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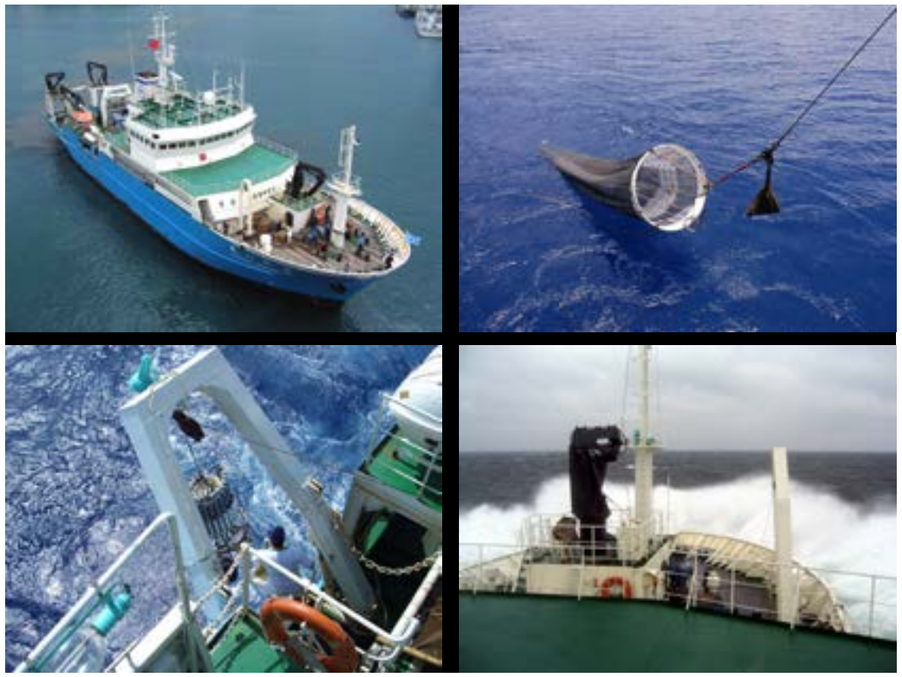
2014年臺灣周邊海域漁場環境監測航次報告 Cruise Report of TaiCOFI Surveys in 2014

行政院農業委員會水產試驗所

Cruise Report of TaiCOFI Surveys in 2014

2014年臺灣周邊海域漁場環境監測航次報告



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行政院農業委員會水產試驗所
中 華 民 國 105 年 12 月

序

臺灣周邊海域得天獨厚的海洋環境賜給我們豐富的漁業資源，各式新鮮美味的魚蝦蟹貝更是國人最優質的蛋白質來源。我國水產品自給率領先其他農糧生產部門，在國際貿易上更是長年的出超國，漁業不論在糧食供給及帶動總體經濟發展均提供了重要貢獻。隨著生活水準的提昇及健康意識的抬頭，未來對水產品的需求勢必節節上升，如何透過試驗研究以謀求漁業資源開發利用與生態保育間之平衡，創造優質且穩定的水產糧食供應，為本所重要的關鍵性任務。

近年來，海洋捕撈業面臨全球氣候變遷、海洋生態環境惡化及漁業資源銳減等多重衝擊，使得臺灣的漁業經營環境愈顯嚴峻。氣候變遷造成魚群分布的改變，亦直接影響了魚群洄游的路徑與時間，導致漁場的改變甚至消失，對漁業資源形成深遠的影響，而海水溫鹽等水團特性則是影響漁場、漁期變動的關鍵因子。為此，許多國家已致力於長期海洋環境及生物資源觀測資料庫之建置，以求有效監測海洋物理與化學環境，方能及時發現問題並提供解決對策，期能降低氣候變遷之衝擊。

水產試驗所為臺灣最重要的水產研究機構，厚植漁業基礎為本所責無旁貸的任務。本所自 2003 年起執行「臺灣周邊海域漁場環境監測計畫」，運用「水試一號」與「水試二號」試驗船及其配備的各項科儀設備，持續建構臺灣周邊海域長期的漁場環境資訊，迄今連續 14 年未曾間斷。本專刊彙錄了同仁們一步一腳印的辛苦成果，希冀藉由本專刊之發行，為臺灣周邊海域漁業研究發展提供良好之基礎，以作為達成資源永續利用的重要基石。

所長 陳君如 謹誌

中華民國一〇五年十二月

Preface

The waters surrounding Taiwan is our priceless property. Our ocean is favorably endowed with all kind of fishery resources, which provide us the best high quality animal protein. In Taiwan, the value of annual fishery production is the highest in agricultural sectors and the degree of self-sufficiency of fishery is also the highest among other food items. Besides, Taiwan is a trade-surplus country in fishery products for a long time. The benefit of fishery in economy and food security is considerable. With the growing demand for fishery products, the balance between fishery development and conservation will be the biggest challenge in the future. Therefore, how to utilize the resources sustainably is a crucial responsibility for fishery researchers of Fisheries Research Institute (FRI)

In recent years, marine capture fishery in Taiwan was encountering the challenge of climate change, deterioration of the marine environment, and the decline of fishery resources. Climate change lead to rising water temperature, with the consequences of changing habitats, alteration of distribution boundary, and the oscillation of fishing grounds of aquatic resources. The effect of climate change is profound for fishery resources and the characteristics of water masses are the key factors that affect the variation of fishing grounds and fishing season. As a result, in order to monitor our ocean and to detect anomalies effectively and to find a way to mitigate the impact of climate change, many countries have devoted to establishing their long-term database for marine environment and aquatic living resources.

Fisheries Research Institute implemented the Taiwan Cooperative Oceanic Fisheries Investigations (TaiCOFI) program to investigate in the hydrography and fisheries resources in the surrounding waters of Taiwan since 2003 and now a consecutive 14 years database of marine environment was established. With the publication of "Cruise report of TaiCOFI surveys in 2014", we hope this project to be helpful for fishery researchers and policy makers. Finally, we hope this project will contribute more to the society and lead fisheries in Taiwan toward sustainability.

Director General

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「臺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臺灣周邊海域長期水文、海況及漁業生物時空分布資訊，進而掌握影響臺灣周邊海域漁業資源變動的機制。多年來，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 2014 年執行「臺灣周邊海域漁場環境監測」計畫（農委會科技計畫編號：103 農科-11.2.1-水-A3(1)）之調查成果，以圖示方式刊出各漁場環境因子之調查成果供各界參考，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。本年度冬季航次由於海象惡劣，僅完成部分測站之採樣；夏季與秋季航次則因臨時縮減航程亦僅完成半數測站。本計畫內容涉及廣泛專業領域，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 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 by TaiCOFI cruises in 2014. 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. For winter cruise, only 11 stations were completed due to the heavy weather during the period. For summer and autumn cruises, only half of the stations were completed due to the lack of operation days. Finally, we will extend our special thanks for your advices to improve this cruise report.

目錄

Contents

海上採樣作業流程

在臺灣周邊海域選定 62 個測站，利用水試一號與水試二號試驗船及其裝備，按季節別於 2014 年 1 月、4 月、8 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, April, August and October in 2014. 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葉綠素分析其葉綠素甲濃度；利用光暗瓶溶解氧法，分析臺灣周邊海域之基礎生產力(primary productivity)。

1.硝酸測定：

硝酸以 Wood-Armstrong-Richard 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，待其成色後於分光光度計以波長 885 nm 測定吸光值並計算待測物之濃度。

3.矽酸測定：

矽酸以 silicon molybdenum blue 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 秒後，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沉澱管中，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^{3-} 、SiO_2^{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^{3-}) 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^{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 seconds 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
行政院農業委員會水產試驗所海洋漁業組	吳繼倫 Wu Chi-Lun	研究員兼組長
行政院農業委員會水產試驗所海洋漁業組	陳郁凱 Chen Yu-Kai	副研究員
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國立臺灣海洋大學環境生物與漁業科學系	鄭學淵 Cheng Sha-Yen	教授

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2014- 01-11 航次	所內人員		所外人員	
	陳均龍	助理研究員	闕智揚	海大環漁系研究生
	蘇博堃	漁航員	簡孜翰	海大環漁系研究生
	張伯瑋	輪機員		
	黃閔裕	漁航員		
2014- 04-16 航次	所內人員		所外人員	
	陳郁凱	副研究員	李純慧	海大環漁系研究生
	潘佳怡	聘用助理研究員	闕智揚	海大環漁系研究生
	蘇博堃	漁航員	李惠淇	海大環漁系研究生
	張伯瑋	輪機員	簡孜翰	海大環漁系研究生
2014- 08-05 航次	所內人員		所外人員	
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葉綠素甲濃度分析	蘇博堃、張伯瑋
基礎生產力	鄭學淵教授實驗室
浮游動物分類	潘佳怡、林芝伃

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)

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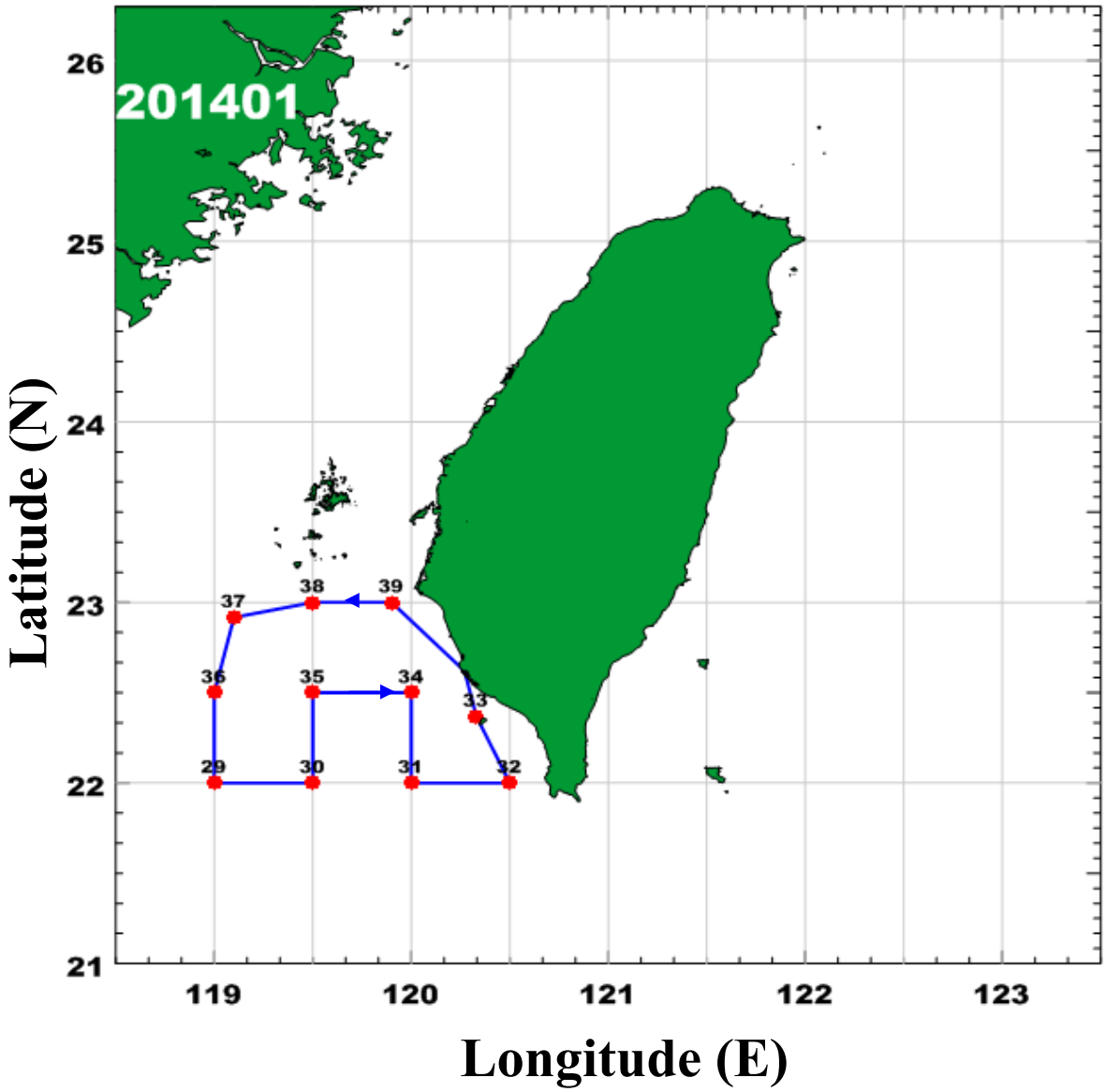

圖 01. 2014 年 1 月航次航跡圖

Fig. 01. Stations and Cruise tracks for TaiCOFI Survey in Jan. 2014.

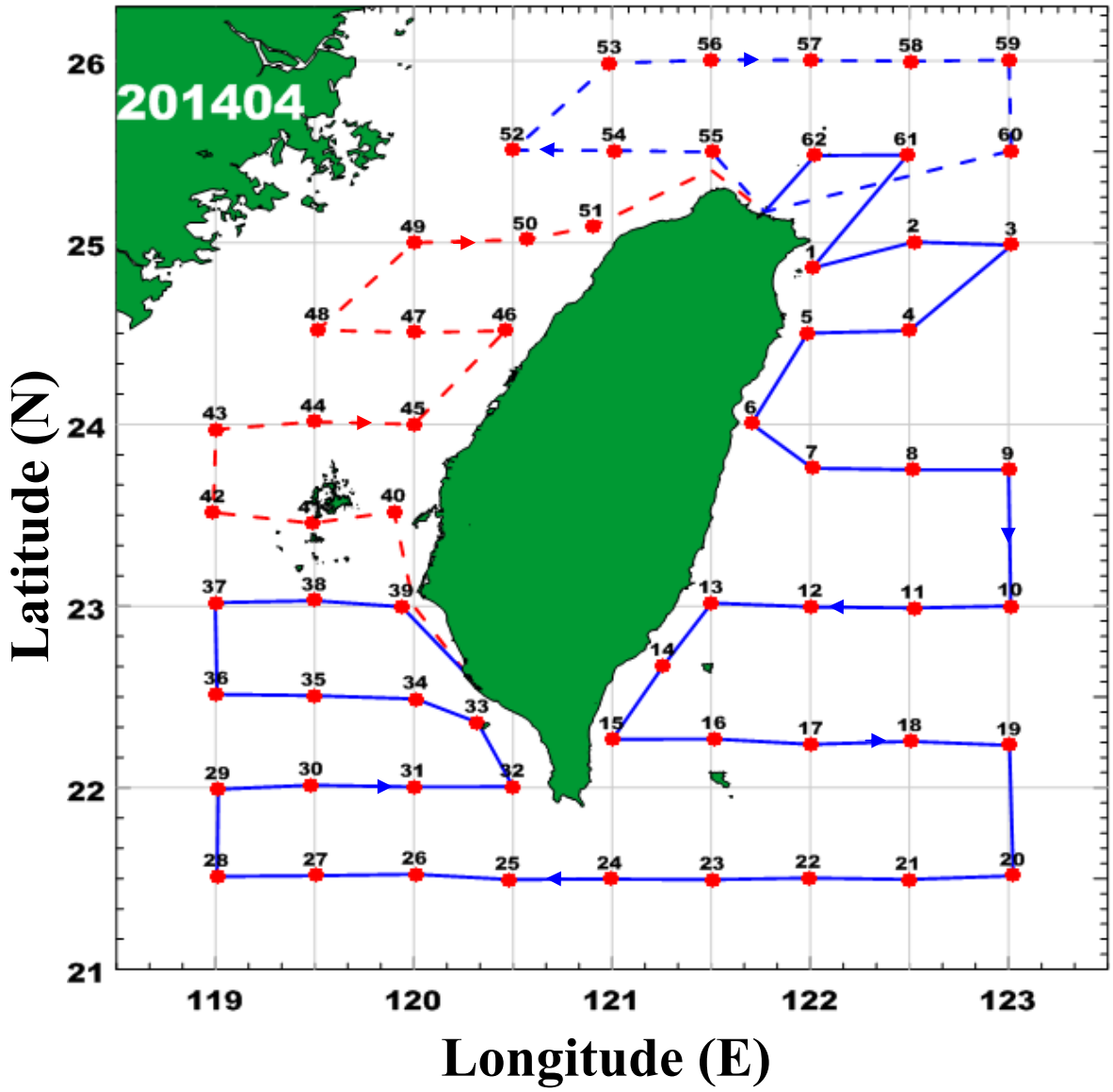

圖 02. 2014 年 4 月航次航跡圖

Fig. 02. Stations and Cruise tracks for TaiCOFI Survey in Apr. 2014.

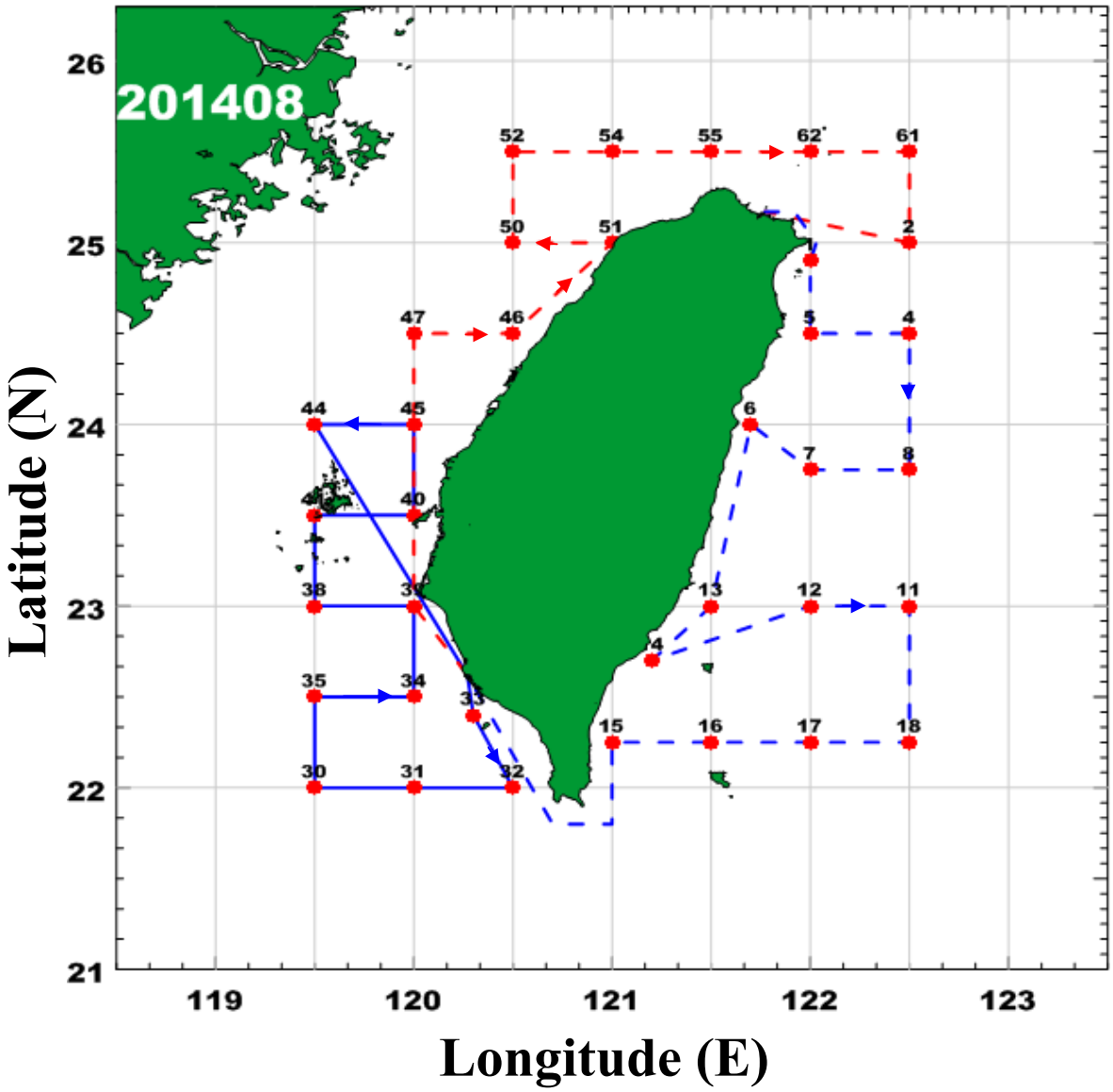

圖 03. 2014 年 8 月航次航跡圖

Fig. 03. Stations and Cruise tracks for TaiCOFI Survey in Aug. 2014.

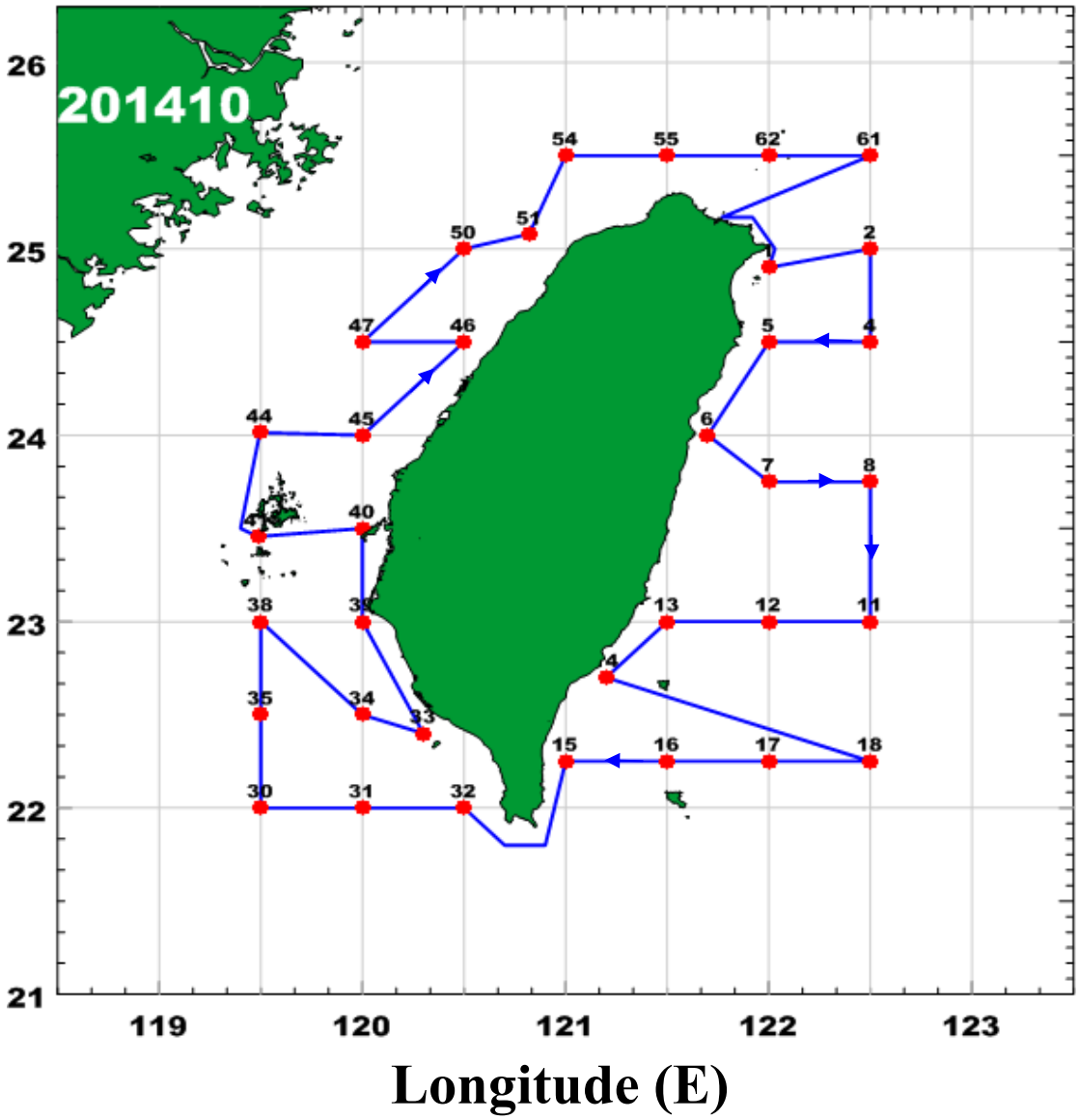

圖 04. 2014 年 10 月航次航跡圖

Fig. 04. Stations and Cruise tracks for TaiCOFI Survey in Oct. 2014

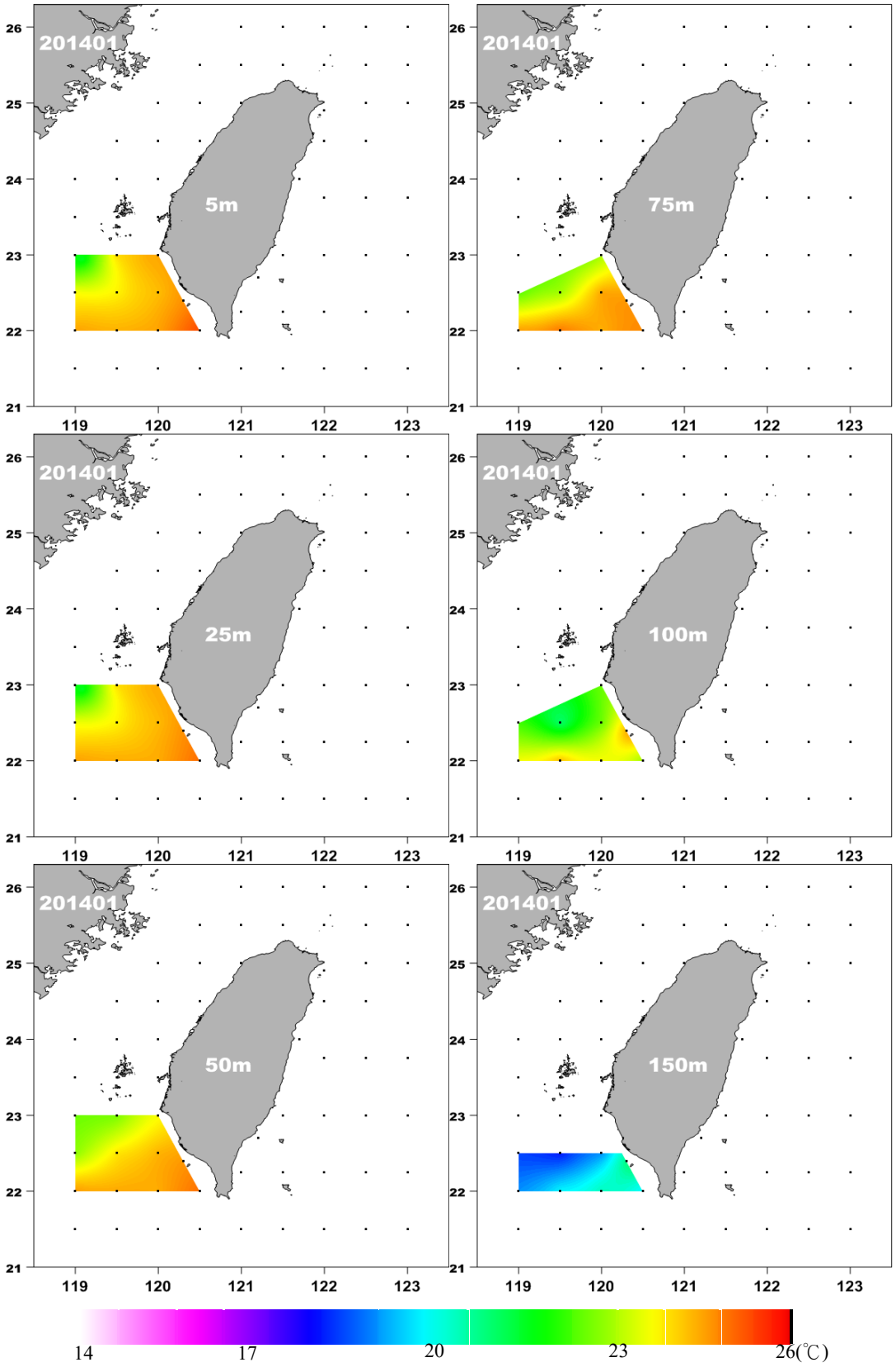

圖 05. 2014 年 1 月航次水溫分布

Fig. 05. Temperature distribution in Jan. 2014.

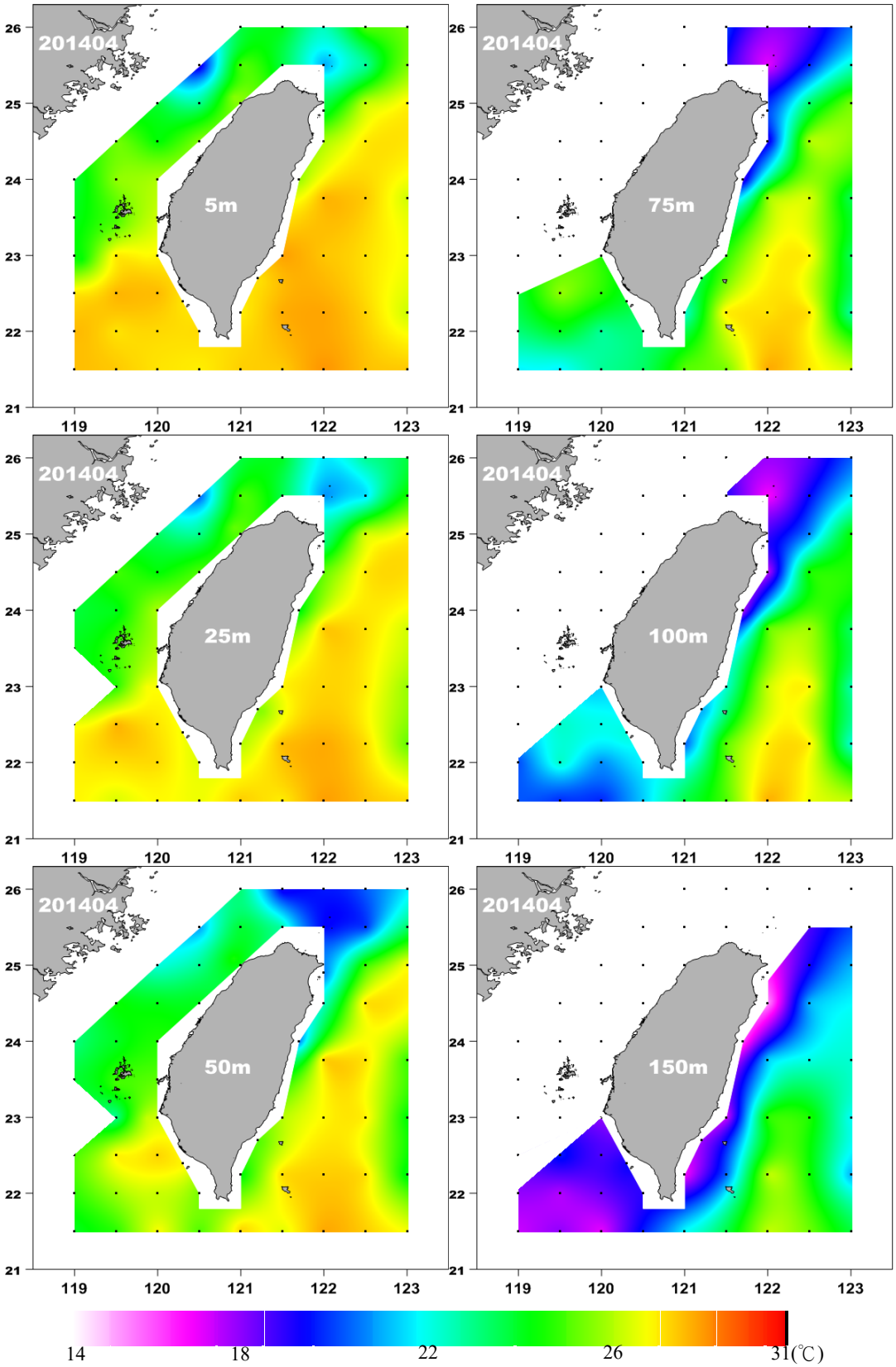

圖 06. 2014 年 4 月航次水溫分布
Fig.06. Temperature distribution in Apr. 2014.

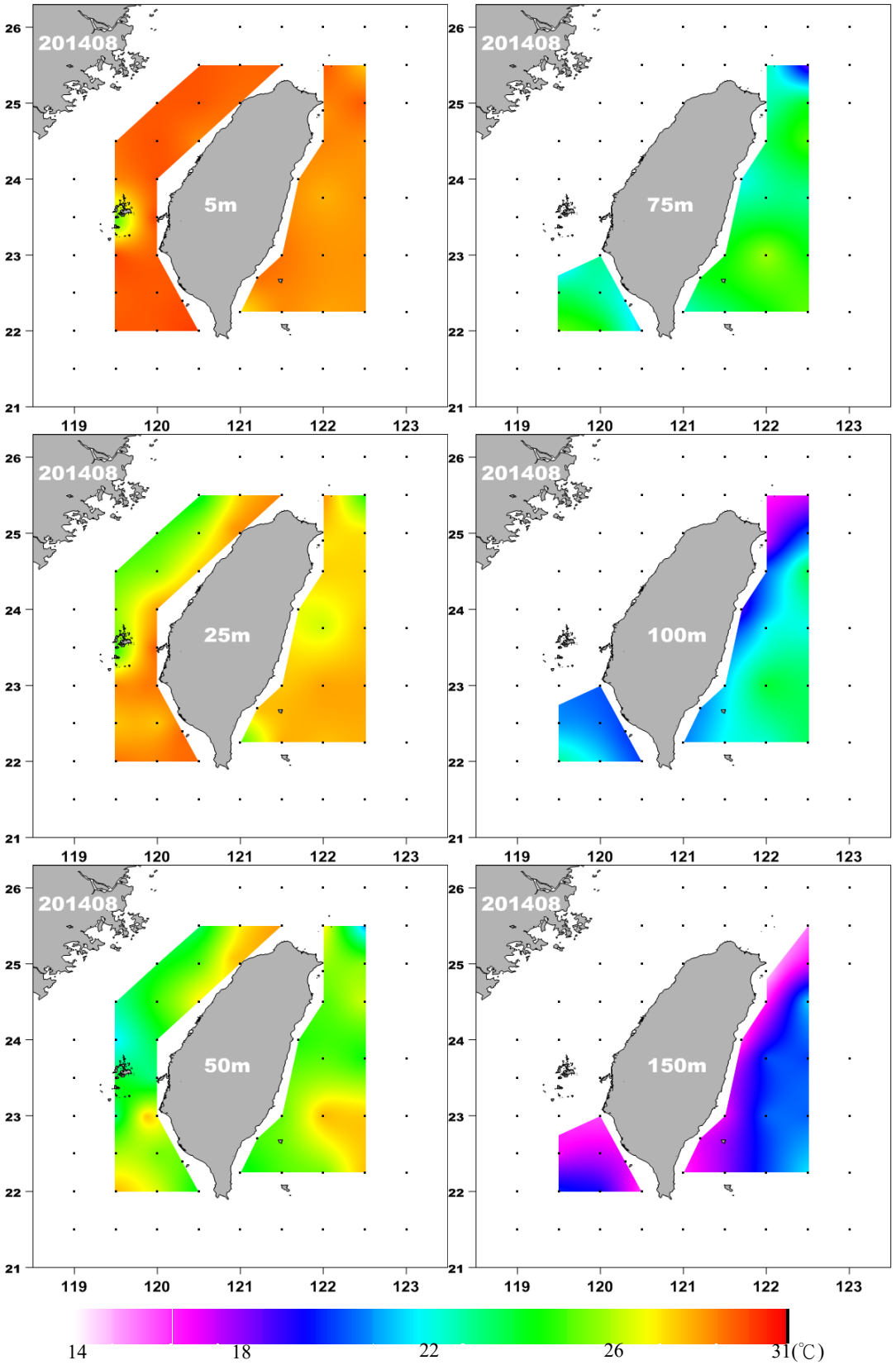

圖 07. 2014 年 8 月航次水溫分布
Fig. 07. Temperature distribution in Aug. 2014.

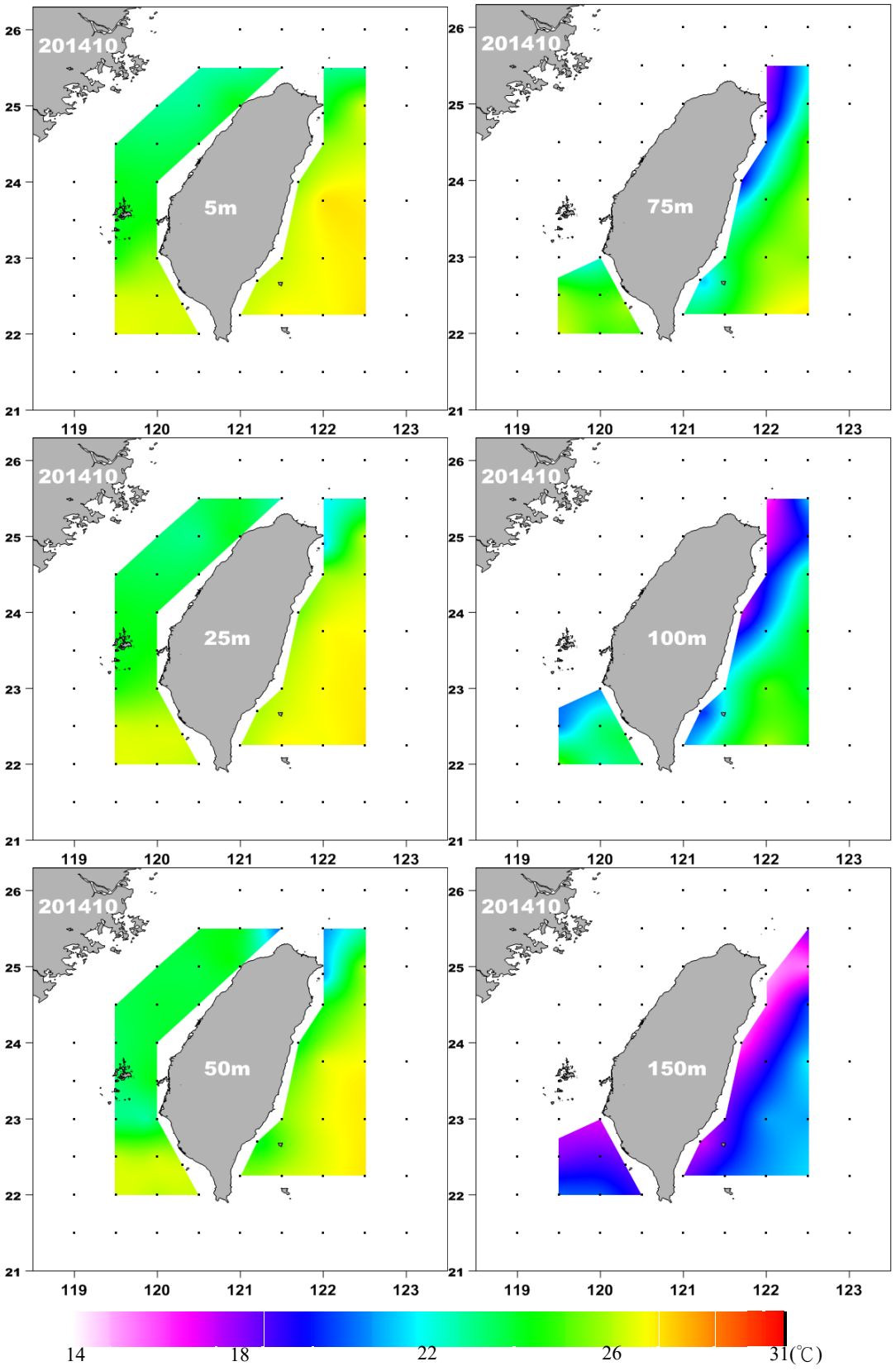

圖 08. 2014 年 10 月航次水溫分布
Fig. 08. Temperature distribution in Oct. 2014.

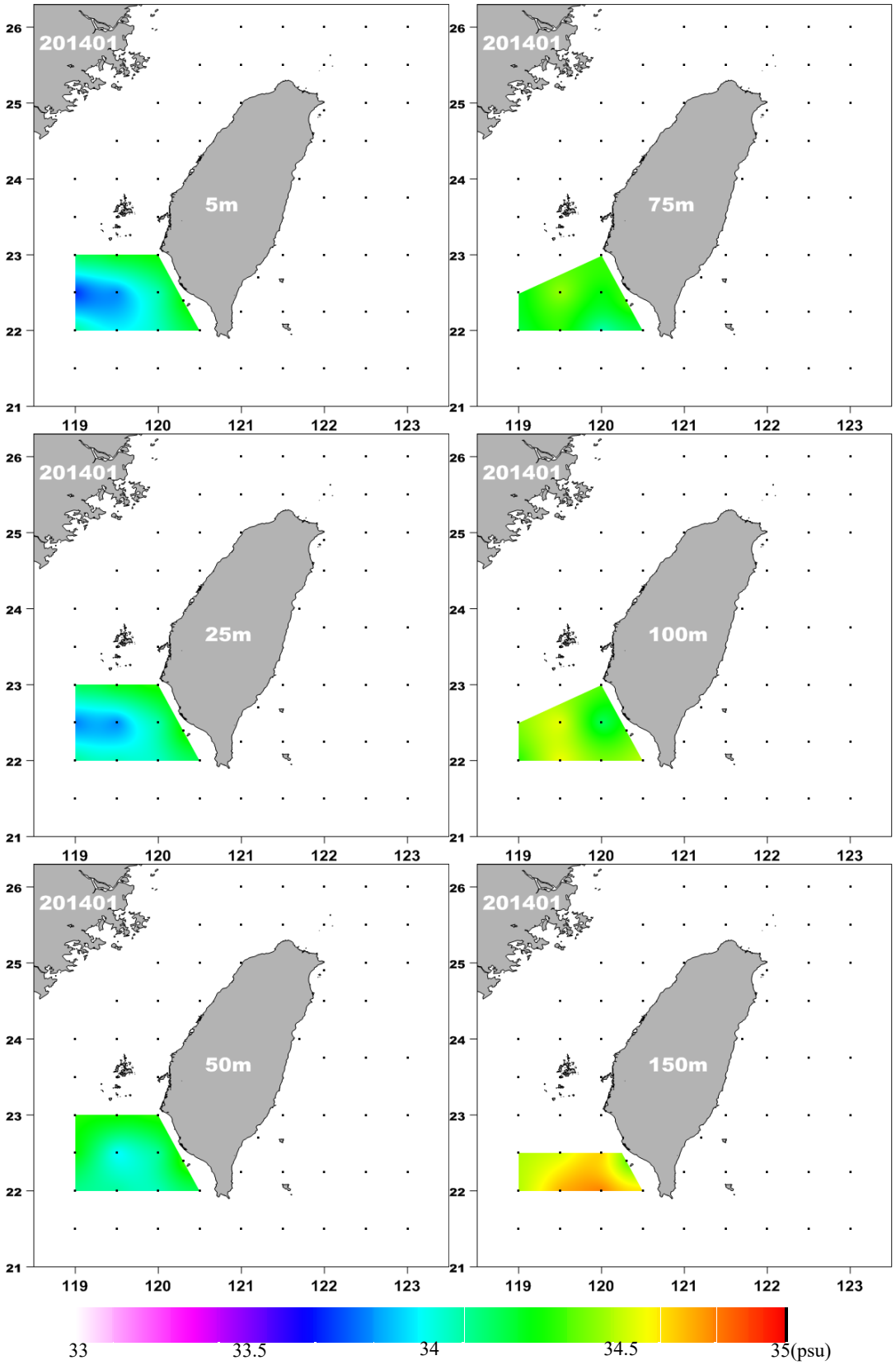

圖 09. 2014 年 1 月航次鹽度分布
Fig. 09. Salinity distribution in Jan. 2014.

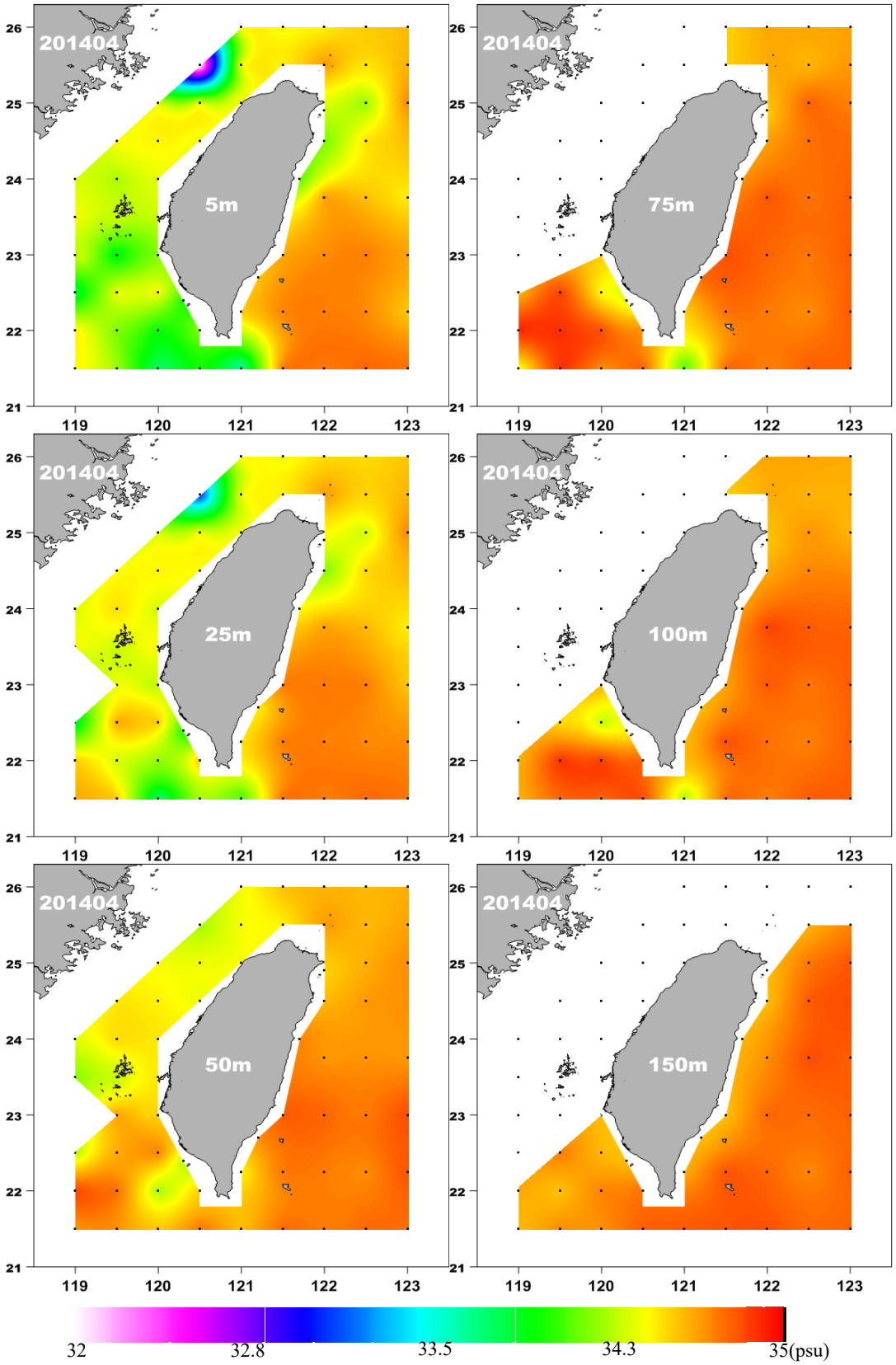

圖 10. 2014 年 4 月航次鹽度分布

Fig. 10. Salinity distribution in Apr. 2014.

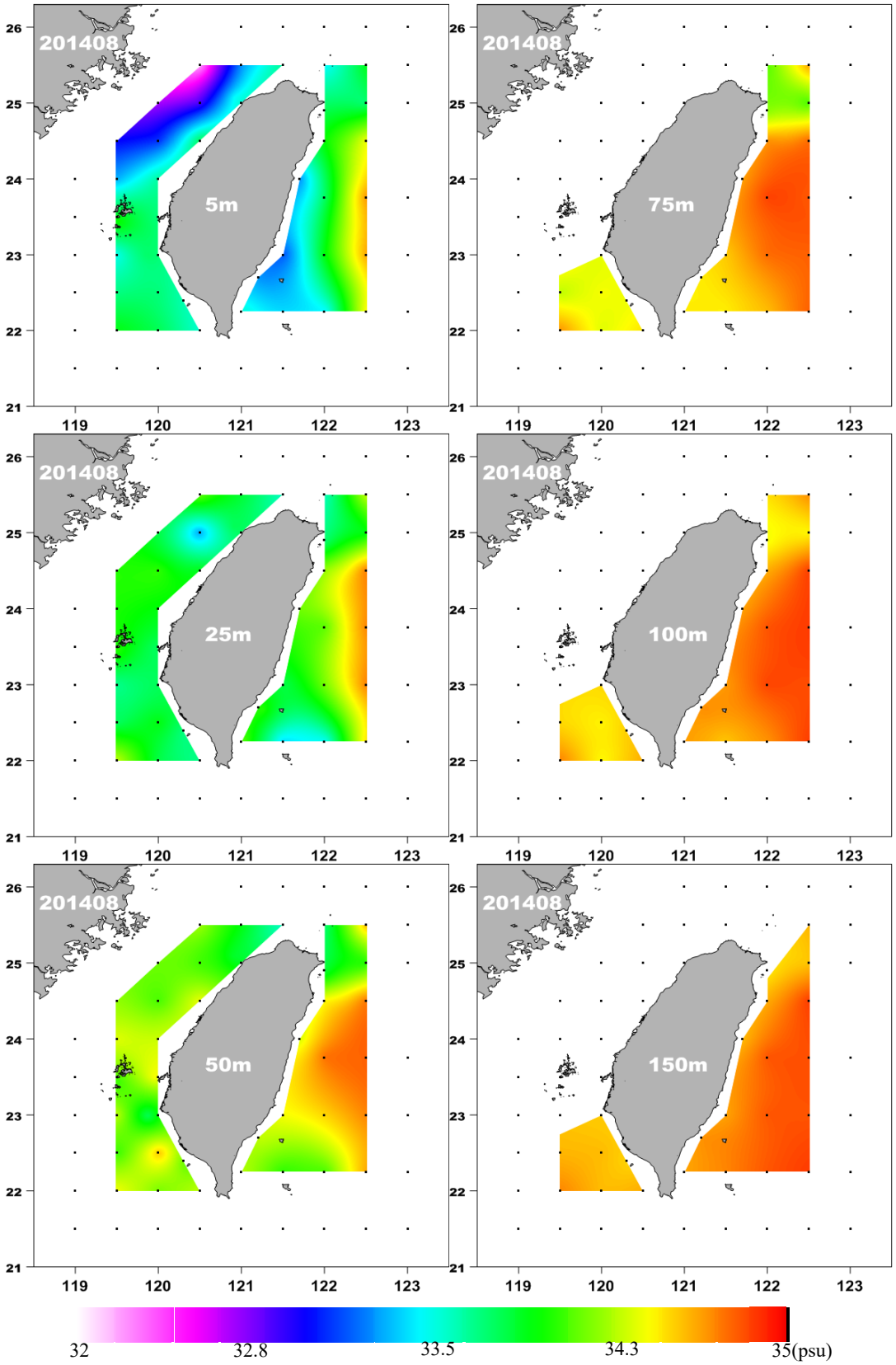

圖 11. 2014 年 8 月航次鹽度分布

Fig. 11. Salinity distribution in Aug. 2014.

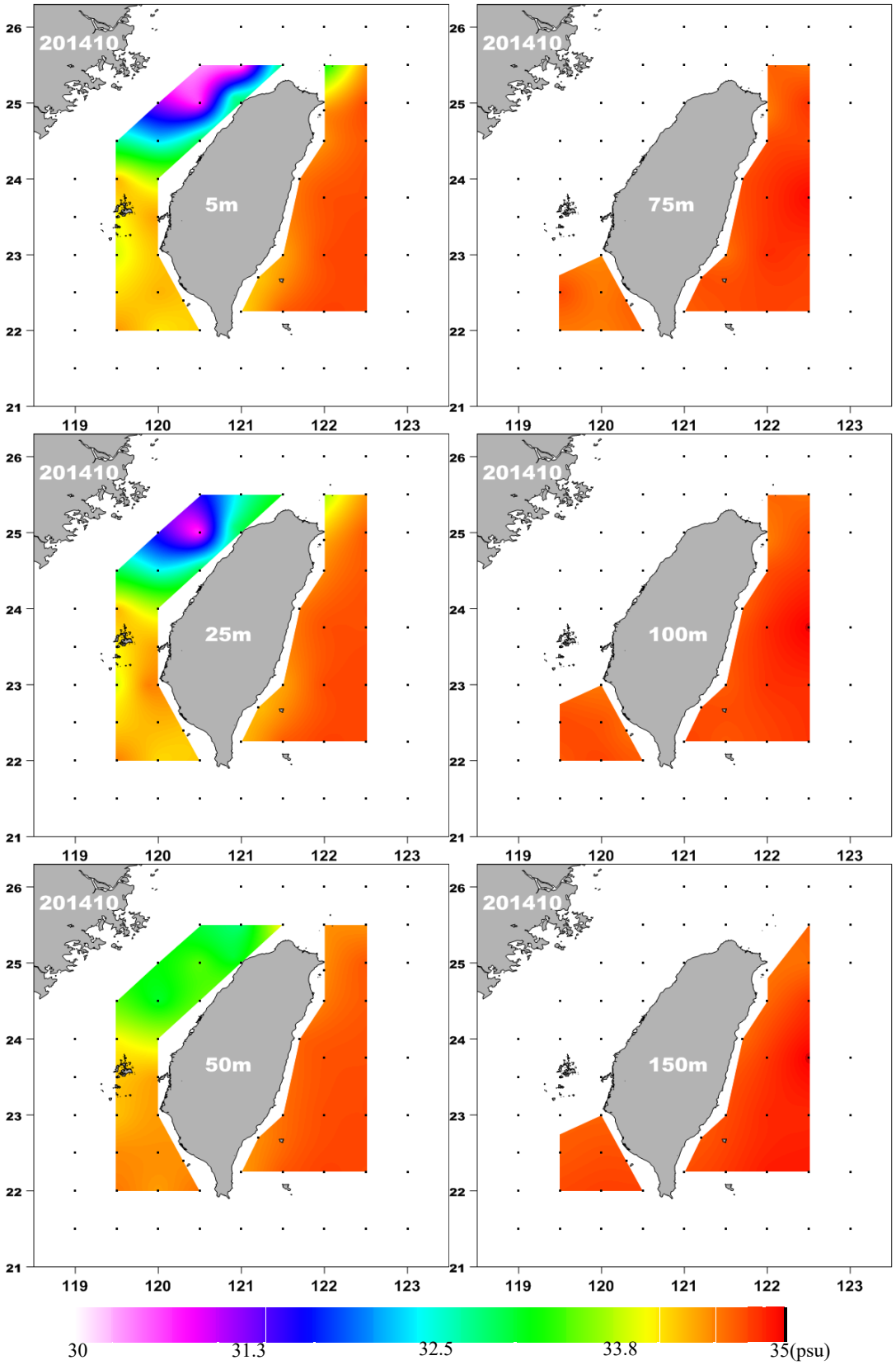

圖 12. 2014 年 10 月航次鹽度分布
Fig. 12. Salinity distribution in Oct. 2014.

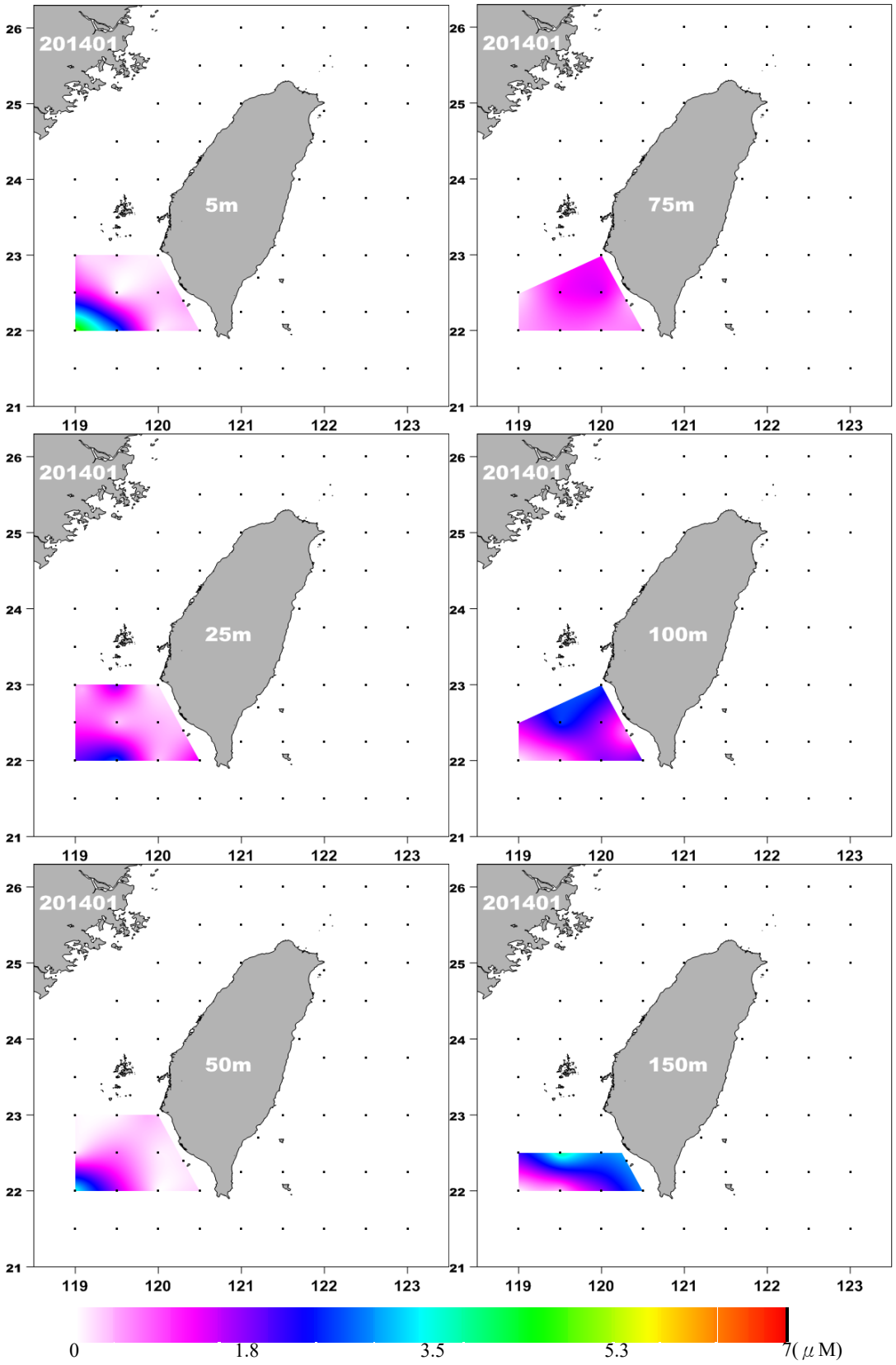

圖 13. 2014 年 1 月航次硝酸鹽(NO_3^-)濃度分布
Fig. 13. Nitrate (NO_3^-) distribution in Jan. 2014.

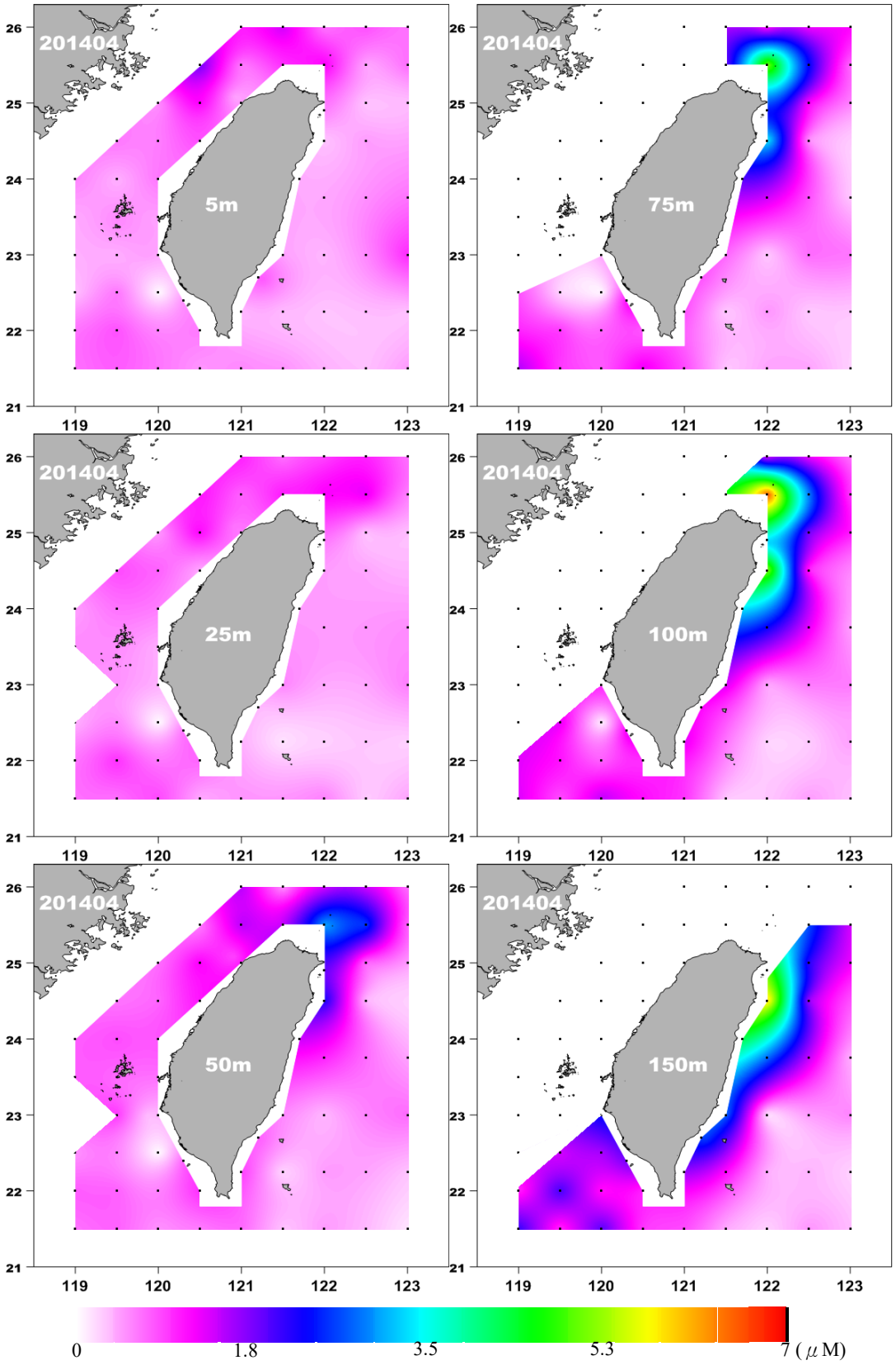

圖 14. 2014 年 4 月航次硝酸鹽(NO_3^-)濃度分布
Fig. 14. Nitrate (NO_3^-) distribution in Apr. 2014.

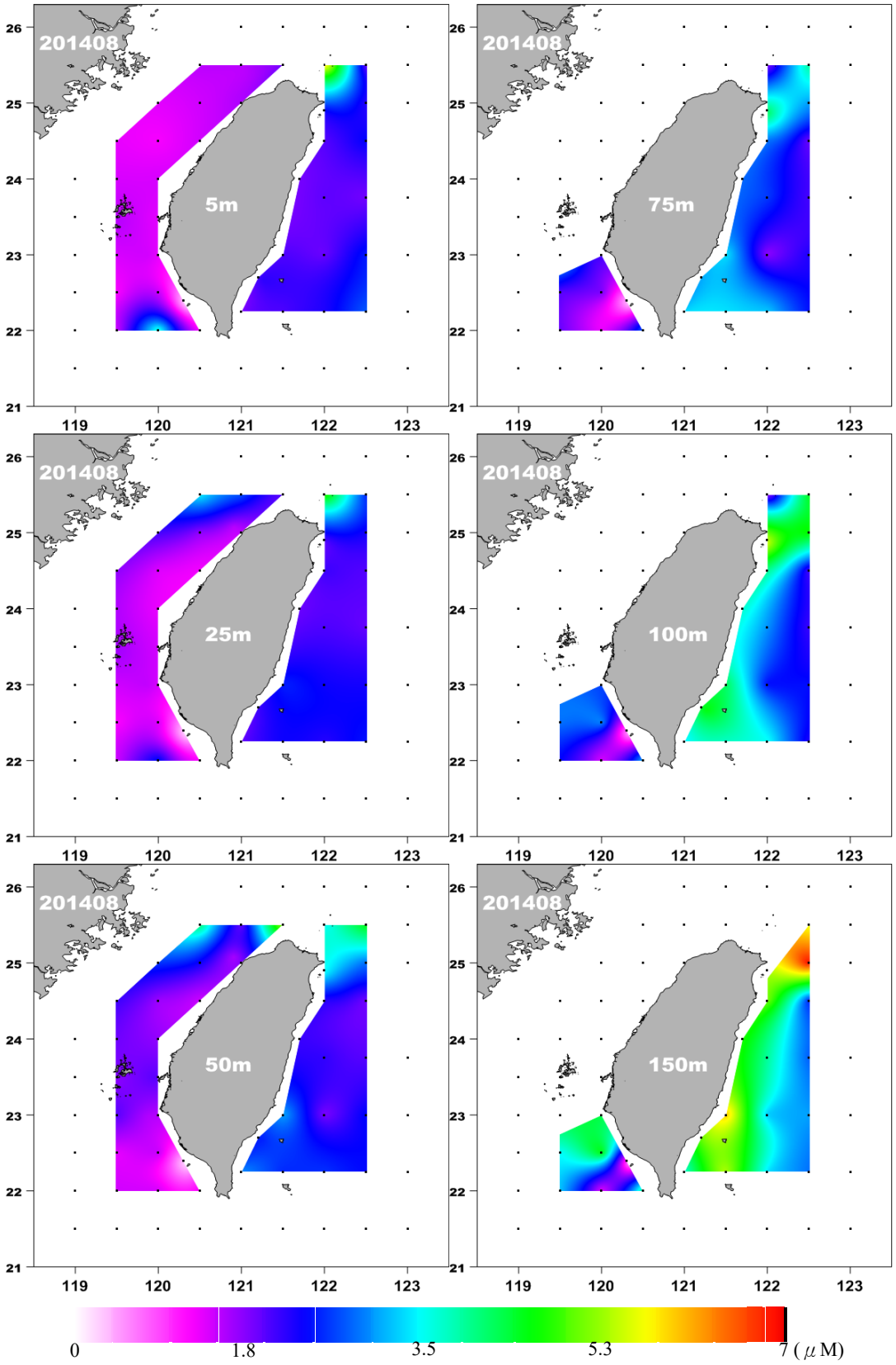

圖 15. 2014 年 8 月航次硝酸鹽(NO_3^-)濃度分布
Fig. 15. Nitrate (NO_3^-) distribution in Aug. 2014.

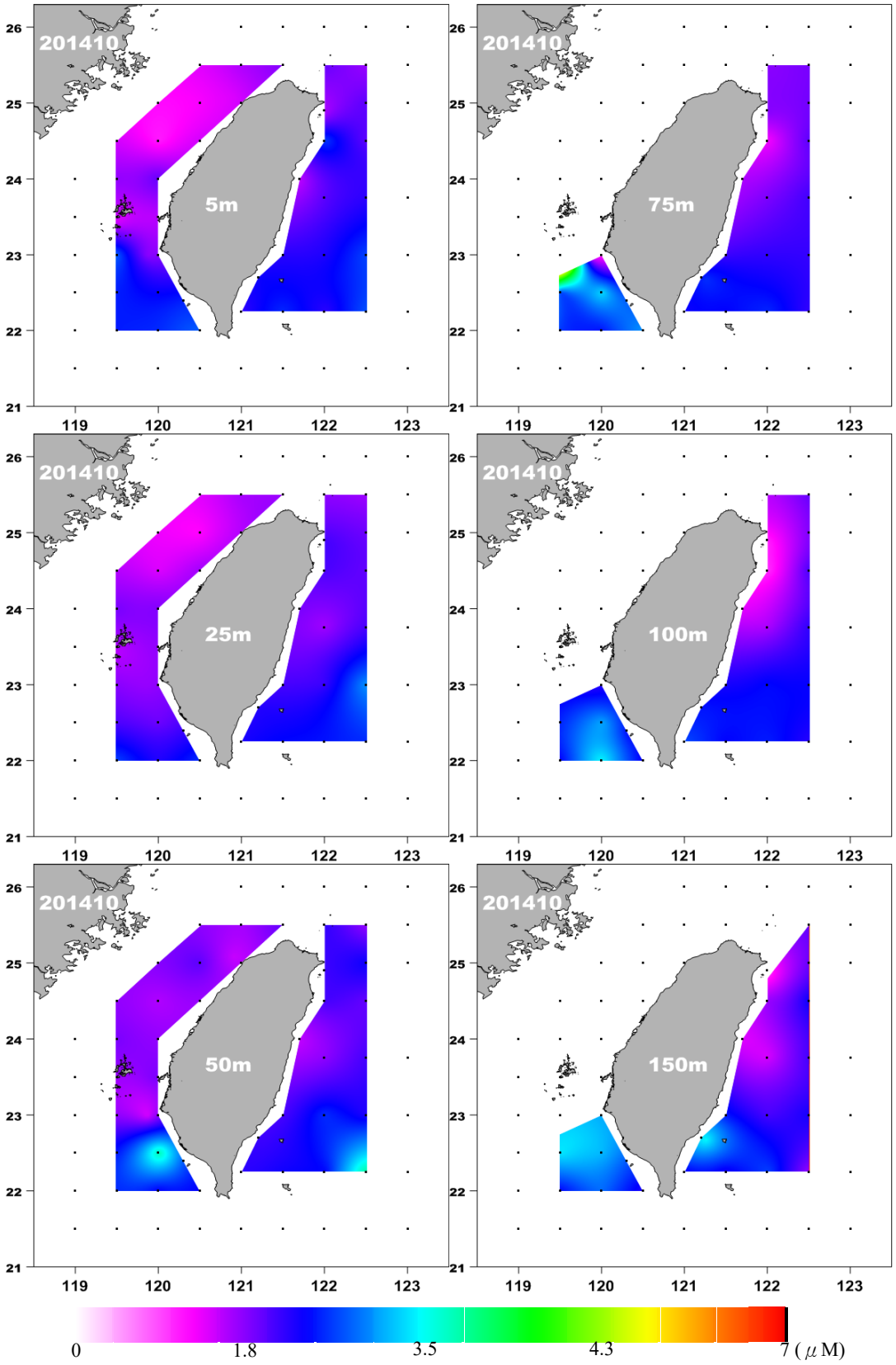

圖 16. 2014 年 10 月航次硝酸鹽(NO_3^-)濃度分布
Fig. 16. Nitrate (NO_3^-) distribution in Oct. 2014.

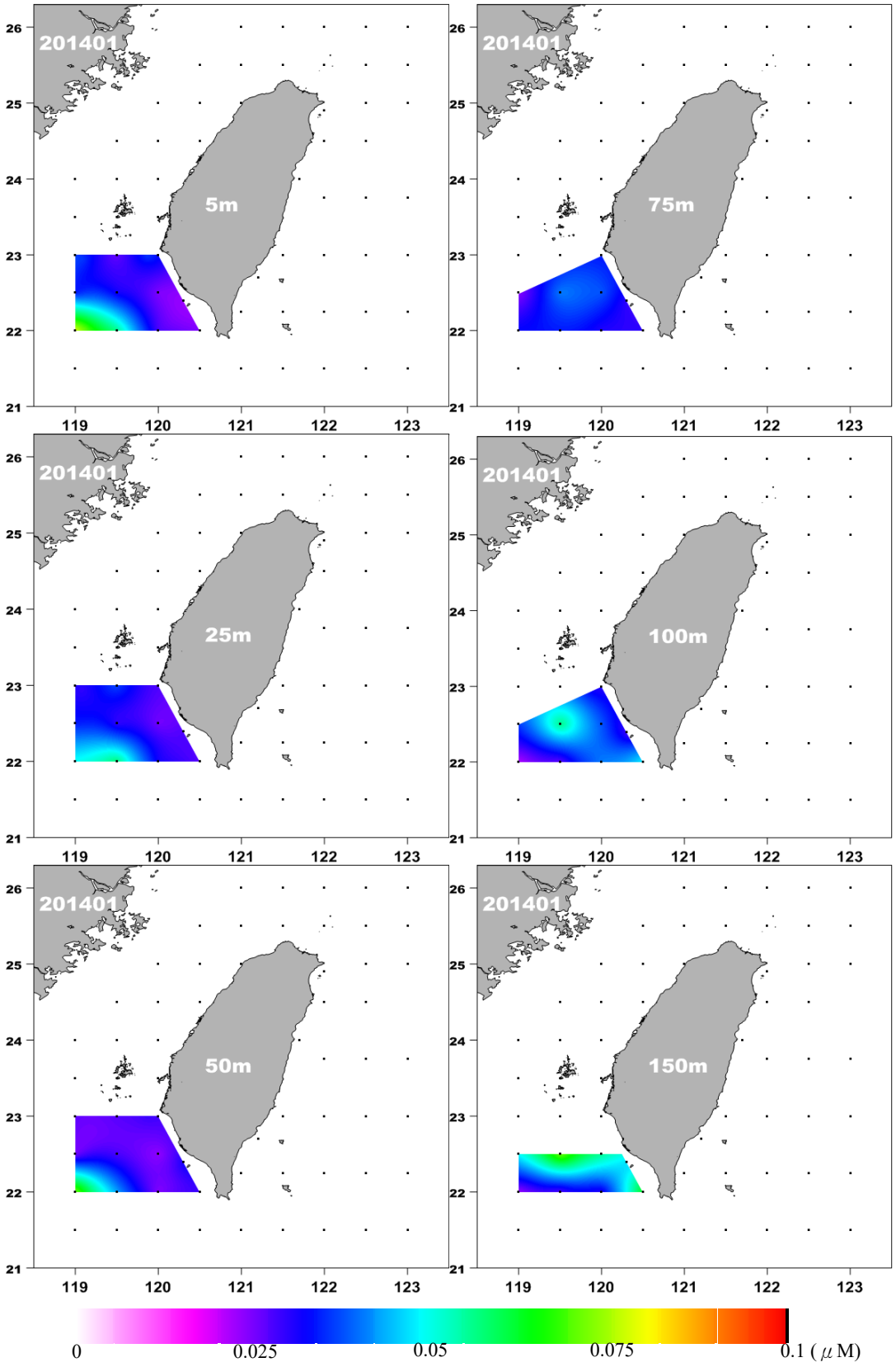

圖 17. 2014 年 1 月航次磷酸鹽(PO_4^{3-})濃度分布
Fig. 17. Phosphate (PO_4^{3-}) distribution in Jan. 2014.

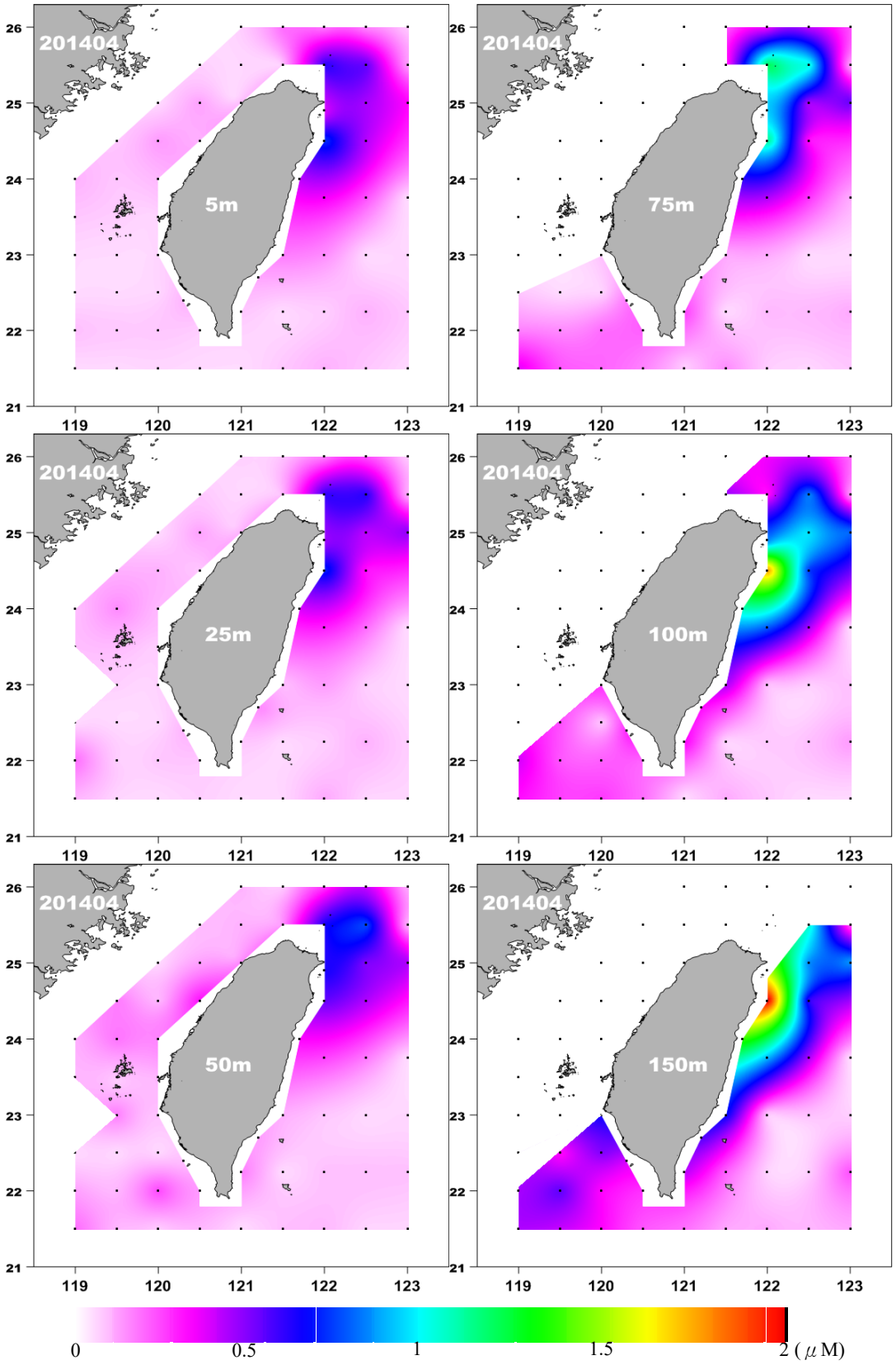

圖 18. 2014 年 4 月航次磷酸鹽(PO_4^{3-})濃度分布

Fig. 18. Phosphate (PO_4^{3-}) distribution in Apr. 2014.

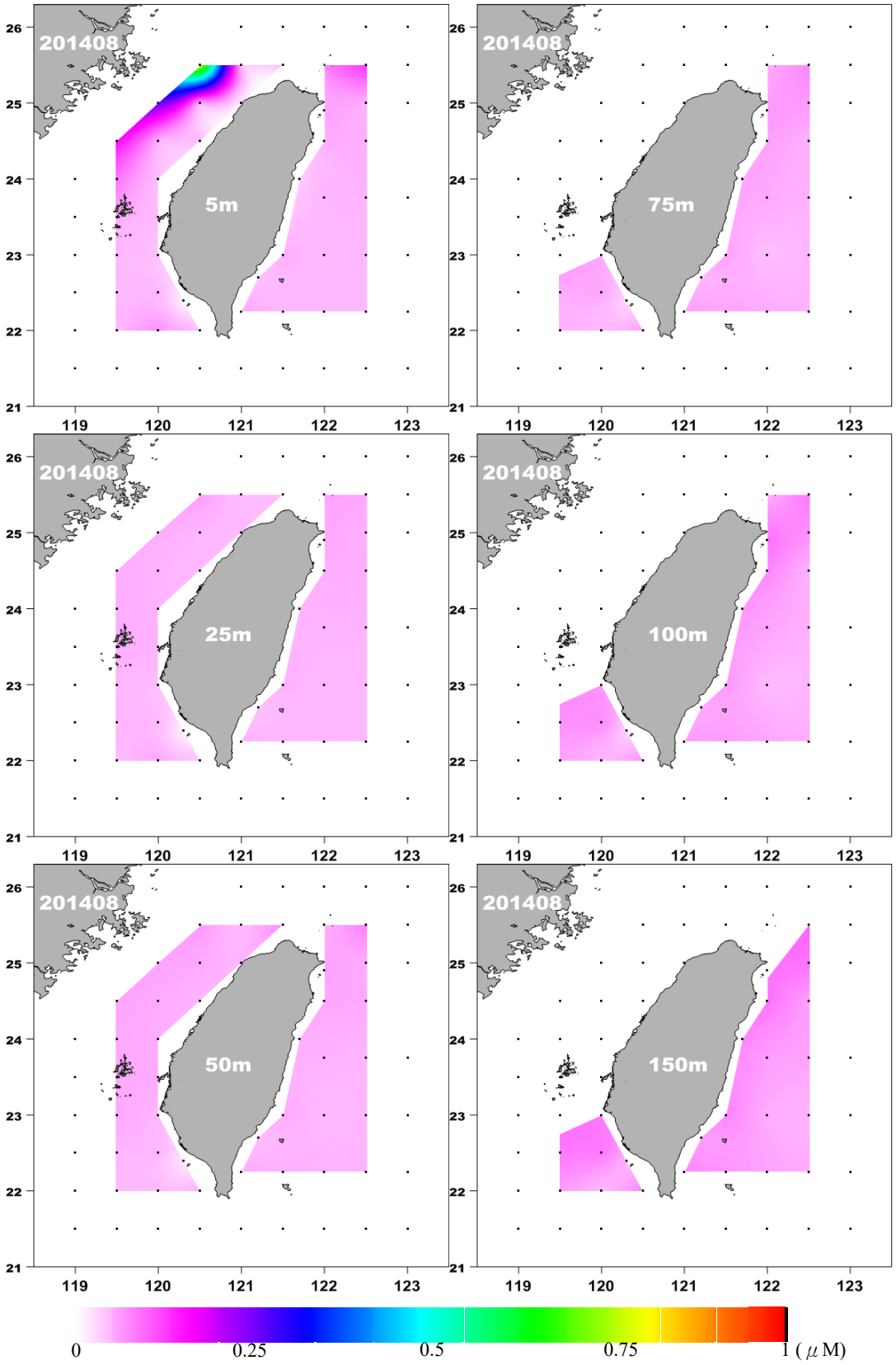

圖 19. 2014 年 8 月航次磷酸鹽(PO_4^{3-})濃度分布
Fig. 19. Phosphate (PO_4^{3-}) distribution in Aug. 2014.

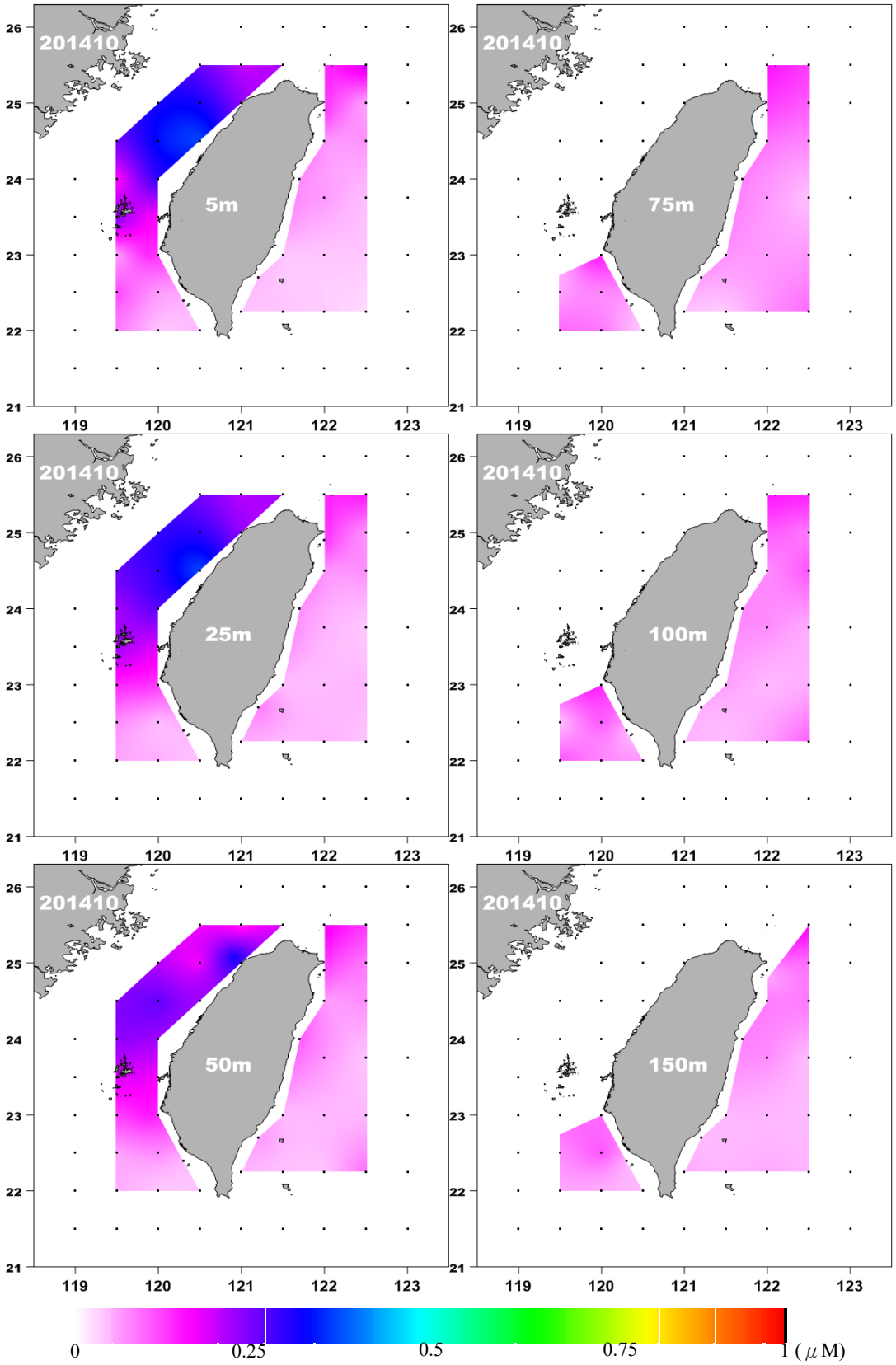

圖 20. 2014 年 10 月航次磷酸鹽(PO_4^{3-})濃度分布
Fig. 20. Phosphate (PO_4^{3-}) distribution in Oct. 2014

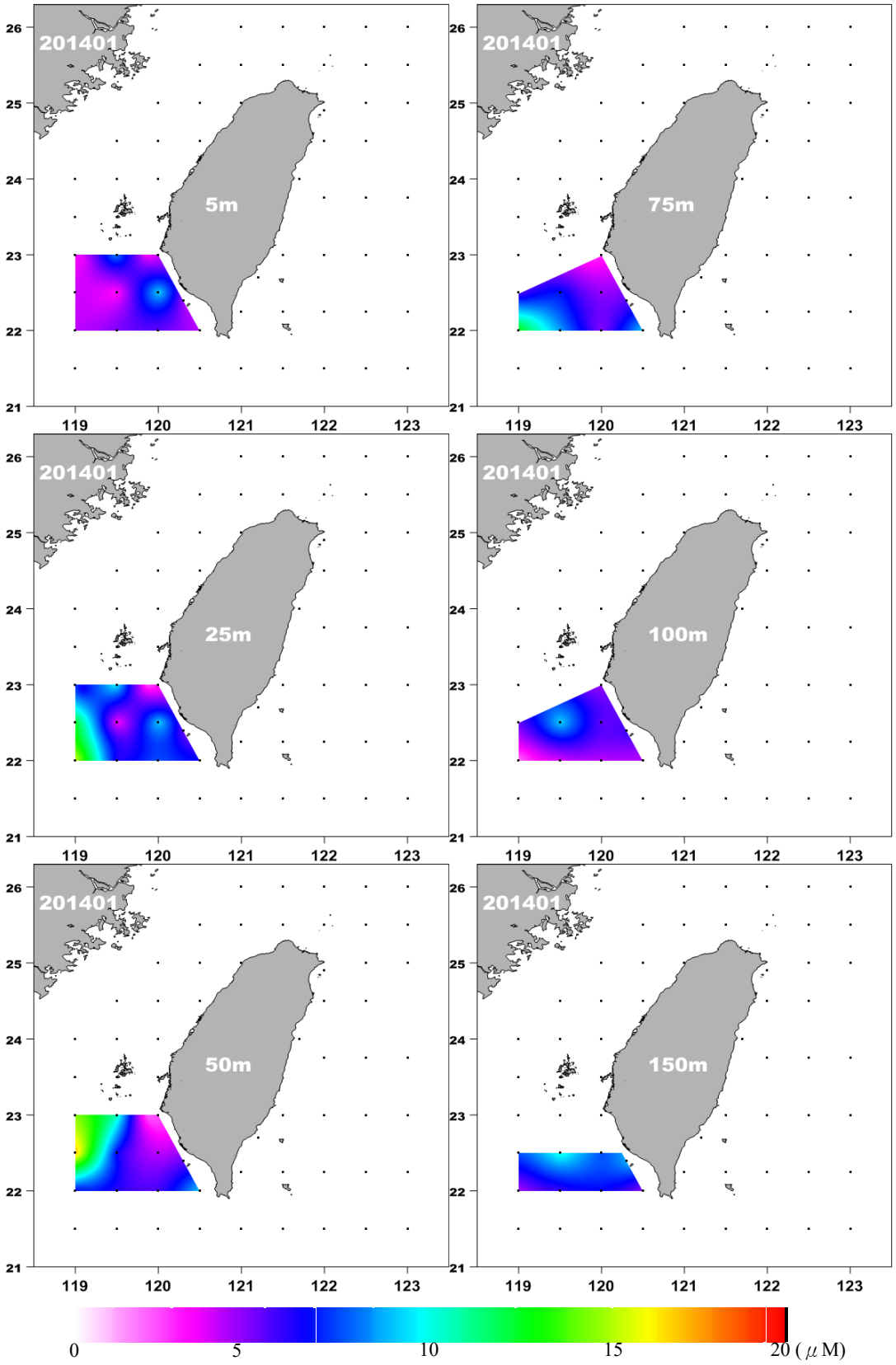

圖 21. 2014 年 1 月航次矽酸鹽(SiO_2^{2-})濃度分布
Fig. 21. Silicate (SiO_2^{2-}) distribution in Jan. 2014.

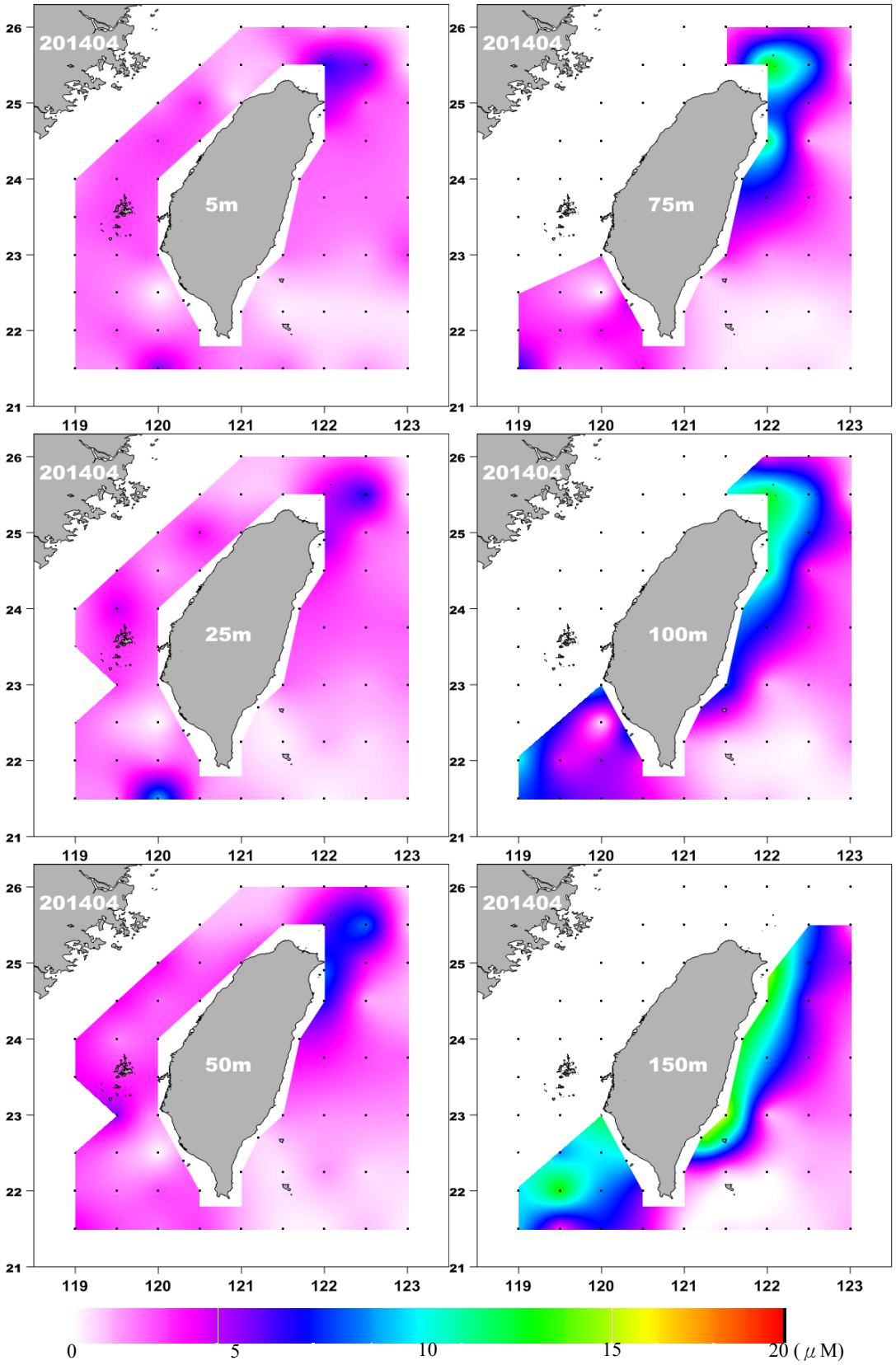

圖 22. 2014 年 4 月航次矽酸鹽(SiO_2^{2-})濃度分布
Fig. 22. Silicate (SiO_2^{2-}) distribution in Apr. 2014.

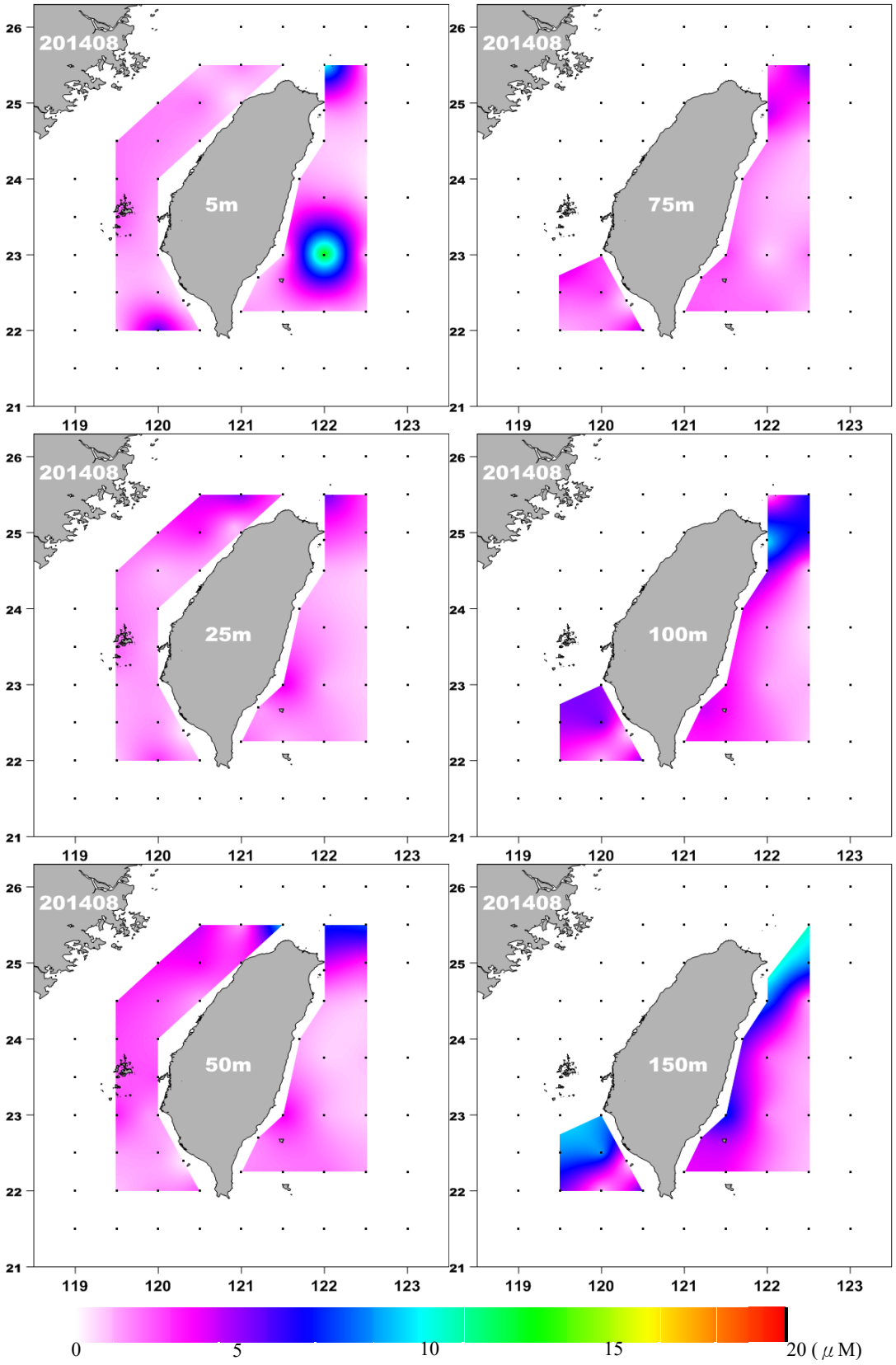

圖 23. 2014 年 8 月航次矽酸鹽(SiO_2^{2-})濃度分布
Fig. 23. Silicate (SiO_2^{2-}) distribution in Aug. 2014.

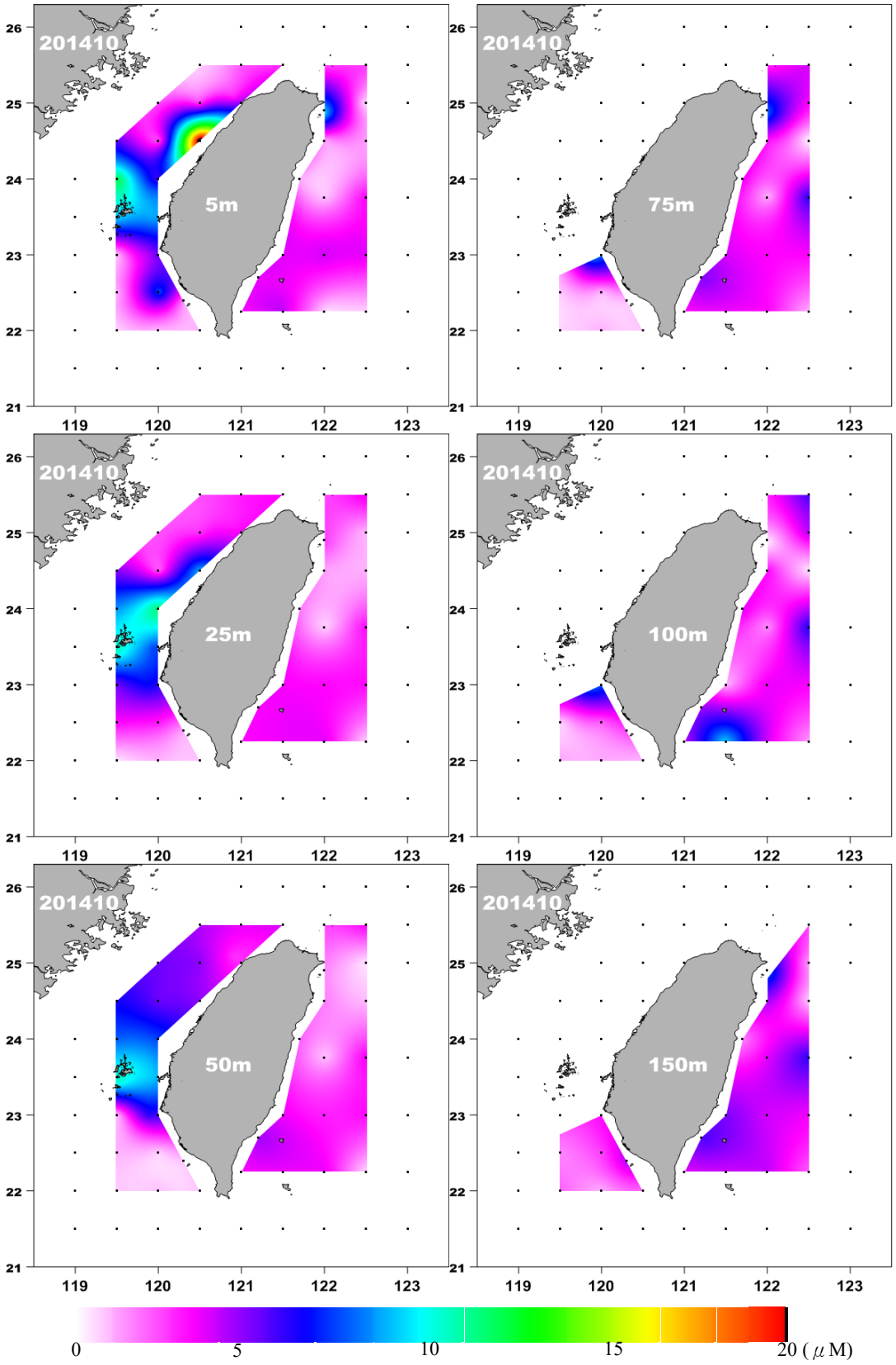

圖 24. 2014 年 10 月航次矽酸鹽(SiO_2^{2-})濃度分布
Fig. 24. Silicate (SiO_2^{2-}) distribution in Oct. 2014.

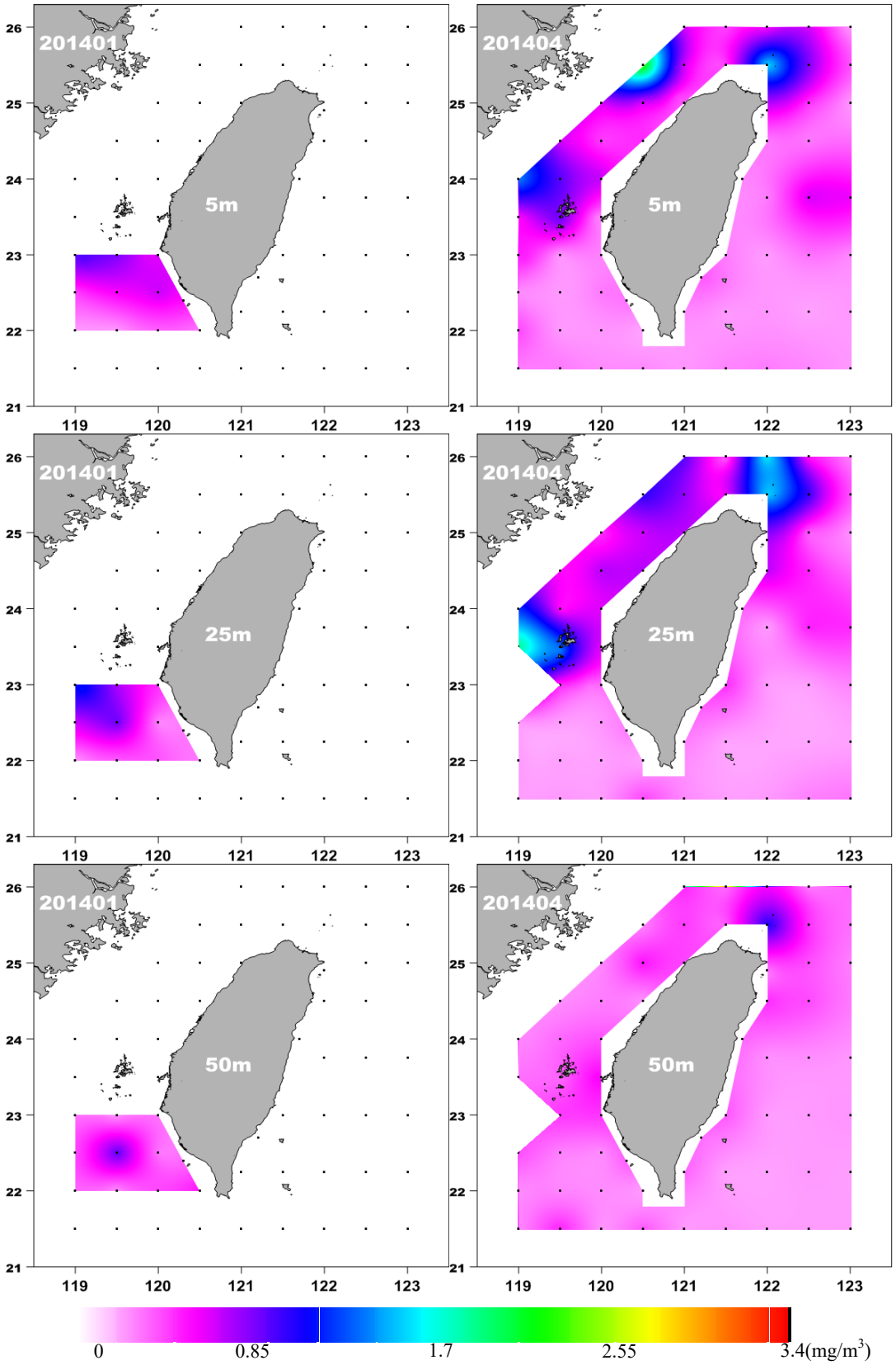

圖 25. 2014 年 1 月及 4 月航次葉綠素甲(chl-*a*)分布

Fig. 25. Chlorophyll-*a* (chl-*a*) distribution in Jan. and Apr. 2014.

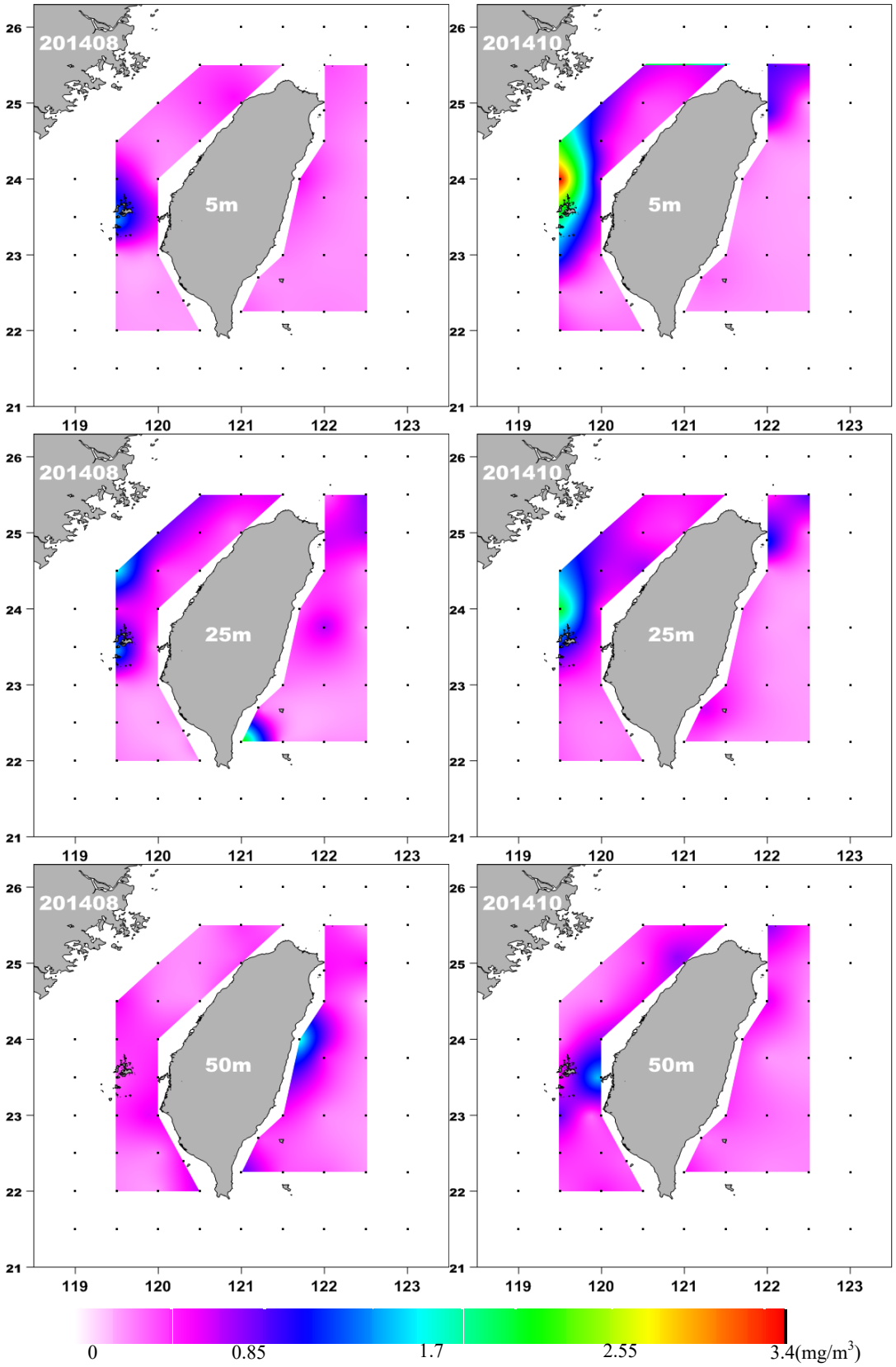

圖 26. 2014 年 8 月及 10 月航次葉綠素甲(chl-*a*)分布

Fig. 26. Chlorophyll-*a* (chl-*a*) distribution in Aug. and Oct. 2014.

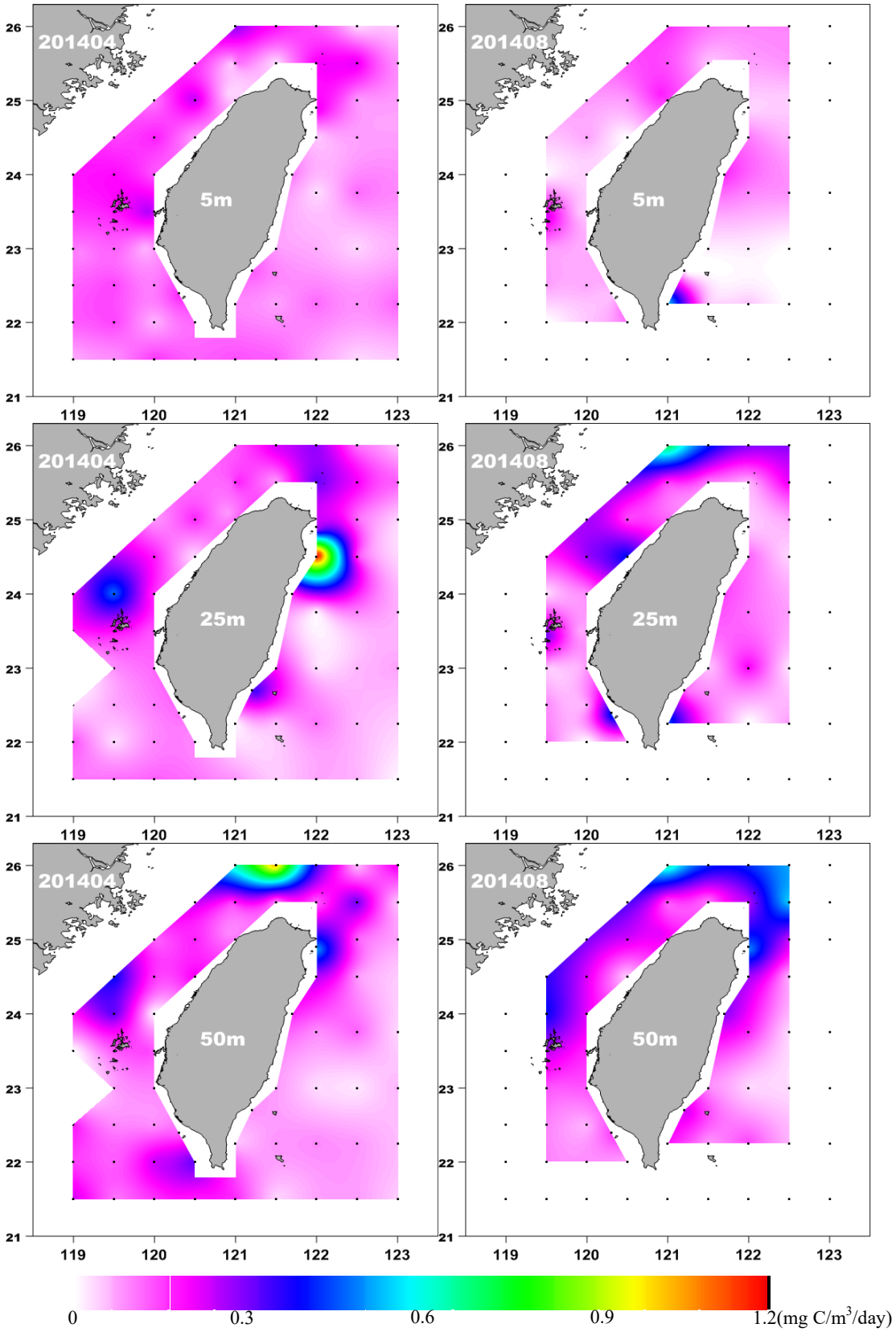

圖 27. 2014 年 4 月及 8 月航次基礎生產力分布

Fig. 27. Primary production distribution in Apr. and Aug. 2014.

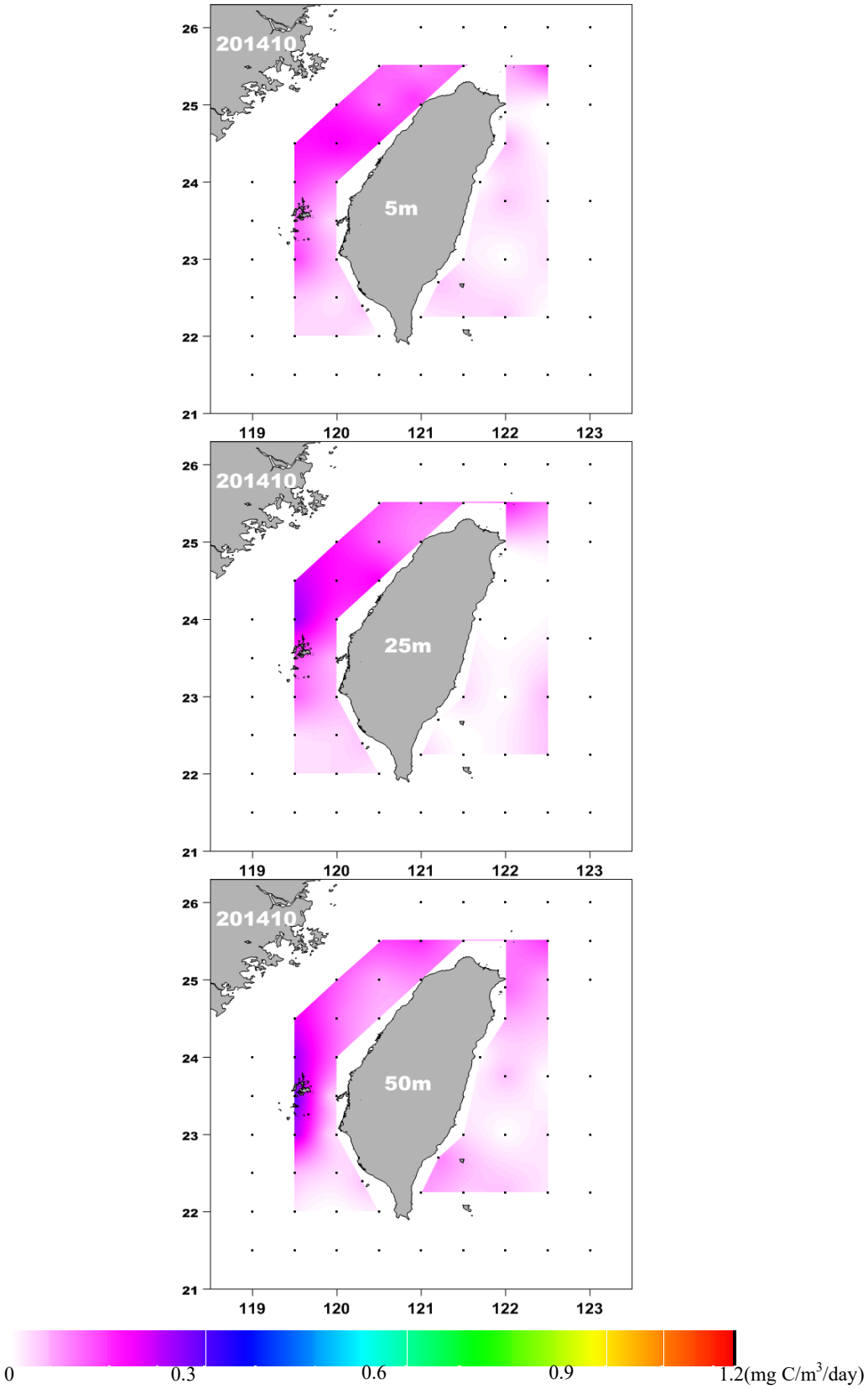

圖 28. 2014 年 10 月航次基礎生產力分布

Fig. 28. Primary production distribution in Oct. 2014.

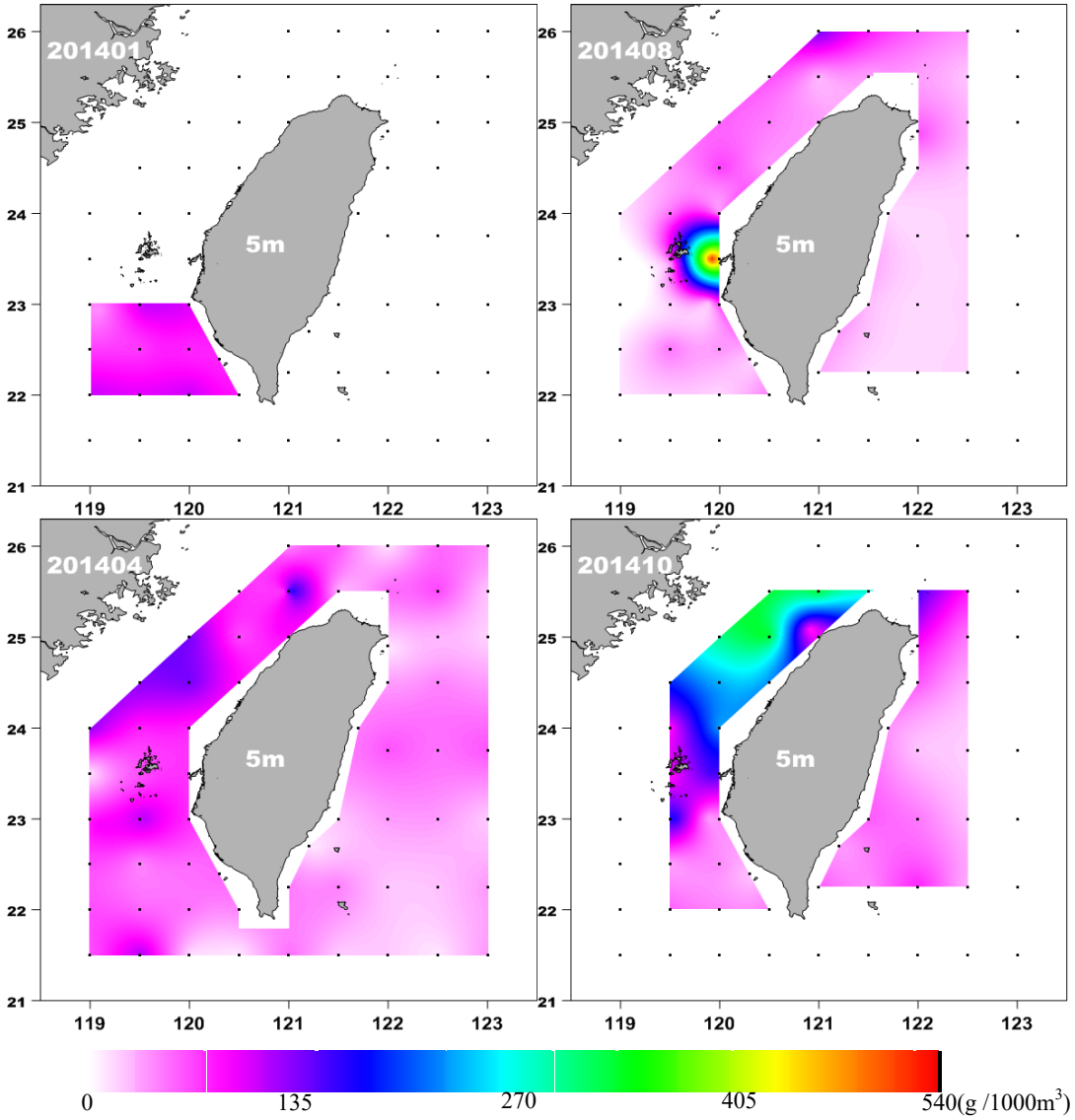

圖 29. 2014 年 1 月、4 月、8 月及 10 月航次浮游動物生物量分布
Fig. 29. Biomass of zooplankton sample for each cruise in 2014.

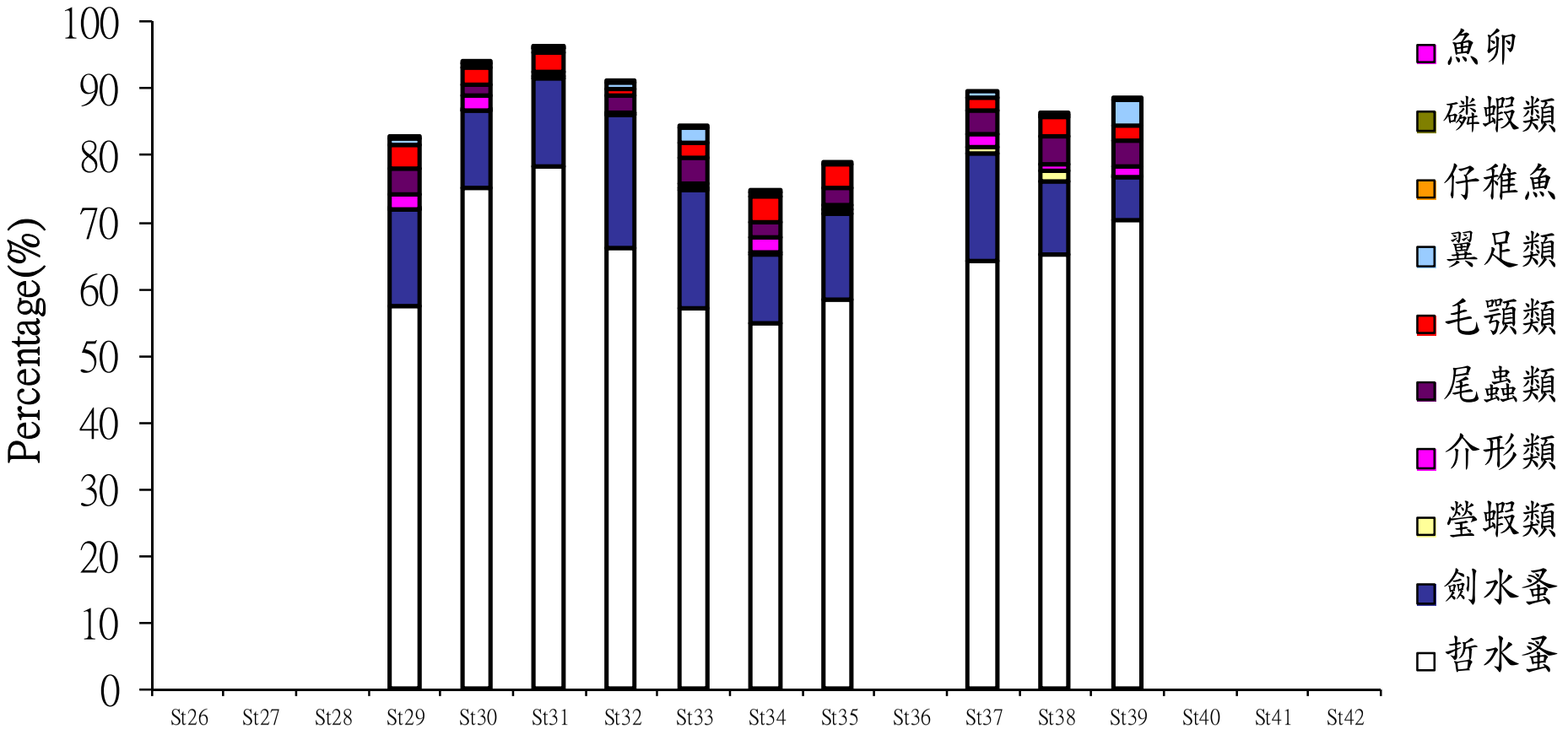

圖 30. 2014 年 1 月航次浮游動物優勢大類出現百分率

Fig. 30. Percentage of the composition of zooplankton in Jan. 2014.

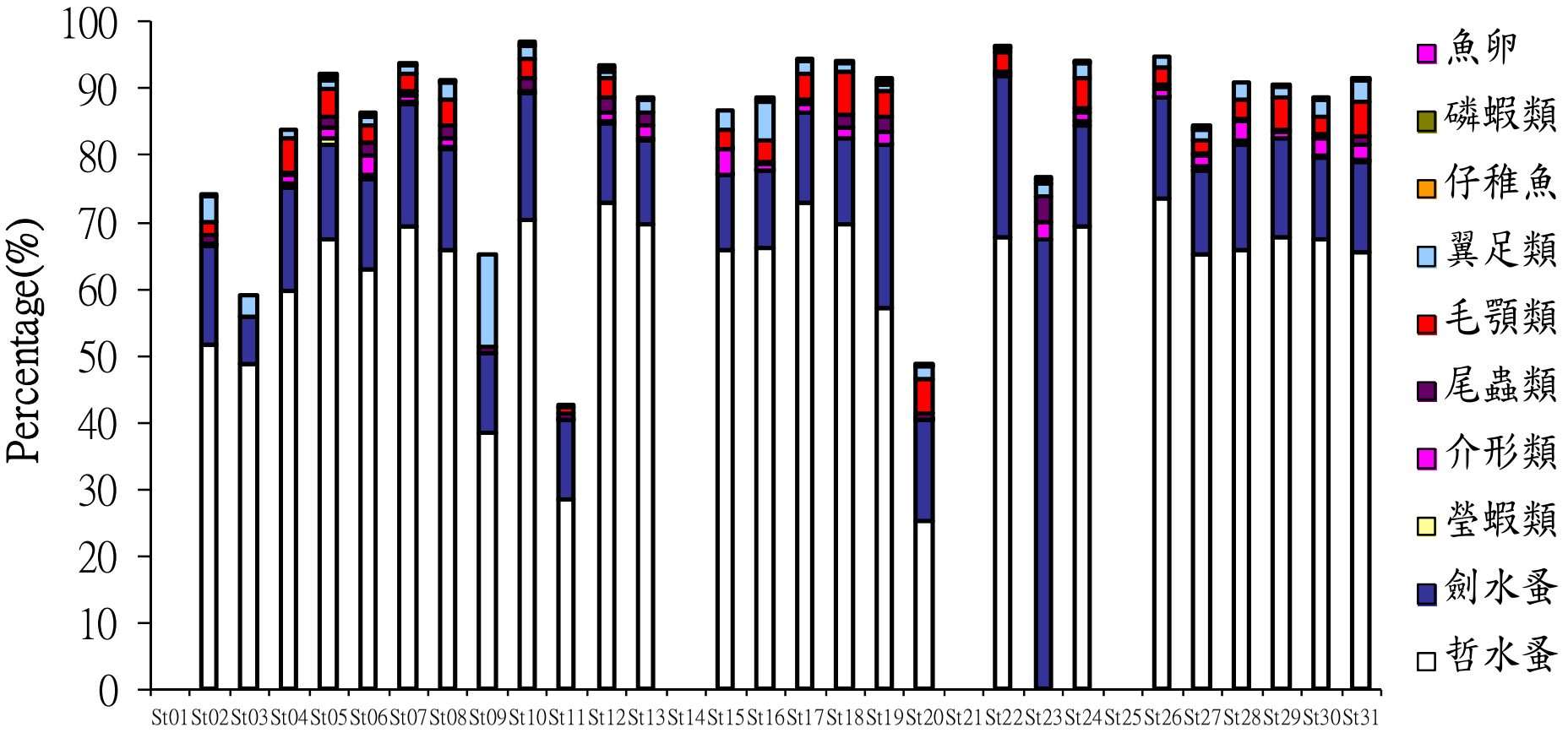

圖 31. 2014 年 4 月航次浮游動物優勢大類出現百分率

Fig. 31. Percentage of the composition of zooplankton in Apr. 2014.

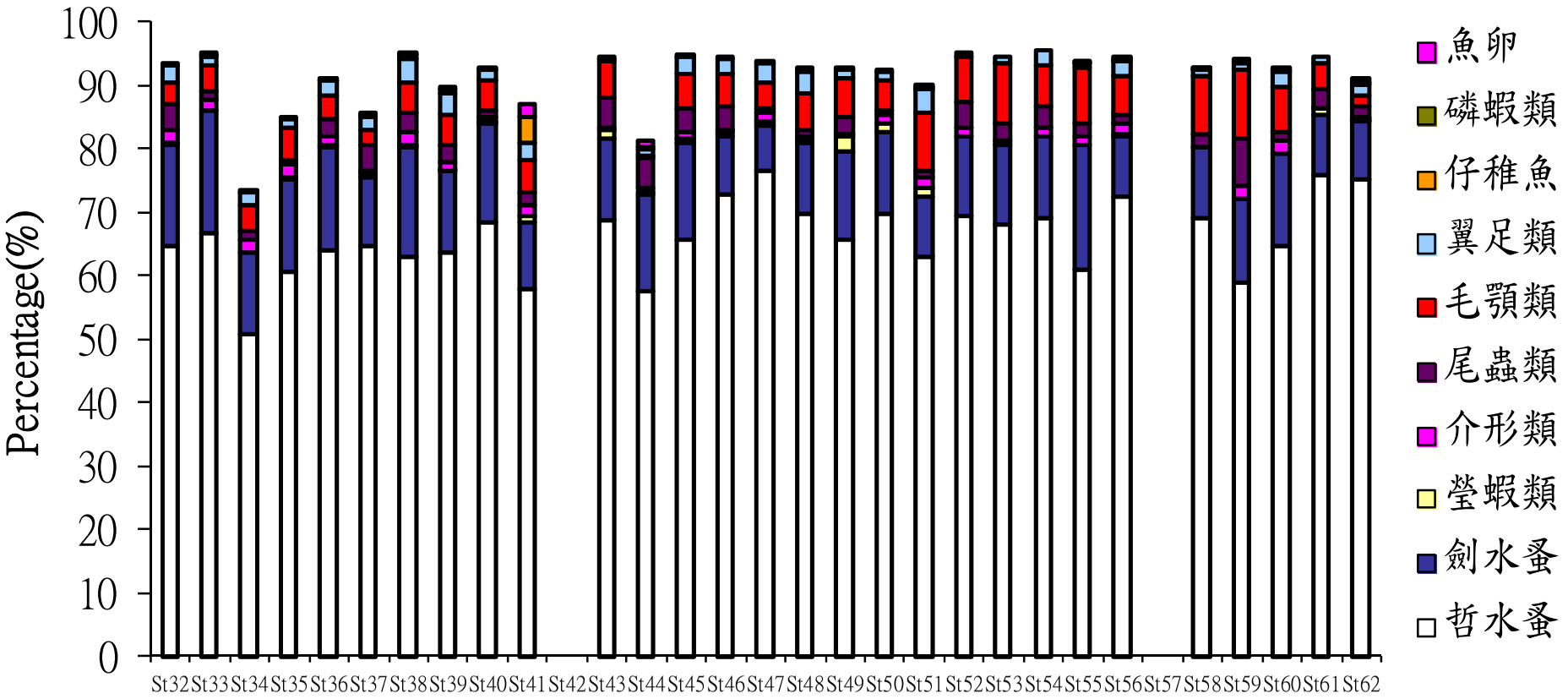

圖 32. 2014 年 4 月航次浮游動物優勢大類出現百分率(續)
Fig. 32. Percentage of the composition of zooplankton in Apr. 2014.

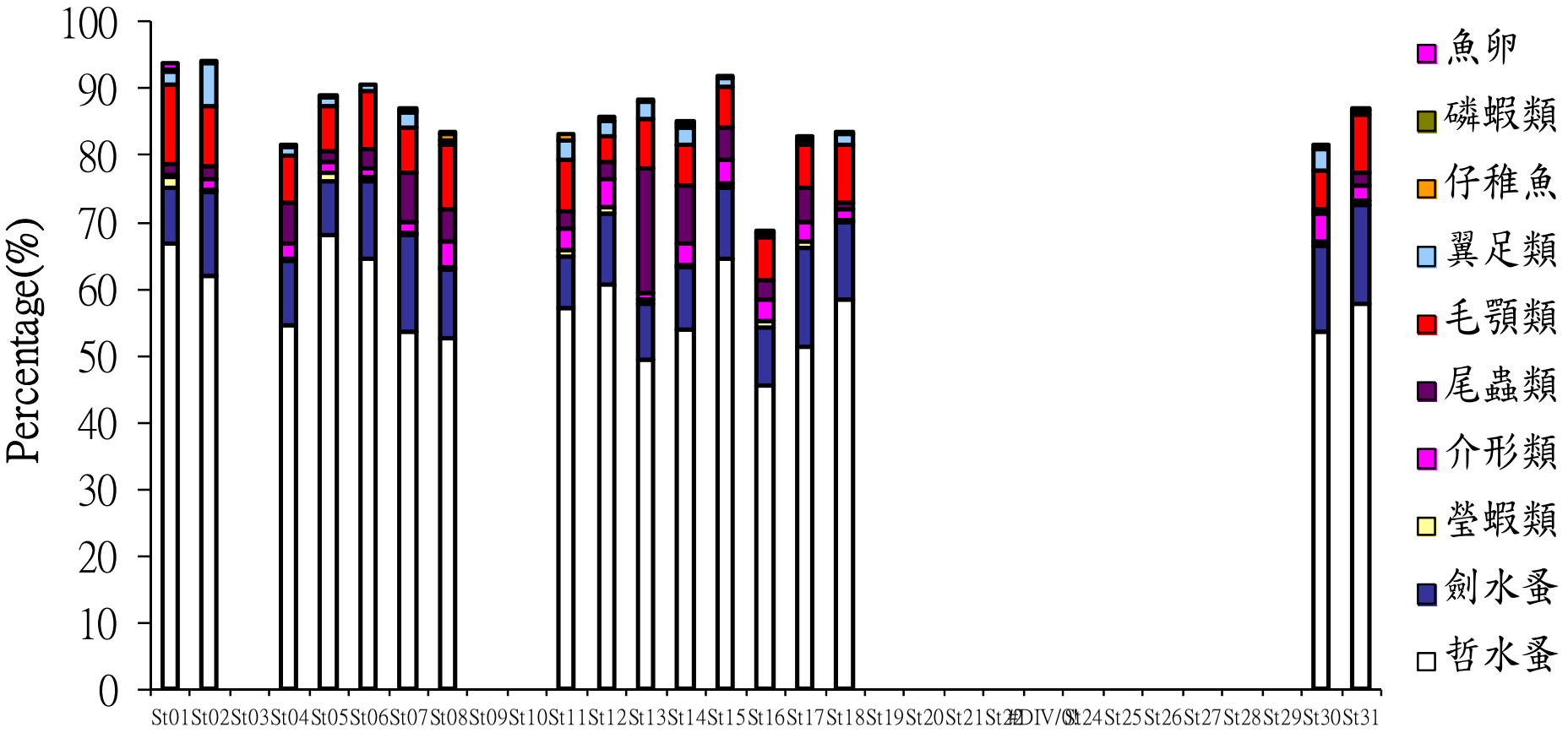

圖 33. 2014 年 8 月航次浮游動物優勢大類出現百分率

Fig. 33. Percentage of the composition of zooplankton in Aug. 2014.

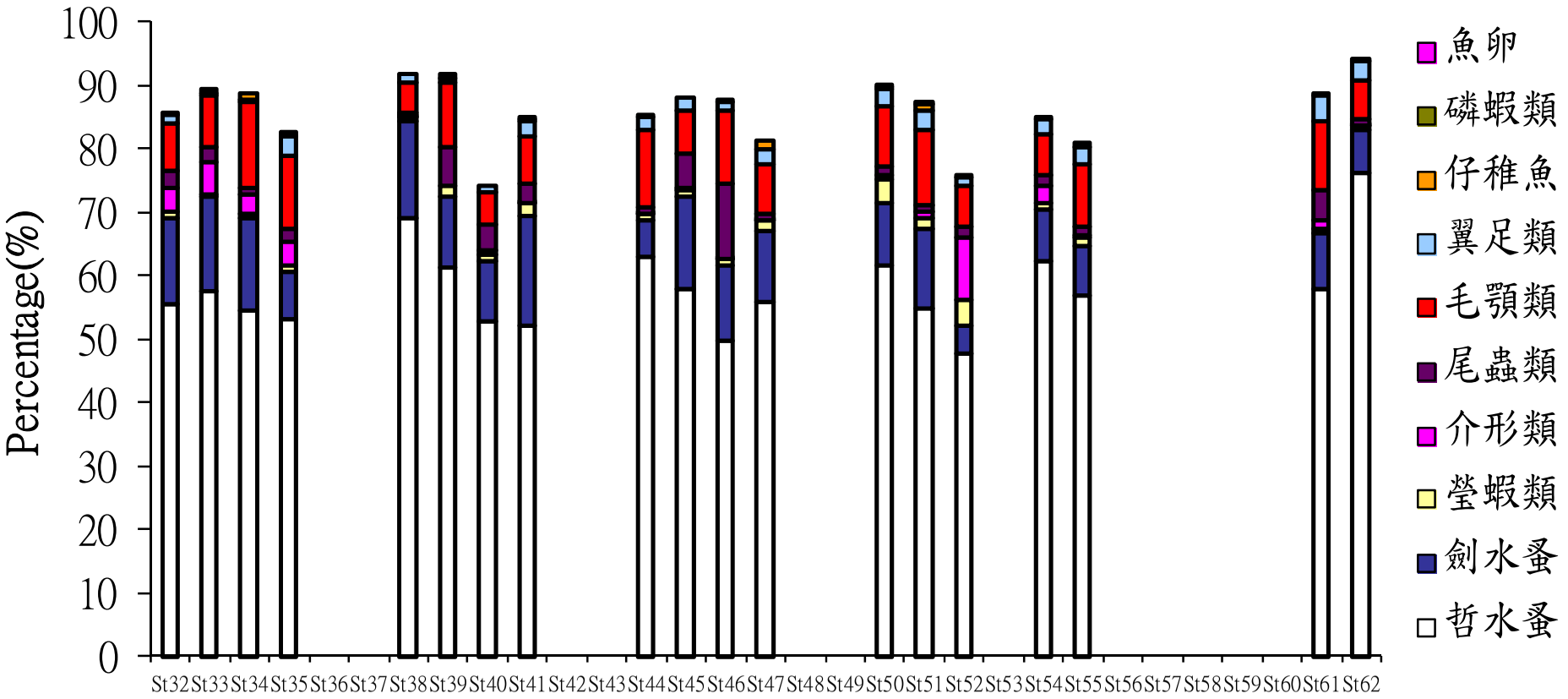

圖 34. 2014 年 8 月航次浮游動物優勢大類出現百分率(續)
Fig. 34. Percentage of the composition of zooplankton in Aug. 2014.

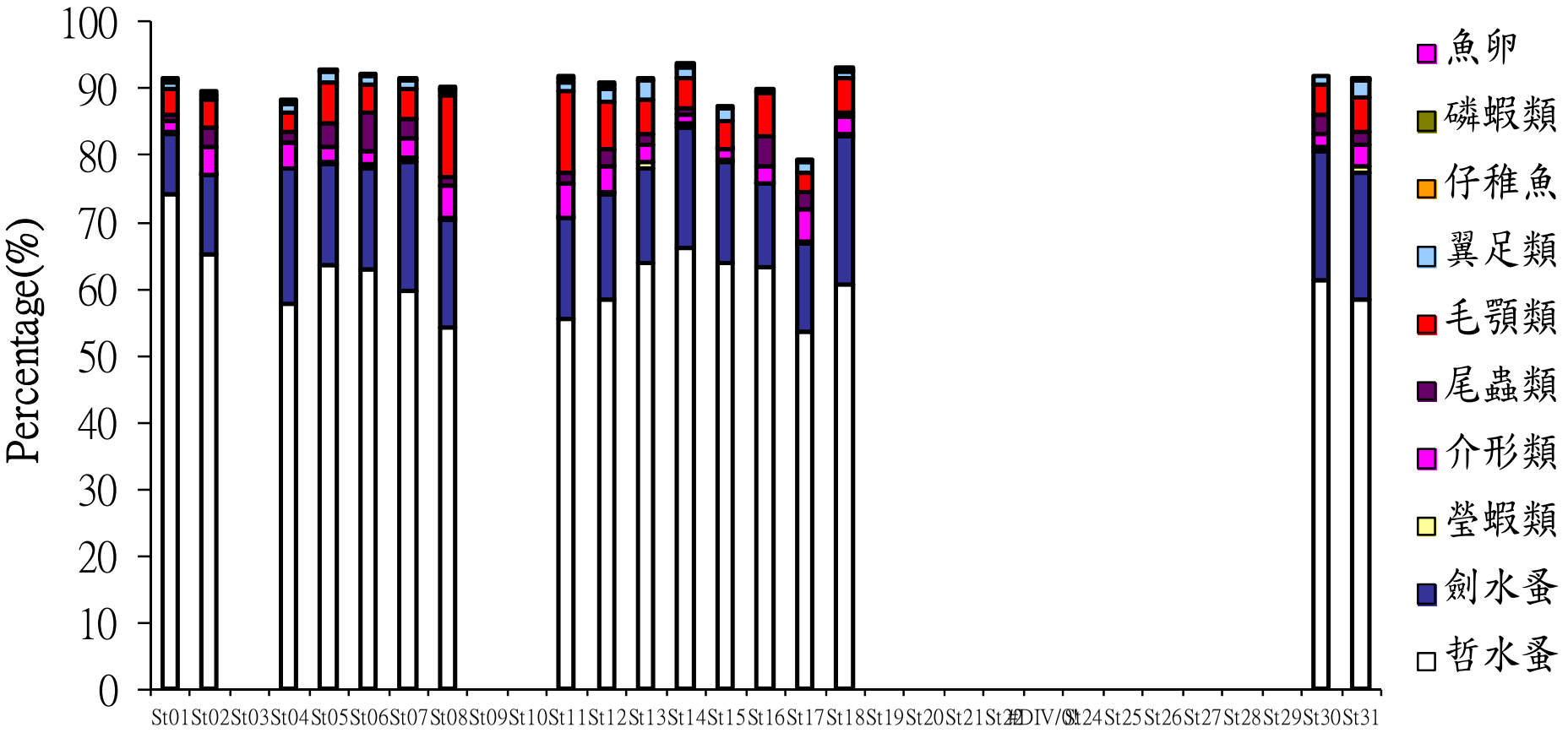

圖 35. 2014 年 10 月航次浮游動物優勢大類出現百分率

Fig. 35. Percentage of the composition of zooplankton in Oct. 2014.

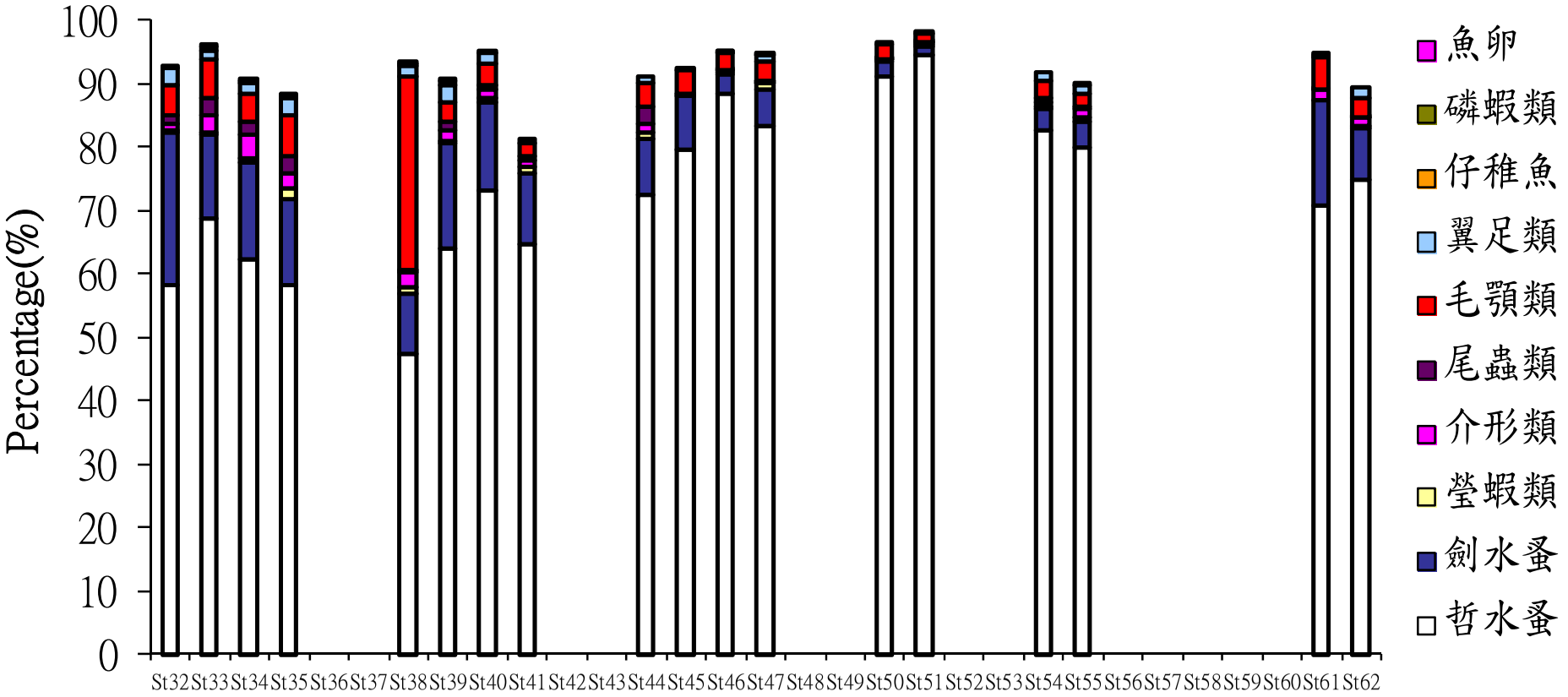

圖 36. 2014 年 10 月航次浮游動物優勢大類出現百分率(續)
Fig. 36. Percentage of the composition of zooplankton in Oct. 2014.

表 01. 2014 年 1 月航次基礎觀測資料
Chart 01. Basic observation data in Jan. 2014

Station	Date	SMT	Lati.	Long.	Depth	SST	Air T.	Air P.	Wind D.	Wind F.	O.N.D	Fl. Ct.	V.M.S.
St.01	-	-	-	-	-	-	-	-	-	-	-	-	-
St.02	-	-	-	-	-	-	-	-	-	-	-	-	-
St.03	-	-	-	-	-	-	-	-	-	-	-	-	-
St.04	-	-	-	-	-	-	-	-	-	-	-	-	-
St.05	-	-	-	-	-	-	-	-	-	-	-	-	-
St.06	-	-	-	-	-	-	-	-	-	-	-	-	-
St.07	-	-	-	-	-	-	-	-	-	-	-	-	-
St.08	-	-	-	-	-	-	-	-	-	-	-	-	-
St.09	-	-	-	-	-	-	-	-	-	-	-	-	-
St.10	-	-	-	-	-	-	-	-	-	-	-	-	-
St.11	-	-	-	-	-	-	-	-	-	-	-	-	-
St.12	-	-	-	-	-	-	-	-	-	-	-	-	-
St.13	-	-	-	-	-	-	-	-	-	-	-	-	-
St.14	-	-	-	-	-	-	-	-	-	-	-	-	-
St.15	-	-	-	-	-	-	-	-	-	-	-	-	-
St.16	-	-	-	-	-	-	-	-	-	-	-	-	-
St.17	-	-	-	-	-	-	-	-	-	-	-	-	-
St.18	-	-	-	-	-	-	-	-	-	-	-	-	-
St.19	-	-	-	-	-	-	-	-	-	-	-	-	-
St.20	-	-	-	-	-	-	-	-	-	-	-	-	-
St.21	-	-	-	-	-	-	-	-	-	-	-	-	-
St.22	-	-	-	-	-	-	-	-	-	-	-	-	-
St.23	-	-	-	-	-	-	-	-	-	-	-	-	-
St.24	-	-	-	-	-	-	-	-	-	-	-	-	-
St.25	-	-	-	-	-	-	-	-	-	-	-	-	-
St.26	-	-	-	-	-	-	-	-	-	-	-	-	-
St.27	-	-	-	-	-	-	-	-	-	-	-	-	-
St.28	-	-	-	-	-	-	-	-	-	-	-	-	-
St.29	20140111	2306	22.01	118.99	1460	24.5	20.1	1022	046	11.6	200	789	473.4
St.30	20140112	0215	22.01	119.51	2402	24.4	20.5	1021	000	5.8	200	1048	628.8
St.31	20140112	1310	22.51	119.99	1081	25.3	21.5	1019	049	12.3	200	769	461.4
St.32	20140112	1612	22.01	120.49	279	25.3	22.3	1018	049	9.4	200	930	558.0
St.33	20140112	1924	22.36	120.33	258	24.6	19.0	1021	069	11.8	163	574	344.4
St.34	20140112	0940	22.51	119.99	626	24.5	20.3	1022	117	10.3	200	843	505.8
St.35	20140112	0640	22.50	119.50	238	24.6	19.2	1022	033	16.4	200	785	471.0
St.36	20140111	2002	22.51	119.01	86	23.6	18.0	1022	086	12.8	172	418	250.8
St.37	20140111	1709	22.96	119.10	27	23.3	19.0	1022	080	11.8	32	131	78.6
St.38	20140111	1449	23.01	119.50	78	23.4	19.5	1022	010	7.9	82	37	22.2
St.39	20140111	1204	23.00	119.92	125	24.0	20.7	1023	310	11.6	126	537	322.2
St.40	-	-	-	-	-	-	-	-	-	-	-	-	-
St.41	-	-	-	-	-	-	-	-	-	-	-	-	-
St.42	-	-	-	-	-	-	-	-	-	-	-	-	-
St.43	-	-	-	-	-	-	-	-	-	-	-	-	-
St.44	-	-	-	-	-	-	-	-	-	-	-	-	-
St.45	-	-	-	-	-	-	-	-	-	-	-	-	-
St.46	-	-	-	-	-	-	-	-	-	-	-	-	-
St.47	-	-	-	-	-	-	-	-	-	-	-	-	-
St.48	-	-	-	-	-	-	-	-	-	-	-	-	-
St.49	-	-	-	-	-	-	-	-	-	-	-	-	-
St.50	-	-	-	-	-	-	-	-	-	-	-	-	-
St.51	-	-	-	-	-	-	-	-	-	-	-	-	-
St.52	-	-	-	-	-	-	-	-	-	-	-	-	-
St.53	-	-	-	-	-	-	-	-	-	-	-	-	-
St.54	-	-	-	-	-	-	-	-	-	-	-	-	-
St.55	-	-	-	-	-	-	-	-	-	-	-	-	-
St.56	-	-	-	-	-	-	-	-	-	-	-	-	-
St.57	-	-	-	-	-	-	-	-	-	-	-	-	-
St.58	-	-	-	-	-	-	-	-	-	-	-	-	-
St.59	-	-	-	-	-	-	-	-	-	-	-	-	-
St.60	-	-	-	-	-	-	-	-	-	-	-	-	-
St.61	-	-	-	-	-	-	-	-	-	-	-	-	-
St.62	-	-	-	-	-	-	-	-	-	-	-	-	-

表 02. 2014 年 4 月航次基礎觀測資料
Chart 02. Basic observation data in Apr. 2014

Station	Date	SMT	Lati.	Long.	Depth	SST	Air T.	Air P.	Wind D.	Wind F.	O.N.D	Fl. Ct.	V.M.S.
St.01	20140416	2031	24.86	122.01	22.1	22.8	1013.0	394.00	151	5.5	200	965	579.0
St.02	20140416	2345	25.00	122.52	23.8	24.3	1013.0	1485.00	179	7.2	200	1333	799.8
St.03	20140417	0303	24.99	123.02	24.9	24.0	1013.0	1723.00	177	5.5	200	1195	717.0
St.04	20140417	0807	24.52	122.50	25.1	24.1	1014.0	604.00	173	3.2	200	953	571.8
St.05	20140417	1133	24.50	121.99	26	24.6	1013.0	662.00	155	5.8	200	1288	772.8
St.06	20140417	1539	24.00	121.70	25.5	22.9	1012.0	674.00	161	5.7	200	1207	724.2
St.07	20140417	1826	23.76	122.01	26.7	26.0	1012.0	>2000	157	4.5	200	943	565.8
St.08	20140417	2200	23.75	122.52	24.9	25.9	10.4	3185.00	154	6.9	200	1479	887.4
St.09	20140418	0154	23.30	123.59	23.5	24.2	1012.0	3688.00	158	7.8	200	945	567.0
St.10	20140418	0610	23.97	123.01	25.1	24.5	1013.0	5000.00	157	6.0	200	1243	745.8
St.11	20140418	0956	22.99	122.52	26	25.0	1014.0	5550.00	149	5.8	200	1006	603.6
St.12	20140418	1320	22.99	122.00	26.4	25.0	1012.0	4863.00	222	2.6	200	1067	640.2
St.13	20140418	1647	23.02	121.50	26.1	23.3	1013.0	2061.00	140	3.7	200	830	498.0
St.14	20140418	2040	22.67	121.26	26	22.6	1013.0	1209.00	107	3.1	200	1030	618.0
St.15	20140419	0001	22.27	121.00	24.9	24.8	1013.0	1195.00	108	2.8	200	1249	749.4
St.16	20140419	0246	22.27	121.52	26.7	24.3	1012.0	550.00	118	3.9	200	903	541.8
St.17	20140419	0617	22.24	122.01	26.7	24.9	1013.0	>4000	105	4.3	200	898	538.8
St.18	20140419	0935	22.26	122.51	26.6	25.0	1014.0	4888.00	90	4.0	200	818	490.8
St.19	20140419	1256	22.23	123.00	25.6	24.9	1013.0	>1000	102	4.3	200	1051	630.6
St.20	20140419	1732	21.52	123.02	25.8	25.3	1010.0	3882.00	115	4.3	200	1064	638.4
St.21	20140419	2118	21.50	122.50	26.8	25.3	1012.0	4824.00	128	5.1	200	939	563.4
St.22	20140420	0028	21.50	121.99	26.9	25.4	1011.0	3549.00	130	5.0	200	934	560.4
St.23	20140420	0336	21.49	121.51	27.1	25.6	1010.0	>2000	269	5.0	200	1340	804.0
St.24	20140420	0700	21.50	120.99	26.9	25.7	1012.0	1200.00	123	2.8	200	977	586.2
St.25	20140420	0957	21.50	120.48	26.8	25.8	1012.0	1551.00	72	2.0	200	975	585.0
St.26	20140420	1244	21.52	120.01	26.2	26.1	1011.0	3006.00	95	5.6	200	1254	752.4
St.27	20140420	1602	21.52	119.51	26	26.1	1009.0	1501.00	67	2.7	200	725	435.0
St.28	20140420	1910	21.51	119.01	25.5	25.9	1011.0	2788.00	344	5.7	200	976	585.6
St.29	20140420	2225	21.99	119.01	25.7	25.5	1012.0	1501.00	30	4.0	200	992	595.2
St.30	20140421	0145	22.01	119.48	25.8	25.5	1011.0	2273.00	304	3.6	200	876	525.6
St.31	20140421	0525	22.00	120.00	26.2	26.5	1012.0	1132.00	16	4.2	200	1128	676.8
St.32	20140421	0844	22.01	122.51	26.5	25.8	1013.0	390.00	96	6.5	200	793	475.8
St.33	20140421	1130	22.36	120.32	26	26.0	1013.0	218.00	176	2.3	200	1148	688.8
St.34	20140421	1345	22.49	120.01	26.2	25.9	1011.0	598.00	175	6.3	200	874	524.4
St.35	20140421	1645	22.51	119.50	25.4	24.3	1011.0	232.00	181	3.6	200	1017	610.2
St.36	20140421	1934	22.51	119.01	24.8	25.4	1012.0	89.00	15	6.5	87	413	247.8
St.37	20140421	2229	23.02	119.00	24.2	24.3	1014.0	27.00	32	6.0	20	214	128.4
St.38	20140422	0122	23.03	119.50	24.6	24.1	1013.0	70.00	6	5.6	77	402	241.2
St.39	20140422	0342	23.00	119.94	25.4	24.0	1013.0	123.00	22	3.9	129	730	438.0
St.40	20140424	0027	23.52	129.91	24.1	22.9	1013.0	114.00	63	6.5	123	618	370.8
St.41	20140424	0255	23.46	119.48	23.9	22.5	1013.0	62.00	24	7.1	50	615	369.0
St.42	20140424	0711	23.52	118.99	23	22.4	1014.0	56.00	34	14.3	50	349	209.4
St.43	20140424	1033	23.97	119.00	24.2	23.4	1014.0	59.00	31	7.5	55	264	158.4
St.44	20140424	1327	24.01	119.50	23.3	22.0	1013.0	72.00	26	8.3	50	501	300.6
St.45	20140424	1633	24.39	120.52	23.8	25.1	1013.0	51.00	23	8.9	45	286	171.6
St.46	20140424	2107	24.52	120.46	23.8	23.5	1015.0	60.00	90	6.0	50	328	196.8
St.47	20140425	0013	24.51	120.00	22.3	22.3	1015.0	64.00	23	8.5	60	460	276.0
St.48	20140425	0318	24.52	119.52	22.4	22.2	1014.0	64.00	23	10.3	57	404	242.4
St.49	20140425	0658	25.00	120.00	21.8	22.2	1014.0	58.00	5	6.0	49	274	164.4
St.50	20140425	0934	25.02	120.57	22.4	23.5	1015.0	82.00	343	5.0	80	655	393.0
St.51	20140425	1155	25.09	120.41	22.7	25.7	1015.0	77.00	71	6.5	80	380	228.0
St.52	20140430	1547	25.51	120.50	21.7	22.0	1014.0	64.00	90	7.5	53	315	189.0
St.53	20140430	1920	25.99	120.99	22.3	21.8	1014.0	85.00	108	5.9	84	458	274.8
St.54	20140430	1247	25.51	121.01	23.4	22.2	1014.0	97.00	77	11.1	91	510	306.0
St.55	20140430	0957	25.50	121.50	23.4	22.5	1014.0	124.00	100	7.6	122	896	537.6
St.56	20140430	2220	26.01	121.50	22.9	22.3	1015.0	75.00	112	5.9	80	543	325.8
St.57	20140501	0108	26.00	122.00	22.1	22.6	1014.0	107.00	57	9.2	100	442	265.2
St.58	20140501	0338	26.00	122.51	25	23.0	1014.0	107.00	157	8.7	100	611	366.6
St.59	20140501	0600	26.01	123.00	23.1	22.5	1015.0	103.00	89	6.5	85	623	373.8
St.60	20140501	0940	25.51	123.01	24.1	23.1	1016.0	331.00	95	7.4	200	1143	685.8
St.61	20140416	1520	25.48	122.49	22.8	22.7	1012.0	396.00	60	8.9	200	662	397.2
St.62	20140416	1238	25.48	122.02	22.7	26.7	1013.0	132.00	154	7.7	121	556	333.6

表 03. 2014 年 8 月航次基礎觀測資料
Chart 03. Basic observation data in Aug. 2014

Station	Date	SMT	Lati.	Long.	Depth	SST	Air T.	Air P.	Wind D.	Wind F.	O.N.D	Fl. Ct.	V.M.S.
St.01	20140815	1823	24.86	121.99	300	28.6	30.3	1008.00	335	2.2	200	1064	638.4
St.02	20140809	1944	25.01	122.51	1491	29.4	28.8	1003.00	156	2.7	200	998	598.8
St.03	-	-	-	-	-	-	-	-	-	-	-	-	-
St.04	20140815	2330	24.52	122.49	640	28.6	29.3	1009.00	19	2.8	200	1055	633.0
St.05	20140815	2043	24.51	122.00	850	28.5	29.8	1009.00	74	5.8	200	1275	765.0
St.06	20140816	1030	23.99	121.69	298	28.6	28	1009.00	110	3.9	200	797	478.2
St.07	20140816	0801	23.75	122.01	3400	28.5	29.5	1009.00	93	3.1	200	1037	622.2
St.08	20140816	0440	23.76	122.51	3657	28.6	29.4	1007.00	75	2.7	200	1049	629.4
St.09	-	-	-	-	-	-	-	-	-	-	-	-	-
St.10	-	-	-	-	-	-	-	-	-	-	-	-	-
St.11	20140817	0419	23.00	122.50	5723	28.5	29	1007.00	176	0.3	200	1153	691.8
St.12	20140817	0120	23.00	122.00	4863	28.4	29.1	1007.00	168	7.0	200	905	543.0
St.13	20140816	1720	23.01	121.51	1900	28.5	29.4	1007.00	98	2.9	200	833	499.8
St.14	20140816	2105	22.68	121.25	1136	28.7	27	1008.00	108	1.5	200	1168	700.8
St.15	20140817	2211	22.25	121.01	1243	28.8	27.2	1010.00	255	2.0	200	970	582.0
St.16	20140817	1501	22.26	121.51	661	28.6	29.1	1007.00	193	2.7	200	1161	696.6
St.17	20140817	1152	22.26	122.00	4138	28.3	28.8	1008.00	156	4.0	200	1140	684.0
St.18	20140817	0853	22.26	122.51	4918	28.2	28.8	1008.00	152	4.3	200	1130	678.0
St.19	-	-	-	-	-	-	-	-	-	-	-	-	-
St.20	-	-	-	-	-	-	-	-	-	-	-	-	-
St.21	-	-	-	-	-	-	-	-	-	-	-	-	-
St.22	-	-	-	-	-	-	-	-	-	-	-	-	-
St.23	-	-	-	-	-	-	-	-	-	-	-	-	-
St.24	-	-	-	-	-	-	-	-	-	-	-	-	-
St.25	-	-	-	-	-	-	-	-	-	-	-	-	-
St.26	-	-	-	-	-	-	-	-	-	-	-	-	-
St.27	-	-	-	-	-	-	-	-	-	-	-	-	-
St.28	-	-	-	-	-	-	-	-	-	-	-	-	-
St.29	-	-	-	-	-	-	-	-	-	-	-	-	-
St.30	20140805	2013	22.00	119.51	958	29	29.1	1004.00	158	4.9	200	1136	681.6
St.31	20140805	1657	21.99	120.01	1167	29.2	29	1004.00	161	6.3	200	955	573.0
St.32	20140805	1402	22.00	120.50	264	29.2	29	1005.00	178	3.7	200	1055	633.0
St.33	20140805	1119	22.37	120.32	555	29.3	29.7	1005.00	191	4.2	200	800	480.0
St.34	20140806	0210	22.49	120.00	640	29.2	27.6	1004.00	184	2.2	200	849	509.4
St.35	20140805	2334	22.48	119.51	252	28.8	29	1005.00	169	4.3	200	1053	631.8
St.36	-	-	-	-	-	-	-	-	-	-	-	-	-
St.37	-	-	-	-	-	-	-	-	-	-	-	-	-
St.38	20140806	0753	23.01	119.51	78	28.2	28.5	1004.00	170	1.8	78	400	240.0
St.39	20140806	0517	23.01	119.99	98	28.1	28.4	1003.00	173	2.6	80	399	239.4
St.40	20140806	1245	23.51	119.91	127	28.7	29.4	1002.00	292	2.3	126	567	340.2
St.41	20140806	1033	23.43	119.51	62	28	28.8	1004.00	220	1.2	50	463	277.8
St.42	-	-	-	-	-	-	-	-	-	-	-	-	-
St.43	20140808	1744	24.00	119.50	68	28.4	28.5	1001.00	295	1.7	60	317	190.2
St.44	20140808	1746	24.00	119.50	66	28.8	29.4	1001.00	249	3.6	60	254	152.4
St.45	20140806	1503	24.01	120.01	44	28.5	28.9	1001.00	208	2.4	35	276	165.6
St.46	20140808	2337	24.51	120.50	59	29.1	28.3	1003.00	205	3.2	54	257	154.2
St.47	20140808	2110	24.50	120.00	68	28.8	28.5	1003.00	217	3.7	63	334	200.4
St.48	-	-	-	-	-	-	-	-	-	-	-	-	-
St.49	-	-	-	-	-	-	-	-	-	-	-	-	-
St.50	20140809	0454	24.99	120.51	81	29.1	28.1	1002.00	212	7.8	76	492	295.2
St.51	20140809	0224	25.00	120.92	71	29	28.2	1002.00	223	6.5	60	339	203.4
St.52	20140809	0744	25.49	120.50	71	29.3	28.3	1003.00	223	5.6	65	315	189.0
St.53	-	-	-	-	-	-	-	-	-	-	-	-	-
St.54	20140809	1007	25.50	121.01	98	29.5	28.7	1003.00	265	5.1	87	403	241.8
St.55	20140809	1213	25.50	121.50	123	29.6	30.4	1003.00	311	3.9	120	410	246.0
St.56	-	-	-	-	-	-	-	-	-	-	-	-	-
St.57	-	-	-	-	-	-	-	-	-	-	-	-	-
St.58	-	-	-	-	-	-	-	-	-	-	-	-	-
St.59	-	-	-	-	-	-	-	-	-	-	-	-	-
St.60	-	-	-	-	-	-	-	-	-	-	-	-	-
St.61	20140809	1653	25.49	122.49	409	29.7	28.7	1001.00	315	2.4	200	850	510.0
St.62	20140809	1417	25.49	121.99	125	29.6	28.8	1002.00	322	4.2	115	647	388.2

表 04. 2014 年 10 月航次基礎觀測資料
Chart 04. Basic observation data in Oct. 2014

Station	Date	SMT	Lati.	Long.	Depth	SST	Air T.	Air P.	Wind D.	Wind F.	O.N.D	Fl. Ct.	V.M.S.
St.01	20141030	1742	24.87	122.01	332	27.0	25.0	1013.98	151	6.1	200	1311	786.6
St.02	20141030	2047	25.01	122.51	1440	28.0	26.1	1015.05	109	7.2	200	1060	636.0
St.03	-	-	-	-	-	-	-	-	-	-	-	-	-
St.04	20141031	0112	24.50	122.51	588	27.8	25.4	1013.63	128	4.6	200	1361	816.6
St.05	20141031	0455	24.50	122.15	763	27.7	24.7	1013.09	227	1.4	200	1221	732.6
St.06	20141031	0931	24.00	121.70	630	27.2	25.2	1013.27	234	3.0	200	1032	619.2
St.07	20141031	1221	23.76	122.01	3226	28.8	25.7	1011.14	035	3.6	200	1303	781.8
St.08	20141031	1540	23.76	122.50	3291	28.8	26.3	1010.78	024	5.3	200	1281	768.6
St.09	-	-	-	-	-	-	-	-	-	-	-	-	-
St.10	-	-	-	-	-	-	-	-	-	-	-	-	-
St.11	20141031	2109	23.03	122.52	5516	29.1	26.4	1012.03	046	5.1	200	990	594.0
St.12	20141101	0030	23.01	122.00	4868	28.8	26.0	1011.14	027	4.3	200	1011	606.6
St.13	20141101	0403	23.00	121.51	2046	28.3	25.0	1010.07	054	1.4	200	1438	862.8
St.14	20141101	0811	22.68	121.25	1024	28.2	25.5	1012.2	003	4.1	200	1334	800.4
St.15	20141102	0204	22.26	121.00	1205	28.6	25.6	1009.89	001	5.2	200	1264	758.4
St.16	20141101	2253	22.26	121.50	448	28.8	26.7	1010.6	029	7.4	200	1188	712.8
St.17	20141101	1937	22.26	122.00	4557	28.9	27.0	1010.25	40	7.9	200	1207	724.2
St.18	20141101	1607	22.26	122.50	4836	29.0	26.7	1008.47	058	7.5	200	1188	712.8
St.19	-	-	-	-	-	-	-	-	-	-	-	-	-
St.20	-	-	-	-	-	-	-	-	-	-	-	-	-
St.21	-	-	-	-	-	-	-	-	-	-	-	-	-
St.22	-	-	-	-	-	-	-	-	-	-	-	-	-
St.23	-	-	-	-	-	-	-	-	-	-	-	-	-
St.24	-	-	-	-	-	-	-	-	-	-	-	-	-
St.25	-	-	-	-	-	-	-	-	-	-	-	-	-
St.26	-	-	-	-	-	-	-	-	-	-	-	-	-
St.27	-	-	-	-	-	-	-	-	-	-	-	-	-
St.28	-	-	-	-	-	-	-	-	-	-	-	-	-
St.29	-	-	-	-	-	-	-	-	-	-	-	-	-
St.30	20141102	1413	22.01	119.50	2384	28.8	26.3	1009.36	019	7.3	200	954	572.4
St.31	20141102	1104	22.00	120.00	1168	28.7	26.2	1011.14	005	6.2	200	1060	636.0
St.32	20141102	0805	22.00	120.50	277	28.6	26.0	1012.03	015	4.0	200	1249	749.4
St.33	20141104	0431	22.37	120.34	160	27.8	24.0	1010.6	314	0.0	200	1214	728.4
St.34	20141104	0215	22.50	120.00	676	27.5	23.1	1010.78	004	7.1	200	1038	622.8
St.35	20141102	1806	22.50	119.50	231	28.6	25.0	1010.07	016	15.2	200	1156	693.6
St.36	-	-	-	-	-	-	-	-	-	-	-	-	-
St.37	-	-	-	-	-	-	-	-	-	-	-	-	-
St.38	20141102	2229	22.93	119.51	86	27.4	23.7	1012.38	024	15.0	80	346	207.6
St.39	20141104	1230	23.01	119.99	125	26.0	24.0	1006	001	6.7	125	1000	600.0
St.40	20141104	1549	23.51	119.91	117	26.0	22.0	1006	020	12.4	110	269	161.4
St.41	20141104	1810	23.44	119.49	49	26.2	22.5	1013.27	009	10.1	50	448	268.8
St.42	-	-	-	-	-	-	-	-	-	-	-	-	-
St.43	-	-	-	-	-	-	-	-	-	-	-	-	-
St.44	20141104	2202	23.99	119.50	62	25.6	21.9	1015.59	029	12.9	55	340	204.0
St.45	20141105	0113	24.00	119.99	40	25.7	22.1	1014.87	038	11.0	35	239	143.4
St.46	20141105	0531	24.49	120.49	50	25.5	21.1	1015.94	044	10.8	45	206	123.6
St.47	20141105	0805	24.50	120.00	61	25.2	21.9	1015.76	036	8.4	52	250	150.0
St.48	-	-	-	-	-	-	-	-	-	-	-	-	-
St.49	-	-	-	-	-	-	-	-	-	-	-	-	-
St.50	20141105	1214	25.00	120.50	77	26.0	21.5	1015.76	042	11.4	70	535	321.0
St.51	20141105	1431	25.09	120.92	73	25.7	21.8	1013.98	046	9.7	70	361	216.6
St.52	-	-	-	-	-	-	-	-	-	-	-	-	-
St.53	-	-	-	-	-	-	-	-	-	-	-	-	-
St.54	20141105	1707	25.50	121.00	91	24.3	21.5	1014.16	067	10.0	85	531	318.6
St.55	20141105	2026	25.50	121.50	116	25.4	21.6	1015.59	095	9.1	110	784	470.4
St.56	-	-	-	-	-	-	-	-	-	-	-	-	-
St.57	-	-	-	-	-	-	-	-	-	-	-	-	-
St.58	-	-	-	-	-	-	-	-	-	-	-	-	-
St.59	-	-	-	-	-	-	-	-	-	-	-	-	-
St.60	-	-	-	-	-	-	-	-	-	-	-	-	-
St.61	20141106	0145	25.51	122.50	403	25.2	21.7	1014.52	057	3.1	200	1484	890.4
St.62	20141105	2309	25.50	122.00	116	25.4	22.0	1015.94	087	7.2	110	651	390.6

2014年台灣周邊海域漁場環境監測航次報告

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