

Second International 'PMOs' Workshop

(23-25 July, 2003)

NATIONAL REPORT OF INDIA

BY

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Pune, India

Venue: IMO, LONDON

OBJECTIVES

- 1. TO TAKE METEOROLOGICAL OBSERVATIONS & TO PROVIDE FORECASTS & OTHER CLIMATOLOGICAL NORMALS FOR THE REGION**
- 2. TO WARN AGAINST SEVERE WEATHER PHENOMENA LIKE TROPICAL CYCLONES, STORM SURGE , GMDSS BULLETINS, METEOROLOGICAL INPUTS DURING SEARCH & RESCUE (GMDSS) AND FOR MPERSS ON HIGH ETC.**
- 3. TO PROVIDE METEOROLOGICAL STATISTICS REQUIRED FOR AGRICULTURE, WATER RESOURCE MANAGEMENT, INDUSTRIES, OIL-EXPLORATION ON HIGH SEAS/ LAND & OTHER NATION- BUILDING ACTIVITIES**
- 4. TO DEVELOP NUMERICAL MODELS FOR PREDICTING LONG RANGE FORECAST FOR INDIAN SOUTH WEST MONSOON & MEDIUM / SHORT RANGE FORECAST MODELS FOR TROPICAL STORMS & OTHER ALLIED DISCIPLINES**
- 5. TO DETECT AND LOCATE EARTHQUAKES & EVALUATION OF SEISMICITY IN DIFFERENT PARTS OF THE COUNTRY FOR DEVELOPMENTS OF VARIOUS PROJECTS**

FUNCTIONS

- RECORDING MET OBSERVATIONS ALL OVER THE COUNTRY & ADJOINING HIGH SEAS
- MAINTAINING OBSERVATORIES & EQUIPPING SHIPS , COLLECTIONS OF DATA FROM SHIPS,AIRCRAFTS & SATELLITES
- PREPARATION OF FORECASTS/WARNINGS FOR OFF-SHORE INDUSTRIES
- USING DELAYED MODE MARINE DATA IN WEEKLY/MONTHLY ANALYSIS TO STUDY FEATURES OF SOUTH-WEST MONSOON
- MAINTAINING CLIMATOLOGICAL DATA BANK AT PUNE FOR MANY PURPOSES: DESIGN OF SHIP BUILDING, STRUCTURES AT SEA FOR DEVELOPMENT OF PORTS, DRILLING STRUCTURES FOR OIL & NATURAL GAS COMMISSION ETC,
- MAINTAINING TELECOMMUNICATION LINKS WITHIN THE COUNTRY & WITH FOREIGN COUNTRIES, FOR COLLECTION& DISSEMINATION OF MET OBSERVATIONS, ANALYSIS & FORECAST ON GLOBAL SCALE
- SCRUTINISING, PROCESSING MET OBSERVATIONS, FOR ASSIMILATION INTO CLIMATOLOGICAL ARCHIVES
- DESIGN, DEVELOPMENT ,MANUFACTURING & MAINTENANCE OF METEOROLOGICAL EQUIPMENTS & PROCUREMENT OF EQUIPMENTS FOR MODERNISATION
- PROVIDE TRAINING FACILITIES TO ALL BRANCHES OF METEOROLOGY , SEISMOLOGY, TELECOMMUNICATION AND INSTRUMENTATION
- CONDUCT RESEARCH IN THEORETICAL & APPLIED METEOROLOGY
- NATIONAL / INTERNATIONAL COOPERATION IN METEOROLOGY & in seismology

PORT METEOROLOGICAL OFFICES IN INDIA

(COASTLINE MORE THAN 6000 Kms)

S.N.	PMO LOCATED AT	Along coast	Working Hours (sat,sun off)
1	Mumbai	WEST	0930-1800
2	Goa (Mormugao)	WEST	0930-1800
3	Kochi	WEST	0900-1730
4	Chennai	EAST	0915-1745
5	Visakhap-atanam	EAST	1000-1700
6	Kolkata	EAST	0930-1800

Map. A: BOUNDARIES OF AREAS USED IN WEATHER BULLETINS
FOR MERCHANT SHIPPING & COASTAL WEATHER

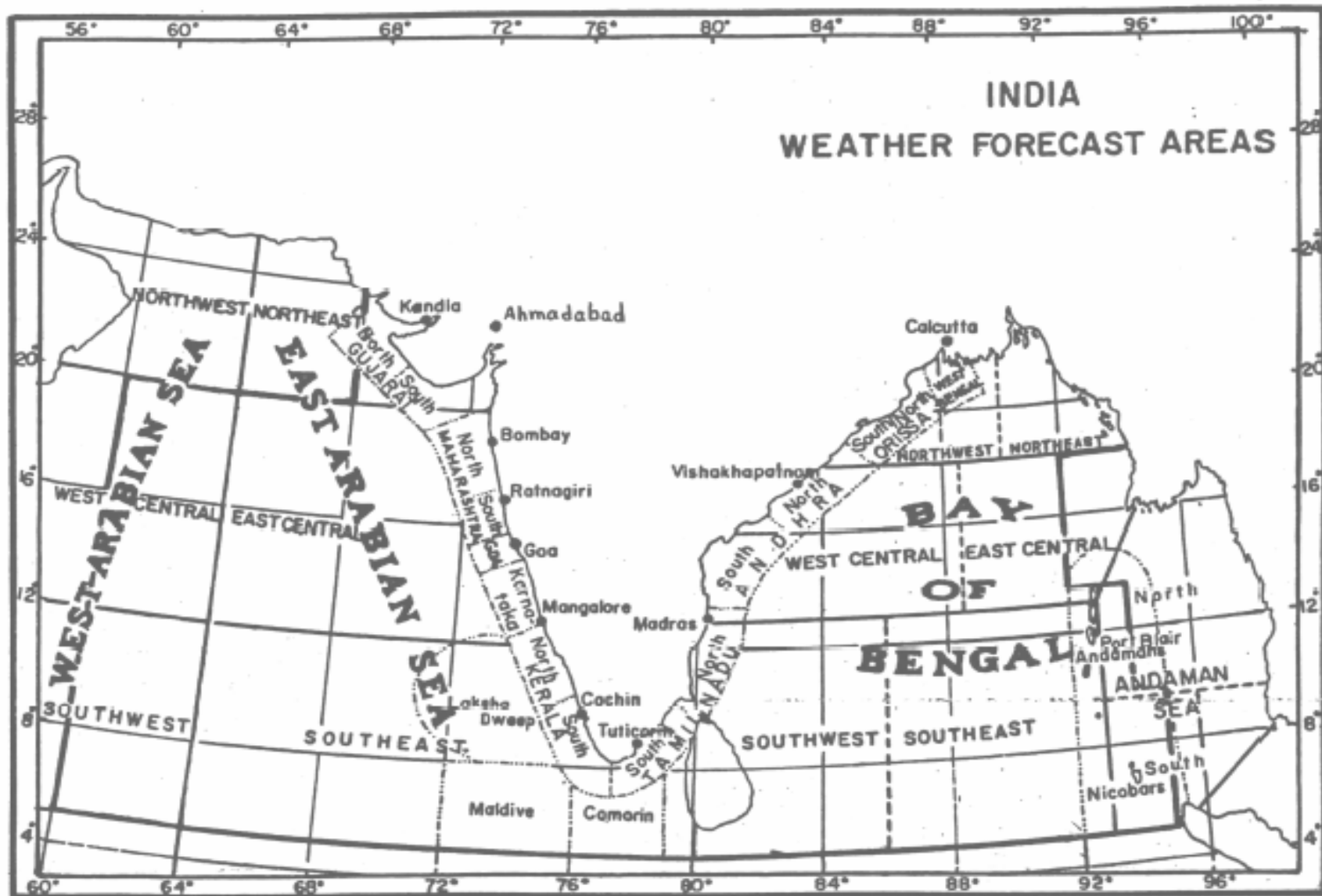


FIG. I

APPENDIX – II

**LIST OF PORTS UNDER THE DIFFERENT SYSTEMS AND
ACWCs/ CWCs FROM WHICH THEY RECEIVE
PORT WARNINGS
(Vide Para 6.3)**

ACWC/CWC	Extended Ports (District)	General Port (District)	Brief Port (District)	Ports without signals
ACWC Kolkata	1. Sagar Island (South 24 Parganas)	1. Kolkata (Kolkata) 2. Budge Budge (South 24 Parganas) 3. Diamond Harbour (-do-) 4. Port Blair (A & N Admn.)	-	-
CWC Bhubaneswar	-	1. Paradeep (Jagatsinghpur) 2. Chatrapur (Ganjam)	1. Chandbali (Bhadrak) 2. Puri (Puri)	-
CWC Vishakhapatnam	1. Kakinada (East Godavari)	1. Vishakhapatnam (Vishakhapatnam) 2. Machilipatnam (Krishna) 3. Nizampatnam (Guntur) 4. Krishnapatnam (Nellore)	1. Kalingapatnam (Srikakulam) 2. Bhimuniapatnam (Vishakhapatnam) 3. Vadarevu (Prakasam)	-
ACWC Chennai	1. Chennai (Chennai) 2. Cuddalore (Cuddalore) 3. Nagapattinam (Nagapattinam)	1. Pamban (Ramanathapuram) 2. Tuticorin (Tuticorin) 3. Pondicherry (Pondicherry) 4. Alapuzha (Alapuzha) 5. Kochi (Emakulam) 6. Baypore (Kozhikode) 7. Kozhikode (-do-) 8. Mangalore (Dakshin Kannada) 9. Panambur (Dakshin Kannada) 10. Karwar (Uttar Kannada)	1. Minicoy (Lakshadweep) 2. Kolachel (Kanyakumari) 3. Rameswaram (Ramanathapuram) 4. Thiruvananthapuram (do) 5. Nee Port (Kollam) 6. Ponnai (Malapuram) 7. Thalaseery (Kannur) 8. Kannur (do) 9. Azhikkal (Kannur) 10. Kasargod (do) 11. Honavar (Uttar Kannada) 12. Bhatkal (Uttar Kannada) 13. Gangoli (Udupi) 14. Malpe (Udupi)	1. Murdeshwar 2. Kumta 3. Tadri (Gokarn) 4. Belekeri (Aversa) (All Uttar Kannada)

ACWC Mumbai	-	<ol style="list-style-type: none"> 1. Mumbai 2. Mormugao (Goa) 3. J.N.P.T. (Raigad) 	<ol style="list-style-type: none"> 1. Dahanu (Thane) 2. Tarapur (Thane) 3. Nawarur (Thane) 4. Satpati (Thane) 5. Kelva Mahim (Thane) 6. Dantiware (Palghar) 7. Bassein (Vasai) 8. Utan (Bhyandar) 9. Kalyan (Thane) 10. Thane (Thane) 11. Manori (Malad) 12. Versova (Andheri) 13. Bandra (Mumbai) 13. Trombay (Devnar) 14. Mora (Uran) (Raigad) 15. Karanja (Raigad) 16. Mandwa (Raigad) 17. Thal (Raigad) 18. Revas (Raigad) 19. Alibag (Raigad) 20. Revdanda (do) 21. Murud (Janjira) 22. Rajapuri (Raigad) 23. Shrivardhan (Raigad) 23. Bankot (Ratnagiri) 24. Harnai (Ratnagiri) 25. Dabhol (Ratnagiri) 26. Jaigad (Ratnagiri) 27. Varoda (Malgund) 28. Ratnagiri (Ratnagiri) 29. Pumagad (Ratnagiri) 30. Jaitapur (Sindhudurg) 31. Devgad (Sindhudurg) 33. Achra (Sindhudurg) 34. Malvan (Sindhudurg) 35. Nivti (Sindhudurg) 36. Vengurla (Sindhudurg) 37. Kiranpani (Aronda) 38. Redi (Sindhudurg) 39. Panjim (Goa) 	<ol style="list-style-type: none"> 1. Ulwa Belapur (Thane)
CWC Ahmedabad	-	<ol style="list-style-type: none"> 1. Kutch Mandvi (Kutch) 2. New Kandla (Kutch) 3. Navlakhi (Rajkot) 4. Bedi Rozi Peir (Jamnagar) 5. Okha (Jamnagar) 6. Porbandar (Porbandar) 7. Veraval (Junagarh) 8. Bhavnagar (Bhavnagar) 	<ol style="list-style-type: none"> 1. Jakhav (NSPO) 2. Mundra (Kutch) 3. Dwarka (Rupen) (NSPO) 4. Dahej (Bharuch) 5. Bharuch (NSPO) 	<ol style="list-style-type: none"> 1. Koteswar (Kutch) 2. Pindhara (Jamnagar) 3. Onjal (Navsari) 4. Wansi Borsi (Surat) 5. Umarsadi (Surat) 6. Kolak (Suart) 7. Valsad (Valsad) 8. Umbergaon (Valsad)

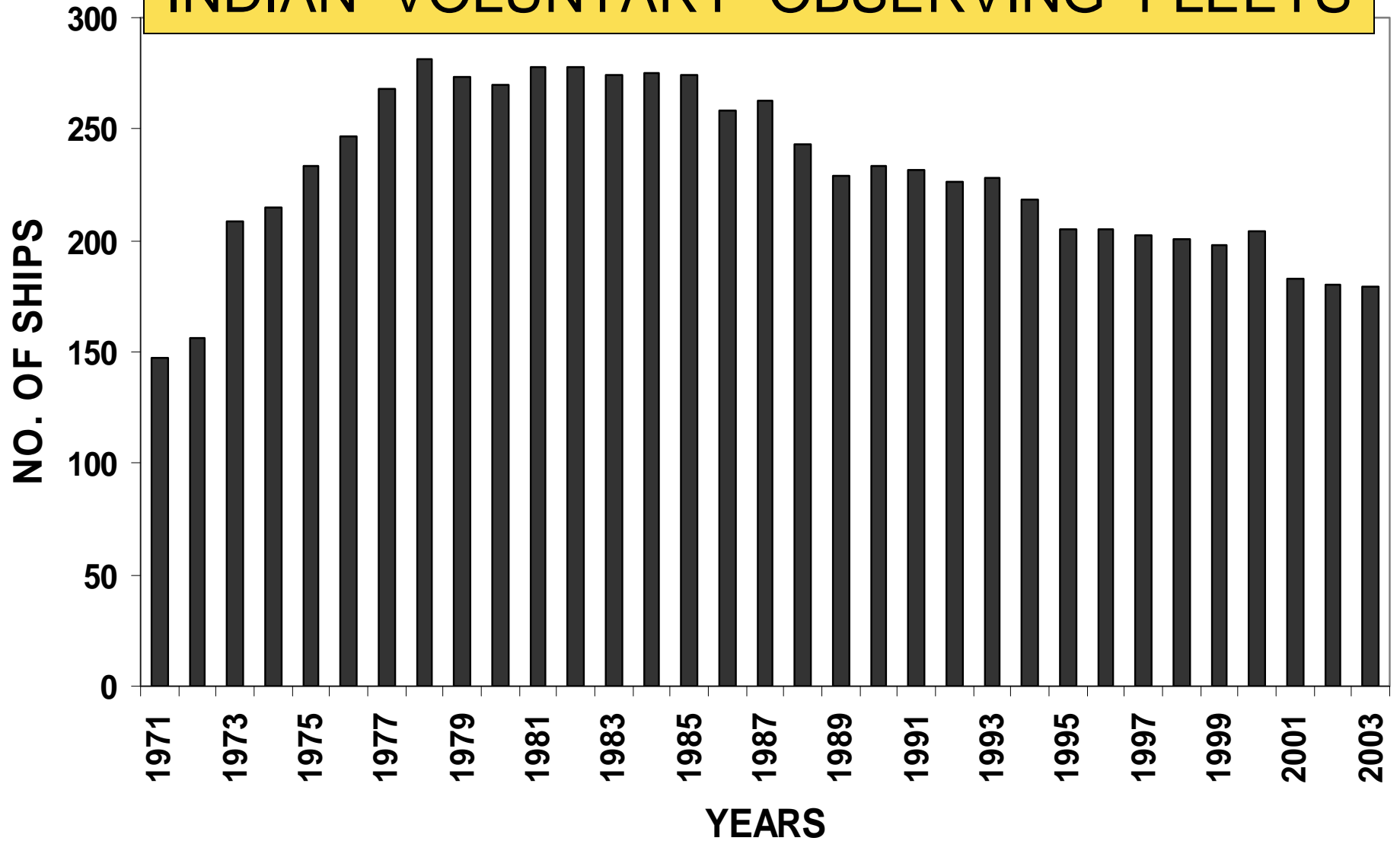
General Ports

Ports without signal

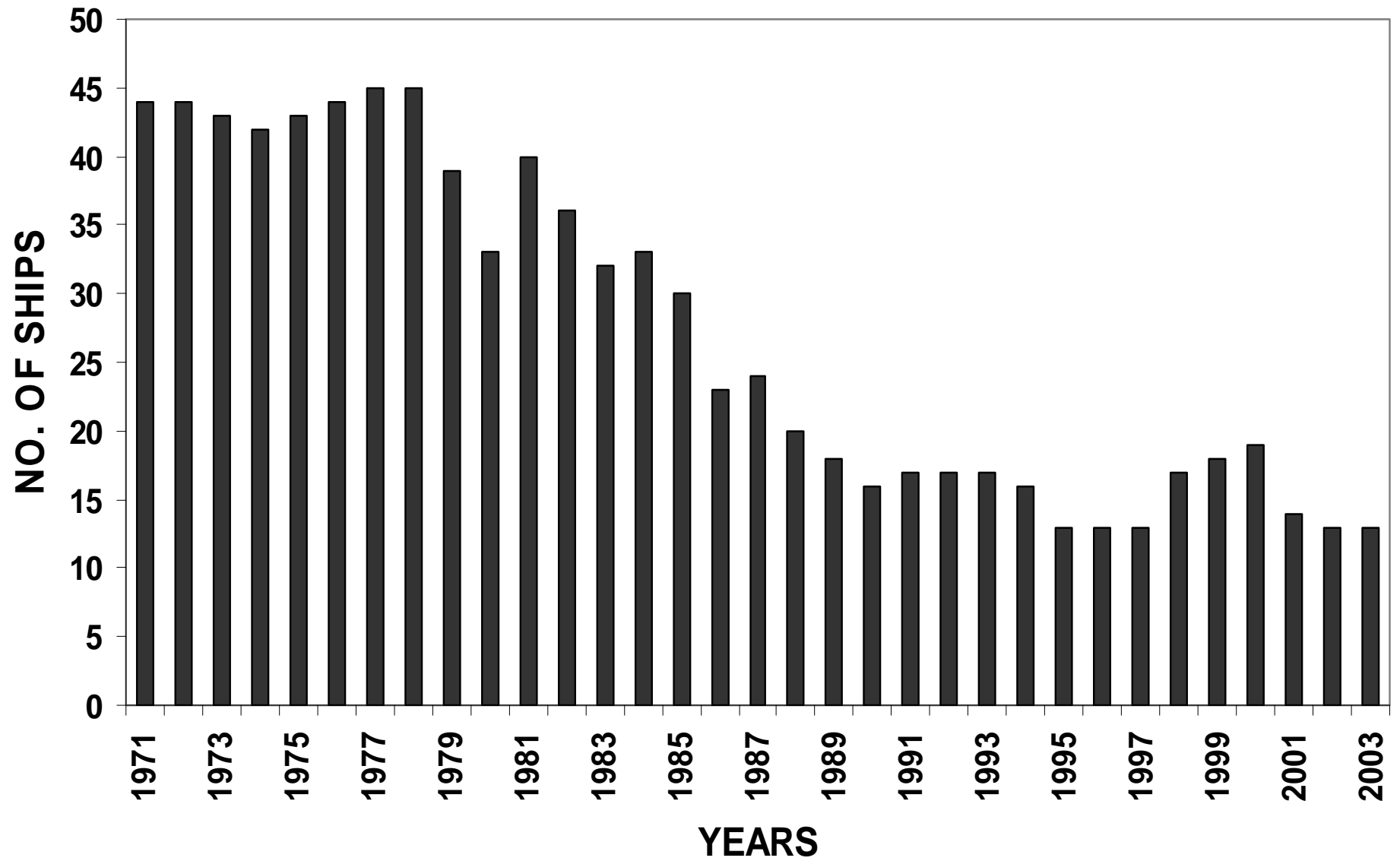
	<p>9.Magdalla (Surat)</p> <p>10.Alang (Bhavnagar)</p> <p>11.Jafrabad (Amreli)</p> <p>12.Mangrol (Junagarh)</p> <p>13.Sikka (Jamnagar)</p> <p>14.Salaya (Jamnagar)</p>		<p>9. Maroli (Surat)</p> <p>10.Billi-mora (Navsari)</p> <p>11.Kham-bhat (Anand)</p> <p>12.Ghogha (Bhavnagar)</p> <p>13.Mahu-va (Amreli)</p> <p>14.Rajpara (Amreli)</p> <p>15.Madhvad (Junagarh)</p> <p>16.Kotada (Junagarh)</p> <p>17.Mul Dwarka (Junagarh)</p> <p>18.Nav Bandar (Junagarh)</p> <p>19.Beyt (Porbandar)</p> <p>20.Iodia (Jamnagar)</p> <p>21.Sach-ana (Jamnagar)</p>
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IVOF SHIPS

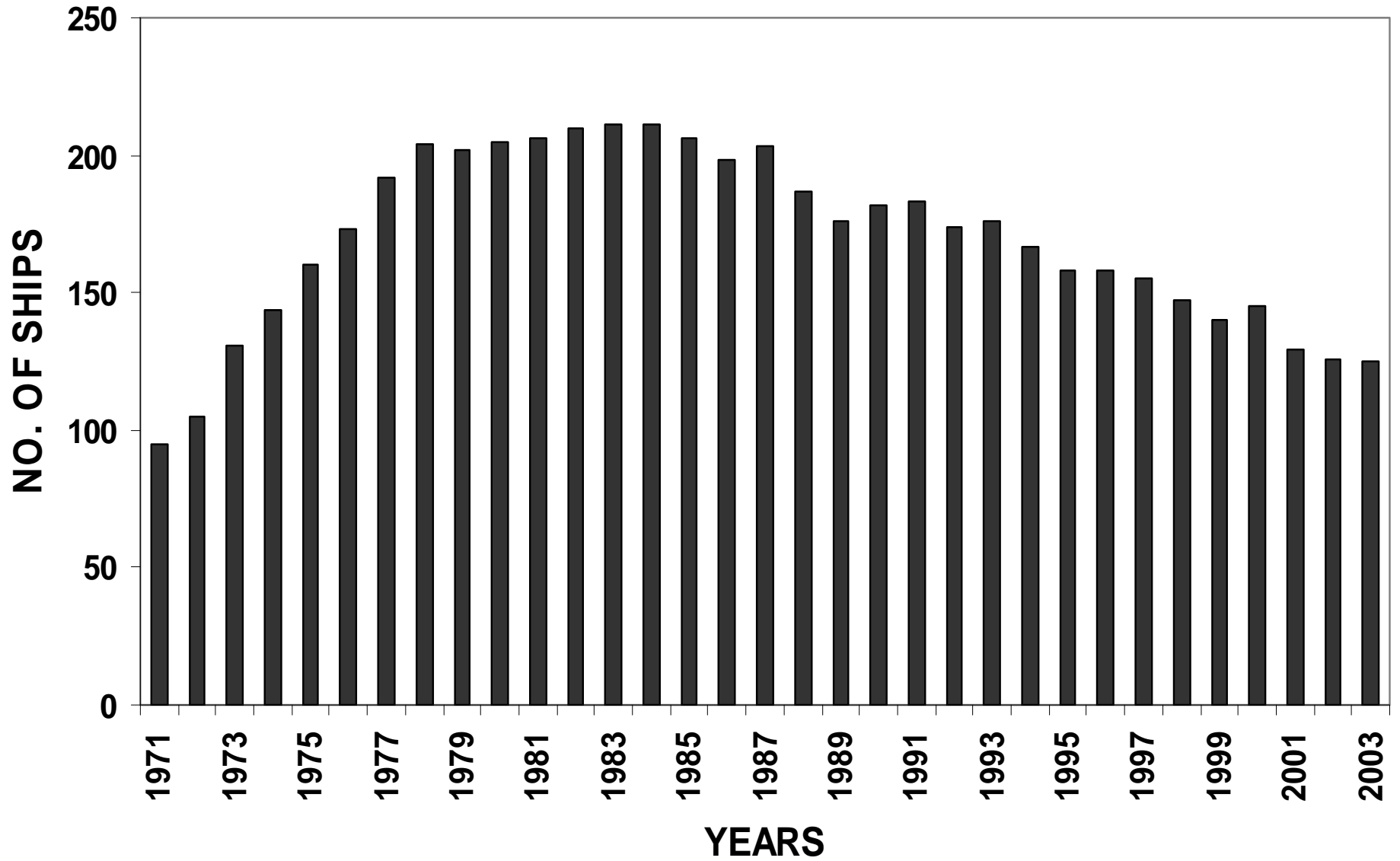
INDIAN VOLUNTARY OBSERVING FLEETS



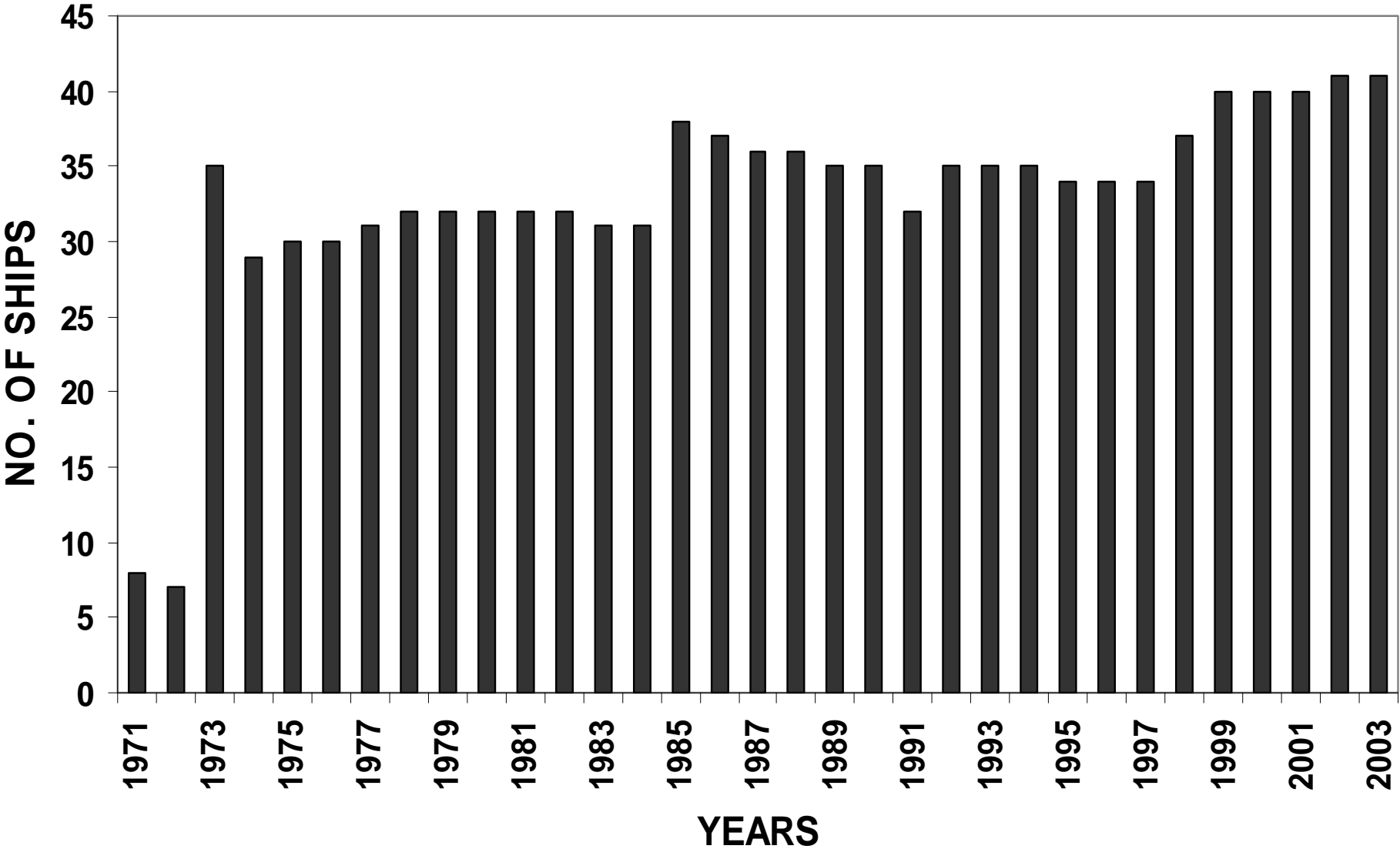
SELECTED SHIPS



SUPPLEMENTARY SHIPS



AUXILLIARY SHIPS



DATA MANAGEMENT ARRANGEMENT

- Recording of marine met observations on boardship by all **IVOF** ships in special met registers (logbooks)
- Collection of logbooks by 6 Port Meteorological Officers from ships recruited by its PMOs.
- Manual scrutiny of logbooks before transfer of observations on magnetic tape in a standard internationally agreed format
- Minimum Quality Control Check (v-2) of observations stored on magnetic tape as well as of those observations received on floppies/diskette.
- Supply of marine data to the GCCs quarterly, after application of quality control check.

COLLECTION OF MARINE DATA BY INDIA (a)

YR	J-F	M-M	J-S	O-D	TOTAL
1951	3745	6115	7729	6274	23863
1952	3359	4999	5640	4526	18524
1953	2248	5241	7532	5724	20745
1954	3292	5930	6955	3991	20168
1955	5125	6748	13546	5385	30804
1956	3366	4673	7050	5115	20204
1957	2747	4660	8700	4816	20923
1958	3159	5698	8666	5152	22675
1959	8143	11635	15494	11123	46395
1960	7351	11869	14605	11672	45497
1961	9435	15361	20548	14778	60122
1962	17738	30632	36196	22633	107199
1963	13160	23091	29460	23273	88948

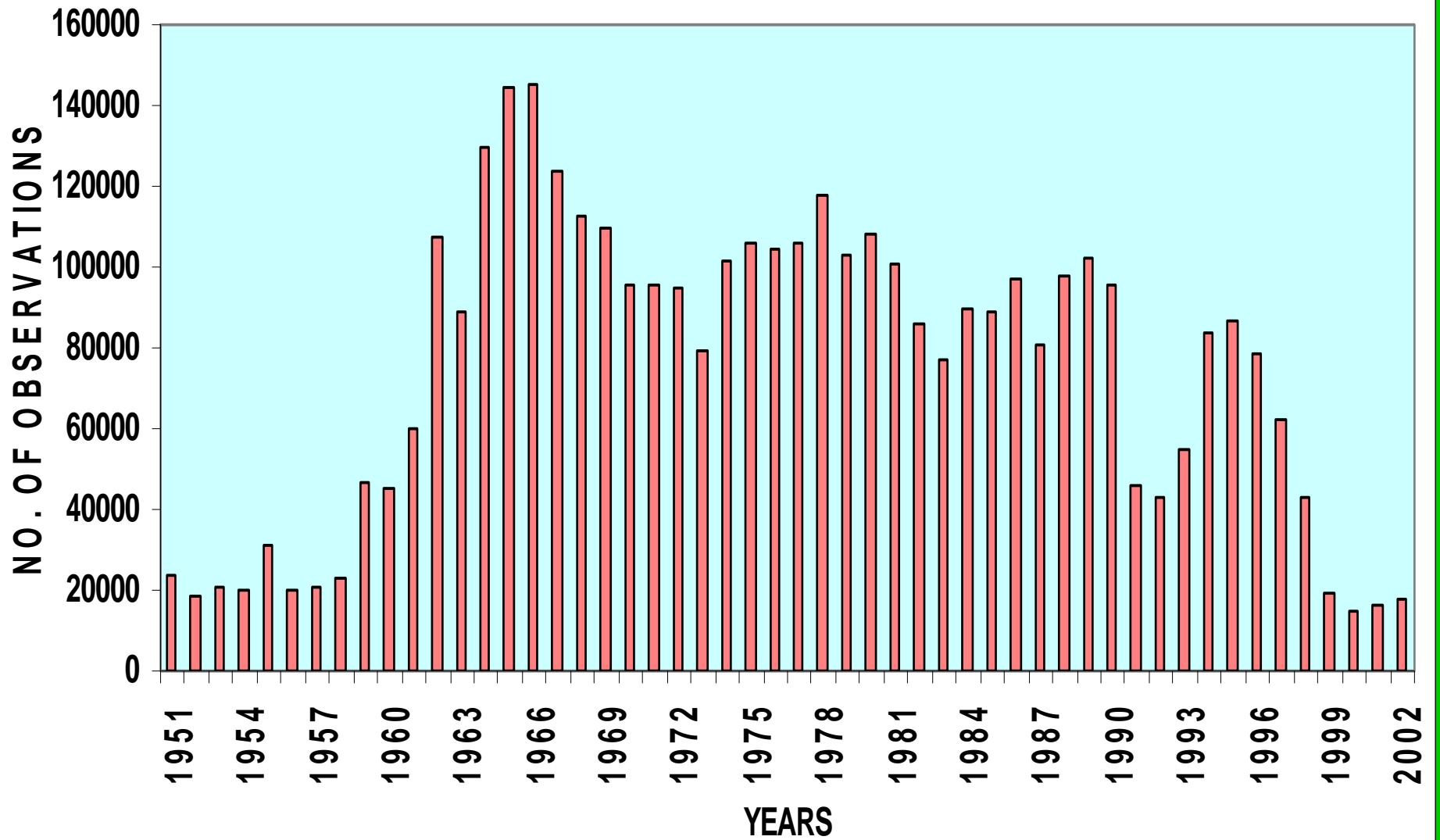
YR	J-F	M-M	J-S	O-D	TOT
1964	21244	33108	44818	30498	129668
1965	22009	36439	49172	37050	144670
1966	21185	39520	48841	35688	145234
1967	24599	38222	35361	25593	123775
1968	16814	30415	37491	27867	112587
1969	18694	26062	37097	27947	109800
1970	14941	23139	33550	23866	95496
1971	15164	24251	30982	25384	95781
1972	15299	23470	32121	23723	94613
1973	12461	18726	28285	19673	79145
1974	17241	25600	34667	23607	101115
1975	16112	25342	36386	28248	106088

SHIPS' OBSERVATION SEASONWISE & ANNUAL

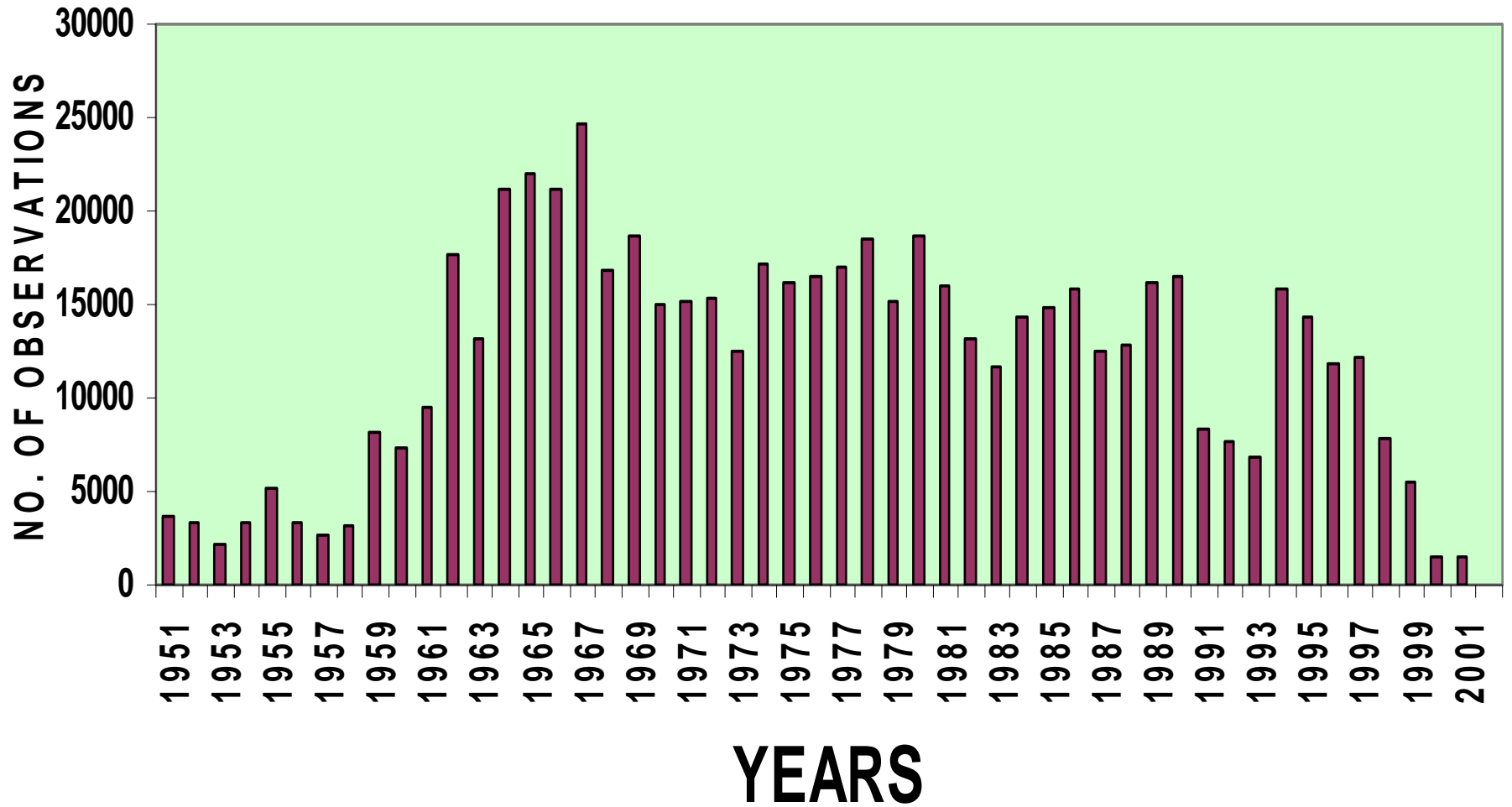
YR	J-F	M -M	J- S	O-D	TOTAL
1976	16582	28274	34068	25799	104723
1977	17031	24626	35962	28009	105628
1978	18452	30381	41261	27762	117856
1979	15218	27109	33383	27616	103326
1980	18697	27918	35864	25652	108131
1981	15967	27396	35211	22159	100673
1982	13208	22767	29039	20833	85847
1983	11662	17557	26178	21496	76893
1984	14399	22927	29918	22735	89979
1985	14791	23509	28786	21475	88561
1986	15797	24219	33304	23542	96862
1987	12476	20710	27541	20369	81096

YR	J-F	M-M	J- S	O-D	T
1988	12855	20666	35592	28634	97747
1989	16178	25802	34742	25627	102349
1990	16583	23106	31012	24846	95547
1991	8392	12211	15160	9987	45750
1992	7614	9130	14205	11879	42828
1993	6834	10954	18258	18928	54974
1994	15873	22334	25577	20159	83943
1995	14284	21387	30822	20465	86958
1996	11762	19844	27847	19254	78707
1997	12189	17336	20216	12275	62016
1998	7886	12474	13036	9649	43045
1999	5560	8267	4756	527	19110
2000	1456	1952	6032	5248	14688
2001	1520	5312	4608	4752	16192
2002					17718

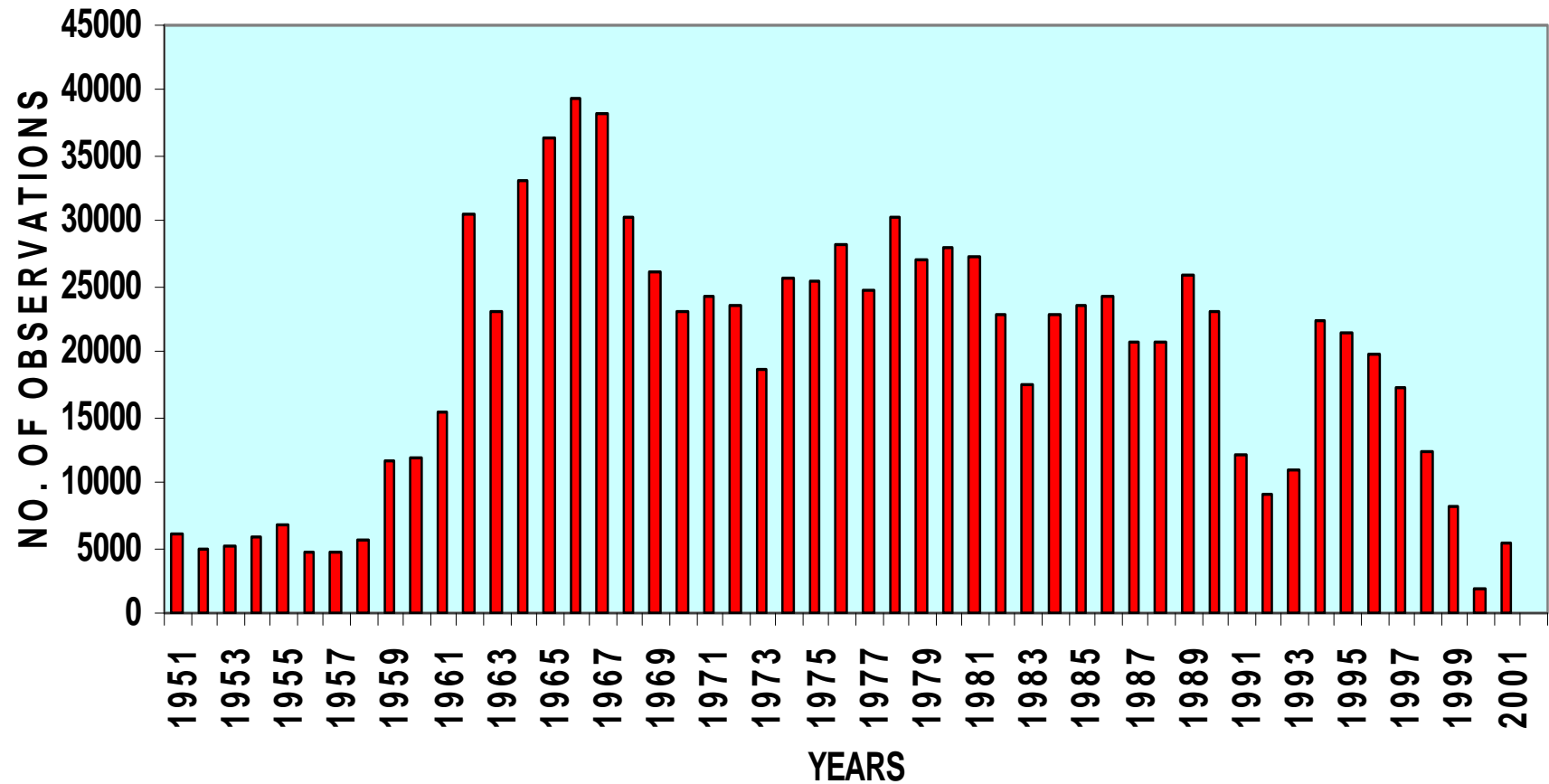
NO. OF OBSERVATIONS RECORDED BY SHIPS YEARWISE



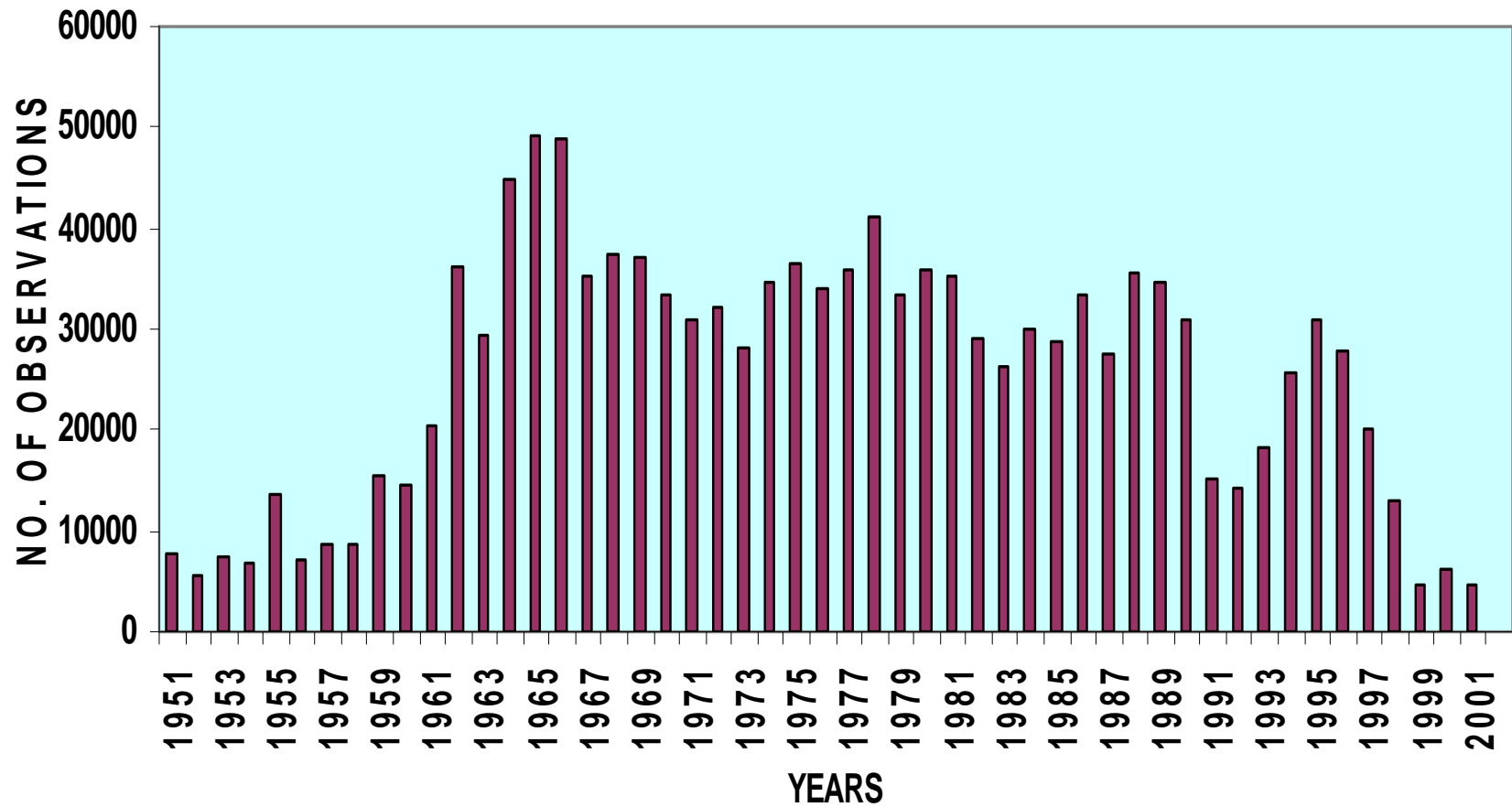
NO. OF OBSERVATIONS IN WINTER SEASON (JAN-FEB)



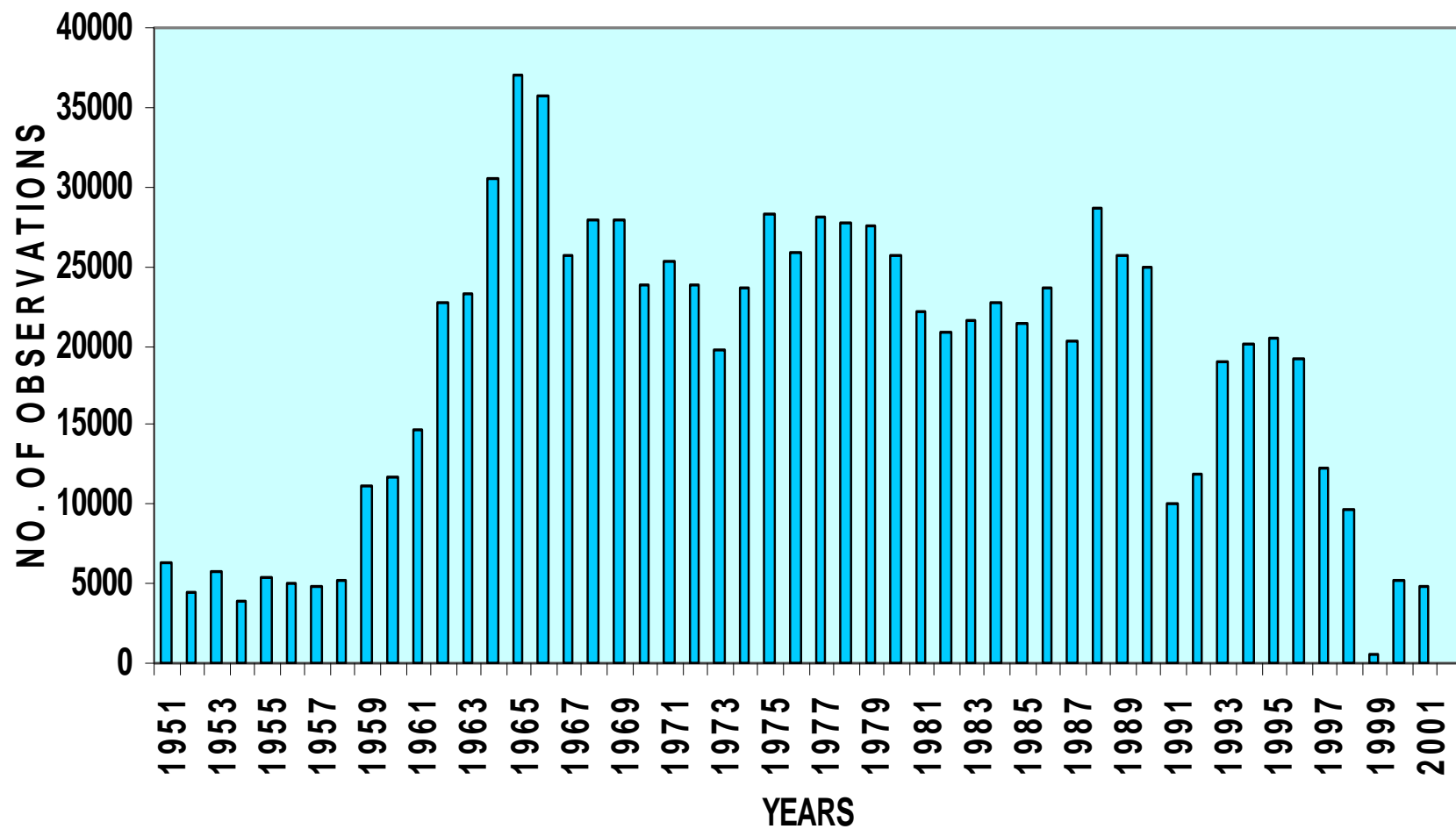
NO. OF OBSERVATIONS IN PREMONSOON SEASON (MAR-MAY)



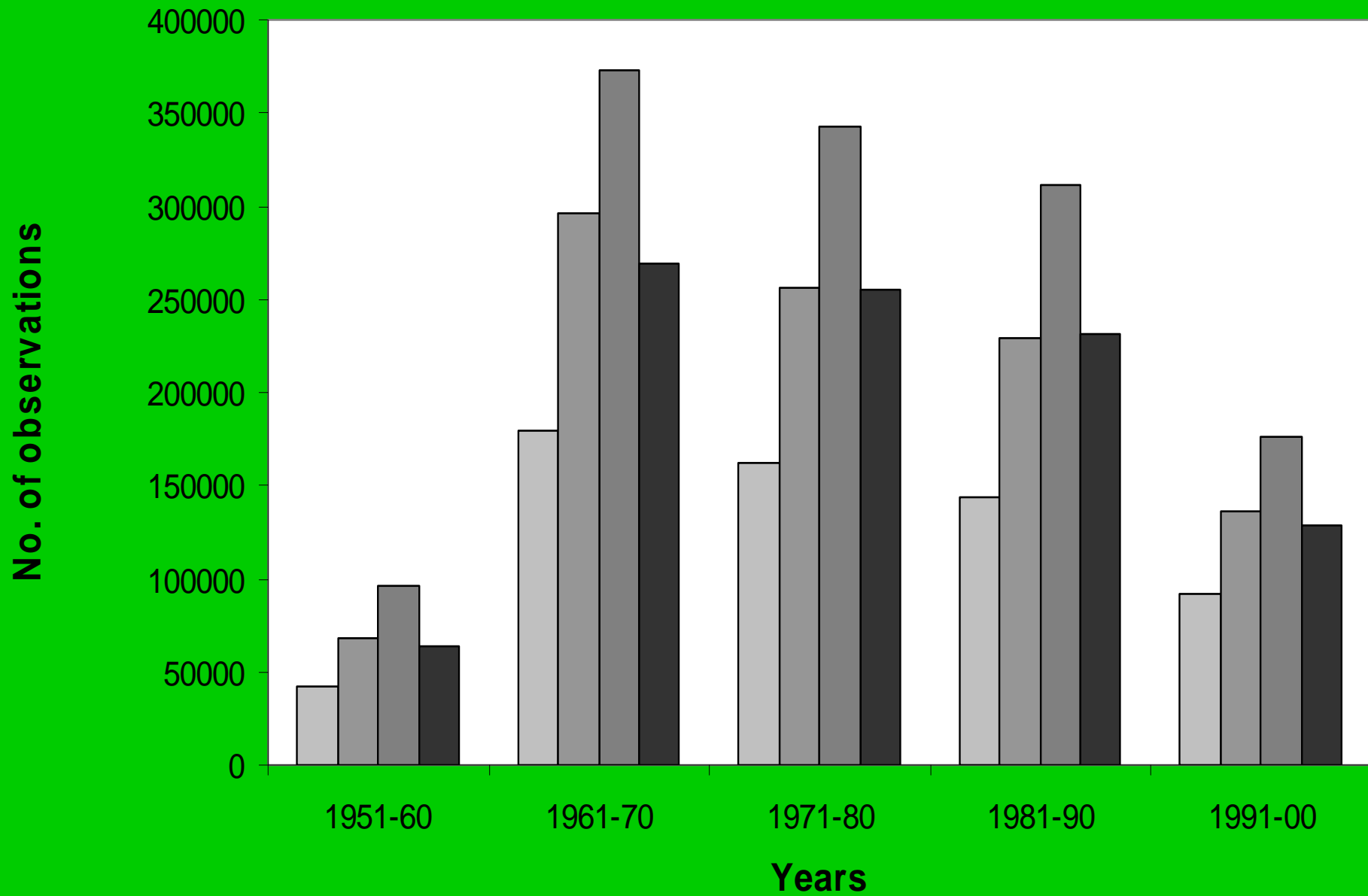
NO. OF OBSERVATIONS IN SOUTH-WEST MONSOON SEASON (JUN-SEP)



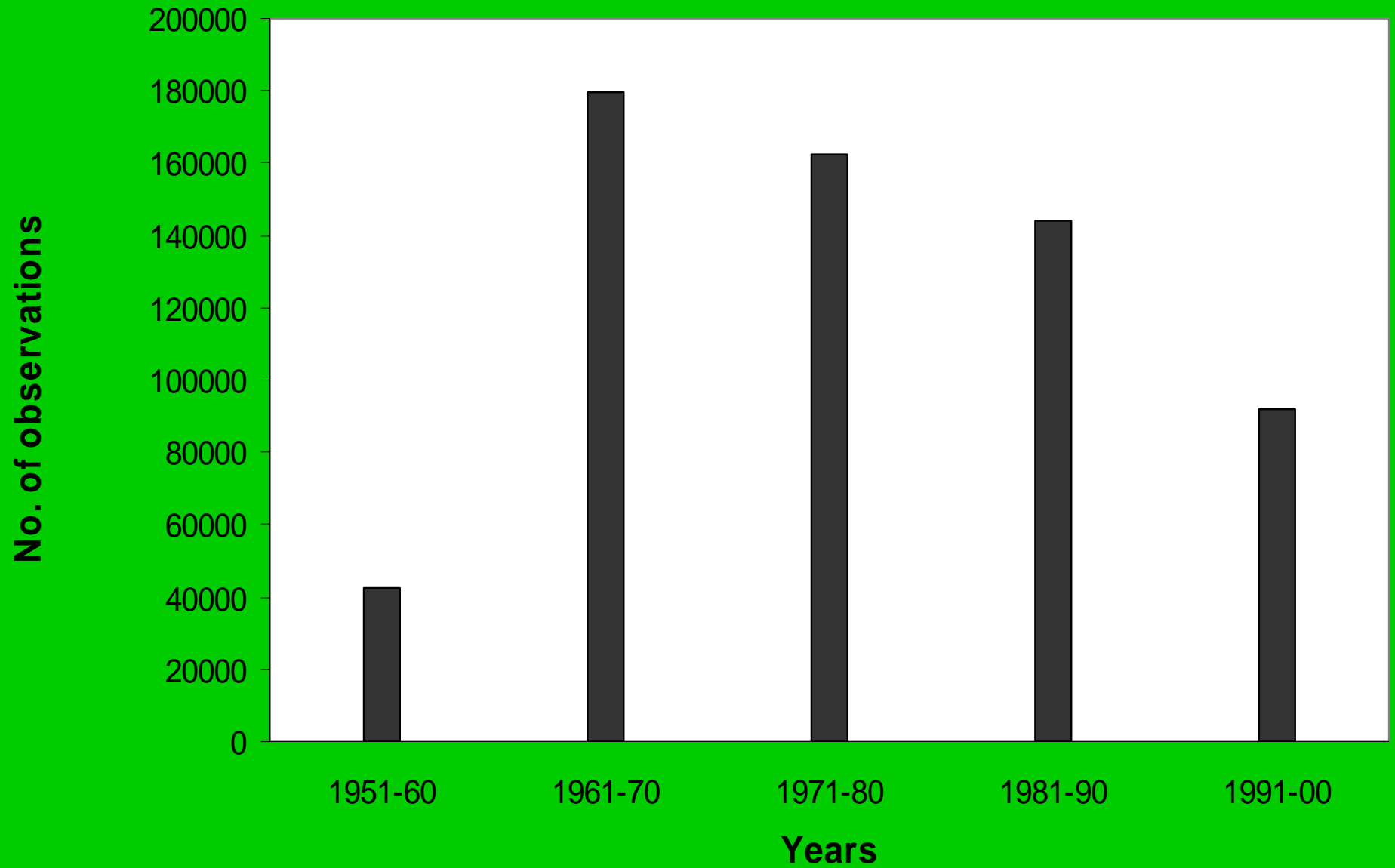
NO. OF OBSERVATIONS IN POST MONSOON SEASON (OCT-DEC)



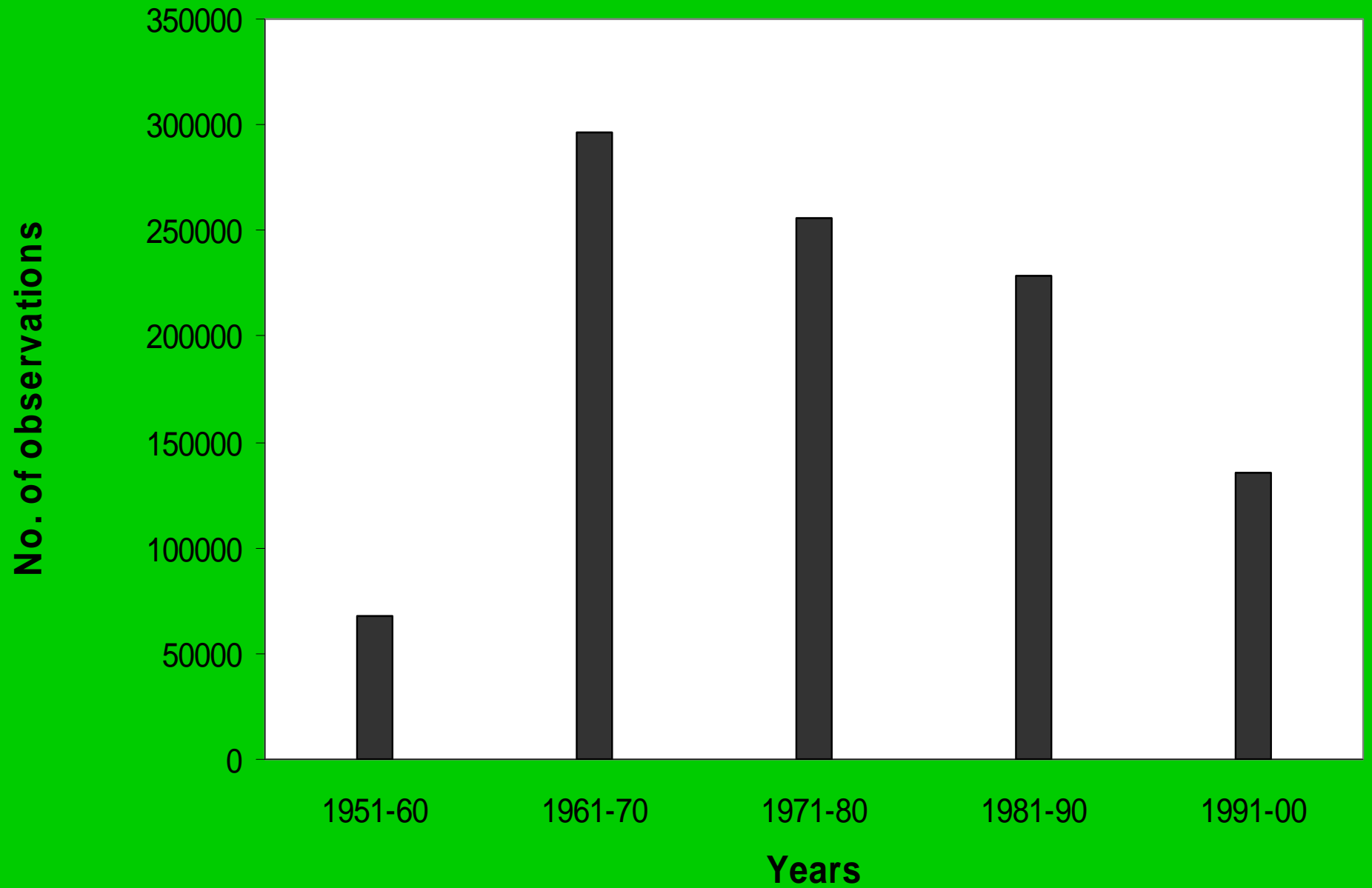
Decadal data of all the seasons



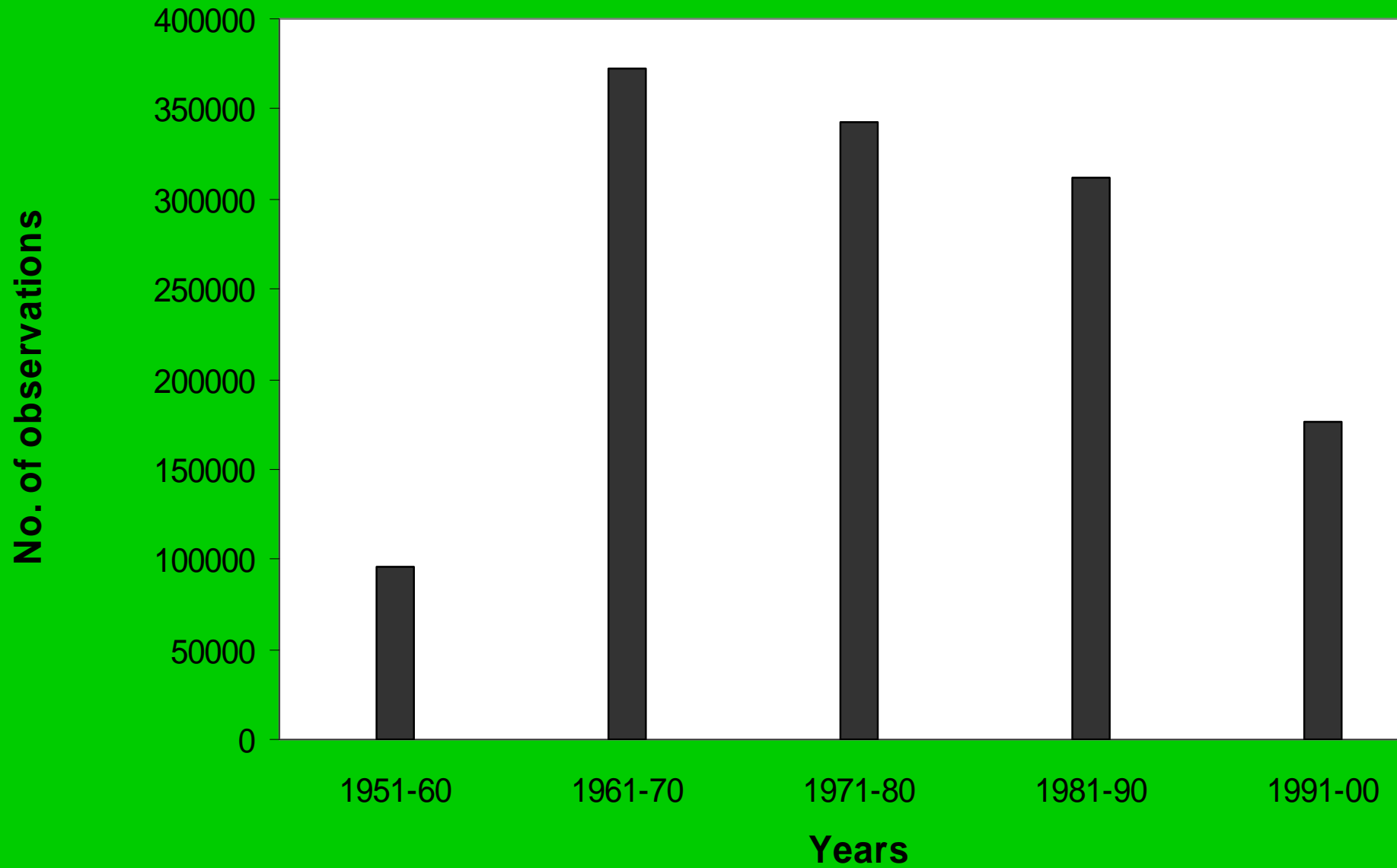
Decadal data of winter season



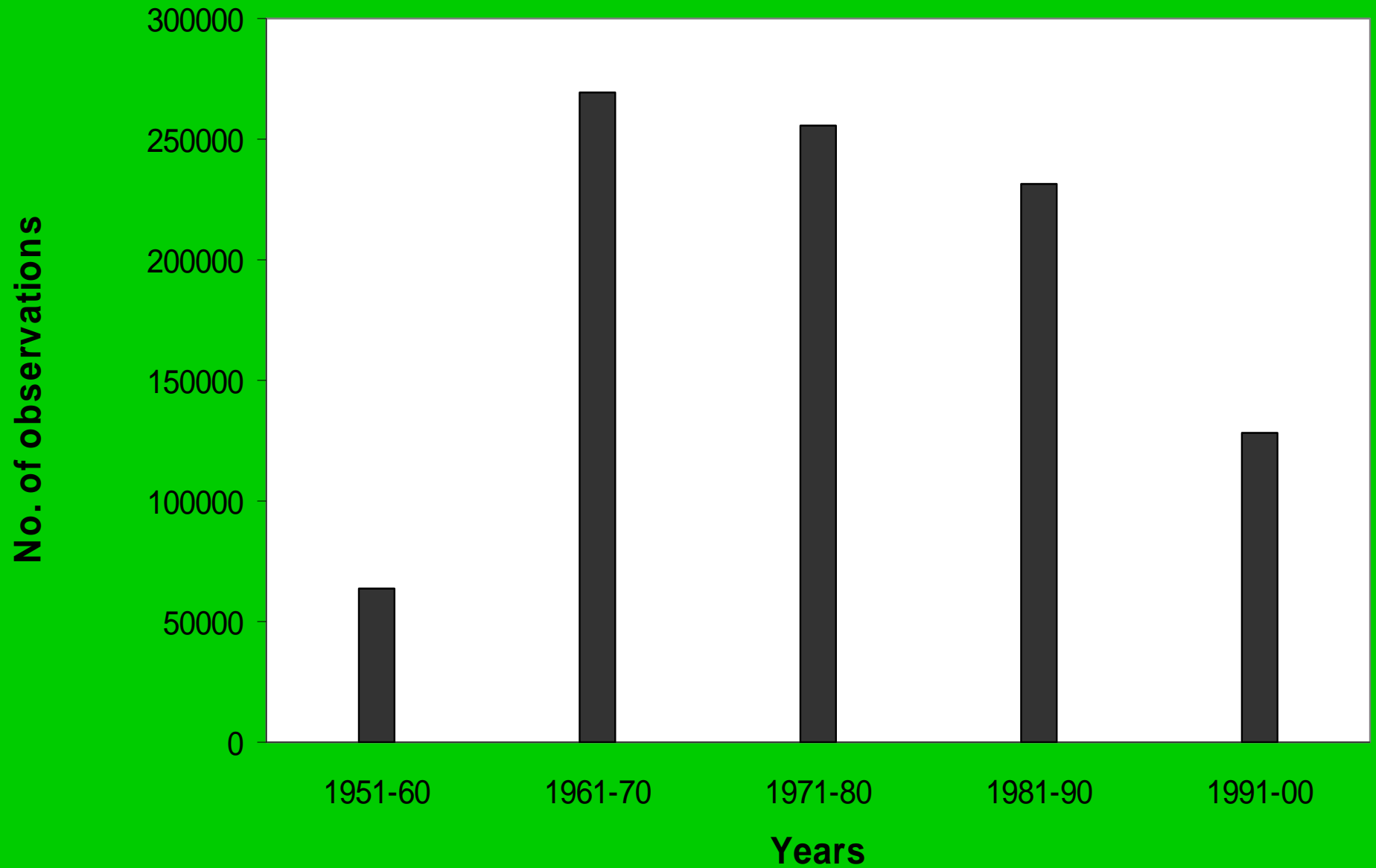
Decadal data of pre-monsoon season



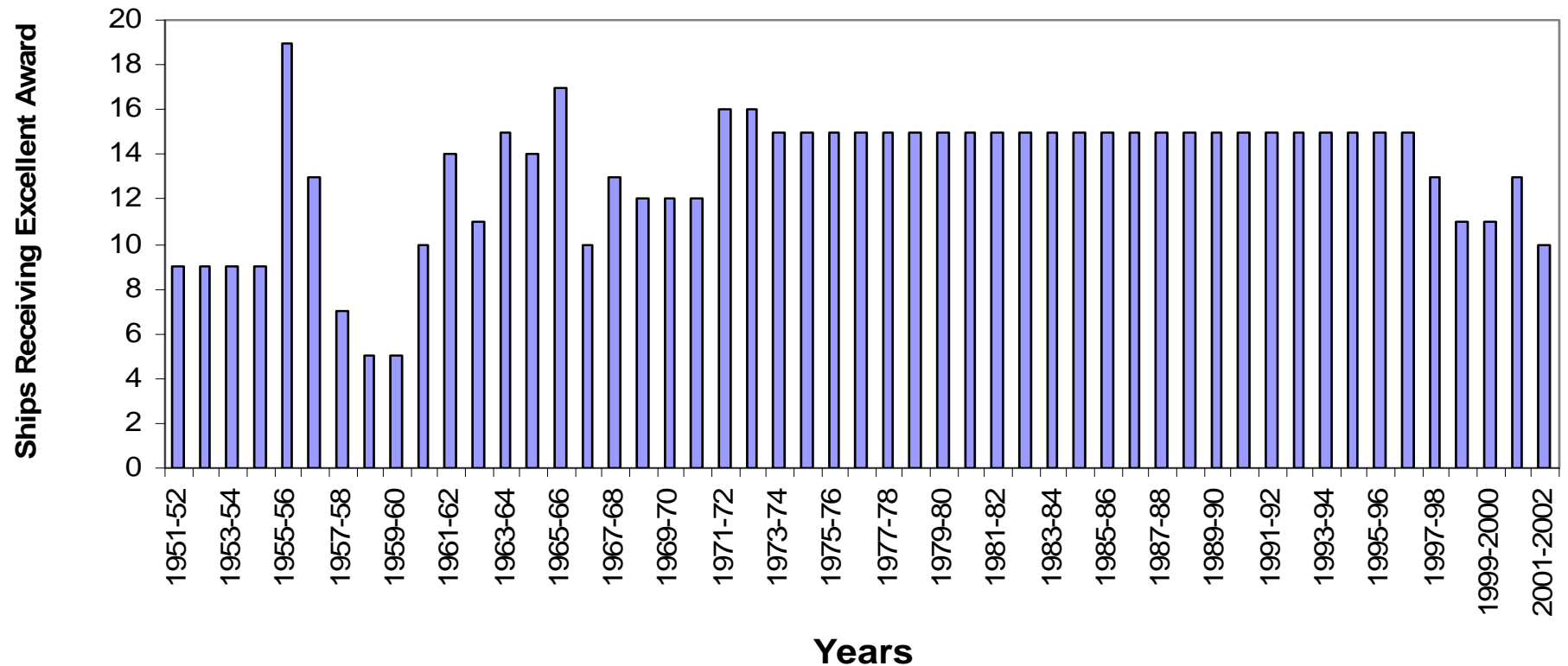
Decadal data of Monsoon season



Decadal data of post-monsoon season



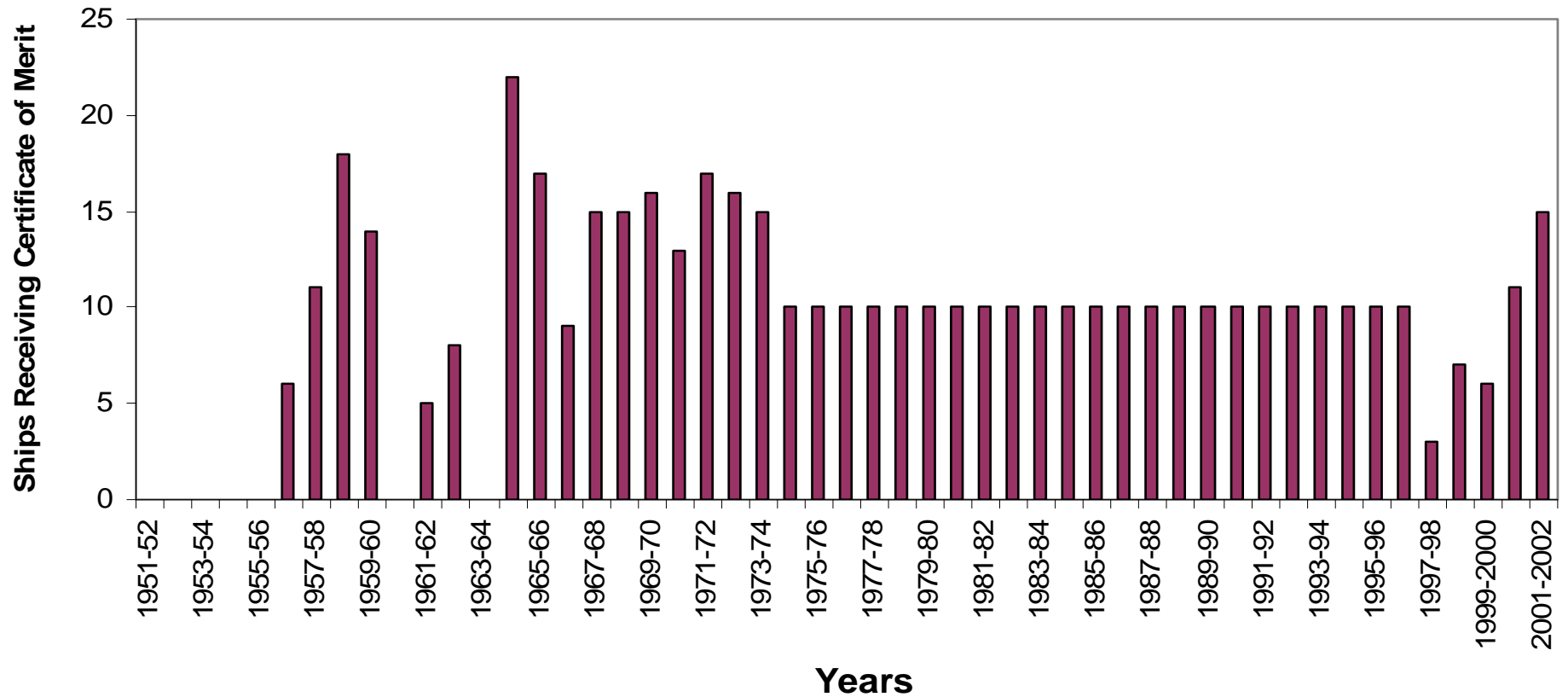
Excellent Award to 'IVOF' Ships



EXCELLENT AWARD (Every year on 5th April)

- **IN THE FORM OF BOOKS ON LITERATURE/SCIENCE/HEALTH/YOGAs etc WORTH INR 30000 + EXCELLENT AWARD CERTIFICATES**
- **CASH PRIZES TO FIRST THREE SHIPs' CAPTAIN FOR THEIR BEST PERFORMANCES INCLUDING TRANSMISSION OF VALUABLE OBSERVATIONS DURING TROPICAL STORMs' PERIOD OVER ARABIAN SEA & BAY OF BENGAL.**

IMD Award of 'Certificate of Merit' to 'IVOF' Ships



CERTIFICATE OF MERIT (Every year on 5th April) :

VOSCLim SHIPS OF INDIA

Ship Name	Call Sign	Date Recruited	Ship Name	Call Sign	Date Recruited
1. M.T. A.B. Tarapore	VWXG	16-10-2000	11. M.T.Major Shaitan Singh	VWWK	16-10-2000
2.M.T. ANNAPURNA	VTXT	16-10-2000	12. M.V. Nancowry	VTXB	16-10-2000
3. M.T. B R Ambedkar	ATJX	16-10-2000	13. M.T. Nanga Parbat	VTXF	16-10-2000
4. M.T. Chatrapati Shivaji	ATKE	16-10-2000	14. M.V. Patliputra	VVKK	16-10-2000
5. M.V. Harshavardhan	ATIU	16-10-2000	15. M.V. Rajiv Gandhi	VVGG	16-10-2000
6 .M.V. Hardwar	VVJV	16-10-2000	16. M.T. Sabrimala	VTXK	16-10-2000
7. M.T. Havildar Abdul Hamid	VWWY	16-10-2000	17. M.V Sagar Kanya	VTJR	16-10-2000
8. M.V. Kanpur	VVGQ	16-10-2000	18. M.T Satyamurti	ATJW	16-10-2000
9. M.V. Lok Pratima	VTCN	16-10-2000	19. M.V. S/o Tripura	ATQQ	16-10-2000
10. M.T.C.H.M. Piru Singh	VWNS	16-10-2000	20. M.T. Tirumalai	VTXG	16-10-2000

INSTRUMENTATION

- 16 VOS HAVE BEEN ALREADY EQUIPPED WITH AUTOMATION OF OBSERVATIONS (TURBOWIN)
- WE HAVE PLANNED TO IMPLIMENT AUTOMATION OF OBSERVATION IN A PHASED MANNER
- THE NATIONAL METEOROLOGICAL SERVICE IS PRESENTLY RELUCTANCE TO INVEST IN 'AUTOMATED SHIPBOARD SYSTEMS' DUE TO LIMITED RESOURCES & HIGH PRIORITY ELSEWHERE.

R & D Programme and Capacity Building

- *NUMERICAL / STATISTICAL / SYNOPTICAL MODELLING FOR THE LONG RANGE FORECAST OF SOUTH-WEST MONSOON SEASON RAINFALL FOR INDIA & ITS METEOROLOGICAL SUB DIVISIONS INDIVIDUAL*
- *STUDIES TO MONITOR CLIMATE CHANGE IN THE REGION*
- *Organisation of Brain Storm Session / Seminar /workshop and Refresher Courses from time to time to upgrade knowledge of officers of IMD & SAARC COUNTRIES*

BY IMD & OTHER RESEARCH INSTITUTIONS / UNIVERSITIES IN INDIA

Marine Forecasting Organisations

<p>Cyclone Warning centres (6)</p>	<p>Kolkata, Mumbai, Chennai, Ahmedabad, Bhubaneswar, Visakhapatnam</p>	<p>Forecasts for Bay of Bengal, Arabian sea, coastal forecasts, cyclone warnings, port warnings</p>
<p>Cyclone warning centres</p>	<p>Mumbai, Kolkata, Indian Ocean & Southern Hemisphere Analysis Centre (INOSHAC) Pune</p>	<p>Fleet forecast for Indian Navy</p>
<p>GMDSS ACWC Mumbai, Kolkata, INOSHAC Pune</p>	<p>Bulletins twice a Day Frequencies increases to four during Rropical storm period</p>	<p>All ships</p>

Periodicals Brought out by IMD

SN	TITLE	ISSUED BY
1	MAUSAM (Quarterly)	DGM, New Delhi
2	Indian Daily Weather Report (IDWR)	DDGM(WF) Pune
3	Regional Daily Weather Report	R.M.C.s
4	State Daily Weather Report	Meteorological centres at state capitals
5	Weekly Weather Report (WWR)	DDGM(WF), Pune
6	All India Weather Summary (AIWS)	DDGM(WF), Pune

7	Meteorological Monograph	ADGM R, Pune
8	Monthly Climatic Data for Indian Stations	ADGMR ,Pune
9	Marine Climatological Summaries: annual ,decadal	ADGMR, P
10	Disastrous Weather Events(annual)	ADGM R, Pune
11	Climate Diagnostic Bulletins (monthly,seasonal)	ADGMR,Pune
12	RSMC Report on Cyclonic Disturbances in the Indian Ocean	NHAC (HQ),New Delhi

THANK YOU

FOR
LISTENING
WITH PATIENCE