



CALIBRACION Y ASIGNACION DE ESCALA PARA GRAVIMETROS LACOSTE & ROMBERG

Denizar Blitzkow, Ezequiel Pallejá, Cristina Pacino,
Eduardo Lauría, Rubén Ramos



Instituciones participantes:

- Instituto Geográfico Militar de Argentina
- Facultad de Ingeniería de la U.B.A.
- Universidad de Sao Paulo (Brasil)

Fecha de realización:

25 de marzo al 07 de abril de 2003



Personal interviniente:

- Ppal. Jorge Hugo Agüero (IGM)
- Técnico Benjamín Roldán (IGM)
- Técnico Carla O' Maseira (USP)



Objetivo:

Determinación del Factor de Escala
de los gravímetros Lacoste & Romberg

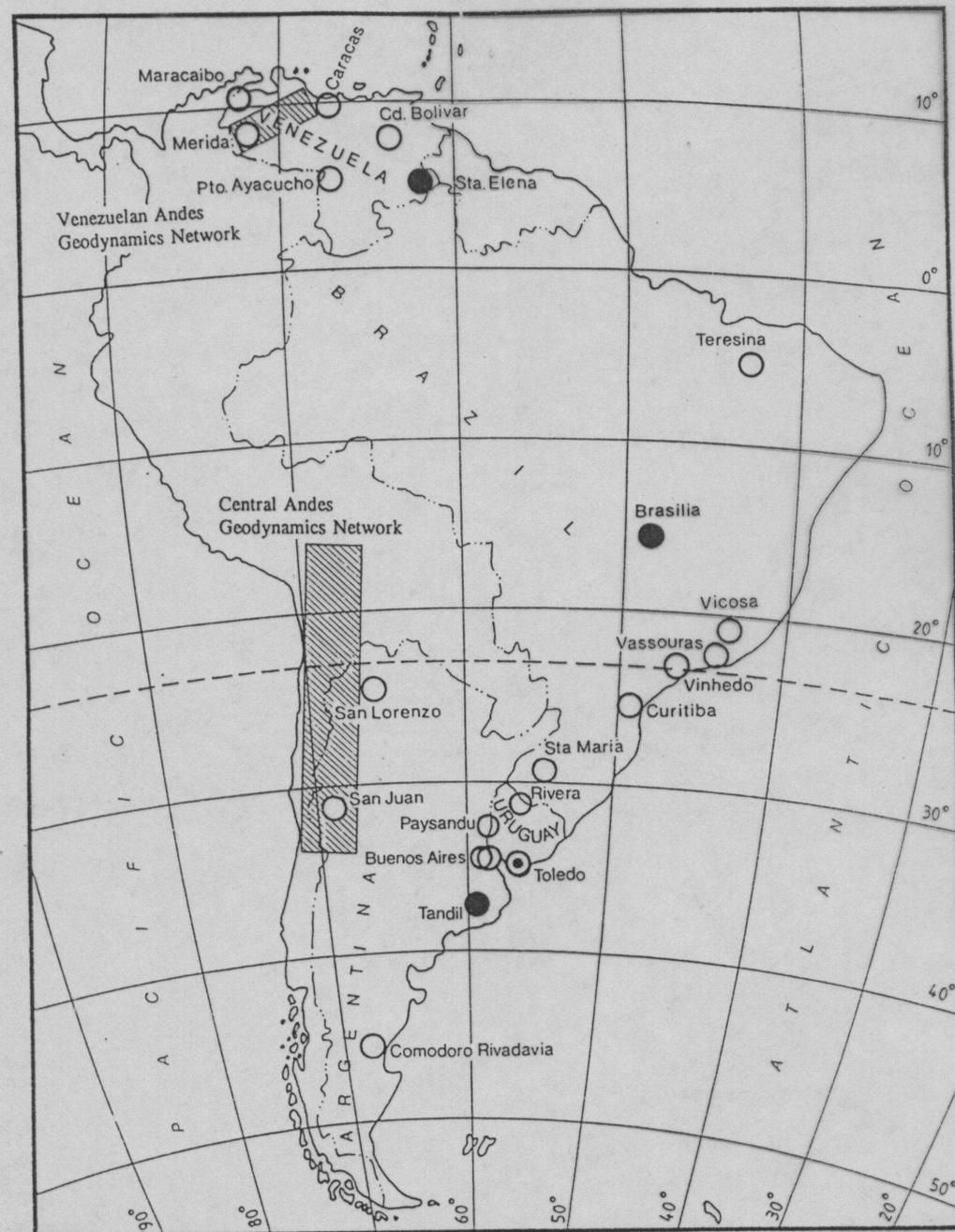


Medición:

Se efectuó sobre 5 puntos de la Red IFE
en Argentina.

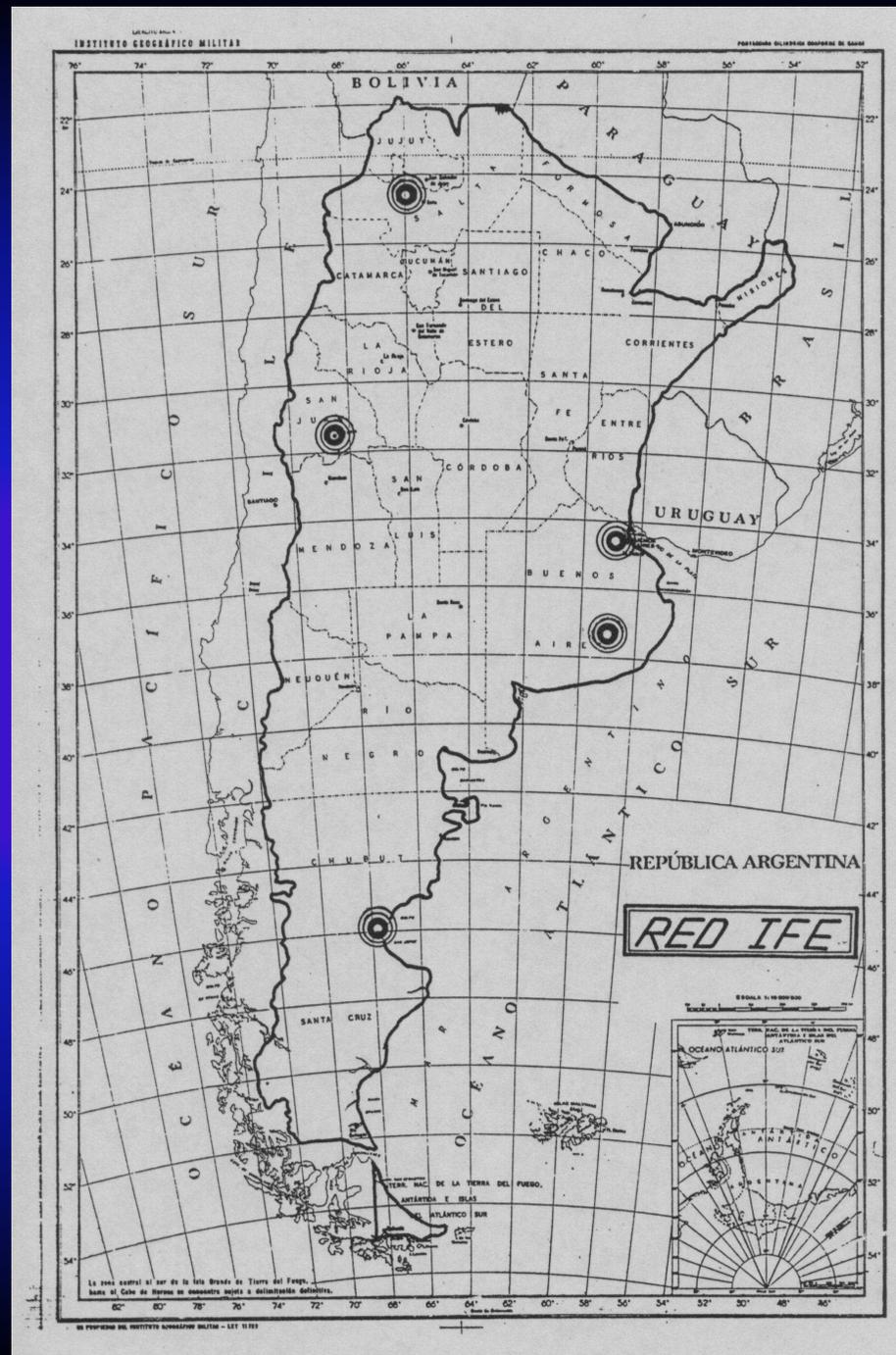


Red IFE Sudamericana





Red IFE Argentina





Estación Absoluta "San Lorenzo" (Salta)

Annex 4 (cont'd)

Absolute Gravity Station

Station Location: San Lorenzo

Country: Argentina

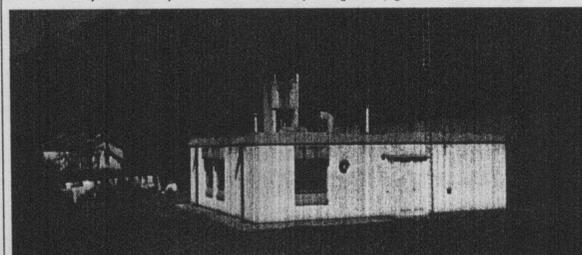
$\varphi = 24.73^\circ\text{S}$

$\lambda = 294.51^\circ\text{E}$

H= 1500 m

$g = 9.784\,094\text{ ms}^{-2}$

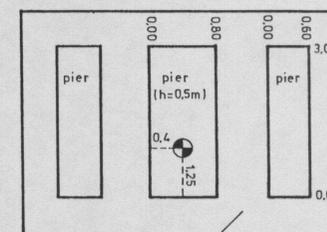
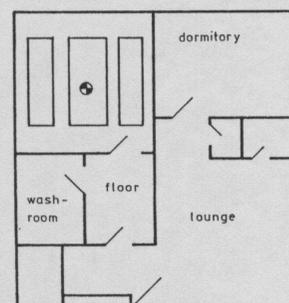
Overview / Access / Outside View / Topo Map



Remarks / Station Identity / Contact

The station is located in the *Instituto Nacional de Prevencion Sismica, San Lorenzo, Estacion SLA (Salta)*.

Detailed Sketch (North? Station Marker?) / Photograph



detail



Date / Author

December 1993, L. Timmen



Estación Absoluta "Zonda" (San Juan)

Annex 4 (cont'd)

Absolute Gravity Station

Station Location: Zonda / San Juan Country: Argentine
 $\varphi = 31.546^\circ\text{S}$ $\lambda = 68.679^\circ\text{W}$ H= 730 m $g = 9\,791\,416.5\ \mu\text{ms}^{-2}$

Overview / Access / Outside View / Topo Map

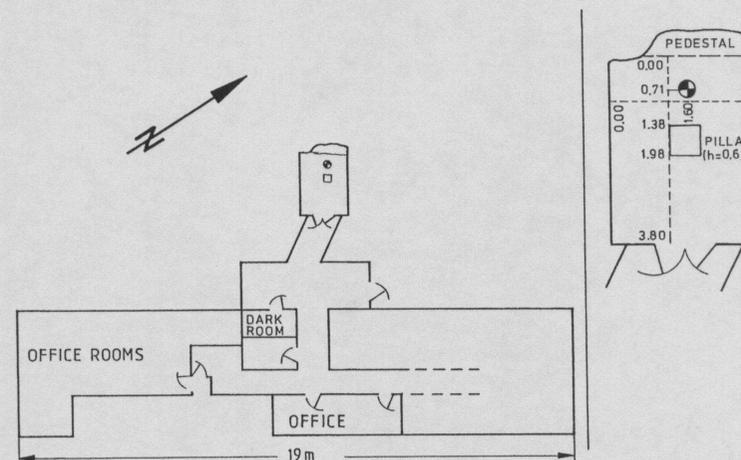


Remarks / Station Identity / Contact

The station is located in the west of San Juan, in the *Instituto Sismologico "Zonda", Universidad Nacional De San Juan*. The room is built in a hill (limestone). The absolute point is established closed to the pillar which serves for relative gravity measurements and earth tide registrations.

Contact: Ingeniero D. Fernando Volponi, Calle La Pampa 2269/71, Oeste (5400) San Juan, phone: 064/230626

Detailed Sketch (North? Station Marker?) / Photograph



Date / Author March 1992, L. Timmen

Institut für Erdmessung, Universität Hannover, Nienburger Str. 6, D-30167 Hannover, Germany



Estación Absoluta "Buenos Aires" (Prov. Bs As)

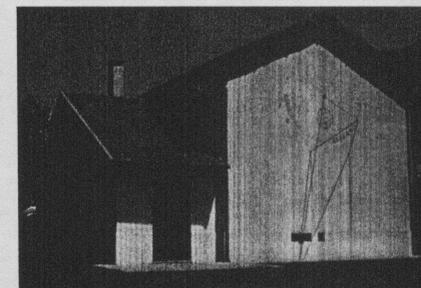
Annex 4 (cont'd)

Absolute Gravity Station

Station Location: Buenos Aires	Country: Argentina		
$\varphi = 34.57^\circ\text{S}$	$\lambda = 301.48^\circ\text{E}$	$H = 8\text{ m}$	$g = 9.796\ 901\ \text{ms}^{-2}$

Overview / Access / Outside View / Topo Map

entrance to the station established in 1991:
 $\phi = 34.57^\circ\text{S}$, $\lambda = 301.48^\circ\text{E}$, $H = 13\text{ m}$,
 $g = 9.796\ 891\ \text{ms}^{-2}$

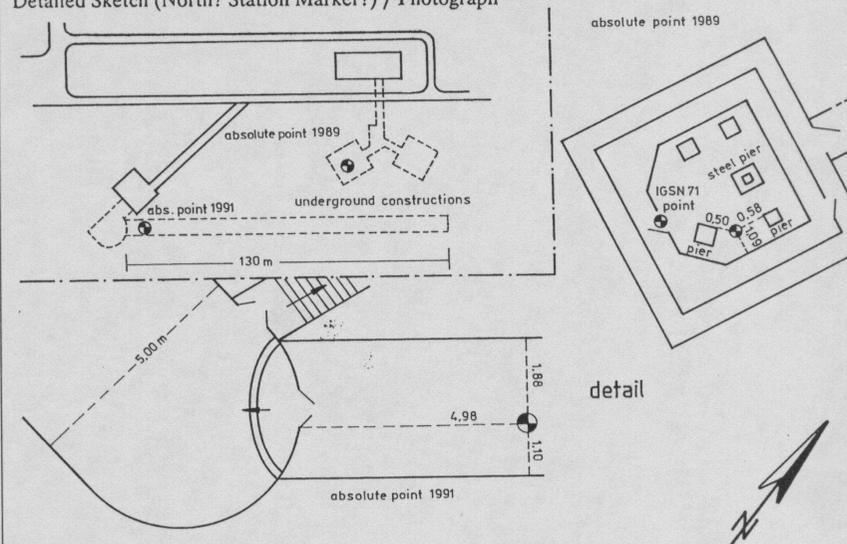


Remarks / Station Identity / Contact

The two absolute gravity points are located in buildings of the *Instituto Geografico Militar* in Migueletes, Buenos Aires. The absolute point 1989 is situated in the "Sotano de Gravedad", more than 8 m below surface level. Due to severe ground water problems a new absolute point was established in 1991. The distance between the stations is about 200 m.

Contact: Carlos Augustos Kurtz, Servicio Internacional de la Hora, Calle 38 (Gral. Savio) No. 865, C.P.1650 Villa Meipú, San Martín. Pcia. de Buenos Aires.

Detailed Sketch (North? Station Marker?) / Photograph



Institut für Erdmessung, Universität Hannover, Nienburger Str. 6, D-30167 Hannover, Germany

Date / Author

December 1993, L. Timmen



Estación Absoluta

“Tandil”

(Prov. Bs As)

Annex 4 (cont'd)

International Absolute Gravity Basestation Network (IAGBN)

Station Location:	Tandil	Country:	Argentina
$\varphi =$	37.40°S	$\lambda =$	59.23°W
H =	180 m	g =	979 904 345 μgals

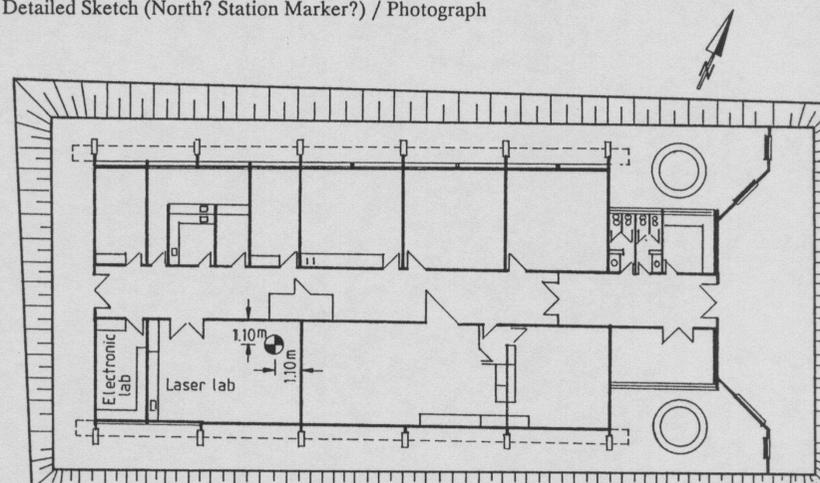
Overview / Access / Outside View / Topo Map



Remarks / Station Identity / Contact

Station is in the laser laboratory of Universidad Nacional del Centro de la Provincia de Buenos Aires, Fisica Experimental, Tandil (building No. 13).

Detailed Sketch (North? Station Marker?) / Photograph



Date / Author July 1989

Rüdiger Röder



Estación Absoluta

“Comodoro Rivadavia”

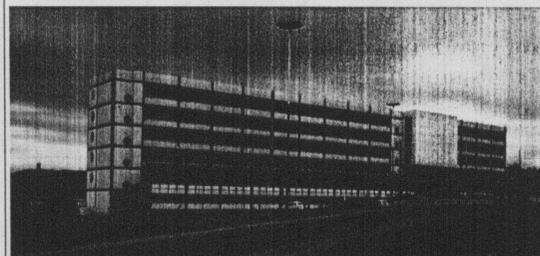
(Prov. Chubut)

Annex 4 (cont'd)

Absolute Gravity Station

Station Location: Comodoro Rivadavia Country: Argentina
 $\varphi = 45.82^\circ\text{S}$ $\lambda = 292.54^\circ\text{E}$ $H = 10\text{ m}$ $g = 9.806\ 638\ \text{ms}^{-2}$

Overview / Access / Outside View / Topo Map

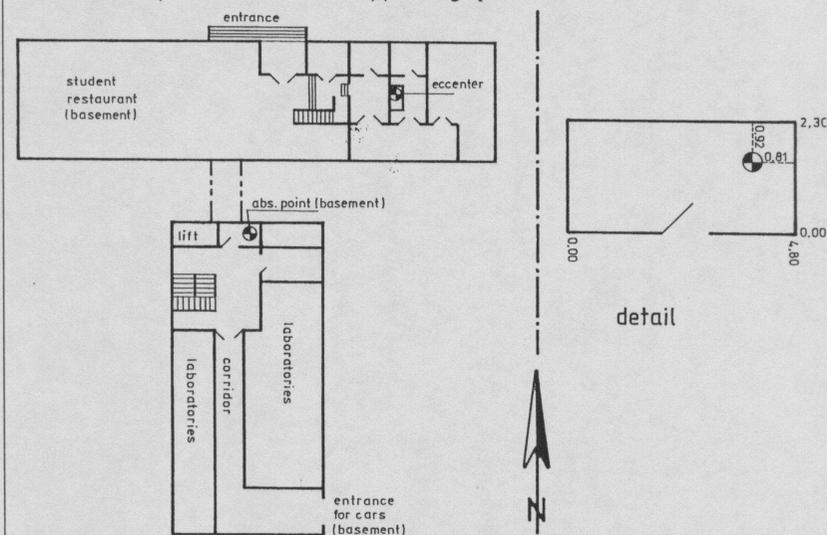


Remarks / Station Identity / Contact

The station is located in the south wing of the *Universidad Nacional de la Patagonia "San Juan Bosco"*. The room belongs to the *Facultad de Ciencias Naturales*. The distance to the coast-line is about 300 m.

Contact: Geol. Mario Griznik, Dpto. Geologia, Univ. Nac. Patagonia, 9000-Comodoro Rivadavia, Argentina.

Detailed Sketch (North? Station Marker?) / Photograph



Date / Author

December 1993, L. Timmen

Institut für Erdmessung, Universität Hannover, Nienburger Str. 6, D-30167 Hannover, Germany



Valores de gravedad de los puntos IFE en Argentina

San Lorenzo (Salta)	----->	978409,410 mgal +/- 0,028 mgal
Zonda (San Juan)	----->	979141,649 mgal +/- 0,008 mgal
Buenos Aires (Prov Bs As)	---->	979688,610 mgal +/- 0,06 mgal
Tandil (Prov Bs As)	----->	979904,360 mgal +/- 0,034 mgal
Comodoro Rivadavia (Chubut)	-->	980663,757 mgal +/- 0,035 mgal

Δg Comodoro Rivadavia - San Lorenzo \approx 2200 mgal

Longitud de la base \approx 3300 km

Sistema de Referencia Gravimétrico: IGSN71



Gravímetros
Lacoste & Romberg
Modelo G

Nros:

G043, G194, G143

INSTRUMENTAL UTILIZADO





MEDICION

Tipo de medición: relativa

Método de medición : "ida y vuelta" dentro de las 48 hs

Registro : 3 lecturas en cada punto

Discrepancias entre lecturas : inferior a 0,01 mgal

"Luego de los registros, todos los operadores efectuaban una lectura en cada uno de los gravímetros, a los efectos de aseverar la correcta observación librándola de cualquier vicio de medición o error grosero"



BASES MEDIDAS

- Buenos Aires - Tandil \approx 300 km
- Buenos Aires - San Juan \approx 1000 km
- San Juan - Salta \approx 800 km
- Tandil - Comodoro Rivadavia \approx 1200 km



RESULTADO DE LAS MEDICIONES

Gravímetro G194

GRAVIMETRO 194 (UNIVERSIDAD DE BUENOS AIRES)

BASE	Δg "de base " (mgal)	Δg "medido " (mgal)	DIFERENCIA $\Delta g_m - \Delta g_b$	FACTOR DE ESCALA $\Delta g_b / \Delta g_m$
Buenos Aires - Tandil	215,750	215,710	- 0,040	1,00018543
Buenos Aires - San Juan	546,961	546,680	- 0,281	1,00051401
San Juan - Salta	732,239	732,545	+ 0,306	0,99958228
Tandil - Comodoro Riv.	759.397	759,340	- 0,057	1,00007507

Factor de Escala Gravímetro 194: 1,00008920



RESULTADO DE LAS MEDICIONES

Gravímetro G143

GRAVIMETRO 143 (UNIVERSIDAD DE SAO PAULO)

BASE	Δg "de base " (mgal)	Δg "medido " (mgal)	DIFERENCIA $\Delta g_m - \Delta g_b$	FACTOR DE ESCALA $\Delta g_b / \Delta g_m$
Buenos Aires - Tandil	215,750	215,725	- 0,025	1,00011589
Buenos Aires - San Juan	546,961	546,730	- 0,231	1,00042251
San Juan - Salta	732,239	732,010	- 0,229	1,00031284
Tandil - Comodoro Riv.	759.397	759,040	- 0,357	1,00047033

Factor de Escala Gravímetro 143: 1,00033039



RESULTADO DE LAS MEDICIONES

Gravímetro G043

GRAVIMETRO 043 (IGM)

BASE	Δg "de base " (mgal)	Δg "medido " (mgal)	DIFERENCIA $\Delta g_m - \Delta g_b$	FACTOR DE ESCALA $\Delta g_b / \Delta g_m$
Buenos Aires - Tandil	215,750	216,170	+ 0,420	0,99805708
Buenos Aires - San Juan	546,961	547,695	+ 0,734	0,99865984
San Juan - Salta	732,239	733,395	+ 1,156	0,99842377
Tandil - Comodoro Riv.	759.397	760,505	+1,108	0,99854307

Factor de Escala Gravímetro 043: 0,99842094



RECOMENDACIONES

Determinar Factores de Escala zonales en gravímetros estáticos para aumentar el grado de precisión en la determinación de los Δg .

Calibrar el instrumento en forma periódica, recorriendo bases largas como la utilizada en el presente trabajo.