

Cruise Name	Ship	Period	Observation Area	Data Status	Publication	Project	Principal	Chemical Variables in Data Set
KH67-1,2	Hakuho-maru	1967/7/18-18.08.1967	North Pacific, Japan Trench	closed	unpublished		Yoshio Horibe, Noriyuki Nasu/ ORI	
KH68-3	Hakuho-maru	1968/7/18-16.08.1968	North Pacific	opened	published		Yoshibumi Tomoda, Yoshio Horibe/ ORI	DO, pH, Duetrium, Tritium, O18/O16, Ca/Sr
KH68-4	Hakuho-maru	1968/11/14-03.03.1969	Pacific Ocean	opened	published		Yoshio Horibe/ ORI	NO2, NO3, Si, PO4, pH, TAlk, isotopes (Th, Pu, Ce, Sr, Po, Pb)
KH70-1	Hakuho-maru	1970/2/3-05.03.1970	North Pacific	opened from JODC (ex. TAlk and isotopes)	published		Toshihiko Teramoto, Yoshio Horibe/ ORI	DO, NO2, NO3, Si, PO4, pH, pCO2, TAlk, isotopes (Cu, Pu, Sr, Ce, Pb, Po, U, Th)
KH70-2	Hakuho-maru	1970/4/14-18.06.1970	North Pacific	opened	published		Yoshio Horibe/ ORI	DO, NO3, Si, PO4, pH, TAlk, pCO2, Ca, Fe, Al, isotopes (Po, Pu, Pb, Ra, Th, U, Sr, Cs, O)
KH71-3	Hakuho-maru	1971/6/18-29.07.1970	Western North Pacific	opened from JODC (ex. TAlk, Chl-a, and	published		Akihiko Hattori/ ORI	DO, NO3, Si, PO4, pH, TAlk, Chl-a, Fe, Al
KH71-5	Hakuho-maru	1971/11/18-10.03.1972	South Pacific	opened from JODC	published		Hiroyuki Tsubota/ ORI	DO, NO2, NO3, Si, PO4, pH
KH73-1	Hakuho-maru	1973/1/10-06.02.1973	Western North Pacific	opened	published		Akihiko Hattori/ ORI	DO, NO2, NO3, Si, PO4, NH4, Chl-a
KH75-3	Hakuho-maru	1975/5/14-02.06.1975	Western North Pacific	opened	published		Yoshio Horibe/ ORI	
KH75-4	Hakuho-maru	1975/6/21-18.08.1975	Northern North Pacific	opened	published		Akihiko Hattori/ ORI	
KH76-1	Hakuho-maru	1976/1/13-15.04.1976	Northern North Pacific	closed	unpublished	GDP	Yoshibumi Tomoda, Yoshio Horibe/ ORI	
KH77-3	Hakuho-maru	1977/9/14-12.10.1977	Japan Sea	opened	published		Yoshio Horibe/ ORI	DO, NO2, NO3, Si, PO4, pH, isotopes (Rn, C, Sr, Cs, Ra, Pb)
KH78-1	Hakuho-maru	1978/1/27-06.03.1978	Western North Pacific	closed	unpublished		Yoshio Horibe/ ORI	
KH78-3	Hakuho-maru	1978/7/5-22.08.1978	Bering Sea, Chukchi Sea, Northern North Pacific	opened	published		Akihiko Hattori/ ORI	
KH79-3	Hakuho-maru	1979/6/26-03.08.1979	Japan Sea, Western North Pacific	closed	unpublished		Yoshio Horibe/ ORI	
KH80-2	Hakuho-maru	1980/4/25-18.06.1980	North Pacific	opened	published		Yoshio Horibe/ ORI	DO, NO3, Si, PO4, pH, isotopes (C, Sr, Cs)
	Ryofu-maru, Hakuho-maru, Kaiyo-maru, R/V Natsushima, R/V Wellington-maru	1981-1989	Equatorial and Southern Pacific	opened from CDIAC and WDCGG	published	Underway air and surface seawater pCO2 data measured during the period of 1981-1989 by the Geochemical Research Department, Meteorological Research Institute, Japan	Hisayuki Y. Inoue/ MRI	xCO2(sea), xCO2(air)
KH82-1	Hakuho-maru	1982/1/22-17.03.1982	North Pacific	opened	published		Yoshiyuki Nozaki/ ORI	DO, NO3, Si, PO4, pH, isotopes (C, Sr, Cs)
KH82-5	Hakuho-maru	1982/11/22-24.02.1983	Eastern and Equatorial Pacific	opened	published		Akihiko Hattori/ ORI	DO, NO2, NO3, Si, PO4, NH4, pH, TAlk, Al, heavy metals (Cu, Zn, Cd), isotopes (Th, Ra, Pb, Po, Be, Pu, Am)
KH83-3	Hakuho-maru	1983/8/11-13.09.1983	Western North Pacific	opened	published		Isao Koike/ ORI	DO, NO2, NO3, Si, PO4, NH4, pH, TAlk, isotopes (Th, Ra, Pb, Po, C, N)
KH84-3	Hakuho-maru	1984/8/21-03.10.1984	Japan Sea	closed	unpublished		Yoshiyuki Nozaki/ ORI	
KH85-2	Hakuho-maru	1985/4/12-15.05.1985	Western North Pacific	opened	published		Akihiko Hattori, Toshisuke Nakai/ ORI	DO, NO2, NO3, Si, PO4, NH4, pH, TAlk, isotopes (Th, Ra, Pb, Po, C, N)
KH85-4	Hakuho-maru	1985/8/6-04.10.1985	North Pacific	closed	unpublished		Hitoshi Sakai/ ORI	
KH86-3	Hakuho-maru	1986/6/3-	North Pacific, Bering Sea	opened	published		Akihiko Hattori/	

Cruise Name	Ship	Period	Observation Area	Data Status	Publication	Project	Principal	Chemical Variables in Data Set
		01.08.1986					ORI	
KH87-2	Hakuho-maru	1987/5/6-09.06.1987	Western North Pacific	closed	unpublished		Yoshiyuki Nozaki, Hitoshi Sakai/ ORI	
KH88-3	Hakuho-maru	1988/6/7-25.08.1988	North Pacific	closed	unpublished	ORACO	Yoshiyuki Nozaki, Jiro Segawa/ ORI	
89-11, 90-01, 90-04, 90-06, 90-10, 91-01, 91-04, 91-06, 91-10, 92-01	Ryofu-maru	1989-1992	Equatorial and Western North Pacific	opened from CDIAC and WDCGG	published	Underway air and surface seawater pCO ₂ data measured during the R/V Ryofu Maru 10 cruises	Takashi Midorikawa/ JMA	xCO ₂ (sea), xCO ₂ (air)
KH89-2	Hakuho-maru	1989/10/27-05.03.1989	North Pacific, North Atlantic, Mediterranean, Indian Ocean, West Pacific	opened	published		Yoshiyuki Nozaki/ ORI	DO, NO ₂ , NO ₃ , Si, PO ₄ , pH, TALK, Chl-a, isotopes (Th, Po, Pb, Rn), Mn, Ca
KH90-3	Hakuho-maru	1990/10/28-14.12.1990	Western Equatorial Pacific	closed	unpublished		Yoshiyuki Nozaki, Hitoshi Sakai/ ORI	
KH91-3	Hakuho-maru	1991/5/9-08.06.1991	Western North Pacific	closed	unpublished		Isao Koike/ ORI	
KH91-5 (WHP-PC13)	Hakuho-maru	1991/8/13-02.10.1993	165E, 40N-5S	opened from WHP	published	WOCE	Keisuke Taira/ ORI	DO, PO ₄ , NO ₃ , NO ₂ , Si, DIC, TALK, pH, C13, (C14), CFC11, CFC12, Chl-a, Tritium
Hokusei '92 Cruise (155E)	Hokusei-maru	1992/6/20-05.07.1992	155E, 44N-39.5N	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO ₄ , NO ₃ , NO ₂ , Si, DIC, TALK, pH, C13, CFC11, CFC12, Chl-a
Hokusei '92 Cruise (175E)	Hokusei-maru	1992/7/10-10.08.1992	Around Emperor Ridge (37N-50N)	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO ₄ , NO ₃ , NO ₂ , Si, DIC, TALK, pH, C13, CFC11, CFC12, Chl-a
NH92-2	Hakurei-maru	1992/8/7-05.10.1992	Western North Pacific	opened as CD-ROM	published as CD-ROM	NOPACCS	Yutaka W. Watanabe/ NIRE	DO, NO ₂ , NO ₃ , PO ₄ , Si, DIC, TALK, pH, fCO ₂ (sea), fCO ₂ (air), Chl-a
KH92-4	Hakuho-maru	1992/9/16-27.10.1992	Western Pacific	closed	unpublished		Yoshiyuki Nozaki/ ORI	
NH93-1	Hakurei-maru	1993/4/13-11.06.1993	Western North Pacific	opened as CD-ROM	published as CD-ROM	NOPACCS	Yutaka W. Watanabe/ NIRE	DO, NO ₂ , NO ₃ , PO ₄ , Si, DIC, TALK, pH, fCO ₂ (sea), fCO ₂ (air), Chl-a
KH93-2 (WHP-P13J)	Hakuho-maru	1993/5/13-30.05.1993	165E, 48N-27N	opened from WHP	published	WOCE, WESTPAC	Keisuke Taira/ ORI	DO, NO ₃ , NO ₂ , Si, PO ₄ , DIC, TALK, pH, C13, C14, CFC11, CFC12, Chl-a, Tritium
KH93-2 /leg.2	Hakuho-maru	1993/5/13-30.05.1993	145E, 37N-20N	opened	published	WOCE, WESTPAC	Keisuke Taira/ ORI	DO, NO ₂ , NO ₃ , Si, PO ₄ , pH, TALK, DIC, C13, C14, CFC11, CFC12, CH ₄ , Chl-a, Tritium
Oshoro '93 Cruise	Oshoro-maru	1993/6/11-20.06.1993	180E, 36N-50.4N	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO ₄ , NO ₃ , NO ₂ , Si, NH ₄ , DIC, TALK, pH, C13, CFC11, CFC12, Chl-a
Hokusei '93 Cruise (155E)	Hokusei-maru	1993/6/15-03.07.1993	155E, 44N-37N	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO ₄ , NO ₃ , NO ₂ , Si, Chl-a
NH93-2	Hakurei-maru	1993/8/7-05.10.1993	Western North Pacific	opened as CD-ROM	published as CD-ROM	NOPACCS	Yutaka W. Watanabe/ NIRE	DO, NO ₂ , NO ₃ , PO ₄ , Si, DIC, TALK, pH, fCO ₂ (sea), fCO ₂ (air), Chl-a
KH93-4	Hakuho-maru	1993/10/18-03.12.1993	165E, 45N-24N	closed	unpublished		Isao Koike/ ORI	DO, PO ₄ , NO ₃ , NO ₂ , Si, NH ₄ , DIC, TALK, pH, Chl-a
WOCE P02T	Kaiyo-maru	1994/1/7-10.02.1994	North Pacific (30N)	opened from JODC and WHP	unpublished	WOCE	Yutaka W. Watanabe/ NIRE	DO, NO ₃ , NO ₂ , PO ₄ , Si, DIC, TALK, pH, Chl-a, CFC11, CFC12
	Shoyo	1994/1/15-23.01.1994	Western North Pacific	opened	unpublished		/JHD/JCG	fCO ₂ (sea), fCO ₂ (air)
NH94-1	Hakurei-maru	1994/4/13-11.06.1994	Western North Pacific	opened as CD-ROM	published as CD-ROM	NOPACCS	Yutaka W. Watanabe/ NIRE	DO, NO ₂ , NO ₃ , PO ₄ , Si, DIC, TALK, pH, fCO ₂ (sea), fCO ₂ (air), Chl-a
	Shoyo	1994/5/6-16.05.1994	Western North Pacific	opened	unpublished		/JHD/JCG	fCO ₂ (sea), fCO ₂ (air)
Hokusei '94 Cruise (155E)	Hokusei-maru	1994/6/1-15.06.1994	155E, 44N-37N	closed	unpublished		Shuichi Watanabe/ Hokkaido Univ.	DO, PO ₄ , NO ₃ , NO ₂ , Si, DIC, TALK, pH, Chl-a
	Shoyo	1994/7/10-04.08.1994	Western North Pacific	opened	unpublished		/JHD/JCG	fCO ₂ (sea), fCO ₂ (air)
NH94-2	Hakurei-maru	1994/8/8-	Western North Pacific	opened as CD-ROM	published as CD-ROM	NOPACCS	Yutaka W. Watanabe/	DO, NO ₂ , NO ₃ , PO ₄ , Si, DIC, TALK, pH, fCO ₂ (sea), fCO ₂ (air), Chl-a

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		06.10.1994			CD-ROM		NIRE	
	Shoyo	1994/8/22-18.09.1994	Western North Pacific	opened	unpublished		/JHD/JCG	fCO2(sea), fCO2(air)
KH94-3	Hakuho-maru	1994/9/2-21.10.1994	Western North Pacific	opened	published	WESTPAC	Yoshiyuki Nozaki/ Univ. Tokyo	NO2, NO3, PO4, Si
	Shoyo	1994/11/22-01.12.1994	Western North Pacific	opened	unpublished		/JHD/JCG	fCO2(sea), fCO2(air)
NH95-1	Hakurei-maru	1995/4/14-12.06.1995	Western North Pacific	opened as CD-ROM	published as CD-ROM	NOPACCS	Yutaka W. Watanabe/ NIRE	DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, fCO2(sea), fCO2(air), Chl-a
Hokusei '95 Cruise (155E)	Hokusei-maru	1995/6/15-03.07.1995	155E, 44N-37N	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a
Hokusei '95 Cruise (175E)	Hokusei-maru	1995/7/10-10.08.1995	Around Emperor Ridge (37N-50N)	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, C13, CFC11, CFC12, Chl-a
NH95-2	Hakurei-maru	1995/8/8-06.10.1995	Western North Pacific	opened as CD-ROM	published as CD-ROM	NOPACCS	Yutaka W. Watanabe/ NIRE	DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, fCO2(sea), fCO2(air), Chl-a
KH95-3	Hakuho-maru	1995/10/20-23.11.1995	165E, 45N-25N	closed	unpublished		Isao Koike/ Univ. Tokyo	DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, pH, Chl-a
NH96-1	Hakurei-maru	1996/4/12-10.06.1996	Western North Pacific	opened as CD-ROM	published as CD-ROM	NOPACCS	Yutaka W. Watanabe/ NIRE	DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, fCO2(sea), fCO2(air), Chl-a
HK9605	Hokko-maru	1996/5/9-16.05.1996	A line (off Hokkaido)	closed	published		Shuichi Watanabe/ Hokkaido Univ.	(DO, CTD only) PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a
WK9605	Wakataka-maru	1996/5/16-25.05.1996	Sanriku Region	closed	unpublished		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, pH, Chl-a
Oshoro '96 Cruise	Oshoro-maru	1996/6/3-19.08.1996	180E, 36N-50.4N	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, pH, C13, CFC11, CFC12, Chl-a
NH96-2	Hakurei-maru	1996/8/17-30.09.1996	Western North Pacific	opened as CD-ROM	published as CD-ROM	NOPACCS	Yutaka W. Watanabe/ NIRE	DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, fCO2(sea), fCO2(air), Chl-a
HK9608	Hokko-maru	1996/8/22-24.08.1996	A line (off Hokkaido)	closed	unpublished		Shuichi Watanabe/ Hokkaido Univ.	(DO, CTD only) PO4, NO3, NO2, Si, TAlk, pH, Chl-a, delta O18
KH96-5	Hakuho-maru	1996/12/19-18.02.1997	Indian Ocean	opened	published		Toshitaka Gamo/ Univ. Tokyo	DO, NO2, NO3, PO4, Si, pH, TAlk, Chl-a, isotopes (Pu, Am, Th, U, Be, Se, Ba, Ra), CH4, heavy metal (Fe, Mn, Cr, Pb, Ru), DMS
	M/S Skaugran	1997-1999	North Pacific	opened	published	Monitoring of Atmosphere-Ocean Carbon Dioxide Exchange by Ship of Opportunity	Yukihiro Nojiri/ CGER/NIES	fCO2 (sea), pCO2 (sea), fCO2 (air)
SY9701	Soyo-maru	1997/1/13-25.01.1997	Sanriku Region	closed	unpublished	SAGE	Katsuyuki Sasaki/ NRIFS	DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a, pCO2(sea)
SY9705	Soyo-maru	1997/5/9-22.05.1997	Sanriku Region	closed	unpublished as CD-ROM	SAGE	Katsuyuki Sasaki/ NRIFS	DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a, pCO2(sea)
Hokusei '97 Cruise (155E)	Hokusei-maru	1997/6/2-16.06.1997	155E, 44N-37N	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a
KH97-2	Hakuho-maru	1997/7/9-08.09.1997	Northern North Pacific	opened	published		Isao Koike/ ORI	DO, NO3, NO2, Si, PO4, NH4, Chl-a, Al, heavy/rare metal (Sc, Ti, V, Fe, Co, Ni, Zn, Ga, Y, Zr, Nb, Mo, Hf, Ta, W), I, As, Br
Hokusei '97 Cruise (175E)	Hokusei-maru	1997/7/11-11.08.1997	Around Emperor Ridge (37N-50N)	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, C13, CFC11, CFC12, Chl-a
	Shoyo	1997/8/6-24.08.1997	Western North Pacific	closed	unpublished	SAGE	Yasushi Imoto/ JHD/JCG	fCO2(sea), fCO2(air)
SY9708	Soyo-maru	1997/8/20-27.08.1997	Sanriku Region	closed	unpublished	SAGE	Katsuyuki Sasaki/ NRIFS	DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, C13, Chl-a, Dtrium, pCO2(sea)
HK9708	Hokko-maru	1997/8/21-23.08.1997	A line (off Hokkaido)	closed	published		Shuichi Watanabe/ Hokkaido Univ.	(DO, CTD only) PO4, NO3, NO2, Si, TAlk, pH, Chl-a
WK9711	Wakataka-maru	1997/11/9-16.11.1997	Sanriku Region	opened (partly closed)	unpublished		Katsuyuki Sasaki/ NRIFS	DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, C13, Chl-a, Dtrium

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Mr9702s	Mirai	1997/11/10 05.12.1997	Western North Pacific	opened	unpublished		Akihiko Murata/ JAMSTEC	fCO2(sea), pCO2(sea), fCO2(air)
Mr9702	Mirai	1997/11/11 04.12.1997	Western North Pacific	opened	unpublished	(KNOT)	Akihiko Murata/ JAMSTEC	DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, Chl-a
NH97	Hakurei-maru 2nd	1997/11/12 17.01.1998	Western North Pacific	opened (partly closed)	unpublished	WEST-COSMIC	Yutaka W. Watanabe/ NIRE	DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, CFC11, CFC12, CFC113, SF6, C13, C14, Chl-a, Ba, Ra, POC
TK9803	Tankai-maru	1998/3/9- 16.03.1998	A line (off Hokkaido)	closed	unpublished		Shuichi Watanabe/ Hokkaido Univ.	(DO, CTD only) PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a, delta O18
SY9804	Soyo-maru	1998/4/14- 29.04.1998	Sanriku Region	closed	unpublished	SAGE	Katsuyuki Sasaki/ NRIFS	DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, C13, CFC11, CFC12, SF6, Chl-a, Dtrium, pCO2(sea)
TK9804	Tankai-maru	1998/4/18- 20.04.1998	A line (off Hokkaido)	opened (partly closed)	unpublished		Katsuyuki Sasaki/ NRIFS	PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a
HK9805	Hokko-maru	1998/5/9- 16.05.1998	A line (off Hokkaido)	closed	published		Shuichi Watanabe/ Hokkaido Univ.	(DO, CTD only) PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a
Hokusei '98 Cruise (155E)	Hokusei-maru	1998/6/1- 15.06.1998	155E, 44N-36.8N	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a
ho98leg1	Hokusei-maru	1998/6/1- 14.06.1998	Western North Pacific	opened	unpublished	(KNOT)	/ CGER/NIES	fCO2(sea), pCO2(sea), fCO2(air)
Hokusei '98 Cruise (155E)	Hokusei-maru	1998/6/22- 06.07.1998	155E, 44N-35.8N	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a
ho98leg2	Hokusei-maru	1998/6/22- 05.07.1998	Western North Pacific	opened	unpublished	(KNOT)	/ CGER/NIES	fCO2(sea), pCO2(sea), fCO2(air)
TK9807	Tankai-maru	1998/7/4- 07.07.1998	A line (off Hokkaido)	opened (partly closed)	unpublished		Katsuyuki Sasaki/ NRIFS	PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a
KH98-3	Hakuho-maru	1998/7/15- 14.08.1998	Western North Pacific, Okhotsk, Japan sea	closed	unpublished		Yoshiyuki Nozaki/ ORI	
	Takuyo	1998/7/17- 11.08.1998	Western North Pacific	closed	unpublished	SAGE	Yasushi Imoto/ /JHD/JCG	fCO2(sea), fCO2(air)
Hokusei '98 Cruise (175E)	Hokusei-maru	1998/7/18- 18.08.1998	Around Emperor Ridge (37N-50N)	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a
ho98leg3	Hokusei-maru	1998/7/18- 16.08.1998	Western North Pacific	opened	unpublished	(KNOT)	/ CGER/NIES	fCO2(sea), pCO2(sea), fCO2(air)
Mr9806	Mirai	1998/8/1- 08.09.1998	Northern North Pacific	opened	unpublished		Akihiko Murata/ JAMSTEC	fCO2(sea), pCO2(sea), fCO2(air)
Mr9806NP	Mirai	1998/8/2- 12.08.1998	Northern North Pacific	opened	unpublished		Akihiko Murata/ JAMSTEC	DIC, fCO2(sea), pCO2(sea), fCO2(air)
NH98	Hakurei-maru 2nd	1998/8/12- 19.10.1998	Western North Pacific	opened (partly closed)	unpublished	WEST-COSMIC	Yutaka W. Watanabe/ NIRE	DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, CFC11, CFC12, CFC113, SF6, C13, C14, Chl-a, Ba, Ra, POC
SY9808	Soyo-maru	1998/8/18- 25.08.1998	Kuroshio Extention	closed	unpublished		Katsuyuki Sasaki/ NRIFS	fCO2(sea), Fluo., Chl-a, Plankton, NO2, NO3, PO4, Si, NH4, DIC, TAlk, pCO2(sea)
HK9808	Hokko-maru	1998/8/20- 22.08.1998	A line (off Hokkaido)	closed	published		Shuichi Watanabe/ Hokkaido Univ.	(DO, CTD only) PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a, delta O18
HK9809	Hokko-maru	1998/9/29- 30.09.1998	A line (off Hokkaido)	closed	published		Katsuyuki Sasaki/ NRIFS	PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a
bo98	Bosei-maru	1998/10/3- 20.10.1998	North Pacific	opened	unpublished	(KNOT)	/ CGER/NIES	fCO2(sea), pCO2(sea), fCO2(air)
Mr98-k01	Mirai	1998/11/3- 11.12.1998	Western North Pacific	opened	unpublished	(KNOT)	Akihiko Murata/ JAMSTEC	DO, NO2, NOx, PO4, Si, DIC, TAlk, pH, fCO2(sea), pCO2(sea), fCO2(air), Chl-a
SY9812	Soyo-maru	1998/11/28 19.12.1998	South of Japan	closed	unpublished		Katsuyuki Sasaki/ NRIFS	fCO2(sea), Fluo., Chl-a, Plankton, NO2, NO3, PO4, Si, NH4, DIC, TAlk, pCO2(sea)

Cruise Name	Ship	Period	Observation Area	Data Status	Publication	Project	Principal	Chemical Variables in Data Set
SY9903	Soyo-maru	1999/3/1-09.03.1999	Sanriku Region	closed	unpublished	SAGE	Katsuyuki Sasaki/ NRIFS	DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a, pCO2(sea)
SY9904	Soyo-maru	1999/4/15-24.04.1999	Kuroshio Extention	closed	unpublished		Katsuyuki Sasaki/ NRIFS	fCO2(sea), Flu., Chl-a, Plankton, NO2, NO3, PO4, Si, NH4, DIC, TAlk, pCO2(sea)
Mr99-k02	Mirai	1999/5/9-27.05.1999	Western North Pacific	opened	unpublished	(KNOT)	Akihiko Murata/ JAMSTEC	DO, NO2, NOx, PO4, Si, DIC, TAlk, pH, fCO2(sea), pCO2(sea), fCO2(air) Chl-a
P1 revisit /leg.1	Kaiyo-maru	1999/5/23-06.06.1999	Northern North Pacific	opened as CD-ROM (partly closed)	published as CD-ROM	SAGE	Yutaka W. Watanabe/ NIRE	DO, NO3, NO2, PO4, Si, DIC, TAlk, pH, Chl-a, C13, C14, CFC11, CFC12, CFC113, SF6, Ca, Ba, Ni, Cd, TOC
Hokusei '99 Cruise (155E)	Hokusei-maru	1999/6/1-15.06.1999	155E, 44N-39.5N	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a
ho99leg1	Hokusei-maru	1999/6/1-14.06.1999	Western North Pacific	opened	unpublished	(KNOT)	/ CGER/NIES	fCO2(sea), pCO2(sea), fCO2(air)
Hokusei '99 Cruise (155E)	Hokusei-maru	1999/6/22-06.07.1999	155E, 44N-35.5N	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a
ho99leg2	Hokusei-maru	1999/6/22-05.07.1999	Western North Pacific	opened	unpublished	(KNOT)	/ CGER/NIES	fCO2(sea), pCO2(sea), fCO2(air)
KH99-3	Hakuho-maru	1999/6/25-25.08.1999	Northern North Pacific, Bering Sea	closed	published		Isao Koike/ ORI	
kh99	Hakuho-maru	1999/6/25-24.08.1999	North Pacific	opened	unpublished	(KNOT)	/ CGER/NIES	fCO2(sea), pCO2(sea), fCO2(air)
Hokusei '99 Cruise (175E)	Hokusei-maru	1999/7/19-19.08.1999	Around Emperor Ridge (37N-50N)	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a
ho99leg3	Hokusei-maru	1999/7/19-19.08.1999	Western North Pacific	opened	unpublished	(KNOT)	/ CGER/NIES	fCO2(sea), pCO2(sea), fCO2(air)
Mr99-k04	Mirai	1999/7/27-18.08.1999	Western North Pacific	opened	unpublished		Akihiko Murata/ JAMSTEC	fCO2(sea), pCO2(sea), fCO2(air)
NH99	Hakurei-maru 2nd	1999/8/5-11.10.1999	Western North Pacific	opened (partly closed)	unpublished	WEST-COSMIC	Yutaka W. Watanabe/ NIRE	DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, CFC11, CFC12, CFC113, SF6, C13, C14, Chl-a, Ba, Ra, POC
SY9909	Soyo-maru	1999/8/26-07.09.1999	South of Japan	closed	unpublished		Katsuyuki Sasaki/ NRIFS	fCO2(sea), Flu., Chl-a, Plankton, NO2, NO3, PO4, Si, NH4, DIC, TAlk, pCO2(sea)
P1 revisit /leg.2	Mirai	1999/9/3-08.09.1999	Northern North Pacific	opened as CD-ROM (partly closed)	published as CD-ROM	SAGE	Yutaka W. Watanabe/ NIRE	DO, NO3, NO2, PO4, Si, DIC, TAlk, pH, Chl-a, C13, C14, CFC11, CFC12, CFC113, SF6, Ca, Ba, Ni, Cd, TOC
	Takuyo	1999/9/10-15.09.1999	Western North Pacific	closed	unpublished	SAGE	Yasushi Imoto/ JHD/JCG	fCO2(sea), fCO2(air)
Mr99-k05	Mirai	1999/9/13-02.10.1999	Western North Pacific	opened	unpublished		Akihiko Murata/ JAMSTEC	DIC, fCO2(sea), pCO2(sea), fCO2(air)
bo99	Bosei-maru	1999/10/7-26.10.1999	North Pacific	opened	unpublished	(KNOT)	/ CGER/NIES	fCO2(sea), pCO2(sea), fCO2(air)
SY9911	Soyo-maru	1999/11/8-23.11.1999	Sanriku Region	closed	unpublished	SAGE	Katsuyuki Sasaki/ NRIFS	DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, pCO2(sea), Flu., Chl-a
	M/S Alligator Hope	1999/11/12-12.05.2001	North Pacific	closed	unpublished	Monitoring of Atmosphere-Ocean Carbon Dioxide Exchange by Ship of Opportunity	Yukihiro Nojiri/ CGER/NIES	fCO2(sea), pCO2(sea), fCO2(air)
SY0001	Soyo-maru	2000/1/19-27.01.2000	Kuroshio Extention	closed	unpublished		Katsuyuki Sasaki/ NRIFS	fCO2 (sea), Flu., Chl-a, Plankton, NO2, NO3, PO4, Si, NH4, DIC, TAlk, pCO2(sea)
Hokusei 2000 Cruise (155E)	Hokusei-maru	2000/6/1-15.06.2000	155E, 44N-38N	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a
KH00-3	Hakuho-maru	2000/6/20-27.07.2000	North Pacific	closed	unpublished		Yoshiyuki Nozaki/ ORI	
Hokusei 2000 Cruise (155E)	Hokusei-maru	2000/6/21-05.07.2000	155E, 44N-35N	closed	published		Shuichi Watanabe/ Hokkaido Univ.	DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a