From: bsip@bsip.sirnetd.ernet.in
To: <geo@giasmd01.vsnl.net.in>
Date: Fri, 13 Nov 1998 07:01:54 +0530
X-MSMail-Priority: Normal
X-Mailer: Microsoft Internet Mail 4.70.1155

Dr C.P.Rajendran
Scientist
Centre for Earth Science Studies
Thruvakkal, Akkulam
TRIVANDRUM - 695031
E-Mail : geo@giasmd01.vsnl.net.in

12-11-98

Dear Dr Rajendran,
I give below the C-14 age results of the samples from Kutch and Himalaya.

Lab No.	Sample No.	Material	C-14 age	Remarks
BS-1474	HJ/W/CP	Wood	19680 +- 220	Pithoragad - Kumaun Himalaya.
S-2158	H/D/1/CP	Sediment		Carbon content insufficient in 300 gms sample
BS-1484	V/T/D/2/CP	Sediment	1370 +- 260	Long term counting is in progress. Final result will be sent at month's end

Yours sincerely,
G.Rajagopalan, Birbal Sahni Institute of Palaeobotany, Lucknow.

c. +91 471 442280

d. geo@giasmd01.vsnl.net.in

From: Director <director@lw1.vsnl.net.in>
To: <geo@giasmd01.vsnl.net.in>
Subject: Re: Dr. G. Rajagopalan, BSIP, Lucknow
Date: Thu, 26 Nov 1998 07:16:16 +0530
X-MSMail-Priority: Normal
X-Mailer: Microsoft Internet Mail 4.70.1155

Dr C.P.Rajendran
Scientist
Centre for Earth Science Studies
Thruvakkal, Akkulam
TRIVANDRUM - 695031
E-Mail : geo@giasmd01.vsnl.net.in

25-11-98

Dear Dr Rajendran,
Thanks for your e-mail of Nov.19. I give below the calibrated C-14 age result of the samples from Kutch.
Kindly acknowledge. I shall greatly appreciate receiving a brief report on use of this date for our record.

Yours sincerely,
G.Rajagopalan, Birbal Sahni Institute of Palaeobotany, Lucknow.

RADIOCARBON DATING LAB.
BSIP, LUCKNOW
RADIOCARBON AGE CALIBRATION
USING COMPUTER PROGRAM Rev 3.0.3 OF QIL, UNIVERSITY OF WASHINGTON

Calibration file(s): INTCAL93.14C
Listing file: cpr98.TXT

BS-1484 S-2160
V/T/D/2/CP, 215 Gm Sediment, ACID PRETREATMENT, R=0.295
Radiocarbon Age BP 1443 ± 95 Reference(s)
Calibrated age(s) cal BP 1325 (Stuiver and Pearson, 1993)
100 year moving average

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 1394 - 1279

Summary of above:

minimum of cal age ranges (cal ages) maximum of cal age ranges:
cal BP 1394 (1325) 1279

References for datasets used:
Stuiver, M and Pearson, GW, 1993, Radiocarbon, 35, 1-23.

Comments:
This standard deviation (error) includes a lab error multiplier.
** 1 sigma = square root of (sample std. dev.[2] + curve std. dev.[2])
2 sigma = 2 x square root of (sample std. dev.[2]+ curve std. dev.[2])
[ ] = calibrated with linear extension to calibration curve
0* represents a "negative" age BP
1955* denotes influence of bomb C-14
For cal yrs between 5500-5190 BC an offset of 25 years is possible.
NOTE: Cal ages and ranges are rounded to the nearest year which may be too precise in many instances. Users are advised to round results to the nearest 10 yr for samples with standard deviation in the radiocarbon age greater than 50 yr.

Note : dev. [2] should be read as -- dev. to the power two

Dr. G. Rajagopalan
Deputy Director

C-245

बीरबल साहनी पुरावनस्पतिविज्ञान संस्थान
BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY

29-04-99

Dear Dr Rajendran,

I give below the C-14 age results of the samples sent by you earlier

Lab No.	Sample No.	Material	C-14 age Yrs B.P. (Measured)	C-14 age range Yrs B.P. (Calibrated)	
BS-1531	VG/T3/D/1/98	Sediment	1840 ± 120	1884 - 1609	→ Cath. mali.
BS-1532	VG/T1/D/1/98	,,	5870 ± 260	7005 - 6407	→ Shells
BS-1534	VG/T5/D/2/98	,,	390 ± 100	517 - 306	→ ?
Same nos. { BS-1530	VG/T5/D/1/98	Sediment	7730 ± 90	8553 - 8403	
BS-1518	VG/T5/D/1/98	Carbonate fraction	3570 ± 100	3982 - 3698	

I shall greatly appreciate receiving your comments on these age with regard to your work.

Yours sincerely,

G. Rajagopalan

Dr C.P.Rajendran
Scientist
Centre for Earth Science Studies
Thruvakkal, Akkulam
TRIVANDRUM - 695031

From Trench T3 I have sent you only one sample. VG/T3/D/1/98 But you have 2 samples.

From Trench T5 I sent 2 samples ~~VG/T5~~ ① VG/T5/D/1/98 & ② VG/T5/D/2/98 Please clarify

You have listed ~~VG/T5/D~~ two samples both having same nos. please clarify

53, University Road, Post Box 106 G. P. O., Lucknow-226 007 (INDIA) Gram : PALAEOBOTANY
Phone : 381948, 74291 (O) 382598 (R) Fax : 091-0522-381948, 374528
E-Mail : bsip@bsip.sirnetd.ernet. in

Dr. G. Rajagopalan
Deputy Director

बीरबल साहनी पुरावनस्पतिविज्ञान संस्थान
BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY

C-367

12th May '99

Dear Dr Rajendran,

I do hope you have received my e-mail dtd 29/4/99 giving ^{14}C age results of the four samples sent by you earlier. I give below the C-14 age results of the samples sent by you earlier. This is a post copy my e-mail.

Lab No.	Sample No.	Material	^{14}C Age Yrs B.P. (Measured)	^{14}C Age range Yrs B.P. (Calibrated)
BS-1531	VG/T3/D/1/98	Sediment	1840 ± 120	1884 - 1609
BS-1532	VG/T1/D/1/98	,,	5870 ± 260	7005 - 6407
BS-1534	VG/T~~3~~5/D/2/98	,,	390 ± 100	517 - 306
BS-1530	VG/T5/D/1/98	,,	7730 ± 90	8553 - 8403
BS-1518	VG/T5/D/1/98	Shell carbonate	3570 ± 100	3982 - 3698
BS-1484	V/T2/D/2/cp	Sediment	1443±95	1394-1279

Our office has received the draft of Rs 10000 sent by you as charges for dating these samples. Yesterday I received the three separated shell samples from Kutch sent by you. I will process them as early as possible and send you the results.

Yours sincerely,

G. Rajagopalan

Dr C.P.Rajendran
Scientist
Centre for Earth Science Studies
Thruvakkal, Akkulam
TRIVANDRUM - 695031
E-Mail : geo@giasmd01.vsnl.net.in

53, University Road, Post Box 106 G. P. O., Lucknow-226 007 (INDIA) Gram : PALAEOBOTANY
Phone : 381948, 74291 (O) 382598 (R) Fax : 091-0522-381948, 374528
E-Mail : bsip@bsip.sirnetd.ernet. in

From: bsiplk@sirnetd.ernet.in ()
X-Mailer: SCO System V Mail (version 3.2)
To: rajen@md3.vsnl.net.in
Subject:
Date: Fri, 14 May 99 15:35:57 IST

May 14, 1999

E-Mail - <rajen@md3.vsnl.net.in>

Dear Dr Rajendran,

Thank you for your letters and also a copy of the R-mail. There was a typographical error in the listing of samples. It's correction is as follows :

BS- 1534 VG/T5/D/2/98 Sediment 390 + 100 517-306

I am sorry for this mistake.

Regards,

Yours sincerely,

(G Rajagopalan)

Telegram : PALAEOBOTANY, LUCKNOW
Telephone : EPABX 74291, 73206, 75945, 75822
Fax : 91-0522-381948, 374528
E-Mail : bsip@bsip.sirnetd.ernet.in
Post Box No. : 106, G.P.O., Lucknow

ALL CORRESPONDENCE SHOULD BE ADDRESSED TO THE DIRECTOR

बीरबल साहनी पुरावनस्पतिविज्ञान संस्थान
BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY
५३, विश्वविद्यालय मार्ग
53, UNIVERSITY ROAD
लखनऊ - २२६ ००७
LUCKNOW - 226 007
(भारत) (INDIA)

No. C-537

Dated ....

May 27, 1999

E-Mail - geo@giasmd01.vsnl.net.in

Dear Dr Rajendran,

Thank you for your letter dated May 21, 1999. I give below the recalibrated dates of all the samples that have been done in our Lab. These are calibrated in terms of AD/BC and are given below :

CALIBRATION OF RADIOCARBON AGE TO CALENDER YEARS

B S No	Sample No	Radiocarbon Age	Calibrated result 1 Sigma	Calibrated result 2 Sigma
1530	VG/T5/D/1/98	7730 ± 90	BC 6603-6453	BC 6751-6383
1531	VG/T3/D/1/98	1840 ± 120	AD 66-341	BC 59 - AD 440
1532	VG/T1/D/1/98	5870 ± 260	BC 5055-4457	BC 5314-4165
1534	VG/T3/D/2/98	390 ± 100	AD 1433-1644	AD 1398-1954
1518	VG/T5/D/1/98	3570 ± 100	BC 2032-1748	BC 2190-1673
1484	V/T/D/2/CP	1443 ± 95	AD 545-AD 669	AD 421-AD 778

I am sending you the graphs concerning the calibrated results by a separate post.

With regards,

Yours sincerely,

G. Rajagopalan

(G Rajagopalan)

Encls : As above

Dr C P Rajendran
Scientist
Centre for Earth Science Studies
Thuruvikkal
Akkulam, Trivandrum 695 031

27/5/99

X-Sender: geo@giasmd01.vsnl.net.in
X-Mailer: QUALCOMM Windows Eudora Pro Version 3.0.3 (32)
Date: Fri, 28 May 1999 09:48:03 +0500
To: "rajen@md3.vsnl.net.in" <rajen@md3.vsnl.net.in>
From: Kusala Rajendran <kusala@vsnl.com>

>From: bsiplk@sirnetd.ernet.in ()
>X-Mailer: SCO System V Mail (version 3.2)
>To: geo@giasmd01.vsnl.net.in
>Subject:
>Date: Thu, 27 May 99 17:52:21 IST
>
> May 27, 1999
>
> E-Mail - geo@giasmd01.vsnl.net.in
>
> Dear Dr Rajendran,
>
> Thank you for your letter dated May 21, 1999. I give below the recalibrated dates of all the samples that have been done in our Lab. These are calibrated in terms of AD/BC and are given below :
>
> CALIBRATION OF RADIOCARBON AGE TO CALENDER YEARS
>
> | B S No | Sample No | Radiocarbon Age | Calibrated result 1 Sigma | 2 Sigma |
> |---|---|---|---|---|
> | 1530 | VG/T5/D/1/98 | 7730 + 90 | BC 6603-6453 | BC 6751-6383 |
> | 1531 | VG/T3/D/1/98 | 1840 + 120 | AD 66-341 | BC 59 - AD 440 |
> | 1532 | VG/T1/D/1/98 | 5870 + 260 | BC 5055-4457 | BC 5314-4165 |
> | 1534 | VG/T3/D/2/98 | 390 + 100 | AD 1433-1644 | AD 1398-1954 |
> | 1518 | VG/T5/D/1/98 | 3570 + 100 | BC 2032-1748 | BC 2190-1673 |
> | 1484 | V/T/D/2/CP | 1443 + 95 | AD 545-AD 669 | AD 421-AD 778 |
>
> I am sending you the graphs concerning the calibrated results by a separate post.
>
> With regards,
>
> Yours sincerely,
>
> (G Rajagopalan)
>
> Encls : As above
>
> Dr C P Rajendran
> Scientist
> Centre for Earth Science Studies
> Thuruvikkal
> Akkulam, Trivandrum 695 031

Dr. G. Rajagopalan
Deputy Director

C-1320

बीरबल साहनी पुरावनस्पतिविज्ञान संस्थान
BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY

9-8-99.

Dear Dr.Rajendran,

I am herewith sending you ^{14}C dating result of three of the shell samples sent by you. Due to power shortege in liquid nitrogen plants in Lucknow, there is no supply of liquid nitrogen for the last two months because of which our ^{14}C dating work has not been progressing as per schedule. Kindly bear with us till such time the liquid nitrogen supply is restored. We will take up the remaining samples for processing as soon as the situation improves.

Encl: as above.

With regards,

Yours Sincerely,

G. Rajagopalan

(G.Rajagopalan)

Dr.C.P.Rajendran
Centre for Earth Science Studies
P.B.7250, Thuruvikkal
Akkulum, Trivandrum
695 031 India.

53, University Road, Post Box 106 G. P. O., Lucknow-226 007 (INDIA) Gram : PALAEOBOTANY
Phone : 381948, 74291 (O) 382598 (R) Fax : 091-0522-381948, 374528
E-Mail : bsip@bsip.sirnetd.ernet.in

C-09

बीरबल साहनी पुरावनस्पतिविज्ञान संस्थान
५३, विश्वविद्यालय मार्ग, लखनऊ–२२६ ००७, भारत
BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY
53, UNIVERSITY ROAD, LUCKNOW-226 007, INDIA

डा० जी० राजागोपालन
विज्ञानी 'जी'
Dr. G. Rajagopalan
Scientist 'G'

April 3, 2000

Dear Dr Rajendran,

I give below the C-14 age results of the samples sent by you earlier

Lab No.	Sample No.	Material	C-14 age Yrs B.P. (Measured)	C-14 age range Yrs B.P. (Calibrated)	
BS-1649	No.2/O/D/99	Sediment	1180 ± 120	1260 - 960	Wadakancheri
BS-1632	No.3/O/D/99	Wood	160 ± 90	290 - 0	
BS-1640	No.4/O/D/99	Charcoal	440± 90	540 - 380	
BS-1644	VG/TO1/D/10/98	Sediment	2900 ± 90	3210 - 2890	→ Kutch

VG/T5/D/2/98

We are processing the remaining one sample and will send you its data in May. You may send the North-east samples.

VG/T5/D/2/98

Yours sincerely,

G. Rajagopalan

Dr C.P.Rajendran
Scientist
Centre for Earth Science Studies
Thruvakkal, Akkulam
TRIVANDRUM - 695031

VG/T5/D/2/98

Wadakanchery

From: "G.Rajagopalan" <raghu@lw1.vsnl.net.in>
To: "CP Rajendran" <rajen@md3.vsnl.net.in>
Subject: C-14 age result
Date: Wed, 19 Apr 2000 18:20:26 +0530
X-MSMail-Priority: Normal
X-Mailer: Microsoft Outlook Express 5.00.2314.1300
X-MimeOLE: Produced By Microsoft MimeOLE V5.00.2314.1300

Dear Dr Rajendran,

I hope you are in receipt of my letter giving the results four samples. I give below the C-14 age of the remaining sample.

Lab No.	Sample No.	Material	Measured C-14 age (Half life=5730±40)	Calibrated age range yrs BP	
BS-1651	1/O/D/99	Sediment	680 ± 90	680 - 550	Wadakanchery

Please send me your comments on these age data in relation to you investigation. You may send the North-east sample.

With best regards,

Yours sincerely
G.Rajagopalan
Birbal Sahni Institute of Palaeobotany
53, University Road, LUCKNOW-226 007
E-Mail: rajagopalang@hotmail.com

1270 – 1400 A.D.

Dr G. Rajagopalan1.vcf

X

Delivered-To: rajen@md3.vsnl.net.in
Reply-To: "G.Rajagopalan" <rajagopalan@bsip.res.in>
From: "G.Rajagopalan" <rajagopalan@bsip.res.in>
To: "CP Rajendran" <cp_r@vsnl.com>
Subject: calibrated dates
Date: Wed, 15 Nov 2000 11:33:17 +0530
Organization: BSIP, Lucknow
X-MSMail-Priority: Normal
X-Mailer: Microsoft Outlook Express 5.00.2314.1300
X-MimeOLE: Produced By Microsoft MimeOLE V5.00.2314.1300

Dear Dr Rajendran,

Since we had Founder's day function yesterday and were, I could not send you the calibrated dates sooner. Please find below the copy of the calibration results.

UNIVERSITY OF WASHINGTON
QUATERNARY ISOTOPE LAB
RADIOCARBON CALIBRATION PROGRAM REV 4.1.2
Stuiver, M. and Reimer, P.J., 1993, Radiocarbon, 35, p. 215-230.

Calibration file(s): intcal98.14c

BS-1484
S-2160
No.V/T/D/2/CP, Sediment, Acid Pretreatment
Radiocarbon Age BP 1440 +/- 100 Reference

Calibrated age(s) cal BP 1327, 1322, 1312 (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 1412 - 1282
two Sigma** cal BP 1534 - 1173

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 1412 (1327, 1322, 1312) 1282
2 sigma cal BP 1534 (1327, 1322, 1312) 1173

A.D.416 A.D 777

BS-1560
S-2252
No.V/T3/D/Sh/4, CPR-3, Shell, No pretreatment
Radiocarbon Age BP 1340 +/- 140 Reference

Calibrated age(s) cal BP 1284 (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 1350 - 1168 1160 - 1126
1108 - 1091
two Sigma** cal BP 1525 - 958

Summary of above: A.D. 425 - 992.

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 1350 (1284) 1091
2 sigma cal BP 1525 (1284) 958

BS-1532
S-2221
VG/T1/D/1/98, Sediment, Acid pretreatment, R=0.08
Radiocarbon Age BP 5870 +/- 260 Reference

Calibrated age(s) cal BP 6718, 6702, 6670 (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 6997 - 6404 6365 - 6360
two Sigma** cal BP 7312 - 6172 6132 - 6116

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:

1 sigma cal BP 6998 (6718, 6702, 6670) 6361
2 sigma cal BP 7313 (6718, 6702, 6670) 6117

BS-1531 B.C 5363 B.C. 4167
S-2220
No.VG/T3/D/1/98, Sediment, Acid pretreatment, R=0.1652
Radiocarbon Age BP 1840 +/- 120 Reference

Calibrated age(s) cal BP 1816, 1791, 1780 (Stuiver et al., 1998a)
1754, 1741

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 1919 - 1912 1897 - 1687
1675 - 1611
two Sigma** cal BP 2040 - 2020 2011 - 1519

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 1919 (1816, 1791, 1780, 1754, 1741) 1611
2 sigma cal BP 2041 (1816, 1791, 1780, 1754, 1741) 1519

BS-1518 BC 91 A.D. 431
S-2204
No.VG/T1/D/1/98, Calcareous Sediment, No pretreatment, R=1.000
Radiocarbon Age BP 3570 +/- 100 Reference

Calibrated age(s) cal BP 3865, 3844, 3844 (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 4054 - 4054 3982 - 3715
3710 - 3699
two Sigma** cal BP 4147 - 4108 4099 - 3631
3616 - 3611 3596 - 3591

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 4055 (3865, 3844, 3844) 3700
2 sigma cal BP 4148 (3865, 3844, 3844) 3592

BS-1530 B.C. 2198 BC 1642
S-2219
No.VG/T5/D/1/98, Sediment, Acid pretreatment, R=0.76
Radiocarbon Age BP 7730 +/- 90 Reference

Calibrated age(s) cal BP 8535, 8532, 8515 (Stuiver et al., 1998a)
8503, 8477, 8469
8457

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 8593 - 8408
two Sigma** cal BP 8698 - 8669 8652 - 8369

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 8594 (8535, 8532, 8515, 8503, 8477, 8469,
8457) 8409
2 sigma cal BP 8699 (8535, 8532, 8515, 8503, 8477, 8469,
8457) 8370

BS-1534 BC 6749 BC 6420.
S-2223
No.VG/T5/D2/98, Sediment, Acid pretreatment, R=0.6039
Radiocarbon Age BP 390 +/- 100 Reference

Calibrated age(s) cal BP 474 (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 521 - 310

```
  two Sigma**   cal BP 621 - 607  555 - 279
                       171 - 152  5 - 5

  Summary of above:

  maximum of cal age ranges (cal ages) minimum of cal age ranges:
   1 sigma  cal BP 521 (474) 310
   2 sigma  cal BP 621 (474) 5
```

BS-1644 A.D.1329 AD.1945
S-2339
No.VG/TOI/D/10/98, Sediment, Acid pretreatment, R=1.000
Radiocarbon Age BP 2900 +/- 90 Reference

```
 Calibrated age(s) cal BP 3055, 3053, 2999        (Stuiver et al., 1998a)

  cal BP age ranges obtained from intercepts (Method A):
   one Sigma**   cal BP 3207 - 3183  3165 - 2919
                        2908 - 2885
   two Sigma**   cal BP 3334 - 3282  3270 - 2783

  Summary of above:

  maximum of cal age ranges (cal ages) minimum of cal age ranges:
   1 sigma  cal BP 3208 (3055, 3053, 2999)  2886
   2 sigma  cal BP 3335 (3055, 3053, 2999)  2784
```

BS-1559 BC1385-~~834~~ BC834
S-2250
No.V/T3/D/Sh/4, CPR-2, Shell, No pretreatment, R=0.4010
Radiocarbon Age BP 360 +/- 130 Reference

```
 Calibrated age(s) cal BP 459, 347, 341          (Stuiver et al., 1998a)

  cal BP age ranges obtained from intercepts (Method A):
   one Sigma**   cal BP 520 - 291
   two Sigma**   cal BP 637 - 596  563 - 240
                        232 - 126  125 - 64
                        38 - 0

  Summary of above:

  maximum of cal age ranges (cal ages) minimum of cal age ranges:
   1 sigma  cal BP 520 (459, 347, 341)  291
   2 sigma  cal BP 637 (459, 347, 341)  0
```

A.D.1313 - 1950

References for datasets used:
Stuiver, M., Reimer, P.J., Bard, E., Beck, J.W., Burr, G.S., Hughen, K.A., Kromer, B., McCormac, F.G., v.d. Plicht, J., and Spurk, M. (1998a). Radiocarbon 40:1041-1083.

Comments:
* This standard deviation (error) includes a lab error multiplier.
** 1 sigma = square root of (sample std. dev.^2 + curve std. dev.^2)
** 2 sigma = 2 x square root of (sample std. dev.^2 + curve std. dev.^2)
where ^2 = quantity squared.
[ ] = calibrated with an uncertain region or a linear extension to the calibration curve
0* represents a "negative" age BP
1955* denotes influence of nuclear testing C-14

NOTE: Cal ages and ranges are rounded to the nearest year which may be too precise in many instances. Users are advised to round results to the nearest 10 yr for samples with standard deviation in the radiocarbon age greater than 50 yr.

Please acknowledge the receipt of the data.

With best regards,

Yours sincerely,
G.Rajagopalan
Birbal Sahni Institute of Palaeobotany
53, University Road, LUCKNOW-226 007
E-Mail: rajagopalan@bsip.res.in
rajagopalang@hotmail.com

Delivered-To: rajen@md3.vsnl.net.in
Reply-To: "G.Rajagopalan" <rajagopalan@bsip.res.in>
From: "G.Rajagopalan" <rajagopalan@bsip.res.in>
To: "Dr C. P. Rajendran" <cp_r@vsnl.com>
Subject: Calibration file
Date: Thu, 25 Jan 2001 09:58:52 +0530
Organization: BSIP, Lucknow
X-MSMail-Priority: Normal
X-Mailer: Microsoft Outlook Express 5.00.2314.1300
X-MimeOLE: Produced By Microsoft MimeOLE V5.00.2314.1300

1950 EQ

UNIVERSITY OF WASHINGTON
QUATERNARY ISOTOPE LAB
RADIOCARBON CALIBRATION PROGRAM REV 4.1.2
Stuiver, M. and Reimer, P.J., 1993, Radiocarbon, 35, p. 215-230.

Calibration file(s): intcal98.14c
Listing file: c14fil.lst
Export file: c14res.csv

BS-1690

S-2398
No.P/D/E1/1, Sediment, Acid pretreatment, R=0.237
Radiocarbon Age BP 2710 +/- 200 Reference

Calibrated age(s) cal BP 2781 (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 3074 - 3073 3062 - 3046
3038 - 3007 3003 - 2711
2627 - 2620 2556 - 2550

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 3075 (2781) 2551

BS-1693

S-2401
No.P1/D/E1/2, Wood, Acid-Alkali-Acid pretreatment, R=0.487
Radiocarbon Age BP 3790 +/- 130 Reference

Calibrated age(s) cal BP 4151 (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 4409 - 3979 3937 - 3933

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 4410 (4151) 3934

BS-1722

S-2432
No.B1/D/E1/1, Sediment, Acid pretreatment, R=0.196
Radiocarbon Age BP 1460 +/- 220 Reference

Calibrated age(s) cal BP 1345, 1340, 1334 (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 1562 - 1174

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 1562 (1345, 1340, 1334) 1174

BS-1727

S-2437
No.B1/D/E1/3, Sediment, Acid pretreatment, R=0.895
Radiocarbon Age BP 5040 +/- 110 Reference

Calibrated age(s) cal BP 5842, 5830, 5748 (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 5913 - 5651

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 5914 (5842, 5830, 5748) 5652

Bs-1728

S-2438
No.B1/D/E1/2, Sediment, Acid pretreatment, R=0.051
Radiocarbon Age BP 1910 +/- 690 Reference

Calibrated age(s) cal BP 1868 (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 2746 - 1171

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 2747 (1868) 1171

BS-1736

S-2447
No.B1/D/E1/4, Sediment, Acid pretreatment, R=0.190
Radiocarbon Age BP 80 +/- 200 Reference

Calibrated age(s) cal BP 49, 45, 0* (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 308 - 0*

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 308 (49, 45, 0*) 0*

BS-1738

S-2449
No.P1/D/E1/4, Sediment, Acid pretreatment, R=0.671
Radiocarbon Age BP 80 +/- 90 Reference

Calibrated age(s) cal BP 49, 45, 0* (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 274 - 186 180 - 175
148 - 11 4 - 0*

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 274 (49, 45, 0*) 0*

BS-1752

S-2463
No.VIG/1/C-1, Charcoal, Acid-Alkali-Acid pretreatment, R=0.9239
Radiocarbon Age BP 1170 +/- 90 Reference

Calibrated age(s) cal BP 1063 (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 1227 - 1209 1179 - 968

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 1227 (1063) 968

BS-1757

S-2468
No.VIG-3-C-1, Sediment, Acid pretreatment, R=0.9532
Radiocarbon Age BP 1390 +/- 90 Reference

Calibrated age(s) cal BP 1294 (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):
one Sigma** cal BP 1350 - 1261

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BP 1350 (1294) 1261

References for datasets used:
Stuiver, M., Reimer, P.J., Bard, E., Beck, J.W., Burr, G.S., Hughen, K.A., Kromer, B., McCormac, F.G., v.d. Plicht, J., and Spurk, M. (1998a). Radiocarbon 40:1041-1083.

Comments:
* This standard deviation (error) includes a lab error multiplier.
** 1 sigma = square root of (sample std. dev.^2 + curve std. dev.^2)
** 2 sigma = 2 x square root of (sample std. dev.^2 + curve std. dev.^2)
where ^2 = quantity squared.
[ ] = calibrated with an uncertain region or a linear extension to the calibration curve
0* represents a "negative" age BP
1955* denotes influence of nuclear testing C-14

NOTE: Cal ages and ranges are rounded to the nearest year which may be too precise in many instances. Users are advised to round results to the nearest 10 yr for samples with standard deviation in the radiocarbon age greater than 50 yr.

G.Rajagopalan
Birbal Sahni Institute of Palaeobotany
53, University Road, LUCKNOW-226 007
E-Mail: rajagopalan@bsip.res.in
rajagopalang@hotmail.com

डा० जी० राजागोपालन
विज्ञानी 'जी'
Dr. G. Rajagopalan
Scientist 'G'

Assam 1950 AD
Nigahur

बीरबल साहनी पुरावनस्पतिविज्ञान संस्थान
५३, विश्वविद्यालय मार्ग, लखनऊ–२२६ ००७, भारत
BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY
53, UNIVERSITY ROAD, LUCKNOW-226 007, INDIA

D- 2713

07-Feb-01

Dear Dr Rajendran,

Thank you very much for the first issue of EQ News. It is very useful and I am delighted to have it.

I have tabulated below the C-14 age results of all the samples processed so far. I sent you a e-mail on 24th Jan with the results of first 9 in the table below. We have two samples under process and I will send the results of these as soon as the counting is completed. I am sorry for the delay in sending these results that was mainly due to some problems in the counting unit, and power rostering in U.P. The counting system has been repaired and the power situation has improved since this week. I hope our dating programme will not get upset.

Lab No.	Sample No.	Material	Measured ^{14}C age ($T_{\frac{1}{2}} = 5730 \pm 40$)	Calibrated age range Yrs BP
BS-1690	P/D/E1/1	SEDIMENT	2790 ± 210	3080 – 2551 B.C 1130-601
BS-1693	P1/D/E1/2	WOOD	3900 ± 130	4410 - 3030 BC 2460-1080
BS-1722	B1/D/E1/1	SEDIMENT	1500 ± 230	1560 - 1170 AD 390-780
BS-1727	B1/D/E1/3	SEDIMENT	5190 ± 110	5910 – 5650 BC 3960-3700
BS-1728	B1/D/E1/2	SEDIMENT	1970 ± 710 @	2750 – 1170 BC 800-AD 800
BS-1736	B1/D/E1/4	SEDIMENT	80 ± 200 #	310 - 0 AD 1640-0
BS-1738	P1/D/E1/4	SEDIMENT	80 ± 90	270 – 0 AD 1680-0
14 BS-1752	VIG/1/C-1	CHARCOAL	1210 ± 90	1230 – 970 AD 720-980
17 BS-1759	VIG/3/C-1	SEDIMENT	1430 ± 90	1350 – 1260 AD 600-690
15 BS-1757	VIG/3/C-2	CHARCOAL	1920 ± 110	1920 – 1630 AD 30-320
16 BS-1760	VIG/3/C-3	SEDIMENT	1940 ± 120	1950 – 1630 AD 01-320
13 BS-1762	VIG/1/C-2	SEDIMENT	1960 ± 110	1990 – 1710 BC 40-~~AD~~ 240

@ Organic carbon content of the sample was only 0.5 % of the required amount, hence large error bar

\# Organic carbon content of the sample was only 1.9 % of the required amount, hence large error bar

Sample P1/D/E1/3 was processed and benzene was obtained but could not be counted as the quantity was too low and sample benzene evaporated before counting could be done.

Samples BR-1 (D1) and BR-1(D2) are under process

I will send you by e-mail the calibration file for the last three samples later.

With best regards,

Yours sincerely,

G. Rajagopalan

Dr C.P.Rajendran,
Centre for earth science studies
Thruvakkal, Akkulam
TRIVANDRUM - 695031

PHONE : Off. : 333621, EPABX : 324291, 325945, 325822, 323206 (Ext. 212). Res. : 382598
Fax : 091-0522- 374528, 381948 GRAM : PALAEOBOTANY
E-mail : rajagopalang@hotmail.com • bsip@bsip.sirnetd.ernet.in

Lab No.	Sample No.	Material	Measured 14C age (T1 = 5730 ± 40)	Calibrated age range Yrs BP
BS-1690	P/D/E1/1	SEDIMENT	2790 ± 200	3080 – 2551
BS-1693	P1/D/E1/2	WOOD	3900 ± 130	4410 - 3030
BS-1722	B1/D/E1/1	SEDIMENT	~~1500 ± 230~~ 1460±220	1560 – 1170
BS-1727	B1/D/E1/3	SEDIMENT	5190 ± 110	~~5910 – 5650~~ ~~5914~~ 5914 5652
BS-1728	B1/D/E1/2	SEDIMENT	1970 ± 710 @	2750 – 1170
BS-1736	B1/D/E1/4	SEDIMENT	80 ± 200	310 - 0
BS-1738	P1/D/E1/4	SEDIMENT	80 ± 90	270 – 0
BS-1752	VIG/1/C-1	CHARCOAL	~~1210 ± 90~~ 1170+90	~~1230 – 970~~ 1227 – 968
BS-1759	VIG/3/C-1	SEDIMENT	~~1430 ± 90~~	~~1350 – 1260~~
			1390 ± 90	1350 – 1261

Telegram : PALAEOBOTANY, LUCKNOW
Telephone : EPABX 74291, 73206, 75945, 75822
Fax : 91-0522-381948, 374528
E-Mail : bsip@bsip.sirnetd.ernet.in
Post Box No. : 106, G.P.O., Lucknow

ALL CORRESPONDENCE
SHOULD BE ADDRESSED
TO THE DIRECTOR

बीरबल साहनी पुरावनस्पतिविज्ञान संस्थान
BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY
५३, विश्वविद्यालय मार्ग
53, UNIVERSITY ROAD
लखनऊ - २२६ ००७
LUCKNOW - 226 007
(भारत) (INDIA)

No. FR-1400

Dated 10/5/02

Dr.B.Sekar

Radiocarbon Dating Laboratory

Dear Dr.Rajendran,

I am herewith sending you the results of two samples sent by you for C-14 dating. I will be away for a 10 days on personal trip . I will try to process your remaining samples within a month. Kindly acknowledge the receipt of the results.

Sample No.	BS No/ S.No	Material	Age of the sample based on half life=5570±30 yrs	Calibrated age range Yrs
VIT/2/2001/C1	1954	Sediment	1270±100	1290-1060
VIT/1/2001/C1	2699	-do-	Sample carbon insufficient for processing	

With best regards,

Thanking you,

Yours faithfully,

B Sekar

(B.Sekar)

Dr.C.P.Rajendran

Scientist

P.B.7250, Akkulam

Trivandrum-695 031.

Wedakkanchen

Delivered-To: rajen@md3.vsnl.net.in
From: "Dr. B. Sekar" <sekarb@bsip.res.in>
To: "c p rajendran" <rajen@md3.vsnl.net.in>
Subject: calib request
Date: Mon, 10 Jun 2002 10:05:58 +0530
X-Mailer: Microsoft Outlook Express 5.00.2314.1300

Dr.B.Sekar
Radiocarbon Dating Laboratory

Dear Dr.Rajendran,

Thank you very much for your mail regarding calbration of your sample. I am herewith sending calib data you wanted. I will let you know as soon as your remaining samples are processed.

Wth best regards,

Thanking you,

Yours faithfully,

UNIVERSITY OF WASHINGTON

QUATERNARY ISOTOPE LAB

RADIOCARBON CALIBRATION PROGRAM REV 4.3

based on Stuiver, M. and Reimer, P.J., 1993, Radiocarbon, 35, p. 215-230.

Listing file: c14res.doc

Export file: c14res.txt

#

#BS-1651

S-2354

No.1/o/D/99, Sediment, Acid pretreatment

#Radiocarbon Age BP 680 +/- 90

Reference

Calibrated age(s) cal BP 654 (Stuiver et al., 1998a)

cal BP age ranges obtained from intercepts (Method A):

one Sigma** cal BP 681 - 621 607 - 554

two Sigma** cal BP 759 - 749 743 - 523

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:

Wadakhandeni

1 sigma cal BP 681 (654) 554

2 sigma cal BP 759 (654) 523

#

References for calibration datasets:

Stuiver, M., Reimer, P.J., Bard, E., Beck, J.W.,

Burr, G.S., Hughen, K.A., Kromer, B., McCormac, F.G.,

v.d. Plicht, J., and Spurk, M. (1998a)

Radiocarbon 40:1041-1083.

Stuiver, M., Reimer, P.J., and Braziunas, T.F. (1998b)

~~Intcal~~ INTCAL98 Radiocarbon age calibration. Radiocarbon 40(3), p.1041-1083.

Radiocarbon 40:1127-1151. (revised dataset);

Stuiver, M. and Braziunas, T.F. (1993) The Holocene

3:289-305. (original dataset)

Comments:

* This standard deviation (error) includes a lab error multiplier.

** 1 sigma = square root of (sample std. dev.^2 + curve std. dev.^2)

** 2 sigma = 2 x square root of (sample std. dev.^2 + curve std. dev.^2)

where ^2 = quantity squared.

[ ] = calibrated with an uncertain region or a linear

extension to the calibration curve

0* represents a "negative" age BP

1955* denotes influence of nuclear testing C-14

NOTE: Cal ages and ranges are rounded to the nearest year which

may be too precise in many instances. Users are advised to

round results to the nearest 10 yr for samples with standard

deviation in the radiocarbon age greater than 50 yr.

Delivered-To: rajen@md3.vsnl.net.in
From: "Dr. B. Sekar" <sekarb@bsip.res.in>
To: "c p rajendran" <rajen@md3.vsnl.net.in>
Subject: calib request
Date: Tue, 11 Jun 2002 09:41:17 +0530
X-Mailer: Microsoft Outlook Express 5.00.2314.1300

Wadakarda

Dr.B.Sekar
Radiocarbon Dating Laboratory

Dear Dr.Rajendran,
Thank you very much for your mail. I am herewith sending you the calib data.
with best regards,

Thanking you,

Yours faithfully,

UNIVERSITY OF WASHINGTON

QUATERNARY ISOTOPE LAB

RADIOCARBON CALIBRATION PROGRAM REV 4.3

based on Stuiver, M. and Reimer, P.J., 1993, Radiocarbon, 35, p. 215-230.

Listing file: c14res.doc

Export file: c14res.txt

#

#BS-1651

S-2354

No.1/O/D/99, Sediment, Acid pretreatment

#Radiocarbon Age BP 680 +/- 90

Reference

Calibrated age(s) cal AD 1296 (Stuiver et al., 1998a)

cal BP 654

cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):

one Sigma** cal AD 1269 - 1329 (681 - 621)

1343 - 1396 (607 - 554)

two Sigma** cal AD 1191 - 1201 (759 - 749)

Wadakancheri

1207 - 1427 (743 - 523)

Summary of above:

maximum of cal age ranges (cal ages) minimum of cal age ranges:

1 sigma cal AD 1269 (1296) 1396

cal BP 681 (654) 554

2 sigma cal AD 1191 (1296) 1427

cal BP 759 (654) 523

#

References for calibration datasets:

Stuiver, M., Reimer, P.J., Bard, E., Beck, J.W.,

Burr, G.S., Hughen, K.A., Kromer, B., McCormac, F.G.,

v.d. Plicht, J., and Spurk, M. (1998a)

Radiocarbon 40:1041-1083.

Stuiver, M., Reimer, P.J., and Braziunas, T.F. (1998b)

Radiocarbon 40:1127-1151. (revised dataset);

Stuiver, M. and Braziunas, T.F. (1993) The Holocene

3:289-305. (original dataset)

Comments:

* This standard deviation (error) includes a lab error multiplier.

** 1 sigma = square root of (sample std. dev.^2 + curve std. dev.^2)

** 2 sigma = 2 x square root of (sample std. dev.^2 + curve std. dev.^2)

where ^2 = quantity squared.

[ ] = calibrated with an uncertain region or a linear

extension to the calibration curve

0* represents a "negative" age BP

1955* denotes influence of nuclear testing C-14

CENTRE FOR EARTH SCIENCE STUDIES
P.B. No.7250, Akkulam
Trivandrum 695031
Kerala, INDIA
Tel: 0471-2445803
Fax: 0471-2442280

BSIP

C.P. Rajendran
Scientist

April 16, 2004

Dear Dr. Chakraborty:

Enclosed are nine samples, which are sent to you for radiocarbon dating. Following is the details of the samples from Cambay basin.

No.	Sample No.	Locality	Material
1	C/K/T2/D2	Kathane	Carb. Sediment
2	C/B/T1/4	Baruchh	"
3	C/B/T1/3	Baruchh	"
4	C/B/T1/2	Baruchh	"
5	C/U/T1/D1	Uthalia	"
6	C/T/T1/4	Surat	"
7	MB/T1/D1	Motibaru	"
8	CN/TC/1	Car Nicobar	Calc. Sediment
9	CN/SA/1	Car Nicobar	"

Looking forward to hearing from you

Yours sincerely

CPR

C.P. Rajendran

To

Dr. Supriyo Chakraborty
Head
Radio Carbon Dating Laboratory
53, University Road
Lucknow 226 007

April 28, 2004

Dear Dr. Chakraborty

As indicated in my email message, I am sending you one more sample to be dated. The description of the sample is as given under.

Sample ID	Location	Material
K/Q/PA/1	Paravur	Charcoal

I would appreciate if you would include this also in the earlier lot. The total number of samples sent to you adds up to ten, including this.

Best regards

Yours sincerely

C.P. Rajendran

BSIP
C14 date Car Nic

August 18, 2004

Dear Dr. Rajendran,

Greetings from Lucknow!

So far we could process two of your samples and one counting result has been finalised as given below.

CN/TC/1 C-14 AGe: 5420+/-80 Cal Age: 6002-6008 in yr BP (1 sigma)

The other sample CN/SA/1 though has been finished counting but we suspect some processing problem. Hence it has been reprocessed and counting is underway. We will let you know the date of this sample within a couple of weeks. Remaining samples we plan to process in September. Kindly bear with us for the inadvertent delay.

With best regards,
Sincerely,

S. Chakraborty

CPR/53/05

March 30, 2005

Sir:

Enclosed please find a packet containing 3 slides with BSIP identification numbers. I happened see this along with my sample collection. This must have reached many years ago through some of my friends in BSIP, when they visited me. I am not able to recollect who brought this here. Any way, I am returning this, as I do not find any need.

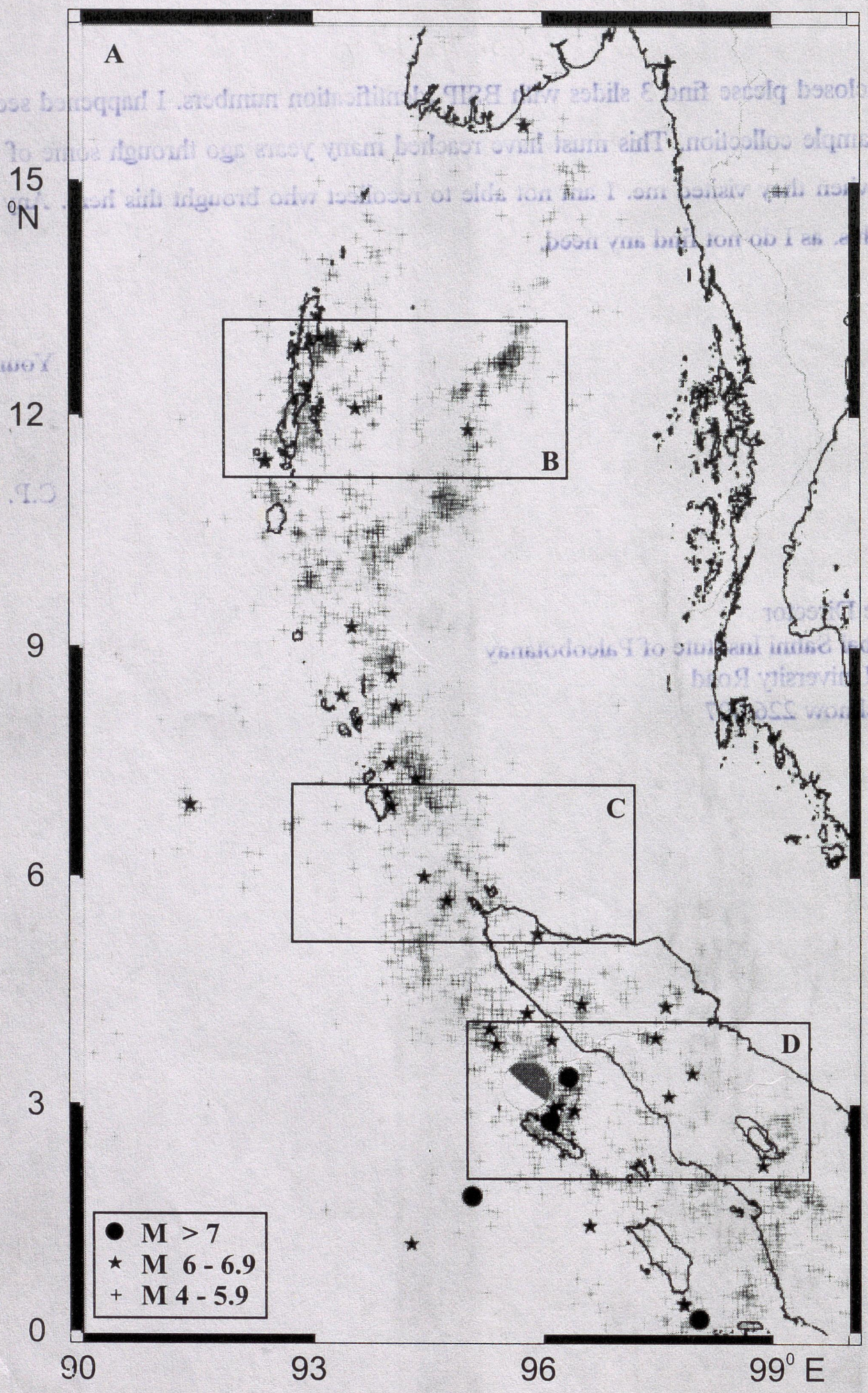
Yours sincerely

CP

C.P. Rajendran

To

The Director
Birbal Sahni Institute of Paleobotanay
53 University Road
Lucknow 226 007


A
B
C
D
15
0N
12
9
6
3
0
90
93
96
99 0 E
M > 7
M 6 - 6.9
M 4 - 5.9

September 19, 2005

Dear Dr. Chakraborty:

I am sending you 10 samples for carbon dating at your laboratory. The sample logs are deposited along with the samples.

Please confirm receiving the parcel.

Thanking you

Yours sincerely

C.P. Rajendran

To

Dr. Supriyo Chakraborty
Head
Radiocarbon Dating Laboratory
Birbal Sahni Institute of Palaeobotany
53, University Road
Lucknow 226 007

NOTE

Enclosed please find the copy of the invoice from the Current Science towards reprint charges of our paper entitled "Near-field observations on the Coseismic deformation associated with the 26 December " to be published in the Journal, Current Science. A draft for Rs.9600/- may kindly be issued payable to Current Science Association, Bangalore as reprint charges. Debit the expenses to PLAN (216).

C.P. Rajendran
PI, PLAN (216)

Through

The Head
GSD

To

The Registrar
CESS

19/9/05

mailed

<u>Details of Sample ID (Mailed to BSIP, Lucknow)</u>

1	RG/Peat/1	
2	RG/Peat/2	4320 ± 120
3	RG/Peat/3	3070 ± 120
4	RG/peat/4	4890 ± 120
5	RG/Wood/1	740 ± 100.
6	PA/Peat/1	
7	GF (A)/FB/D	
8	GF (B) FB/D	
9	CB/HUT/OT	
10	MN/Sill2/S3	1050 ± 100

Arun_note
Brochure_note
note_ct
July 4

CPR/150/05 September 28, 2005

Dear Dr. Chakraborty:

I am sending you one more sample for carbon dating at your laboratory (Sample ID: MB/Trench/L4). The sample log is deposited with the samples. This should be treated as part of the earlier bunch of samples.

Please confirm receiving the parcel,

Thanking you

Yours sincerely

C.P. Rajendran

To

Dr. Supriyo Chakraborty
Head
Radiocarbon Dating Laboratory
Birbal Sahni Institute of Palaeobotany
53, University Road
Lucknow 226 007

430 PROFORMA FOR BIODATA OF INVESTIGATORS

A. Name : DR. A.R. CHAUDHRI

B. Date of Birth: 18th August, 1967

C. Institution : Kurukshetra University

D. Whether belong to SC/ST : No

E. Academic (M.Sc. onwards) and professional career

Degree/Position held	Year	University/Institution
M.Sc. (Hons.) Geology	1988	Panjab University, Chandigarh
UGC-CSIR NET Examination	1988	Conducted by UGC-CSIR
UGC Junior Research Fellow	1988-1990	Panjab University, Chandigarh
UGC Senior Research Fellow	1990-1993	Panjab University, Chandigarh
Ph.D.	1992	Panjab University, Chandigarh
Lecturer	1993-1998	Kurukshetra University
Senior Lecturer	1998-Continuing	Kurukshetra University

F. **Award/Prize/Certificate etc. won by investigator:**

1. Stood first in the Panjab University consecutively for three years during B.Sc. Hons. Geology.

   AWARDED UNIVERSITY GOLD MEDAL

2. Awarded UGC National Scholarship in 1988.

3. Awarded University Merit Certificate in M.Sc. Hons. Geology.

G. Publications (Number only)

Books : Nil

Research Papers, reports: Twelve published, two accepted for publication

Patents: Nil

Others please specify : Abstracts Seven

Kerala-Pattanam

October 3, 2005

Dear Dr. Chakraborty:

Enclosed is yet another sample, which needs to be carbon-dated at your lab. The sample id is K/Q/PA/2. Age: 9510 ± 130

Kindly include this in my list of sample, sent earlier.

Thanking you

Yours sincerely

C.P. Rajendran

To

Dr. Supriyo Chakraborty
Head
Radiocarbon Dating Laboratory
Birbal Sahni Institute of Palaeobotany
53, University Road
Lucknow 226 007

B Available equipment and accessories to be utilized for the project

Sl. No.		Name of equipment and accessories	Model and make	Remarks
a) Available within investigators group	1	N.A.		
	2			
	3			
b) Available in the investigators Deptt.	4	Sieve Shaker		
	5	Sieves		
	6			
c) Available elsewhere in the institution or in the region	7			
	8			
	9			

Note: Please make sure that the aforesaid facilities and equipment will be available for the project

डा० बी. शेखर
रेडियो कार्बन डेटिंग लैब
Dr. B. Sekar
Radiocarbon Dating Laboratory

(7)

BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY
1946

बीरबल साहनी पुरावनस्पतिविज्ञान संस्थान, लखनऊ
BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY
५३, विश्वविद्यालय मार्ग,
53, University Road,
लखनऊ-२२६ ००७,
Lucknow-226 007,
(भारत) (INDIA)

(भारत सरकार के विज्ञान एवं प्रौद्योगिकी विभाग का एक स्वायत्तशासी संस्थान)
(AN AUTONOMOUS INSTITUTE UNDER DEPARTMENT OF SCIENCE & TECHNOLOGY, GOVERNMENT OF INDIA)

No. C-1189 Date 13/11/05

Dear Dr.Rajendran,

I am herewith sending you the result of ^{14}C dating of one of the samples sent by you in the present lot. I will send the result of remaining samples as soon as they are ready. Kindly acknowledge the receipt of the results and please give your comments on the dates.

Sample No	BS No./ S.No.	Age of the sample based the value of $T_{1/2}$= 5570±30 YBP	Calibrated age Yr BP	Calibrated age range Yr BP
GF GP(A)-FB-D 2487 Calcareous Sediment		12820±480	15460	16030-14300

With best regards,

Thanking you,

Yours faithfully,

B Sekar

(B.Sekar)

Dr.C.P.Rajendran
Scientist, ESD,
CESS, Akkulam,
Trivandrum-695 037.

cbs@001@gmail.com
Email : ~~sekarb@bsip.res.in~~, sekar_b2001@yahoo.co.in ● Phone (O) +91-0522-2740008, 2740011, 2740470
Resi : 0522-2346022 ● Mobile : 0522-3235184 ● Fax + 91-0522-2740098, 2740485 ● PO BOX 106 ● Gram : PALAEOBOTANY

Date: Tue, 03 Jan 2006 05:24:33 +0000 (GMT)
From: B Sekar <sekar_b2001@yahoo.co.in>
Subject: C-14 dates
To: rajen@md3.vsnl.net.in

Dear Dr.Rajendran,

I am herewith sending ^{14}C dating results of three more sediment samples sent by you in the present lot. I will inform you the results of remaining samples as soon as they are ready. Kindly acknowledge the receipt of results of the samples and give your comments on the dates as early as possible.

Sample No./ BS NO Age of the sample based on the Calib Age Calibrated age range Depth(cm) value of half life=5570±30(yrs BP) (Yrs BP) (yrs BP)

Panchevadi - Middle Andaman

PA/Peat/1 2505 1490±140 1350 1530-1290
~~1290~~

K/Q/PA/2 2501 9510±130 10740 11110-10580
Peat (Kerala - Pattanam)

M/B/T1/L4 2507 1490±110 1350 1520-1290
Sediment (Mahabalipuram)

with best regards,

Thanking you,

Yours faithfully,

(B.Sekar)

4

Date: Wed, 18 Jan 2006 12:17:06 +0000 (GMT)
From: B Sekar <sekar_b2001@yahoo.co.in>
Subject: Re: samples
To: cp_r@vsnl.com

Dear Dr.Rajendran,

I am herewith sending ^{14}C dating results of four more sediment samples sent by you in the present lot. I will inform you the remaining samples as soon as they are ready. Kindly acknowledge the receipt of results of the samples and give your comments on the dates as early as possible.

Sample No./ BS NO Age of the sample based on the Calib Age Calibrated age range Depth(cm) value of half life=5570±30(yrs BP) (Yrs BP) (yrs BP)

RG/Peat/1	2510	Modern	N.A	N.A.
RG/Peat/2	2511	4320±130	4860	5050-4730
GF/B/FB/D Cal.Sediment	2513	5990±120	6830	6990-6670
CB/HWT/OT Cal.Sediment	2515	8220±160	9240	9470-9010

with best regards,

Thanking you,

Yours faithfully,

(B.Sekar)

4

BSIP
14 Feb. 2006

Date: Wed, 15 Feb 2006 05:26:47 +0000 (GMT)
From: B Sekar <sekar_b2001@yahoo.co.in>
Subject: Re: samples
To: "C.P.Rajendran" <cp_r@vsnl.com>

Dear Dr.Rajendran,

I am herewith sending ^{14}C dating results of four more samples sent by you in the present lot. Kindly acknowledge the receipt of results of the samples and give your comments on the dates as early as possible.

Sample No./ BS NO Age of the sample based on the Calib Age Calibrated age range Depth(cm) value of half life=5570±30(yrs BP) (Yrs BP) (yrs BP)

MN/Silli/S3 Charcoal	2521	1050±100	950	1060-800.
RG/Peat/4	2527	4690±120	5450	5590-5300
RG/Peat/3	2528	3070±120	3260	3440-3080
RG/Wood/1	2530	740±100	670	740-570

with best regards,

Thanking you,

Yours faithfully,

(B.Sekar)

विज्ञान और प्रौद्योगिकी विभाग
Department of Science & Technology

BSIP

Vanagiri samples for BSIP

Kaveripattanam - 31/3/2006

1. V/R/T2 — Reed from top tsunami layer

2 (a) VB5/E/D(1)
3. (b) VB5/E/D(2) — Bulk sample from the soil just above the older tsunami Eastern wall

~~3. VB5/E~~

4. V/SB3 — Soil from the top of ~~t~~ younger tsunami

File Date → BSIP
20/2/2006.

Dear Dr.Rajendran,

Thank you for your mail. I am herewith sending ^{14}C dating results of all the samples sent by you in the present lot with 2 sigma calibration as well as AD/BC data. Kindly acknowledge the receipt of results of the samples and give your comments on the dates as early as possible.

Sample No./ Depth(cm)	BS NO	Age of the sample based on the value of half life=5570±30(yrs BP)	Calib Age (Yrs BP)/ Yrs BC	Calibrated age range 1 sigma (yrs BP)/ YrsBC	2 sigma/ YrsBC
GP(A)-FB-D	2487	12820±480	15460	16030-14300	16630-13830
Cal.Sed.			13510	14080-12350	14680-11880
K/Q/PA/2	2501	9510±130	10740	11110-10580	11190-10420
Peat			8790	9160-8630	9240-8470
PA/Peat/1	2505	1490±140	1350	1530-1290	1710-1150
			600 AD	420-660 AD	250-800 AD
M/B/T1/L4	2507	1490±110	1350	1520-1290	1690-1180
Sediment			600 AD	430-660 AD	260-770 AD
RG/Peat/1	2510	Modern	N.A	N.A.	N.A.
RG/Peat/2	2511	4320±130	4860	5050-4730	5310-4530
			2910	3100-2780	3360-2580
GF/B/FB/D	2513	5990±120	6830	6990-6670	7210-6500
Cal.Sediment			4880	5040-4720	5260-4550
CB/HWT/OT	2515	8220±160	9240	9470-9010	9530-8650
Cal.Sediment			7290	7520- 7060	7580-6700
MN/Silli/S3	2521	1050±100	950	1060-800	1220-740
Charcoal			1000 AD	890-1150 AD	730-1210 AD
RG/Peat/4	2527	4690±120	5450	5590-5300	5650-5050
			3500	3640-3350	3700-3100
RG/Peat/3	2528	3070±120	3260	3440-3080	3550-2930
			1310	1490-1130	1600-980
RG/Wood/1	2530	740±100	670	740-570	910-540
			1280 AD	1220-1380	1040-1410

with best regards,

Thanking you,

Yours faithfully,

(B.Sekar)

CENTRE FOR EARTH SCIENCE STUDIES

P.B. No.7250, Akkulam
Trivandrum 695031
Kerala, INDIA
Tel: 0471-2445803
Fax: 0471-2442280

C.P. Rajendran
Scientist

CPR/39/2006

March 31, 2006

Dear Dr. Chakraborty

I am sending you additional four samples for radiocarbon dating.

1. V/R/T2
2. VB5/E/D(1)
3. VB5/E/D(2) Duplicate
4. V/SB3

Kindly send me an invoice including the earlier samples. I will send you the sample record sheets shortly.

Yours sincerely

C.P. Rajendran

To

Dr. Supriyo Chakraborty
Scientist-In charge, C-14 Laboratory
BIrbal Sahni Institute of Paleobotany
53 University Road
Lucknow-226007

payment sent m...

Dear Dr. Rajendran,

We have received the following samples whose payments are due. I will request the concerned person to send you a proforma invoce. Please note that starting April 1 the fee will be slightly higher due to the revision of the service taxes.

Best reagrds,

Supriyo

Sample ID	Date Received	Status of payment and data sheet	
V/R/T2	5-4-06	- due-	Varagiri
V/SB3	5-4-06	- due -	Varagiri
VB5/E/D(2)	5-4-06	- due -	Varagiri
VB5/E/D(1)	5-4-06	- due -	Varagiri
MA/BR/1	18-04-06	- due -	Mahim beach, Maharashtra
3940±100 MA/BR/2	18-04-06	- due - Mahim, Maharashtra	Mahim beach - Maharashtra.
C-1	28-04-06	- due - Carbon from Wagad SST	~~S~~ Kharoi
C-2	28-04-06	- due - Collected from layer 2	~~Bhudarmora~~ -
C-3	28-04-06	- due - [illegible]	Bhudarmora

Budharmora (Bhuj) Samples 18/Sept./2006.

Dear Dr. Rajendran,

Enclosed pls see the result of two samples. The other sample C-1 could not be done due to low carbon yield.

Sample ID	BS No	C-14 Age	Cal Age range (1 sigma) yr BP
C-2	2625	15,320±140	18,640 - 18,000
C-3	2621	6110±110	7,180 - 6,760

Layer 2, bulk sedi.

Calcrete, under the occupation level.

With best regards,
Supriyo

Budharnusta - trench 2 September 2006

BSIP.

SAMPLE C2

Radiocarbon Age BP 15320 +/- 140

Calibration data set: intcal98.14c (Stuiver et al., 1998a)

% area enclosed under distribution	cal AD age ranges	relative area probability
68.3 (1 sigma)	cal BC 16678- 16041	1.000
95.4 (2 sigma)	cal BC 17021- 15749	1.000

SAMPLE C3

Radiocarbon Age BP 6110 +/- 110

Calibration data set: intcal98.14c (Stuiver et al., 1998a)

% area enclosed under distribution	cal AD age ranges	relative area probability
68.3 (1 sigma)	cal BC 5209- 5164	0.144
	5145- 5107	0.115
	5084- 4904	0.633
95.4 (2 sigma)	cal BC 5300- 4780	1.000

~~From~~ From BSIP
Sept - 20, 2006

Sample status, pls see the table

Sample ID	BS No	C-14 Age (yr BP)	Cal age yr BP (1 σ range)	
MA/BR-2	**2581**	**3940±100**	**4520 - 4240**	Mahim
MA/BR-1	**2611**	**2670±100**	**2860 - 2740**	Mahim
C3	**2621**	**6110±110**	**7180 - 6760**	Budhar
V/R/T/2	**2624**	**counting**		reed from top tsunami layer.
C2	**2625**	**15,320±140**	**18,640 - 18,000**	Budhar.
VB5/E/D(2)	**NA**	**processing**		bulk sample from soil above the older tsunami
V/SB3	NA	To process	soil from the top of younger tsunami	
VB5/E/D(1)	NA	To process		

Dear Dr. Rajendran,

12/NOV/2006

Pls see the table below:

Sample ID	BS No	C-14 Age (yr BP)	Cal age yr BP (1 σ range)
MA/BR-2	2581	3940±100	4520 - 4240
MA/BR-1	2611	2670±100	2860 - 2740
C3	2621	6110±110	7180 - 6760
V/R/T/2	2624	0	Modern
C2	2625	15,320±140	18,640 - 18,000
VB5/E/D(2)	2642	4210±220	5030 - 4420
V/SB3	NA	[C] determined	[C] = 0.05%
VB5/E/D(1)	NA	[C] determined	[C] = 0.047%

VB5/E/D(2)

THe blue numbers are current aalysis. The last two samples could not be dated due to very low carbon concentration. We have determined [C] which is shown above. If you would like you may send two other samples in lieu of these samples.

Best regards,
Supriyo

<u>Details of Sample ID</u> (Sent to BSIP, Lucknow)

1	RG/Peat/1	Modern
2	RG/Peat/2	4320±130
3	RG/Peat/3	
4	RG/peat/4	
5	RG/Wood/1	
6	PA/Peat/1	
7	GF (A)/FB/D	
8	GF (B) FB/D	
9	CB/HUT/OT	
10	~~MN/Sill2/S3~~ MN/Sill 1/S3	1050±100

Sample from ~~Vypeen~~ Pallanam (Vypeen)

9510±130 Yr. B. P

K/Q/PA/2 (Terry's id: TS18/51)

SF - 20.3 gms.

Depth 51 m -

(Vypeen-Pallanam).

(Earlier sample dated

K/Q/PA/1

C14 2660±90 Yr. B. P.

Dear Dr. Rajendran,

Please see the attachment for current status of your samples. BS numbers and the calibrated dates I will send you later.

Sample C/T/T1/4 has low organic C, if you could send additional amount we can try again.

Sample C/B/T1/3 appears to have very little organic carbon, we have not processed yet if you think the sample is very important we can try, otherwise we can date some other sample instead of this.

THe last sample K/Q/PA/1 - I feel very sorry appears to be missing. I will search again , in case it is not traceable could you pls send me additional sample.

With betst regards,
S. Chakraborty
--- "C.P.Rajendran" <cp_r@vsnl.com> wrote:

> Dear Dr. Chakraborty,
>
> Have you been able to complete my samples?
>
> Best regards
>
> CP Rajendran

April 18, 2007

Dear Dr. Supriyo:

I am sending herewith five soil samples for radiocrbon dating. The sample ids are given below:

1. BUR-1/C/2
2. PEA-1/B/1
3. CHO-1/B/1
4. BUR-2/B/1
5. LAX/B/1

Please send me an invoice showing the payment details for these samples.

Sincerely yours

C.P. Rajendran

To:

Dr. Supriyo Chakraborty
Radiocarbon Dating Laboratory
Birbal Sahni Institute of Palaeobotany
53, University Road
Lucknow 226007

April 18, 2007

Dear Dr. Raviprasad:

I am sending herewith nine soil samples for AMS dating. The sample ids are given below:

1. PEA-1/B/1
2. HUT/B/2
3. HUT/C/1
4. CHO=1/B/2/T
5. CHO-1/B/3/G
6. LAX/B/1
7. BUR-1/C/2
8. HUT/C/2
9. HUT/B/3

I hope you will be able to complete the analyses and let me know the results at the earliest.

Sincerely yours

C.P. Rajendran

To:

Dr. Raviprasad
Radiocarbon AMS Laboratory
Institute of Physics
Sachivalaya Marg
Bhubaneshwar 751005
Orissa

Makran samples.

INDIAN INSTITUTE OF SCIENCE
BANGALORE 560 012, INDIA

C.P. Rajendran
Centre for Earth Sciences
e mail: cprajendran@ceas.iisc.ernet.in
alt.e-mail: cp.rajendran@yahoo.com
Tel: +91-80 2293 3402/09480707044

December 1, 2008

Dear Dr. Nautiyal:

Please refer to my earlier e-mail correspondence with respect to the analyses of samples from the Makran Coast in order to understand the earthquake recurrence and tectonism. We have agreed to conduct this study as a collaborative study. I am sending the following samples for age determination at your radiocarbon laboratory.

Kindly acknowledge the receipt.

Sincerely,

C.P. Rajendran

Dr. C.M. Nautiyal
Radiocarbon Lab.
Birbal Sahni Institute of Paleobotany
53, University Road
Lucknow 226007

0522-2712218(Res)
2740008, 2740011 (off)
Mob. 091-09415107078

1. B-1/M ✓
2. F-1/M ✓
3. P-4/M ✓
4. PB-1/M ✓
5. BA-2/M ✓
6. INCO-1/M ✓
7. STO-3/~~A~~A/M ✓
8. P-2/M ✓
9. P-3/M ✓
10. INCO-2/M ✓
11. ~~BC-1/M~~ BL-1/M
12. ~~STO-3/M~~ ✓ STO-3/B/M

The sample details are enclosed.

✓ another box -
Two boxes

Indian Institute of Science
Bangalore 560 012 India

C.P. Rajendran
Ramanujan Fellow
Centre for Earth Sciences
E mail: cprajendran@ceas.iisc.ernet.in
080 2293 3402; 09480707044

February 3, 2009

Dear Dr. Nautiyal:

Please refer to your message regarding the discrepancy in the sample list and forms. I am enclosing the fresh sample forms along with a list of simples.

Sincerely,

C.P. Rajendran

Dr. C.M. Nautiyal
Radiocarbon Lab.
Birbal Sahni Institute of Paleobotany
53, University Road
Lucknow 226007

1. B-1/M
2. F-1/M
3. P-4/M
4. PB-1/M
5. BA-2/M
6. INCO-1/M
7. STO-3/A/M
8. P-2/M
9. P-3/M
10. INCO-2/M
11. BL-1/M
12. STO-3/B/M

Makran
liquefaction: 856 ± 20 B.P.

CALIB RADIOCARBON CALIBRATION PROGRAM*

*To be used in conjunction with:
Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.

CEaS
249 ± 23
Marine Shell
Radiocarbon Age 856±20
Delta R = 12±34
Calibration data set: marine04.14c
Hughen et al. 2004
One Sigma Ranges: [start:end] relative area
[cal AD 1445: cal AD 1503] 1.
Two Sigma Ranges: [start:end] relative area
[cal AD 1415: cal AD 1547] 1.

Ranges marked with a * are suspect due to impingment on the end of the calibration data set

KA Hughen, MGL Baillie, E Bard, A Bayliss, JW Beck, C Bertrand, PG Blackwell,
CE Buck, G Burr, KB Cutler, PE Damon, RL Edwards, RG Fairbanks, M Friedrich,
TP Guilderson, B Kromer, FG McCormac, S Manning, C Bronk Ramsey, PJ Reimer,
RW Reimer, S Remmele, JR Southon, M Stuiver, S Talamo, FW Taylor,
J van der Plicht, and CE Weyhenmeyer (2004), Radiocarbon 46:1059-1086.

15551

16 A Form.

1.14 lakhs

Makran samples

Radiocarbon dates:

The percentages within brackets indicate the percentage of CO-2 from the sample.
Dead Co-2 was added to make it to 100%. This means the uncertainty is higher if
more CO-2 was added.

In one case, the date is given as 50,000 yrs. It could be higher than this.

1. S-3932, BS-3086 P-2/M, Shell: 2270 Yrs +- 100 Yrs (84%)
2. S-3935, BS-3089, P-3/M, Shell: 3170 Yrs +- 100 Yrs (81%)
3. S-3936, BS-3090, INCO-2/m, Kankar: 18460 Yrs +- 180 Yrs (89%)
4. S-3937, BS-3091, BA- 3/M, Shell: 7260 Yrs +- 120 Yrs (52%)
5. S-3938, BS-3092, BA-2/M, Shell: 3980 Yrs +- 110 Yrs (62%)
6. S-3939, BS-3083, Calc. Sed.: 23910 Yrs +- 260 Yrs (98%)
7. S- 3874,BS-3030, STO-3/A/M, shell, 26000 Yrs +- 320 Yrs (82%)
8. S-3876, BS-3032, PB-1/M, shell, 46050 Yrs +- 4280 Yrs (60%)
9. S-3934, BS-3088, P-4, shell, >50,000 Yrs +- 7070 Yrs (saturation) (100%)

March 2, 2009

Laccadives Samples

Dear Dr. Nautiyal:

I am sending you the following ssmples for age determination at your radiocarbon laboratory. Kindly send me an invoice for sending you the payment.

Kindly acknowledge the receipt.

Sincerely,

C.P. Rajendran

Dr. C.M. Nautiyal
Radiocarbon Lab.
Birbal Sahni Institute of Paleobotany
53, University Road
Lucknow 226007

Phone : 0522-2712218 (Res), 2740008, 2740011 (Off), Mob : 091-09415107078

1. KV-1
2. A-B-!
3. A-B-2
4. A-B-3
5. KAV-P-1
6. KAV-P-2
7. KAV-P-3

The sample details are enclosed.

Sample sent on 2/3/09.

Lakshadweep samples (January 2009) BSIP

1. KV-1 : In front of the Kavaratti guest house; N 10°33.444’ (from the high tide level) 28-1-09 — Coral conglomerate E 072° 38.294
2. A-B-1 : Agatti borehole; 12 m; 10°32’04’ 31-1-09
3. A-B-2 : Agatti borehole; 18.75 m E 72°12'11"
4. A-B-3 : Agatti borehole; 21.5 m
5. KAV-P-1 : 4.5 m; Kavaratti echogram profile- harbour to offshore ridge 30-01-09
6. KAV-P-2 : 7m; Kavaratti echogram profile- harbour to offshore ridge
7. KAV-P-3 ; 13.1 m; Kavaratti echogram profile- harbour to offshore ridge

RADIOCARBON SAMPLE RECORD

(One record, per sample. Copy as required.)

Birbal Sahni Institute of Palaeobotany, 53, University Road, Lucknow- 226007, Ph: 0522-2740008, Fax: 2740485

1. Submitter's name & address with phone, fax and e-mail CPRajendran IISc Bangalore	2. Date of submission 8/4/09	**3. For BSIP use only** p; Date of Acknowledgement with code (Institution/ Submitter/ Sample-ID/Date of receiving payment/ Page in Sample Register / Date of sample) Payment Received Yes/ No Details of Bank Draft: **Sample No. :** BS- **Processing Permitted:** Processed on: Age & Error Results Sent? **YES** ? NO? Reference:
4. Collector's name & address CPRajendran -Do-	5. Date of collection 31/3/09	
6. Sample ID/ Date of submission: (A simple, unambiguous label needed. Without this information, the sample will not be dated. Sample ID: K/1	**7. Details of payment made including amount and mode and no.**	
8. Describe the place, town, district, state, country of the sample submitted (for marine sample the oceanic area must be mentioned)		9. Lat N 9° 07.479' Long E 92° 48.594' Car Nicobar
10. Type of investigation (e.g) natural exposure, trial trench, systematic excavation, boring).	Natural exposure.	
11.Depth below surface in cms (profile to be provided)	12. Position within the profile	13. Occurrence of leaching or humus infiltration in profile Top of a coastal terrace.
14. (b) Depth at which root (lets) are detectable.	15. Material (Wood, charcoal, peat, shell or sediment Shelly material.	16. Weight (in gms) >500 g.

	etc.)	
17. Carbon content if known (%):	18. Occurrence (as sediment, as scattered fragment, pieces, layer? and context (grave, rock shelter, hearth, sequences) etc.	Layer

19. Presence of foreign matter, which could affect the date (rootlet, carbonate etc.)

Nil

20 Environmental conditions and any other important information (flooding, water logging, proximity to water reservoir, tectonic disturbance etc.)

Coastal terrace.

21. Method of sample collection, treatment (hand- picked, root- removed, preservative used, chemical treatment etc.) and packing.

Handpicked.

22. Have you submitted the entire sample? Yes ? No ?	22. Can you collect more samples?	
Yes.		No.

23 Correlation with culture, climatic phases etc. and associated finds.

24. Expected age and basis of age estimation.

> 5000 Years.

25 a) Brief description of the project (Title of project, host organization, sponsoring agency if different. If a BSIP project, please mention project no.).

Earthquake recurrence in Andaman + Niccobar.

(b) Status of the project and the relevance of the date and about the specific contribution the date is expected to make ?

Age of the terrace

26. (a). Stratigraphic sketch with chronological divisions (indicate the position of the sample in the sketch. If necessary, attach a diagram.

27 Relative priority (in the lot).

29. If you have been provided radiocarbon dates by us in the last few years please give us copies of the papers/report that you may have published and list the enclosures here.

30. Any other information that could help us in dating the sample or in setting priority.

Signatures of the submitter

C P Rajendran

Makran Samples 23/02/2010

Calibrated Ages

Friday, 22 January, 2010 6:35 PM

From:

"CHANDRA MOHAN NAUTIYAL" <cmnautiyal@yahoo.co.uk>
View contact details

To:

"CP Rajendran" <cprajendran@ceas.iisc.ernet.in>

Dear Dr. CPR,

It

CALIBRATED AGES

1. S-3932, BS-3086 P-2/M, Shell: 292 Yrs BC+- 118Yrs
2. S-3935, BS-3089, P-3/M, Shell: 1432 Yrs BC +- 106 Yrs
3. S-3936, BS-3090, INCO-2/m, Kankar: 20050 Yrs BC +- 275 Yrs
4. S-3937, BS-3091, BA- 3/M, Shell: 6124 Yrs BC +- 112
5. S-3938, BS-3092, BA-2/M, Shell: 2473 Yrs BC +- 163 Yrs
6. S-3939, BS-3083, Calc. Sed.: 26843 Yrs BC +- 433 Yrs

7. BS 3008 S- 3934
P-4/M, Shell, Calendric age: (BC) 51960 yrs BC +- 6933 yrs

Makran

Lab code	Sample code	14C BP (CRA)	14C Age SD years	Lab Error or added va	Delta R years	Delta R SD years	Marine C percent	Description optional	CalCurve Number
S-3932 BS-3086	P-2/M	2270	100	1	232	26	84	Marine shell/Makran/Arabian Sea	4
S-3935 BS-3089	P-3/M	3170	100	1	232	26	81	Marine shell/Makran/Arabian Sea	4
S-3936 BS-3090	INCO-2/m	18460	180	1	232	26	89	Marine shell/Makran/Arabian Sea	4
S-3937 BS-3091	BA- 3/M	7260	120	1	232	26	52	Marine shell/Makran/Arabian Sea	4
S-3938 BS-3092	Ba -2/M	3980	110	1	232	26	62	Marine shell/Makran/Arabian Sea	4
S-3939 BS-3083	Calc. sed.	23910	260	1	232	26	98	Marine shell/Makran/Arabian Sea	4
S-3974 BS-3030	STO-3/A/M	26000	320	1	232	26	82	Marine shell/Makran/Arabian Sea	4
S-3976 BS-3032	PB-1/M	46050	4280	1	232	26	60	Marine shell/Makran/Arabian Sea	4
S-3934 BS-3088	P-4	50000	7070	1	232	26	100	Marine shell/Makran/Arabian Sea	4
S-3928 BS-3082	INCO-1/M	25700	320	1	232	26	94	Marine shell/Makran/Arabian Sea	4

Makran-data-1

Makran Samples: Given that dead CO_2 was added to make the percentages 100. Values in the brackets of data provided indicate the percentage of CO_2 from the sample. Here, the calibration curve 3 (Marine09) has been used i.e. dead CO_2 is not accounted for.

Delta R = 249±23 **24.83 N and 65.92 E**	**Delta R = 212±25** **24.83 N and 65.92 E**	**Delta R = 232±26** **(average)**
CALIB RADIOCARBON CALIBRATION PROGRAM* Copyright 1986-2010 M Stuiver and PJ Reimer *To be used in conjunction with: Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230. S-3932 BS-3086 Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 2270±100 Delta R = 249±23 Calibration data set: marine09.14c # Reimer et al. 2009 One Sigma Ranges: [start:end] relative area [cal AD 236: cal AD 488] 1. Two Sigma Ranges: [start:end] relative area [cal AD 126: cal AD 603] 1. S-3935 BS-3089 Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 3170±100 Delta R = 249±23 Calibration data set: marine09.14c # Reimer et al. 2009 One Sigma Ranges: [start:end] relative area [cal BC 851: cal BC 578] 1. Two Sigma Ranges: [start:end] relative area [cal BC 961: cal BC 421] 1. S-3936 BS-3090 Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 18460±180 Delta R = 249±23 Calibration data set: marine09.14c # Reimer et al. 2009	CALIB RADIOCARBON CALIBRATION PROGRAM* Copyright 1986-2010 M Stuiver and PJ Reimer *To be used in conjunction with: Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230. S-3932 BS-3086 Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 2270±100 Delta R = 212±25 Calibration data set: marine09.14c # Reimer et al. 2009 One Sigma Ranges: [start:end] relative area [cal AD 188: cal AD 438] 1. Two Sigma Ranges: [start:end] relative area [cal AD 82: cal AD 566] 1. S-3935 BS-3089 Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 3170±100 Delta R = 212±25 Calibration data set: marine09.14c # Reimer et al. 2009 One Sigma Ranges: [start:end] relative area [cal BC 917: cal BC 649] 1. Two Sigma Ranges: [start:end] relative area [cal BC 1034: cal BC 471] 1. S-3936 BS-3090 Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 18460±180 Delta R = 212±25 Calibration data set: marine09.14c # Reimer et al. 2009	CALIB RADIOCARBON CALIBRATION PROGRAM* Copyright 1986-2010 M Stuiver and PJ Reimer *To be used in conjunction with: Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230. S-3932 BS-3086 Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 2270±100 Delta R = 232±26 Calibration data set: marine09.14c # Reimer et al. 2009 One Sigma Ranges: [start:end] relative area [cal AD 212: cal AD 465] 1. Two Sigma Ranges: [start:end] relative area [cal AD 99: cal AD 582] 1. S-3935 BS-3089 Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 3170±100 Delta R = 232±26 Calibration data set: marine09.14c # Reimer et al. 2009 One Sigma Ranges: [start:end] relative area [cal BC 887: cal BC 613] 1. Two Sigma Ranges: [start:end] relative area [cal BC 995: cal BC 440] 1. S-3936 BS-3090 Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 18460±180 Delta R = 232±26 Calibration data set: marine09.14c # Reimer et al. 2009

One Sigma Ranges: [start:end] relative area
[cal BC 19567: cal BC 19029] 0.978639
[cal BC 18683: cal BC 18662] 0.021361
Two Sigma Ranges: [start:end] relative area
[cal BC 19732: cal BC 18540] 1.

S-3937 BS-3091
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 7260±120
Delta R = 249±23
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 5664: cal BC 5455] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 5775: cal BC 5323] 1.

S-3938 BS-3092
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 3980±110
Delta R = 249±23
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 1866: cal BC 1576] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 1997: cal BC 1435] 1.

S-3939 BS-3083
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 23910±260
Delta R = 249±23
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 26445: cal BC 25892] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 26699: cal BC 25580] 0.971321
[cal BC 25286: cal BC 25074] 0.028679

S-3974 BS-3030

One Sigma Ranges: [start:end] relative area
[cal BC 19596: cal BC 19053] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 19848: cal BC 18563] 1.

S-3937 BS-3091
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 7260±120
Delta R = 212±25
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 5688: cal BC 5476] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 5823: cal BC 5363] 1.

S-3938 BS-3092
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 3980±110
Delta R = 212±25
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 1900: cal BC 1609] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 2047: cal BC 1462] 1.

S-3939 BS-3083
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 23910±260
Delta R = 212±25
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 26461: cal BC 25926] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 26734: cal BC 25601] 0.984116
[cal BC 25248: cal BC 25101] 0.015884

S-3974 BS-3030

One Sigma Ranges: [start:end] relative area
[cal BC 19582: cal BC 19032] 0.997179
[cal BC 18672: cal BC 18670] 0.002821
Two Sigma Ranges: [start:end] relative area
[cal BC 19790: cal BC 18552] 1.

S-3937 BS-3091
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 7260±120
Delta R = 232±26
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 5674: cal BC 5465] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 5800: cal BC 5342] 1.

S-3938 BS-3092
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 3980±110
Delta R = 232±26
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 1882: cal BC 1591] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 2019: cal BC 1447] 1.

S-3939 BS-3083
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 23910±260
Delta R = 232±26
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 26453: cal BC 25909] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 26715: cal BC 25590] 0.977607
[cal BC 25270: cal BC 25086] 0.022393

S-3974 BS-3030

Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 26000±320
Delta R = 249±23
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 28492: cal BC 27764] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 28845: cal BC 27555] 1.

S-3976 BS-3032
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 46050±4280
Delta R = 249±23
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[*cal BC 48051: cal BC 43747] 1.
Two Sigma Ranges: [start:end] relative area
[*cal BC 48051: cal BC 40129] 1.

S-3934 BS-3088 has an invalid age for it's selected calibration curve.
Valid radiocarbon ages are [448:46805]

S-3928 BS-3082
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 25700±320
Delta R = 249±23
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 28264: cal BC 27630] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 28587: cal BC 27341] 1.

Ranges marked with a * are suspect due to impingment on the end of the calibration data set

Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 26000±320
Delta R = 212±25
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 28540: cal BC 27791] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 28877: cal BC 27573] 1.

S-3976 BS-3032
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 46050±4280
Delta R = 212±25
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[*cal BC 48051: cal BC 43764] 1.
Two Sigma Ranges: [start:end] relative area
[*cal BC 48051: cal BC 40155] 1.

S-3934 BS-3088 has an invalid age for it's selected calibration curve.
Valid radiocarbon ages are [448:46805]

S-3928 BS-3082
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 25700±320
Delta R = 212±25
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 28279: cal BC 27644] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 28612: cal BC 27380] 1.

Ranges marked with a * are suspect due to impingment on the end of the calibration data set

Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 26000±320
Delta R = 232±26
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 28514: cal BC 27775] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 28861: cal BC 27563] 1.

S-3976 BS-3032
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 46050±4280
Delta R = 232±26
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[*cal BC 48051: cal BC 43755] 1.
Two Sigma Ranges: [start:end] relative area
[*cal BC 48051: cal BC 40141] 1.

S-3934 BS-3088 has an invalid age for it's selected calibration curve.
Valid radiocarbon ages are [448:46805]

S-3928 BS-3082
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 25700±320
Delta R = 232±26
Calibration data set: marine09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 28271: cal BC 27637] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 28598: cal BC 27359] 1.

Ranges marked with a * are suspect due to impingment on the end of the calibration data set

Makran-dates-2.

Makran Samples: Given that dead CO_2 was added to make the percentages 100. Values in the brackets of data provided indicate the percentage of CO_2 from the sample. Here, the calibration curve 4 (Marine09 + Northern Hemisphere09) has been used i.e. added dead CO_2 has been accounted for.

Delta R = 249±23 **24.83 N and 65.92 E**	ref: **Delta R = 212±25** **24.83 N and 65.92 E**	**Delta R = 232±26** **(average)**
CALIB RADIOCARBON CALIBRATION PROGRAM* Copyright 1986-2010 M Stuiver and PJ Reimer *To be used in conjunction with: Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.	CALIB RADIOCARBON CALIBRATION PROGRAM* Copyright 1986-2010 M Stuiver and PJ Reimer *To be used in conjunction with: Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.	CALIB RADIOCARBON CALIBRATION PROGRAM* Copyright 1986-2010 M Stuiver and PJ Reimer *To be used in conjunction with: Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.
S-3932 BS-3086 P-2/M Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 2270±100 Delta R = 249±23 Calibration data set: Marine/No. Hem # Reimer et al. 2009 One Sigma Ranges: [start:end] relative area [cal AD 134: cal AD 378] 1. Two Sigma Ranges: [start:end] relative area [cal AD 16: cal AD 508] 1.	S-3932 BS-3086 P-2/M Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 2270±100 Delta R = 212±25 Calibration data set: Marine/No. Hem # Reimer et al. 2009 One Sigma Ranges: [start:end] relative area [cal AD 94: cal AD 339] 1. Two Sigma Ranges: [start:end] relative area [cal BC 34: cal AD 453] 1.	S-3932 BS-3086 P-2/M Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 2270±100 Delta R = 232±26 Calibration data set: Marine/No. Hem # Reimer et al. 2009 One Sigma Ranges: [start:end] relative area [cal AD 116: cal AD 362] 1. Two Sigma Ranges: [start:end] relative area [cal BC 17: cal AD 477] 1.
S-3935 BS-3089 cal. year B.P. P-3/M Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 3170±100 Delta R = 249±23 Calibration data set: Marine/No. Hem # Reimer et al. 2009 One Sigma Ranges: [start:end] relative area [cal BC 985: cal BC 765] 1. Two Sigma Ranges: [start:end] relative area [cal BC 1148: cal BC 1144] 0.001027 [cal BC 1132: cal BC 576] 0.998973	S-3935 BS-3089 Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 3170±100 Delta R = 212±25 Calibration data set: Marine/No. Hem # Reimer et al. 2009 One Sigma Ranges: [start:end] relative area [cal BC 1007: cal BC 786] 1. Two Sigma Ranges: [start:end] relative area [cal BC 1207: cal BC 702] 0.991458 [cal BC 687: cal BC 662] 0.008542	S-3935 BS-3089 Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 3170±100 Delta R = 232±26 Calibration data set: Marine/No. Hem # Reimer et al. 2009 One Sigma Ranges: [start:end] relative area [cal BC 996: cal BC 775] 1. Two Sigma Ranges: [start:end] relative area [cal BC 1184: cal BC 653] 0.991295 [cal BC 645: cal BC 620] 0.008705
S-3936 BS-3090 1NCO-2/M Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 18460±180 Delta R = 249±23	S-3936 BS-3090 Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 18460±180 Delta R = 212±25	S-3936 BS-3090 Marine shell sample from Makran (Arabian Sea) Radiocarbon Age 18460±180 Delta R = 232±26

The C^{14} ~~age~~ reservoir effect calculated as 249±23 was subtracted from conventional ($\delta^{13}C$ corrected) ^{14}C data. The values are then converted to Calendar yr. B.P. (1950) using intcal04.14C calibration data set (Reimer et al., 2004) via the CALIB program (Stuiver & Reimer, 1993.

Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 19624: cal BC 19086] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 19947: cal BC 18589] 1.

S-3937 BS-3091 3/M
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 7260±120
Delta R = 249±23
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 5968: cal BC 5946] 0.073278
[cal BC 5924: cal BC 5717] 0.926722
Two Sigma Ranges: [start:end] relative area
[cal BC 6042: cal BC 5620] 1.

S-3938 BS-3092 BA ~~1~~ 2/M ~~1~~
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 3980±110
Delta R = 249±23
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 2182: cal BC 2179] 0.006088
[cal BC 2149: cal BC 1860] 0.956168
[cal BC 1842: cal BC 1824] 0.037744
Two Sigma Ranges: [start:end] relative area
[cal BC 2302: cal BC 1687] 1.

S-3939 BS-3083
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 23910±260
Delta R = 249±23 Calc. sed.
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 26451: cal BC 25905] 1.

Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 19677: cal BC 19125] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 20092: cal BC 18874] 0.955494
[cal BC 18759: cal BC 18607] 0.044506

S-3937 BS-3091
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 7260±120
Delta R = 212±25
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 5971: cal BC 5942] 0.115065
[cal BC 5929: cal BC 5732] 0.884935
Two Sigma Ranges: [start:end] relative area
[cal BC 6055: cal BC 5628] 1.

S-3938 BS-3092
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 3980±110
Delta R = 212±25
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 2189: cal BC 1883] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 2347: cal BC 1726] 0.997715
[cal BC 1707: cal BC 1700] 0.002285

S-3939 BS-3083
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 23910±260
Delta R = 212±25
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 26467: cal BC 25937] 1.

Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 19643: cal BC 19099] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 20038: cal BC 18843] 0.941701
[cal BC 18779: cal BC 18599] 0.058299

S-3937 BS-3091
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 7260±120
Delta R = 232±26
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 5969: cal BC 5944] 0.094646
[cal BC 5926: cal BC 5724] 0.905354
Two Sigma Ranges: [start:end] relative area
[cal BC 6048: cal BC 5624] 1.

S-3938 BS-3092
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 3980±110
Delta R = 232±26
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 2187: cal BC 2161] 0.059489
[cal BC 2153: cal BC 1872] 0.940511
Two Sigma Ranges: [start:end] relative area
[cal BC 2327: cal BC 2325] 0.000372
[cal BC 2316: cal BC 1695] 0.999628

S-3939 BS-3083
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 23910±260
Delta R = 232±26
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 26458: cal BC 25920] 1.

Two Sigma Ranges: [start:end] relative area
[cal BC 26711: cal BC 25588] 0.976377
[cal BC 25273: cal BC 25084] 0.023623

S-3974 BS-3030 STO-3/A/M.
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 26000±320
Delta R = 249±23
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 28676: cal BC 28180] 0.708096
[cal BC 28119: cal BC 27831] 0.291904
Two Sigma Ranges: [start:end] relative area
[cal BC 28942: cal BC 27614] 1.

S-3976 BS-3032 PB-1/M
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 46050±4280
Delta R = 249±23
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[*cal BC 48051: cal BC 43861] 1.
Two Sigma Ranges: [start:end] relative area
[*cal BC 48051: cal BC 40305] 1.

S-3934 BS-3088 has an invalid age for it's selected calibration curve.
Valid radiocarbon ages are [448:46805]

S-3928 BS-3082 INCO-1
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 25700±320
Delta R = 249±23
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 28280: cal BC 27645] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 28613: cal BC 27383] 1.

Two Sigma Ranges: [start:end] relative area
[cal BC 26748: cal BC 25605] 0.988043
[cal BC 25235: cal BC 25114] 0.011957

S-3974 BS-3030
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 26000±320
Delta R = 212±25
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 28740: cal BC 28201] 0.767746
[cal BC 28096: cal BC 27849] 0.232254
Two Sigma Ranges: [start:end] relative area
[cal BC 28966: cal BC 27630] 1.

S-3976 BS-3032
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 46050±4280
Delta R = 212±25
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[*cal BC 48051: cal BC 43870] 1.
Two Sigma Ranges: [start:end] relative area
[*cal BC 48051: cal BC 40320] 1.

S-3934 BS-3088 has an invalid age for it's selected calibration curve.
Valid radiocarbon ages are [448:46805]

S-3928 BS-3082
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 25700±320
Delta R = 212±25
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 28298: cal BC 27660] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 28640: cal BC 27415] 1.

Two Sigma Ranges: [start:end] relative area
[cal BC 26727: cal BC 25597] 0.981854
[cal BC 25257: cal BC 25096] 0.018146

S-3974 BS-3030
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 26000±320
Delta R = 232±26
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 28702: cal BC 28189] 0.73309
[cal BC 28110: cal BC 27838] 0.26691
Two Sigma Ranges: [start:end] relative area
[cal BC 28954: cal BC 27622] 1.

S-3976 BS-3032
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 46050±4280
Delta R = 232±26
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[*cal BC 48051: cal BC 43865] 1.
Two Sigma Ranges: [start:end] relative area
[*cal BC 48051: cal BC 40312] 1.

S-3934 BS-3088 has an invalid age for it's selected calibration curve.
Valid radiocarbon ages are [448:46805]

S-3928 BS-3082
Marine shell sample from Makran (Arabian Sea)
Radiocarbon Age 25700±320
Delta R = 232±26
Calibration data set: Marine/No. Hem
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 28287: cal BC 27651] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 28626: cal BC 27398] 1.

Ranges marked with a * are suspect due to impingment on the end of the calibration data set # PJ Reimer, MGL Baillie, E Bard, A Bayliss, JW Beck, PG Blackwell, # C Bronk Ramsey, CE Buck, GS Burr, RL Edwards, M Friedrich, PM Grootes, # TP Guilderson, I Hajdas, TJ Heaton, AG Hogg, KA Hughen, KF Kaiser, B Kromer, # FG McCormac, SW Manning, RW Reimer, DA Richards, JR Southon, S Talamo, # CSM Turney, J van der Plicht, CE Weyhenmeyer (2009) Radiocarbon 51:1111-1150. # PJ Reimer, MGL Baillie, E Bard, A Bayliss, JW Beck, PG Blackwell, # C Bronk Ramsey, CE Buck, GS Burr, RL Edwards, M Friedrich, PM Grootes, # TP Guilderson, I Hajdas, TJ Heaton, AG Hogg, KA Hughen, KF Kaiser, B Kromer, # FG McCormac, SW Manning, RW Reimer, DA Richards, JR Southon, S Talamo, # CSM Turney, J van der Plicht, CE Weyhenmeyer (2009) Radiocarbon 51:1111-1150.	Ranges marked with a * are suspect due to impingment on the end of the calibration data set # PJ Reimer, MGL Baillie, E Bard, A Bayliss, JW Beck, PG Blackwell, # C Bronk Ramsey, CE Buck, GS Burr, RL Edwards, M Friedrich, PM Grootes, # TP Guilderson, I Hajdas, TJ Heaton, AG Hogg, KA Hughen, KF Kaiser, B Kromer, # FG McCormac, SW Manning, RW Reimer, DA Richards, JR Southon, S Talamo, # CSM Turney, J van der Plicht, CE Weyhenmeyer (2009) Radiocarbon 51:1111-1150. # PJ Reimer, MGL Baillie, E Bard, A Bayliss, JW Beck, PG Blackwell, # C Bronk Ramsey, CE Buck, GS Burr, RL Edwards, M Friedrich, PM Grootes, # TP Guilderson, I Hajdas, TJ Heaton, AG Hogg, KA Hughen, KF Kaiser, B Kromer, # FG McCormac, SW Manning, RW Reimer, DA Richards, JR Southon, S Talamo, # CSM Turney, J van der Plicht, CE Weyhenmeyer (2009) Radiocarbon 51:1111-1150.	Ranges marked with a * are suspect due to impingment on the end of the calibration data set # PJ Reimer, MGL Baillie, E Bard, A Bayliss, JW Beck, PG Blackwell, # C Bronk Ramsey, CE Buck, GS Burr, RL Edwards, M Friedrich, PM Grootes, # TP Guilderson, I Hajdas, TJ Heaton, AG Hogg, KA Hughen, KF Kaiser, B Kromer, # FG McCormac, SW Manning, RW Reimer, DA Richards, JR Southon, S Talamo, # CSM Turney, J van der Plicht, CE Weyhenmeyer (2009) Radiocarbon 51:1111-1150. # PJ Reimer, MGL Baillie, E Bard, A Bayliss, JW Beck, PG Blackwell, # C Bronk Ramsey, CE Buck, GS Burr, RL Edwards, M Friedrich, PM Grootes, # TP Guilderson, I Hajdas, TJ Heaton, AG Hogg, KA Hughen, KF Kaiser, B Kromer, # FG McCormac, SW Manning, RW Reimer, DA Richards, JR Southon, S Talamo, # CSM Turney, J van der Plicht, CE Weyhenmeyer (2009) Radiocarbon 51:1111-1150.

Indian Institute of Science

Centre for Earth Sciences

Dr. Kusala Rajendran

Associate Professor, Centre for Earth Sciences
Indian Institute of Science, Bangalore 560 012, India
Tel: +91 80 22932633, email: kusala@ceas.iisc.ernet.in

February 1, 2010

Dear Dr. Nautiyal

I am sending the following samples for age determination at your radiocarbon laboratory. Please find enclosed the sample forms.

1. RG/N/OP/02
2. RG/N/ST/O2

Kindly acknowledge the receipt of the samples.

Sincerely,

Kusala Rajendran

Dr. C. M. Nautiyal
Radiocarbon Dating Laboratory
Birbal Sahani Institute of Palaeobotany
53, Univeristy Road
Lucknow – 226007, India.
Email: cmnautiyal@yahoo.co.uk
Phone: 05222740008
Fax: 05222740485

RADIOCARBON SAMPLE RECORD

(One record, per sample. Copy as required.)

Birbal Sahni Institute of Palaeobotany, 53, University Road, Lucknow- 226007, Ph: 0522-2740008, Fax: 2740485

1. Submitter's name & address with phone, fax and e-mail KUSALA RAJENDRAN CEAS (IISc) BANGALORE	2. Date of submission 01/02/2010	3. For BSIP use only p; Date of Acknowledgement with code (Institution/ Submitter/ Sample-ID/Date of receiving payment/ Page in Sample Register / Date of sample) Payment Received Yes/ No Details of Bank Draft: **Sample No. :** BS- **Processing Permitted:** Processed on: Age & Error Results Sent? **YES** ? NO? Reference:
4. Collector's name & address KUSALA RAJENDRAN CEAS (IISC)	5. Date of collection 12/11/2009	
6. Sample ID/ Date of submission: (A simple, unambiguous label needed. Without this information, the sample will not be dated. SAMPLE ID: RG/N/ST/02	**7. Details of payment made including amount and mode and no.**	
8. Describe the place, town, district, state, country of the sample submitted (for marine sample the oceanic area must be mentioned)	PORT BLAIR (ANDAMAN)	9. Lat : Long : 11° 34.906' N 92° 44.166' E
10. Type of investigation (e.g) natural exposure, trial trench, systematic excavation, boring).	NATURAL EXPOSURE	
11.Depth below surface in cms (profile to be provided)	12. Position within the profile	13. Occurrence of leaching or humus infiltration in profile SUNKEN PROFILE (1 m BELOW SURFACE)
14 (b) Depth at which root (lets) are detectable. 1 m	15. Material (Wood, charcoal, peat, shell or sediment wood	16. Weight (in gms) >500 gms

	etc.)	
17. Carbon content if known (%):	18. Occurrence (as sediment, as scattered fragment, pieces, layer? and context (grave, rock shelter, hearth, sequences) etc.	- LAYER

19. Presence of foreign matter, which could affect the date (rootlet, carbonate etc.)

- NIL

20 Environmental conditions and any other important information (flooding, water logging, proximity to water reservoir, tectonic disturbance etc.)

- WATER LOGGING

21. Method of sample collection, treatment (hand- picked, root- removed, preservative used, chemical treatment etc.) and packing.

- HAND PICKED

22. Have you submitted the entire sample? Yes ? No ? YES	22. Can you collect more samples? NO	-

23 Correlation with culture, climatic phases etc. and associated finds.

-

24. Expected age and basis of age estimation.

~~EAP~~

25 a) Brief description of the project (Title of project, host organization, sponsoring agency if different. If a BSIP project, please mention project no.).

EARTHQUAKE RECURRENCE IN ANDAMAN & NICOBAR

(b) Status of the project and the relevance of the date and about the specific contribution the date is expected to make ?

AGE OF LOCAL SUBSIDENCE

26. (a). Stratigraphic sketch with chronological divisions (indicate the position of the sample in the sketch. If necessary, attach a diagram.

27 Relative priority (in the lot).

29. If you have been provided radiocarbon dates by us in the last few years please give us copies of the papers/report that you may have published and list the enclosures here.

30. Any other information that could help us in dating the sample or in setting priority.

Dr. Kusala Rajendran
Signatures of the submitter Associate Professor
Centre for Earth Sciences

RADIOCARBON SAMPLE RECORD

(One record, per sample. Copy as required.)

Birbal Sahni Institute of Palaeobotany, 53, University Road, Lucknow- 226007, Ph: 0522-2740008, Fax: 2740485

1. Submitter's name & address with phone, fax and e-mail KUSALA RAJENDRAN CEaS (IISc) BANGALORE	2. Date of submission 01/02/2010	**3. For BSIP use only** p; Date of Acknowledgement with code (Institution/ Submitter/ Sample-ID/Date of receiving payment/ Page in Sample Register / Date of sample) Payment Received Yes/ No Details of Bank Draft: **Sample No. :** BS- **Processing Permitted:** Processed on: Age & Error Results Sent? **YES** ? NO? Reference:
4. Collector's name & address KUSALA RAJENDRAN CEaS (IISc)	5. Date of collection 12/11/2009	
6. Sample ID/ Date of submission: (A simple, unambiguous label needed. Without this information, the sample will not be dated. SAMPLE ID: RG/N/OP/02	**7. Details of payment made including amount and mode and no.**	
8. Describe the place, town, district, state, country of the sample submitted (for marine sample the oceanic area must be mentioned)	PORT BLAIR (ANDAMAN)	9. Lat : Long : 11 34.871 N 92 44.170 E
10. Type of investigation (e.g) natural exposure, trial trench, systematic excavation, boring).	NATURAL EXPOSURE	
11. Depth below surface in cms (profile to be provided)	12. Position within the profile	13. Occurrence of leaching or humus infiltration in profile SUNKEN PROFILE (1m BELOW SURFACE)
14. (b) Depth at which root (lets) are detectable. 1m	15. Material (Wood, charcoal, peat, shell or sediment wood	16. Weight (in gms) >500 gms

	etc.)	
17. Carbon content if known (%):	18. Occurrence (as sediment, as scattered fragment, pieces, layer? and context (grave, rock shelter, hearth, sequences) etc.	- LAYER

19. Presence of foreign matter, which could affect the date (rootlet, carbonate etc.)

- NIL

20 Environmental conditions and any other important information (flooding, water logging, proximity to water reservoir, tectonic disturbance etc.)

- WATER LOGGING

21. Method of sample collection, treatment (hand- picked, root- removed, preservative used, chemical treatment etc.) and packing.

- HAND PICKED

22. Have you submitted the entire sample? Yes ? No ? YES	22. Can you collect more samples? NO	-

23 Correlation with culture, climatic phases etc. and associated finds.

-

24. Expected age and basis of age estimation.

25 a) Brief description of the project (Title of project, host organization, sponsoring agency if different. If a BSIP project, please mention project no.).

EARTHQUAKE RECURRENCE IN ANDAMAN & NICOBAR

(b) Status of the project and the relevance of the date and about the specific contribution the date is expected to make ?

AGE OF LOCAL SUBSIDENCE

26. (a). Stratigraphic sketch with chronological divisions (indicate the position of the sample in the sketch. If necessary, attach a diagram.

27 Relative priority (in the lot).

29. If you have been provided radiocarbon dates by us in the last few years please give us copies of the papers/report that you may have published and list the enclosures here.

30. Any other information that could help us in dating the sample or in setting priority.

Signatures of the submitter

Dr. Kusala Rajendran
Associate Professor
Centre for Earth Sciences

From: CHANDRA MOHAN NAUTIYAL <cmnautiyal@yahoo.co.uk>
Date: 16 March 2010 3:42:30 PM GMT+05:30
To: Kusala Rajendran <kusala@ceas.iisc.ernet.in>

There are 2 samples recd. (RG/N/OP/02 and RG/N/ST/02)for which DD is awaited. Pl confirm if the DD has been sent.

CMN
BSIP, 53, University Road, Lucknow- 226007. INDIA
Phone : 0522-2742937(Off), Mob : 091-09415107078

Indian Institute of Science
Bangalore 560 012

Dr. C.P. Rajendran
Ramanujan Fellow
Centre for Earth Sciences
E mail: cprajendran@ceas.iisc.ernet.in
080 2293 3402; 09535248004

March 23, 2010

Dear Dr. Nautiyal:

Please recall our conversation regarding seven samples which were last year in the month of March. I am informed by you that the samples are not found in your lab. I am sending you the repeat of the following five samples for age determination at your radiocarbon laboratory. These are parts of the samples retained by me and of which only five could be found..

Payment ~~of~~ has already been made against your invoice.

Kindly acknowledge the receipt of the samples.

Sincerely,

C.P. Rajendran

Dr. C.M. Nautiyal
Radiocarbon Lab.
Birbal Sahni Institute of Paleobotany
53, University Road
Lucknow 226007

Phone : 0522-2712218 (Res), 2740008, 2740011 (Off), Mob : 091-09415107078

1. KV-1
2. A-B-!
3. A-B-2
4. A-B-3
5. KAV-P-2

Lakhadweep / Car Nicobar.

From: CHANDRA MOHAN NAUTIYAL <cmnautiyal@yahoo.co.uk>
To: CP Rajendran <cp.rajendran@yahoo.com>
Sent: Tue, October 12, 2010 12:44:59 PM
Subject: Dates

1. S- 4023, BS- 3176, KV-1, Kavarali, Cal. Sed., Radiocarbon Age: 1770+- 70

2. S-4025, BS- 3178, K-1, Car Nicobar, Kankar Radiocarbon Age; 20,900 +- 220

3. S- 4029, BS- 3181, A-B-2, 18m,Agati, Cal Sed. Radiocarbon Age: 5070 +- 80

4. S- 4030, BS- 3182: MODERN

5. S-4022, BS- 3175, A-B-1, Agati, 12m, Cal Sed.

Radiocarbon Age: 4100 +- 80

All ages in yrs BP
Dr. Chandra Mohan Nautiyal
MSc (UOR/IIT-R); PhD (PRL/ GU); FGSI; F-NCSTC-NW; FSES
Member Executive, Vigyan Parishad and The Society of Earth Scientists

Rangachanga
Port Blair

Oct-25/2010

From: CHANDRA MOHAN NAUTIYAL <cmnautiyal@yahoo.co.uk>
> Date: 12 October 2010 2:52:41 PM GMT+05:30
> To: Kusala Rajendran <kusala@ceas.iisc.ernet.in>
> Subject: Dates
>
> Please find below 2 dates:
>
> 1. S- 4062, BS- 3212/RG/N/ST/02, Charcoal
> Modern
>
> 2. S- 4064, BS- 3214, RG/N/OP/2, 1.0 m, charcoal
>
> Radiocarbon Age: 1110 +- 70 Yrs
>
> Calibration and averaging yields: 940 Yrs AD +- 70 Yrs
>
> Dr. Chandra Mohan Nautiyal

From: "Vanessa Andrade" <vanessa@ceas.iisc.ernet.in>
> Date: 13 October 2010 10:18:07 AM GMT+05:30
> To: "Kusala Rajendran" <kusala@ceas.iisc.ernet.in>
> Subject: Dates_tree?
> Reply-To: vanessa@ceas.iisc.ernet.in
>
> S- 4064, BS- 3214, RG/N/OP/2, 1.0 m depth, charcoal
> Radiocarbon Age 1110±70
> Calibration data set: intcal09.14c
> # Reimer et al. 2009
> One Sigma Ranges: [start:end] relative area
> [cal AD 832: cal AD 836] 0.012355
> [cal AD 869: cal AD 1017] 0.987645 11° 34.706' N
> Two Sigma Ranges: [start:end] relative area
> [cal AD 712: cal AD 745] 0.022479 92° 44.166' E
> [cal AD 767: cal AD 1038] 0.977521
>
> S- 4062, BS- 3212/RG/N/ST/02, Charcoal
> Modern (??)
>
> On Tue, October 12, 2010 3:11 pm, Kusala Rajendran wrote:
>>

Indian Institute of Science
Bangalore 560 012

Prof. C.P. Rajendran
Ramanujan Fellow
Centre for Earth Sciences
E mail: *cprajendran@ceas.iisc.ernet.in*
080 2293 3402; 09535248004

April 2, 2012

To
Dr. C. M. Nautiyal
Scientist-in- Charge
Radio Carbon Dating Laboratory
Birbal Sahni Institute of Palaeobotany
53 University Road, Lucknow - 226007, India.

Dear Dr. Nautiyal

I am sending two samples for radiocarbon dating at your facility along with the sample record sheets. Please arrange to have them dated at the earliest and inform me of the results.

The samples are

1.	SIM-2/L1	from Bihar, India	Weight = 20 gm	AD 1660 ± 90
2.	RAP/W1/P7	from ~~Bihar~~ Up, India	Weight > 20 gm	BC 211 – AD 132

Regarding the payment, please send me an invoice for the samples as soon as possible so that we can arrange for a bank draft to be sent to you.

Sincerely,

C.P. Rajendran

BSIP Rapti

RAP/W1/P7

Age: 2030±80 YrBP

Cal BP 1818 – 2160

Cal BC 211 – AD 132

CALIB RADIOCARBON CALIBRATION PROGRAM*

*To be used in conjunction with:
Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.

```
S-3459 (BP)
Description
Radiocarbon Age 2030±80
Calibration data set: intcal09.14c
# Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
                  [cal BP 1896: cal BP 2065] 0.889229
                  [cal BP 2083: cal BP 2108] 0.110771
Two Sigma Ranges: [start:end] relative area
                  [cal BP 1818: cal BP 2160] 0.960533
                  [cal BP 2170: cal BP 2177] 0.003496
                  [cal BP 2245: cal BP 2301] 0.035971

S-3459 (AD/BC)
Description
Radiocarbon Age 2030±80
Calibration data set: intcal09.14c
# Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
                  [cal BC 159: cal BC 134] 0.110771
                  [cal BC 116: cal AD 54] 0.889229
Two Sigma Ranges: [start:end] relative area
                  [cal BC 352: cal BC 296] 0.035971
                  [cal BC 228: cal BC 221] 0.003496
                  [cal BC 211: cal AD 132] 0.960533
```

Ranges marked with a * are suspect due to impingment on the end of the calibration data set

PJ Reimer, MGL Baillie, E Bard, A Bayliss, JW Beck, PG Blackwell,
C Bronk Ramsey, CE Buck, GS Burr, RL Edwards, M Friedrich, PM Grootes,
TP Guilderson, I Hajdas, TJ Heaton, AG Hogg, KA Hughen, KF Kaiser, B Kromer,
FG McCormac, SW Manning, RW Reimer, DA Richards, JR Southon, S Talamo,
CSM Turney, J van der Plicht, CE Weyhenmeyer (2009) Radiocarbon 51:1111-1150.

RADIOCARBON SAMPLE RECORD

(One record, per sample. May copy as required.)

Birbal Sahni Institute of Palaeobotany, 53, University Road, Lucknow- 226007, Ph: 0522-2740008, Fax: 2740485

1. Submitter's name & address with phone, fax and e-mail *Dr. C. P. Rajendran, IISc Bangalore* *08022933402, (fax) 08022933405* *cp.rajendran@yahoo.com*	2. Date of submission *April 3, 2012*	**3. For BSIP use only** Date of Acknowledgement with code (Institution/ Submitter/ Sample-ID/Date of receiving payment/ Page in Sample Register / Date of sample) Payment Received ☐ Yes/ ☐ No Details of Bank Draft: **Sample No. :** BS- **Processing Permitted:** Processed on: Age & Error Results Sent? NO Reference:
4. Collector's name Address, phone, e-mail- ID *Dr. C. P. Rajendran, IISc Bangalore* *08022933402, (fax) 08022933405* *cp.rajendran@yahoo.com*	5. Date of collection *March 15, 2012*	
6. Sample ID/ Date of submission: (A simple, unambiguous label needed. Without this information, the sample will not be dated. *RAP/W1/P7*	**7. Details of payment made including amount and mode and no.** *Please send us an invoice after which we will prepare a bank draft for the same.*	
8. Describe the place, town, district, state, country of the sample submitted (for marine sample the oceanic area must be mentioned)	*Rapti, Bihar, India*	9. Lat : *27° 32' 21.0"* Long : *82° 02' 34.6"*
10. Type of investigation (e.g) natural exposure, trial trench, systematic excavation, boring).	*Trench*	
11.Depth below surface in cms (profile to be provided) *2.5 m*	12. Position within the profile	13. Occurrence of leaching or humus infiltration in profile
14. (b) Depth at which root(lets) are detectable.	15. Material (Wood, charcoal, peat, shell or sediment etc.) *Wood*	16. Weight (in gms) *> 20 gms*
17. Carbon content if known (%): *Not known*	18. Occurrence (as sediment, as scattered fragment, pieces, layer…) and context (grave, rock shelter, hearth, sequences) etc.	*Scattered fragments*
19. Presence of foreign matter, which could affect the date (rootlet, carbonate etc.)		
20. Environmental conditions and any other important information (flooding, water logging, proximity to water reservoir, tectonic disturbance etc.) *Flooding*		
21. Method of sample collection, treatment (hand- picked, root- removed, preservative used, chemical treatment etc.) and packing. *Sample collected during trenching, whole sample handpicked from trench. No pre-treatment.*		

22. Have you submitted the entire sample? *Yes* ☒ No ☐	22. Can you collect more samples?	*No*
23 Correlation with culture, climatic phases etc. and associated finds. *Sample from liquefaction features*		
24. Expected age and basis of age estimation.		
25 a) Brief description of the project (Title of project, host organization, sponsoring agency if different. If a BSIP project, please mention project no.). In case of a BSIP- or BSIP- based project, please state if other studies have been conducted. *Estimating the recurrence of earthquakesin the Central-Eastern Himalaya and Upper Assam from the distant liquefactions of the river flood plains (MOES)*		
(b) Status of the project and the relevance of the date and about the specific contribution the date is expected to make ? *Continuing project, age will be useful to estimate earthquake recurrence in the region.*		
26. (a). Stratigraphic sketch with chronological divisions (indicate the position of the sample in the sketch. If necessary, attach a diagram.		
27 Relative priority (in the lot). *None*		
29. **If you have been provided radiocarbon dates by us in the last few years please give us copies of the papers/report that you may have published and list the enclosures here.** *Dates from the Andaman Islands were published in Rajendran et al., 2007 and dates from Makran are included in a paper being reviewed currently.*		
30. **Any other information that could help us in dating the sample or in setting priority.**		

NOTE:

1. The details are sought to help in dating. NO BLANKS PLEASE.
3. Each sample to have a separate set of data sheets. Data sheets in a different format may not be accepted. Samples with incomplete info./ inadequate amount may not be possible to date. Samples, DD, sheets are desired together. Usual sample requirement: Sediment: 300g; wood: 20 g, charcoal: 15 g; peat 50-100 g; shell: 100 g.
4. May e-mail the sheets to: director@bsip.res.in or Scientist-in-charge C-14 Lab<cmnautiyal@yahoo.co.uk> (Ph. 09415107078, 0522 2742937) but follow up with the original sheets with samples and payment. It is best if samples, sheets and DD are sent together. If DD is sent separately, please mention so and attach copy of the sample record sheets.
5. The BSIP BS numbers must be quoted in the publication/ report. Analysis- charges: Rs 3500/- plus tax (10.36%) making a total of Rs. 3861/- per samples. For foreign countries, US $ 250 plus taxes @ 10.36% at present) per sample as Demand Draft in favour of Director, Birbal Sahni Institute of Palaeobotany, Lucknow payable at a Lucknow bank only.
6. While corresponding, please always refer to the sample ID, payment details and also to the name of the person/ dept. mentioned as the submitter under entry-1 to help us to track the samples.
7. To ensure safe and complete communication, please fill up entry-4 completely and carefully
8. PLEASE KEEP A COPY OF THIS FORM OR ALL DETAILS OF SAMPLES/ CODES ETC. FOR REFERENCE
9. BSIP holds the right to publish the dates as samples dated in BSIP Radiocarbon laboratory with due acknowledgement of the collector one year after the communication of dates to the submitter or publication.

The results are for academic use. I have seen and give consent to the note.

Signatures of the submitter: **Dr. C. P. Rajendran**
Ramanujan Fellow
Centre for Earth Sciences
Indian Institute of Science
Bangalore - 560 012

INCOIS

RADIOCARBON SAMPLE RECORD

(One record, per sample. May copy as required.)

Birbal Sahni Institute of Palaeobotany, 53, University Road, Lucknow- 226007, Ph: 0522-2740008, Fax: 2740485

1. Submitter's name & address with phone, fax and e-mail CP Rajendran CEAS, IISc, Bangalore cp.rajendran@yahoo.com	2. Date of submission **24-06-2013**	**3. For BSIP use only** Date of Acknowledgement with code (Institution/ Submitter/ Sample-ID/Date of receiving payment/ Page in Sample Register / Date of sample) Payment Received ☐ Yes/ ☐ No Details of Bank Draft: **Sample No. :** BS- **Processing Permitted:** Processed on: Age & Error Results Sent? NO Reference:
4. Collector's name address CP Rajendran phone e-mail- ID	5. Date of collection 22-06-2013	
6. Sample ID/ Date of submission: (A simple, unambiguous label needed. Without this information, the sample will not be dated. ~~CB-PB1~~ PB-CB-1.	**7. Details of payment made including amount and mode and no.**	
8. Describe the place, town, district, state, country of the sample submitted (for marine sample the oceanic area must be mentioned)	**Port Blair**	9. Lat : 11°36'32.2" N Long : 92°41' 08.5"
10. Type of investigation (e.g) natural exposure, trial trench, systematic excavation, boring).	excavation	
11.Depth below surface in cms (profile to be provided) 1.5 m	12. Position within the profile	13. Occurrence of leaching or humus infiltration in profile
14. (b) Depth at which root(lets) are detectable.	15. Material (Wood, charcoal, peat, shell or sediment etc.) wood	16. Weight (in gms)
17. Carbon content if known (%):	18. Occurrence (as sediment, as scattered fragment, pieces, layer...) and context (grave, rock shelter, hearth, sequences) etc.	**fragment**
19. Presence of foreign matter, which could affect the date (rootlet, carbonate etc.)		
20 Environmental conditions and any other important information (flooding, water logging, proximity to water reservoir, tectonic disturbance etc.) **water logged**		

21. Method of sample collection, treatment (hand- picked, root- removed, preservative used, chemical treatment etc.) and packing. **Hand picked**		
22. Have you submitted the entire sample? Yes ☐ No ☐	22. Can you collect more samples? No	
23 Correlation with culture, climatic phases etc. and associated finds.		
24. Expected age and basis of age estimation. ~500-1000 years		
25 a) Brief description of the project (Title of project, host organization, sponsoring agency if different. If a BSIP project, please mention project no.). In case of a BSIP- or BSIP- based project, please state if other studies have been conducted. Project to understand earthquake recurrence		
(b) Status of the project and the relevance of the date and about the specific contribution the date is expected to make ? Date of land subsidence		
26. (a). Stratigraphic sketch with chronological divisions (indicate the position of the sample in the sketch. If necessary, attach a diagram.		
27 Relative priority (in the lot).		
29. **If you have been provided radiocarbon dates by us in the last few years please give us copies of the papers/report that you may have published and list the enclosures here.**		
30. **Any other information that could help us in dating the sample or in setting priority.**		

NOTE:

1. **The details are sought to help in dating. NO BLANKS PLEASE.**
3. **Each sample to have a separate set of data sheets.** Data sheets in a different format may not be accepted. Samples with incomplete info./ inadequate amount may not be possible to date. Samples, DD, sheets are desired together. Usual sample requirement: Sediment: 300g; wood: 20 g, charcoal: 15 g; peat 50-100 g; shell: 100 g.
4. May e-mail the sheets to: **director@bsip.res.in** or Scientist-in-charge C-14 Lab<**cmnautiyal@yahoo.co.uk**> (Ph. 09415107078, 0522 2742937) but follow up with the original sheets with samples and payment. It is best if samples, sheets and DD are sent together. If DD is sent separately, please mention so and attach copy of the sample record sheets.
5. The BSIP BS numbers must be quoted I the publication/ report. **Analysis- charges**: Rs 3500/- plus tax (10.36%) making a total of Rs. 3861/- per samples. For foreign countries, US $ 250 plus taxes @ 10.36% at present) per sample as Demand Draft in favour of **Director, Birbal Sahni Institute of Palaeobotany, Lucknow** payable at a Lucknow bank only.
6. **While corresponding, please always refer to the sample ID, payment details and also to the name of the person/ dept. mentioned as the submitter under entry-1 to help us to track the samples.**
7. **To ensure safe and complete communication, please fill up entry-4 completely and carefully**
8. **PLEASE KEEP A COPY OF THIS FORM OR ALL DETAILS OF SAMPLES/ CODES ETC. FOR REFERENCE**
9. **BSIP holds the right to publish the dates as samples dated in BSIP Radiocarbon laboratory with due acknowledgement of the collector one year after the communication of dates to the submitter or publication .**

The results are for academic/ cultural use . I have seen and give consent to the note.

BSIP dates.

BS No	Sample ID	Status	C-14 Age	Cal Age (yr BP, 1 sigma)
2329	C/K/T2/D2	Dated	2550+/-150	2780 - 2358
na	C/B/T1/4	Not processed, appears to have very low Carbon		
na	C/B/T1/3	Not processed, appears to have very low carbon		
2324	C/B/T1/2	Dated	106±77	20 - 143
na	C/U/T1/D1	Processed, insufficient CO2- sample abandoned		
2322	C/T/T1/4	Dated	250±70	146 - 194
2330	MB/T1/D1	Dated	7540±130	8417 - 8184
2258	CN/TC/1	Dated Cas Nil	5420±80	6293 - 6064
2260	CN/SA/1	Dated Cas Nil	35910±1040	Not applicable
2312	K/Q/PA/1	Dated	2660±90	2849 - 2740

Kalhana 2780-2358

Ulhatia — 2614-2343.

Motibaon 8417-8184

Kerala.

Note: C/B/T1/2 labeled sample was placed inside a plastic bag that was labeled C/U/T1/D1. That is internal labeling was C/B/T1/2 and external labeling was C/U/T1/D1. We have considered the external labeling as correct labeling.

R 28546/1	BD/T1/CP/L-1	9135 ± 95	8602 BC - 8208 BC.	10551 - 10157
R 28546/5	BD/T1/CP/L-2	11529 ± 70	11901 BC - 11656 BC.	13850 - 13605

Assam samples (Dilma)

BSIP

UNIVERSITY OF WASHINGTON
QUATERNARY ISOTOPE LAB
RADIOCARBON CALIBRATION PROGRAM REV 4.1.2

Stuiver, M. and Reimer, P.J., 1993, Radiocarbon, 35, p. 215-230.

Calibration file(s): intcal98.14c
Listing file: cpr01.lst
Export file: c14res.csv
BS-1900
S-2631
No.D2/1897/3, Sediment, Acid pretreatment, R=0.296
Radiocarbon Age BP 2170 +/- 140 Reference
2170±140 yr.
Calibrated age(s) cal BC 200 (Stuiver et al., 1998a)
cal BP 2149
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal BC 393 - 40 (2342 - 1989)
26 - 24 (1975 - 1973)
8 - 3 (1957 - 1952)
two Sigma** cal BC 537 - 532 (2486 - 2481)
B.C. 535 – 530 ✓
520 - cal AD 92 (2469 - 1858)
cal AD 98 - 126 (1852 - 1824)

Summary of above:
maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal BC 393 (200) 3
cal BP 2343 (2149) 1953
2 sigma cal BC 537 (200) cal AD 126
cal BP 2487 (2149) 1824

BS-1901
S-2633
No.D2/1897/2, Sediment, Acid pretreatment, R=0.5216
Radiocarbon Age BP 1250 +/- 80 Reference
Calibrated age(s) cal AD 775 (Stuiver et al., 1998a)
cal BP 1175
cal AD/BC (cal BP) age ranges obtained from intercepts (Method A):
one Sigma** cal AD 673 - 888 (1277 - 1062)
two Sigma** cal AD 645 - 979 (1305 - 971)
A.D. 645 – 980 ✓
(1250±80 yr. BP.)

Summary of above:
maximum of cal age ranges (cal ages) minimum of cal age ranges:
1 sigma cal AD 673 (775) 888
cal BP 1277 (1175) 1062
2 sigma cal AD 645 (775) 979
cal BP 1305 (1175) 971

References for datasets used:
Stuiver, M., Reimer, P.J., Bard, E., Beck, J.W., Burr, G.S., Hughen, K.A., Kromer, B., McCormac, F.G., v.d. Plicht, J., and Spurk, M. (1998a). Radiocarbon 40:1041-1083.

Comments:

* This standard deviation (error) includes a lab error multiplier.
** 1 sigma = square root of (sample std. dev.^2 + curve std. dev.^2)
** 2 sigma = 2 x square root of (sample std. dev.^2 + curve std. dev.^2)
where ^2 = quantity squared.
[ ] = calibrated with an uncertain region or a linear extension to the calibration curve
0* represents a "negative" age BP
1955* denotes influence of nuclear testing C-14

NOTE: Cal ages and ranges are rounded to the nearest year which may be too precise in many instances. Users are advised to round results to the nearest 10 yr for samples with standard deviation in the radiocarbon age greater than 50 yr.