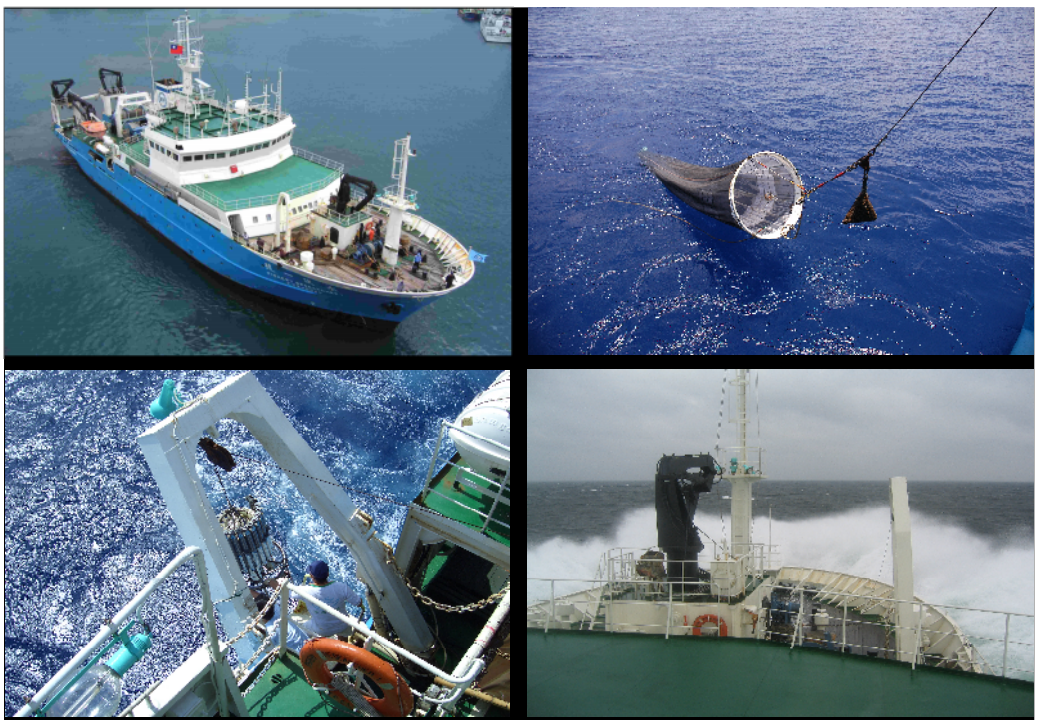
Cruise Report of TaiCOFI Surveys in 2007

2007 年台灣周邊海域漁場環境監測航次報告



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Fisheries Research Institute
Council of Agriculture, Executive Yuan
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行政院農業委員會水產試驗所

中華民國 99 年 12 月

序

眾所周知，地球的環境正面臨空前的危機。全球暖化的影響，不只作用在人類可以直接感覺到的氣候上，更深遠的影響海洋物理與化學環境，進一步的影響棲息其中的海洋生物，而一直是人類蛋白質重要來源的海洋水產資源，亦難免受其影響，於是全球暖化的惡果最終仍會反饋到我們人類身上。因此，如何有效監測海洋物理與化學環境，以便及時發現問題並提供解決對策，是海洋研究重要的工作。

為落實永續農業政策，維護自然生態環境，本所致力於台灣周邊海域生態系構造及漁場環境動態研究。本所為執行漁場環境監測，除多次邀請日本東北大學名譽教授川崎健以及美國西南漁業中心 Nancy Lo 博士至所指導外，並派員前往美國與加州沿岸漁場環境監測團隊 (California Cooperative Oceanic Fisheries Investigations, CALCOFI) 進行交流，實地觀摩該計畫各項科儀與網具操作標準作業流程以及資料庫建置與應用方式，期使我國漁場環境調查技術達到可與國際接軌的水平。

台灣四面環海，海洋資源是我們最重要的資產之一，然海上工作一直較陸上工作辛苦而危險，海洋研究工作亦是如此，除了要面對研究工作中的種種困難，更要克服暈船、惡劣氣候及與世隔絕等等不適。因此，從事海洋研究的工作人員，惟有抱持迎著風前行的堅定決心，才能克服一切險阻，而本專刊正是本所研究人員辛苦工作的結晶，衷心期望藉由本專刊之發行，提供豐碩調查成果予國內相關研究單位卓參，作為未來永續漁業發展的堅實基礎。

所長

蘇偉成 謹誌

中華民國九十九年十二月

Preface

As everyone knows, the earth is experiencing unprecedented crisis. Global warming affects not only the climate but also the physical and chemical properties of the ocean. Marine organisms, an important source of high quality animal proteins, are no exception to the influence of global warming. Finally, human beings will suffered from the consequences. Therefore, how to monitoring our ocean to detect anomalies effectively and to find a way to deal with the situation is the priority for fishery researchers.

In order to carry out the sustainable use policy and to protect our environment, Fisheries Research Institute implemented the Taiwan Cooperative Oceanic Fisheries Investigations (TaiCOFI) program based on the hydrography of the surrounding waters off Taiwan to investigate in the dynamics between fishery resources and environmental factors. Special thanks have to be expressed to Professor Emeritus Dr. Kawasaki of Tohoku University and Dr. Nancy Lo of the Southwest Fisheries Science Center, for their valuable advices to the program. In addition, we also learn a lot from CALCOFI (California Cooperative Oceanic Fisheries Investigations) through academic exchange.

Taiwan is an island and the ocean is our priceless property. The Kuroshio continuously flows northward along the eastern coast of Taiwan, which comprises a pathway for many migratory fishes, such as mackerel, skip jack, tuna, billfish, shark, dolphinfish, etc. In the west, the Taiwan Strait is much shallower and abundant in demersal fishes like Japanese butterfish, silver pomfret, ribbon fish, eels, flounders, croaker, etc. However, with the changing of climate and industrialization, how to exploit the resources sustainably is the key question. Through publishing「Cruise Report of TaiCOFI Surveys in 2007」, we hope our investigation results will be helpful to fishery researchers in Taiwan and contribute more to the society, leading fisheries in Taiwan towards sustainability.

Director, Fisheries Research Institute

前言

近年來由於全球氣候變遷及海洋環境污染問題日益嚴重，許多國家已致力於海洋環境及生物資源之基礎探測與資料庫之建置。然以往我國有關海洋方面之研究計畫多侷限於局部海域之短期研究，觀測線或觀測點常隨計畫主題改變而改變，缺乏長期而有系統性的調查資料，再者，多數計畫係以海洋物理化學為研究重點，漁業研究學者欲將這些資料應用在水產資源研究上，著實不易。

有鑑於此，水產試驗所於 2003 年起著手實施「台灣周邊海域漁場環境監測」計畫，於周邊海域設置 62 個測站按季蒐集水溫、鹽度、營養鹽、葉綠素、浮游動物等漁場環境資訊，嘗試透過此全面性之調查來瞭解台灣周邊海域長期水文、海況及漁業生物時空分佈資訊，進而掌握影響台灣周邊海域漁業資源變動的機制。六年來，承蒙各方提供寶貴之經驗與建議，不斷改進海洋探測科儀操作及採樣相關流程，在本所同仁與國內相關學術單位的共同努力下，無論在各項科儀操作效率、漁場環境調查技術或漁業生物研究上均已小有成果。

本專刊彙集本所於 2007 年執行「台灣周邊海域漁場環境監測」計畫（農委會科技計畫編號：96 農科-15.1.1-水-A3(1)）之調查成果，計畫執行之海上採樣作業流程、各調查項目實驗室檢測流程、各航次出海採樣及樣本分析人員均有詳述於後，此外，利用 Surfer 軟體以圖示方式刊出台灣周邊海域之水溫、鹽度、營養鹽、葉綠素、浮游動物及基礎生產力等漁場環境因子之調查成果以供各界參考。本計畫內容涉及廣泛專業領域，也由於人力及經驗的關係，雖戮力以赴亦難免有疏漏不周之處，希冀各界先進不吝賜教斧正。

Introduction

With the changing of climate and the growing of marine environmental pollutions in recent years, many countries have devoted to establishing their database for marine environment and aquatic living resources. However, in the past, marine research programs in Taiwan were mostly confined to a short time scale and of a limited region. Besides, transects or stations of surveys were usually changing with the changing of projects, resulted in a scarcity of long term and systematic observations of waters around Taiwan. Furthermore, most programs were aimed at marine chemistry and physics studies. It is hard for fishery scientists to incorporate that information into fishery stock assessment.

As a result, Fisheries Research Institute implemented「Taiwan Cooperative Oceanic Fisheries Investigations, TaiCOFI」program in 2003 to conduct quarterly cruises to collect water temperature, salinity, nutrients, chlorophyll-*a* and zooplankton measurements at 62 stations in the surrounding waters of Taiwan. Through this thorough investigation, we try to understand the coupling of physical, chemical and biological dynamics in the surrounding waters of Taiwan to figure out the factors associated with the fluctuation of fishery resources. For the past 6 years, we really appreciated for the valuable advices from academic communities to improve our field sampling techniques and operation procedures of marine observation instrument. With the hardworking of our staff members and associated academic organizations, now we have preliminary achievements in the operating efficiency of marine observation instruments, fishing ground investigation techniques and fisheries biology research.

The data presented in this report were collected during four cruises in 2007 of the TaiCOFI program. Data from the cruises were collected and processed by personnel of FRI and Associate Professor Cheng Shiue-Yuan of National Taiwan Ocean University participated in the analysis of primary productivity. Standard procedures of field program and sample analysis are described in detail and the distribution of water temperature, salinity, nutrients, chlorophyll-*a*, zooplankton and primary production are illustrated in figures for each cruise. Finally, we will extent our special thanks for your advices to improve this cruise report.

目錄

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海上採樣作業流程

在台灣周邊海域選定 62 個測站，利用水試一號試驗船及其裝備，按季節別於 2007 年 1 月、5 月、7 月及 10 月，進行下列之工作項目：

1.CTD 溫鹽調查：

採用 Seabird SBE-911PLUS 溫鹽深儀（CTD），每測站均投放至 1000 m (水深不足之測站則以實際水深少 10 m 為原則)，取得溫深鹽之連續資料。

2.分層採水：

利用 General Oceanics 之自動採水瓶，採取 5、25、50、75、100、150 m 等水層之海水各 2000 ml。

3.葉綠素甲測定：

取各層海水 1000 ml，利用 Millipore 濾紙過濾後，以-20℃急速冷凍保存，再攜回實驗室檢測。

4.營養鹽類測定：

分別收集各層海水 100 ml，以液態氮(-196℃)急速冷凍保存後，再攜回實驗室檢測。

5.浮游動物採集：

以 ORI 網下放至 200 m 深(水深不足之測站則以實際水深少 5 m 為原則)，以 1 m/s 速度上揚，取得之樣本以 5%福馬林海水溶液保存，再攜回實驗室測定生物量及分類。

Field Observations

The survey was carried out in the waters surrounding Taiwan by *Fishery Researcher I* during quarterly cruise in January, May, July and October in 2007. The following procedures were conducted at each station.

1. Temperature and salinity:
   CTD, Seabird SBE-911PLUS, was lowered from the surface to 1000 m (or 10 m above the bottom for shallow areas).
2. Water sampling for chlorophyll-*a* and nutrients:
   The Rosette (GO-1015), mounted on the frame of CTD, were sequentially closed and collectded 2 liter water sample at specific target depths (5, 25, 50, 75, 100, 150 m) as the CTD was raised.
3. Chlorophyll-*a* concentration measurement:
   One liter of sea water samples were immediately filtered through Whatman GF/F filter papers and then put in -20℃ refrigerator for chlorophyll-*a* concentration measurement in the laboratory.
4. Nutrients concentration measurement:
   100 ml of sea water samples for each depth were collected and then put in liquid nitrogen (-196℃) for nutrients concentration measurement in the laboratory.
5. Sampling gear and methods for zooplankton:
   The ORI net, with a 1.6 m diameter mouth opening, 6 m in length and 0.333 mm meshes, was towed obliquely to 200 m (for shallow areas, 10 m above the bottom) at each station. The net opening is fastened with a short 3-lead bridle connected to several meters of line which attached to the towing cable by a clamp. A General Oceanic flowmeter is suspended across the center of the net mouth to measure the amount of water filtered during each tow. The net was towed at a ship speed of 1.0 knots for about 10 minutes. After the net was on board, samples were pouring into the PVC bottle and preserved immediately in 5 % formalin buffered with sodium borate.

樣本實驗檢測流程

壹、營養鹽、葉綠素及基礎生產力之測定流程

取各水層水樣急速凍結保存後，分析各水層之硝酸（nitrate）、磷酸（phosphate）、矽酸（silicate）等營養鹽，另外將濾畢各層海水之濾紙以丙酮溶解萃取出色素後分析其葉綠素甲濃度；利用光暗瓶溶解氧法，分析台灣周邊海域之基礎生產力(primary productivity)。

1.硝酸測定：

硝酸以 Wood-Armstrong-Ricgard 法測定，將過濾之試水通過銅-鎘還原管，使硝酸還原成亞硝酸，然後加入 Sulfanilamide 及 NED 溶液，於分光光度計上以 542 nm 測定吸光值並計算其濃度，另取同樣試水不經銅-鎘還原管，直接測定水中之亞硝酸濃度，將經過銅-鎘還原管之數值扣除水中亞硝酸之濃度後，依銅-鎘還原管之還原率計算水中硝酸之濃度。

2.磷酸測定：

磷酸以 Molybdenum blue-Ascorbic acid 法測定，將過濾後之試水加入以 Ammonium molybdate、Sulfuric acid、Ascorbic acid 及 Potassium antimonyl–tartrate 所配製的還原溶液，待其成色後在分光光度計以波長 885 nm 測定吸光值並計算待測物之濃度。

3.矽酸測定：

矽酸以 Molybdosilicate 法測定，將過濾之試水先後添加 50 % HCl、10 % Ammonium molybdate 及 10 % Oxalic acid 後，加入以 1–amino–2-naphthol -4-sulfonic acid、Na_2SO_3 及 $NaHSO_3$ 所配製的還原試劑，混合完成後於分光光度計上以波長 815 nm 測定其吸光值，由各波長之吸光值並計算待測物之濃度。

4.葉綠素甲測定：

葉綠素甲以 Trichromatic 法測定，將各水層過濾後的濾紙，分別加入丙酮研磨後，放入恆溫培養箱（4 ℃）24 小時之後，將樣品置於冷凍離心機 4 ℃、轉速 3000 rpm 離心 15 分鐘後，分別取出上清液，使用分光光度計測其各波長之吸光值後由公式(Jeffrey and Humphrey, 1975)計算葉綠素甲濃度。

5.基礎生產力測定：

將試水分別裝入錫箔紙包覆之暗色溶氧及透明瓶中，分別進行光度恆溫培養，經 24 小時後，測定溶氧瓶中水樣始末之溶氧差，換算成碳生產力即得。

貳、浮游動物鑑種及計數流程

返航後先將樣品靜置，以便後續分量。

分樣：

取一瓶樣品，將其上部的澄清液先用小塊 100 目網布過濾直至網布上有浮游動物出現為止，然後先將樣品瓶中的動浮液倒入小燒杯中，再利用洗滌瓶將樣品瓶中及網布上的浮游動物完全沖洗至小燒杯內，再將採樣回來的樣品瓶上標籤撕下，貼在一個 150 ml 的標本瓶上。接著，將小燒杯中的動浮液倒入分樣器中，將分樣器左右擺動約十次，然後站在分樣器前方目測左右數量是否一致，若一致再將其倒出，倒出後會分為兩部分，將其中一部分裝入剛才貼有標籤的 150 ml 的標本瓶（該瓶分量為 1/2），將剩下的那一部分再倒入分樣器內進行分樣，重複上述步驟。直到目測該分量的樣品中約有 1000 隻左右浮游動物為止。

鑑種及計數：

將該測站的最小分量樣本瓶中的動浮液倒入培養皿，將裝有動浮液的培養皿擺上顯微鏡的載物台計數及鑑種，計數時以 Z 字的方法依序計數，一個方格內的動浮算完再算下一個方格，鑑一隻就按一下該種的計數器，緩慢移動培養皿，該培養皿算完後，將其倒入 250 ml 的燒杯中，再算第二盤直到將該最小分量樣本瓶中的動浮液全數算完，此時確認計數器的值全部加起來是否有超過 2000 隻，若超過 2000 隻，該測站即計算完畢；若尚未超過 2000 隻，則將另一瓶還未計算的最小分量樣本瓶的動浮液全數算完，若仍然小於 2000 隻，就再將上一分量的樣本瓶的動浮液全數算完，直到計數器全部加起來有超過 2000 隻，該測站樣本才算計數完畢。

生物沉澱量、排水容積、濕重：

1. 生物沉澱量：取 100 ml 沉澱管，將管中的水位都標定到 100，靜置一個晚上後，目視生物沉澱量刻度，在記錄沉澱管上的數值時需要往下數一格，以減少誤差。
2. 濕重：將一測站之樣本倒入沈澱管中，並注意沉澱管中樣本之容積之刻度，在將沉澱管中之樣品倒入吸引器中，將其樣本浮游動物與樣本液分開，吸至浮游動物沒有多餘之樣本液後，將其浮游動物放入秤中量其重量，即為其濕重。
3. 排水容積：濕重測量完畢時，剩下的澄清液倒入沉澱管中觀察其刻度。

Laboratory procedures

Seawater samples were collected at discrete depths (from 5 to 150 m) for inorganic nutrients (NO_3、PO_4、SiO_2)、chlorophyll-*a* (chl-*a*) and primary productivity (PP) and then were analyzed with standard methods depending on variable chemical properties in the laboratory.

1. Nitrate

Nitrate (NO_3) was measured by reducing nitrate to nitrite (NO_2) and then determining the nitrite by employing the pink azo dye method. Sulfanilamide and NED solutions were added to seawater samples and then measured by using a spectrophotometer analyzer at 542 nm for final determination of concentrations.

2. **Phosphate**

Phosphate (PO_4) was determined by the molybdenum blue method. Ammonium molybdate、Sulfuric acid、Ascorbic acid and Potassium antimonyl-tartrat mixed solutions at room temperature were added to seawater samples and then measured by using a spectrophotometer analyzer at 885 nm for final determination of concentrations.

3. Silicate

Silicate (SiO_2) was measured by the Molybdenum blue method. Seawater samples were immediately acidified with 50 % Hydrochloric acid、10 % Ammonium molybdate and 10 % Oxalic acid and then 1-amino-2-naphthol-4-sulfonic acid、Na_2SO_3 and $NaHSO_3$ mixed solutions was added to the samples. For final determination of concentrations, samples were measured by using a spectrophotometer analyzer at 815 nm.

4. Chlorophyll-*a*

Chlorophyll-*a* (chl-*a*) was measured by the Trichromatic method. Pigments were extracted in cold acetone (90%) for 24 hours. The samples were centrifuged at 3000 rpm under 4℃ for 15 minutes and then transfer the samples extracts from the centrifuge tube to the cuvette by careful pipeting. The final determination of chlorophyll-*a* samples were measured by using a spectrophotometer.

5. Primary productivity

Primary productivity (PP) were measured by the Dissolved Oxygen method. Seawater samples were cultured in the light and dark tanks for 24 h and then

measured by using a DO meter analyzer on board.

6. Zooplankton

Each plankton sample was repeatedly divided with a Folsom splitter until its subsample contained 2000 specimens of zooplankton. Zooplanktons were than sorted and classified into 30 categories. The number of each category was recorded and the abundance of each category was expressed as the number of individuals per cubic meter (inds/m^3).

計畫主持人 Program leader

農業委員會水產試驗所研究員兼主任秘書　劉燈城 Liu Don-Chung

計畫執行人員 Participating researchers

單位名稱	研究人員	職稱
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農業委員會水產試驗所海洋漁業組	陳彥民 Chen Yan-Min	約聘研究助理
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農業委員會水產試驗所沿近海資源研究中心	吳龍靜 Wu Long-Jing	研究員兼主任
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國立台灣海洋大學環境生物與漁業科學系	鄭學淵 Cheng Sha-Yen	副教授

各航次出海採樣人員 Cruise personnel

2007- 01- 11 航次	所內人員		所外人員	
	陳彥民	聘用研究助理	王勝平	海大環漁系助理教授
	陳慶聲	副研究員	李純慧	海大環漁系研究生
	簡煌彬	專業技工	劉百蟬	海大環漁系研究生
	梁宏彥	國防儲備役	莊惠婷	海大環漁系研究生
2007- 05- 10 航次	所內人員		所外人員	
	陳彥民	聘用研究助理	李純慧	海大環漁系研究生
	陳慶聲	副研究員	劉百蟬	海大環漁系研究生
	簡煌彬	專業技工	莊惠婷	海大環漁系研究生
			蔡壁如	海大環漁系研究生
			賴怡錦	海大環漁系研究生
2007- 07- 04 航次	所內人員		所外人員	
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	翁進興	助理研究員	王勝平	海大環漁系副教授
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	林正雄	二副	朱振銘	三副
	張豐平	輪機長	程秀同	大管
	翁建順	二管	鄭清波	三管
	廖介生	輪機員	丁振傑	輪機員
	謝耀瑩	輪機員	陳建良	大廚
	蔡嘉進	二廚	林文賢	漁航員
	羅勝義	漁航員	李堂炯	漁航員
	葉日信	漁航員	蔡安傑	漁航員
	林冠宏	漁航員	陳明展	漁航員
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略語表

Abbreviations

Date	作業日期
SMT	作業開始時間
Lati.	緯度(°N)
Long.	經度(°E)
Depth	深度(m)
SST	表層水溫(℃)
Air T.	氣溫(℃)
Air P.	氣壓(mb)
Wind D.	風向
Wind F.	風速(節)
O.N.D.	作業水深(m)
Fl. Ct.	濾水器讀數
V.W.S.	濾水體積(m^3)
N.A.	Not Available

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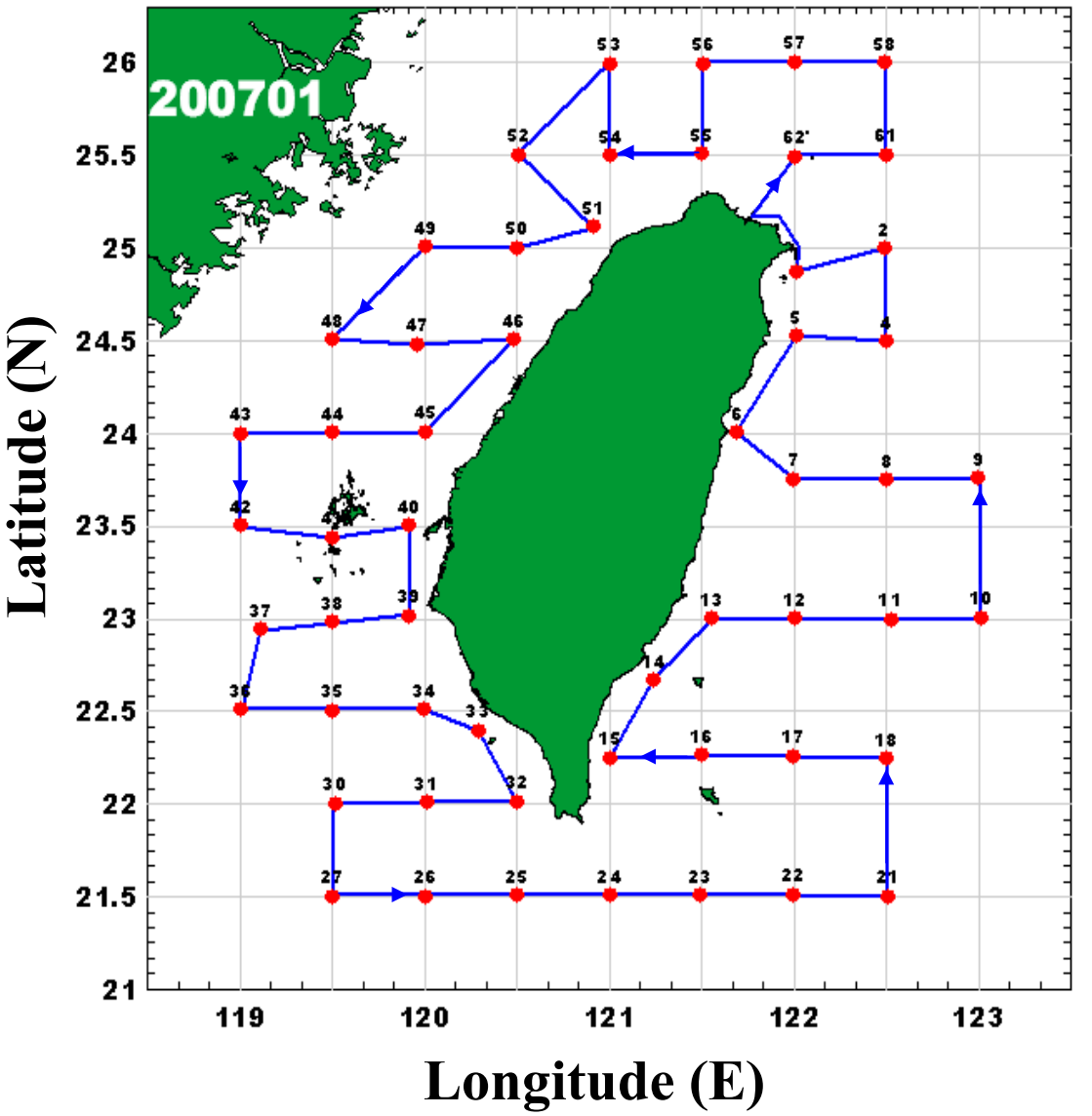

圖 01. 2007-01 航次航跡圖

Fig. 01. Stations and Cruise tracks for TaiCOFI Survey in Jan. 2007

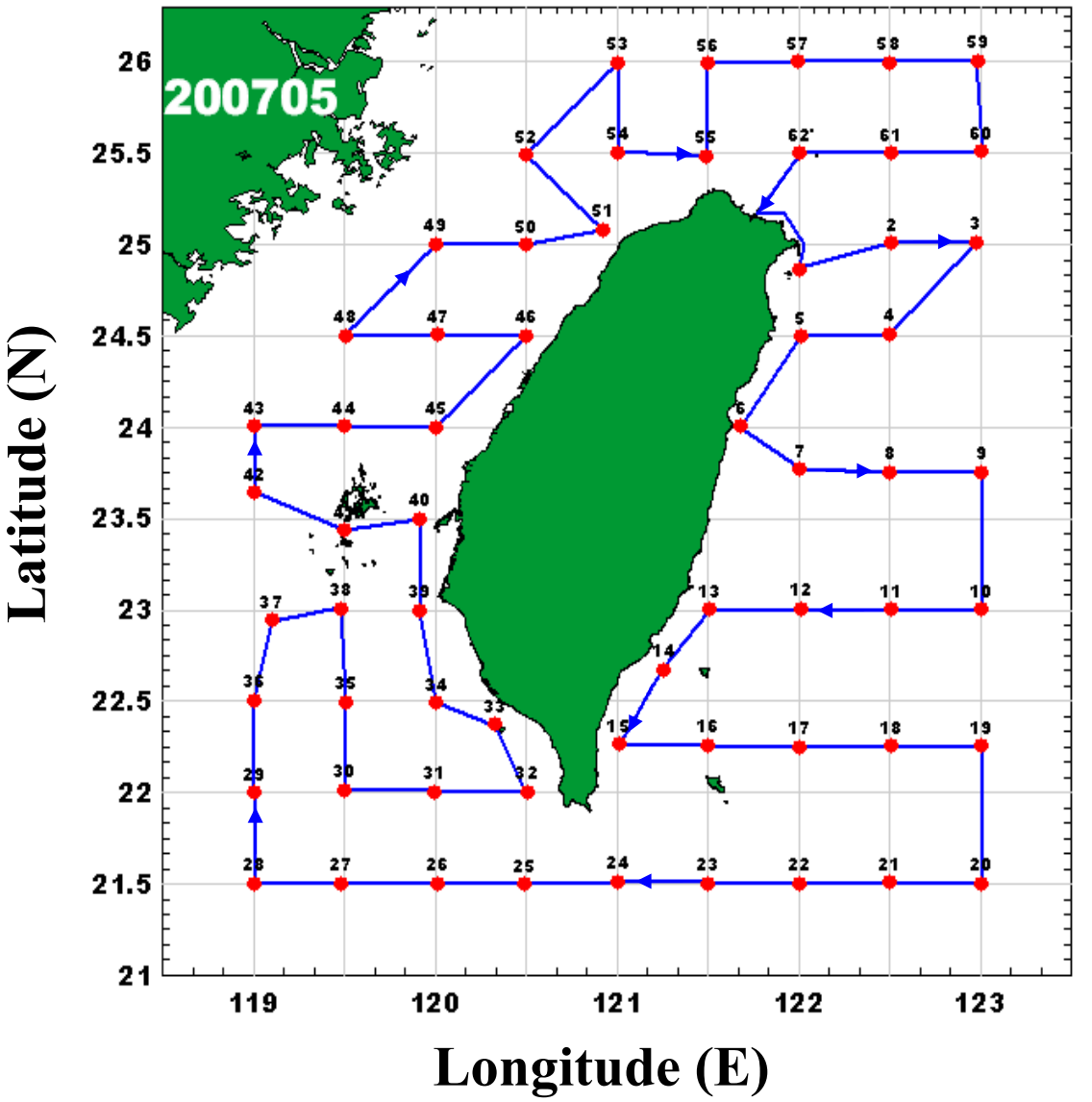

圖 02. 2007-05 航次航跡圖

Fig.02. Stations and Cruise tracks for TaiCOFI Survey in May 2007

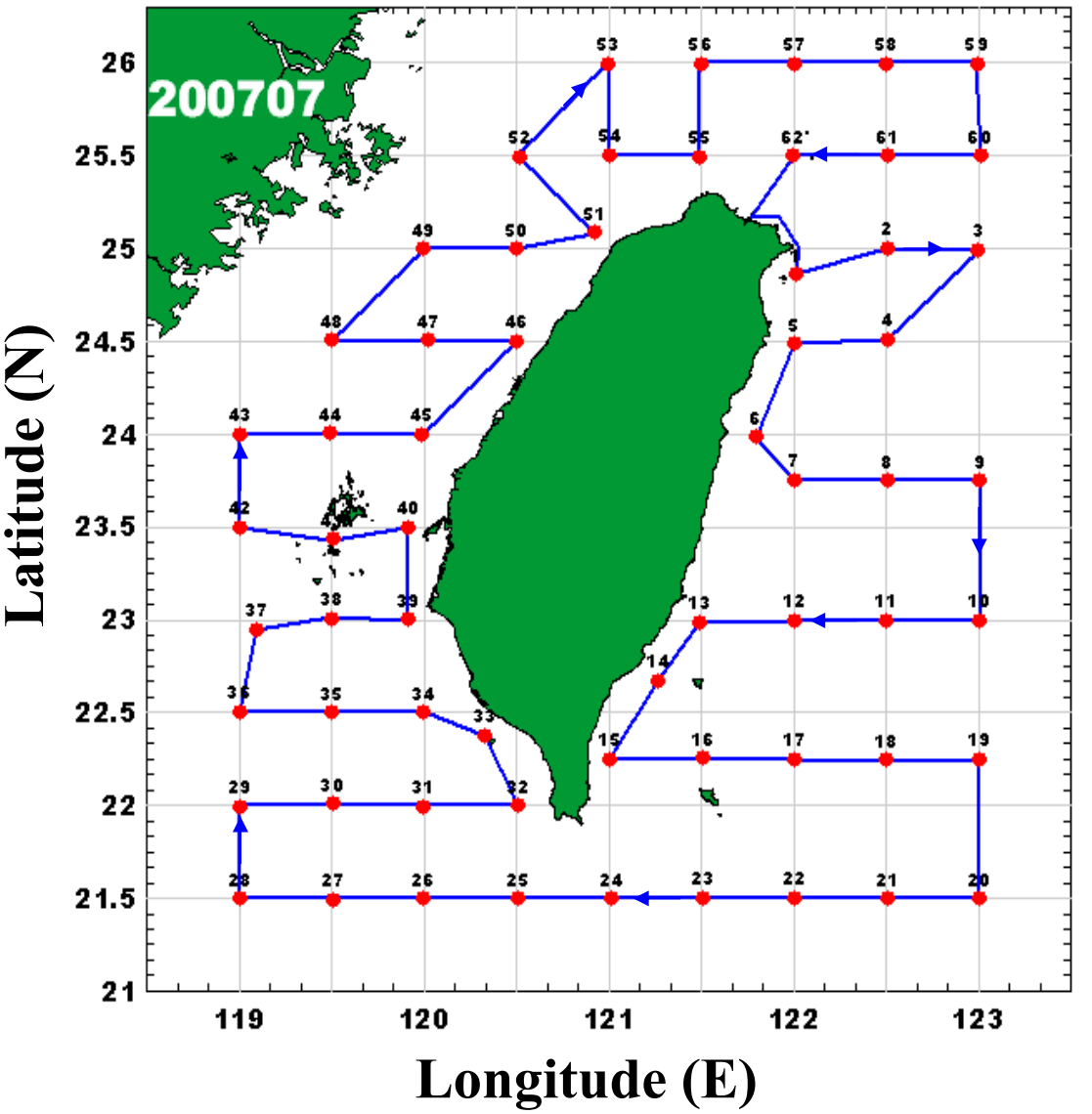

圖 03. 2007-07 航次航跡圖

Fig.03. Stations and Cruise tracks for TaiCOFI Survey in Jul. 2007

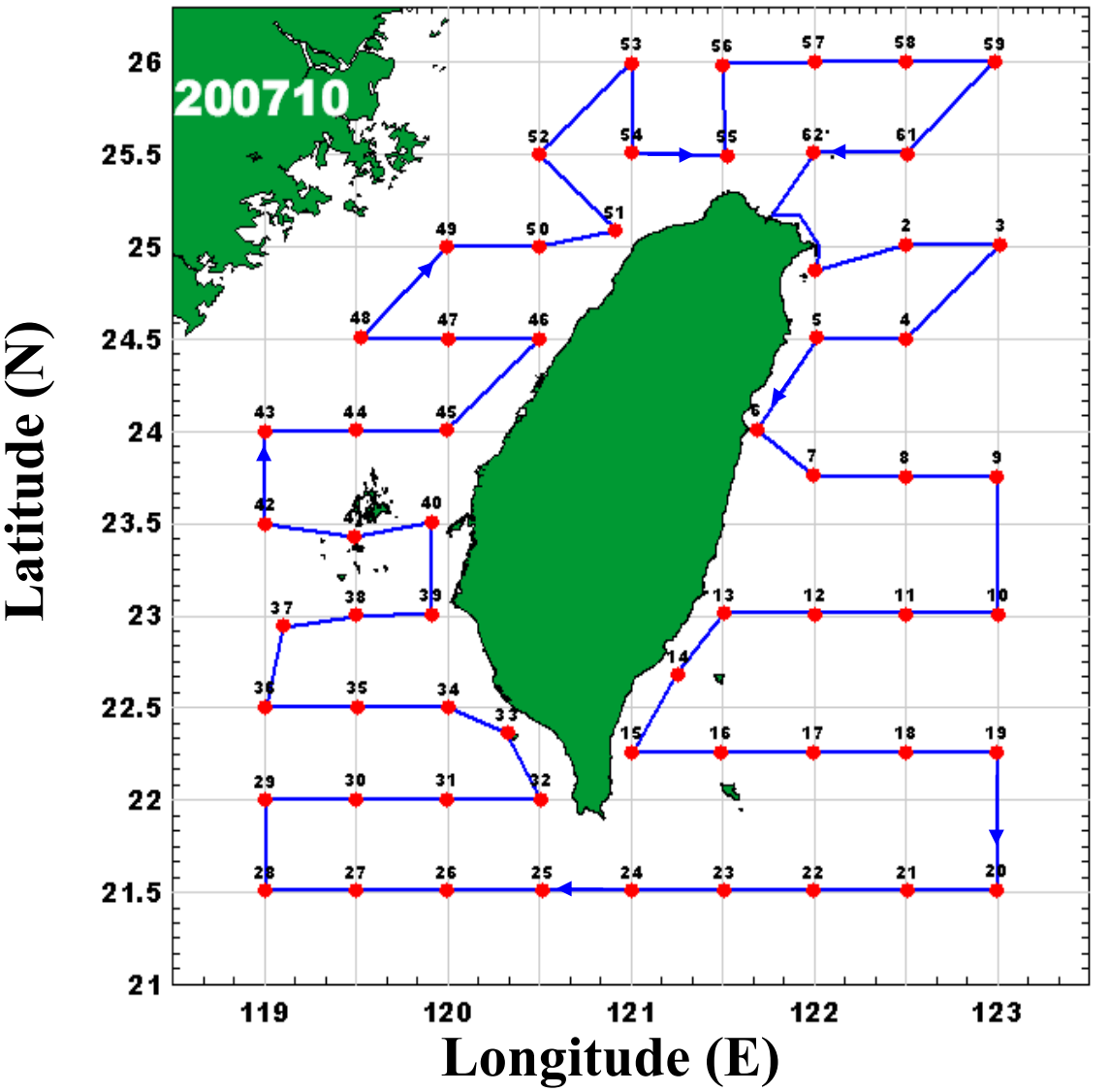

圖 04. 2007-10 航次航跡圖

Fig.04. Stations and Cruise tracks for TaiCOFI Survey in Oct. 2007

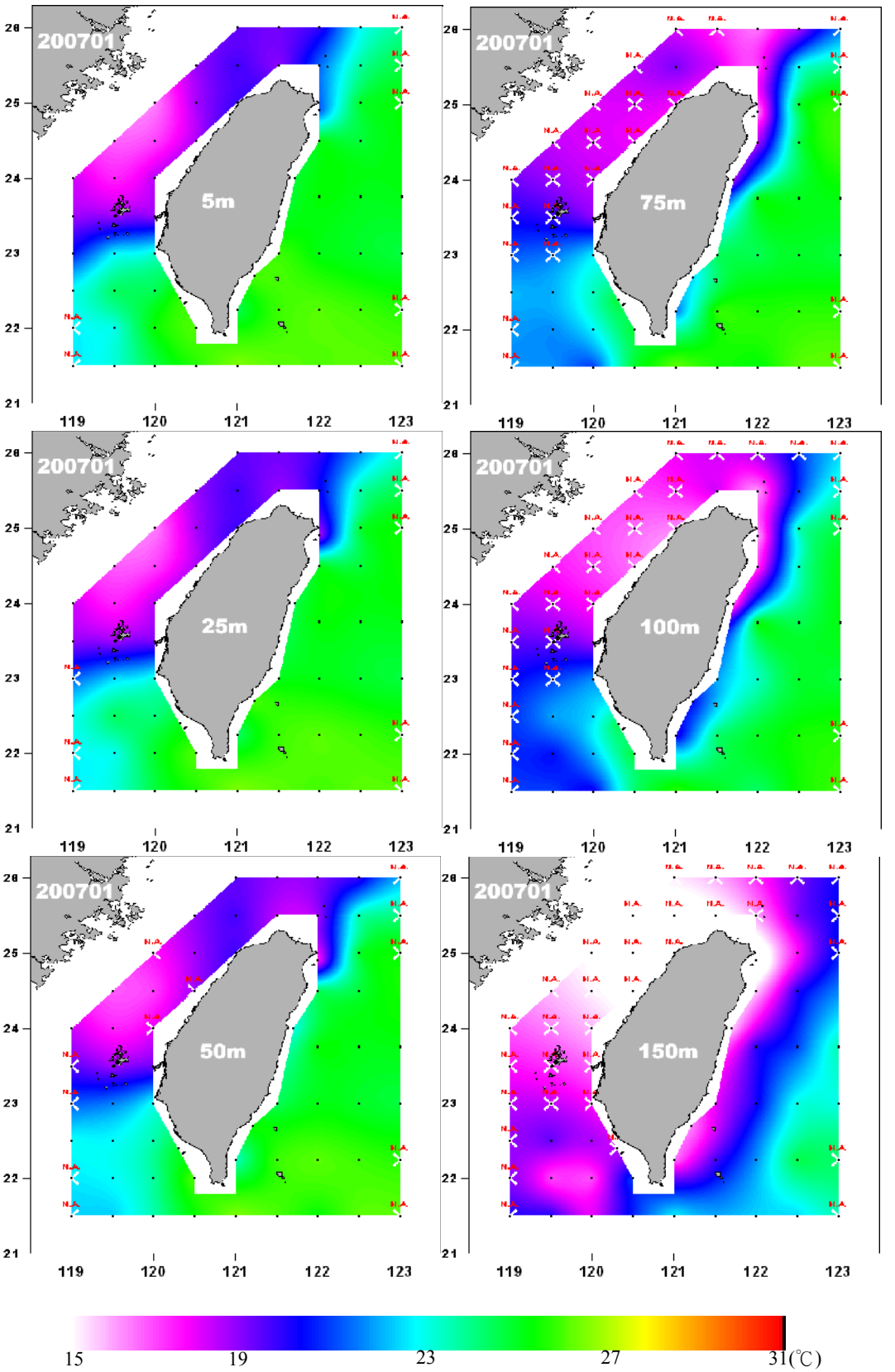

圖 05. 2007-01 航次水溫分布

Fig.05. Temperature distribution in Jan. 2007

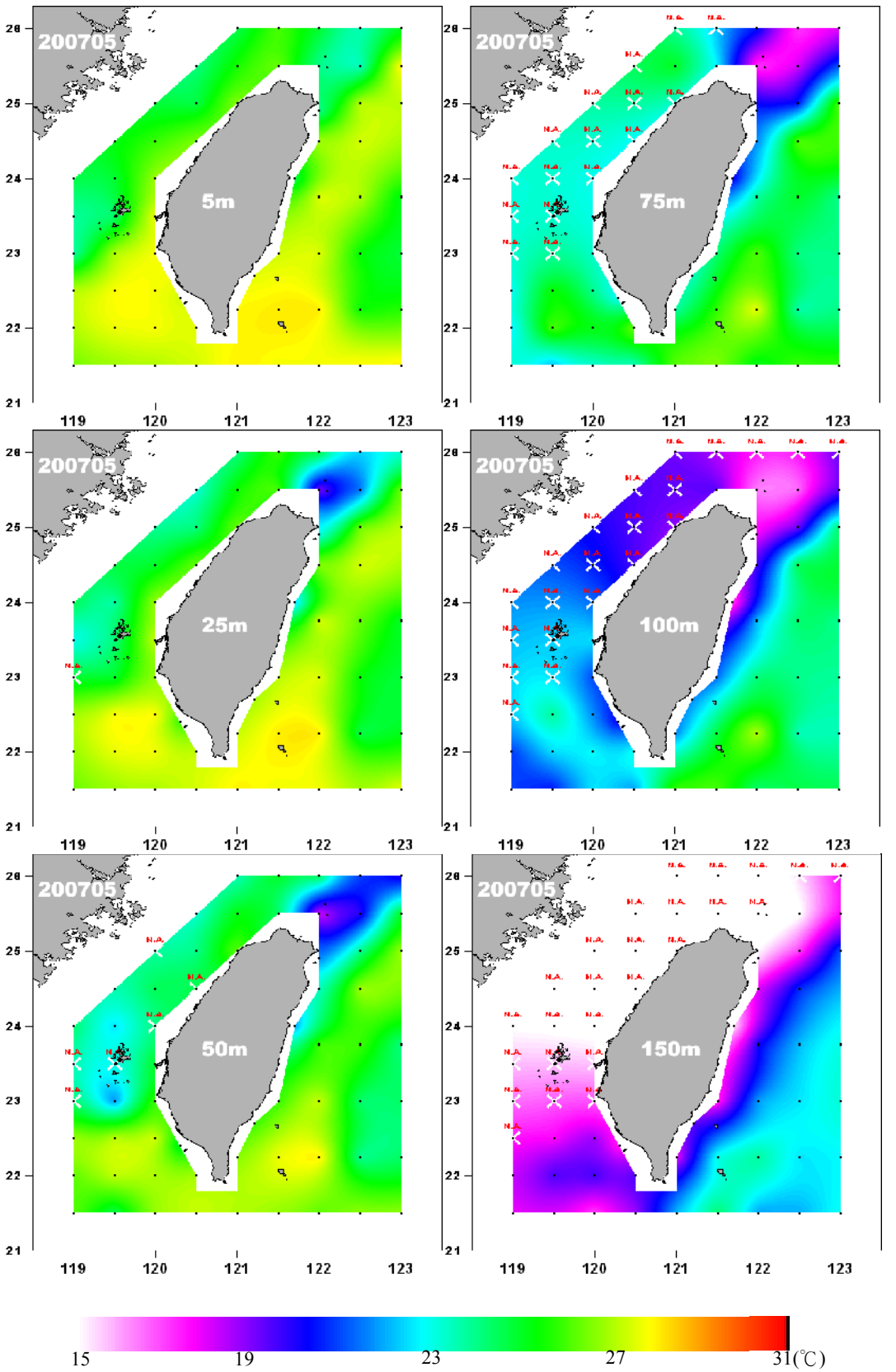

圖 06. 2007-05 航次水溫分布

Fig.06. Temperature distribution in May 2007

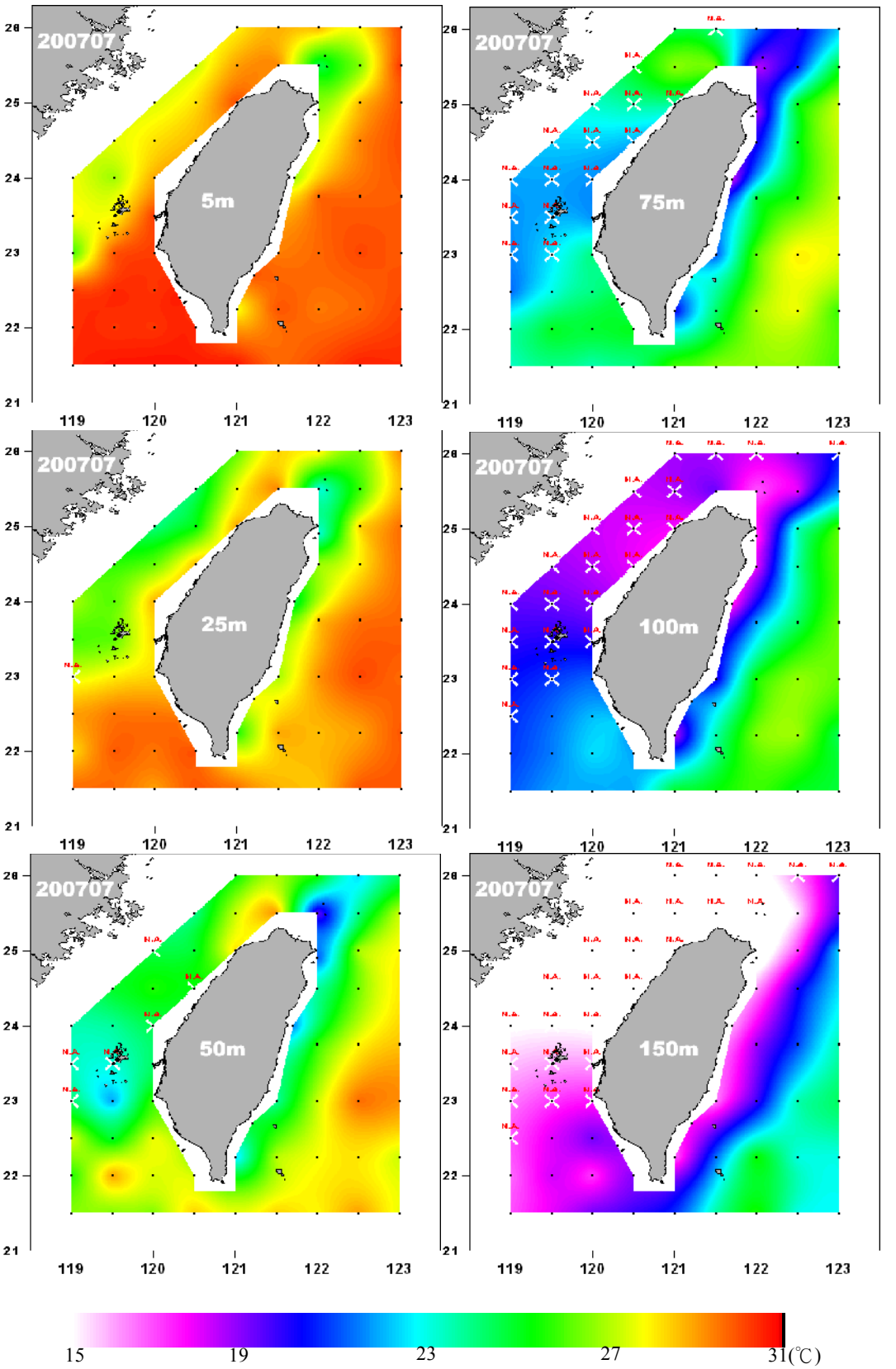

圖 07. 2007-07 航次水溫分布

Fig.07. Temperature distribution in Jul. 2007

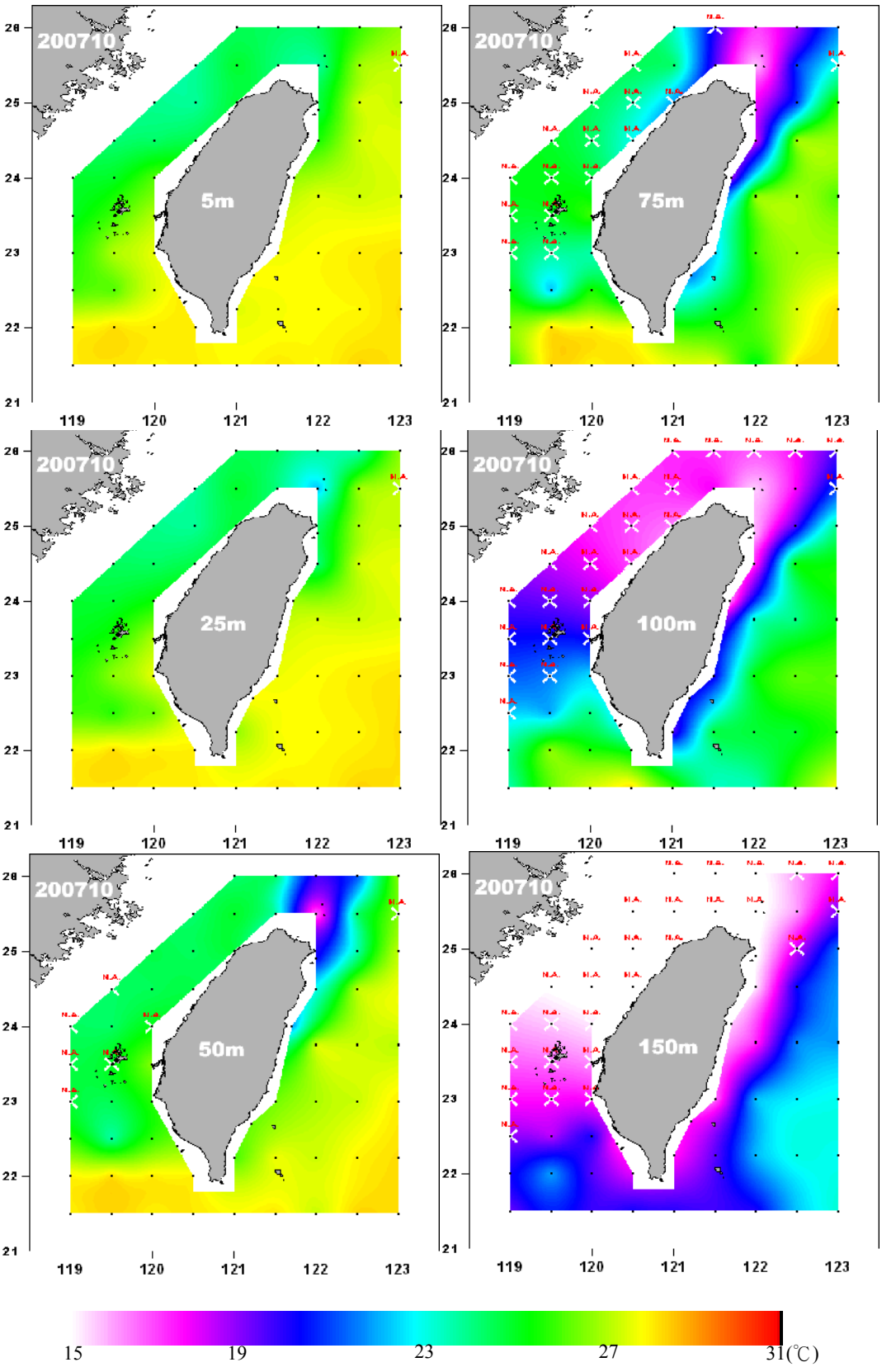

圖 08. 2007-10 航次水溫分布

Fig.08. Temperature distribution in Oct. 2007

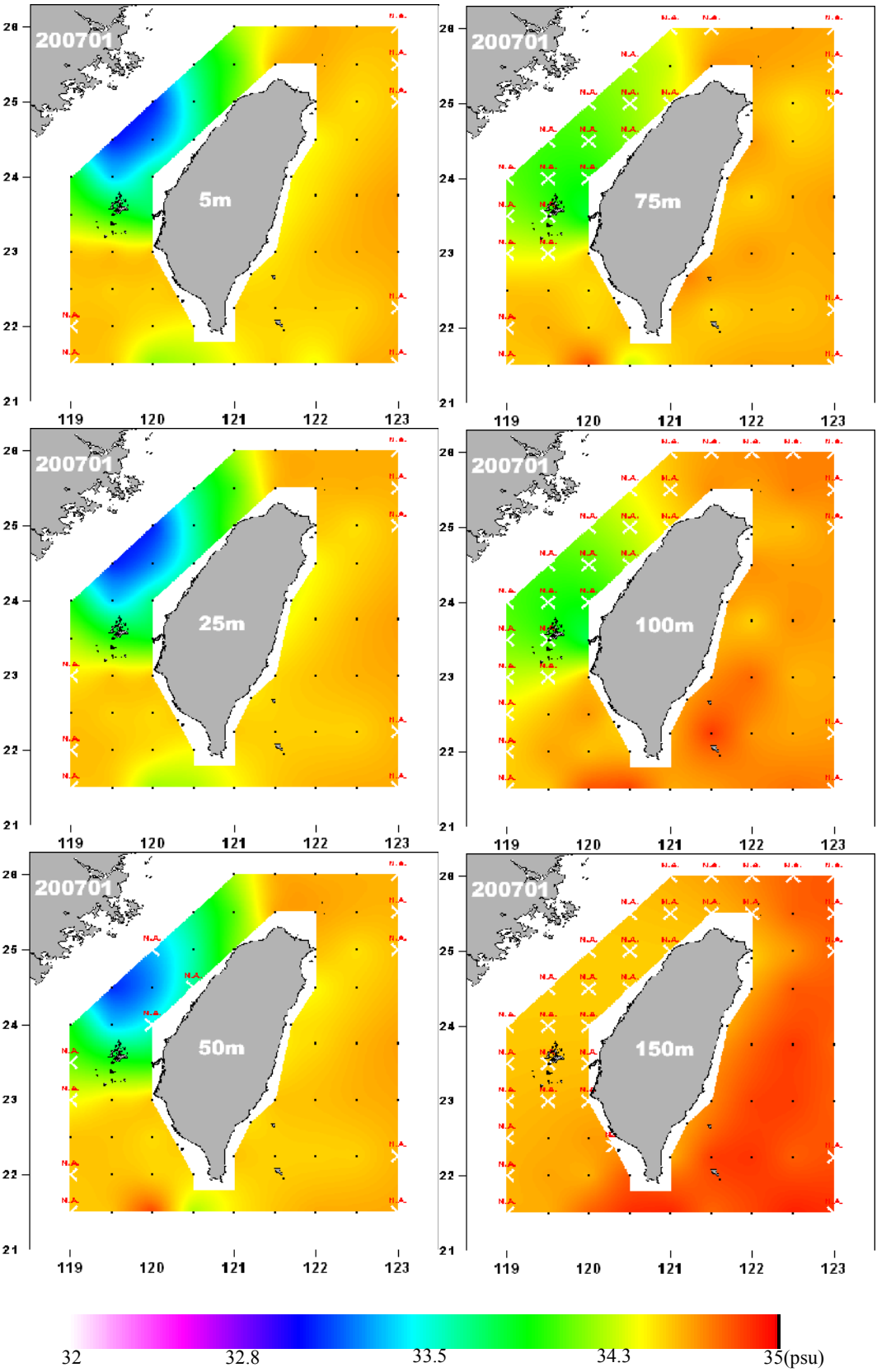

圖 09. 2007-01 航次鹽度分布
Fig. 09. Salinity distribution in Jan. 2007

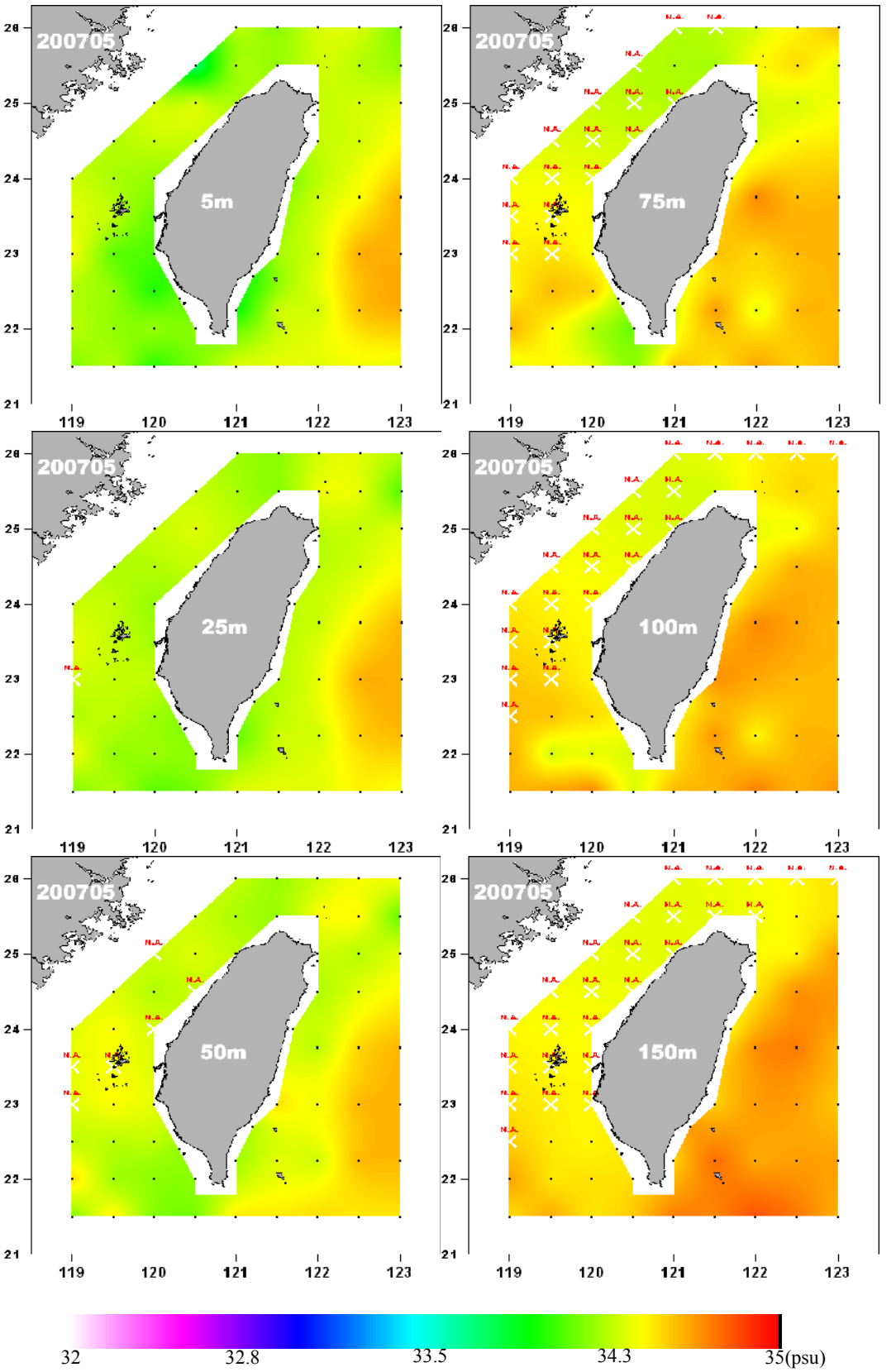

圖 10. 2007-05 航次鹽度分布

Fig. 10. Salinity distribution in May 2007

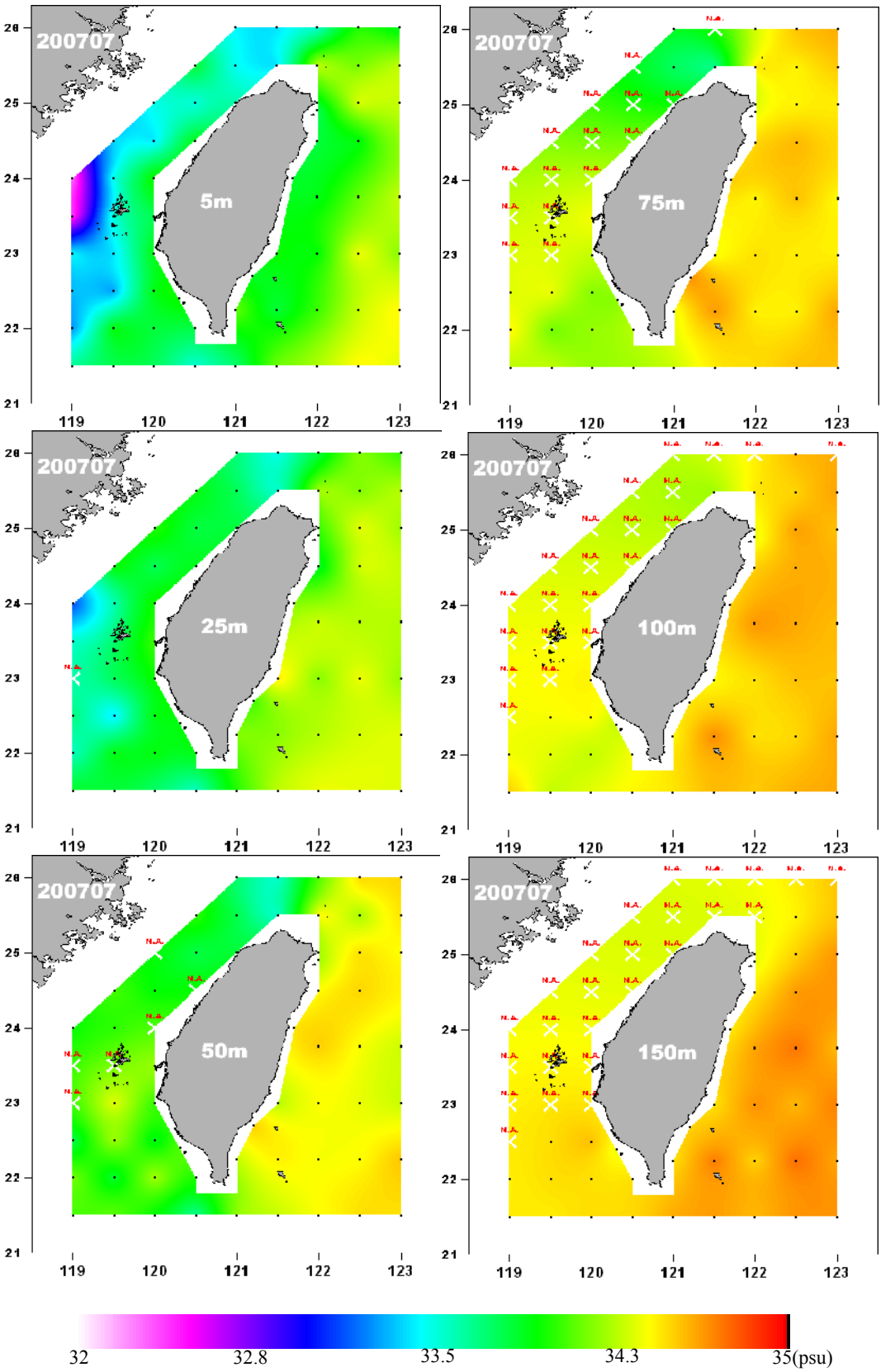

圖 11. 2007-07 航次鹽度分布

Fig. 11. Salinity distribution in Jul. 2007

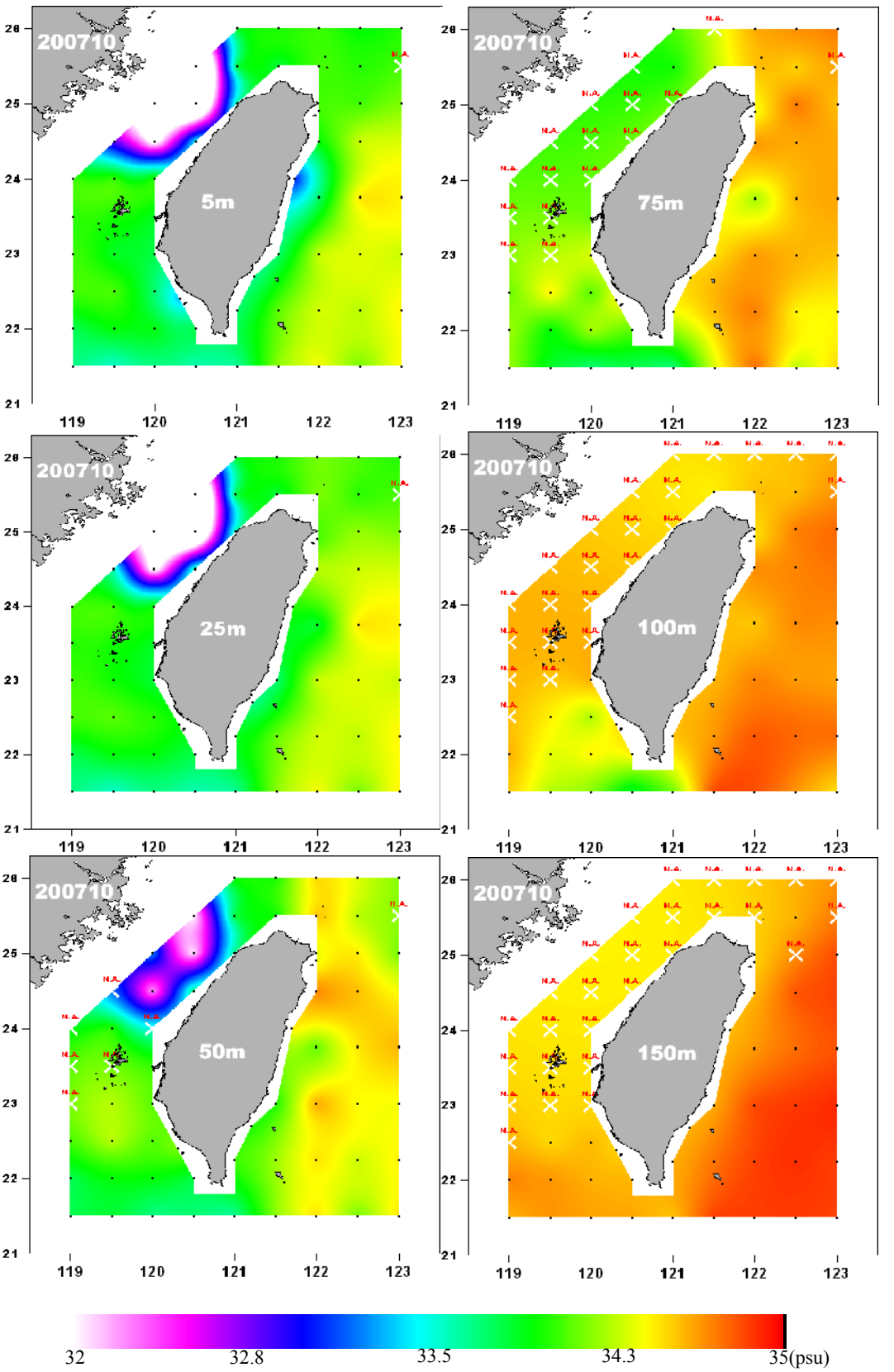

圖 12. 2007-10 航次鹽度分布

Fig. 12. Salinity distribution in Oct. 2007

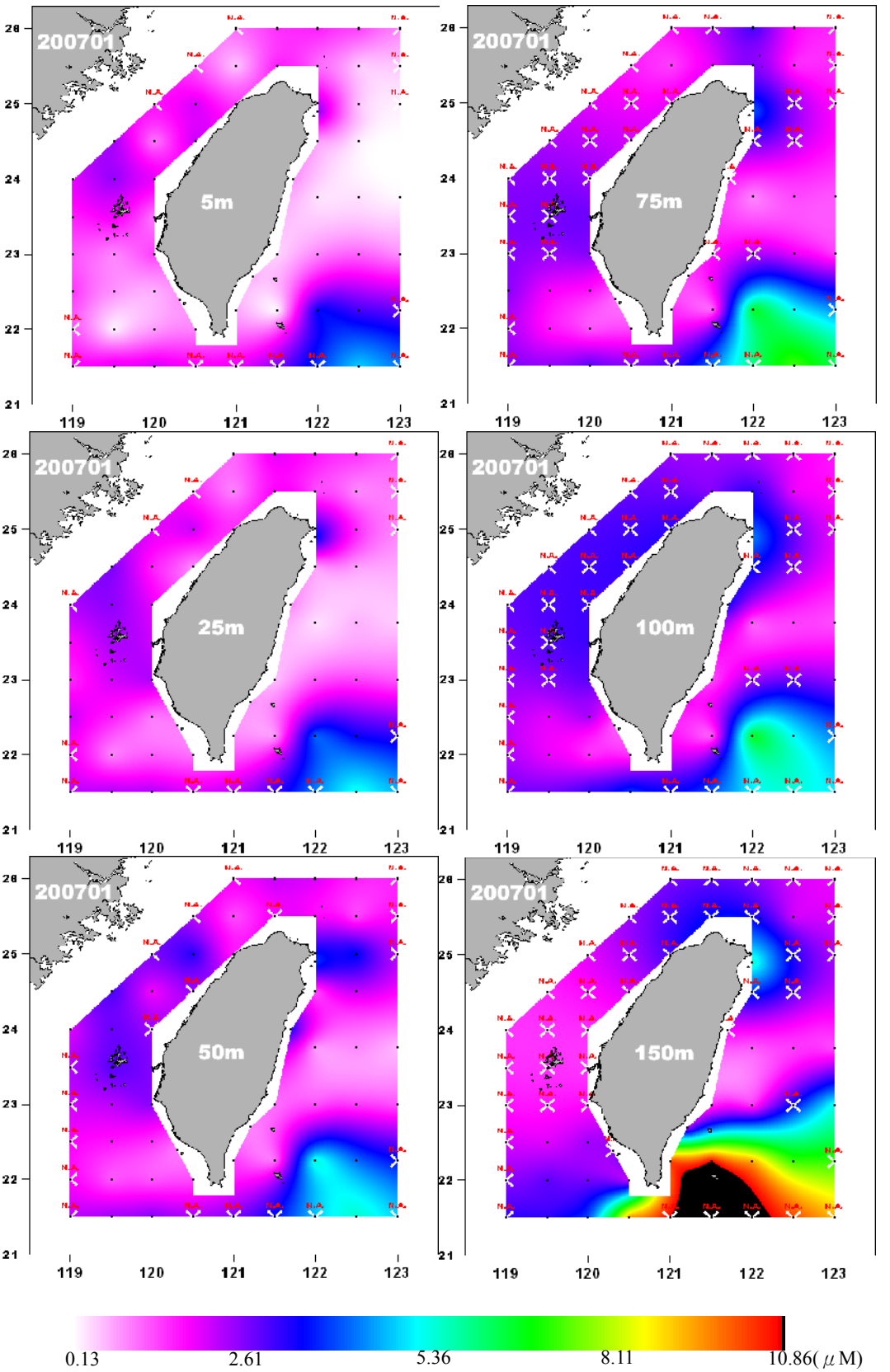

圖 13. 2007-01 航次硝酸鹽(NO_3)濃度分布

Fig. 13. Nitrate (NO_3) distribution in Jan. 2007

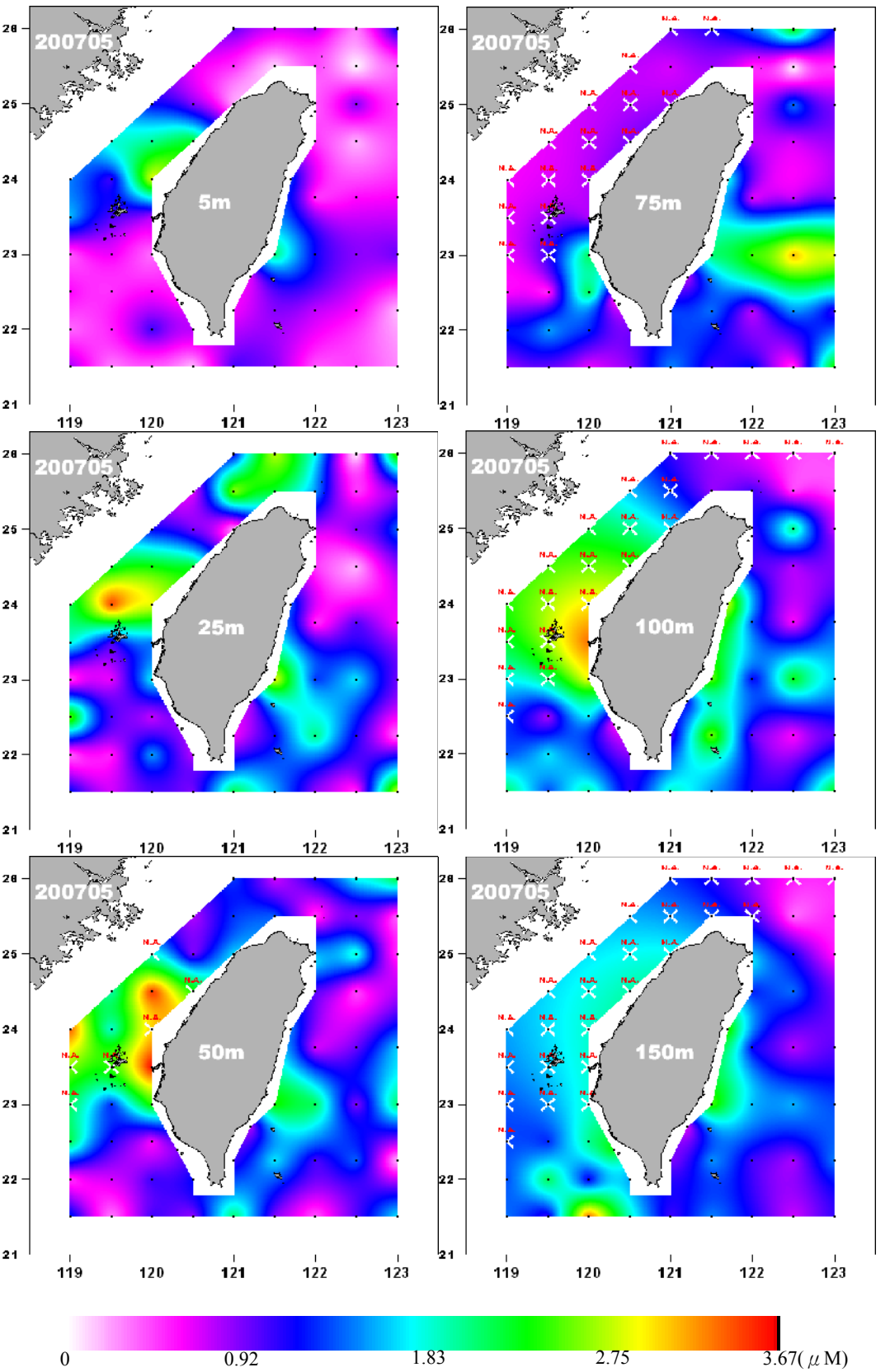

圖 14. 2007-05 航次硝酸鹽(NO_3)濃度分布

Fig. 14. Nitrate (NO_3) distribution in May 2007

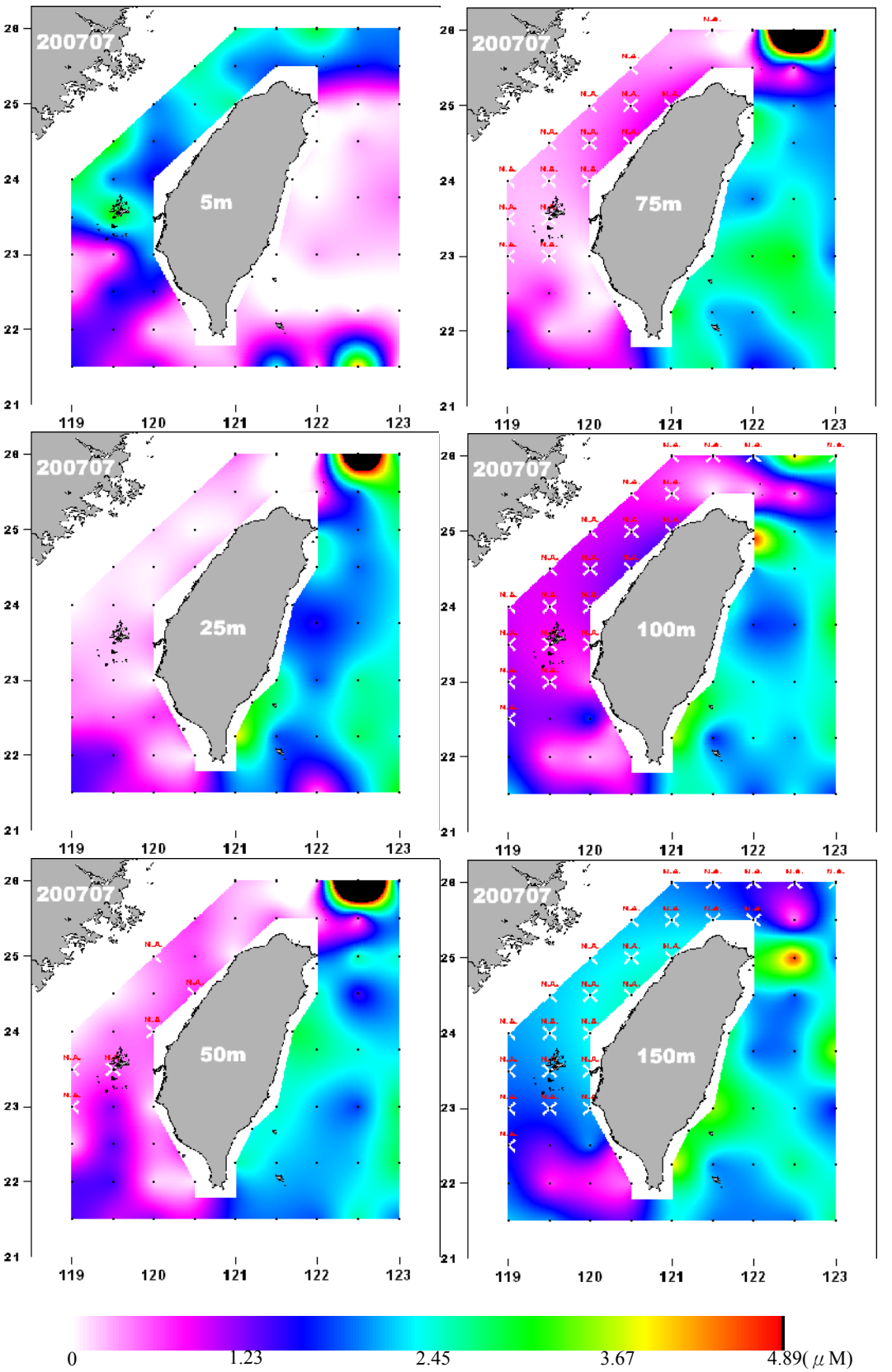

圖 15. 2007-07 航次硝酸鹽(NO_3)濃度分布

Fig. 15. Nitrate (NO_3) distribution in Jul. 2007

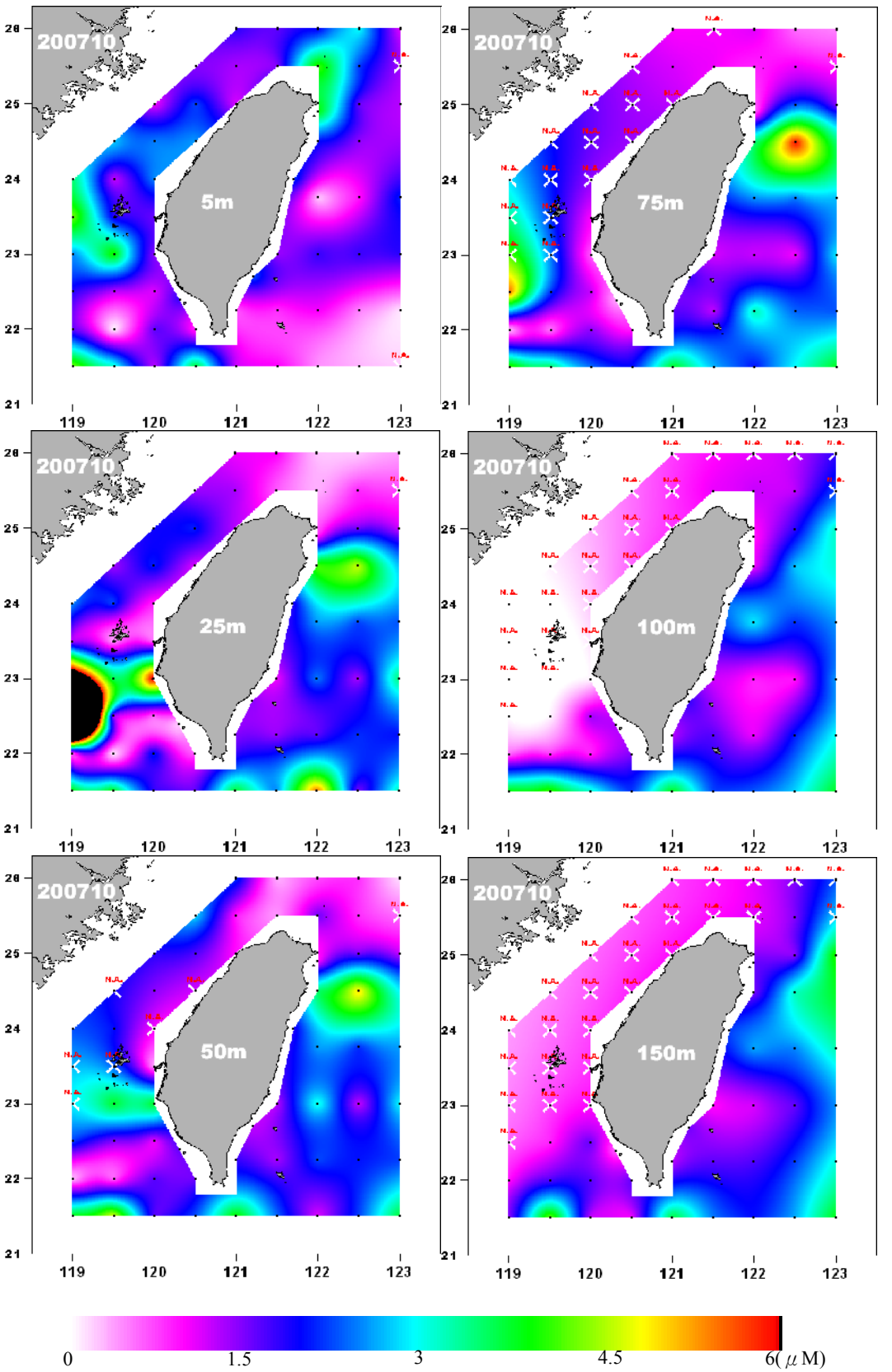

圖 16. 2007-10 航次硝酸鹽(NO_3)濃度分布

Fig. 16. Nitrate (NO_3) distribution in Oct. 2007

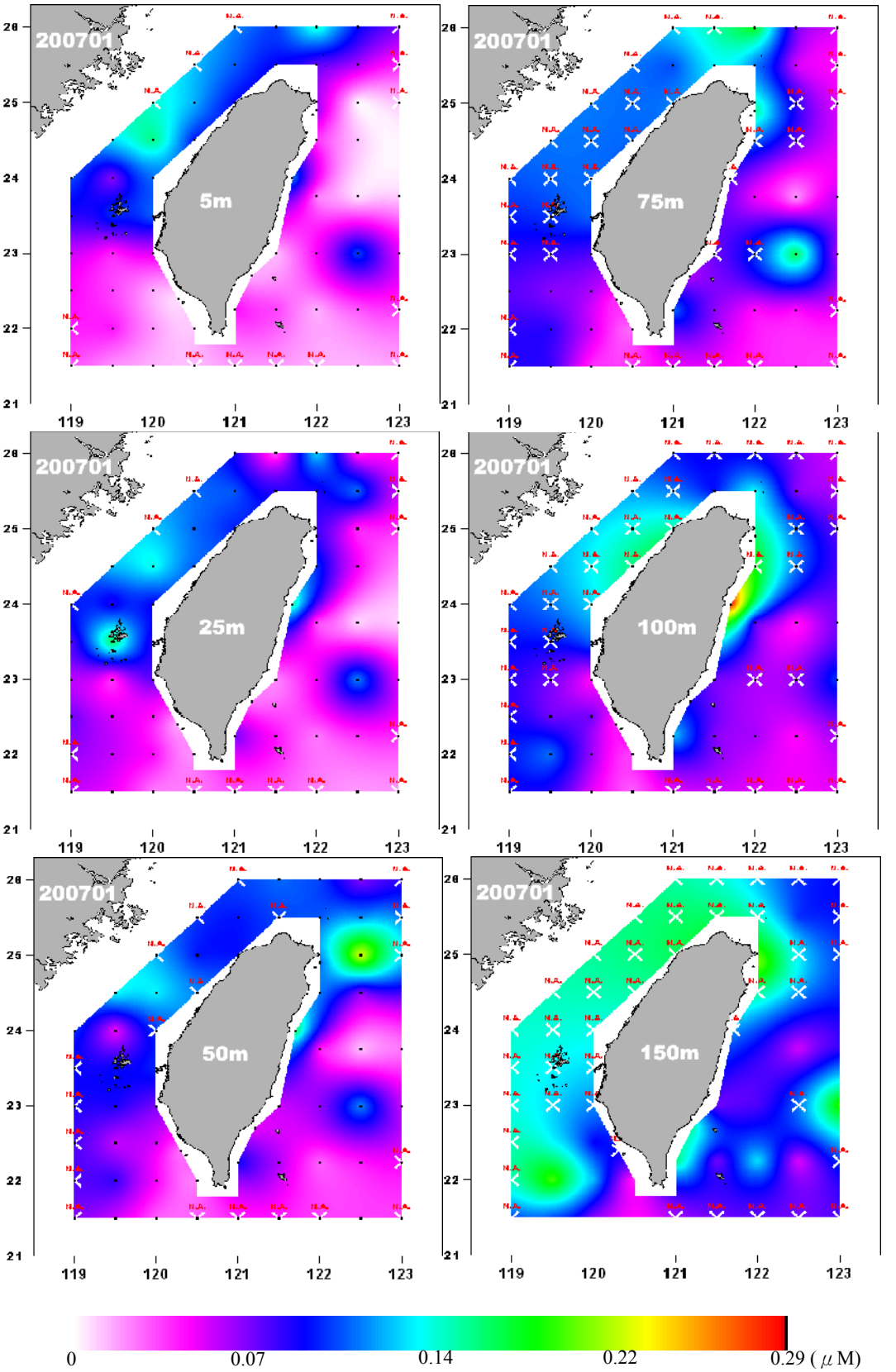

圖 17. 2007-01 航次磷酸鹽(PO_4)濃度分布

Fig. 17. Phosphate (PO_4) distribution in Jan. 2007

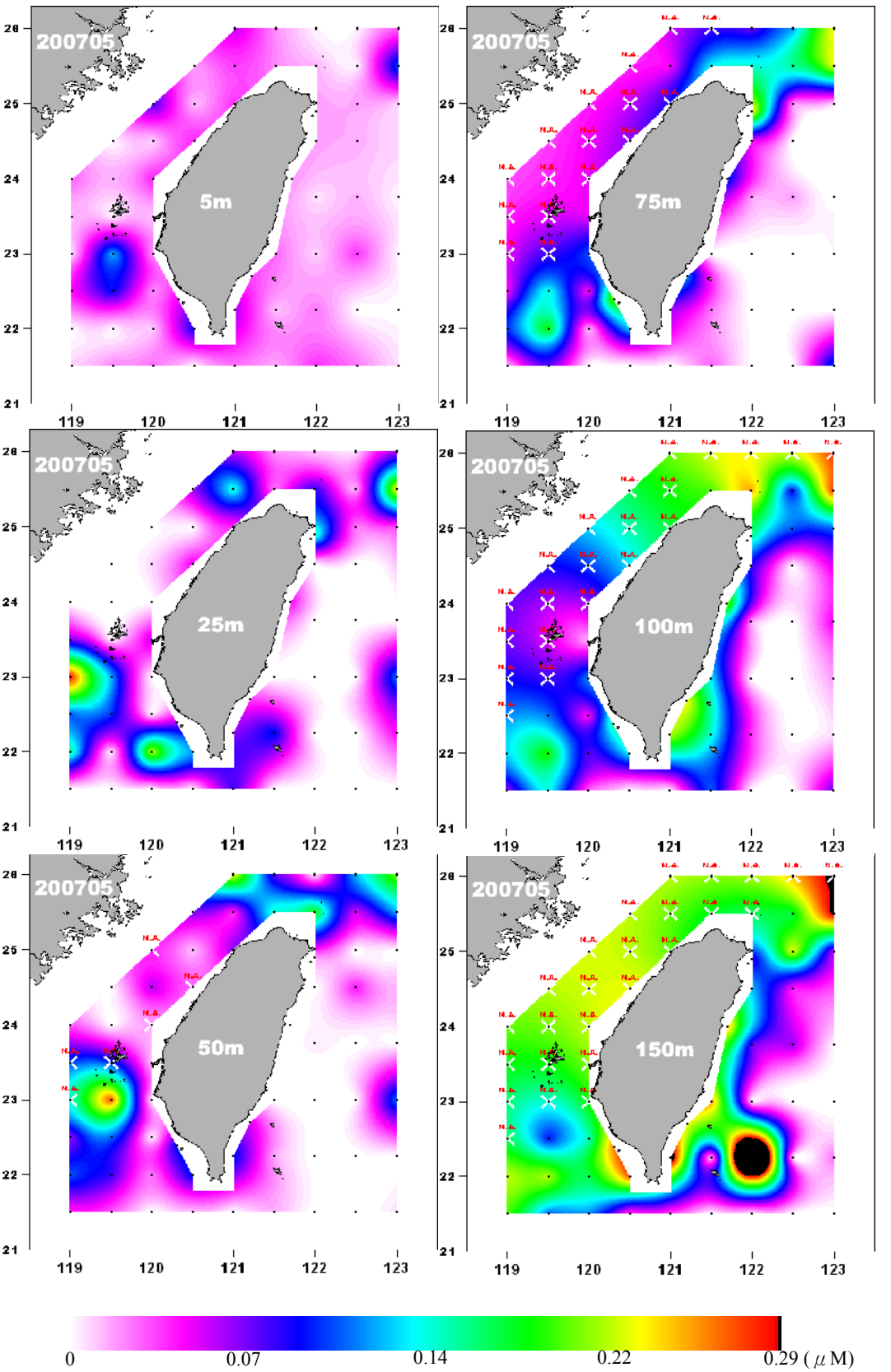

圖 18. 2007-05 航次磷酸鹽(PO_4)濃度分布

Fig. 18. Phosphate (PO_4) distribution in May 2007

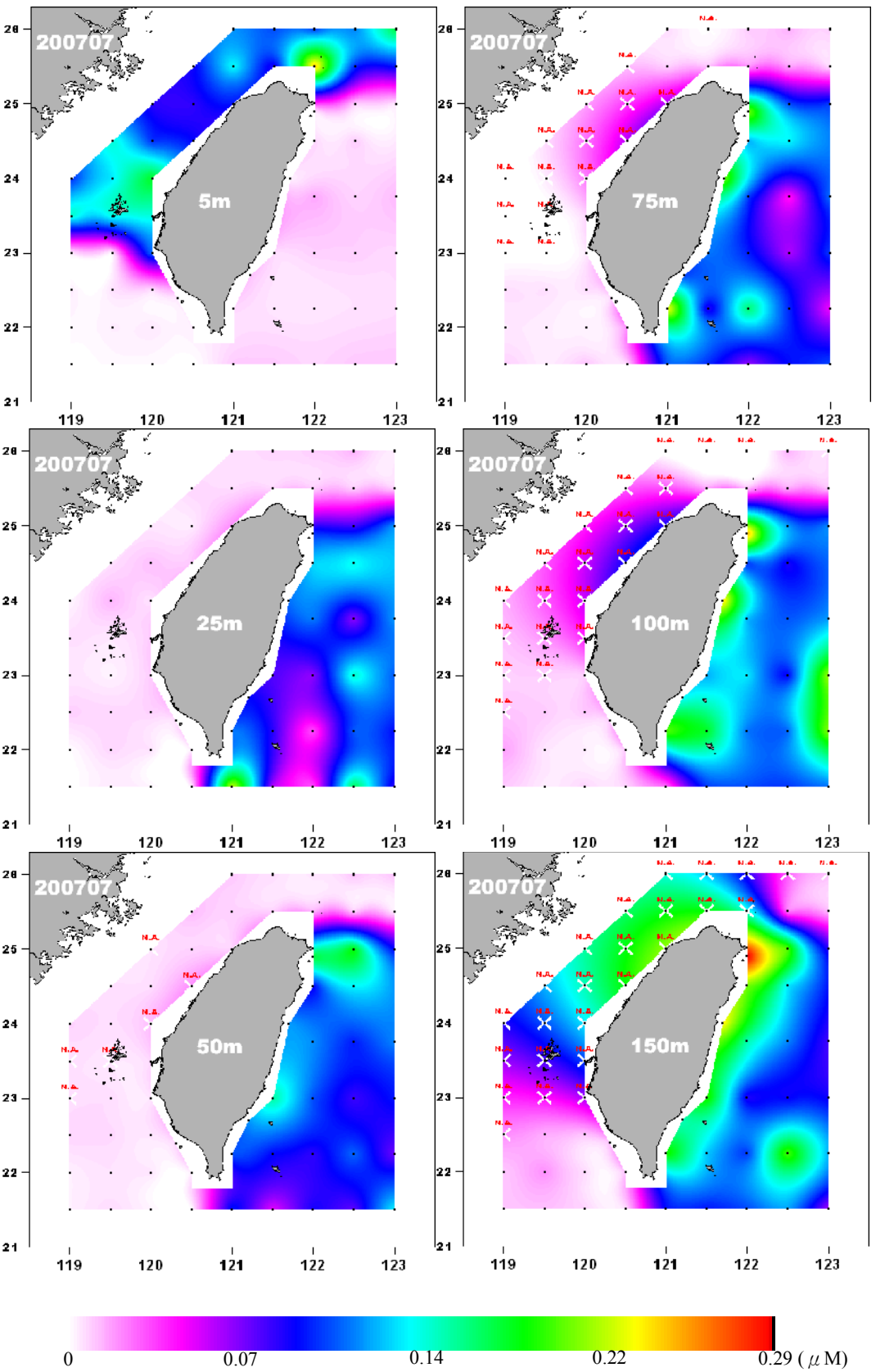

圖 19. 2007-07 航次磷酸鹽(PO_4)濃度分布

Fig. 19. Phosphate (PO_4) distribution in Jul. 2007

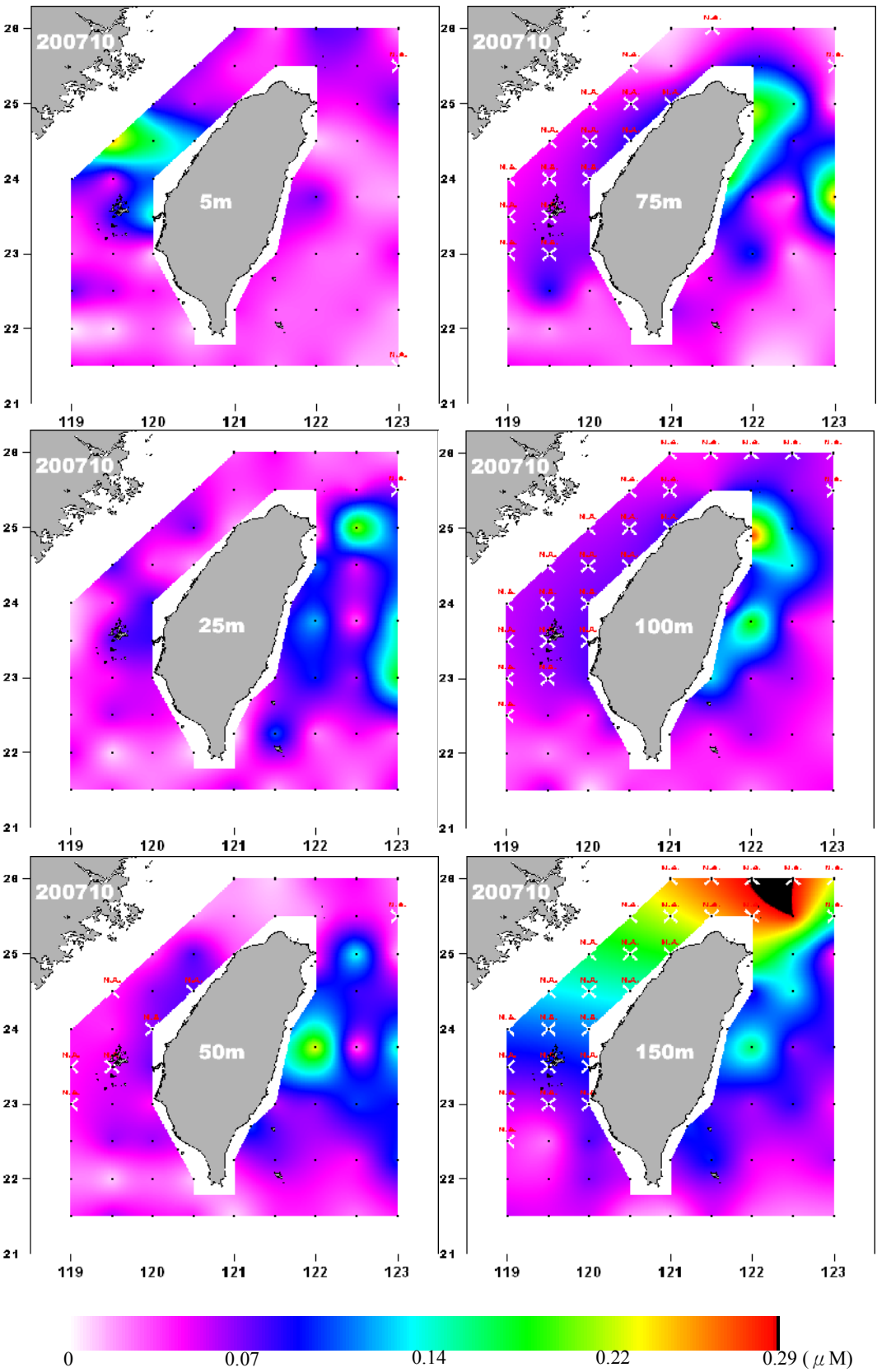

圖 20. 2007-10 航次磷酸鹽(PO_4)濃度分布

Fig. 20. Phosphate (PO_4) distribution in Oct. 2007

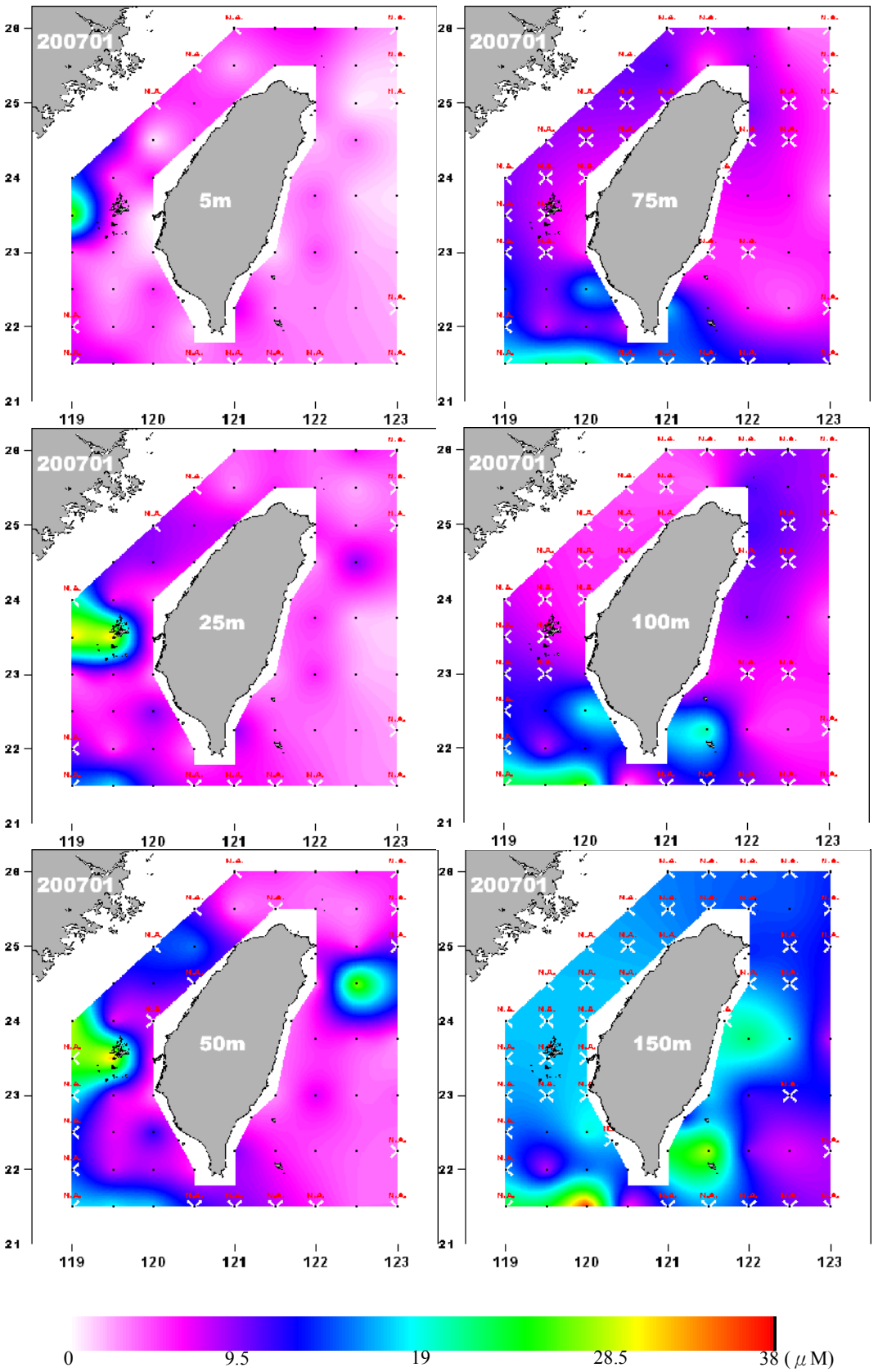

圖 21. 2007-01 航次矽酸鹽(SiO_2)濃度分布

Fig. 21.Silicate (SiO_2) distribution in Jan. 2007

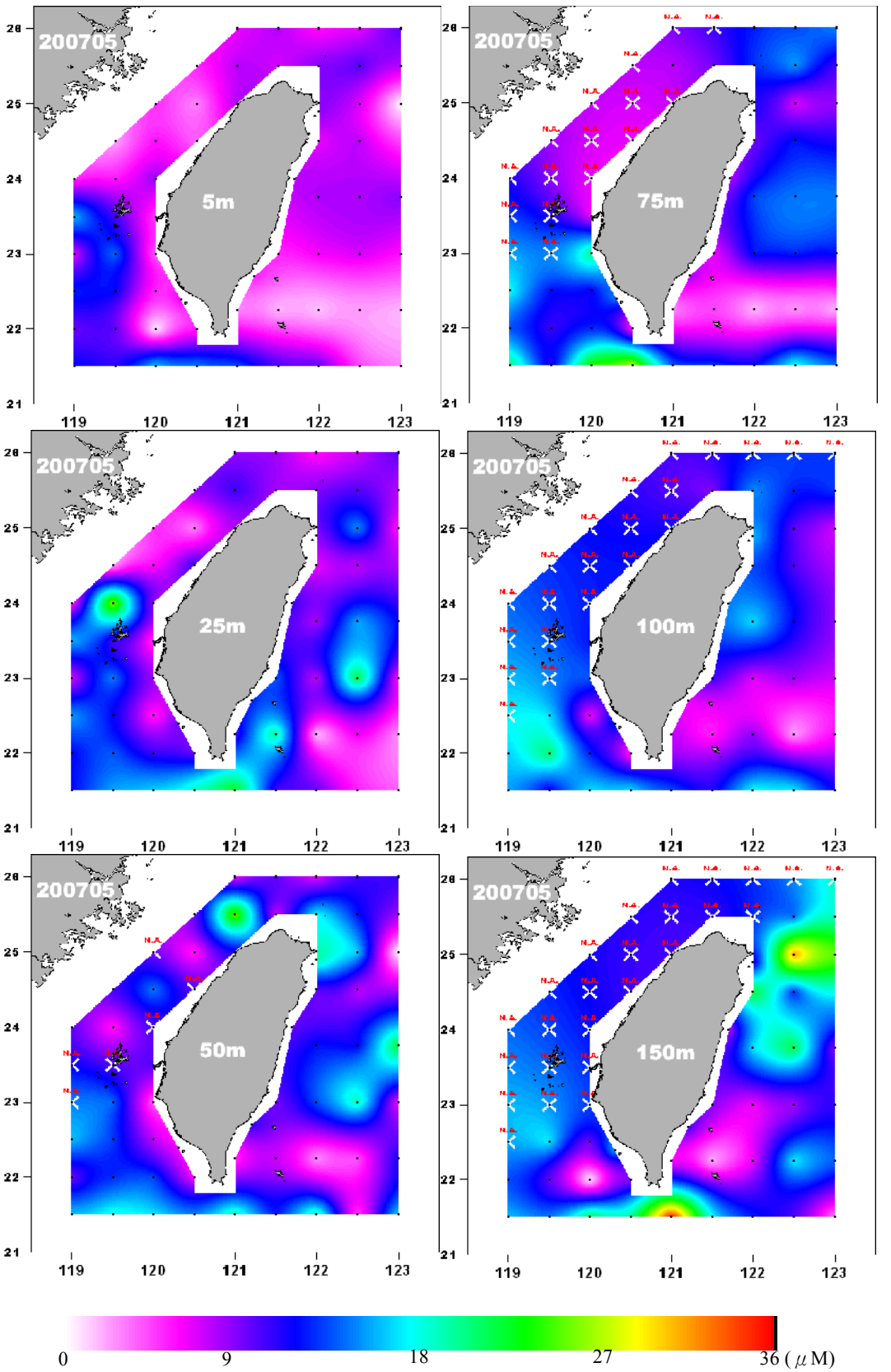

圖 22. 2007-05 航次矽酸鹽(SiO_2)濃度分布

Fig. 22.Silicate (SiO_2) distribution in May 2007

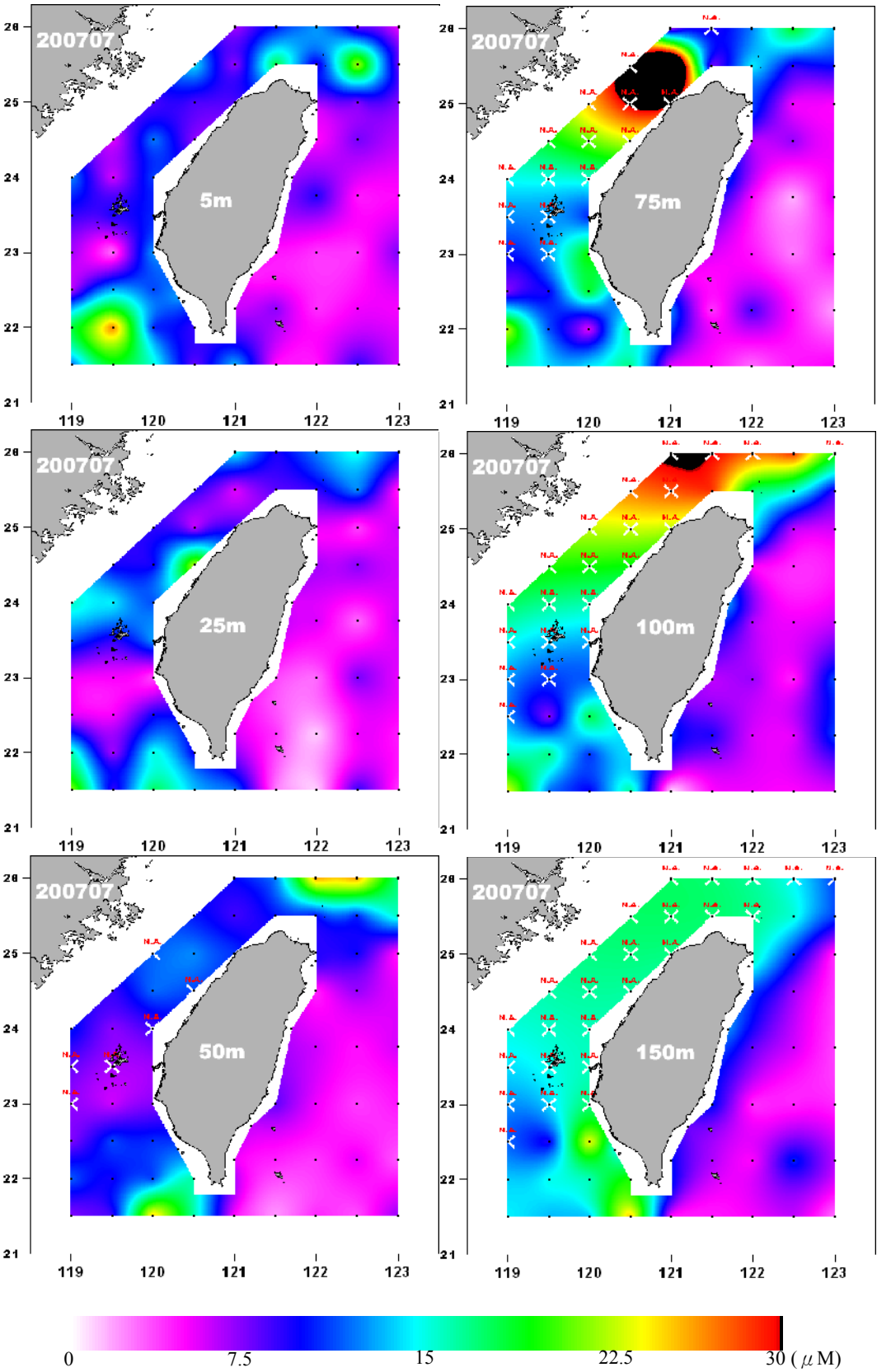

圖 23. 2007-07 航次矽酸鹽(SiO_2)濃度分布

Fig. 23.Silicate (SiO_2) distribution in Jul. 2007

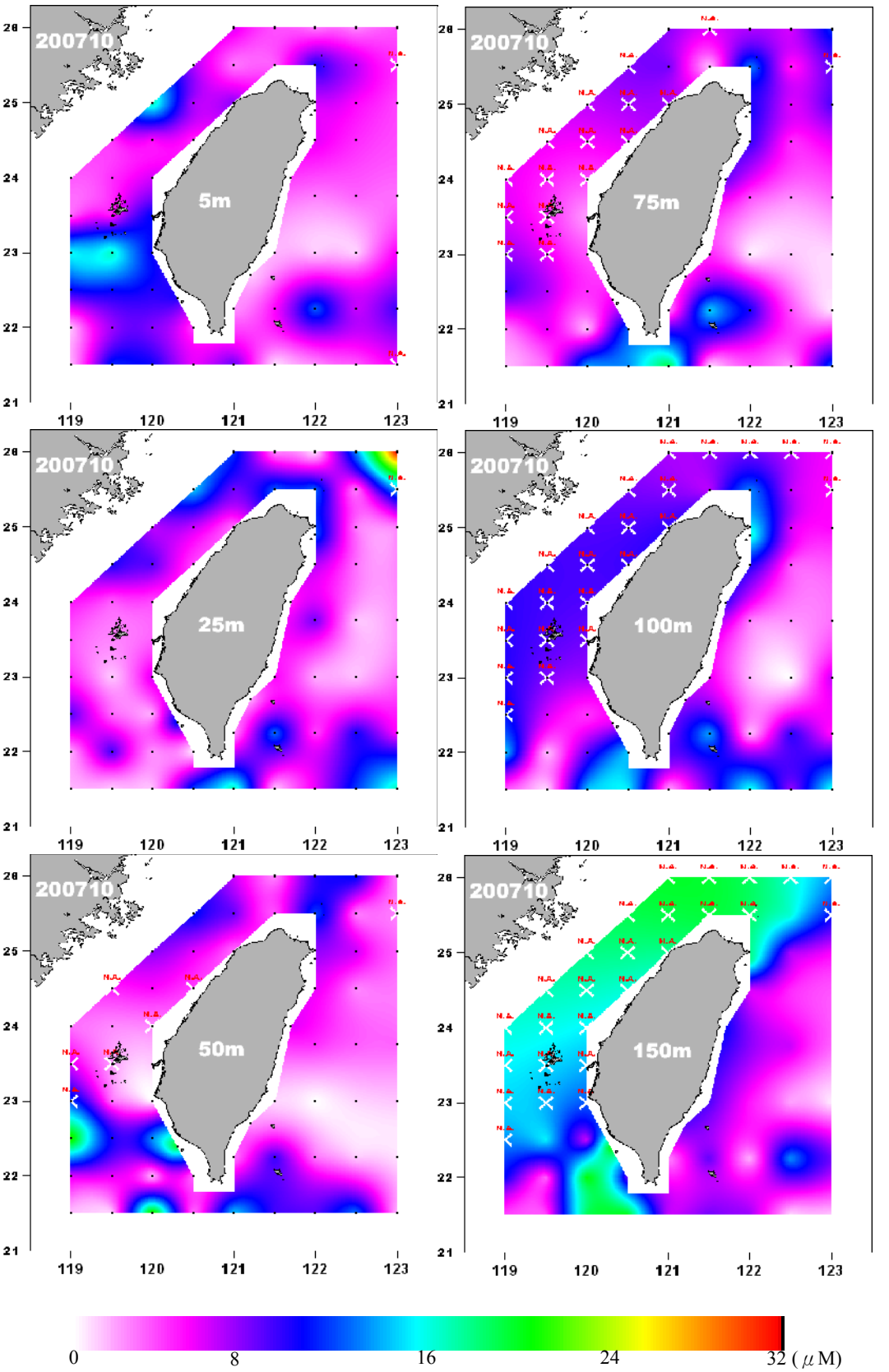

圖 24. 2007-10 航次矽酸鹽(SiO_2)濃度分布

Fig.24.Silicate (SiO_2) distribution in Oct. 2007

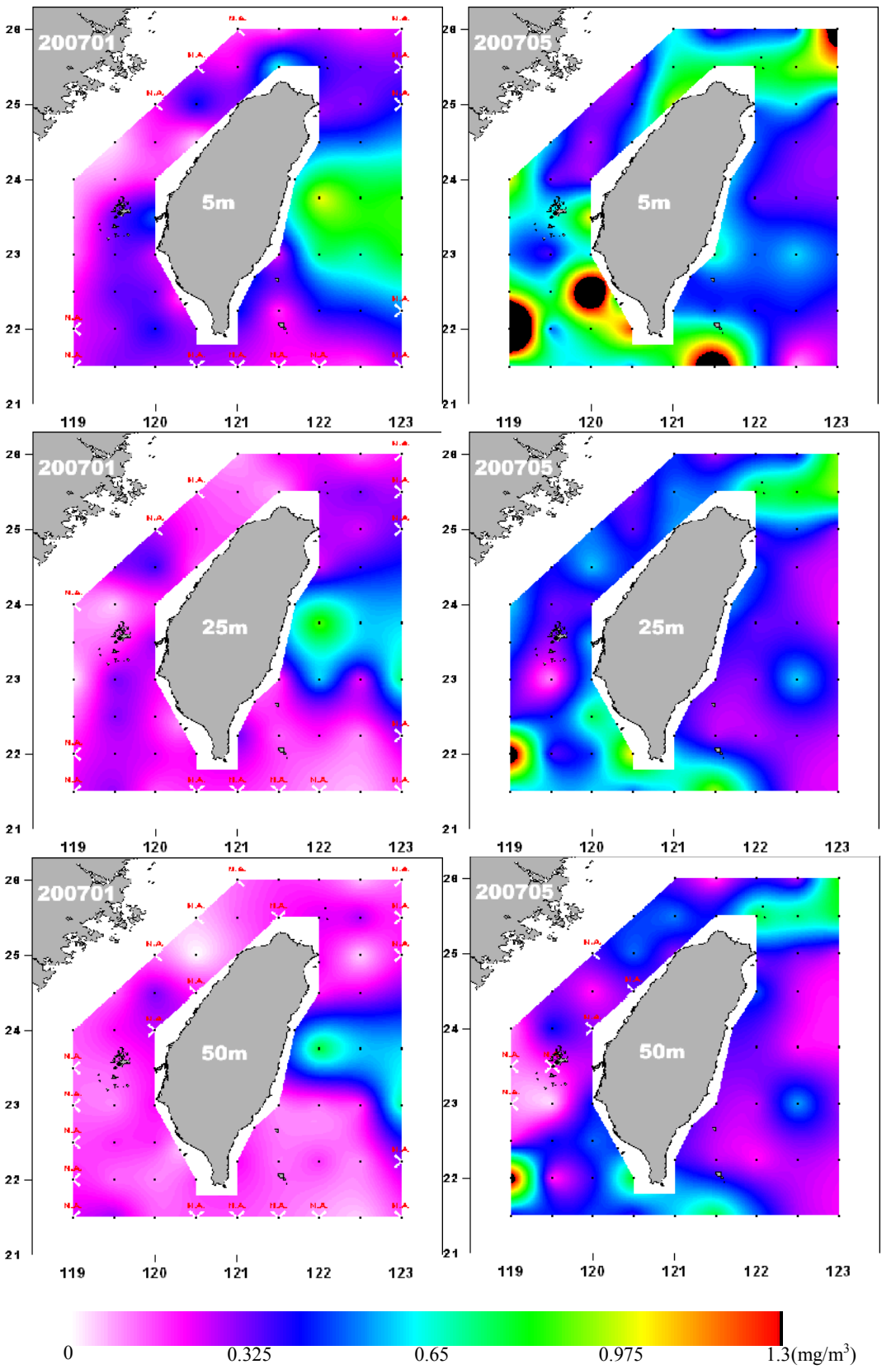

圖 25. 2007 年 1 月及 5 月葉綠素甲(chl-*a*)分布

Fig. 25. Chlorophyll-*a* (chl-*a*) distribution in Jan. and May 2007

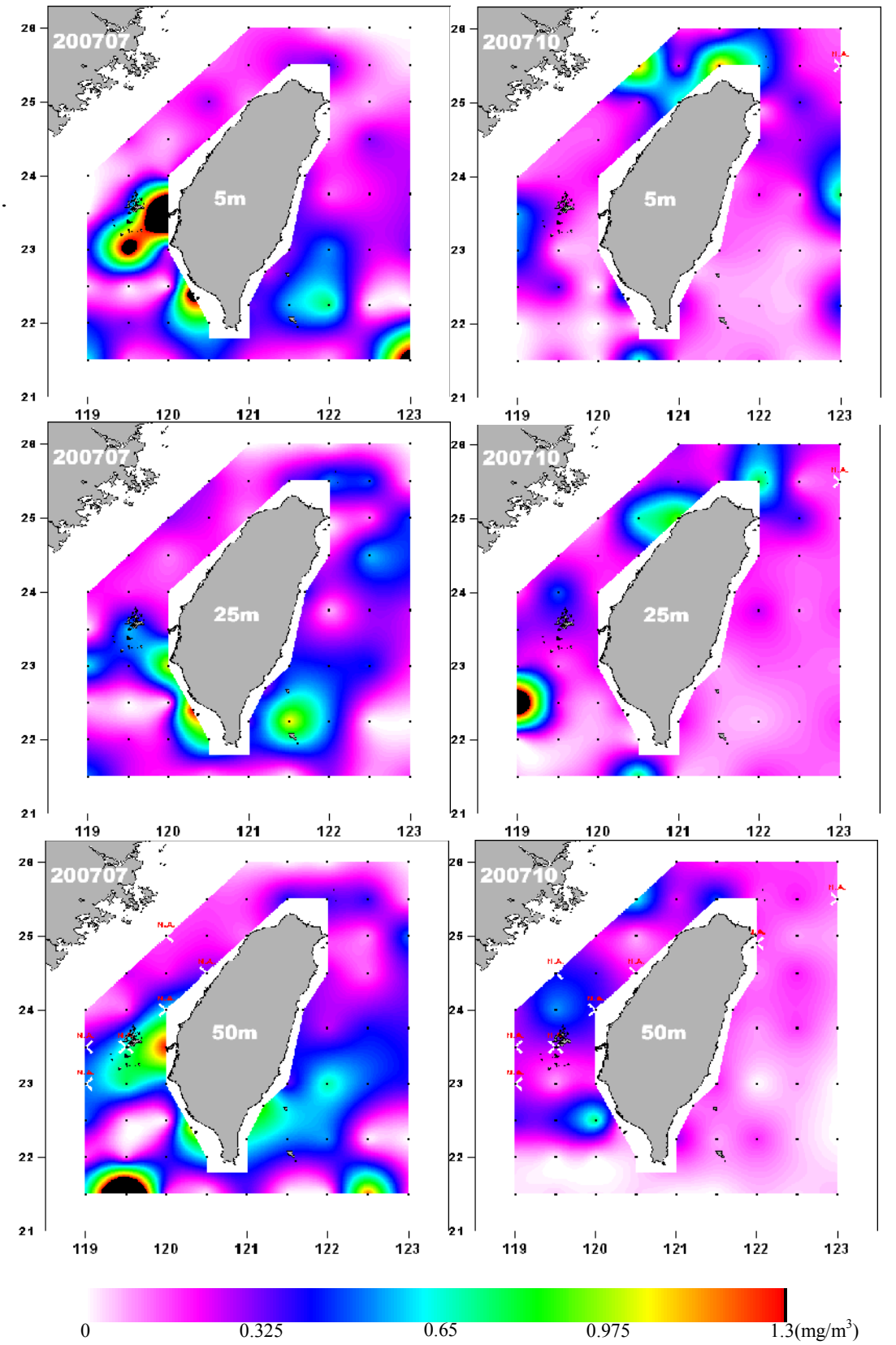

圖 26. 2007 年 7 月及 10 月葉綠素甲(chl-*a*)分布

Fig. 26. Chlorophyll-*a* (chl-*a*) distribution in Jul. and Oct. 2007

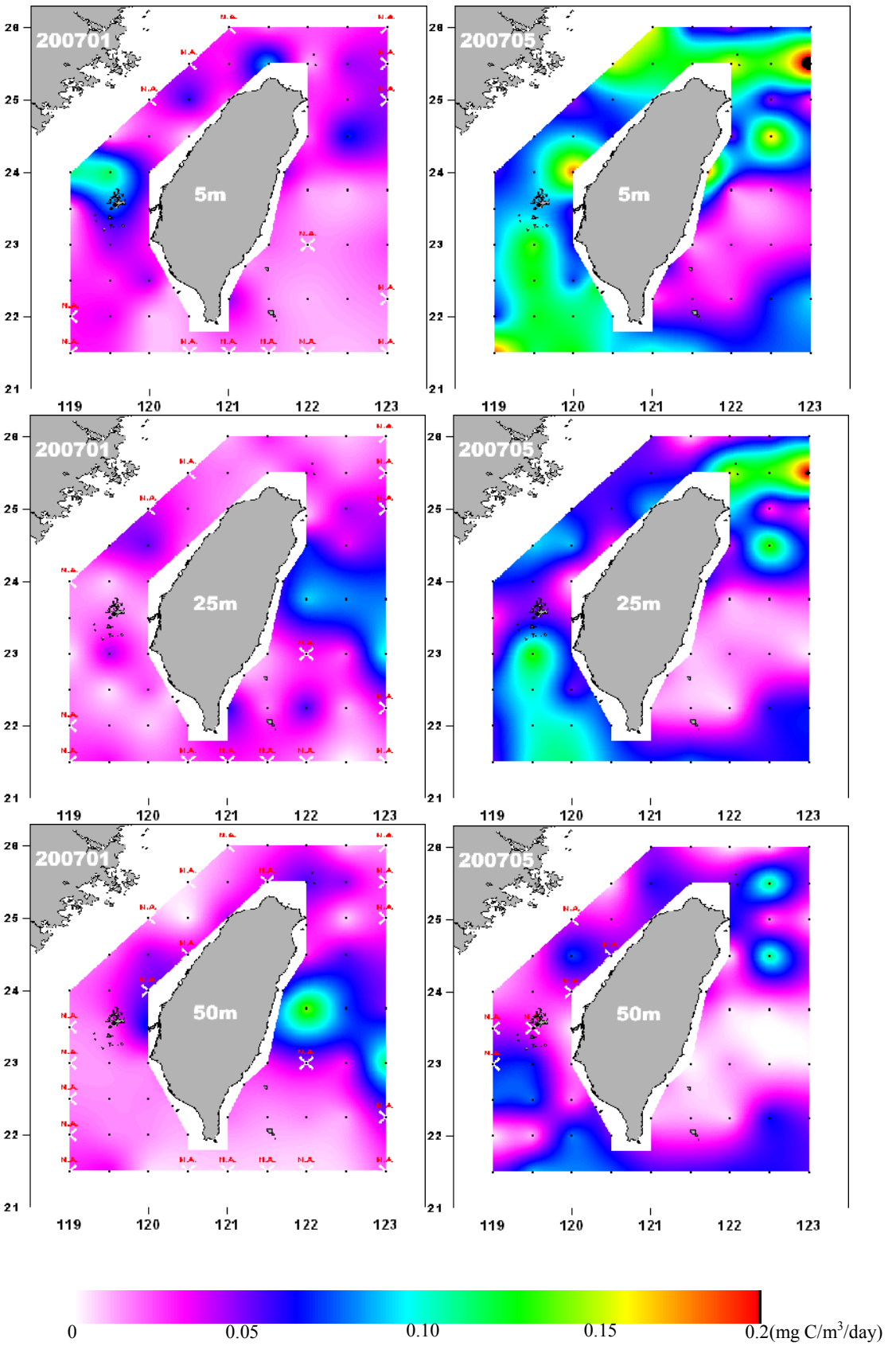

圖 27. 2007 年 1 月及 5 月基礎生產力分布

Fig. 27. Primary production distribution in Jan. and May 2007

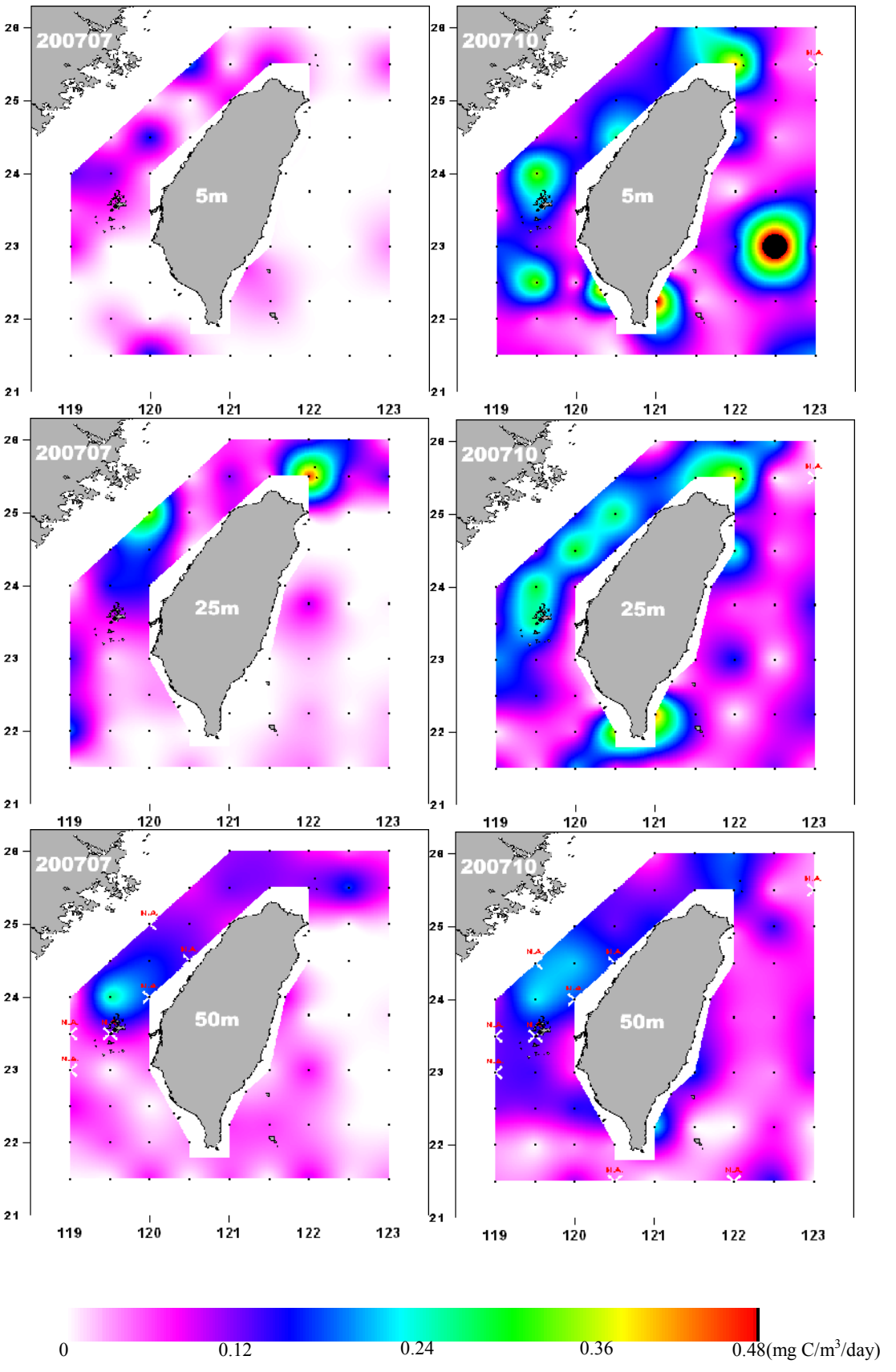

圖 28. 2007 年 7 月及 10 月基礎生產力分布

Fig. 28. Primary production distribution in Jul. and Oct. 2007

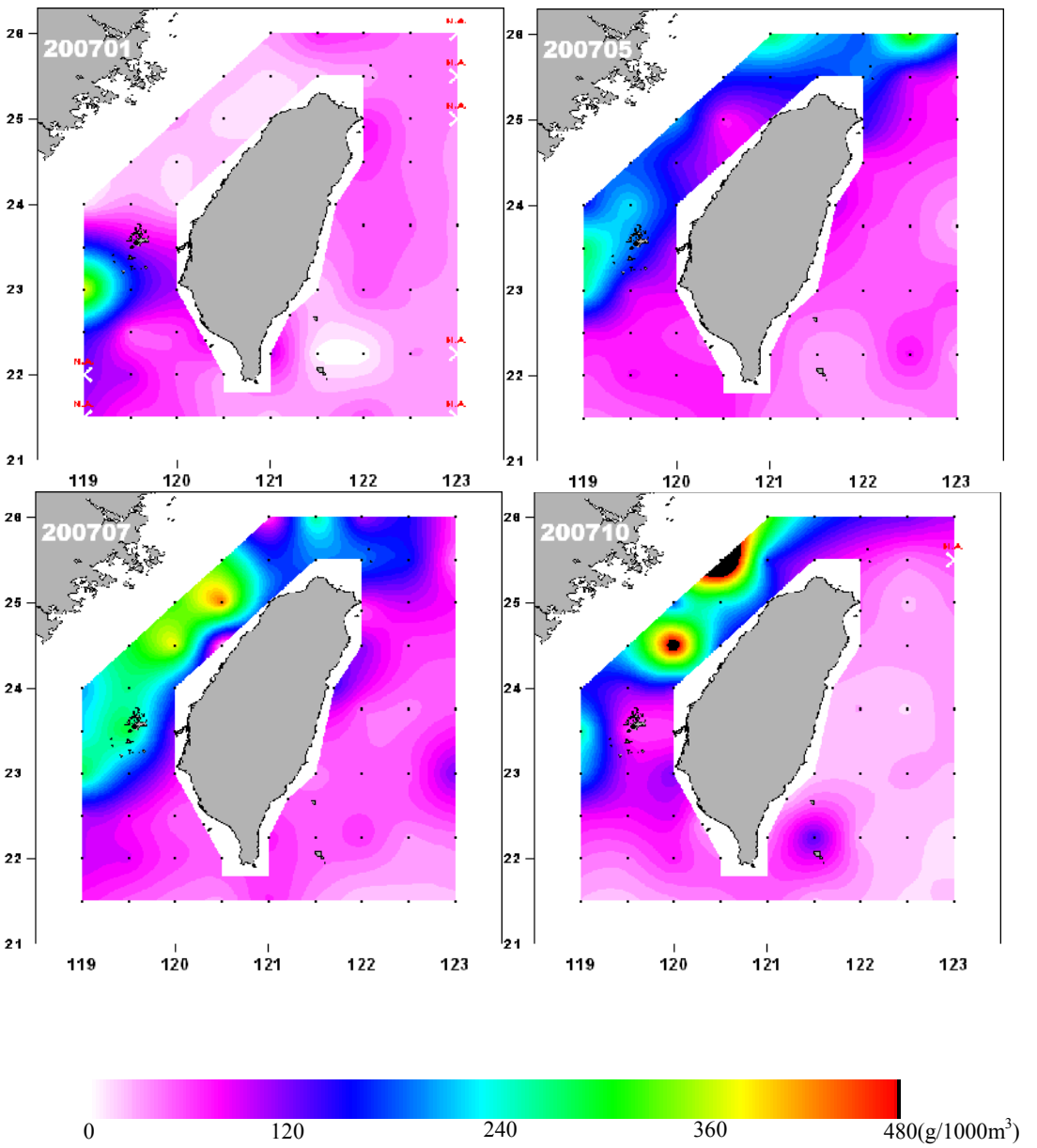

圖 29. 2007 年 1 月、5 月、7 月及 10 月浮游動物生物量分布
Fig. 29. Biomass of zooplankton sample in 2007

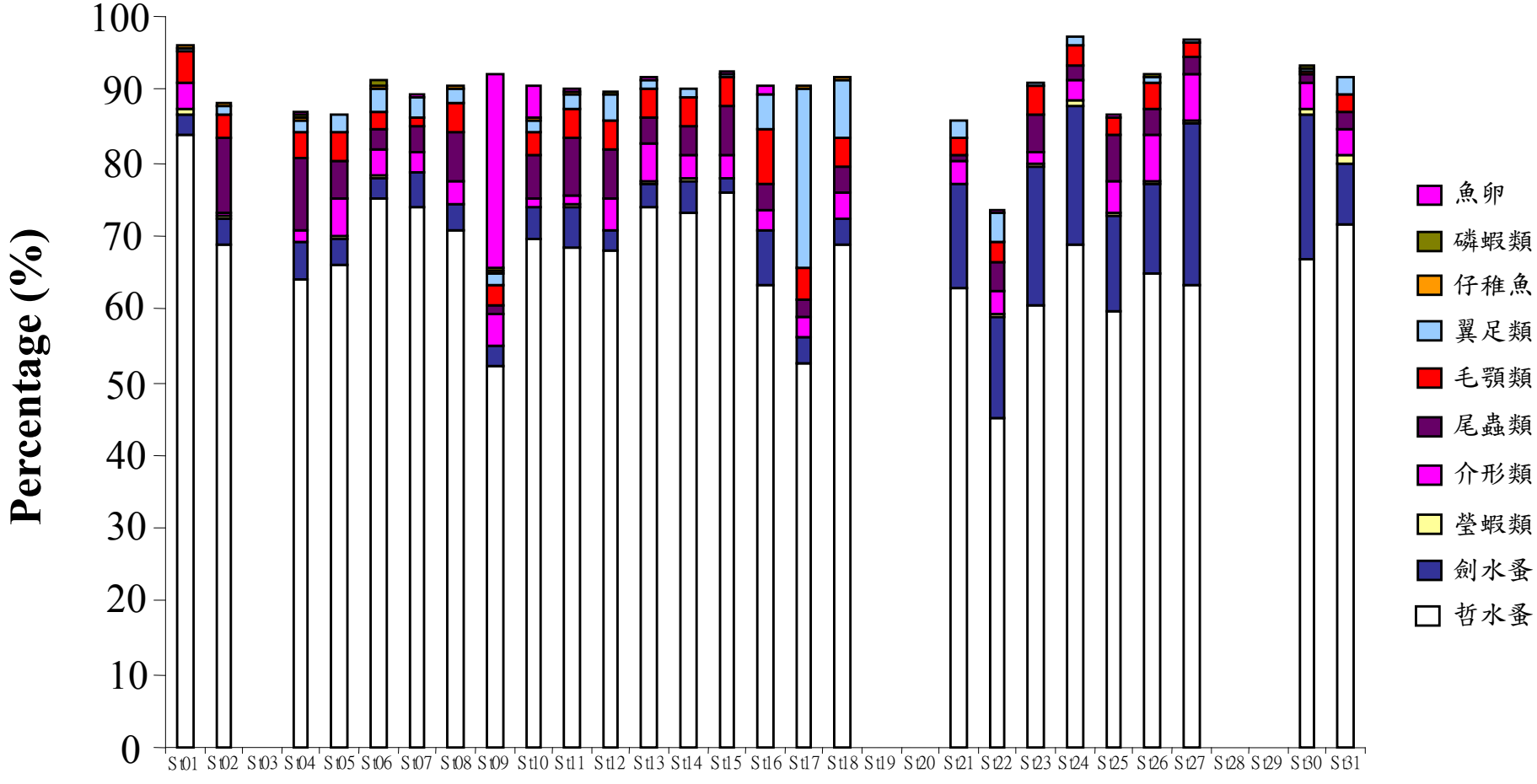

圖 30. 2007-01 航次浮游動物優勢大類出現百分率

Fig. 30. Percentage of the composition of zooplankton in Jan. 2007

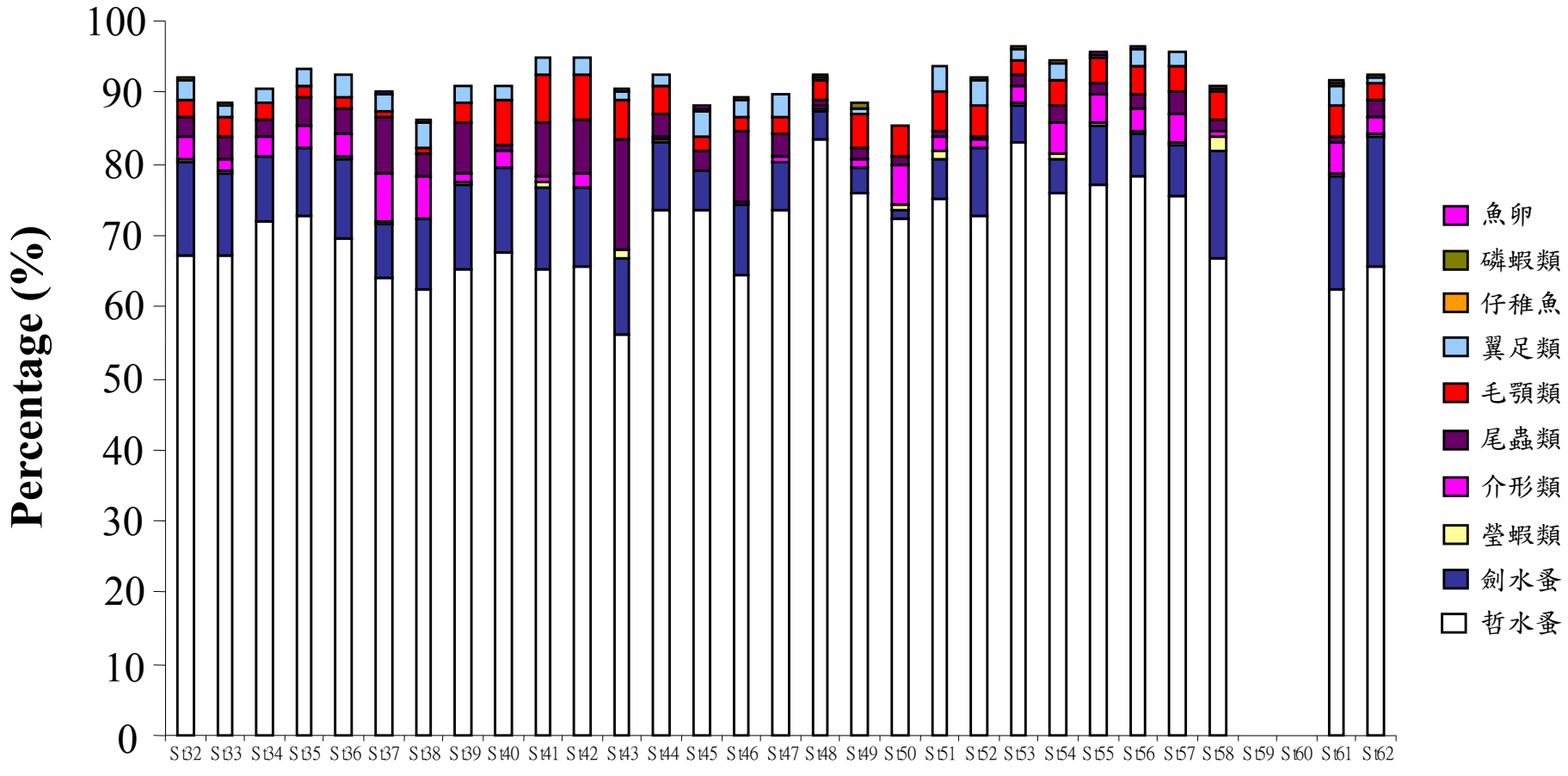

圖 31. 2007-01 航次浮游動物優勢大類出現百分率(續)

Fig. 31. Percentage of the composition of zooplankton in Jan. 2007

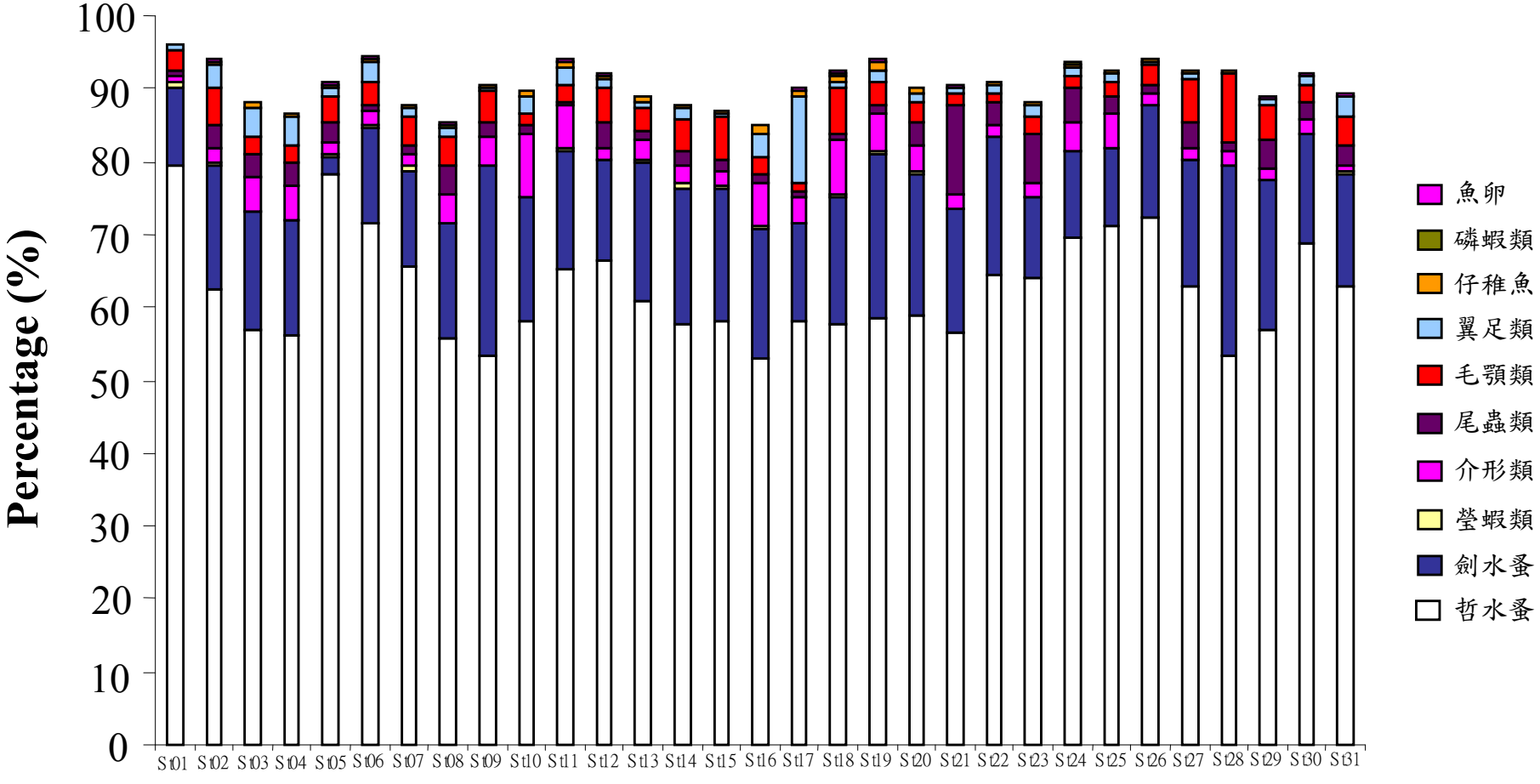

圖 32. 2007-05 航次浮游動物優勢大類出現百分率

Fig. 32. Percentage of the composition of zooplankton in May 2007

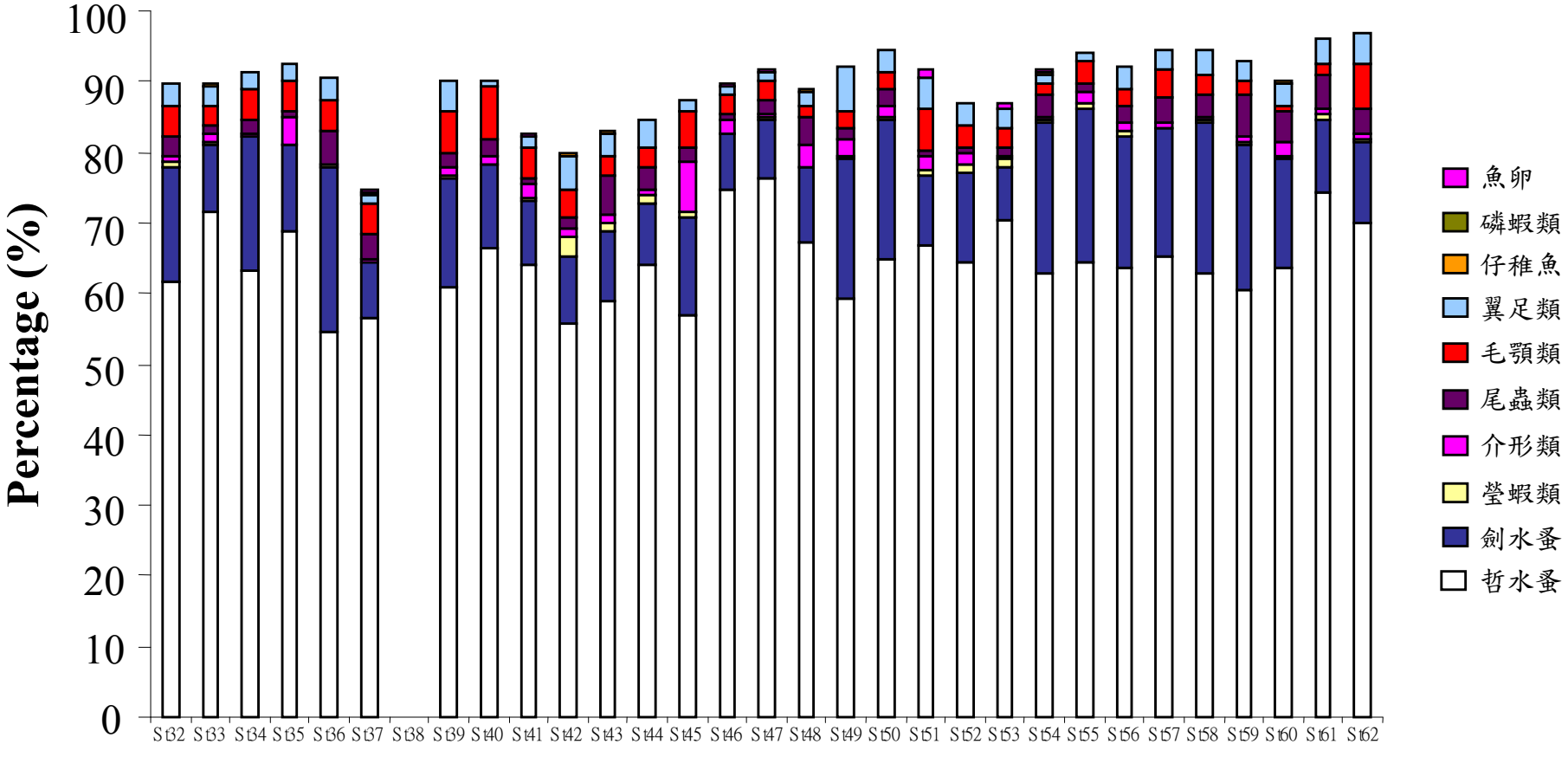

圖 33. 2007-05 航次浮游動物優勢大類出現百分率(續)

Fig. 33. Percentage of the composition of zooplankton in May 2007

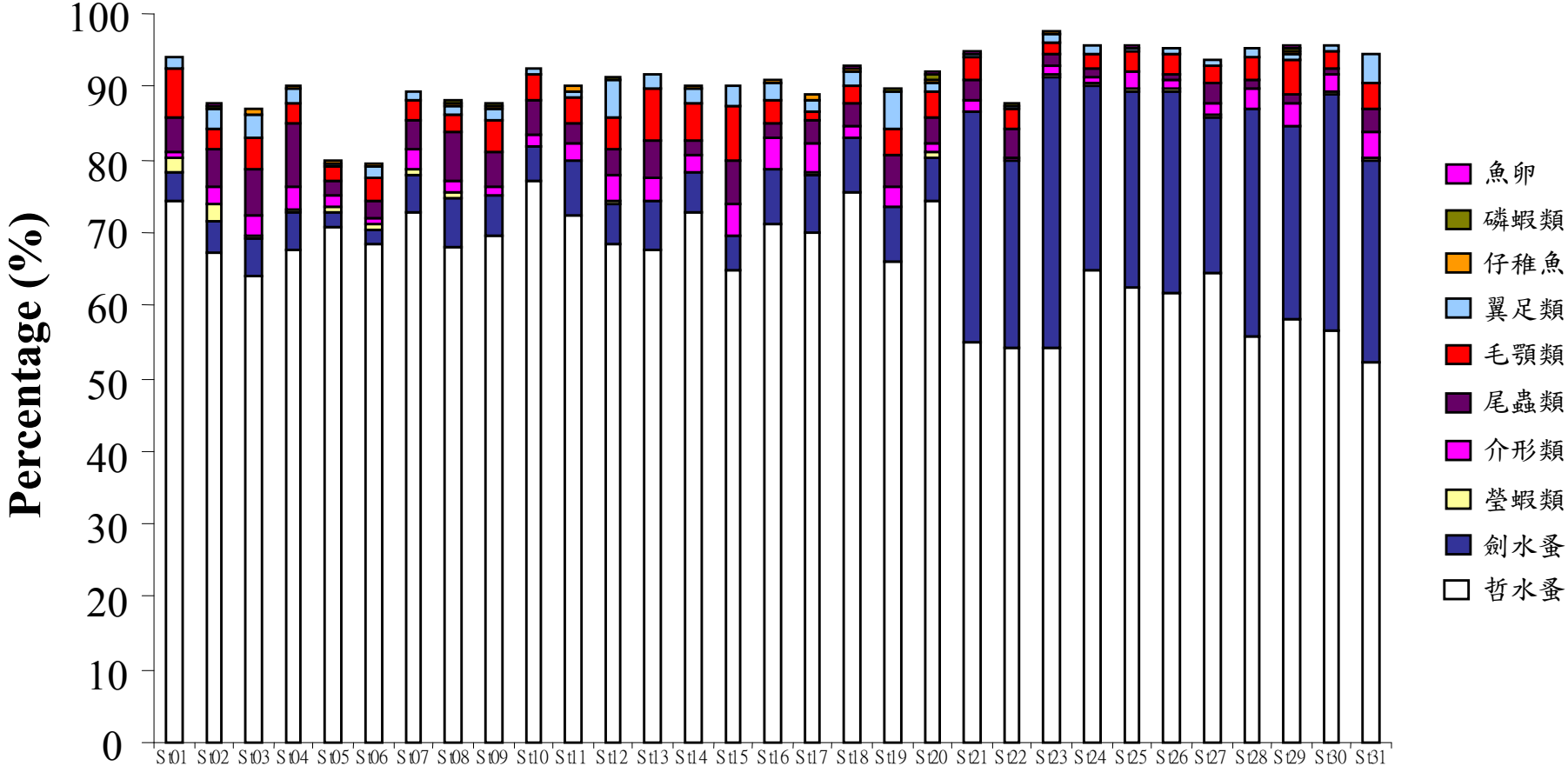

圖 34. 2007-07 航次浮游動物優勢大類出現百分率

Fig. 34. Percentage of the composition of zooplankton in Jul. 2007

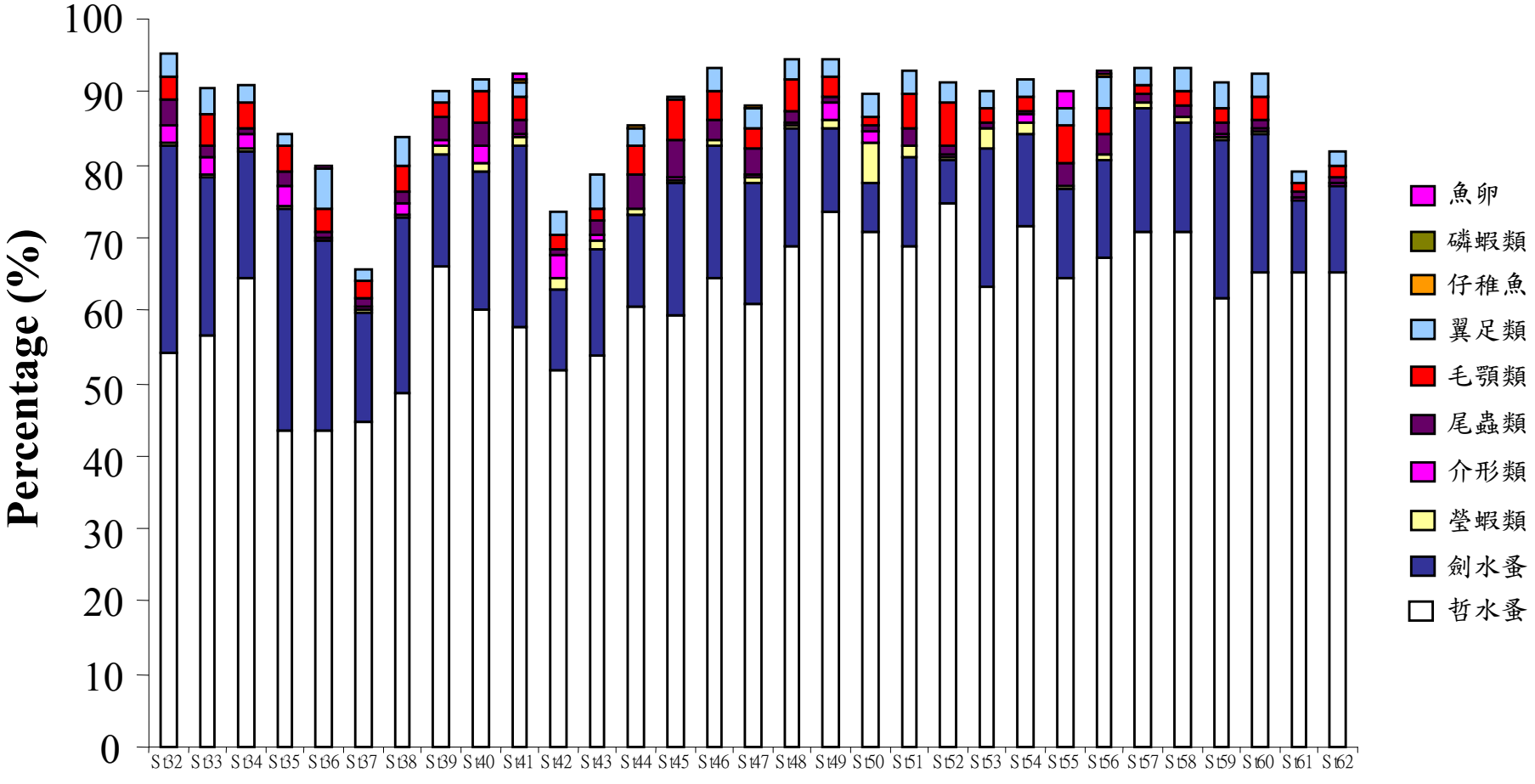

圖 35. 2007-07 航次浮游動物優勢大類出現百分率(續)

Fig. 35. Percentage of the composition of zooplankton in Jul. 2007

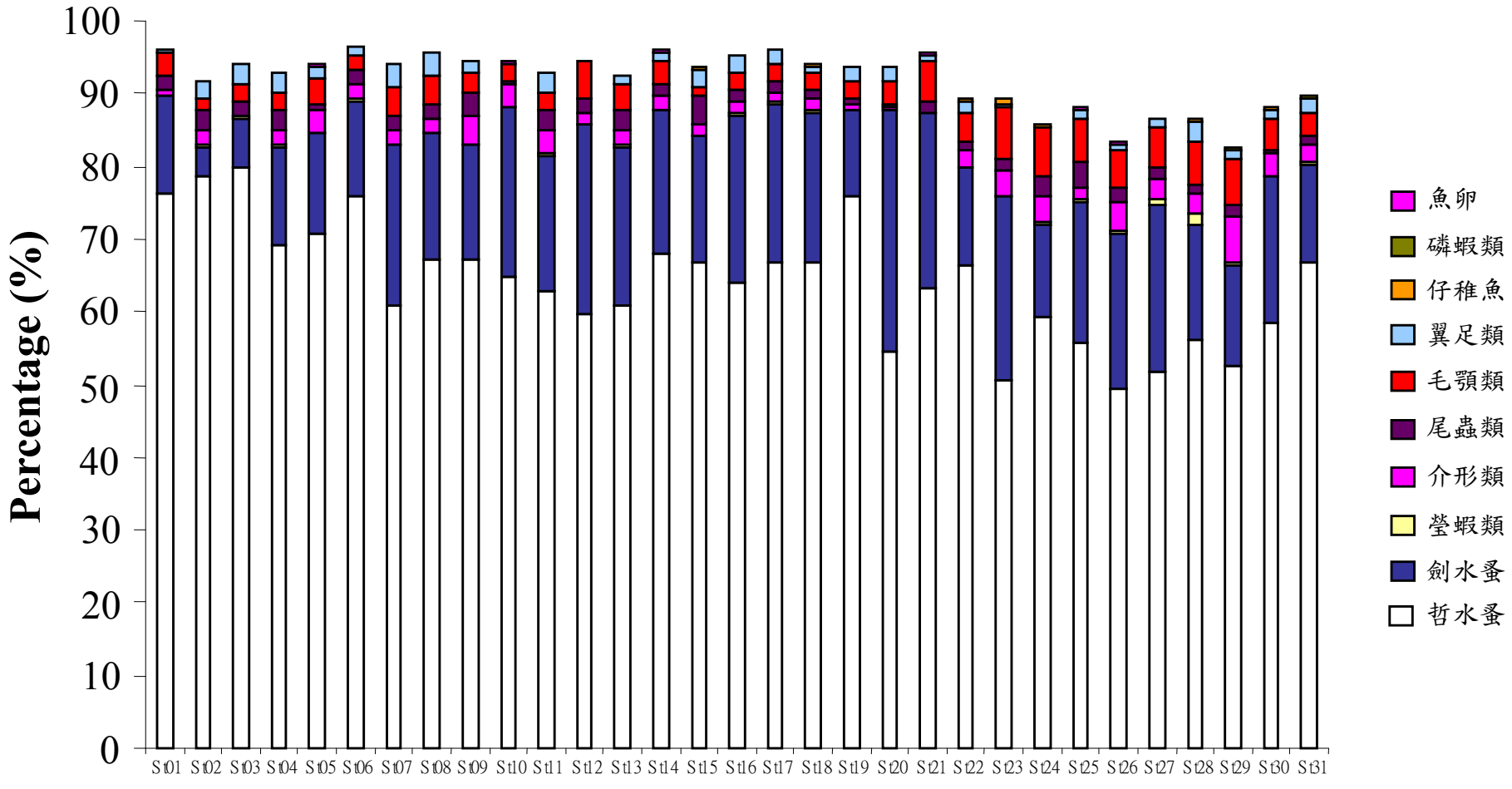

圖 36. 2007-10 航次浮游動物優勢大類出現百分率

Fig. 36. Percentage of the composition of zooplankton in Oct. 2007

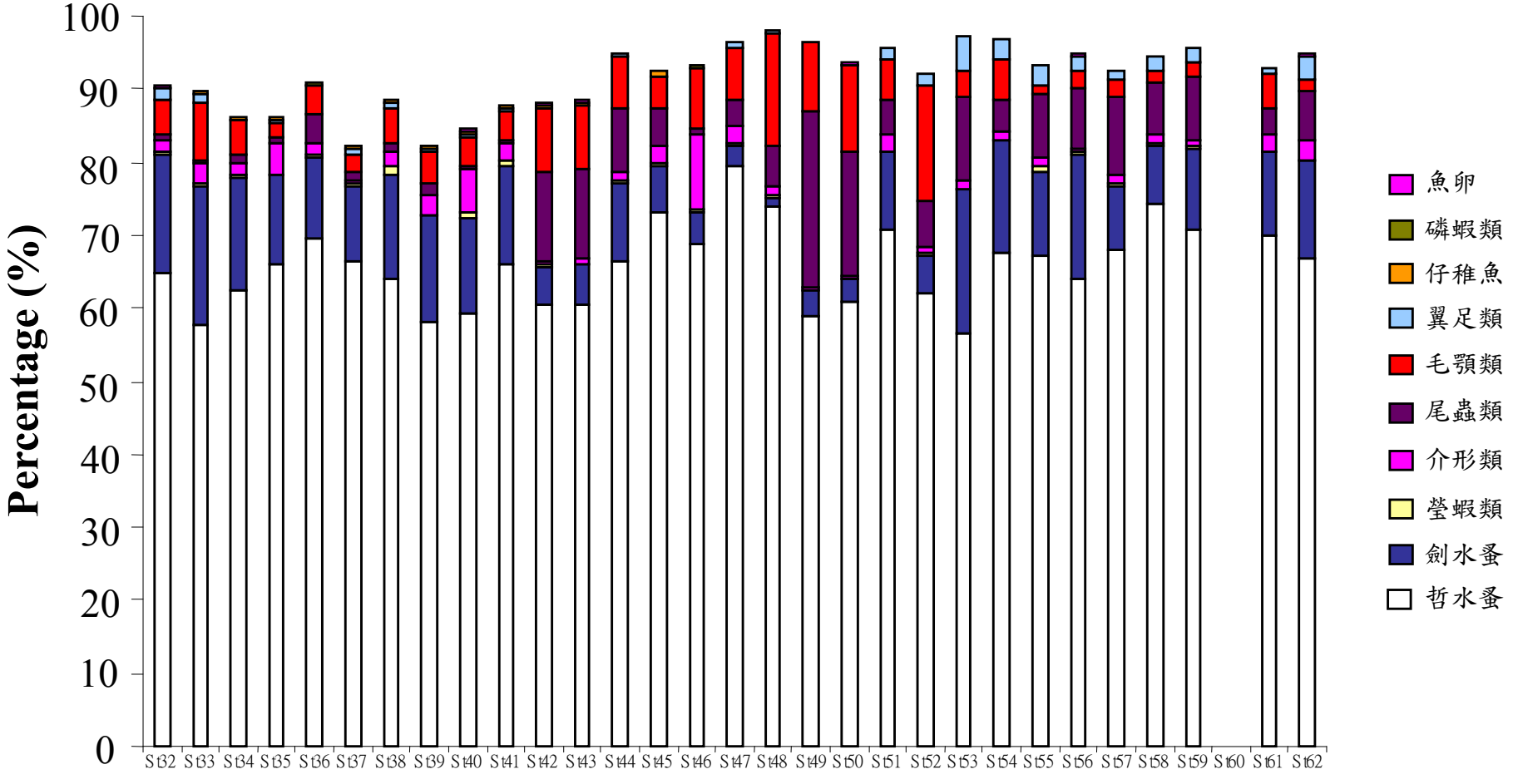

圖 37. 2007-10 航次浮游動物優勢大類出現百分率(續)

Fig. 37. Percentage of the composition of zooplankton in Oct. 2007

表 01. 2007-01-11 航次基礎觀測資料
Chart 01.Basic observation data in Jan. 2007

Station	Date	SMT	Lati.	Long.	Depth	SST	AirT.	AirP.	WindD.	WindF.	O.N.D.	Fl.Ct.	V.M.S.
St.01	20070129	1810	24.87	122.01	368	24.1	17.5	1022.00	050	4.6	200	1680	1008.0
St.02	20070129	1415	25.00	122.49	1449	21.9	14.5	1022.00	042	6.5	200	1791	1074.6
St.03	-	-	-	-	-	-	-	-	-	-	-	-	-
St.04	20070129	1800	24.50	122.50	636	22.6	15.3	1022.00	079	3.4	200	2826	1695.6
St.05	20070131	0140	24.53	122.01	749	24.5	18.1	1026.00	336	5.5	200	1785	1071.0
St.06	20070130	2150	24.01	121.69	368	24.3	18.7	1024.00	027	7.8	200	1974	1184.4
St.07	20070130	1850	23.75	122.00	3396	24.2	18.9	1023.00	040	9.5	200	1699	1019.4
St.08	20070129	2255	23.75	122.50	3092	23.1	16.5	1023.00	023	4.8	200	1620	972.0
St.09	20070130	0205	23.76	123.00	3657	23.2	16.8	1022.00	083	5.4	200	1768	1060.8
St.10	20070130	0658	23.00	123.01	5639	23.5	18.0	1023.00	016	8.6	200	1633	979.8
St.11	20070130	1035	23.00	122.52	5552	24.0	18.8	1023.00	042	6.0	200	1482	889.2
St.12	20070118	2311	23.00	122.00	4889	25.2	20.4	1019.00	026	12.9	200	1938	1162.8
St.13	20070118	1938	23.00	121.55	2188	24.4	20.6	1018.00	020	15.1	200	2033	1219.8
St.14	20070118	1615	22.67	121.24	1091	25.7	21.4	1017.00	020	13.1	200	1552	931.2
St.15	20070118	1230	22.25	121.00	1208	25.4	21.1	1018.00	028	13.4	200	1331	798.6
St.16	20070118	0922	22.26	121.50	456	25.8	22.0	1016.00	015	15.6	200	1685	1011.0
St.17	20070118	0614	22.26	121.99	4565	26.0	22.4	1016.00	032	13.9	200	2083	1249.8
St.18	20070118	0250	22.25	122.50	4855	26.1	22.2	1016.00	021	16.2	200	1656	993.6
St.19	-	-	-	-	-	-	-	-	-	-	-	-	-
St.20	-	-	-	-	-	-	-	-	-	-	-	-	-
St.21	20070117	2220	21.50	122.51	4786	26.5	23.6	1016.00	044	2.4	200	1929	1157.4
St.22	20070117	1842	21.51	121.99	3474	26.5	23.1	1016.00	018	7.3	200	2532	1519.2
St.23	20070117	1457	21.51	121.49	2092	26.8	23.3	1014.00	026	11.3	200	1505	903.0
St.24	20070117	1140	21.51	121.00	1195	26.9	24.1	1015.00	037	9.3	200	1742	1045.2
St.25	20070117	0738	21.51	120.50	1667	26.5	24.6	1015.00	061	10.3	200	1760	1056.0
St.26	20070117	0415	21.51	120.00	2945	26.1	24.4	1014.00	063	8.7	200	1377	826.2
St.27	20070117	0009	21.51	119.50	2983	25.1	22.8	1016.00	064	11.6	200	2246	1347.6
St.28	-	-	-	-	-	-	-	-	-	-	-	-	-
St.29	-	-	-	-	-	-	-	-	-	-	-	-	-
St.30	20070116	2100	22.00	119.51	2422	24.9	22.2	1019.00	032	6.8	200	1892	1135.2
St.31	20070116	1740	22.01	120.01	1224	27.4	24.4	1015.00	087	7.8	200	1774	1064.4
St.32	20070116	1420	22.01	120.50	171	26.7	24.5	1015.00	080	8.7	200	1685	1011.0
St.33	20070116	0935	22.40	120.29	146	25.4	22.0	1018.00	351	4.7	200	1140	684.0
St.34	20070116	0707	22.51	119.99	718	24.5	21.0	1018.00	016	6.3	200	1504	902.4
St.35	20070116	0335	22.51	119.49	214	21.4	17.9	1016.00	007	6.7	200	2173	1303.8
St.36	20070116	0100	22.51	119.01	83	23.2	19.7	1017.00	038	7.8	78	680	408.0
St.37	20070115	2235	22.94	119.11	25	21.4	17.9	1016.00	030	6.4	20	137	82.2
St.38	20070115	2019	22.98	119.50	78	22.7	18.8	1019.00	009	5.0	70	893	535.8
St.39	20070115	1759	23.02	119.92	126	23.3	19.7	1016.00	359	10.2	120	952	571.2
St.40	20070115	1415	23.50	119.91	121	20.5	17.3	1016.00	005	9.8	120	1048	628.8
St.41	20070115	1215	23.44	119.50	62	19.8	17.1	1018.00	007	11.6	46	472	283.2
St.42	20070115	0930	23.50	119.00	55	19.6	18.1	1017.00	028	10.0	49	353	211.8
St.43	20070114	0816	24.00	119.00	59	18.2	13.2	1021.00	027	19.1	55	538	322.8
St.44	20070115	0530	24.00	119.50	61	17.2	14.6	1019.00	014	14.3	61	473	283.8
St.45	20070115	0237	24.01	120.00	40	19.0	17.1	1019.00	005	14.1	33	415	249.0
St.46	20070114	2245	24.51	120.48	50	19.6	18.6	1018.00	026	14.2	47	454	272.4
St.47	20070114	1943	24.48	119.96	60	18.1	15.6	1019.00	006	13.0	50	278	166.8
St.48	20070114	0417	24.51	119.50	66	16.6	11.6	1021.00	018	20.0	60	618	370.8
St.49	20070114	0226	25.01	120.00	51	16.3	13.0	1021.00	008	13.2	58	445	267.0
St.50	20070113	1511	25.00	120.50	76	19.3	15.3	1019.00	038	17.6	70	1207	724.2
St.51	20070113	1248	25.11	120.91	79	19.8	15.7	1020.00	031	14.7	70	574	344.4
St.52	20070112	2045	25.51	120.51	64	19.0	15.0	1021.00	032	17.4	57	942	565.2
St.53	20070112	1655	26.00	121.00	80	19.2	14.3	1019.00	024	18.8	75	754	452.4
St.54	20070112	1222	25.50	121.00	91	19.5	16.4	1019.00	004	12.0	80	593	355.8
St.55	20070112	0945	25.51	121.50	115	20.1	18.8	1021.00	016	10.4	110	774	464.4
St.56	20070112	0650	26.00	121.51	67	19.0	17.8	1020.00	020	11.2	63	389	233.4
St.57	20070112	0400	26.00	122.00	100	19.7	19.3	1019.00	036	5.0	95	800	480.0
St.58	20070112	0121	26.00	122.49	104	20.2	19.6	1020.00	055	6.4	100	1070	642.0
St.59	-	-	-	-	-	-	-	-	-	-	-	-	-
St.60	-	-	-	-	-	-	-	-	-	-	-	-	-
St.61	20070111	2227	25.50	122.50	405	20.9	18.8	1020.00	106	4.7	200	1879	1127.4
St.62	20070111	1925	25.50	122.01	116	20.9	17.8	1020.00	005	6.3	113	865	519.0

表 02. 2007-05-10 航次基礎觀測資料
Chart 02.Basic observation data in May 2007

Station	Date	SMT	Lati.	Long.	Depth	SST	AirT.	AirP.	WindD.	WindF.	O N D	Fl.Ct.	V M S.
St.01	20070510	1456	24.87	122.00	330	26.9	25.1	1013.09	140	3.6	200	1381	828.6
St.02	20070510	1745	25.01	122.51	1443	27.7	25.3	1012.92	086	6.6	200	1473	883.8
St.03	20070510	2044	25.01	122.98	2587	27.7	25.3	1013.63	105	6.0	200	1350	810.0
St.04	20070511	0137	24.51	122.50	598	27.8	25.0	1013.00	120	2.0	200	1611	966.6
St.05	20070511	0510	24.50	122.01	880	27.7	25.3	1013.63	103	3.7	200	1879	1127.4
St.06	20070511	0922	24.00	121.68	344	25.9	25.7	1014.72	039	0.0	200	1572	943.2
St.07	20070511	1156	23.77	122.01	2981	27.8	24.9	1014.34	100	4.0	200	1783	1069.8
St.08	20070511	1509	23.75	122.50	3114	27.9	24.9	1012.74	082	5.0	200	1371	822.6
St.09	20070511	1810	23.75	123.01	3640	26.5	24.4	1013.63	116	5.6	200	1775	1065.0
St.10	20070511	2255	23.00	123.00	5297	24.0	25.8	1013.98	041	2.2	200	1623	973.8
St.11	20070512	0206	23.00	122.51	5518	26.1	23.1	1011.00	028	4.0	200	1482	889.2
St.12	20070512	0516	23.00	122.02	4894	27.6	24.3	1012.00	060	3.0	200	1550	930.0
St.13	20070512	0841	23.00	121.51	2027	25.8	23.9	1013.90	109	2.6	200	1192	715.2
St.14	20070512	1246	22.67	121.25	1184	28.7	26.2	1011.31	085	3.7	200	1296	777.6
St.15	20070512	1634	22.26	121.01	1177	29.0	26.5	1009.89	061	2.2	200	1451	870.6
St.16	20070512	1938	22.26	121.50	471	28.8	26.4	1011.49	006	4.5	200	1318	790.8
St.17	20070512	2245	22.25	122.01	4582	28.8	25.9	1012.20	088	4.5	200	1980	1188.0
St.18	20070513	0145	22.25	122.51	4858	27.1	25.0	1011.49	120	6.5	200	1911	1146.6
St.19	20070513	0508	22.26	123.00	3526	26.8	25.9	1011.49	088	7.0	200	1533	919.8
St.20	20070513	0940	21.50	123.01	5032	28.6	26.6	1012.74	093	6.3	200	1500	900.0
St.21	20070513	1240	21.51	122.50	4787	28.4	26.6	1011.49	063	6.7	200	1438	862.8
St.22	20070513	1539	21.50	122.00	3470	28.4	26.4	1010.07	083	7.2	200	1466	879.6
St.23	20070513	1845	21.51	121.50	2104	28.8	25.9	1011.14	070	9.0	200	1388	832.8
St.24	20070513	2142	21.51	121.00	1140	28.8	26.6	1012.20	041	8.0	200	1577	946.2
St.25	20070514	0115	21.50	120.49	1553	28.9	26.9	1010.25	080	8.1	200	1992	1195.2
St.26	20070514	0450	21.50	120.01	2952	28.1	25.7	1009.71	090	6.4	200	1653	991.8
St.27	20070514	0812	21.51	119.48	2952	28.6	26.8	1011.85	089	6.4	200	1507	904.2
St.28	20070514	1140	21.50	119.01	2777	28.3	26.5	1011.85	085	7.0	200	1466	879.6
St.29	20070514	1508	22.00	119.00	1445	28.0	25.7	1010.07	020	7.3	200	1455	873.0
St.30	20070515	0416	22.02	119.50	2632	28.5	26.6	1010.42	357	3.7	200	1756	1053.6
St.31	20070515	0746	22.01	119.99	1075	28.6	26.8	1011.49	012	5.0	200	1465	879.0
St.32	20070515	1053	22.00	120.50	278	29.0	28.5	1011.49	300	0.0	200	1368	820.8
St.33	20070515	1345	22.37	120.33	486	29.3	27.7	1009.53	285	4.3	200	1593	955.8
St.34	20070521	1100	22.49	120.00	578	28.7	26.0	1006.00	095	1.7	200	1635	981.0
St.35	20070515	0120	22.50	119.51	235	28.3	26.0	1010.00	165	2.0	200	1498	898.8
St.36	20070514	2035	22.50	119.00	85	27.8	25.3	1010.42	058	5.2	80	411	246.6
St.37	20070514	2035	22.94	119.10	30	25.7	23.5	1011.31	042	2.2	25	199	119.4
St.38	20070514	2225	23.01	119.48	76	27.3	25.3	1011.14	028	4.2	71	590	354.0
St.39	20070521	1418	23.00	119.91	127	29.4	26.8	1004.73	006	3.3	120	788	472.8
St.40	20070521	1759	23.50	119.92	122	28.9	25.7	1004.73	355	6.0	117	932	559.2
St.41	20070521	2019	23.44	119.50	55	26.2	24.4	1006.00	024	4.1	49	291	174.6
St.42	20070521	2246	23.64	119.01	50	24.8	23.7	1007.00	045	4.2	46	559	335.4
St.43	20070522	0114	24.01	119.00	59	25.9	24.0	1005.44	021	4.7	50	409	245.4
St.44	20070522	0352	24.01	119.49	62	25.5	24.1	1004.82	014	4.6	52	585	351.0
St.45	20070522	0628	24.00	120.00	40	27.2	25.7	1005.00	013	0.0	35	364	218.4
St.46	20070522	1004	24.50	120.50	51	27.7	25.5	1005.00	342	0.0	45	340	204.0
St.47	20070522	1240	24.50	120.01	61	27.5	25.0	1005.08	356	4.5	55	550	330.0
St.48	20070522	1512	24.50	119.50	62	27.1	24.6	1004.02	002	3.7	59	450	270.0
St.49	20070522	1835	25.00	120.00	52	26.4	24.5	1004.00	059	3.1	45	338	202.8
St.50	20070522	2051	25.00	120.50	73	26.6	25.4	1005.00	187	3.7	68	580	348.0
St.51	20070522	2251	25.08	120.92	68	27.5	26.1	1005.44	222	4.0	64	483	289.8
St.52	20070523	0156	25.49	120.50	64	25.6	23.9	1004.02	242	3.0	60	609	365.4
St.53	20070523	0534	26.00	121.01	80	26.6	24.8	1004.00	190	2.8	74	511	306.6
St.54	20070523	0829	25.51	121.00	88	26.8	25.4	1005.00	180	0.0	80	594	356.4
St.55	20070523	1057	25.48	121.49	112	27.7	26.8	1004.91	222	6.1	105	734	440.4
St.56	20070523	1342	25.99	121.50	68	27.7	26.0	1003.30	233	6.6	63	411	246.6
St.57	20070523	1655	26.00	122.00	100	27.2	25.2	1002.00	154	5.1	95	743	445.8
St.58	20070523	2008	26.00	122.50	104	26.3	24.5	1004.00	172	4.7	99	692	415.2
St.59	20070523	2316	26.01	122.98	99	26.8	26.0	1004.02	213	4.5	90	470	282.0
St.60	20070524	0300	26.51	123.01	775	27.6	26.1	1002.59	214	0.0	200	1551	930.6
St.61	20070524	0651	25.50	122.51	437	26.4	25.6	1002.00	153	6.3	200	1315	789.0
St.62	20070524	1143	25.50	122.01	118	24.6	25.7	1005.00	175	3.8	105	678	406.8

表 03. 2007-07-04 航次基礎觀測資料
Chart 03.Basic observation data in Jul.2007

Station	Date	SMT	Lati.	Long.	Depth	SST	AirT.	AirP.	WindD.	WindF.	O N D	Fl.Ct.	V M S.
St.01	20070704	1425	24.86	122.01	427	30.6	28.9	1006.00	115	2.8	200	1763	1057.8
St.02	20070704	1709	25.00	122.51	1465	31.1	29.5	1006.00	195	5.2	200	1059	635.4
St.03	20070704	2000	24.99	123.00	1670	30.8	29.5	1007.40	192	8.4	200	1666	999.6
St.04	20070705	0057	24.51	122.51	570	30.7	29.3	1006.69	189	8.6	200	1203	721.8
St.05	20070705	0433	24.49	122.00	1189	29.8	27.2	1005.00	008	3.7	200	1279	767.4
St.06	20070705	0811	23.98	121.80	812	29.9	28.6	1006.00	174	2.6	200	911	546.6
St.07	20070705	1050	23.75	122.00	3450	30.7	29.4	1006.00	188	10.1	200	1364	818.4
St.08	20070705	1350	23.75	122.51	3003	31.2	29.7	1006.51	173	8.7	200	1516	909.6
St.09	20070705	1648	23.75	123.01	3647	31.2	29.9	1007.00	180	4.8	200	1389	833.4
St.10	20070705	2132	23.00	123.01	5454	31.3	29.5	1009.00	155	7.4	200	1230	738.0
St.11	20070706	0120	23.00	122.50	5534	31.1	29.1	1007.85	170	9.0	200	1482	889.2
St.12	20070706	0442	23.00	122.01	4921	30.7	28.8	1006.51	196	7.6	200	1514	908.4
St.13	20070706	0818	22.99	121.49	1746	30.6	28.4	1007.00	206	6.6	200	1198	718.8
St.14	20070706	1245	22.67	121.26	1160	31.4	29.8	1007.75	173	7.6	200	1490	894.0
St.15	20070706	1731	22.25	121.00	1208	31.4	29.3	1006.33	208	8.3	200	1194	716.4
St.16	20070706	2020	22.25	121.51	700	31.3	29.4	1008.10	185	6.0	200	1430	858.0
St.17	20070706	2310	22.25	122.00	4577	31.0	29.0	1009.00	183	5.3	200	1261	756.6
St.18	20070707	0205	22.24	122.50	4853	30.9	28.9	1007.75	159	6.0	200	1796	1077.6
St.19	20070707	0505	22.25	123.00	3605	31.0	29.0	1008.64	176	5.8	200	1229	737.4
St.20	20070707	1140	21.50	123.00	4928	32.1	29.5	1007.93	175	5.0	200	1376	825.6
St.21	20070707	1434	21.50	122.51	4786	32.0	30.2	1007.00	161	6.2	200	1432	859.2
St.22	20070707	1756	21.50	122.00	3470	32.0	29.9	1007.40	158	3.1	200	1401	840.6
St.23	20070708	0133	21.50	121.51	2086	31.2	29.1	1005.62	152	45.0	200	1642	985.2
St.24	20070708	0605	21.50	121.01	925	31.3	29.5	1006.51	166	3.1	200	1328	796.8
St.25	20070708	1000	21.50	120.51	1803	32.0	30.0	1006.00	144	5.9	200	1712	1027.2
St.26	20070708	1315	21.50	119.99	2981	32.2	30.2	1005.08	144	4.8	200	1488	892.8
St.27	20070708	1610	21.50	119.51	2976	32.3	30.1	1003.84	129	4.8	200	1173	703.8
St.28	20070708	1912	21.50	119.00	2792	32.1	29.8	1003.66	080	2.6	200	1270	762.0
St.29	20070708	2252	22.00	119.00	1515	31.8	29.7	1004.37	156	3.4	200	1522	913.2
St.30	20070709	0157	22.01	119.50	2394	31.6	29.4	1003.30	128	3.8	200	1478	886.8
St.31	20070709	0518	22.00	120.00	1145	31.1	28.4	1003.66	172	2.8	200	1116	669.6
St.32	20070709	0835	22.00	120.51	358	31.6	29.1	1003.30	111	7.0	200	1429	857.4
St.33	20070709	1251	22.38	120.33	480	32.1	30.0	1001.70	177	7.4	200	1441	864.6
St.34	20070711	1055	22.50	120.00	639	31.8	29.8	1001.00	232	3.6	200	1376	825.6
St.35	20070711	1400	22.50	119.50	237	32.5	29.9	1000.46	280	4.1	200	1218	730.8
St.36	20070711	1651	22.50	119.00	85	31.5	29.8	998.85	286	2.4	83	651	390.6
St.37	20070711	1917	22.95	119.09	27	29.7	27.9	999.50	002	208.0	20	114	68.4
St.38	20070712	0543	23.01	119.50	73	30.0	28.1	999.03	033	3.3	70	524	314.4
St.39	20070712	0807	23.00	119.91	126	30.6	28.9	999.57	328	5.5	123	775	465.0
St.40	20070712	1100	23.50	119.91	103	31.0	28.8	998.50	333	4.7	100	709	425.4
St.41	20070712	1317	23.43	119.50	55	29.4	27.7	998.68	340	303.0	45	346	207.6
St.42	20070712	1557	23.50	119.00	49	30.1	29.3	996.72	003	0.0	47	392	235.2
St.43	20070712	1830	24.00	119.00	60	29.7	28.0	997.07	087	3.0	43	371	222.6
St.44	20070712	2100	24.01	119.49	62	29.0	7.5	998.32	355	3.1	55	362	217.2
St.45	20070712	2340	24.00	119.99	42	28.9	28.0	997.43	336	5.7	35	324	194.4
St.46	20070713	0342	24.50	120.50	50	29.5	27.2	996.18	349	7.6	42	2285	1371.0
St.47	20070713	0626	24.51	120.02	61	29.1	27.2	997.25	020	5.6	56	327	196.2
St.48	20070713	0855	24.50	119.50	58	28.7	27.4	997.61	013	2.2	58	393	235.8
St.49	20070713	1224	25.00	120.00	53	29.4	28.1	996.90	226	4.8	45	261	156.6
St.50	20070713	1441	25.00	120.50	74	30.2	28.9	996.30	241	3.4	65	425	255.0
St.51	20070713	1638	25.08	120.92	77	30.7	29.5	995.12	240	3.6	69	580	348.0
St.52	20070713	1947	25.50	120.51	64	28.8	27.5	996.18	208	5.8	60	445	267.0
St.53	20070714	0858	26.00	120.99	82	30.2	27.9	997.96	223	9.7	77	753	451.8
St.54	20070714	1210	25.50	121.00	91	30.1	28.7	998.00	230	11.2	88	592	355.2
St.55	20070714	1442	25.50	121.49	112	30.7	29.6	998.50	230	9.5	109	704	422.4
St.56	20070714	1830	26.00	121.49	68	30.7	28.8	1000.63	202	7.2	62	259	155.4
St.57	20070715	1300	26.00	122.00	100	30.2	29.2	1002.06	230	10.0	96	621	372.6
St.58	20070715	1601	26.00	122.50	105	30.3	28.4	1002.24	186	4.0	100	684	410.4
St.59	20070715	1914	26.00	122.99	95	31.0	29.5	1002.59	020	7.0	85	927	556.2
St.60	20070715	2243	25.50	123.01	763	31.2	30.1	1003.13	199	8.6	200	1640	984.0
St.61	20070716	0247	25.50	122.51	453	29.6	27.8	1003.30	254	2.2	200	1218	730.8
St.62	20070716	0719	25.50	122.00	118	28.4	28.3	1003.84	256	11.4	110	752	451.2

表 04.2007-10-12 航次基礎觀測資料
Chart 04.Basic observation data in Oct.2007

Station	Date	SMT	Lati.	Long.	Depth	SST	AirT.	AirP.	WindD.	WindF.	O N D	Fl.Ct.	V M S.
St.01	20071012	1400	24.87	122.01	314	26.9	29.5	1013.00	31	10.2	200	1468	880.8
St.02	20071012	1712	25.01	122.50	1436	27.4	25.7	1014.00	44	12.3	200	1783	1069.8
St.03	20071012	2036	25.01	123.01	1596	27.9	26.1	1016.00	45	10.3	200	1321	792.6
St.04	20071013	0130	24.50	122.50	581	28.9	26.2	1015.00	45	10.1	200	1429	857.4
St.05	20071013	0453	24.51	122.02	1074	27.6	25.4	1015.00	45	7.3	200	1686	1011.6
St.06	20071013	0858	24.01	121.69	563	27.6	23.8	1017.00	5	8.4	200	1446	867.6
St.07	20071013	1145	23.76	121.99	3188	28.5	26.6	1015.00	45	9.6	200	1360	816.0
St.08	20071013	1520	23.75	122.50	3136	28.7	26.2	1014.00	22	11.7	200	1280	768.0
St.09	20071013	1850	23.76	123.00	3646	28.6	26.0	1015.00	23	11.4	200	1432	859.2
St.10	20071013	2357	23.01	123.00	5686	29.2	26.6	1015.00	32	10.8	200	1335	801.0
St.11	20071014	0329	23.01	122.50	5539	28.9	26.3	1014.00	15	9.7	200	1462	877.2
St.12	20071014	0649	23.01	122.00	4888	28.8	26.1	1015.00	11	12.2	200	1562	937.2
St.13	20071014	1009	23.01	121.51	2086	28.8	26.1	1016.00	14	11.8	200	1664	998.4
St.14	20071014	1339	22.68	121.25	1123	29.4	25.9	1013.00	40	15.8	200	1631	978.6
St.15	20071014	1755	22.26	121.01	1210	29.4	26.0	1013.00	25	14.4	200	1700	1020.0
St.16	20071014	2126	22.26	121.49	508	28.7	26.2	1015.00	18	13.9	200	512	307.2
St.17	20071015	0102	22.26	122.00	5687	28.8	26.1	1014.00	37	14.0	200	2706	1623.6
St.18	20071015	0437	22.26	122.50	5686	28.7	26.5	1013.00	25	14.2	200	1685	1011.0
St.19	20071015	0807	22.26	123.00	5688	28.8	26.7	1015.00	13	14.5	200	1785	1071.0
St.20	20071015	1328	21.51	123.00	5024	29.5	25.3	1012.00	45	13.9	200	1520	912.0
St.21	20071015	1636	21.51	122.51	4784	29.0	26.3	1012.00	40	15.9	200	1724	1034.4
St.22	20071015	1955	21.51	122.00	3479	28.9	26.5	1014.00	25	16.6	200	1457	874.2
St.23	20071015	2312	21.51	121.50	2070	28.9	26.8	1015.00	45	14.3	200	1499	899.4
St.24	20071016	0240	21.51	121.00	978	28.7	25.8	1013.00	26	18.5	200	1401	840.6
St.25	20071016	0615	21.51	120.51	1861	28.8	25.6	1013.00	46	17.0	200	1556	933.6
St.26	20071016	0934	21.51	119.99	2945	28.9	26.4	1015.00	49	12.5	200	1338	802.8
St.27	20071016	1237	21.51	119.50	2996	28.9	25.5	1014.00	351	8.7	200	1305	783.0
St.28	20071016	1542	21.51	119.01	2816	28.8	25.7	1014.00	13	10.9	200	1407	844.2
St.29	20071016	1927	22.00	119.00	1564	28.3	24.5	1013.00	14	36.0	200	1480	888.0
St.30	20071016	2243	22.01	119.50	2405	28.1	24.8	1015.00	290	6.0	200	1286	771.6
St.31	20071017	0148	22.00	119.99	1142	28.1	24.8	1015.00	177	350.0	200	1571	942.6
St.32	20071017	0500	22.00	120.51	598	28.5	25.7	1011.00	8.6	49.0	200	1785	1071.0
St.33	20071017	0815	22.37	120.32	399	28.5	25.7	1012.00	268	2.0	200	1550	930.0
St.34	20071021	1050	22.50	120.00	608	28.4	24.8	1014.00	306	2.6	200	1208	724.8
St.35	20071021	1422	22.51	119.50	240	27.7	24.4	1012.00	332	4.1	200	1321	792.6
St.36	20071021	1712	22.50	119.01	86	26.9	24.1	1013.00	16	7.2	75	521	312.6
St.37	20071021	1957	22.94	119.10	30	27.2	23.5	1013.00	20	11.0	24	141	84.6
St.38	20071021	2210	23.00	119.50	74	26.9	23.8	1013.00	347	9.0	70	636	381.6
St.39	20071022	0037	23.01	119.91	126	27.3	24.8	1013.00	254	2.8	120	405	243.0
St.40	20071022	0317	23.51	119.91	99	28.0	24.3	1012.00	42	4.6	85	606	363.6
St.41	20071022	0550	23.43	119.49	50	27.9	24.2	1012.00	13	8.1	45	404	242.4
St.42	20071022	0823	23.50	119.00	54	28.0	24.3	1013.00	17	8.3	40	240	144.0
St.43	20071022	1138	24.00	119.00	56	26.2	27.6	1014.00	21	12.3	50	431	258.6
St.44	20071022	1424	24.00	119.49	60	25.9	23.2	1012.00	16	11.5	50	376	225.6
St.45	20071022	1708	24.01	119.99	40	26.4	23.7	1011.00	30	13.4	30	193	115.8
St.46	20071022	2107	24.50	120.50	54	26.0	24.0	1011.00	20	10.6	45	333	199.8
St.47	20071022	2342	24.50	120.00	61	26.0	24.1	1011.00	27	10.6	55	298	178.8
St.48	20071023	0208	24.51	119.53	48	26.0	24.1	1011.00	21	12.2	42	304	182.4
St.49	20071023	0603	25.00	119.99	54	26.0	24.0	1011.00	34	12.5	45	277	166.2
St.50	20071023	0927	25.00	120.49	76	26.0	24.0	1011.00	34	17.0	65	413	247.8
St.51	20071023	1203	25.09	120.92	71	25.9	24.7	1012.00	42	17.9	65	483	289.8
St.52	20071023	1515	25.50	120.50	63	25.7	23.7	1014.00	36	13.1	56	288	172.8
St.53	20071023	1920	26.00	121.00	82	26.1	23.7	1015.00	49	11.6	72	630	378.0
St.54	20071023	2208	25.51	121.01	91	26.0	23.1	1015.00	56	14.4	80	637	382.2
St.55	20071024	0054	25.49	121.52	120	25.9	23.1	1015.00	64	14.5	110	761	456.6
St.56	20071024	0400	25.99	121.50	68	26.1	24.2	1015.00	53	9.0	63	589	353.4
St.57	20071024	0706	26.00	122.00	100	24.2	26.1	1017.00	65	8.5	95	647	388.2
St.58	20071024	0945	26.00	122.50	106	26.7	25.3	1017.00	82	10.0	95	696	417.6
St.59	20071024	1211	26.00	122.98	96	27.8	25.6	1016.00	76	9.3	90	656	393.6
St.60	-	-	-	-	-	-	-	-	-	-	-	-	-
St.61	20071024	1737	25.51	122.51	447	28.4	26.0	1015.00	86	8.6	200	1539	923.4
St.62	20071024	2038	25.51	122.00	116	27.1	24.9	1016.00	78	6.4	100	906	543.6

2007 年台灣周邊海域漁場環境監測航次報告

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