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E. FISHERIES AND MARINE DATA REPORT

Wind-driven transportations at selected Positions in the Northeastern Pacific Ocean

A. Ballantyne and W. P. Wickett

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Department of Fisheries and the Environment
Fisheries and Marine Service
Resource Services Branch
Pacific Biological Station
Nanaimo, British Columbia V9R 5K6

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Fisheries and Marine Service

Data Report 116

December 1978

TIME-SERIES OF COMPUTED WIND-DRIVEN
TRANSPORTS AT SELECTED POSITIONS
IN THE NORTHEASTERN PACIFIC OCEAN

by

A. Ballantyne and W. P. Wickett

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ABSTRACT

Ballantyne, A., and W. P. Wickett. 1978. Time-series of computed wind-driven transports at selected positions in the northeastern Pacific Ocean. Fish. Mar. Serv. Data Rep. 116; 85 p.

This report contains time-series graphs and accompanying data of monthly and smoothed monthly means of computed wind-driven Ekman and total transports and vertical velocities at selected positions in the northeastern Pacific Ocean. Mean monthly (December-March) values of transports and vectors of Ekman transport are included.

Key words: wind-driven transport, northeast Pacific, time-series, divergence, vectors.

RÉSUMÉ

Ballantyne, A., and W. P. Wickett. 1978. Time-series of computed wind-driven transports at selected positions in the northeastern Pacific Ocean. Fish. Mar. Serv. Data Rep. 116; 85 p.

Ce rapport présente les chronogrammes et les données concomitantes des moyennes mensuelles et des moyens mensuelles ajustées des transports "Ekman" et total effectués par le vent et des vitesses verticales calculés aux positions choisies au nord-est de l'océan Pacifique. Les statistiques moyennes mensuelles des transports et des vecteurs de transport "Ekman" sont comprisés.

Mots clés: transport effectué par le vent, le nord-est du Pacifique, chronogrammes, divergence, vecteurs.

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TIME-SERIES OF COMPUTED WIND-DRIVEN TRANSPORTS AT
SELECTED POSITIONS IN THE NORTHEASTERN PACIFIC OCEAN

Graphs and tables of parameters and indices reflecting environmental variability and long-term trends for the waters off the northeastern Pacific coast are being prepared for publication in the Fisheries and Marine Service Data Report series. The first was Data Report No. 65 (Ballantyne 1978) which contained graphs of sea levels at four British Columbia stations. The second was Data Report No. 95 (Wickett and Ballantyne 1978) which contained graphs of surface salinity at eight British Columbia shore stations and at Ocean Station P. In this third report, graphs and tables of computed wind-driven transports are presented for selected locations in the northeastern Pacific Ocean. The locations are those we have found particularly useful in studies of the ocean survival of British Columbia fishes, of changing monthly mean sea levels and of circulation of the waters of the Subarctic Pacific Region.

The transports in Sections I, II and III are computed at alternate 5° latitudes and longitudes for the North Pacific Ocean from latitudes 20° to 60° according to the method of Fofonoff (1962). They are derived from digitized monthly mean surface pressure data supplied by the Long Range Prediction Group of the U. S. National Weather Service. They have been published for the years 1946 to 1977 in the Limnology and Oceanograph Manuscript series, the Technical Report series and this Data Report series.

The transports in Section IV are computed at alternate 2 degrees of latitude and longitude from latitudes 45°N to 57°N and from longitudes 126°W to 164°W. They are derived from daily sea surface pressure values obtained from charts supplied by the Pacific Weather Central, Vancouver International Airport, Richmond, B. C. Twice weekly and monthly means are calculated from the daily computations. These monthly means supplement the 5° computations. The daily values are used in studies of short-term events such as that reported by Wickett (1973).

The vectors of Ekman transport, presented in Section I, are drawn from the values listed in the accompanying tables. The graphs in Sections II, III and IV have monthly values with eleven-month normally weighted running mean values overlaid. They are machine plotted using a Calcomp plotter and Xerox 530 computer.

COMMENTS

A few observations are noted. There was an increased northerly Ekman component at 55°N 135°W for the 4-month period ending March 1958 and 1978 (Fig. 2). Along 45°N there was an irregular southward pulsing generally centred on the years 1948, 1953, 1958, 1964, 1967, 1971 and 1976 (see also Fig. 7). Figure 4 indicates reduced northward total transport in the winters of 1948-49, 1956-57, 1961-62 and 1971-72. Winter vertical velocities, a

measure of entrainment of deeper water into the euphotic zone, were relatively small in the 1960's at 55°N 135°W. The figures in Section IV indicate that zonal components of Ekman transport are much larger than the meridional Ekman components in the nearshore waters.

ACKNOWLEDGMENTS

We thank the Long Range Prediction Group, U. S. National Meteorological Center, Maryland for monthly mean sea level pressure data, G. Muttit, Officer i/c Pacific Weather Central, Richmond, B. C. for daily sea level pressure analysis charts, G. R. Cresswell and J. A. Thomson for writing the 2 degree computing program, A. J. Dodimead for his helpful comments and M. Douglas for drafting assistance.

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- Fofonoff, N. P. 1962. Machine computations of mass transport in the North Pacific Ocean. J. Fish. Res. Board Can. 19(6): 1121-1141.
- Wickett, W. Percy. 1973. An unusually strong current in Hecate Strait, September 1968. Fish. Res. Board Can. Tech. Rep. 395. 23 p.
- Wickett, W. Percy and A. Ballantyne. 1978. Graphs of surface salinity at nine northeastern Pacific stations: Langara Island, Triple Island, Bonilla Island, Cape St. James, McInnes Island, Pine Island, Kains Island, Amphitrite Point and Ocean Station P. Fish. and Mar. Ser. Data Rep. No. 95. 45 p.

SECTION I

5° Dec-Mar mean monthly Ekman transport vectors
and computer output listings



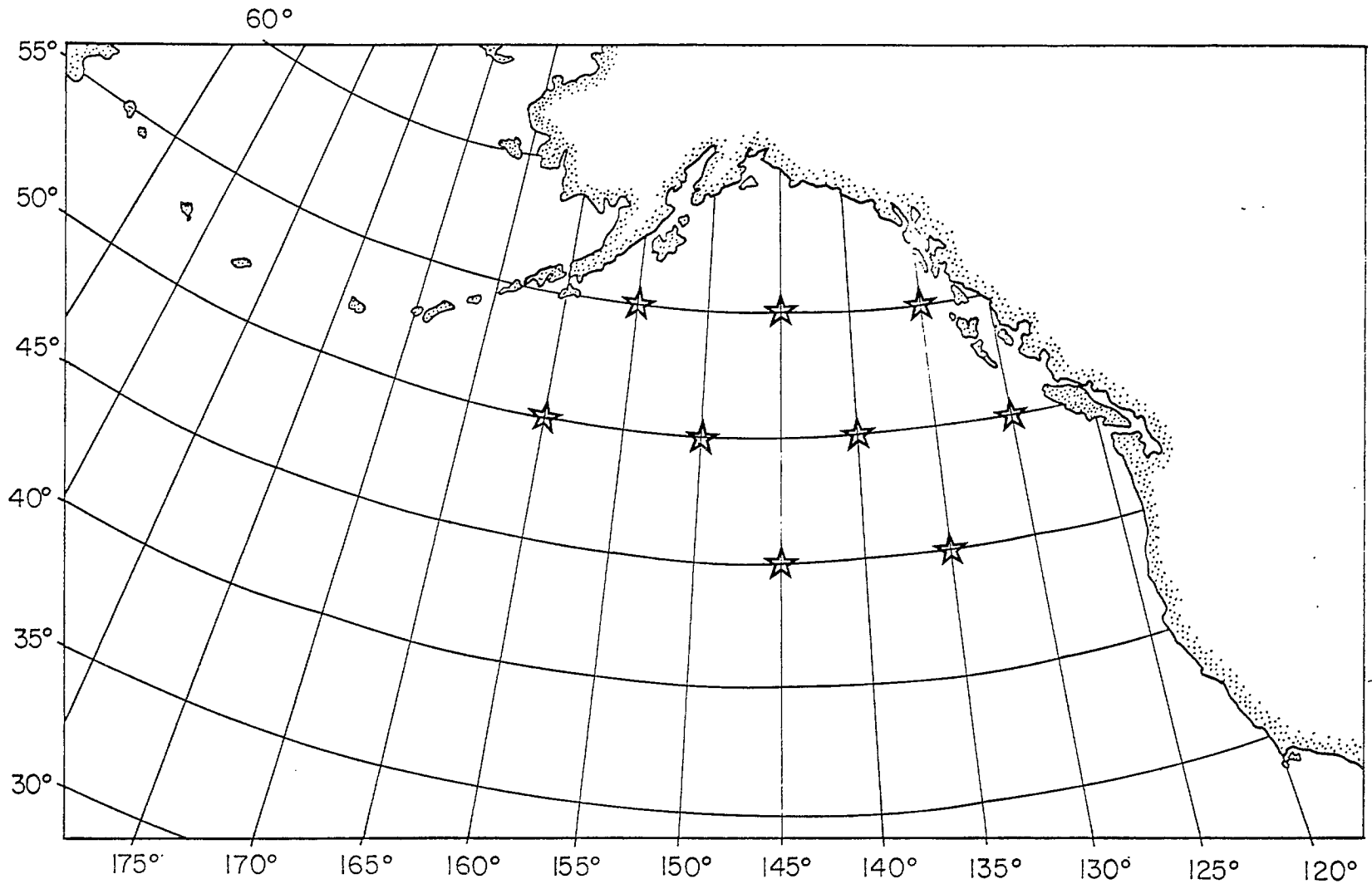


Fig. 1. Grid points at which Dec-Mar mean monthly transports have been calculated and vectors of Ekman transport have been graphed.



Table

MEAN MONTHLY EKMAN TRANSPORT -- DECEMBER TO MARCH

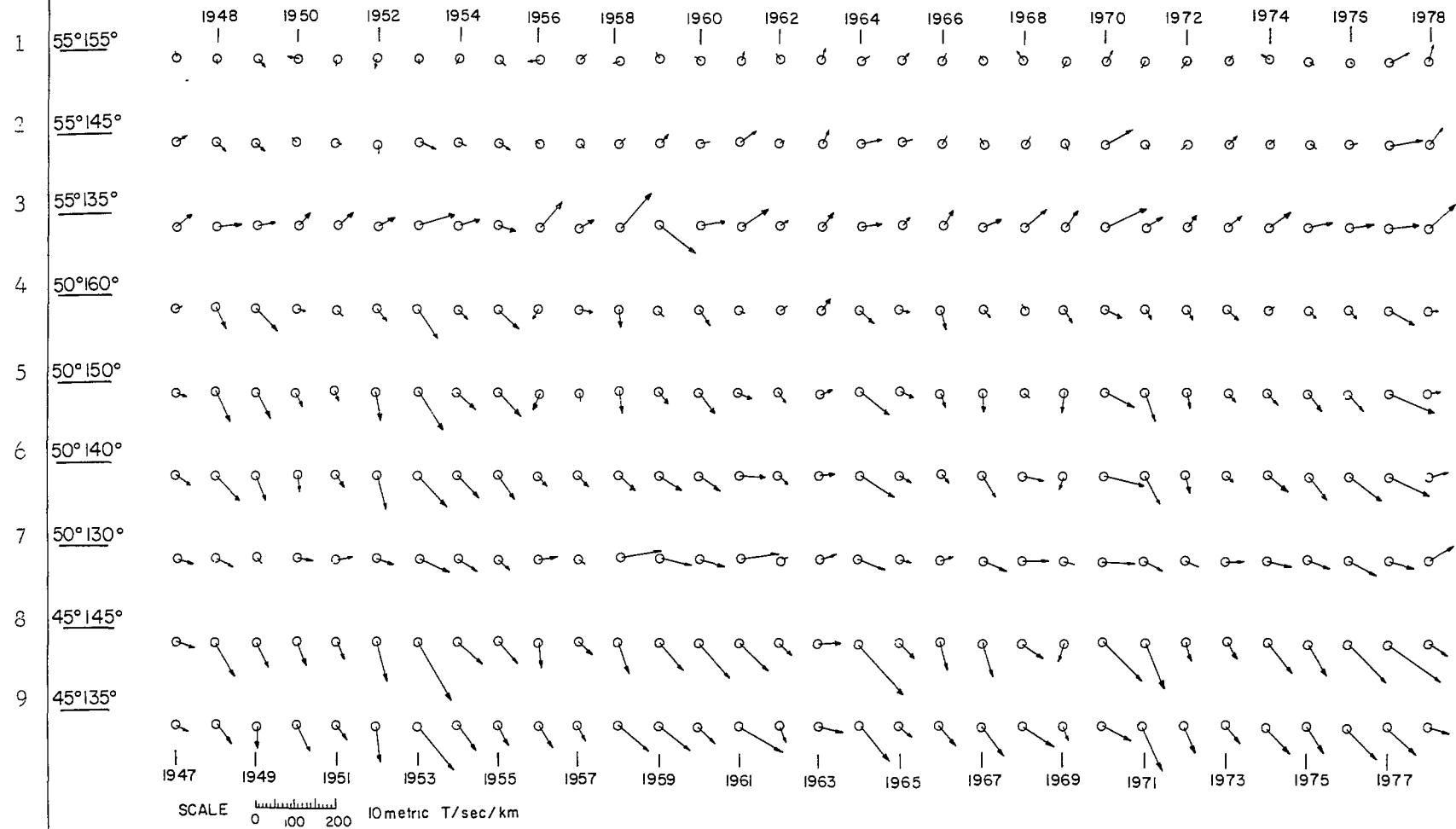


Fig. 2. Vectors of mean monthly Ekman transport (+ north and east) for the months Dec-Mar for selected grid points in the northeastern Pacific Ocean, 1946-78. Dates shown are for March. Values of components are given in Tables 1 to 9 following which also give the corresponding values for pressure, total, integrated total and integrated geostrophic transport and vertical velocity.

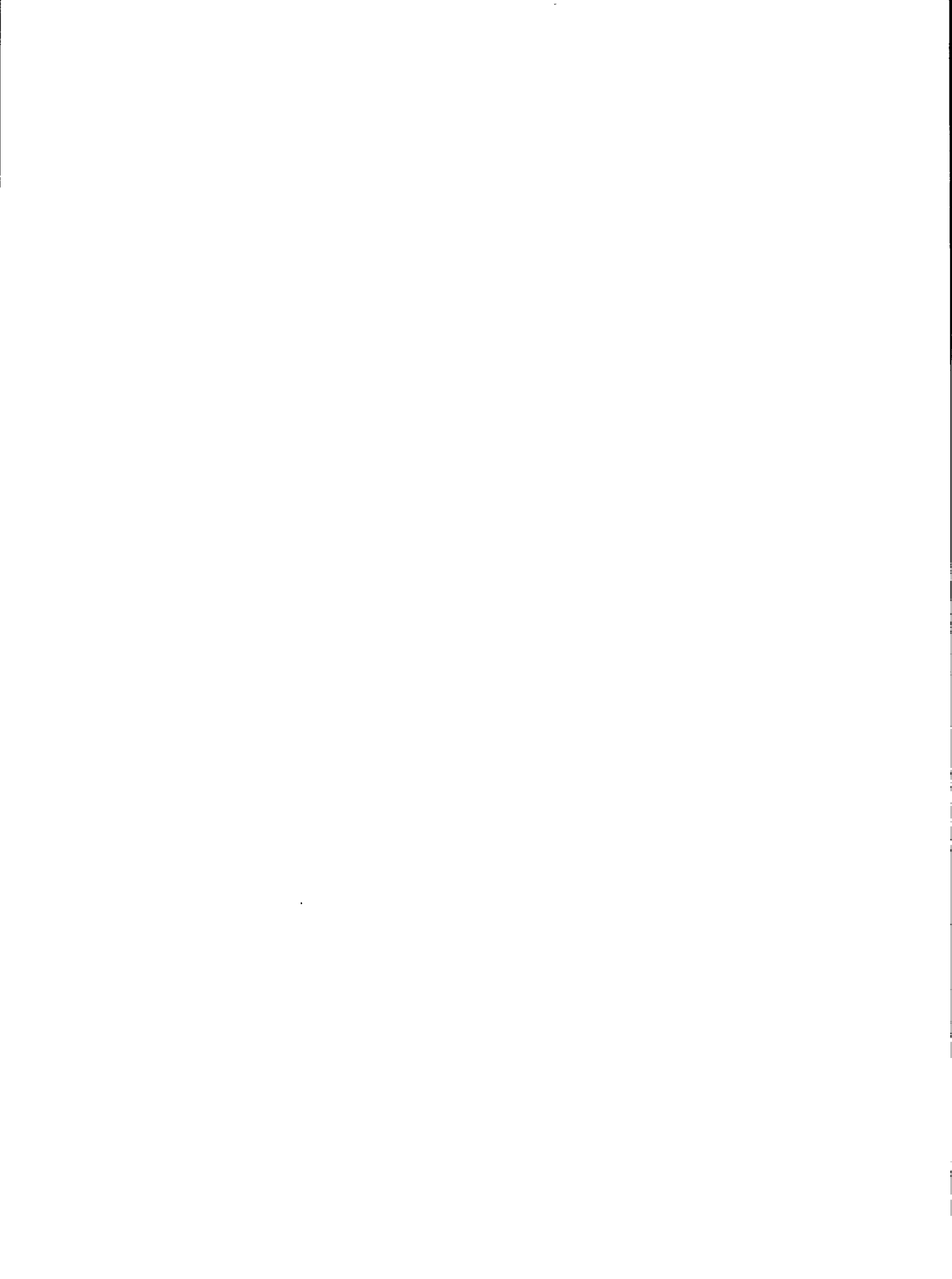


Table 1. Dec-Mar mean monthly computer output listing at 55°N latitude 155°W longitude.

YEAR	MONTH	START	END	Ekman			Integrated		Vertical Velocity	
				Pressure	Meridional	Zonal	Total	Geostrophic		
4612	4703			1008.75	14.00	3.50	8.75	139.25	136.50	20.50
4712	4803			1005.00	-14.00	0.00	101.75	167.25	169.25	301.50
4812	4903			1008.50	-16.75	14.50	73.25	187.75	189.25	221.75
4912	5003			1009.75	2.25	-21.25	40.25	177.50	176.00	113.25
5012	5103			1007.75	-3.75	-1.75	21.00	164.00	163.00	61.25
5112	5203			1006.75	-15.00	-5.75	8.75	229.50	230.50	28.50
5212	5303			996.75	-6.25	2.50	162.00	277.50	277.75	458.25
5312	5403			1005.75	-3.25	-8.00	62.50	176.00	176.25	182.00
5412	5503			1006.75	-13.50	15.75	67.75	121.25	123.50	198.75
5512	5603			1008.75	-7.25	-43.75	25.25	208.00	206.00	76.25
5612	5703			1009.75	6.25	6.50	9.00	90.50	90.00	23.75
5712	5803			1000.00	-4.25	-8.75	99.25	263.50	260.50	289.50
5812	5903			1004.00	15.25	-29.50	100.50	298.50	295.00	285.75
5912	6003			1002.00	7.25	-0.50	97.50	157.75	156.25	282.00
6012	6103			997.75	27.75	8.75	119.25	144.00	139.00	336.50
6112	6203			1010.25	9.25	-0.50	46.50	81.00	79.75	134.25
6212	6303			1007.00	40.00	8.75	118.25	126.50	122.00	327.00
6312	6403			998.75	13.25	20.75	121.75	123.75	122.25	342.00
6412	6503			1006.50	16.75	14.50	68.75	83.00	80.25	195.75
6512	6603			1003.75	14.25	3.50	136.00	120.00	116.50	392.50
6612	6703			1006.25	1.75	-6.00	30.50	139.25	138.25	87.50
6712	6803			1005.50	18.00	-16.75	37.50	134.25	131.25	97.25
6812	6903			1008.00	-7.25	-4.25	33.25	160.25	159.25	96.25
6912	7003			996.25	22.75	15.25	135.00	227.50	223.25	381.75
7012	7103			1004.75	-2.00	-7.50	51.50	190.75	190.25	150.00
7112	7203			1009.50	-8.50	-14.25	81.00	189.25	189.00	227.75
7212	7303			1005.00	5.50	4.25	45.25	135.25	133.75	127.75
7312	7403			1001.75	9.75	-10.25	69.50	207.00	204.25	190.00
7412	7503			1003.25	-1.50	0.50	24.00	154.00	154.00	71.00
7512	7603			1002.25	1.50	1.00	32.00	151.50	151.00	93.50
7612	7703			997.50	22.00	50.00	132.75	113.25	111.50	377.00
7712	7803			1001.50	44.50	8.50	76.00	112.25	106.00	198.50

Table 2. Dec-Mar mean monthly computer output listing at 55°N latitude 145°W longitude.

YEAR START	-MONTH END	Pressure	Ekman		Total	Integrated		Vertical Velocity
			Meridional	Zonal		Total	Geostrophic	
4612	4703	1008.25	14.75	15.25	132.75	94.00	92.50	373.00
4712	4803	1004.75	-18.00	27.75	172.75	82.00	82.50	513.75
4812	4903	1008.25	-18.50	19.25	177.75	107.75	108.00	524.25
4912	5003	1007.25	1.00	-0.50	105.50	131.00	130.00	297.25
5012	5103	1006.00	-1.00	1.75	91.75	128.00	127.00	266.50
5112	5203	1003.25	-14.75	1.25	177.75	170.00	169.75	513.75
5212	5303	997.25	-11.25	40.75	240.25	149.25	148.50	693.50
5312	5403	1005.50	-9.75	18.75	107.00	122.00	121.75	314.25
5412	5503	1007.75	-23.00	28.50	115.00	63.00	63.75	333.00
5512	5603	1004.25	1.75	-3.75	116.00	162.75	160.75	333.75
5612	5703	1010.50	-2.50	6.25	53.25	70.75	70.25	153.50
5712	5803	999.50	13.50	15.25	198.75	168.75	165.75	567.00
5812	5903	1002.50	11.25	14.50	193.50	204.50	202.00	558.50
5912	6003	1003.25	4.25	24.25	153.00	77.50	77.00	441.00
6012	6103	999.75	38.25	43.50	133.25	63.50	61.00	369.75
6112	6203	1010.50	9.50	7.75	82.25	40.25	39.25	236.00
6212	6303	1009.00	32.50	24.50	118.00	51.00	48.75	318.00
6312	6403	1003.25	14.75	54.50	101.50	53.00	52.00	285.25
6412	6503	1009.25	16.75	19.00	44.00	46.75	45.25	120.00
6512	6603	1005.00	25.75	14.75	79.75	51.00	48.75	226.50
6612	6703	1003.75	4.00	-0.75	119.00	91.50	90.75	334.25
6712	6803	1003.50	19.25	7.75	119.75	84.00	82.25	332.25
6812	6903	1006.00	-2.50	0.00	99.00	118.00	116.75	286.00
6912	7003	1000.00	31.50	67.50	236.75	108.75	106.50	675.75
7012	7103	1003.00	-0.75	9.50	148.00	127.00	126.25	422.25
7112	7203	1006.75	-1.75	-0.25	149.75	115.75	114.75	419.50
7212	7303	1005.00	3.25	10.25	100.50	88.75	88.00	288.75
7312	7403	1001.00	10.25	12.25	176.25	128.25	126.75	500.00
7412	7503	1003.25	-4.75	13.00	124.75	107.00	106.50	359.50
7512	7603	1003.00	2.25	21.50	129.25	100.00	99.50	375.25
7612	7703	1003.25	12.50	86.50	138.50	27.00	26.25	387.75
7712	7803	1004.00	45.75	35.00	89.00	59.75	56.25	237.75

Table 3. Dec-Mar mean monthly computer output listing at 55°N latitude 135°W longitude.

YEAR	MONTH	START	END	Ekman			Integrated		Vertical Velocity
				Pressure	Meridional	Zonal	Total	Geostrophic	
4612	4703	1011.00	32.25	34.75	162.00	0.00	0.00	440.75	
4712	4803	1008.75	2.25	57.50	161.25	0.00	0.00	452.25	
4812	4903	1011.00	8.00	33.75	160.00	0.00	0.00	444.25	
4912	5003	1008.75	36.75	36.75	305.50	0.00	0.00	846.50	
5012	5103	1008.50	38.75	51.25	310.00	0.00	0.00	886.75	
5112	5203	1005.00	22.75	43.50	355.75	0.00	0.00	1024.75	
5212	5303	1003.75	33.50	90.50	228.00	0.00	0.00	664.25	
5312	5403	1008.25	17.75	50.00	275.25	0.00	0.00	795.50	
5412	5503	1011.00	-7.00	37.75	83.00	0.00	0.00	241.00	
5512	5603	1007.00	69.75	60.75	394.75	0.00	0.00	1133.75	
5612	5703	1012.25	14.50	29.75	168.50	0.00	0.00	488.00	
5712	5803	1003.50	73.75	87.25	330.00	0.00	0.00	900.25	
5812	5903	1007.25	65.75	95.00	448.00	0.00	0.00	1288.25	
5912	6003	1009.00	15.25	56.25	90.25	0.00	0.00	260.25	
6012	6103	1006.75	46.75	76.50	66.00	0.00	0.00	174.75	
6112	6203	1014.25	16.25	17.75	43.50	0.00	0.00	123.75	
6212	6303	1013.25	34.25	40.50	41.50	0.00	0.00	104.50	
6312	6403	1008.75	12.75	62.75	64.50	0.00	0.00	182.75	
6412	6503	1012.25	26.25	23.00	102.75	0.00	0.00	289.50	
6512	6603	1008.25	42.00	31.50	79.75	0.00	0.00	220.25	
6612	6703	1006.25	21.25	41.00	168.50	0.00	0.00	472.50	
6712	6803	1007.50	40.75	57.25	144.00	0.00	0.00	403.50	
6812	6903	1008.25	38.75	32.75	271.00	0.00	0.00	769.00	
6912	7003	1008.50	49.25	103.75	105.00	0.00	0.00	293.75	
7012	7103	1006.25	20.75	39.25	250.25	0.00	0.00	729.50	
7112	7203	1008.25	26.25	21.75	213.25	0.00	0.00	584.25	
7212	7303	1008.50	28.75	35.25	177.50	0.00	0.00	495.50	
7312	7403	1005.75	36.50	59.00	225.50	0.00	0.00	643.25	
7412	7503	1007.50	15.00	63.25	209.75	0.00	0.00	593.00	
7512	7603	1007.50	9.75	64.00	184.00	0.00	0.00	528.50	
7612	7703	1010.75	6.75	74.75	-54.00	0.00	0.00	-151.75	
7712	7803	1009.50	68.25	65.00	98.50	0.00	0.00	271.75	

Table 4. Dec-Mar mean monthly computer output listing at 50°N latitude 160°W longitude.

YEAR -MONTH START END	Pressure	Ekman		Total	Integrated		Vertical Velocity
		Meridional	Zonal		Total	Geostrophic	
4612 4703	1008.00	6.00	7.75	26.75	30.75	32.75	84.00
4712 4803	1008.75	-49.50	22.00	20.00	70.75	83.25	86.00
4812 4903	1011.25	-53.75	51.75	-22.25	-19.75	-7.50	-59.50
4912 5003	1010.75	-3.25	11.00	-0.25	88.75	94.25	1.25
5012 5103	1010.00	-18.25	13.00	-10.75	57.25	62.00	-25.25
5112 5203	1010.25	-32.75	21.50	21.25	149.25	163.25	80.75
5212 5303	999.75	-67.00	36.50	133.75	238.25	254.50	470.25
5312 5403	1007.00	-24.50	21.00	70.50	143.00	152.25	254.50
5412 5503	1009.00	-44.50	43.75	62.75	56.75	67.50	242.25
5512 5603	1012.25	-22.75	-17.50	-11.00	170.75	176.00	-30.75
5612 5703	1009.25	1.75	35.25	-10.50	36.25	39.75	-36.50
5712 5803	1002.25	-45.00	7.75	26.25	176.50	183.75	107.75
5812 5903	1003.50	-15.50	4.25	65.00	157.50	163.25	225.00
5912 6003	1003.25	-30.50	19.50	98.00	153.75	160.75	350.50
6012 6103	997.75	-7.00	6.00	38.75	201.50	202.50	136.25
6112 6203	1009.50	3.00	12.25	15.00	61.50	63.75	53.00
6212 6303	1005.25	31.75	30.75	16.00	39.50	37.25	39.50
6312 6403	999.50	-37.00	38.50	151.00	262.50	272.25	519.00
6412 6503	1006.25	-2.25	23.50	58.25	111.25	113.50	199.75
6512 6603	1006.75	-46.00	9.25	30.75	183.00	187.75	124.50
6612 6703	1008.25	-14.00	15.00	11.75	131.75	139.75	38.25
6712 6803	1005.50	11.50	-5.75	33.25	146.75	147.25	103.25
6812 6903	1011.25	-34.75	20.00	38.75	52.75	58.75	129.00
6912 7003	994.75	-20.50	41.25	186.75	216.00	220.25	647.50
7012 7103	1006.50	-25.50	17.00	74.50	185.25	196.25	265.00
7112 7203	1011.25	-25.00	17.50	-14.00	58.25	66.00	-44.50
7212 7303	1004.50	-23.75	26.75	67.25	80.75	84.75	238.75
7312 7403	1001.00	2.75	10.75	72.00	172.25	177.50	244.25
7412 7503	1004.50	-20.75	20.50	82.25	131.25	139.75	295.00
7512 7603	1003.50	-21.50	15.25	84.00	195.25	204.50	292.50
7612 7703	996.25	-30.75	64.25	188.75	160.00	167.50	665.50
7712 7803	998.50	1.00	13.25	63.25	162.25	159.00	220.00

Table 5. Dec-Mar mean monthly computer output listing at 50°N latitude 150°W longitude.

YEAR	-MONTH	START	END	Ekman			Integrated		Vertical Velocity
				Pressure	Meridional	Zonal	Total	Total Geostrophic	
4612	4703	1009.75	-3.25	19.00	-3.50	22.50	24.75	-15.50	
4712	4803	1010.00	-72.00	37.25	49.00	46.25	54.50	195.75	
4812	4903	1013.75	-67.75	33.25	-36.00	1.25	9.25	-105.00	
4912	5003	1011.50	-31.25	12.00	19.75	81.75	86.25	79.50	
5012	5103	1010.25	-26.75	7.00	-17.00	67.25	70.50	-43.50	
5112	5203	1010.00	-78.00	14.00	52.25	123.00	133.25	199.75	
5212	5303	1001.75	-96.25	58.50	86.25	159.75	170.25	348.00	
5312	5403	1008.75	-43.50	38.00	69.75	92.75	100.00	257.50	
5412	5503	1012.00	-53.75	50.50	17.25	28.25	35.50	87.25	
5512	5603	1008.50	-40.50	-17.25	85.50	144.00	147.25	313.50	
5612	5703	1012.50	-16.50	21.75	29.75	29.50	32.50	114.00	
5712	5803	1001.75	-51.75	5.00	26.50	157.50	161.25	111.25	
5812	5903	1004.00	-28.75	21.50	71.00	108.75	113.00	263.75	
5912	6003	1005.00	-46.75	32.50	78.50	90.50	95.25	290.00	
6012	6103	999.00	-12.50	31.50	102.50	150.50	151.00	357.00	
6112	6203	1011.75	-13.00	14.50	20.50	49.00	51.00	76.75	
6212	6303	1007.50	8.75	38.00	-19.00	40.75	39.75	-75.00	
6312	6403	1003.50	-56.75	81.00	155.75	152.75	158.75	558.75	
6412	6503	1008.75	-15.50	34.00	46.75	73.75	75.50	161.00	
6512	6603	1005.75	-34.00	7.00	86.50	141.25	143.25	313.00	
6612	6703	1007.75	-42.25	6.00	33.00	115.75	121.75	122.25	
6712	6803	1004.25	-3.75	2.75	50.25	117.00	117.75	169.25	
6812	6903	1011.50	-43.25	-1.75	-47.75	55.50	59.00	-161.50	
6912	7003	999.50	-34.00	74.00	132.00	101.75	104.50	473.25	
7012	7103	1008.25	-64.50	25.00	47.00	141.50	149.50	173.25	
7112	7203	1011.25	-41.00	7.75	-11.00	67.25	72.50	-32.50	
7212	7303	1007.00	-25.75	20.25	10.25	53.50	55.50	45.25	
7312	7403	1003.00	-34.50	23.00	91.75	113.50	118.00	313.50	
7412	7503	1007.25	-49.25	33.25	63.75	79.00	85.50	242.50	
7512	7603	1005.50	-44.50	39.75	128.75	119.25	126.25	468.75	
7612	7703	1003.00	-44.25	111.25	90.75	60.00	65.00	315.50	
7712	7803	1001.25	5.00	28.75	76.75	112.25	109.50	256.00	

Table 6. Dec-Mar mean monthly computer output listing at 50°N latitude 140°W longitude.

YEAR -MONTH START END	Pressure	Ekman		Total	Integrated		Vertical Velocity
		Meridional	Zonal		Total	Geostrophic	
4612 4703	1012.00	-24.50	32.00	16.25	18.00	19.00	63.25
4712 4803	1011.75	-69.25	53.50	30.75	17.75	21.00	130.75
4812 4903	1014.50	-67.75	21.75	-7.75	17.00	19.75	-4.75
4912 5003	1011.00	-42.75	8.50	27.25	65.00	66.75	94.50
5012 5103	1009.75	-30.75	15.25	47.75	56.25	57.25	178.25
5112 5203	1009.25	-88.00	24.25	86.00	73.75	77.75	322.00
5212 5303	1004.50	-79.75	75.75	118.00	86.75	90.75	447.50
5312 5403	1011.00	-57.00	54.25	59.75	46.75	50.00	229.00
5412 5503	1014.75	-60.25	39.50	-17.00	28.00	31.00	-33.00
5512 5603	1006.75	-30.25	15.00	70.75	88.25	89.00	253.50
5612 5703	1014.75	-29.75	24.75	-10.00	22.00	23.75	-20.75
5712 5803	1002.25	-32.00	38.00	131.50	101.00	101.50	465.00
5812 5903	1007.50	-39.00	61.50	84.75	53.50	55.00	314.75
5912 6003	1007.75	-33.75	49.25	69.75	37.75	39.25	252.75
6012 6103	1003.25	-3.00	71.50	103.00	77.00	76.75	350.50
6112 6203	1013.75	-17.00	20.75	32.00	30.25	30.75	119.00
6212 6303	1011.00	2.75	39.75	43.50	32.25	31.50	140.75
6312 6403	1008.50	-49.00	85.75	110.75	57.25	60.00	410.00
6412 6503	1011.00	-15.75	25.00	58.00	36.00	36.75	204.50
6512 6603	1006.25	-12.00	15.50	92.75	77.50	77.50	326.00
6612 6703	1006.75	-48.00	28.00	116.50	62.75	65.25	419.25
6712 6803	1005.75	-8.50	49.00	110.25	59.75	59.75	382.50
6812 6903	1008.75	-25.00	-5.25	54.50	53.50	54.25	194.50
6912 7003	1005.75	-20.00	96.00	77.50	27.25	27.50	275.50
7012 7103	1008.25	-68.00	37.50	135.75	76.25	79.50	496.25
7112 7203	1010.75	-48.50	10.25	62.00	49.00	51.25	225.50
7212 7303	1008.50	-18.75	17.75	26.00	40.50	41.00	96.50
7312 7403	1005.50	-38.50	50.50	91.00	48.00	50.00	319.75
7412 7503	1009.00	-54.25	47.50	59.25	35.00	37.50	222.75
7512 7603	1009.25	-59.50	80.50	87.00	41.75	45.25	322.00
7612 7703	1009.75	-39.50	101.50	34.00	15.50	17.50	118.25
7712 7803	1005.00	17.25	43.75	56.75	64.50	62.75	189.25

Table 7. Dec-Mar mean monthly computer output listing at 50°N latitude 130°W longitude.

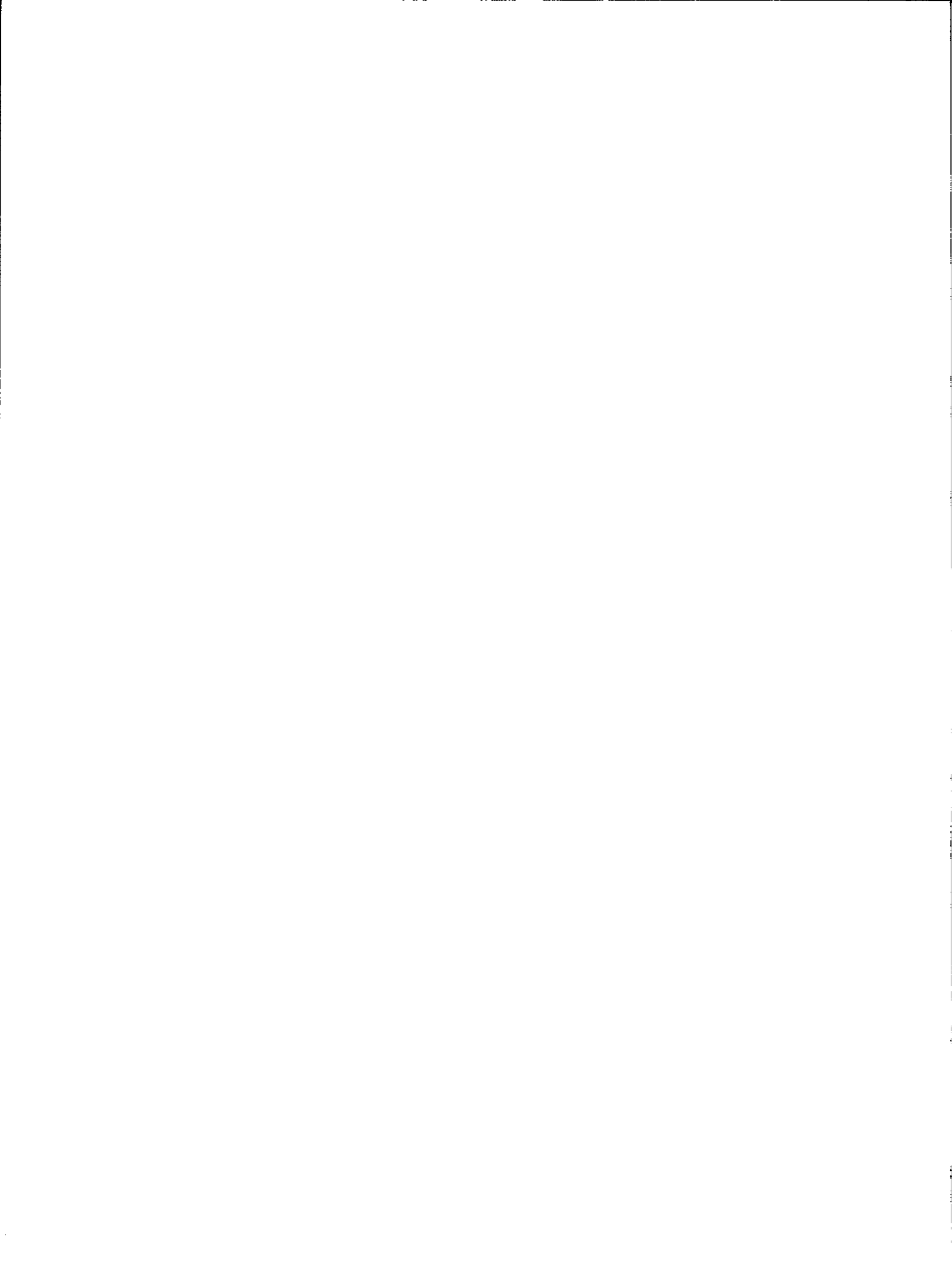
YEAR - MONTH START END	Pressure	Ekman			Integrated		Vertical Velocity
		Meridional	Zonal	Total	Total	Geostrophic	
4612 4703	1015.00	-12.75	34.75	34.50	0.00	0.00	116.00
4712 4803	1014.00	-24.50	45.00	18.50	0.00	0.00	69.25
4812 4903	1014.50	-14.25	17.75	55.00	0.00	0.00	190.75
4912 5003	1010.50	-8.50	42.50	154.50	0.00	0.00	539.00
5012 5103	1011.75	3.00	46.75	109.50	0.00	0.00	378.00
5112 5203	1009.50	-22.75	39.75	120.50	0.00	0.00	433.25
5212 5303	1009.00	-34.75	80.50	124.25	0.00	0.00	449.50
5312 5403	1012.50	-35.50	55.25	71.00	0.00	0.00	258.00
5412 5503	1015.50	-29.50	36.00	95.50	0.00	0.00	342.75
5512 5603	1009.75	10.00	54.25	176.25	0.00	0.00	614.75
5612 5703	1014.50	-13.25	25.75	72.50	0.00	0.00	259.50
5712 5803	1006.25	11.00	101.75	151.25	0.00	0.00	510.75
5812 5903	1012.50	-9.00	78.25	64.50	0.00	0.00	226.75
5912 6003	1013.00	-14.00	59.00	36.00	0.00	0.00	129.50
6012 6103	1009.75	7.75	90.75	112.75	0.00	0.00	379.00
6112 6203	1015.00	0.00	14.50	52.25	0.00	0.00	176.25
6212 6303	1015.00	9.50	50.50	46.00	0.00	0.00	153.50
6312 6403	1013.50	-26.50	67.50	49.50	0.00	0.00	196.75
6412 6503	1013.75	-4.25	22.00	42.75	0.00	0.00	150.75
6512 6603	1009.25	4.50	37.50	123.75	0.00	0.00	432.25
6612 6703	1009.75	-23.00	53.25	58.50	0.00	0.00	223.00
6712 6803	1010.75	1.25	62.00	57.50	0.00	0.00	200.75
6812 6903	1009.25	5.25	23.75	95.00	0.00	0.00	327.00
6912 7003	1013.00	8.00	74.50	-1.75	0.00	0.00	-4.50
7012 7103	1011.00	-25.50	42.25	77.25	0.00	0.00	282.25
7112 7203	1011.75	-15.50	31.00	75.75	0.00	0.00	263.00
7212 7303	1011.25	2.50	41.75	87.00	0.00	0.00	301.25
7312 7403	1009.75	-13.50	54.75	43.25	0.00	0.00	159.00
7412 7503	1012.75	-16.50	58.25	38.50	0.00	0.00	127.25
7512 7603	1014.00	-35.00	68.25	30.00	0.00	0.00	114.25
7612 7703	1015.25	-18.25	59.25	8.75	0.00	0.00	40.75
7712 7803	1010.00	39.00	60.00	124.00	0.00	0.00	411.50

Table 8. Dec-Mar mean monthly computer output listing at 45°N latitude 145°W longitude.

YEAR START	-MONTH END	Pressure	Ekman			Integrated		Vertical Velocity
			Meridional	Zonal	Total	Total	Geostrophic	
4612	4703	1013.25	-14.50	46.75	-2.25	-43.50	-41.00	-6.50
4712	4803	1016.75	-86.50	51.75	-28.25	-40.25	-32.00	-80.00
4812	4903	1019.00	-63.25	24.75	-37.25	-11.50	-3.75	-132.50
4912	5003	1015.25	-55.50	30.75	-14.75	12.75	21.25	-45.25
5012	5103	1013.50	-34.50	15.50	10.50	29.75	35.25	60.25
5112	5203	1016.50	-106.75	28.25	-66.50	-27.25	-14.50	-226.75
5212	5303	1009.75	-148.00	90.75	32.25	16.75	33.75	200.25
5312	5403	1014.75	-58.25	63.25	-26.00	-82.00	-74.25	-87.50
5412	5503	1018.50	-60.50	52.25	-32.75	-57.25	-50.00	-107.00
5512	5603	1011.25	-63.00	11.25	44.50	56.00	63.50	214.00
5612	5703	1016.75	-42.25	43.75	-11.75	-28.50	-23.00	-31.50
5712	5803	1006.25	-83.25	29.00	50.25	119.75	129.25	240.25
5812	5903	1010.50	-85.50	77.25	72.50	31.75	40.75	345.75
5912	6003	1011.25	-74.25	47.00	15.00	1.50	8.75	92.00
6012	6103	1004.25	-67.25	78.25	123.50	89.75	98.50	532.50
6112	6203	1015.50	-29.75	40.75	4.25	-8.50	-4.75	30.00
6212	6303	1010.50	4.00	60.25	-30.00	-6.50	-5.50	-141.50
6312	6403	1012.50	-126.75	115.50	-7.25	-26.25	-12.75	35.25
6412	6503	1014.00	-38.50	37.75	-45.75	-20.00	-15.25	-174.75
6512	6603	1010.50	-69.25	18.75	24.25	59.00	66.25	131.50
6612	6703	1012.25	-81.25	30.25	24.25	23.00	33.75	132.25
6712	6803	1007.25	-39.75	60.00	90.50	25.00	30.75	381.00
6812	6903	1013.25	-47.00	-10.25	3.00	43.75	48.25	19.50
6912	7003	1007.50	-90.00	100.75	11.25	4.00	10.75	84.25
7012	7103	1014.75	-110.50	52.75	-35.25	-2.25	11.75	-87.75
7112	7203	1015.50	-46.25	17.75	-38.25	-6.50	1.50	-141.50
7212	7303	1010.25	-51.50	25.50	41.25	78.50	-83.75	189.25
7312	7403	1009.25	-75.50	60.00	-24.25	5.00	14.00	-68.50
7412	7503	1013.50	-78.75	50.00	-10.00	9.00	17.00	-10.50
7512	7603	1013.00	-93.00	98.00	41.75	-56.25	-45.50	209.00
7612	7703	1011.50	-89.50	129.25	3.00	-27.75	-18.25	36.00
7712	7803	1004.50	-28.00	47.25	46.00	61.00	62.75	195.25

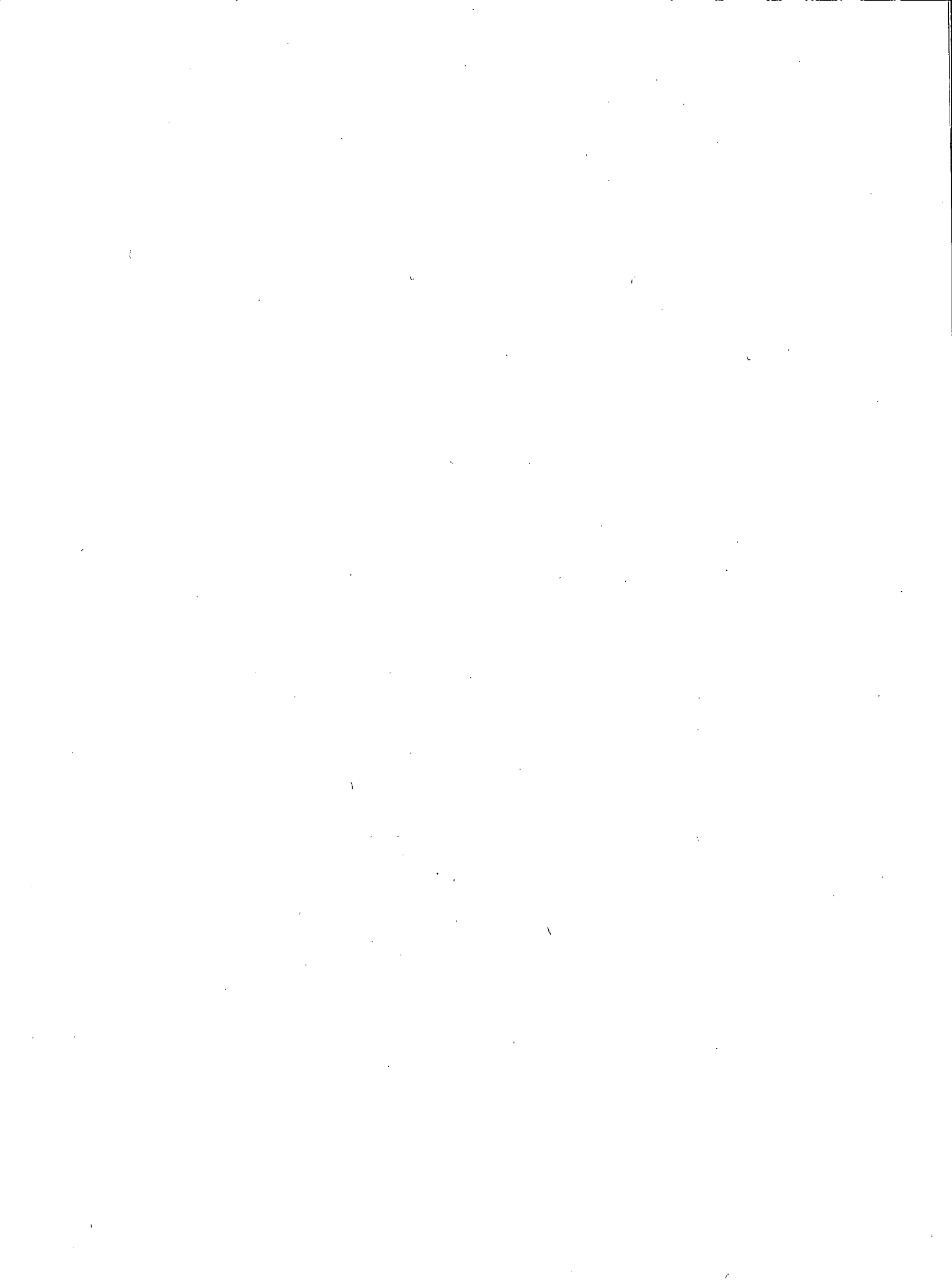
Table 9. Dec-Mar mean monthly computer output listing at 45°N latitude 135°W longitude.

YEAR	-MONTH	START	END	Ekman			Integrated		Vertical Velocity
				Pressure	Meridional	Zonal	Total	Geostrophic	
4612	4703	1017.00	-18.50	28.25	-49.25	-23.25	-22.25	-196.00	
4712	4803	1017.75	-58.00	25.00	-35.00	-15.25	-12.50	-125.50	
4812	4903	1019.00	-60.50	0.25	-10.50	7.25	10.00	-20.75	
4912	5003	1014.50	-69.25	27.75	39.50	3.00	6.50	195.50	
5012	5103	1014.00	-42.50	30.25	33.00	12.75	15.00	155.00	
5112	5203	1015.00	-89.75	10.00	-9.25	3.00	7.25	7.50	
5212	5303	1013.00	-115.75	87.00	18.25	-3.50	3.25	137.00	
5312	5403	1016.50	-59.25	44.75	-71.00	-44.25	-40.75	-274.25	
5412	5503	1020.50	-51.25	24.50	-53.00	-23.50	-20.50	-194.00	
5512	5603	1011.75	-54.00	34.25	40.25	22.75	25.50	194.50	
5612	5703	1017.50	-39.25	21.00	-21.50	-15.25	-13.25	-73.50	
5712	5803	1006.25	-67.00	74.75	145.50	42.75	46.75	620.25	
5812	5903	1014.00	-64.00	72.50	17.50	-3.75	-0.75	97.25	
5912	6003	1013.75	-44.75	49.50	9.75	-8.00	-6.00	57.50	
6012	6103	1009.75	-61.00	108.25	80.50	9.50	13.00	355.50	
6112	6203	1017.25	-33.00	18.00	-18.75	-3.00	-1.50	-65.75	
6212	6303	1014.50	-14.00	58.50	24.25	-4.00	-3.25	100.25	
6312	6403	1016.50	-88.25	79.00	-11.50	-18.75	-14.00	3.75	
6412	6503	1015.75	-35.75	24.75	-13.00	3.00	5.00	-32.75	
6512	6603	1011.00	-51.50	38.75	71.00	21.50	24.25	319.00	
6612	6703	1012.75	-77.50	54.00	40.75	-2.25	2.00	207.00	
6712	6803	1011.75	-42.75	78.75	8.25	-13.75	-11.50	53.25	
6812	6903	1011.00	-29.25	3.75	42.00	26.50	27.50	174.75	
6912	7003	1012.25	-35.00	72.25	7.50	-3.00	-1.50	44.50	
7012	7103	1015.50	-103.00	43.25	23.50	2.75	8.00	149.75	
7112	7203	1015.75	-64.75	23.75	17.75	1.75	5.50	92.00	
7212	7303	1011.75	-39.25	31.75	81.00	30.75	32.50	352.75	
7312	7403	1011.75	-62.25	58.25	28.00	3.75	7.50	143.75	
7412	7503	1014.75	-56.75	40.50	11.50	8.25	11.25	68.25	
7512	7603	1017.50	-78.50	74.00	-66.00	-46.75	-42.75	-245.00	
7612	7703	1016.75	-65.75	70.25	-29.75	-17.00	-14.00	-98.50	
7712	7803	1008.50	-11.50	47.50	43.00	25.75	26.25	183.75	



SECTION II

5° monthly mean Integrated Total, Meridional Ekman
and Zonal Ekman transport graphs and data listing.
January values are plotted immediately above the year.



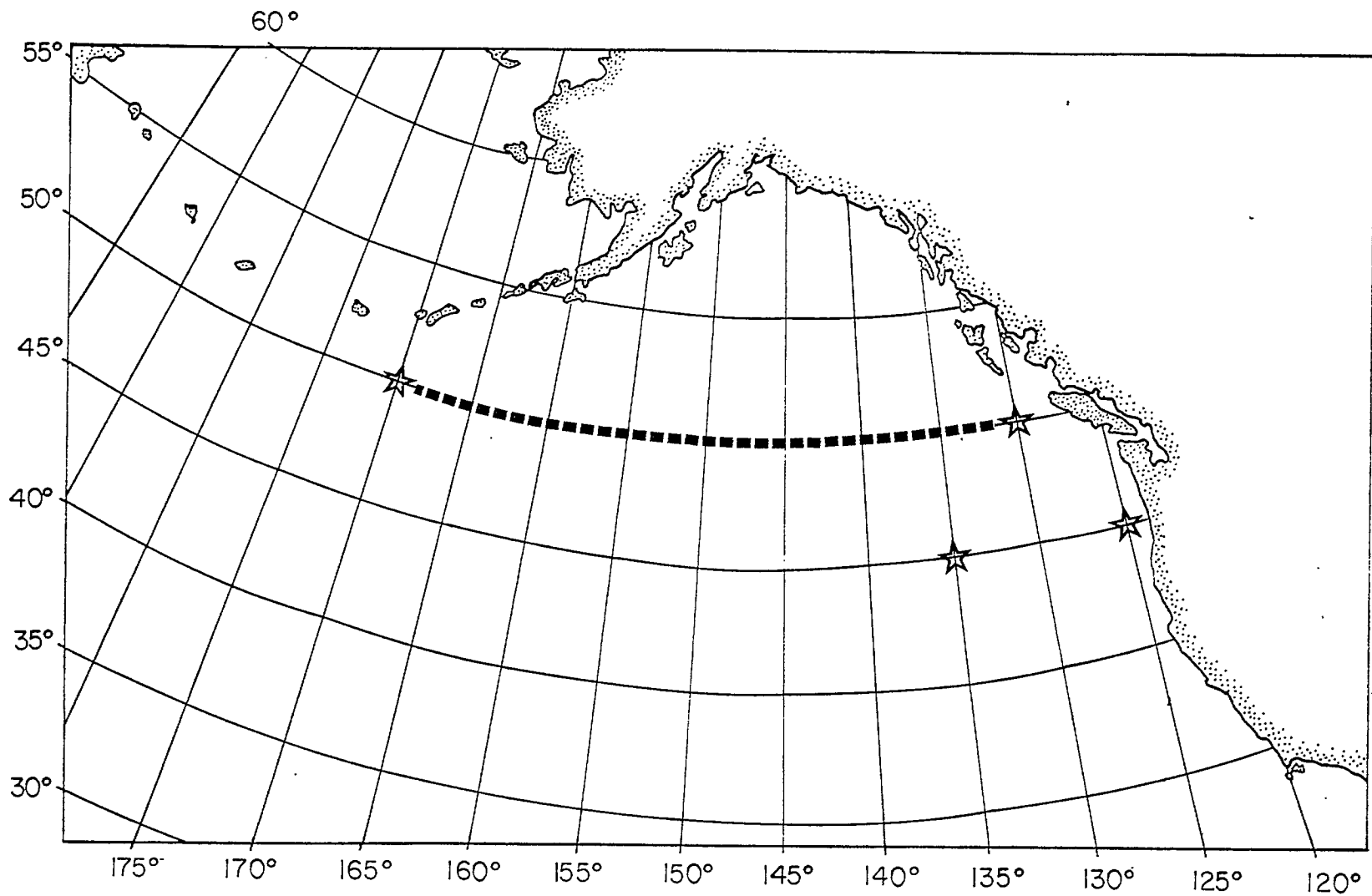


Fig. 3. Grid points at which 5° monthly mean Meridional and Zonal components of Ekman transport have been graphed, and section of latitude 50°N for which the Integrated Total transport has been computed and plotted as 50°N 170°W. Tables 10-16 contain data listings.

MONTHLY MEAN INTEGRATED TOTAL TRANSPORT 50N 170W

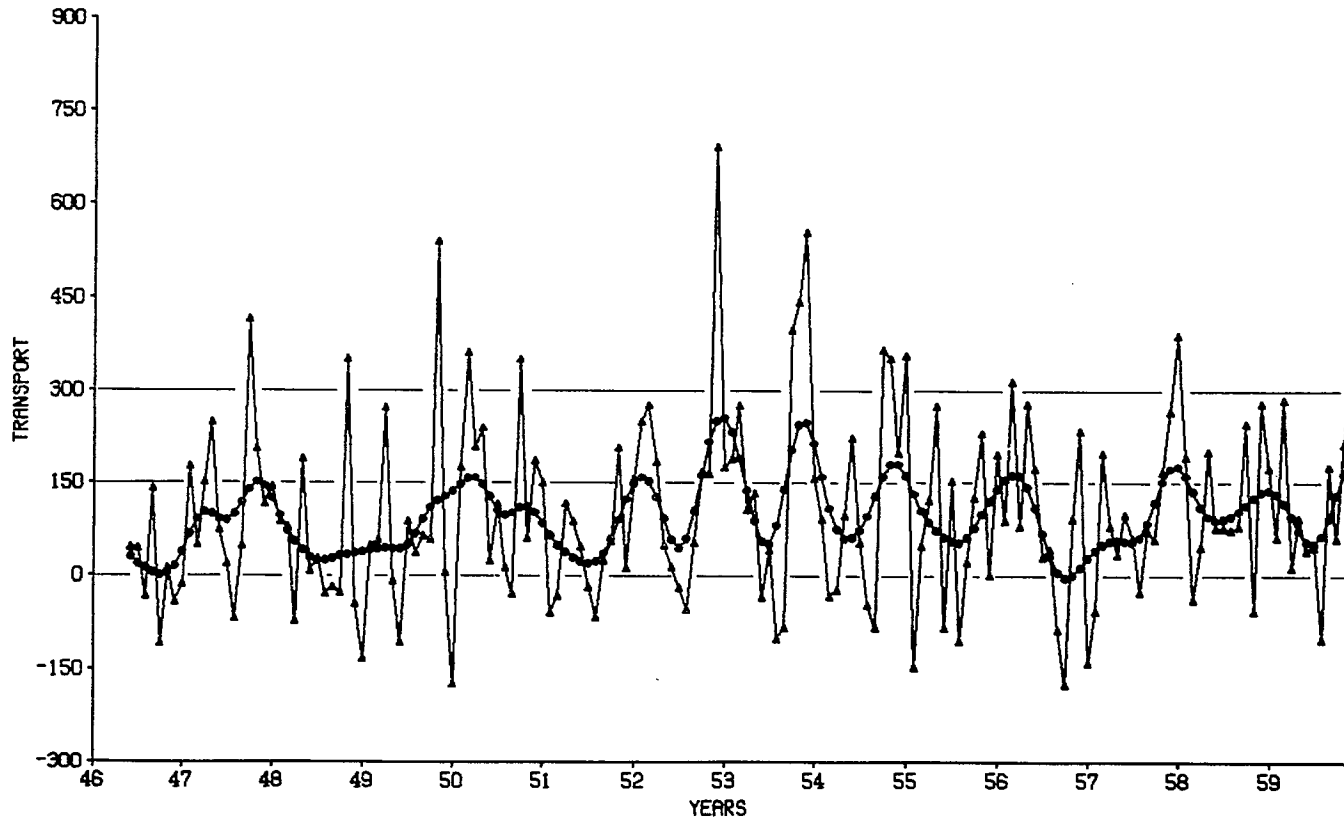


Fig. 4a.

MONTHLY MEAN INTEGRATED TOTAL TRANSPORT 50N 170W

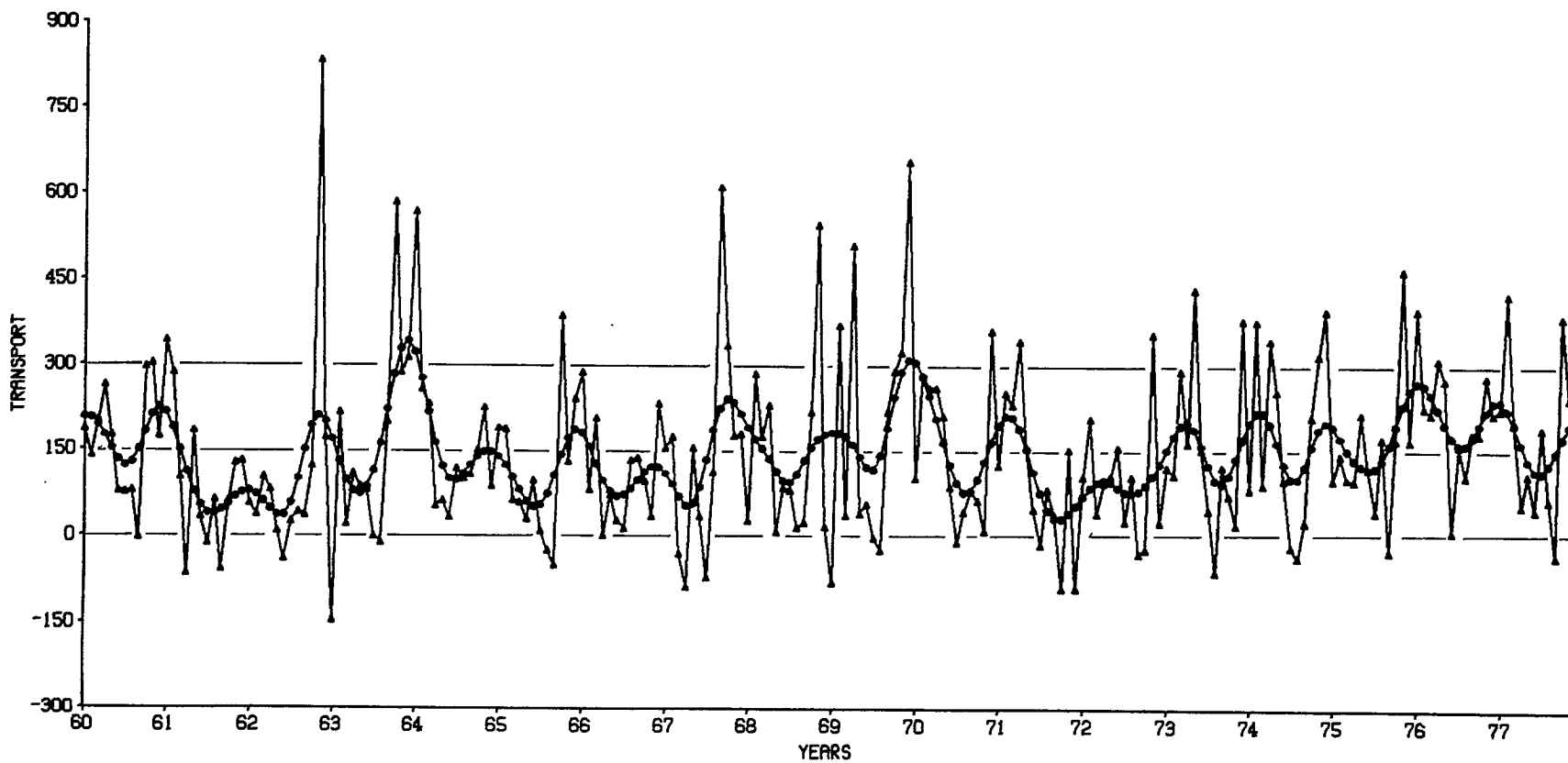


Fig. 4a, b. Graph of monthly and 11-mo weighted running mean of Total transport integrated from 130° to 170° along 50°N for the years 1946-77. The units are 10^5 metric T/sec (+ north. For data listing see Table 10.

MONTHLY MEAN MERIDIONAL TRANSPORT 50N 130W

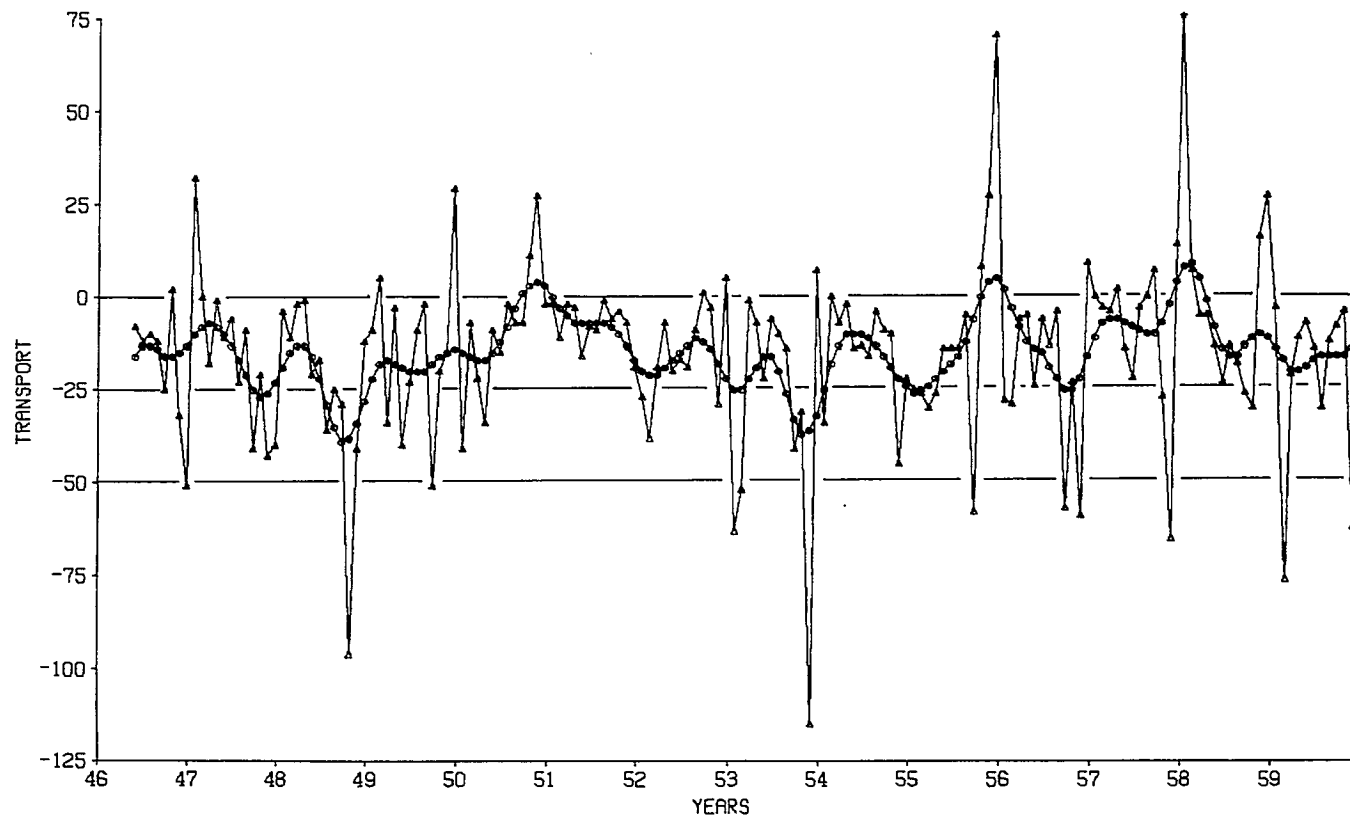


Fig. 5a.

MONTHLY MEAN MERIDIONAL TRANSPORT 50N 130W

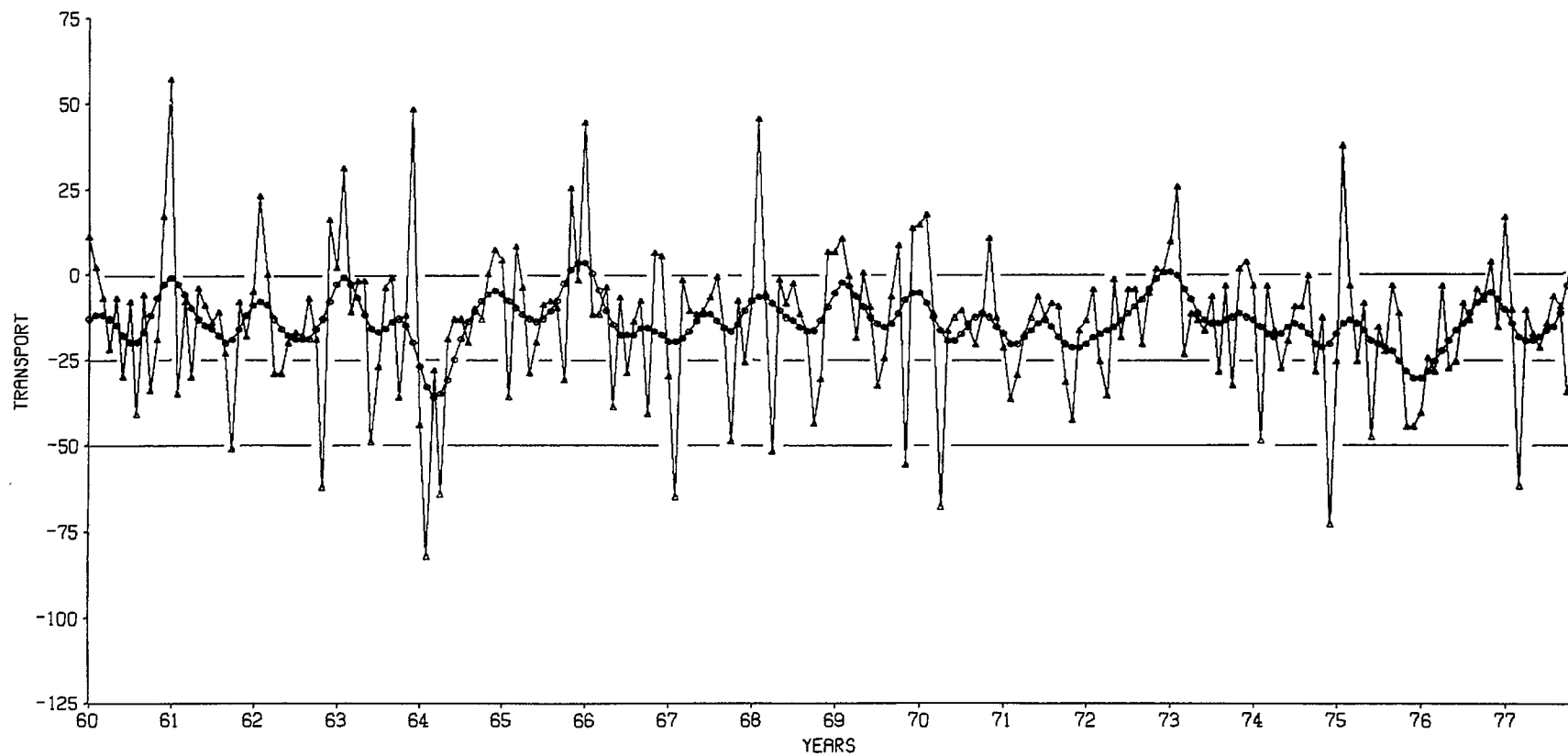


Fig. 5a, b. Graph of monthly mean Meridional Ekman transport at 50°N 130°W for the years 1946-77. The units are 10 metric T/sec/km (+ north). For data listing see Table 11.

MONTHLY MEAN ZONAL TRANSPORT 50N 130W

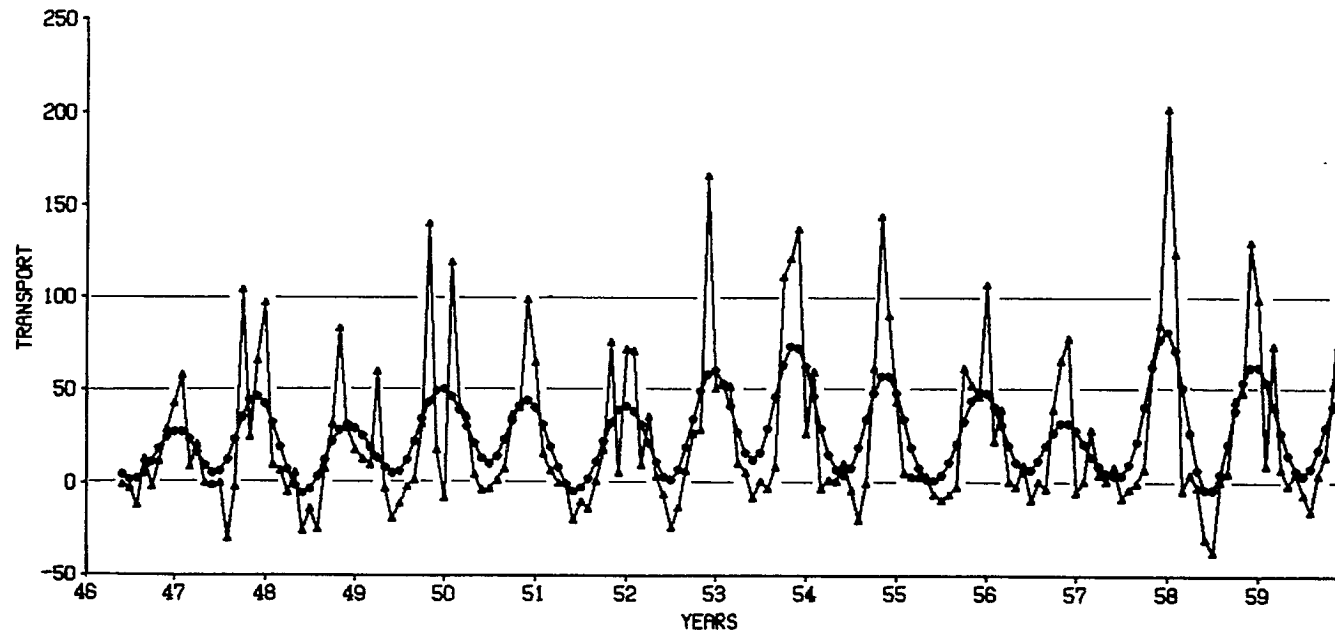


Fig. 6a.

MONTHLY MEAN ZONAL TRANSPORT 50N 130W

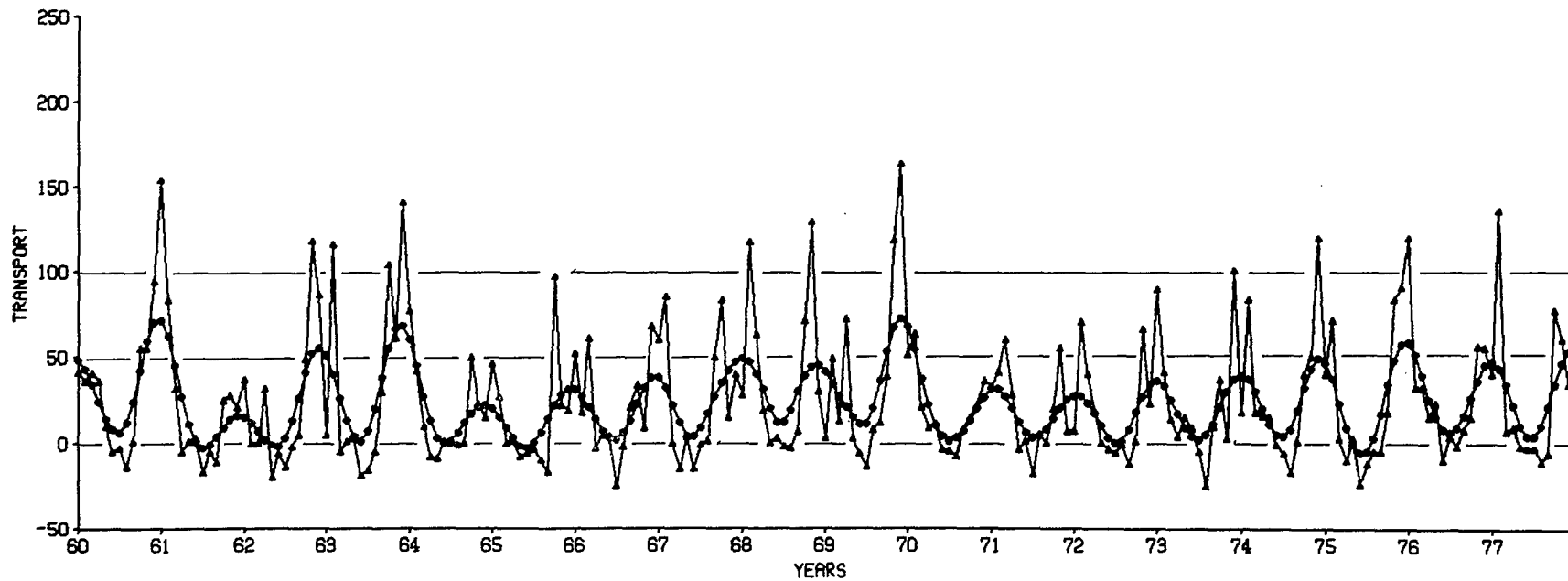


Fig. 6a, b. Graph of monthly mean Zonal Ekman transport at 50°N 130°W for the years 1946-77. The units are 10 metric T/sec/km (+ east). For data listing see Table 12.

MONTHLY MEAN MERIDIONAL TRANSPORT 45N 135W

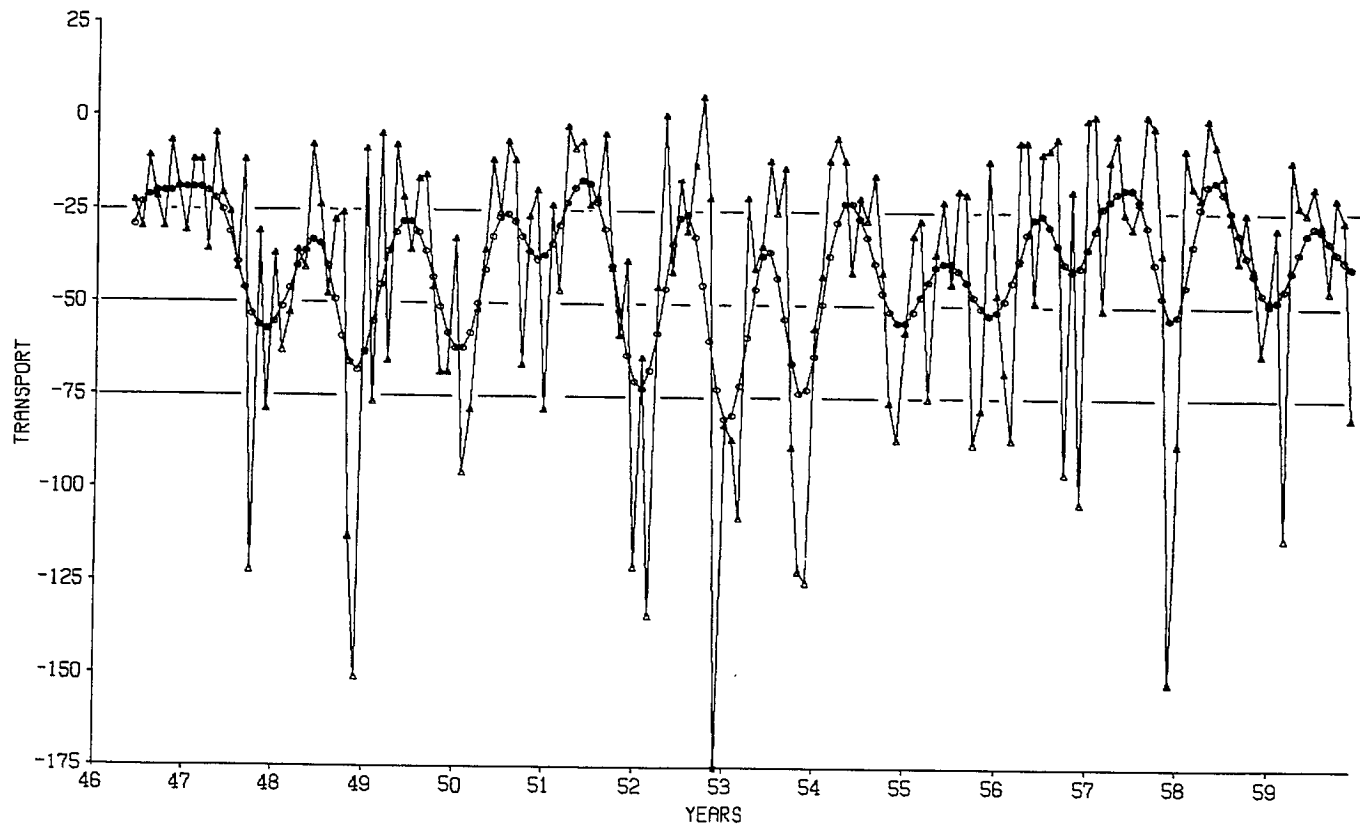


Fig. 7a.

MONTHLY MEAN MERIDIONAL TRANSPORT 45N 135W

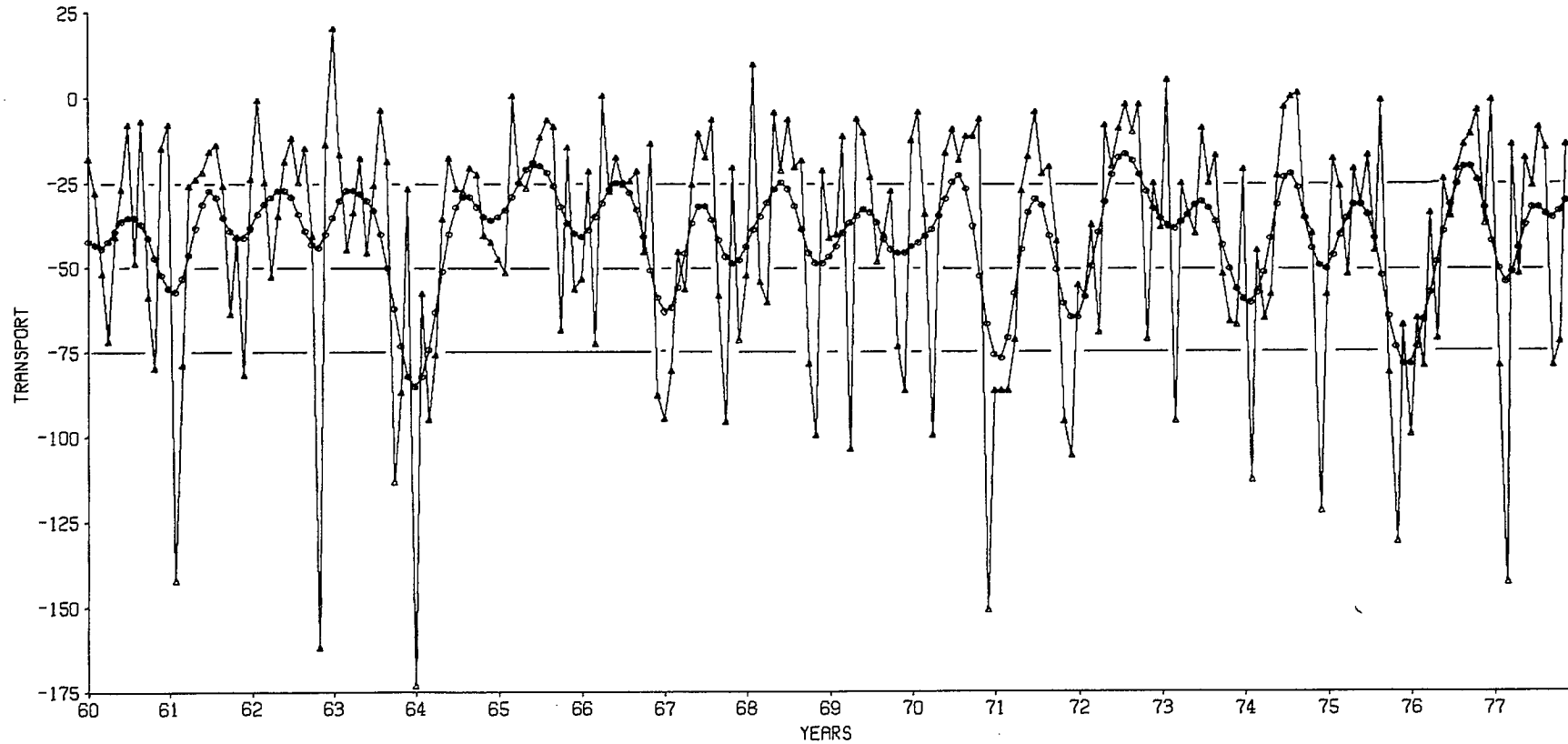


Fig. 7a, b. Graph of monthly mean Meridional Ekman transport at 45°N 135°W for the years 1946-77. The units are 10 metric T/sec/km (+ north). For data listing see Table 13.

MONTHLY MEAN ZONAL TRANSPORT 45N 135W

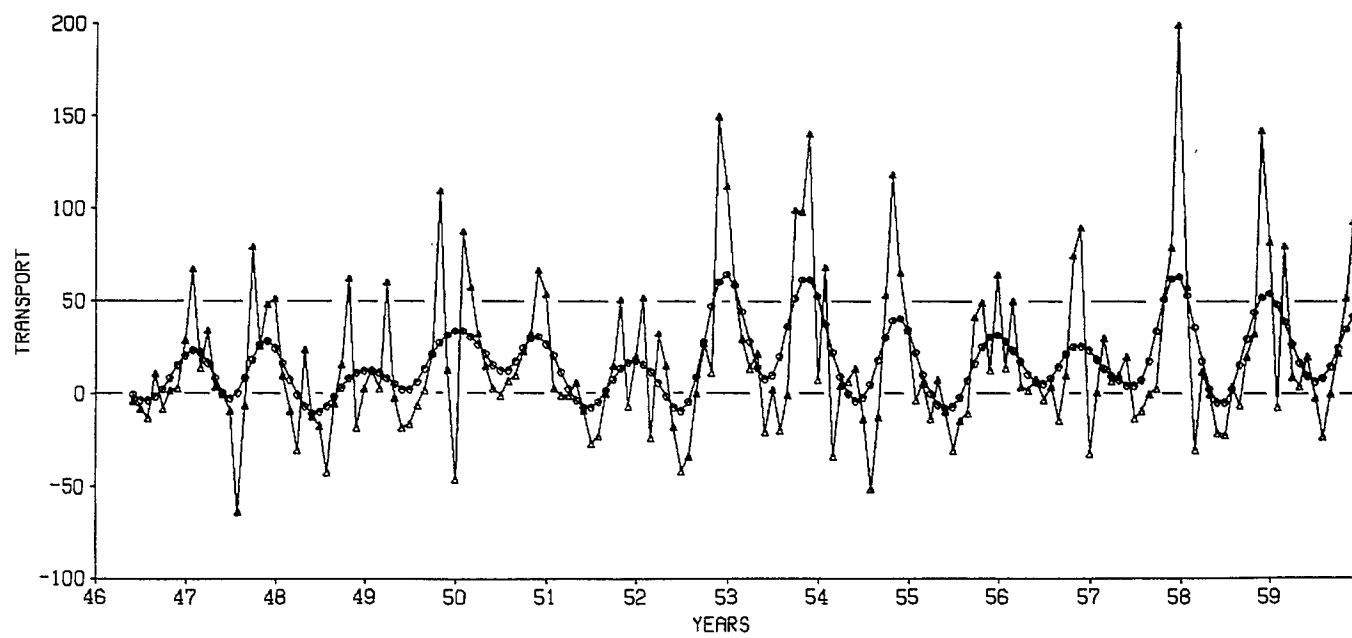


Fig. 8a.

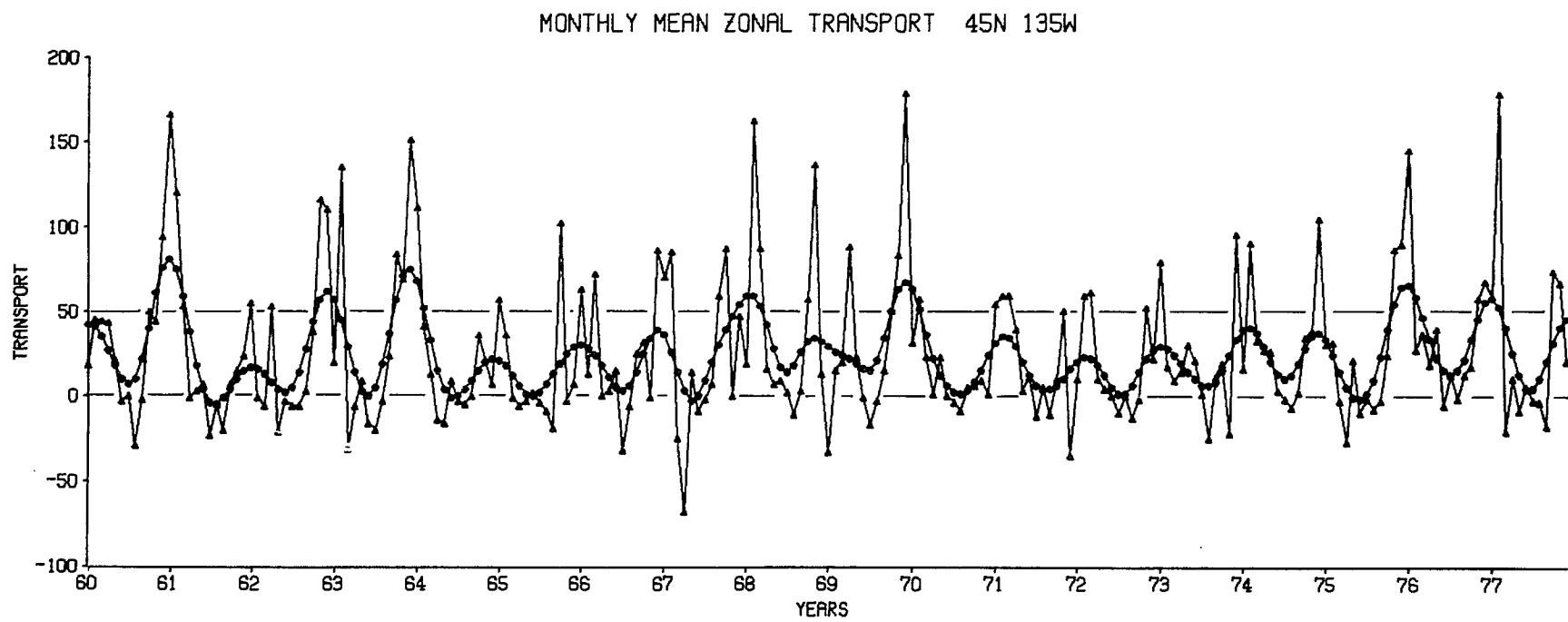


Fig. 8a, b. Graph of monthly mean Zonal Ekman transport at 45°N 135°W for the years 1946-77. The units are 10 metric T/sec/km (+ east). For data listing see Table 14.

MONTHLY MEAN MERIDIONAL TRANSPORT 45N 125W

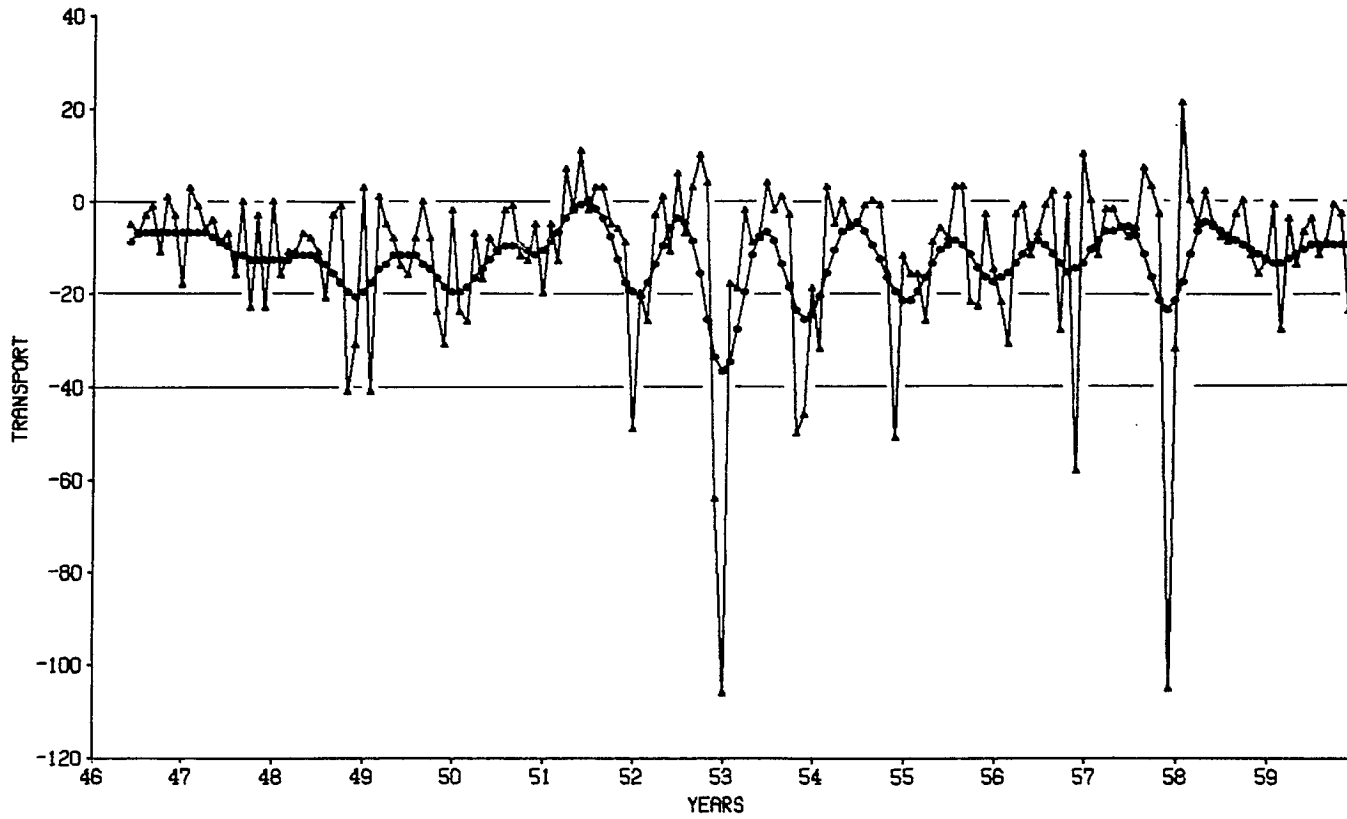


Fig. 9a.

MONTHLY MEAN MERIDIONAL TRANSPORT 45N 125W

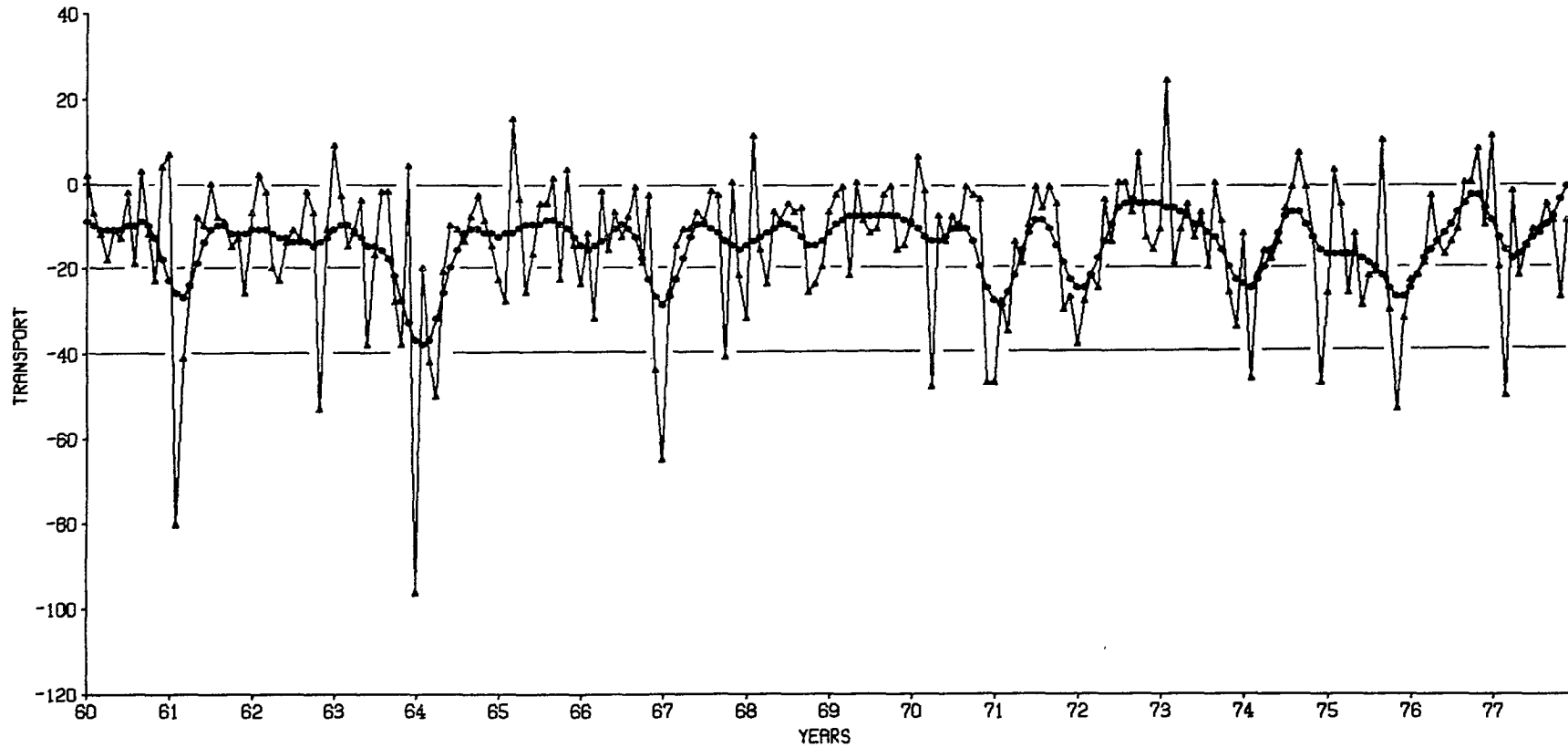


Fig. 9a,b. Graph of monthly mean Meridional Ekman transport at 45°N 125°W for the years 1946-77. The units are 10 metric T/sec/km (+ north). For data listing see Table 15.

MONTHLY MEAN ZONAL TRANSPORT 45N 125W

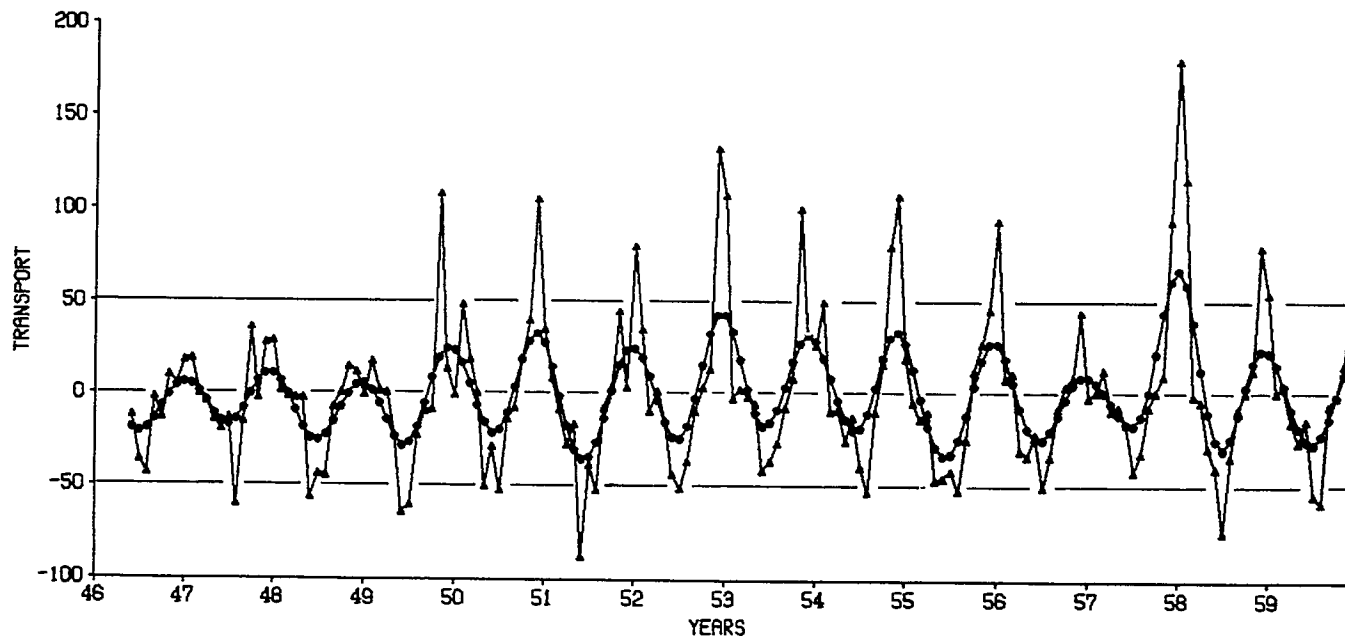


Fig. 10a.

MONTHLY MEAN ZONAL TRANSPORT 45N 125W

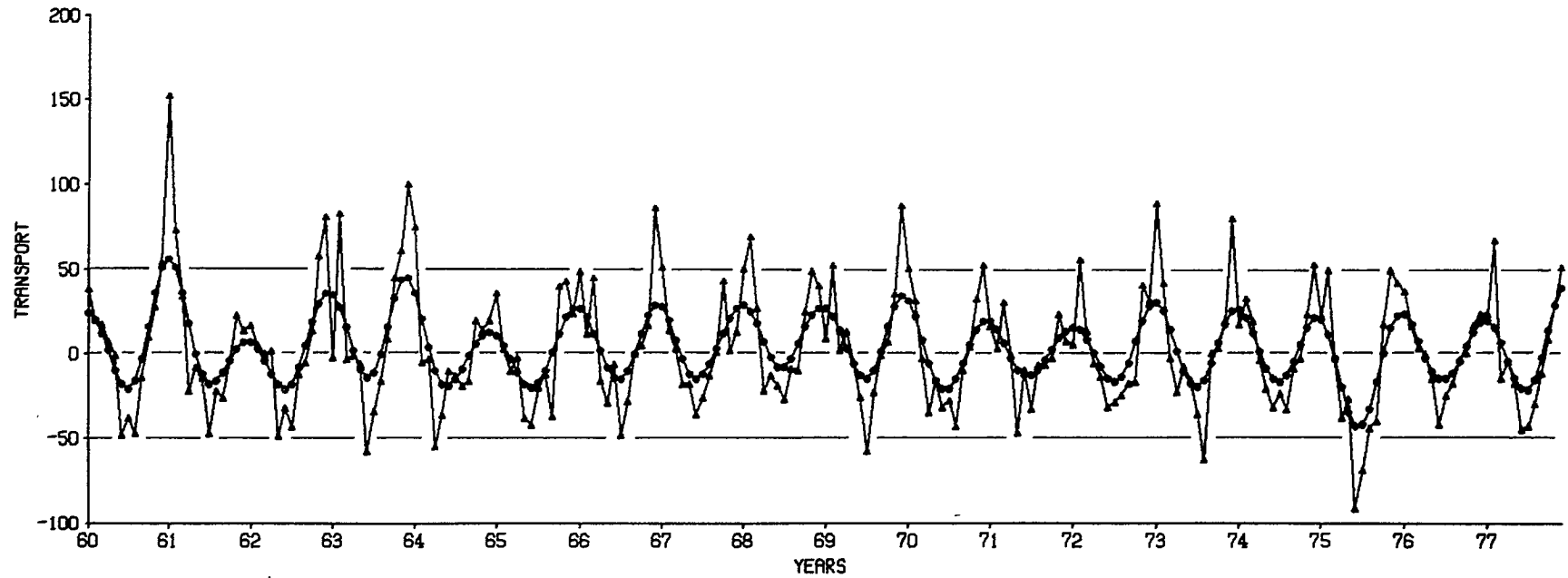


Fig. 10a, b. Graph of monthly mean Zonal Ekman transport at 45°N 125°W for the years 1946-77. The units are 10 metric T/sec/km (+ east). For data listing see Table 16.



TABLE 10. MONTHLY MEAN INTEGRATED TOTAL TRANSPORT 50N 170W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
ITT 46	144	183	246	-116	37	44	43	-33	140	-109	12	-42
ITT 47	-14	176	49	151	248	73	19	-68	47	415	205	115
ITT 48	143	87	78	-73	188	7	27	-29	-19	-28	350	-45
ITT 49	-133	47	56	271	-9	-107	87	35	62	56	537	4
ITT 50	-174	173	359	206	237	22	113	12	-31	348	58	184
ITT 51	148	-61	-33	114	85	45	-20	-68	22	53	204	10
ITT 52	154	246	273	181	46	12	-22	-56	51	165	161	686
ITT 53	171	185	272	103	130	-37	39	-103	-84	394	439	550
ITT 54	154	88	-35	-25	94	220	50	-49	-85	362	348	196
ITT 55	353	-148	46	119	272	-84	151	-105	20	124	228	0
ITT 56	194	87	311	78	275	170	28	40	-88	-175	89	232
ITT 57	-140	-57	196	78	33	97	58	-27	70	56	166	263
ITT 58	386	190	-39	45	199	74	75	71	77	244	-58	277
ITT 59	171	59	283	12	91	38	45	-102	174	58	211	366
ITT 60	185	139	202	263	175	76	75	77	-3	297	302	173
ITT 61	343	286	101	-65	183	32	-13	63	-57	61	127	130
ITT 62	56	37	103	81	9	-39	25	42	36	122	832	172
ITT 63	-146	217	21	109	87	81	0	-11	200	584	287	313
ITT 64	568	257	231	52	61	33	118	99	107	150	225	87
ITT 65	189	187	62	58	30	97	8	-25	-50	386	130	240
ITT 66	287	80	206	1	72	26	13	132	136	95	34	232
ITT 67	153	173	-30	-87	154	34	-71	111	609	333	174	178
ITT 68	27	284	173	229	7	83	79	14	23	217	544	16
ITT 69	-80	369	36	508	39	55	-3	-24	217	289	322	653
ITT 70	100	280	259	259	209	85	-11	41	77	61	8	359
ITT 71	122	250	229	341	152	46	-15	80	36	-91	150	-90
ITT 72	102	205	38	92	104	154	25	103	-30	-23	353	24
ITT 73	119	106	289	161	431	150	45	-62	120	70	19	377
ITT 74	80	375	88	342	252	97	-19	-37	23	208	315	394
ITT 75	97	140	99	95	213	118	42	170	-26	168	464	165
ITT 76	395	224	214	309	273	8	158	104	180	177	279	213
ITT 77	222	422	201	54	107	46	188	62	-34	383	241	60
ITT 78	357	231	144	132	228							

TABLE 11. MONTHLY MEAN MERIDIONAL EKMAN TRANSPORT 50N 130W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MER.46	-49	-23	-51	-32	-2	-8	-12	-10	-12	-25	2	-32
MER.47	-51	32	0	-18	-1	-11	-6	-23	-9	-41	-21	-43
MER.48	-40	-4	-11	-2	-1	-21	-17	-36	-25	-29	-96	-41
MER.49	-12	-4	5	-34	-3	-40	-23	-9	-2	-51	-20	-15
MER.50	29	-41	-7	-22	-34	-9	-15	-2	-7	-7	11	27
MER.51	-2	-2	-11	-2	-3	-16	-8	-9	-1	-6	-4	-7
MER.52	-19	-27	-38	-19	-7	-20	-17	-19	-9	1	-3	-29
MER.53	5	-63	-52	-1	-7	-22	-6	-10	-14	-41	-31	-115
MER.54	7	-34	0	-7	-2	-14	-13	-16	-4	-9	-10	-45
MER.55	-22	-25	-26	-30	-26	-14	-14	-14	-5	-58	8	27
MER.56	70	-28	-29	-6	-5	-24	-6	-13	-4	-57	-23	-59
MER.57	9	0	-3	-4	2	-14	-22	-3	0	7	-27	-65
MER.58	14	88	7	-5	-5	-13	-23	-13	-18	-26	-30	16
MER.59	27	-3	-76	-21	-11	-7	-14	-30	-12	-8	-4	-62
MER.60	11	2	-7	-22	-7	-30	-8	-41	-6	-34	-19	17
MER.61	57	-35	-8	-30	-4	-9	-14	-11	-23	-51	-8	-18
MER.62	-5	23	0	-29	-29	-20	-17	-18	-7	-19	-62	16
MER.63	2	31	-11	-2	-2	-49	-27	-4	-1	-36	-12	48
MER.64	-44	-82	-28	-64	-19	-13	-13	-20	-10	-13	0	7
MER.65	4	-36	8	-4	-29	-20	-9	-8	-10	-31	25	-2
MER.66	44	-12	-12	-4	-39	-7	-29	-14	-8	-41	6	5
MER.67	-30	-65	-2	-11	-12	-11	-7	-1	-16	-49	-8	-26
MER.68	-8	45	-6	-52	-2	-9	-3	-12	-17	-44	-31	6
MER.69	6	10	-1	-19	0	-10	-33	-25	-7	8	-56	13
MER.70	14	17	-12	-68	-17	-13	-11	-16	-21	-12	10	-13
MER.71	-22	-37	-30	-18	-13	-7	-13	-9	-10	-32	-43	-17
MER.72	-14	-5	-26	-36	-2	-19	-5	-5	-21	-6	1	0
MER.73	9	25	-24	-12	-14	-17	-7	-29	-4	-33	1	3
MER.74	-4	-49	-4	-17	-28	-20	-10	-10	-1	-29	-13	-73
MER.75	-26	37	-4	-26	-9	-48	-16	-23	-4	-12	-45	-45
MER.76	-41	-25	-29	-4	-28	-26	-9	-14	-5	-8	3	-16
MER.77	16	-11	-62	-11	-18	-22	-15	-7	-10	-35	-27	19
MER.78	107	30	0	-4	-16							

TABLE 12. MONTHLY MEAN ZONAL EKMAN TRANSPORT 50N 130W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
ZON.46	72	60	28	12	-3	-1	-3	-12	13	-2	12	29
ZON.47	43	58	9	21	0	-1	0	-30	-2	104	25	66
ZON.48	97	10	7	-5	6	-26	-14	-25	8	32	83	30
ZON.49	18	13	10	60	-3	-19	-11	-2	2	32	140	18
ZON.50	-8	119	41	36	5	-4	-3	2	8	37	41	99
ZON.51	65	16	7	0	0	-20	-10	-14	1	18	76	6
ZON.52	72	71	10	36	4	-6	-24	-13	7	27	29	166
ZON.53	51	53	52	11	6	-8	1	-3	9	111	121	137
ZON.54	27	60	-3	2	1	11	-4	-20	0	62	144	90
ZON.55	44	6	4	4	4	-6	-9	-6	-2	62	53	47
ZON.56	107	23	40	1	-2	10	-9	1	-3	40	66	78
ZON.57	-5	1	29	5	1	9	-8	-3	0	8	65	85
ZON.58	202	124	-4	5	-2	-30	-37	1	6	45	49	130
ZON.59	99	10	74	8	-1	6	-6	-15	5	15	53	118
ZON.60	41	36	41	36	10	-5	-3	-14	1	55	55	94
ZON.61	154	83	32	-5	1	3	-17	-5	-11	25	28	21
ZON.62	37	0	0	32	-20	-6	-14	-2	5	49	118	86
ZON.63	5	116	-5	1	3	-19	-16	-5	30	104	61	141
ZON.64	77	42	10	-8	-9	1	0	-1	0	50	23	15
ZON.65	46	27	0	1	-8	-6	-4	-10	-17	97	22	19
ZON.66	52	18	61	-3	5	4	-25	-2	21	34	9	68
ZON.67	60	85	0	-15	4	-15	-1	1	50	83	15	40
ZON.68	28	117	63	19	0	3	-2	-3	7	71	129	30
ZON.69	3	49	13	72	3	-6	-14	8	12	39	118	163
ZON.70	51	63	21	9	11	-4	-5	-8	8	15	22	36
ZON.71	32	41	60	28	-4	1	-18	5	0	20	55	7
ZON.72	7	70	40	18	0	-4	-6	-1	-12	1	66	23
ZON.73	89	41	14	4	15	9	-5	-25	10	37	3	100
ZON.74	18	83	18	16	15	-1	-6	-17	1	40	50	119
ZON.75	40	71	3	-10	3	-24	-12	-5	-5	18	83	90
ZON.76	119	32	32	15	23	-10	4	-2	8	15	56	55
ZON.77	40	135	7	9	-2	-3	-3	-11	-6	77	60	34
ZON.78	105	82	19	1	1							

TABLE 13. MONTHLY MEAN MERIDIONAL EKMAN TRANSPORT 45N 135W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MER.46	-67	-47	-116	-34	-2	-23	-30	-11	-22	-30	-7	-19
MER.47	-31	-12	-12	-36	-5	-21	-26	-41	-12	-122	-31	-79
MER.48	-37	-63	-53	-36	-41	-8	-24	-48	-28	-26	-113	-151
MER.49	-9	-77	-5	-66	-8	-22	-36	-17	-16	-46	-69	-69
MER.50	-33	-96	-79	-52	-36	-12	-26	-7	-12	-67	-27	-20
MER.51	-79	-24	-47	-3	-9	-7	-24	-22	-5	-41	-59	-39
MER.52	-121	-65	-134	-46	0	-42	-17	-31	-13	5	-22	-185
MER.53	-83	-87	-108	-22	-41	-35	-12	-26	-14	-89	-122	-125
MER.54	-57	-43	-12	-6	-12	-42	-22	-28	-16	-42	-77	-87
MER.55	-58	-32	-28	-76	-37	-23	-45	-20	-21	-88	-79	-12
MER.56	-48	-69	-87	-7	-7	-50	-10	-9	-6	-96	-20	-104
MER.57	-1	0	-52	-12	-5	-26	-30	-23	0	-3	-37	-152
MER.58	-88	-9	-19	-22	-1	-8	-16	-28	-39	-26	-41	-64
MER.59	-49	-30	-113	-12	-24	-26	-19	-29	-47	-22	-28	-81
MER.60	-18	-28	-52	-72	-41	-27	-8	-49	-7	-59	-80	-15
MER.61	-8	-142	-79	-26	-24	-22	-16	-14	-26	-64	-41	-82
MER.62	-24	-1	-25	-53	-35	-19	-12	-25	-15	-41	-162	-14
MER.63	20	-17	-45	-34	-18	-46	-26	-4	-19	-113	-87	-27
MER.64	-173	-58	-95	-76	-36	-18	-27	-28	-21	-23	-41	-43
MER.65	-48	-52	0	-25	-27	-20	-12	-7	-9	-69	-15	-57
MER.66	-54	-22	-73	0	-28	-18	-26	-25	-22	-46	-14	-88
MER.67	-95	-81	-46	-57	-26	-11	-18	-7	-59	-96	-21	-72
MER.68	-53	9	-55	-61	-5	-22	-7	-21	-19	-79	-100	-22
MER.69	-42	-41	-12	-104	-7	-11	-24	-49	-41	-28	-74	-87
MER.70	-13	-5	-35	-100	-35	-17	-10	-19	-12	-12	-7	-151
MER.71	-87	-87	-87	-72	-28	-18	-5	-23	-21	-43	-96	-106
MER.72	-56	-59	-38	-70	-9	-21	-10	-3	-11	-3	-72	-26
MER.73	-39	4	-96	-26	-35	-41	-10	-26	-18	-53	-67	-68
MER.74	-22	-113	-46	-66	-59	-24	-4	-1	0	-36	-41	-122
MER.75	-59	-19	-27	-53	-22	-32	-18	-46	-2	-82	-131	-68
MER.76	-100	-66	-80	-35	-72	-25	-36	-22	-15	-12	-5	-38
MER.77	-2	-80	-143	-15	-53	-19	-27	-10	-16	-80	-73	-15
MER.78	15	-34	-12	-35	-34							

TABLE 14. MONTHLY MEAN ZONAL EKMAN TRANSPORT 45N 135W

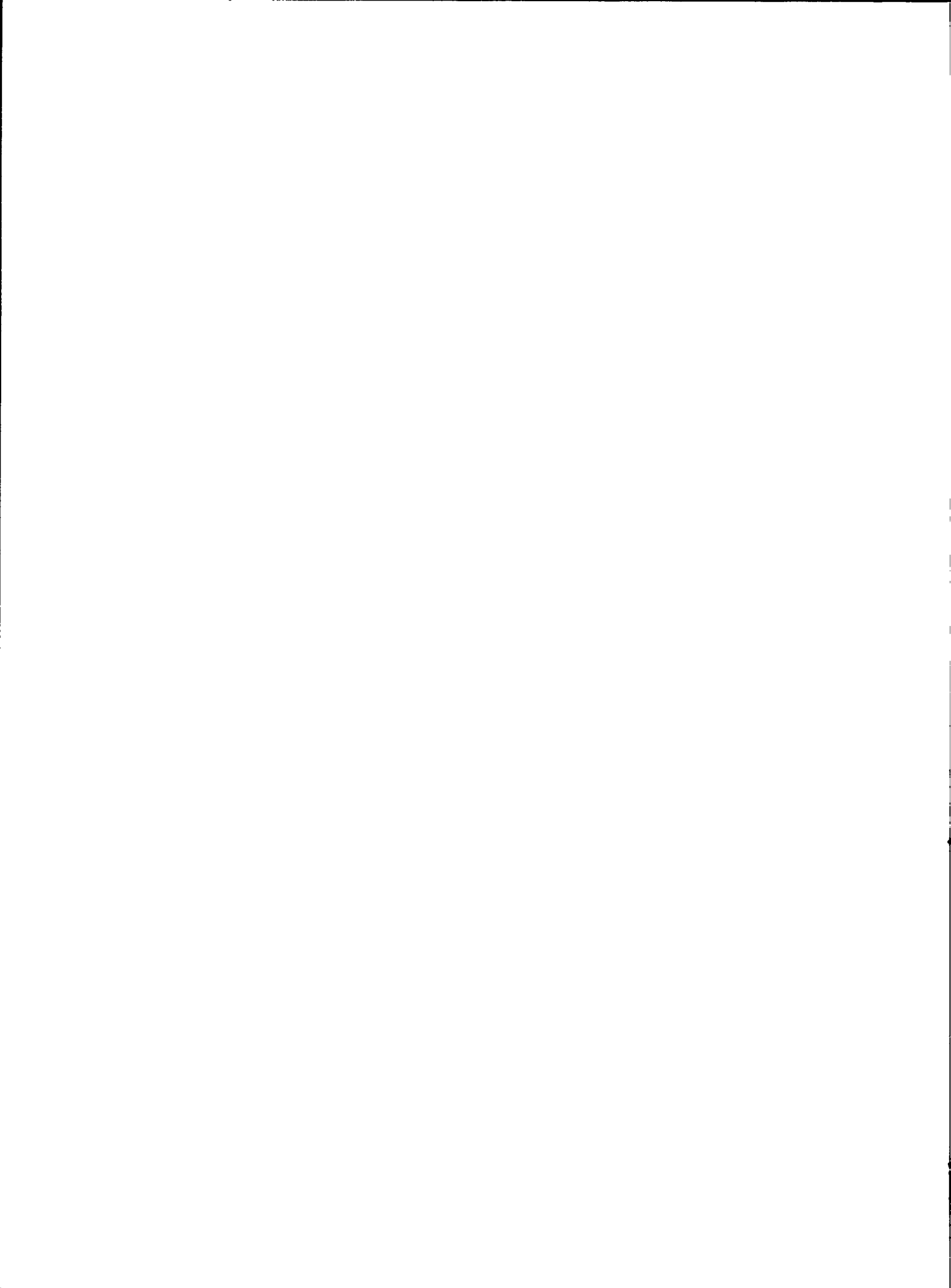
YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
ZON.46	76	52	8	3	0	-4	-8	-13	11	-8	2	3
ZON.47	29	67	14	34	4	0	-9	-64	-6	79	26	48
ZON.48	51	10	-9	-30	24	-12	-17	-42	-5	16	62	-18
ZON.49	3	13	3	60	-2	-18	-16	-6	2	22	109	13
ZON.50	-46	87	57	32	15	3	-1	7	10	23	32	66
ZON.51	53	3	-1	-1	6	-9	-27	-23	0	15	50	-7
ZON.52	20	51	-24	32	15	-18	-42	-34	0	27	11	149
ZON.53	111	59	29	13	21	-21	2	-20	-1	98	97	139
ZON.54	7	67	-34	4	6	13	-14	-52	-13	52	117	64
ZON.55	33	-4	5	-14	7	-10	-31	-15	-11	40	48	12
ZON.56	63	13	49	3	1	7	-4	3	-15	9	73	88
ZON.57	-33	0	29	6	9	19	-14	-10	-1	2	51	77
ZON.58	197	56	-31	11	-1	-22	-23	3	-7	19	31	140
ZON.59	80	-8	78	8	3	19	-3	-24	-1	21	50	91
ZON.60	18	45	44	43	21	-3	0	-29	-2	50	44	94
ZON.61	166	120	53	-1	3	7	-23	-5	-20	7	15	24
ZON.62	55	-1	-6	53	-21	-3	-6	-6	3	38	116	110
ZON.63	20	135	-31	-6	9	-16	-20	-3	24	84	69	151
ZON.64	111	41	13	-14	-16	9	-3	-5	0	36	21	7
ZON.65	57	36	-1	-6	-3	2	-4	-9	-19	102	-3	7
ZON.66	63	13	72	0	3	15	-32	-6	25	32	-1	86
ZON.67	70	85	-25	-68	14	-9	-2	7	59	87	0	47
ZON.68	19	162	87	16	7	9	2	-11	3	57	136	13
ZON.69	-33	15	20	88	23	-1	-17	-3	15	50	83	178
ZON.70	31	57	23	1	23	0	-4	-9	5	6	9	1
ZON.71	54	59	59	39	3	11	-12	5	-11	10	50	-35
ZON.72	10	59	61	10	4	0	-10	0	-13	-2	52	22
ZON.73	79	17	9	14	30	21	1	-25	11	19	-22	95
ZON.74	16	90	32	27	26	3	-2	-7	2	34	38	104
ZON.75	30	31	-3	-27	21	-10	-2	-8	-3	24	86	89
ZON.76	144	27	36	18	39	-6	12	-2	12	17	57	67
ZON.77	58	177	-21	10	-9	5	-3	-4	-18	73	66	20
ZON.78	71	85	14	-9	3							

TABLE 15. MONTHLY MEAN MERIDIIONAL EKMAN TRANSPORT 45N 125W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MER.46	-31	-19	-23	-12	0	-5	-7	-3	-1	-11	1	-3
MER.47	-18	3	-1	-6	-4	-9	-7	-16	0	-23	-3	-23
MER.48	0	-16	-11	-11	-7	-8	-11	-21	-3	-1	-41	-31
MER.49	3	-41	1	-5	-8	-14	-16	-8	0	-8	-24	-31
MER.50	-2	-24	-26	-7	-17	-8	-11	-2	-1	-12	-13	-5
MER.51	-20	-5	-13	7	-2	11	-2	3	3	-5	-6	-9
MER.52	-49	-20	-26	-3	1	-11	6	-7	3	10	4	-64
MER.53	-106	-18	-19	-2	-9	-8	4	-2	1	-3	-50	-46
MER.54	-19	-32	3	-5	0	-5	-5	-1	0	-1	-16	-51
MER.55	-12	-16	-16	-26	-9	-6	-8	3	3	-22	-23	-3
MER.56	-15	-22	-31	-3	-1	-12	-7	-1	2	-28	1	-58
MER.57	10	0	-12	-2	-2	-6	-8	-6	7	3	-3	-105
MER.58	-32	21	0	-5	2	-5	-8	-9	-3	0	-12	-16
MER.59	-13	-1	-28	-4	-14	-7	-4	-12	-9	-1	-3	-24
MER.60	2	-7	-12	-18	-11	-13	-2	-19	3	-12	-23	4
MER.61	7	-80	-41	-24	-8	-10	0	-8	-9	-15	-13	-26
MER.62	-7	2	-2	-20	-23	-14	-11	-13	-2	-7	-53	-11
MER.63	9	-3	-15	-11	-4	-38	-17	-2	-2	-28	-38	4
MER.64	-96	-20	-42	-50	-21	-10	-11	-14	-8	-3	-9	-15
MER.65	-23	-28	15	-4	-26	-17	-5	-5	1	-23	3	-15
MER.66	-24	-12	-32	-2	-16	-7	-13	-8	-1	-19	-3	-44
MER.67	-65	-26	-15	-11	-11	-7	-9	-2	-3	-41	0	-22
MER.68	-32	11	-16	-24	-7	-9	-5	-7	-6	-26	-24	-20
MER.69	-7	-3	-1	-22	0	-9	-12	-11	-3	-1	-16	-15
MER.70	-9	6	-2	-48	-8	-14	-8	-11	-1	-3	-4	-47
MER.71	-47	-28	-35	-14	-19	-10	-1	-6	-1	-5	-30	-27
MER.72	-38	-28	-22	-25	-4	-14	0	0	-7	7	-13	-16
MER.73	-11	24	-19	-11	-5	-13	-7	-20	0	-9	-26	-34
MER.74	-12	-46	-22	-16	-18	-14	-6	-1	7	-1	-13	-47
MER.75	-26	3	-5	-26	-12	-29	-22	-21	10	-30	-53	-32
MER.76	-23	-22	-19	-3	-14	-17	-14	-11	0	0	8	-10
MER.77	11	-20	-50	-2	-22	-15	-11	-11	-5	-9	-27	-9
MER.78	43	1	0	-6	-12							

TABLE 16. MONTHLY MEAN ZONAL EKMAN TRANSPORT 45N 125W

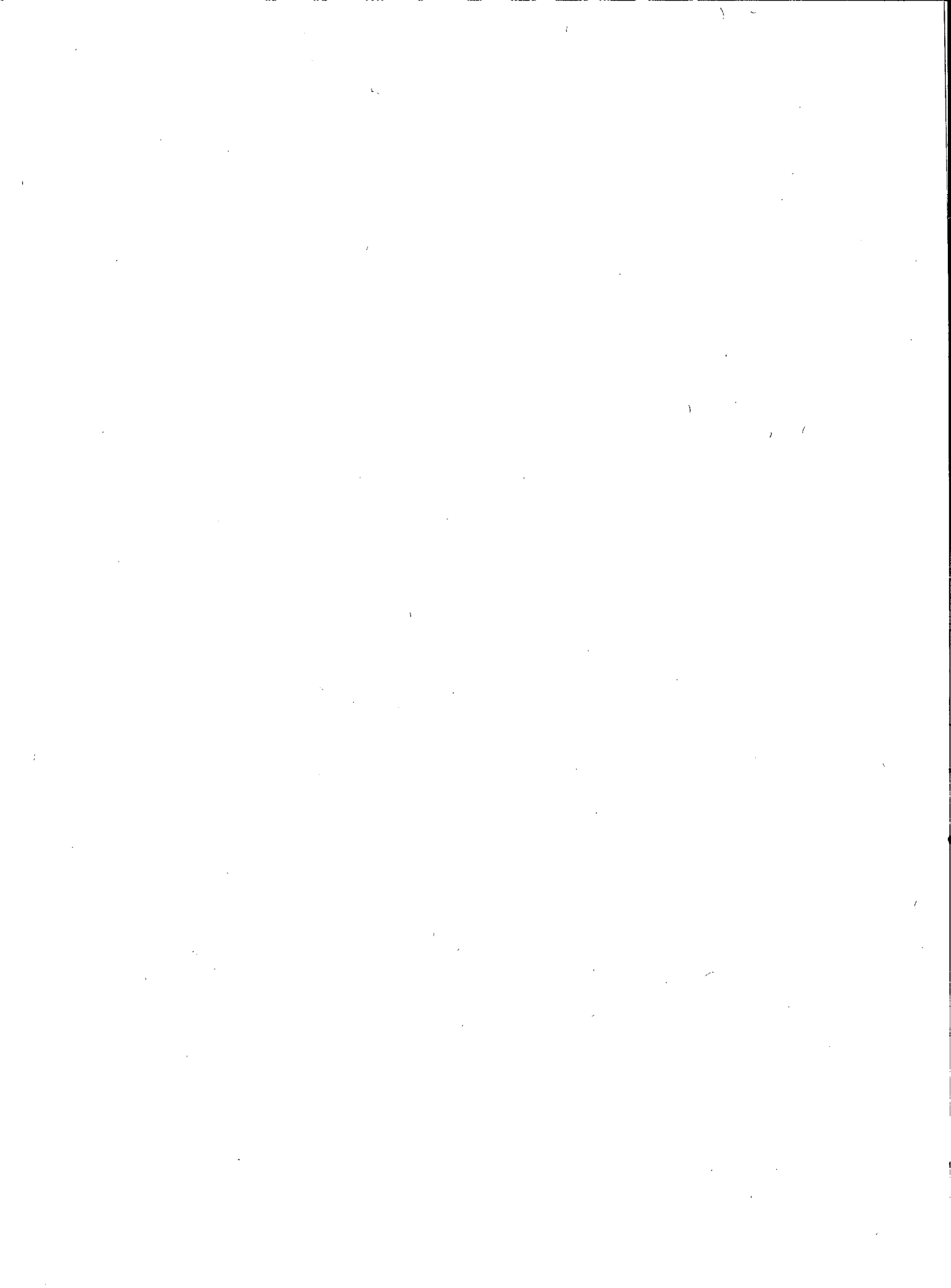
YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	UCT	NOV	DEC
ZON.46	29	27	-4	-4	-29	-12	-36	-43	-2	-13	10	5
ZON.47	18	19	0	-4	-14	-19	-13	-60	-15	36	-2	28
ZON.48	29	2	-1	-2	-2	-56	-43	-44	-7	1	15	12
ZON.49	0	18	2	1	-22	-64	-60	-22	-9	-8	108	14
ZON.50	0	49	19	1	-50	-28	-52	-13	-7	20	40	105
ZON.51	35	9	-8	-27	-16	-88	-38	-52	-7	4	45	4
ZON.52	80	35	-9	2	-14	-43	-51	-36	-9	4	14	132
ZON.53	107	-2	3	-1	-5	-41	-36	-26	-7	9	100	32
ZON.54	27	50	-9	-8	-25	-12	-39	-53	-9	17	80	107
ZON.55	20	-4	-13	-9	-46	-45	-41	-52	-24	13	28	46
ZON.56	94	9	12	-30	-33	-21	-50	-33	-7	5	10	45
ZON.57	-1	2	14	-8	-6	-15	-41	-31	-6	2	11	94
ZON.58	180	116	0	-3	-28	-39	-74	-33	-7	2	14	80
ZON.59	55	2	5	-14	-25	-13	-54	-58	-5	0	17	49
ZON.60	38	20	17	7	-1	-48	-38	-47	-14	10	28	54
ZON.61	152	73	34	-22	-8	-14	-47	-22	-26	-3	23	14
ZON.62	17	5	0	2	-49	-32	-43	-12	-5	14	58	81
ZON.63	-2	83	-3	-1	-6	-58	-34	-16	9	45	61	100
ZON.64	75	-5	-3	-55	-36	-10	-13	-19	-16	20	14	20
ZON.65	36	3	-10	-2	-38	-42	-20	-12	-37	40	43	24
ZON.66	49	12	45	-16	-29	-6	-48	-28	0	5	17	86
ZON.67	51	14	3	-18	-18	-36	-26	-13	1	43	2	13
ZON.68	50	69	27	-22	-13	-19	-27	-9	-10	25	49	40
ZON.69	9	52	2	13	-5	-26	-58	-23	-1	7	35	87
ZON.70	50	31	-3	-35	-16	-32	-28	-43	-10	4	32	52
ZON.71	16	3	30	-1	-47	-10	-33	-7	-7	-3	23	7
ZON.72	5	55	13	-6	-14	-32	-29	-25	-18	-17	40	31
ZON.73	88	41	-3	-23	-8	-16	-36	-63	0	3	19	79
ZON.74	17	32	19	-4	-21	-32	-24	-33	-9	-3	23	52
ZON.75	22	49	-3	-38	-27	-91	-69	-44	-40	17	49	41
ZON.76	36	16	3	-1	-15	-42	-25	-18	-4	0	16	23
ZON.77	23	66	-15	-5	-18	-45	-43	-30	-12	8	29	50
ZON.78	106	53	2	-4	-27							



SECTION III

5° monthly mean Vertical Velocity graphs
and data listings.

January values are plotted immediately above the year.



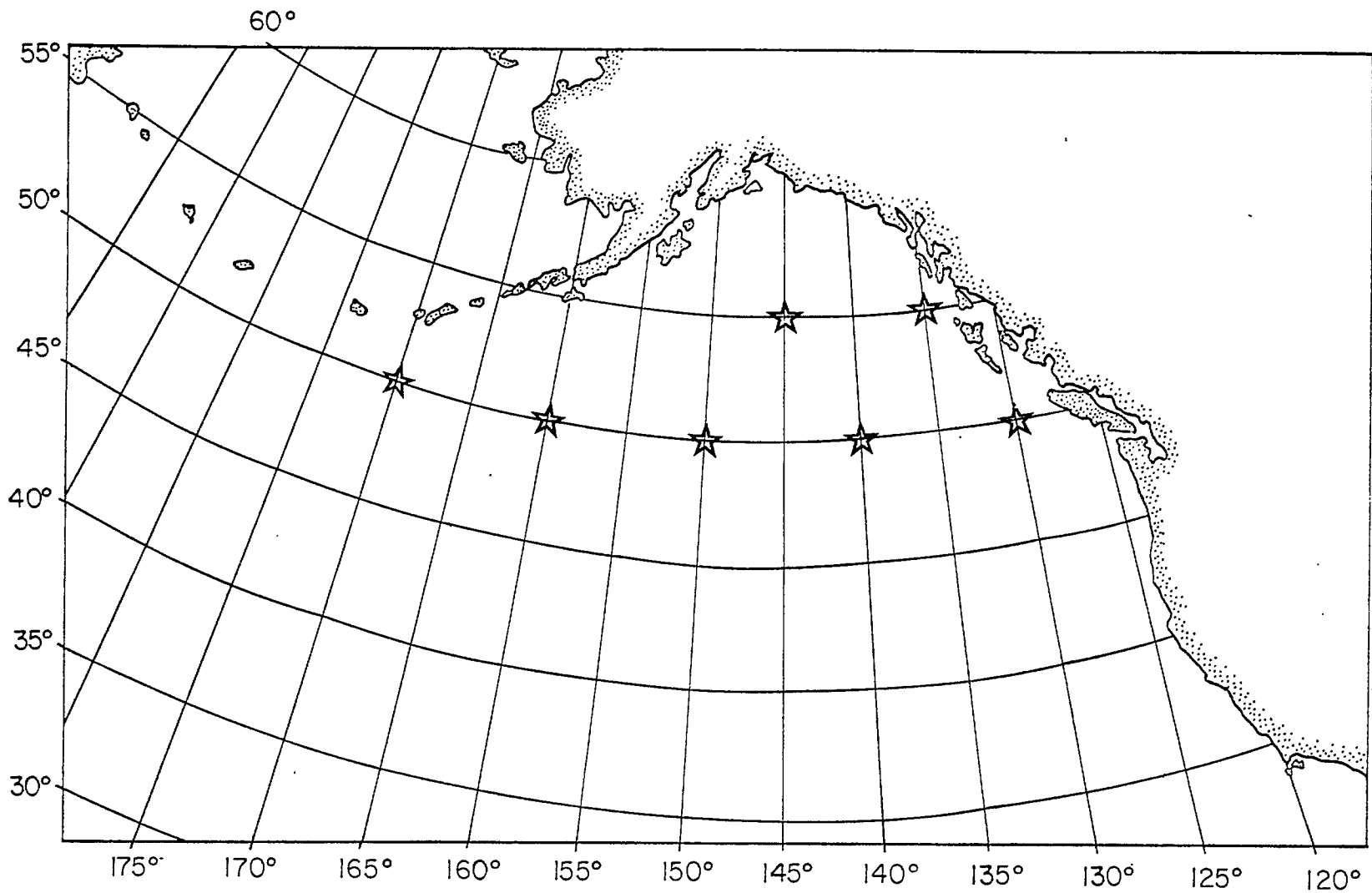


Fig. 11. Grid points at which 5° monthly mean components of Vertical Velocity have been graphed and data listed in Tables 17-23.

MONTHLY MEAN VERTICAL VELOCITY 55N 145W

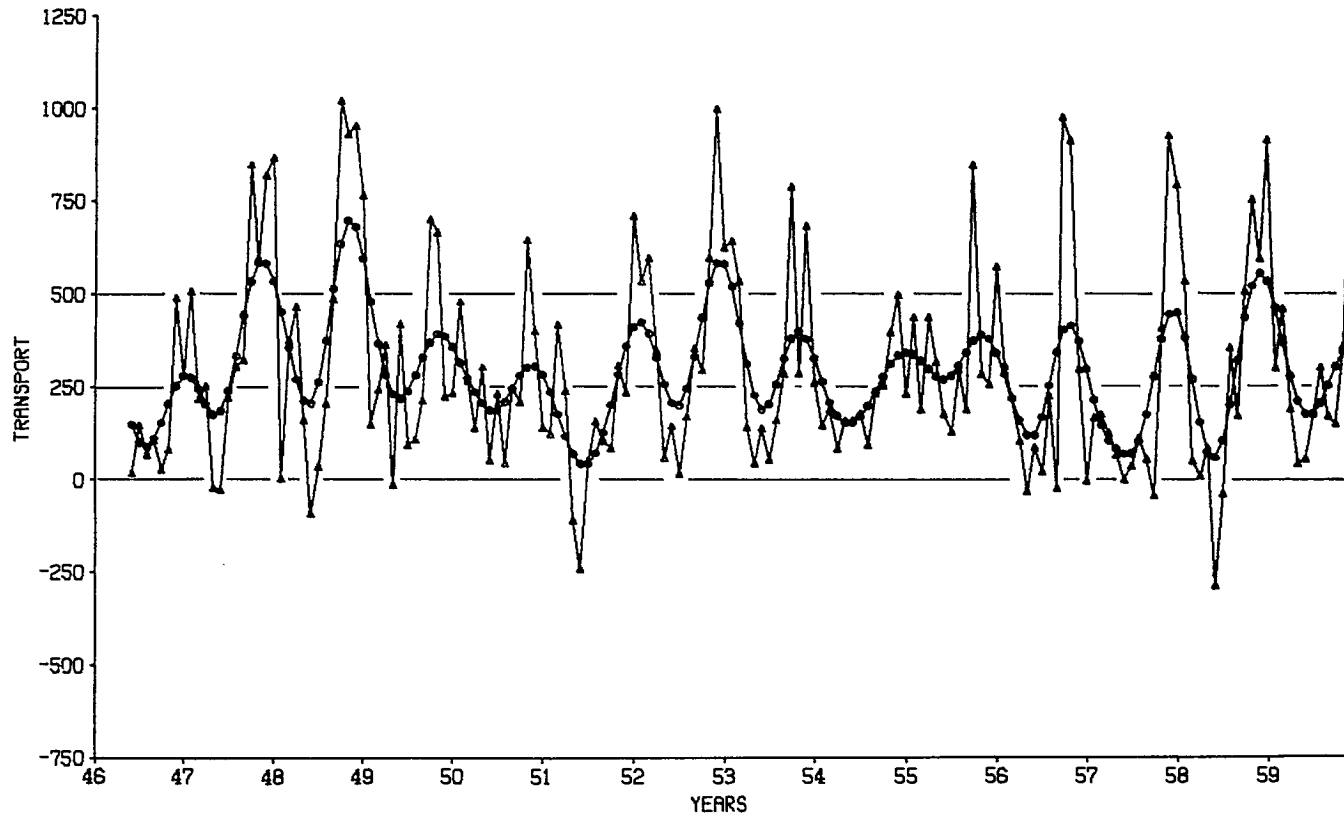


Fig. 12a.

MONTHLY MEAN VERTICAL VELOCITY 55N 145W

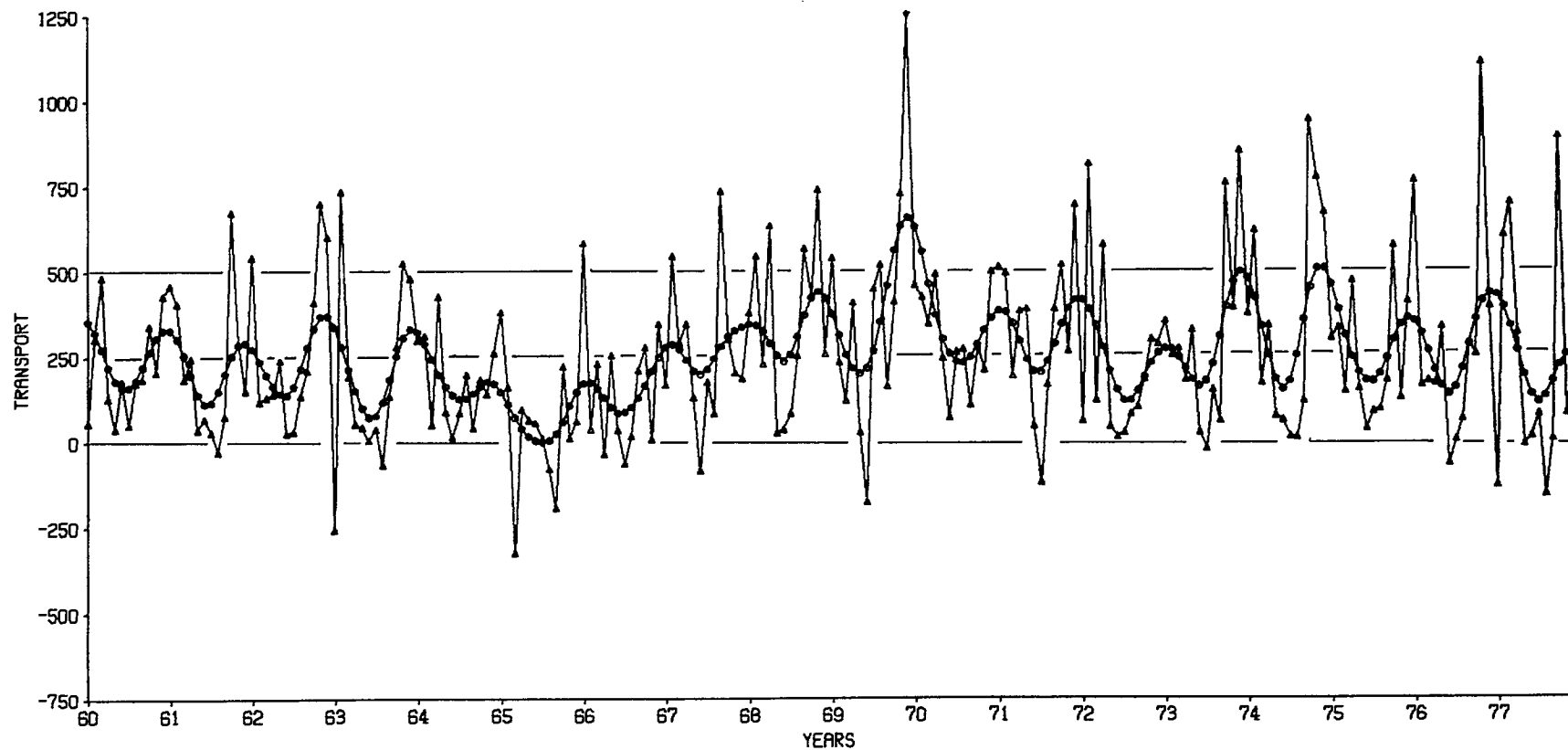


Fig. 12a, b. Graph of monthly mean Vertical Velocity at 55°N 145°W for the years 1946-77. The units are cm/mo (+ up). For data listing see Table 17.

MONTHLY MEAN VERTICAL VELOCITY 55N 135W

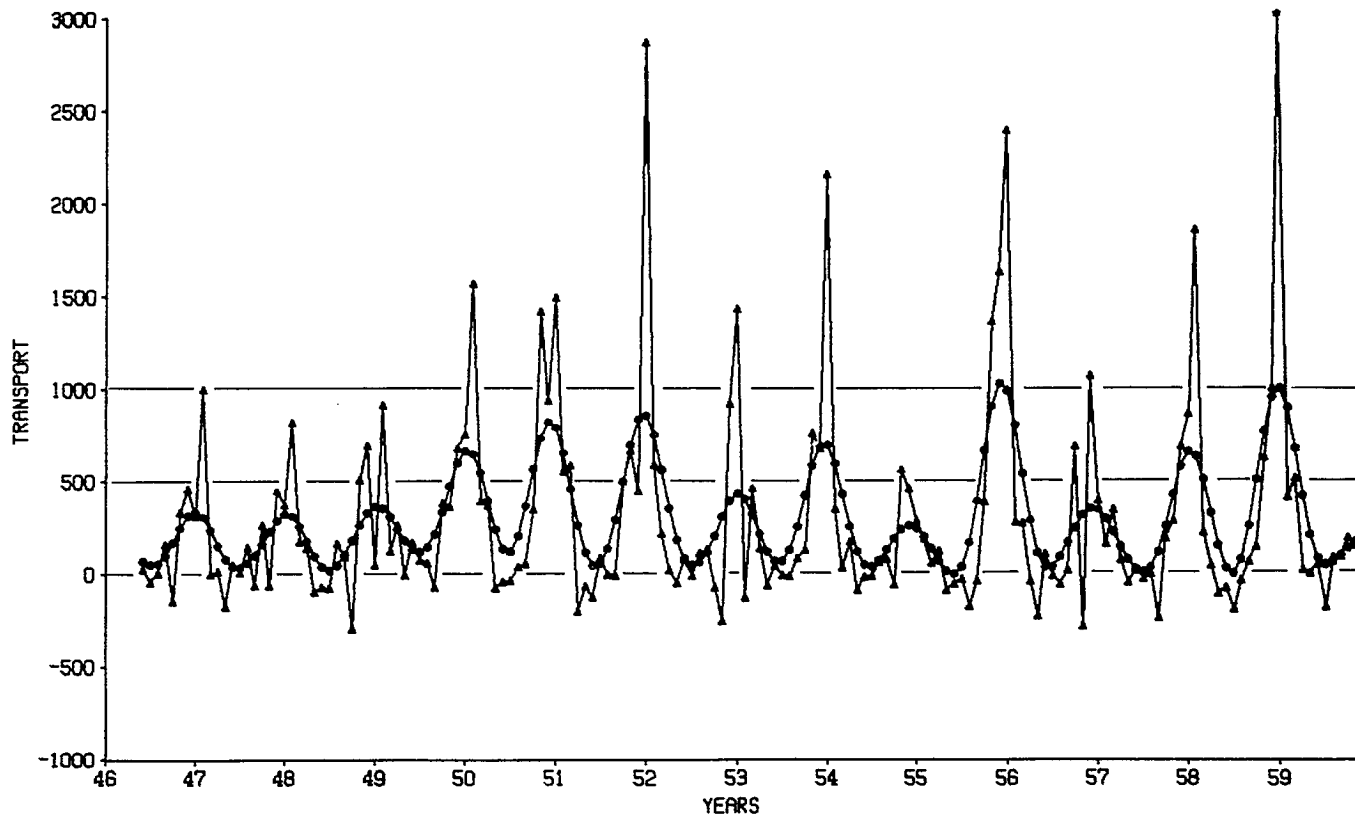


Fig. 13a.

MONTHLY MEAN VERTICAL VELOCITY 55N 135W

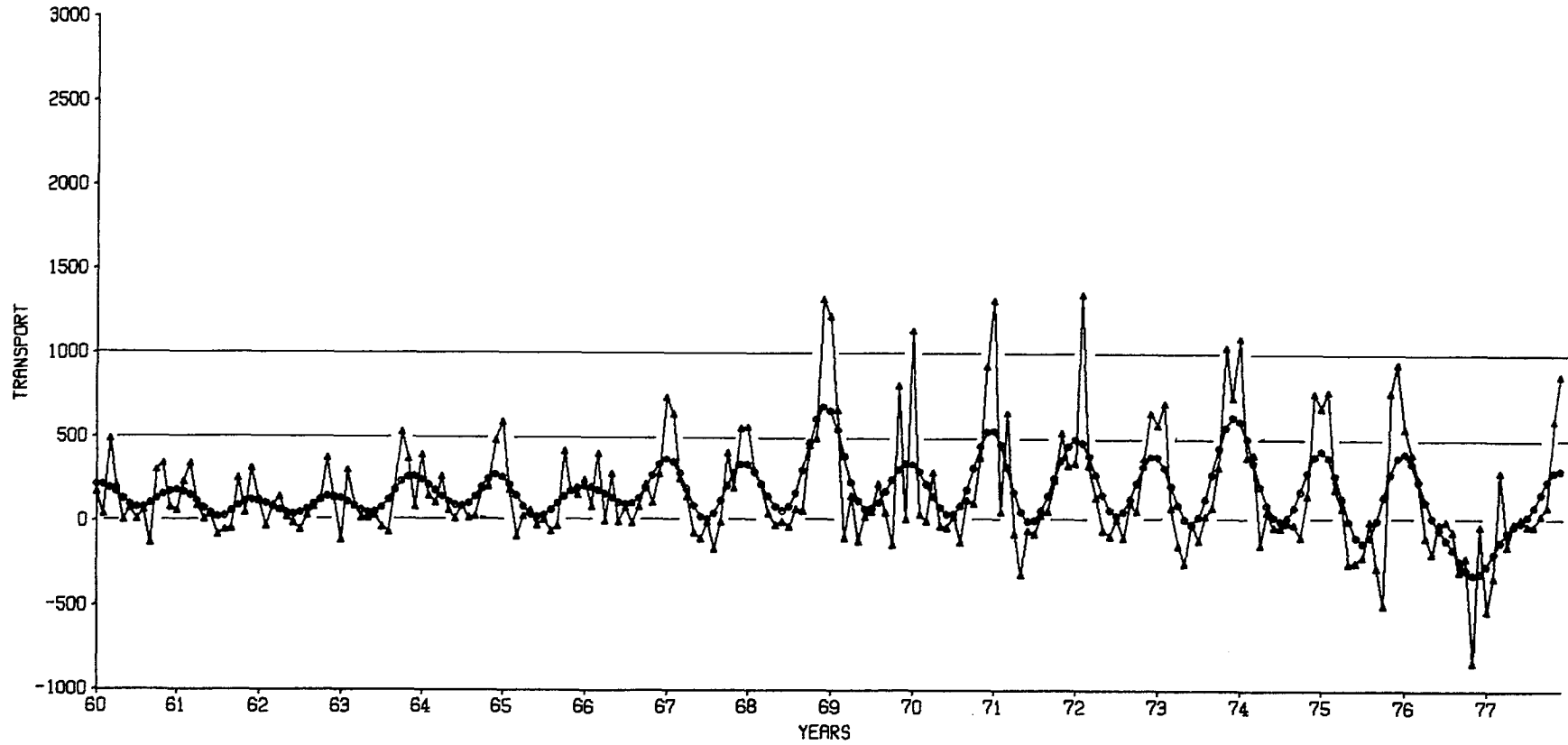


Fig. 13a, b. Graph of monthly mean Vertical Velocity at 55°N 135°W for the years 1946-77. The units are cm/mo (+ up). For data listing see Table 18.

MONTHLY MEAN VERTICAL VELOCITY 50N 170W

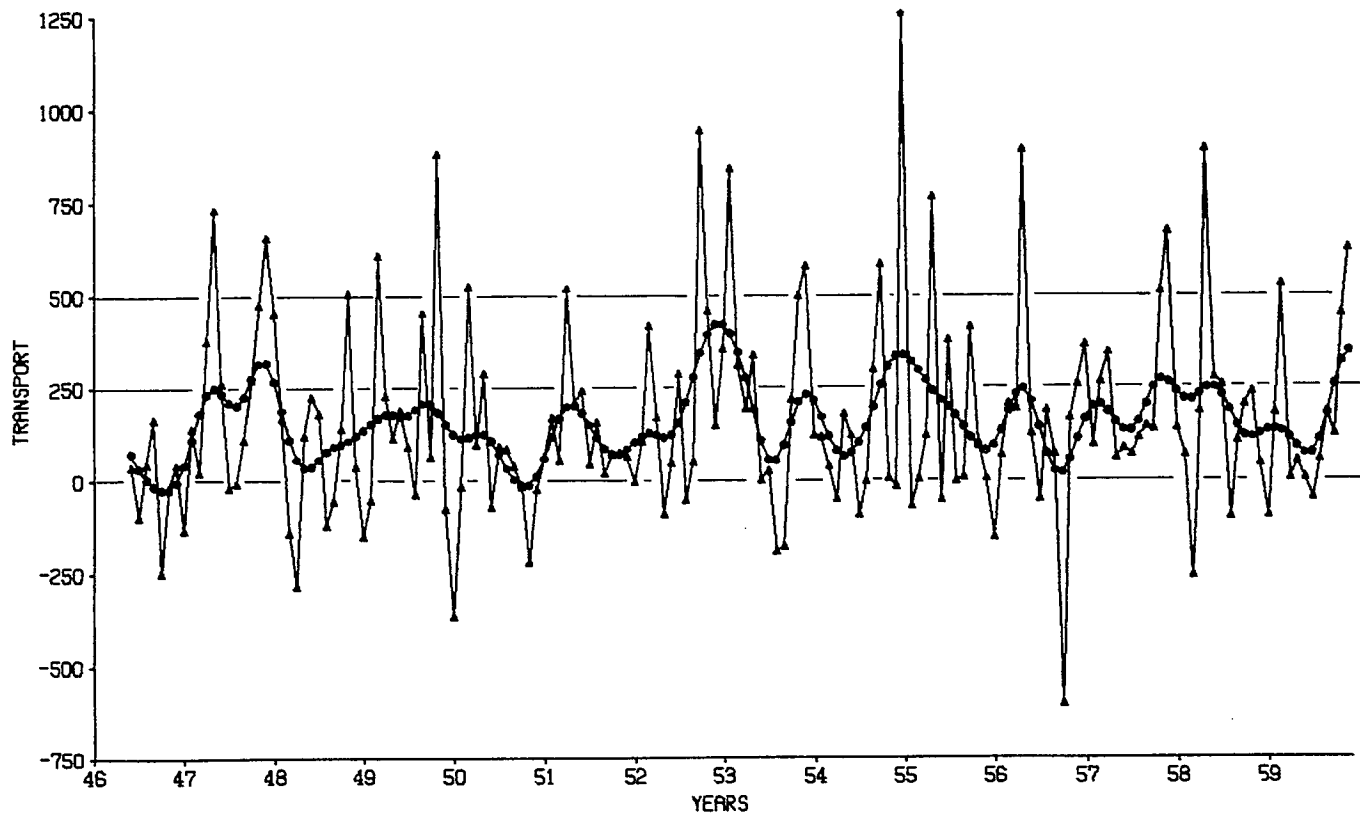


Fig. 14a.

MONTHLY MEAN VERTICAL VELOCITY 50N 170W

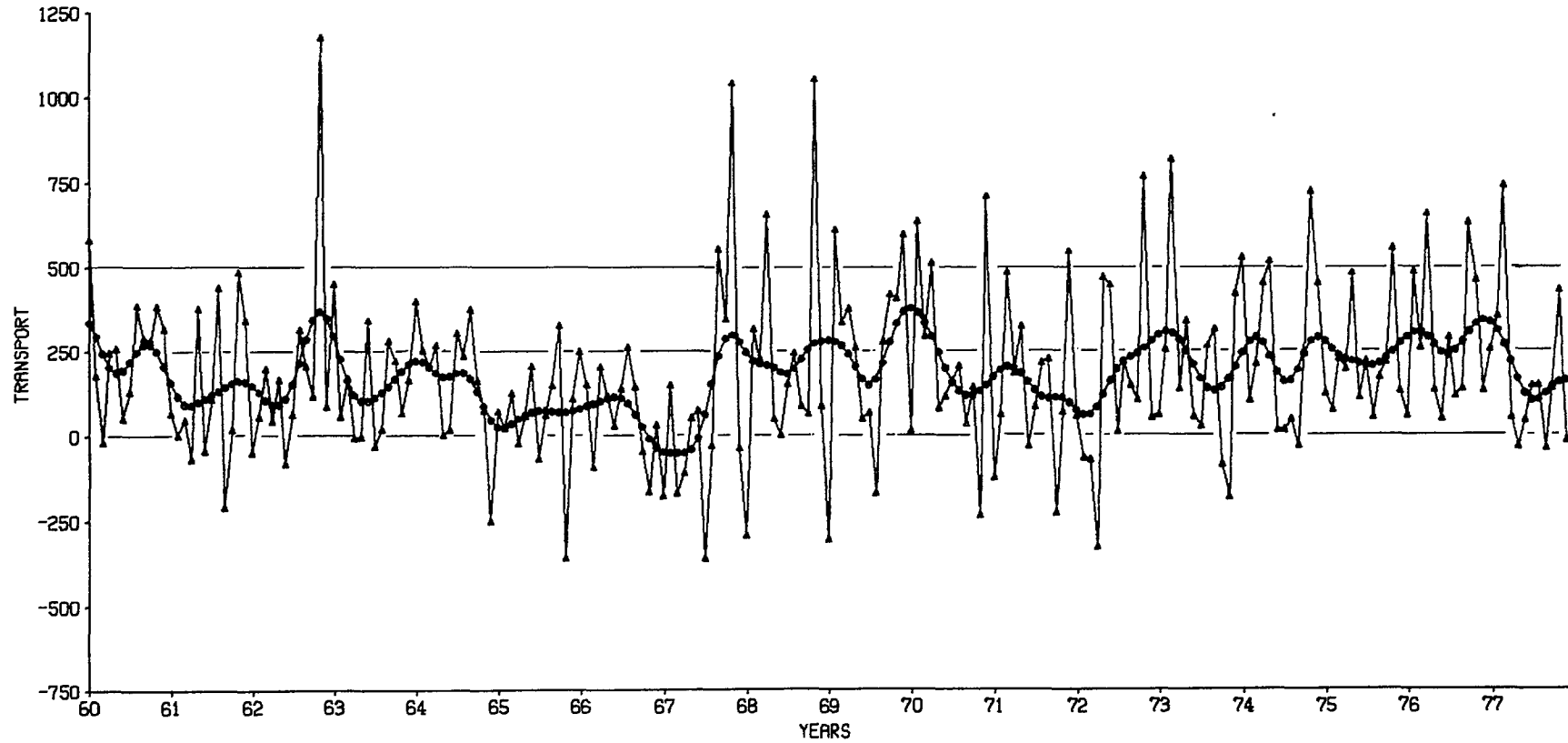


Fig. 14a, b. Graph of monthly mean Vertical Velocity at 50°N 170°W for the years 1946-77. The units are cm/mo (+ up). For data listing see Table 19.

MONTHLY MEAN VERTICAL VELOCITY 50N 160W

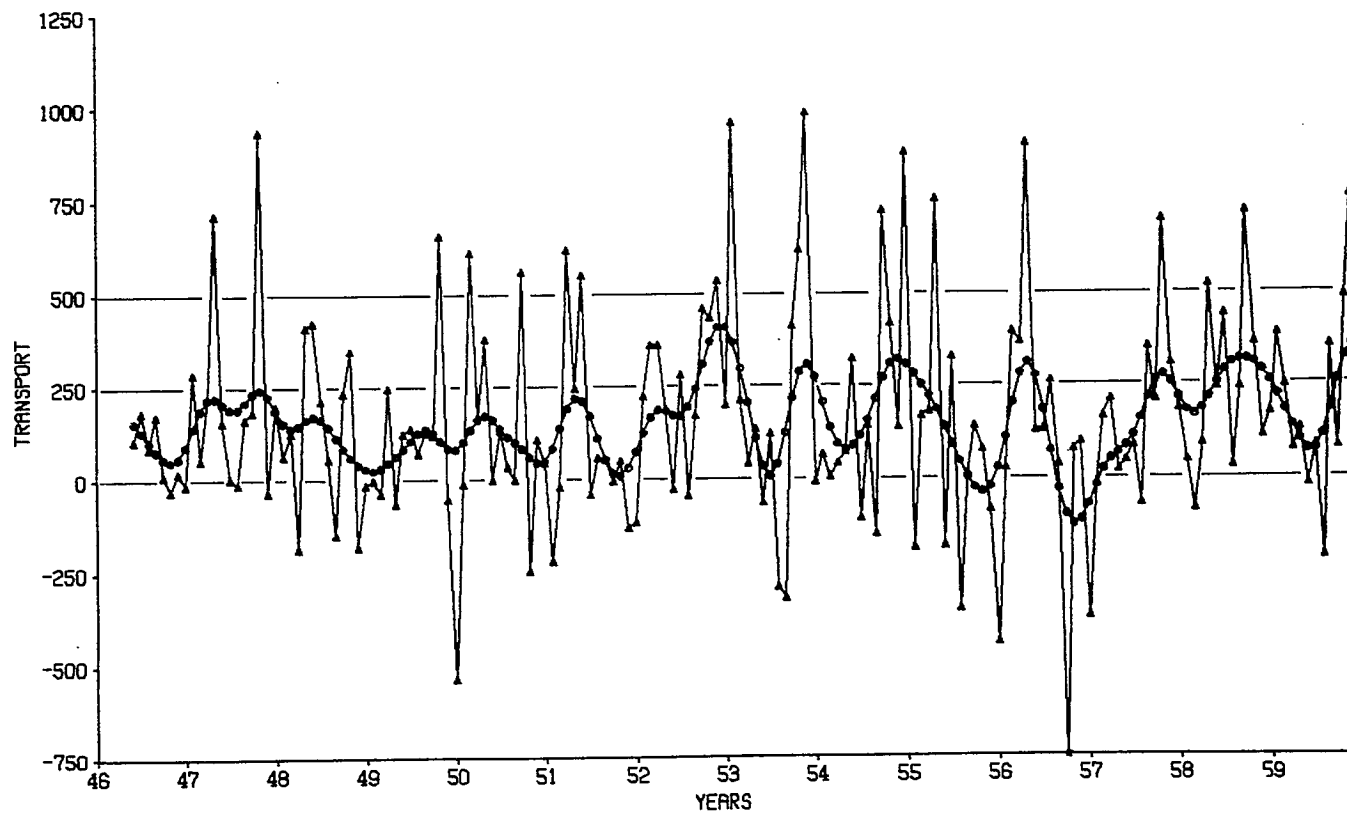


Fig. 15a.

MONTHLY MEAN VERTICAL VELOCITY 50N 160W

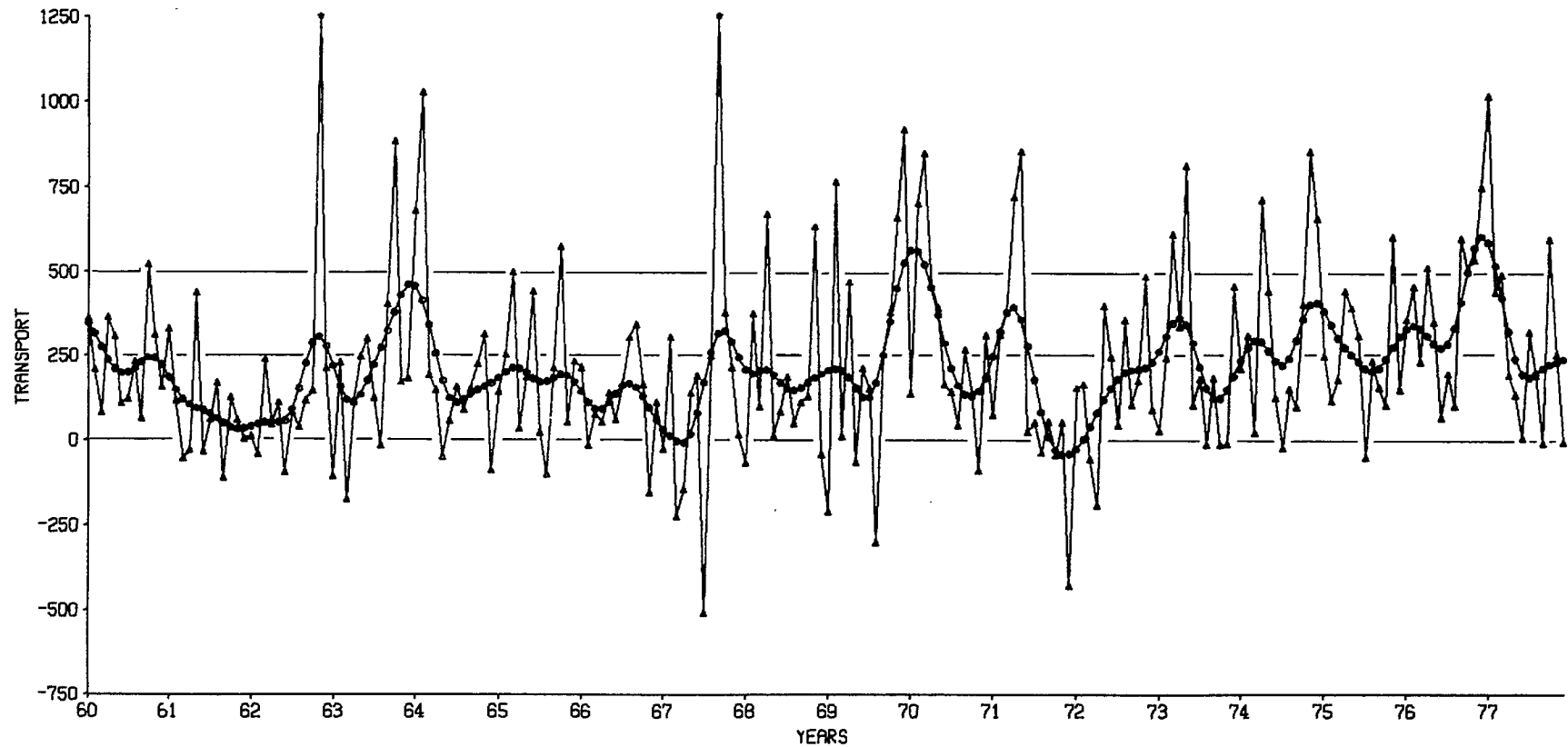


Fig. 15a, b. Graph of monthly mean Vertical Velocity at 50°N 160°W for the years 1946-77. The units are cm/mo (+ up). For data listing see Table 20.

MONTHLY MEAN VERTICAL VELOCITY 50N 150W

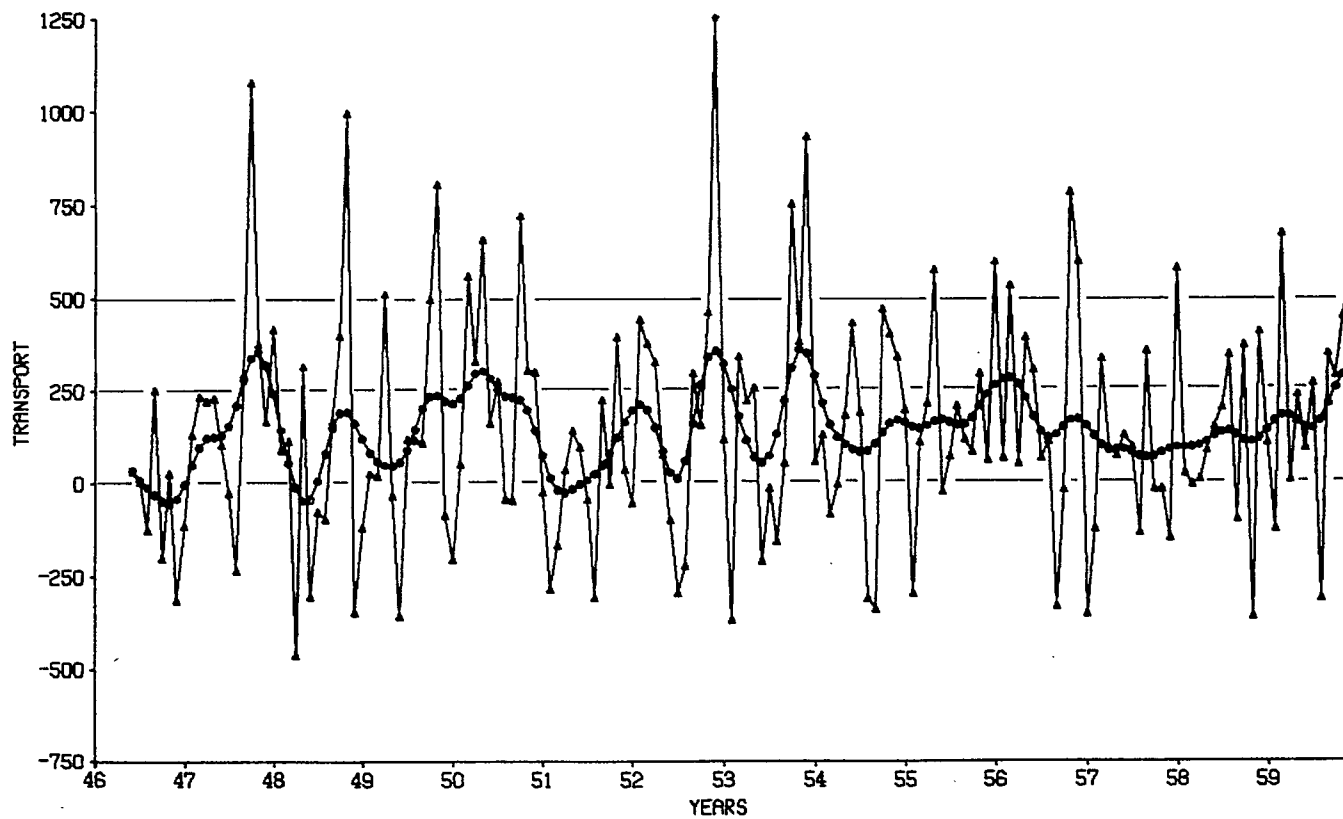


Fig. 16a.

MONTHLY MEAN VERTICAL VELOCITY 50N 150W

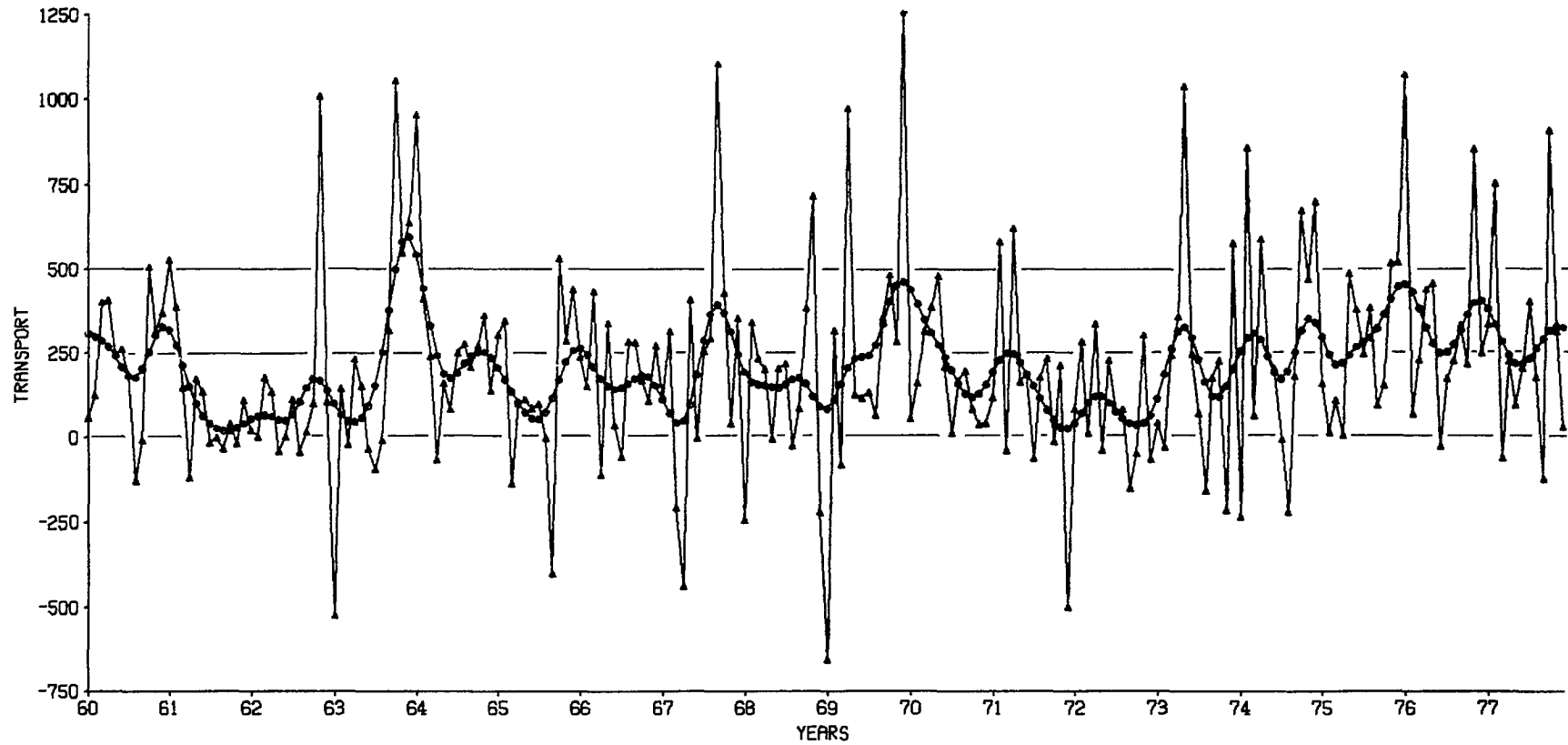


Fig. 16a, b. Graph of monthly mean Vertical Velocity at 50°N 150°W for the years 1946-77. The units are cm/mo (+ up). For data listing see Table 21.

MONTHLY MEAN VERTICAL VELOCITY 50N 140W

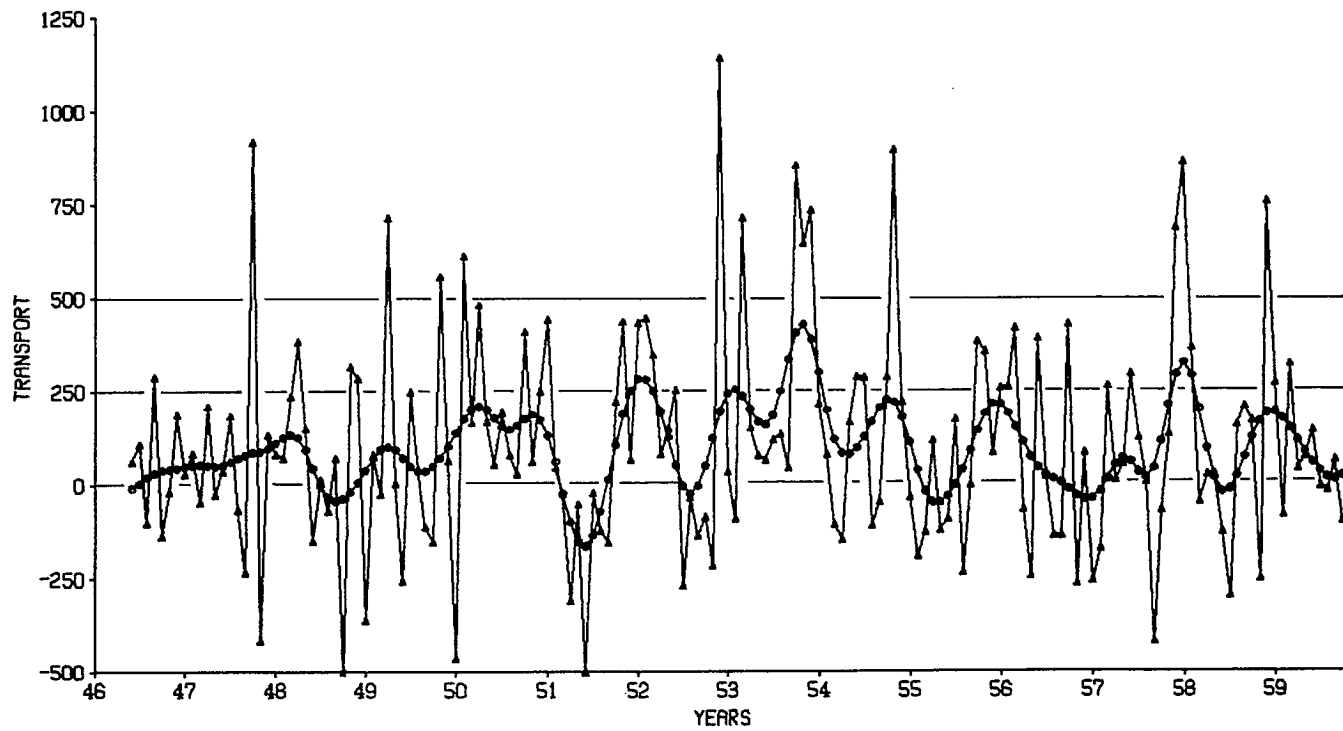


Fig. 17a.

MONTHLY MEAN VERTICAL VELOCITY 50N 140W

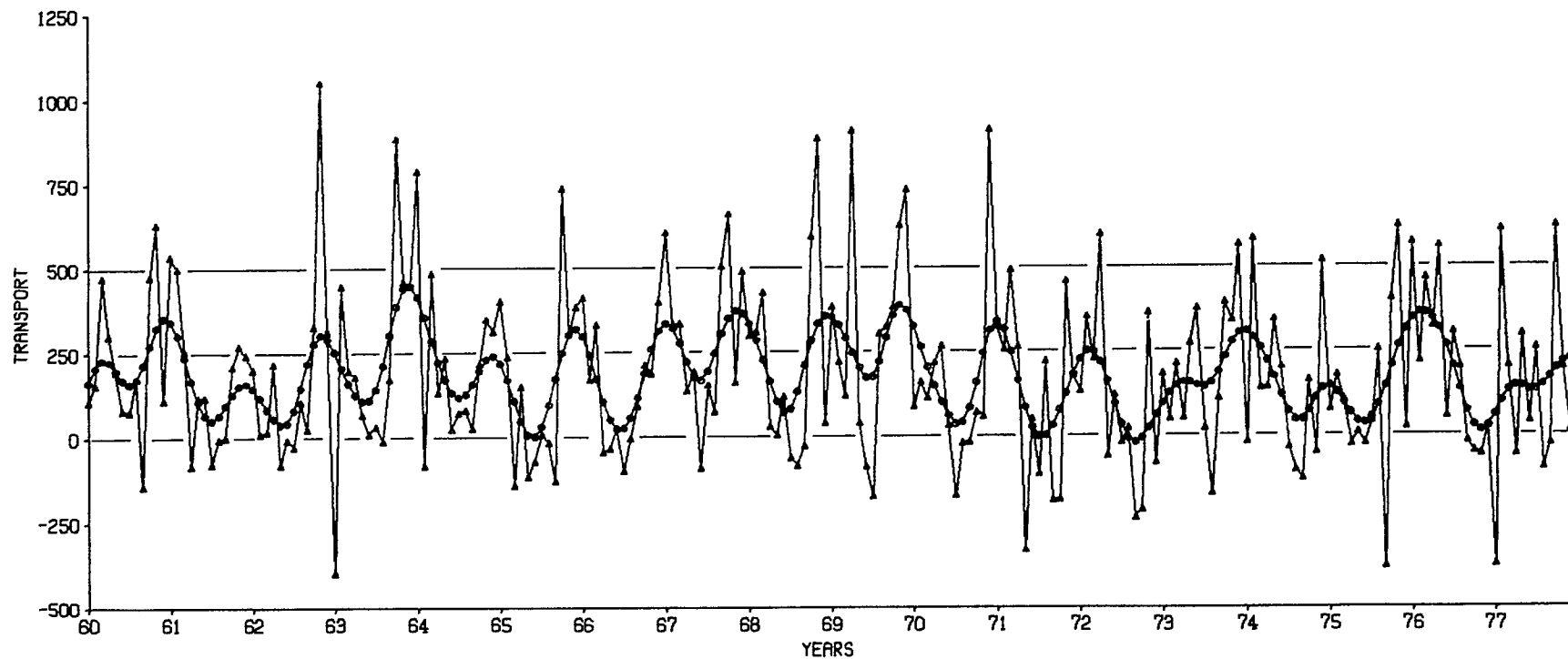


Fig. 17a, b. Graph of monthly mean Vertical Velocity at 50°N 140°W for the years 1946-77. The units are cm/mo (+ up). For data listing see Table 22.

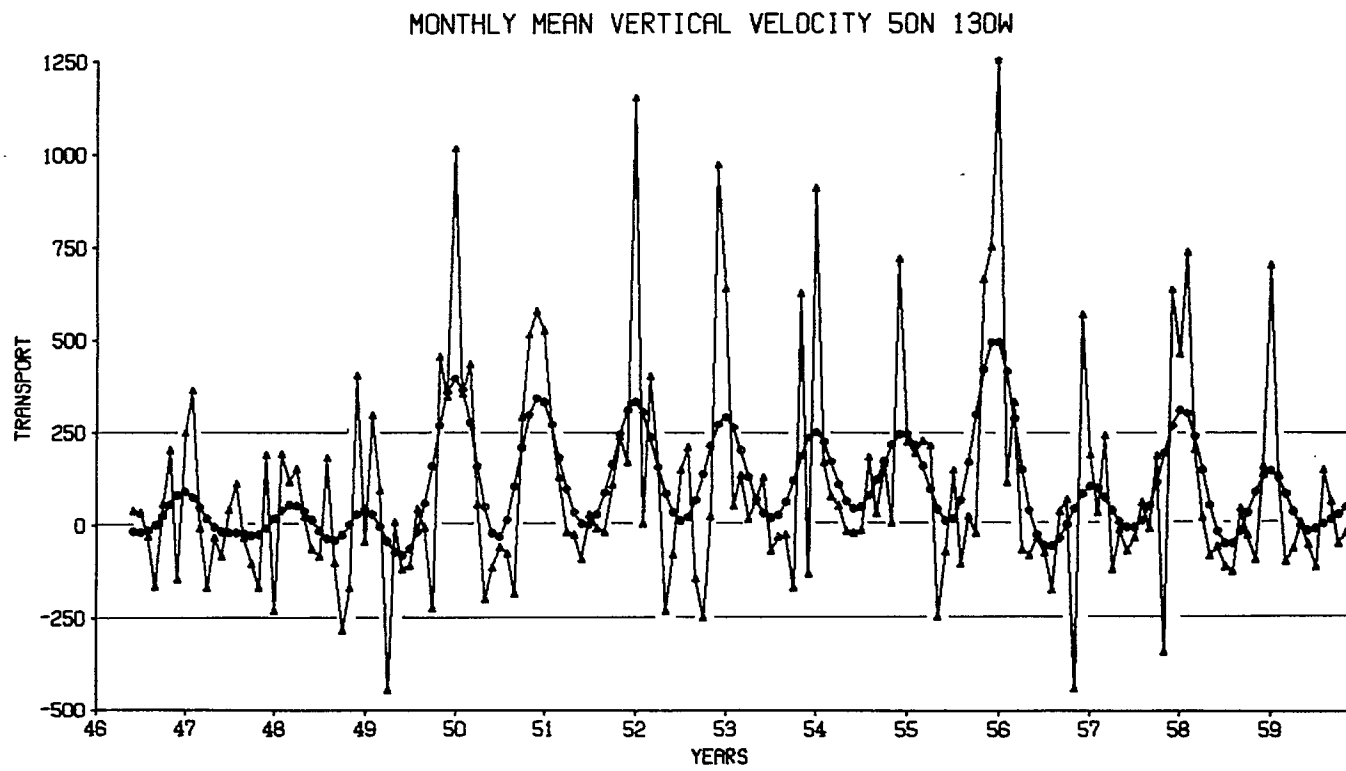


Fig. 18a.

MONTHLY MEAN VERTICAL VELOCITY 50N 130W

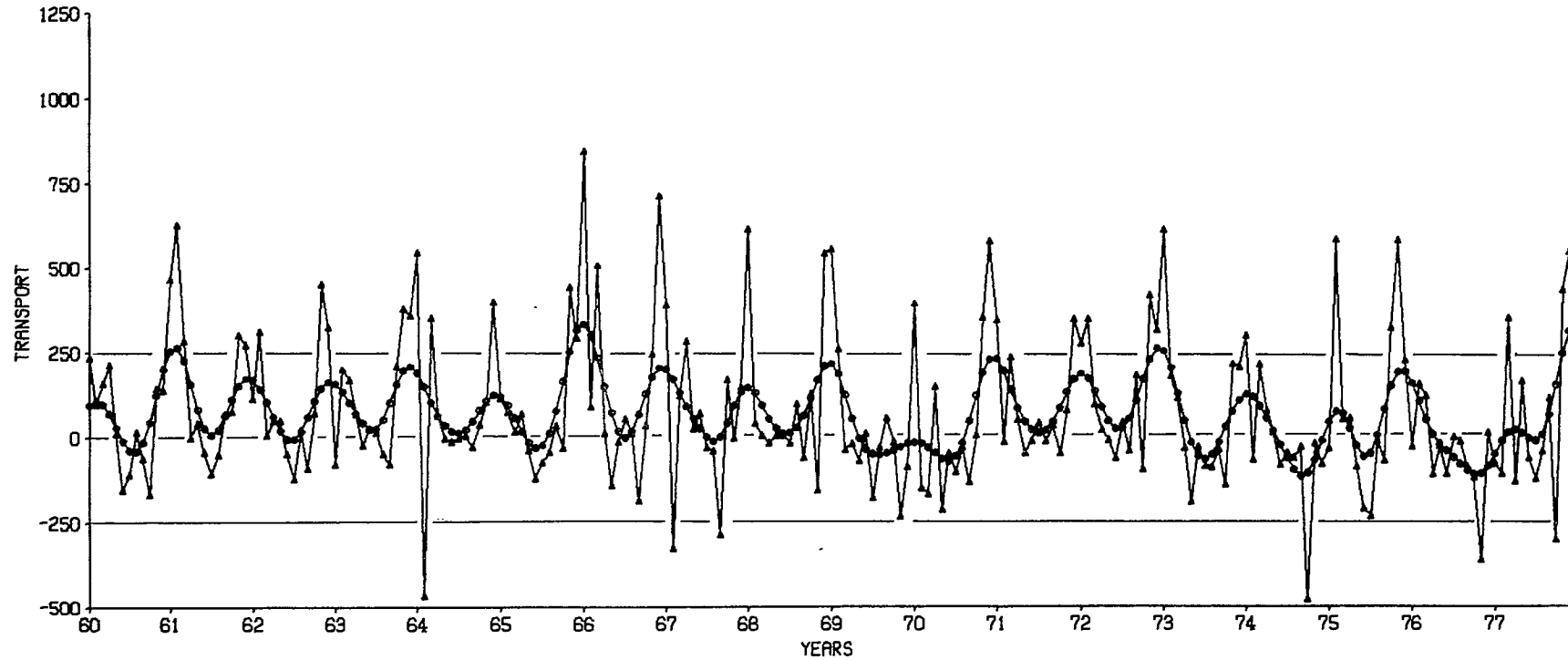


Fig. 18a, b. Graph of monthly mean Vertical Velocity at 50°N 130°W for the years 1946-77. The units are cm/mo (+ up). For data listing see Table 23.

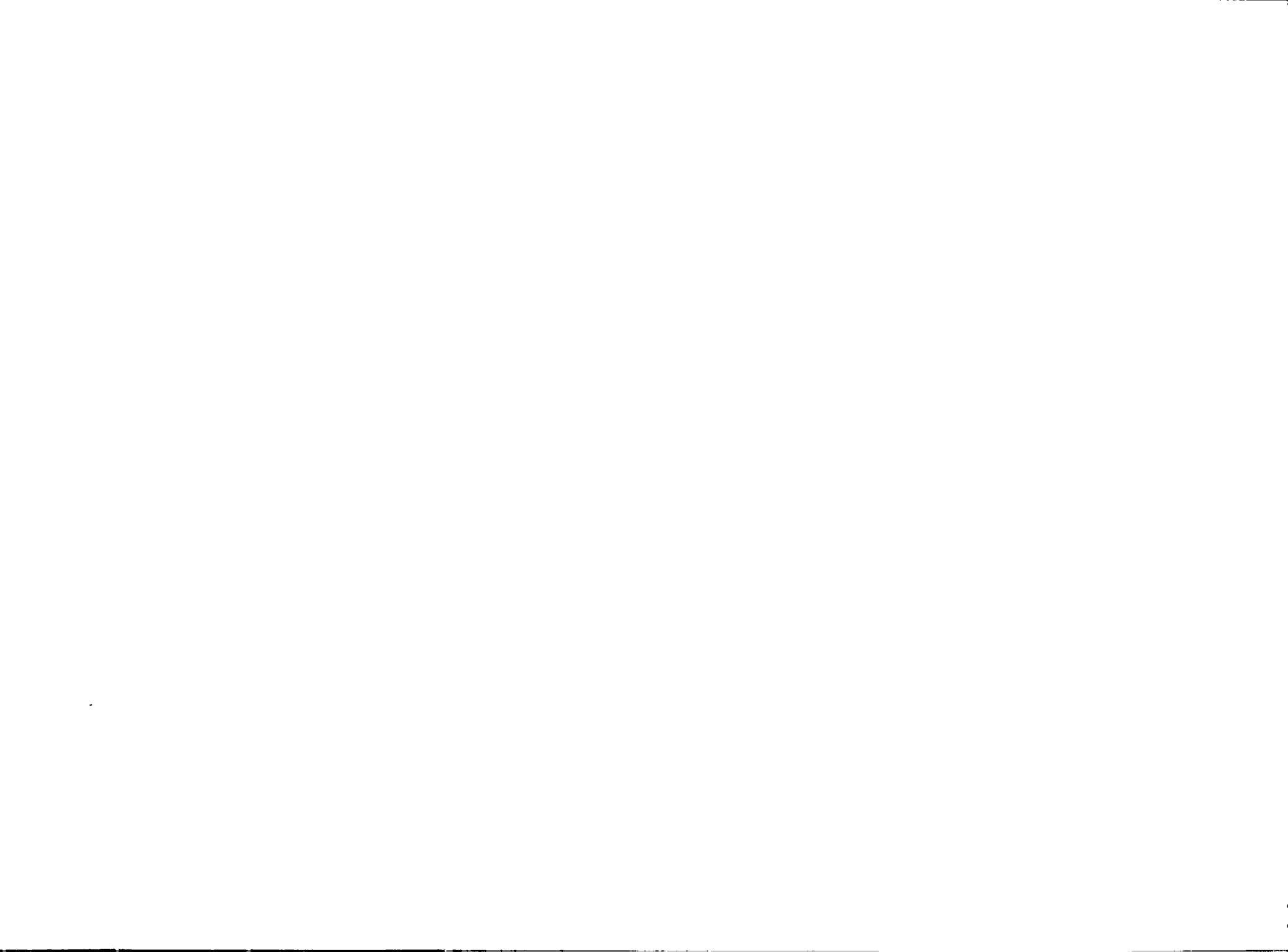


TABLE 17. MONTHLY MEAN VERTICAL VELOCITY 55N 145W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
VV46	185	575	875	308	-110	15	145	66	105	27	80	488
VV47	282	507	215	252	-23	-30	222	304	321	845	593	817
VV48	864	0	374	463	159	-95	33	203	484	1017	927	948
VV49	762	147	240	362	-17	416	92	105	210	697	662	221
VV50	230	475	263	136	300	49	228	42	245	207	640	395
VV51	137	120	414	236	-113	-243	49	153	101	81	304	231
VV52	704	529	591	340	54	140	12	165	348	290	591	991
VV53	618	636	529	136	38	133	48	155	281	781	282	677
VV54	256	141	183	79	154	154	173	88	228	248	391	491
VV55	227	431	183	431	311	171	124	291	183	839	278	251
VV56	566	302	216	99	-37	81	17	220	-28	966	904	291
VV57	-8	161	170	118	62	-6	31	106	48	-50	401	915
VV58	784	525	44	3	79	-292	-43	348	167	498	744	586
VV59	903	293	452	183	36	49	170	295	163	143	352	921
VV60	56	303	484	128	39	180	50	176	185	342	207	428
VV61	458	407	186	246	37	68	29	-28	76	673	289	151
VV62	542	119	132	141	240	25	32	137	210	412	699	602
VV63	-257	733	194	53	43	5	39	-67	135	280	523	478
VV64	299	312	52	427	88	13	86	199	41	183	142	262
VV65	380	161	-323	97	64	55	9	-80	-194	222	12	60
VV66	580	37	229	-37	253	34	-64	17	208	276	6	343
VV67	165	541	288	344	128	-87	174	82	731	298	200	184
VV68	376	542	227	630	24	34	81	251	563	424	736	257
VV69	537	230	120	405	26	-178	445	516	162	409	726	1482
VV70	456	421	344	488	243	68	261	269	107	276	209	497
VV71	508	492	192	380	385	44	-122	166	386	515	264	692
VV72	58	810	118	574	42	12	24	79	99	182	297	284
VV73	350	251	270	179	324	23	-23	148	58	754	389	847
VV74	371	613	169	336	72	58	11	8	115	937	768	667
VV75	298	329	144	466	152	33	84	90	176	569	124	407
VV76	759	162	173	165	331	-69	1	62	282	251	1101	392
VV77	-133	599	693	313	-15	9	74	-160	0	885	75	252
VV78	116	386	197	21	163							

TABLE 18. MONTHLY MEAN VERTICAL VELOCITY 55N 135W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
VV46	371	444	178	273	-17	24	-45	3	160	-147	331	456
VV47	314	996	-3	14	-176	49	10	143	-61	263	-63	445
VV48	373	816	175	140	-97	-74	-79	164	94	-298	507	694
VV49	47	911	125	265	-6	169	73	59	-71	381	365	678
VV50	754	1564	390	369	-75	-43	-36	36	53	348	1412	931
VV51	1488	545	583	-200	-68	-125	83	-7	-11	495	662	443
VV52	2859	584	213	16	-51	71	-11	107	127	-78	-257	914
VV53	1422	-134	455	133	-65	36	-10	-18	76	123	754	671
VV54	2142	342	27	167	-93	-20	-16	60	75	-62	555	452
VV55	280	181	51	120	-94	-56	-30	-179	-42	384	1350	1619
VV56	2379	271	266	-41	-229	103	-13	-57	16	682	-284	1062
VV57	390	158	342	71	-49	20	-25	-2	-237	190	285	683
VV58	856	1844	218	45	-105	-75	-193	-39	63	144	620	993
VV59	3244	407	509	16	0	50	-182	83	89	186	148	351
VV60	166	36	488	207	1	75	6	64	-134	300	337	76
VV61	60	227	336	90	8	36	-84	-50	-47	251	50	313
VV62	117	-30	95	142	25	-14	-53	32	82	127	371	139
VV63	-110	300	89	19	18	33	-36	-66	188	529	368	82
VV64	393	147	109	262	65	11	90	16	29	191	203	479
VV65	587	183	-91	30	61	-27	7	-61	-30	414	179	152
VV66	245	85	399	0	276	-6	76	-13	85	220	106	276
VV67	733	634	247	144	-72	-108	-9	-168	-8	403	193	546
VV68	555	297	216	42	-26	-6	-38	69	57	448	489	1311
VV69	1212	655	-102	150	-122	23	53	218	50	-141	801	10
VV70	1130	36	-1	289	-33	-42	23	-127	125	102	372	917
VV71	1309	52	640	-77	-319	-55	-78	34	57	242	521	327
VV72	341	1341	328	136	-57	-91	8	-104	101	57	370	638
VV73	569	698	77	-147	-252	-15	-115	30	77	317	1028	725
VV74	1080	377	391	-142	52	-39	-40	-11	-24	-97	146	753
VV75	668	765	186	79	-252	-247	-210	-2	-276	-496	756	926
VV76	543	395	250	-97	-193	-15	-3	-63	-296	-216	-833	-33
VV77	-530	-332	288	-146	-10	11	-27	-30	32	85	590	857
VV78	92	-48	186	54	-10							

TABLE 19. MONTHLY MEAN VERTICAL VELOCITY SON 170w

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
VV46	499	370	417	-27	199	37	-99	44	163	-249	-20	40
VV47	-134	139	22	375	730	261	-21	-10	108	271	473	656
VV48	451	166	-141	-283	119	224	179	-122	-56	138	503	36
VV49	-152	-54	606	227	110	187	88	-39	450	62	876	-78
VV50	-365	-18	521	93	287	-75	88	81	37	-19	-222	-27
VV51	61	166	52	515	206	238	42	154	15	65	72	61
VV52	-7	101	413	165	-93	44	284	-57	47	938	454	143
VV53	351	836	306	188	334	-3	22	-193	-182	214	493	574
VV54	117	111	33	-55	174	115	-97	-5	294	579	2	-21
VV55	1446	-75	-1	117	758	-57	374	-6	3	409	95	0
VV56	-155	64	201	188	883	122	-53	183	67	-603	163	254
VV57	361	91	262	340	56	81	65	110	141	134	505	666
VV58	137	64	-259	180	886	270	252	-101	101	199	234	40
VV59	-100	177	523	2	46	1	-52	50	178	118	443	619
VV60	580	178	-18	246	258	52	131	386	288	281	384	317
VV61	65	2	46	-68	376	-43	108	438	-209	18	484	342
VV62	-48	56	199	44	166	-82	64	314	207	116	1173	86
VV63	449	56	170	-6	-4	340	-32	18	278	220	65	163
VV64	397	252	202	266	0	16	302	234	371	161	73	-250
VV65	70	20	123	-24	57	204	-68	59	147	323	-358	105
VV66	247	148	-95	202	115	27	137	258	141	-49	-165	29
VV67	-178	146	-172	-111	48	72	-360	-32	548	340	1035	-40
VV68	-294	311	223	651	45	-1	148	240	84	60	1045	83
VV69	-305	606	330	372	256	45	63	-172	273	413	400	591
VV70	12	631	289	506	76	112	157	201	32	138	-237	705
VV71	-126	58	479	182	319	-34	81	211	222	-228	65	540
VV72	53	-69	-73	-328	463	440	9	214	144	101	761	49
VV73	57	248	812	133	333	52	23	260	308	-88	-183	413
VV74	521	99	207	446	510	12	11	43	-34	237	716	447
VV75	118	72	220	192	475	105	213	49	167	210	549	127
VV76	53	479	253	650	128	43	283	110	131	623	454	127
VV77	249	347	731	47	-39	38	140	142	-43	134	423	-22
VV78	261	52	217	66	132							

TABLE 20. MONTHLY MEAN VERTICAL VELOCITY 50N 160W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
VV46	182	146	439	167	167	103	181	84	172	9	-32	17
VV47	-16	283	52	218	711	154	1	-15	161	182	931	-36
VV48	197	60	123	-186	409	422	210	53	-149	231	345	-180
VV49	-16	-4	-38	243	-67	122	136	68	124	115	654	-54
VV50	-536	-13	608	165	376	-4	129	31	-3	557	-246	103
VV51	41	-222	-23	613	241	547	-45	54	49	-8	45	-134
VV52	-118	218	357	357	183	-32	277	-49	165	453	428	529
VV53	194	951	207	37	129	-70	117	-293	-323	407	612	975
VV54	-14	59	-2	35	66	317	-110	135	-154	713	412	130
VV55	868	-191	162	174	743	-185	321	-353	6	134	70	-88
VV56	-443	20	388	360	891	122	124	255	32	-812	72	91
VV57	-374	-22	159	205	15	40	82	-73	346	203	688	300
VV58	179	40	-88	86	514	235	434	26	236	708	356	107
VV59	169	382	242	71	125	-25	80	-217	349	75	482	752
VV60	360	208	82	363	306	108	121	231	63	522	311	155
VV61	328	116	-54	-30	436	-34	60	168	-110	127	58	4
VV62	11	-42	239	45	110	-94	84	38	117	146	1263	210
VV63	-106	228	-174	112	246	298	123	-17	402	881	170	182
VV64	679	1024	191	146	-48	56	157	89	149	224	311	-90
VV65	142	250	497	34	183	439	21	-101	210	571	50	230
VV66	211	-17	74	52	136	58	164	300	339	162	-155	108
VV67	-29	301	-227	-147	135	187	-508	247	1262	373	211	13
VV68	-68	371	97	666	10	82	183	47	109	126	630	-43
VV69	-211	761	9	465	-67	208	148	-301	252	376	657	913
VV70	134	699	844	452	389	161	138	42	263	136	-92	307
VV71	70	308	375	715	848	21	48	-40	51	-47	48	-429
VV72	150	160	-59	-194	393	242	42	351	102	170	480	86
VV73	24	238	607	332	807	99	177	-16	179	-17	-14	451
VV74	205	303	18	706	436	122	-27	146	94	396	847	651
VV75	245	110	174	437	385	304	-53	228	151	98	596	144
VV76	350	449	227	505	344	61	190	96	592	502	529	742
VV77	1007	430	483	185	128	1	313	186	-13	588	246	-11
VV78	315	128	448	408	603							

TABLE 21. MONTHLY MEAN VERTICAL VELOCITY 50N 150W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
VV46	-17	387	477	-150	32	30	3	-127	252	-200	26	-313
VV47	-113	130	234	222	229	103	-27	-234	293	1077	375	165
VV48	416	89	113	-462	315	-304	-77	-96	167	398	993	-345
VV49	-118	25	18	510	-33	-356	118	116	109	497	803	-87
VV50	-204	50	559	328	656	161	273	-43	-46	720	304	299
VV51	-24	-283	-166	35	141	97	-45	-306	224	-4	393	36
VV52	-54	441	376	326	75	-98	-293	-221	296	156	460	1301
VV53	116	-367	342	220	257	-209	-13	-155	53	752	382	932
VV54	55	128	-85	-4	182	430	188	-309	-338	468	402	338
VV55	197	-295	109	213	573	-24	71	207	117	83	294	61
VV56	595	67	531	52	392	303	66	112	-331	-20	781	597
VV57	-351	-123	333	88	70	127	95	-134	353	-20	-19	-148
VV58	576	24	-7	8	85	149	200	343	-100	370	-359	405
VV59	107	-125	668	5	235	91	267	-311	345	285	446	581
VV60	56	123	400	406	246	260	183	-128	-10	505	314	370
VV61	526	386	146	-119	172	134	-16	-2	-34	38	-19	108
VV62	20	2	177	134	-42	2	112	-43	15	98	1007	103
VV63	-525	144	-22	230	151	-34	-94	-10	316	1051	546	635
VV64	952	409	239	-67	158	80	249	275	206	270	360	135
VV65	302	344	-137	98	110	83	97	-4	-401	528	284	437
VV66	236	148	431	-112	337	34	-59	281	278	166	106	269
VV67	118	311	-209	-439	407	-4	253	290	1100	427	38	351
VV68	-244	339	231	198	-5	202	215	-27	83	381	713	-221
VV69	-657	314	-82	968	124	114	132	63	351	480	282	1370
VV70	54	158	311	383	477	206	11	164	194	81	36	39
VV71	116	579	-41	618	162	184	-63	175	231	-14	212	-502
VV72	80	281	11	334	-38	227	75	80	-151	-50	300	-67
VV73	40	-32	240	355	1034	245	69	-158	173	223	-215	574
VV74	-236	854	62	585	242	200	-10	-222	179	672	467	697
VV75	155	11	107	3	483	375	245	381	90	151	514	516
VV76	1065	67	227	435	453	-29	171	224	328	214	848	246
VV77	331	749	-64	220	92	201	398	174	-125	902	308	25
VV78	494	466	39	53	598							

TABLE 22. MONTHLY MEAN VERTICAL VELOCITY 50N 140W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
VV46	322	137	199	-353	-71	62	110	-101	288	-136	-18	188
VV47	29	83	-47	210	-25	37	185	-66	-233	916	-417	134
VV48	82	71	236	383	150	-148	14	-68	72	-510	316	284
VV49	-361	82	-24	714	3	-256	249	42	-112	-150	557	64
VV50	-463	612	165	480	168	55	193	80	30	409	62	248
VV51	442	47	-24	-309	-50	-500	-20	-121	-153	222	435	67
VV52	432	444	345	81	148	252	-270	-33	-137	-86	-215	1136
VV53	35	-92	711	150	77	64	119	135	43	850	643	731
VV54	213	78	-106	-145	165	286	284	-108	-46	287	892	219
VV55	-34	-192	-125	117	-120	-92	174	-234	-1	382	353	83
VV56	257	258	416	-67	-245	388	21	-135	-137	426	-265	85
VV57	-257	-172	261	11	55	294	125	6	-420	-69	135	683
VV58	858	364	-45	27	26	-127	-297	159	207	168	-252	753
VV59	268	-82	320	42	75	143	-7	-16	63	-98	-94	274
VV60	106	157	474	302	196	82	76	175	-142	476	631	111
VV61	536	500	255	-81	118	119	-75	-3	1	210	271	243
VV62	202	11	20	218	-79	-6	-26	106	26	328	1050	313
VV63	-397	449	198	180	69	12	34	-8	173	885	462	448
VV64	788	-82	486	134	237	27	74	82	30	219	350	314
VV65	403	239	-138	151	-114	-68	11	-13	-127	737	306	386
VV66	414	170	334	-41	-32	28	-95	0	95	215	189	402
VV67	605	333	337	140	193	-88	155	76	505	660	164	490
VV68	301	311	428	33	8	122	-59	-81	-23	593	884	43
VV69	386	224	125	907	45	-83	-171	306	325	385	626	731
VV70	91	164	116	220	268	37	-169	-16	-13	74	62	908
VV71	325	258	494	266	-330	54	-107	224	-183	-182	460	180
VV72	137	355	230	599	-53	125	-13	26	-236	-210	366	-73
VV73	187	55	217	56	277	379	27	-164	115	396	343	566
VV74	-14	583	144	146	345	205	-28	-96	-122	167	-44	519
VV75	82	182	108	-21	14	-19	47	256	-379	406	621	30
VV76	571	221	466	324	560	59	306	204	-14	-44	-52	30
VV77	-373	609	207	-52	299	44	258	-91	-20	619	200	20
VV78	421	182	134	187	-26							

TABLE 23. MONTHLY MEAN VERTICAL VELOCITY 50N 130W

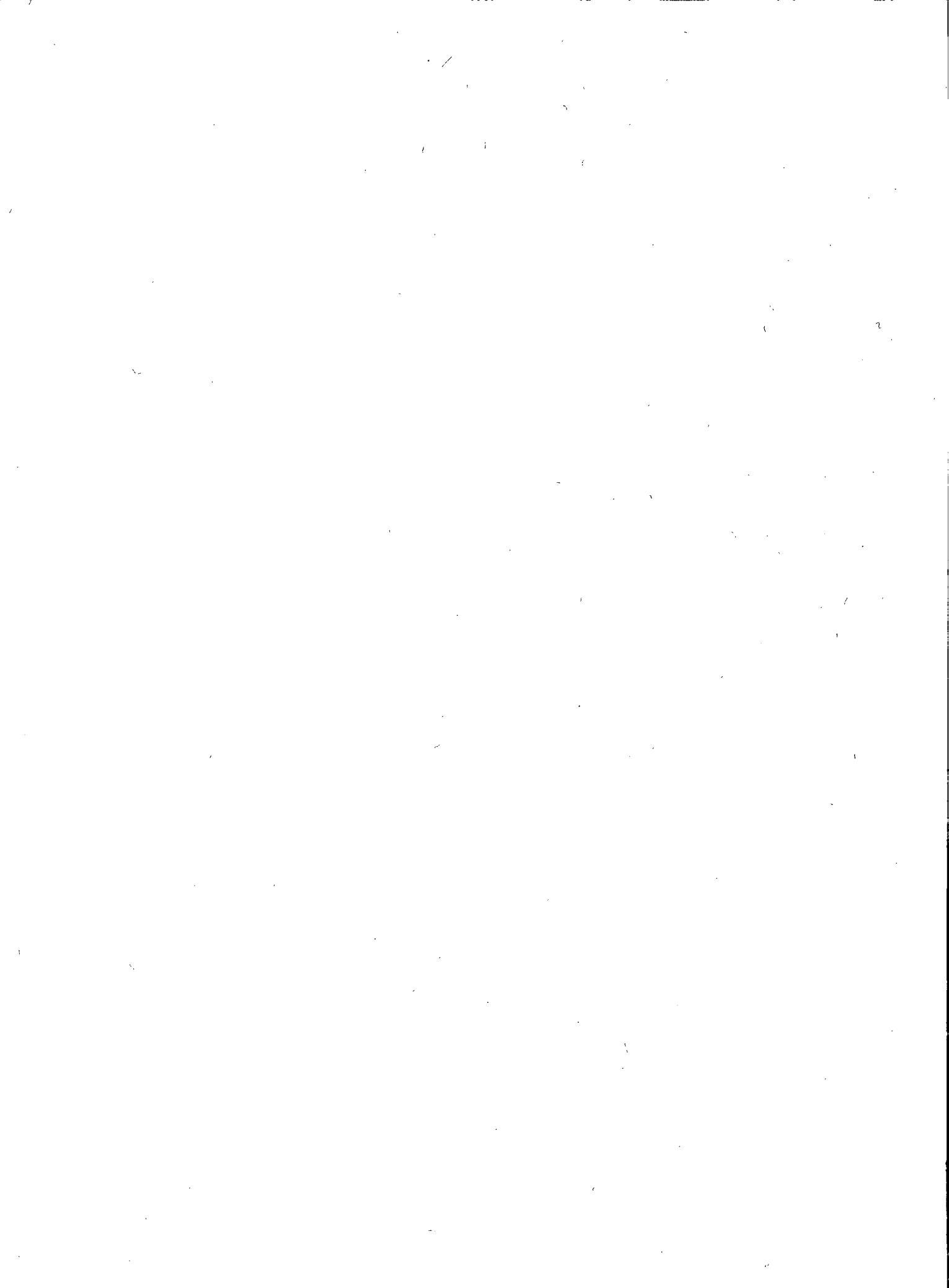
YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
VV46	116	88	99	-95	-73	38	33	-29	-164	59	203	-144
VV47	250	365	-7	-167	-31	-81	45	115	-30	-102	-167	192
VV48	-228	193	120	154	26	-62	-82	184	-98	-281	-165	407
VV49	-40	299	97	-445	12	-115	-107	47	-4	-222	457	349
VV50	1015	355	437	58	-197	-111	-57	-73	-181	294	515	578
VV51	527	275	132	-16	-24	-88	32	-5	-17	112	241	172
VV52	1150	7	404	160	-228	-77	150	211	-141	-247	27	970
VV53	638	53	137	20	67	131	-65	-29	-24	-167	626	-128
VV54	908	172	80	55	-13	-18	-12	185	35	168	8	719
VV55	227	196	229	215	-244	-69	150	-102	27	-18	663	751
VV56	1258	117	333	-63	-79	-30	-71	-171	38	71	-438	569
VV57	190	36	243	-115	-9	-67	-31	65	-5	189	-339	635
VV58	464	737	207	25	-79	-54	-108	-122	48	-24	-89	162
VV59	701	138	-94	-58	12	-49	-108	151	66	-46	-17	29
VV60	234	97	158	214	11	-153	-109	16	-60	-167	144	140
VV61	465	627	284	0	41	-44	-107	-50	68	77	302	272
VV62	115	312	6	49	48	-49	-120	21	-90	72	452	324
VV63	-79	200	169	70	-24	23	15	-49	-79	208	379	358
VV64	544	-467	352	65	-3	-14	-3	4	-29	36	105	399
VV65	115	73	16	70	-39	-120	-74	-44	35	-31	442	292
VV66	844	88	505	11	-141	-14	53	12	-186	33	244	710
VV67	388	-327	121	281	25	68	-32	-42	-287	169	-4	146
VV68	612	40	5	-19	3	5	-18	97	-62	126	-157	538
VV69	552	256	-38	-21	-71	9	-179	-32	55	-16	-233	-89
VV70	390	-151	-168	147	-214	-48	-103	-32	-134	4	349	574
VV71	340	-17	232	48	-49	-13	39	-14	31	-49	76	344
VV72	271	343	94	18	-10	-63	41	-42	179	-96	413	311
VV73	607	176	111	-33	-190	-32	-85	-90	-39	-140	210	202
VV74	294	-69	209	73	12	-84	-49	-64	-32	-478	-21	-80
VV75	-35	576	48	51	-88	-212	-233	-13	-70	317	574	220
VV76	-31	151	117	-112	-29	-110	-3	-17	-92	-122	-361	10
VV77	-81	-110	344	-134	158	-66	-126	-47	108	-305	427	538
VV78	673	433	2	11	-100							



SECTION IV

2° monthly mean Meridional and Zonal Ekman
transport graphs and data listings.

January values are plotted immediately above the year.



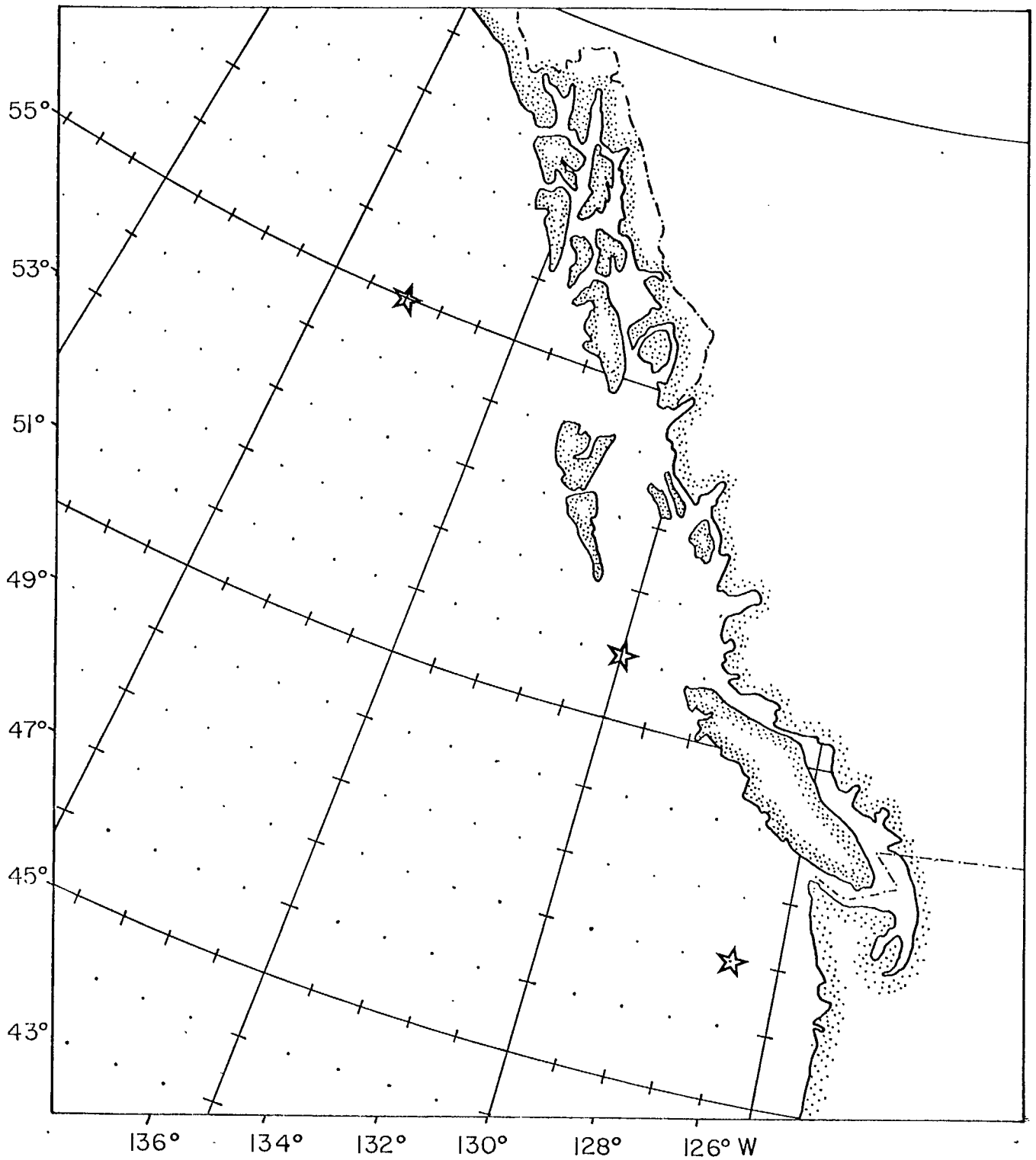


Fig. 19. Grid points at which 2° monthly mean components of Ekman transport have been graphed and data listed in Tables 24-29.

MONTHLY MEAN MERIDIONAL TRANSPORT 55N 138W

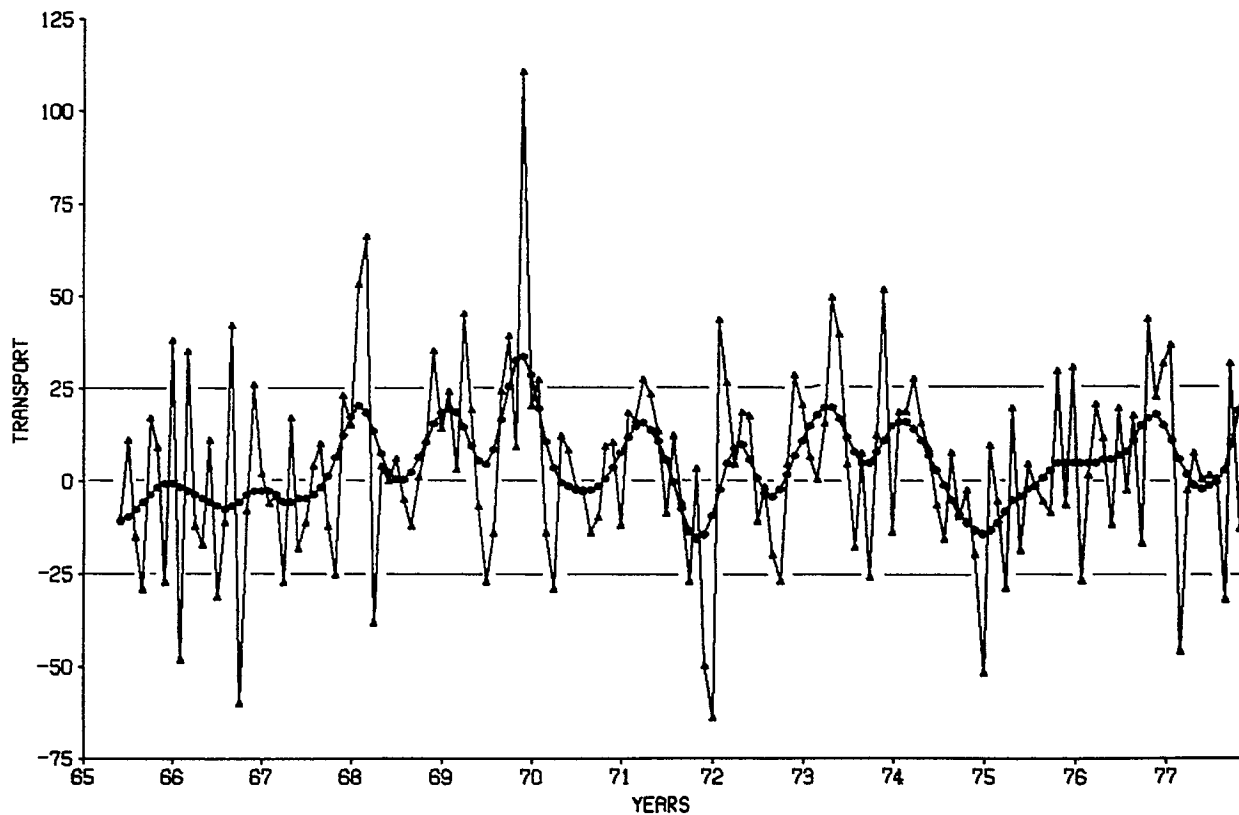


Fig. 20. Graph of monthly mean Meridional Ekman transport at 55°N 138°W for the years 1965-77. The units are 10 metric T/sec/km (+ north). For data listing see Table 24.

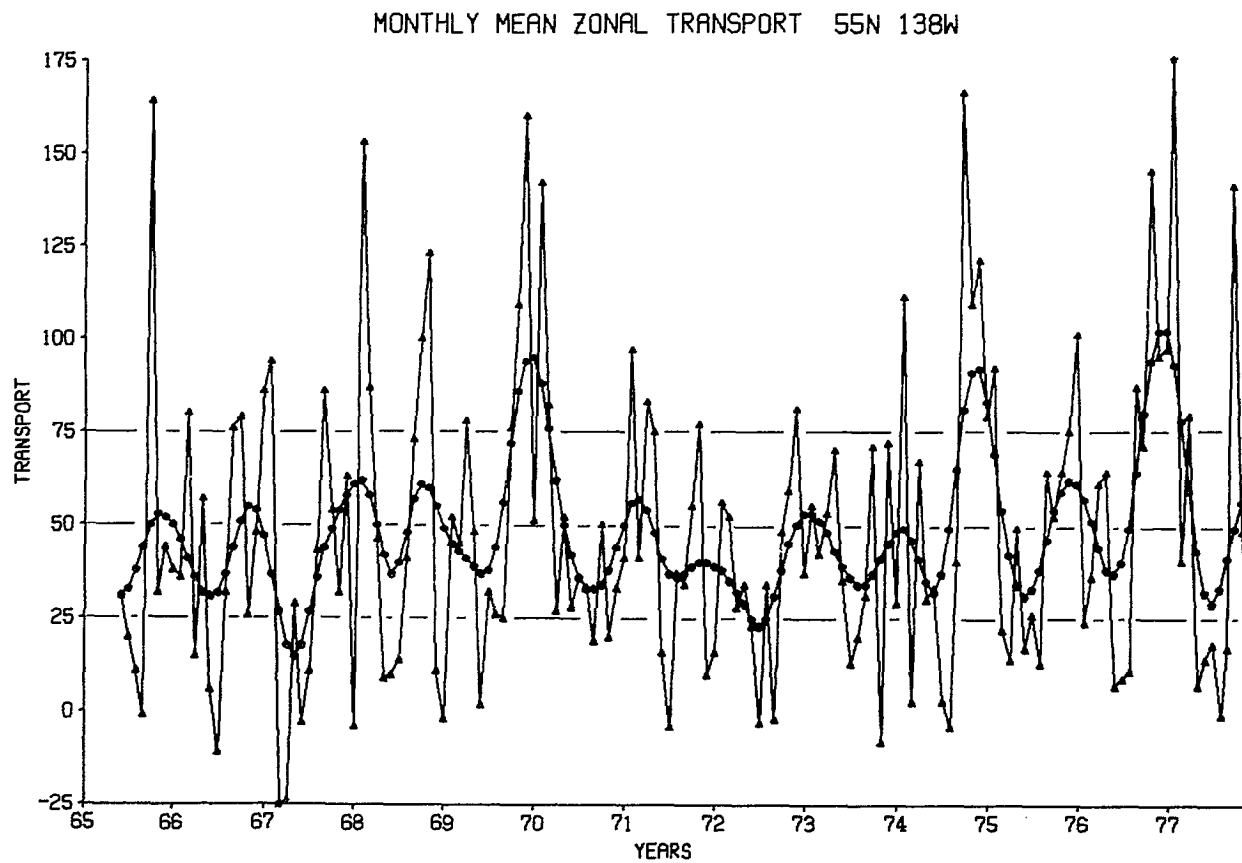


Fig. 21. Graph of monthly mean Zonal Ekman transport at 55°N 138°W for the years 1965-77. The units are 10 metric T/sec/km (+ east). For data listing see Table 25.

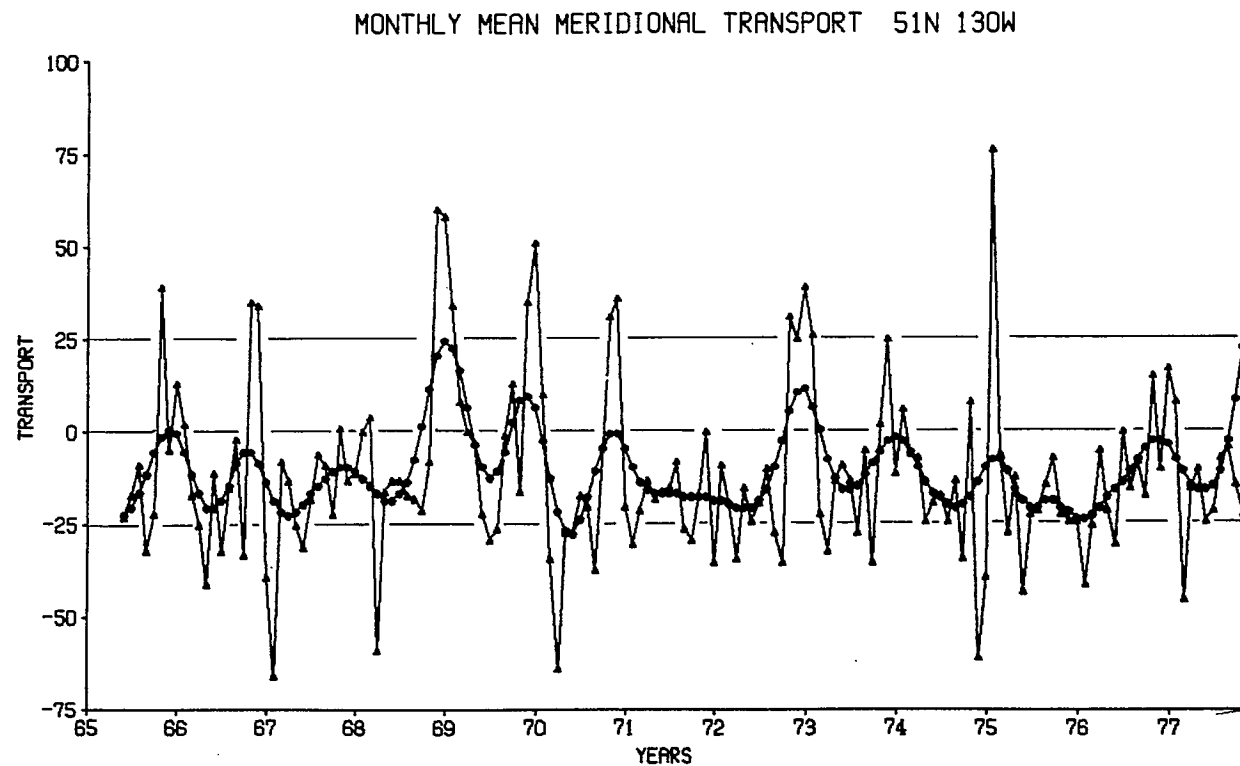


Fig. 22. Graph of monthly mean Meridional Ekman transport at 51°N 130°W for the years 1965-77. The units are 10 metric T/sec/km (+ north). For data listing see Table 26.

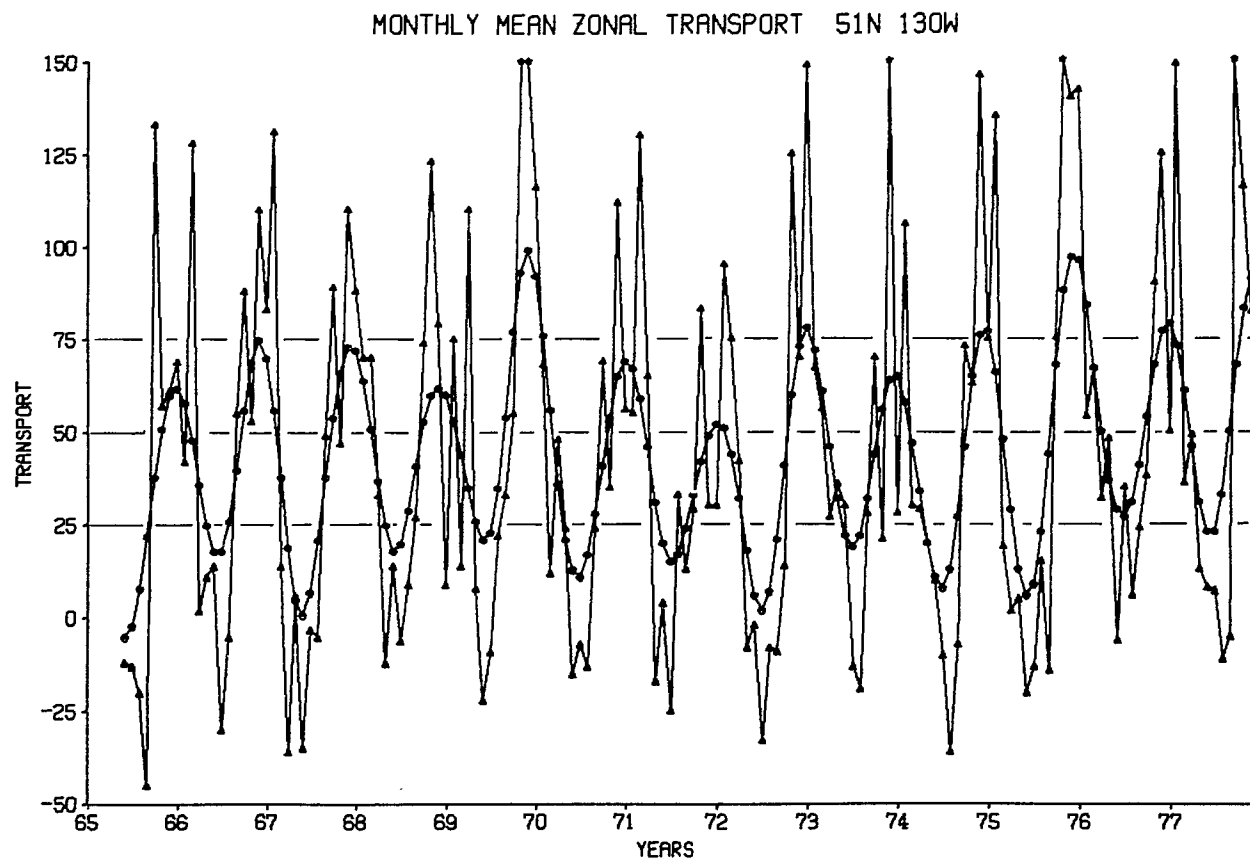


Fig. 23. Graph of monthly mean Zonal Ekman transport at 51°N 130°W for the years 1965-77. The units are 10 metric T/sec/km (+ east). For data listing see Table 27.

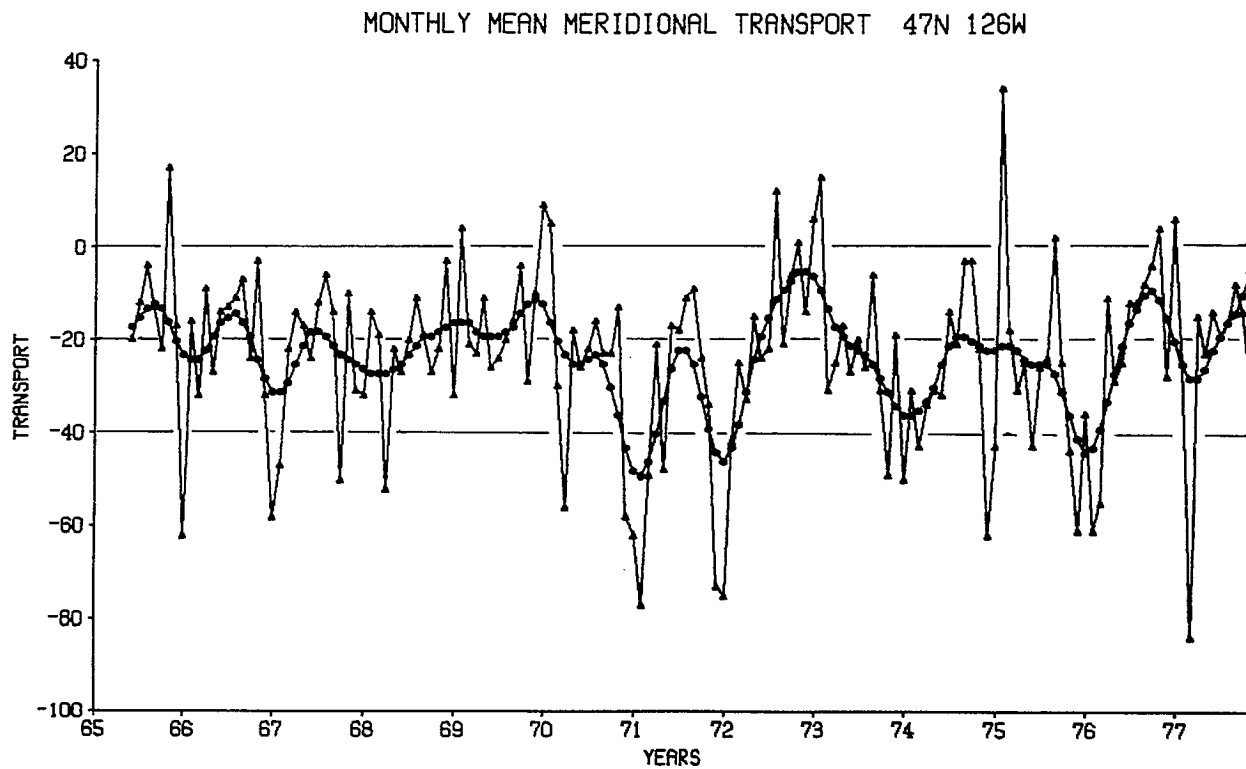


Fig. 24. Graph of monthly mean Meridional Ekman transport at 47°N 126°W for the years 1965-77. The units are 10 metric T/sec/km (+ north). For data listing see Table 28.

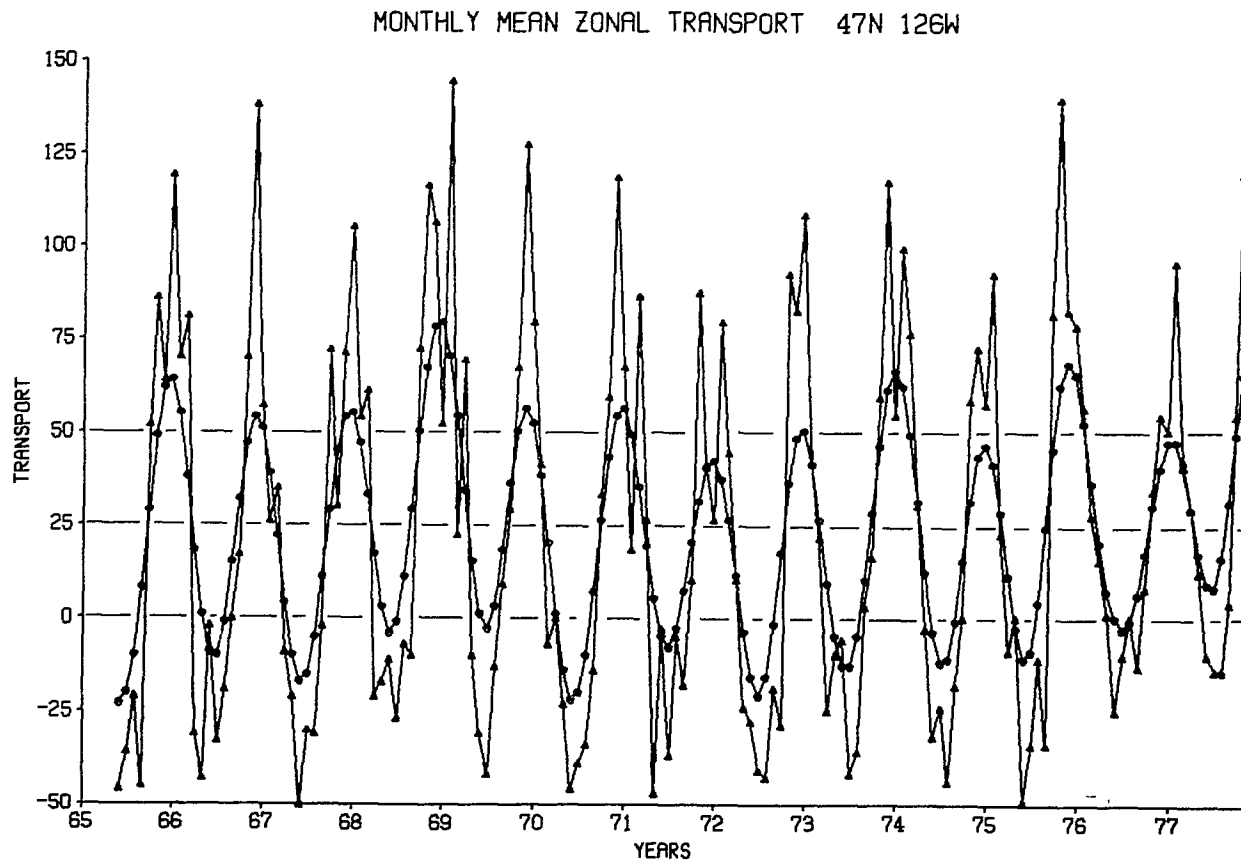


Fig. 25. Graph of monthly mean Zonal Ekman transport at 47°N 126°W for the years 1965-77. The units are 10 metric T/sec/km (+ east). For data listing see Table 29.

TABLE 24. MONTHLY MEAN MERIDIONAL EKMAN TRANSPORT 55N 138W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MER.65	5	-10	6	-9	-39	-10	11	-15	-29	17	9	-27
MER.66	38	-48	35	-12	-17	11	-31	-11	42	-60	-8	26
MER.67	2	-6	-4	-27	17	-18	-11	4	10	-12	-25	23
MER.68	15	53	66	-38	4	0	6	-5	-12	1	11	35
MER.69	14	24	3	45	19	-7	-27	-14	24	39	9	110
MER.70	20	27	-14	-29	12	8	-2	-3	-14	-10	9	10
MER.71	-12	18	16	27	23	13	-9	12	-6	-27	3	-50
MER.72	-64	43	26	4	18	17	-11	-2	-20	-27	4	28
MER.73	20	6	0	15	49	39	4	-18	7	-26	12	51
MER.74	-14	18	18	27	15	8	-7	-16	7	-10	-3	-20
MER.75	-52	9	-6	-29	19	-19	4	-2	-6	-9	29	-7
MER.76	30	-27	1	20	11	-12	19	-3	17	-17	43	22
MER.77	31	36	-46	-3	7	0	1	0	-32	31	-13	14
MER.78	97	53	10	-4	-6							

TABLE 25. MONTHLY MEAN ZONAL EKMAN TRANSPORT 55N 138W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
ZON.65	67	51	45	39	30	31	20	11	-1	164	32	44
ZON.66	38	36	80	15	57	6	-11	32	76	79	26	48
ZON.67	86	94	-27	-24	29	-3	11	43	86	54	32	63
ZON.68	-4	153	87	46	9	10	14	41	73	100	123	11
ZON.69	-2	52	45	78	48	2	32	26	25	76	109	160
ZON.70	51	142	82	27	52	28	36	33	19	50	20	33
ZON.71	41	97	41	83	75	16	-4	37	34	55	77	10
ZON.72	16	56	52	28	34	23	-3	34	-2	48	59	81
ZON.73	37	55	42	53	70	35	13	20	31	71	-8	72
ZON.74	29	111	3	67	30	33	3	-4	40	166	109	121
ZON.75	79	92	22	14	49	17	26	13	64	52	64	75
ZON.76	101	24	36	61	64	7	9	11	87	71	145	95
ZON.77	97	178	40	79	7	14	18	-1	17	141	48	11
ZON.78	72	101	52	12	40							

TABLE 26. MONTHLY MEAN MERIDIONAL EKMAN TRANSPORT 51N 130W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MER.65	-16	-49	0	-5	-55	-23	-17	-9	-32	-22	39	-5
MER.66	13	2	-17	-25	-41	-11	-32	-15	-2	-33	35	34
MER.67	-39	-66	-8	-13	-25	-31	-18	-6	-9	-22	1	-13
MER.68	-11	0	4	-59	-16	-13	-13	-17	-18	-21	-8	60
MER.69	58	34	8	0	-3	-22	-29	-26	-1	13	-16	35
MER.70	51	10	-34	-64	-27	-27	-17	-20	-37	-4	31	36
MER.71	-20	-30	-21	-13	-18	-16	-15	-8	-26	-29	-17	0
MER.72	-35	-9	-19	-34	-15	-24	-19	-10	-27	-35	31	25
MER.73	39	26	-22	-32	-13	-9	-13	-27	-5	-35	2	25
MER.74	-11	6	-6	-7	-24	-19	-17	-24	-13	-34	8	-61
MER.75	-39	76	-6	-27	-12	-43	-22	-21	-14	-7	-22	-24
MER.76	-24	-41	-25	-5	-21	-30	0	-15	-8	-17	15	-10
MER.77	17	8	-45	-15	-10	-24	-21	-7	-4	-14	-22	56
MER.78	129	60	0	4	-27							

TABLE 27. MONTHLY MEAN ZONAL EKMAN TRANSPORT 51N 130W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
ZON.65	80	56	-24	14	-8	-12	-13	-20	-45	133	57	61
ZON.66	69	42	128	2	11	14	-30	-5	55	88	53	110
ZON.67	83	131	14	-36	6	-35	-3	-5	49	89	47	110
ZON.68	88	70	70	33	-12	14	-6	9	27	74	123	79
ZON.69	9	75	14	110	8	-22	-9	22	33	55	165	164
ZON.70	116	68	12	48	24	-15	-7	-13	24	69	35	112
ZON.71	56	55	130	65	-17	4	-25	33	13	29	83	30
ZON.72	30	95	75	42	-8	-2	-33	-8	-9	14	125	70
ZON.73	149	67	56	27	36	30	-13	-19	28	70	21	156
ZON.74	28	106	30	29	20	10	-10	-36	-7	73	63	146
ZON.75	75	135	19	2	5	-20	-13	15	-14	75	153	140
ZON.76	142	54	67	32	48	-6	35	6	24	38	90	125
ZON.77	50	149	36	49	13	8	7	-11	-5	151	116	82
ZON.78	95	133	57	18	17							

TABLE 28. MONTHLY MEAN MERIDIONAL EKMAN TRANSPORT 47N 126W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MER.65	-35	-49	-1	-9	-35	-20	-12	-4	-13	-22	17	-17
MER.66	-62	-16	-32	-9	-27	-14	-13	-11	-7	-24	-3	-32
MER.67	-58	-47	-22	-14	-17	-24	-12	-6	-14	-50	-10	-31
MER.68	-32	-14	-19	-52	-22	-27	-20	-11	-19	-27	-22	-3
MER.69	-32	4	-21	-23	-11	-26	-24	-20	-16	-4	-29	-10
MER.70	9	5	-30	-56	-18	-26	-22	-16	-23	-23	-13	-58
MER.71	-62	-77	-49	-21	-48	-17	-18	-11	-9	-24	-34	-73
MER.72	-75	-42	-25	-33	-15	-24	-22	12	-21	-6	1	-14
MER.73	6	15	-31	-25	-17	-27	-20	-26	-6	-31	-49	-19
MER.74	-50	-31	-43	-34	-31	-32	-14	-21	-3	-3	-22	-62
MER.75	-43	34	-18	-31	-25	-43	-26	-24	2	-25	-44	-61
MER.76	-36	-61	-55	-11	-29	-25	-12	-12	-8	-4	4	-28
MER.77	6	-25	-84	-15	-23	-14	-19	-16	-8	-14	-31	-11
MER.78	38	45	-4	-14	-19							

TABLE 29. MONTHLY MEAN ZONAL EKMAN TRANSPORT 47N 126W

YR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
ZON.65	54	11	-15	4	-29	-46	-36	-21	-45	52	86	64
ZON.66	119	70	81	-31	-43	-2	-33	-19	0	17	70	138
ZON.67	57	26	35	-9	-21	-50	-30	-31	-2	72	30	71
ZON.68	105	54	61	-21	-17	-11	-27	-7	-10	72	116	106
ZON.69	52	144	22	69	-10	-31	-42	-13	9	29	67	127
ZON.70	79	41	-7	0	-23	-46	-39	-34	-14	33	59	118
ZON.71	67	18	86	26	-47	-3	-37	-5	-18	10	87	41
ZON.72	26	79	44	10	-24	-28	-41	-43	-19	-29	92	82
ZON.73	108	41	21	-25	-10	-6	-42	-36	3	16	59	117
ZON.74	54	99	76	30	-3	-32	-24	-44	-18	0	58	72
ZON.75	57	92	22	-9	0	-49	-34	-11	-34	61	139	82
ZON.76	78	56	27	15	1	-25	-10	0	-13	8	34	54
ZON.77	50	45	42	29	12	-10	-14	-14	4	54	119	84
ZON.78	97	99	34	19	-5							

