| Cruise Name | Ship | Period C | Observation Area | Data Status | Publication | Project | Principal | Chemical Variables in Data Set |
|-------------|---------------------|-----------------|---|-------------------------|-------------|--|---------------------------|---|
| KH67-1,2 | Hakuho-maru | 1967/7/18- N | North Pacific, Japan Trench | closed | unpublished | | Yoshio Horibe, | |
| | | 18.08.1967 | | | | | Noriyuki Nasu/ ORI | |
| KH68-3 | Hakuho-maru | 1968/7/18- N | North Pacific | opened | published | | Yoshibumi Tomoda, | DO, pH, Dutrium, Tritium, O18/O16, Ca/Sr |
| | | 16.08.1968 | | | | | Yoshio Horibe/ ORI | |
| KH68-4 | Hakuho-maru | 1968/11/14-P | Pacific Ocean | opened | published | | Yoshio Horibe/ ORI | NO2, NO3, Si, PO4, pH, TAlk, isotopes (Th, Pu, Ce, Sr, Po, Pb) |
| | | 03.03.1969 | | | | | | |
| KH70-1 | Hakuho-maru | 1970/2/3- N | North Pacific | opened from JODC | published | | Toshihiko Teramoto, | DO, NO2, NO3, Si, PO4, pH, pCO2, TAlk, isotopes (Cu, Pu, Sr, Ce, Pb, Po, U, |
| | | 05.03.1970 | | (ex. TAlk and isotopes) | | | Yoshio Horibe/ ORI | Th) |
| KH70-2 | Hakuho-maru | 1970/4/14- N | North Pacific | opened | published | | Yoshio Horibe/ | DO, NO3, Si, PO4, pH, TAlk, pCO2, Ca, Fe, Al, isotopes (Po, Pu, Pb, Ra, Th, |
| | | 18.06.1970 | | | | | ORI | U, Sr, Cs, O) |
| KH71-3 | Hakuho-maru | | Western North Pacific | opened from JODC | published | | Akihiko Hattori/ ORI | DO, NO3, Si, PO4, pH, TAlk, Chl-a, Fe, Al |
| | | 29.07.1970 | | (ex. TAlk, Chl-a, and | | | | |
| KH71-5 | Hakuho-maru | 1971/11/18-S | South Pacific | opened from JODC | published | | Hiroyuki Tsubota/ | DO, NO2, NO3, Si, PO4, pH |
| | | 10.03.1972 | | | | | ORI | |
| KH73-1 | Hakuho-maru | | Western North Pacific | opened | published | | Akihiko Hattori/ | DO, NO2, NO3, Si, PO4, NH4, Chl-a |
| | | 06.02.1973 | | | | | ORI | |
| KH75-3 | Hakuho-maru | | Western North Pacific | opened | published | | Yoshio Horibe/ | |
| ******** | ** 1 1 | 02.06.1975 | v d | | | | ORI | |
| KH75-4 | Hakuho-maru | | Northern North Pacific | opened | published | | Akihiko Hattori/ | |
| WITE 1 | YY 1 1 | 18.08.1975 | I d. N. d.D. 'C' | 1 1 | 11:1 1 | CDD | ORI | |
| KH76-1 | Hakuho-maru | | Northern North Pacific | closed | unpublished | GDP | Yoshibumi Tomoda, | |
| MILES O | Hakuho-maru | 15.04.1976 | | 1 | 11:1 1 | | Yoshio Horibe/ ORI | DO NOS NOS C. DOV. H |
| KH77-3 | Hakuno-maru | 1977/9/14- Ja | apan Sea | opened | published | | Yoshio Horibe/ | DO, NO2, NO3, Si, PO4, pH, isotopes (Rn, C, Sr, Cs, Ra, Pb) |
| V1170 1 | Holysho mom | 12.10.1977 | Western North Pacific | closed | unnuhlichad | | ORI Vashia Hariba/ | |
| KH78-1 | Hakuho-maru | 06.03.1978 | western North Pacific | ciosed | unpublished | | Yoshio Horibe/ ORI | |
| KH78-3 | Hakuho-maru | | Bering Sea, Chukchi Sea, Northern | onened | published | | Akihiko Hattori/ | |
| KII/6-3 | Hakuno-maru | | - | оренец | published | | ORI | |
| KH79-3 | Hakuho-maru | | North Pacific apan Sea, Western North Pacific | closed | unpublished | | Yoshio Horibe/ | |
| K1179-3 | Hakuno-maru | 03.08.1979 | apan sea, western North Facilic | closed | unpuonsneu | | ORI | |
| KH80-2 | Hakuho-maru | 1980/4/25- N | North Pacific | opened | published | | Yoshio Horibe/ | DO, NO3, Si, PO4, pH, isotopes (C, Sr, Cs) |
| K1100-2 | Hakuno-maru | 18.06.1980 | vorui i acine | оренеи | published | | ORI | DO, NO3, 31, 1 O4, p11, isotopes (C, 31, Cs) |
| | Ryofu-maru, | 1981- | | | | Underway air and surface | - | xCO2(sea), xCO2(air) |
| | Hakuho-maru, | 1989 | | | | seawater pCO2 data measured | Hisayuki Y. Inoue/ MRI | ACO2(364), ACO2(411) |
| | Kaiyo-maru, | - | Equatorial and Southern Pacific | opened from CDIAC and | published | during the period of 1981-1989 by | | |
| | R/V Natsushima, | | Squatoriai and Southern I acrite | WDCGG | * | the Geochemical Research Depertment, | | |
| | R/V Wellington-mart | 1 | | | | Meteorological Research Institute, Japan | | |
| KH82-1 | Hakuho-maru | 1982/1/22- N | North Pacific | opened | published | | Yoshiyuki Nozaki/ | DO, NO3, Si, PO4, pH, isotopes (C, Sr, Cs) |
| | | 17.03.1982 | | • | | | ORI | |
| KH82-5 | Hakuho-maru | 1982/11/22-E | Eastern and Equatorial Pacific | opened | published | | Akihiko Hattori/ | DO, NO2, NO3, Si, PO4, NH4, pH, TAlk, Al, heavy metals (Cu, Zn, Cd), |
| | | 24.02.1983 | • | • | | | ORI | isotopes (Th, Ra, Pb, Po, Be, Pu, Am) |
| KH83-3 | Hakuho-maru | 1983/8/11- V | Western North Pacific | opened | published | | Isao Koike/ | DO, NO2, NO3, Si, PO4, NH4, pH, TAlk, isotopes (Th, Ra, Pb, Po, C, N) |
| | | 13.09.1983 | | | | | ORI | |
| KH84-3 | Hakuho-maru | 1984/8/21- Ja | apan Sea | closed | unpublished | | Yoshiyuki Nozaki | |
| | | 03.10.1984 | | | | | /ORI | |
| KH85-2 | Hakuho-maru | 1985/4/12- V | Western North Pacific | opened | published | | Akihiko Hattori, | DO, NO2, NO3, Si, PO4, NH4, pH, TAlk, isotopes (Th, Ra, Pb, Po, C, N) |
| | | 15.05.1985 | | | | | Toshisuke Nakai/ ORI | |
| KH85-4 | Hakuho-maru | | North Pacific | closed | unpublished | | Hitoshi Sakai/ | |
| | | 04.10.1985 | | | | | ORI | |
| KH86-3 | Hakuho-maru | I I | North Pacific, Bering Sea | opened | published | | Akihiko Hattori/ | |
| | Tamano mara | - 7 0 0 0 0 0 1 | ueme, beimg ben | -1 | racioned | | - Intilia Intion | |

| 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- | Western North Pacific | closed | unpublished | | Yoshiyuki Nozaki, | |
| | | 09.06.1987 | | | p | | Hitoshi Sakai/ ORI | |
| KH88-3 | Hakuho-maru | | North Pacific | closed | unpublished | ORACO | Yoshiyuki Nozaki, | |
| 11100 5 | Tuntuno mara | 25.08.1988 | 1 total 1 delite | crosca | unpuononeu | | Jiro Segawa/ ORI | |
| 89-11, 90-01, 90-04, 90-06, 90- | Ryofu-maru | 1989- | Equatorial and Western North Pacific | opened from CDIAC and | published | Underway air and surface seawater pCO2 data | | xCO2(sea), xCO2(air) |
| 10, 91-01, 91-04, 91-06, 91-10, | rijora mara | 1992 | Equatorial and Western World Patient | | puononea | measured during the R/V Ryofu Maru 10 cruises | | 1002(000), 1002(ull) |
| KH89-2 | Hakuho-maru | | North Pacific, North Atlantic, | WDCGG opened | published | measured during the R/V Ryolu Maru 10 cruises | Yoshiyuki Nozaki/ | DO, NO2, NO3, Si, PO4, pH, TAlk, Chl-a, isotopes (Th, Po, Pb, Rn), Mn, Ca |
| 1110, 2 | Tuntuno mara | 05.03.1989 | Mediterranean, Indian Ocean, West | оренеа | puononea | | ORI | 5 o, 1102, 1103, 61, 1 o 1, p11, 11 m1, 6m u, notopes (11, 1 o, 1 o, 1 m), 1 m1, 6m |
| KH90-3 | Hakuho-maru | | Western Equatorial Pacific | closed | unpublished | | Yoshiyuki Nozaki, | |
| 111,00 | Tuntuno mara | 14.12.1990 | Western Equatorial Fuerre | crosca | unpuononeu | | Hitoshi Sakai/ ORI | |
| KH91-3 | Hakuho-maru | 1991/5/9- | Western North Pacific | closed | unpublished | | Isao Koike/ | |
| | Tuntuno mara | 08.06.1991 | Western Frontier Lacine | crosca | unpuononeu | | ORI | |
| KH91-5 (WHP-PC13) | Hakuho-maru | | 165E, 40N-5S | opened from WHP | published | WOCE | Keisuke Taira/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, C13, (C14,) CFC11, CFC12, Chl-a, |
| Kiisi s (Will Tels) | riakuno mara | 02.10.1993 | 1032, 4014 35 | opened from WTI | puonsneu | WOCE | ORI | - |
| Hokusei '92 Cruise (155E) | Hokusei-maru | | 155E, 44N-39.5N | closed | published | | Shuichi Watanabe/ | Tritium DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, C13, CFC11, CFC12, Chl-a |
| Hokuser 72 eruise (1332) | Hokusei maru | 05.07.1992 | 1552, 4411 57.511 | ciosca | puonsneu | | Hokkaido Univ. | 50, 104, 1103, 1102, 51, 510, 1711k, p11, c13, c1 c11, c1 c12, c11 u |
| Hokusei '92 Cruise (175E) | Hokusei-maru | | Around Emperor Ridge (37N-50N) | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, C13, CFC11, CFC12, Chl-a |
| Hokuser 72 eruise (173L) | Hokusel-maru | 10.08.1992 | Around Emperor Riage (3714-3014) | ciosca | published | | Hokkaido Univ. | 100, 104, 1103, 1102, 51, 11C, 174k, pH, C13, Cl C11, Cl C12, Cll-a |
| NH92-2 | Hakurei-maru | | Western North Pacific | opened as CD-ROM | published as | NOPACCS | | DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, fCO2(sea), fCO2(air), Chl-a |
| 11172 2 | Hakurer mara | 05.10.1992 | Western Worth Lacine | opened as CD ROM | • | Nornees | | 50, 1102, 1103, 1 04, 51, 510, 1 111k, p11, 1002(stat), 1002(all), clir a |
| KH92-4 | Hakuho-maru | | Western Pacific | closed | CD-ROM unpublished | | NIRE Yoshiyuki Nozaki/ | |
| K11)2-4 | Hakuno-maru | 27.10.1992 | Western Facility | ciosca | unpuonsneu | | ORI | |
| NH93-1 | Hakurei-maru | | Western North Pacific | opened as CD-ROM | published as | NOPACCS | | DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, fCO2(sea), fCO2(air), Chl-a |
| 11173-1 | Hakurer-maru | 11.06.1993 | western North Facilic | opened as CD-KOW | • | Noraces | | DO, 1102, 1103, 1 04, 31, DIC, 1 Alk, pH, 1CO2(sea), 1CO2(all), Clif-a |
| KH93-2 (WHP-P13J) | Hakuho-maru | | 165E, 48N-27N | opened from WHP | CD-ROM published | WOCE, WESTPAC | NIRE Keisuke Taira/ | DO, NO3, NO2, Si, PO4, DIC, TAlk, pH, C13, C14, CFC11, CFC12, Chl-a, |
| K1175-2 (W111-1 155) | Hakuno-maru | 30.05.1993 | 1032, 4011-2711 | opened from WTH | published | WOCE, WESTFAC | ORI | • |
| KH93-2 /leg.2 | Hakuho-maru | | 145E, 37N-20N | opened | published | WOCE, WESTPAC | Keisuke Taira/ | Tritium DO, NO2, NO3, Si, PO4, pH, TAlk, DIC, C13, C14, CFC11, CFC12, CH4, Chl- |
| K1175-2710g.2 | Hakuno-maru | 30.05.1993 | 1432, 3711-2011 | opened | published | WOCE, WESTIAC | ORI | |
| Oshoro '93 Cruise | Oshoro-maru | | 180E, 36N-50.4N | closed | published | | Shuichi Watanabe/ | a, Tritium DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, pH, C13, CFC11, CFC12, Chl-a |
| Oshoro 33 Cruise | Oshoro-maru | 20.06.1993 | 160E, 30IN-30.4IN | ciosed | published | | Hokkaido Univ. | DO, 1 04, 1103, 1102, 31, 11114, DIC, 1 Alk, pH, C13, C1 C11, C1 C12, C111-a |
| Hokusei '93 Cruise (155E) | Hokusei-maru | | 155E, 44N-37N | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, Chl-a |
| Hokuser 93 Cruise (133E) | Hokusei maru | 03.07.1993 | 1552, 4414 5714 | ciosca | puonsneu | | Hokkaido Univ. | 50,104,1105,1102,51, cm u |
| NH93-2 | Hakurei-maru | | Western North Pacific | opened as CD-ROM | published as | NOPACCS | | DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, fCO2(sea), fCO2(air), Chl-a |
| 14175 2 | Tukurer mara | 05.10.1993 | Western Worth Facility | opened as CD ROM | • | Nornees | | 50, 1102, 1103, 1 04, 51, 510, 1711k, p11, 1002(sea), 1002(aii), ciii a |
| KH93-4 | Hakuho-maru | | 165E, 45N-24N | closed | CD-ROM unpublished | | NIRE Isao Koike/ | DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, pH, Chl-a |
| Kily5 4 | riakuno mara | 03.12.1993 | 1032, 4314 2414 | ciosca | unpuonsneu | | ORI | 50, 104, 1103, 1102, 51, 1114, 510, 1111k, 511, cili u |
| WOCE P02T | Kaiyo-maru | | North Pacific (30N) | opened from JODC and | unnublished | WOCE | | DO, NO3, NO2, PO4, Si, DIC, TAlk, pH, Chl-a, CFC11, CFC12 |
| | rango mara | 10.02.1994 | Troitin Tuellie (3011) | WHP | unpuononeu | | | 50, 1105, 1102, 1 0 1, 51, 510, 11mi, p.1, c.m. u, c. c.1., c. c.12 |
| | Shoyo | | Western North Pacific | opened | unpublished | | NIRE | fCO2(sea), fCO2(air) |
| | biloyo | 23.01.1994 | Western Frontier Lacine | opened | unpuononeu | | /JHD/JCG | 1002(000), 1002(001) |
| NH94-1 | Hakurei-maru | | Western North Pacific | opened as CD-ROM | published as | NOPACCS | | DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, fCO2(sea), fCO2(air), Chl-a |
| | | 11.06.1994 | | op | CD-ROM | | | |
| | Shoyo | | Western North Pacific | opened | unpublished | | NIRE | fCO2(sea), fCO2(air) |
| | | 16.05.1994 | | | puolisiiou | | /JHD/JCG | ,, |
| Hokusei '94 Cruise (155E) | Hokusei-maru | | 155E, 44N-37N | closed | unpublished | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a |
| (1002) | | 15.06.1994 | , ::=: =:=: | | - Farmonea | | Hokkaido Univ. | -, -,,,,,, p-4) |
| | Shoyo | | Western North Pacific | opened | unpublished | | | fCO2(sea), fCO2(air) |
| | | 04.08.1994 | | | puolisiiou | | /JHD/JCG | ,, |
| NH94-2 | Hakurei-maru | | Western North Pacific | opened as CD-ROM | published as | NOPACCS | | DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, fCO2(sea), fCO2(air), Chl-a |
| | | 1//-/0/0- | estern rorun ruenne | opened as CD-ROM | Paononeu as | | - ataka 11. 11 atahaUC/ | 25, 1.52, 1.65, 1.54, 51, 510, 11 lik, p11, 1002(50a), 1002(all), Cill-d |

| Cruise Name | Ship | Period Observation Area | Data Status | Publication | Project | Principal | Chemical Variables in Data Set |
|---|---------------|---|------------------------|--------------|---|---------------------|---|
| | ~ | 06.10.1994 | | CD-ROM | | 1 | |
| | Shoyo | 1994/8/22- Western North Pacific | opened | unpublished | | NIRE | fCO2(sea), fCO2(air) |
| | Siloyo | 18.09.1994 | opened | unpuonsneu | | /JHD/JCG | ICO2(sea), ICO2(aii) |
| KH94-3 | Hakuho-maru | 1994/9/2- Western North Pacific | opened | published | WESTPAC | Yoshiyuki Nozaki/ | NO2, NO3, PO4, Si |
| | | 21.10.1994 | | | | Univ. Tokyo | |
| | Shoyo | 1994/11/22 Western North Pacific | opened | unpublished | | | fCO2(sea), fCO2(air) |
| | | 01.12.1994 | | | | /JHD/JCG | |
| NH95-1 | Hakurei-maru | 1995/4/14- Western North Pacific | opened as CD-ROM | published as | NOPACCS | Yutaka W. Watanabe/ | DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, fCO2(sea), fCO2(air), Chl-a |
| | | 12.06.1995 | | CD-ROM | | NIRE | |
| Hokusei '95 Cruise (155E) | Hokusei-maru | 1995/6/15- 155E, 44N-37N | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a |
| | | 03.07.1995 | | | | Hokkaido Univ. | |
| Hokusei '95 Cruise (175E) | Hokusei-maru | 1995/7/10- Around Emperor Ridge (37N-50N) | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, C13, CFC11, CFC12, Chl-a |
| | | 10.08.1995 | | | | Hokkaido Univ. | |
| NH95-2 | Hakurei-maru | 1995/8/8- Western North Pacific | opened as CD-ROM | published as | NOPACCS | Yutaka W. Watanabe/ | DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, fCO2(sea), fCO2(air), Chl-a |
| | | 06.10.1995 | | CD-ROM | | NIRE | |
| KH95-3 | Hakuho-maru | 1995/10/20-165E, 45N-25N | closed | unpublished | | Isao Koike/ | DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, pH, Chl-a |
| | | 23.11.1995 | | | | Univ. Tokyo | |
| NH96-1 | Hakurei-maru | 1996/4/12- Western North Pacific | opened as CD-ROM | published as | NOPACCS | Yutaka W. Watanabe/ | DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, fCO2(sea), fCO2(air), Chl-a |
| | | 10.06.1996 | | CD-ROM | | NIRE | |
| HK9605 | Hokko-maru | 1996/5/9- A line (off Hokkaido) | closed | published | | Shuichi Watanabe/ | (DO, CTD only) PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a |
| | | 16.05.1996 | | | | Hokkaido Univ. | |
| WK9605 | Wakataka-maru | 1996/5/16- Sanriku Region | closed | unpublished | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, pH, Chl-a |
| | | 25.05.1996 | | | | Hokkaido Univ. | |
| Oshoro '96 Cruise | Oshoro-maru | 1996/6/3- 180E, 36N-50.4N | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, pH, C13, CFC11, CFC12, Chl-a |
| | | 19.08.1996 | | | | Hokkaido Univ. | |
| NH96-2 | Hakurei-maru | 1996/8/17- Western North Pacific | opened as CD-ROM | published as | NOPACCS | Yutaka W. Watanabe/ | DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, fCO2(sea), fCO2(air), Chl-a |
| | | 30.09.1996 | | CD-ROM | | NIRE | |
| HK9608 | Hokko-maru | 1996/8/22- A line (off Hokkaido) | closed | unpublished | | Shuichi Watanabe/ | (DO, CTD only) PO4, NO3, NO2, Si, TAlk, pH, Chl-a, delta O18 |
| | | 24.08.1996 | | | | Hokkaido Univ. | |
| KH96-5 | Hakuho-maru | 1996/12/19 Indian Ocean | opened | published | | Toshitaka Gamo/ | DO, NO2, NO3, PO4, Si, pH, TAlk, Chl-a, isotopes (Pu, Am, Th, U, Be, Se, Ba, |
| | | 18.02.1997 | | | | Univ. Tokyo | Ra), CH4, heavy metal (Fe, Mn, Cr, Pb, Ru), DMS |
| | M/S Skaugran | 1997-1999 North Pacific | opened | published | Monitoring of Atmosphere-Ocean Carbon | Yukihiro Nojiri | fCO2 (sea), pCO2 (sea), fCO2 (air) |
| | | | | | Dioxide Exchange by Ship of Opportunity | CGER/NIES | |
| SY9701 | Soyo-maru | 1997/1/13- Sanriku Region | closed | unpublished | SAGE | Katsuyuki Sasaki/ | DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a, pCO2(sea) |
| | | 25.01.1997 | | | | NRIFS | |
| SY9705 | Soyo-maru | 1997/5/9- Sanriku Region | closed | unpublished | SAGE | Katsuyuki Sasaki/ | DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a, pCO2(sea) |
| | | 22.05.1997 | | as CD-ROM | | NRIFS | |
| Hokusei '97 Cruise (155E) | Hokusei-maru | 1997/6/2- 155E, 44N-37N | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a |
| YYY07 2 | | 16.06.1997 | ļ., | 1,1 | | Hokkaido Univ. | Do May May at Dol Will all the state of the |
| KH97-2 | Hakuho-maru | 1997/7/9- Northern North Pacific | opened | published | | Isao Koike/ | DO, NO3, NO2, Si, PO4, NH4, Chl-a, Al, heavy/rare metal (Sc, Ti, V, Fe, Co, |
| | ļ | 08.09.1997 | 1 | 1 | | ORI | Ni, Zn, Ga, Y, Zr, Nb, Mo, Hf, Ta, W), I, As, Br |
| Hokusei '97 Cruise (175E) | Hokusei-maru | 1997/7/11- Around Emperor Ridge (37N-50N) | closed | published | | | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, C13, CFC11, CFC12, Chl-a |
| | | 11.08.1997 | 1 | 1 | la Lar | Hokkaido Univ. | (SOON) SOON () |
| | Shoyo | 1997/8/6- Western North Pacific | closed | unpublished | SAGE | Yasushi Imoto/ | fCO2(sea), fCO2(air) |
| CV0709 | C | 24.08.1997 | -14 | | CACE | JHD/JCG | DO DOA NOS NOS C: NITA DIC TAIL CIS CLI - Det : COS |
| SY9708 | Soyo-maru | 1997/8/20- Sanriku Region | closed | unpublished | SAUE | Katsuyuki Sasaki/ | DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, C13, Chl-a, Dutrium, pCO2(sea) |
| *************************************** | ** | 27.08.1997 | 1 | 1,1 | | NRIFS | TO CITE A VIOLANCE NO CITATION OF |
| HK9708 | Hokko-maru | 1997/8/21- A line (off Hokkaido) | closed | published | | Shuichi Watanabe/ | (DO, CTD only) PO4, NO3, NO2, Si, TAlk, pH, Chl-a |
| ***** | 1 | 23.08.1997 | | | | Hokkaido Univ. | |
| WK9711 | Wakataka-maru | 1997/11/9- Sanriku Region | opened (partly closed) | unpublished | | Katsuyuki Sasaki/ | DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, C13, Chl-a, Dutrium |
| | | 16.11.1997 | | | | NRIFS | |

| Cruise Name | Ship | Period Observation Area | Data Status | Publication | Project | Principal | Chemical Variables in Data Set |
|---------------------------|------------------|---|------------------------|-------------|-------------|----------------------------|--|
| Mr9702s | Mirai | 1997/11/10-Western North Pacific | opened | unpublished | - | Akihiko Murata/ | fCO2(sea), pCO2(sea), fCO2(air) |
| | | 05.12.1997 | | | | JAMSTEC | |
| Mr9702 | Mirai | 1997/11/11 Western North Pacific | opened | unpublished | (KNOT) | Akihiko Murata/ | DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, Chl-a |
| | | 04.12.1997 | | | | JAMSTEC | _ |
| NH97 | Hakurei-maru 2nd | 1997/11/12-Western North Pacific | opened (partly closed) | unpublished | WEST-COSMIC | | DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, CFC11, CFC12, CFC113, SF6, C13, |
| | | 17.01.1998 | | 1 | | NIRE | C14, Chl-a, Ba, Ra, POC |
| TK9803 | Tankai-maru | 1998/3/9- A line (off Hokkaido) | closed | unpublished | | Shuichi Watanabe/ | (DO, CTD only) PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a, delta O18 |
| | | 16.03.1998 | | 1 | | Hokkaido Univ. | |
| SY9804 | Soyo-maru | 1998/4/14- Sanriku Region | closed | unpublished | SAGE | Katsuyuki Sasaki/ | DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, C13, CFC11, CFC12, SF6, Chl-a, |
| | | 29.04.1998 | | 1 | | NRIFS | Dutrium, pCO2(sea) |
| TK9804 | Tankai-maru | 1998/4/18- A line (off Hokkaido) | opened (partly closed) | unpublished | | | PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a |
| | | 20.04.1998 | (Family 111111) | | | - | |
| HK9805 | Hokko-maru | 1998/5/9- A line (off Hokkaido) | closed | published | | NRIFS Shuichi Watanabe/ | (DO, CTD only) PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a |
| | | 16.05.1998 | | P | | Hokkaido Univ. | |
| Hokusei '98 Cruise (155E) | Hokusei-maru | 1998/6/1- 155E, 44N-36.8N | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a |
| Hokuser 76 Cruise (155E) | Hokusei maru | 15.06.1998 | closed | published | | Hokkaido Univ. | 50, 104, 1103, 1102, 51, 510, 11111, p11, cili u |
| ho98leg1 | Hokusei-maru | 1998/6/1- Western North Pacific | opened | unpublished | (KNOT) | / | fCO2(sea), pCO2(sea), fCO2(air) |
| novolegi | 110kusei-maru | 14.06.1998 | opened | unpuonsneu | (KNO1) | CGER/NIES | 1002(sca), pe02(sca), 1002(aii) |
| Hokusei '98 Cruise (155E) | Hokusei-maru | 1998/6/22- 155E, 44N-35.8N | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a |
| Hokuser 76 Cruise (133L) | 110kusei-maru | 06.07.1998 | ciosca | published | | Hokkaido Univ. | 100, 104, 1003, 1002, 31, 1010, 1741k, pH, CHI-a |
| ho98leg2 | Hokusei-maru | 1998/6/22- Western North Pacific | opened | unpublished | (KNOT) | / | fCO2(sea), pCO2(sea), fCO2(air) |
| 110981eg2 | riokusei-iliaru | 05.07.1998 | opened | unpuonsneu | (KNO1) | CGER/NIES | icoz(sea), pcoz(sea), icoz(aii) |
| TK9807 | T1: | | | | | | DOA NOS NOS CENHA DIC TAIL CLI - |
| 1K980/ | Tankai-maru | 1998/7/4- A line (off Hokkaido) | opened (partly closed) | unpublished | | Katsuyuki Sasaki/ | PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a |
| 171100 2 | ** 1 1 | 07.07.1998 | 1 1 | 11:1 1 | | NRIFS | |
| KH98-3 | Hakuho-maru | 1998/7/15- Western North Pacific, Okhotsk | , closed | unpublished | | Yoshiyuki Nozaki/ | |
| | m 1 | 14.08.1998 Japan sea | | 11:1 | 0.4.07 | ORI | range () range () |
| | Takuyo | 1998/7/17- Western North Pacific | closed | unpublished | SAGE | Yasushi Imoto | fCO2(sea), fCO2(air) |
| | | 11.08.1998 | | | | /JHD/JCG | |
| Hokusei '98 Cruise (175E) | Hokusei-maru | 1998/7/18- Around Emperor Ridge (37N-50N) | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a |
| | | 18.08.1998 | | | | Hokkaido Univ. | |
| ho98leg3 | Hokusei-maru | 1998/7/18- Western North Pacific | opened | unpublished | (KNOT) | / | fCO2(sea), pCO2(sea), fCO2(air) |
| | | 16.08.1998 | | | | CGER/NIES | |
| Mr9806 | Mirai | 1998/8/1- Northern North Pacific | opened | unpublished | | Akihiko Murata/ | fCO2(sea), pCO2(sea), fCO2(air) |
| | | 08.09.1998 | | | | JAMSTEC | |
| Mr9806NP | Mirai | 1998/8/2- Northern North Pacific | opened | unpublished | | Akihiko Murata/ | DIC, fCO2(sea), pCO2(sea), fCO2(air) |
| | | 12.08.1998 | | | | JAMSTEC | |
| NH98 | Hakurei-maru 2nd | 1998/8/12- Western North Pacific | opened (partly closed) | unpublished | WEST-COSMIC | Yutaka W. Watanabe/ | DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, CFC11, CFC12, CFC113, SF6, C13, |
| | | 19.10.1998 | | | | NIRE | C14, Chl-a, Ba, Ra, POC |
| SY9808 | Soyo-maru | 1998/8/18- Kuroshio Extention | closed | unpublished | | Katsuyuki Sasaki/ | fCO2(sea), Fluo., Chl-a, Plankton, NO2, NO3, PO4, Si, NH4, DIC, TAlk, |
| | | 25.08.1998 | | | | NRIFS | pCO2(sea) |
| HK9808 | Hokko-maru | 1998/8/20- A line (off Hokkaido) | closed | published | | Shuichi Watanabe/ | (DO, CTD only) PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a, delta O18 |
| | | 22.08.1998 | | | | Hokkaido Univ. | |
| HK9809 | Hokko-maru | 1998/9/29- A line (off Hokkaido) | closed | published | | Katsuyuki Sasaki/ | PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a |
| | | 30.09.1998 | | | | NRIFS | |
| bo98 | Bosei-maru | 1998/10/3- North Pacific | opened | unpublished | (KNOT) | / | fCO2(sea), pCO2(sea), fCO2(air) |
| | | 20.10.1998 | | | | CGER/NIES | |
| Mr98-k01 | Mirai | 1998/11/3- Western North Pacific | opened | unpublished | (KNOT) | Akihiko Murata/ | DO, NO2, NOx, PO4, Si, DIC, TAlk, pH, fCO2(sea), pCO2(sea), fCO2(air), |
| | <u> </u> | 11.12.1998 | | | | JAMSTEC | Chl-a |
| SY9812 | Soyo-maru | 1998/11/28-South of Japan | closed | unpublished | | Katsuyuki Sasaki/ | fCO2(sea), Fluo., Chl-a, Plankton, NO2, NO3, PO4, Si, NH4, DIC, TAlk, |
| | • | 19.12.1998 | 1 | 1 | l | | 1 |

| Cruise Name | Ship | Period | Observation Area | Data Status | Publication | Project | Principal | Chemical Variables in Data Set |
|----------------------------|--------------------|------------|------------------------------------|--------------------------|--------------|---|-------------------|---|
| SY9903 | Soyo-maru | 1999/3/1- | Sanriku Region | closed | unpublished | SAGE | Katsuyuki Sasaki/ | DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, Chl-a, pCO2(sea) |
| | | 09.03.1999 | | | | | NRIFS | |
| SY9904 | Soyo-maru | 1999/4/15- | Kuroshio Extention | closed | unpublished | | Katsuyuki Sasaki/ | fCO2(sea), Fluo., Chl-a, Plankton, NO2, NO3, PO4, Si, NH4, DIC, TAlk, |
| | | 24.04.1999 | | | | | NRIFS | pCO2(sea) |
| Mr99-k02 | Mirai | 1999/5/9- | Western North Pacific | opened | unpublished | (KNOT) | Akihiko Murata/ | DO, NO2, NOx, PO4, Si, DIC, TAlk, pH, fCO2(sea), pCO2(sea), fCO2(air) Chl |
| | | 27.05.1999 | | | | | JAMSTEC | a |
| P1 revisit /leg.1 | Kaiyo-maru | 1999/5/23- | Northern North Pacific | opened as CD-ROM (partly | published as | SAGE | | DO, NO3, NO2, PO4, Si, DIC, TAlk, pH, Chl-a, C13, C14, CFC11, CFC12, |
| | | 06.06.1999 | | closed) | CD-ROM | | NIRE | CFC113, SF6, Ca, Ba, Ni, Cd, TOC |
| Hokusei '99 Cruise (155E) | Hokusei-maru | 1999/6/1- | 155E, 44N-39.5N | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a |
| | | 15.06.1999 | | | | | Hokkaido Univ. | |
| ho99leg1 | Hokusei-maru | 1999/6/1- | Western North Pacific | opened | unpublished | (KNOT) | / | fCO2(sea), pCO2(sea), fCO2(air) |
| | | 14.06.1999 | | | | | CGER/NIES | |
| Hokusei '99 Cruise (155E) | Hokusei-maru | 1999/6/22- | 155E, 44N-35.5N | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a |
| | | 06.07.1999 | | | | | Hokkaido Univ. | |
| ho99leg2 | Hokusei-maru | 1999/6/22- | Western North Pacific | opened | unpublished | (KNOT) | / | fCO2(sea), pCO2(sea), fCO2(air) |
| | | 05.07.1999 | | | | | CGER/NIES | |
| KH99-3 | Hakuho-maru | 1999/6/25- | Northern North Pacific, Bering Sea | closed | published | | Isao Koike/ | |
| | | 25.08.1999 | | | | | ORI | |
| kh99 | Hakuho-maru | 1999/6/25- | North Pacific | opened | unpublished | (KNOT) | / | fCO2(sea), pCO2(sea), fCO2(air) |
| | | 24.08.1999 | | | | | CGER/NIES | |
| Hokusei '99 Cruise (175E) | Hokusei-maru | 1999/7/19- | Around Emperor Ridge (37N-50N) | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a |
| | | 19.08.1999 | | | | | Hokkaido Univ. | |
| ho99leg3 | Hokusei-maru | 1999/7/19- | Western North Pacific | opened | unpublished | (KNOT) | / | fCO2(sea), pCO2(sea), fCO2(air) |
| | | 19.08.1999 | | | | | CGER/NIES | |
| Mr99-k04 | Mirai | 1999/7/27- | Western North Pacific | opened | unpublished | | Akihiko Murata/ | fCO2(sea), pCO2(sea), fCO2(air) |
| | | 18.08.1999 | | | | | JAMSTEC | |
| NH99 | Hakurei-maru 2nd | 1999/8/5- | Western North Pacific | opened (partly closed) | unpublished | WEST-COSMIC | | DO, NO2, NO3, PO4, Si, DIC, TAlk, pH, CFC11, CFC12, CFC113, SF6, C13, |
| | | 11.10.1999 | | | | | NIRE | C14, Chl-a, Ba, Ra, POC |
| SY9909 | Soyo-maru | 1999/8/26- | South of Japan | closed | unpublished | | Katsuyuki Sasaki/ | fCO2(sea), Fluo., Chl-a, Plankton, NO2, NO3, PO4, Si, NH4, DIC, TAlk, |
| | | 07.09.1999 | | | | | NRIFS | pCO2(sea) |
| P1 revisit /leg.2 | Mirai | 1999/9/3- | Northern North Pacific | opened as CD-ROM (partly | published as | SAGE | | DO, NO3, NO2, PO4, Si, DIC, TAlk, pH, Chl-a, C13, C14, CFC11, CFC12, |
| | | 08.09.1999 | | closed) | CD-ROM | | NIRE | CFC113, SF6, Ca, Ba, Ni, Cd, TOC |
| | Takuyo | 1999/9/10- | Western North Pacific | closed | unpublished | SAGE | Yasushi Imoto/ | fCO2(sea), fCO2(air) |
| | | 15.09.1999 | | | | | JHD/JCG | |
| Mr99-k05 | Mirai | 1999/9/13- | Western North Pacific | opened | unpublished | | Akihiko Murata/ | DIC, fCO2(sea), pCO2(sea), fCO2(air) |
| | | 02.10.1999 | | | | | JAMSTEC | |
| bo99 | Bosei-maru | 1999/10/7- | North Pacific | opened | unpublished | (KNOT) | / | fCO2(sea), pCO2(sea), fCO2(air) |
| | | 26.10.1999 | | | | | CGER/NIES | |
| SY9911 | Soyo-maru | 1999/11/8- | Sanriku Region | closed | unpublished | SAGE | Katsuyuki Sasaki/ | DO, PO4, NO3, NO2, Si, NH4, DIC, TAlk, pCO2(sea), Fluo., Chl-a |
| | | 23.11.1999 | | | | | NRIFS | |
| | M/S Alligator Hope | 1999/11/12 | North Pacific | closed | unpublished | Monitoring of Atmosphere-Ocean Carbon | | fCO2(sea), pCO2(sea), fCO2(air) |
| ******* | _ | 12.05.2001 | | | | Dioxide Exchange by Ship of Opportunity | CGER/NIES | |
| SY0001 | Soyo-maru | | Kuroshio Extention | closed | unpublished | | Katsuyuki Sasaki/ | fCO2 (sea), Fluo., Chl-a, Plankton, NO2, NO3, PO4, Si, NH4, DIC, TAlk, |
| H. 1. (2000 C.). (1557) | ** 1 . | 27.01.2000 | | 1 1 | 11: 1 1 | | NRIFS | pCO2(sea) |
| Hokusei 2000 Cruise (155E) | Hokusei-maru | 2000/6/1- | 155E, 44N-38N | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a |
| | | 15.06.2000 | N 4 70 101 | | | | Hokkaido Univ. | |
| KH00-3 | Hakuho-maru | | North Pacific | closed | unpublished | | Yoshiyuki Nozaki/ | |
| | | 27.07.2000 | | | | | ORI | |
| Hokusei 2000 Cruise (155E) | Hokusei-maru | | 155E, 44N-35N | closed | published | | Shuichi Watanabe/ | DO, PO4, NO3, NO2, Si, DIC, TAlk, pH, Chl-a |
| | | 05.07.2000 | | | | | Hokkaido Univ. | |