

"WHAT'S HAPPENING IN THE WESTERN U.S.?"

BY

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KLOSKO, TORRENCE, ROBBINS AND FRICKE

PART 1 HISTORY, ANNUAL BASELINES (Dave Smith)

PART 2 VECTOR MOTIONS OF WESTERN U.S. SITES (Demos)

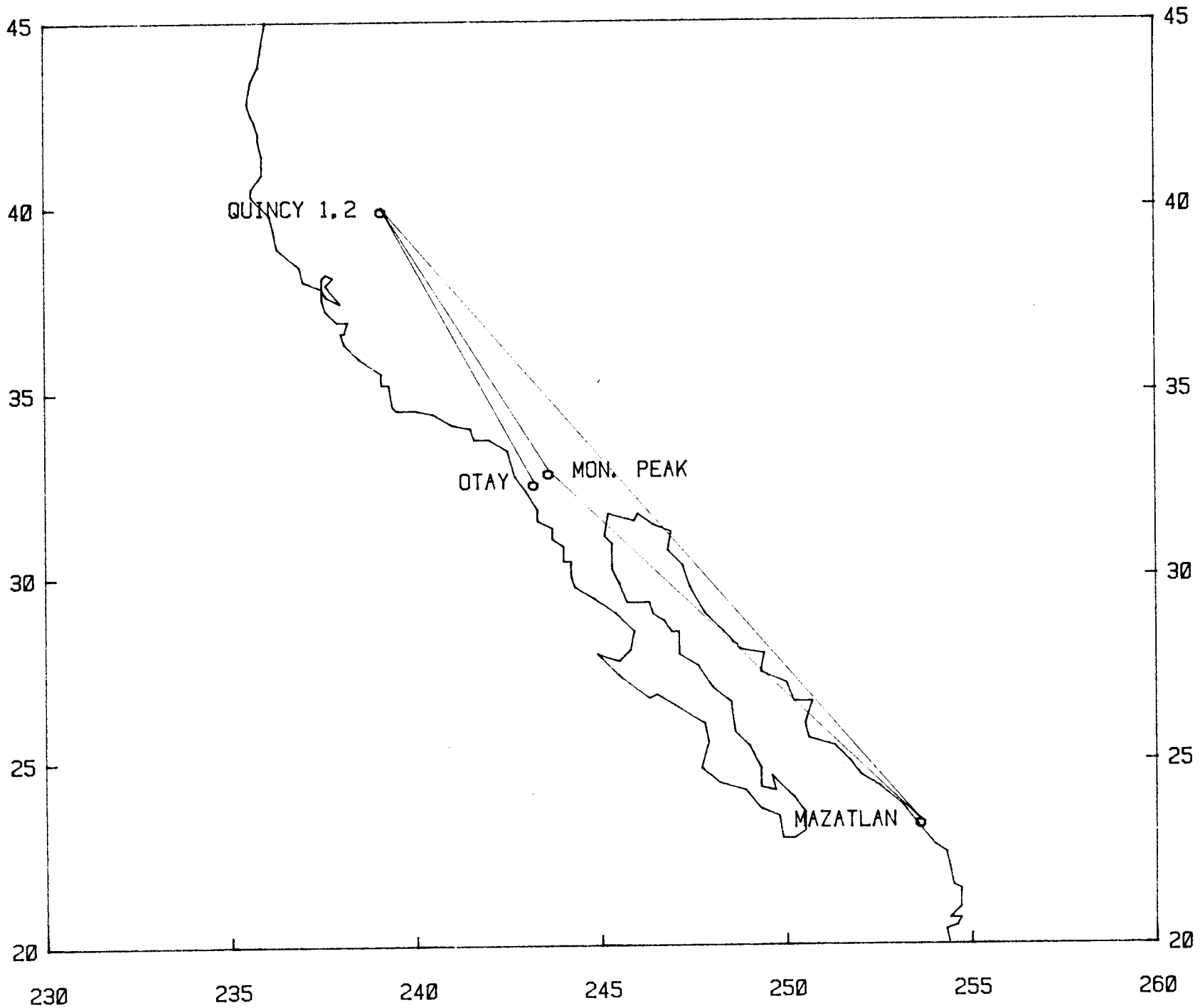
PRESENTED AT THE CRUSTAL DYNAMICS PRINCIPAL INVESTIGATORS MEETING
GSFC, OCTOBER 16TH, 1985.

Robbins
Presented 10-16-85

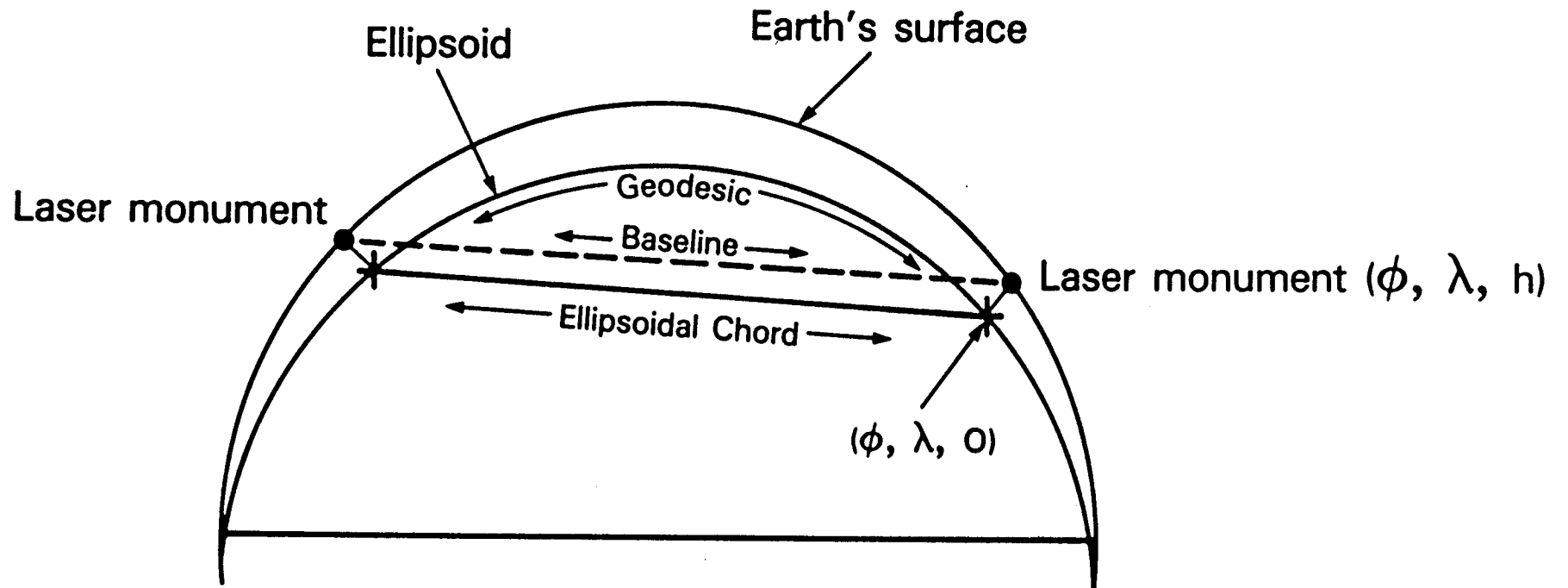
PART I

SAN ANDREAS FAULT EXPERIMENT (SAFE)

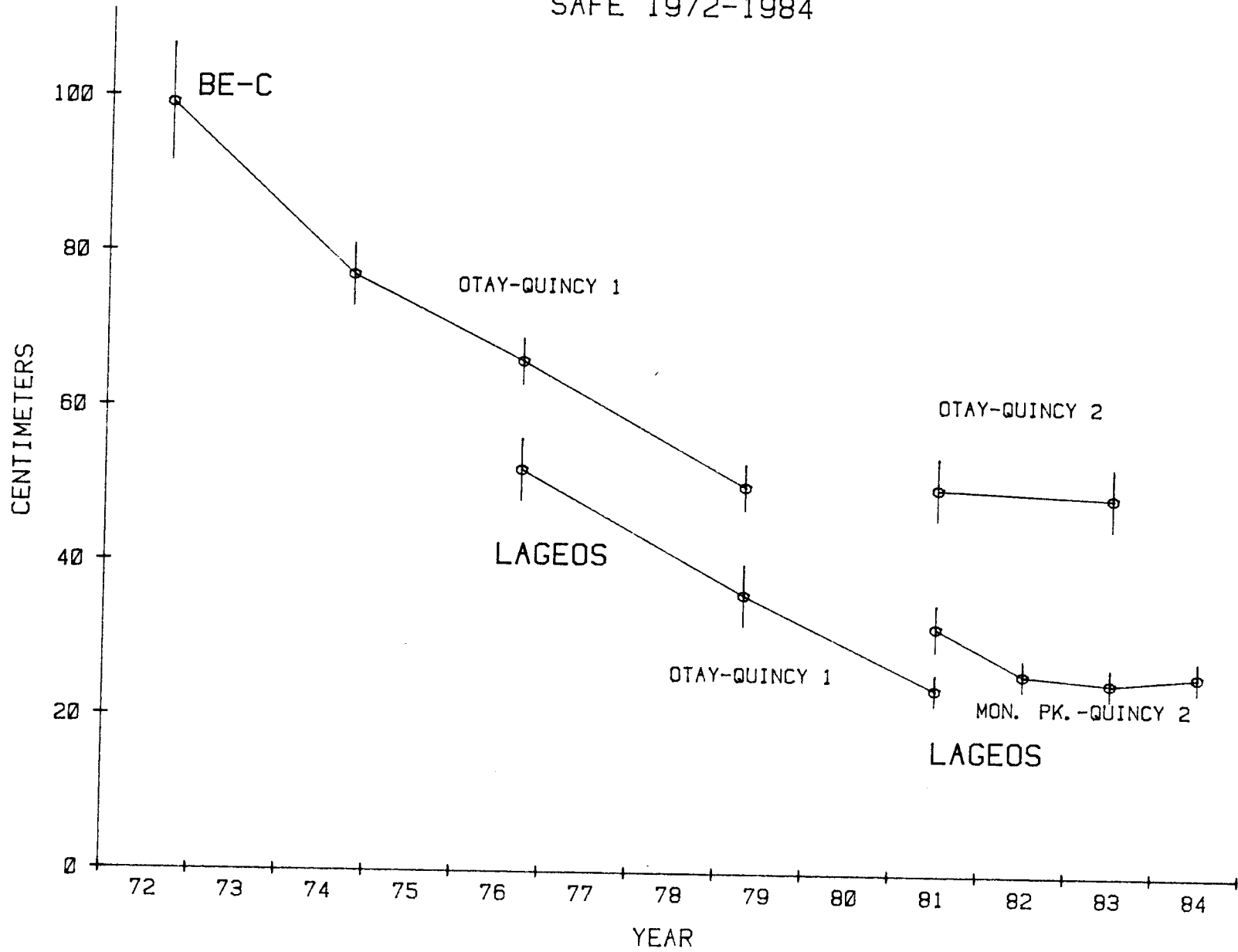
	BE-C	LAGEOS	OTAY MTN.	QUINCY 1	MON. PEAK	QUINCY 2
1972	X		X	X		
1974	X		X	X		
1976	X	X	X	X		
1979	X	X	X	X		
1981		X	X	X	X	X
1982		X			X	X
1983		X			X	X
1984		X			X	X



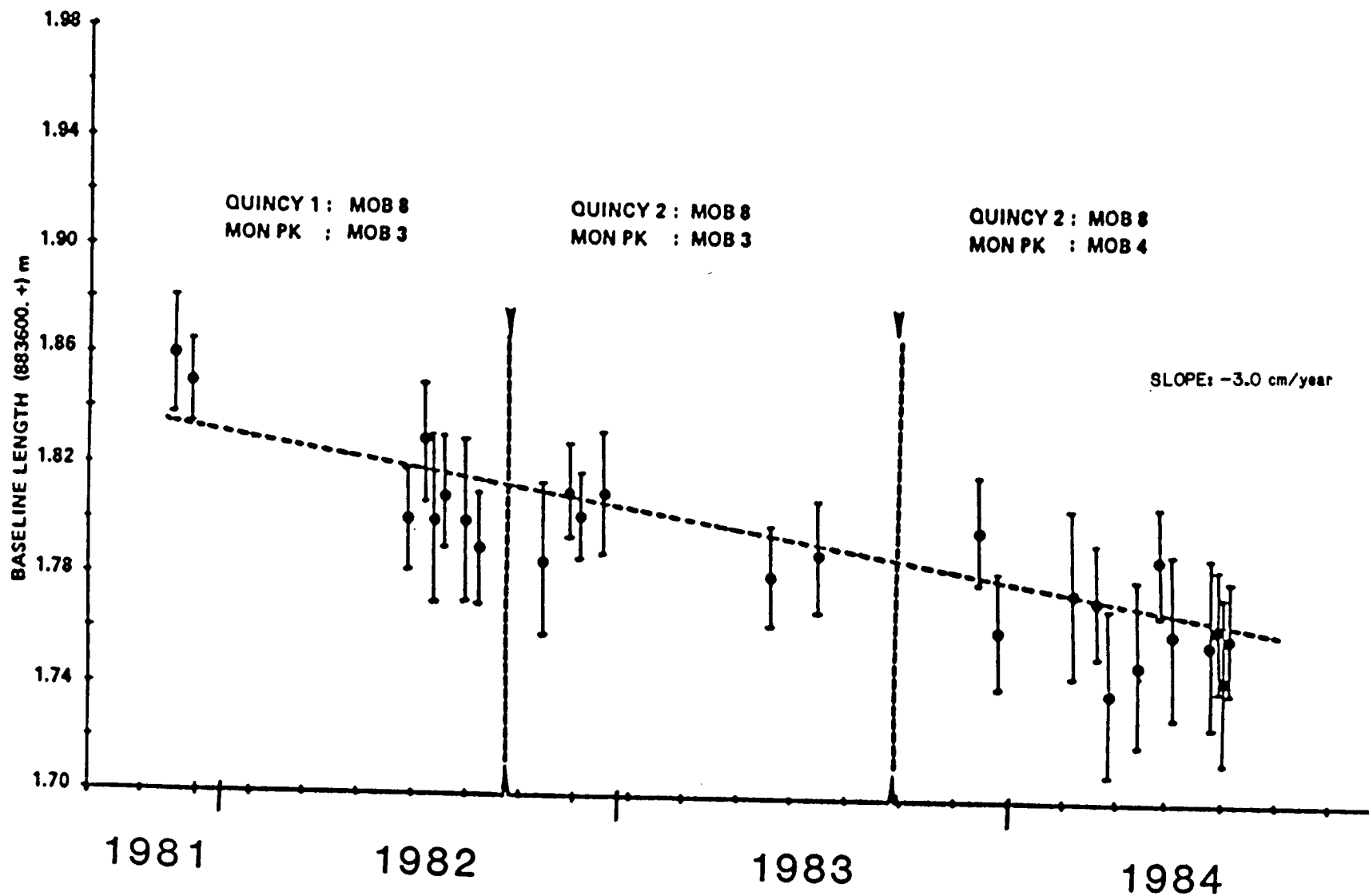
BASELINE, ELLIPSOIDAL CHORD, GEODESIC



SAFE 1972-1984



SAFE: MONUMENT PEAK TO QUINCY, 1981 to 1984 USING SHORT ARC TECHNIQUE



SAFE STATION HEIGHTS

OTAY		1976	981.32	±	.10	M
		1977	.72	±	.06	
		1978	.63	±	.04	
		1979	.58	±	.03	
		1981	.36	±	.03	
		1983	.41	±	.03	
MON. PEAK	1981	1981	1831.74	±	.05	
		1982	.90	±	.05	
		1983	.82	±	.02	
		1984	.80	±	.01	
QUINCY 1*,2		1976	1099.07	±	.14*	
		1979	.34	±	.06*	
(Q2 = Q1 + 46.35)		1981	.21	±	.04*]
		1981	.14	±	.04	
		1982	.19	±	.02	
		1983	.21	±	.01	
		1984	.21	±	.01	

MAZATLAN RESULTS

MAZATLAN TO MON. PEAK

1983 1436927.93 ± .03 m.

1984 1436927.99 ± .02 m.

RATE = + 6.6 ± 4 cm/YR

M/J + 5.4 cm/YR.

MAZATLAN TO QUINCY 2

1983 2280512.36 ± .03 m.

1984 2280512.43 ± .02 m.

RATE = 7.3 ± 4 cm/YR

M/J 0.0 cm/YR.

MAZATLAN TO GSFC

1983 3256811.17 ± .03 m.

1984 3256811.16 ± .02 m.

RATE = - 1.3 ± 3 cm/YR.

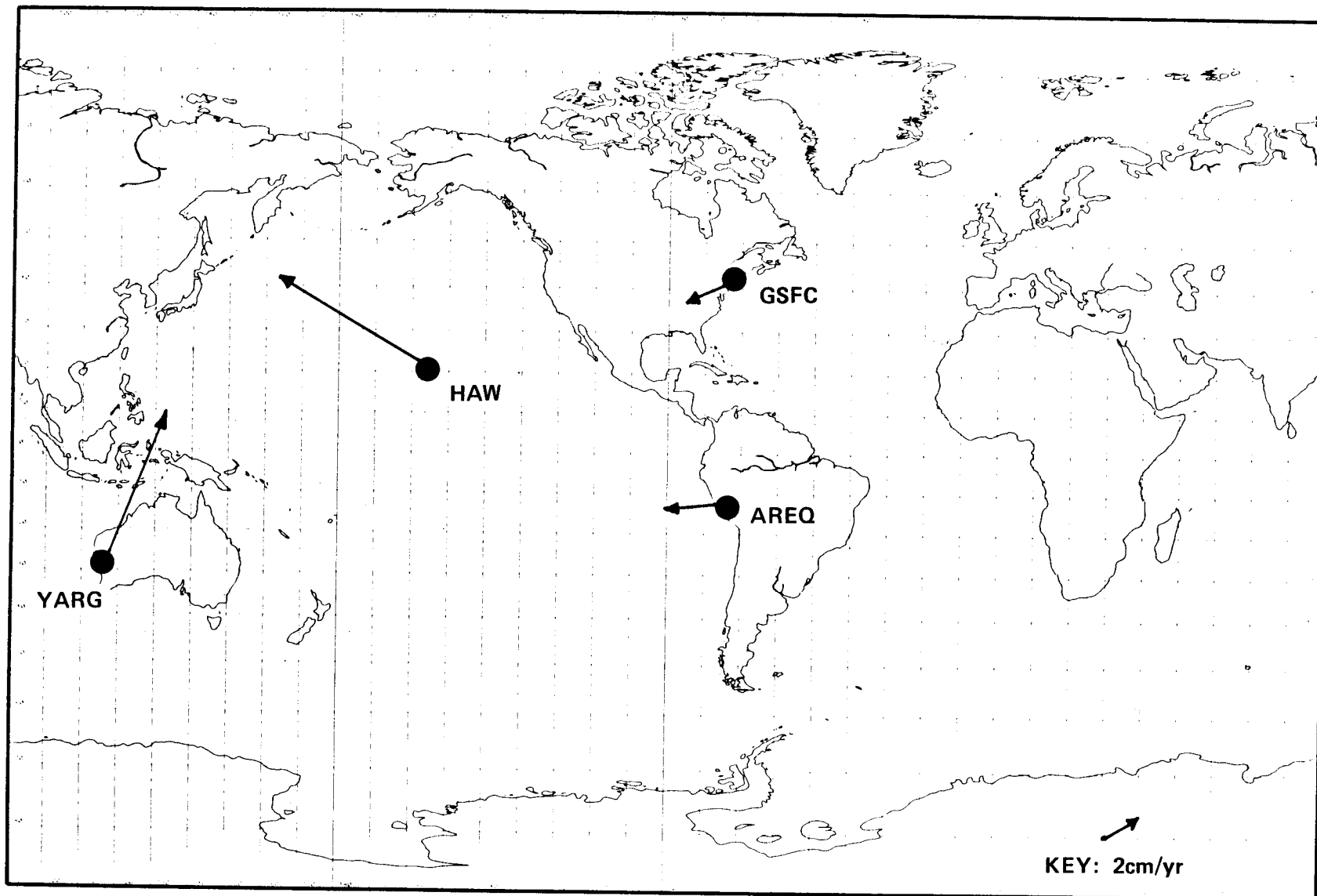
M/J 0.0 cm/YR.

CONCLUSIONS

- o 1982 - '84 MOTION BETWEEN MONUMENT PEAK AND QUINCY 2 IS ONLY
-1 OR -2 CM/YR, OR LESS.

- o 1972 - '81 MOTION BETWEEN OTAY AND QUINCY 1 WAS ABOUT
-6 CM/YR.

PART II



KUGEL-MASS-STAB 1/ 100 @ M10

STANDARD ZONE AND UNIT SYSTEMS: WGS 84
 METRIC PARAMETER D1 = 6378137.0 D2 = 0.0
 MODEL RADIUS R = 6377000.0 M

THE LASER REFERENCE NETWORK
ABSOLUTE MOTIONS FROM MINSTER / JORDAN AM1 - 2 MODEL

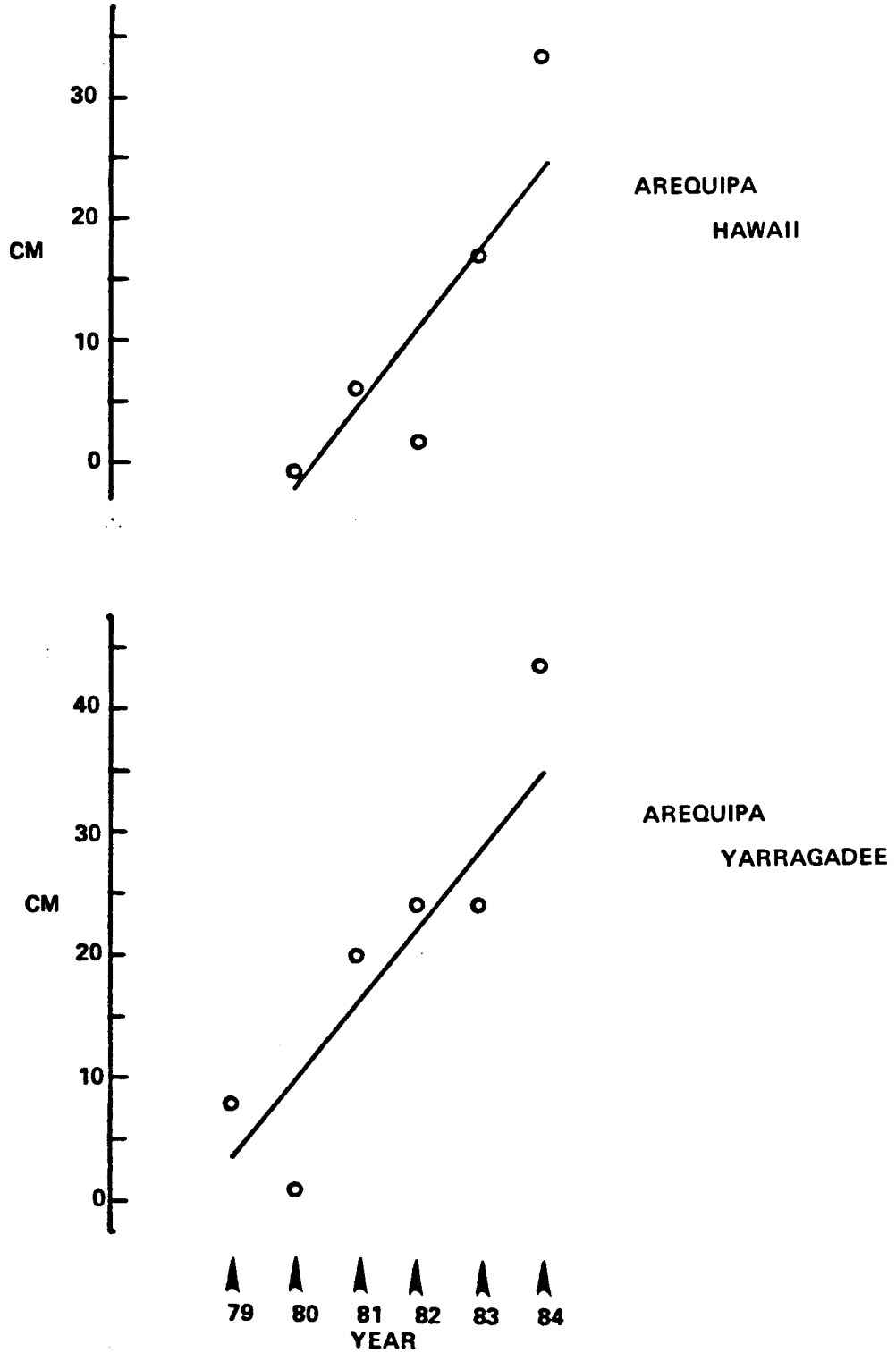
GEODESIC DISTANCE RATES IN CM/YR
FOR
REFERENCE STATIONS

Key: OBS_{SL6}/MJ

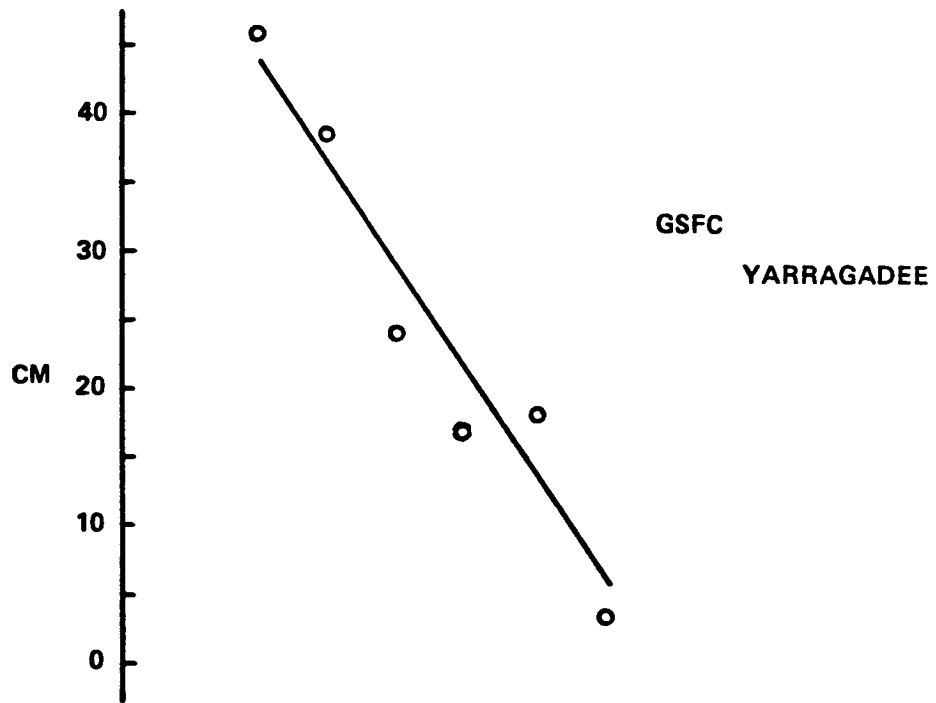
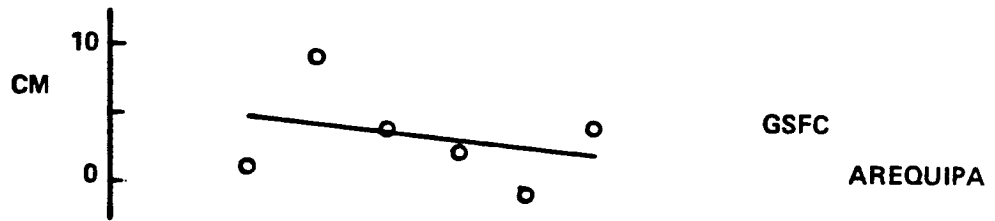
GSFC
(NA)

AREQUIPA (SA)	-0.9±1.0 / -0.6	AREQ	
HAWAII (PAC)	+3.0±1.7 / 1.7	+7.6±2.4 / 6.6	HAW
YARG (AUS)	-8.0±1.0 / -8.8	+8.2±2.0 / 6.1	-8.8±1.5 / -10.2

OBSERVED ANNUAL GEODESIC DISTANCES FOR
REFERENCE STATIONS WITH RATES PREDICTED FROM
MINSTER/JORDAN AM1-2

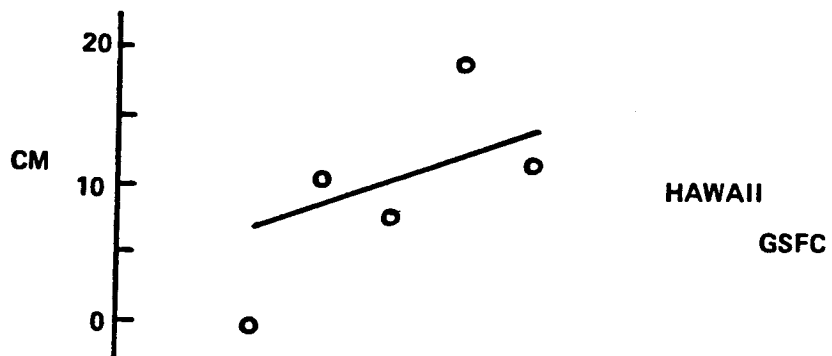
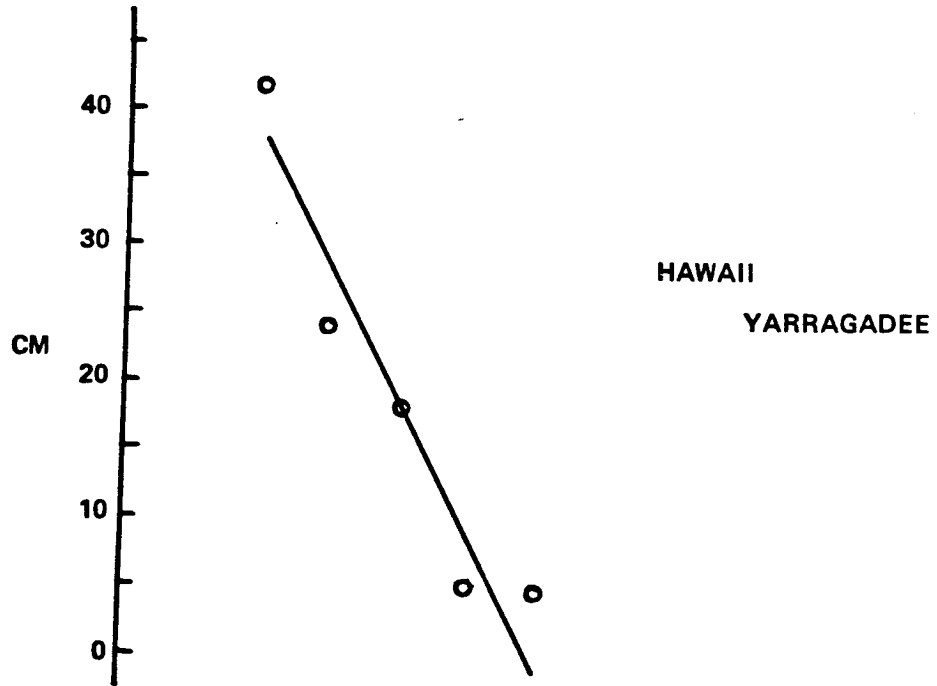


OBSERVED ANNUAL GEODESIC DISTANCES FOR
REFERENCE STATIONS WITH RATES PREDICTED FROM
MINSTER/JORDAN AM1-2



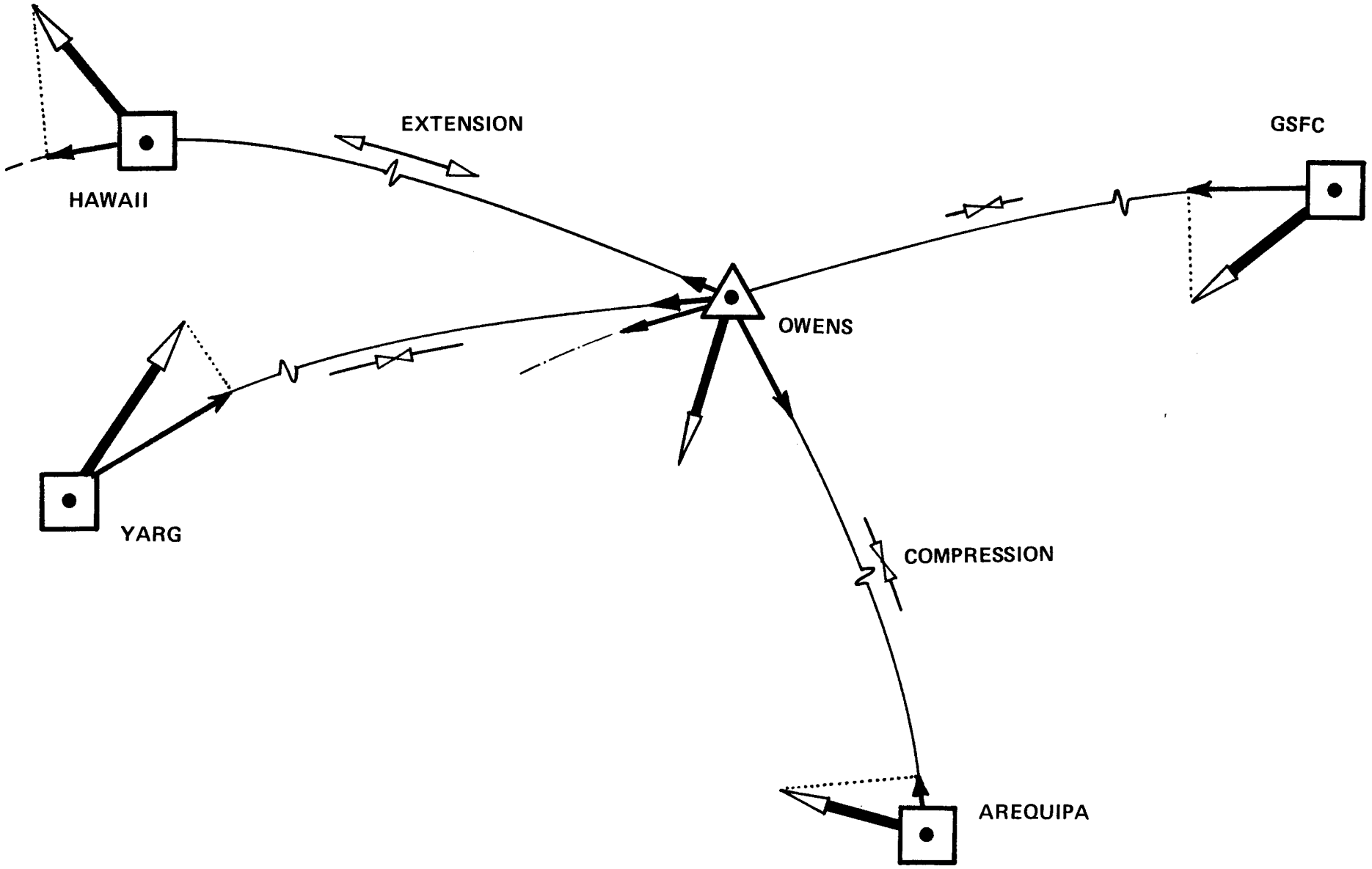
▲ 79 ▲ 80 ▲ 81 ▲ 82 ▲ 83 ▲ 84
YEAR

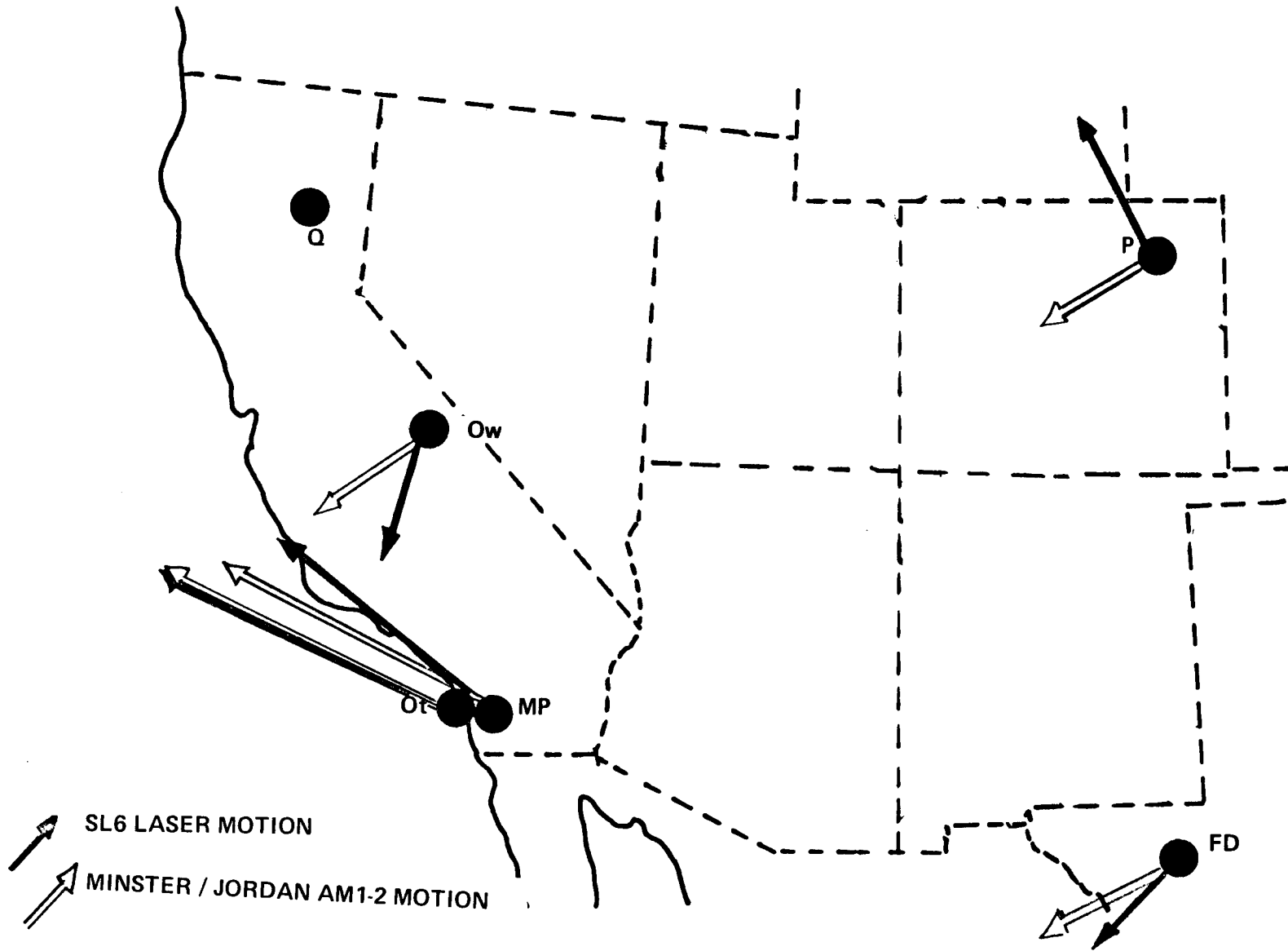
OBSERVED ANNUAL GEODESIC DISTANCES FOR
REFERENCE STATIONS WITH RATES PREDICTED FROM
MINSTER/JORDAN AM1-2



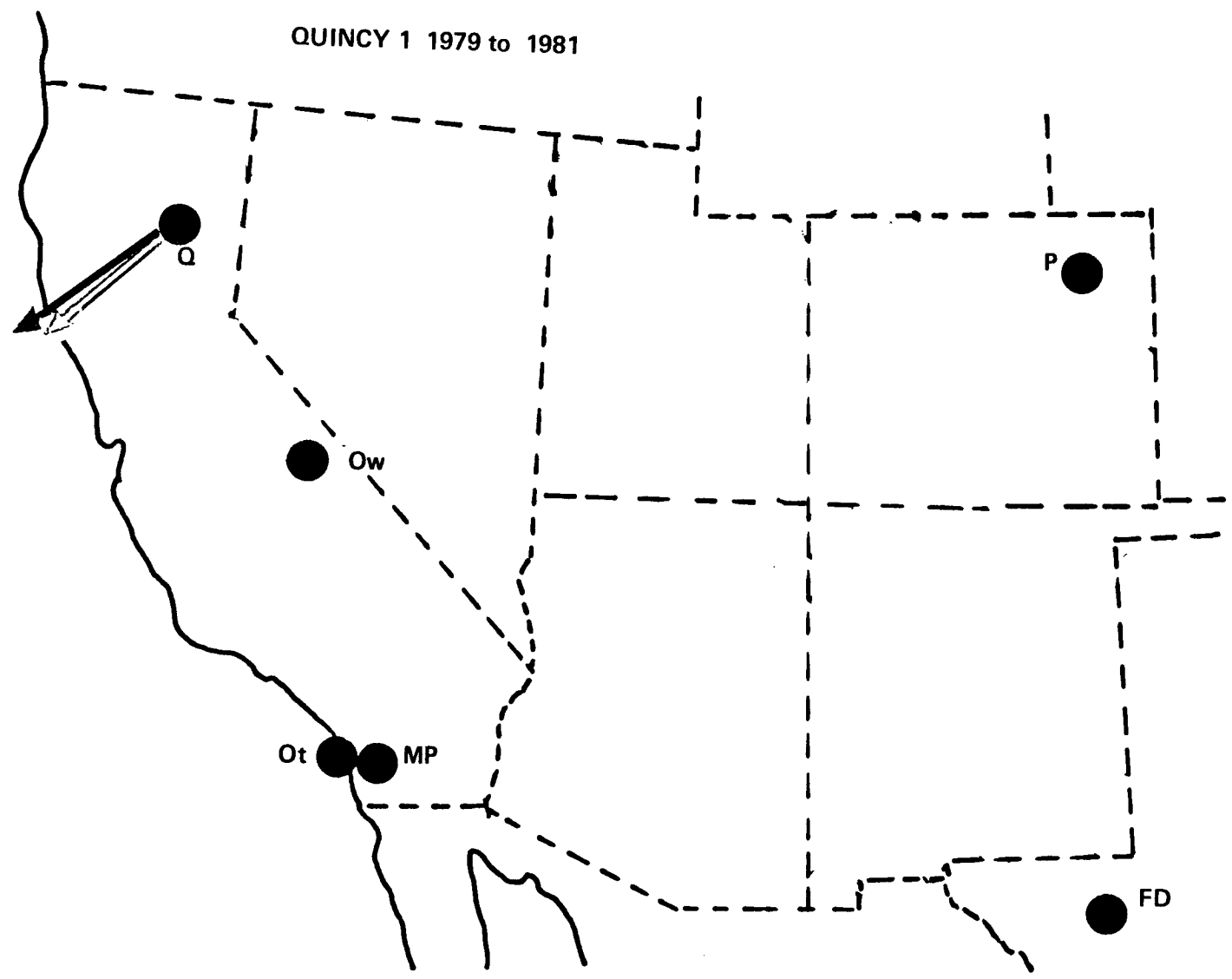
▲ 79 ▲ 80 ▲ 81 ▲ 82 ▲ 83 ▲ 84
YEAR

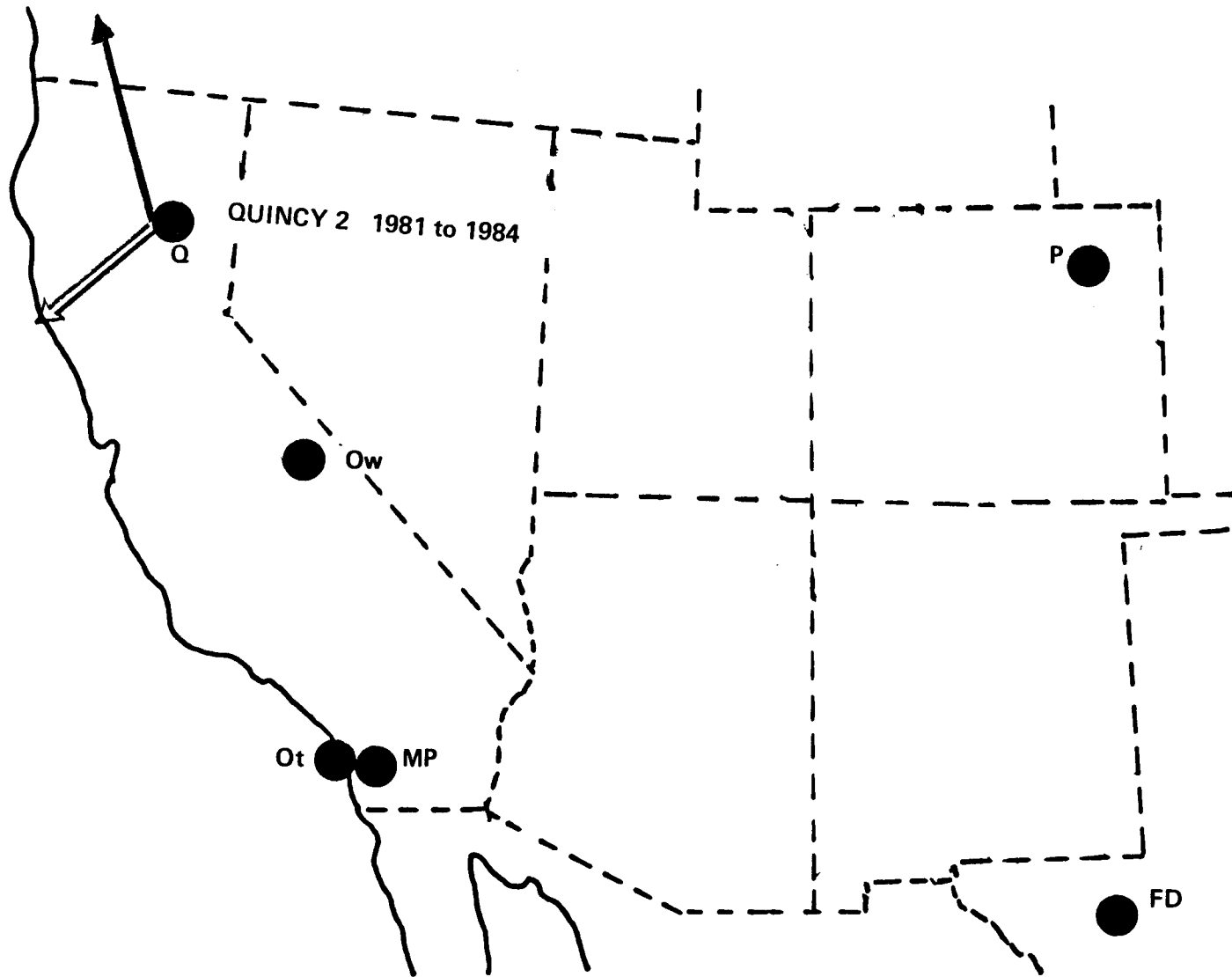
ABSOLUTE MOTIONS



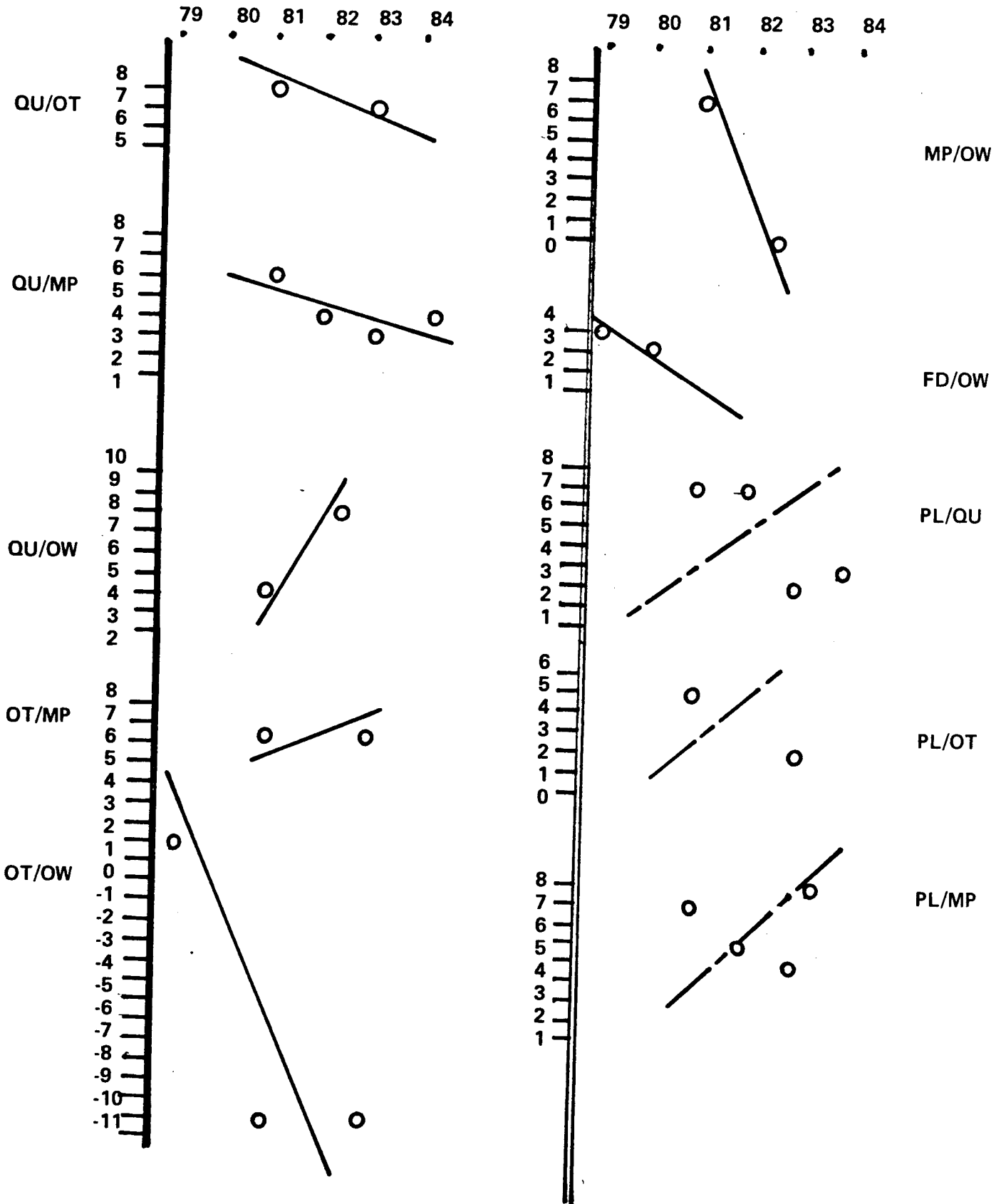


QUINCY 1 1979 to 1981

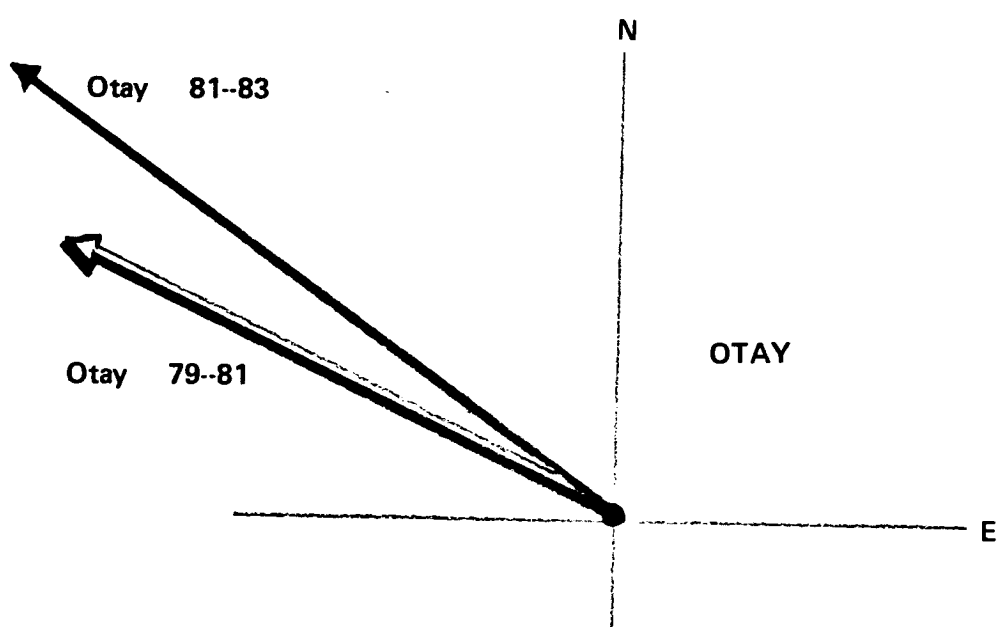
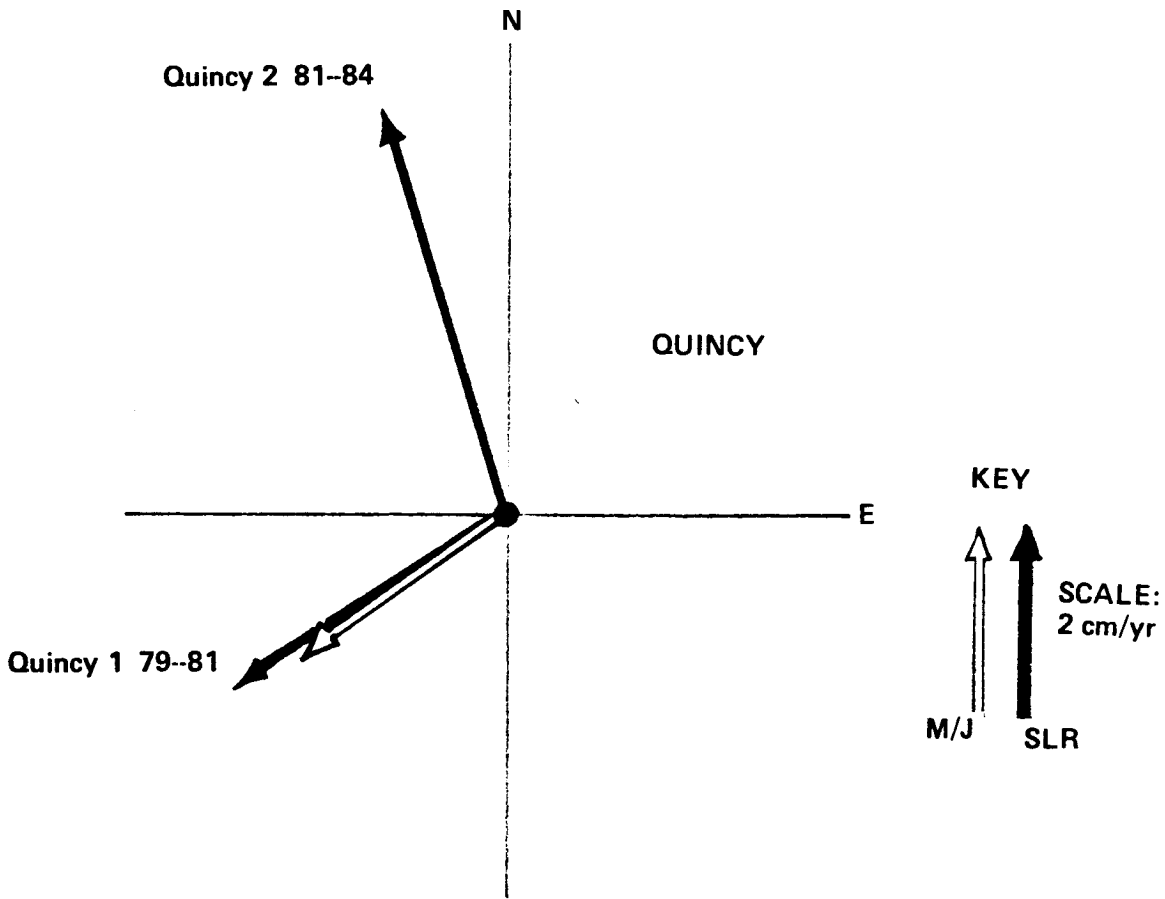




CLOSURE ON ABSOLUTE MOTION OF
NORTH AMERICAN STATIONS: INTERNAL
GEODESIC DISTANCE RATES



OBS. vs. RATES from MODEL



TEMPORAL VARIATION IN THE ABSOLUTE MOTION OF OTAY MOUNTAIN AND QUINCY

ABSOLUTE STATION SLR MOTIONS:
 IN WESTERN U.S.A.
 REFERENCE M/J AM1-2

NO.	STATION	RATE (cm/yr)		AZIMUTH ^o		COMMENT
		M/J	SL6	M/J	SL6	
7105	GSFC	2.69	---	248.9	---	ER; NAM
7210	HAWAII	9.68	---	300.4	---	ER; PAC
7907	AREQUIPA	3.12	---	265.8	---	ER; SAM
7090	YARGDE	7.97	---	21.7	---	ER; AUST
7062	OTAYMT *	6.38	6.4	296.7	300	WUSA; PAC
7110	MONPK *	6.31	5.4	296.6	310	WUSA; PAC
7114	OWENVL *	2.49	2.5	235.5	195	WUSA; NAM
7086	FTDAVIS*	2.67	1.8	241.1	225	WUSA; NAM
7051	QUINCY1*	2.41	3.3	233.9	237	WUSA
7109	QUINCY2*	2.41	4.4	233.9	345	WUSA
7112	PLATVL ##	2.55	3.4	239.4	330	WUSA

^o Clockwise from north

ER = EXTERNAL REFERENCE STATION: M/J model is adopted and is consistent with observed motions.

* Confirmed from internal chord rates

Unconfirmed from internal chord rates

SUMMARY

- o **A DETERMINATION OF THE ABSOLUTE MOTION OF THE LASER STATIONS IN THE WESTERN UNITED STATES HAS BEEN MADE.**

A TECHNIQUE UTILIZING A WELL ESTABLISHED GLOBAL SLR REFERENCE FRAME HAS BEEN DEVELOPED.

- o **ALL WELL DETERMINED SITES HAVE A MOTION CONSISTENT WITH THE MOTIONS PREDICTED FROM THE GEOLOGICAL MODEL, AM1-2, WITH THE EXCEPTION OF QUINCY IN THE 1981-1984 TIME FRAME.**
- o **QUINCY NOW IS MOVING NORTH-EASTERLY COMPARED TO ITS EARLIER DETERMINED MOTION.**