

**THE SOUTH PACIFIC SEA LEVEL & CLIMATE  
MONITORING PROJECT  
(PHASE III)**

Survey Report

Precise Differential  
Levelling

**Kiribati**

June 2004

This report was prepared by:

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**Australian Government**  
**Bureau of Meteorology**

**Quality Certification:**

I authorise the issue of this document in accordance with the Quality Assurance procedures of the National Tidal Centre, Australian Bureau of Meteorology.

William Mitchell  
Manager - National Tidal Centre  
Australian Bureau of Meteorology

November 2004

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# South Pacific Sea Level and Climate Monitoring Project

## Precise Differential Levelling Survey

# KIRIBATI

June 2004

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The ninth precise differential levelling survey of the three deep bench marks, the SEAFRAME Station and associated survey marks in Betio, Tarawa, Kiribati has been successfully completed by Mr. Steven Turner and Mr. Andrick Lal.

Second precise levelling connections were made to three new deep bench marks established during the June 2002 visit and to the Continuous Global Positioning System (CGPS) pillar.

### Survey of Deep Bench Mark Array and SEAFRAME Station

Precise Differential Levelling was undertaken between the three deep bench marks, KIR 1, KIR 2, KIR 3 and the SEAFRAME station. All the levelling was a repeat of the levelling carried out on eight previous occasions since December 1992.

All the bench marks were found undisturbed. Precise level connections were made to the project plaque (KIR 12) and the SEAFRAME Sensor Bench Mark (KIR 13). Three of the holding marks levelled during the 2002 survey were not found. Stainless steel bolts drilled and glued into concrete have replaced these marks.

Three of the four bench marks, KIR 46, KIR 47 and KIR 49, placed during the 2002 survey to densify the existing array and provide additional redundancy were found. Unfortunately KIR 48 has been destroyed and will not be replaced.

As in previous surveys, connections were made to the bench marks placed by the University of Hawaii.

## Results of the Bench Mark Array Survey

All the data have now been reduced and copies of the results and adjustment have been forwarded to the Chief Surveyor, Lands and Survey Division, Ministry of Home Affairs and Rural Development.

As in previous surveys, KIR 1 has been held fixed at a reduced level (RL) of 3.5334m. This value was derived in the 1992 survey from bench mark UT 8 and has been used in all subsequent surveys. The datum for this RL is Tide Gauge Zero (University of Hawaii).

Comparisons between the sets of reduced levels (RL's) determined in the eight previous adjustments and the 2004 RL's are satisfactory. There is good agreement between the RL's of the three deep bench marks KIR 1, KIR 2 and KIR 3 which have a long time series of data.

During this survey an internal precision of considerably less than  $1.0\text{mm}\sqrt{K}$  was achieved between all of the deep bench marks and the SEAFRAME Sensor BM.

In previous reports concern has been expressed over the apparent movement of Project Plaque, KIR 12, and the SEAFRAME Sensor BM, KIR 13. It is encouraging to note that there appears to have been little relative movement of these two marks between the last four surveys.



Levelling KIR 2

Since the first survey in 1992, KIR 12 has moved 1.38mm relative to KIR 1 while KIR 13 has moved 2.19mm. Despite indications that marks are now relatively stable, this movement is still outside the  $2.0\text{mm}\sqrt{K}$  specification for the Project. Therefore a close watch is still needed on these two marks.

The comparisons of the coastal array bench marks are as follows:

<u>Mark Number</u>	<u>1992RL (m)</u>	<u>1994RL (m)</u>	<u>1995RL (m)</u>	<u>1996RL (m)</u>	<u>1997RL (m)</u>	<u>1999RL (m)</u>	<u>2000RL (m)</u>	<u>2002RL (m)</u>	<u>2004RL (m)</u>
KIR 1	3.5334	3.5334	3.5334	3.5334	3.5334	3.5334	3.5334	3.5334	3.5334
KIR 2	3.1835	3.1838	3.1845	3.1843	3.1843	3.1844	3.1847	3.1843	3.1843
KIR 3	3.5657	3.5655	3.5654	3.5654	3.5657	3.5644	3.5658	3.5648	3.5653
KIR 12	4.2176	4.2187	4.2195	4.2191	4.2196	4.2195	4.2195	4.2191	4.2190
KIR 13	4.6302	4.6319	4.6331	4.6321	4.6325	4.6324	4.6321	4.6321	4.6324

<u>Mark Number</u>	<u>04-02 (mm)</u>	<u>04-92 (mm)</u>
KIR 1	FIXED	FIXED
KIR 2	0.00	+0.72
KIR 3	+0.59	-0.39
KIR 12	-0.07	+1.38
KIR 13	+0.22	+2.19

Several of the holding pins continue to show substantial movement.

### Survey Support

Once again the Meteorological Office provided valuable assistance to the survey by offering to store the survey equipment overnight at the end of every day's field work.

Due to other work commitments staff from the Lands and Survey Division, Ministry of Home Affairs and Decentralization were unable to participate in this survey.



Levelling along road to the CGPS installation at the Meteorological Office.

# KIRIBATI

## **BEITO, TARAWA**

- **KIR 1** is the adopted reference point for the coastal array.  
RL = 3.5334 metres TGZ (University of Hawaii)
- The height of **KIR 1** was derived by adopting the TGZ height of **UT 8** (benchmark – now destroyed) for the 1992 survey.  
RL = 4.027 metres TGZ
- Point **UT 6** is a survey mark connected to the survey with no known height.
- Points **KIR 1, KIR 2, KIR 3, KIR 46, KIR 47 & KIR 49** are Deep Bench Marks.
- **KIR 13** is the SEAFRAME Sensor Bench Mark.
- **KIR 12** is the Project Plaque.
- Points **BM 1, BM 2 & BM 5** are Bench Marks placed by the University of Hawaii.
- New point placed in the 2004 survey:

**KIR 50 – KIR 52 (Stainless Steel Bolts)**

# KIRIBATI

## BETIO, TARAWA

### 2004 REDUCED LEVELS

INSTRUMENT: Wild NA3003 S/N 92987      DATUM: Tide Gauge Zero  
DATE: 29<sup>th</sup> May – 02<sup>nd</sup> June 2004      PAGES: 3326 - 3354

POINT #	2004 DIFF.	2004 RL	
KIR 1		<b>3.5334000</b>	<b>Adopted Height</b>
KIR 50	+0.4026050	3.9360050	
KIR 40	-0.3244525	3.6115525	
KIR 7	-0.1145525	3.4970000	
KIR 40		3.6115525	
KIR 39	+0.4663575	4.0779100	
KIR 19	+0.0003650	4.0782750	
KIR 39		4.0779100	
KIR 29	-0.3545575	3.7233525	
KIR 49	+0.2991025	4.0224550	
BM 5	+0.1404025	4.1628575	
KIR 38	+0.2281975	4.2506525	
KIR 30	-0.2479975	4.0026550	
KIR 38		4.2506525	
KIR 12	-0.0316350	4.2190175	
KIR 13	+0.4133375	4.6323550	
KIR 38		4.2506525	
BM 1	-1.0747900	3.1758625	
KIR 38		4.2506525	
BM 2	-0.1815625	4.0690900	

POINT #	2004 DIFF (cont.)	2004 RL (cont.)
KIR 50		3.9360050
<b>KIR 46</b>	-0.5572125	<b>3.3787925</b>
KIR 42	+0.3998300	3.7786225
KIR 26	-0.0241550	3.7544675
KIR 51	-0.1617775	3.5926900
KIR 52	+0.3115100	3.9042000
KIR 43	-0.2428500	3.6613500
KIR 35	-0.0072350	3.6541150
KIR 43		3.6613500
<b>KIR 2</b>	-0.4770950	<b>3.1842550</b>
KIR43		3.6613500
UT 6	+0.1657650	3.8271150
KIR 44	-0.2034325	3.6236825
KIR 36	-0.0078875	3.6157950
KIR 44		3.6236825
<b>KIR 47</b>	-0.3284700	<b>3.2952125</b>
KIR 31	+0.8967400	4.1919525
KIR 45	-0.3550200	3.8369325
KIR 32	+0.0117975	3.8487300
KIR 45		3.8369325
KIR 37	-0.0590650	3.7778675
KIR 33	-0.0309525	3.7469150
<b>KIR 3</b>	-0.1815675	<b>3.5653475</b>
<b>KIRIBM</b>	+0.8476125	<b>4.4129600</b>
RM 2	-0.9128125	3.5001475
<b>KIRIBM</b>		<b>4.4129600</b>
RM 3	-0.8975812	3.5153788
<b>KIRIBM</b>		<b>4.4129600</b>
RM 1	-0.0280000	3.5373475
KIR 33		3.7469150
KIR 34	+0.0431663	3.7900813

# KIRIBATI

## BETIO, TARAWA

### TABLE OF REDUCED LEVELS

INSTRUMENT: Wild NA3003 S/N 92987

DATUM: Tide Gauge Zero

DATE: 29<sup>th</sup> May – 02<sup>nd</sup> June 2004

PAGES: 3326 - 3354

POINT #	2004 RL	2002 RL	1992 RL (see note below)
KIR 1	3.5334000	3.5334000	3.5334000
KIR 50	3.9360050	New Point (2004)	
KIR 40	3.6005525	3.6126625	New Point (2002)
KIR 7	3.4970000	3.5002475	3.5429330
KIR 39	4.0779100	4.0780300	New Point (2002)
KIR 19	4.0782750	4.0783450	4.0780505
KIR 29	3.7233525	3.7298675	3.7357500
KIR 49	4.0224550	4.0231925	New Point (2002)
BM5	4.1628575	4.1632500	4.1643290
KIR 38	4.2506525	4.2503450	New Point (2002)
KIR 30	4.0026550	4.0034500	4.0050650
KIR 12	4.2190175	4.2190850	4.2176415
KIR 13	4.6323550	4.6321375	4.6301615
BM1	3.1758625	3.1761875	3.1792300
BM 2	4.0690900	4.0698275	4.0724133
KIR 46	3.3787925	3.3781950	New Point (2002)
KIR 42	3.7786225	3.3790425	New Point (2002)
KIR 26	3.7544675	3.7292775	3.7309675
KIR 51	3.5926900	New Point (2004)	
KIR 52	3.9042000	New Point (2004)	

POINT #	2004 RL (cont.)	2002 RL (cont.)	1992 RL (cont.) (see note below)
KIR 43	3.6613500	3.6605050	New Point (2002) 3.6556625
KIR 35	3.6541150	3.6544250	
<b>KIR 2</b>	<b>3.1842550</b>	<b>3.1842525</b>	<b>3.1835325</b>
UT 6	3.8271150	3.8257025	3.8256725
KIR 44	3.6236825	3.6270900	New Point (2002)
KIR 36	3.6157950	3.6154000	3.6188700
<b>KIR 47</b>	<b>3.2952125</b>	<b>3.2947625</b>	New Point (2002)
KIR 31	4.1919525	4.1936575	4.2001675
KIR 45	3.8369325	3.8435375	New Point (2002)
KIR 32	3.8487300	3.8517575	3.8549775
KIR 37	3.7778675	3.7762475	3.7770925
KIR 33	3.7469150	3.7464075	3.7464850
<b>KIR 3</b>	<b>3.5653475</b>	<b>3.5647625</b>	<b>3.5657338</b>
<b>KIRIBM</b>	<b>4.4129600</b>	<b>4.4124100</b>	New Point (2002)
RM 2	3.5001475	New Point (2004)	
RM 3	3.5153788	New Point (2004)	
RM 1	3.5373475	New Point (2004)	
KIR 34	3.7900813	3.7895150	3.7896300

**NOTE:** The RL listed under 1992 is the first RL determined for that point. The RL may not have first been determined in 1992 but is listed in that column for simplicity.

# KIRIBATI

## BETIO, TARAWA

### COMPARISON OF RL DIFFERENCES:

INSTRUMENT: Wild NA3003 S/N 92987      DATUM: Tide Gauge Zero  
DATE: 29<sup>th</sup> May – 02<sup>nd</sup> June 2004      PAGES: 3326 - 3354

POINT #	04RL – 02RL (mm) Adopted Height	04RL – 92RL (mm)
KIR 1		
KIR 2	0.00	+0.72
KIR 3	+0.59	-0.39
KIR 7	-3.25	-45.93
KIR 12	-0.07	+1.38
KIR 13	+0.22	+2.19
KIR 19	-0.07	+0.22
KIR 26	+25.19	+23.50
KIR 29	-6.52	-12.40
KIR 30	-0.80	-2.41
KIR 31	-1.71	-8.22
KIR 32	-3.03	-6.25
KIR 33	+0.51	+0.43
KIR 34	+0.57	+0.45
KIR 35	-0.31	-1.55
KIR 36	+0.40	-3.08
KIR 37	+1.62	+0.78
KIR 38	+0.31	
KIR 39	-0.12	
KIR 40	-1.11	
KIR 42	-0.42	
KIR 43	+0.85	
KIR 44	-3.41	
KIR 45	-6.61	
KIR 46	+0.60	
KIR 47	+0.45	
KIR 49	-0.74	

POINT #	04RL – 02RL (mm)	04RL – 92RL (mm)
BM 1	-0.33	-3.37
BM 2	-0.74	-3.32
BM 5	-0.39	-1.47
UT 6	+1.41	+1.44
KIRIBM	+0.55	

**NOTE:** The RL difference listed under 02RL – 92RL is the first RL difference determined for that point. The RL may not have first been determined in 1992 but is listed in that column for simplicity.

# SOUTH PACIFIC SEA LEVEL AND CLIMATE MONITORING PROJECT

## REDUCED LEVELS – BETIO, TARAWA, KIRIBATI

**INSTRUMENT:** Wild NA 3003 S/N 92897

**DATE OF LEVELLING:** 29<sup>th</sup> May – 02<sup>nd</sup> June 2004

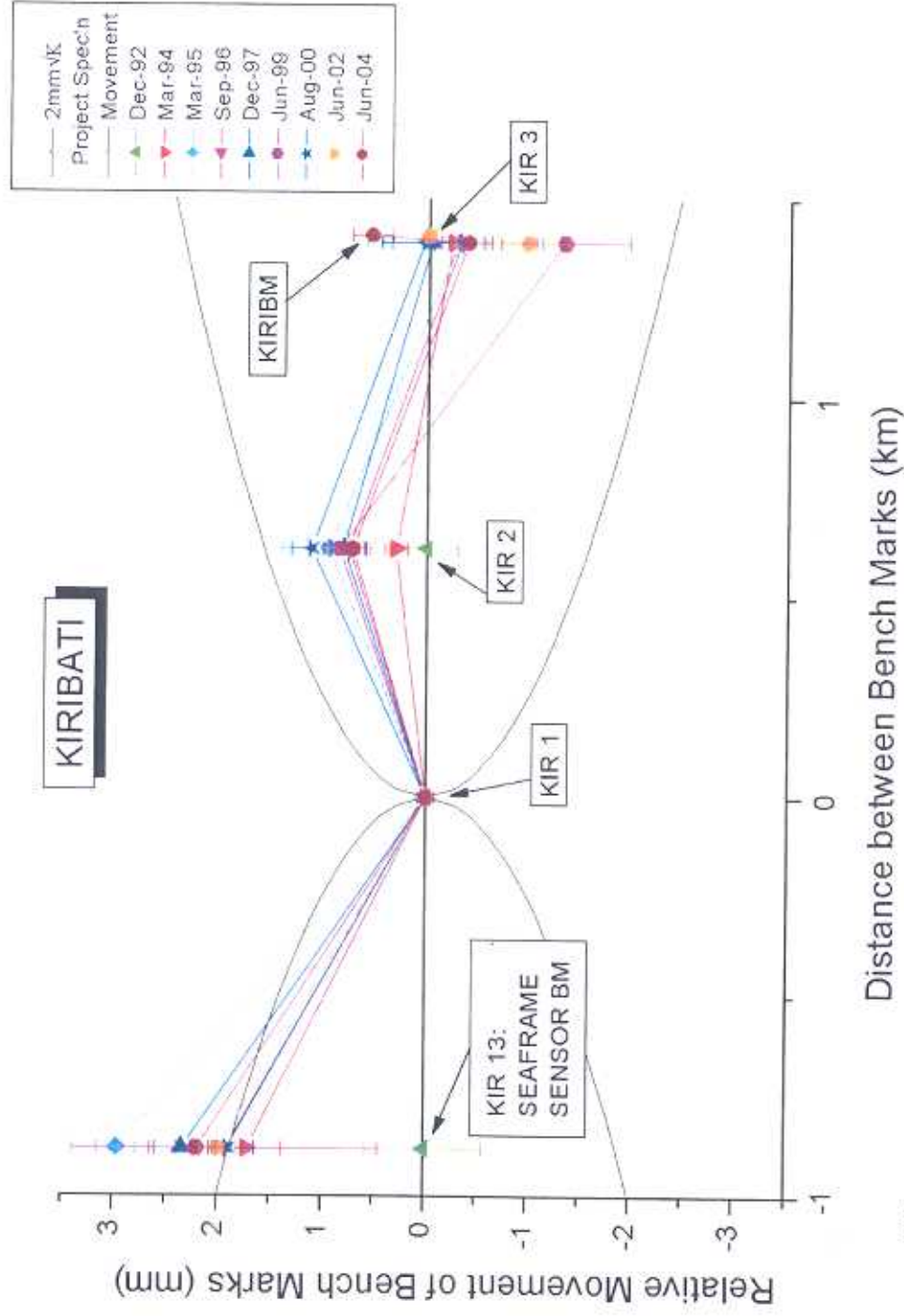
**SURVEY TYPE:** First Order

**DATUM FOR LEVELLING:** Tide Gauge Zero

**BENCH MARK ADOPTED:** KIR 1 (3.5334 metres)

SURVEY MARK	2004 RL	TYPE OF MARK
KIR 1	3.5334	Deep Bench Mark
KIR 50	3.9360	Stainless Steel Bolt in Concrete
KIR 7	3.4970	Steel Pin
KIR 40	3.6115	Stainless Steel Bolt in Concrete
KIR 19	4.0783	Masonry Nail in Concrete
KIR 39	4.0779	Stainless Steel Bolt in Concrete
KIR 29	3.7234	Masonry Nail in Concrete
BM 5	4.1629	Bench Mark
KIR 49	4.0225	Bench Mark
KIR 30	4.0027	Masonry Nail in Concrete
KIR 38	4.2506	Stainless Steel Bolt in Concrete
KIR 12	4.2190	Project Plaque
KIR 13	4.6324	SEAFRAME Sensor Bench Mark
BM 1	3.1759	Bench Mark
BM 2	4.0691	Bench Mark

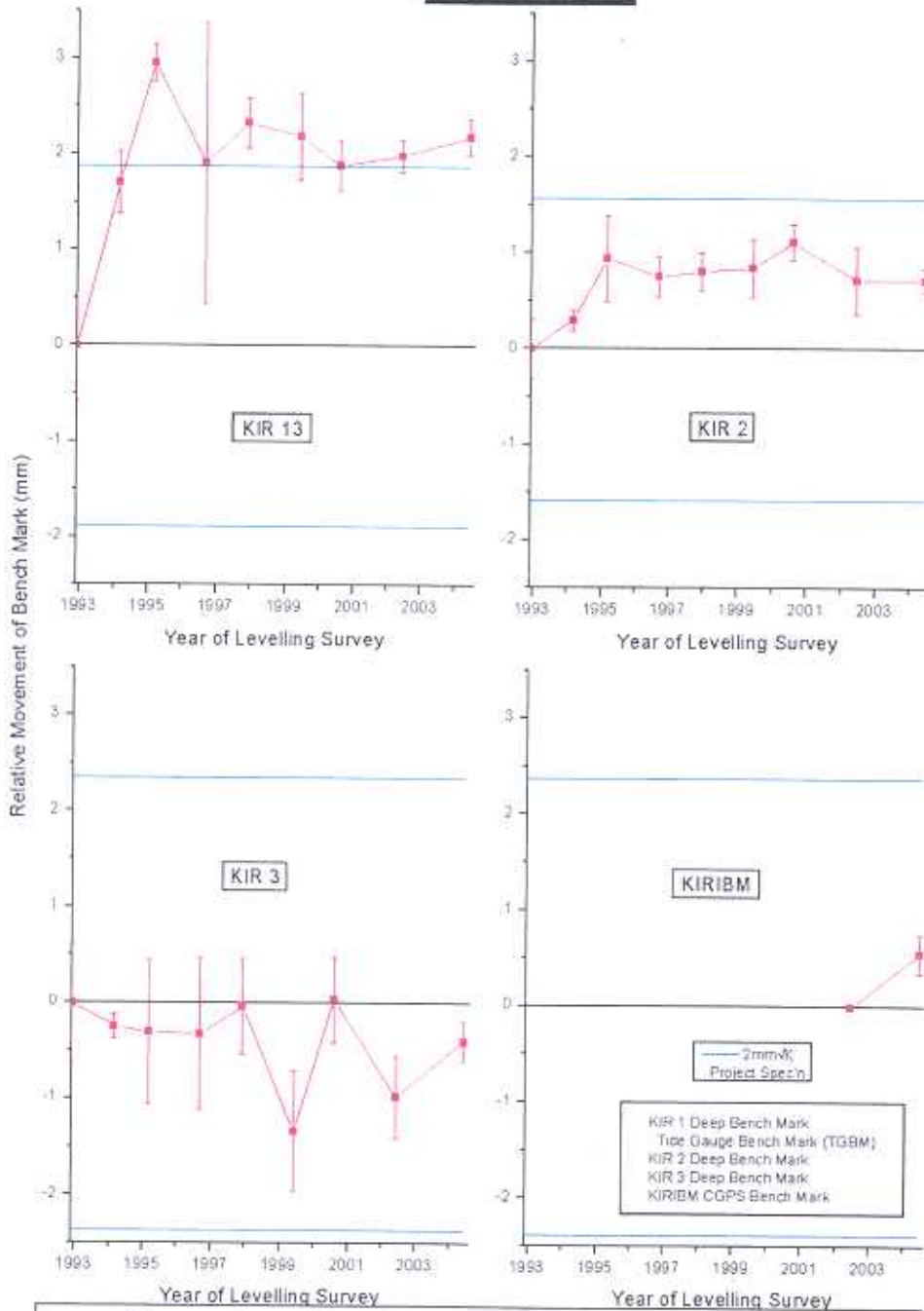
SURVEY MARK	2004 RL	TYPE OF MARK
KIR 46	3.3788	Deep Bench Mark
KIR 42	3.7786	Stainless Steel Bolt in Concrete
KIR 26	3.7545	Masonry Nail in Concrete
KIR 51	3.5927	Stainless Steel Bolt in Concrete
KIR 52	3.9042	Stainless Steel Bolt in Concrete
KIR 35	3.6541	Masonry Nail in Concrete
KIR 43	3.6614	Stainless Steel Bolt in Concrete
KIR 2	3.1843	Deep Bench Mark
UT 6	3.8271	Pin in Concrete – Survey Mark
KIR 36	3.6160	Masonry Nail in Concrete
KIR 44	3.6237	Stainless Steel Bolt in Concrete
KIR 31	4.1920	Masonry Nail in Concrete
KIR 47	3.2952	Deep Bench Mark
KIR 32	3.8487	Masonry Nail in Concrete
KIR 45	3.8369	Stainless Steel Bolt in Concrete
KIR 37	3.7779	Masonry Nail in Concrete
KIR 33	3.7469	Masonry Nail in Concrete
KIR 3	3.5653	Deep Bench Mark
KIR 34	3.7901	Masonry Nail in Concrete
KIRIBM	4.4130	Bench Mark
RM 2	3.5001	Recovery Mark
RM 3	3.5154	Recovery Mark
RM 1	3.5373	Recovery Mark



11/2/04

C:\Program Files\ChapinLab\Chapin\krcos\_1\k1\_2004

# KIRIBATI



Time series of Bench Mark movement relative to the Tide Gauge Bench Mark, KIR 1, since December 1992

MOVEMENT LIST

SOUTH PACIFIC SEA LEVEL AND CLIMATE MONITORING PROJECT

Date:	04-12-92	10-03-94	30-03-95	12-09-96
Point no.	1. Meas. Height TGZ m	2. Measurement Height TGZ m	3. Measurement Height TGZ m	4. Measurement Height TGZ m
		D 2-1 mm	D 3-2 mm	D 3-1 mm
				D 4-3 mm
				D 4-1 mm
BM1	3.17923	3.17958	3.17981	3.17927
BM2	4.07241	4.07278	4.07333	4.07311
BM5	4.16433	4.16495	4.16502	4.16518
UT6		3.82567	3.82628	3.82644
KIR1	3.53340	3.53340	3.53340	3.53340
KIR2	3.18353	3.18383	3.18448	3.18429
KIR3	3.56573	3.56549	3.56543	3.56541
KIR7	3.54293	3.52622	3.52582	3.52531
KIR12	4.21764	4.21872	4.21954	4.21913
KIR13	4.63016	4.63187	4.63312	4.63207
KIR19			4.07805	4.07813

Difference from 1st measurement always refers to 1st measurement of respective point (D=last-initial measurement).  
 Difference from measurement n-1 always refers to penultimate measurement (D=last-penultimate measurement)

**MOVEMENT LIST**

**SOUTH PACIFIC SEA LEVEL AND CLIMATE MONITORING PROJECT**

Point no.	12-12-97		21-06-99		27-08-00	
	Height m	TGZ	Height m	TGZ	Height m	TGZ
BM1	3.17957	0.30	3.17924	-0.33	3.17885	-0.39
BM2	4.07235	-0.76	4.07188	-0.47	4.07119	-0.69
BM5	4.16523	0.05	4.16430	-0.93	4.16433	0.03
UT6	3.82649	0.05	3.82681	0.32	3.82698	0.17
KIR1	3.53340	0.00	3.53340	0.00	3.53340	0.00
KIR2	3.18434	0.05	3.18438	0.04	3.18465	0.27
KIR3	3.56570	0.29	3.56440	-1.30	3.56577	1.37
KIR7	3.52494	-0.37	3.50552	-19.42	3.50500	-0.52
KIR12	4.21961	0.48	4.21953	-0.08	4.21948	-0.05
KIR13	4.63249	0.42	4.63235	-0.14	4.63205	-0.30
KIR19	4.07849	0.36	4.07847	-0.02	4.07851	0.04
KIR26	3.73097		3.73012	-0.85	3.72716	-2.96
KIR29			3.73576		3.73528	-0.48
KIR30			4.00507		4.00436	-0.71
KIR31			4.20017		4.19723	-2.94
KIR32			3.85498		3.85542	0.44
KIR33			3.74648		3.74740	0.92
KIR34			3.78963		3.79042	0.79
KIR35					3.65566	
KIR36					3.61886	
KIR37					3.77708	

Difference from 1st measurement always refers to 1st measurement of respective point (D=last-initial measurement),  
 Difference from measurement n-1 always refers to penultimate measurement (D=last-penultimate measurement)

MOVEMENT LIST

SOUTH PACIFIC SEA LEVEL AND CLIMATE MONITORING PROJECT

Point no.	Height	TGZ	8. Measurement	D 8-7	8-1	Height	TGZ	9. Measurement	D 9-8	9-1	Height	TGZ	10. Measurement	D 10-9
	m		mm	mm	mm	m		mm	mm	mm	m		mm	mm
BM1	3.17619		-2.66		-3.04	3.17586		-0.33		-3.37				
BM2	4.06983		-1.36		-2.58	4.06909		-0.74		-3.32				
BM5	4.16325		-1.08		-1.08	4.16286		-0.39		-1.47				
RM1						3.53732								
RM2						3.50012								
RM3						3.51536								
UT6	3.82571		-1.27		0.04	3.82711		1.40		1.44				
KIR1	3.53340		0.00		0.00	3.53340		0.00		0.00				
KIR2	3.18425		-0.40		0.72	3.18424		-0.01		0.71				
KIR3	3.56476		-1.01		-0.97	3.56532		0.56		-0.41				
KIR7	3.50025		-4.75		-42.68	3.49699		-3.26		-45.94				
KIR12	4.21909		-0.39		1.45	4.21902		-0.07		1.38				
KIR13	4.63215		0.10		1.99	4.63235		0.20		2.19				
KIR19	4.07835		-0.16		0.30	4.07827		-0.08		0.22				
KIR26	3.72927		2.11		-1.70	3.75446		25.19		23.49				
KIR29	3.72987		-5.41		-5.89	3.72335		-6.52		-12.41				
KIR30	4.00345		-0.91		-1.62	4.00265		-0.80		-2.42				

Difference from 1st measurement always refers to 1st measurement of respective point (D=last-initial measurement),  
 Difference from measurement n-1 always refers to penultimate measurement (D=last-penultimate measurement)

**MOVEMENT LIST**

SOUTH PACIFIC SEA LEVEL, AND CLIMATE MONITORING PROJECT

Point no.	Height	TGZ	D	8-7	8. Measurement	D	8-1	9. Measurement	D	9-8	9. Measurement	D	9-1	10. Measurement	D	10-9	10. Measurement
	m		mm	mm		mm	mm	m	mm	mm	m	mm	mm	mm	mm	mm	mm
KIR31	4.19366		-3.57		4.19194		-1.72		-8.23								
KIR32	3.85176		-3.66		3.84872		-3.04		-6.26								
KIR33	3.74640		-1.00		3.74689		0.49		0.41								
KIR34	3.78951		-0.91		3.79006		0.55		0.43								
KIR35	3.65442		-1.24		3.65410		-0.32		-1.56								
KIR36	3.61540		-3.46		3.61578		0.38		-3.08								
KIR37	3.77624		-0.84		3.77785		1.61		0.77								
KIR38	4.25035				4.25065		0.30		0.30								
KIR39	4.07803				4.07791		-0.12		-0.12								
KIR40	3.61267				3.61155		-1.12		-1.12								
KIR42	3.77904				3.77862		-0.42		-0.42								
KIR43	3.66050				3.66134		0.84		0.84								
KIR44	3.62709				3.62367		-3.42		-3.42								
KIR45	3.84354				3.83692		-6.62		-6.62								
KIR46	3.37819				3.37879		0.60		0.60								
KIR47	3.29476				3.29520		0.44		0.44								
KIR49	4.02319				4.02245		-0.74		-0.74								
KIR50					3.93600												
KIR51					3.59268												
KIR52					3.90420												
KIRIBM	4.41241				4.41294		0.53		0.53								

Difference from 1st measurement always refers to 1st measurement of respective point (D=last-initial measurement),  
 Difference from measurement n-1 always refers to penultimate measurement (D=last-penultimate measurement)

# KIRIBATI

## BETIO, TARAWA

### PRECISION OF 2004 SURVEY:

INSTRUMENT: Wild NA3003 S/N 92987      DATUM: Tide Gauge Zero  
DATE: 29<sup>th</sup> May – 02<sup>nd</sup> June 2004      PAGES: 3326 - 3354

POINT #	FORWARD LEVELLING	BACK LEVELLING	DIFF (mm)	DIST (km)	PRECISION
KIR 1 KIR 13	+1.0989425	+1.0989675	0.025	0.881	0.03√K
KIR 1 KIR 2	-0.3491800	-0.3491100	0.070	0.625	0.09√K
KIR 2 KIR 3	+0.3811100	+0.3810750	0.035	0.769	0.04√K
KIR 1 KIR 3	+0.0319300	+0.0319650	0.035	1.394	0.03√K
KIR 2 KIR 13	+1.4480525	+1.4481475	0.095	1.506	0.08√K
KIR 3 KIR 13	+1.0669775	+1.0670375	0.060	2.275	0.04√K
KIR 1 KIRIBM	+0.8795500	+0.8795700	0.020	1.411	0.02√K
KIR 13 KIRIBM	-0.2194175	-0.2193725	0.045	2.292	0.03√K

**INDIVIDUALS CONSULTED DURING THE  
GEODETIC SURVEY VISIT**

MINISTRY OF HOME AFFAIRS AND DECENTRALIZATION  
Lands and Survey Division

Mr. Tebutonga, Chief Surveyor  
Mr. Romano Reo, Surveyor

MINISTRY OF ENVIRONMENT AND SOCIAL DEVELOPMENT  
Meteorological Division

Mr. Tekena Teitiba, Officer in Charge, Meteorological Office

AUSTRALIAN HIGH COMMISSION

Ms. Gillian Dadswell, Second Secretary, Development Cooperation  
Mr. Nicholas McDermott, Activity Manager, Development Cooperation

**GEODETIC SURVEY VISIT ITINERARY**

Depart Adelaide	0745	QF740	Thursday 27 May 2004
Arrive Sydney	1005		Thursday 27 May 2004
Depart Sydney	1235	QF391	Thursday 27 May 2004
Arrive Nadi	1820		Thursday 27 May 2004
Depart Nadi	0755	ON252	Friday 28 May 2004
Arrive Tarawa	1055		Friday 28 May 2004
Depart Tarawa	1330	ON141	Thursday 03 June 2004
Arrive Nadi	1630		Thursday 03 June 2004
Depart Nadi	0825	QF392	Friday 04 June 2004
Arrive Sydney	1105		Friday 04 June 2004
Depart Sydney	1420	QF759	Friday 04 June 2004
Arrive Adelaide	1600		Friday 04 June 2004