



# Seismological Network Operations & Data Management at IAG-USP

Short Presentation @  
IRIS MANAGING WAVEFORM DATA  
AND RELATED METADATA FOR  
SEISMIC NETWORKS

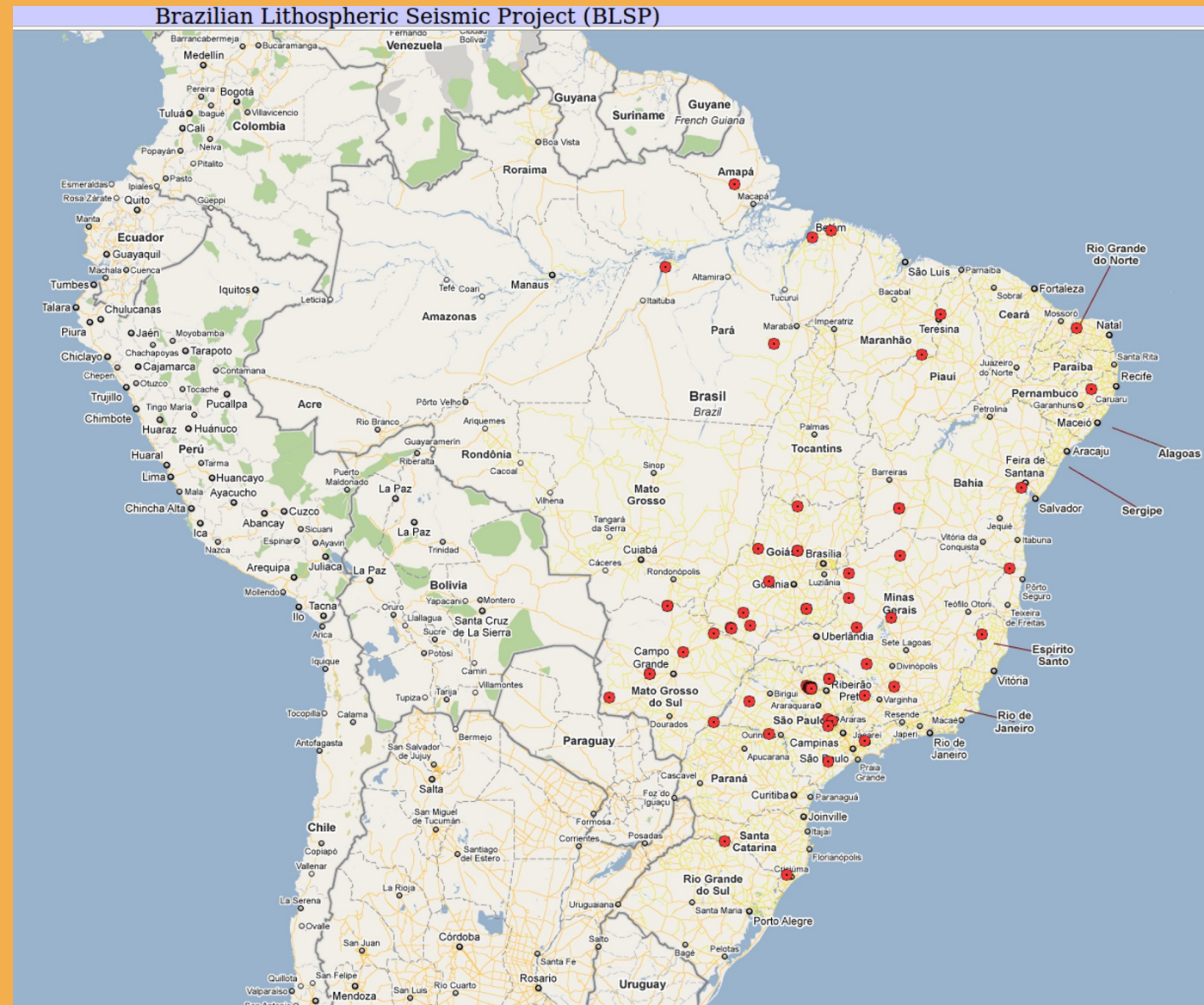
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**B.Collaço** (iag-usp).



## IAG-USP 1992-2008:

- about 60 temporary stations (BB & SP seismometers) at whole country.

- most of them operating about > 2 years





## IAG-USP 1992-2008:

- large amount of data stored in different disks without a properly structured database.
- a lot of time and money were spent updating computer systems, disk storages and routine back-ups without prevent dataloss.
- very hard access and share of IAG-USP data between institutions and researchers.





## IAG-USP 2008-2010:

- full priority to assembling data to be stored at the IRIS DMC.

- many different recording configurations and instrument types had been used in the same station.

- sometimes up to 4 different streams with different sampling rates and gains were used.

### Visitas de Campo

Técnicos: Jose Roberto Barbosa/Celia Data da Visita: 21/07/1999

Sismômetro (+): STS2 g1 - Streickeisen STS2 1a Registrado (+): 671 Reftek (072A-02-16bits)

Estacao (+): AREB - Areado - MG

Aquisição: Início (JD: 174) 23/06/1999 19:44:00 Fim (JD: 202) 21/07/1999 16:23:00

Imagem: Servidor|Midia: none Caminho: none Arquivo: none

Dados: Servidor|Midia: tombador.iag.usp.br Caminho: /tomb9/blsp95/raw/areb\_99202 Formato: segY Dados:  Usar

Comentarios: Estacao normal.

### Streams:

[12] [1] [2]  
[3] [4]  
[Limpar]  
[Ajusta]

### Samples:

[10] [20]  
[40] [50]  
[100] [200]  
[500]

### Ganho:

[1] [32]  
[128]

### Stream:

[1] [2] [3]  
[7]

### RefChannel:

[E1] [E4]

#	Stream	RefChannel	Nome Seed	Loc. Seed	sps Hz	Ganho	Az.	Merg.
1[x]	1	1	BHZ	10	10	32	0	-90 [v]
2[x]	1	2	BHN	10	10	32	0	0 [v]
3[x]	1	3	BHE	10	10	32	90	0 [v]
4[x]	2	1	BHZ	50	50	32	0	-90 [v]
5[x]	2	2	BHN	50	50	32	0	0 [v]
6[x]	2	3	BHE	50	50	32	90	0 [v]
7[x]	3	4	BLZ	50	50	1	0	-90 [v]
8[x]	3	5	BLN	50	50	1	0	0 [v]
9[x]	3	6	BLE	50	50	1	90	0 [v]
10[x]	7	1	HHZ	02	200	32	0	-90 [v]
11[x]	7	2	HHN	02	200	32	0	0 [v]
12[x]	7	3	HHE	02	200	32	90	0 [v]

Def. Sample. [ 10 ] Def. Gain. [ 1 ] Def. Stream. [ 1 ]

“LogSheet” webapp: see how many streams and channels were used for just one operation period

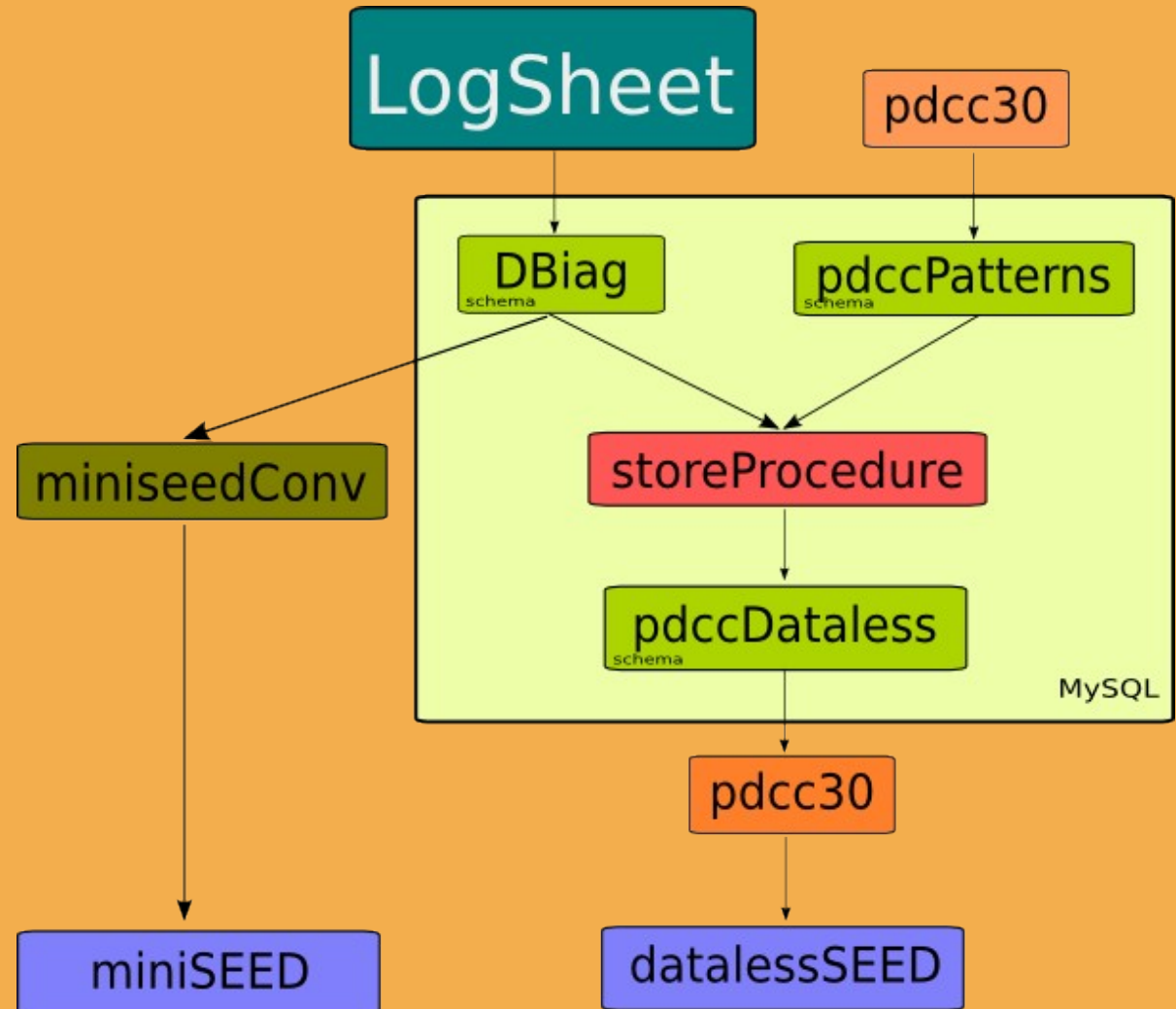


## IAG-USP 2008-2010:

- LogSheet WebApplication was developed to try solve these troubles.

- today (with a lot of help and patience from IRIS-DMC) all data acquired by IAG-USP are stored at IRIS-DMC

- almost all of the IRIS request tools were tested successfully with IAG-USP dataset.





## IAG-USP 2008-2010:

- also a simple WEB-PORTAL was designed to promote/advertise the IAG-USP Seismological Lab.

The screenshot displays the Sismologia website interface. At the top, it features the Sismologia logo and USP logo. A navigation menu includes links for Home, Institucional, Sismicidade do Brasil, Serviços e Publicações, Conheça, Projetos, SeisComp, and Fale Conosco. The main content area is divided into several sections:

- Cursos e Palestras:** A section for courses and lectures, with a text snippet: "Confira nessa página, o material de estudo disponibilizado pela Sismologia. Ele inclui softwares, apostilas, dicas e manuais sobre diversos temas relacionados à Sismologia. [mais...](#)"
- Projetos de Pesquisa:** A section for research projects, with a text snippet: "Saiba mais sobre os **projetos de pesquisa** desenvolvidos pelo grupo de sismologia. E não deixe de conferir os **trabalhos e publicações** do grupo."
- Visitas de Campo:** A section for field visits, with a text snippet: "Consulte informações sobre as estações sismográficas mantidas pela Sismologia. As manutenções, equipamentos, período de operação, etc. [mais...](#)"
- Boletim Sísmico Brasileiro:** A section for the Brazilian seismic bulletin, with a text snippet: "No boletim você encontra um catálogo de todos os sismos registrados no Brasil". Below this is a map of Brazil with numerous colored dots representing seismic events.
- News Articles:** A sidebar on the right contains several news items:
  - TREMOR DE TERRA ASSUSTA MUNICÍPIOS DE MACEDÔNIA-SP E MIRA ESTRELA-SP.** [2009-10-22] Um pequeno tremor de terra causa medo em moradores de 2 pequenas cidades no interior paulista. [mais...](#)
  - SISMO EM PARAIBUNA, VALE DO PARAÍBA, SP** [2009-09-09] Tremor de terra atinge cidade de Paraibuna no Vale do Paraíba na noite de 06-09-2009 [mais...](#)
  - TREMOR DE TERRA EM SÃO JOSÉ DO RIO PARDO-SP** [2009-08-01] Sentido em vários bairros da cidade [mais...](#)
- Chile: Modelo de Ruptura:** A section for Chile, with a text snippet: "Pesquisadores modelam a ruptura e os deslocamentos provocados pelo tremor do Chile de 27-02-2010."

At the bottom of the page, there is a banner for the "Meeting of the Americas Iguassu Falls, Brazil 8-13 August, 2010" featuring a toucan logo.



## IAG-USP 2010 & Future BRASIS Project:

- 55 BB permanent real-time stations to be installed by four institutions



-Study Brazilian seismicity, locating all magnitudes 3+

-Studies of crust and upper mantle structure.

## Stations





## IAG-USP 2010 & Future BRASIS Project:

- 55 BB permanent real-time stations to be installed by four institutions



**Standard Answer:  
YES! We'll share our data!**

## Stations



-Study Brazilian seismicity, locating all magnitudes 3+

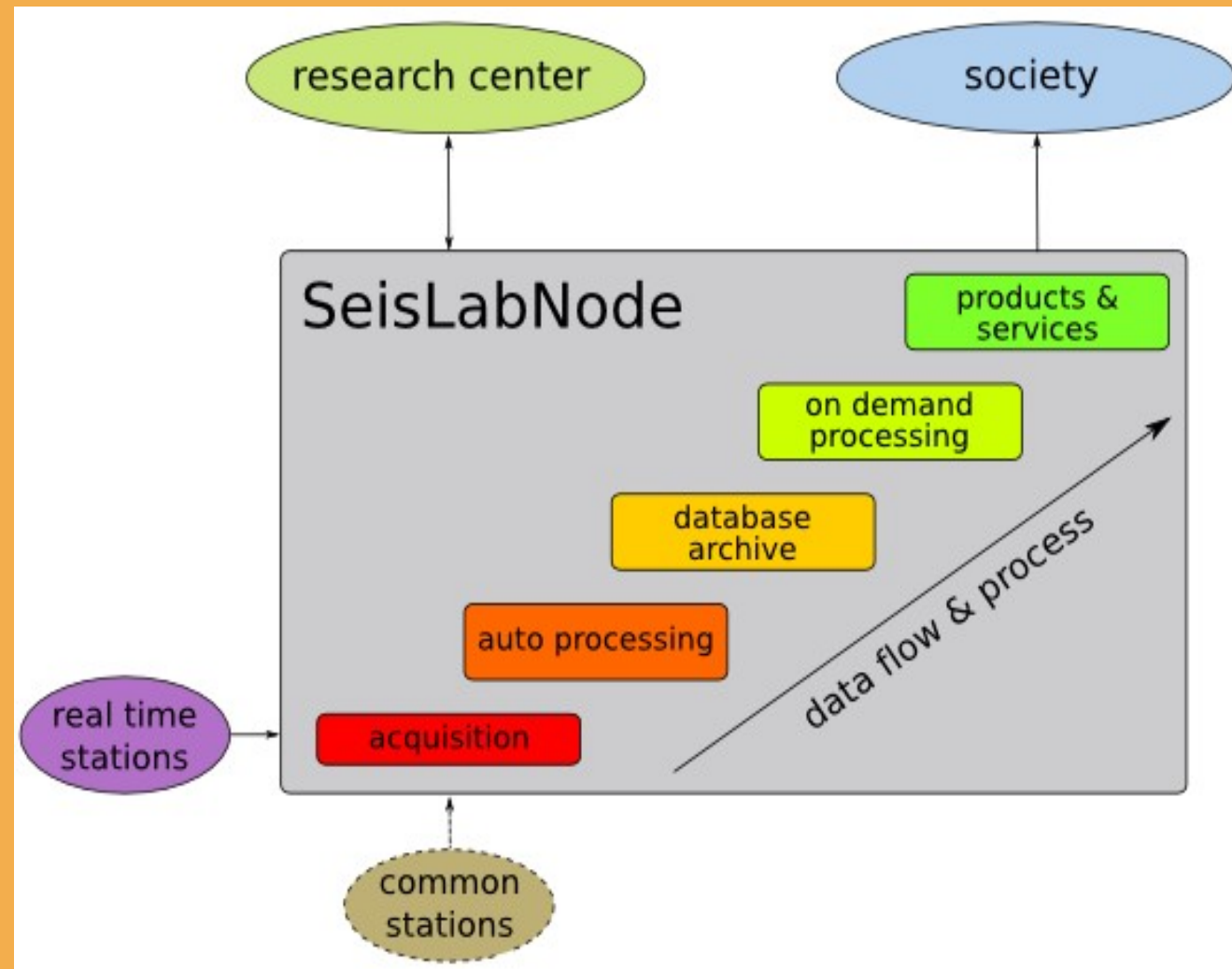
-Studies of crust and upper mantle structure.





## IAG-USP 2010 & Future: Technology & RealTime data processing

- datacenter infrastructure
- realtime data acquisition & processing
- seedLink, arcLink & SeisComP3
- modular arrangement of processing components





## IAG-USP 2010 & Future: NonRealTime data processing ?

- not all of our seismological experiments will be at real time data acquisition.
- the realtime data processing creates databases, schemas, data objects and models.
- we wonder to be able to use the same model, objects, database structure and tools in both scenarios.



## IAG-USP 2010 & Future: Geophysical WebSchool Lab

- was created a geophysical/seismological webLab, as part of expected goals of BRASIS Project, to encourage and promote EarthSciences at elementary school.

- it ables teachers and students to cooperate and disseminate content by themselves.

- many other seismological products should be developed after BRASIS operates with a minimum density of stations.

The screenshot shows the 'GEOFÍSICA na ESCOLA' website. At the top, there's a navigation menu with options: 'Aulas Teóricas', 'Atividades Práticas', 'Dados Geofísicos', 'Softwares Educativos', and 'AudioVisual'. Below this is the site's header with the logo and name 'GEOFÍSICA na ESCOLA' and 'Instituto de Astronomia, Geofísica e Ciências Atmosféricas'. The main content area is divided into several sections:

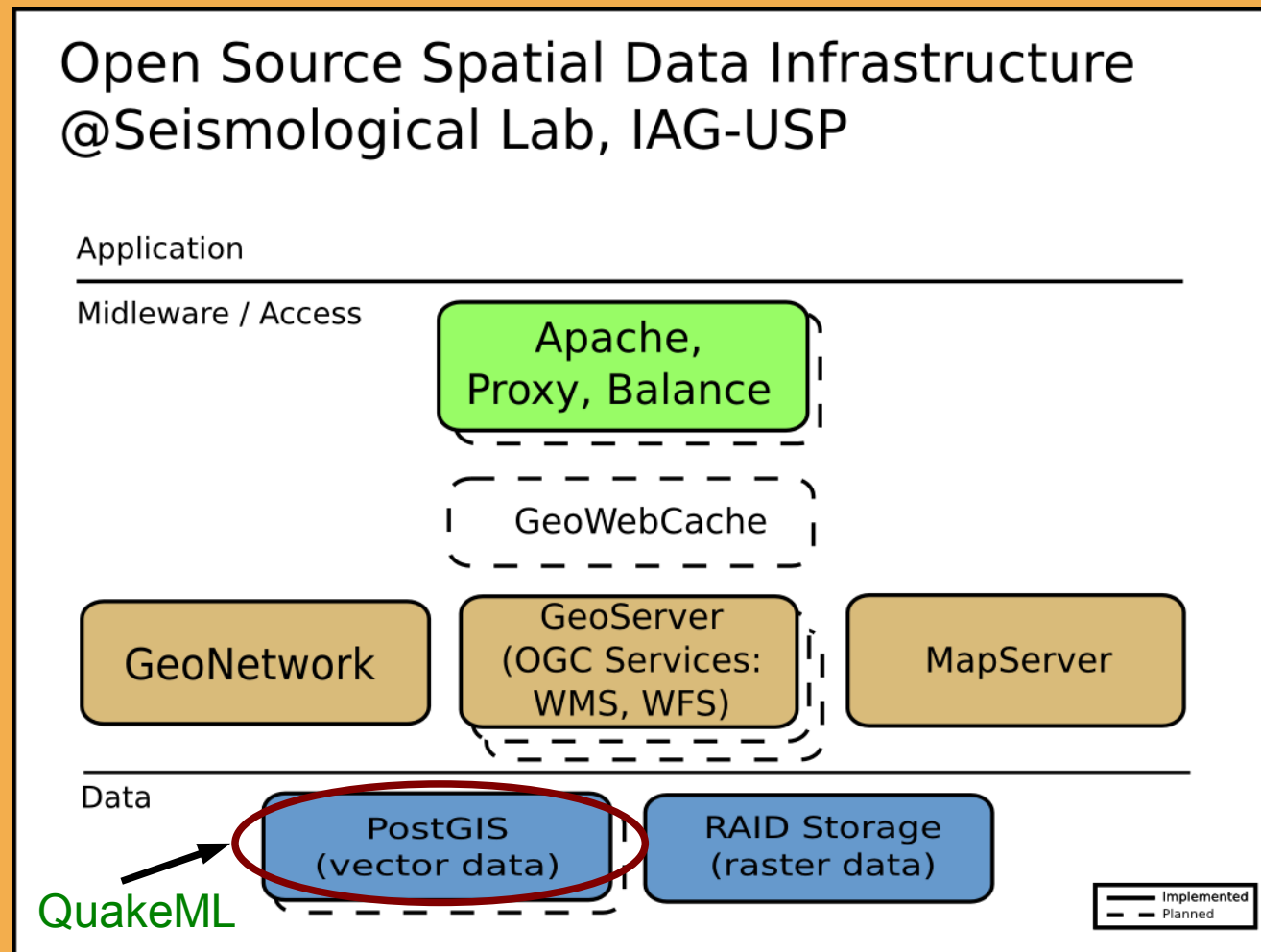
- TERREMOTOS NO MUNDO M5+:** A list of earthquakes with magnitudes of 5.3 or higher, including locations like Salta, Argentina; New Guinea, Papua New Guinea; Moro Gulf, Mindanao, Philippines; and Kuril Islands.
- TempoReal: VABB-Est.Sismográfica de Valinhos, SP:** A featured article with a 'Novo!' badge. It describes a real-time seismic recording using the 'SeisGram2k' software. Below the text is a screenshot of the software interface showing three channels of seismic data (red, blue, and green traces) over time.
- Terremoto em Zona de mergulho de placa:** A section with a video illustrating plate subduction, explaining the process of an oceanic plate moving under a continental plate and the resulting pressure storage and release.
- ENQUETE (Survey):** A section asking 'O que você achou do site?:' with radio button options: Excelente, Bom, Razoável, Ruim, and Péssimo.
- Navigation and Utility:** A top navigation bar, a 'Login do usuário' form with fields for 'Usuário:' and 'Senha:', and a 'Criar nova conta' link.



## IAG-USP 2010 & Future: Geophysical OpenSource SDI

- was prototyped an OpenSource Spatial Data Infrastructure to serve and maintain some related data layers consumed and produced by us using OGC standard formats (WMS/WFS/GeoSciML).

- SeisComP3 QuakeML implementation using PostGIS database extensions could be merged to provide other data products.





## Thanks to:

- IAG-USP Seismological Lab staff and coordinators.
- Petrobras (BRASIS Funder)
- IRIS/DMC (Rick Benson/MaryAnn Wood: too much help and patience)
- All others seismological staff in Brazil.

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-  
<http://www.sismo.iag.usp.br>



# SISMLOGIA

Instituto de Astronomia, Geofísica e Ciências Atmosféricas

USP



**Thank you!**