



HOKKAIDO UNIVERSITY

Title	Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, January - July 2004
Author(s)	SHIRASAWA, Kunio; ISHIKAWA, Masao; TAKATSUKA, Toru et al.
Citation	低温科学. 物理篇. 資料集, 63, 1-10
Issue Date	2005-03-25
Doc URL	https://hdl.handle.net/2115/18841
Type	departmental bulletin paper
File Information	63_p1-10.pdf



Kunio SHIRASAWA, Masao ISHIKAWA, Toru TAKATSUKA, Ryuichi NAGATA and Soshi HAMAOKA 2004 Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, January – July 2004. *Low Temperature Science, Ser. A., 63. Data Report.*

Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, January – July 2004* **

Kunio SHIRASAWA, Masao ISHIKAWA, Toru TAKATSUKA,
(*Institute of Low Temperature Science, Hokkaido University*),
Ryuichi NAGATA
(*Okhotsk Garinko Tower Co., Mombetsu, Hokkaido*) and
Soshi HAMAOKA
(*Mombetsu Municipal Office, Mombetsu, Hokkaido*)
(*Received February 2005*)

Abstract: Measurements of wind speed and direction, humidity, air temperature and solar radiation were carried out through all the year round at a marine tower on the Okhotsk Sea coast of Mombetsu, Hokkaido. Shown in this report are time series of those meteorological and oceanographic variables and also daily sea-ice distributions and ice concentrations observed by the sea-ice radar.

要旨: 北海道オホーツク海沿岸域のほぼ中央に位置する紋別に設置されたタワーにて風速・風向、湿度、気温、日射の連続観測を行った。また、流氷レーダーにて結氷期の沿岸域の流氷分布、密接度の観測を行った。ここでは、これらの時系列観測データを報告する。

Key words: Meteorological and Oceanographic Variables, Air-Sea-Ice Observation System (ASIOS), Sea-Ice Radar, Okhotsk Sea Coast of Hokkaido

キーワード: 気象・海洋要素、大気-海洋-海氷観測システム、流氷レーダー、北海道オホーツク海沿岸

* 北海道大学低温科学研究所業績 第3975号

** 北海道大学低温科学研究所 流氷研究施設 研究報告 第176号

I. Introduction

The Air-Sea-Ice Observation System (ASIOS) of Hokkaido University was established near Mombetsu Harbor, Hokkaido in 1986, in order to measure the atmospheric boundary layer over sea ice in the near shore region covered with unstable pack ice (e.g., Aota *et al.*, 1988; Shirasawa and Aota, 1991). After some years' operation the tower of the ASIOS was removed to be reconstructed on a breakwater at the west end of the Mombetsu Harbor (Figs. 1 and 2), and it has been operated since April 1997. Another marine tower, so called the Okhotsk Tower was constructed at the east end of the Mombetsu Harbor in February 1996 (Fig. 1). It has been mainly used for oceanographic observations and as an under-ice aquarium. Measurements of meteorological and oceanographic variables have been carried out through all the year round by the ASIOS and Okhotsk Tower on the Okhotsk Sea coast since April 1997. Time series of those variables during the period from January through July 2004 are reported in this data report. The time series data for the periods from April 1997 to November 1998, from December 1998 to December 1999, from January to December 2000, from January to December 2001, from January to December 2002 and from January to December 2003 were reported by Shirasawa *et al.* (1998), Shirasawa *et al.* (1999), Shirasawa *et al.* (2000), Shirasawa *et al.* (2001), Shirasawa *et al.* (2002) and Shirasawa *et al.* (2003), respectively.

II. Observation

The ASIOS tower stands on a breakwater at the west end of Mombetsu Harbor, where is located free to sea breeze (Fig. 1). Meteorological sensors were installed on a mast on the observation capsule of 3 m in diameter and of 2.7 m in height with a dome, and at the height of about 15 m from the sea level. The Okhotsk Tower located at the east end of Mombetsu Harbor (Fig. 1) has been used mainly for oceanographic observations. Sea-ice distributions and ice concentrations on the Okhotsk Sea coast near Mombetsu within about 50 km from the shoreline have been observed daily by the sea-ice radar network of Hokkaido University.

Time series of wind speed and direction, humidity, air temperature and solar radiation obtained from the ASIOS tower during the period from January to July 2004 are shown in Fig. 3. The daily ice concentrations observed by the sea-ice radar are also shown in Fig. 3. The air temperature was -3°C at the beginning of January and about -10°C at minimum during January-February. The sea ice appeared within the radar coverage at the Mombetsu radar station on 30 January. The air temperature started increasing from mid-March, while sea ice disappeared from the radar coverage on 13 March. Wind roses shown monthly in Fig. 4 indicate that the sea breeze is

predominant during January.

The Sea Ice Research Laboratory of Hokkaido University in Mombetsu was closed down in July 2004. The ASIOS tower has, therefore, not been working since then.

References

- Aota, M., Shirasawa, K., Hayashi, S., and Ide, M. (1988) Air-Sea-Ice Observation System of Hokkaido University and Preliminary Results of the 1988 Experiment. *Proc. IAHR Ice Symposium 1988*, Sapporo, 651-660.
- Shirasawa, K., and Aota, M. (1991) Atmospheric Boundary Layer Measurements over Sea Ice in the Sea of Okhotsk. *J. Mar. Syst.*, **2**, 63-79.
- Shirasawa, K., Ishikawa, M., Takatsuka, T., Daibou, T., Aota, M., and Hamaoka, S. (1998) Meteorological Observations at Marine Towers in Mombetsu, Hokkaido, April 1997 – November 1998. *Low Temperature Science, Ser. A.*, **57. Data Report**, 19-43.
- Shirasawa, K., Ishikawa, M., Takatsuka, T., Daibou, T., Aota, M., and Hamaoka, S. (1999) Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, December 1998 – December 1999. *Low Temperature Science, Ser. A.*, **58. Data Report**, 1-13.
- Shirasawa, K., Ishikawa, M., Takatsuka, T., Daibou, T., Aota, M., Hamaoka, S., and Tateyama, K. (2000) Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, January – December 2000. *Low Temperature Science, Ser. A.*, **59. Data Report**, 1-11.
- Shirasawa, K., Ishikawa, M., Takatsuka, T., Daibou, T., Aota, M., Hamaoka, S., and Tateyama, K. (2001) Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, January – December 2001. *Low Temperature Science, Ser. A.*, **60. Data Report**, 1-11.
- Shirasawa, K., Ishikawa, M., Takatsuka, T., Daibou, T., Tateyama, K., and Hamaoka, S. (2002) Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, January – December 2002. *Low Temperature Science, Ser. A.*, **61. Data Report**, 1-12.
- Shirasawa, K., Ishikawa, M., Takatsuka, T., Daibou, T., Tateyama, K., Nagata, R., and Hamaoka, S. (2003) Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, January – December 2003. *Low Temperature Science, Ser. A.*, **62. Data Report**, 1-18.

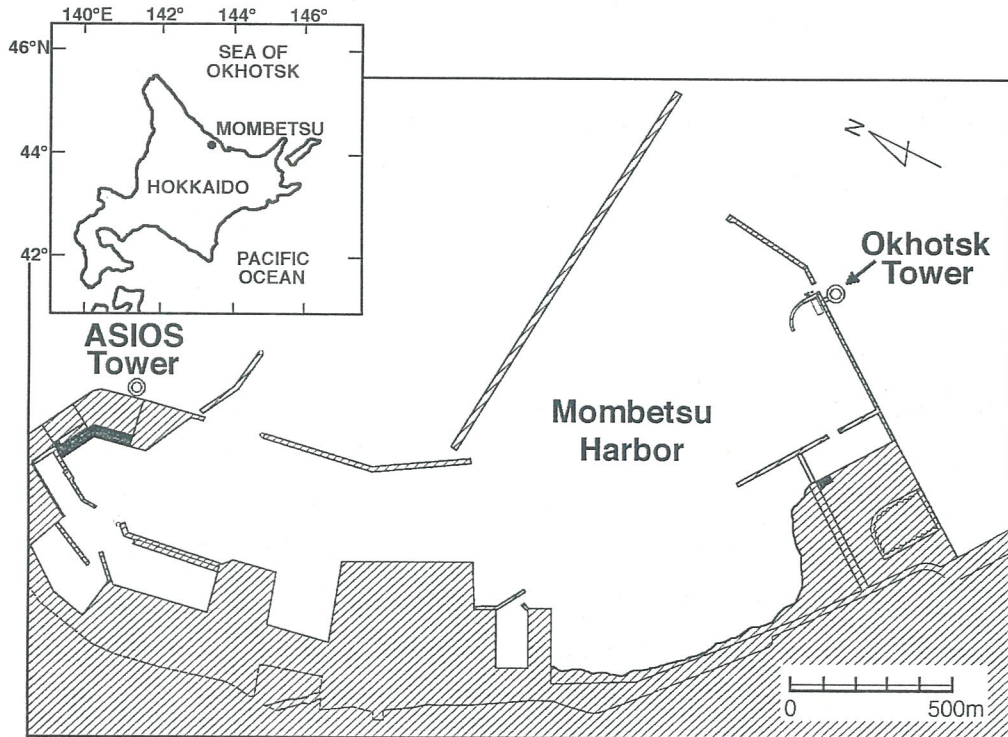


Fig. 1 The sites of the Air-Sea-Ice Observation System (ASIOS) tower and the Okhotsk Tower, Mombetsu, Hokkaido. The sea-ice radar coverage at Mombetsu radar station is shown as a half circle on the map.



Fig. 2 The Air-Sea-Ice Observation System (ASIOS) tower.

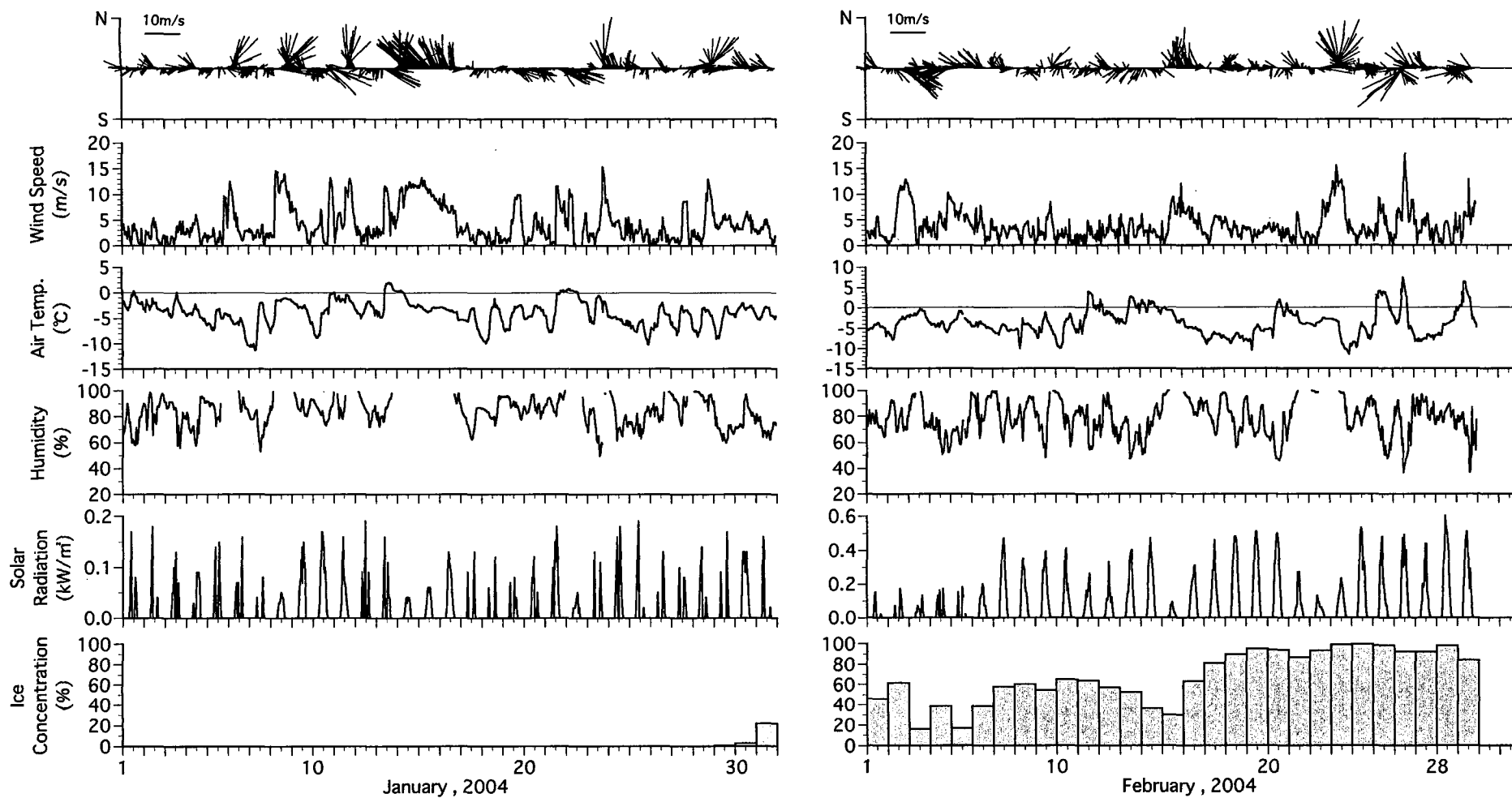
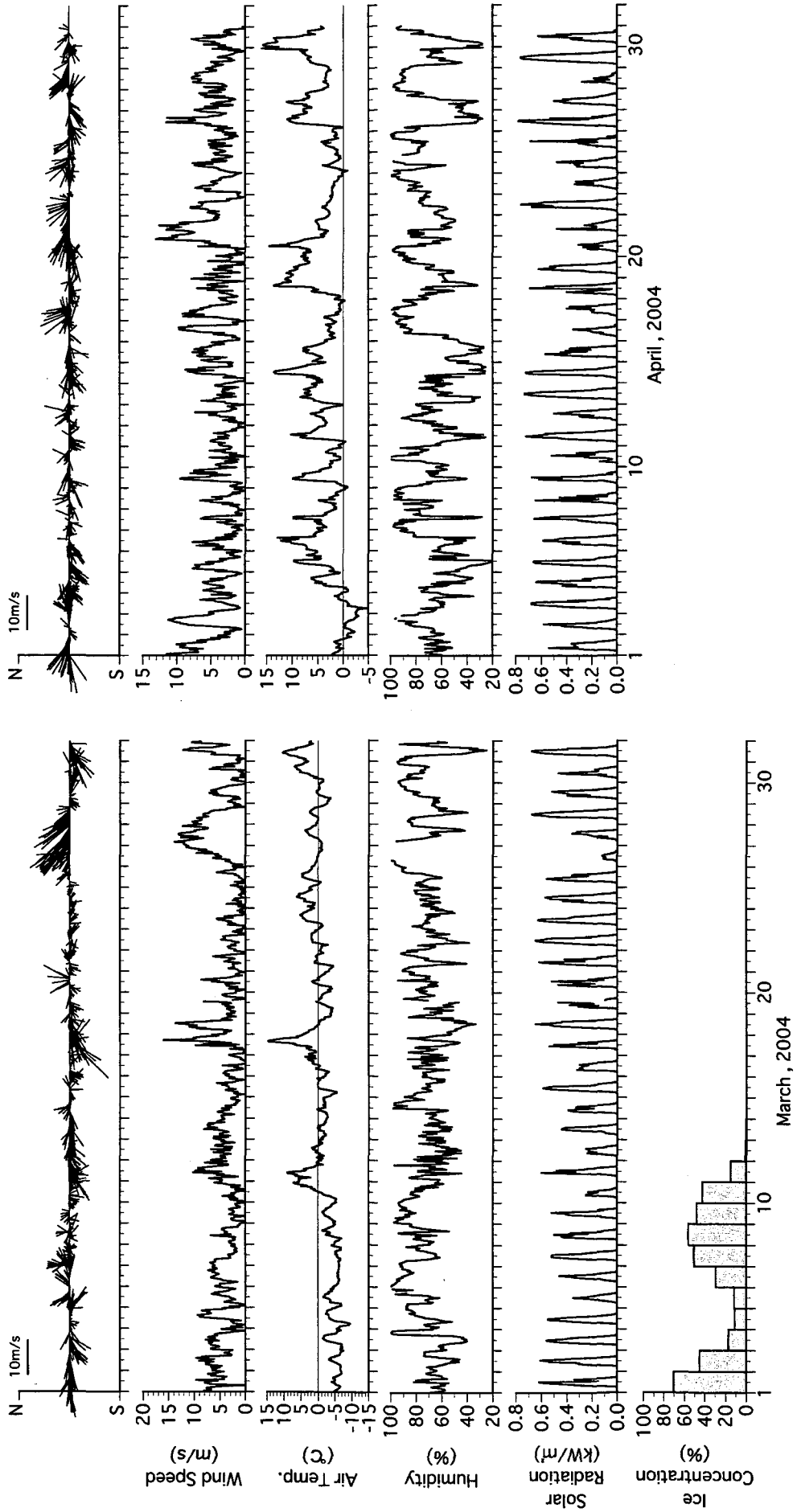
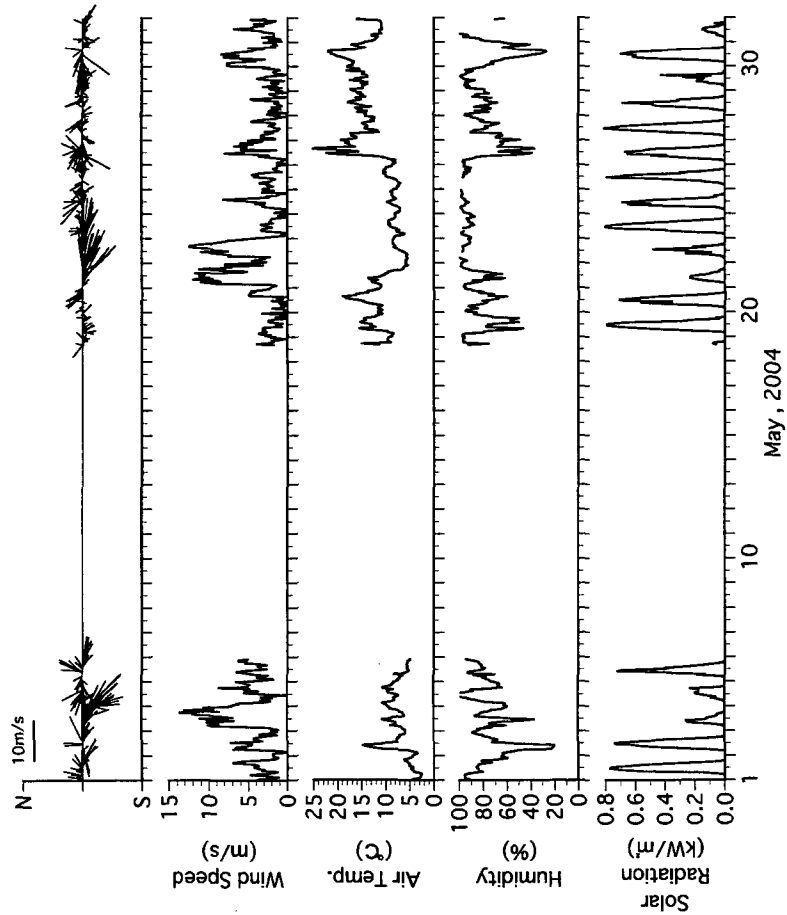
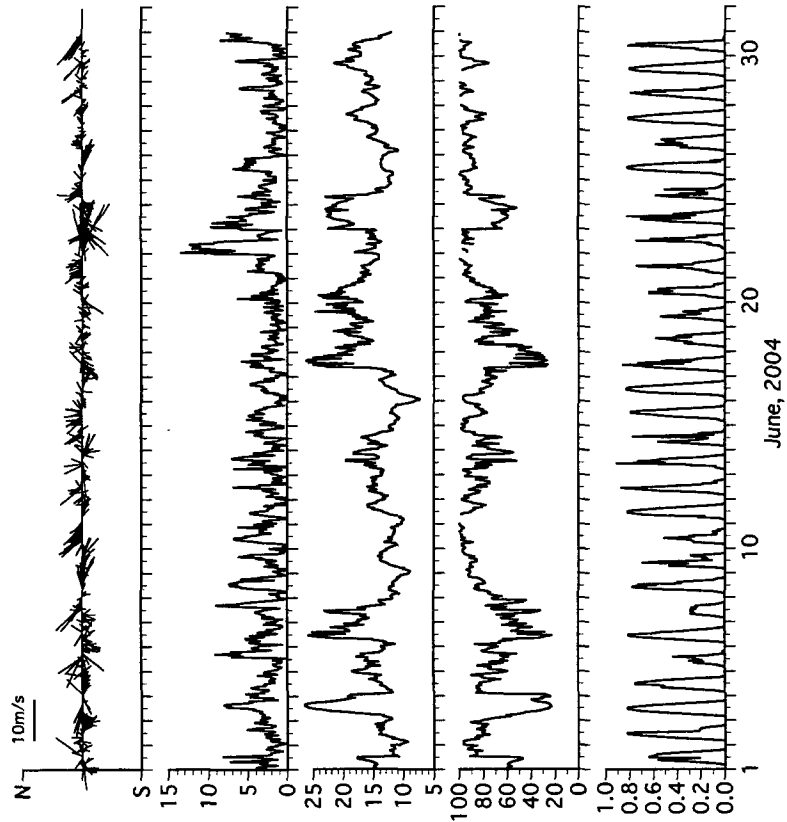
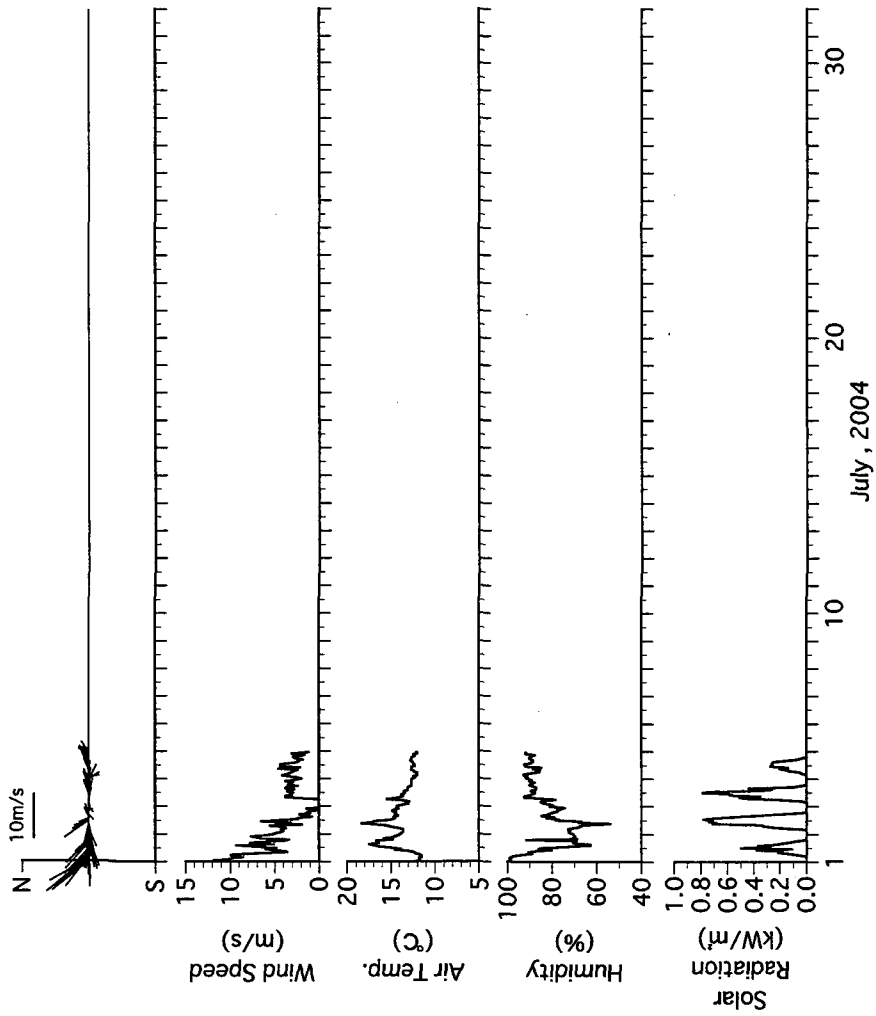


Fig. 3 Time series of wind speed and direction, humidity, air temperature and solar radiation obtained from the ASI0S tower during the period from January to July 2004, together with the ice concentration observed by the sea-ice radar.







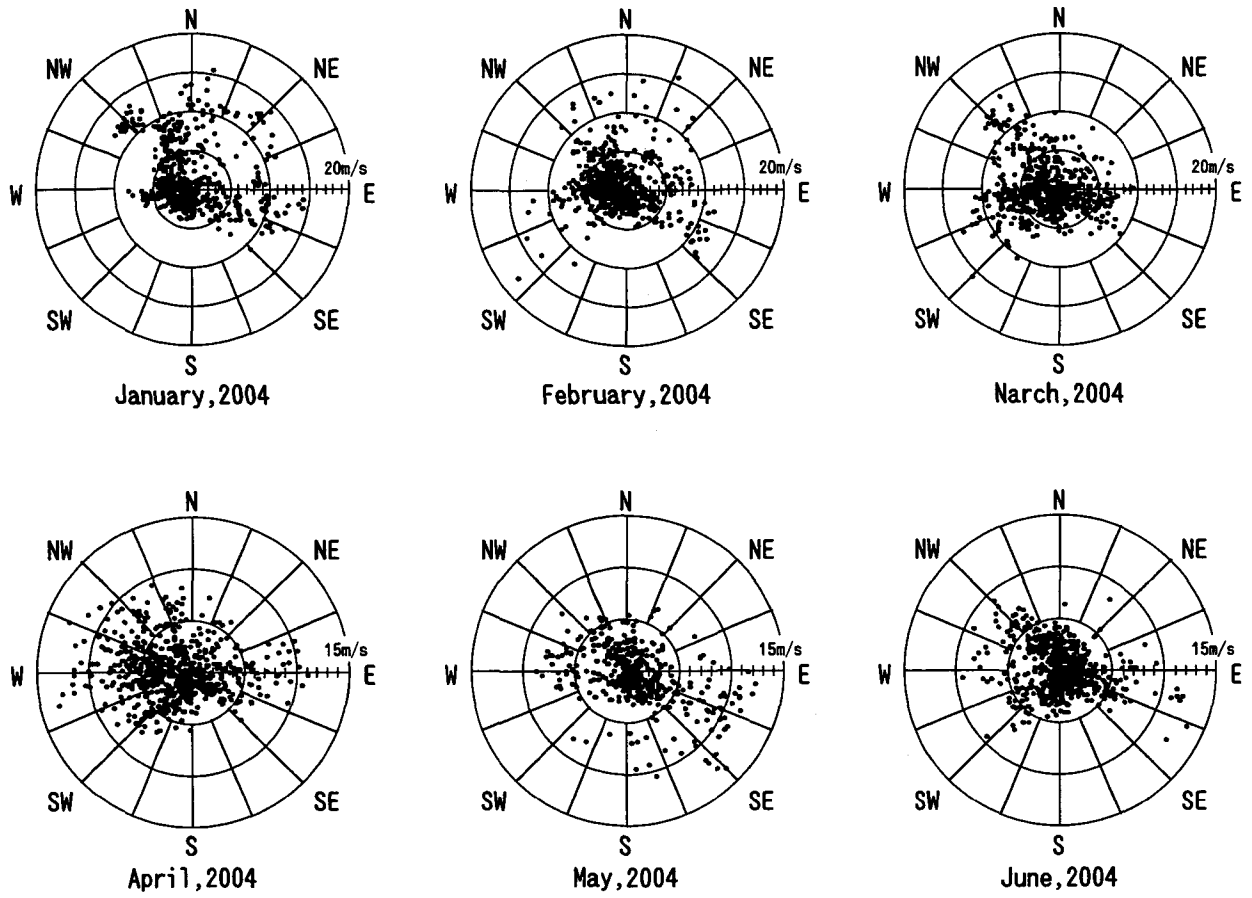


Fig. 4 Monthly wind roses obtained from the ASIOS tower during the period from January to June 2004.

List of the Data Report series related to the ASIOS

- Aota, M., Shirasawa, K., Hayashi, S., and Ide, M. (1988) Air-Sea-Ice Observation System of Hokkaido University and Preliminary Results of the 1988 Experiment. *Proc. IAHR Ice Symposium 1988*, Sapporo, 651-660.
- Shirasawa, K., and Aota, M. (1991) Atmospheric Boundary Layer Measurements over Sea Ice in the Sea of Okhotsk. *J. Mar. Syst.*, **2**, 63-79.
- Shirasawa, K., Ishikawa, M., Takatsuka, T., Daibou, T., Aota, M., and Hamaoka, S. (1998) Meteorological Observations at Marine Towers in Mombetsu, Hokkaido, April 1997 – November 1998. *Low Temperature Science, Ser. A.*, **57**. *Data Report*, 19-43.
- Shirasawa, K., Ishikawa, M., Takatsuka, T., Daibou, T., Aota, M., and Hamaoka, S. (1999) Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, December 1998 – December 1999. *Low Temperature Science, Ser. A.*, **58**. *Data Report*, 1-13.
- Shirasawa, K., Ishikawa, M., Takatsuka, T., Daibou, T., Aota, M., Hamaoka, S., and Tateyama, K. (2000) Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, January – December 2000. *Low Temperature Science, Ser. A.*, **59**. *Data Report*, 1-11.
- Shirasawa, K., Ishikawa, M., Takatsuka, T., Daibou, T., Aota, M., Hamaoka, S., and Tateyama, K. (2001) Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, January – December 2001. *Low Temperature Science, Ser. A.*, **60**. *Data Report*, 1-11.
- Shirasawa, K., Ishikawa, M., Takatsuka, T., Daibou, T., Tateyama, K., and Hamaoka, S. (2002) Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, January – December 2002. *Low Temperature Science, Ser. A.*, **61**. *Data Report*, 1-12.
- Shirasawa, K., Ishikawa, M., Takatsuka, T., Daibou, T., Tateyama, K., Nagata, R., and Hamaoka, S. (2003) Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, January – December 2003. *Low Temperature Science, Ser. A.*, **62**. *Data Report*, 1-18.
- Shirasawa, K., Ishikawa, M., Takatsuka, T., Nagata, R., and Hamaoka, S. (2004) Meteorological and Oceanographic Observations at Marine Towers on the Okhotsk Sea Coast of Hokkaido, January – July 2004. *Low Temperature Science, Ser. A.*, **63**. *Data Report*, (this issue).