IAGA / IASPEI Joint Scientific Meeting 2025

Summer School Joint Session:

Legacy Data

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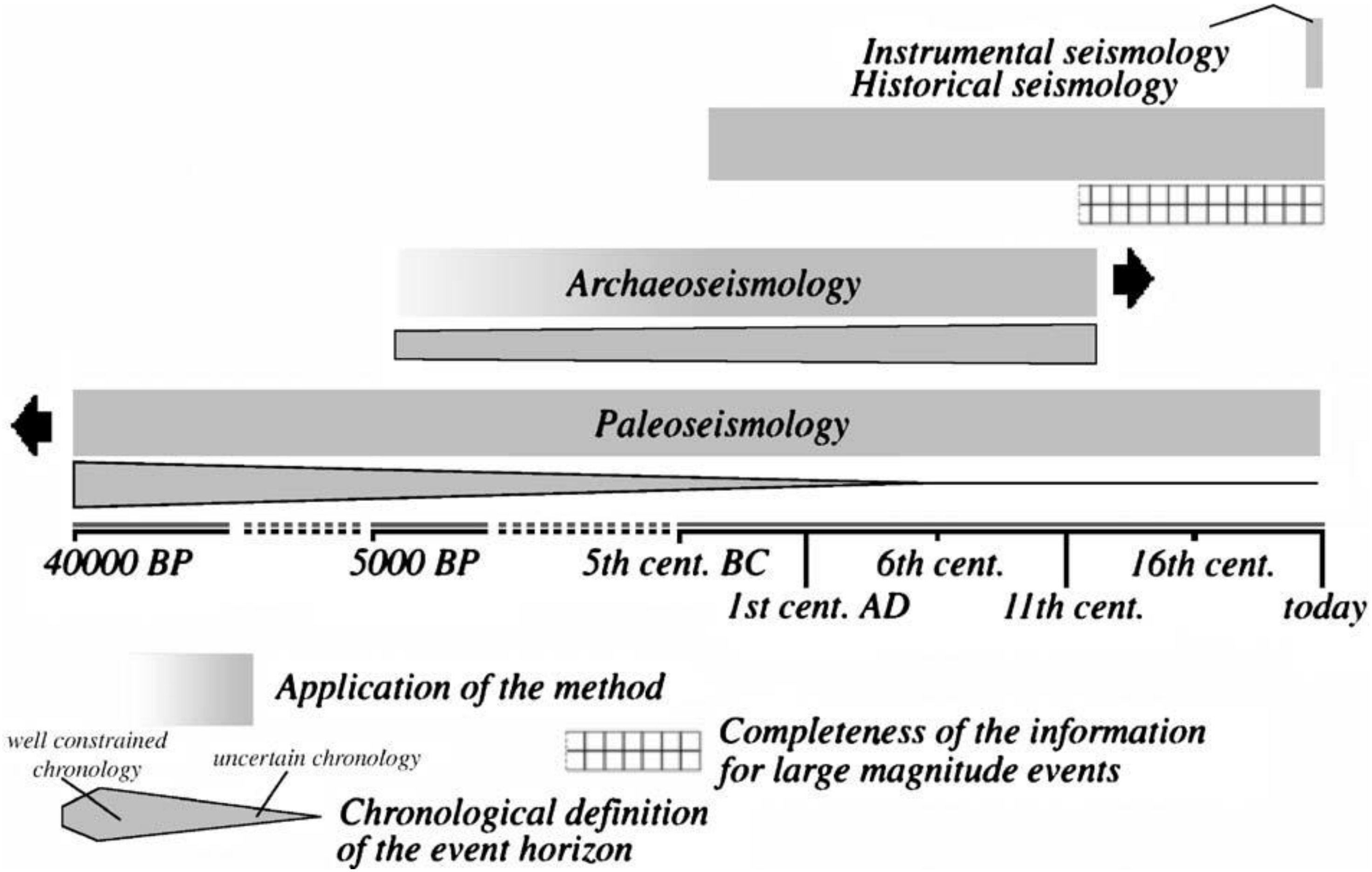
IUGG International Association of Geomagnetism and Aeronomy

IUGG International Association of Seismology and Physics of the Earth's Interior

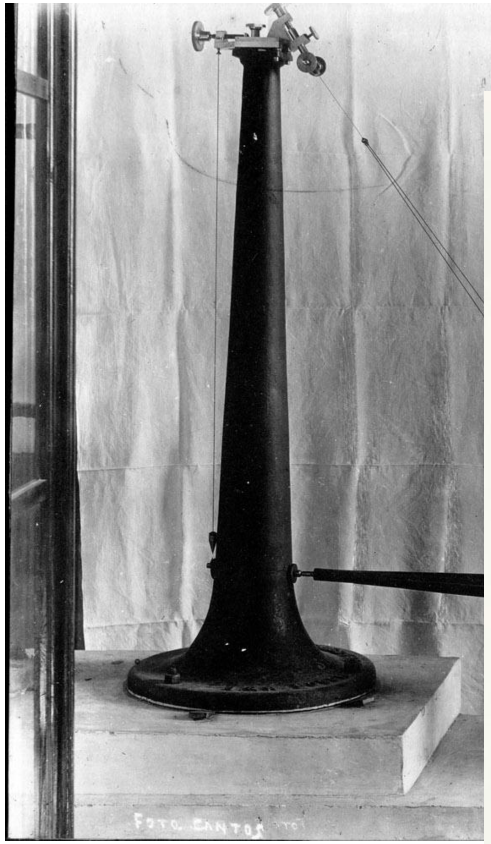
instituto superior de engenharia de lisboa

Definition

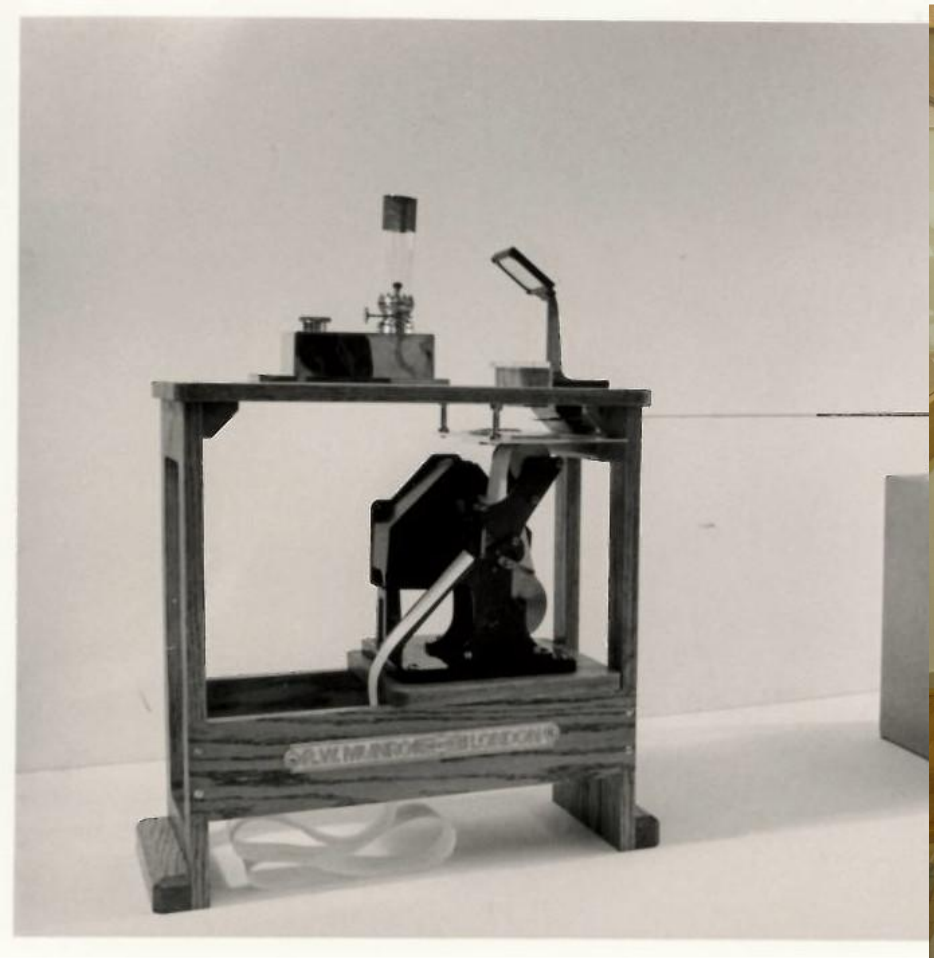


(Galadini et al., J. Seismol. 2006)

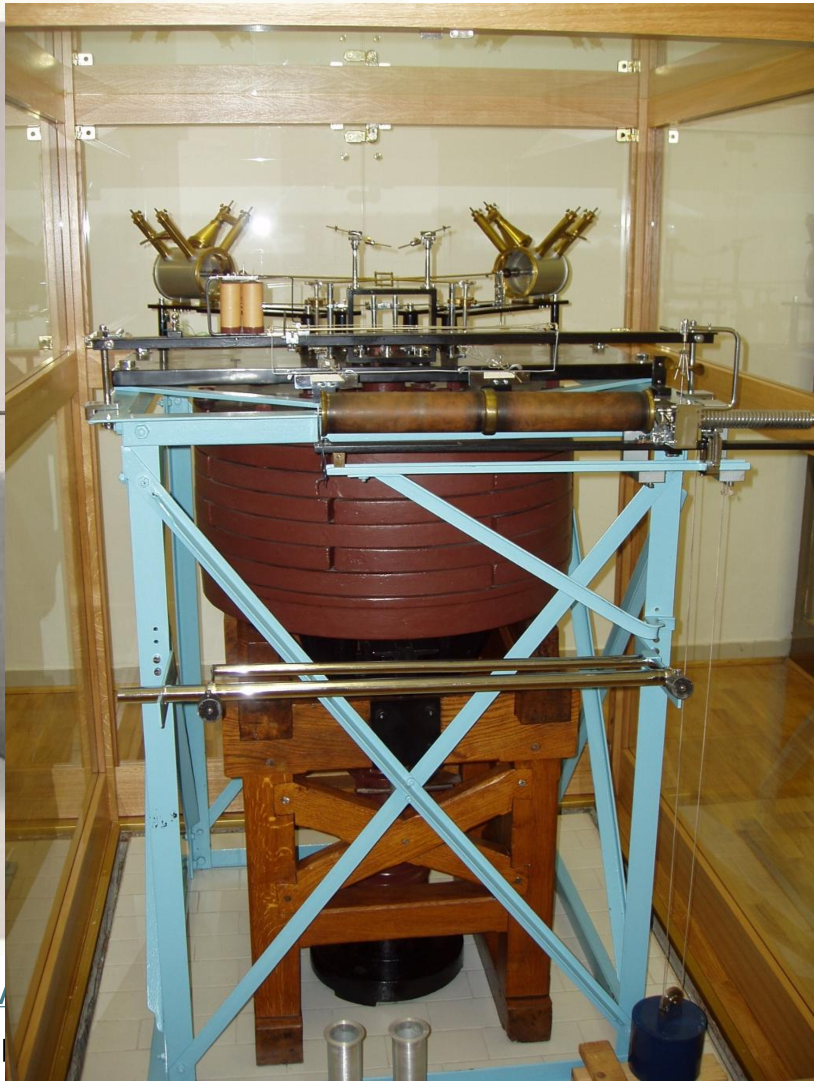
Instruments



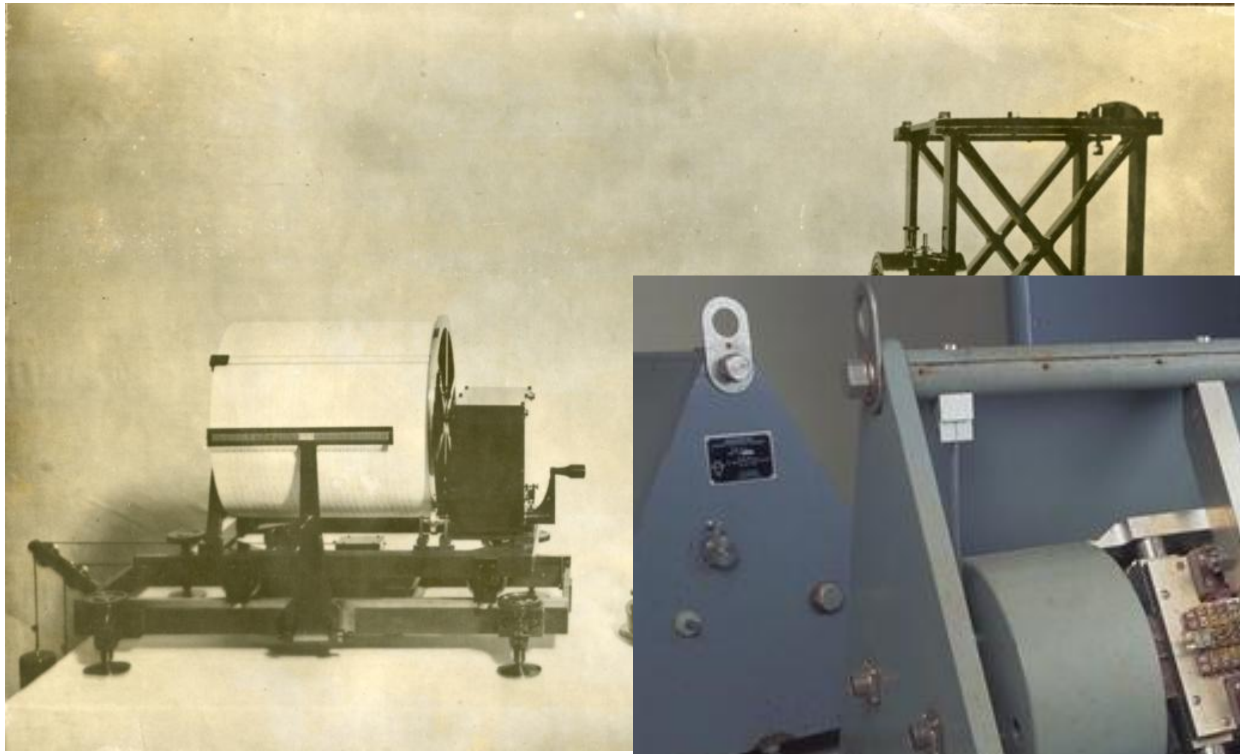
Bosch-Omori, TOL



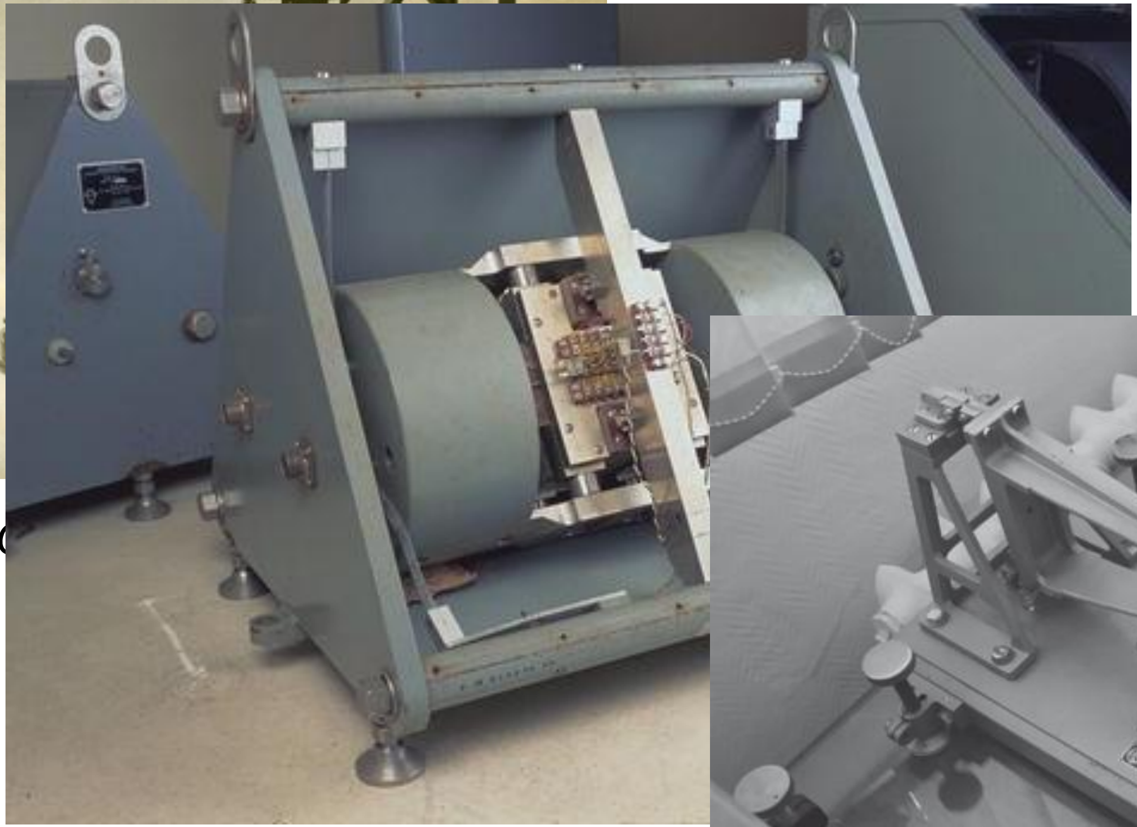
Milne, https://science.gc.ca/site/science/en/
geological-survey-canada-175-objects/48-fi



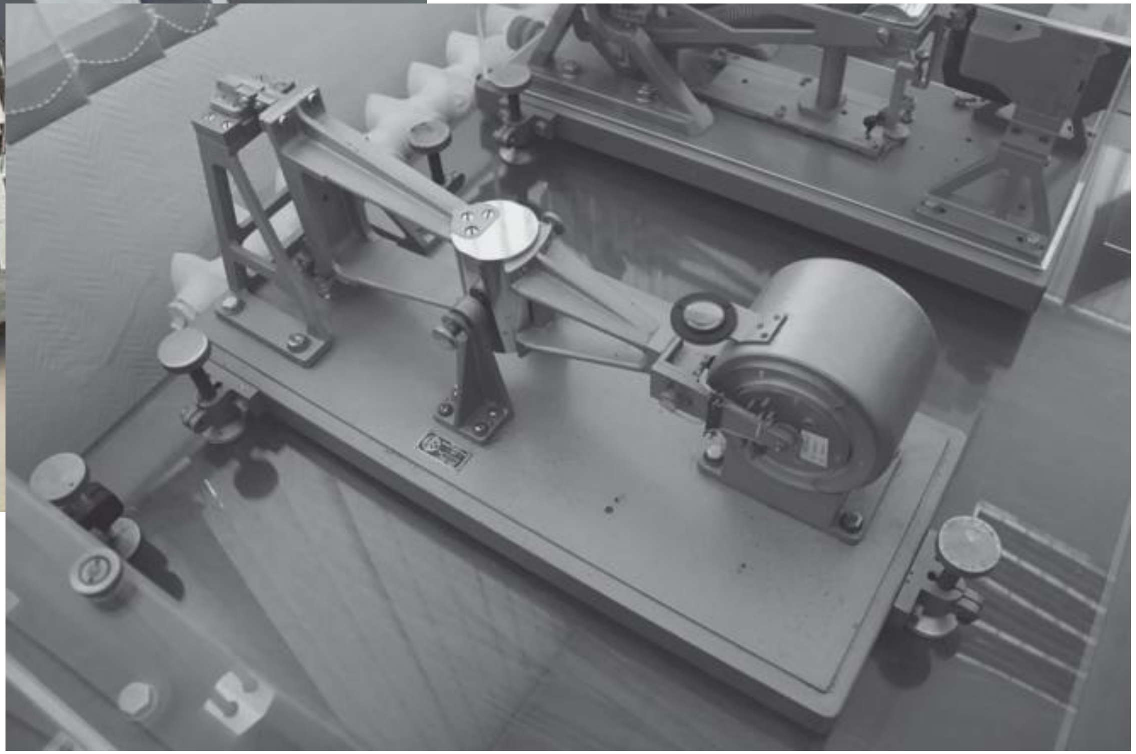
Wiechert, (http://www.gfz.hr/sobe-en/seismographs.htm)



Galitzin, (Rose, *Sci. Museum* (

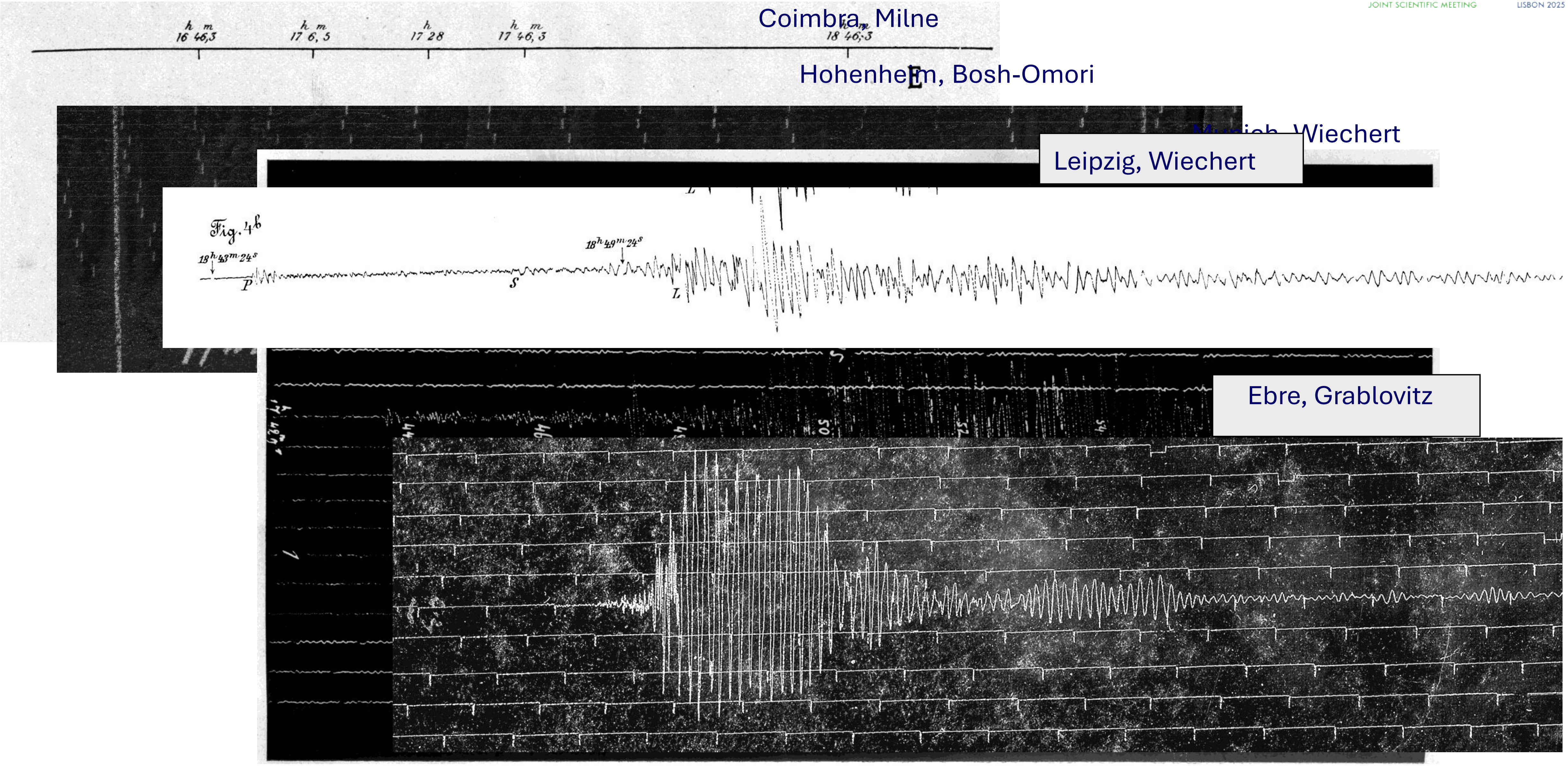


Benioff, (TOL)

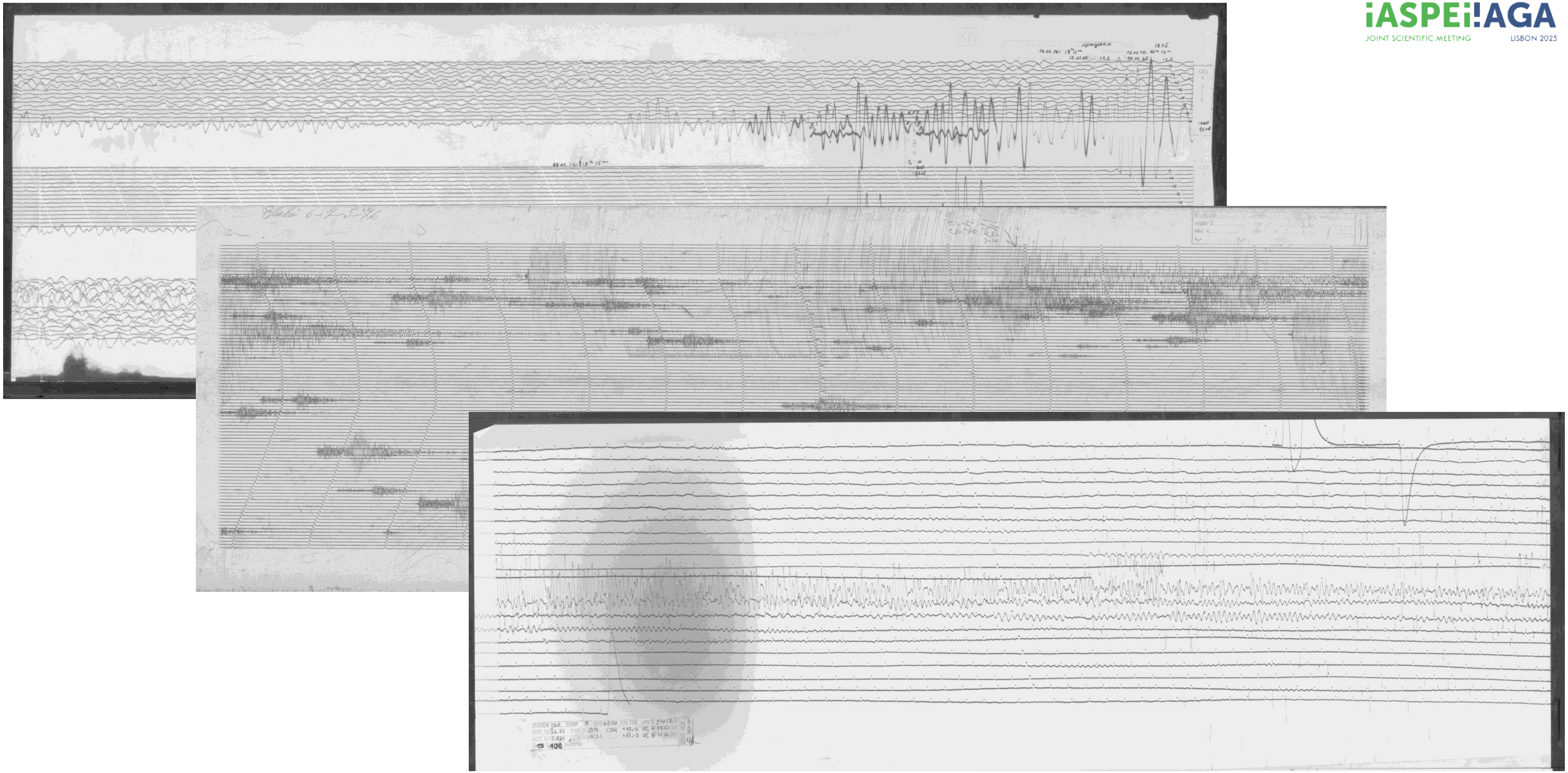


Kirnos, (Rogozhin et al., *Izv. -Atmos. Ocean. Phys.*, 2019)

Records


Coimbra, Milne
Hohenheim, Bosh-Omori
Wiechert
Leipzig, Wiechert
Ebre, Grablovitz
Fig. 4b

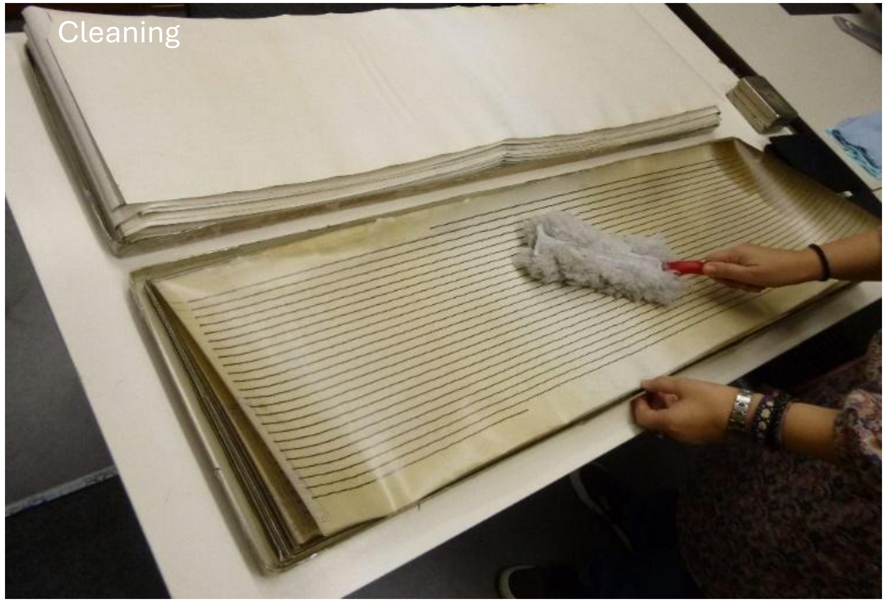
Records

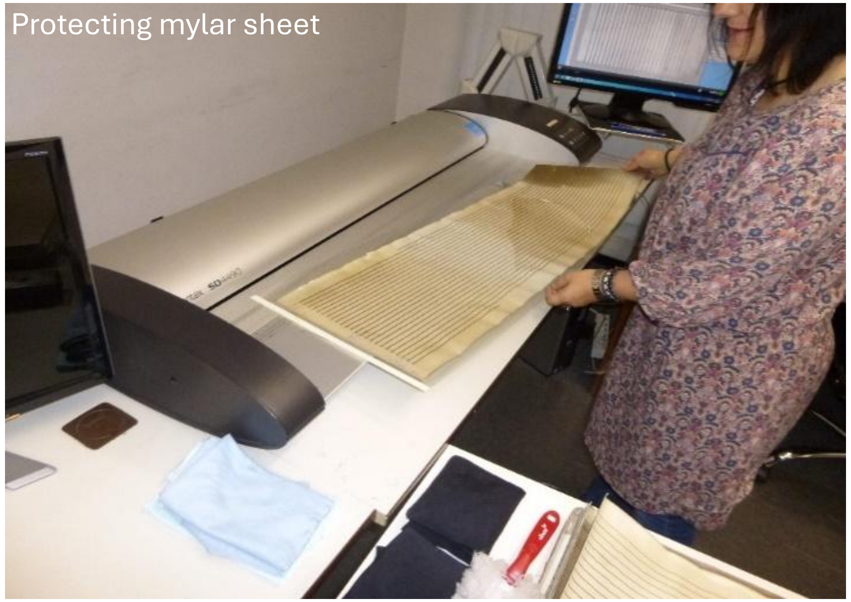


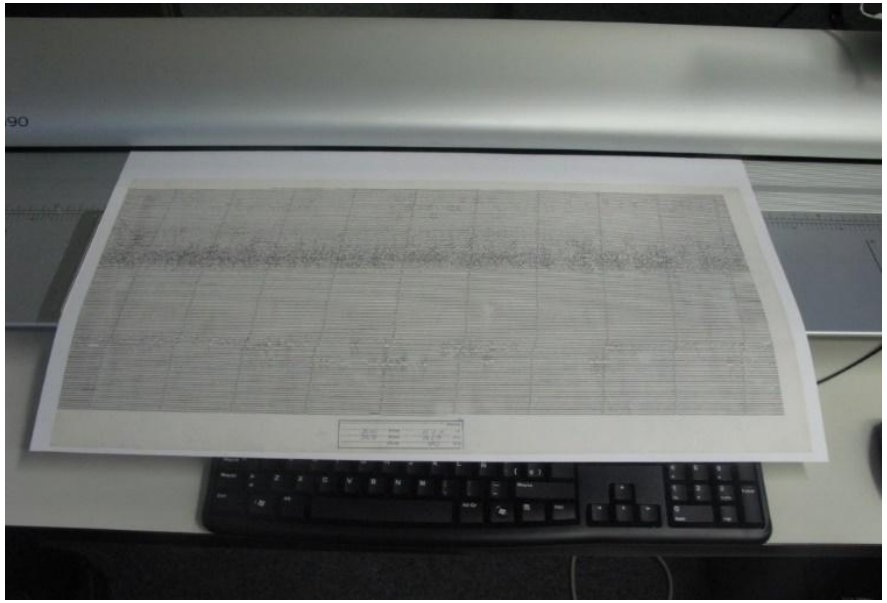
Archives


IGN Geophysical Data Archive,
Toledo, Spain

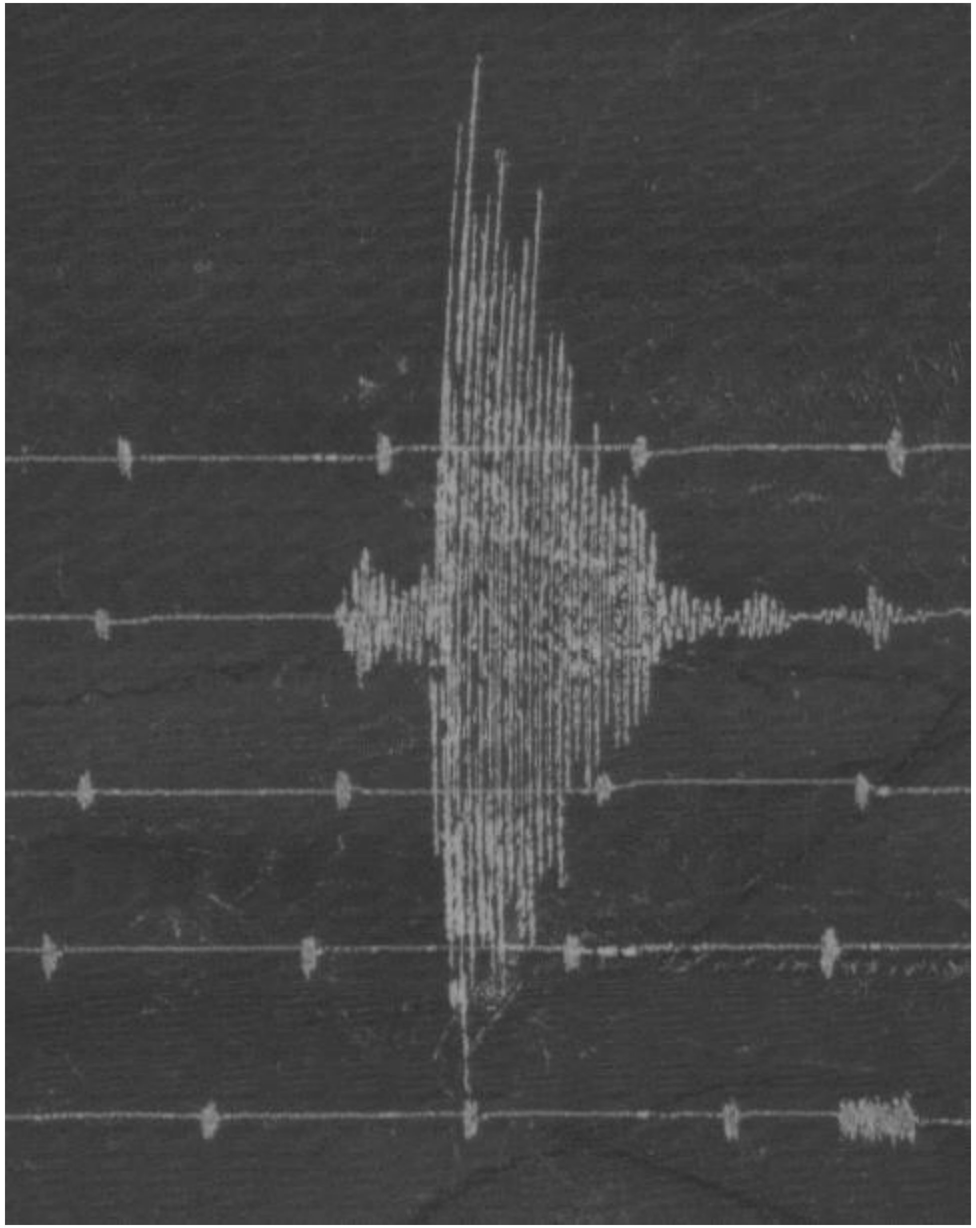

Some where in Spain...
Barcelona, Fabra Observatory

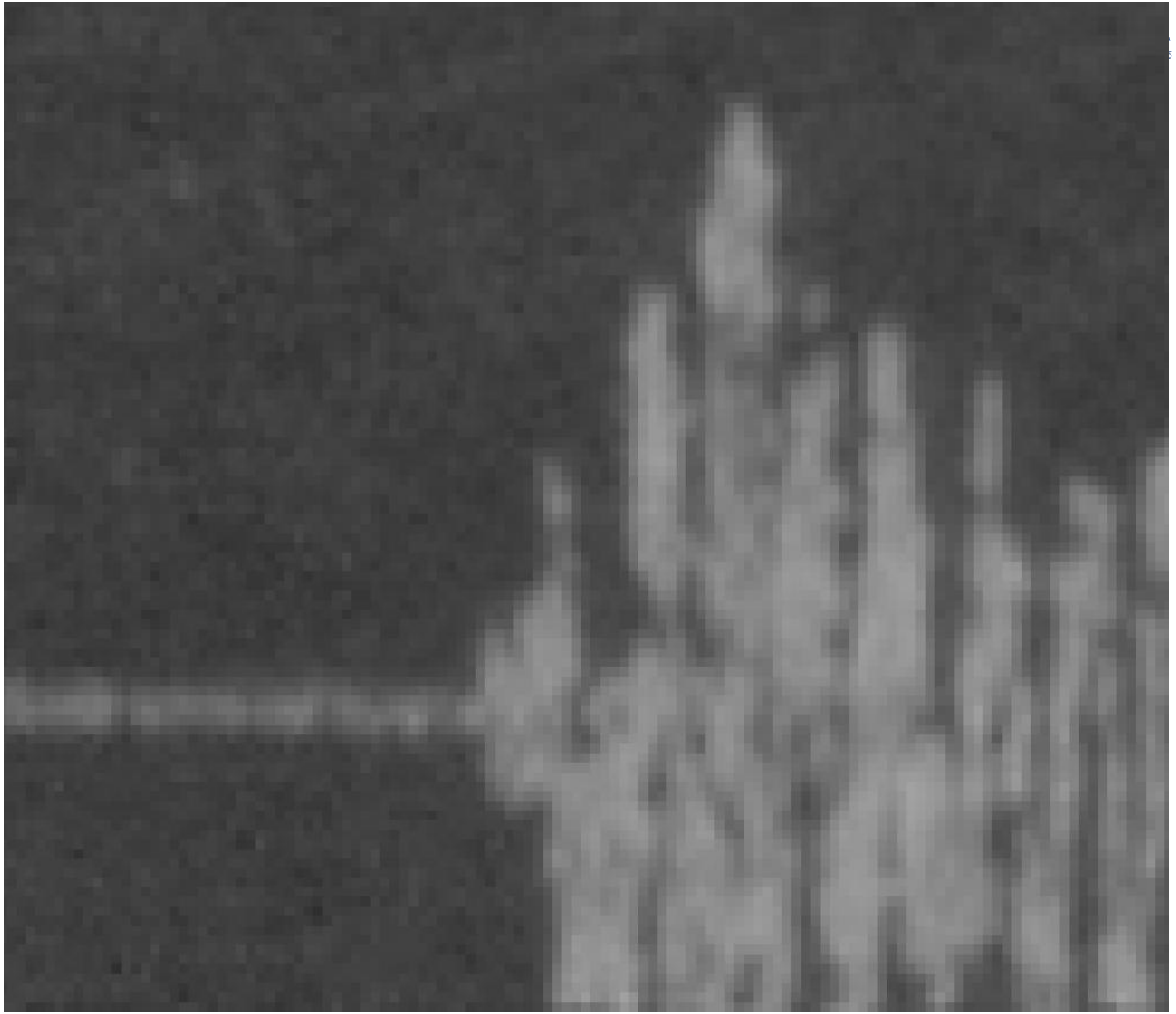

Cleaning


Protecting mylar sheet

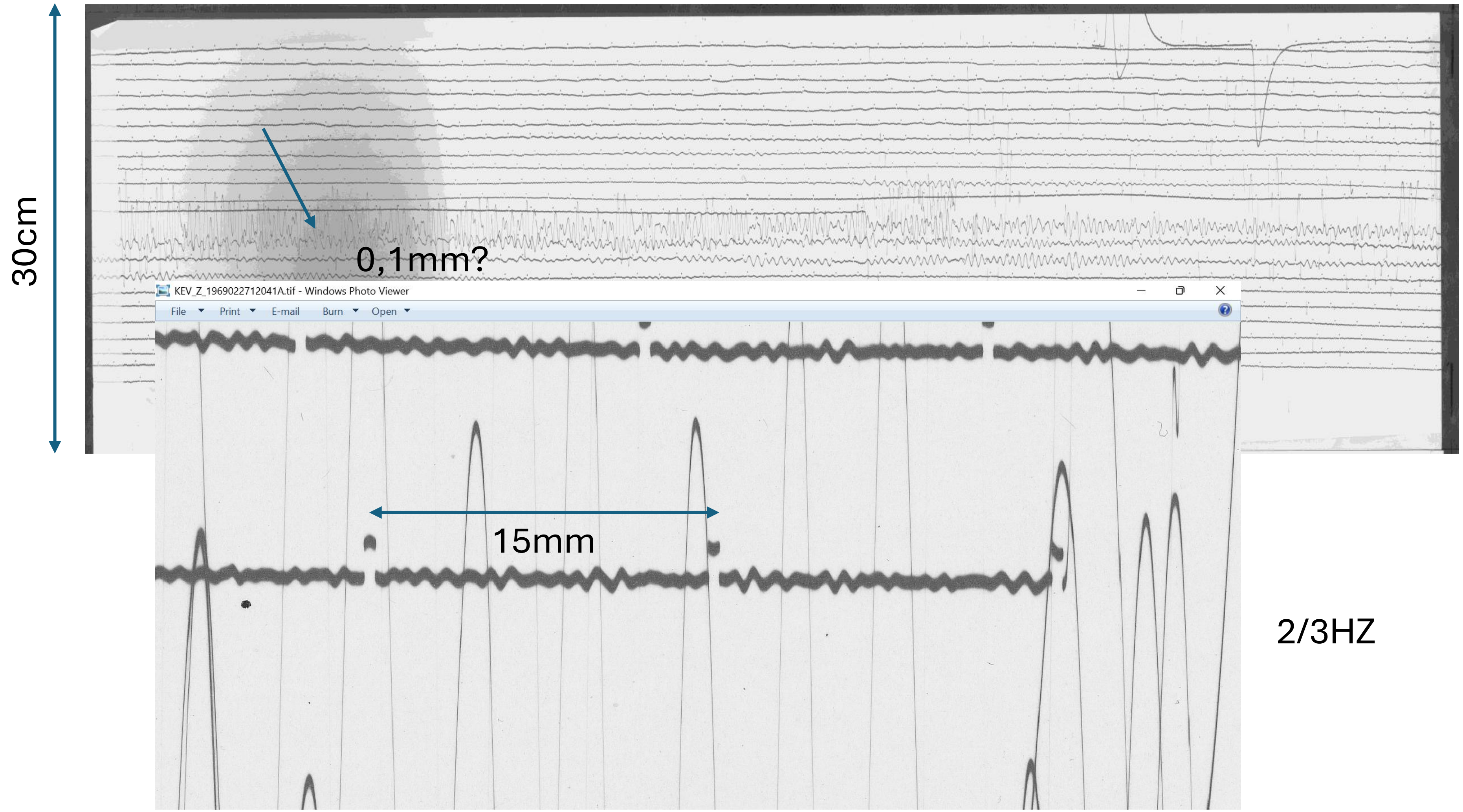


Resolution





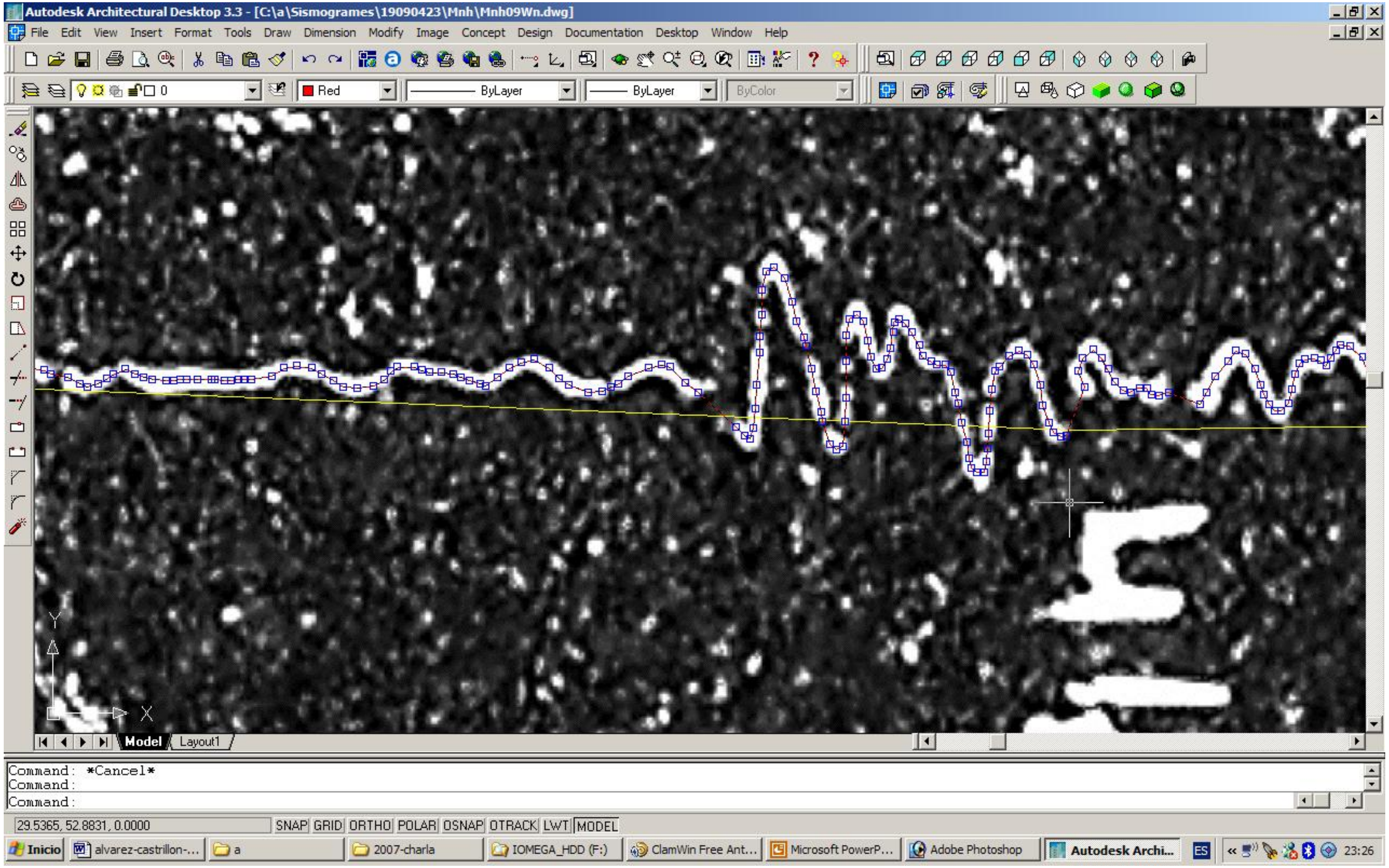
Dynamic range & Resolution



60/66dB

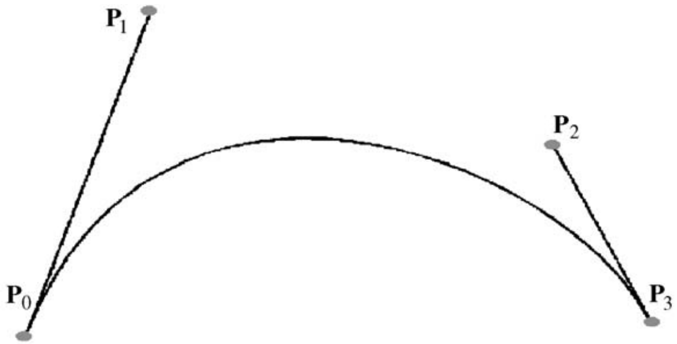
2/3HZ

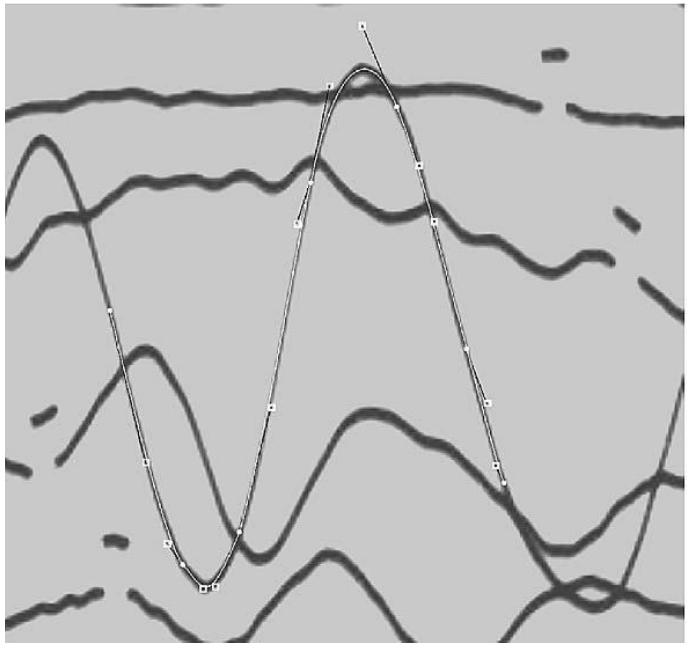
Digitizing


Autodesk Architectural Desktop 3.3 - [C:\a\Sismogrames\19090423\Mnh\Mnh09Wn.dwg]
File Edit View Insert Format Tools Draw Dimension Modify Image Concept Design Documentation Desktop Window Help
Red
ByLayer
ByLayer
ByColor
Model
Layout1
Command: *Cancel*
Command:
Command:
29.5365, 52.8831, 0.0000
SNAP GRID ORTHO POLAR OSNAP OTRACK LWT MODEL
Inicio
alvarez-castrillon-...
a
2007-charla
IOMEGA_HDD (F:)
ClamWin Free Ant...
Microsoft PowerP...
Adobe Photoshop
Autodesk Archi...
ES
23:26

Digitizing

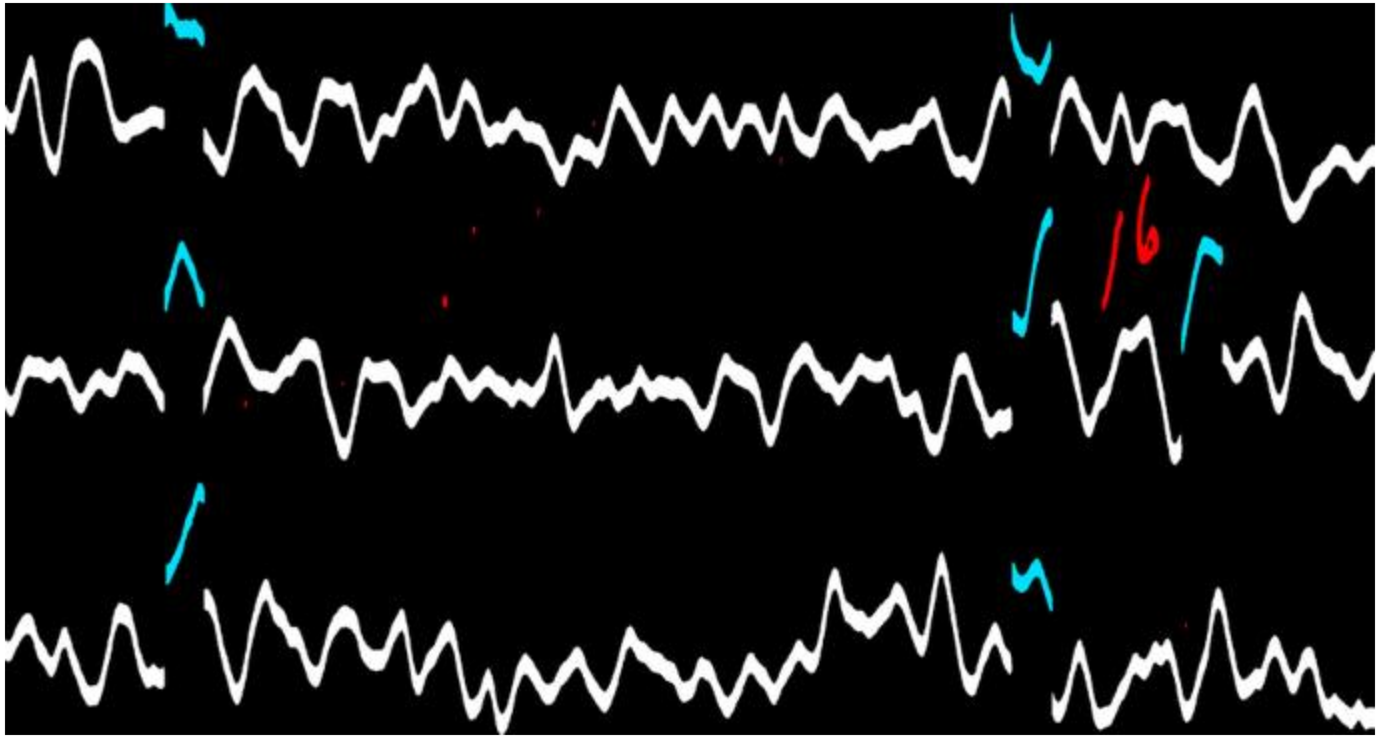
Bézier curves





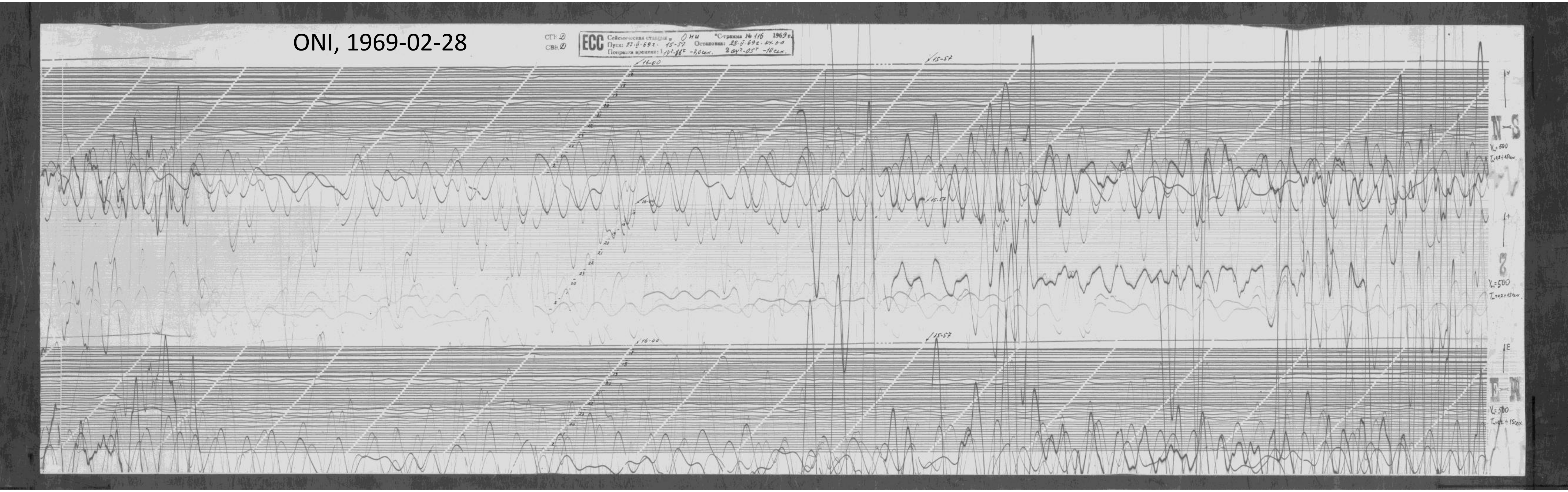
(Pintore et al., TESEO, 2005)

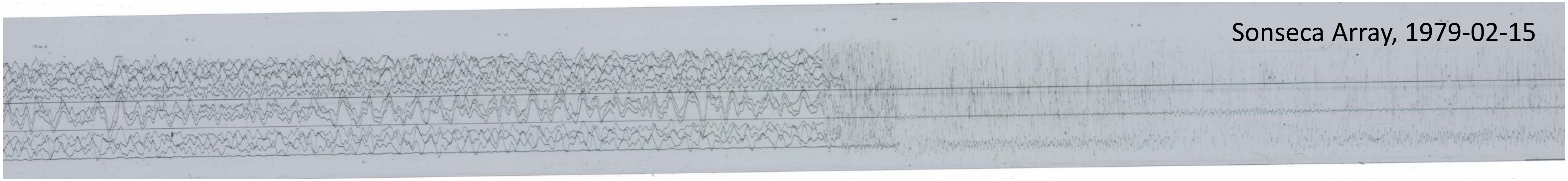
Image processing (patern recognition)



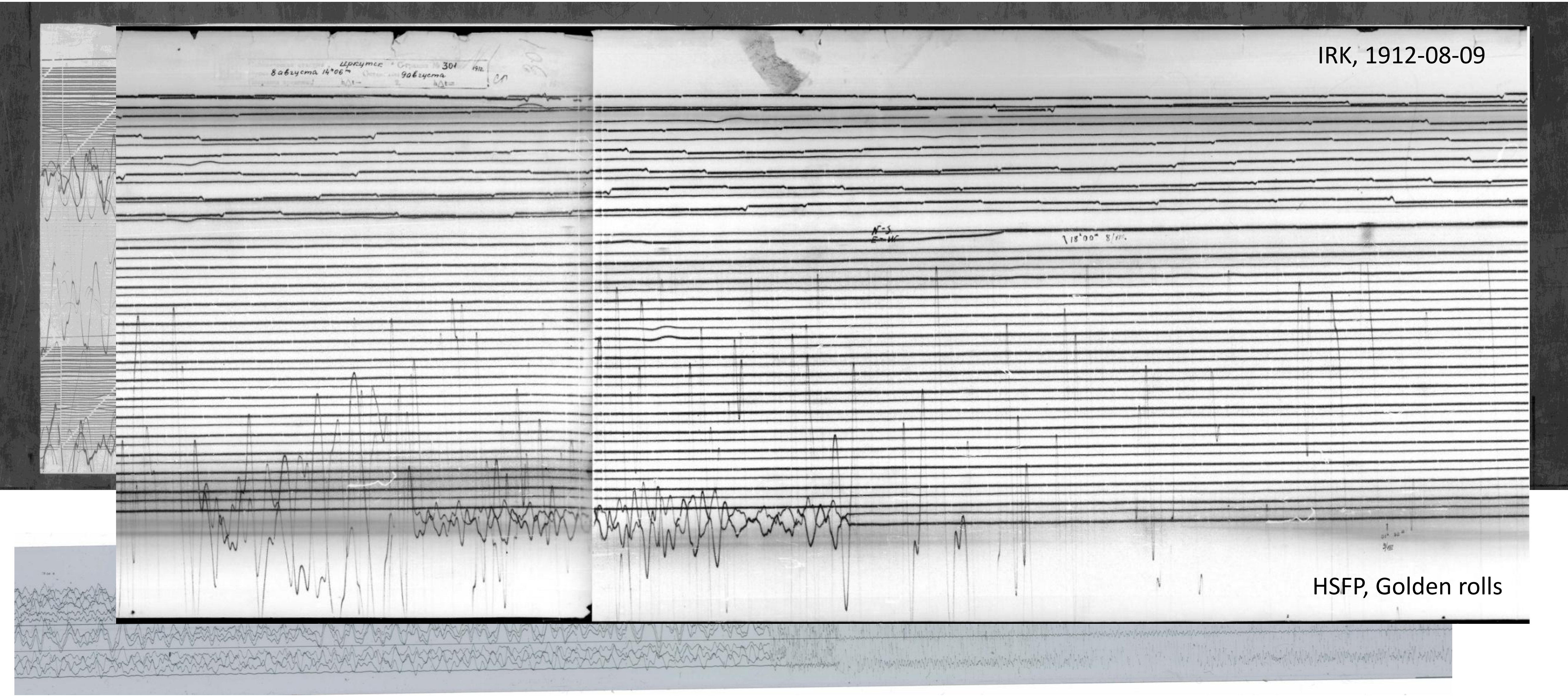
(Ishi & Ishi, DigitSeis, 2022)

Digitizing (problems)



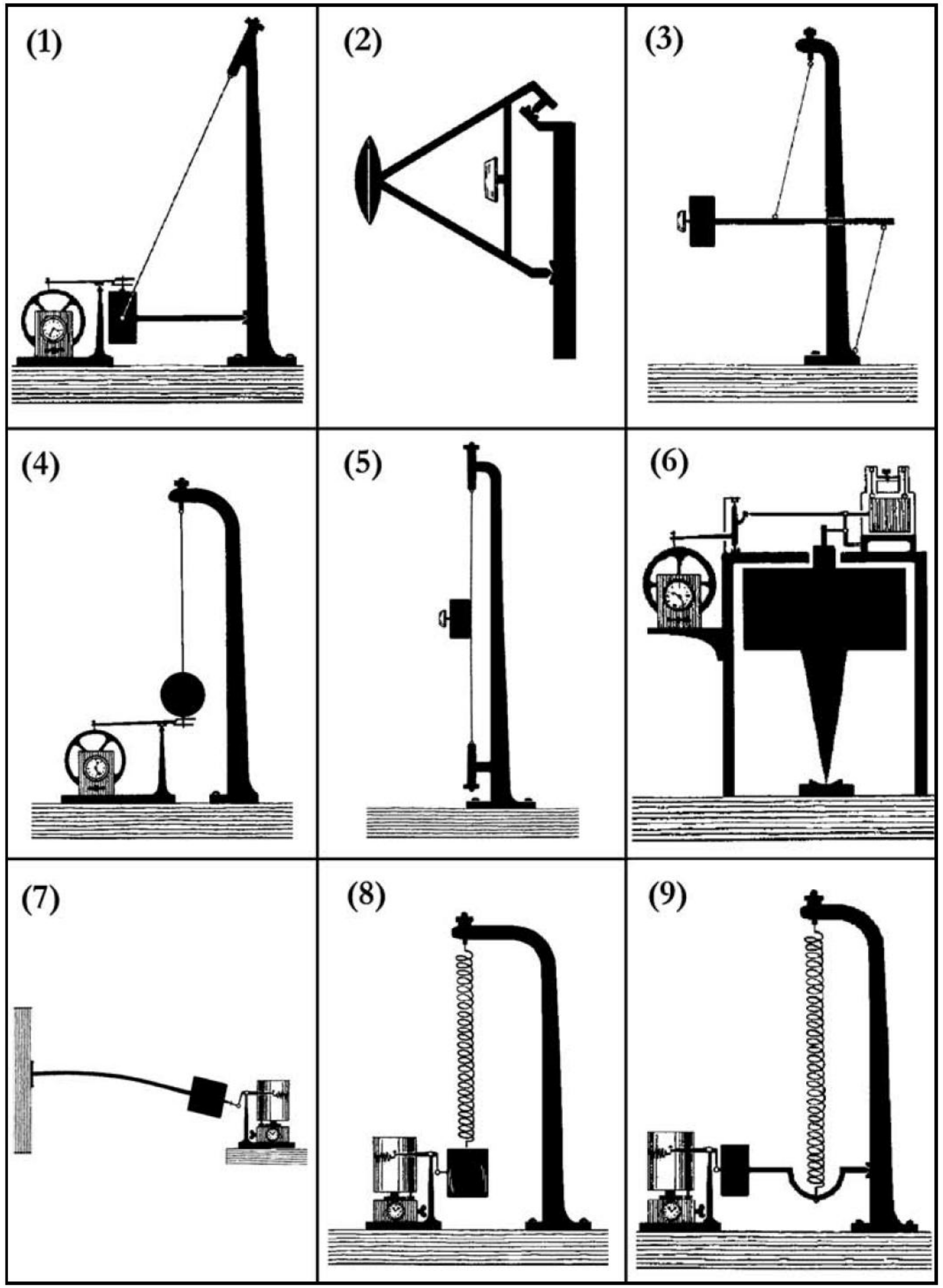


Digitizing (problems)



Seismogram lack of homogeneity

- BAAS (Milne) Network
- Popular instruments
    - Bosch-Omori
    - Wiechert
    - Galitzin
- World Wide Standarized Seismograph Network (WWSSN)
- United Network of Seismic Observations (ECCH)

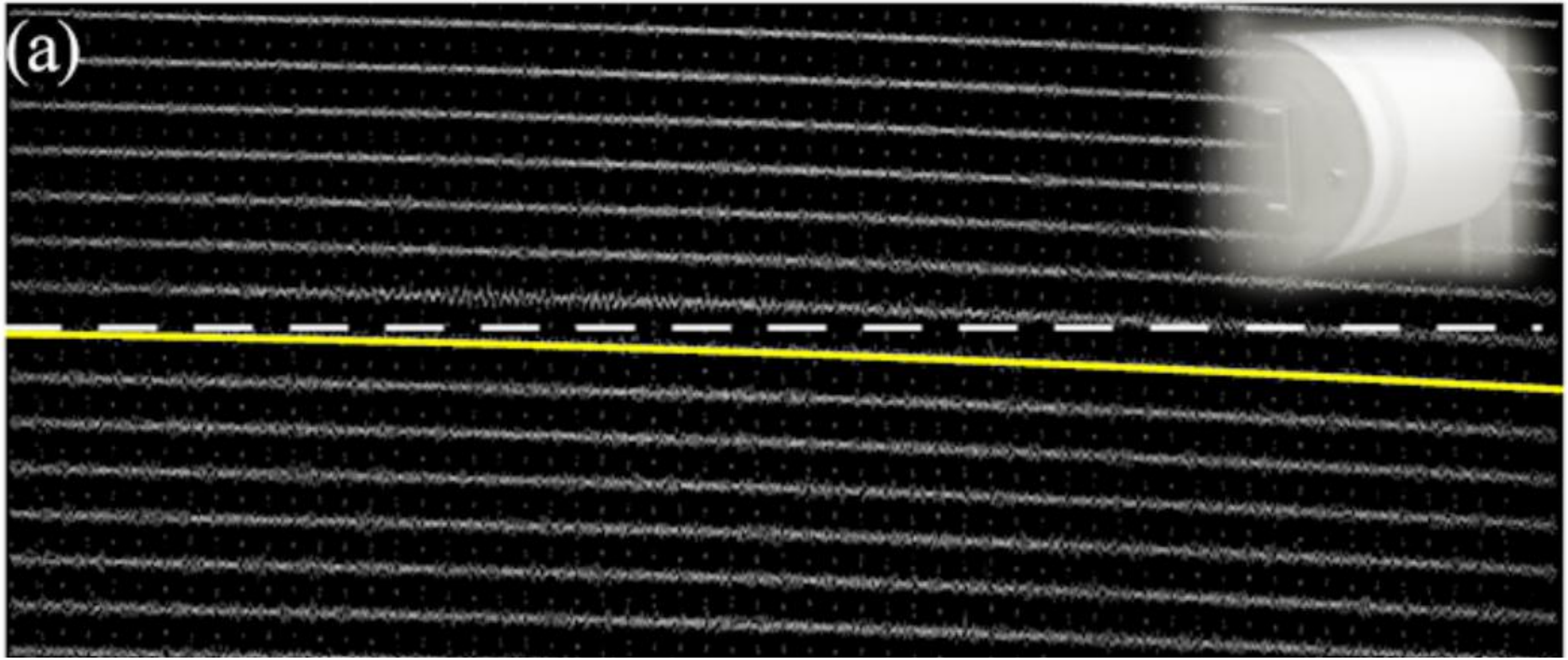


All instruments fit in these 9 types

Correction

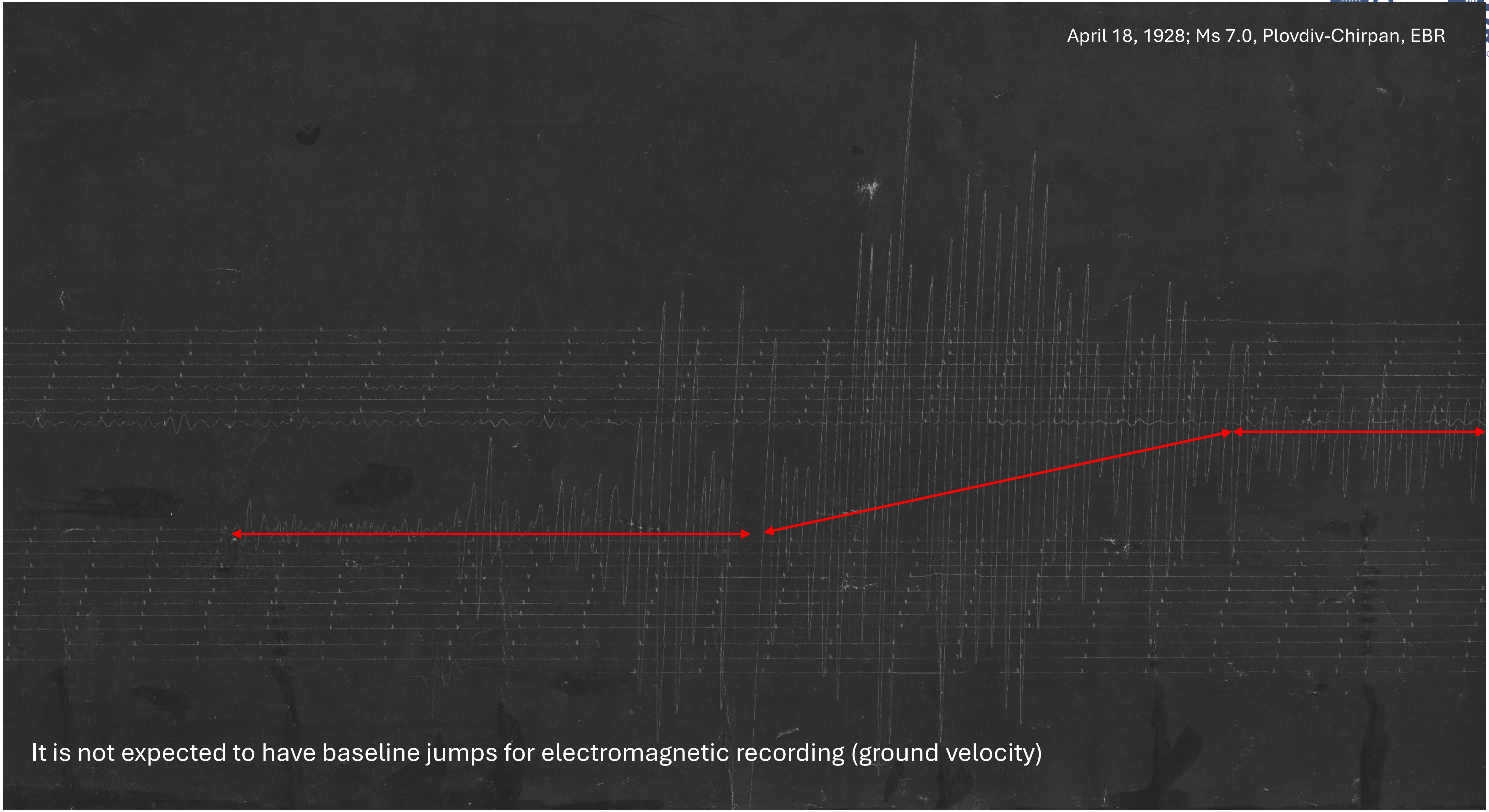
- DC correction/Baseline
- Detrending
- Displacement of the baseline
- Uneven record speed
- Arm length (curvature) & Skew/Slanting
- Interpolation
- Correction of time marks

Detrending



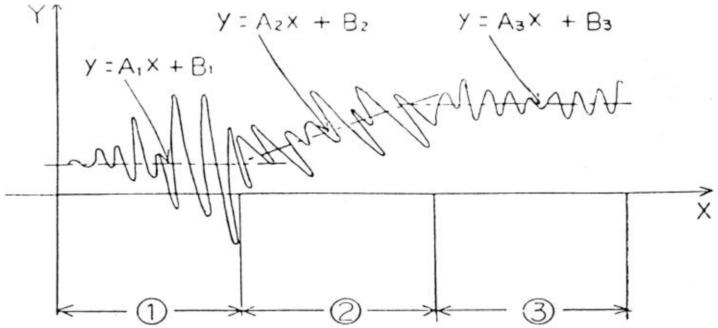
From: http://www.seismology.harvard.edu/research/DigitSeis.html

Displacement of the baseline

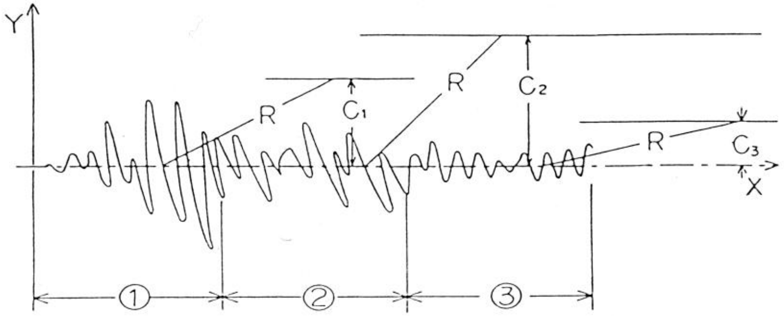


Displacement of the baseline

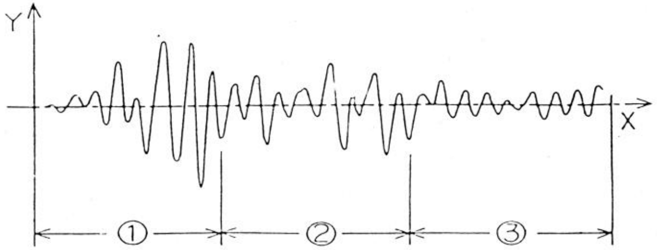
R. Inoue and T. Matsumoto



(a) Original time history where the apparent zero-line varies in three stages.



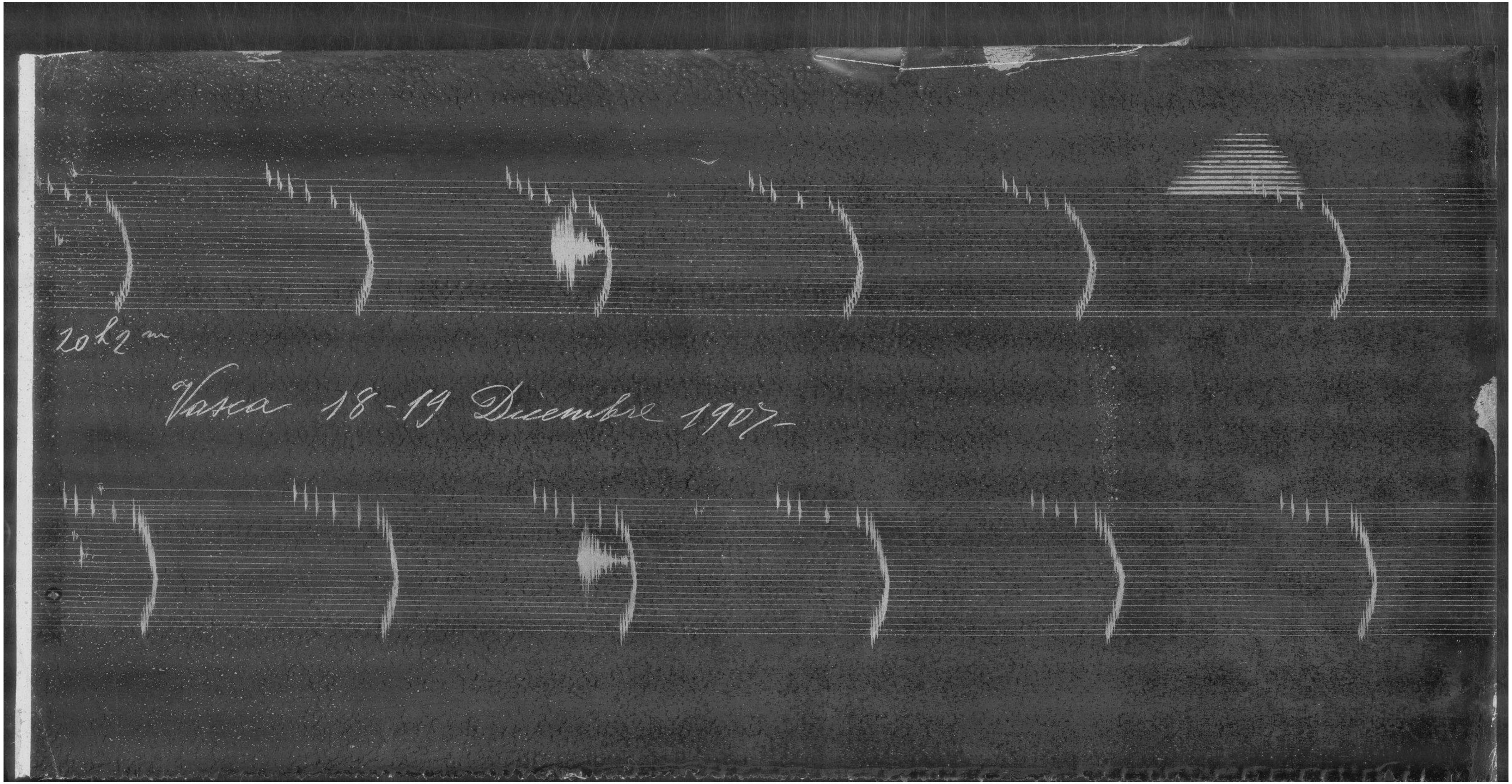
(b) Time history where the baseline correction is performed in each section.



(c) Time history from which the effects of the finite arm length and the arm inclination in each section are removed.

Figure 5. Arm-corrections done for an example seismogram.

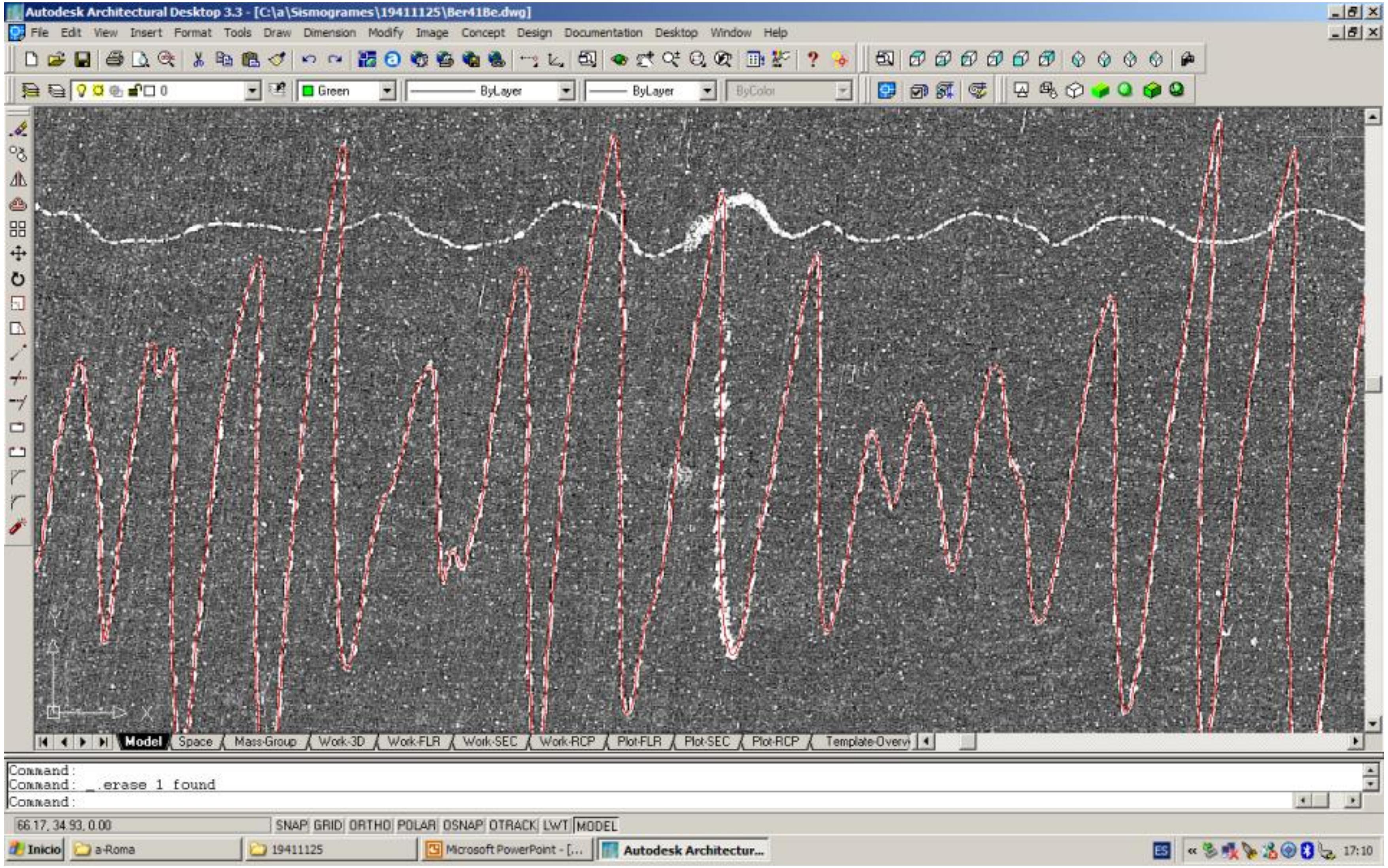
- Uneven record speed



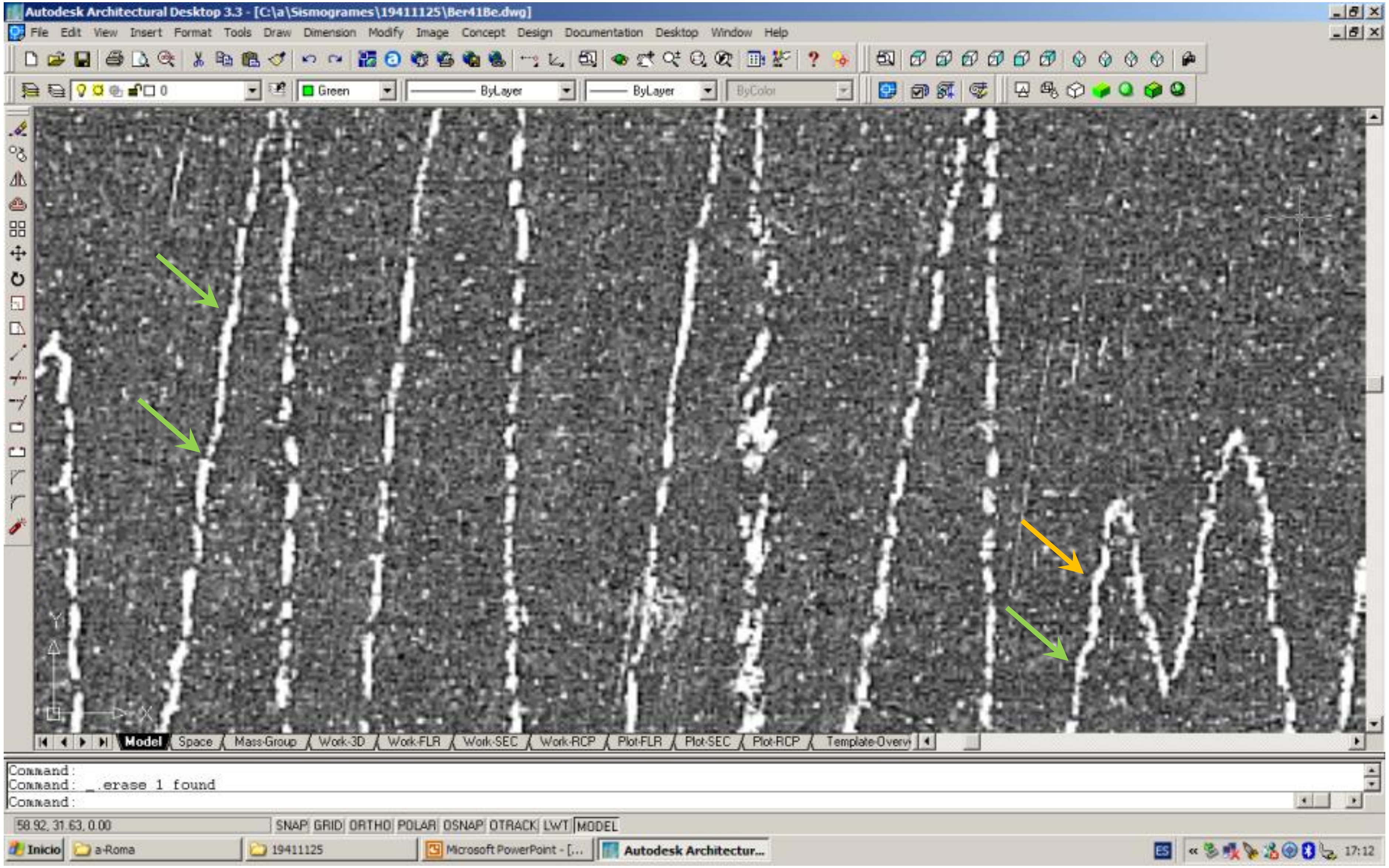
Ischia, 1907

- Uneven record speed

Bergen – Bosch-Omori E-W

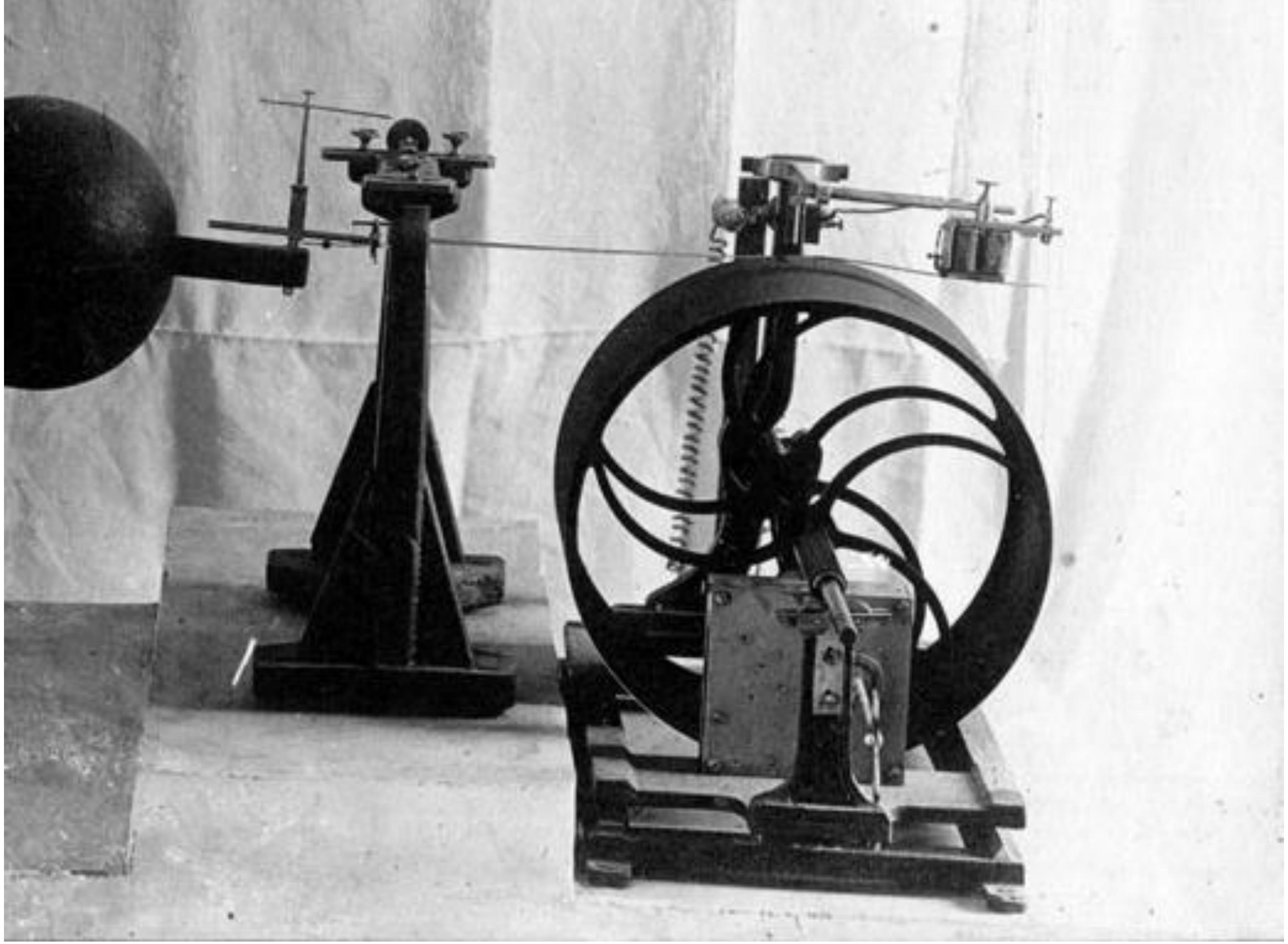


- Uneven record speed

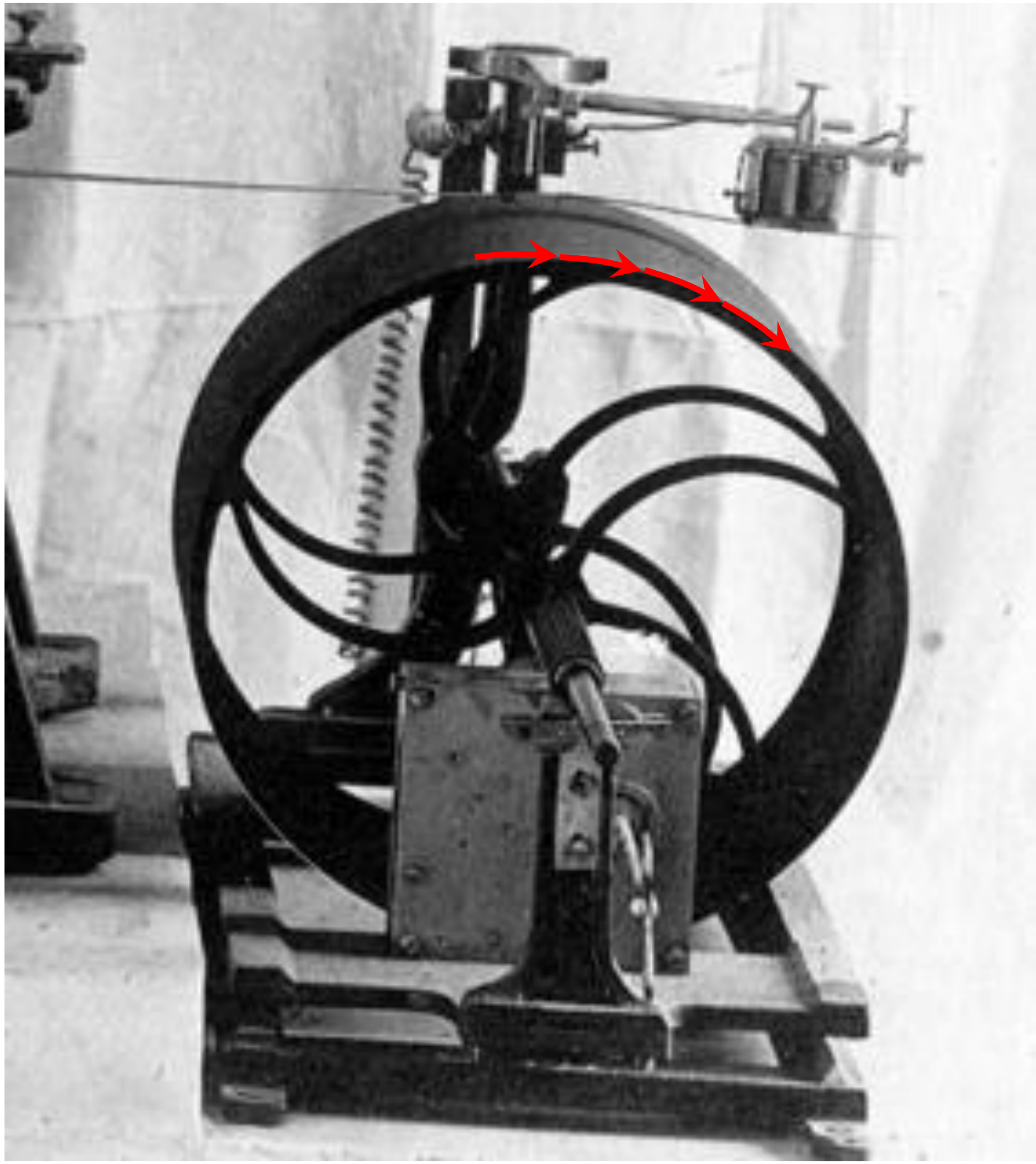


- Uneven record speed

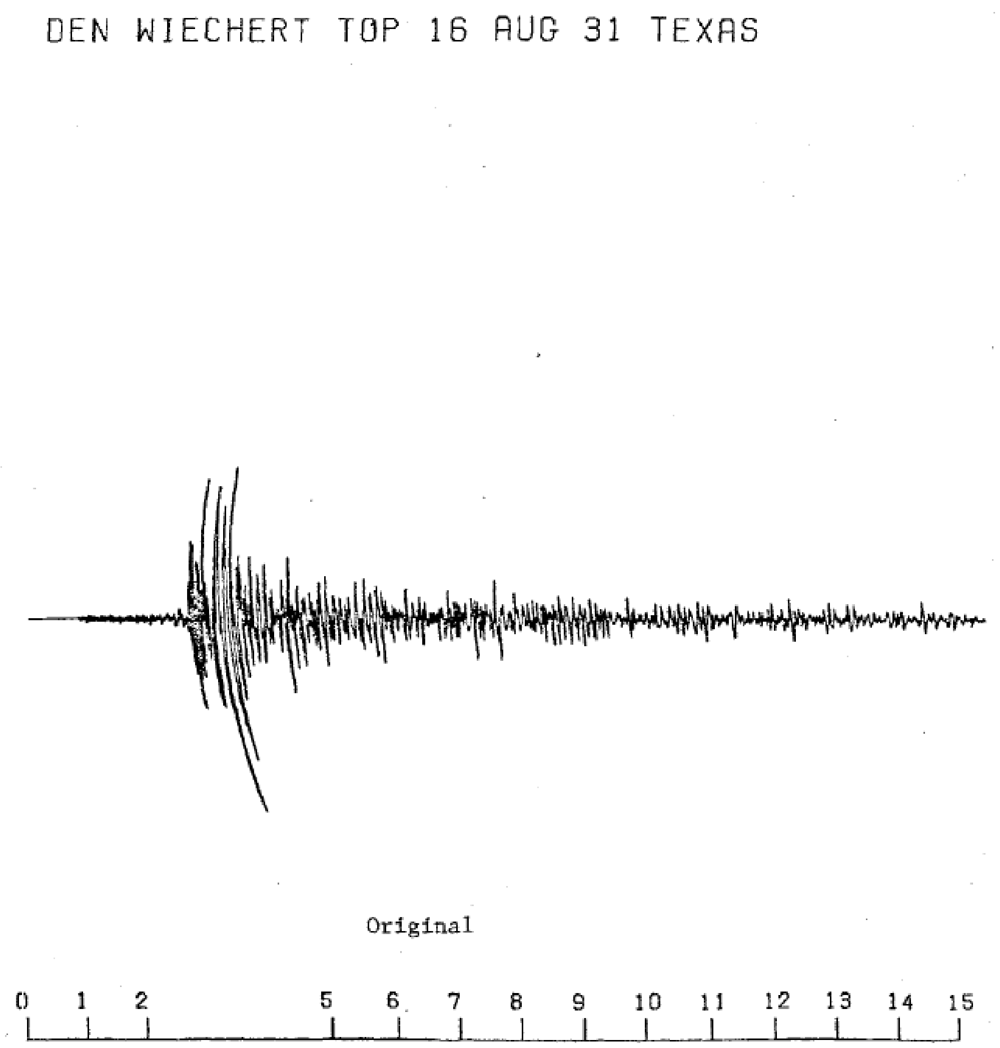
Bosch-Omori seismograph at Toledo Observatory (TOL). IGN

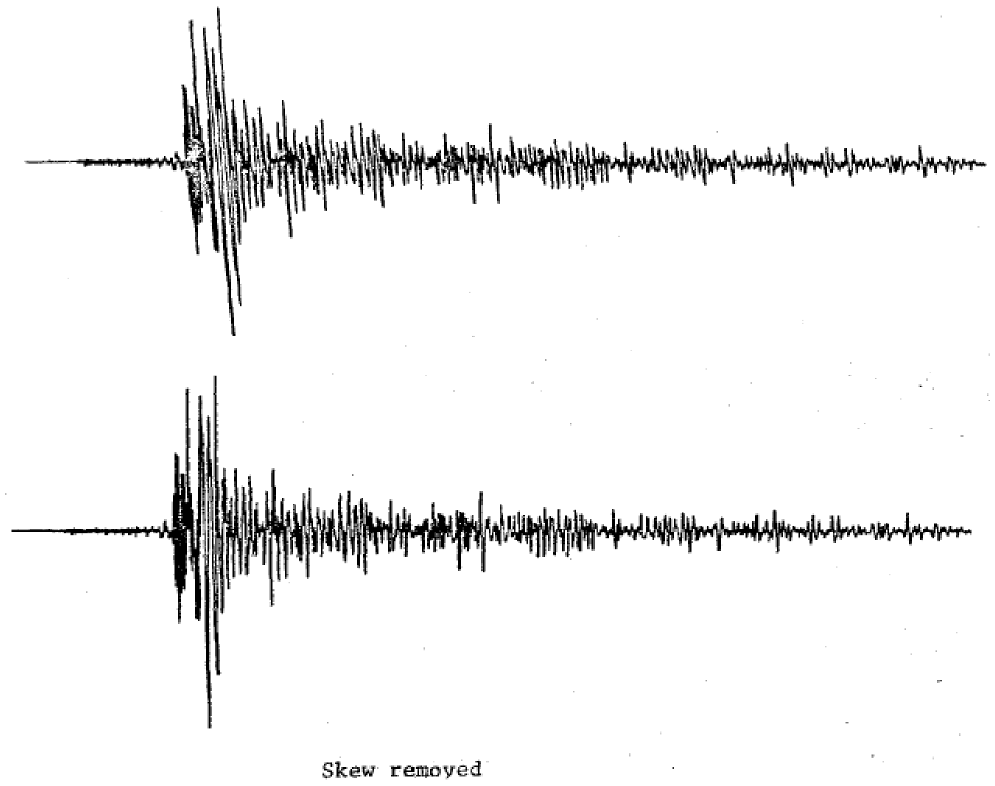


- Uneven record speed



Arm length (curvature) & Skew/Slanting



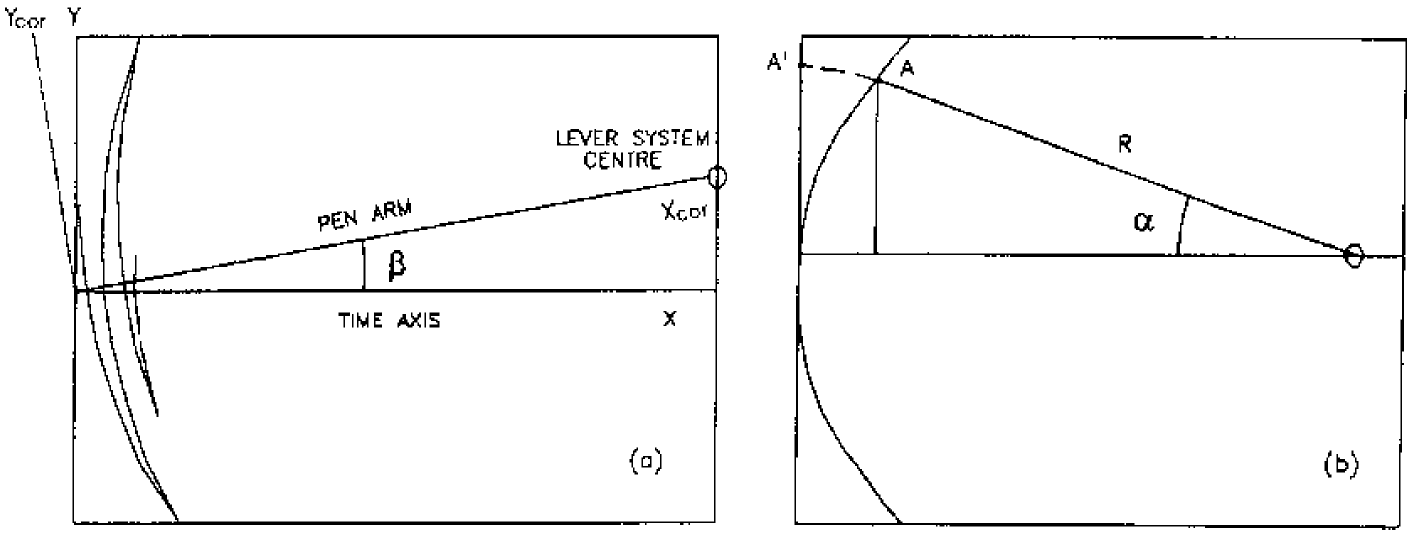


Hermmann. (1978)

Arm length (curvature) & Skew/Slanting

Corrections for arm-lenght and skew

(Let's assume recording is obtained in a flat surface – no drum)

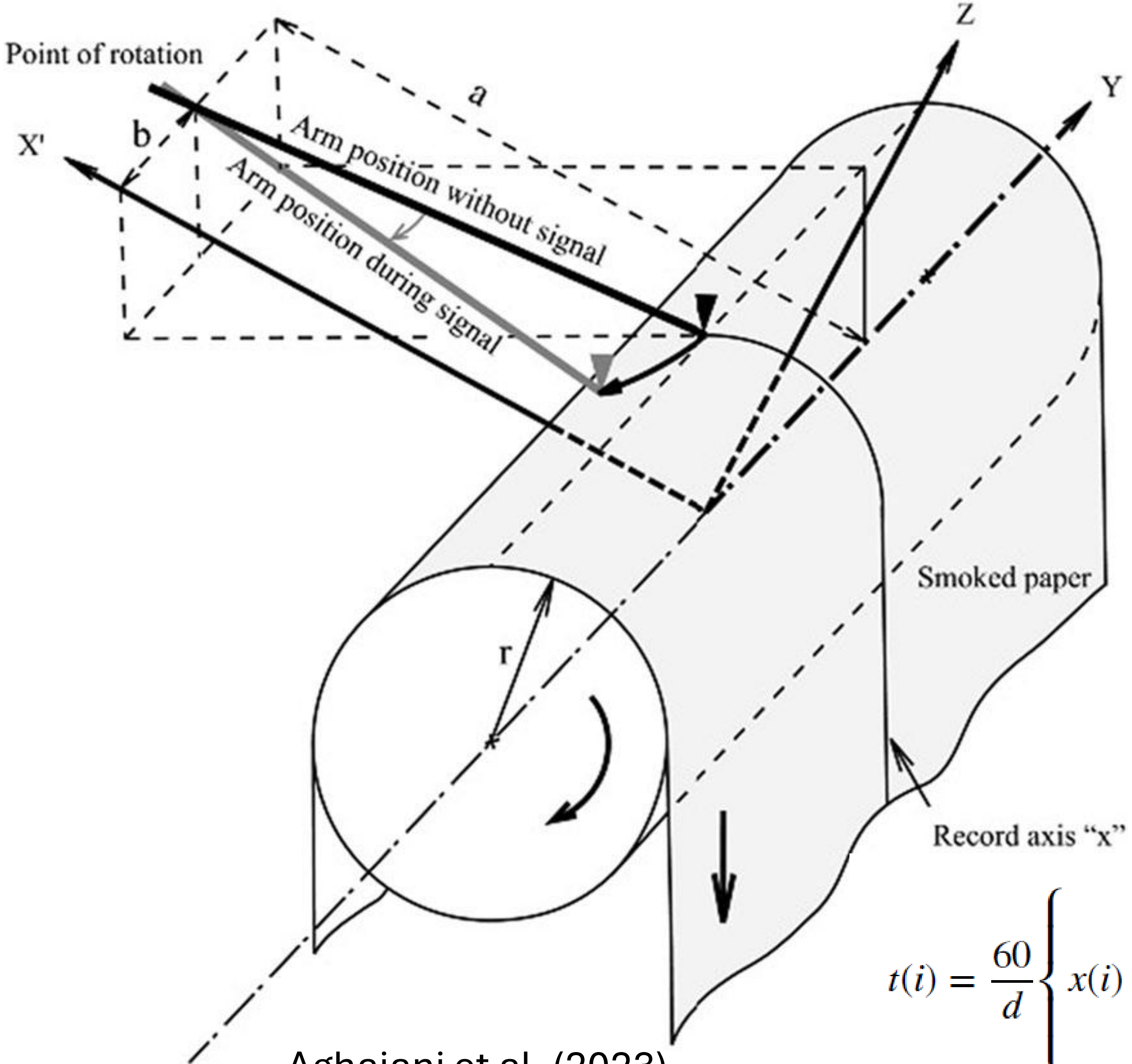


$$x_{cor} = x + ytg\beta$$
$$y_{cor} = y/\cos\beta$$

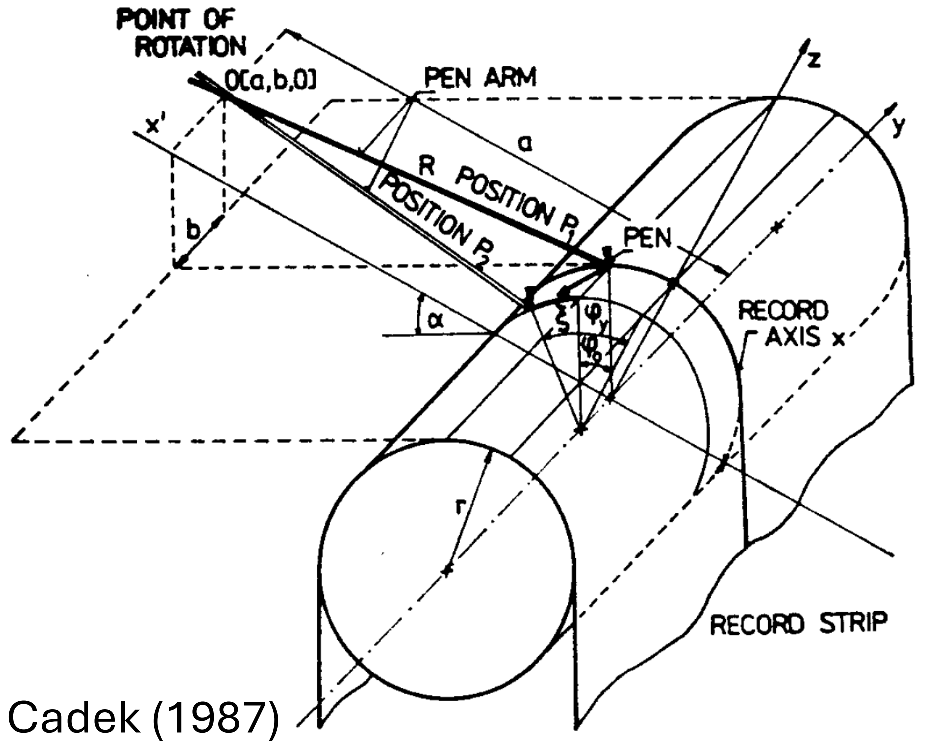
$$x_{cor} = x_{dig} - l_r(1 - \cos\alpha)$$
$$y_{cor} = l_r\alpha$$

Samardjieva et al. (1997)

Arm length (curvature) & Skew/Slanting



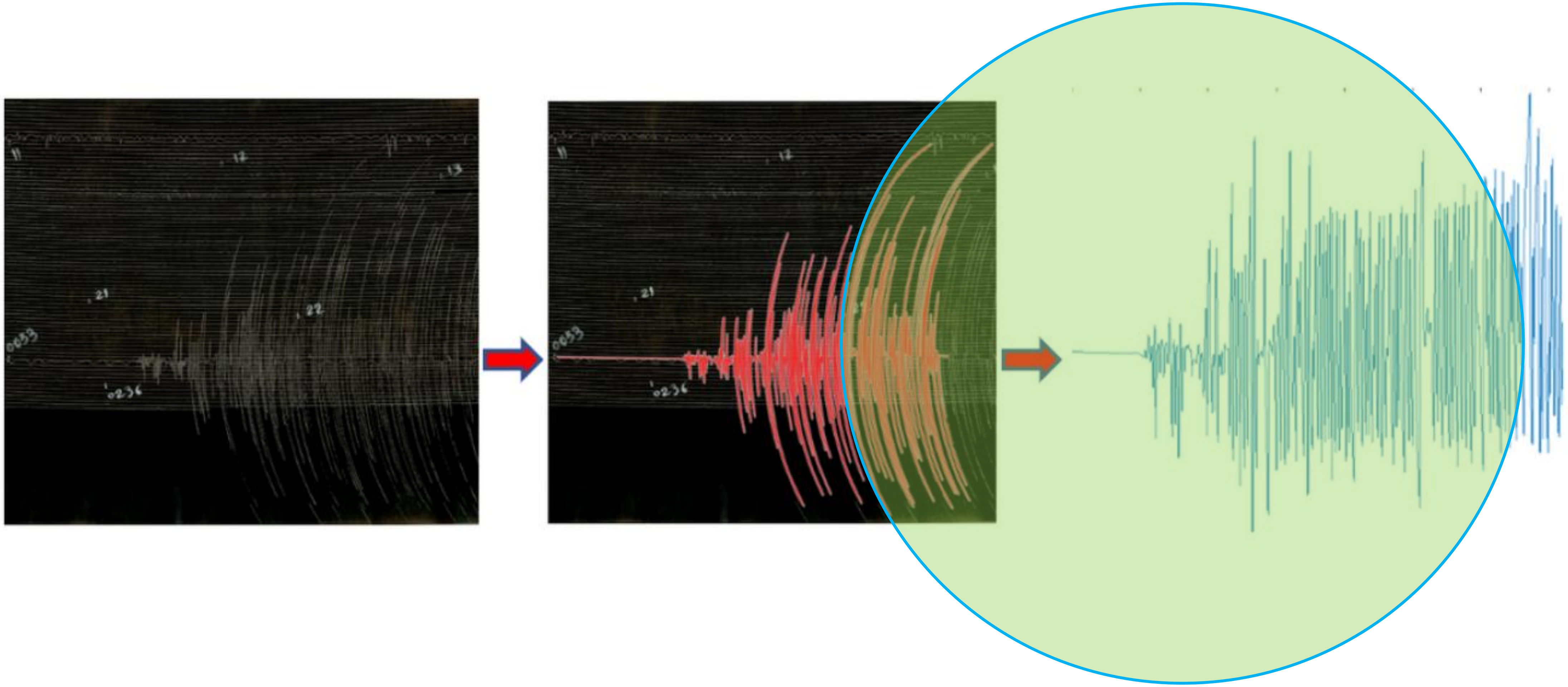
Aghajani et al. (2023)



Cadek (1987)

$$t(i) = \frac{60}{d}\left\{ x(i) - r\frac{arcsin\left\{r^2 + a^2 - L^2 + \left[y(i) - b\right]^2\right\} + arcsin(r^2 + a^2 - L^2 + b^2)}{2ar} \right\}$$

Arm length (curvature) & Skew/Slanting



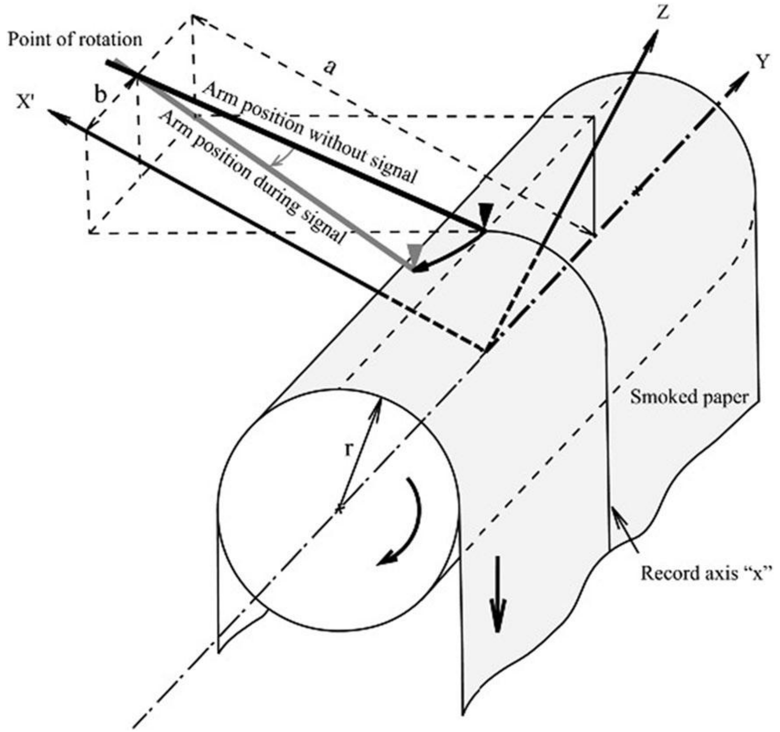
(From Aghajani, JOSE, 2023)

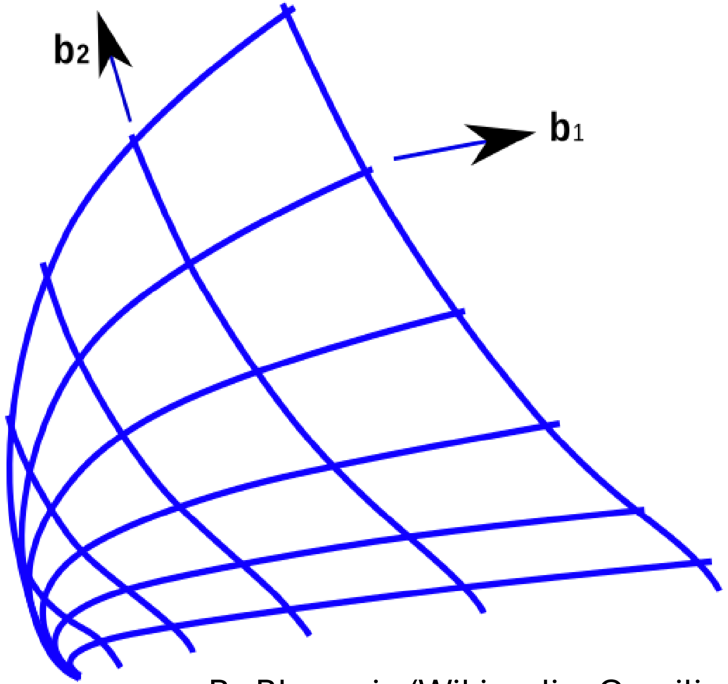
Arm length (curvature) & Skew/Slanting

Institute of Geophysics, University of Tehran (IGUT)

Fabra Observatory, Barcelona

Arm length (curvature) & Skew/Slanting





By Bbanerje (Wikipedia, Curvilinear coordinates)

(WIKI) Curvilinear coordinates are a coordinate system for Euclidean space in which the coordinate lines may be curved. These coordinates may be derived from a set of Cartesian coordinates by using a transformation that is locally invertible (a one-to-one map) at each point.

Arm length (curvature) & Skew/Slanting

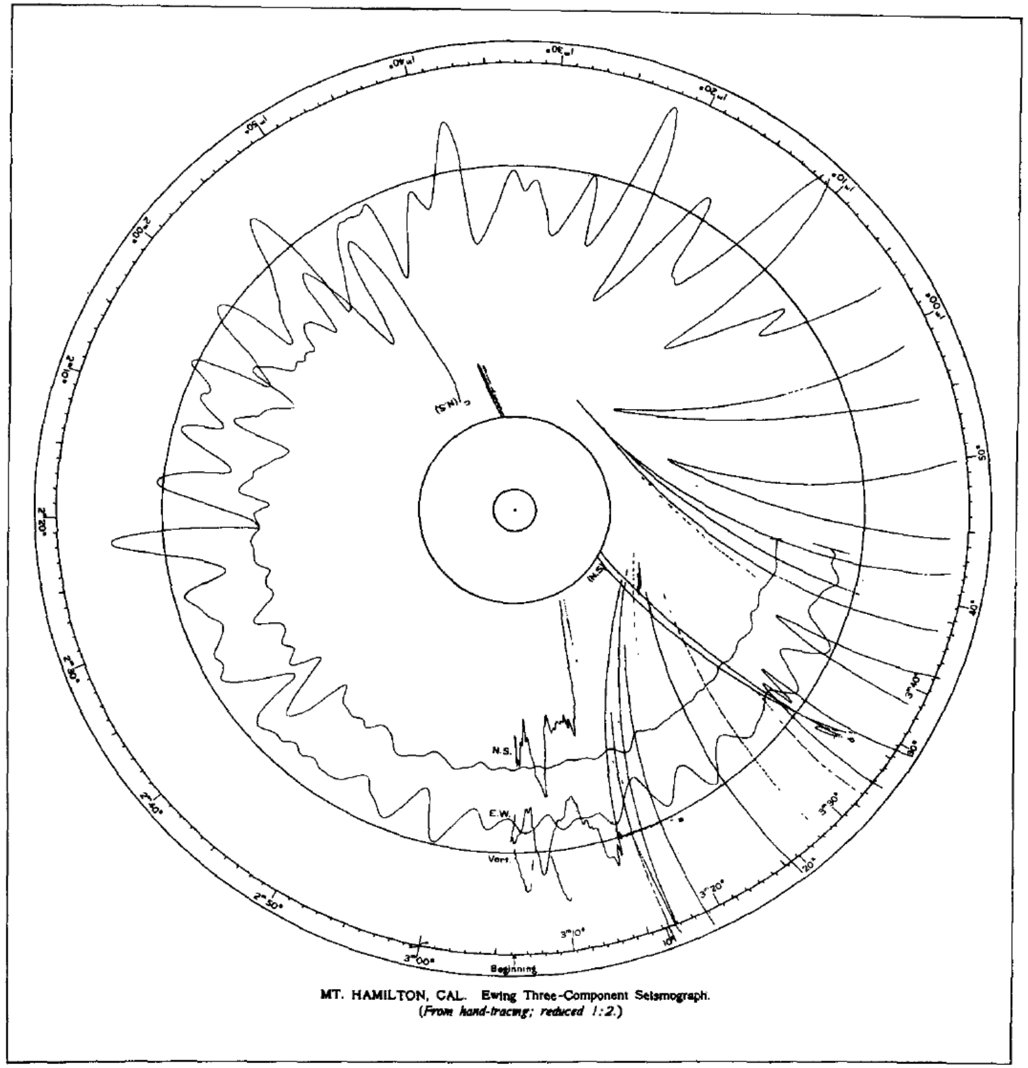
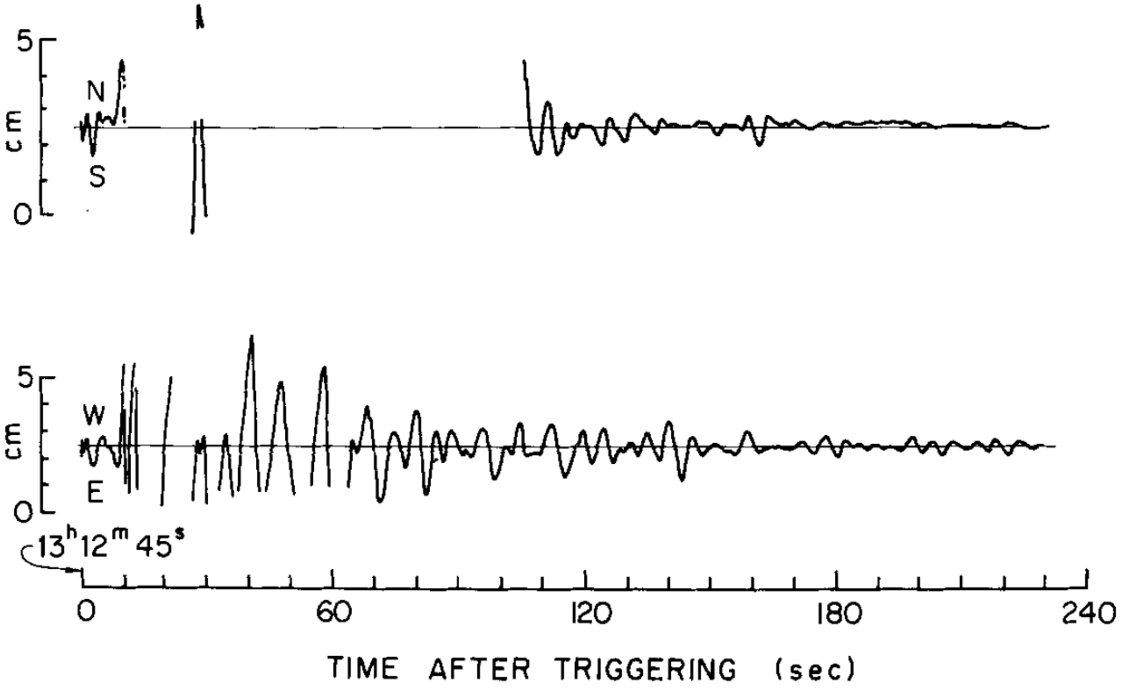
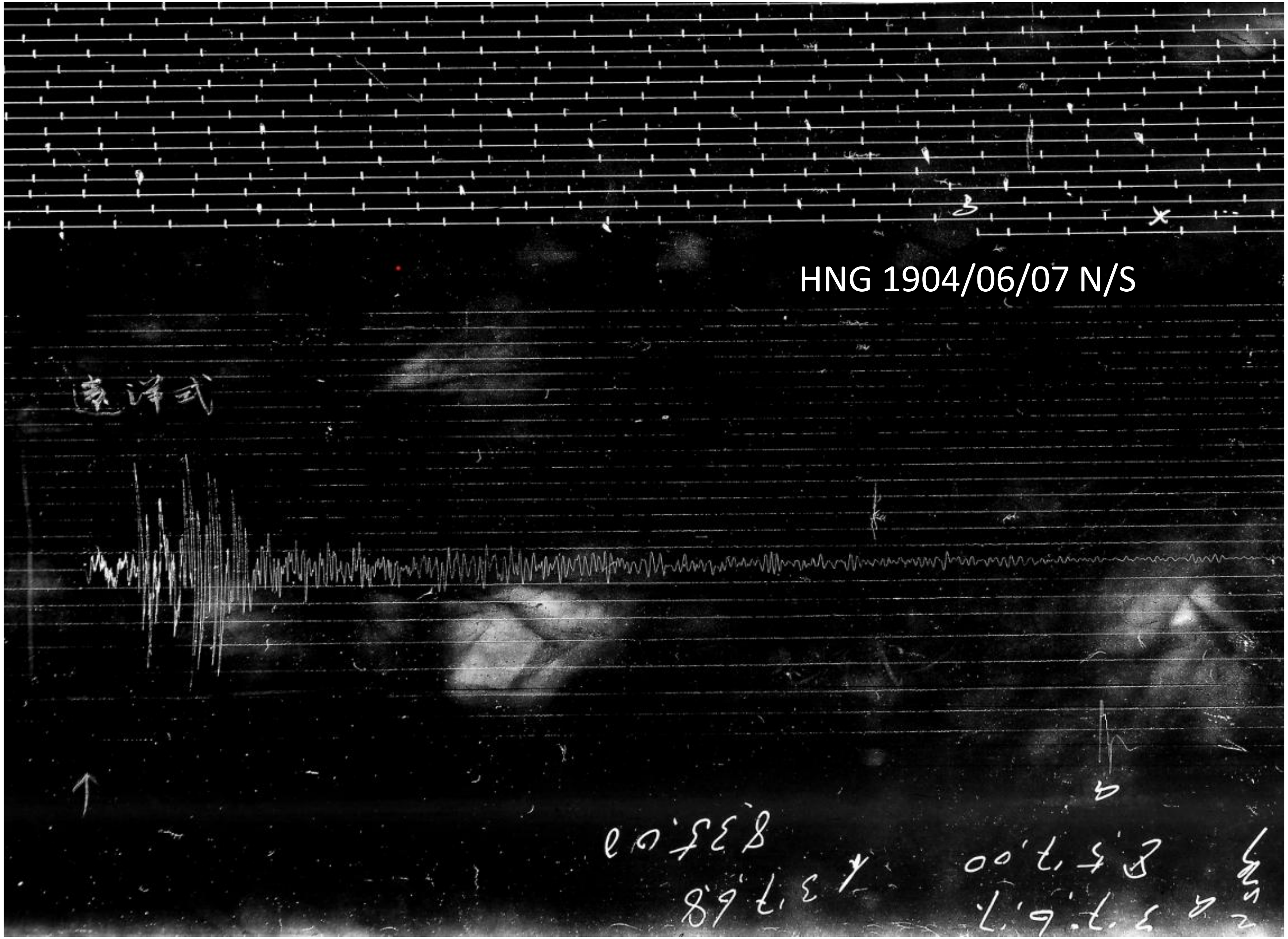


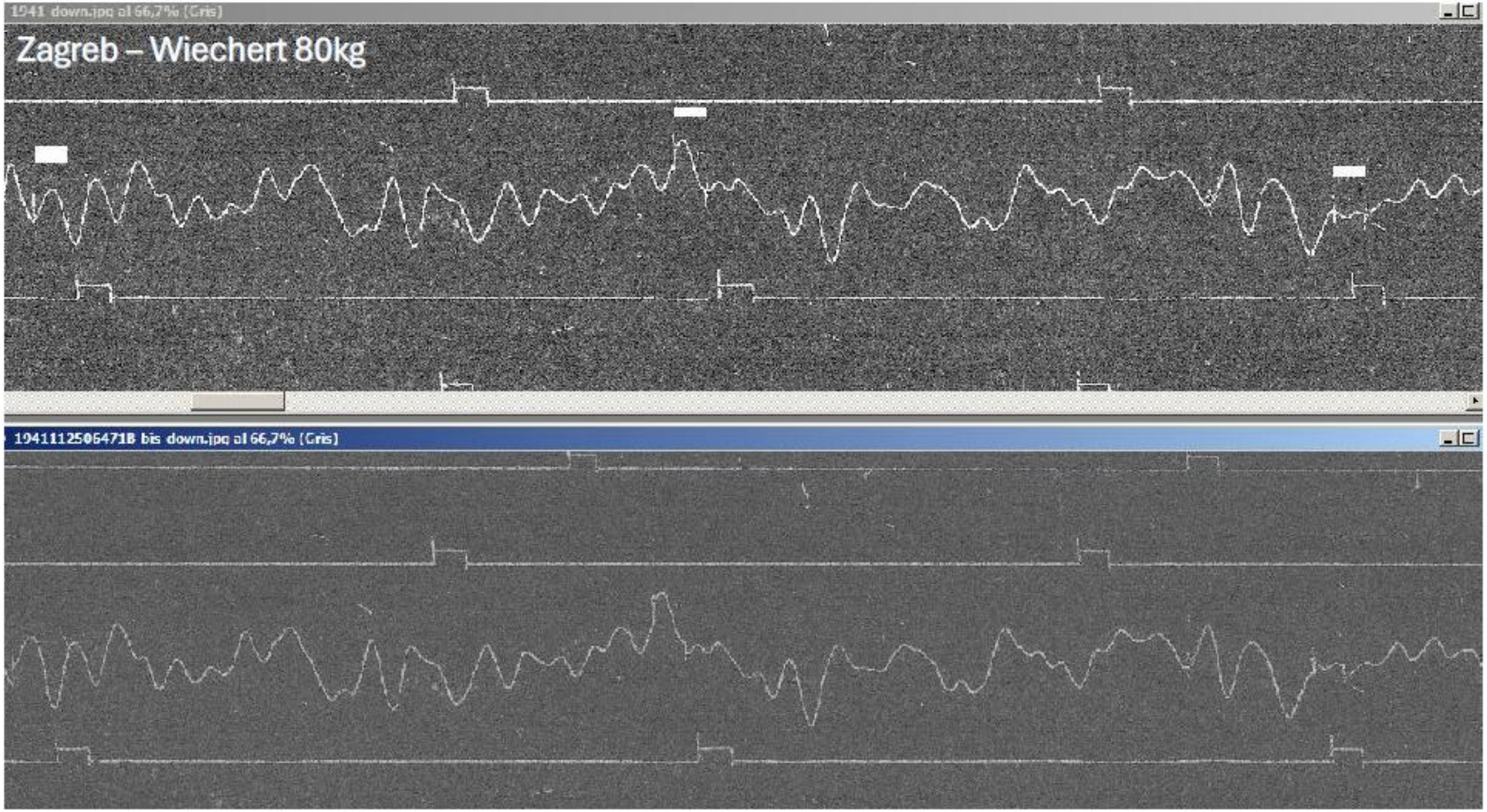
Fig. 3a. The Ewing three-component seismograph record from Lick Observatory, Mt. Hamilton (from plate 29 of the Atlas accompanying the *Report*.) See Figure 3b for the amplitude scale.



(From Boore, BSSA, 1977)


HNG 1904/06/07 N/S

Correction of time marks



Correction of time marks

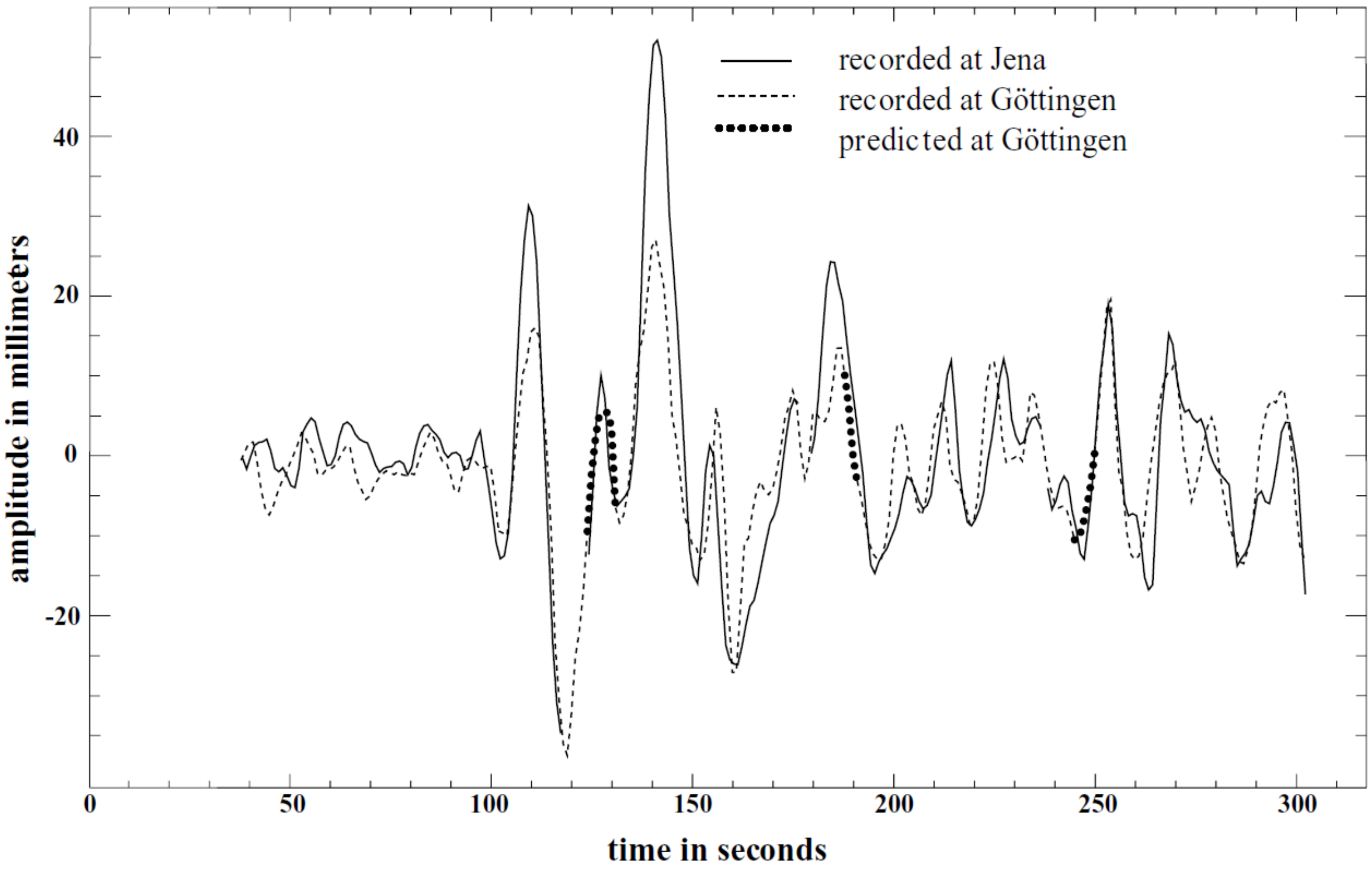


Figure 4. Comparison between the Göttingen and Jena '*S*' waveforms (Bolnay earthquake). The minute gaps at Göttingen are corrected by using predictive filters.

(From Schlupp &Cisternas, GJI, 2007)

Absolute timing

VALLE DI POMPEI, Napoli.

OSSERVATORIO METEOROLOGICO VULCANOLOGICO GEODINAMICO « PIO X » (Direttore, G. B. Alfano).

$\varphi = 40° 45'$ $\lambda = 14° 30'$ $h = m.\ 20\ c.$

Tromometrografi tipo « Omori » con registrazione a nerofumo.

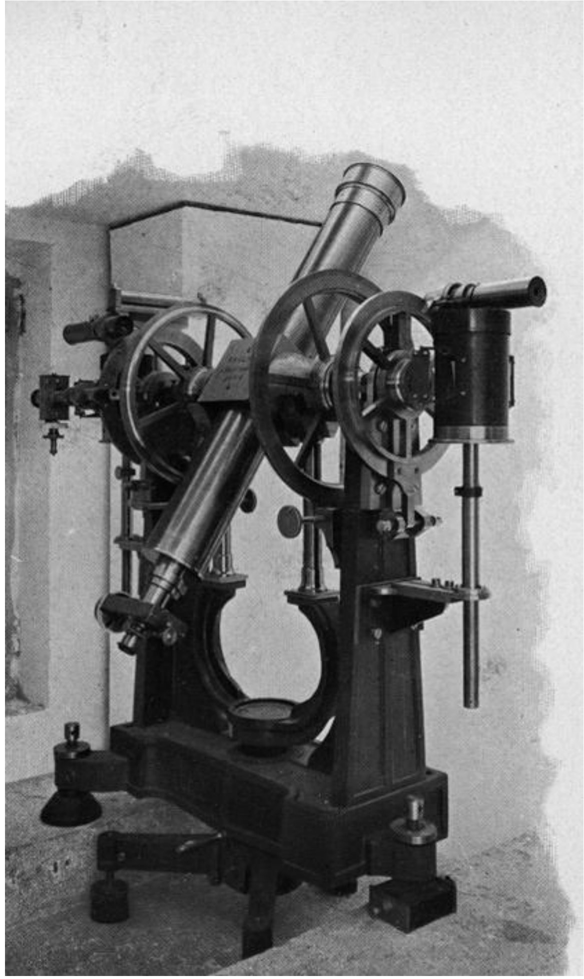
Kg. 200 $P = 12^s$ $I = 25$ $V = 100$ cm.

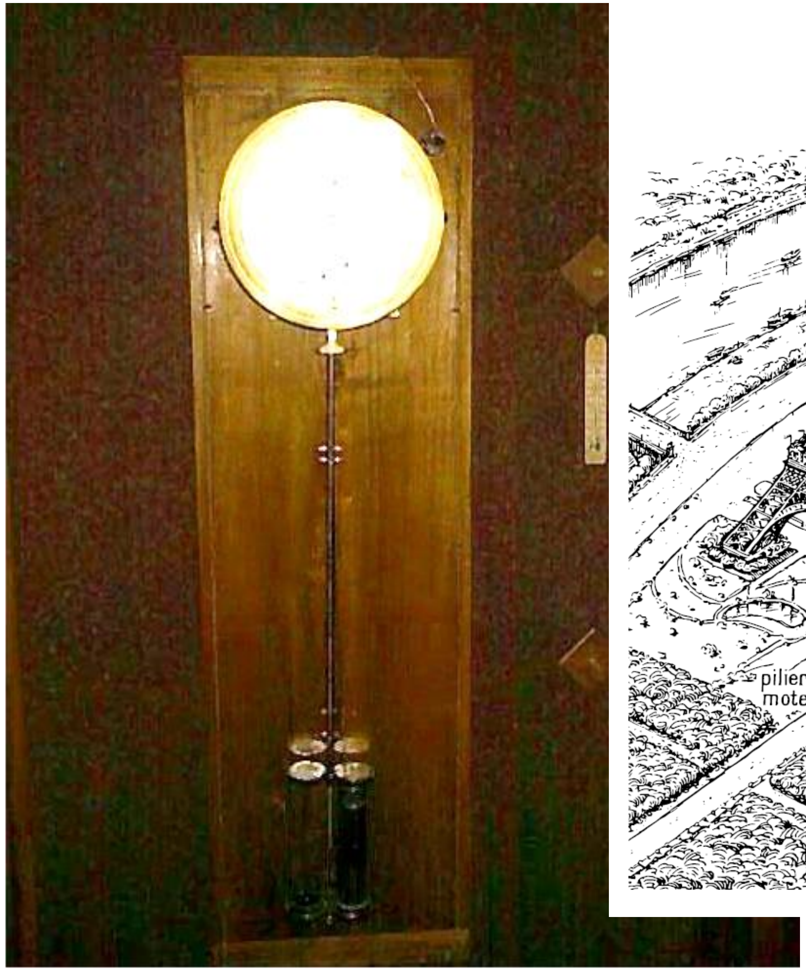
Esiste qualche altro strumento secondario.

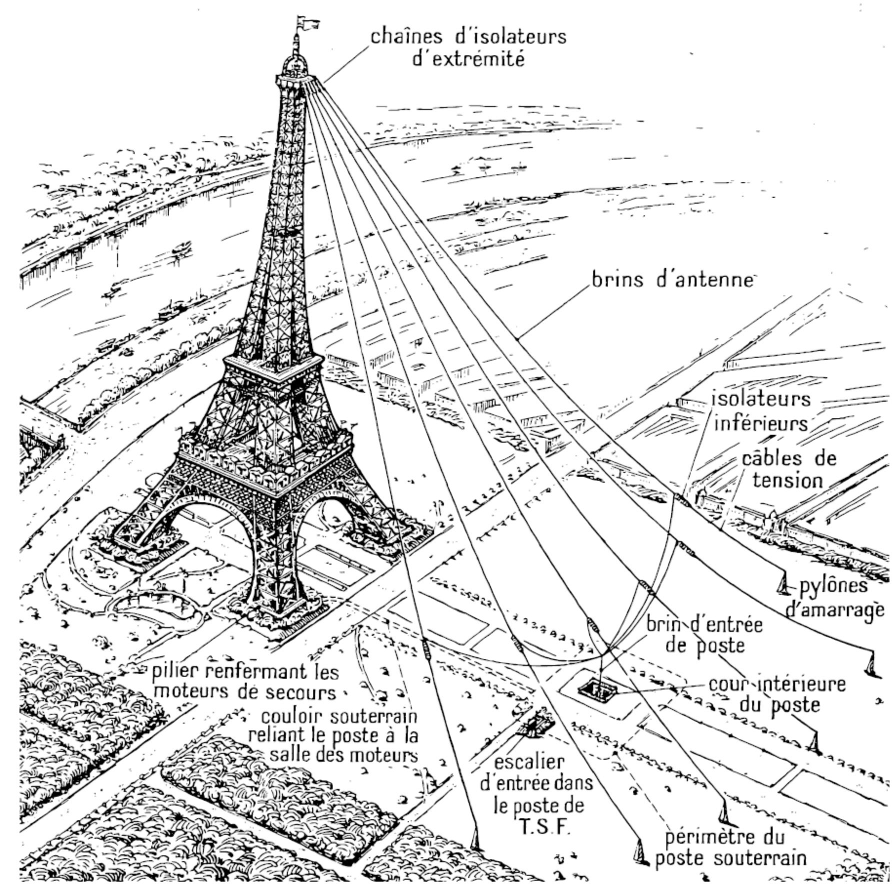
Il tempo è regolato sul colpo di cannone a mezzodì a Napoli.

(From Agamennone, BSSI, 1909)

Absolute timing







(From Agnew, BSSA, 2000)

Bulletins

TERREMOTI — 1902 — GENNAIO

1. ***Rocca di Papa*** (Frascati-Roma).

Pendolo orizzontale E-W (Kg. 60; P. $13^s,2$; I. 0; V. 49 cm.). Anteriormente alle $6^h\,{}^1/_2$ la linea è abbastanza regolare. Tra $6^h34^m18^s \pm 3^s$ e $6^h38^m42^s$ insignificanti ondulazioni, seguite da altro gruppetto più accentuato tra $6^h43^m30^s$ e $6^h46^m22^s$. Dopo breve sosta, comincia una lunga serie d'onde consimili alle $6^h48^m18^s$. Ma la parte più saliente del sismogramma si compone di 64 semi-onde ($7^h4^m30^s$-$7^h18^m25^s$) dapprima crescenti fino all'ampiezza massima totale di mm. 3,4 attorno a $7^h9^m20^s$ e poi decrescenti. Il loro periodo medio semplice è di $13^s,5$. Poi decrescono in generale con frequenti interferenze, qua e là, che sembrano cessare verso 7^h32^m. Indi restano continuamente percettibili fin verso 8^h. Altri due brevi gruppetti, di natura dubbia, intorno a 8^h34^m e 8^h40^m.

Bulletins

TABLE I.—*List of Principal Disturbances registered by Milne's Seismograph at Colaba, Bombay.*

1906.

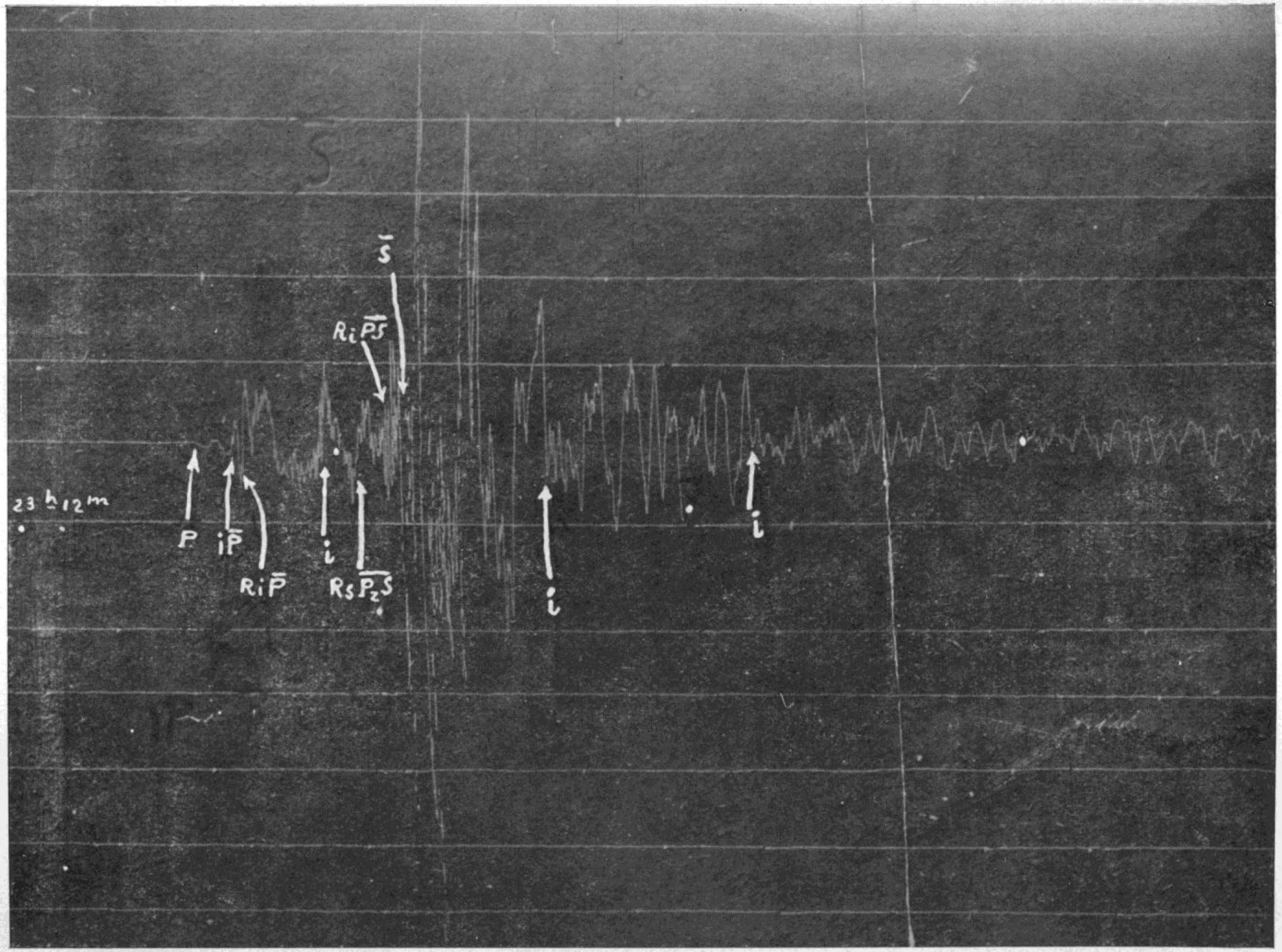
Observatory number.	Date.	Time of Disturbance in G. M. T.						Amplitude or half the complete range of maximum motion.	Remarks.
		Beginning.		Maximum.		End.			
		H.	m.	H.	m.	H.	m.	mm.	
18	1906 January 6 ...	22	9·9	22	13·3	22	34·2	0·4	Sensibility to tilt 1 mm. = 0″·47.
34	,, ,, 15 ...	19	44·3	19	46·0	20	6·0	0·7	
43	,, ,, 21 ...	13	58·8	14	8·2	...		1·5	End lost in shifting time.
62	,, ,, 27 ...	10	17·1	10	28·0	11	33·7	2·3	
78	,, ,, 31 ...	15	56·3	17	18·5	20	5·1	15·2	
79	,, February 1 ...	2	49·0	2	54·0	3	46·5	0·6	
137	,, ,, 19 ...	2	23·6	3	12·9	4	53·9	1·5	
149	,, ,, 23 ...	15	53·7	15	57·8	16	18·5	1·0	
153	,, ,, 24 ...	9	24·4	9	25·4	9	32·8	0·7	
167	,, ,, 26 ...	10	41·6	10	42·2	10	49·8	0·5	
175	,, ,, 27 ...	19	44·2	19	49·4	21	5·0	8·4	
188	,, March 2 ...	6	25·0	6	30·1	7	18·5	2·6	

Bulletins

83	5	P	23	12	19,6	»	»	»	»	»
		i$\bar{P}$	23	12	21,9	»	»	»	»	»
		$R_1 \bar{P}$	23	12	24,8	0,7	»	»	»	»
		$R_5 \bar{P}$	23	12	30.4	»	»	»	»	»
		$R_{12} \bar{P}$	23	12	33,7	»	»	»	»	»
		$R_{s2} \bar{P}$	23	12	43,3	1,1	»	»	»	»
		$R_{12} P_3 S$	23	12	45,2	»	»	»	»	»
		i$\bar{S}$	23	12	48,4	2,5	»	»	»	»
		$R_1 \bar{S}$	23	12	51,5	»	»	»	»	»
		$R_s \bar{S}$	23	13	1,6	»	»	»	»	»
		M	23	13	4,5	2,2	»	67 E	»	»
		$R_{12} P\bar{S}_s$	23	13	5,9	2,2	»	»	»	»
		M	23	13	11,7	2,7	»	»	118 D	»
		$R_{s2} P_2 S_3$	23	13	12,0	»	»	»	»	»

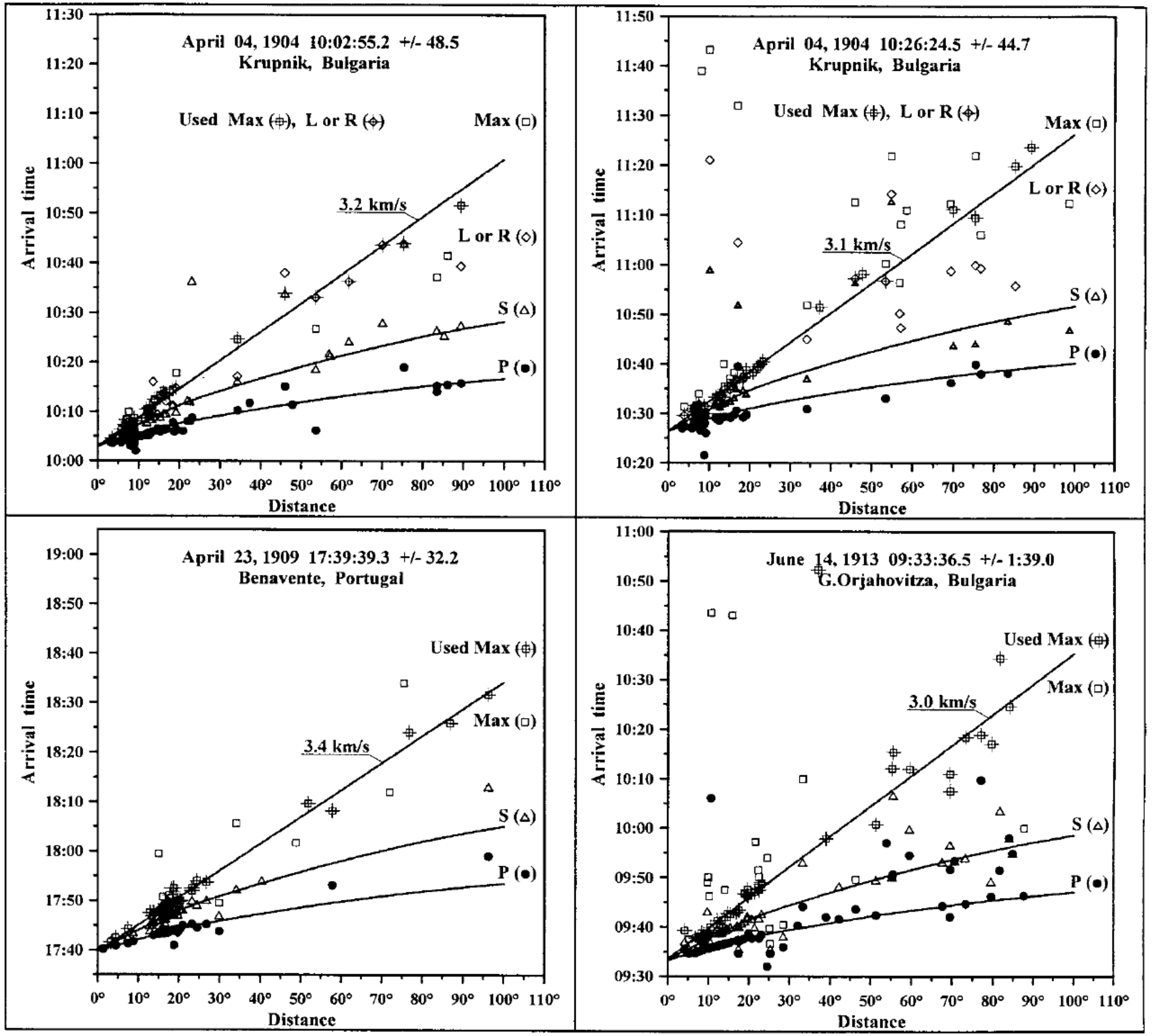
Epicentro: 37°, 35′ 42″ N. y 4°, 38′ 00″ W. Gr. Hora en el epicentro, 23 h. 11 m. 50 s. Profundidad hipocentral, 50 km. Hora en el hipocentro, 23 h. 11 m. 41 s. Sentido de Grado VIII (ruinoso) en Montilla: de Grado VIII-VII en Espejo (provincia de Córdoba, España.) La isosista VII pasa por el N., de Castro del Río, por Montemayor, S. de Aguilar y W. de Nueva Carteya, existiendo una zona secundaria de este mismo Grado alargada de NNE. a SSW., como la principal, y que comprende los pueblos de Cabra y Doña Mencía. La isosista VI se extiende por el N. hasta Cañete de las To-

El terremoto de Montilla. LÁM. VIII



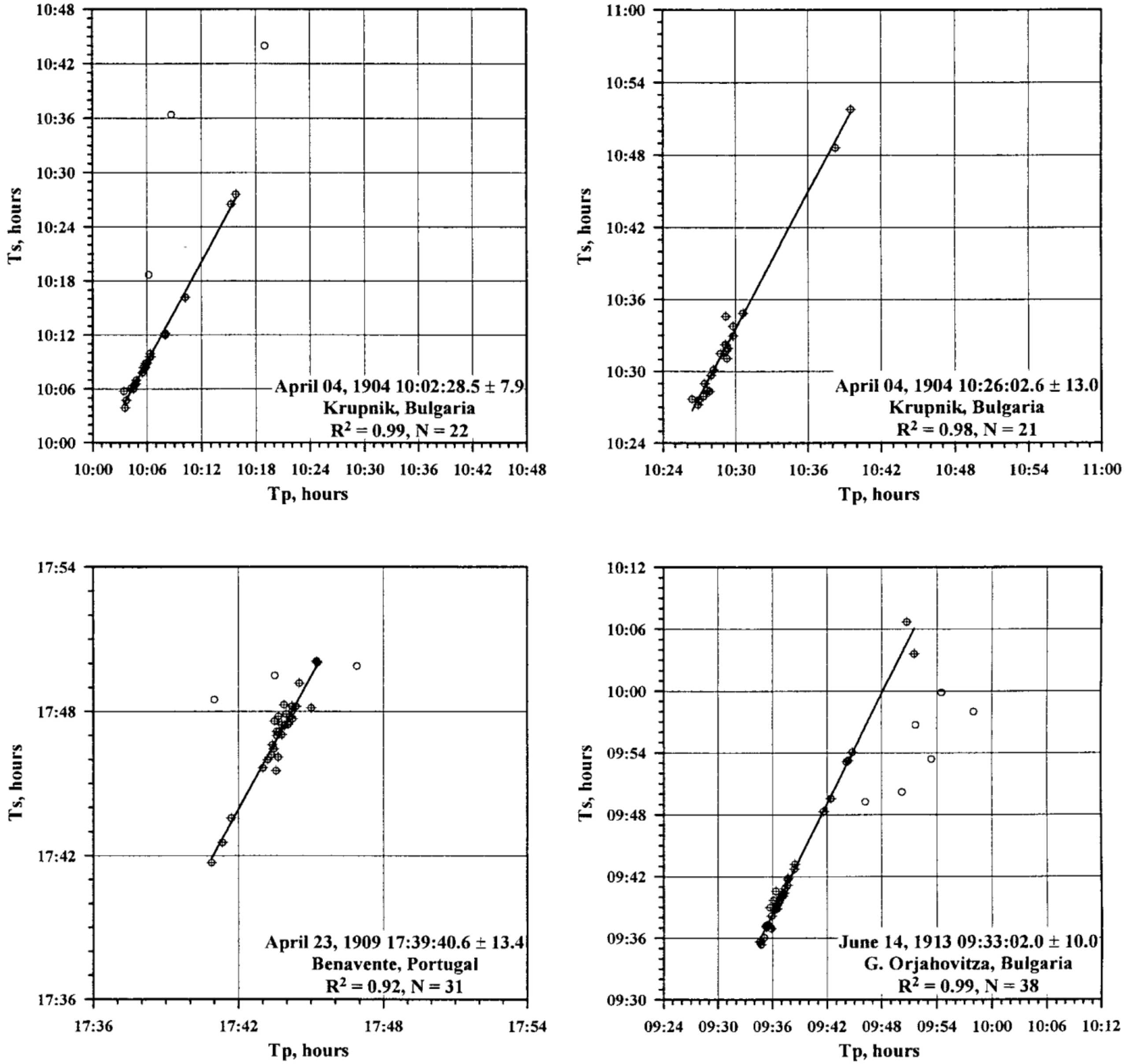
Sismograma del Observatorio de Toledo, 5 de julio de 1930. — Comp. N. E.-S. W.

Bulletins



(Dineva et al., JOSE, 2002)

Bulletins

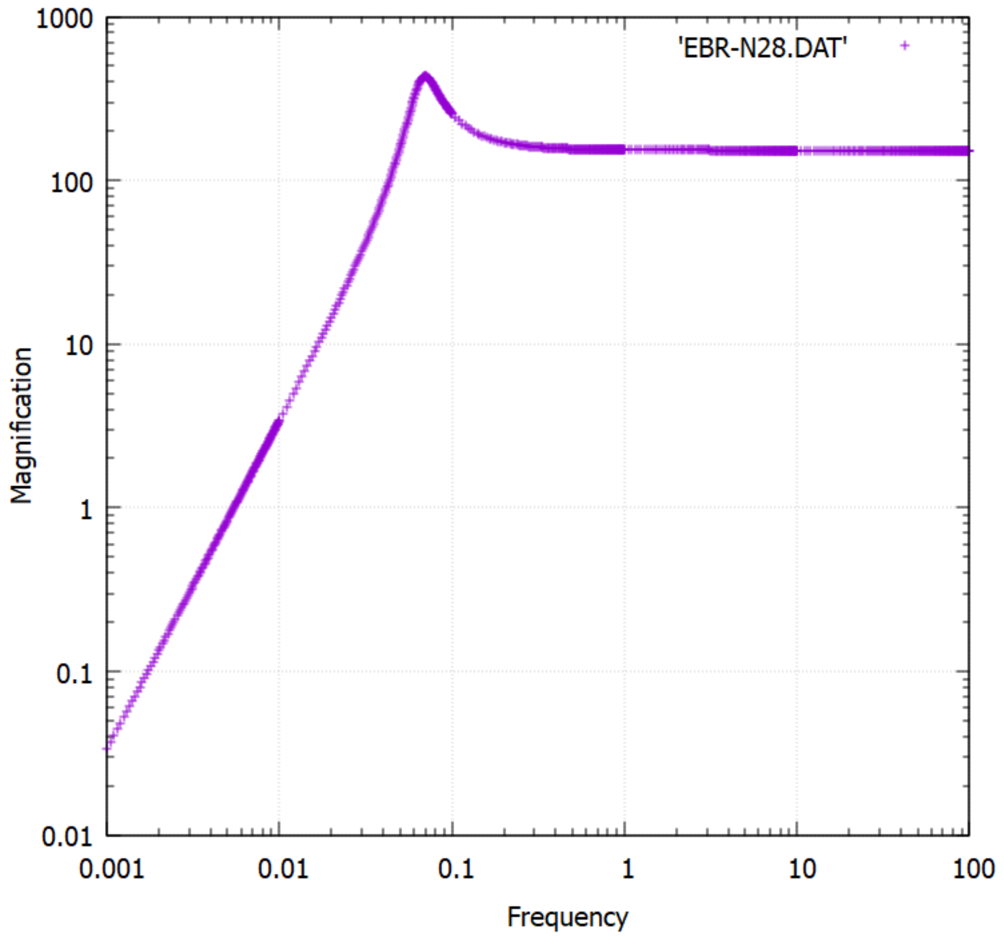


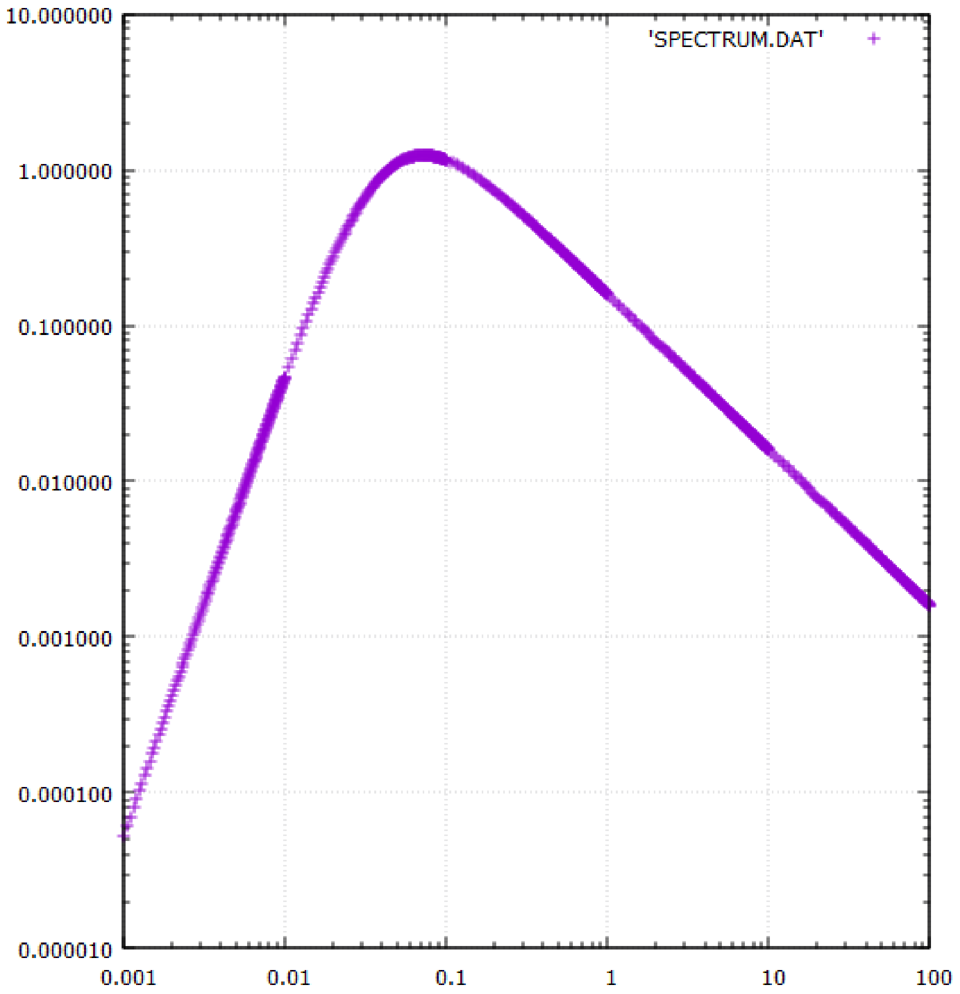
(Dineva et al., JOSE, 2002)

Transfer function

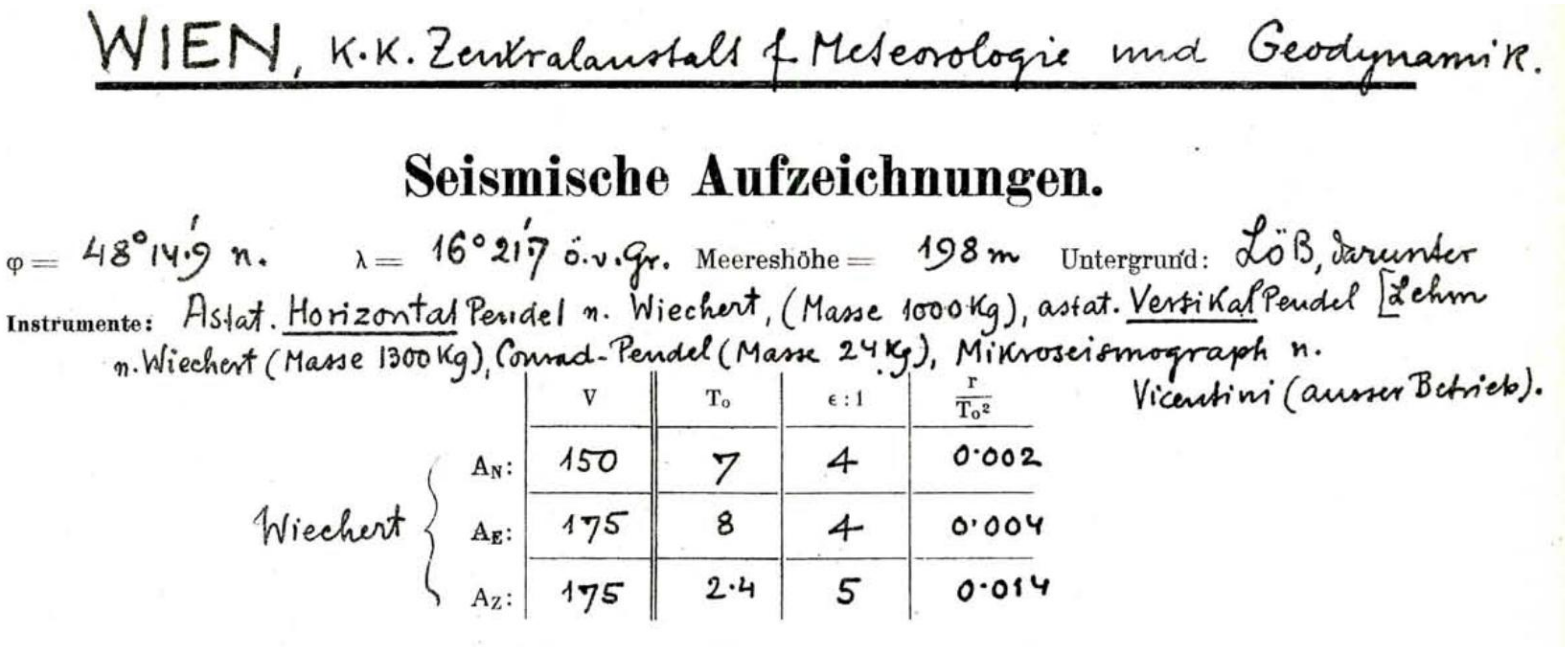
Electromagnetic

Mechanical





Transfer function



WIEN, K.K. Zentralanstalt f. Meteorologie und Geodynamik.

Seismische Aufzeichnungen.

$\varphi =$ 48°14.'9 n. $\lambda =$ 16°21.'7 ö.v.Gr. Meereshöhe = 198 m Untergrund: Löß, darunter [Lehm

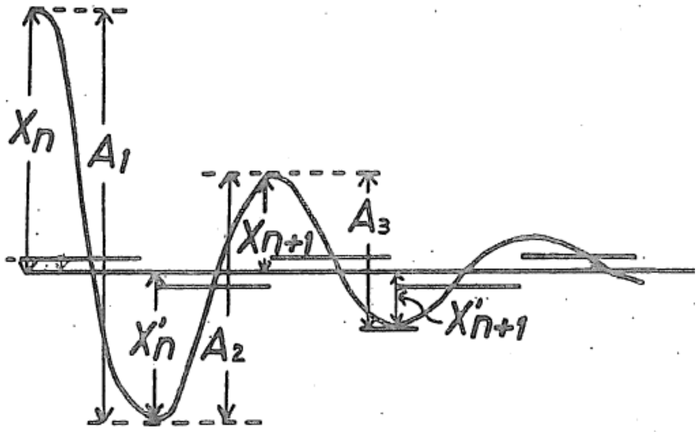
Instrumente: Astat. Horizontal Pendel n. Wiechert, (Masse 1000 Kg), astat. Vertikal Pendel n. Wiechert (Masse 1300 Kg), Conrad-Pendel (Masse 24 Kg), Mikroseismograph n. Vicentini (ausser Betrieb).

		V	T_0	$\epsilon : 1$	$\frac{r}{T_0^2}$
Wiechert	A_N:	150	7	4	0·002
	A_E:	175	8	4	0·004
	A_Z:	175	2·4	5	0·014

Transfer function (mechanical instrument)

$$H_d(s) = A_m \frac{s^2}{(s^2 + 2s\omega_o h + \omega_o{}^2)}$$

$$(p_{1,2} = -\left(h \pm j\sqrt{1-h^2}\right)$$



$$h = \frac{\ln \varepsilon}{\sqrt{\pi^2 + \ln^2 \varepsilon}}$$

ε:1	*h*	ε:1	*h*	ε:1	*h*	ε:1	*h*
1.0	0.00	14.5	0.65	28.0	0.73	43.0	0.77
1.5	0.13	15.0	0.65	28.5	0.73	44.0	0.77
2.0	0.22	15.5	0.66	29.0	0.73	45.0	0.77
2.5	0.28	16.0	0.66	29.5	0.73	46.0	0.77
3.0	0.33	16.5	0.67	30.0	0.73	47.0	0.77
3.5	0.37	17.0	0.67	30.5	0.73	48.0	0.78
4.0	0.40	17.5	0.67	31.0	0.74	49.0	0.78
4.5	0.43	18.0	0.68	31.5	0.74	50.0	0.78
5.0	0.46	18.5	0.68	32.0	0.74	52.0	0.78
5.5	0.48	19.0	0.68	32.5	0.74	54.0	0.79
6.0	0.50	19.5	0.69	33.0	0.74	55.0	0.79
6.5	0.51	20.0	0.69	33.5	0.74	56.0	0.79
7.0	0.53	20.5	0.69	34.0	0.74	58.0	0.79
7.5	0.54	21.0	0.70	34.5	0.75	60.0	0.79
8.0	0.56	21.5	0.70	35.0	0.75	62.0	0.80
8.5	0.56	22.0	0.70	35.5	0.75	64.0	0.80
9.0	0.57	22.5	0.70	36.0	0.75	65.0	0.80
9.5	0.58	23.0	0.71	36.5	0.75	66.0	0.80
10.0	0.59	23.5	0.71	37.0	0.75	68.0	0.80
10.5	0.60	24.0	0.71	37.5	0.75	70.0	0.80
11.0	0.61	24.5	0.71	38.0	0.76	75.0	0.81
11.5	0.61	25.0	0.72	38.5	0.76	80.0	0.81
12.0	0.62	25.5	0.72	39.0	0.76	85.0	0.82
12.5	0.63	26.0	0.72	39.5	0.76	90.0	0.82
13.0	0.63	26.5	0.72	40.0	0.76	95.0	0.82
13.5	0.64	27.0	0.72	41.0	0.76	100.0	0.83
14.0	0.64	27.5	0.72	42.0	0.77		

Transfer function

No.

Instruments:

Galitzin pendulums with galvanometric registration.

Constants:

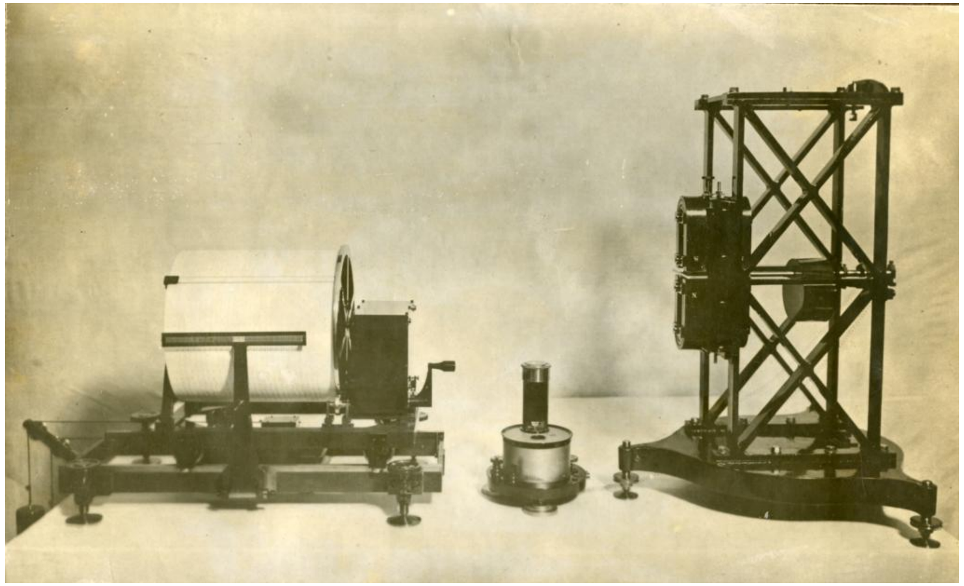
Component	l	T_1	A_1	μ^2	T	k
	cm	sec	cm		sec	
N	12.5	12.62	100	0.0	12.4	105
E	12.5	12.62	100	0.0	11.9	102
Z	14.4	11.56	100	—0.1	10	95

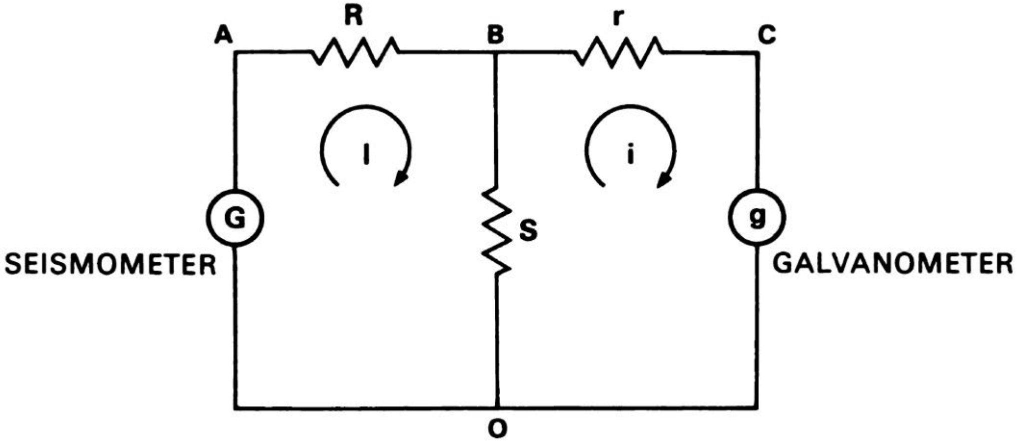
Wiechert 1000 kg. horizontal seismograph.

Wiechert 1300 kg. vertical seismograph.

Constants:

Component	T	ν	ϱ	V
	sec		mm	
N	9.6	4.4	0.6	220
E	9.3	4.0	0.7	195
Z	5.3	4	0.2	170





Transfer function

$$H_d(s) = A_m \frac{s^3}{(s^2 + 2s\omega_s h_s + \omega_s{}^2)(s^2 + 2s\omega_g h_g + \omega_g{}^2) - 4h_s\omega_s h_g\omega_g\sigma^2 s^2}$$

$$\sigma^2 = \cancel{\frac{h'_s\,h'_g}{h_s\,h_g}\,\frac{S^2}{(S+R)(S+r)}}$$

$$H_d(s) = A_m \frac{s^3}{(s^2 + 2s\omega_s h_s + \omega_s{}^2)(s^2 + 2s\omega_g h_g + \omega_g{}^2)}$$

$$p_{1,2} = -\left(h_s \pm j\sqrt{1 - h_s^2}\right)\omega_0$$

$$p_{3,4} = -\left(h_g \pm j\sqrt{1 - h_g^2}\right)\omega_0$$

Transfer function

Fiche n° **Casier:** Station : STRASBOURG

Lat.: 48°35'01" N. Long.: 7°45'58",5 E. Altitude: 135 m. Pays : France

Temps utilisé : Temps Moyen de Greenwich (signaux horaires scientifiques et ordinaires).

Sous-sol : Alluvions rhénan Profondeur 1,5m. Température:7°à8° Piliers : béton

Enregistrements troublés par microséismes : oui, et par la circulation routière et les usines avoisinantes – 2,8μ)

Constantes :

Type de l'instrument	Composante	Enregistrement	Amortissement	Construction	Marque de temps	Défilement: 1 min.	Sens du mouvement masse	T_g	V_m	T_p	K	μ^2	A_1	l_r	M	V	T.	ε
						mm		s		s			mm	mm	t.			h=
Galitzine	N-S	gal	6m	1912	i	30	–	20,6	640	22,4	35,5	0	1000	125,2				
	E-W	gal	6m	1912	i	30	–	22,2	660	22,2	32,5	0	1000	123,6				
	V	"	"	1912	i	30	+	11,6	710	11,6	24,4	+0,2	1000	432,6				
C.P.P.	V	"	"	Courte pér. 1947	i	60	+	1,2	4400	1,4		0	1000					
Wiechert	N-S	m	air	1903	i	15	+								1,8	270	8,4	0,49
	E-W	"	"	1903	i	15	–								1,0	145	8,4	0,50
	V	"	"	1910	i	15	–								1,2	145	4,0	0,48
19 T.	N-S	"	"	1925	i	60	–								19,0	780	2,5	0,42
	E-W	"	"	1925	i	60	+								19,0	750	1,8	0,50

$$A_m = \frac{2\,k\,A}{l}$$

- k - The transmission factor.
- A - The length of the beam of light from the galvanometer mirror to the recording drum.
- l - The length of the simple equivalent pendulum.

Transfer function

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Strasbourg:
Calibration sheet for horitzontal
Galitzin seismograph
components

Fiche n° Casier: Station : STRASBOURG

Lat.: 48°35'01" N. Long.: 7°45'58",5 E. Altitude: 135 m. Pays : France

Temps utilisé : Temps Moyen de Greenwich (signaux horaires scientifiques et ordinaires).

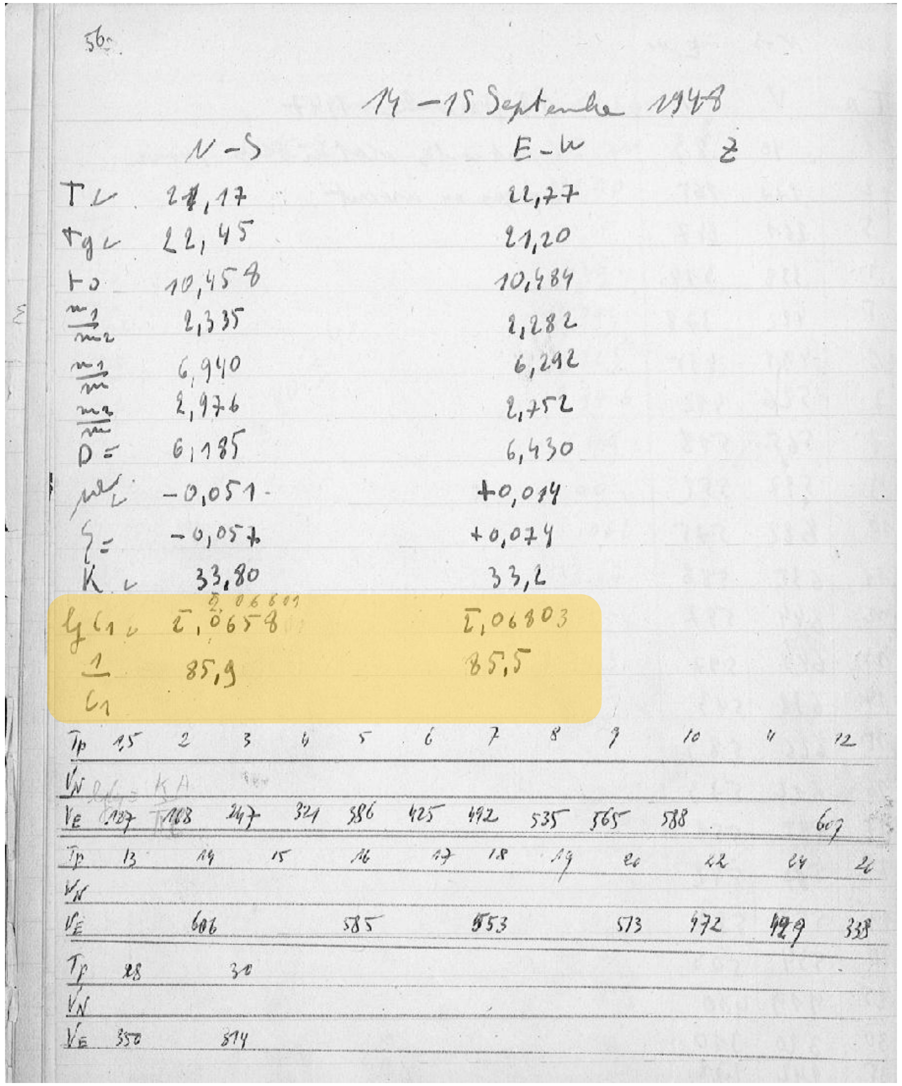
Sous-sol : Alluvions rhénan Profondeur :1,5m. Température:7°à8° Piliers : béton

Enregistrements troubles par microséismes : oui, et par la circulation routière et les usines avoisinantes - 2,8μ)

Constantes :

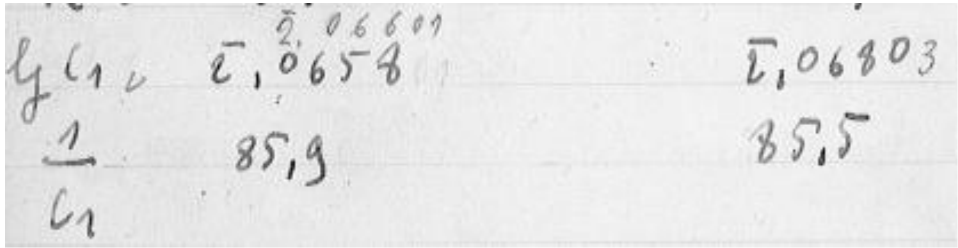
Type de l'instrument	Composante	Enregistrement	Amortissement	Construction	Marque de temps	Défilement: 1 min.	Sens du mouvement masse	T_g	V_m	T_p	K	μ^2	A_1	l_r	M	V	T.	ε
						mm		s		s			mm	mm	t.			h=
Galitzine	N-S	gal	ém	1912	i	30	-	20,6	640	22,4	35,5	0	1000	125,2				
	E-W	gal	ém	1912	i	30	-	22,2	660	22,2	32,5	0	1000	1236				
	V	"	"	1912	i	30	+	11,6	710	11,6	24,4	+0,2	1000	4326				
C.P.P.	V	"	"	Courte pér. 1947	i	60	+	1,2	4400	1,4		0	1000					
Wiechert	N-S	m	air	1903	i	15	+								1,8	270	8,4	0,49
	E-W	"	"	1903	i	15	-								1,0	145	8,4	0,50
	V	"	"	1910	i	15	-								1,2	145	4,0	0,48
19 T.	N-S	"	"	1925	i	60	-								19,0	780	2,5	0,42
	E-W	"	"	1925	i	60	+								19,0	750	1,8	0,50

Example: Calibration



Transfer function

- **Meaning of C_1:**



lg C_1	$\bar{2}$,0658 ($\bar{2}$,06601)	$\bar{2}$,06803
$\frac{1}{C_1}$	85,9	85,5

Maximum magnification for Galitzine is:

$$V_{max} = \frac{3\sqrt{3}}{16}\frac{kA}{\pi l}T$$

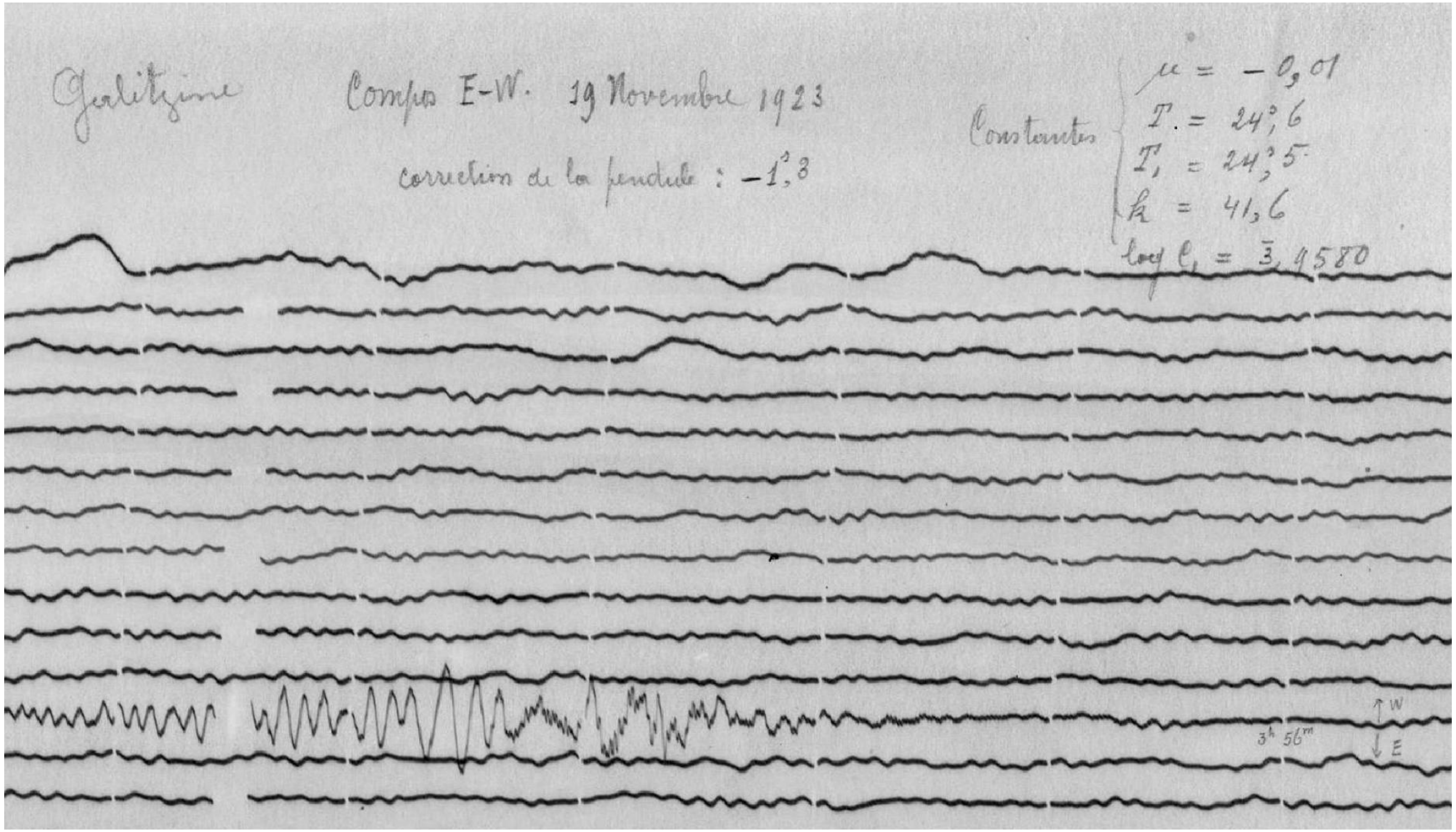
And we define C_1 as:

$$C = \frac{\pi l}{kA}$$

$log\ C_1 = \bar{2}.0658$

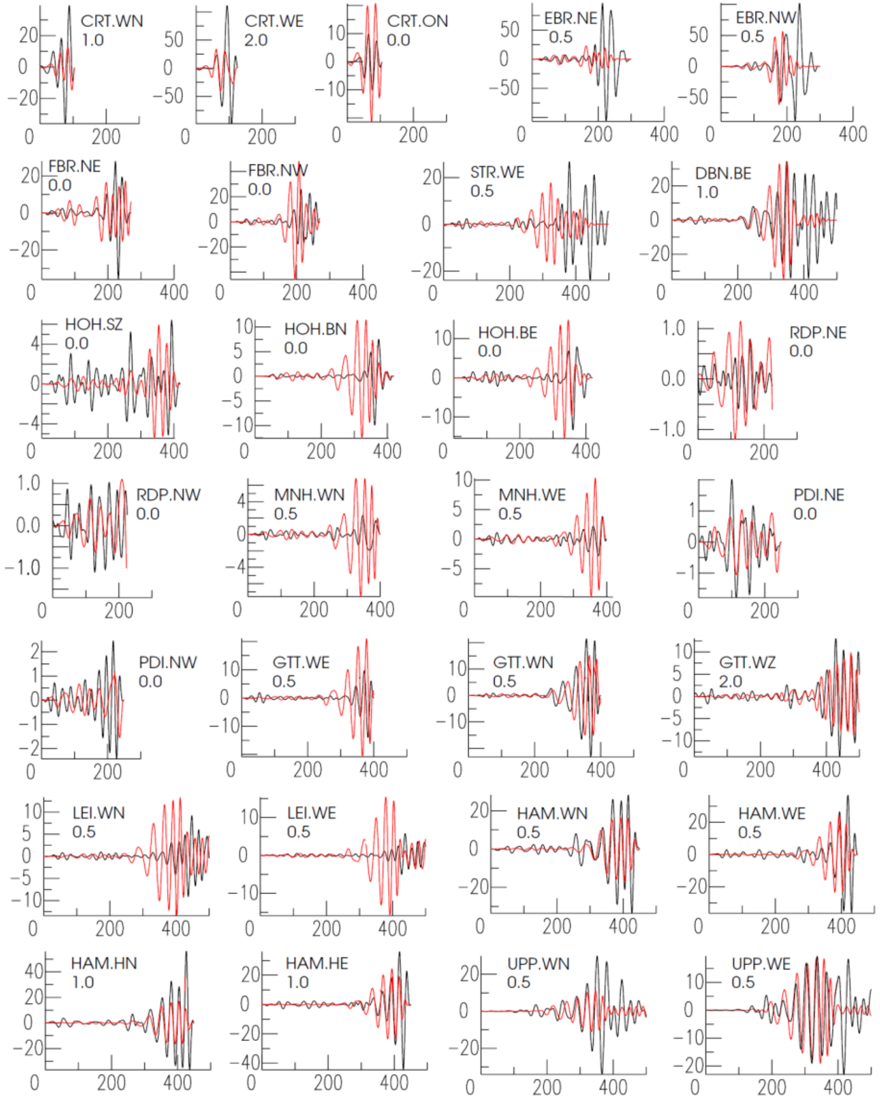
$log\ C_1 = \bar{2}.0658$ (in modern notation $log\ C_1 = -1.9342$) $1/C_1 = 85.9$

Transfer function

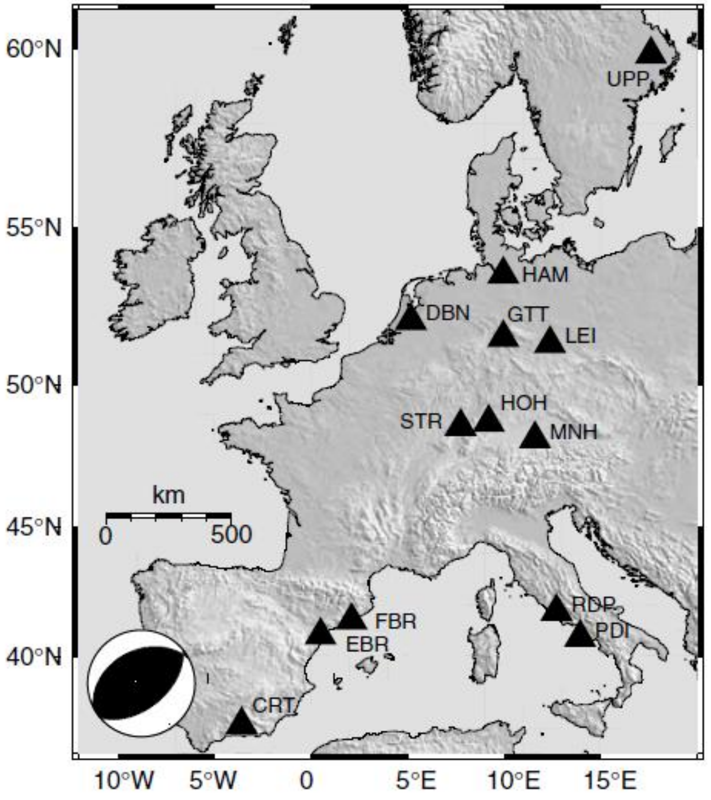


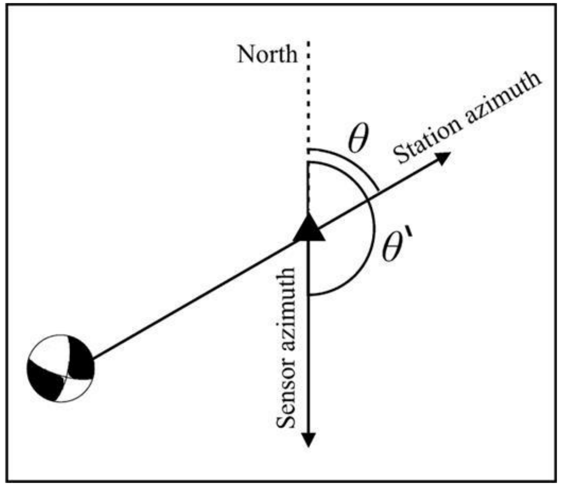
Example: UCC, Galitzine E-W

Applications - MT



<u>23 April 1909, Benavente (Portugal), Mw 6.0</u>

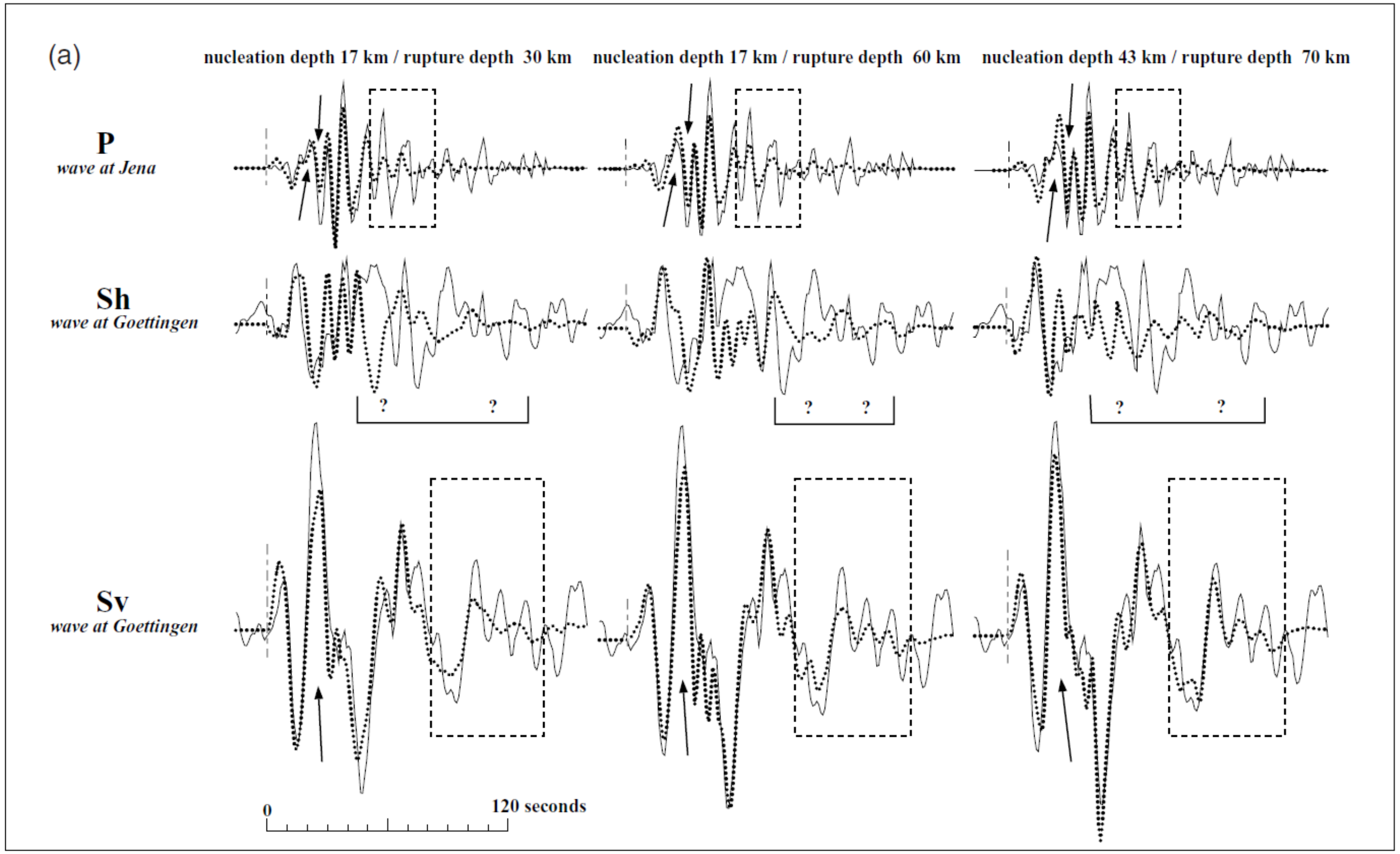


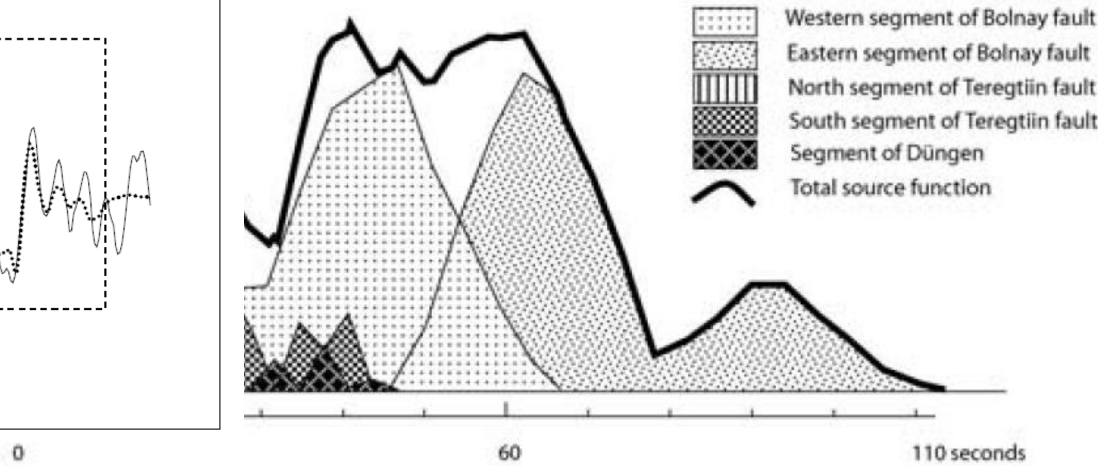


(From Stich et al., GJI, 2005)

Applications - STF

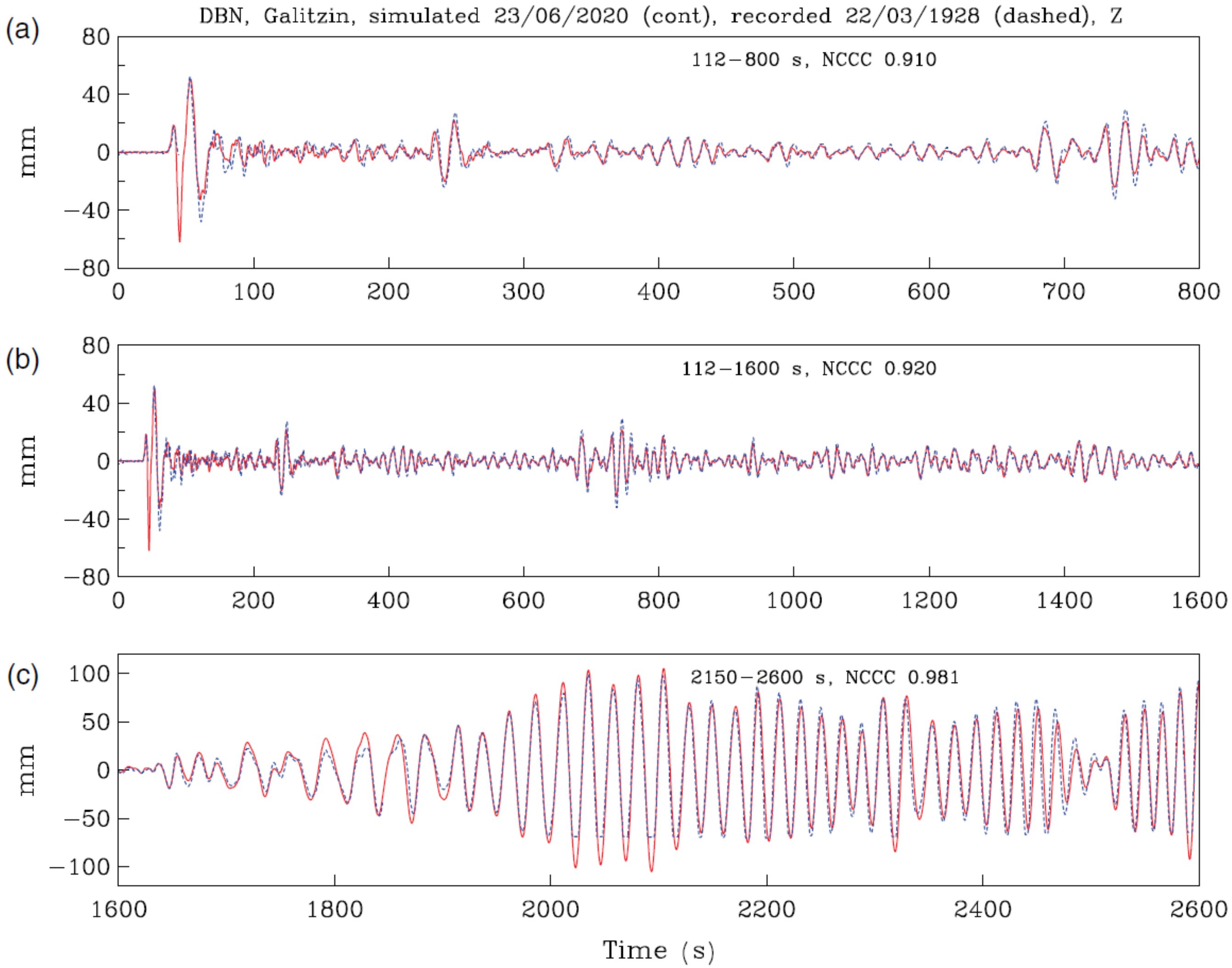
Bolnay earthquake; July 23, 1905; Mw 8.5





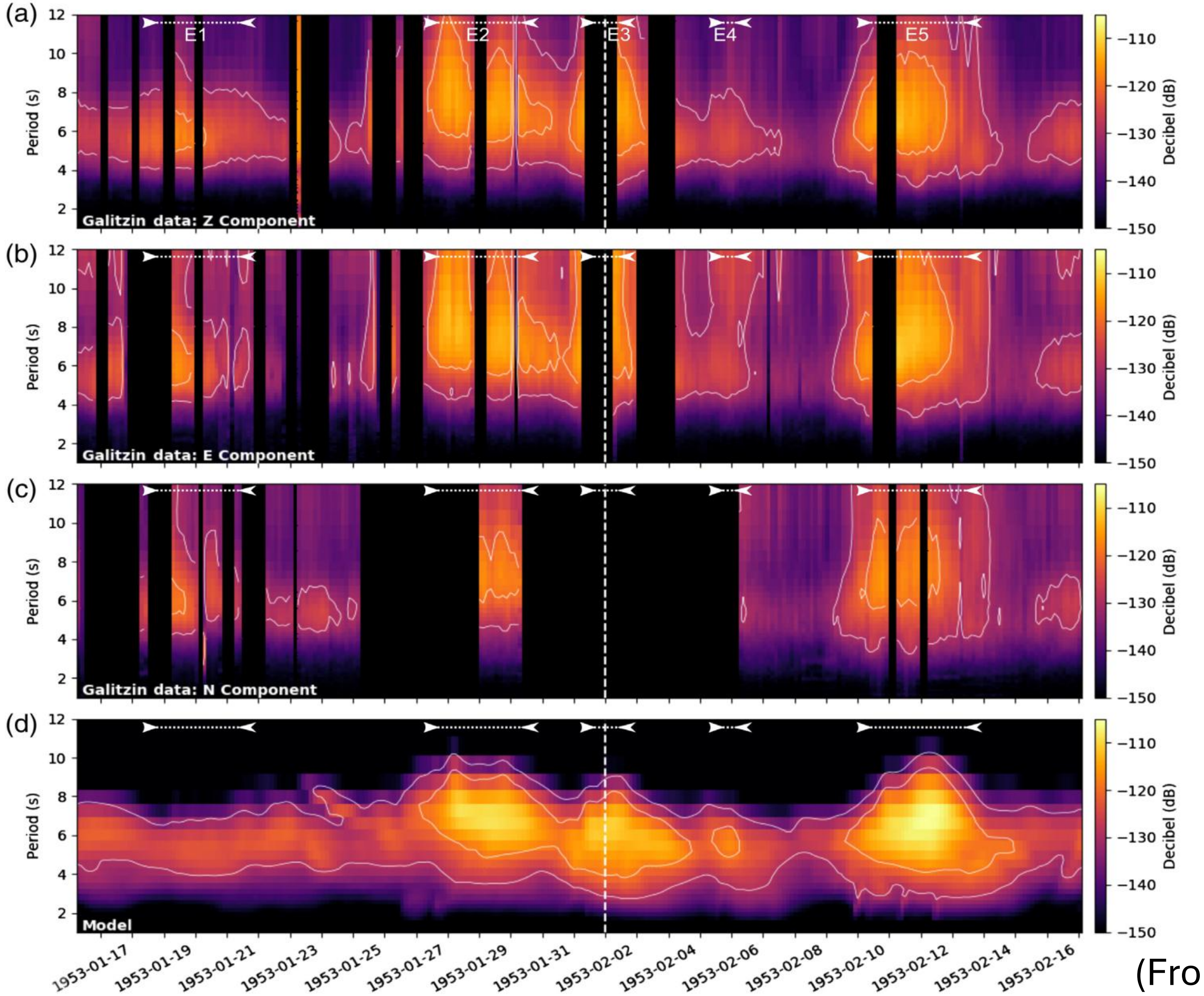
(From Schlupp &Cisternas, GJI, 2007)

Applications – Repeating events



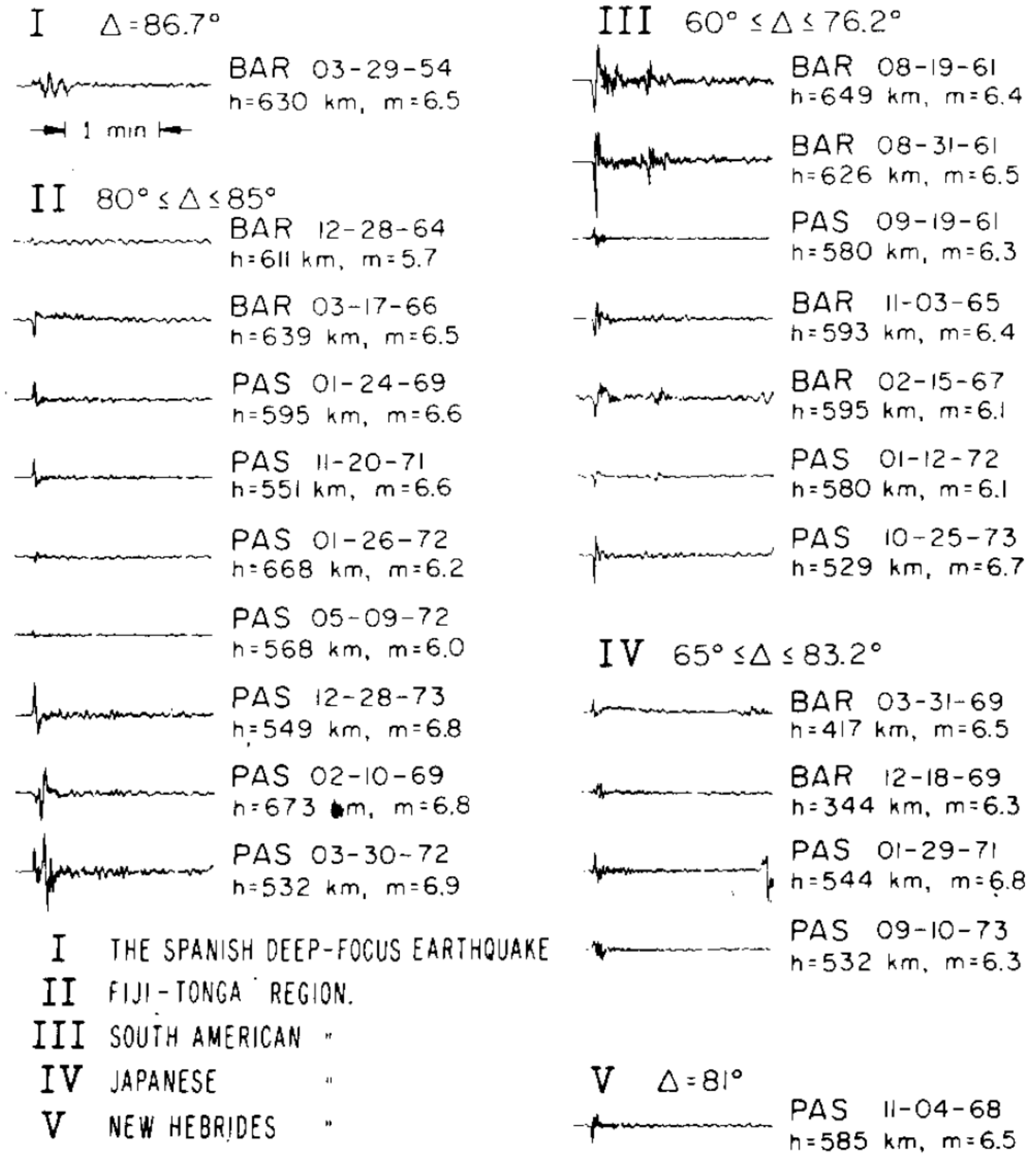
(From Singh et al., SRL, 2024)

Applications – Ocean Climate Models



(From Lecocq et al., SRL, 2020)

Applications - STF



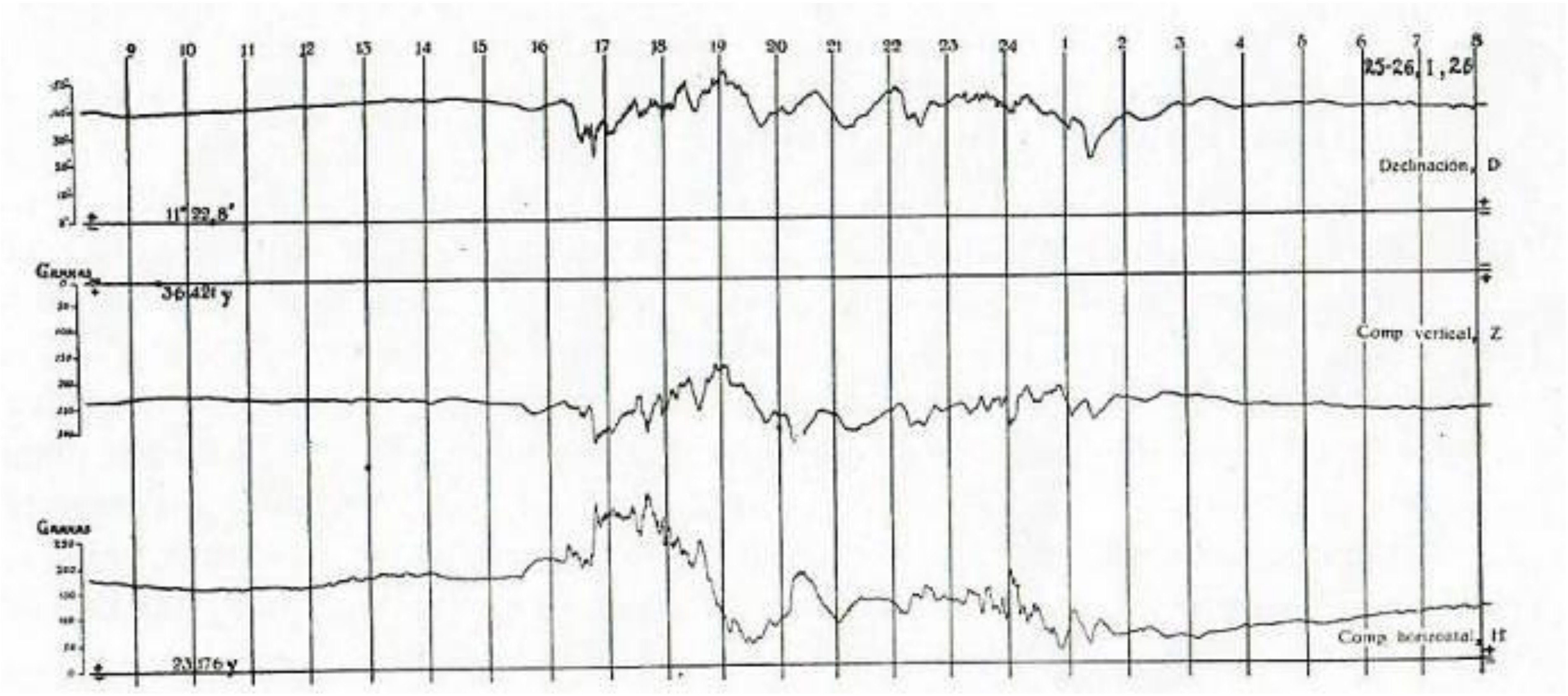
(Chung & Kanamori, PEPI, 1976)

Applications – Nuclear explosions

Applications – Volcano activity

Chichón Volcano, Mexico, March 28, 1982

(from https://www.volcanocafe.org/el-chichon/)


9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 1 2 3 4 5 6 7 8
25-26, I, 26
Declinacion, D
11°22,8'
Gammas
36421 γ
Comp. vertical, Z
Gammas
Comp. horizontal, H
23176 γ

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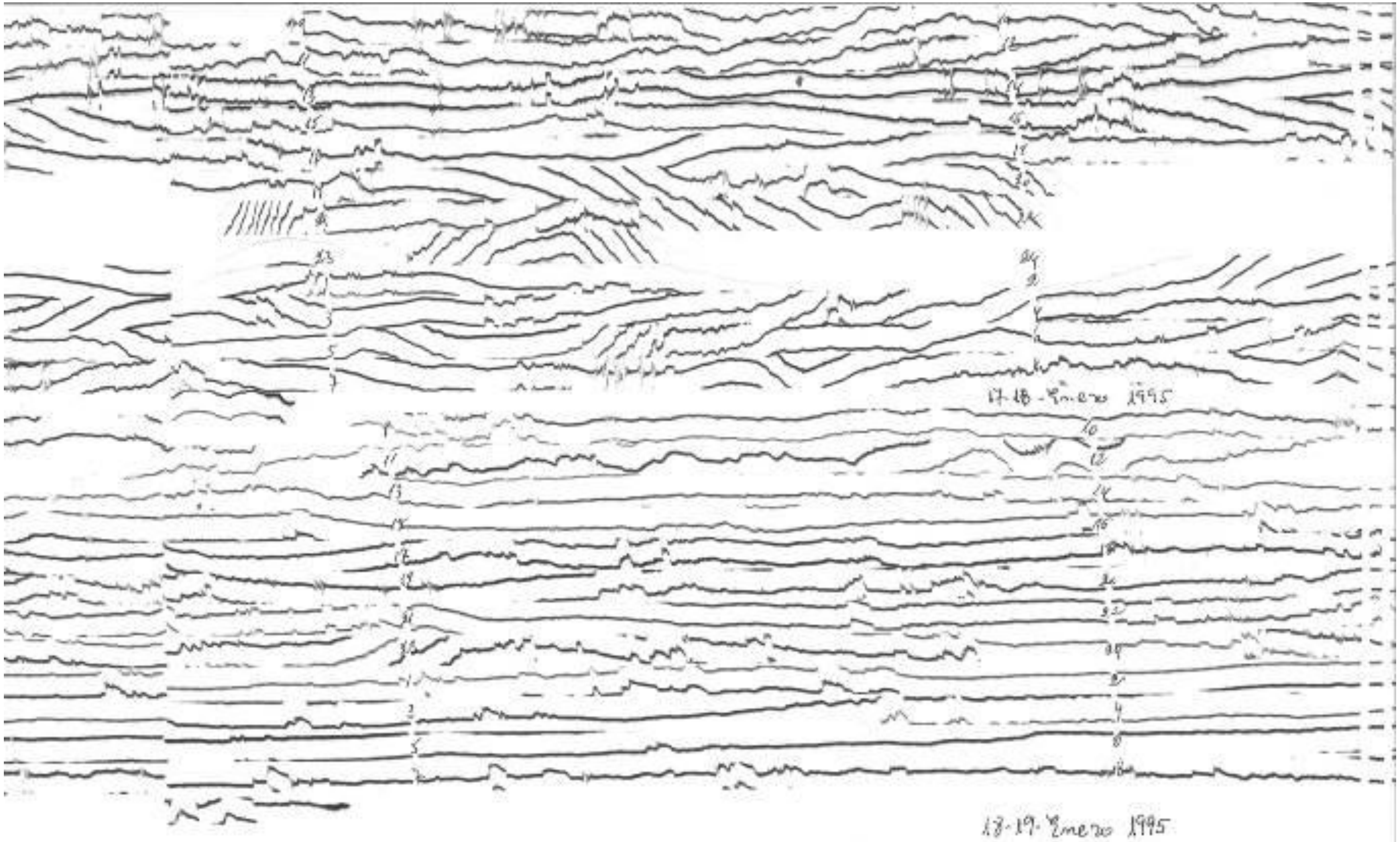
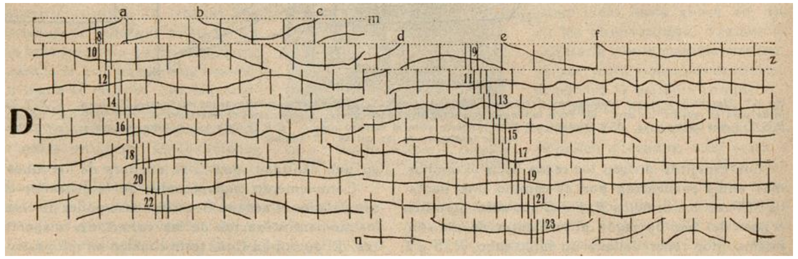
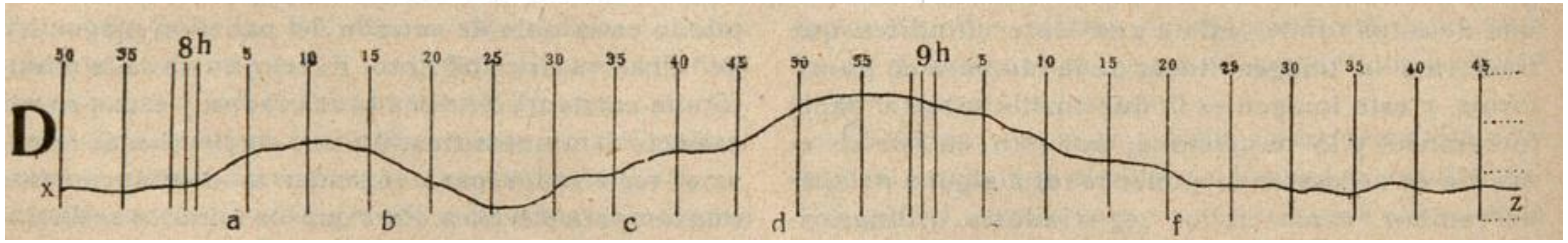
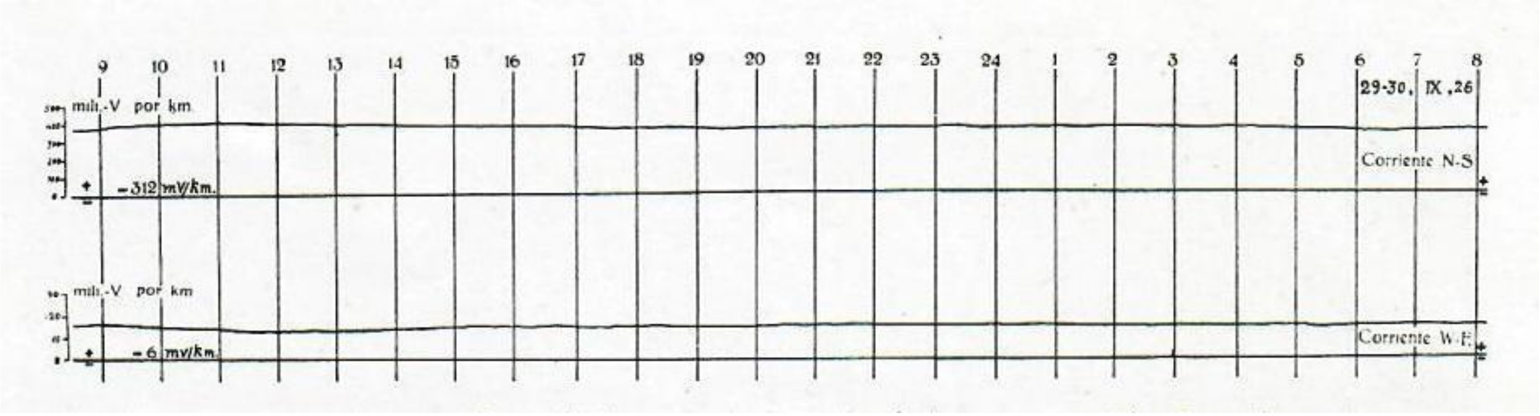
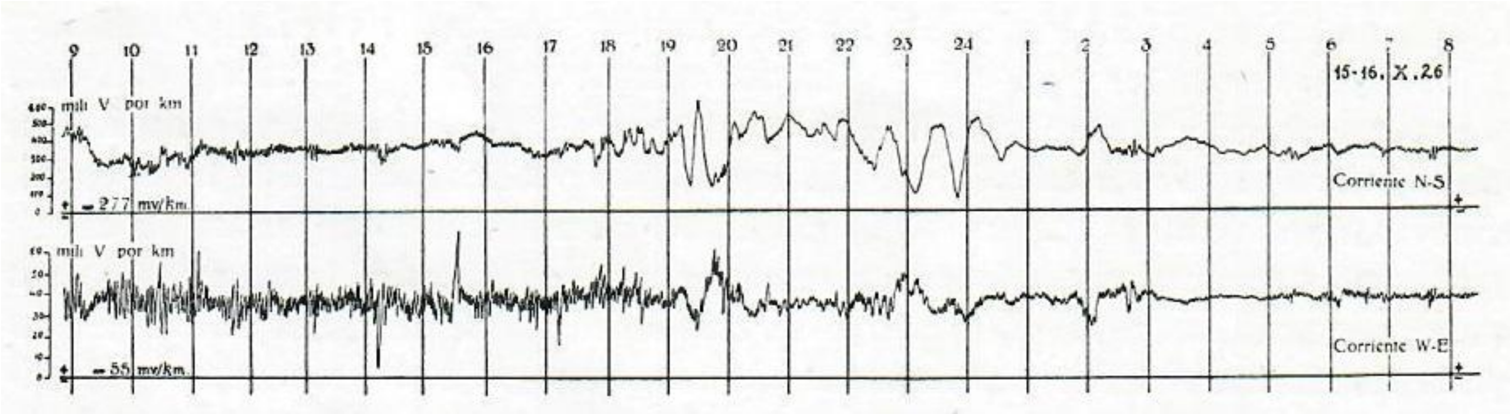






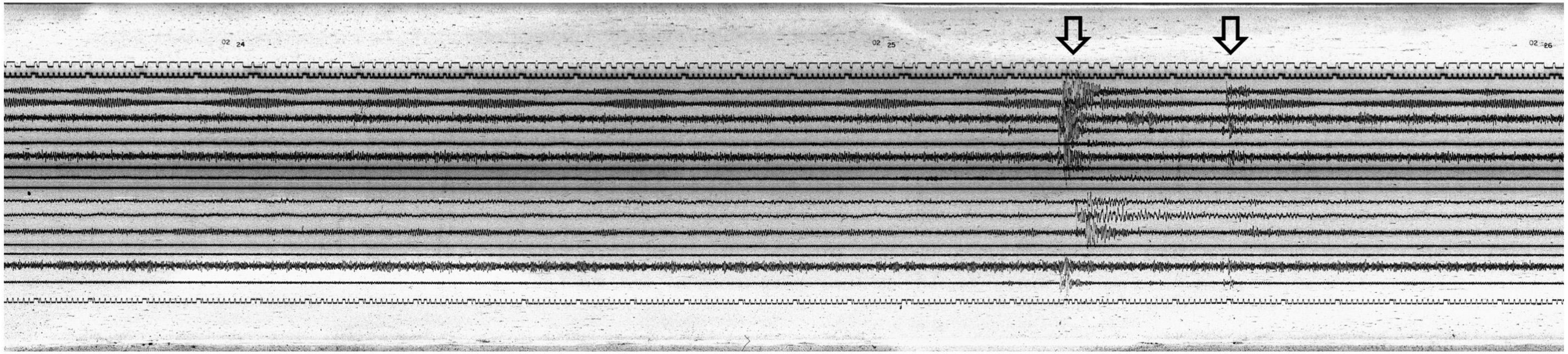


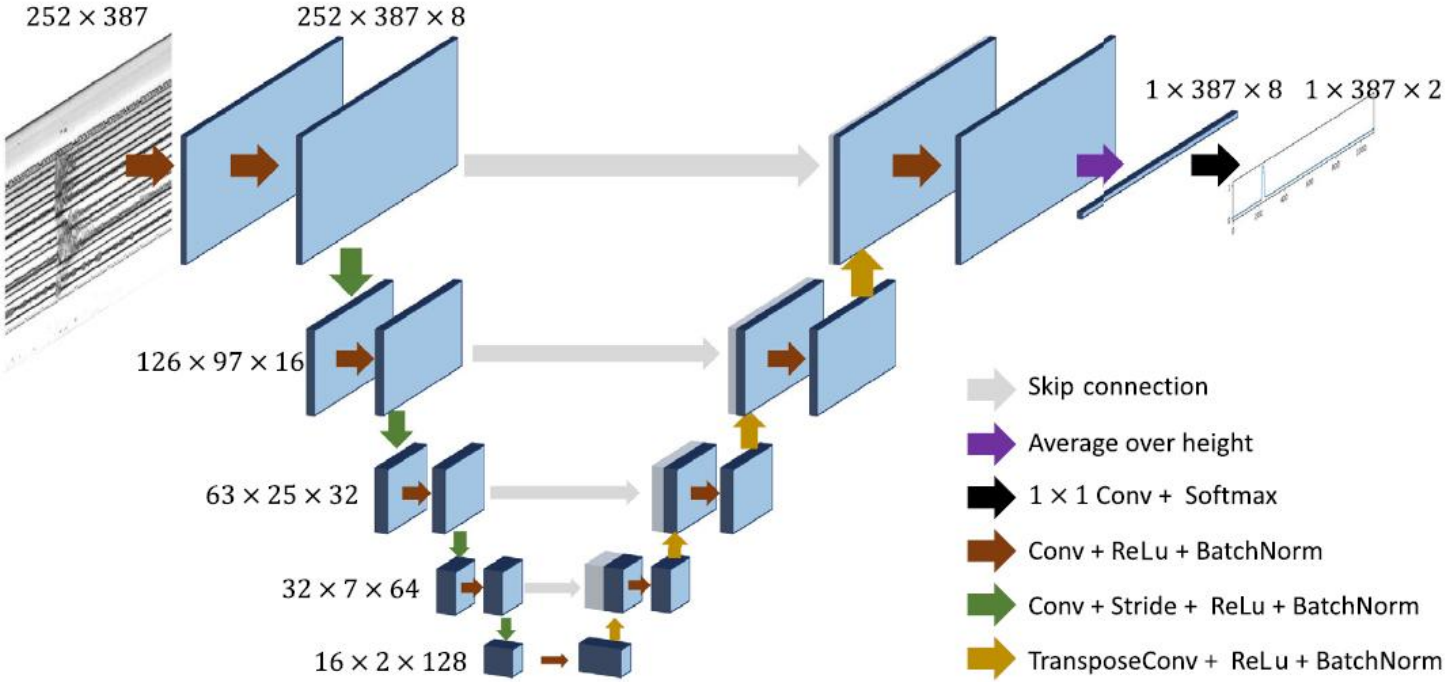


Telluric corrents. EBR (29-30 de setember 1926) (top) and (15-16 october 1926) (down).

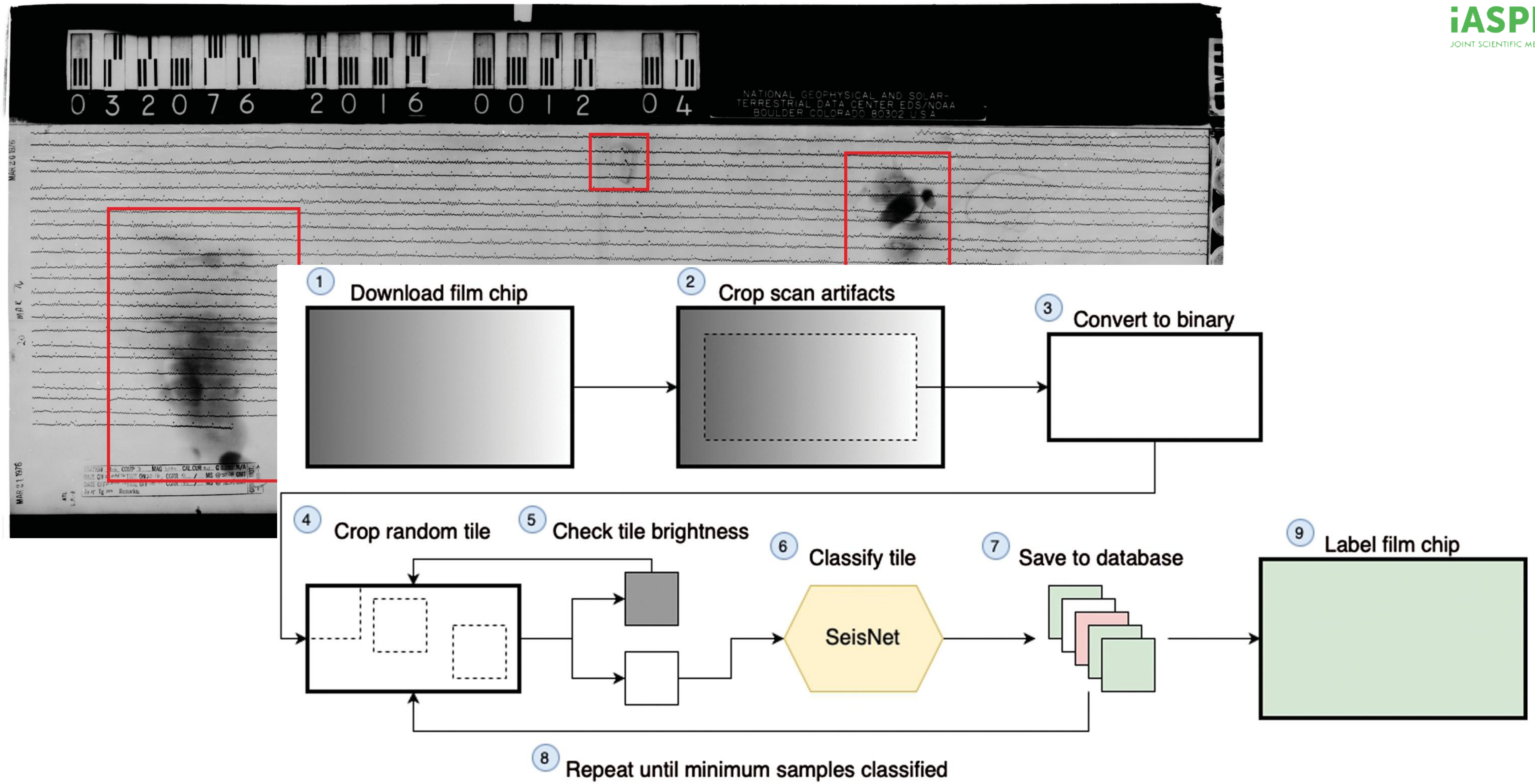
Magnetograms | British Geolog
British Geological Survey (BGS)
largeimages.bgs.ac.uk/iip/magnetograms.html?id=570000/577416
IGN
USGS
CSEM
ReNaSS
Terratrèmols
WebMacro
WebEvents
InfoSIS_web v2.0
Legacy
Legacy GitHub
ApolloServer
All Bookmarks
IIP
DECLINATION INCREASING DOWN
D. La Cour Magnetographs.
Time Marks

Neural Networks





(From Wang et al., SRL, 2022)

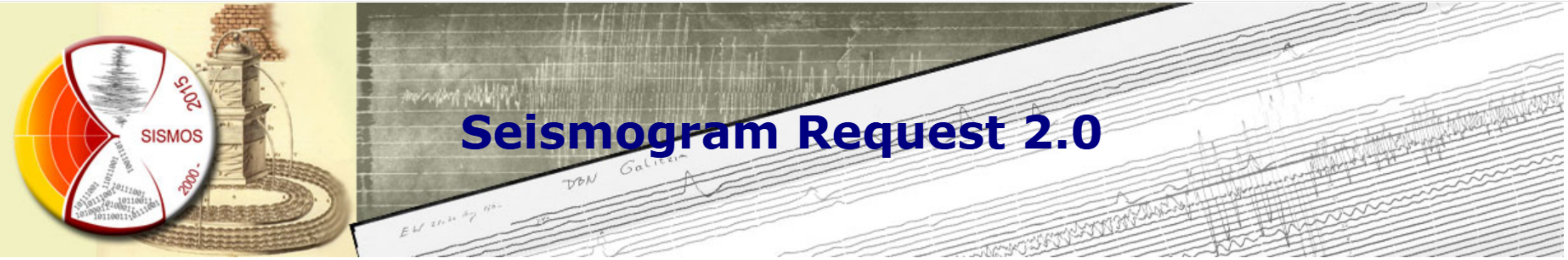


(From Nagle-McNaughton et al., SRL, 2022)

INGV - Sismos - Seismogram Re

Not secure seismogramrequest.rm.ingv.it

IGN USGS CSEM ReNaSS Terratrèmols WebMacro WebEvents InfoSIS_web v2.0 Legacy Legacy GitHub ApolloServer All Bookmarks



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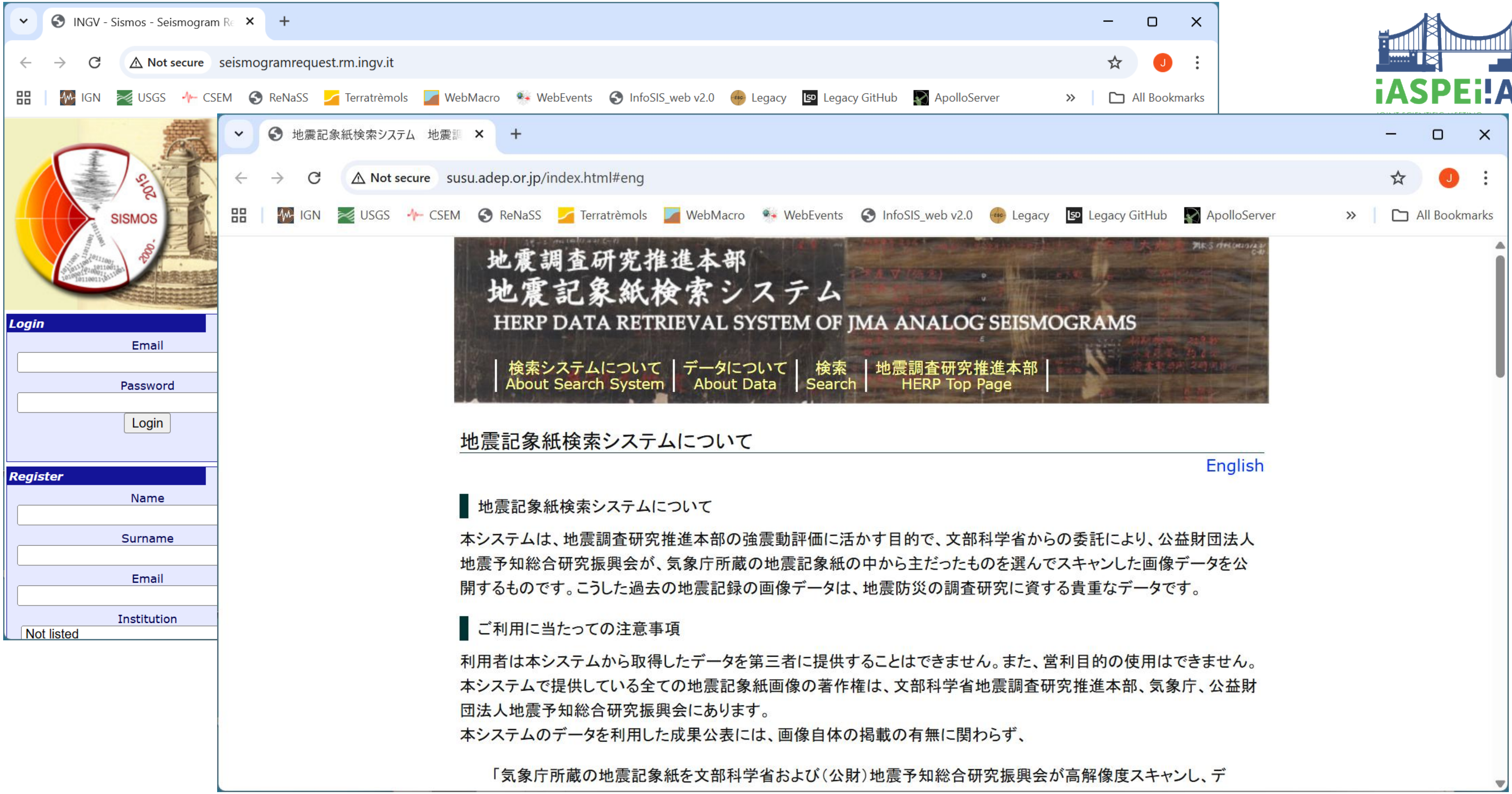
- free download for the Italian INGV seismic stations;
- subject to specific restrictions related to seismic stations not INGV Italian and foreign ones.

However, they can be freely downloaded more than 80% of the scans, in accordance with the recognition of the appropriate credits. More generally, the use of digital scans distributed under the Creative Commons Attribution 4.0 International License. Seismogram Request 2.0 is the culmination of a long and complex process of reorganization of the SISMOS database, also aims to promote greater integration between seismograms and documents that let you make better use for science.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USGS
CSEM
ReNaSS
Terratrèmols
WebMacro
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InfoSIS_web v2.0
Legacy
Legacy GitHub
ApolloServer
All Bookmarks
SISMOS
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Password
Login
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Name
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地震調査研究推進本部
地震記象紙検索システム
HERP DATA RETRIEVAL SYSTEM OF JMA ANALOG SEISMOGRAMS
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地震記象紙検索システムについて
本システムは、地震調査研究推進本部の強震動評価に活かす目的で、文部科学省からの委託により、公益財団法人地震予知総合研究振興会が、気象庁所蔵の地震記象紙の中から主だったものを選んでスキャンした画像データを公開するものです。こうした過去の地震記録の画像データは、地震防災の調査研究に資する貴重なデータです。
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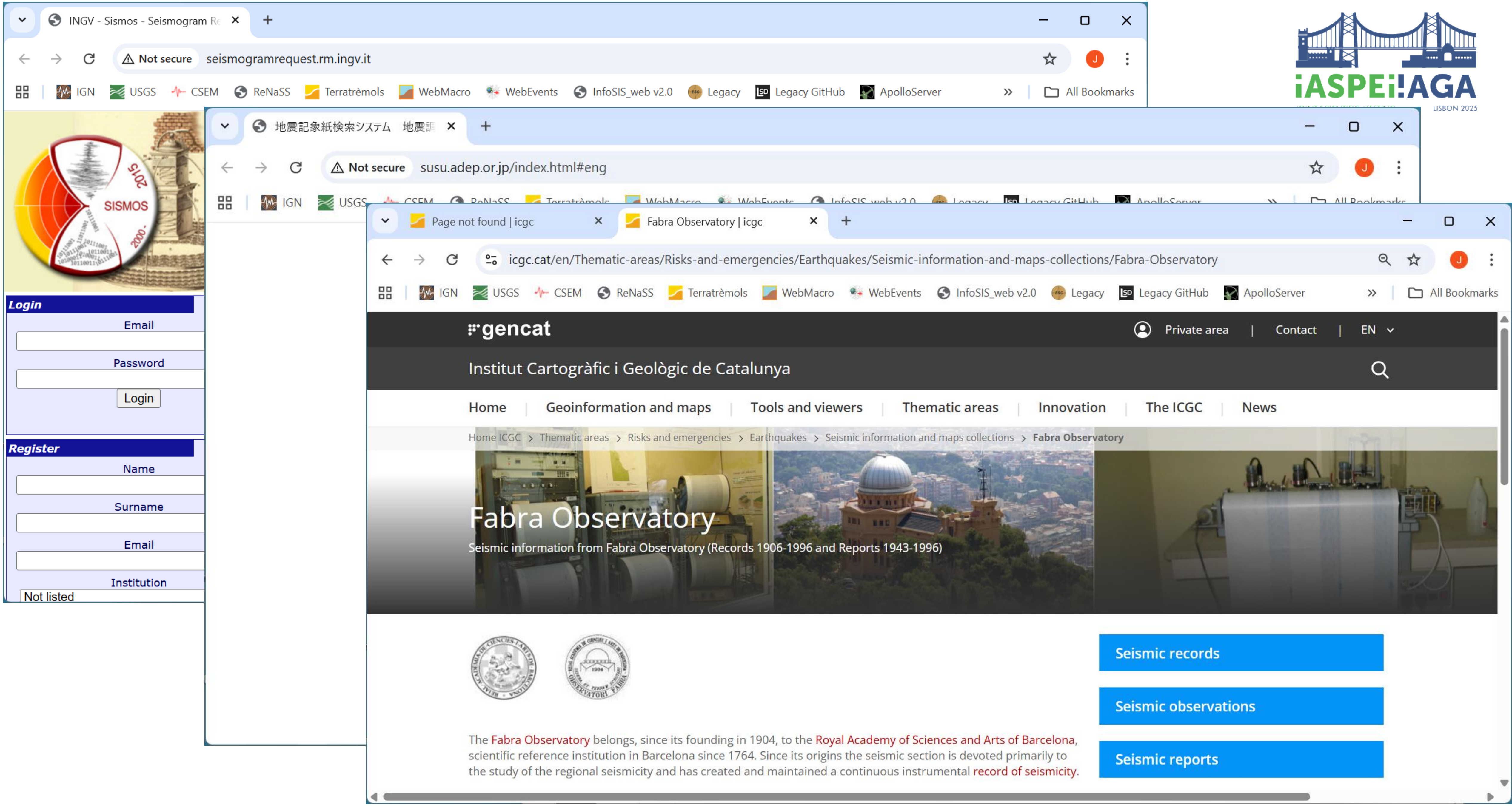


IASPEI IAGA
LISBON 2025

A manual for the use of old analog seismograms

- Present graduate student has never seen/use analog seismograms.
- "We" are the last generation of researchers/technicians that used regularly (and are acquainted with) analog seismograms.
- Documents/publications on the specific details for the proper management and understanding of the contents of analog seismograms have been published in old times and are not easy to identify/locate for young researchers.
- Each time a student goes into the topic has to receive "individual" training.
- A short manual, pointing to common topics when dealing with analog seismograms may facilitate the training of students and increase the use of such data.

The CoSOI recognized these facts (IUGG2023, Berlin) and decided to add a new chapter to the NMSOP on use of analog seismograms

New Project

Approved Project

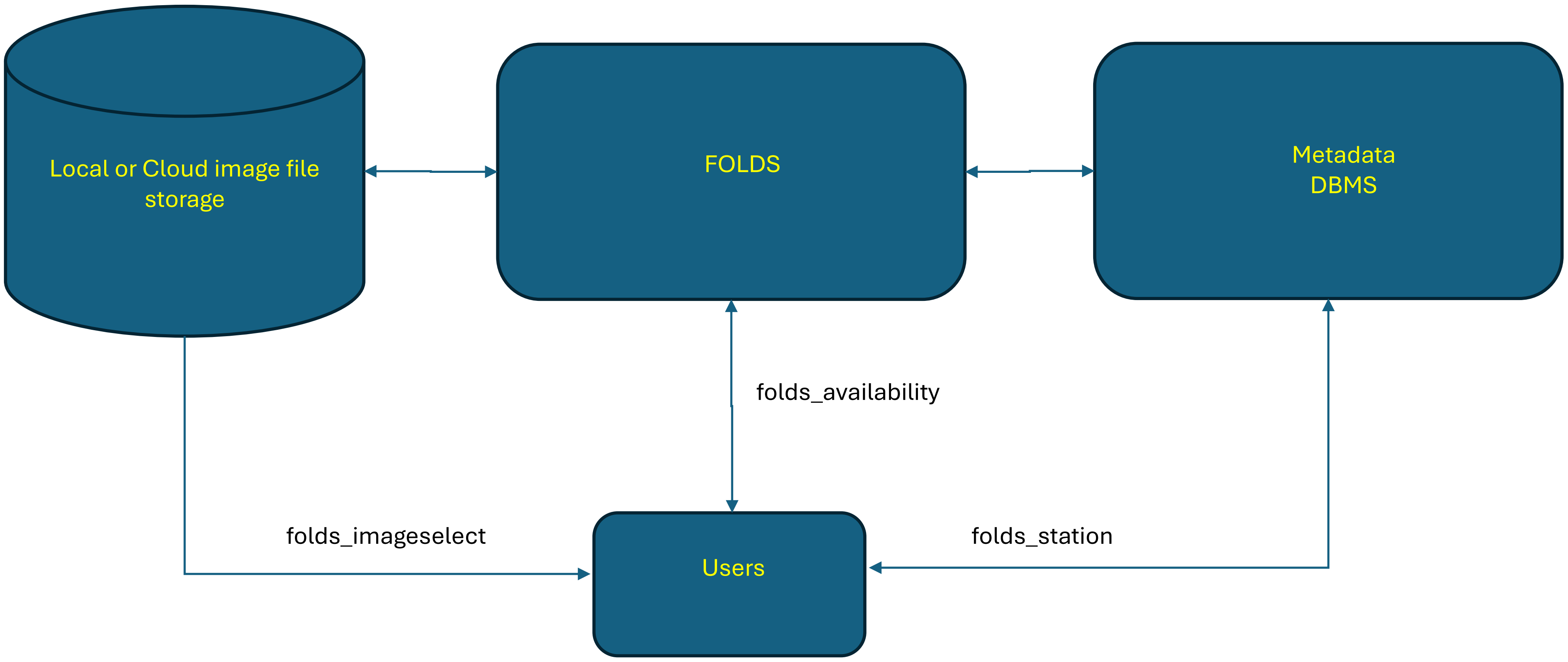
Federation of Online Legacy Data in Seismology

FOLDs

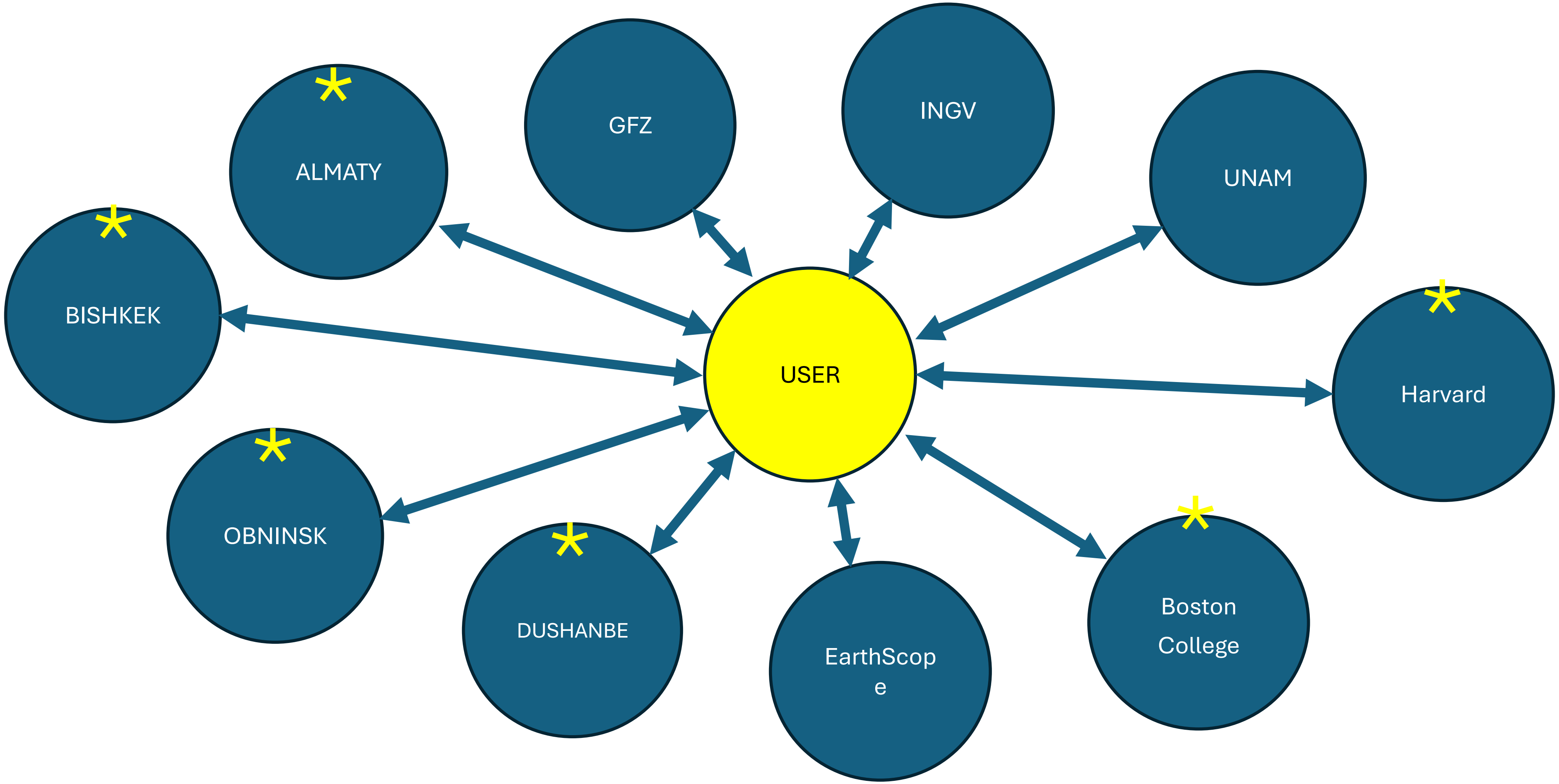
a system to acquire, manage, and distribute metadata & Digital versions of Legacy SEISMIC data

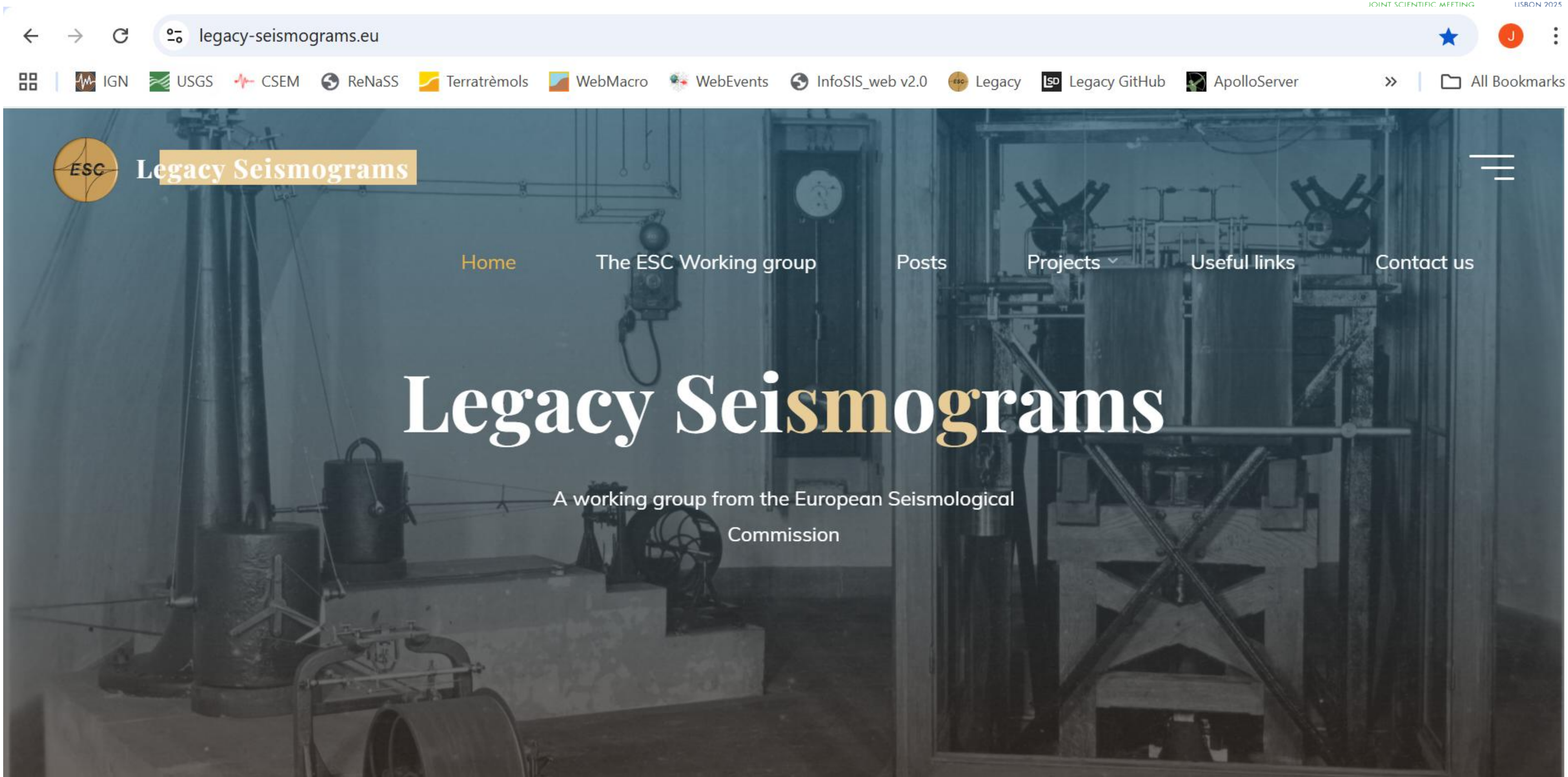
Tim Ahern, IRIS (now EarthScope) emeritus
Lorraine HWang, UC Davis (CIG)

FOLDS will be a federated and Distributed System



A Federated system for legacy data

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USGS
CSEM
ReNaSS
Terratrèmols
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Analog Seismograms in the Digital Era: Methods, Applications, and Perspectives

Participating journal: Journal of Seismology

Submissions open on
01 September 2025

Submission deadline
01 March 2026

This Special Issue aims to present interdisciplinary contributions focused on the study of pre-digital earthquakes through the analysis and re-evaluation of historical seismograms. The focus will be on the most recent, new and novel techniques for recovering, digitizing, calibrating, and interpreting analog seismic data, primarily recorded between the early 20th century and the advent of the modern digital era.

Through this issue, we promote a collective reflection on the scientific and cultural relevance of analog-era seismograms. Despite their age and technological limitations, these records often preserve high-quality waveform information that, when properly retrieved and analyzed, can still offer valuable insights into both historical and modern seismicity. The aim is to shed light on a distinctive and still largely underused scientific...

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