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Distributions of Pack Ice in the Okhotsk Sea off Hokkaido Observed Using a Sea-Ice
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Report.*

**Distributions of Pack Ice in the Okhotsk Sea off Hokkaido Observed Using a
Sea-Ice Radar Network, January - March 2004^{*,**}**

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Summary

Distributions of pack ice in the Okhotsk Sea off Hokkaido were observed using a sea-ice radar network at every 0900 JST (Japanese Standard Time) during the whole sea-ice season in 2004. Time series of daily ice distributions during the period from 17 January to 13 March 2004 are shown in Fig. 1. They are also shown in the web site at: <http://www.hokudai.ac.jp/lowtemp/sirl/shome.html>. In addition, pictures of radar images were taken at every three-hour interval throughout the whole sea-ice season for further studies in coastal sea-ice dynamics and movements.

Time series of the daily ice concentration within about 50-km radar coverage from the coastline during the period from 1969 through 2004 is shown in Fig. 2. It appears that the daily ice concentration and period of the ice season decreased drastically since 1989.

The first and last days of the ice season observed by the sea-ice radar are listed in Table 1.

The Abashiri radar station was shut down after the sea-ice season in 2003. The Sea Ice Research Laboratory of Hokkaido University in Mombetsu was closed down in July 2004. The Mombetsu and Esashi radar stations were, therefore, successively shut down since then.

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要旨

北海道大学流氷観測用レーダー網により北海道オホーツク海岸沖の2004年1月17日から3月13日までの毎日午前9時における流氷分布を観測した(第1図)。流氷分布図の作成は、レーダー画像処理装置を利用して以下の手順にしたがって行われた。(1)枝幸、紋別、網走、3局の各レーダー映像を画像処理装置のブラウン管面上で重ね合わせ、3局合成レーダー画像を作る。(2)波浪や雲からくる妨害信号を人手によって除去する。(3)氷縁や氷湖などを線でなぞり流氷域を明確にする。(4)地図画像上に重ね合わせ、流氷域に斜線を施して流氷分布図を完成させる。氷野内には大小無数の氷湖が存在する場合もあるが、作図に当たっては、氷縁と比較的巨大的な氷湖に主眼をおいた。レーダー映像写真およびレーダー画像データは、流氷期間中3時間毎に保存されている。詳細な流氷分布の変化を追跡する場合には利用できる。

また、1969年から2004年までに観測された流氷レーダーの範囲内の流氷量の変動を第2図に示す。毎日午前9時の流氷分布図から、レーダーの範囲(海域のみ)を100として流氷が占める割合(密接度、%)を流氷期間中積算した量をその年の「流氷量(%d)」と定義した。1989年より流氷量が顕著に減少している傾向が見られる。

枝幸、紋別、網走局でそれぞれ観測された流氷初日、終日、流氷日数を第1表に示す。

網走局は2003年流氷シーズン後に、枝幸局と紋別局は2004年流氷シーズン後に閉鎖された。これは流氷研究施設(紋別市)が2004年7月に閉鎖されたことに伴う処置であった。

Key words: Pack Ice, Okhotsk Sea, Hokkaido, Sea-Ice Radar Network, Radar Image, Ice Concentration

キーワード: 流氷, オホーツク海, 北海道, 流氷観測用レーダー網, レーダー画像, 密接度

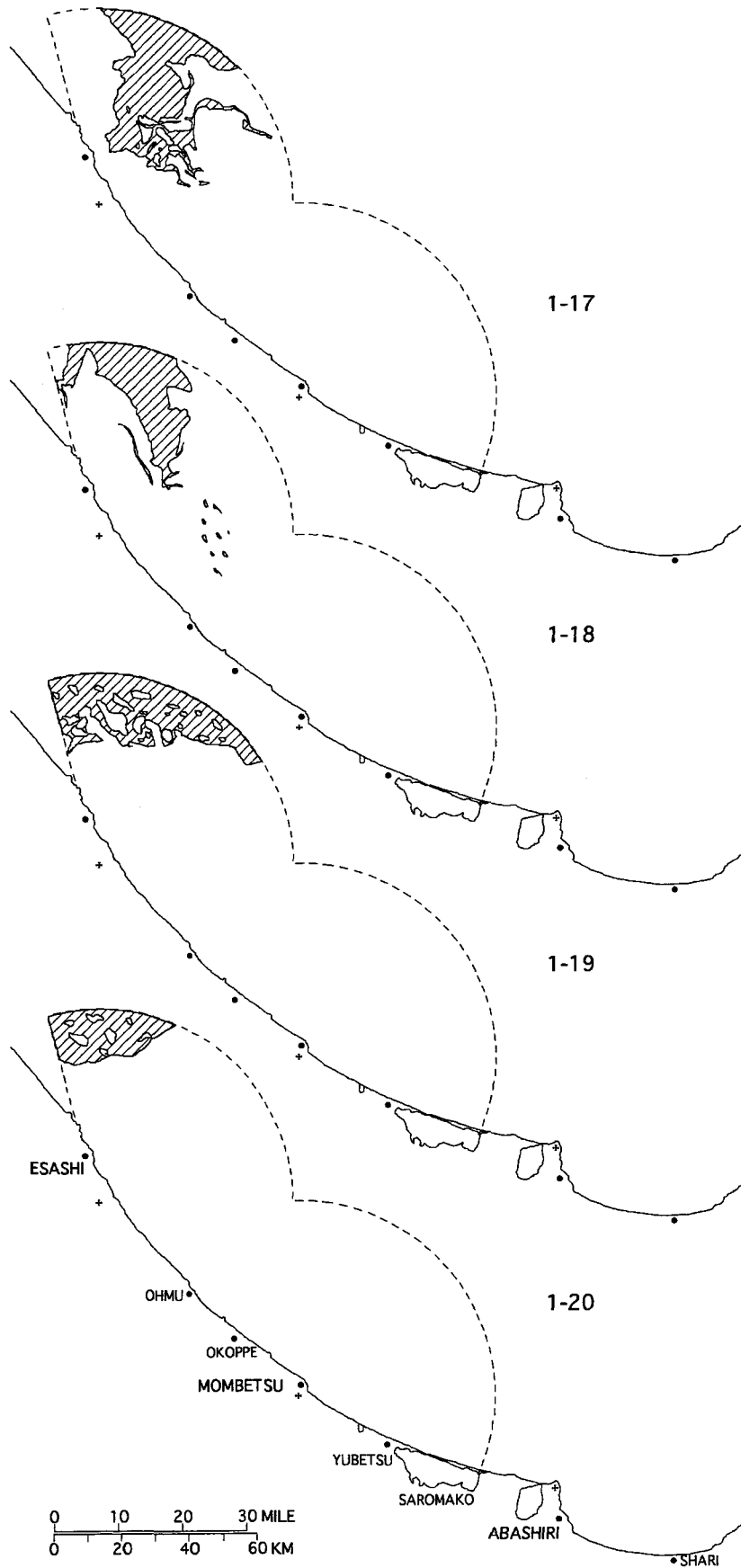
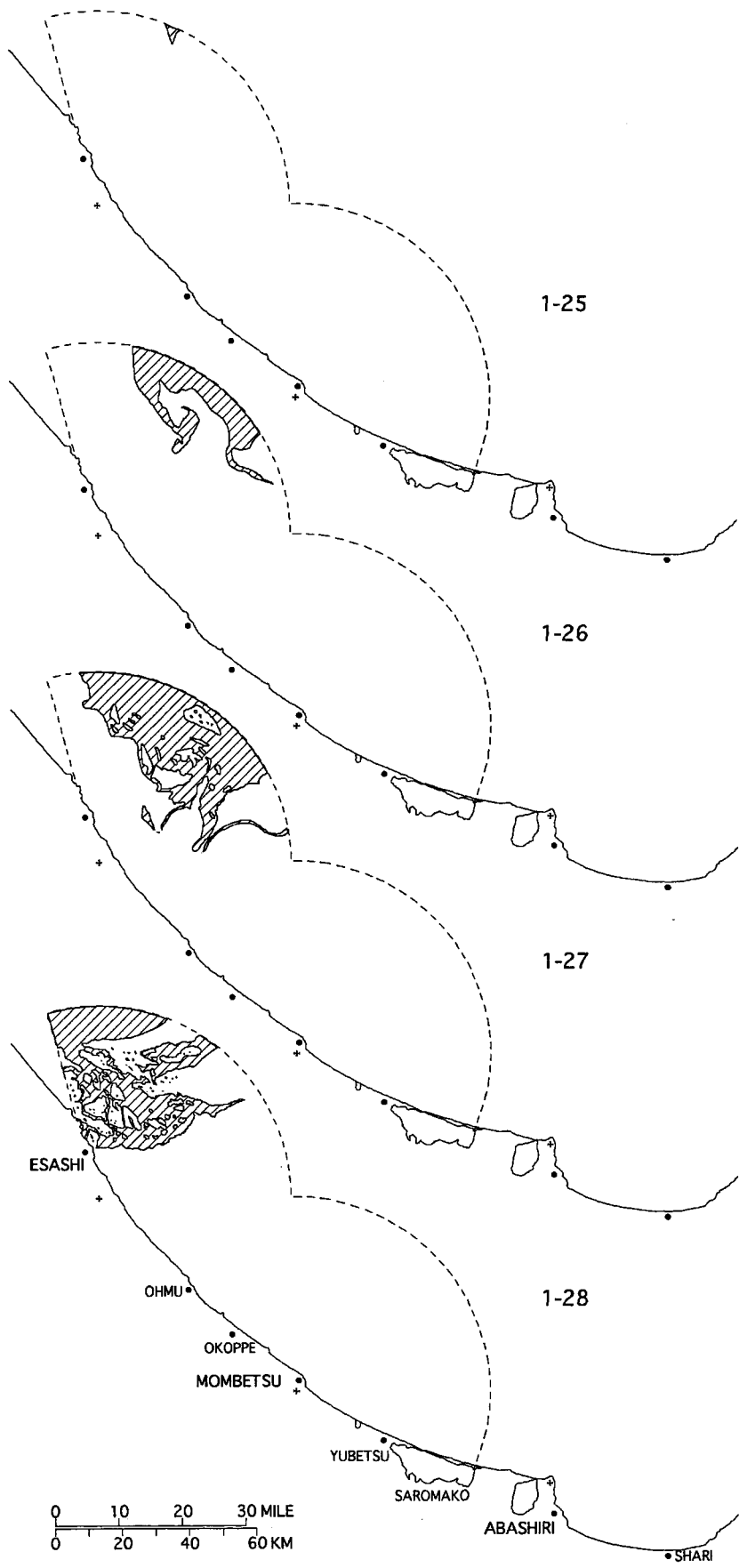
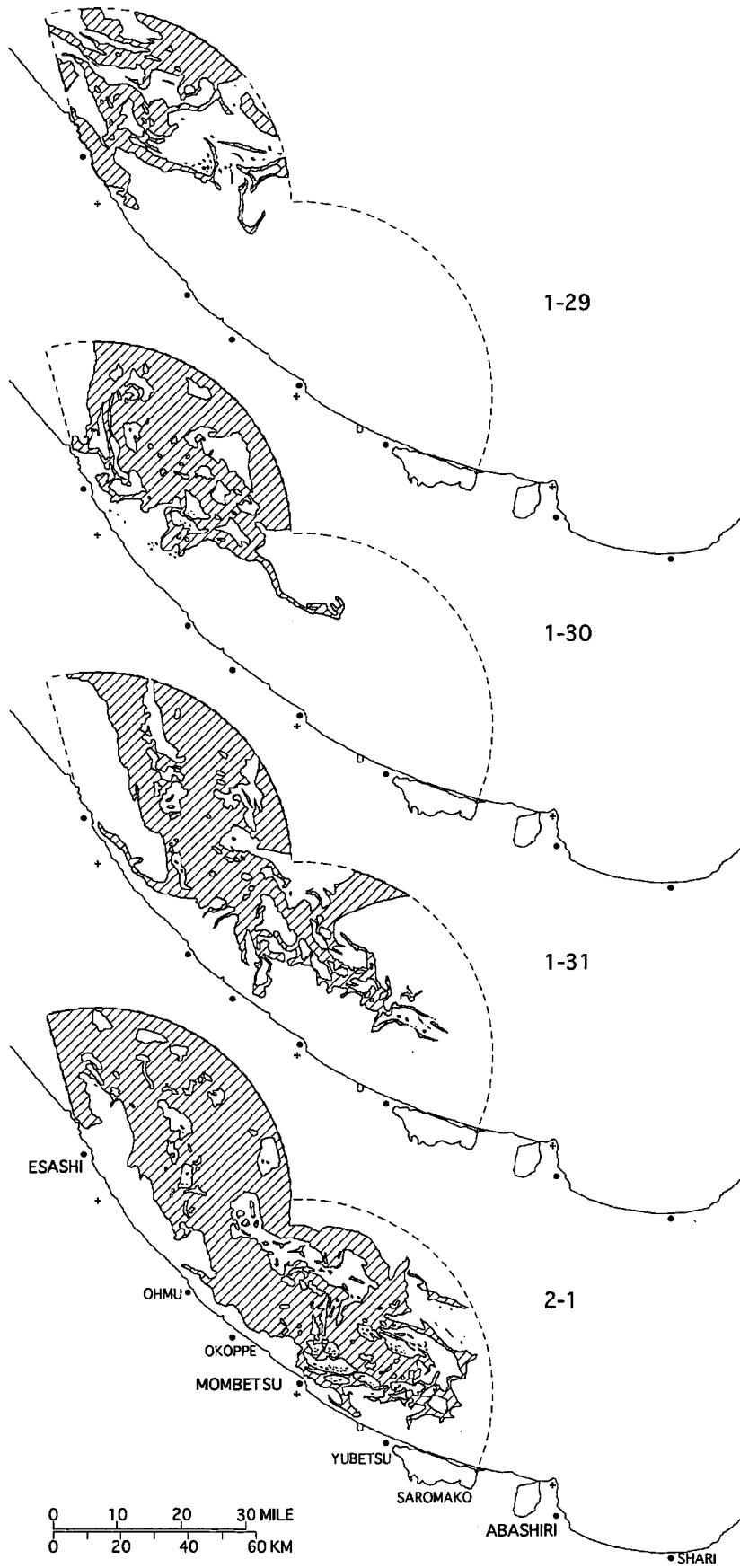
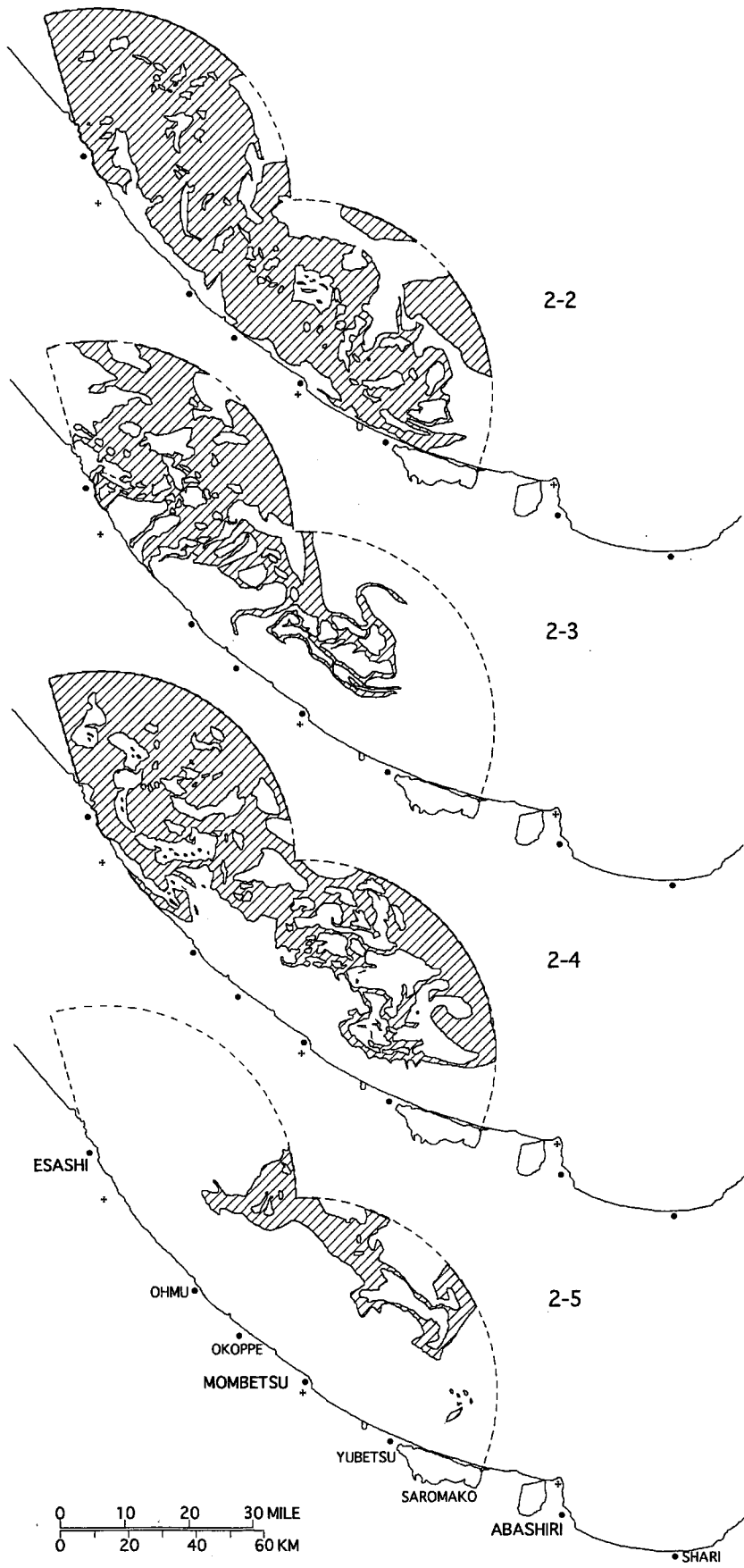
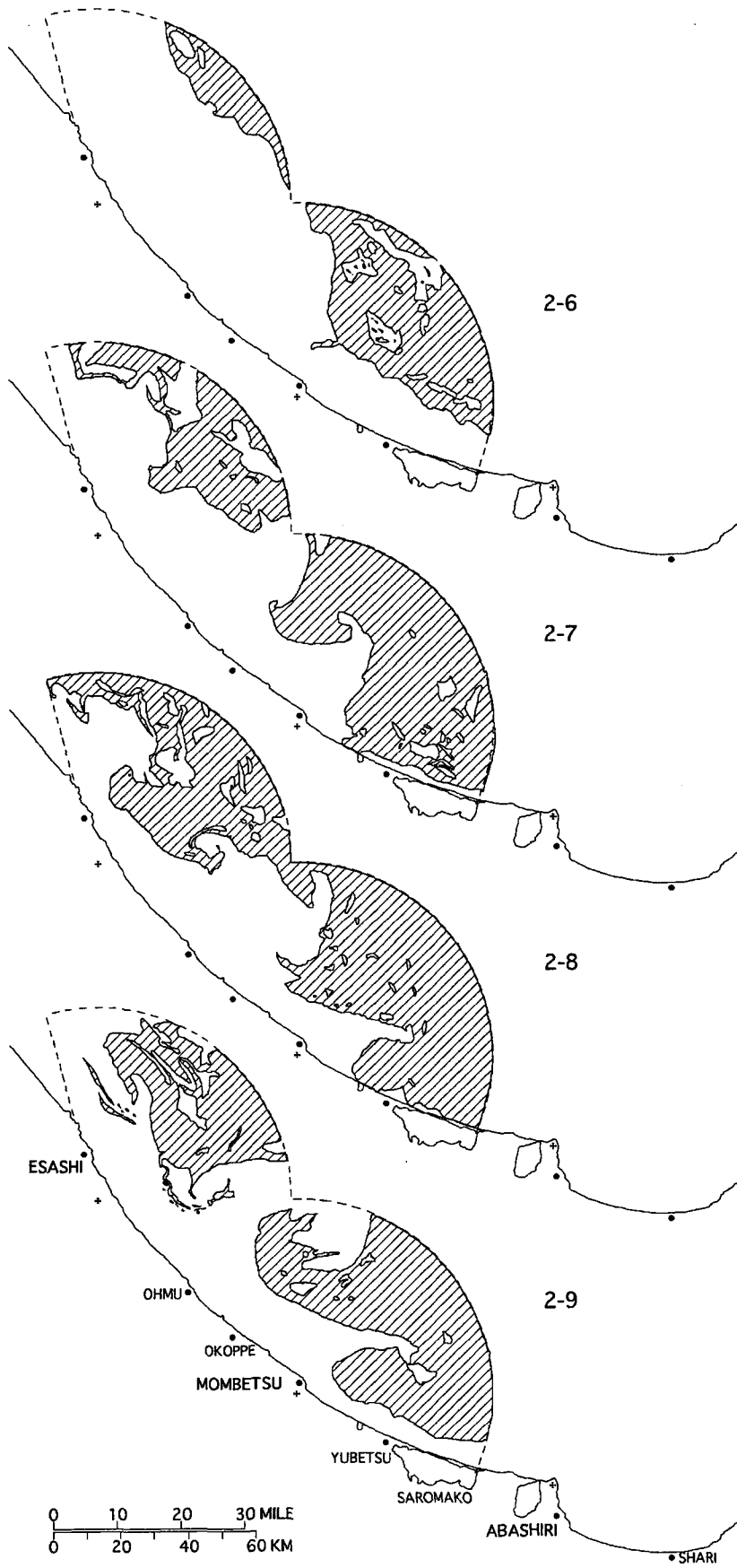


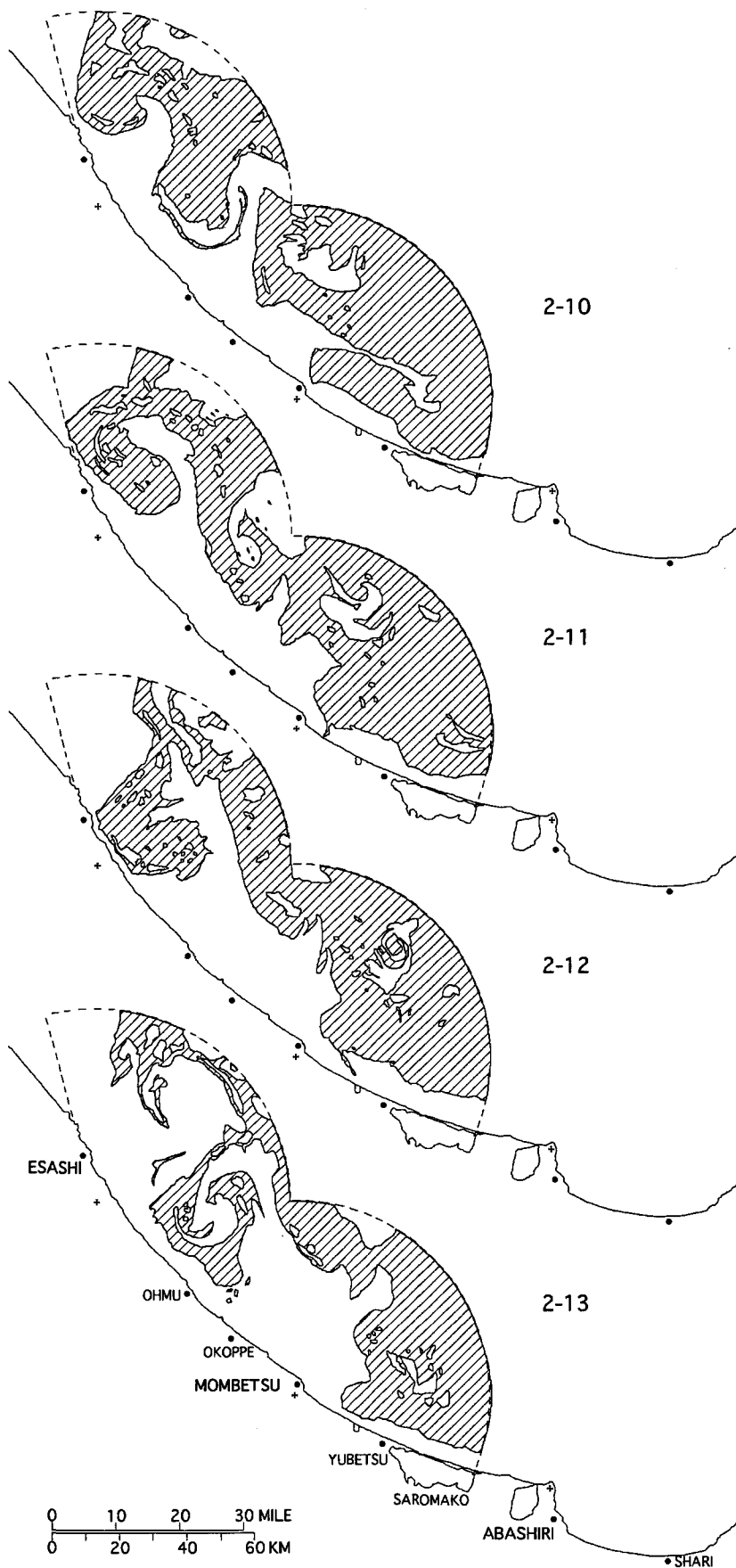
Fig. 1 Distributions of pack ice in the Okhotsk Sea off Hokkaido observed by a sea-ice radar network at 0900 JST during the period from 17 January through 13 March 2004.

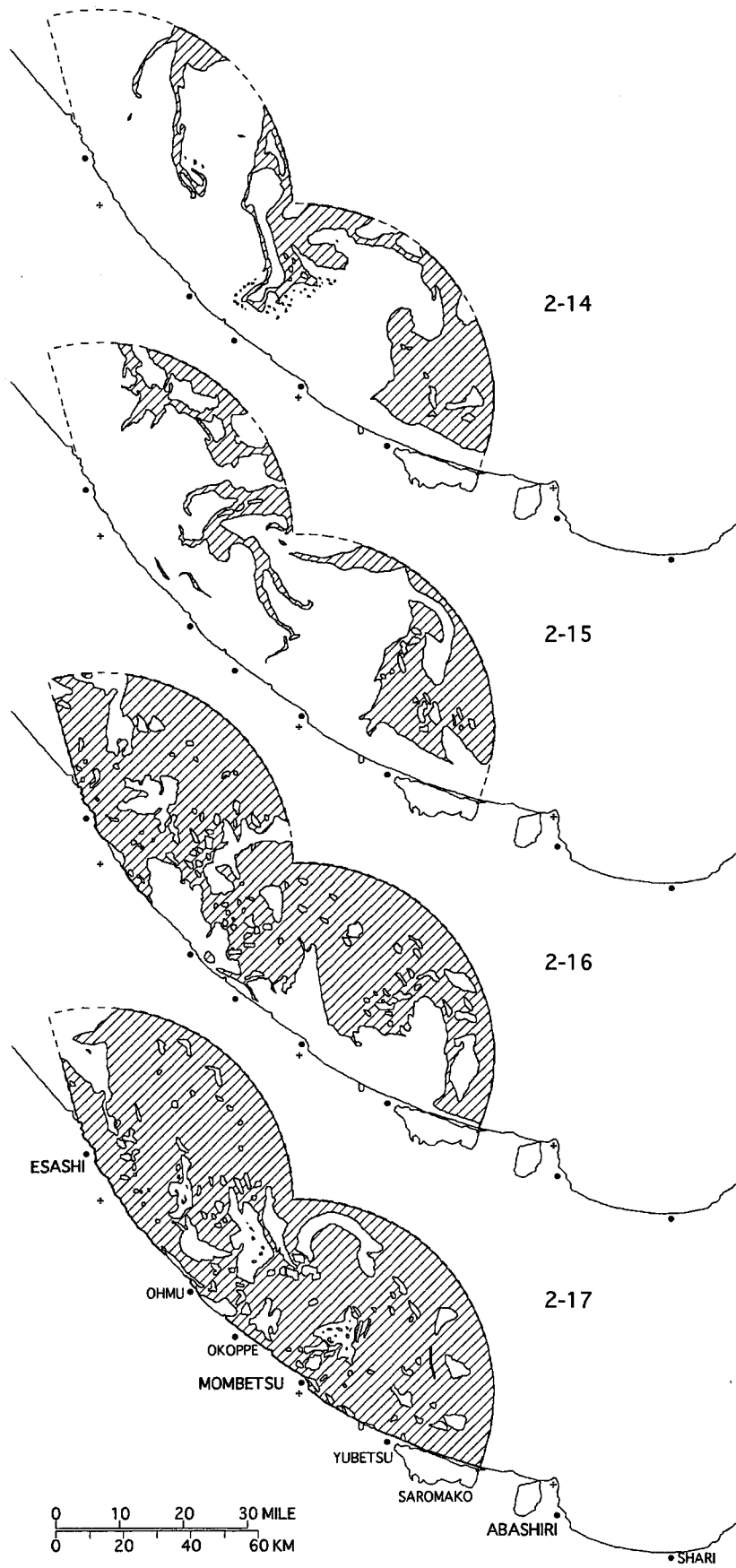


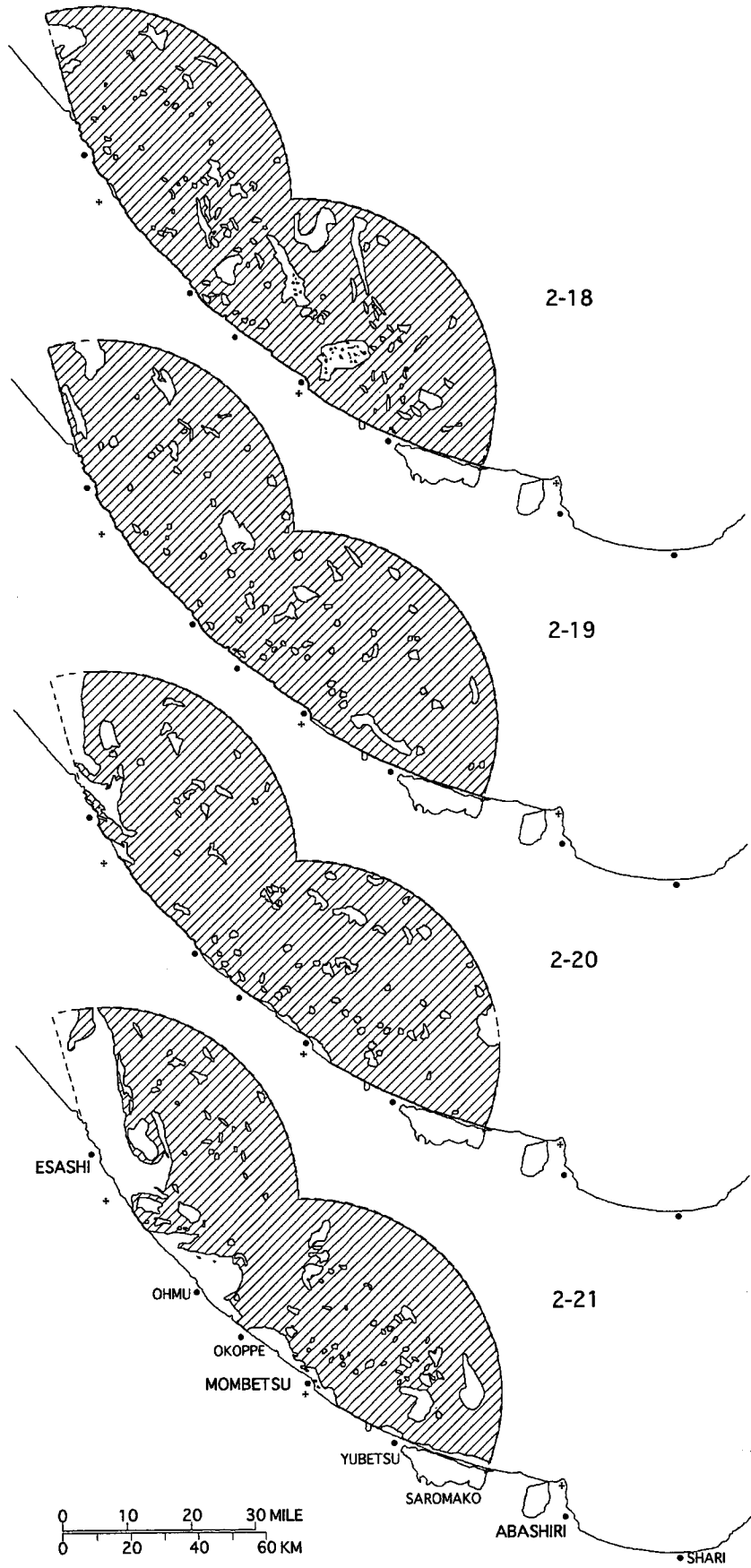


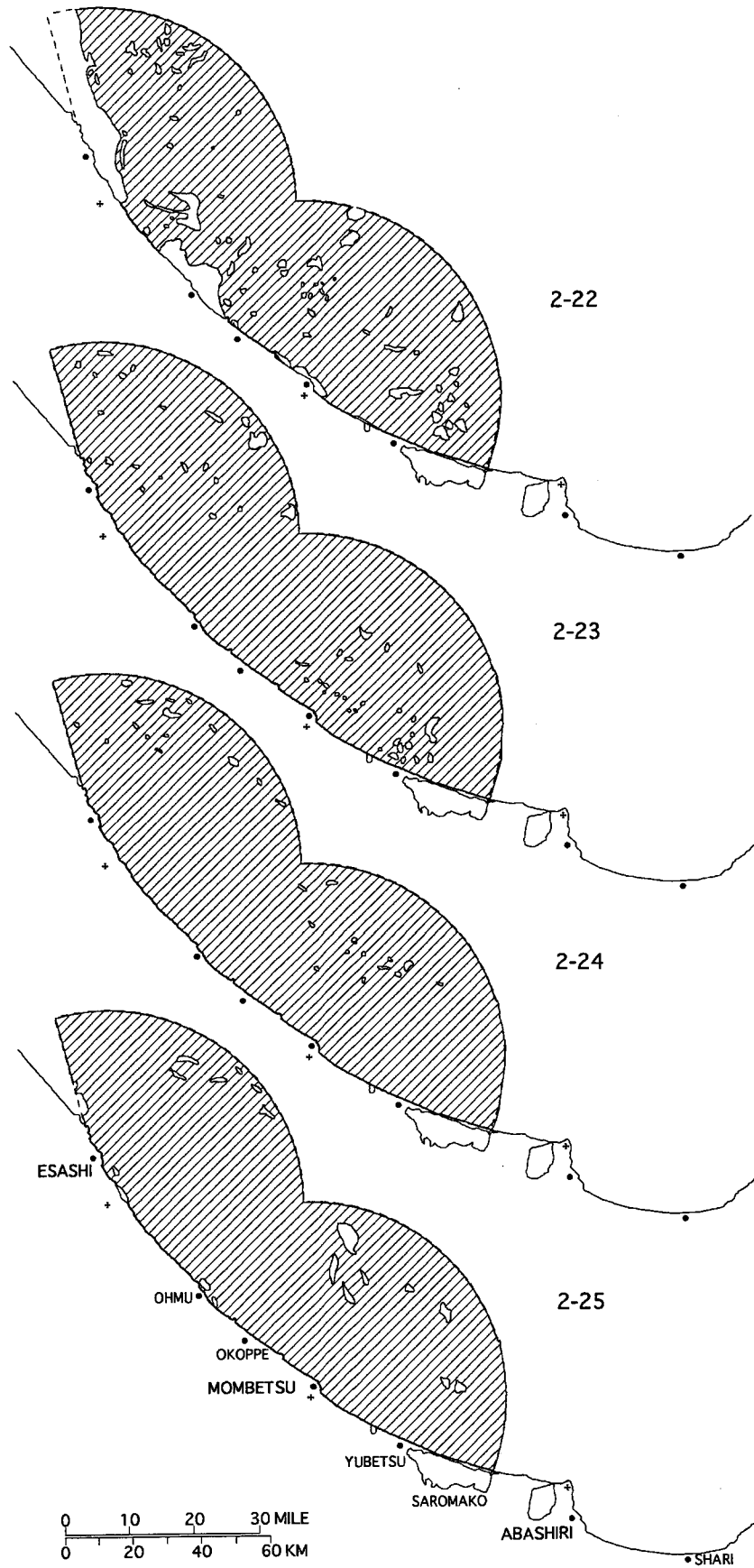


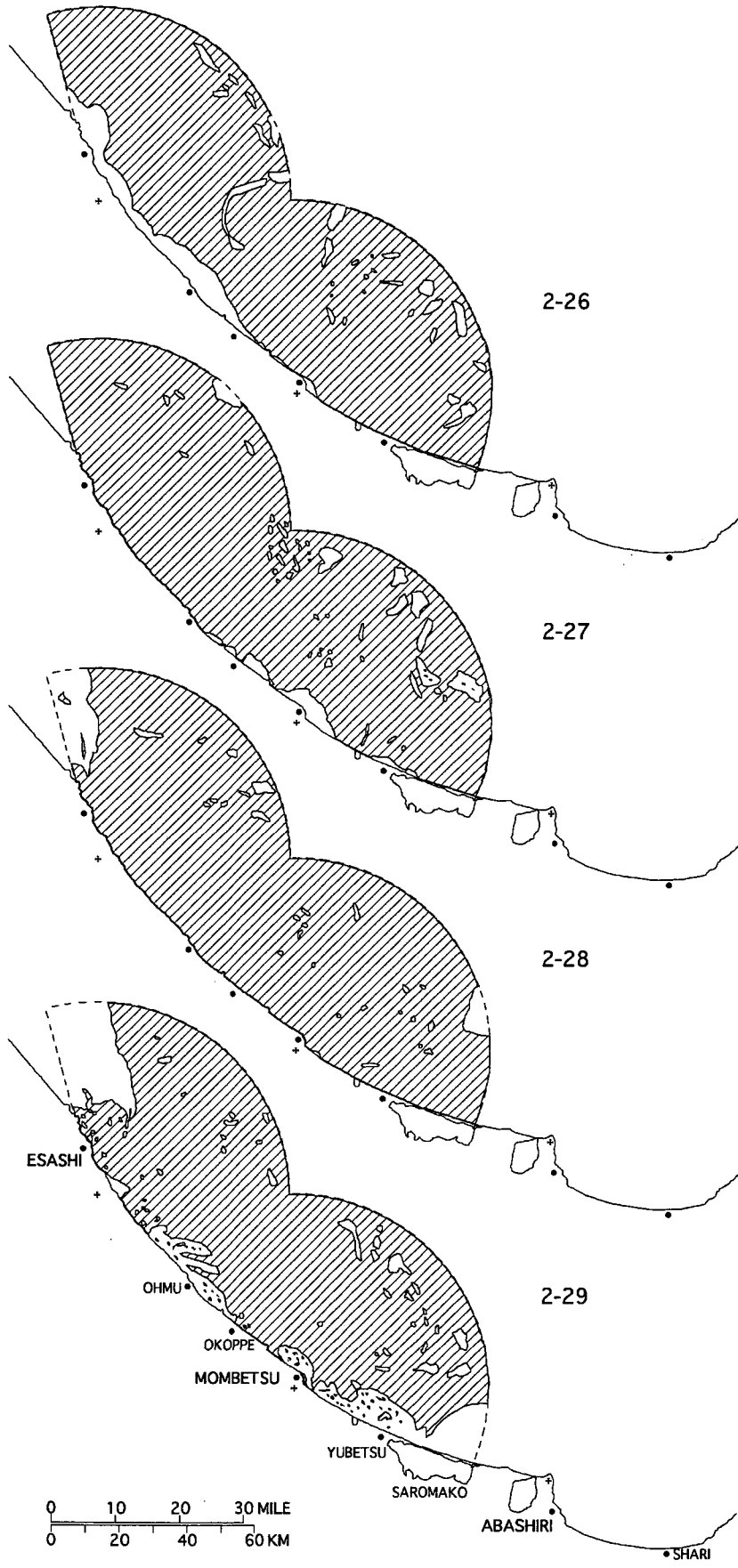


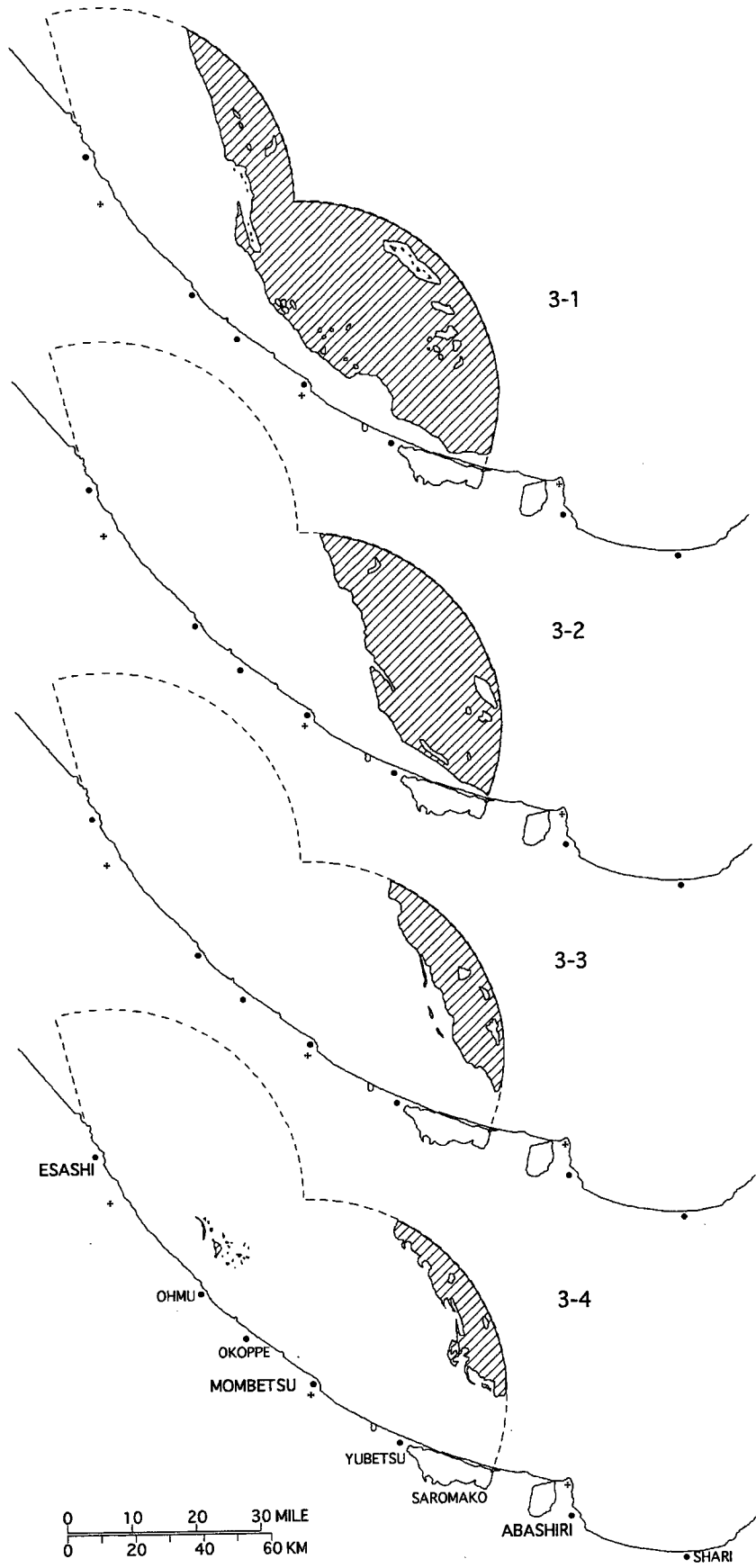


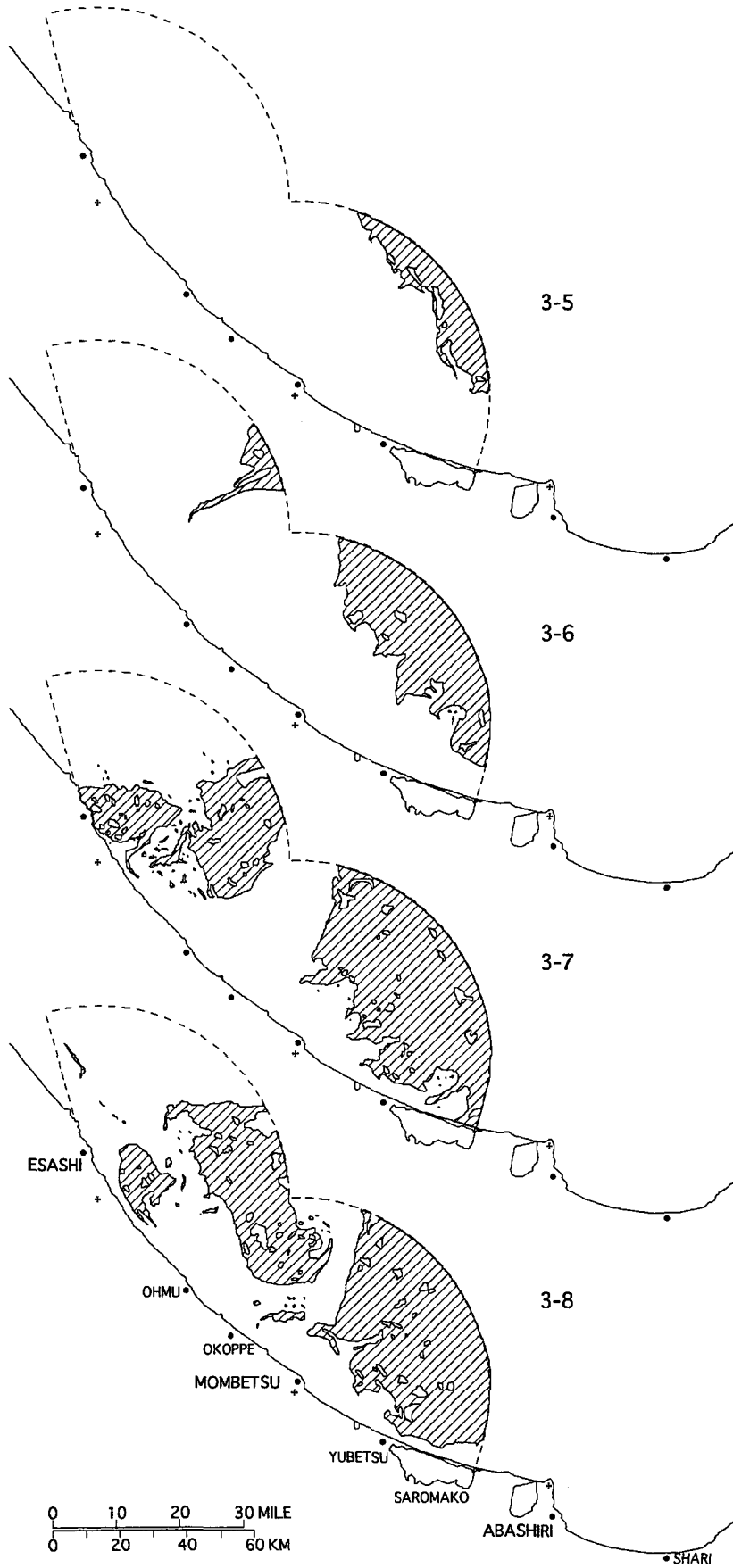


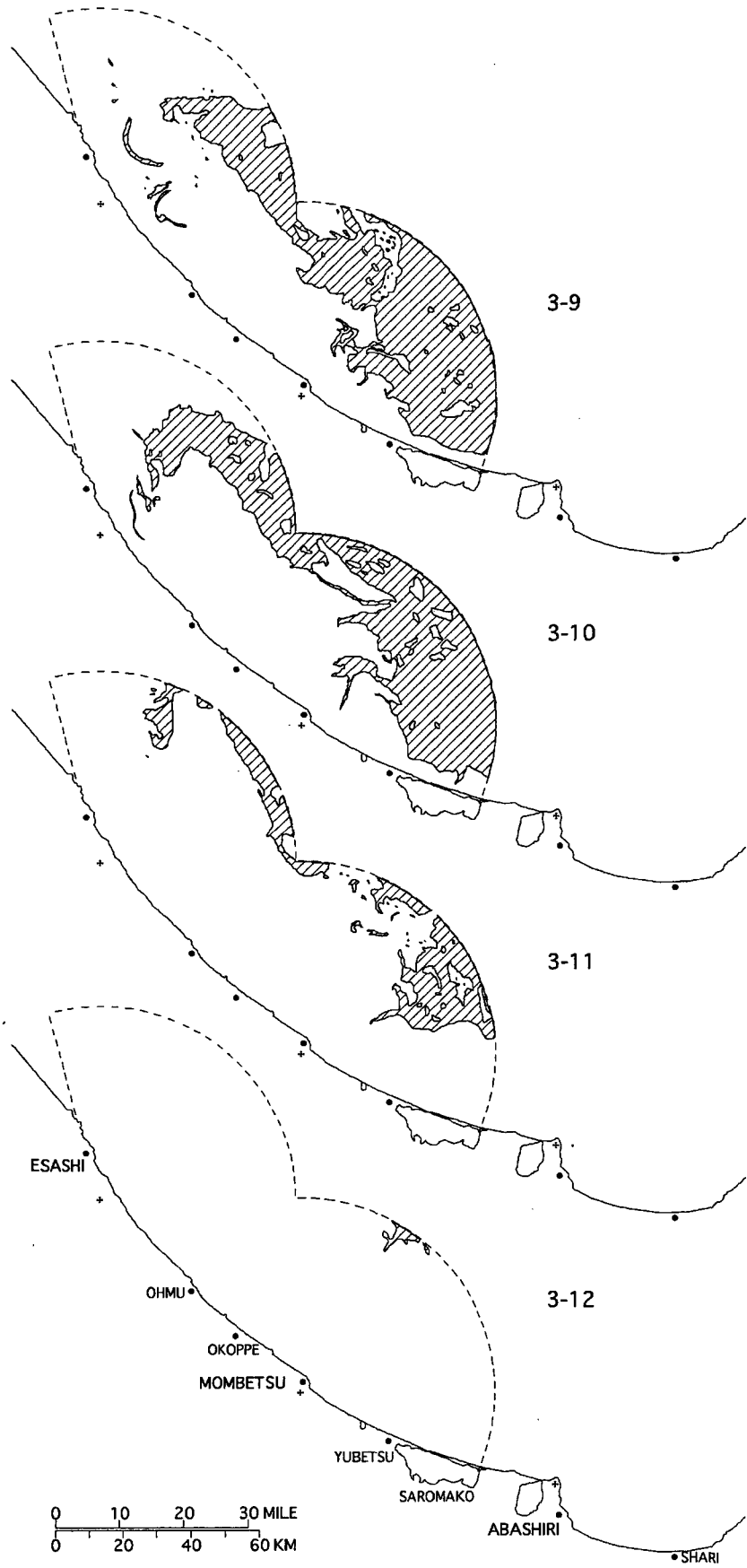


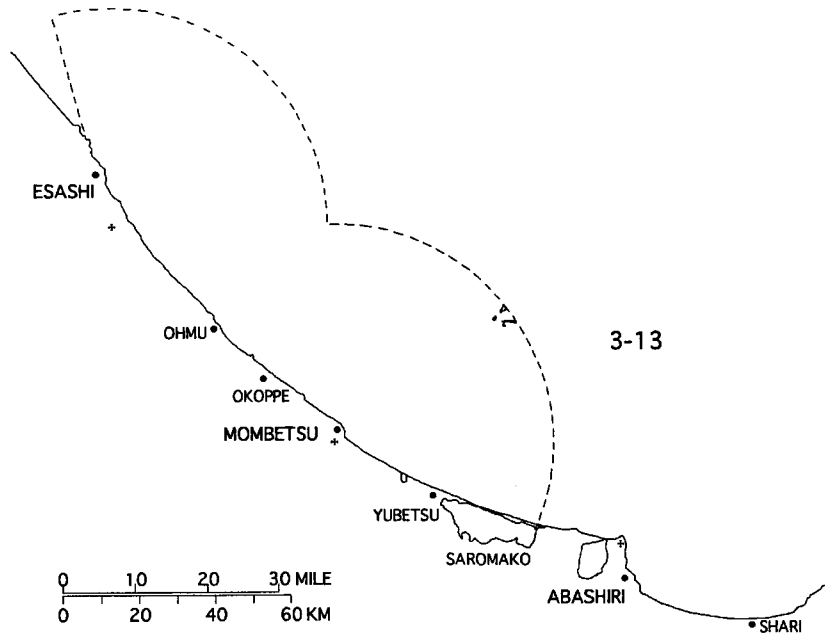












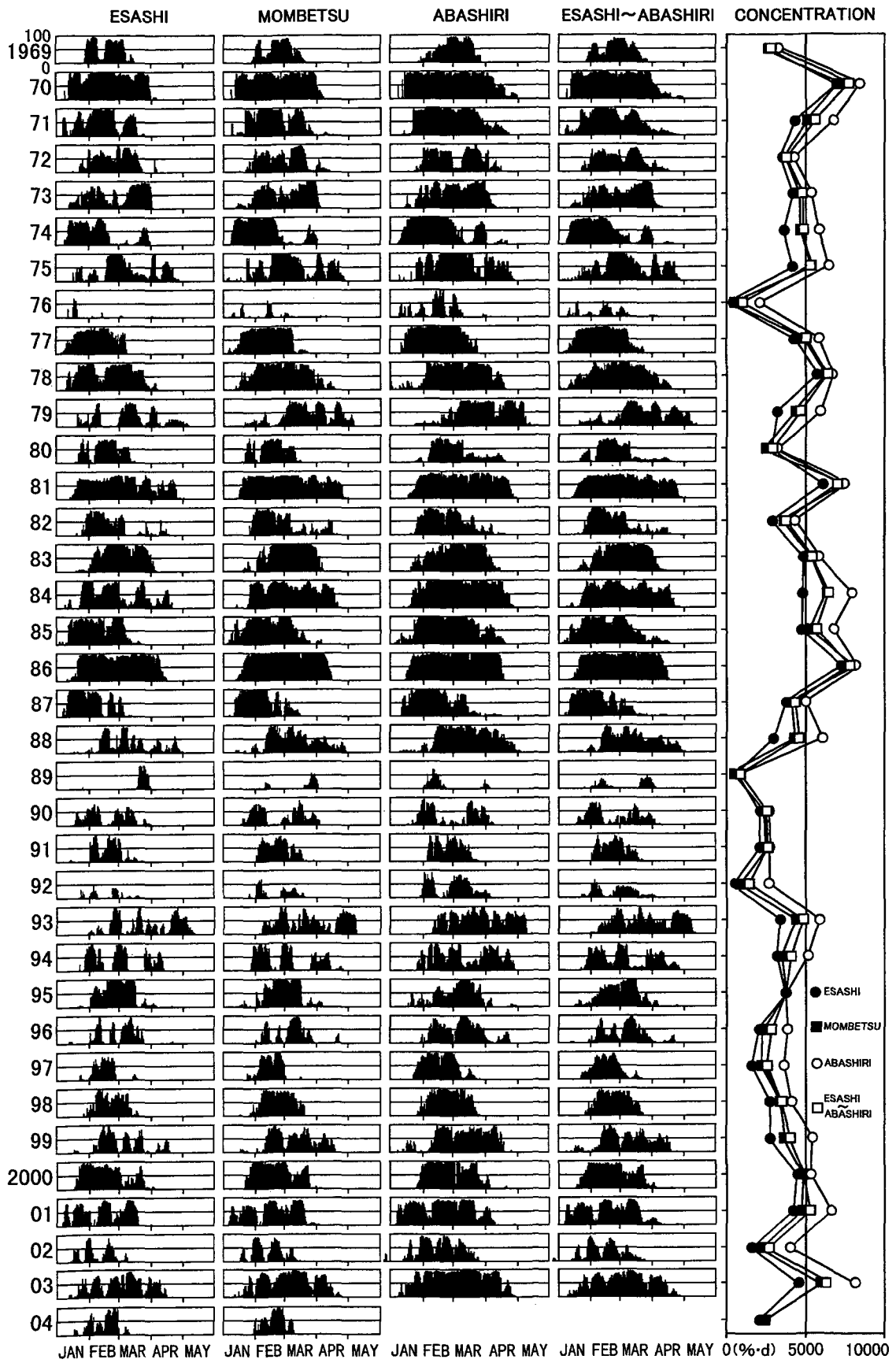


Fig. 2 Daily ice concentrations within about 50-km radar coverage from the coastline during the period from 1969 through 2004.

Table 1. The first and last days of the sea-ice season at Esashi, Mombetsu and Abashiri Radar Stations during the period from 1969 through 2004.

Year	Esashi			Mombetsu			Abashiri			Esashi-Abashiri		
	First	Last	Days	First	Last	Days	First	Last	Days	First	Last	Days
1969	1/28	3/16	47	1/29	3/21	52	1/28	3/27	59	1/28	3/27	59
1970	1/09	4/05	83	1/09	4/07	87	1/09	4/30	109	1/09	4/30	119
1971	1/07	3/25	71	1/08	4/19	90	1/12	4/22	101	1/07	4/22	106
1972	1/17	4/07	65	1/13	4/14	85	1/18	4/15	83	1/13	4/15	87
1973	1/13	4/04	81	1/13	4/04	81	1/15	4/10	82	1/13	4/10	88
1974	1/08	3/31	74	1/09	4/02	74	1/09	4/21	102	1/08	4/21	102
1975	1/17	4/27	95	1/05	4/29	102	1/08	4/30	102	1/05	4/30	110
1976	1/12	4/10	28	1/10	4/10	33	1/10	4/11	64	1/10	4/11	67
1977	1/06	3/09	63	1/06	3/24	76	1/12	3/25	73	1/06	3/25	79
1978	1/10	4/11	89	1/11	4/18	98	1/01	4/19	104	1/01	4/19	104
1979	1/21	5/12	92	1/21	5/16	105	1/22	5/19	115	1/21	5/19	117
1980	1/19	4/17	61	1/24	4/19	64	1/22	4/19	83	1/19	4/19	89
1981	1/14	5/02	108	1/14	5/02	108	1/17	4/29	103	1/14	5/02	109
1982	1/20	4/20	74	1/21	4/20	82	1/20	4/18	84	1/20	4/20	91
1983	1/20	4/06	75	1/20	4/07	74	1/21	4/14	84	1/20	4/14	85
1984	1/09	4/23	97	1/13	4/22	93	1/13	4/27	102	1/09	4/27	106
1985	1/04	3/22	77	1/05	4/15	89	1/06	4/19	104	1/04	4/19	106
1986	1/11	4/16	96	1/13	4/15	93	1/11	4/19	99	1/11	4/19	99
1987	1/07	3/26	59	1/07	3/31	72	1/11	4/15	90	1/07	4/15	95
1988	1/18	5/02	100	1/13	4/29	97	1/11	5/04	109	1/11	5/04	111
1989	1/26	4/01	16	1/26	4/02	23	2/01	4/04	31	1/26	4/04	40
1990	1/18	4/04	67	1/18	4/03	68	1/18	4/08	74	1/18	4/08	80
1991	1/14	3/25	53	2/01	3/29	51	2/04	3/26	51	1/14	3/26	57
1992	1/23	3/20	36	1/14	3/20	42	1/29	4/06	66	1/23	4/06	72
1993	1/23	5/19	105	2/05	5/14	97	2/09	5/17	96	1/23	5/19	107
1994	1/23	4/13	58	1/26	4/27	71	1/26	5/02	96	1/23	5/02	99
1995	1/07	4/25	76	1/17	4/25	72	1/18	4/29	85	1/07	4/29	92
1996	1/13	4/22	57	1/16	4/23	66	1/29	4/25	84	1/13	4/25	92
1997	1/23	4/23	38	1/24	3/26	48	1/23	3/28	65	1/23	3/28	65
1998	1/27	3/22	54	1/17	3/21	57	1/26	3/27	61	1/17	3/27	63
1999	1/17	4/22	89	1/18	4/22	88	1/08	4/26	101	1/08	4/26	105
2000	1/18	4/05	78	1/21	4/07	77	1/17	4/21	80	1/17	4/21	86
2001	1/06	4/02	75	1/06	4/04	87	1/06	4/29	103	1/06	4/29	103
2002	1/14	3/09	53	1/17	3/21	58	12/25	3/26	77	12/25	3/26	77
2003	1/12	4/22	97	1/11	4/25	102	1/09	4/30	111	1/09	4/30	112
2004	1/17	3/11	47	1/17	3/13	46						
Mean	1/15	4/7	70	1/16	4/11	75	1/17	4/19	87	1/13	4/18	91

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