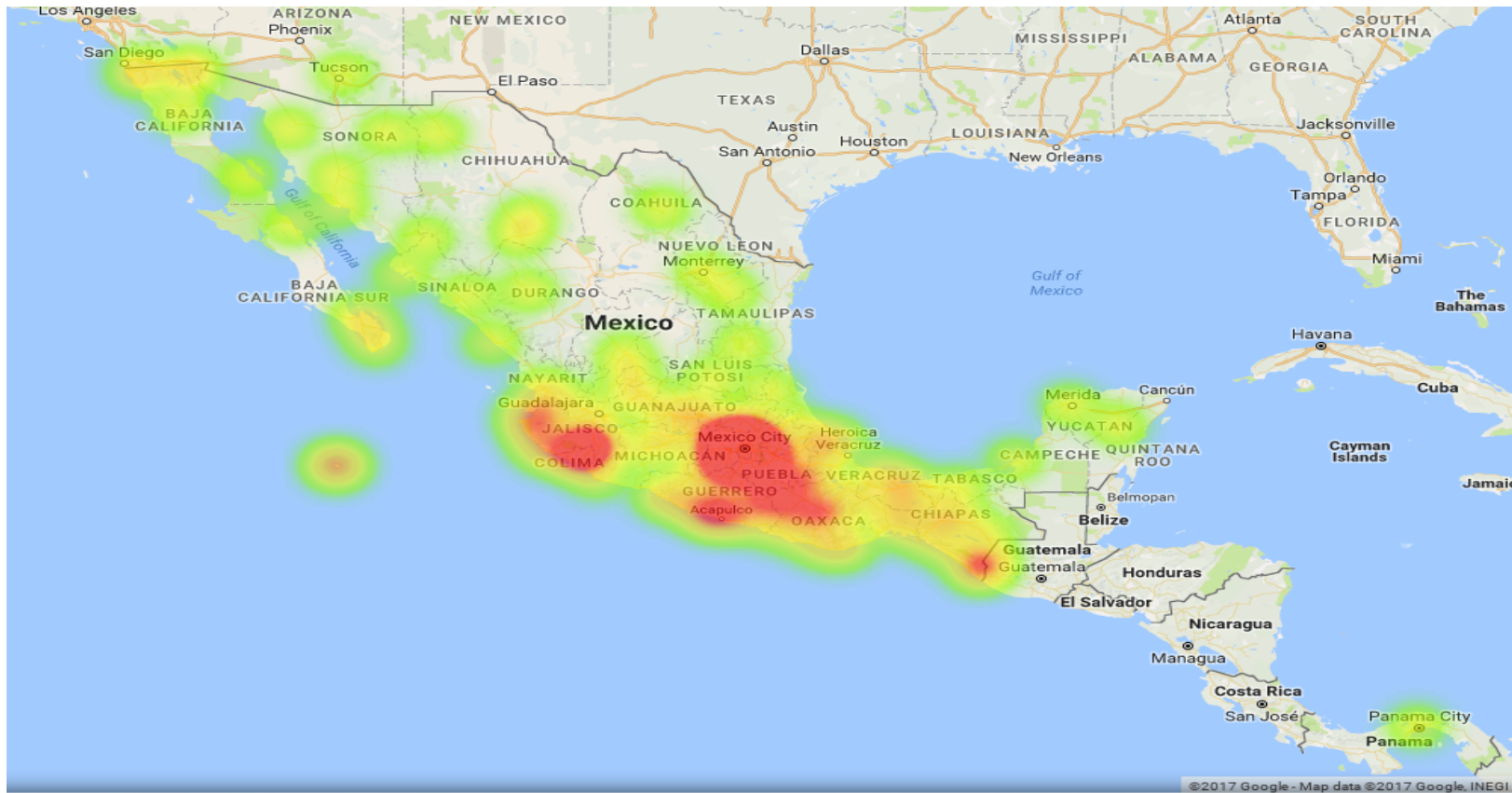
Improving density of stations



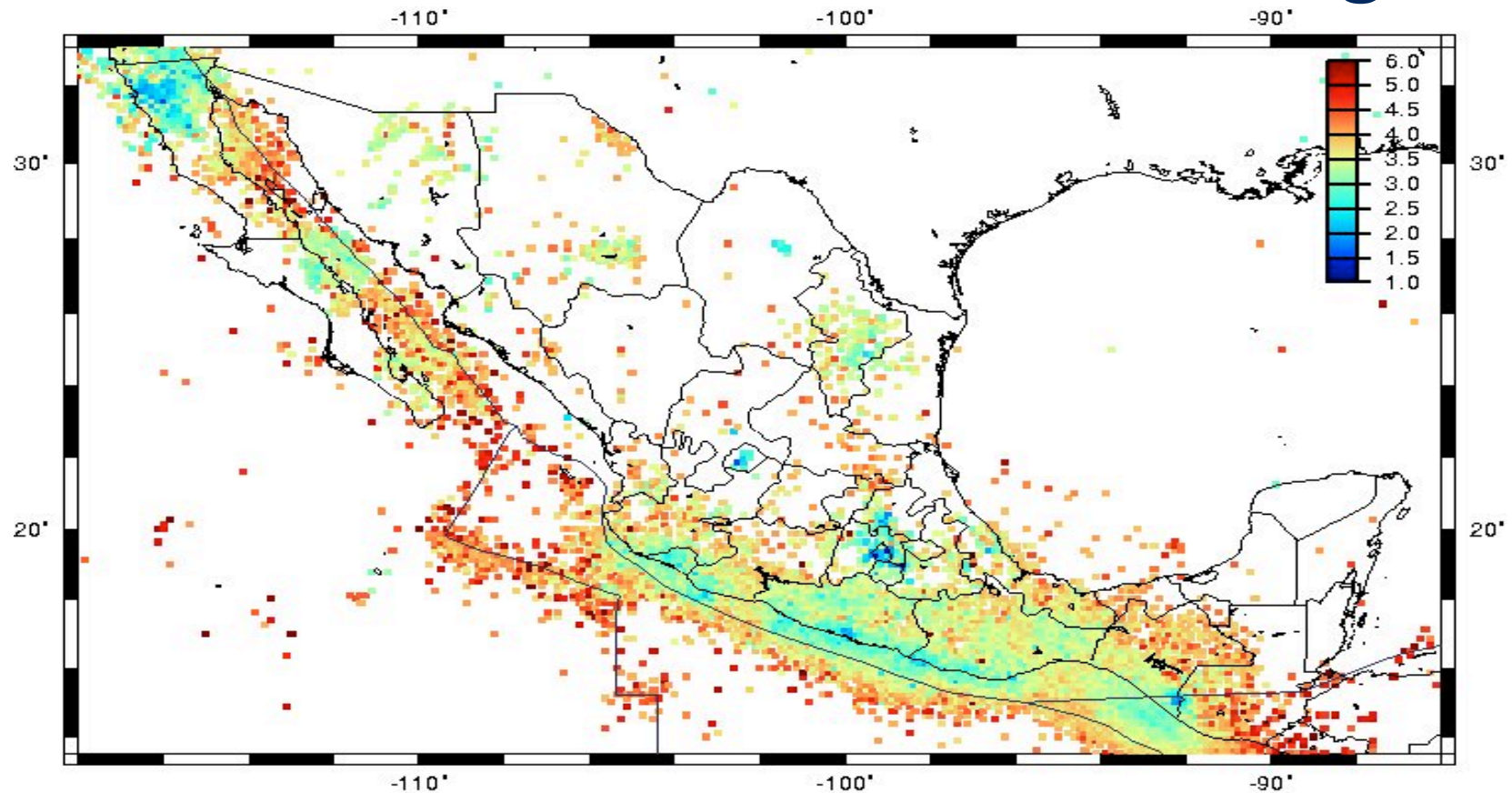
3-year project:
increase of 38 BB
stations,
complemented by
local, regional
networks and strong
motion stations.



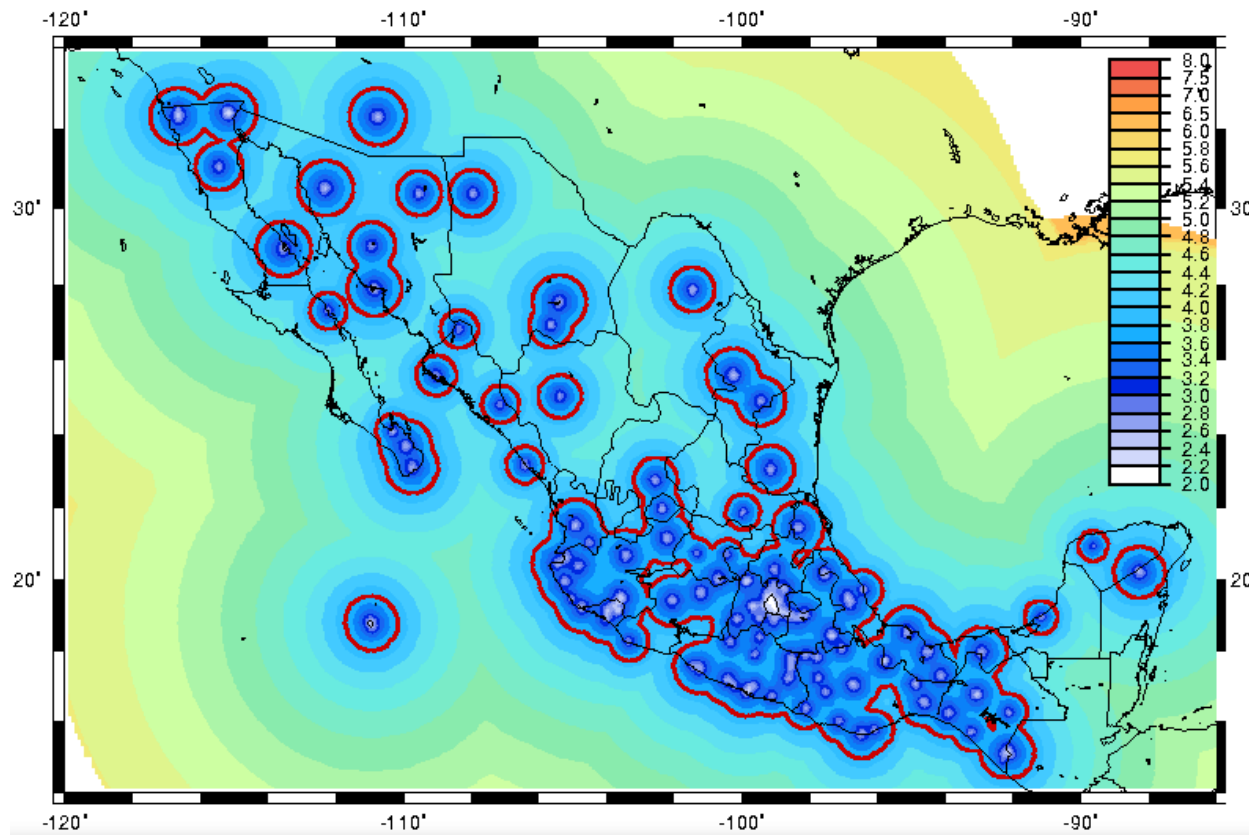
Density of stations



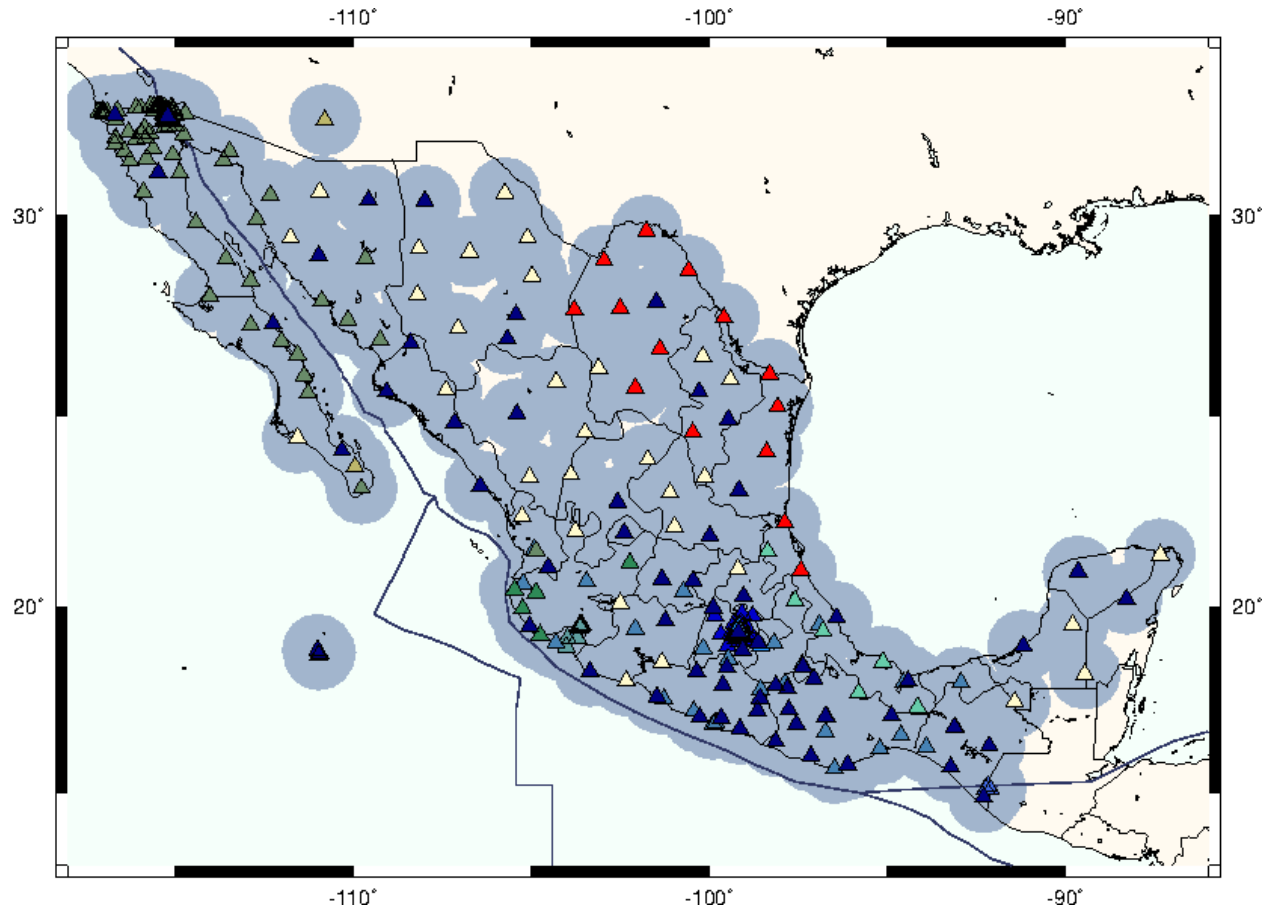
Minimum detection based on catalogue



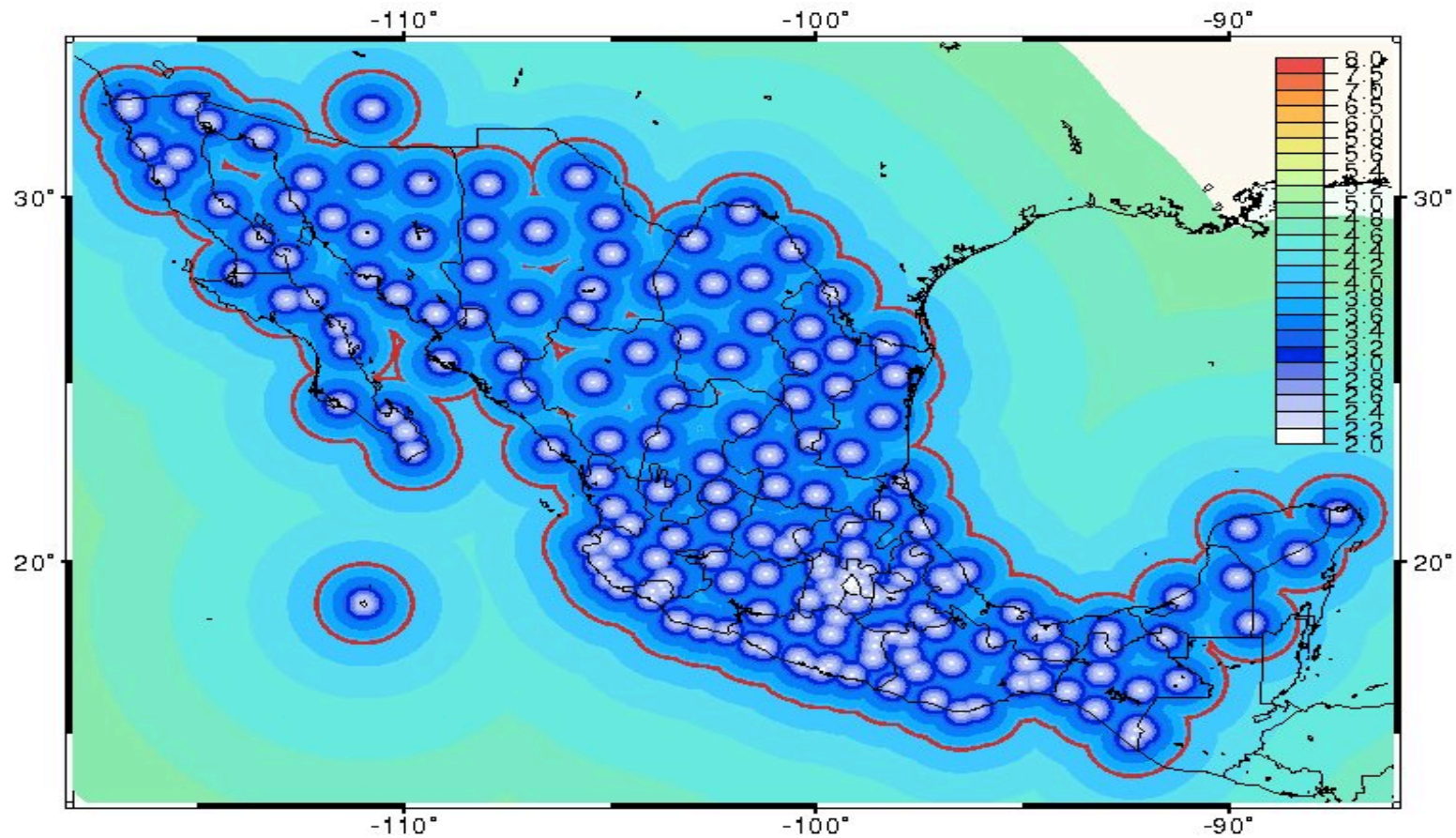
Based noise detection levels



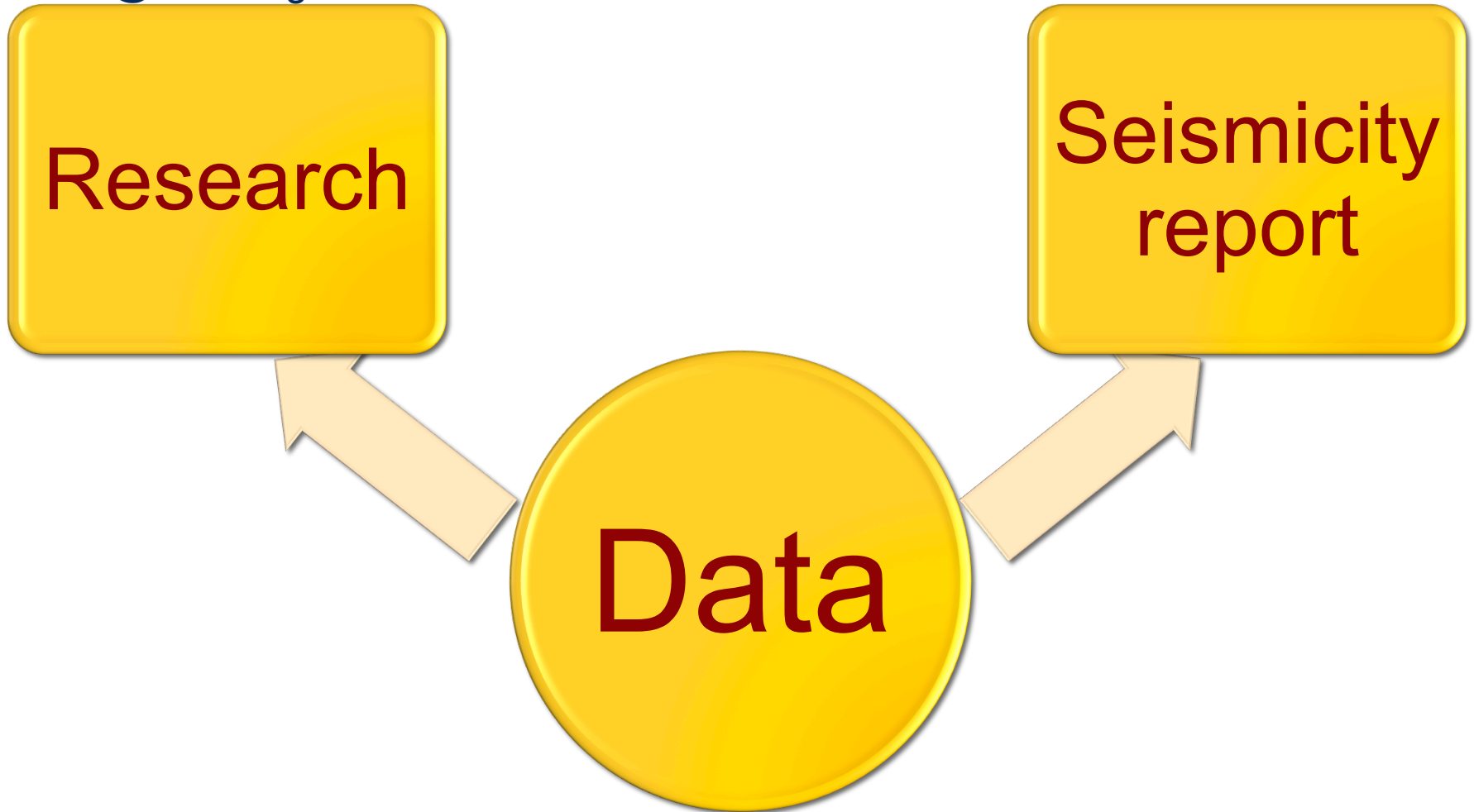
Future: Mexican Seismic Network



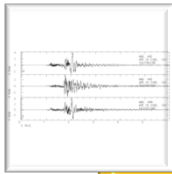
Minimum detection



ssndata@sismologico.unam.mx

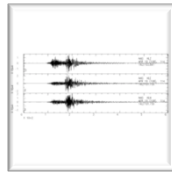


Seismic data



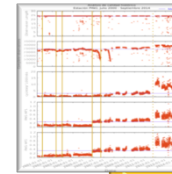
Velocity

- Real time 100 mps



Acceleration

- Real time 100 mps



Displacement

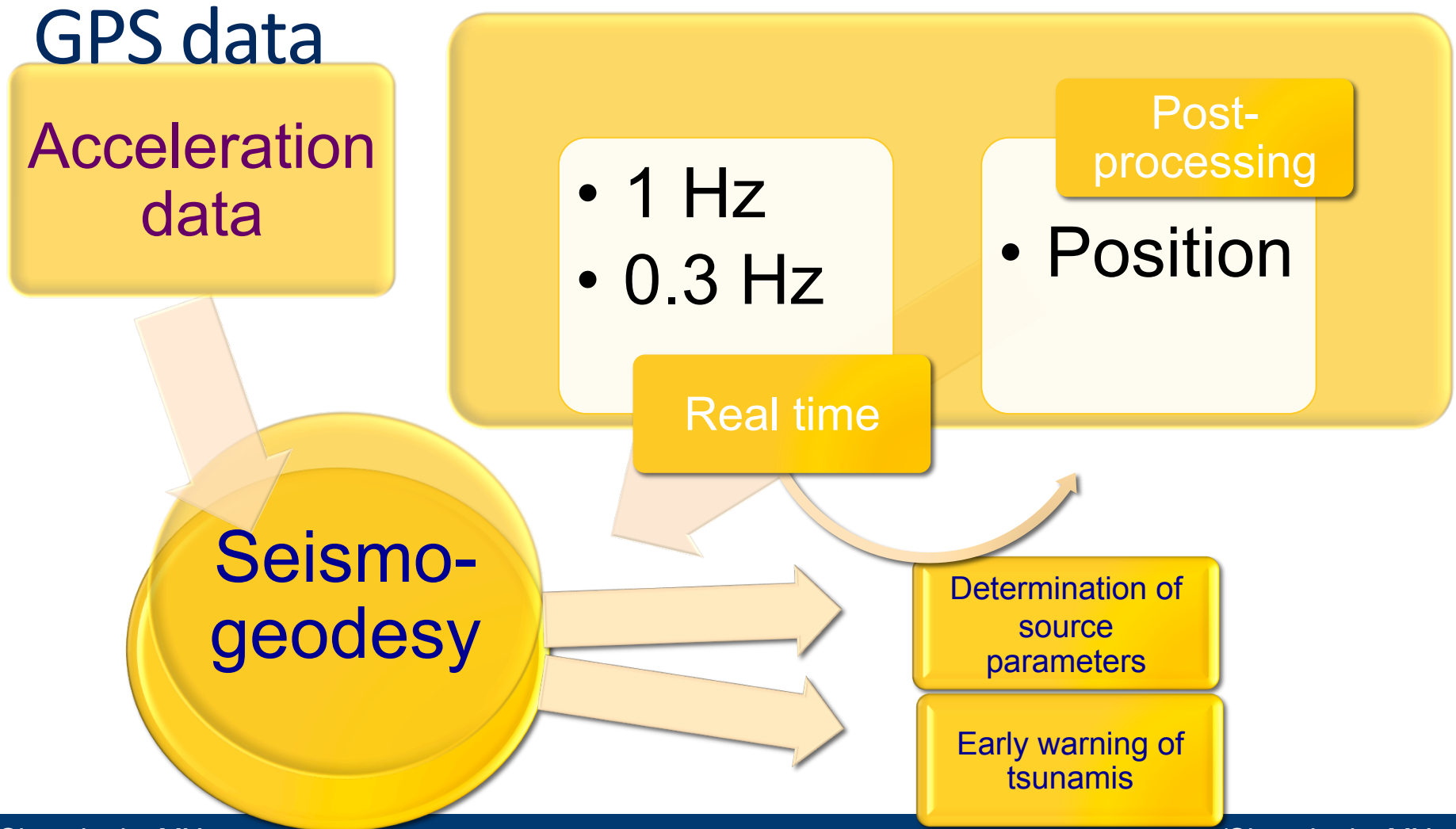
- Real time 1 mps

Basis of numerous investigations:

- Seismic source
- Structure
- Site effect
- Strong motion
- ❖ Interferometry
- ❖ Tectonic tremors

Basis of numerous investigations:

- Cortical deformation.
- Slower earthquake
- ❖ Seismo- geodesy
- ❖ Early warning of tsunamis



Parameters reported

Location

- Seiscomp
- Seisan

Magnitude

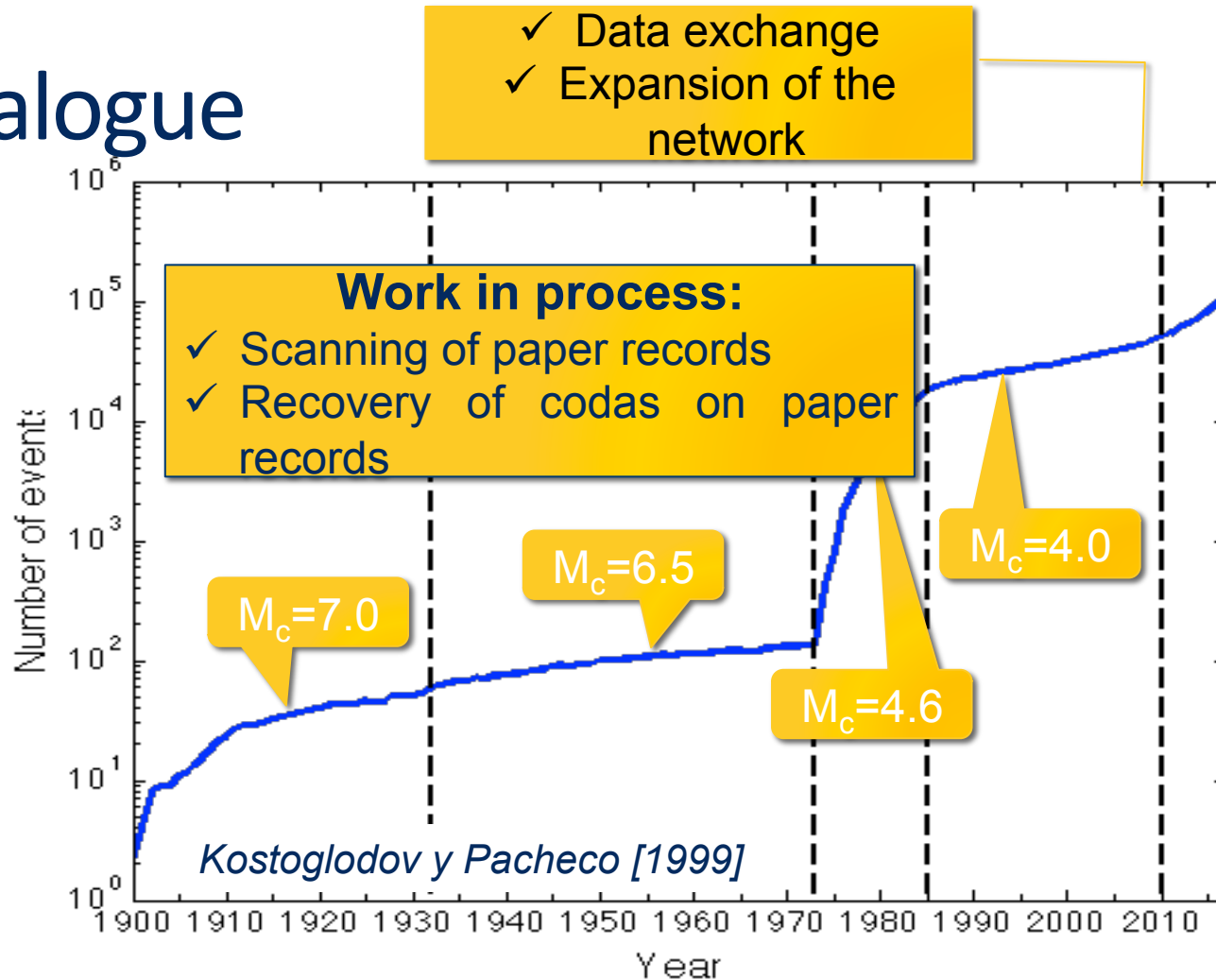
- M_A , M_E
- M_C
- M_W

Fase W

TM
Regional
rtCMT

Not reported: Focal mechanism or moment tensor

Catalogue

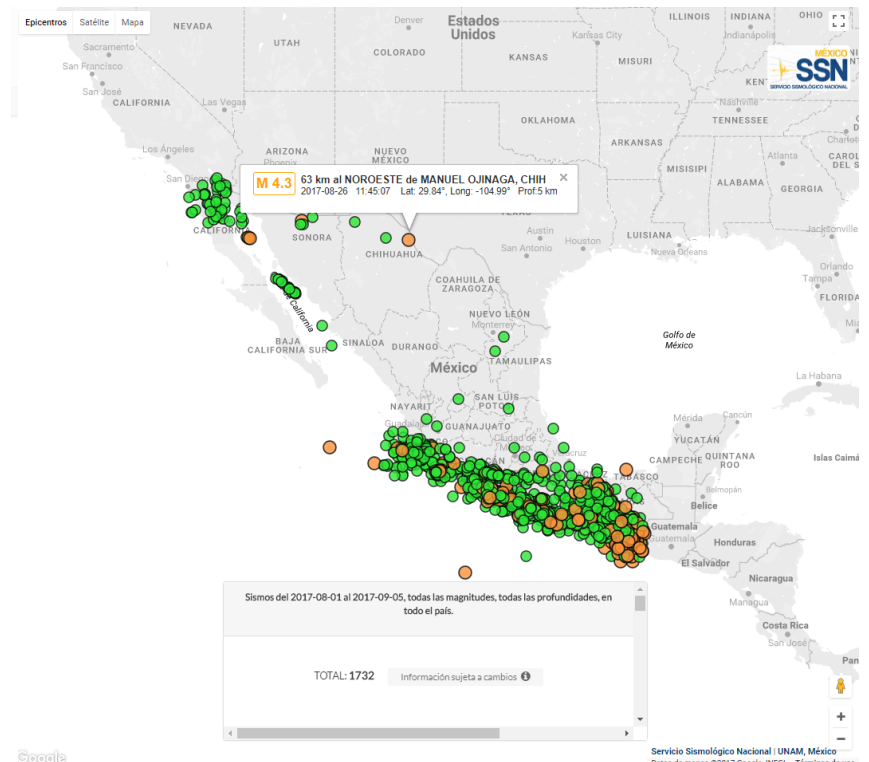


Catalogue

The screenshot shows the search results interface of the Servicio Sismológico Nacional (SSN). A modal window titled "Resultados" is open, displaying the following information:

- Periodo: Sismos del 2017-09-01 al 2017-09-05, todas las magnitudes, todas las profundidades, en todo el país.
- TOTAL: 184
- Buttons: "Descargar CSV", "Aviso legal, uso de datos y privacidad", "Cerrar".

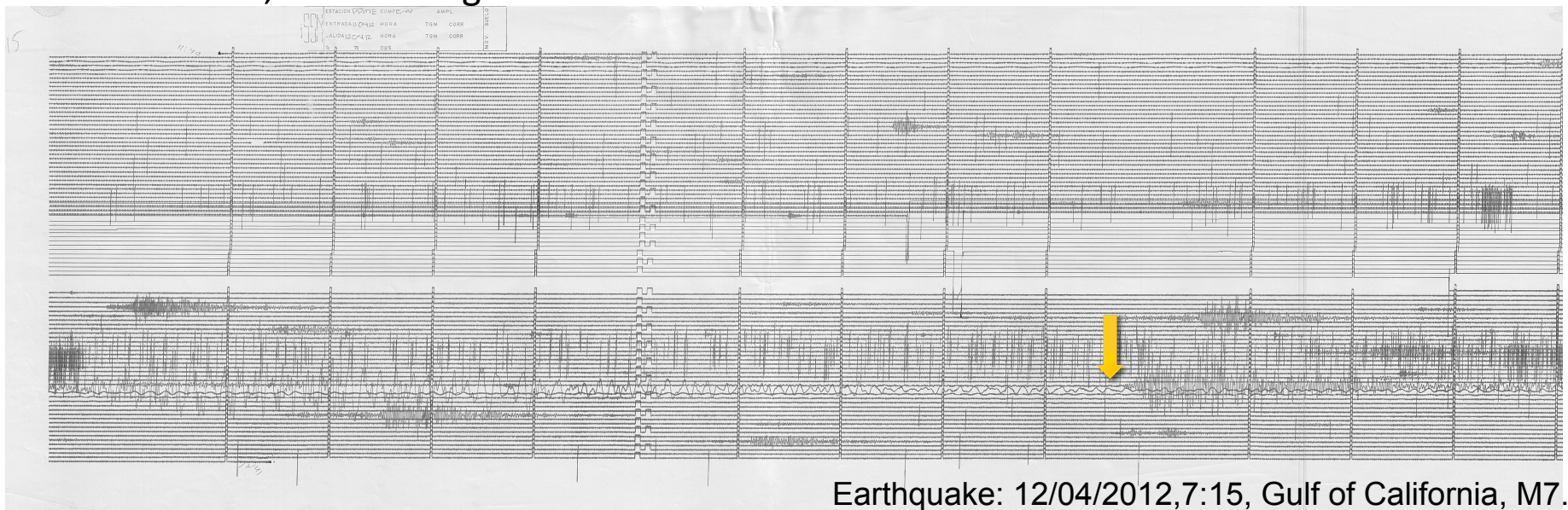
The background interface includes filters for "PERÍODO" (Date range: 2017-09-01 to 2017-09-05), "MAGNITUD" (Magnitude range: 4.0 to 9.9), and "PROFUNDIDAD" (Depth range: menos de 1 hasta 500 km). It also features a "FILTRAR POR" section for "Estado" and "Área", and a "FORMATO DE SALIDA" section with options for "Lista ordenable por campos", "Archivo de valores separados por comas", and "Mapa de epicentros".



Information since 1900

- 104,503 earthquakes in catalog since January 20, 1900.
- Record on paper from 1906:
 - 310,000 seismograms until 2015.

11-12 April 2012
station PPM, component EW



Earthquake: 12/04/2012,7:15, Gulf of California, M7.0

National Seismic Library online

- Data base:
 - 18,000
 - Aleph system



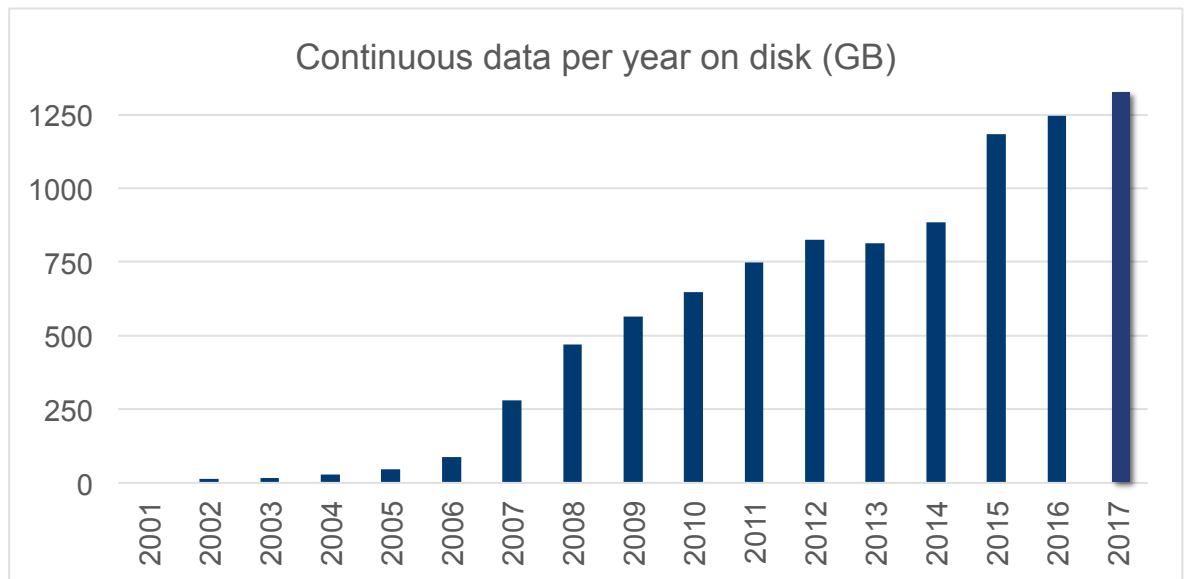
Con el apoyo del proyecto "Toda la UNAM en línea" y la aceptación de la propuesta "Sismoteca Nacional en Línea" (TUL_1380) para formar parte de la difusión de la información y los documentos resguardados por la Universidad Nacional Autónoma de México en sus distintos recintos, se crea el presente sitio web que permitirá como principal objetivo el difundir la información sísmológica del país por medio de los sismogramas escaneados y ligados a una base de datos con los elementos bibliográficos pertinentes que permitan su identificación, recuperación y despliegue del texto completo de cada material.

En el desarrollo del proyecto participan el Instituto de Geofísica, el Servicio Sismológico Nacional y la Biblioteca Conjunta de Ciencias de la Tierra, teniendo sus bases en la propuesta "SismoMex" que buscó desde sus orígenes la conformación de la primera Sismoteca dentro de las instalaciones de la UNAM.

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Digital records

- Digital data since 1986.
- The segment data for earthquakes was only kept.
- The continuous signal is saved since 2001.



Data

Current space 91 TB

With the increase of 52 stations would be 25.6 TB of data per year

Acumulado	Red IG (RT)			8734.72	
	Red Tacana (Guralp)			250	
	Red Veracruz (Guralp)			240	
	Red del valle (Guralp)			1624	
	Red del valle (Reftek)			2048	
	Red GPS			1945.6	
	Datos seisan			400	
	Datos mos			420	
Total acumulado				15662.32	15.3

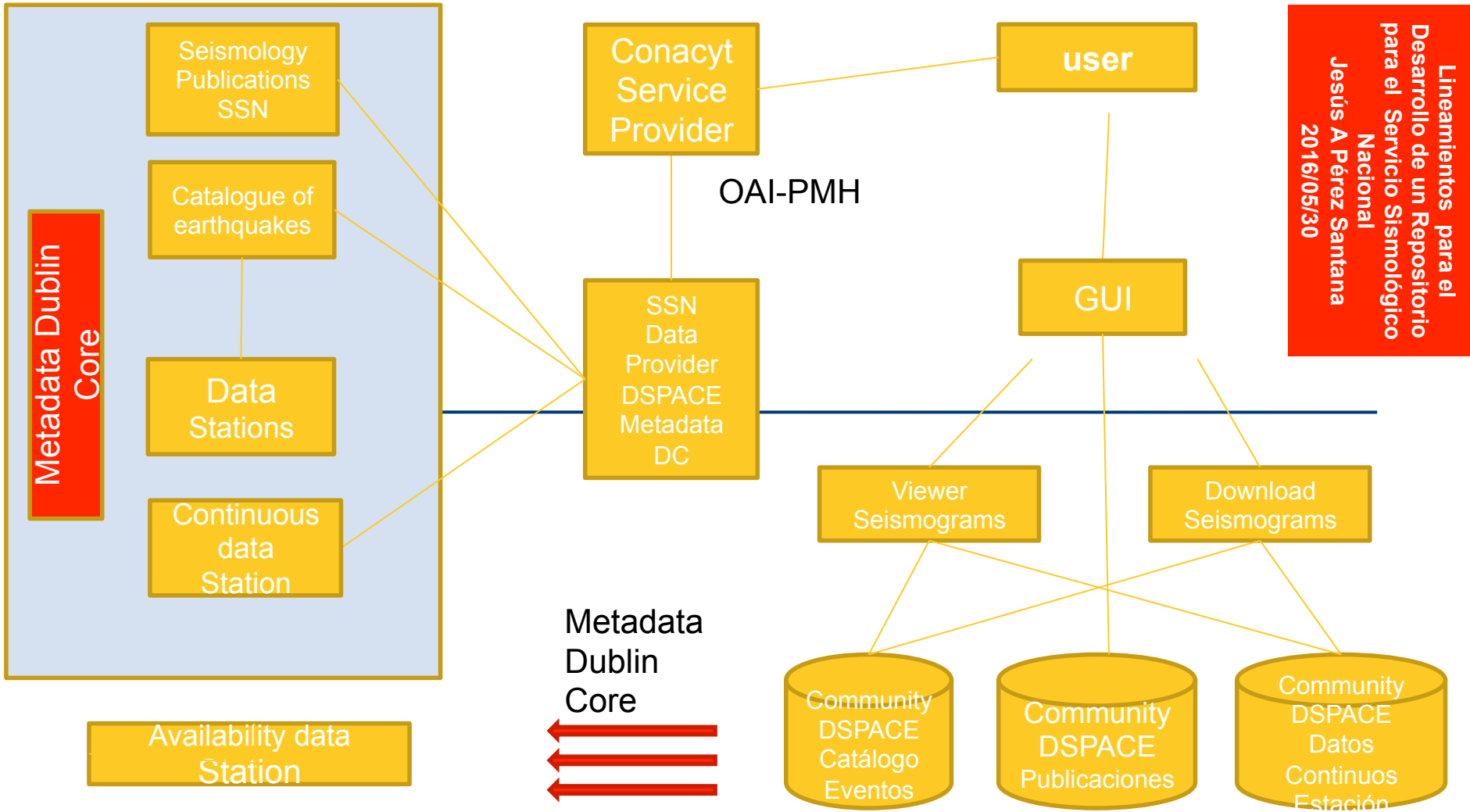
Año	Tipo dato	Espacio por año (GB) / estación	No. estaciones	TOTAL (GB)	TOTAL (TB)
Actual	Red IG (RT)	20	63	1260	1.23
Actual	Red Tacana (Guralp)	29	3	87	0.08
Actual	Red Veracruz (Guralp)	29	3	87	0.08
Actual	Red del valle (Guralp)	29	14	406	0.4
Actual	Red del valle (Reftek)	43	16	688	0.67
Actual	Red GPS	44	17	748	0.73
		0	0	0	0
		0	0	0	0
	Espacio total en un año			3276	3.2
	Datos seisan			300	
	Datos mos			40	
Total				3616	3.53

Data repository of the National Seismological Service

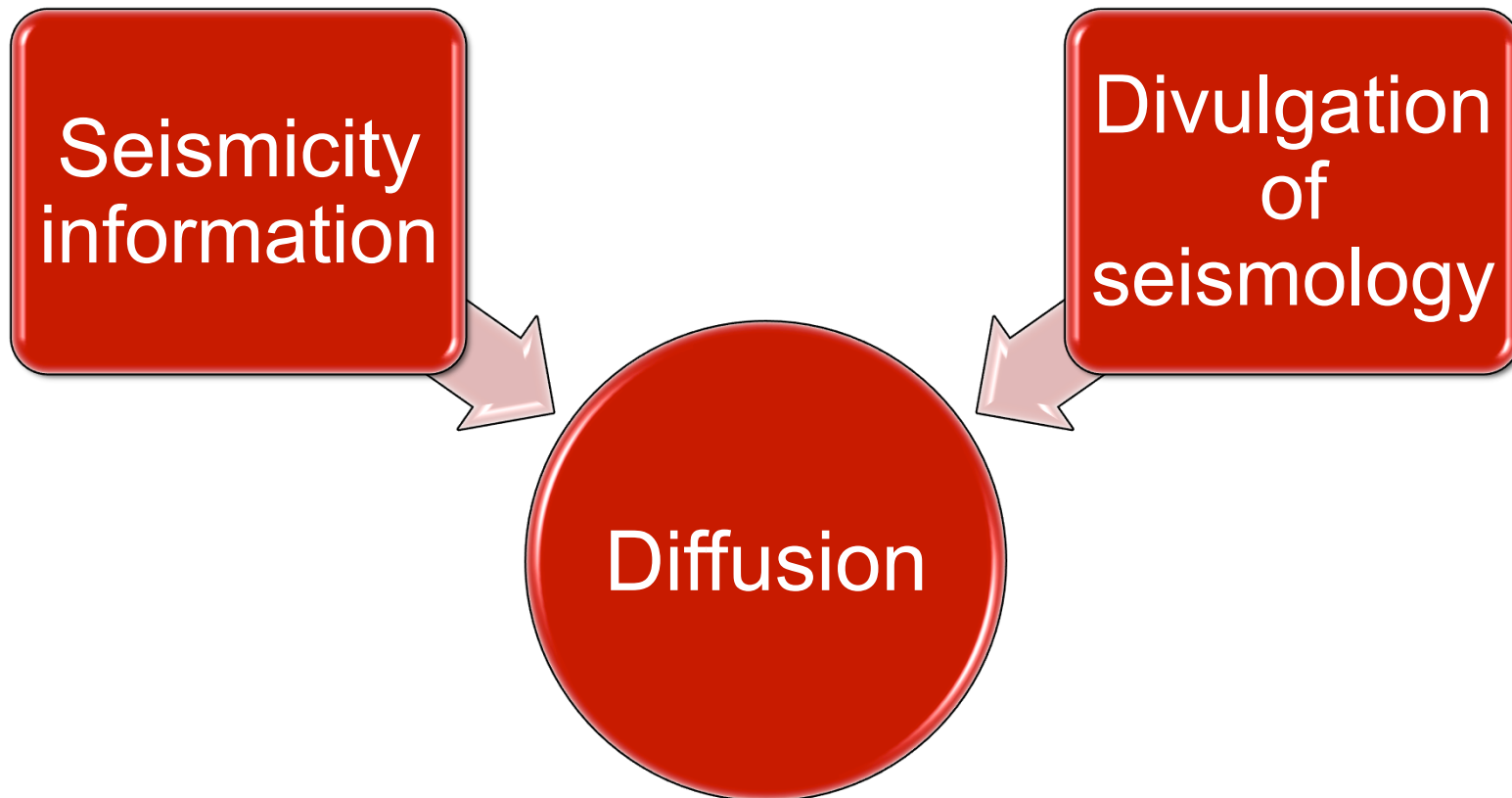


- **Objective:** Have a repository of seismological data with easy access so that will boost the use of them by researchers of the UNAM, Mexico and the world.
- Consolidate the SSN as the leading provider of seismic data of the country, with which is to create new knowledge of the seismotectonic of Mexico; as well as to address one of the big national problems, in particular those that relate to the determination of the seismic hazard and the risk reduction that this implies.





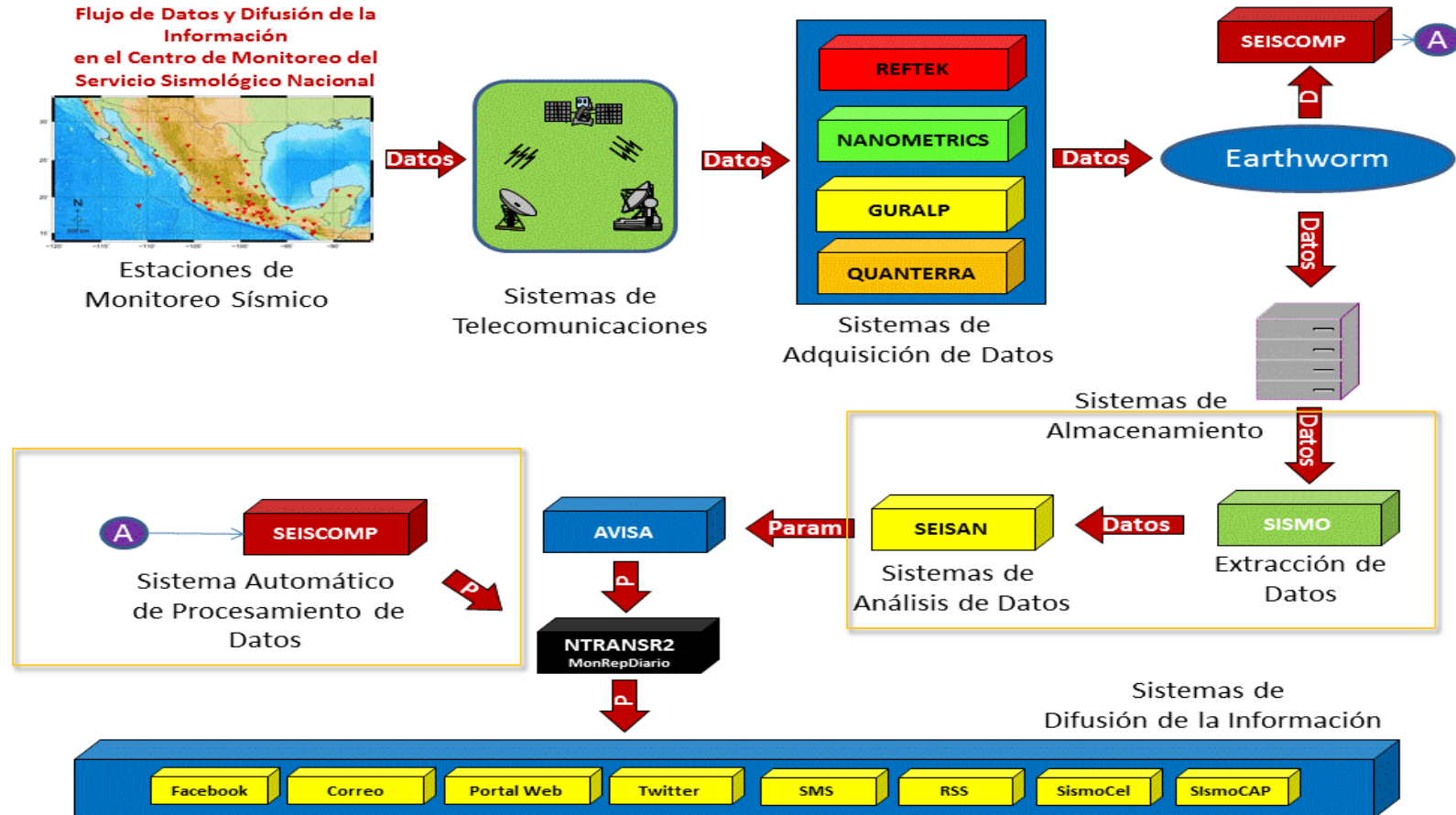
Lineamientos para el
 Desarrollo de un Repositorio
 para el Servicio Sismológico
 Nacional
 Jesús A Pérez Santana
 2016/05/30



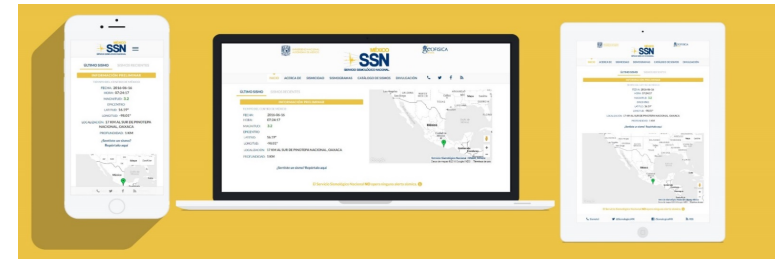
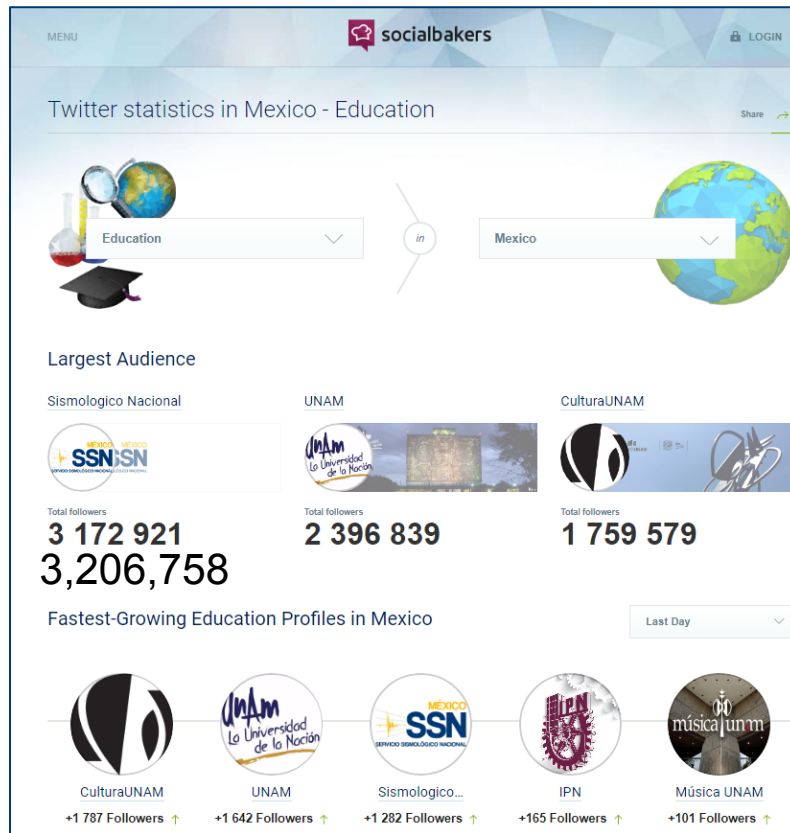
Data transmission



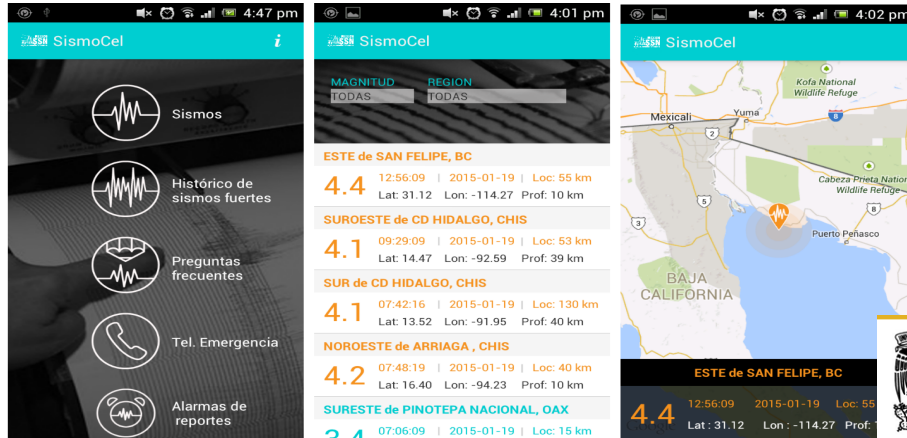
Data flow



Report



Work in process



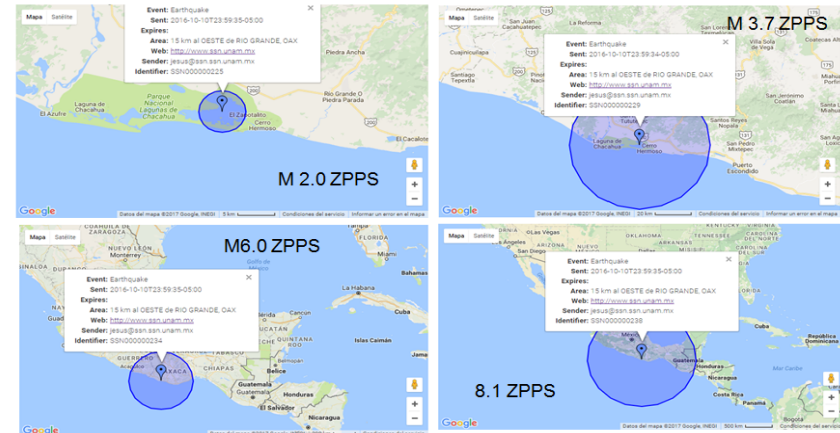
App: SismocelMX



SismoCAP
Zona Posible de Percepción del Sismo
Aceleración Mínima = 2 GALS
ZPPS = $10^{(4.08 \log \text{Magnitud} - 0.7511)}$



SismoCAP
(CAP = Common Alerting Protocol)



Mirror of the SSN



Site redundancy



Redundancy in data reception

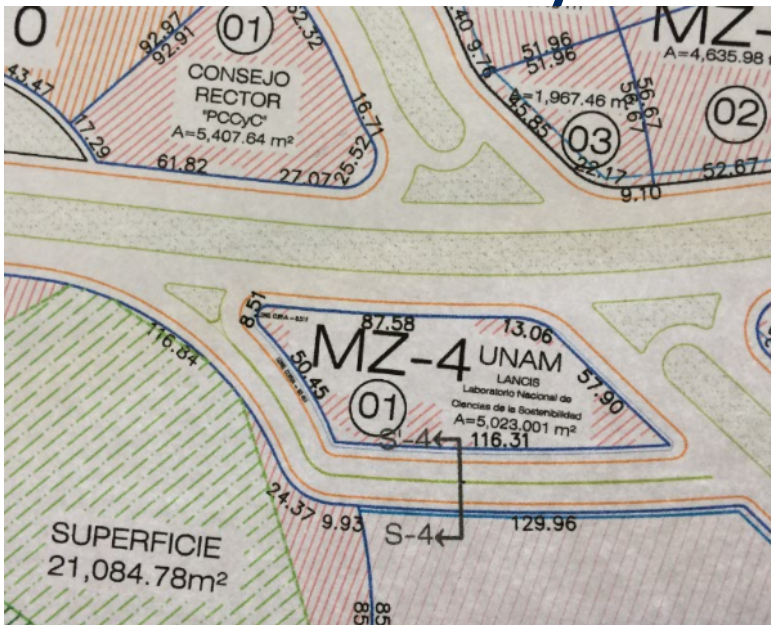


Mirror at alternate locations

Alternate Center of monitoring of the National Seismological Service

- Operation 24 x 7 x 365 of the SSN.
- Repository, management and distribution of seismic data of the SSN and seismological experiments.
- Repository, management and operation of seismic equipment for the development of experiments.

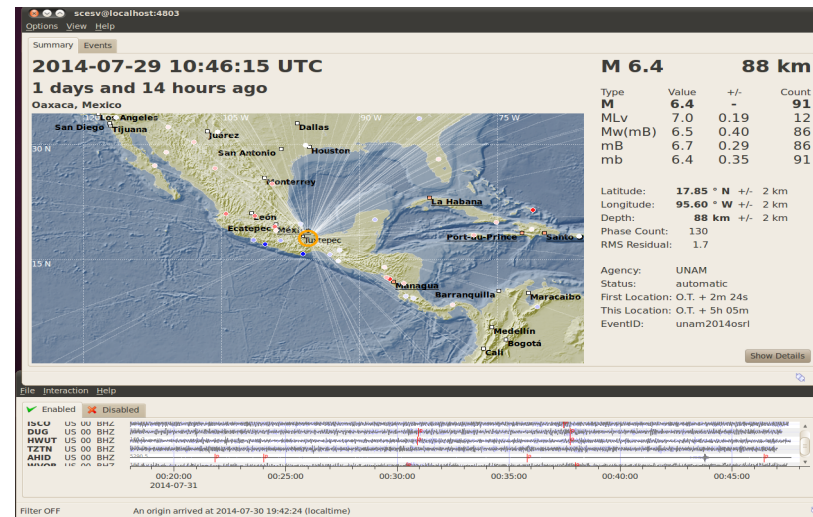
Site redundancy in Pachuca city at knowledge and culture city



Data Reception Redundancy in Linares City, facilities from UANL



Systems acquisition, processing, analysis and automatic publication



Conclusions

- The activities of the SSN are framed in the three substantive tasks of the UNAM, also fulfilling its mandate to promptly inform authorities and society about the seismicity of the country.
- The SSN is in transition and expected high growth in all aspects.
- This will lead to seek new strategies for operation and maintenance, from budget up to's analysis of the information.

Thanks



Información automática:
@SismologicoMx



/SismologicoMX

Preguntas y comentarios:
@ssn_mx

www.ssn.unam.mx