106-152-7A07
MOTC-IOT-105-H3DA002c-Y11

# 2016 年港灣環境資訊網觀測資料年報
# (高雄海域觀測海氣象資料)

交通部運輸研究所

中華民國 106 年 9 月

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著者：蘇青和、李俊穎、陳明宗、劉清松
傅怡釧、陳鈞彥、林珂如、謝佳紘

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106

二〇一六年港灣環境資訊網觀測資料年報(高雄海域觀測海氣象資料) 交通部運輸研究所

GPN：1010601177
定價全套16冊1600元

國家圖書館出版品預行編目(CIP)資料

港灣環境資訊網觀測資料年報(高雄海域觀測海氣象資料). 2016 年 / 蘇青和等編輯. -- 初版. -- 臺北市 : 交通部運研所, 2017.09
面 ; 公分
ISBN 978-986-05-3265-4(平裝)

1.海洋氣象

444.94 106014574

2016 年港灣環境資訊網觀測資料年報(高雄海域觀測海氣象資料)
編　　輯：蘇青和、李俊穎、陳明宗、劉清松、傅怡釧、陳鈞彥、林珂如、謝佳紘
出版機關：交通部運輸研究所
地　　址：10548 臺北市敦化北路 240 號
網　　址：www.ihmt.gov.tw (中文版＞中心出版品)
電　　話：(04)26587176
出版年月：中華民國 106 年 9 月
印 刷 者：
版(刷)次冊數：初版一刷
本書同時登載於交通部運輸研究所港灣技術研究中心網站
定　　價：全套 16 冊 1600 元
展 售 處：
交通部運輸研究所運輸資訊組•電話：(02)23496880
國家書店松江門市:10485 臺北市中山區松江路 209 號 F1•電話:(02)25180207
五南文化廣場：40042 臺中市中山路 6 號•電話：(04)22260330

GPN： 1010601177 ISBN：978-986-05-3265-4(全套:平裝)
著作財產權人：中華民國(代表機關：交通部運輸研究所)
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<tr><td>國際標準書號(或叢刊號)<br>ISBN 978-986-05-3265-4<br>(全套:平裝)</td><td>政府出版品統一編號<br>1010601177</td><td>運輸研究所出版品編號<br>106-152-7A07</td><td>計畫編號<br>105-H3DA002c-Y11</td></tr>
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<tr><td colspan="4">關鍵詞港灣環境資訊網、2016 年、高雄海域、觀測海氣象資料、年報</td></tr>
<tr><td colspan="4">摘要：<br>本港灣環境資訊網觀測海氣象資料年報，包括高雄海域2016年觀測風力、波浪、潮汐及海流等資料之觀測記錄表及逐時資料歷線圖。</td></tr>
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</table>

**PUBLICATION ABSTRACTS OF RESEARCH PROJECTS**
**INSTITUTE OF TRANSPORTATION**
**MINISTRY OF TRANSPORTATION AND COMMUNICATIONS**

TITLE: Annual Report of Oceanographical Observation Data in Kao-Hsiung Offshoe Region at 2016

| ISBN(OR ISSN) | GOVERNMENT PUBLICATIONS NUMBER | IOT SERIAL NUMBER | PROJECT NUMBER |
|---|---|---|---|
| 978-986-05-3265-4(pbk) | 1010601177 | 106-152-7A07 | 105-H3DA002c-Y11 |


DIVISION: HARBOR & MARINE TECHNOLOGY CENTER

DIVISION DIRECTION: Yung-Fang Chiu

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PROJECT PERIOD

FROM January 2016

TO December 2016


KEY WORDS: Harbor Environment Information Website, 2016, Annual Report, Kao-Hsiung Off-shoe Region, Oceanographical Observation Data



ABSTRACT:

This Annual report 2016 of Harbor Environment Information Website(HEIV) covers the observation data of winds, waves, tides and currents near Kao-Hsiung offshoe region in Taiwan. The contents in this Annual report include the records of observation and the time series of data.


| DATE OF PUBLICATION | NUMBER OF PAGES | A SET OF SIXTEEN BOOKS | CLASSIFICATION |
|---|---|---|---|
| Sep. 2017 | 148 | 1600 | □RESTRICTED □CONFIDENTIAL □SECRET □TOP SECRET ■UNCLASSIFIED |


The views expressed in this publication are not necessarily those of the Ministry of Transportation and Communications.

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# 誌　　謝

2016 年港灣環境資訊網觀測風力資料，蒐集之高雄海域風力資料，除本中心自行觀測之外，在高雄氣象站(**測站 E**) 觀測風力資料，係交通部**中央氣象局(CWB)**提供。彌陀海上浮標站(**測站 Z**)、小港氣象站(**測站 H**)等觀測風力資料，係經濟部**水利署(WRA)**提供，謹致謝忱。

2016 年港灣環境資訊網觀測波浪資料，蒐集之高雄海域波浪資料，除本中心自行觀測之外，在彌陀海上浮標站(**測站 Z**)觀測波浪資料，係經濟部**水利署(WRA)**提供，謹致謝忱。

2016 年港灣海氣象觀測潮汐資料，蒐集之高雄海域潮汐觀測資料，除本中心自行觀測之外，在高雄 1 港(**測站 F**)、高雄 2 港(**測站 L**)等觀測潮汐資料，係交通部**中央氣象局**提供，謹致謝忱。

2016 年港灣環境資訊網觀測海流資料，蒐集之高雄海域海流資料，除本中心自行觀測之外，在彌陀海上浮標(**測站 Z**)觀測海流資料，係經濟部**水利署(WRA)**提供，謹致謝忱。

# 第一章　2016 年高雄海域觀測風力資料

高雄海域風之觀測係 2003 年 6 月本中心**(IHMT)**在高雄港十號碼頭安裝一具風速風向即時傳送監測系統(稱**測站 B0**)，本測站於 2010 年 9 月停止觀測。2010 年 10 月在第二港口南防坡堤堤頭，增設 Gill 二維超音波式風速計(**測站 B1**)，測站之位置如圖 1。另於 2007 年 4 月在高雄港二港口北防坡堤頭增設超音波風速風向儀(稱**測站 W 及測站 C**)。

高雄港附近風力觀**測站 E** 風速儀屬中央氣象局**(CWB)**所有，**測站 Z**(彌陀外海浮標站) 及小港氣象站**測站 H** 之風速儀則屬水利署**(WRA)**所有。各測站歷年觀測風資料蒐集概況如表 1。

本中心測站風資料之蒐集係採取每小時測定十分鐘之風速、風向數據加以平均，而得出該小時之平均風速、平均風向、最大陣風風速、最大陣風風向、最大陣風之發生時間。本中心之風力資料以取平均風速及平均風向為主。其他測站觀測風速、風向資料也是平均風速(m/s)及風向(度)。

本風力年報以取經檢核或修補後之 **W 站**資料作為**主要觀測站**，2016 年主要觀測站修補前(後)每月觀測之風資料記錄期間統計表，如表 1.1a，2016 年風力**次要觀測站**資料(未補餘)記錄統計表，如表 1.1b，**主要觀測站修補前後**每月風力歷線比較圖，如圖 1.1，**主要觀測站**與**次要觀測站**(或**其他觀測站**)每月風力歷線比較圖，如圖 1.2 以後。

**表 1 高雄海域觀測風力資料蒐集概況表(統計時間至 2016 年 11 月)**

| 測站 | 緯度 | 經度 | 觀測期間 | 觀測單位 | 備註 |
|---|---|---|---|---|---|
| B | 22°36'54"N | 120°17'19"E | 2002/06-2016/11(觀測中) | 港研中心 | 高雄 1 港口 |
| W | 22°32'51"N | 120°17'55"E | 2010/09-2016/11(觀測中) | 港研中心 | 高雄 2 港口 |
| C | 22°32'51"N | 120°17'55"E | 2007/04-2016/11(觀測中) | 港研中心 | 高雄 2 港口 |
| E | 22°33'58"N | 120°18'57"E | 1999/01-2016/11(觀測中) | 中央氣象局 | 高雄 |
| Z | 22°45'50"N | 120°09'49"E | 2012/09-2016/11(觀測中) | 水利署 | 彌陀浮標站 |
| H | 23°09'32"N | 121°24'12"E | 2013/09-2016/11(觀測中) | 中央氣象局 | 小港氣象站 |

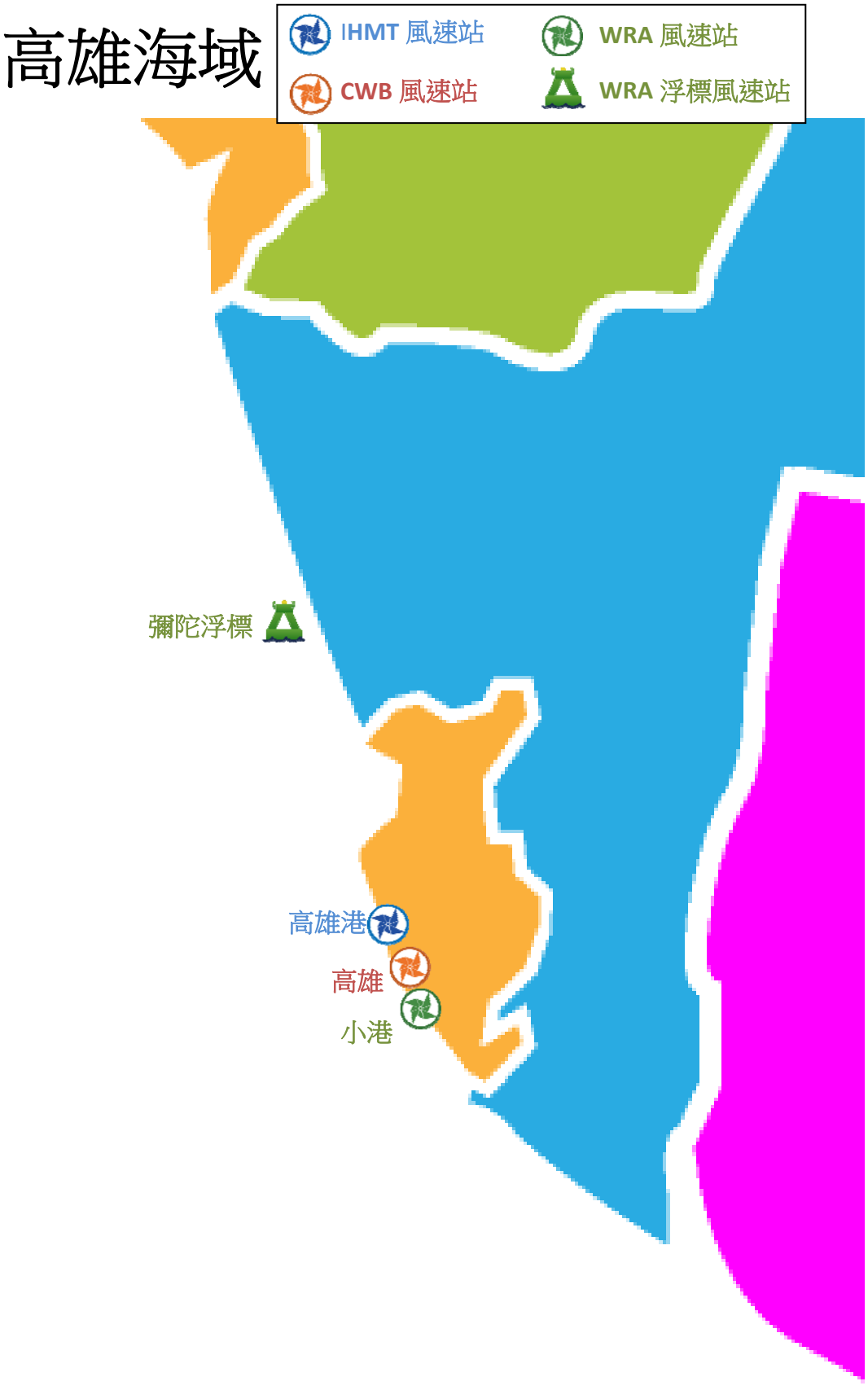


圖 1 高雄海域風力觀測站位置示意圖

# 表1.1a 2016年每月高雄海域修補前各測站觀測風力資料紀錄統計表

| 年/月 港區 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 |
|---|---|---|---|---|---|---|---|---|
| 測站 | W | Z | B | C | E | H | | |
| 2015/12月 | 743 (99.9%) | 720 (96.8%) | 744 (100%) | 228 (30.6%) | 744 (100%) | 744 (100%) | * | * |
| 2016/ 1月 | 743 (99.9%) | 729 (98.0%) | 744 (100%) | 90 (12.1%) | 743 (99.9%) | 738 (99.2%) | * | * |
| 2016/ 2月 | 695 (99.9%) | 696 (100%) | 696 (100%) | * | 696 (100%) | 696 (100%) | * | * |
| 2016/ 3月 | 743 (99.9%) | 744 (100%) | 744 (100%) | 343 (46.1%) | 744 (100%) | 744 (100%) | * | * |
| 2016/ 4月 | 720 (100%) | 720 (100%) | 720 (100%) | 698 (96.9%) | 720 (100%) | 720 (100%) | * | * |
| 2016/ 5月 | 730 (98.1%) | 744 (100%) | 744 (100%) | 712 (95.7%) | 744 (100%) | 743 (99.9%) | * | * |
| 2016/ 6月 | 719 (99.9%) | 712 (98.9%) | 720 (100%) | 501 (69.6%) | 720 (100%) | 719 (99.9%) | * | * |
| 2016/ 7月 | 743 (99.9%) | 744 (100%) | 744 (100%) | 743 (99.9%) | 744 (100%) | 744 (100%) | * | * |
| 2016/ 8月 | 743 (99.9%) | 744 (100%) | 742 (99.7%) | 742 (99.7%) | 744 (100%) | 744 (100%) | * | * |
| 2016/ 9月 | 719 (99.9%) | 637 (88.5%) | 720 (100%) | 334 (46.4%) | 720 (100%) | 715 (99.3%) | * | * |
| 2016/10月 | 743 (99.9%) | 9 ( 1.2%) | 744 (100%) | 652 (87.6%) | 744 (100%) | 744 (100%) | * | * |
| 2016/11月 | 719 (99.9%) | 198 (27.5%) | 720 (100%) | 217 (30.1%) | 720 (100%) | 719 (99.9%) | * | * |
| 2016/冬季 | * | * | * | * | * | * | * | * |
| 2016/春季 | * | * | * | * | * | * | * | * |
| 2016/夏季 | * | * | * | * | * | * | * | * |
| 2016/秋季 | * | * | * | * | * | * | * | * |
| 2016/整年 | * | * | * | * | * | * | * | * |
| 起始年月 | * | * | * | * | * | * | * | * |
| 結束年月 | * | * | * | * | * | * | * | * |

# 表1.1b 2016年每月高雄海域修補後各測站風力資料統計表

| 年/月 港區 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 |
|---|---|---|---|---|---|---|---|---|
| 測站 | W | Z | B | C | E | H | | |
| 2015/12月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/ 1月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/ 2月 | 696 (100%) | * | * | * | * | * | * | * |
| 2016/ 3月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/ 4月 | 720 (100%) | * | * | * | * | * | * | * |
| 2016/ 5月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/ 6月 | 720 (100%) | * | * | * | * | * | * | * |
| 2016/ 7月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/ 8月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/ 9月 | 720 (100%) | * | * | * | * | * | * | * |
| 2016/10月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/11月 | 720 (100%) | * | * | * | * | * | * | * |
| 2016/冬季 | * | * | * | * | * | * | * | * |
| 2016/春季 | * | * | * | * | * | * | * | * |
| 2016/夏季 | * | * | * | * | * | * | * | * |
| 2016/秋季 | * | * | * | * | * | * | * | * |
| 2016/整年 | * | * | * | * | * | * | * | * |
| 起始年月 | * | * | * | * | * | * | * | * |
| 結束年月 | * | * | * | * | * | * | * | * |

# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

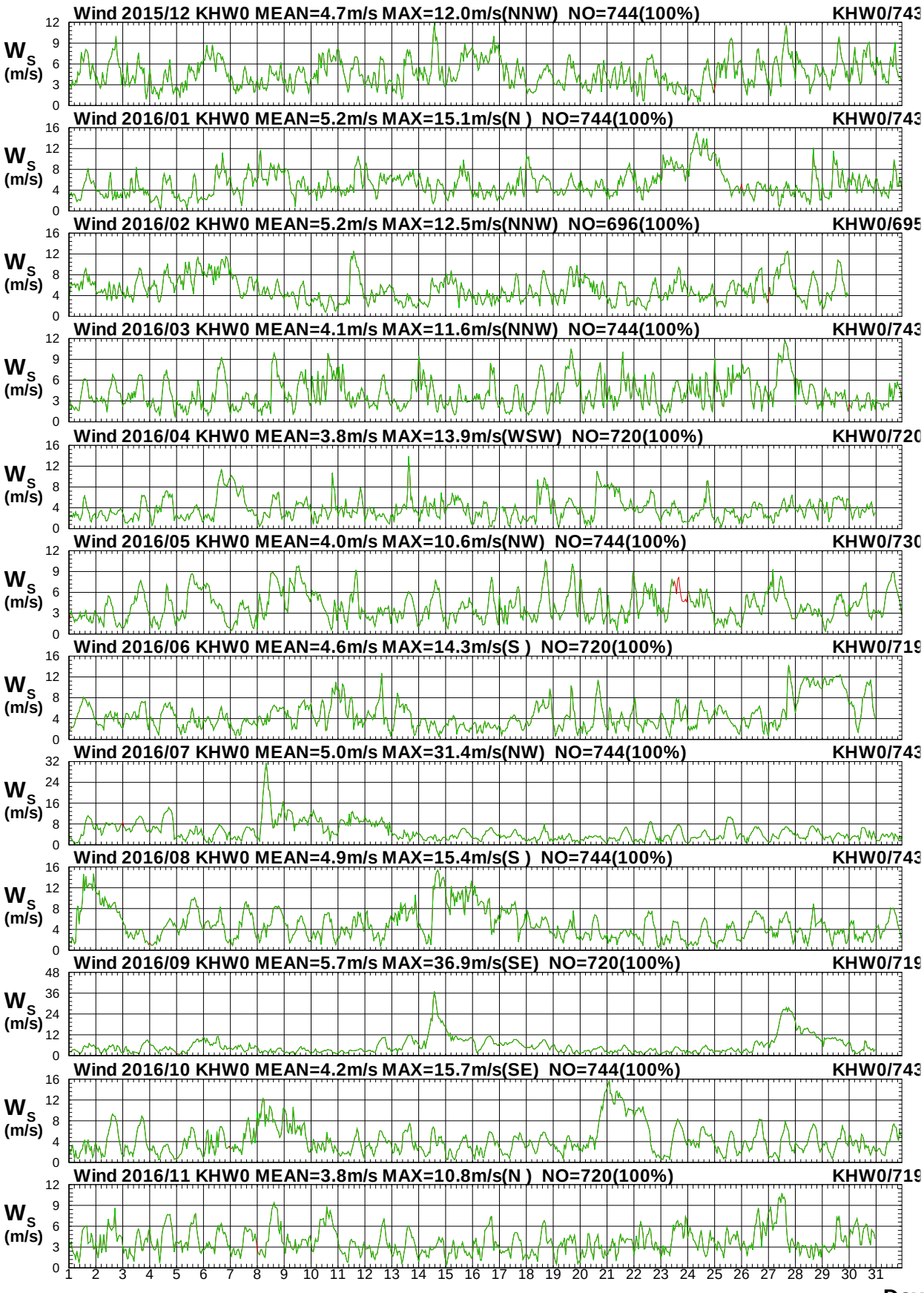


圖1.1a　2016年每月高雄海域 W 站修補前後之風速比較圖

W15CKHW0.1HA W15CKHW0.1H0 W161KHW0.1HA W161KHW0.1H0 W162KHW0.1HA W162KHW0.1H0
W163KHW0.1HA W163KHW0.1H0 W164KHW0.1HA W164KHW0.1H0 W165KHW0.1HA W165KHW0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

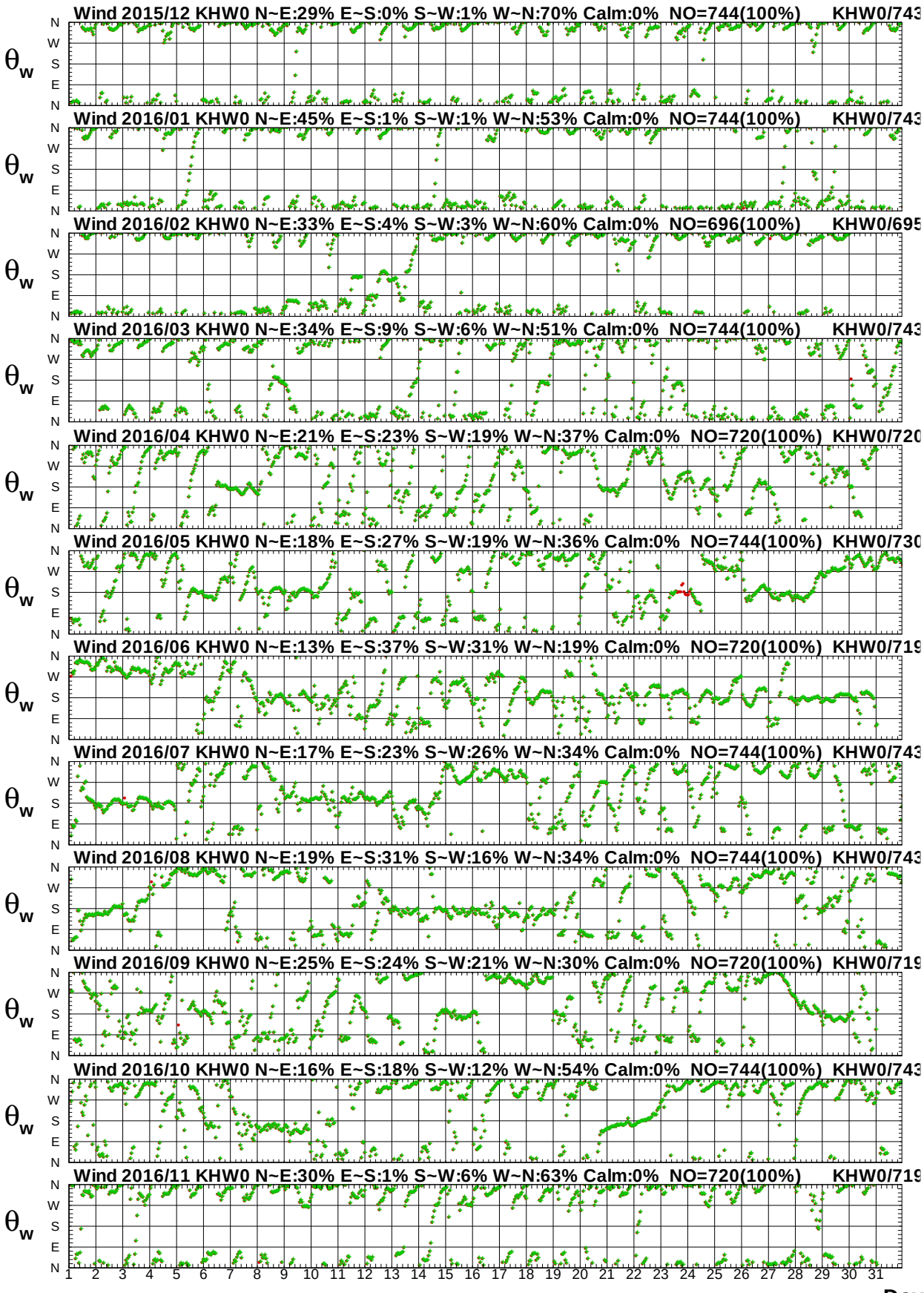


圖 1.1b　2016年每月高雄海域 W 站修補前後之風向比較圖

# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

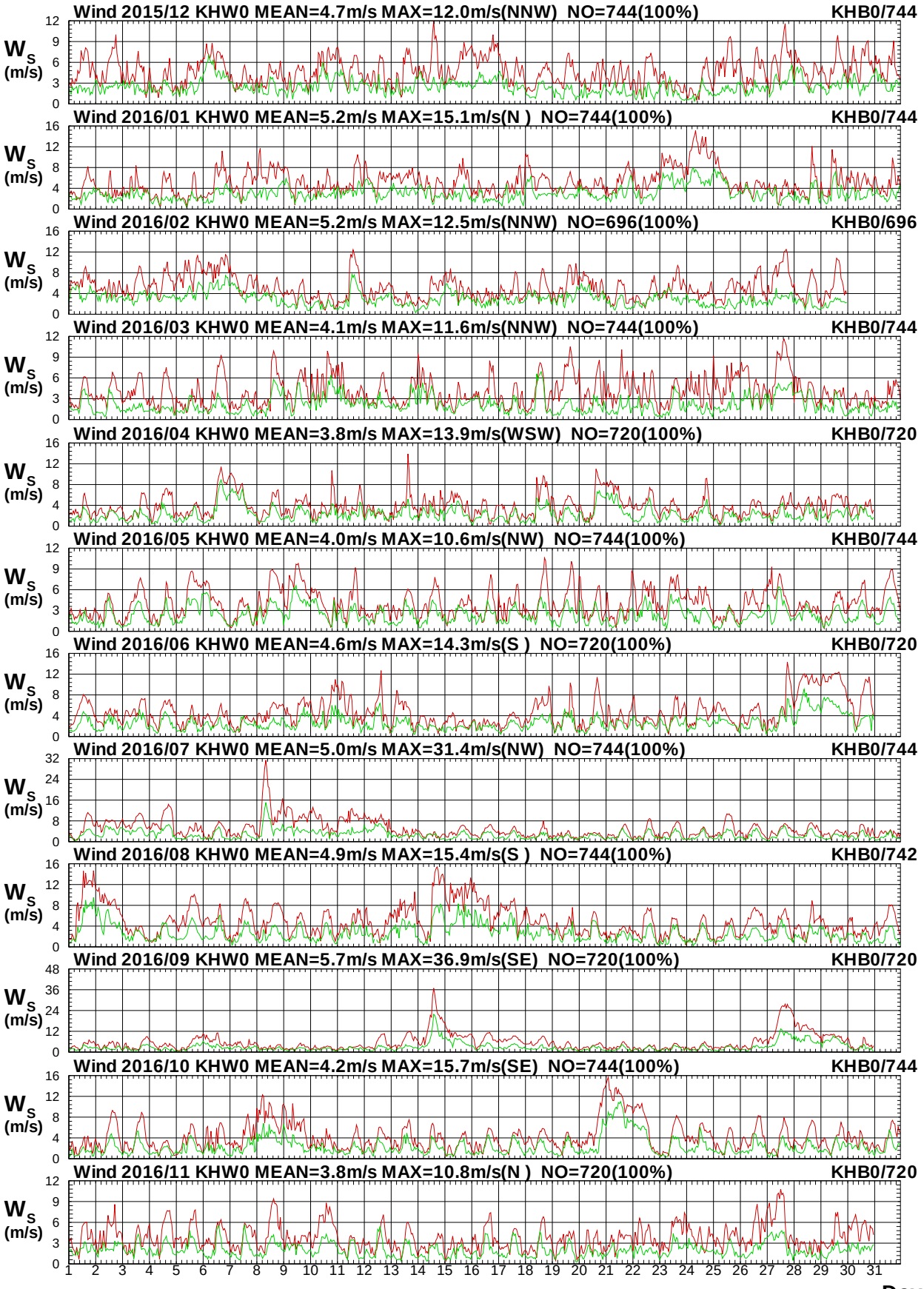


圖1.2a　2016年每月高雄海域 W 站與 B 站風速比較圖

W15CKHW0.1HA W15CKHB0.1H0 W161KHW0.1HA W161KHB0.1H0 W162KHW0.1HA W162KHB0.1H0
W163KHW0.1HA W163KHB0.1H0 W164KHW0.1HA W164KHB0.1H0 W165KHW0.1HA W165KHB0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

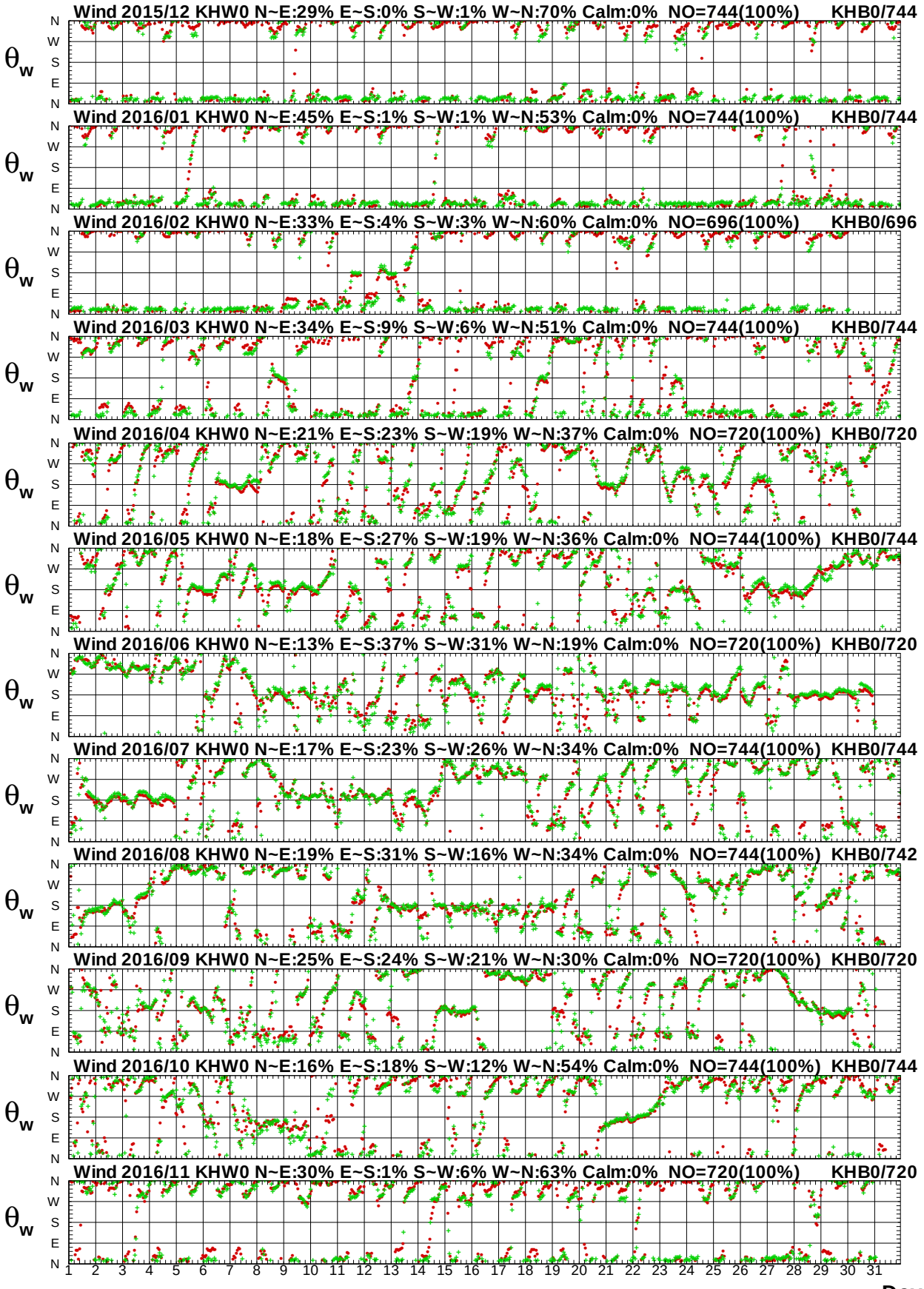


圖 1.2b　2016年每月高雄海域 W 站與 B 站風向比較圖

# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

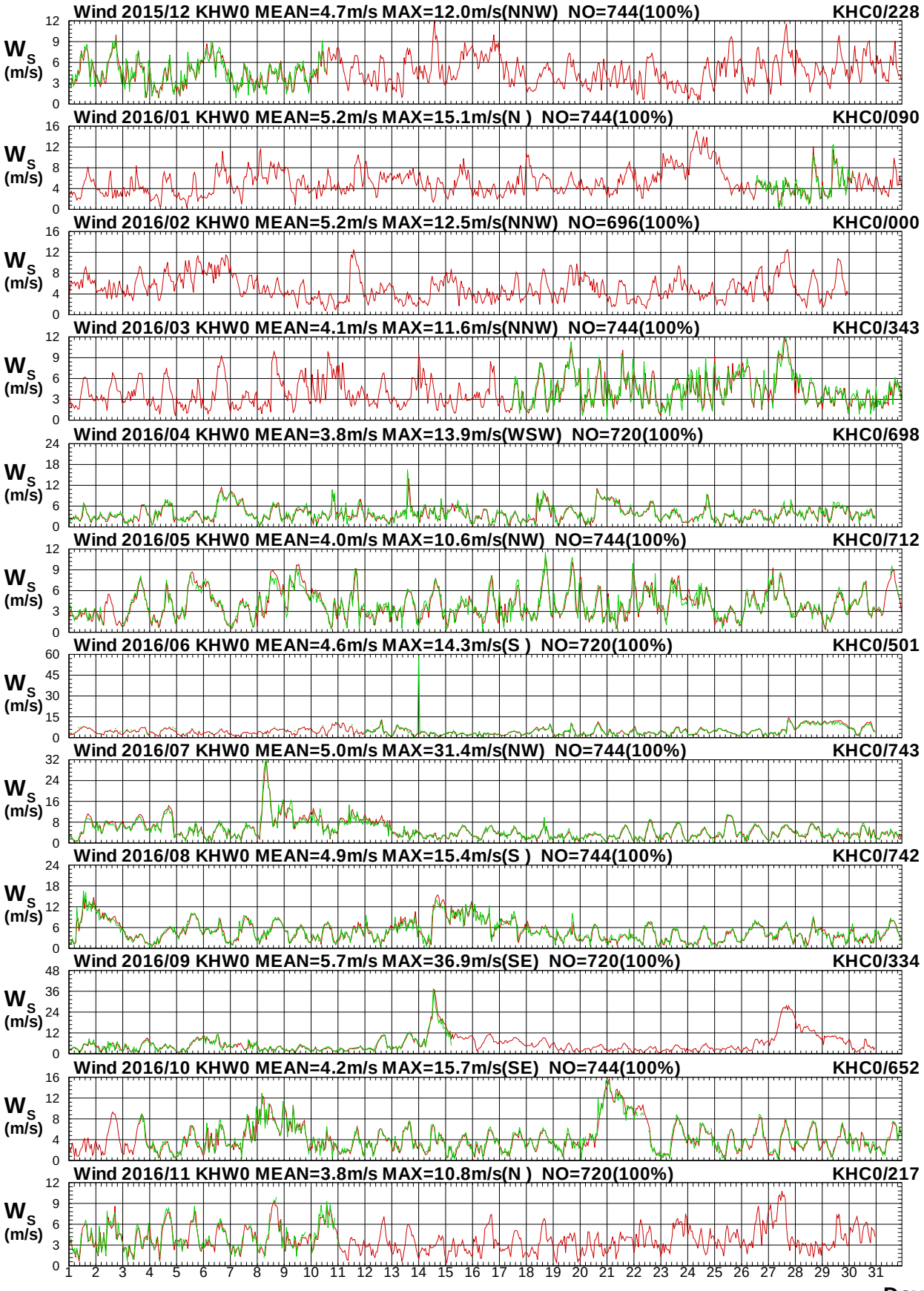


圖 1.3a　2016年每月高雄海域 W 站與 C 站風速比較圖

W15CKHW0.1HA W15CKHC0.1H0 W161KHW0.1HA W161KHC0.1H0 W162KHW0.1HA W162KHC0.1H0
W163KHW0.1HA W163KHC0.1H0 W164KHW0.1HA W164KHC0.1H0 W165KHW0.1HA W165KHC0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

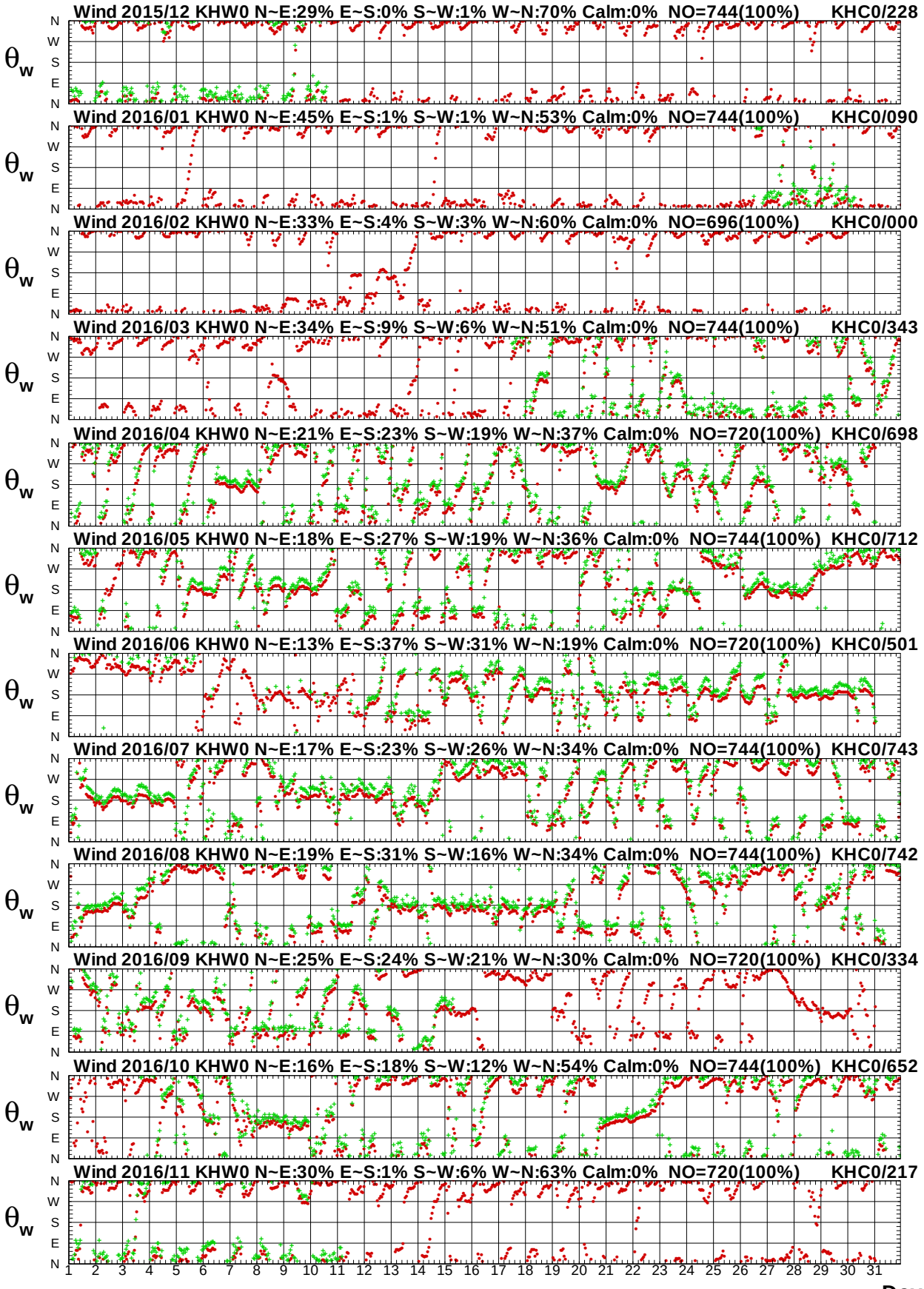


圖 1.3b　2016年每月高雄海域 W 站與 C 站風向比較圖

W15CKHW0.1HA W15CKHC0.1H0 W161KHW0.1HA W161KHC0.1H0 W162KHW0.1HA W162KHC0.1H0
W163KHW0.1HA W163KHC0.1H0 W164KHW0.1HA W164KHC0.1H0 W165KHW0.1HA W165KHC0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

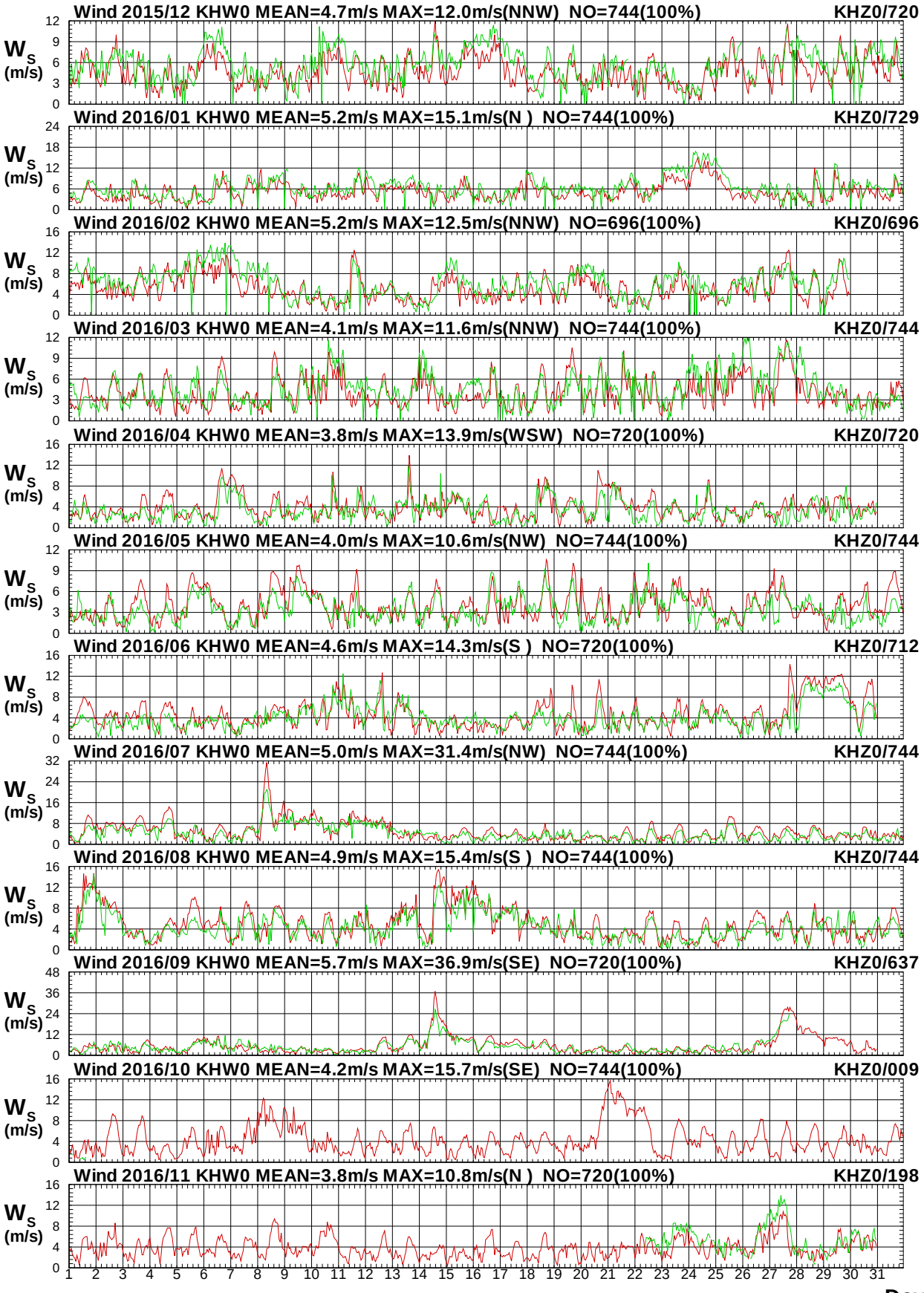


圖1.4a　2016年每月高雄海域 W 站與 Z 站風速比較圖

W15CKHW0.1HA W15CKHZ0.1H0 W161KHW0.1HA W161KHZ0.1H0 W162KHW0.1HA W162KHZ0.1H0
W163KHW0.1HA W163KHZ0.1H0 W164KHW0.1HA W164KHZ0.1H0 W165KHW0.1HA W165KHZ0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

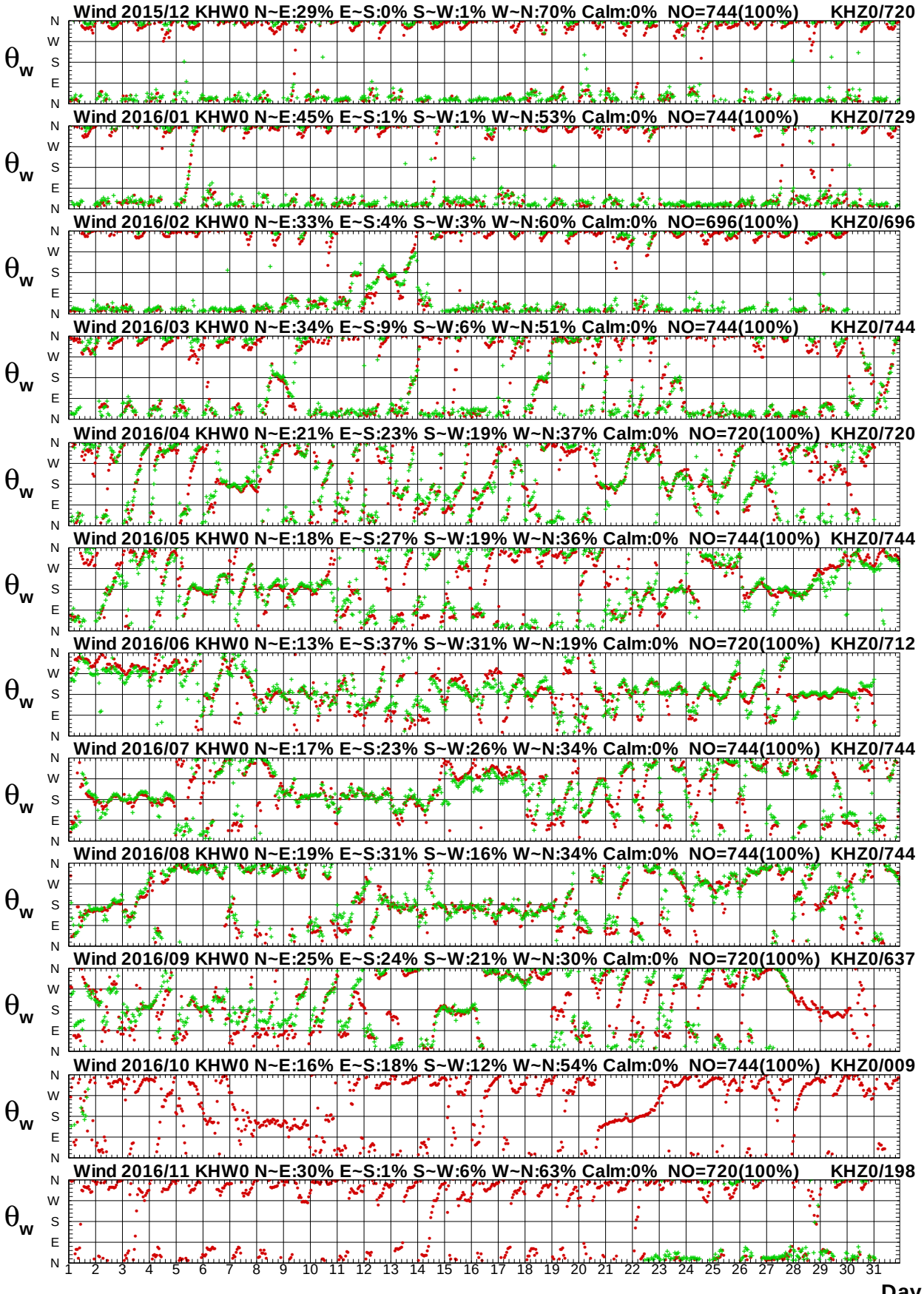


圖1.4b　2016年每月高雄海域 W 站與 Z 站風向比較圖

W15CKHW0.1HA W15CKHZ0.1H0 W161KHW0.1HA W161KHZ0.1H0 W162KHW0.1HA W162KHZ0.1H0
W163KHW0.1HA W163KHZ0.1H0 W164KHW0.1HA W164KHZ0.1H0 W165KHW0.1HA W165KHZ0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

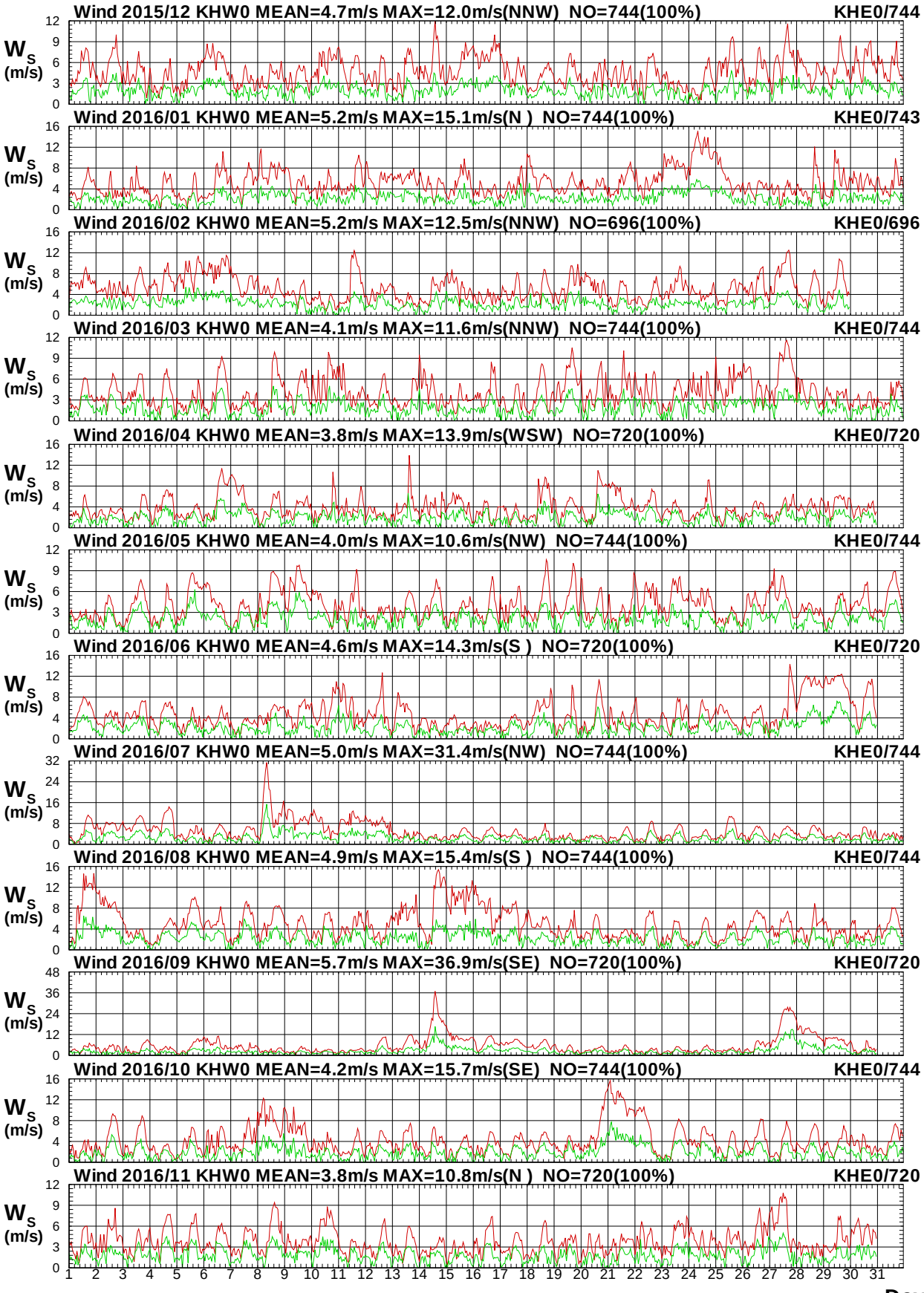


圖1.5a　2016年每月高雄海域 W 站與 E 站風速比較圖

W15CKHW0.1HA W15CKHE0.1H0 W161KHW0.1HA W161KHE0.1H0 W162KHW0.1HA W162KHE0.1H0
W163KHW0.1HA W163KHE0.1H0 W164KHW0.1HA W164KHE0.1H0 W165KHW0.1HA W165KHE0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

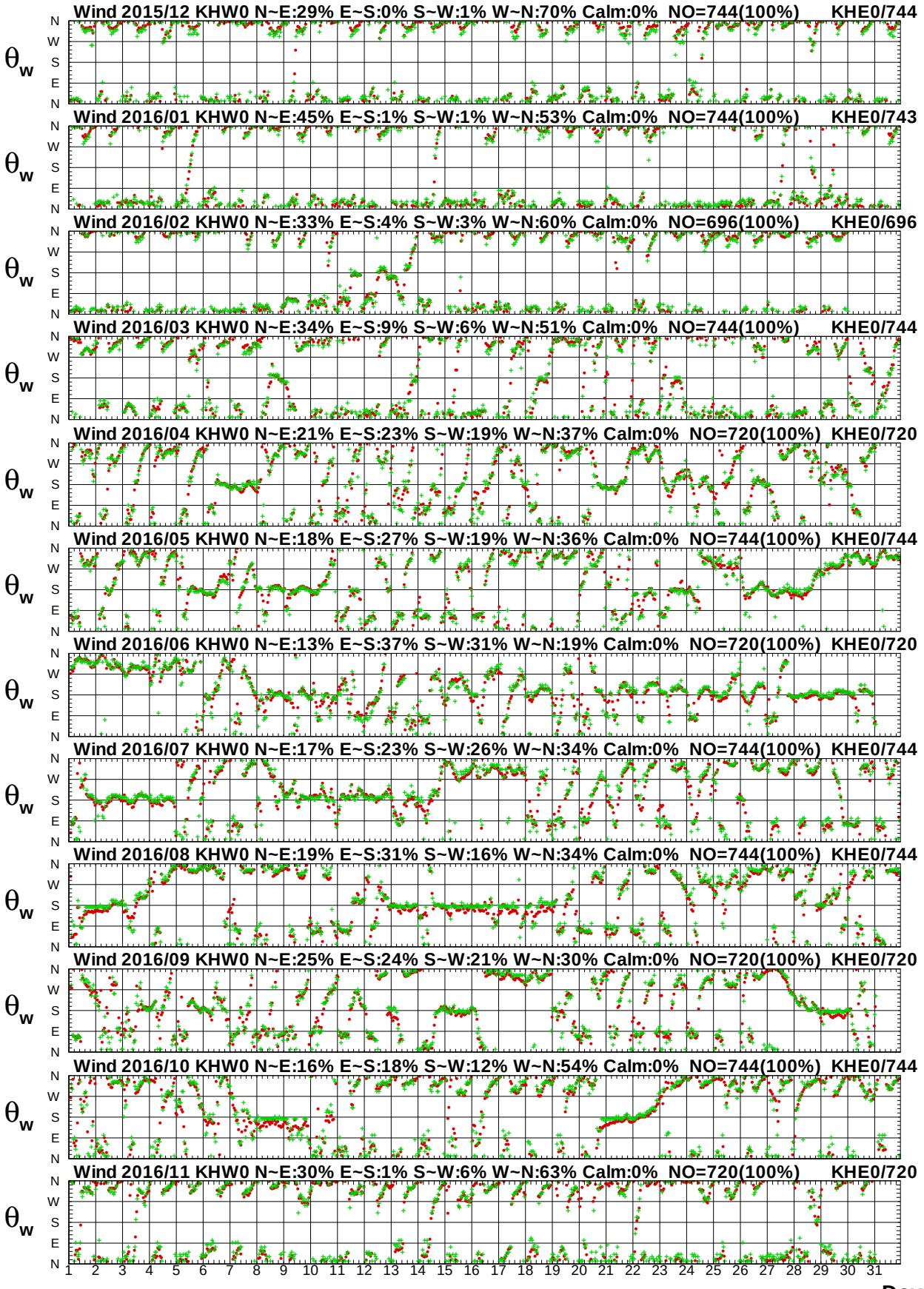


圖 1.5b　2016年每月高雄海域 W 站與 E 站風向比較圖

# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

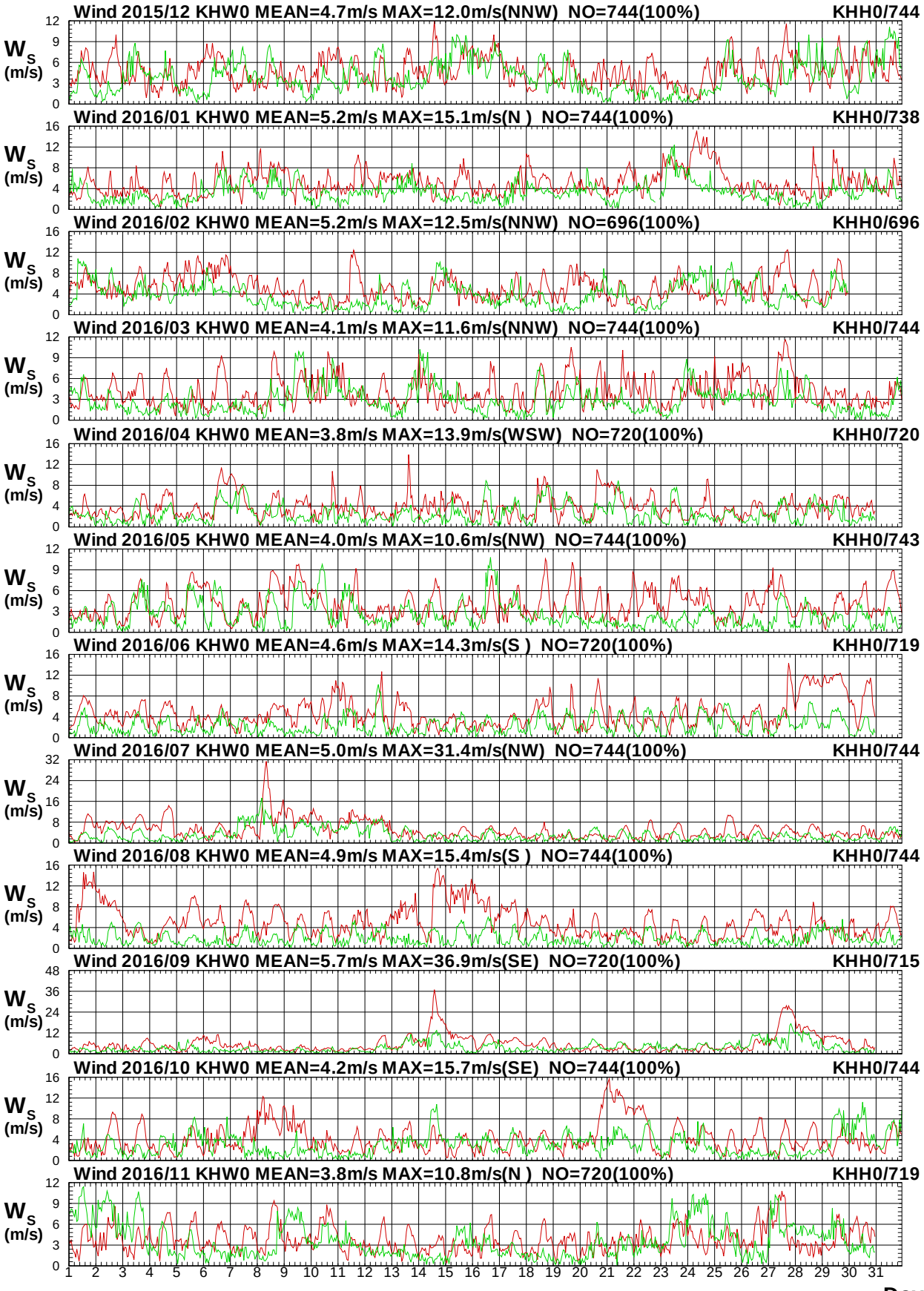


圖1.6a　2016年每月高雄海域 W 站與 H 站風速比較圖

W15CKHW0.1HA W15CKHH0.1H0 W161KHW0.1HA W161KHH0.1H0 W162KHW0.1HA W162KHH0.1H0
W163KHW0.1HA W163KHH0.1H0 W164KHW0.1HA W164KHH0.1H0 W165KHW0.1HA W165KHH0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

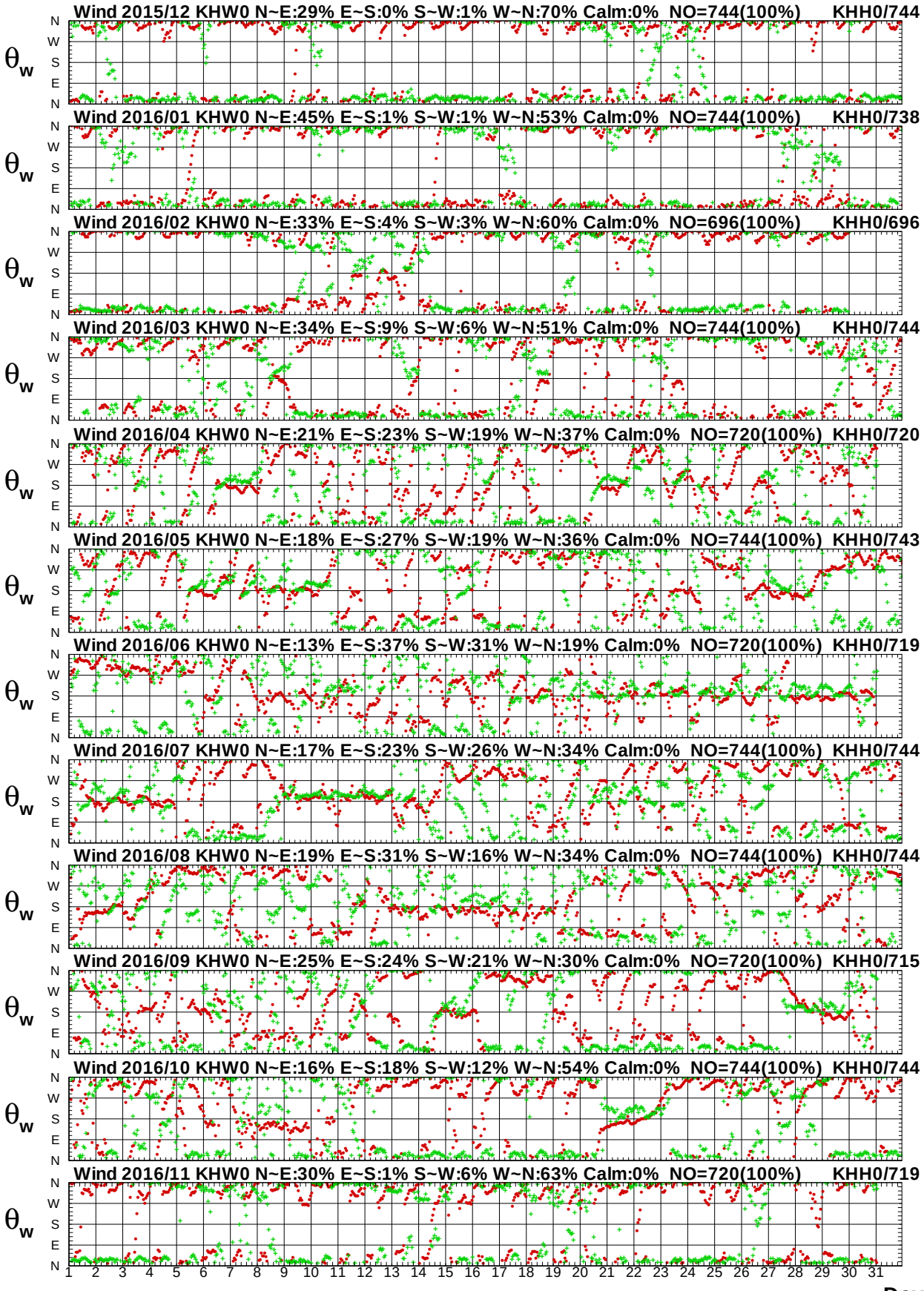


圖 1.6b　2016年每月高雄海域 W 站與 H 站風向比較圖

W15CKHW0.1HA W15CKHH0.1H0 W161KHW0.1HA W161KHH0.1H0 W162KHW0.1HA W162KHH0.1H0
W163KHW0.1HA W163KHH0.1H0 W164KHW0.1HA W164KHH0.1H0 W165KHW0.1HA W165KHH0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

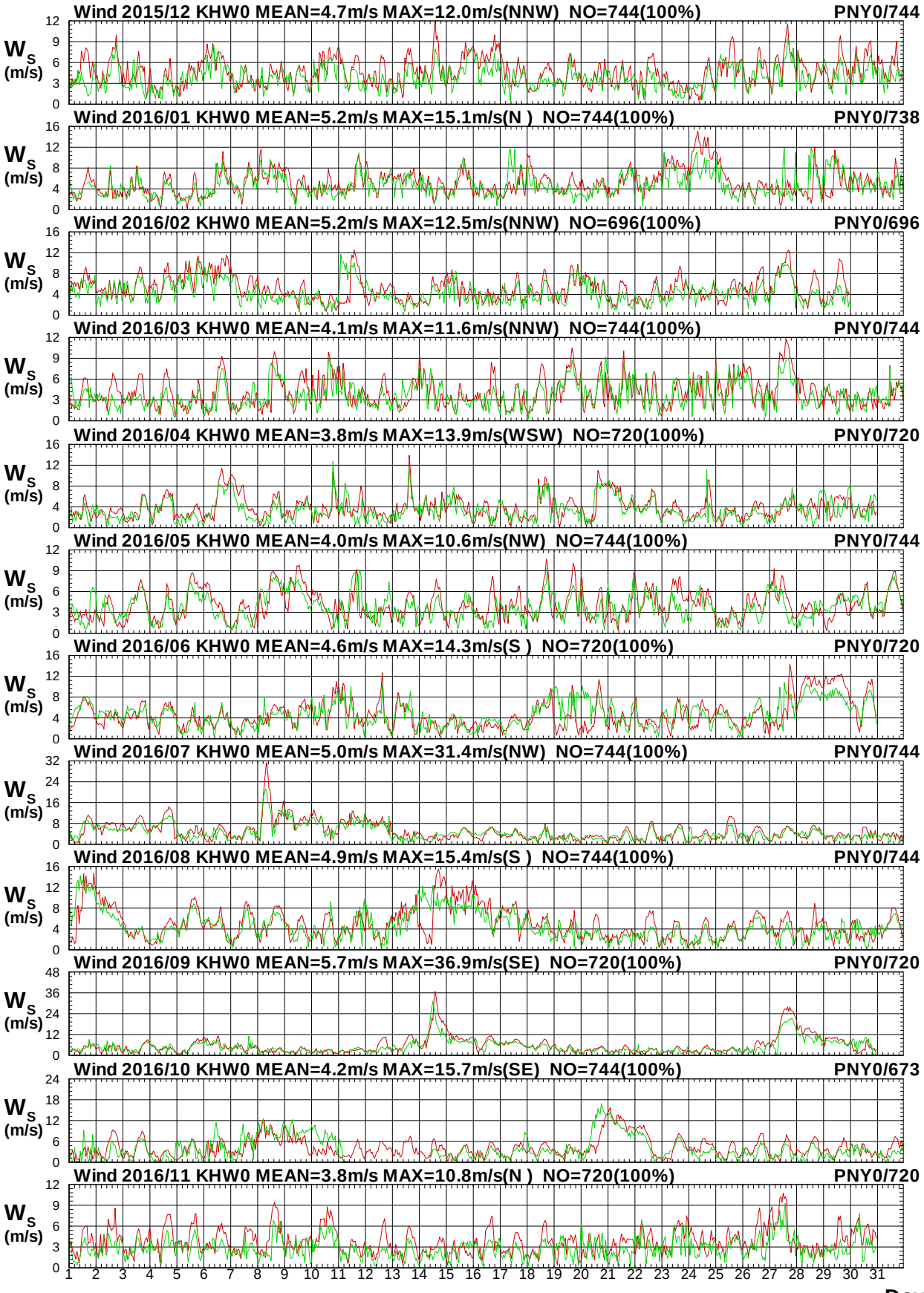


圖1.7a　2016年每月高雄海域 W 站與屏東海域 Y 站風速圖

W15CKHW0.1HA W15CPNY0.1H0 W161KHW0.1HA W161PNY0.1H0 W162KHW0.1HA W162PNY0.1H0
W163KHW0.1HA W163PNY0.1H0 W164KHW0.1HA W164PNY0.1H0 W165KHW0.1HA W165PNY0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

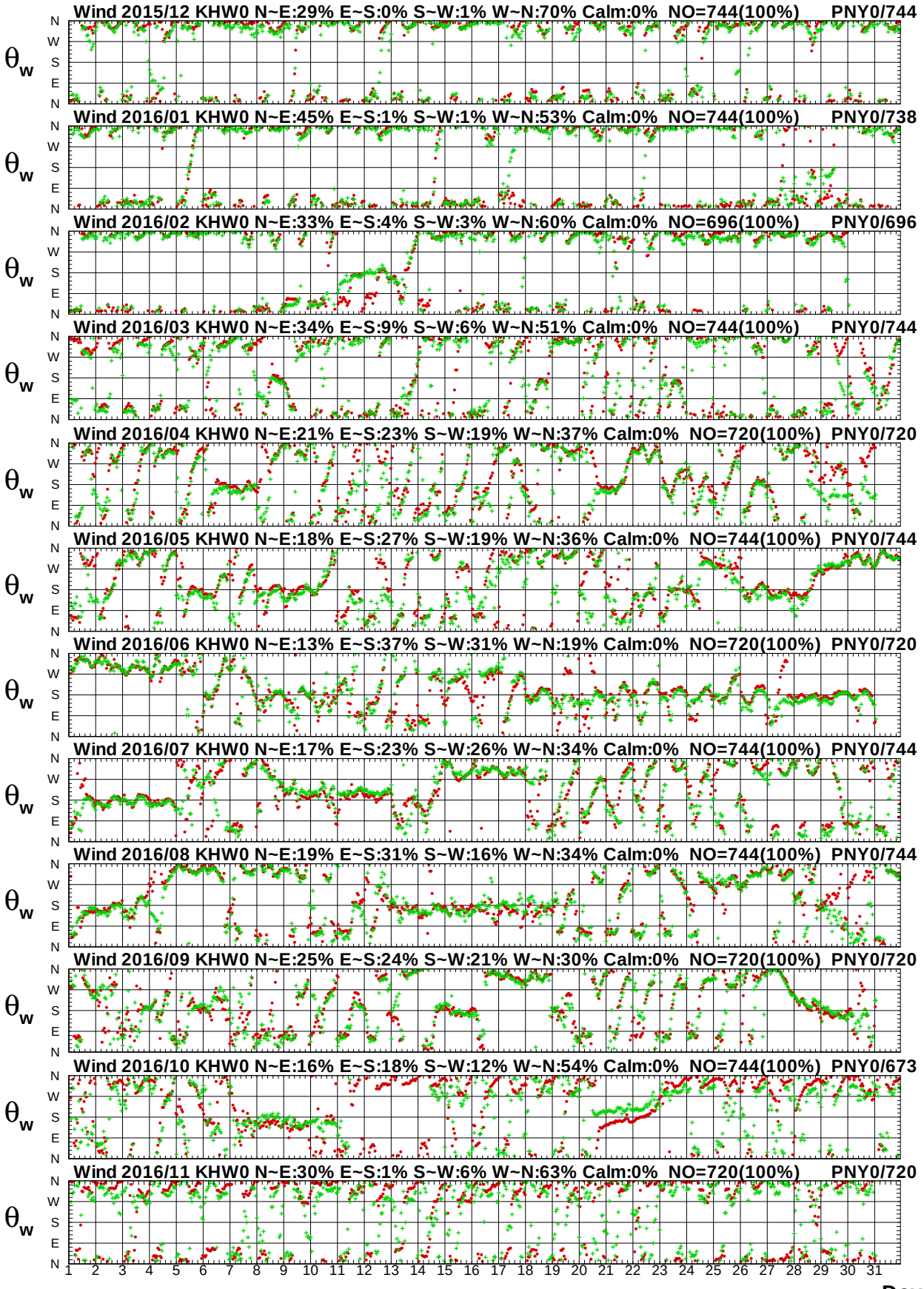


圖1.7b　2016年每月高雄海域 W 站與屏東海域 Y 站風向圖

# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

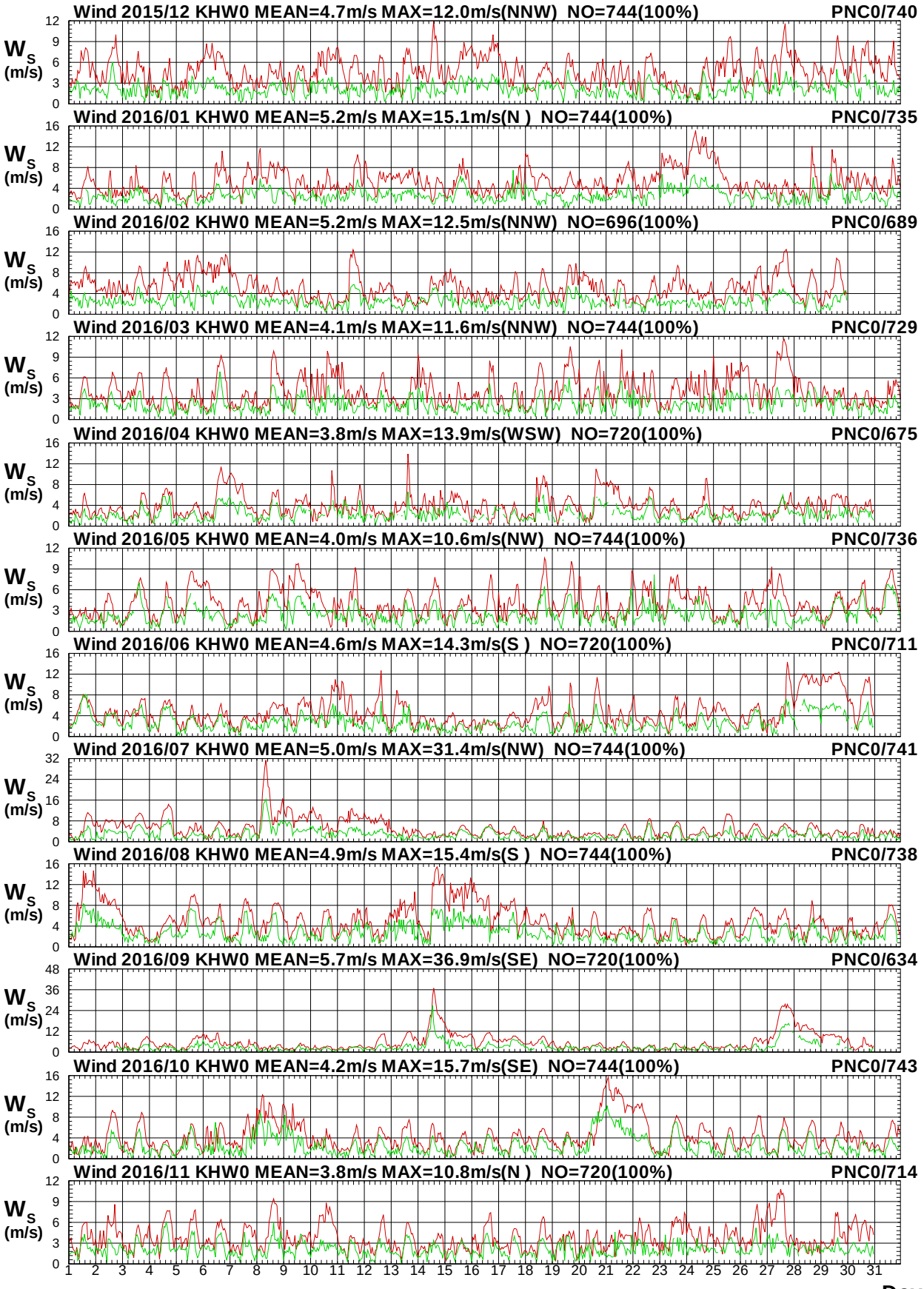


圖1.8a　2016年每月高雄海域 W 站與屏東海域 C 站風速圖

W15CKHW0.1HA W15CPNC0.1H0 W161KHW0.1HA W161PNC0.1H0 W162KHW0.1HA W162PNC0.1H0
W163KHW0.1HA W163PNC0.1H0 W164KHW0.1HA W164PNC0.1H0 W165KHW0.1HA W165PNC0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

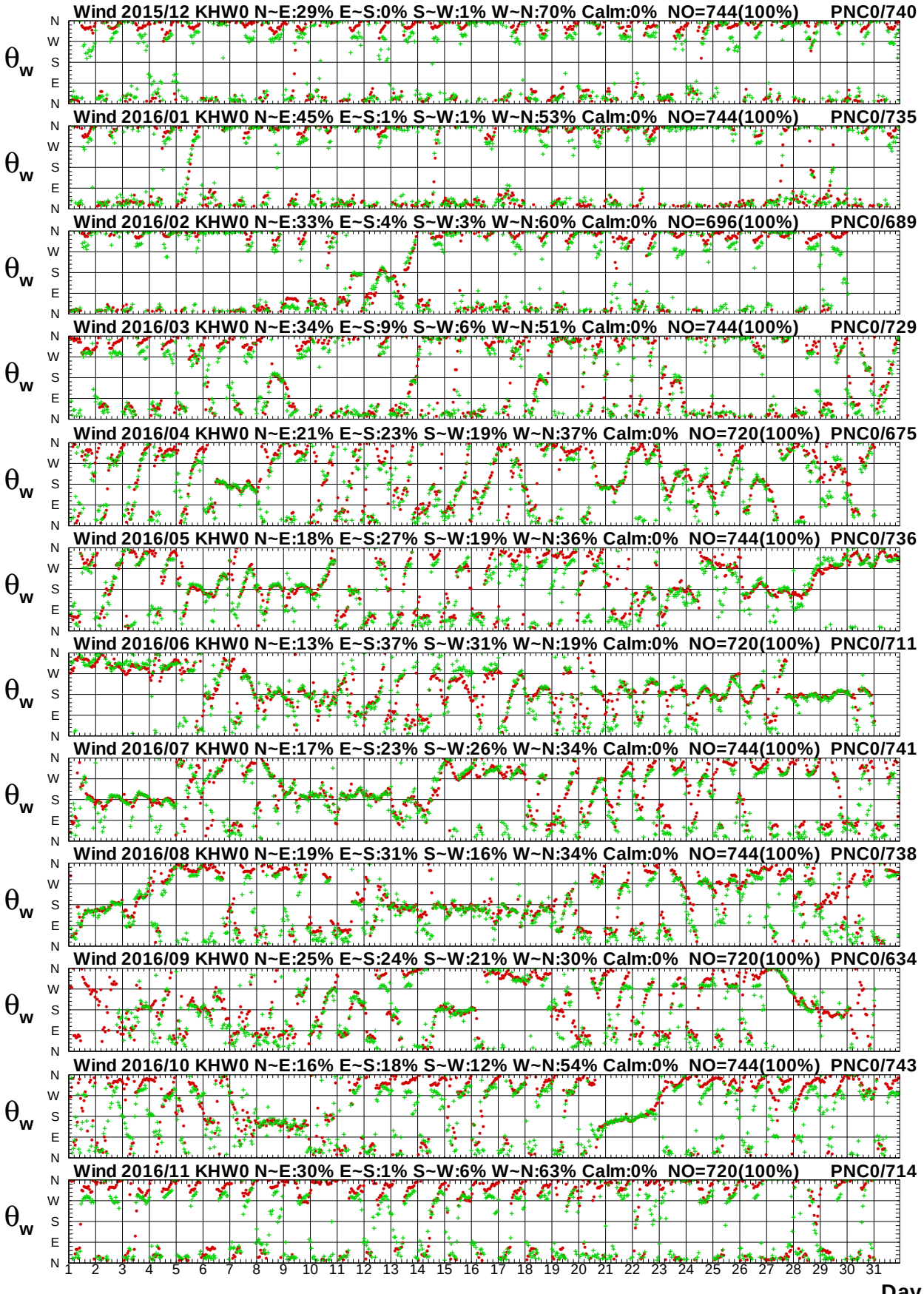


圖1.8b　2016年每月高雄海域 W 站與屏東海域 C 站風向圖

W15CKHW0.1HA W15CPNC0.1H0 W161KHW0.1HA W161PNC0.1H0 W162KHW0.1HA W162PNC0.1H0
W163KHW0.1HA W163PNC0.1H0 W164KHW0.1HA W164PNC0.1H0 W165KHW0.1HA W165PNC0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

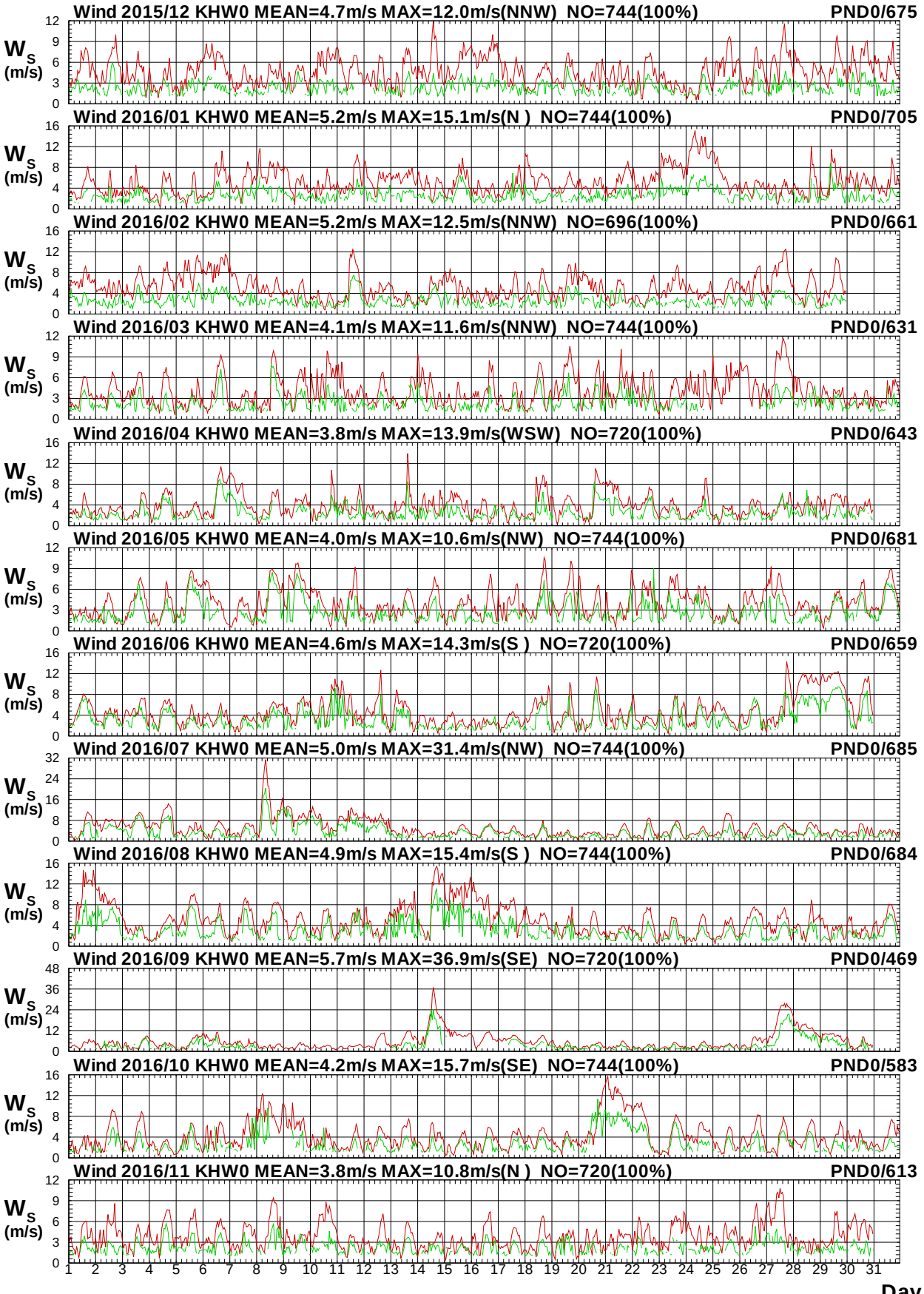


圖1.9a　2016年每月高雄海域 W 站與屏東海域 D 站風速圖

W15CKHW0.1HA W15CPND0.1H0 W161KHW0.1HA W161PND0.1H0 W162KHW0.1HA W162PND0.1H0
W163KHW0.1HA W163PND0.1H0 W164KHW0.1HA W164PND0.1H0 W165KHW0.1HA W165PND0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

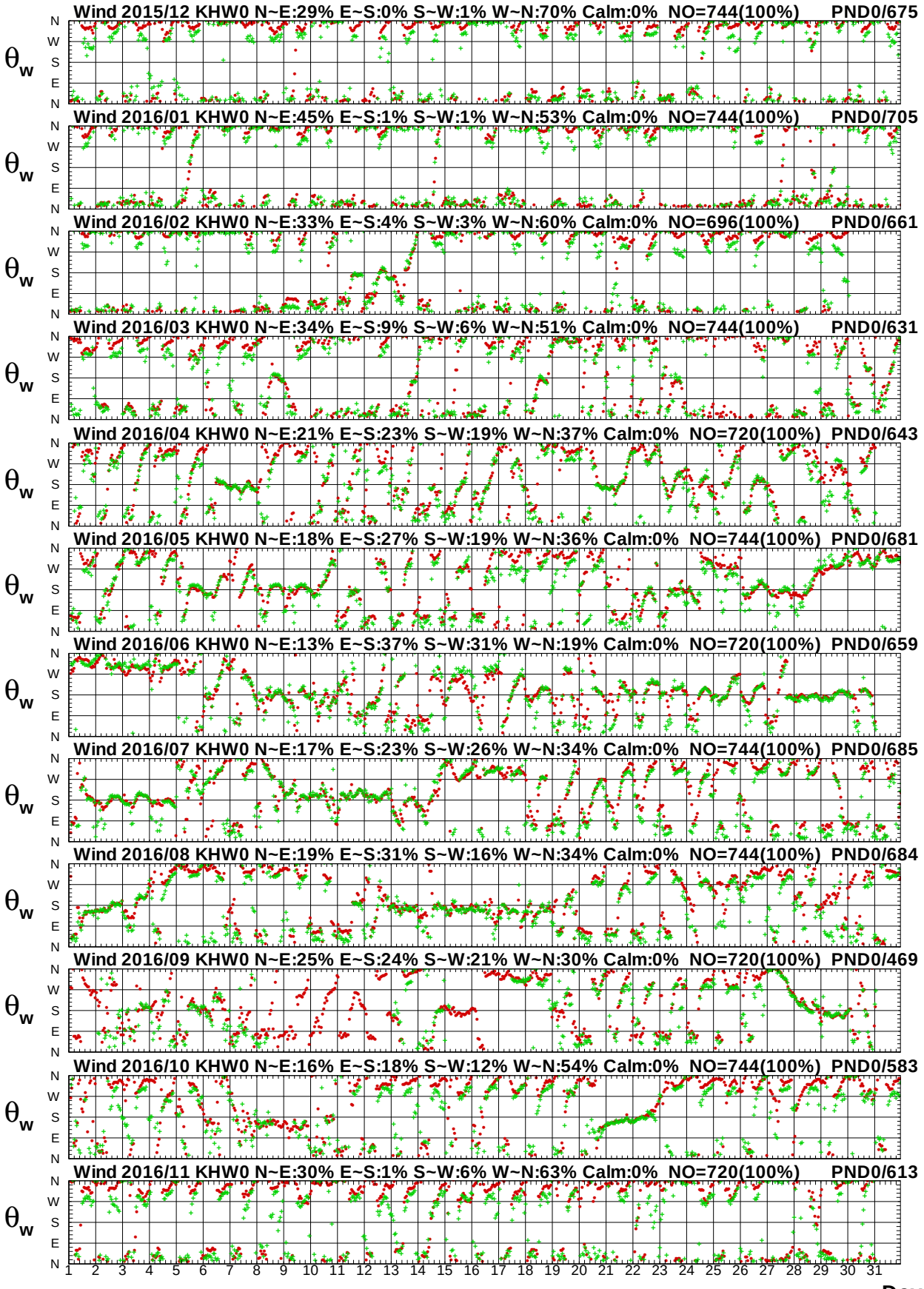


圖1.9b　2016年每月高雄海域 W 站與屏東海域 D 站風向圖

# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

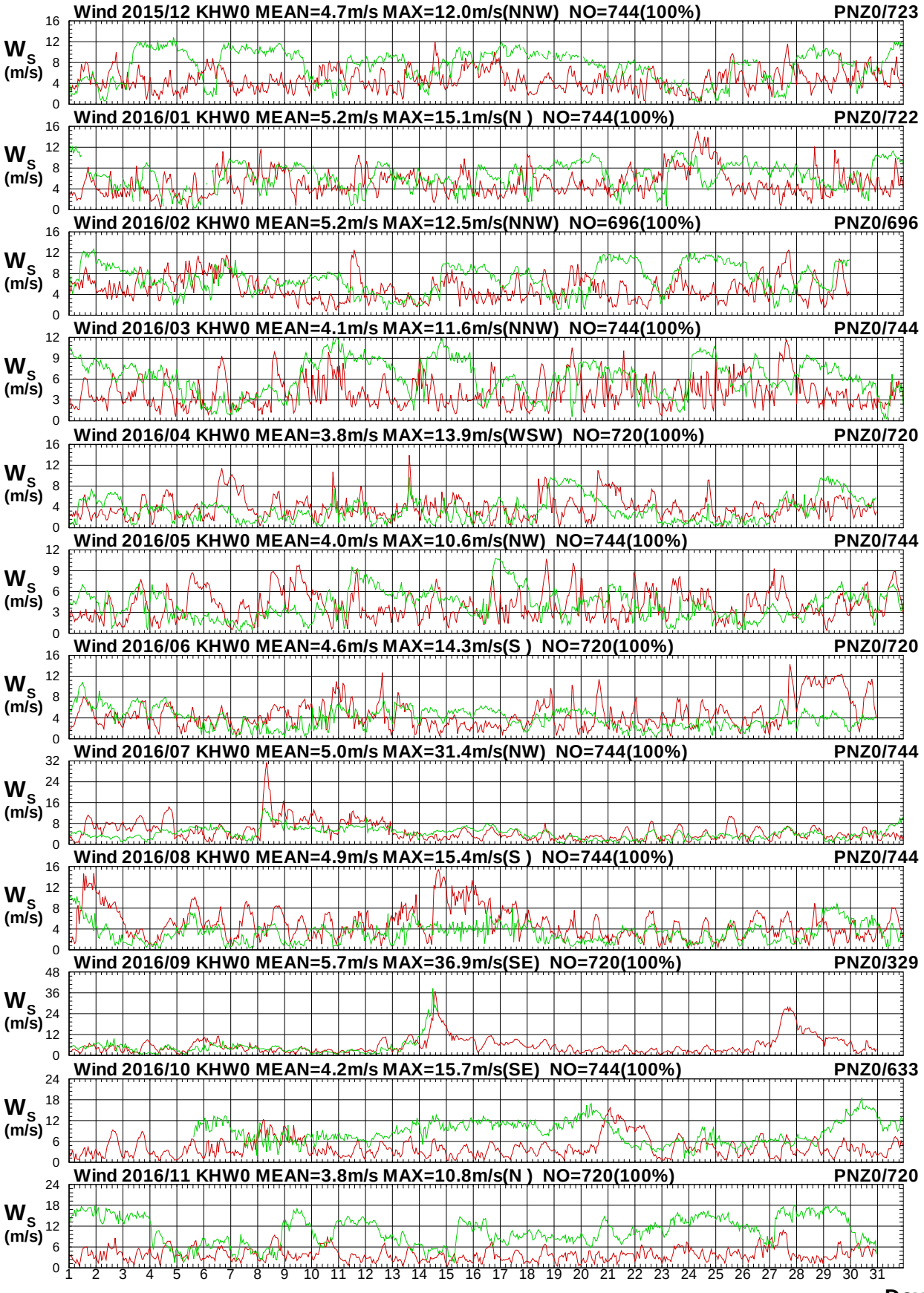


圖1.10a　2016年每月高雄海域 W 站與屏東海域 Z 站風速圖

# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

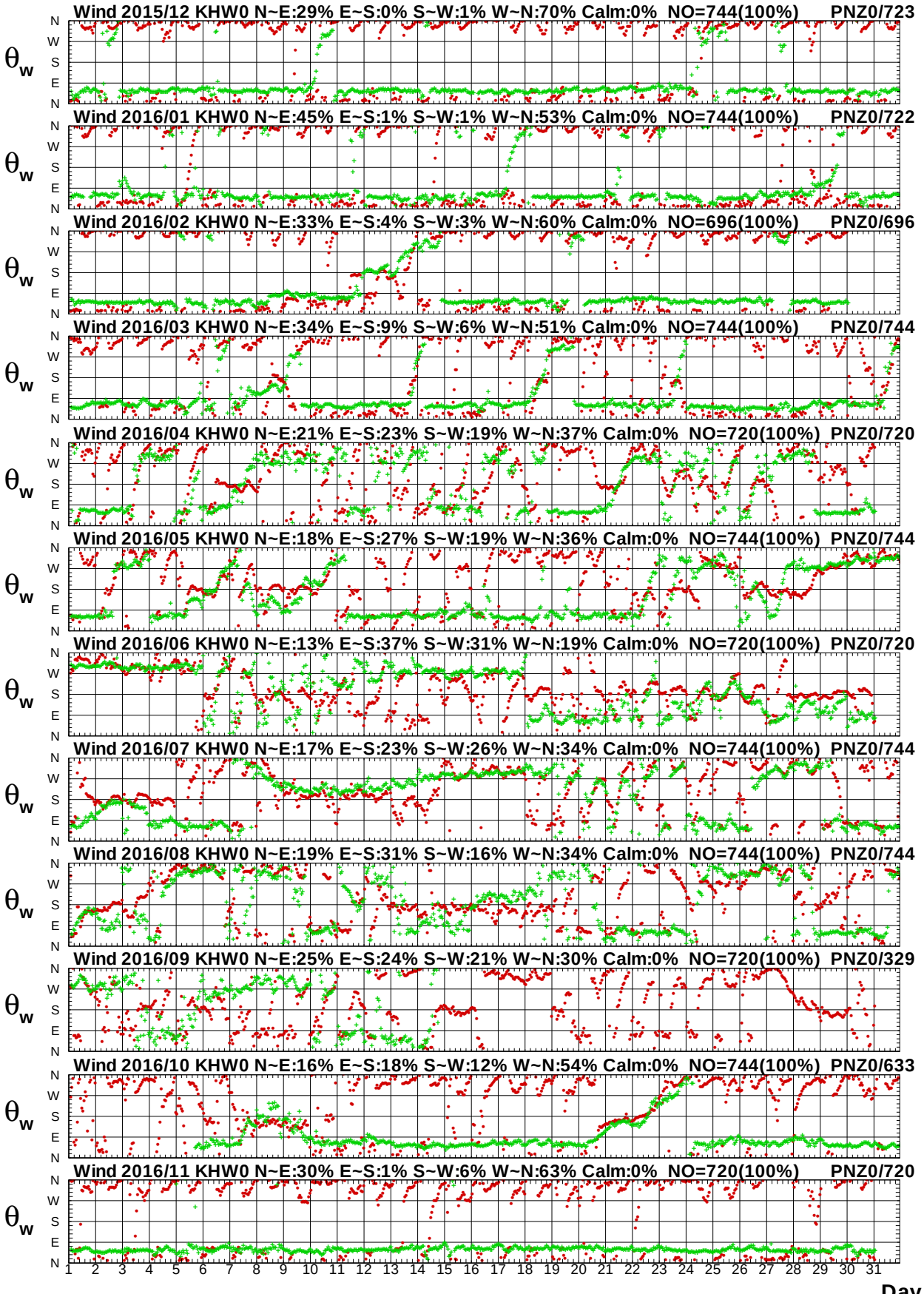


圖1.10b　2016年每月高雄海域 W 站與屏東海域 Z 站風向圖

W15CKHW0.1HA W15CPNZ0.1H0 W161KHW0.1HA W161PNZ0.1H0 W162KHW0.1HA W162PNZ0.1H0
W163KHW0.1HA W163PNZ0.1H0 W164KHW0.1HA W164PNZ0.1H0 W165KHW0.1HA W165PNZ0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

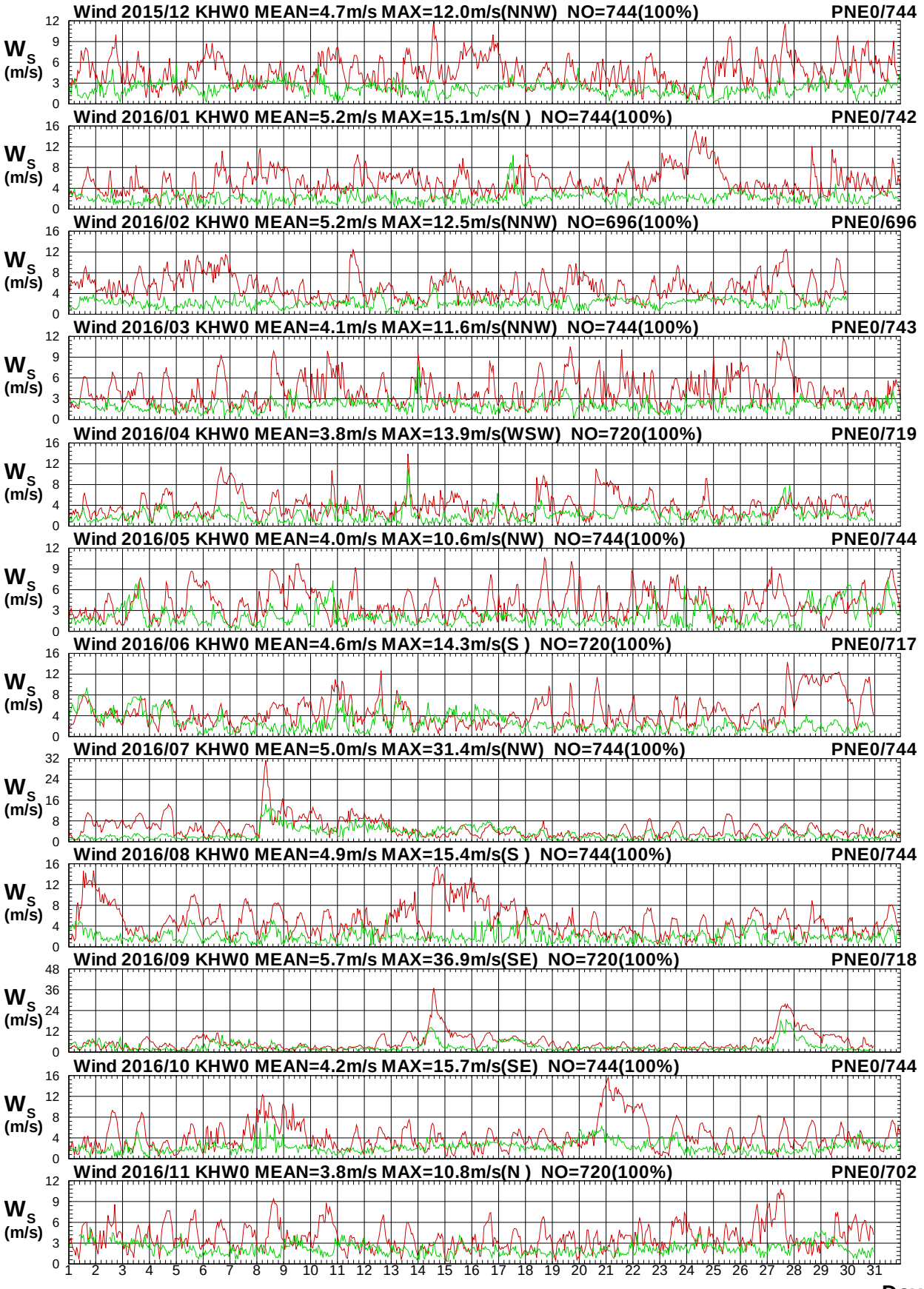


圖1.11a　2016年每月高雄海域 W 站與屏東海域 E 站風速圖

W15CKHW0.1HA W15CPNE0.1H0 W161KHW0.1HA W161PNE0.1H0 W162KHW0.1HA W162PNE0.1H0
W163KHW0.1HA W163PNE0.1H0 W164KHW0.1HA W164PNE0.1H0 W165KHW0.1HA W165PNE0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

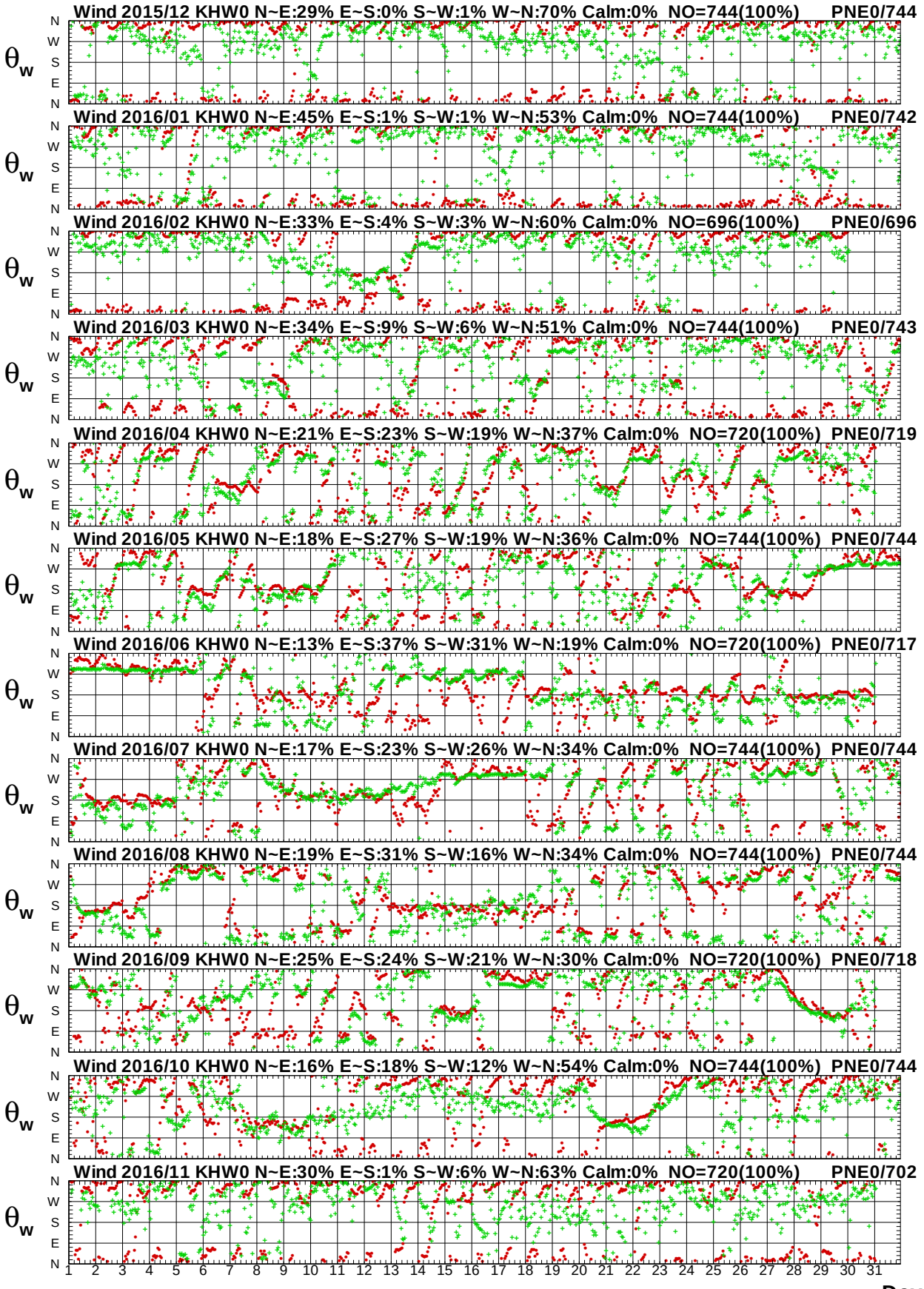


圖1.11b　2016年每月高雄海域 W 站與屏東海域 E 站風向圖

W15CKHW0.1HA W15CPNE0.1H0 W161KHW0.1HA W161PNE0.1H0 W162KHW0.1HA W162PNE0.1H0
W163KHW0.1HA W163PNE0.1H0 W164KHW0.1HA W164PNE0.1H0 W165KHW0.1HA W165PNE0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

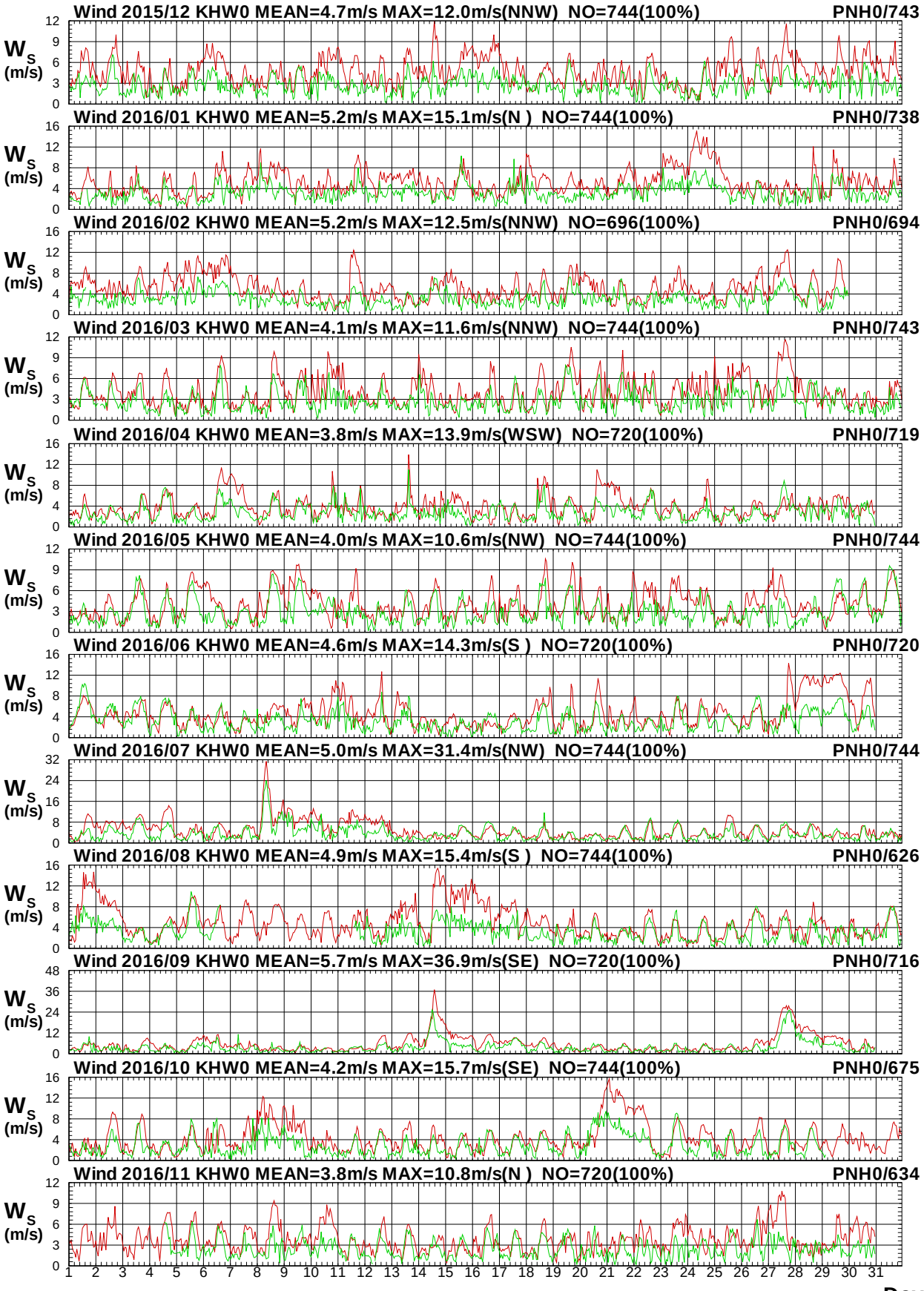


圖1.12a　2016年每月高雄海域 W 站與屏東海域 H 站風速圖

W15CKHW0.1HA W15CPNH0.1H0 W161KHW0.1HA W161PNH0.1H0 W162KHW0.1HA W162PNH0.1H0
W163KHW0.1HA W163PNH0.1H0 W164KHW0.1HA W164PNH0.1H0 W165KHW0.1HA W165PNH0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

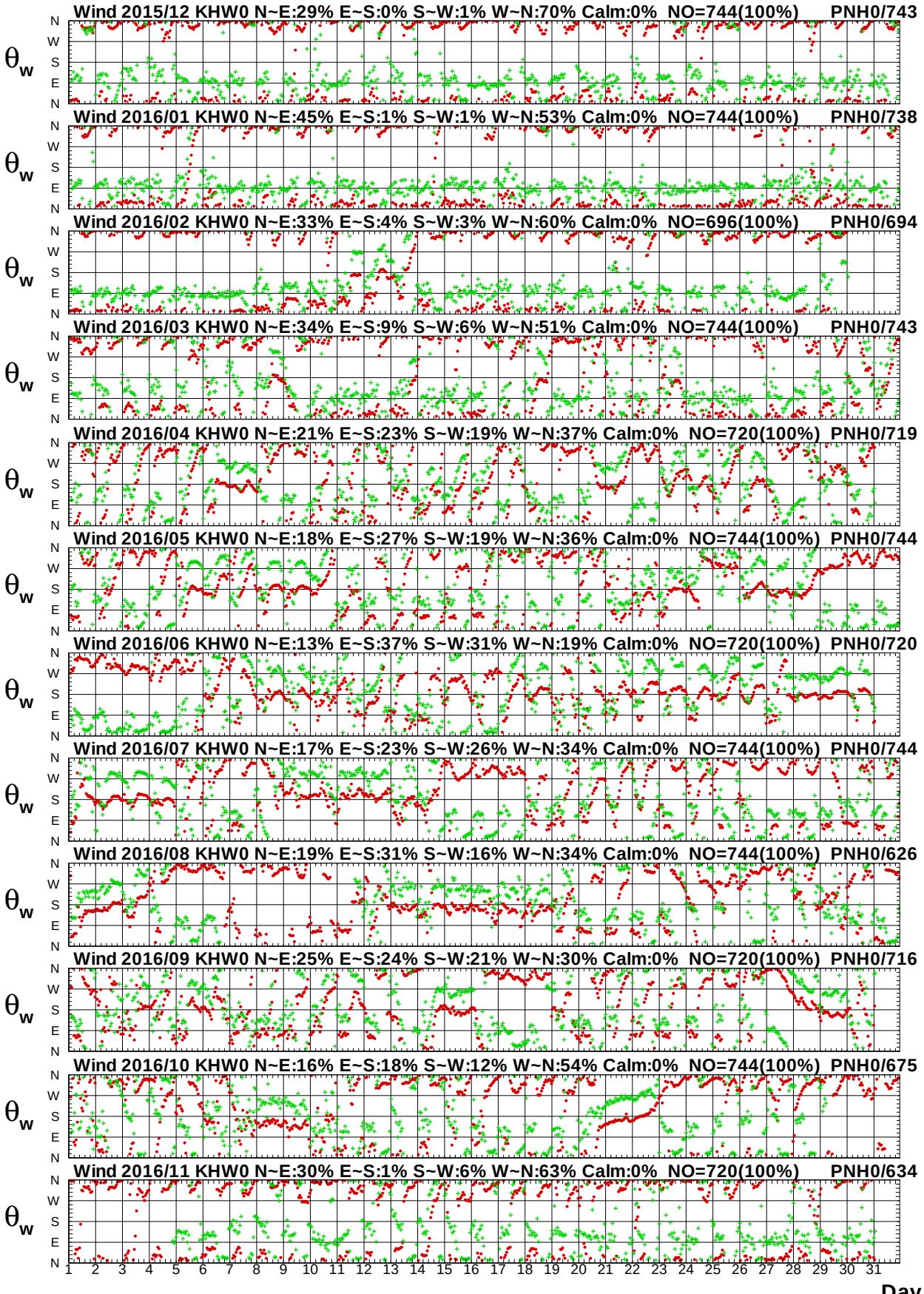


圖1.12b　2016年每月高雄海域 W 站與屏東海域 H 站風向圖

W15CKHW0.1HA W15CPNH0.1H0 W161KHW0.1HA W161PNH0.1H0 W162KHW0.1HA W162PNH0.1H0
W163KHW0.1HA W163PNH0.1H0 W164KHW0.1HA W164PNH0.1H0 W165KHW0.1HA W165PNH0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

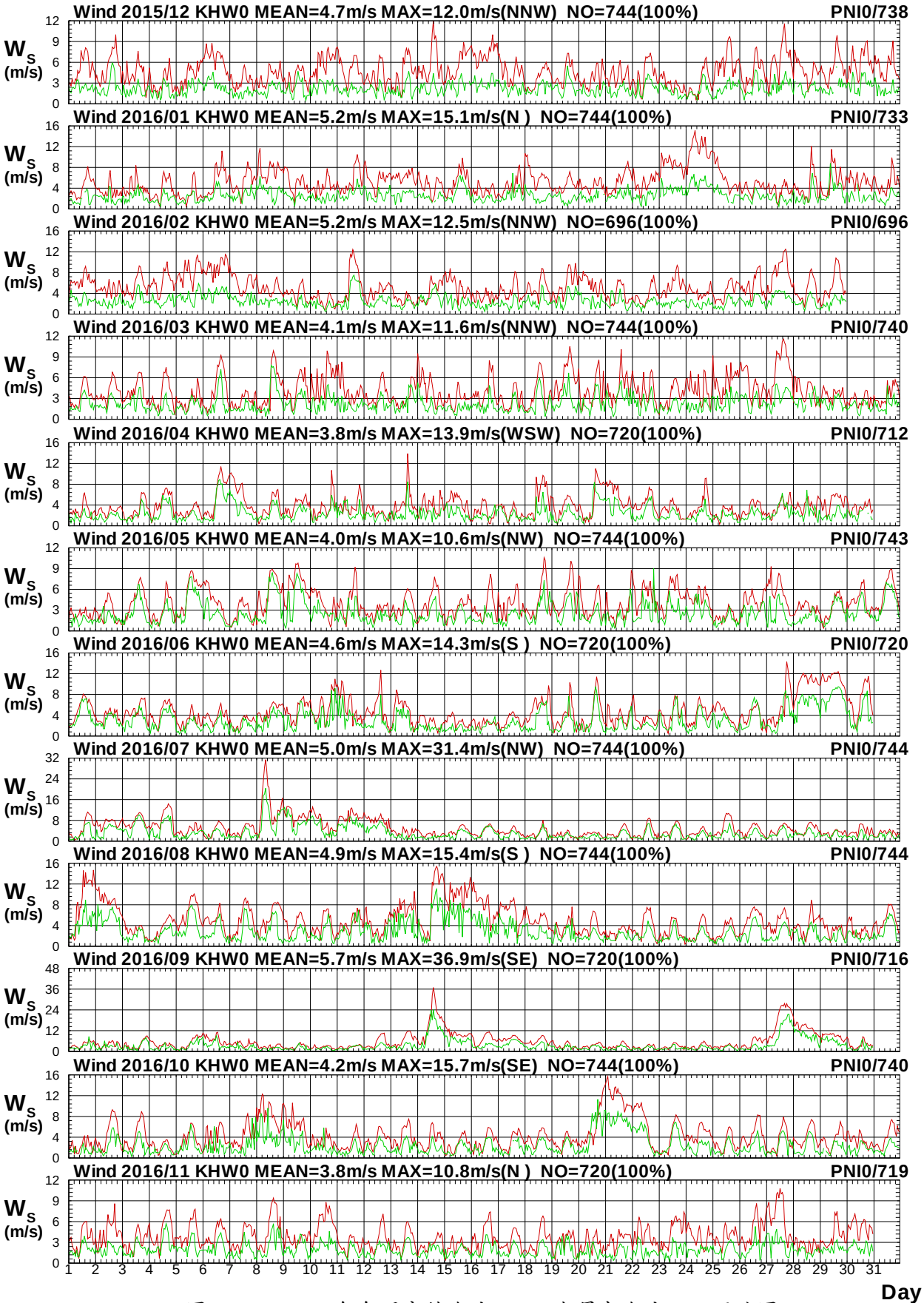


圖1.13a　2016年每月高雄海域 W 站與屏東海域 I 站風速圖

W15CKHW0.1HA W15CPNI0.1H0 W161KHW0.1HA W161PNI0.1H0 W162KHW0.1HA W162PNI0.1H0
W163KHW0.1HA W163PNI0.1H0 W164KHW0.1HA W164PNI0.1H0 W165KHW0.1HA W165PNI0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

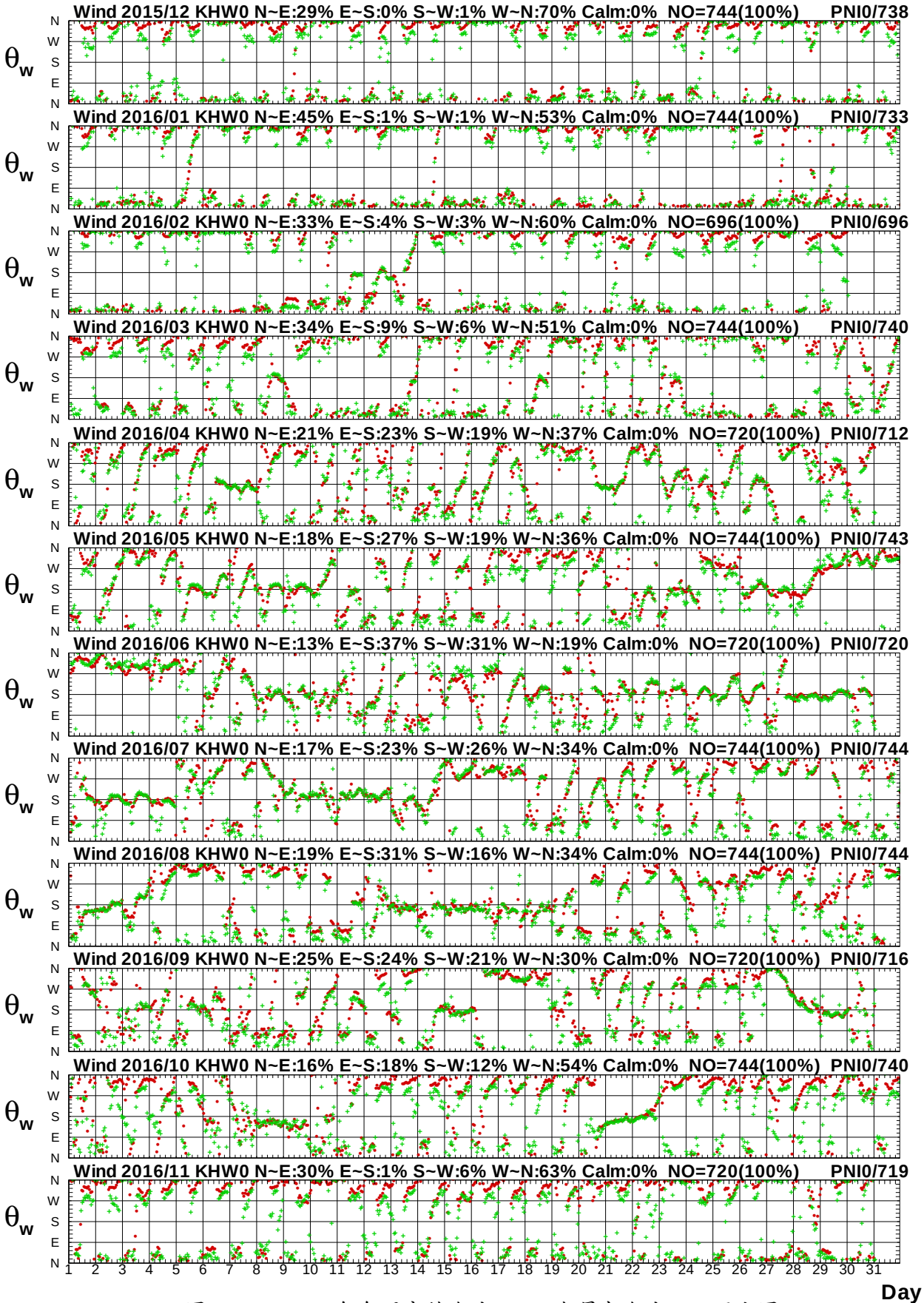


圖1.13b　2016年每月高雄海域 W 站與屏東海域 I 站風向圖

W15CKHW0.1HA W15CPNI0.1H0 W161KHW0.1HA W161PNI0.1H0 W162KHW0.1HA W162PNI0.1H0
W163KHW0.1HA W163PNI0.1H0 W164KHW0.1HA W164PNI0.1H0 W165KHW0.1HA W165PNI0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

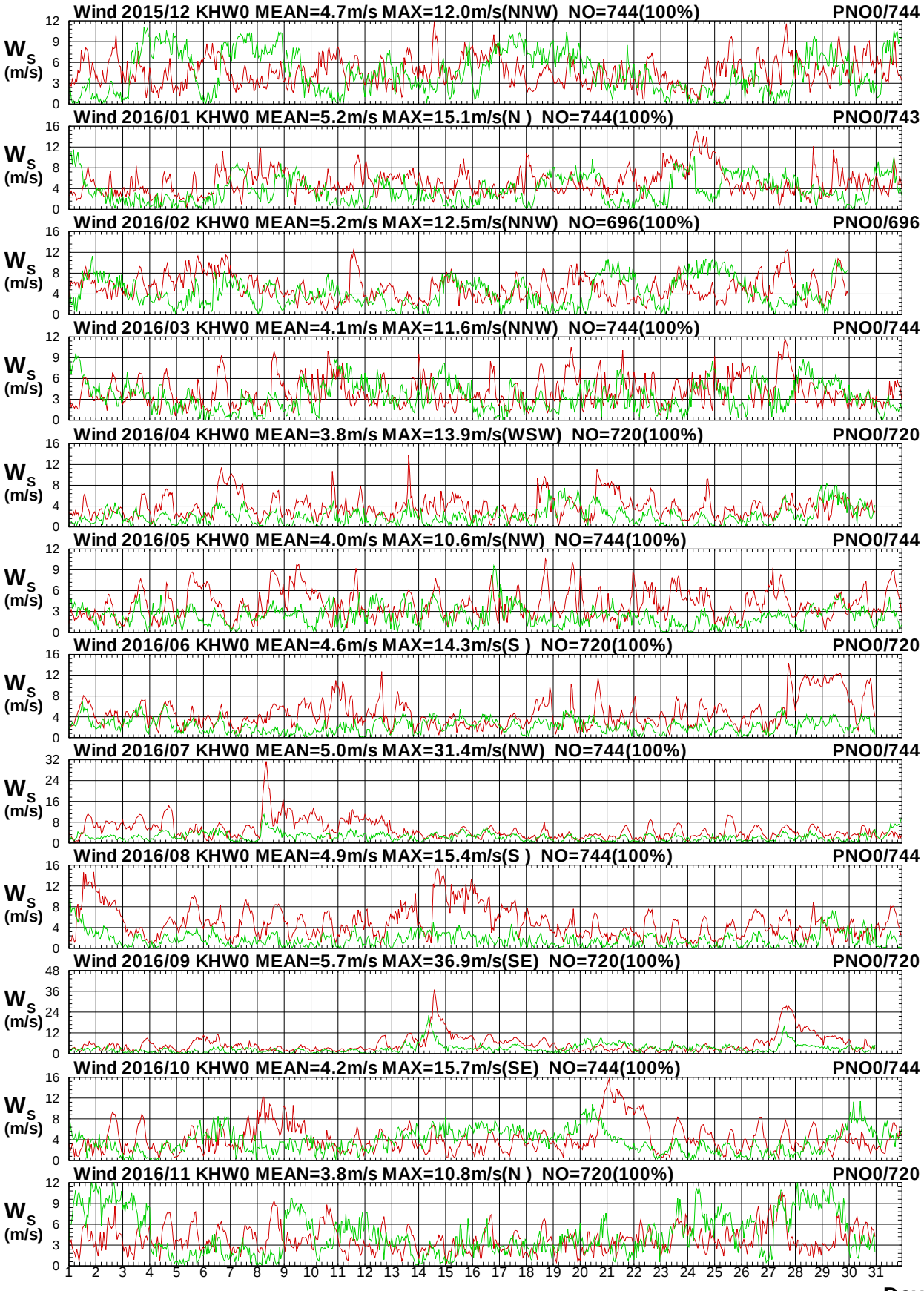


圖1.14a　2016年每月高雄海域 W 站與屏東海域 O 站風速圖

# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

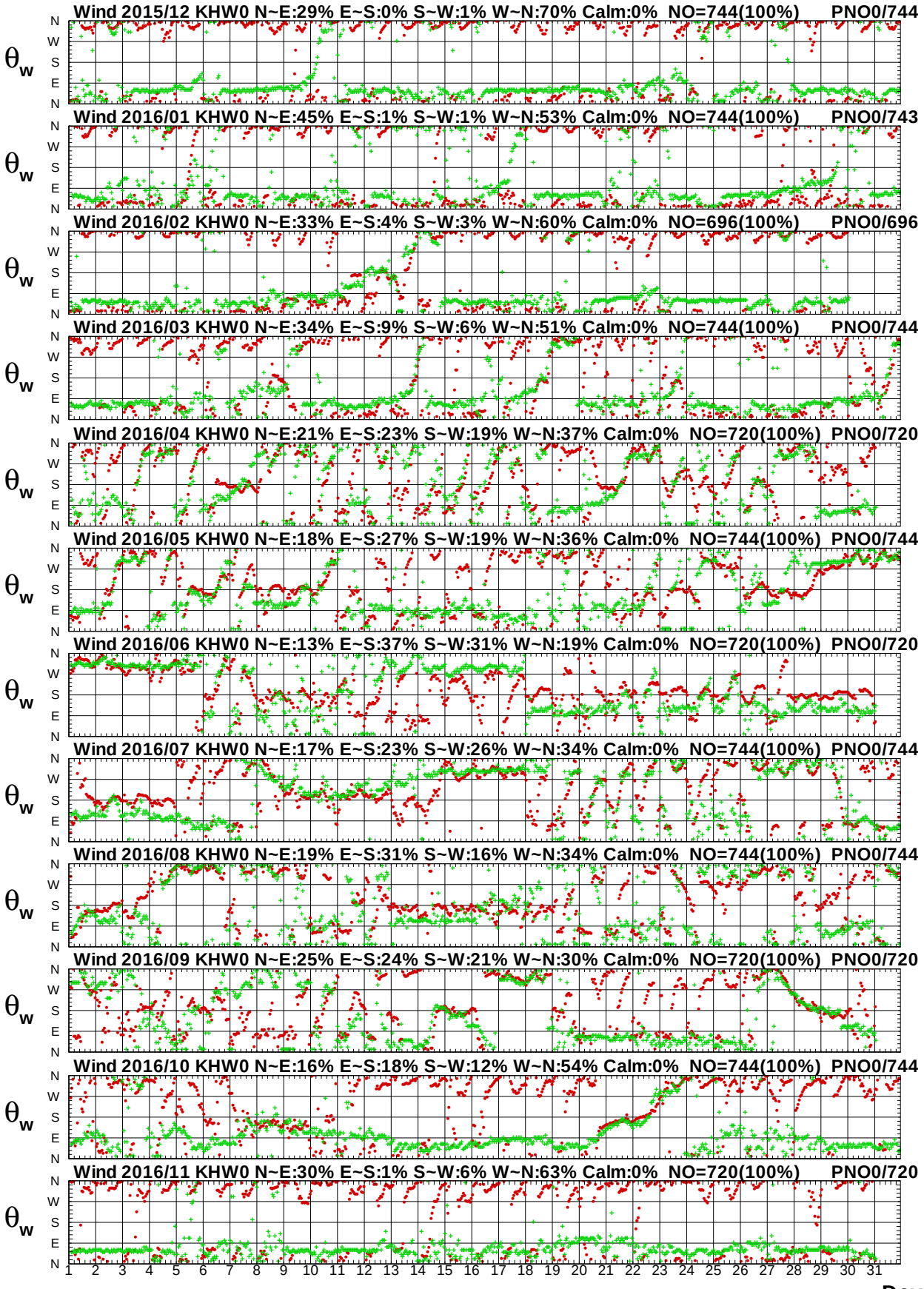


圖 1.14b　2016年每月高雄海域 W 站與屏東海域 O 站風向圖

W15CKHW0.1HA W15CPNO0.1H0 W161KHW0.1HA W161PNO0.1H0 W162KHW0.1HA W162PNO0.1H0
W163KHW0.1HA W163PNO0.1H0 W164KHW0.1HA W164PNO0.1H0 W165KHW0.1HA W165PNO0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

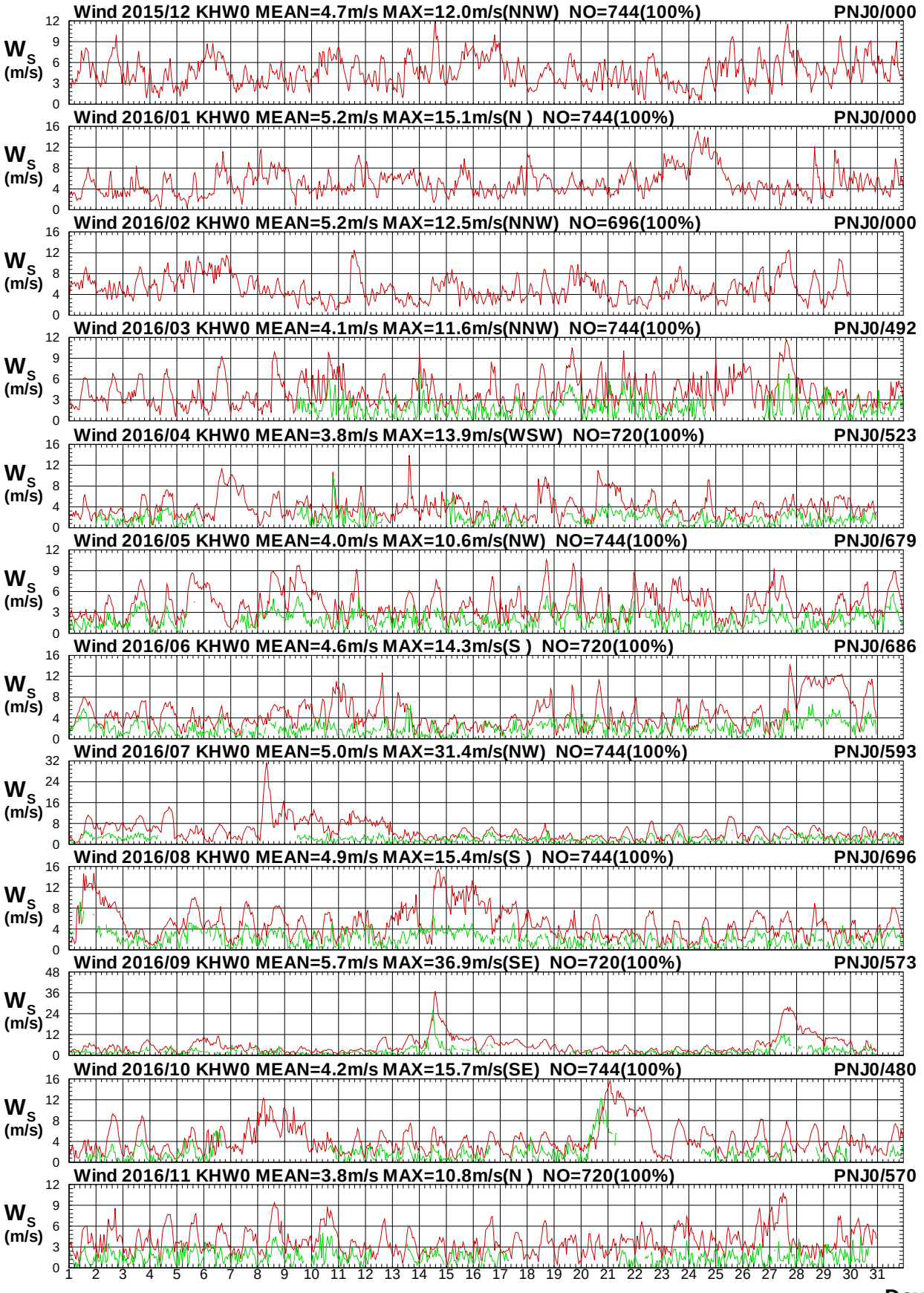


圖1.15a　2016年每月高雄海域 W 站與屏東海域 J 站風速圖

W15CKHW0.1HA W15CPNJ0.1H0 W161KHW0.1HA W161PNJ0.1H0 W162KHW0.1HA W162PNJ0.1H0
W163KHW0.1HA W163PNJ0.1H0 W164KHW0.1HA W164PNJ0.1H0 W165KHW0.1HA W165PNJ0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

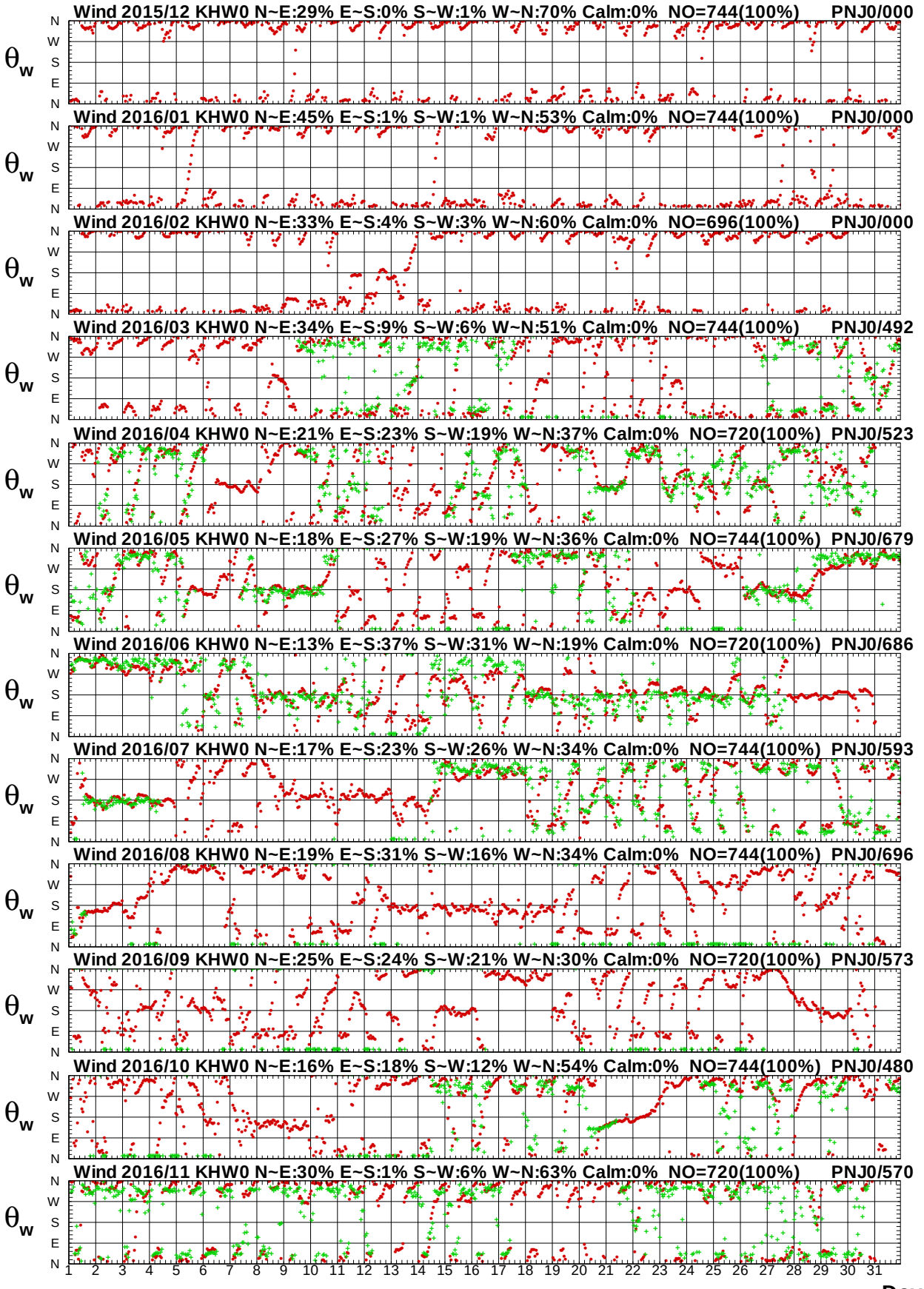


圖 1.15b　2016年每月高雄海域 W 站與屏東海域 J 站風向圖

# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

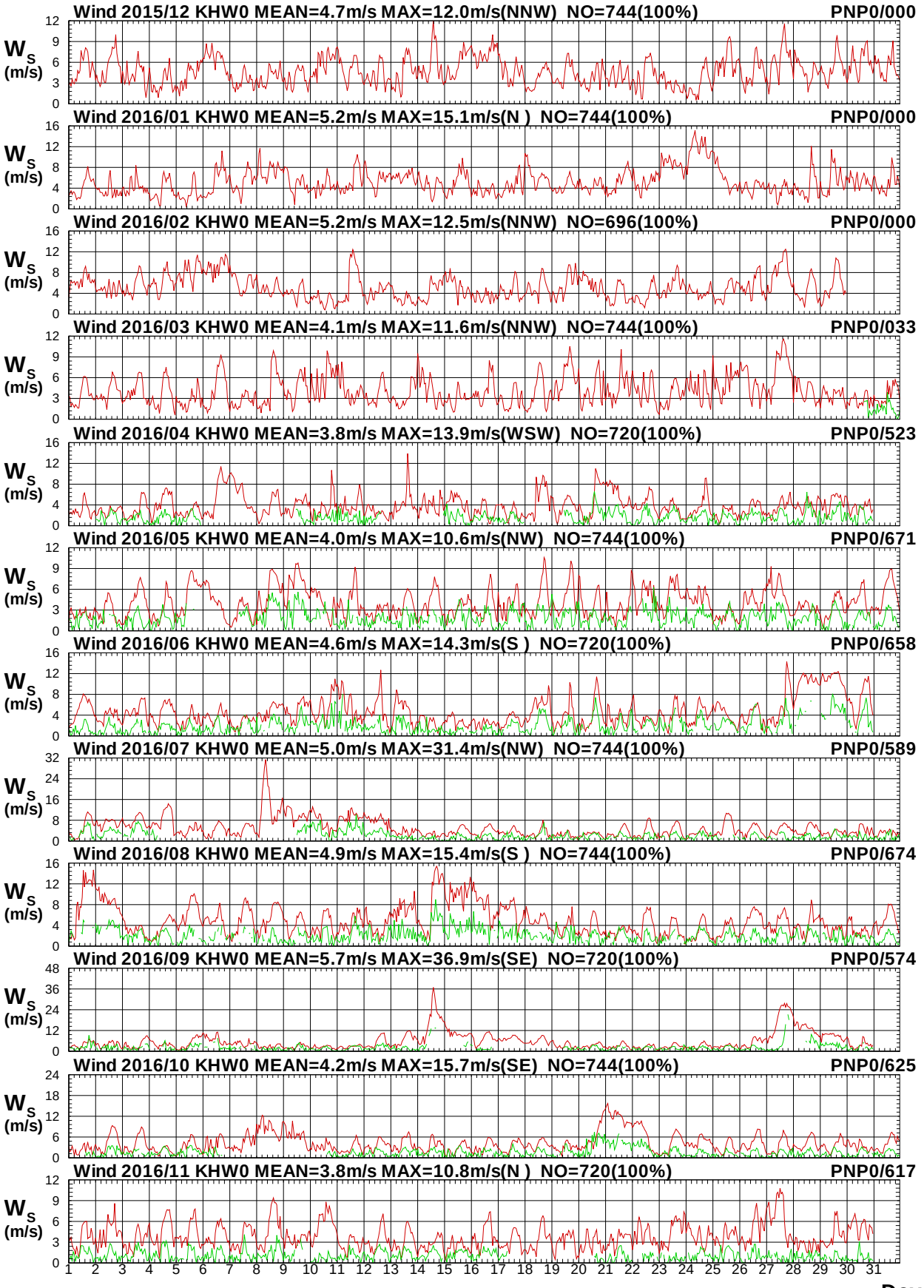


圖1.16a　2016年每月高雄海域 W 站與屏東海域 P 站風速圖

# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

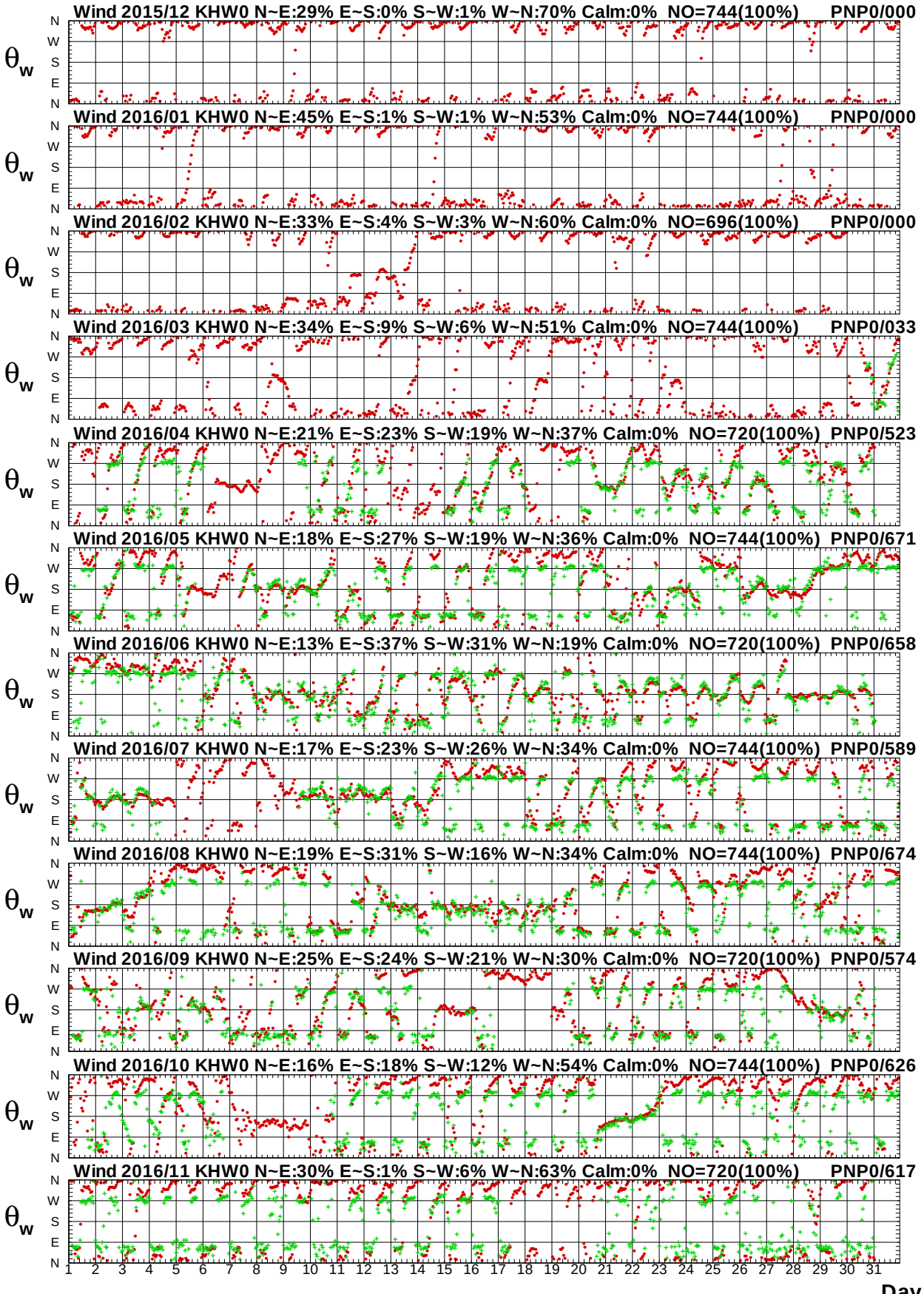


圖1.16b　2016年每月高雄海域 W 站與屏東海域 P 站風向圖

W15CKHW0.1HA W15CPNP0.1H0 W161KHW0.1HA W161PNP0.1H0 W162KHW0.1HA W162PNP0.1H0
W163KHW0.1HA W163PNP0.1H0 W164KHW0.1HA W164PNP0.1H0 W165KHW0.1HA W165PNP0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

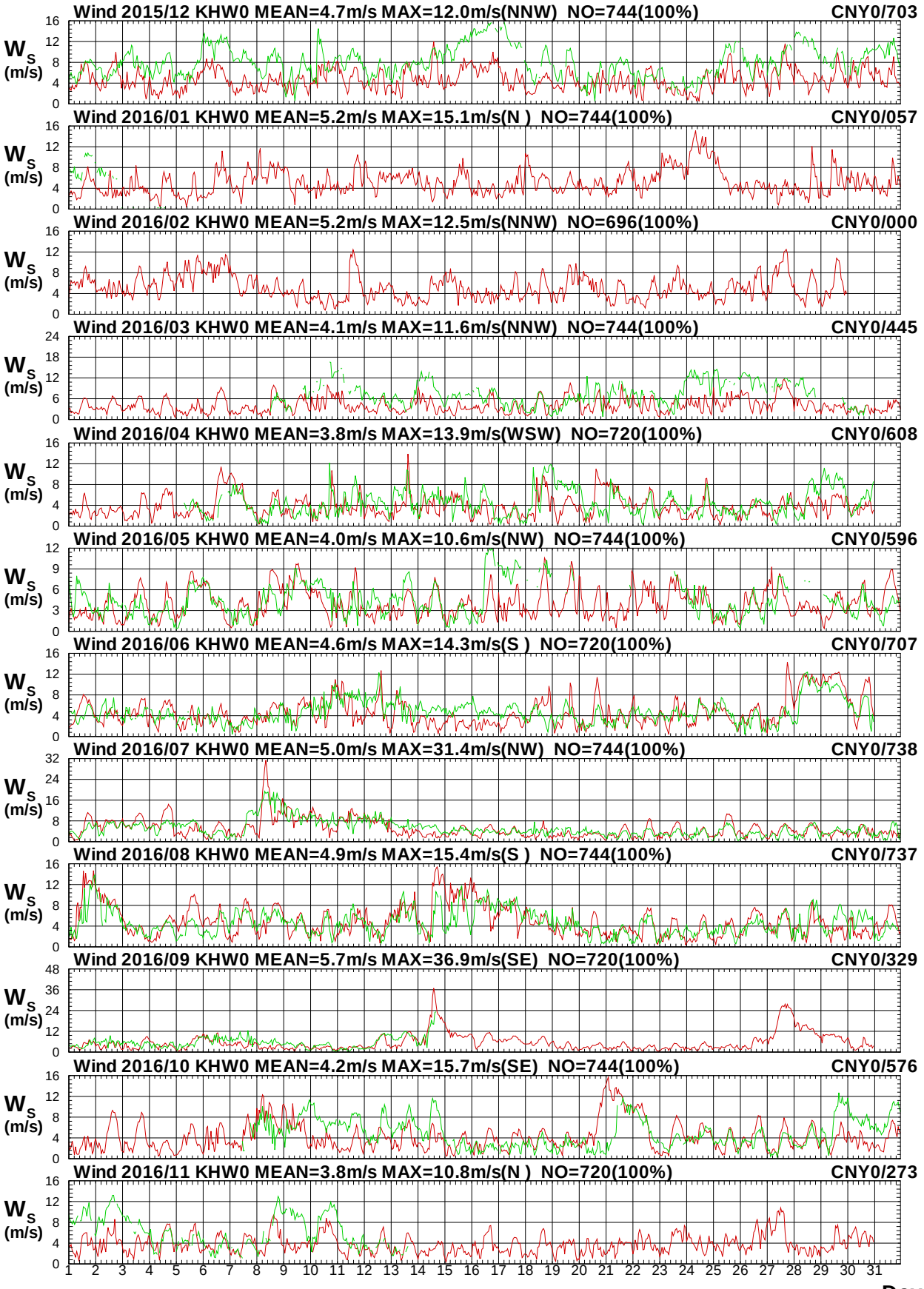


圖1.17a　2016年每月高雄海域 W 站與嘉南海域 Y 站風速圖

W15CKHW0.1HA W15CCNY0.1H0 W161KHW0.1HA W161CNY0.1H0 W162KHW0.1HA W162CNY0.1H0
W163KHW0.1HA W163CNY0.1H0 W164KHW0.1HA W164CNY0.1H0 W165KHW0.1HA W165CNY0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

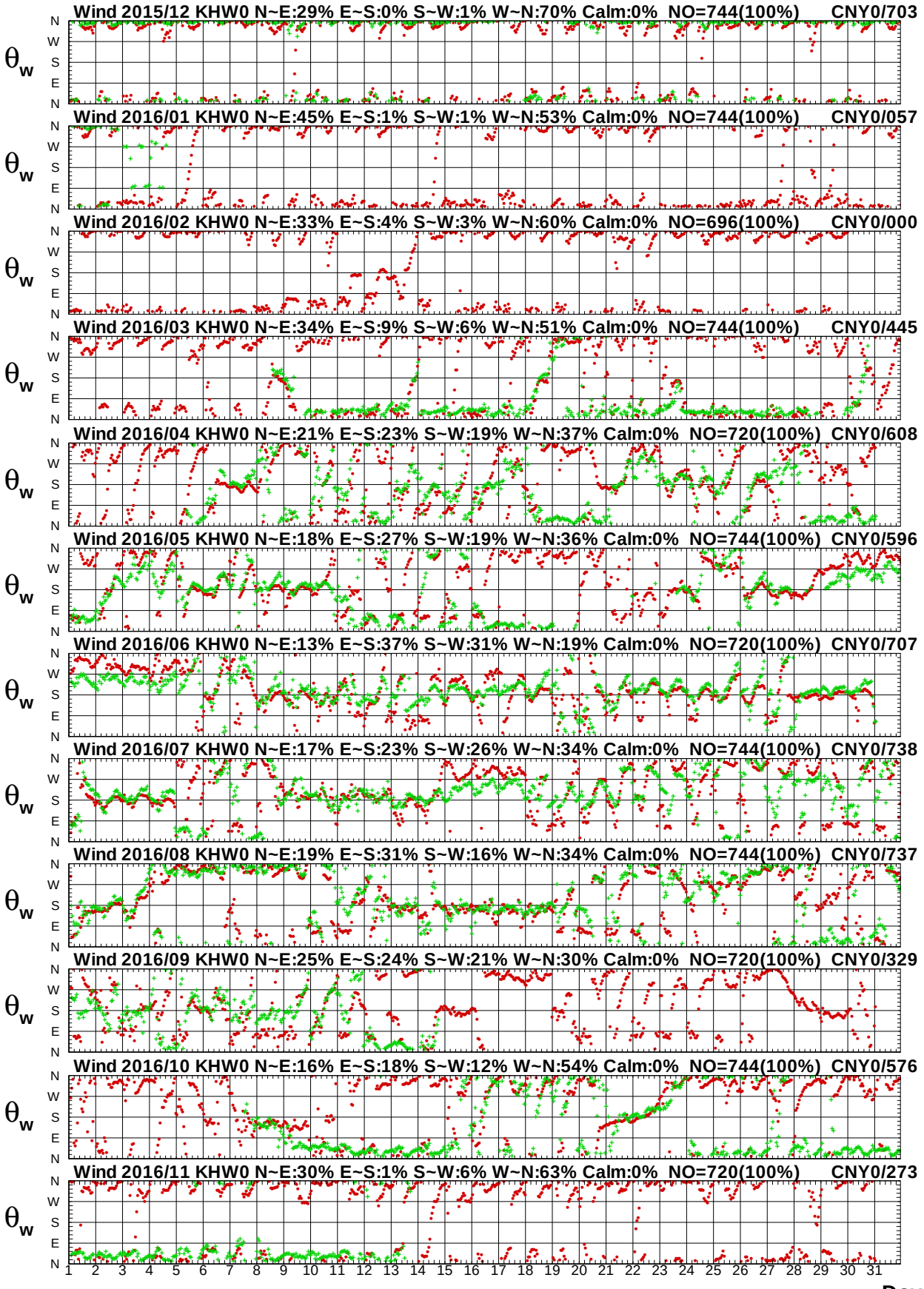


圖1.17b　2016年每月高雄海域 W 站與嘉南海域 Y 站風向圖

W15CKHW0.1HA W15CCNY0.1H0 W161KHW0.1HA W161CNY0.1H0 W162KHW0.1HA W162CNY0.1H0
W163KHW0.1HA W163CNY0.1H0 W164KHW0.1HA W164CNY0.1H0 W165KHW0.1HA W165CNY0.1H0

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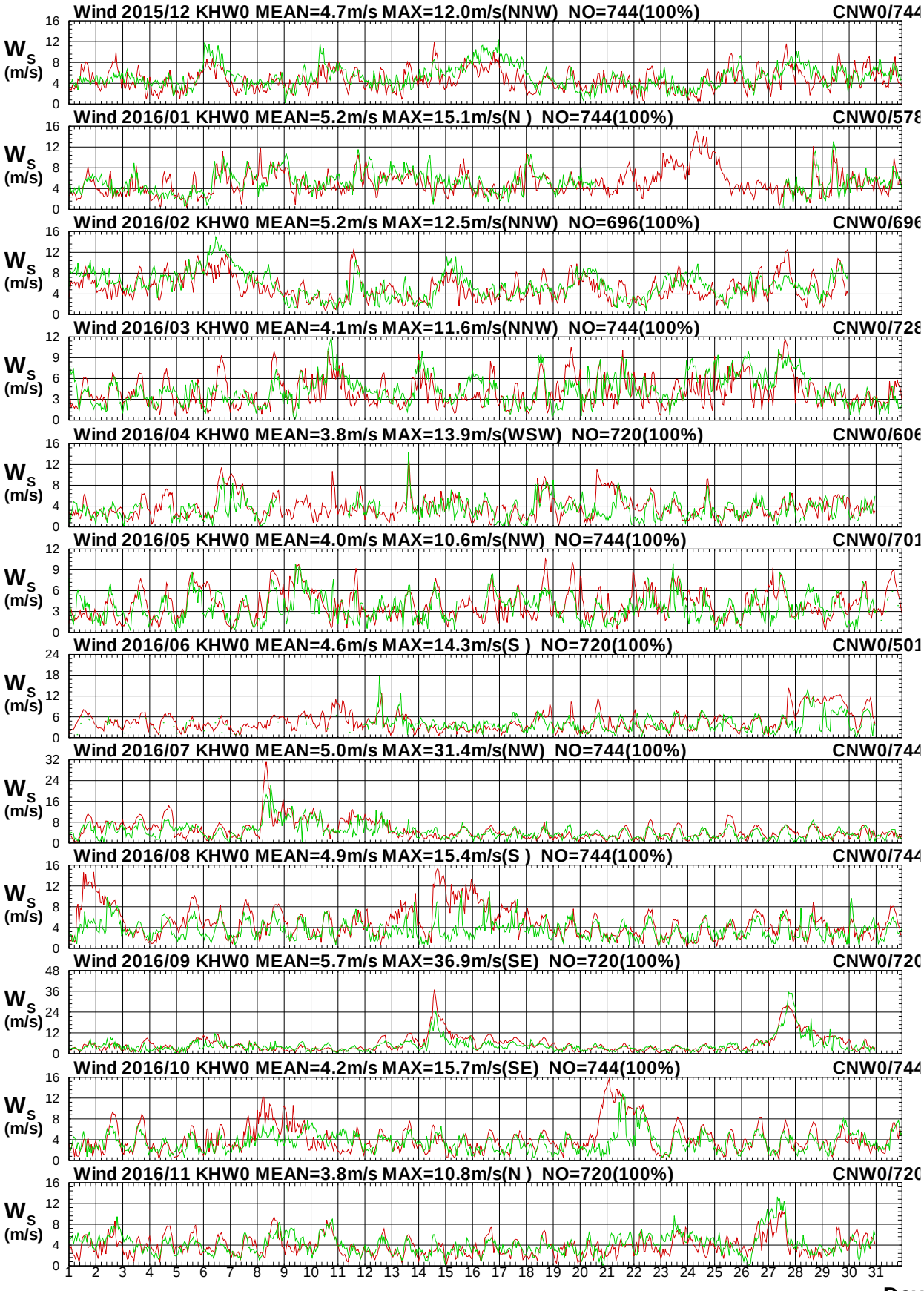


圖 1.18a　2016年每月高雄海域 W 站與嘉南海域 W 站風速圖

W15CKHW0.1HA W15CCNW0.1H0 W161KHW0.1HA W161CNW0.1H0 W162KHW0.1HA W162CNW0.1H0
W163KHW0.1HA W163CNW0.1H0 W164KHW0.1HA W164CNW0.1H0 W165KHW0.1HA W165CNW0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

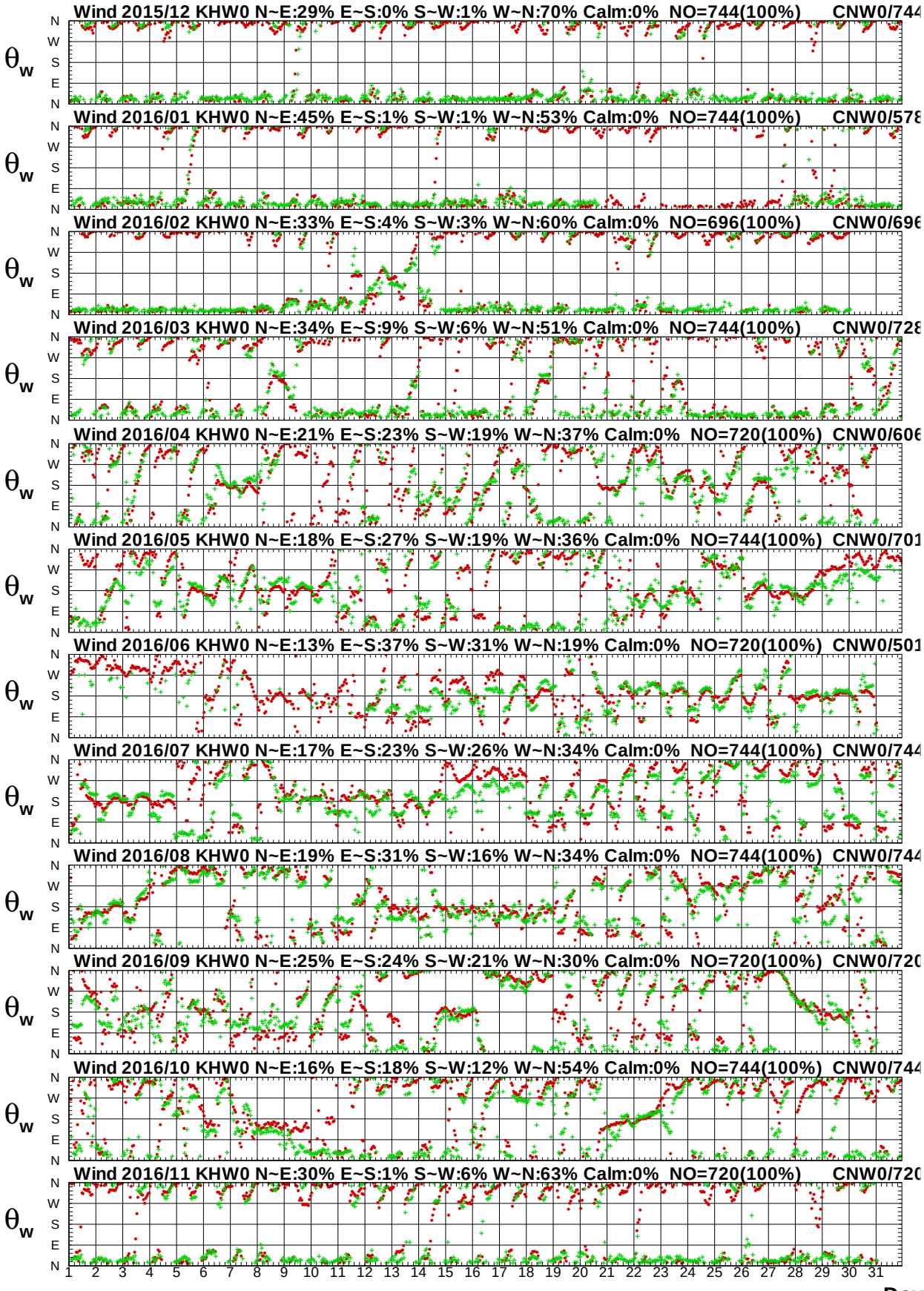


圖 1.18b　2016年每月高雄海域 W 站與嘉南海域 W 站風向圖

W15CKHW0.1HA W15CCNW0.1H0 W161KHW0.1HA W161CNW0.1H0 W162KHW0.1HA W162CNW0.1H0
W163KHW0.1HA W163CNW0.1H0 W164KHW0.1HA W164CNW0.1H0 W165KHW0.1HA W165CNW0.1H0

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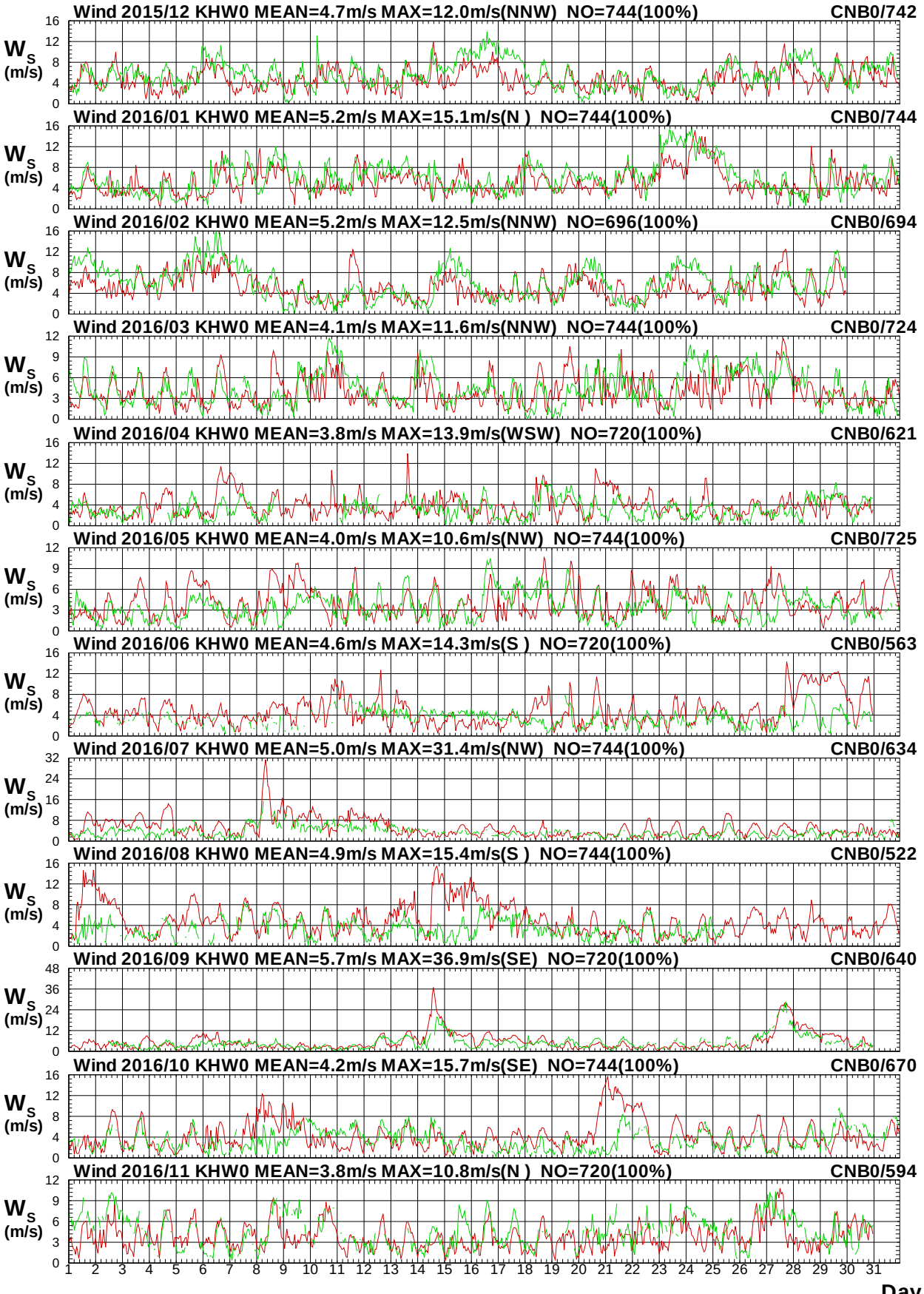


圖 1.19a　2016年每月高雄海域 W 站與嘉南海域 B 站風速圖

W15CKHW0.1HA W15CCNB0.1H0 W161KHW0.1HA W161CNB0.1H0 W162KHW0.1HA W162CNB0.1H0
W163KHW0.1HA W163CNB0.1H0 W164KHW0.1HA W164CNB0.1H0 W165KHW0.1HA W165CNB0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

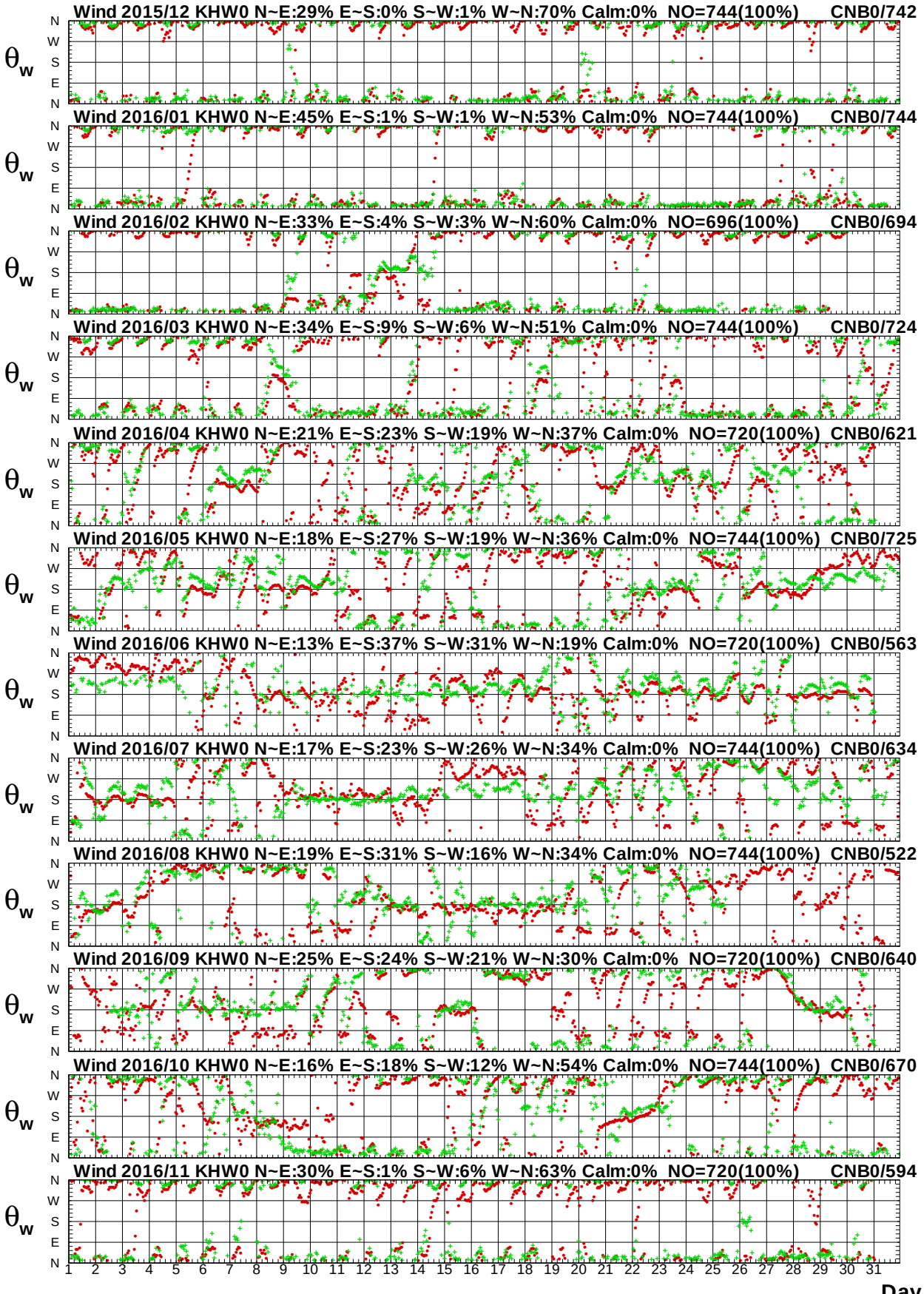


圖1.19b　2016年每月高雄海域 W 站與嘉南海域 B 站風向圖

W15CKHW0.1HA W15CCNB0.1H0 W161KHW0.1HA W161CNB0.1H0 W162KHW0.1HA W162CNB0.1H0
W163KHW0.1HA W163CNB0.1H0 W164KHW0.1HA W164CNB0.1H0 W165KHW0.1HA W165CNB0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

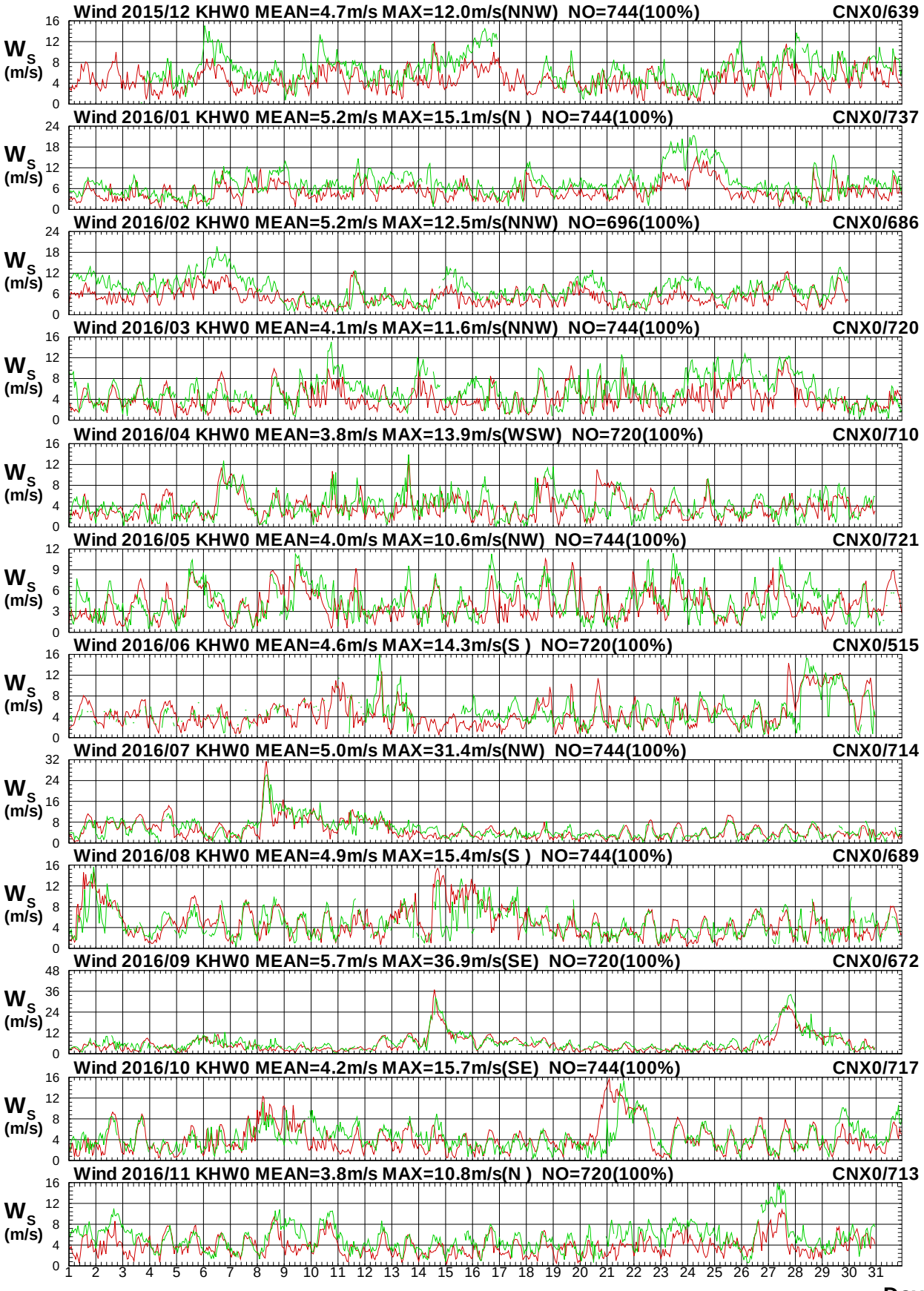


圖1.20a　2016年每月高雄海域 W 站與嘉南海域 X 站風速圖

W15CKHW0.1HA W15CCNX0.1H0 W161KHW0.1HA W161CNX0.1H0 W162KHW0.1HA W162CNX0.1H0
W163KHW0.1HA W163CNX0.1H0 W164KHW0.1HA W164CNX0.1H0 W165KHW0.1HA W165CNX0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

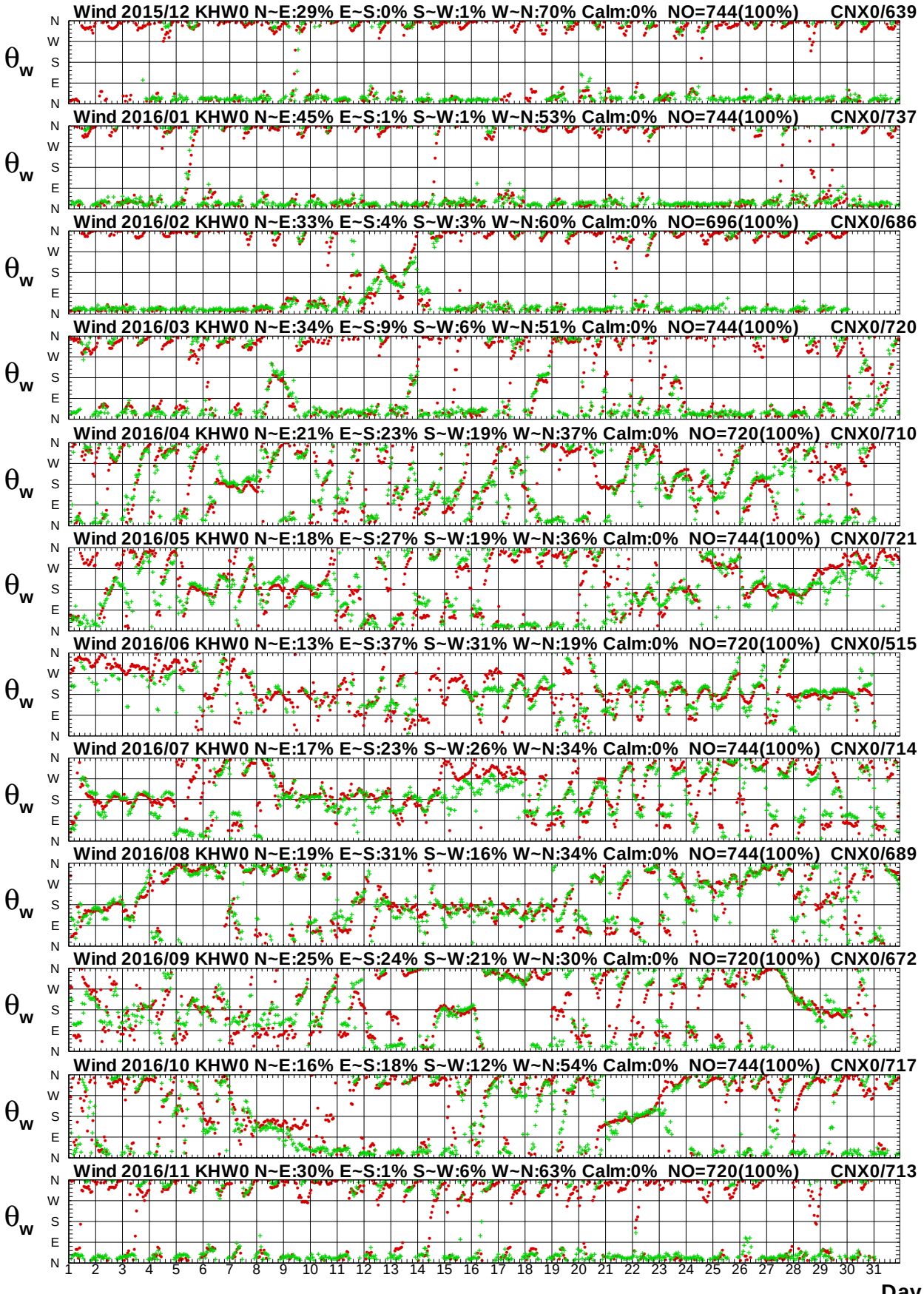


圖 1.20b　2016年每月高雄海域 W 站與嘉南海域 X 站風向圖

W15CKHW0.1HA W15CCNX0.1H0 W161KHW0.1HA W161CNX0.1H0 W162KHW0.1HA W162CNX0.1H0
W163KHW0.1HA W163CNX0.1H0 W164KHW0.1HA W164CNX0.1H0 W165KHW0.1HA W165CNX0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

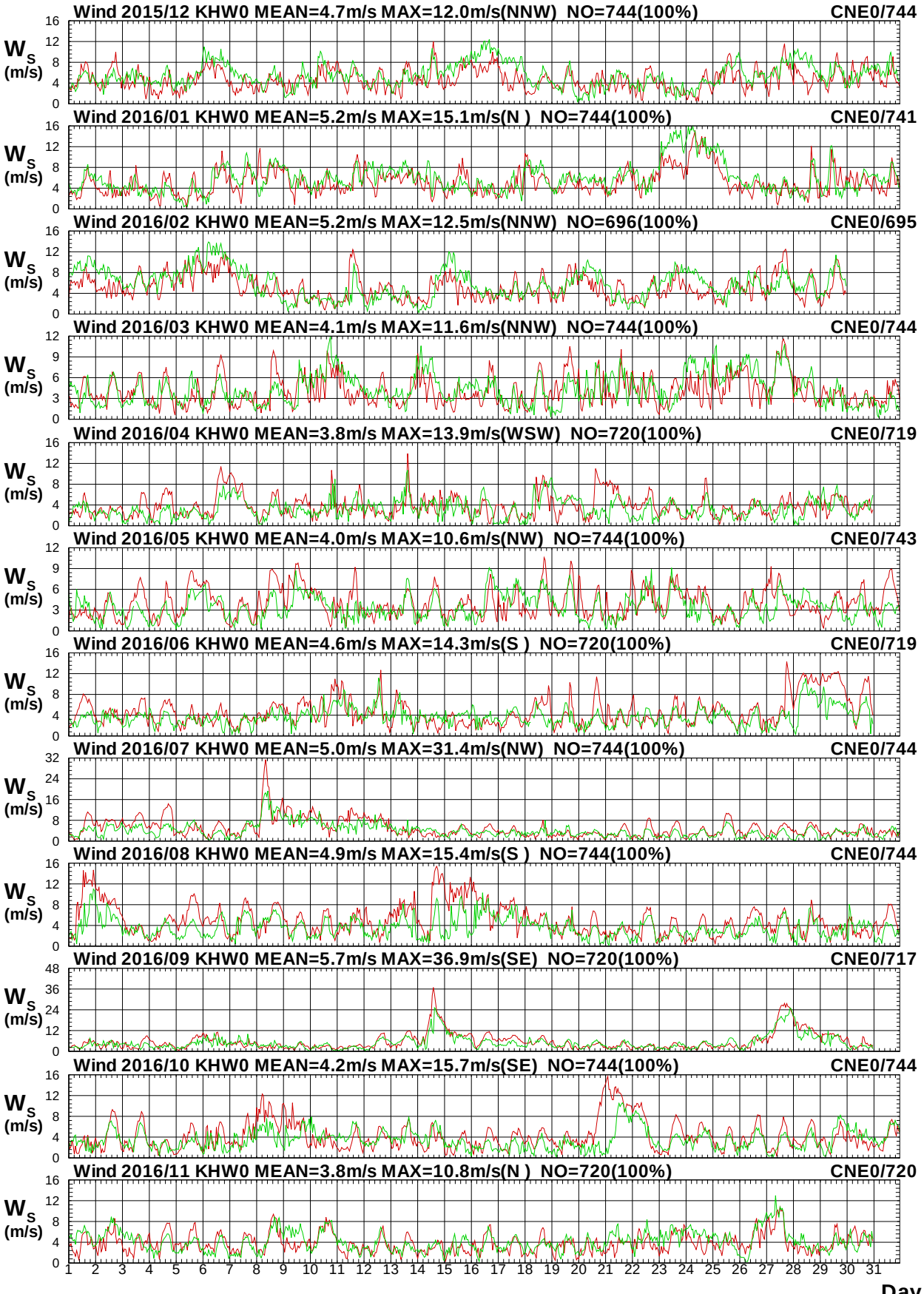


圖1.21a　2016年每月高雄海域 W 站與嘉南海域 E 站風速圖

W15CKHW0.1HA W15CCNE0.1H0 W161KHW0.1HA W161CNE0.1H0 W162KHW0.1HA W162CNE0.1H0
W163KHW0.1HA W163CNE0.1H0 W164KHW0.1HA W164CNE0.1H0 W165KHW0.1HA W165CNE0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

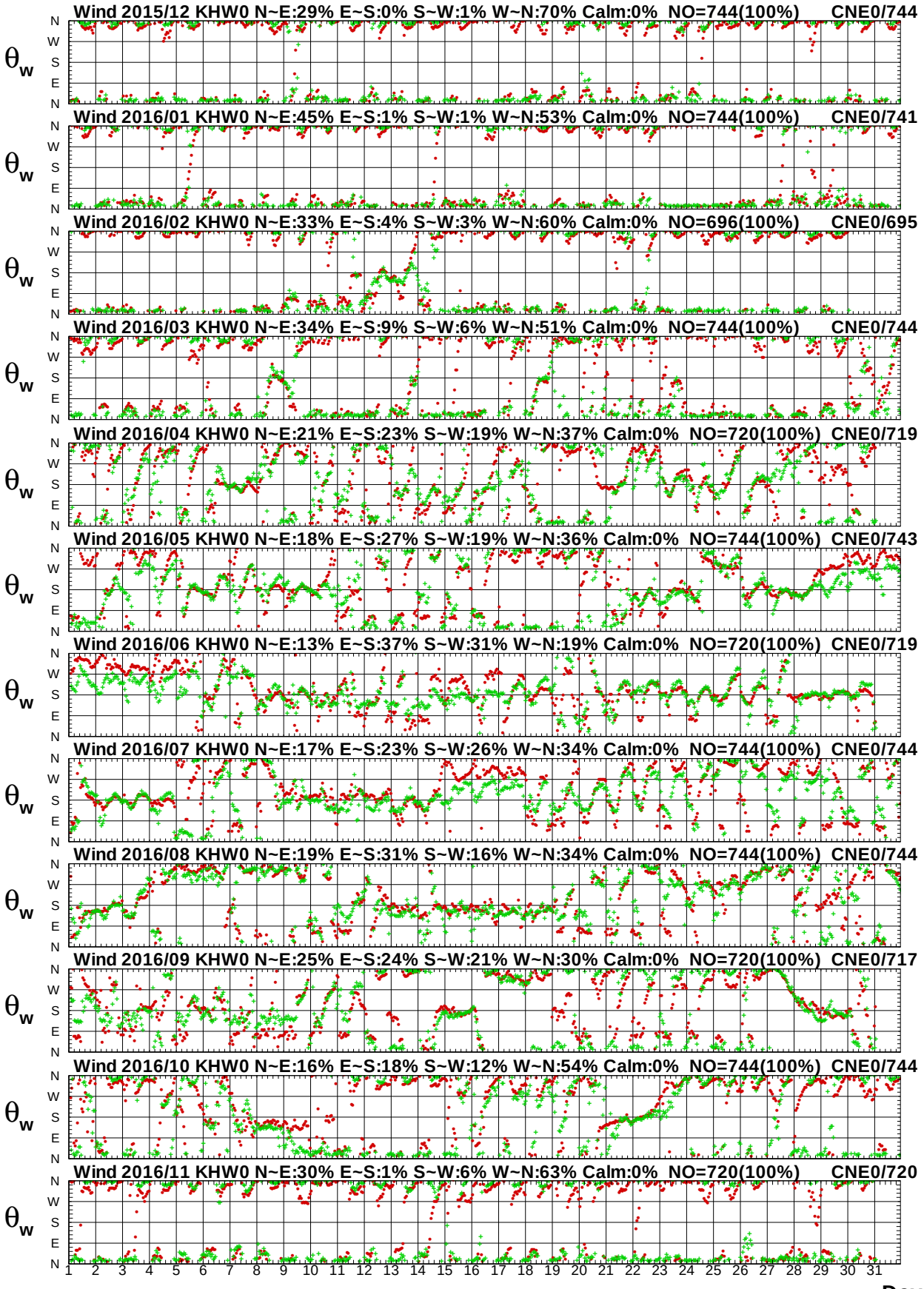


圖1.21b　2016年每月高雄海域 W 站與嘉南海域 E 站風向圖

W15CKHW0.1HA W15CCNE0.1H0 W161KHW0.1HA W161CNE0.1H0 W162KHW0.1HA W162CNE0.1H0
W163KHW0.1HA W163CNE0.1H0 W164KHW0.1HA W164CNE0.1H0 W165KHW0.1HA W165CNE0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

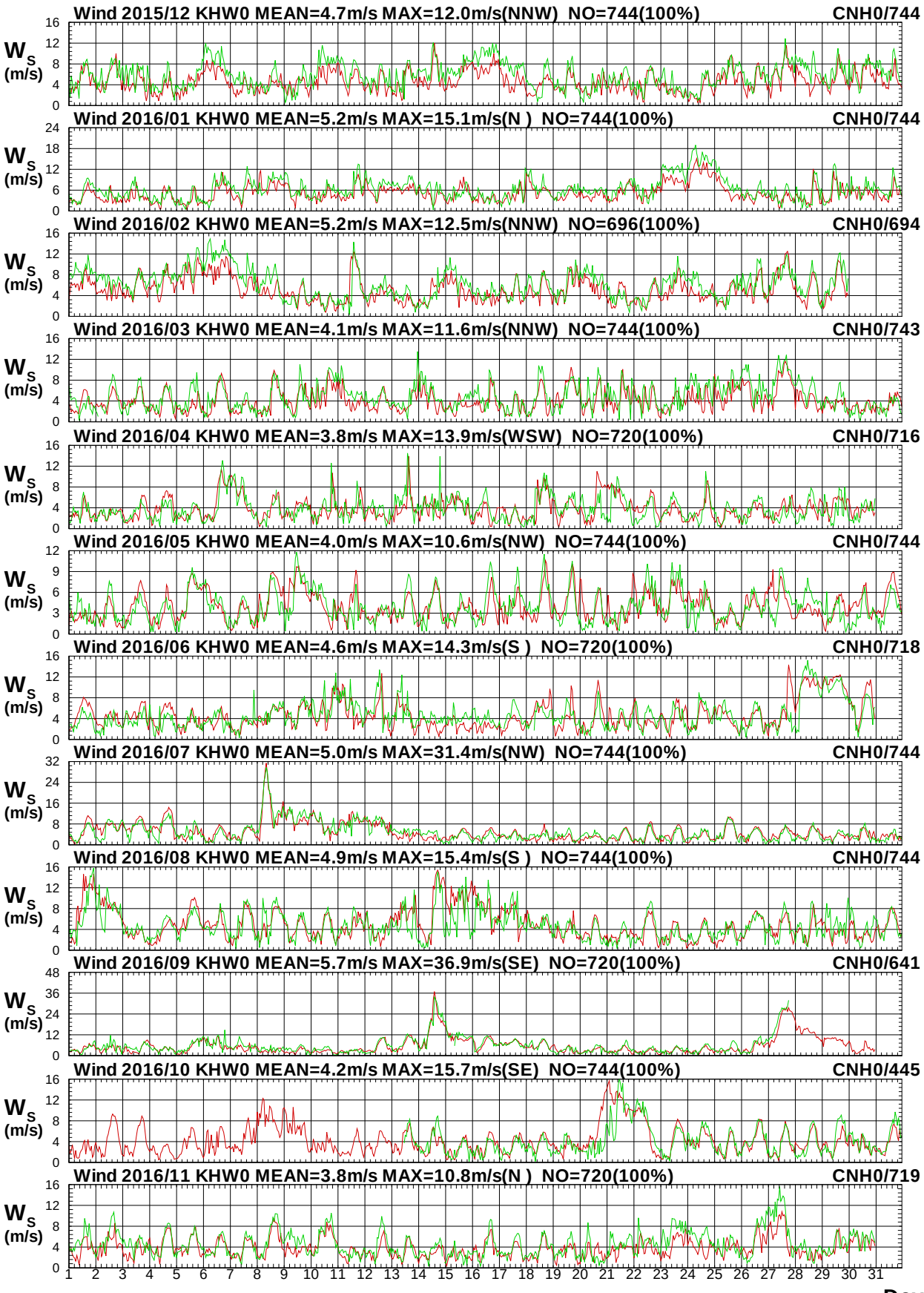


圖1.22a　2016年每月高雄海域 W 站與嘉南海域 H 站風速圖

W15CKHW0.1HA W15CCNH0.1H0 W161KHW0.1HA W161CNH0.1H0 W162KHW0.1HA W162CNH0.1H0
W163KHW0.1HA W163CNH0.1H0 W164KHW0.1HA W164CNH0.1H0 W165KHW0.1HA W165CNH0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

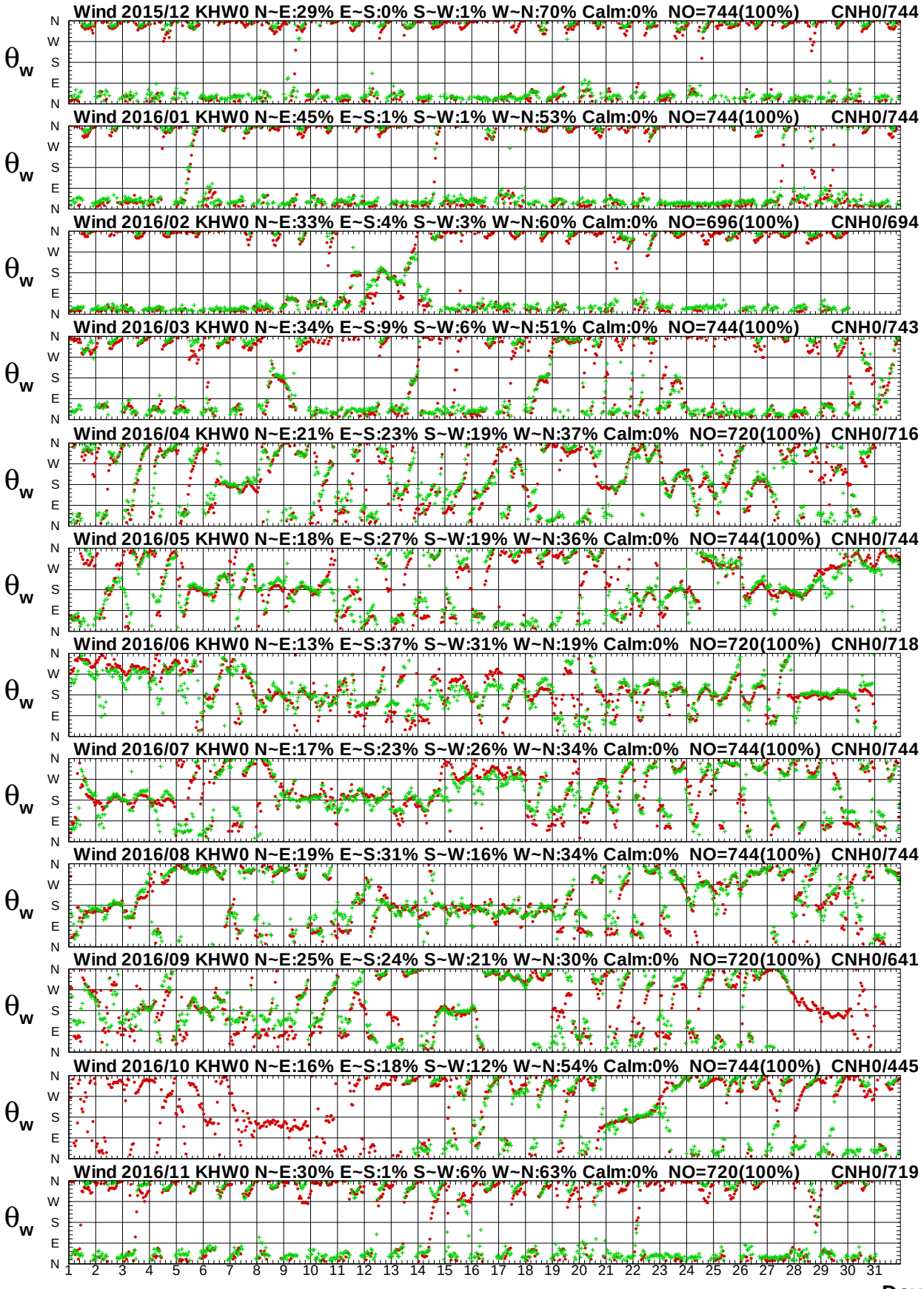


圖 1.22b　2016年每月高雄海域 W 站與嘉南海域 H 站風向圖

W15CKHW0.1HA W15CCNH0.1H0 W161KHW0.1HA W161CNH0.1H0 W162KHW0.1HA W162CNH0.1H0
W163KHW0.1HA W163CNH0.1H0 W164KHW0.1HA W164CNH0.1H0 W165KHW0.1HA W165CNH0.1H0

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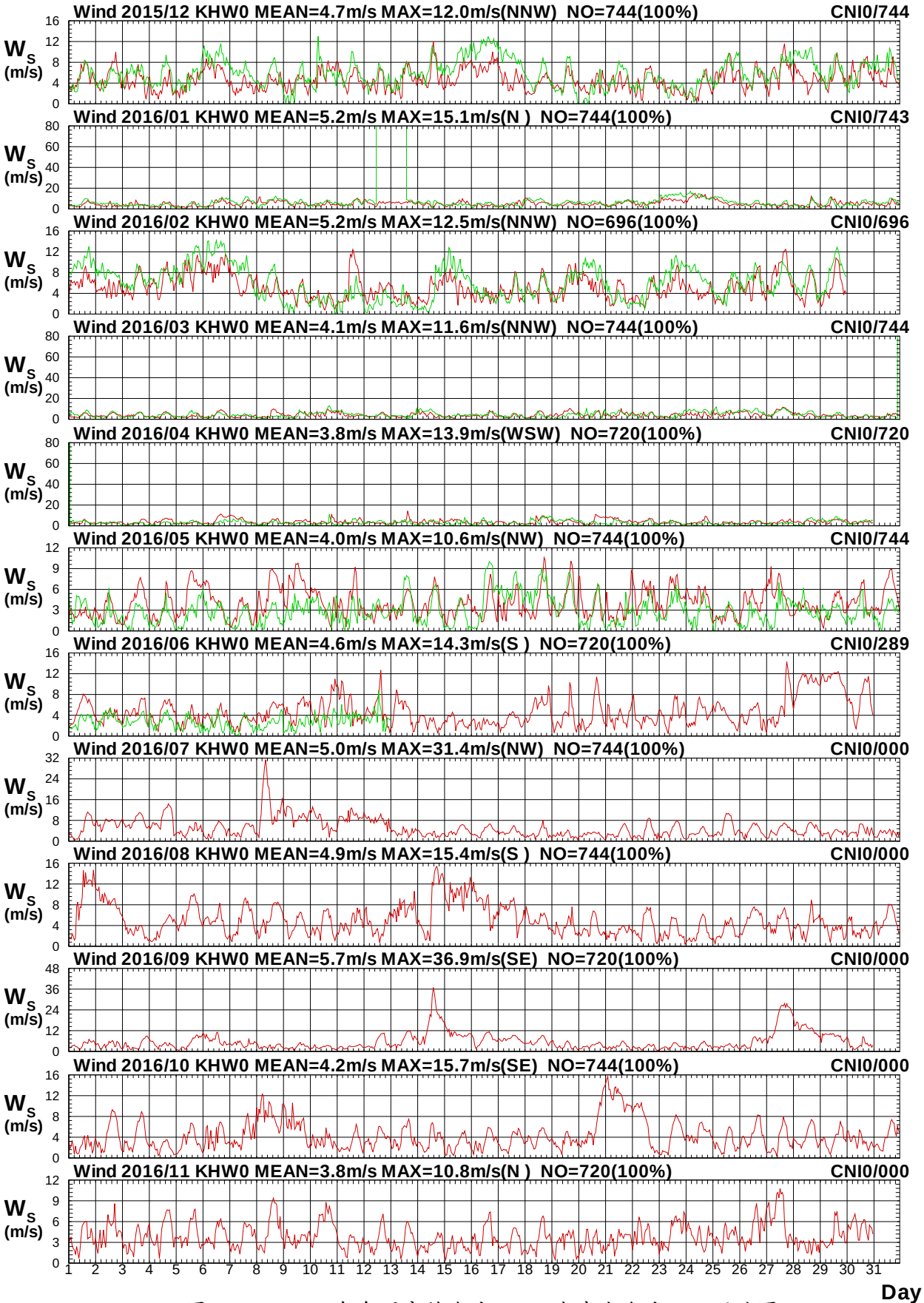


圖 1.23a　2016年每月高雄海域 W 站與嘉南海域 I 站風速圖

W15CKHW0.1HA W15CCNI0.1H0 W161KHW0.1HA W161CNI0.1H0 W162KHW0.1HA W162CNI0.1H0
W163KHW0.1HA W163CNI0.1H0 W164KHW0.1HA W164CNI0.1H0 W165KHW0.1HA W165CNI0.1H0

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# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

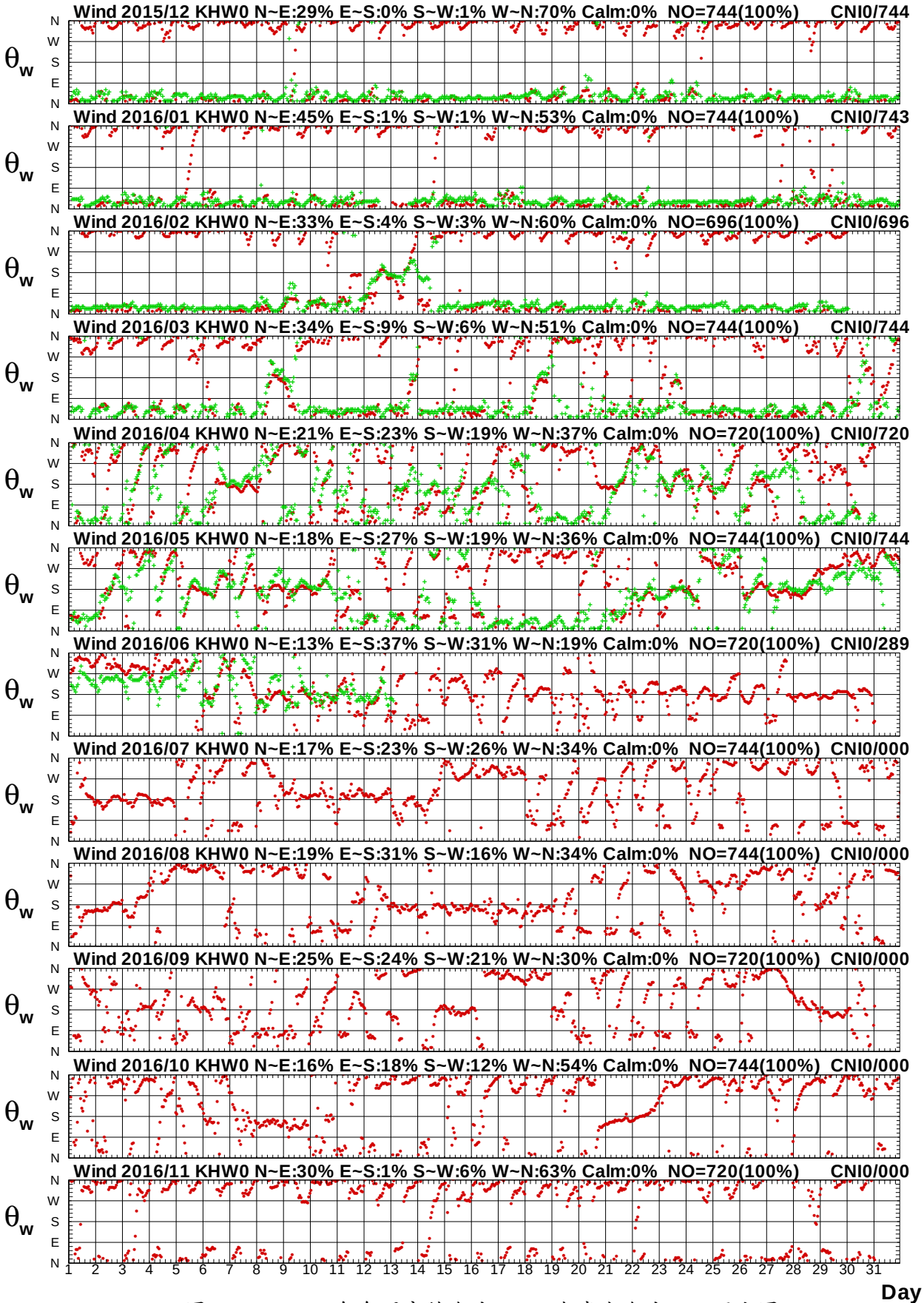


圖1.23b　2016年每月高雄海域 W 站與嘉南海域 I 站風向圖

W15CKHW0.1HA W15CCNI0.1H0 W161KHW0.1HA W161CNI0.1H0 W162KHW0.1HA W162CNI0.1H0
W163KHW0.1HA W163CNI0.1H0 W164KHW0.1HA W164CNI0.1H0 W165KHW0.1HA W165CNI0.1H0

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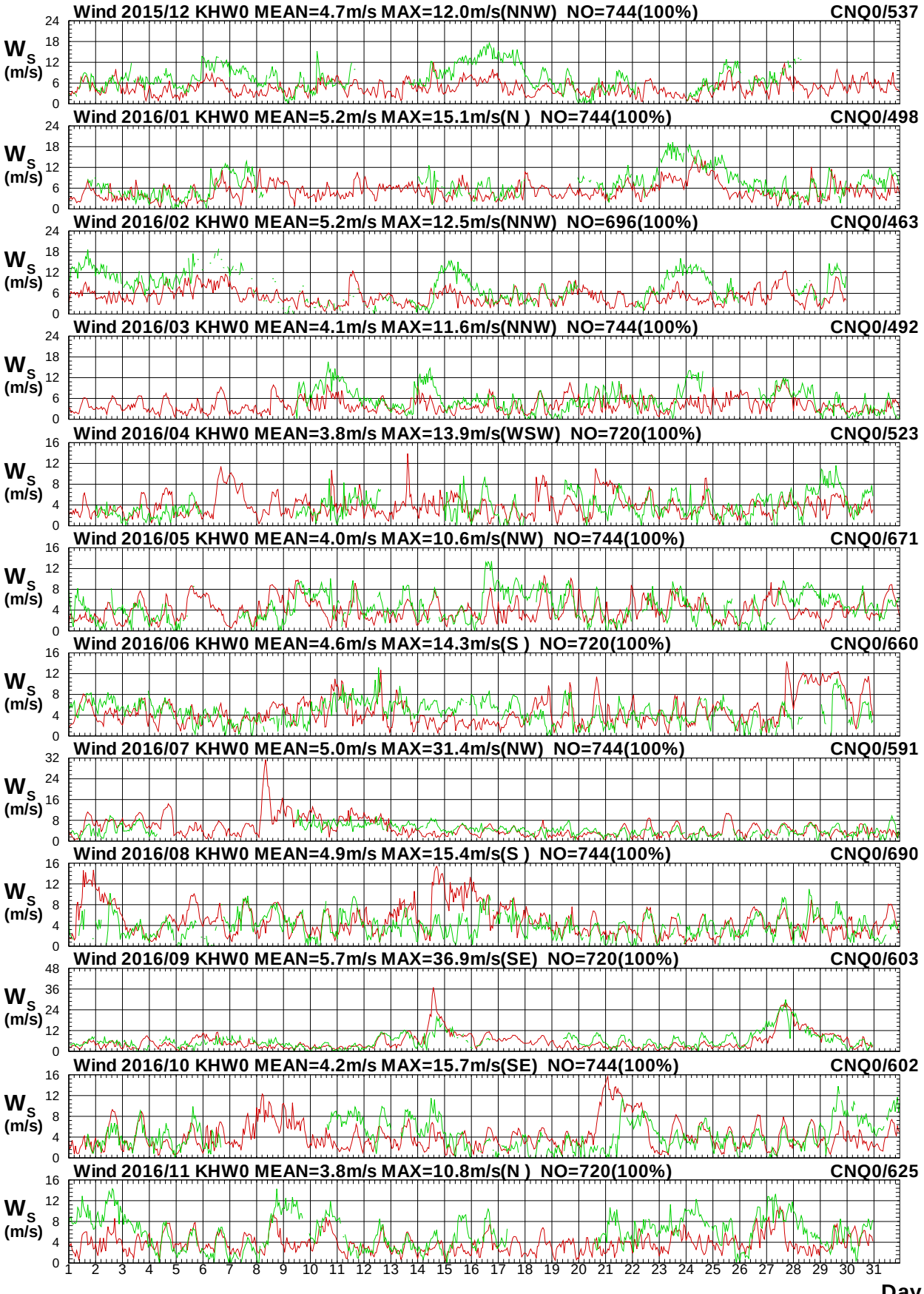


圖1.24a　2016年每月高雄海域 W 站與嘉南海域 Q 站風速圖

# Wind Direction in Kao-Hsiung Seas of KHW0 at 2016

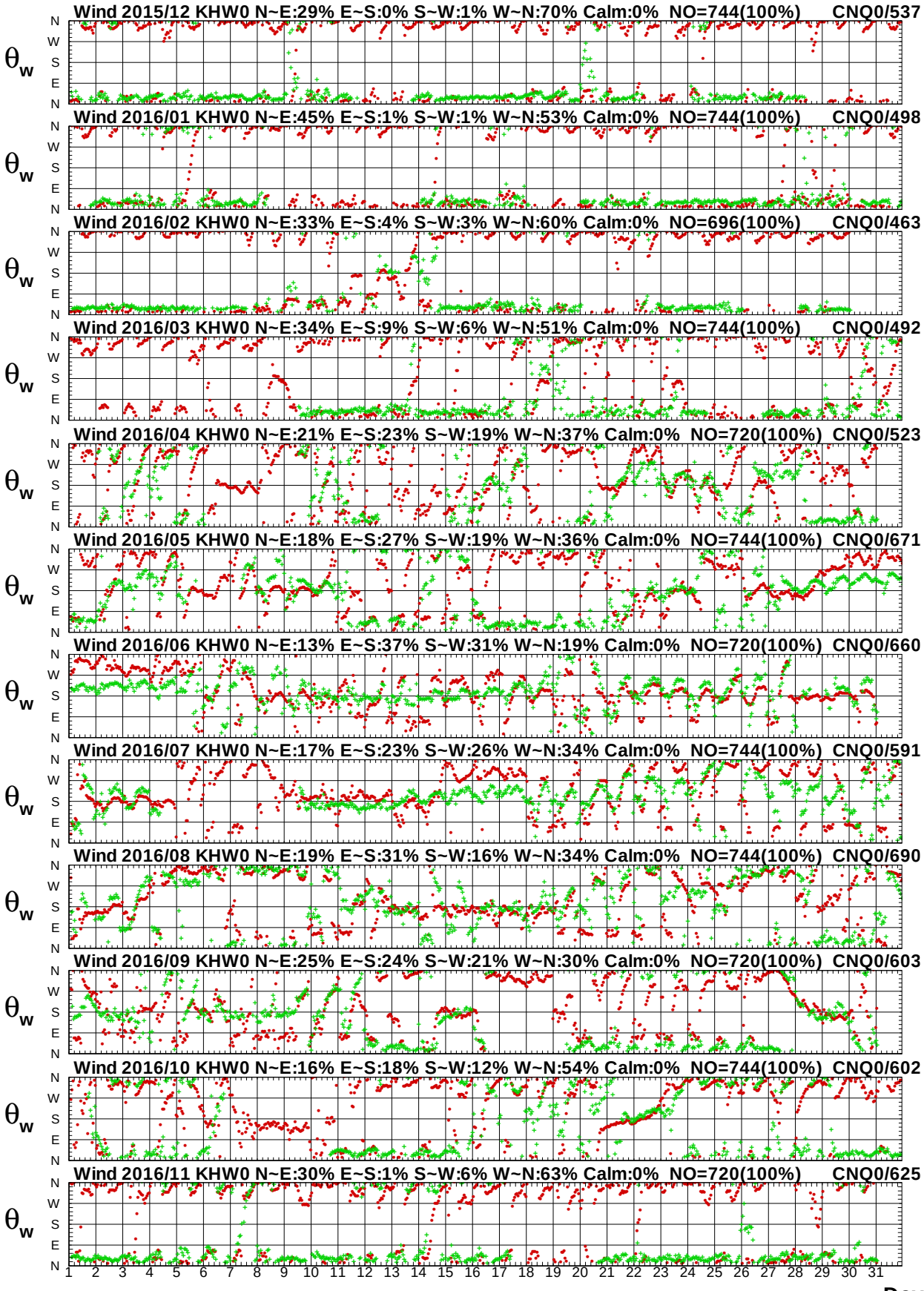


圖 1.24b　2016年每月高雄海域 W 站與嘉南海域 Q 站風向圖

W15CKHW0.1HA W15CCNQ0.1H0 W161KHW0.1HA W161CNQ0.1H0 W162KHW0.1HA W162CNQ0.1H0
W163KHW0.1HA W163CNQ0.1H0 W164KHW0.1HA W164CNQ0.1H0 W165KHW0.1HA W165CNQ0.1H0

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# Wind Speed in Kao-Hsiung Seas of KHW0 at 2016

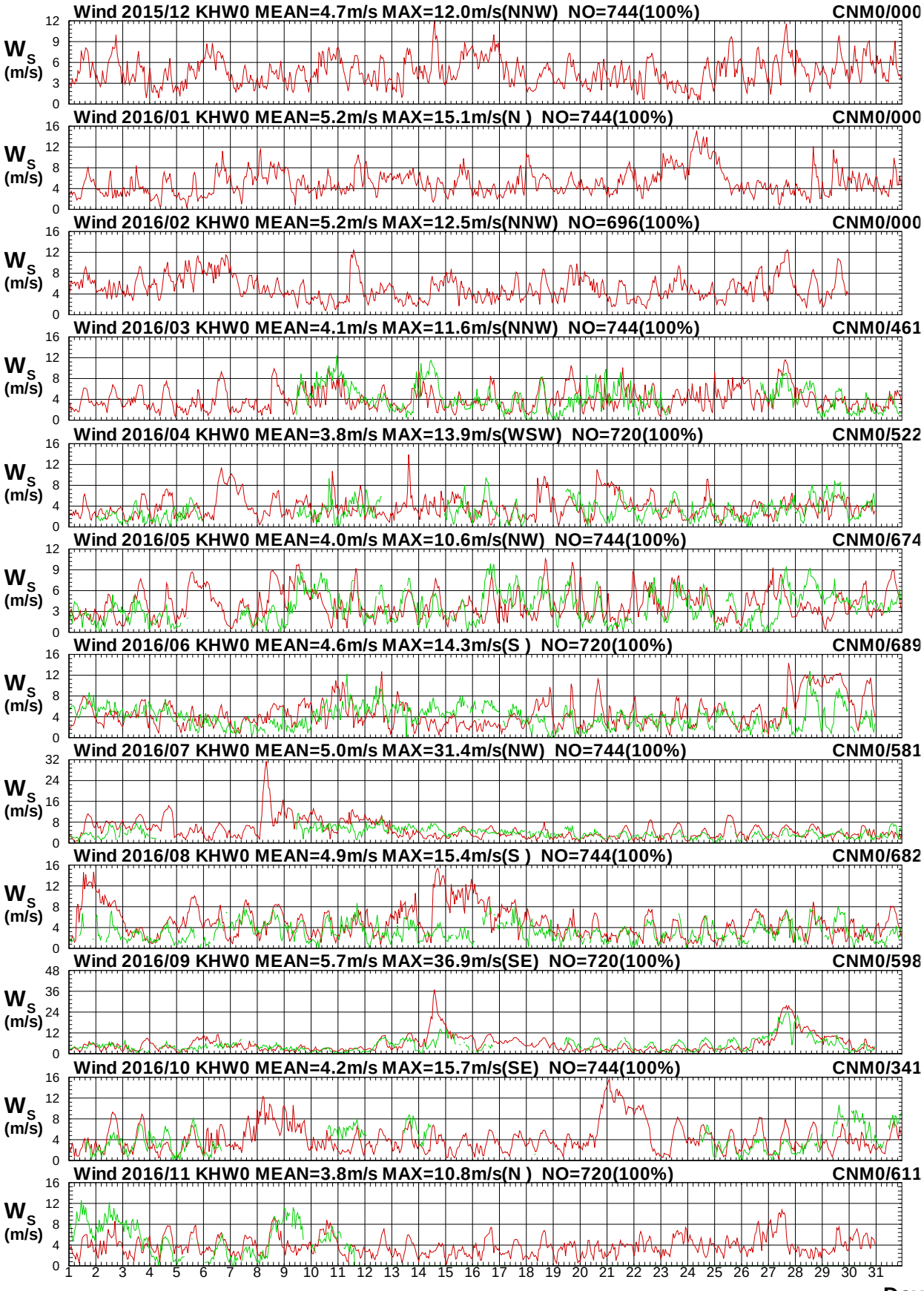


圖 1.25a　2016年每月高雄海域 W 站與嘉南海域 M 站風速圖

W15CKHW0.1HA W15CCNM0.1H0 W161KHW0.1HA W161CNM0.1H0 W162KHW0.1HA W162CNM0.1H0
W163KHW0.1HA W163CNM0.1H0 W164KHW0.1HA W164CNM0.1H0 W165KHW0.1HA W165CNM0.1H0

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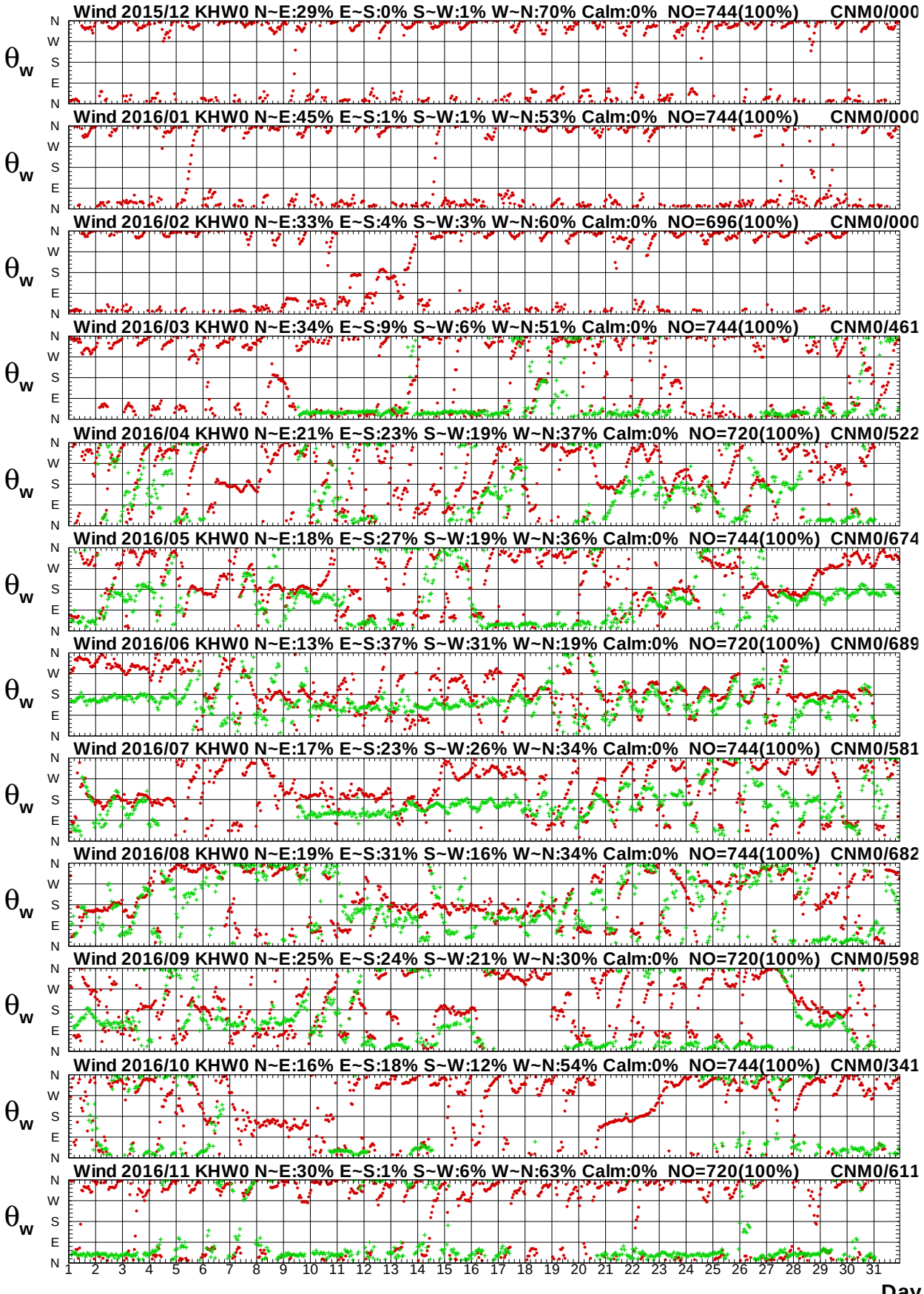


圖 1.25b　2016年每月高雄海域 W 站與嘉南海域 M 站風向圖

W15CKHW0.1HA W15CCNM0.1H0 W161KHW0.1HA W161CNM0.1H0 W162KHW0.1HA W162CNM0.1H0
W163KHW0.1HA W163CNM0.1H0 W164KHW0.1HA W164CNM0.1H0 W165KHW0.1HA W165CNM0.1H0

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# 第二章　2016 年高雄海域觀測波浪資料

高雄海域波浪觀測係本中心**(IHMT)**2000 年 12 月於中區污水處理廠附近海域安置 NORTEK 公司之剖面海流與波浪即時監測系統(**測站 X0**)，如圖 2，以進行長期觀測。本站於 2005 年 8 月移至第二港口附近海(**稱測站 X1**)，水深約 18m;另於 2014 年 4 月及 12 月分別於第一港口及第二港口附近海(**測站 A** 及**測站 1、測站 2)**，增設潮波儀站。

**測站 Z**(彌陀外海浮標站)之波浪儀則屬水利署**(WRA)**所有。高雄海域各測站歷年觀測波浪資料蒐集概況如表 2。

波浪觀測 AWCP 系統有兩個分離波高量測模式:一個是對平靜波浪時，當資料由傳統式壓力感應器量測時將會因儀器佈放的深度而受很大的影響。此時，表面高度必須用一個聲波式的高度感應器量測波高。AWCP 波向量測範圍：波向的量測從海面下 3 米以上的流向資料與波高資料計算轉換而得。對攪動的海況來說；用於轉換波向的該層深度應該自動被調整為平均水位也就是 $H_{max/2}$。量測的參數為：平均波向及波向分佈，波向單位為度。

本波浪年報以取經檢核或修補後之 **W 站**資料作為**主要觀測站**，2016 年主要觀測站修補前(後)每月觀測之波浪資料記錄期間統計表，如表 2.1a，2016 年波浪**次要觀測站**資料(未補餘)記錄統計表，如表 2.1b，**主要觀測站修補前後**每月波浪歷線比較圖，如圖 2.1，**主要觀測站**與**次要觀測站**(或**其他觀測站**)每月波浪歷線比較圖，如圖 2.2 以後。

**表 2 高雄海域觀測波浪資料蒐集概況表(統計時間至 2016 年 11 月)**

| 測站 | 緯度 | 經度 | 觀測期間 | 觀測單位 | 備註 |
|---|---|---|---|---|---|
| X0 | 22°34'23"N | 120°16'09"E | 2000/12-2005/08 | 港研中心 | 高雄中洲外海 |
| X1 | 22°32'34"N | 120°17'38"E | 2005/08-2016/11(觀測中) | 港研中心 | 高雄 2 港口外海 |
| A | 22°38'36"N | 120°14'13"E | 2014/04-2016/03 | 港研中心 | 高雄 1 港口外海 |
| 1 | | | 2014/12-2015/12 | 港研中心 | 高雄 2 港口外海 |
| 2 | | | 2015/12-2016/11 | 港研中心 | 高雄 2 港口外海 |
| Z | 22°45'50"N | 120°09'49"E | 2012/09-2016/11(觀測中) | 水利署 | 彌陀外海浮標站 |

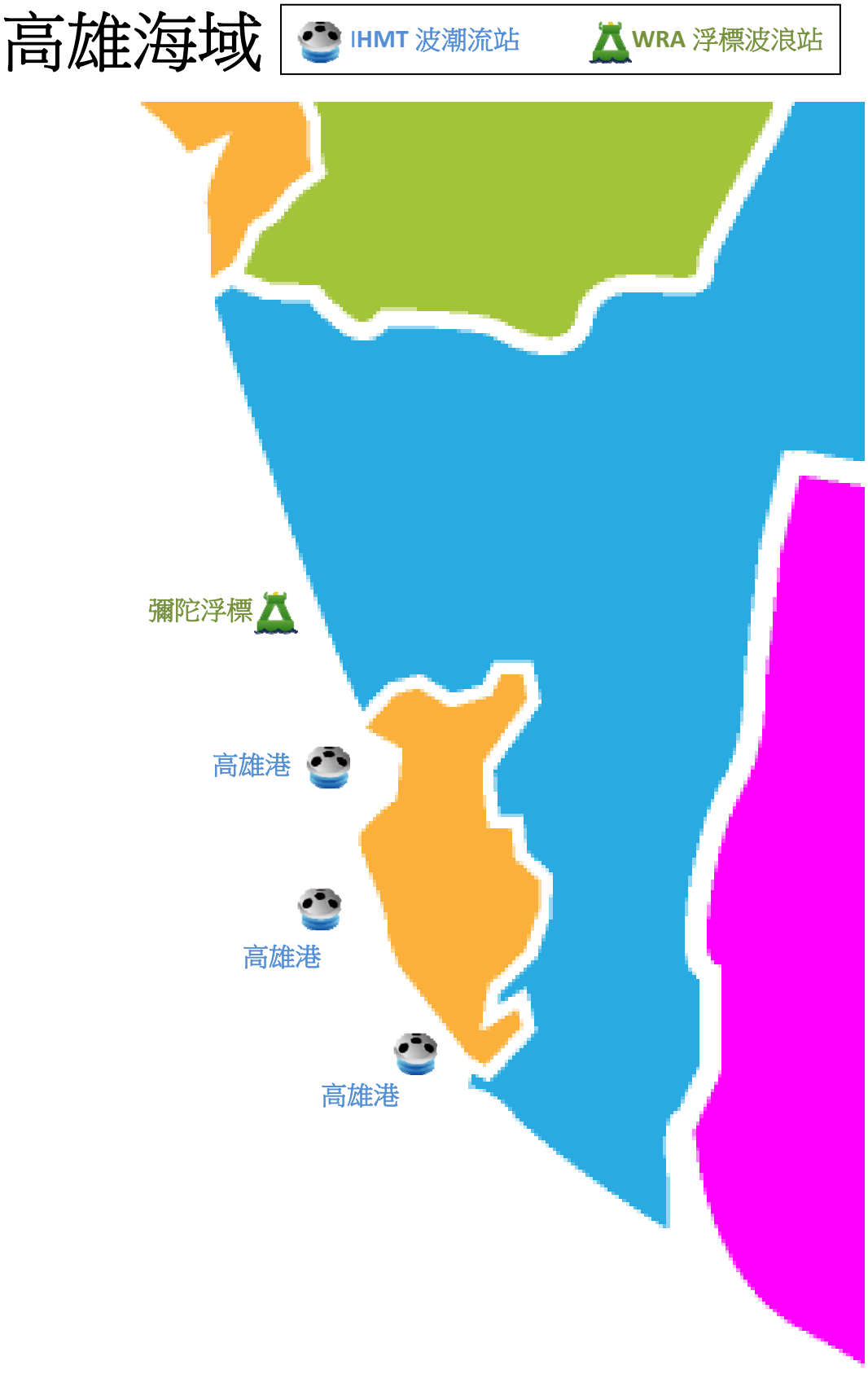


圖 2 高雄海域波浪觀測站位置示意圖

# 表2.1a 2016年每月高雄海域修補前各測站觀測波浪資料紀錄統計表

| 年/月 港區 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 |
|---|---|---|---|---|---|---|---|---|
| 測站 | X | Z | A | 1 | 2 | | | |
| **2015/12**月 | 738 (99.2%) | 668 (89.8%) | * | 250 (33.6%) | 470 (63.2%) | * | * | * |
| **2016/ 1**月 | 743 (99.9%) | 670 (90.1%) | * | * | 729 (98.0%) | * | * | * |
| **2016/ 2**月 | 691 (99.3%) | 632 (90.8%) | * | * | 657 (94.4%) | * | * | * |
| **2016/ 3**月 | 743 (99.9%) | 678 (91.1%) | * | * | 744 (100%) | * | * | * |
| **2016/ 4**月 | 718 (99.7%) | 667 (92.6%) | * | * | 720 (100%) | * | * | * |
| **2016/ 5**月 | 738 (99.2%) | 711 (95.6%) | * | * | 744 (100%) | * | * | * |
| **2016/ 6**月 | 720 (100%) | 688 (95.6%) | * | * | 719 (99.9%) | * | * | * |
| **2016/ 7**月 | 706 (94.9%) | 703 (94.5%) | * | * | 744 (100%) | * | * | * |
| **2016/ 8**月 | 623 (83.7%) | 731 (98.3%) | * | * | 744 (100%) | * | * | * |
| **2016/ 9**月 | 714 (99.2%) | 687 (95.4%) | * | * | 718 (99.7%) | * | * | * |
| **2016/10**月 | 734 (98.7%) | 711 (95.6%) | * | * | 744 (100%) | * | * | * |
| **2016/11**月 | 705 (97.9%) | 711 (98.8%) | * | * | 177 (24.6%) | * | * | * |
| **2016/**冬季 | * | * | * | * | * | * | * | * |
| **2016/**春季 | * | * | * | * | * | * | * | * |
| **2016/**夏季 | * | * | * | * | * | * | * | * |
| **2016/**秋季 | * | * | * | * | * | * | * | * |
| **2016/**整年 | * | * | * | * | * | * | * | * |
| 起始年月 | * | * | * | * | * | * | * | * |
| 結束年月 | * | * | * | * | * | * | * | * |

# 表2.1b 2016年每月高雄海域修補後各測站波浪資料統計表

| 年/月 港區 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 |
|---|---|---|---|---|---|---|---|---|
| 測站 | X | Z | A | 1 | 2 | | | |
| **2015/12**月 | 744 (100%) | * | * | * | * | * | * | * |
| **2016/ 1**月 | 744 (100%) | * | * | * | * | * | * | * |
| **2016/ 2**月 | 696 (100%) | * | * | * | * | * | * | * |
| **2016/ 3**月 | 744 (100%) | * | * | * | * | * | * | * |
| **2016/ 4**月 | 720 (100%) | * | * | * | * | * | * | * |
| **2016/ 5**月 | 744 (100%) | * | * | * | * | * | * | * |
| **2016/ 6**月 | 720 (100%) | * | * | * | * | * | * | * |
| **2016/ 7**月 | 744 (100%) | * | * | * | * | * | * | * |
| **2016/ 8**月 | 744 (100%) | * | * | * | * | * | * | * |
| **2016/ 9**月 | 720 (100%) | * | * | * | * | * | * | * |
| **2016/10**月 | 744 (100%) | * | * | * | * | * | * | * |
| **2016/11**月 | 720 (100%) | * | * | * | * | * | * | * |
| **2016/**冬季 | * | * | * | * | * | * | * | * |
| **2016/**春季 | * | * | * | * | * | * | * | * |
| **2016/**夏季 | * | * | * | * | * | * | * | * |
| **2016/**秋季 | * | * | * | * | * | * | * | * |
| **2016/**整年 | * | * | * | * | * | * | * | * |
| 起始年月 | * | * | * | * | * | * | * | * |
| 結束年月 | * | * | * | * | * | * | * | * |

# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

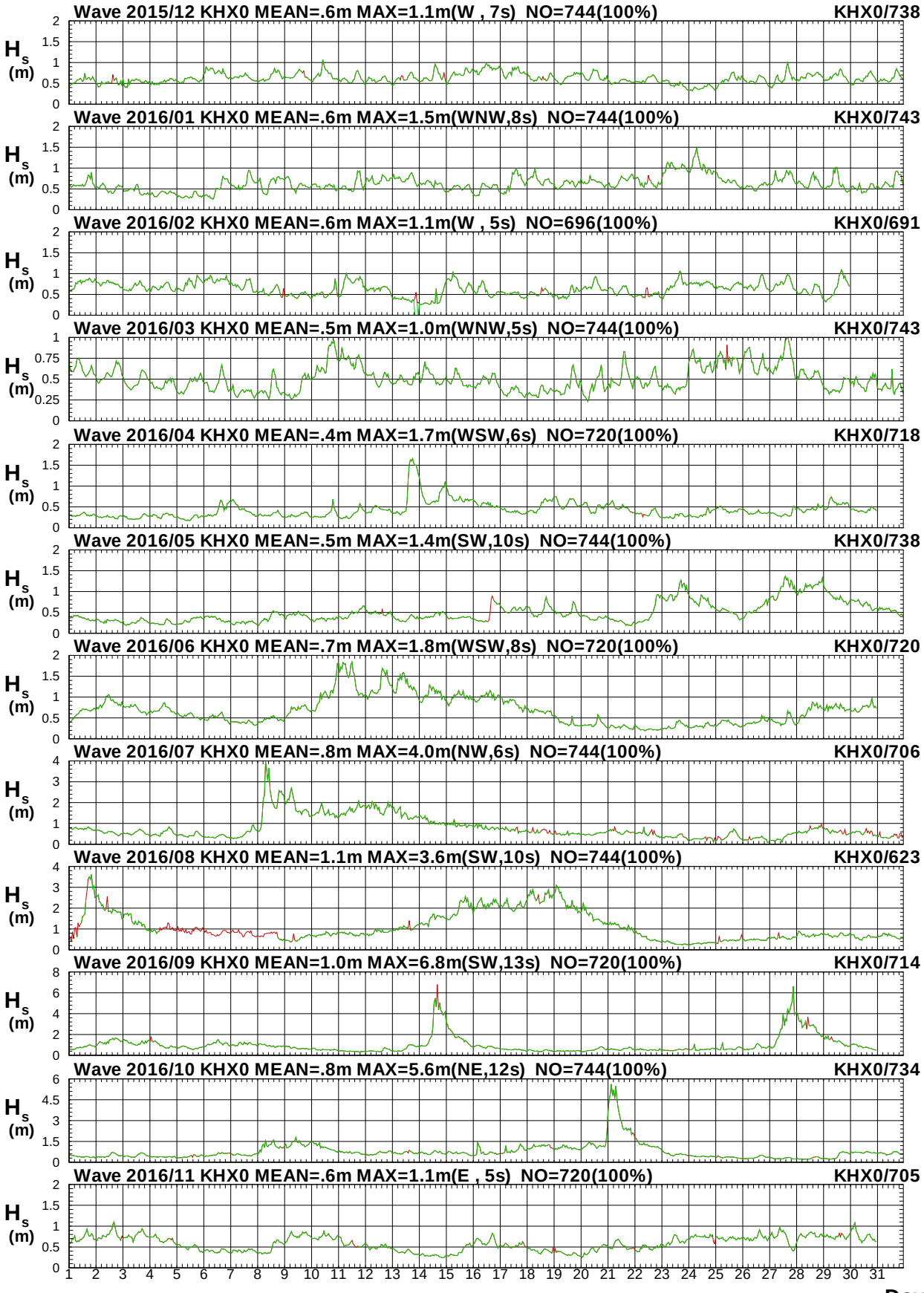


圖 2.1a　2016年每月高雄海域 X 站修補前後之波高比較圖

V15CKHX0.1HA V15CKHX0.1H0 V161KHX0.1HA V161KHX0.1H0 V162KHX0.1HA V162KHX0.1H0
V163KHX0.1HA V163KHX0.1H0 V164KHX0.1HA V164KHX0.1H0 V165KHX0.1HA V165KHX0.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

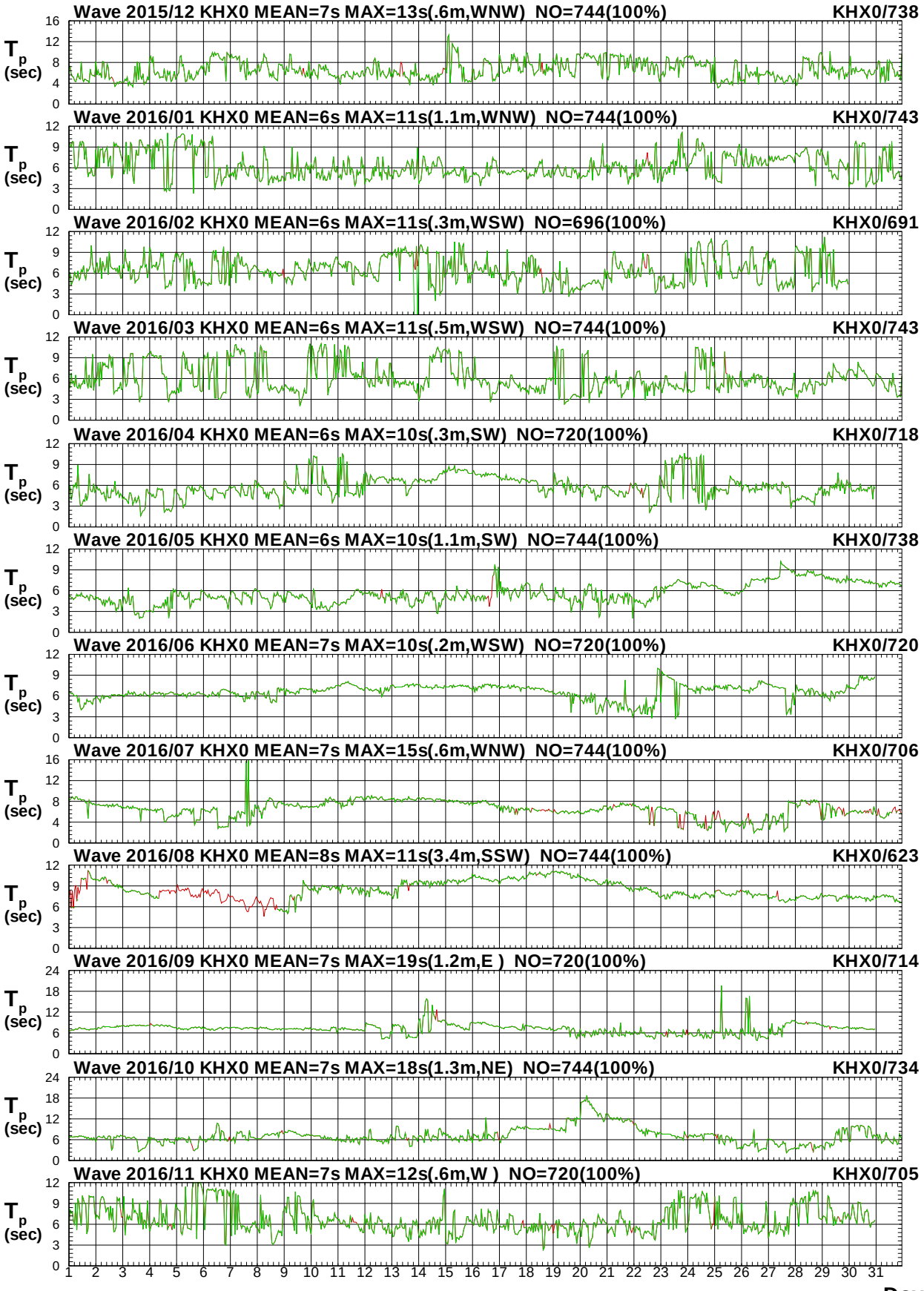


圖 2.1b　2016年每月高雄海域 X 站修補前後之週期比較圖

V15CKHX0.1HA V15CKHX0.1H0 V161KHX0.1HA V161KHX0.1H0 V162KHX0.1HA V162KHX0.1H0
V163KHX0.1HA V163KHX0.1H0 V164KHX0.1HA V164KHX0.1H0 V165KHX0.1HA V165KHX0.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

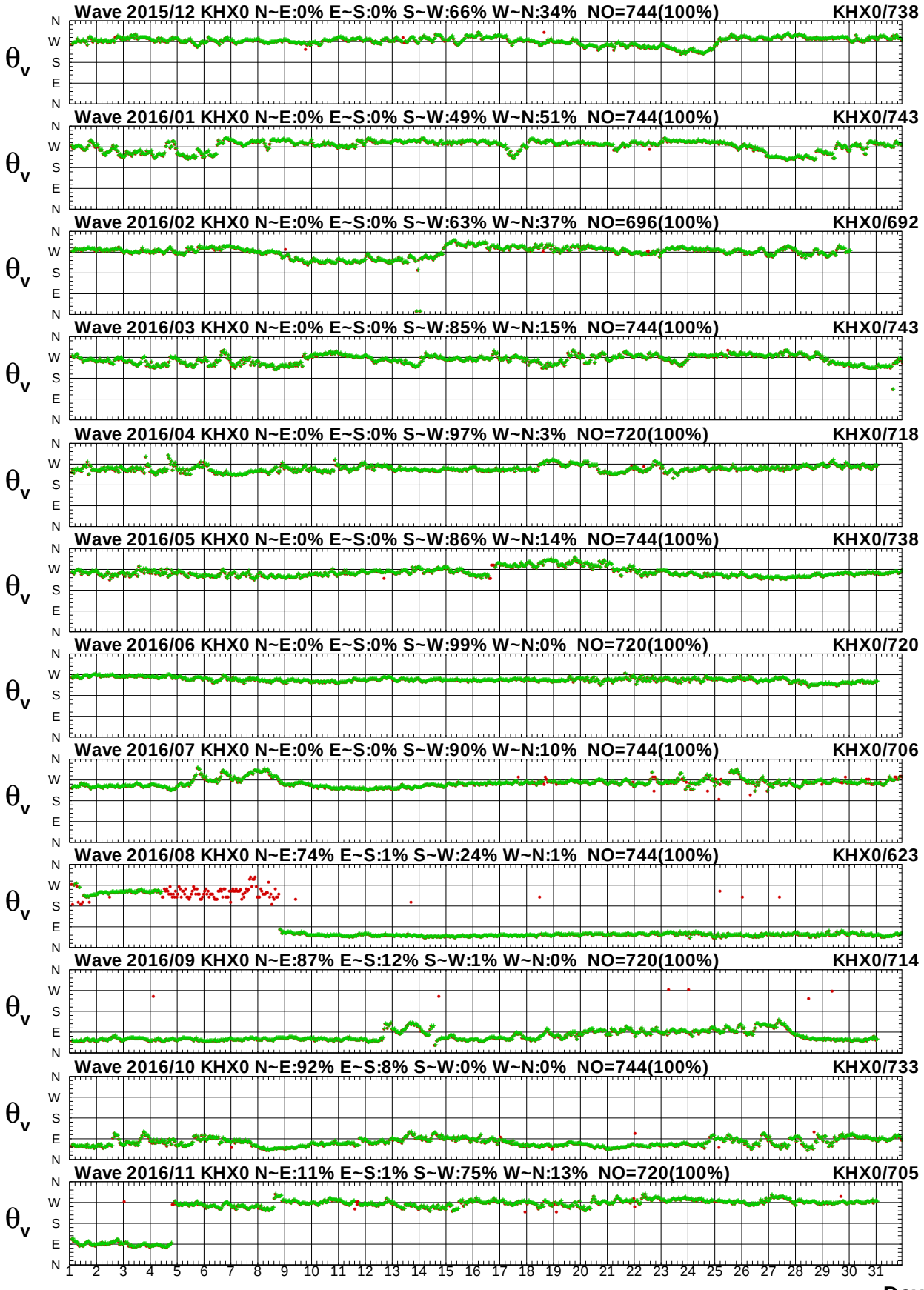


圖2.1c　2016年每月高雄海域 X 站修補前後之波向比較圖

# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

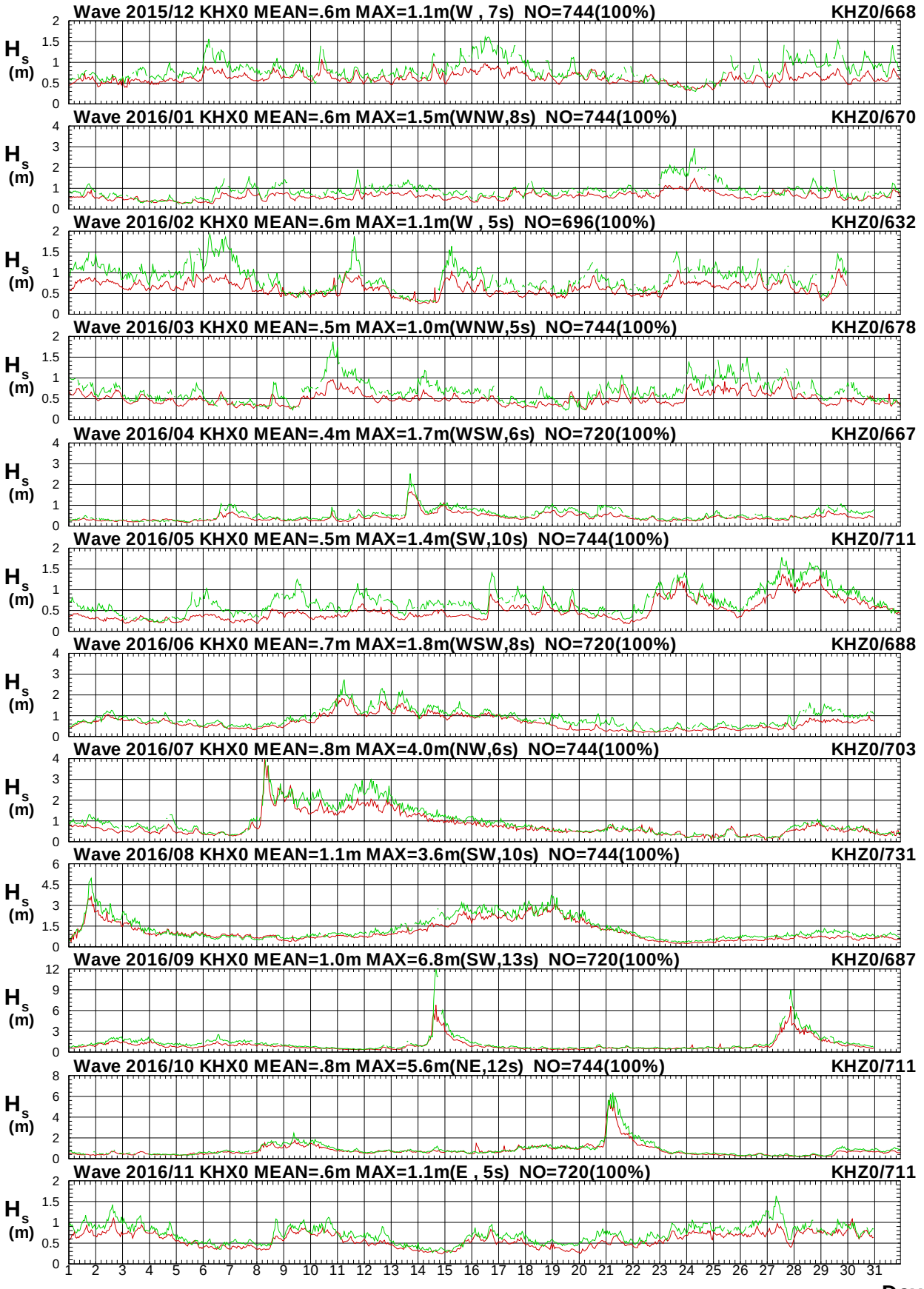


圖 2.2a　2016年每月高雄海域 X 站與 Z 站波高比較圖

V15CKHX0.1HA V15CKHZ0.1H0 V161KHX0.1HA V161KHZ0.1H0 V162KHX0.1HA V162KHZ0.1H0
V163KHX0.1HA V163KHZ0.1H0 V164KHX0.1HA V164KHZ0.1H0 V165KHX0.1HA V165KHZ0.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

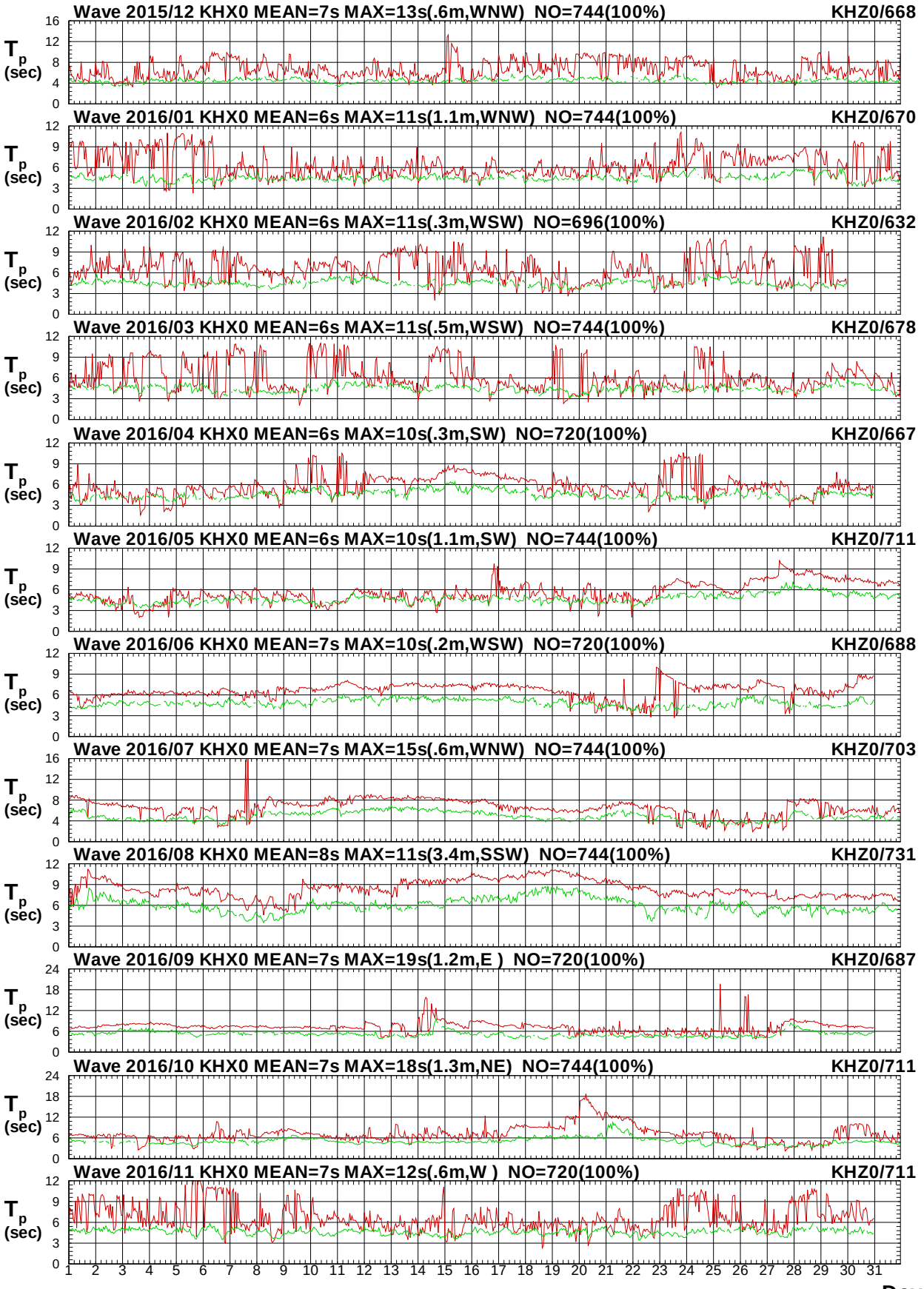


圖 2.2b　2016年每月高雄海域 X 站與 Z 站週期比較圖

V15CKHX0.1HA V15CKHZ0.1H0 V161KHX0.1HA V161KHZ0.1H0 V162KHX0.1HA V162KHZ0.1H0
V163KHX0.1HA V163KHZ0.1H0 V164KHX0.1HA V164KHZ0.1H0 V165KHX0.1HA V165KHZ0.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

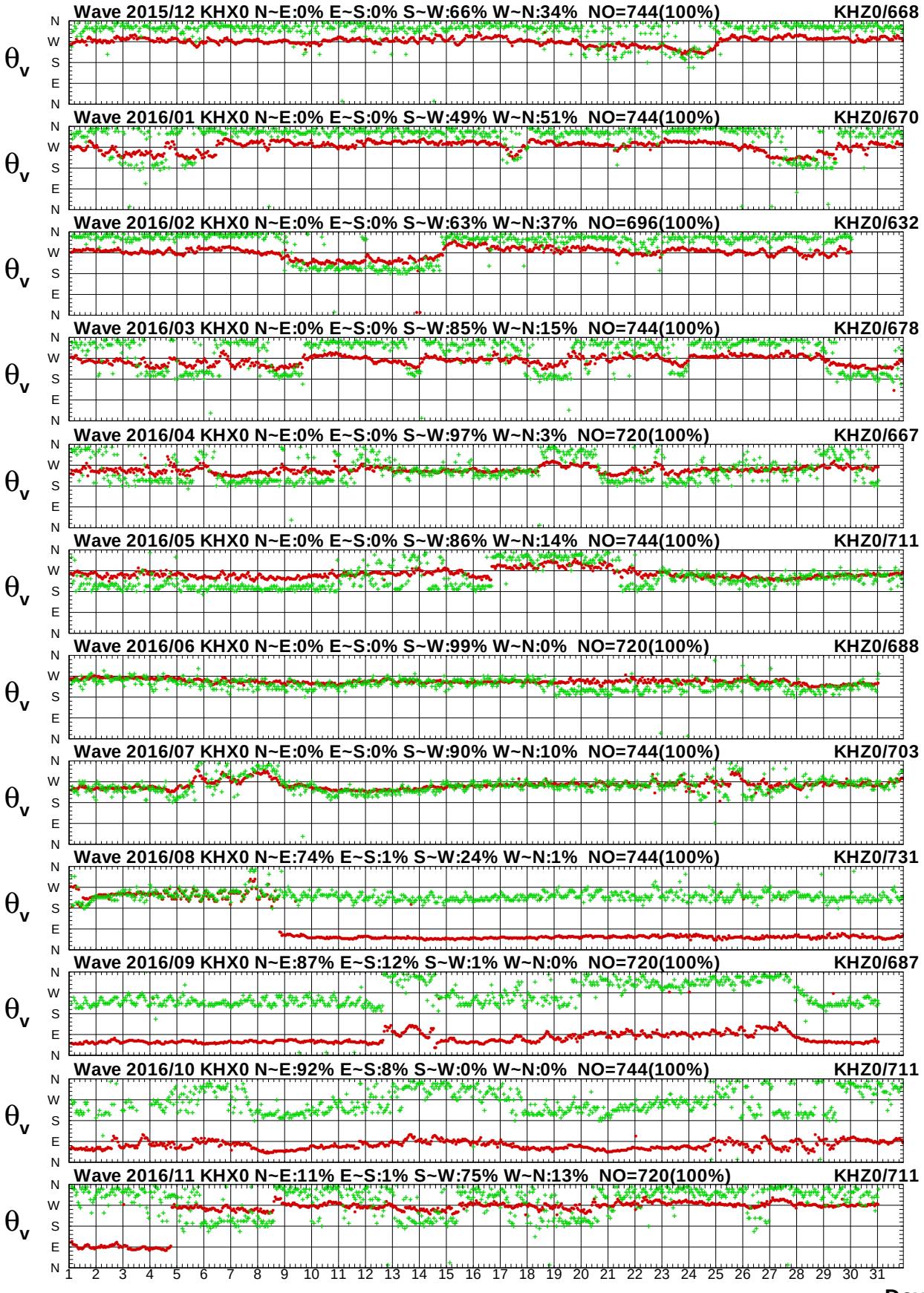


圖 2.2c　2016年每月高雄海域 X 站與 Z 站波向比較圖

V15CKHX0.1HA V15CKHZ0.1H0 V161KHX0.1HA V161KHZ0.1H0 V162KHX0.1HA V162KHZ0.1H0
V163KHX0.1HA V163KHZ0.1H0 V164KHX0.1HA V164KHZ0.1H0 V165KHX0.1HA V165KHZ0.1H0

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# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

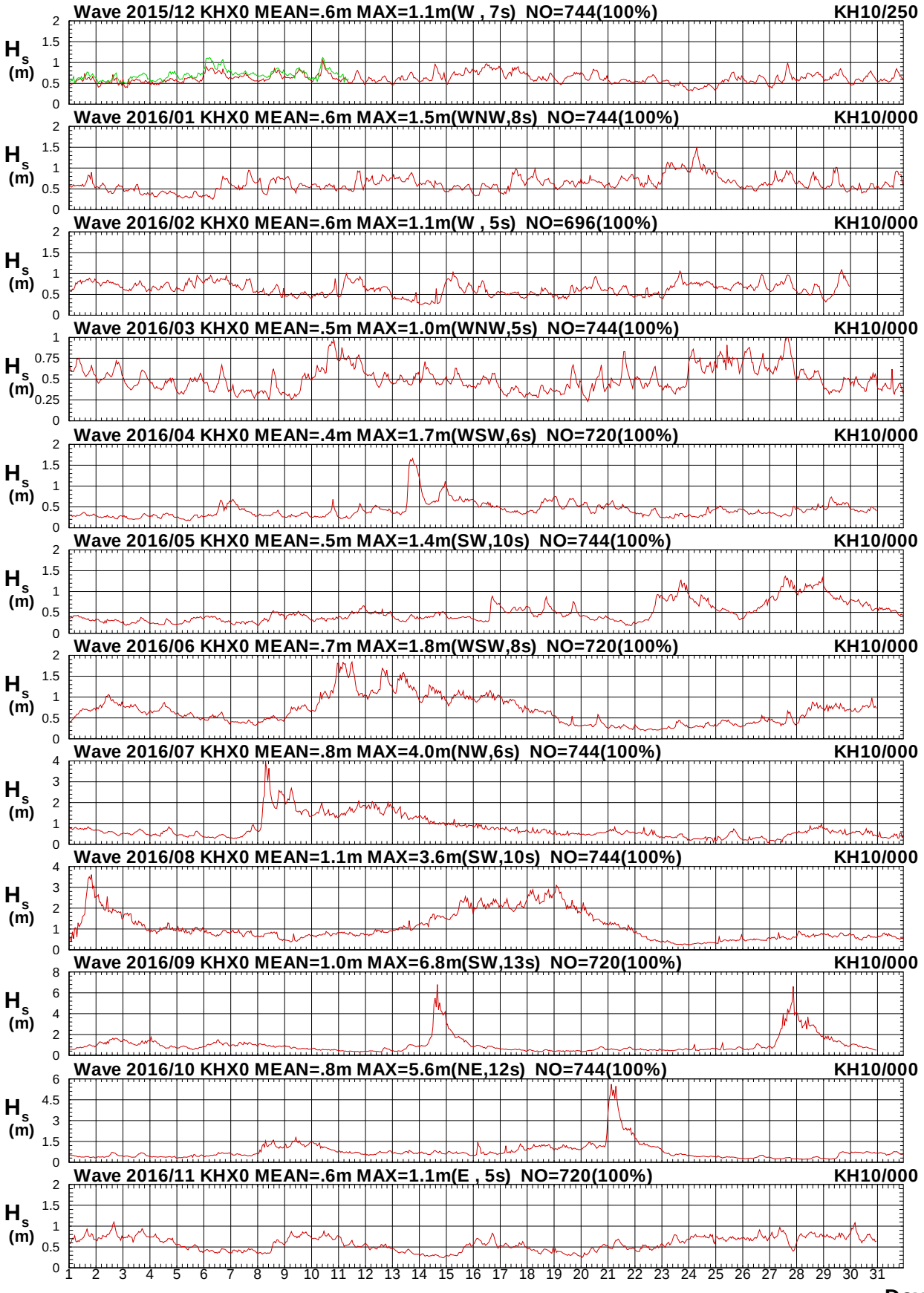


圖 2.3a　2016年每月高雄海域 X 站與 1 站波高比較圖

V15CKHX0.1HA V15CKH10.1H0 V161KHX0.1HA V161KH10.1H0 V162KHX0.1HA V162KH10.1H0
V163KHX0.1HA V163KH10.1H0 V164KHX0.1HA V164KH10.1H0 V165KHX0.1HA V165KH10.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

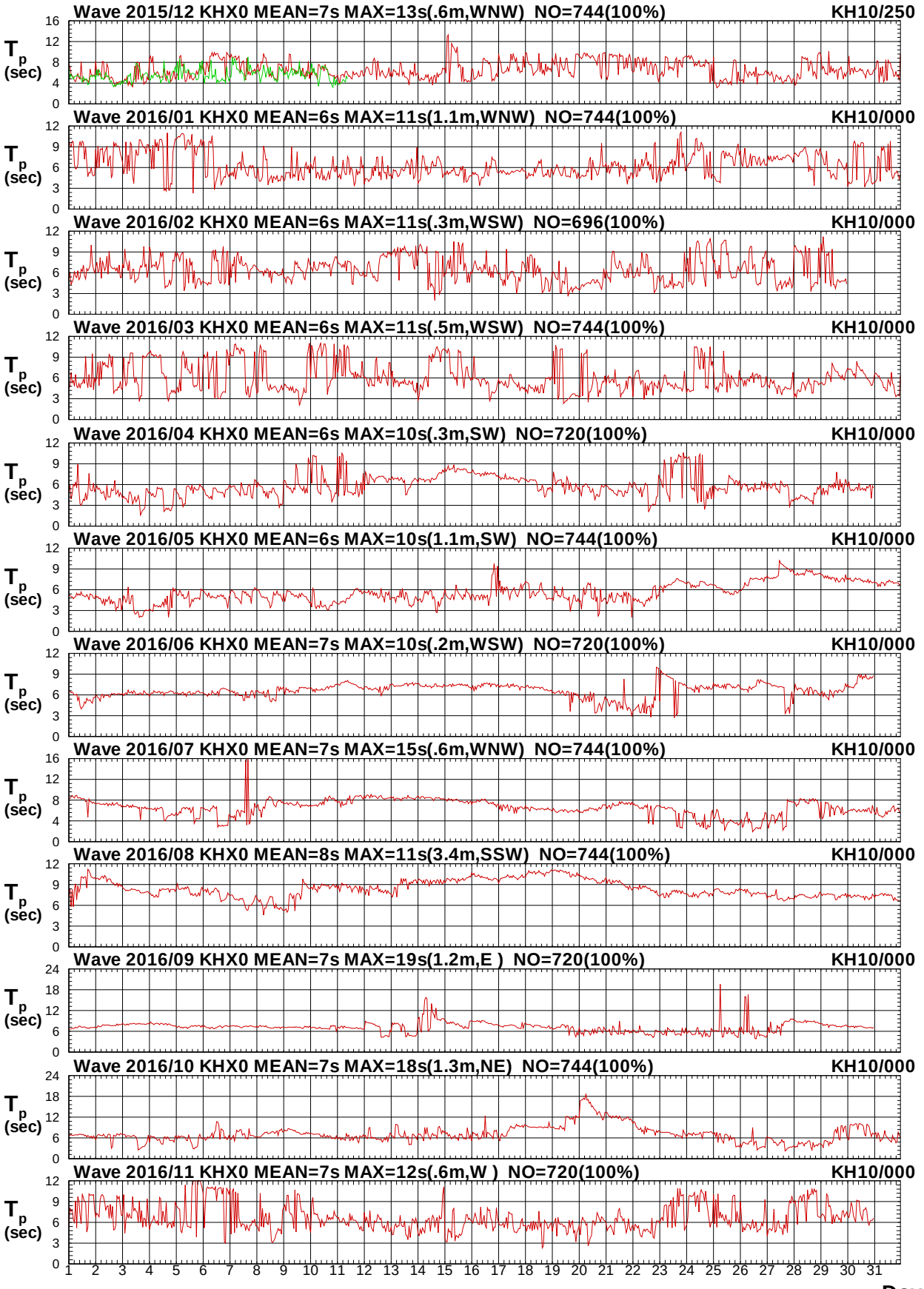


圖 2.3b　2016年每月高雄海域 X 站與 1 站週期比較圖

V15CKHX0.1HA V15CKH10.1H0 V161KHX0.1HA V161KH10.1H0 V162KHX0.1HA V162KH10.1H0
V163KHX0.1HA V163KH10.1H0 V164KHX0.1HA V164KH10.1H0 V165KHX0.1HA V165KH10.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

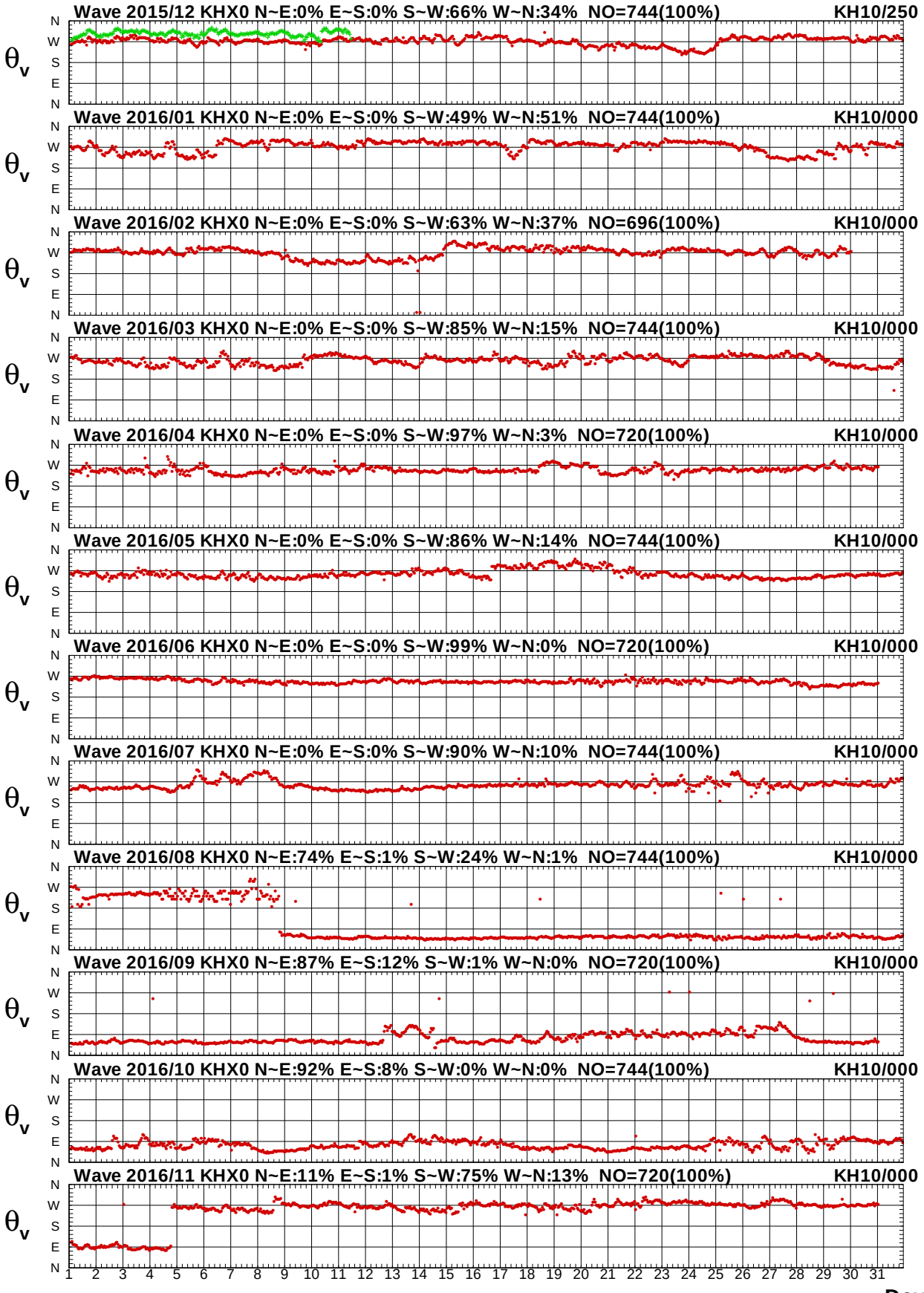


圖 2.3c　2016年每月高雄海域 X 站與 1 站波向比較圖

V15CKHX0.1HA V15CKH10.1H0 V161KHX0.1HA V161KH10.1H0 V162KHX0.1HA V162KH10.1H0
V163KHX0.1HA V163KH10.1H0 V164KHX0.1HA V164KH10.1H0 V165KHX0.1HA V165KH10.1H0

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# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

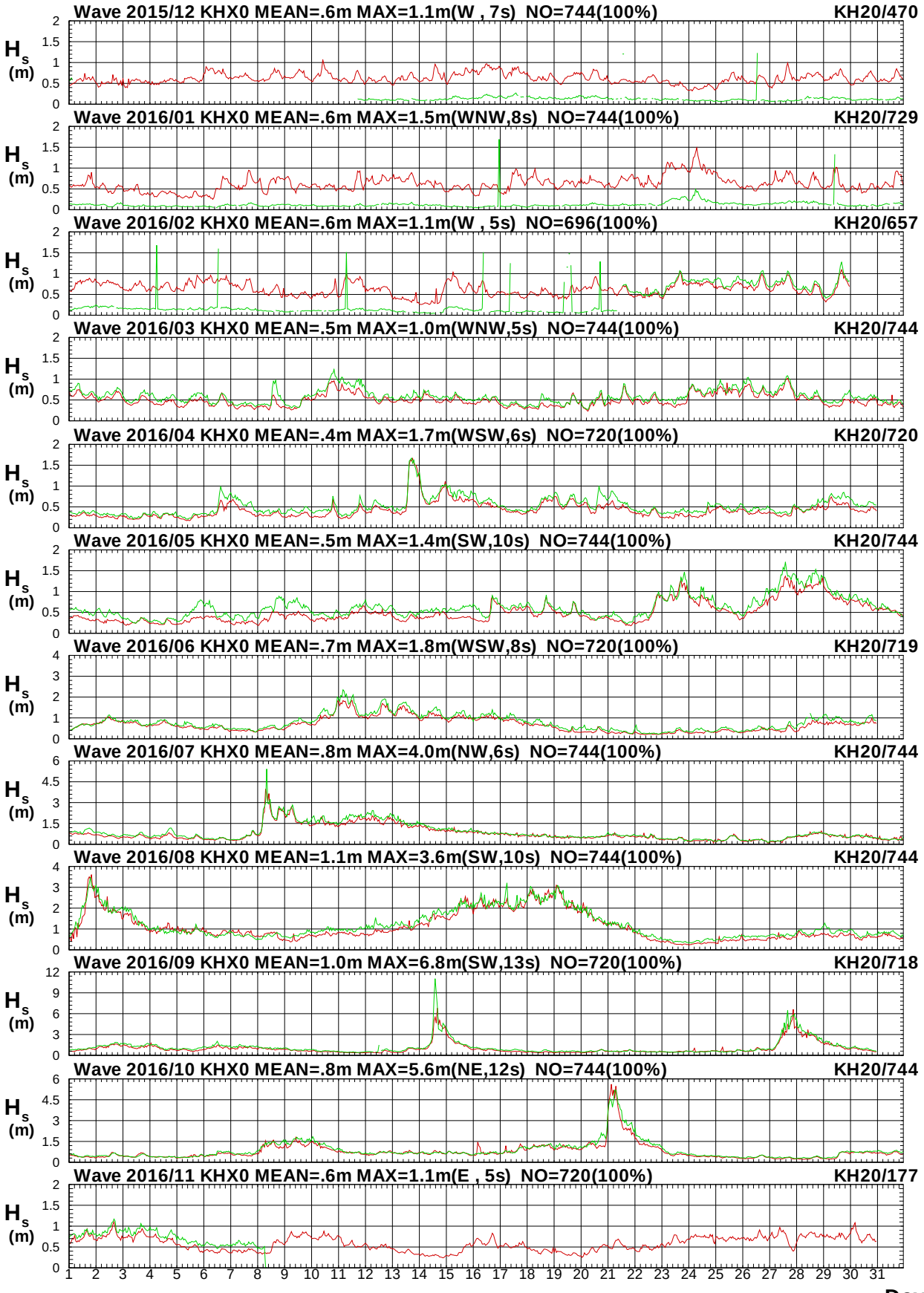


圖 2.4a　2016年每月高雄海域 X 站與2站波高比較圖

V15CKHX0.1HA V15CKH20.1H0 V161KHX0.1HA V161KH20.1H0 V162KHX0.1HA V162KH20.1H0
V163KHX0.1HA V163KH20.1H0 V164KHX0.1HA V164KH20.1H0 V165KHX0.1HA V165KH20.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

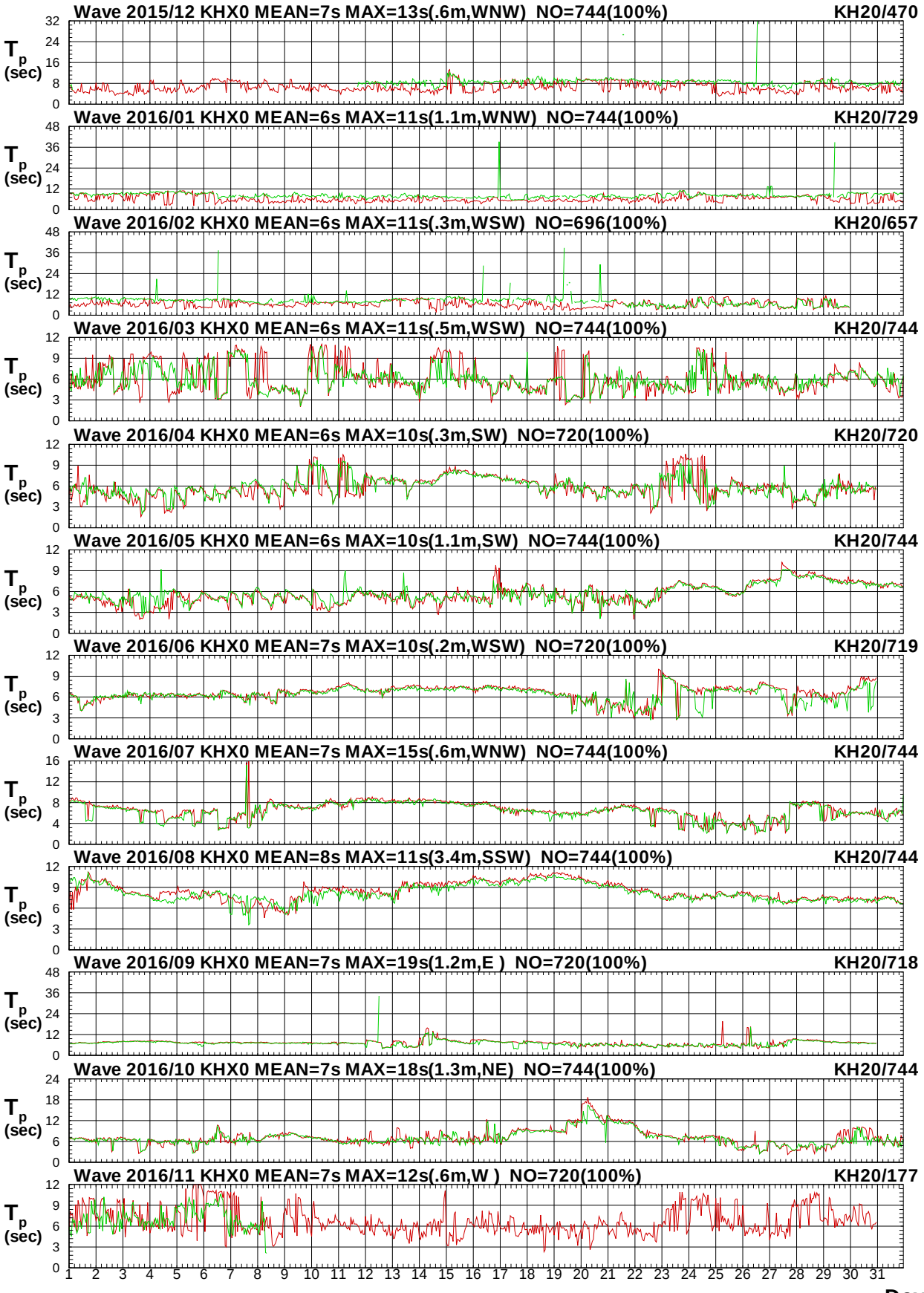


圖 2.4b　2016年每月高雄海域 X 站與2站週期比較圖

V15CKHX0.1HA V15CKH20.1H0 V161KHX0.1HA V161KH20.1H0 V162KHX0.1HA V162KH20.1H0
V163KHX0.1HA V163KH20.1H0 V164KHX0.1HA V164KH20.1H0 V165KHX0.1HA V165KH20.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

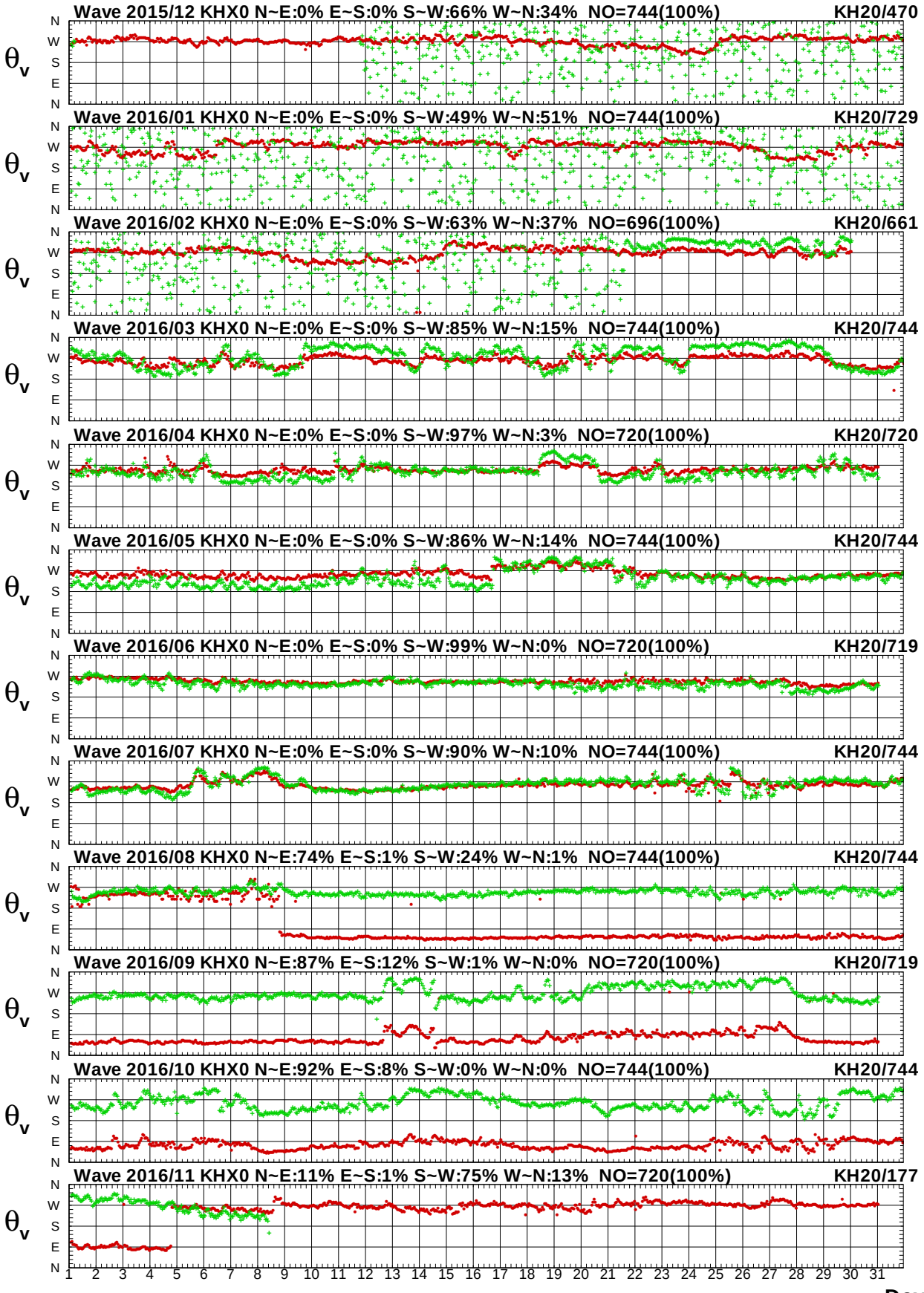


圖 2.4c　2016年每月高雄海域 X 站與2站波向比較圖

V15CKHX0.1HA V15CKH20.1H0 V161KHX0.1HA V161KH20.1H0 V162KHX0.1HA V162KH20.1H0
V163KHX0.1HA V163KH20.1H0 V164KHX0.1HA V164KH20.1H0 V165KHX0.1HA V165KH20.1H0

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# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

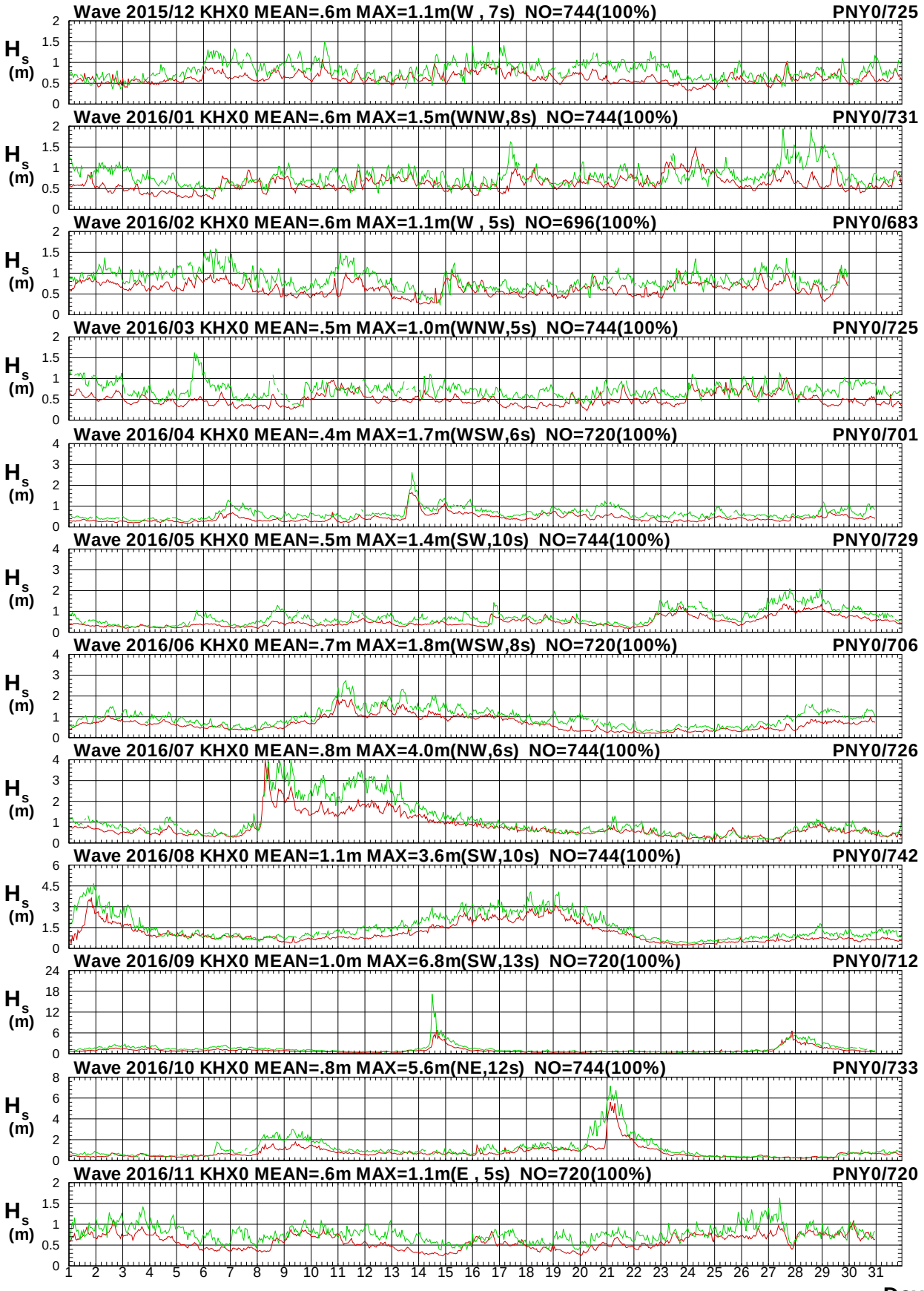


圖 2.5a　2016年每月高雄海域 X 站與屏東海域 Y 站波高圖

V15CKHX0.1HA V15CPNY0.1H0 V161KHX0.1HA V161PNY0.1H0 V162KHX0.1HA V162PNY0.1H0
V163KHX0.1HA V163PNY0.1H0 V164KHX0.1HA V164PNY0.1H0 V165KHX0.1HA V165PNY0.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

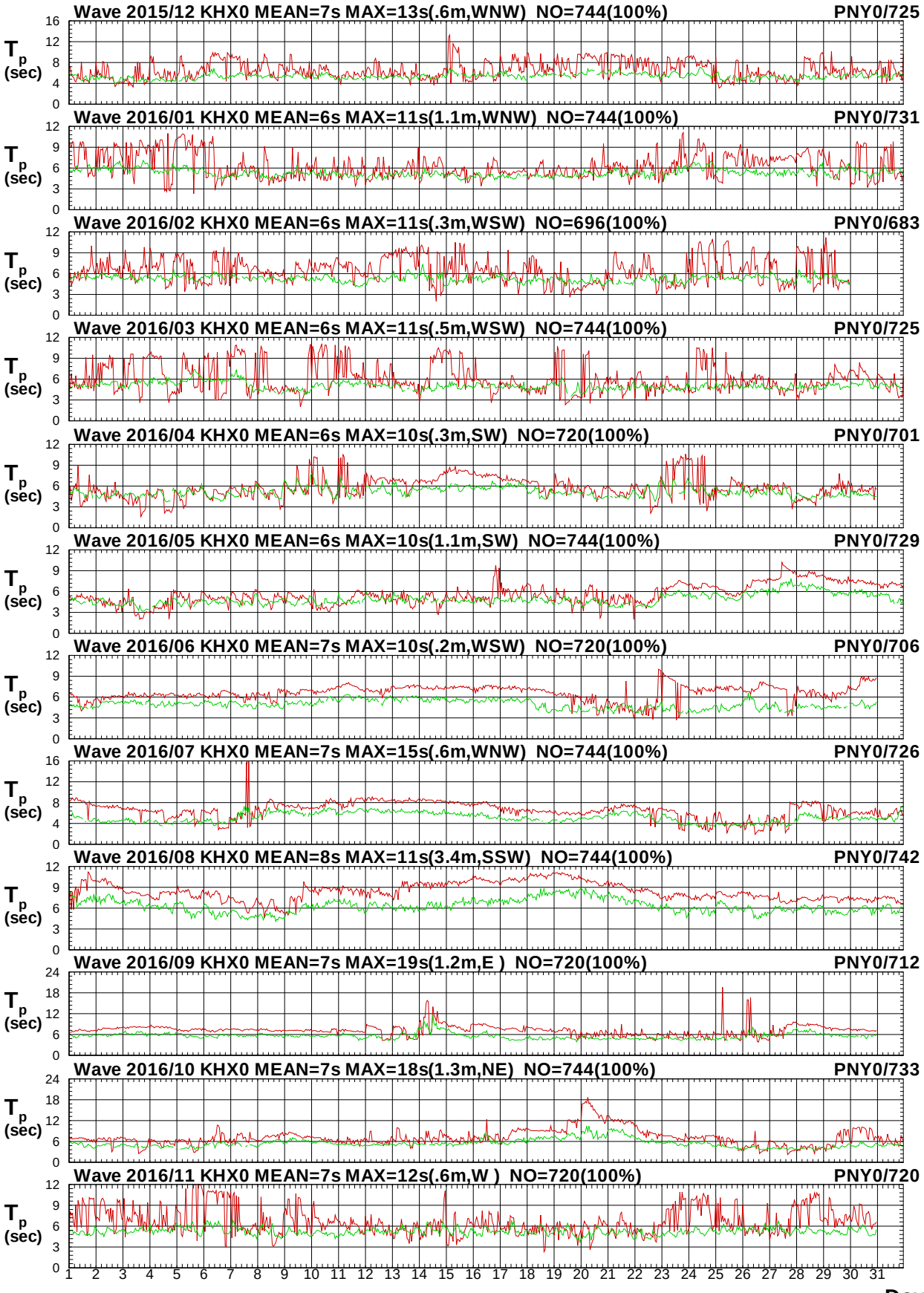


圖 2.5b　2016年每月高雄海域 X 站與屏東海域 Y 站週期圖

V15CKHX0.1HA V15CPNY0.1H0 V161KHX0.1HA V161PNY0.1H0 V162KHX0.1HA V162PNY0.1H0
V163KHX0.1HA V163PNY0.1H0 V164KHX0.1HA V164PNY0.1H0 V165KHX0.1HA V165PNY0.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

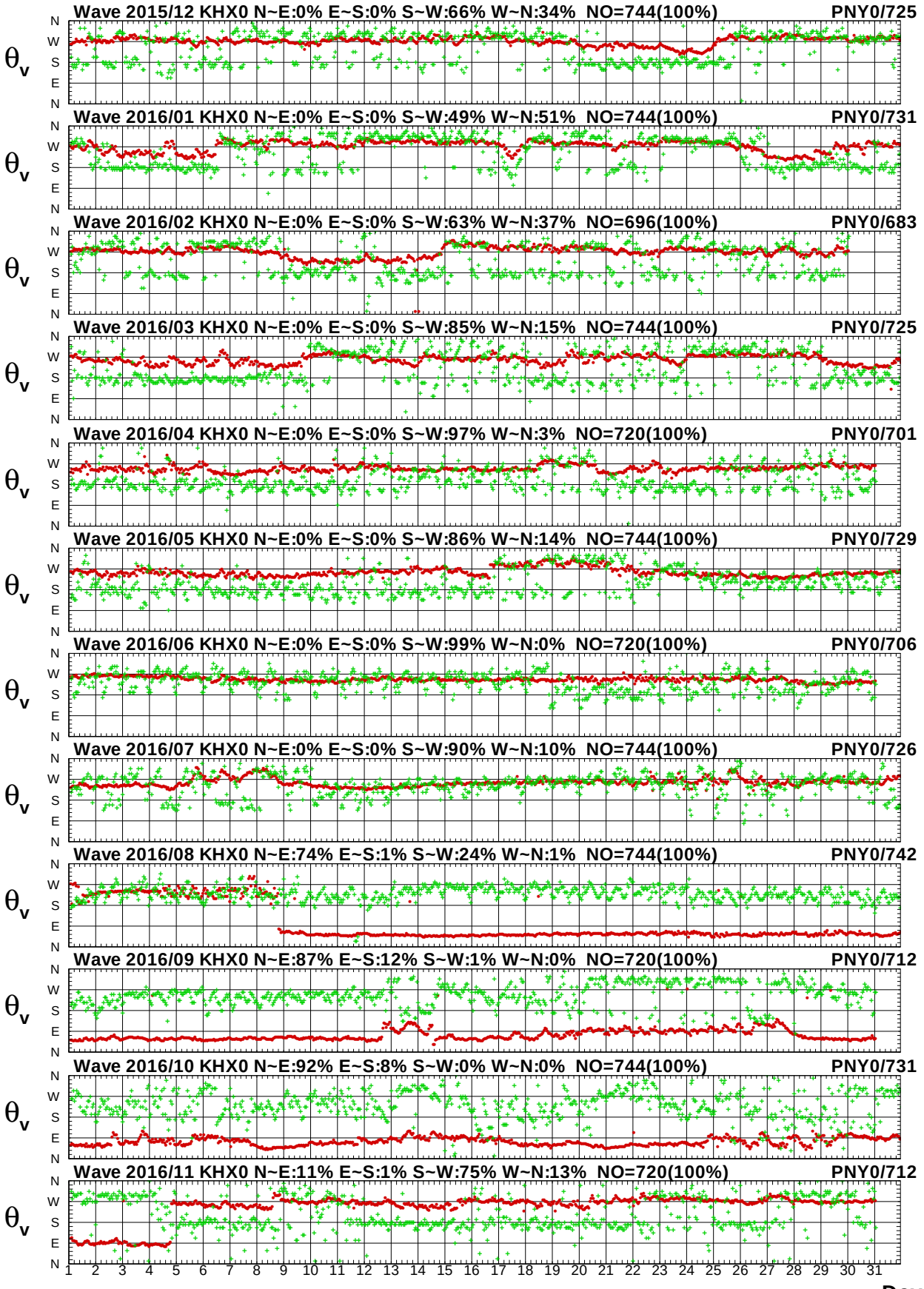


圖 2.5c　2016年每月高雄海域 X 站與屏東海域 Y 站波向圖

# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

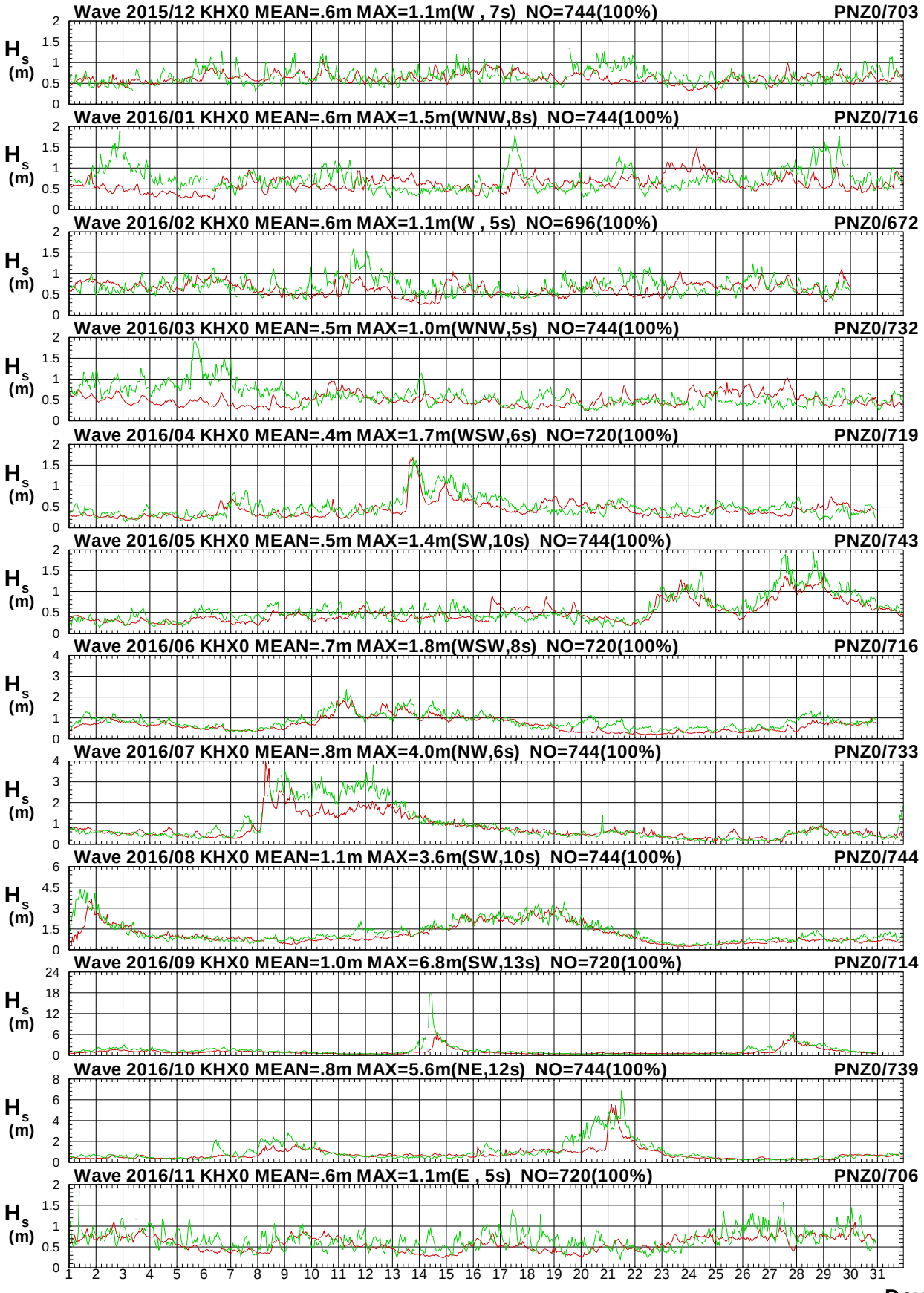


圖 2.6a　2016年每月高雄海域 X 站與屏東海域 Z 站波高圖

V15CKHX0.1HA V15CPNZ0.1H0 V161KHX0.1HA V161PNZ0.1H0 V162KHX0.1HA V162PNZ0.1H0
V163KHX0.1HA V163PNZ0.1H0 V164KHX0.1HA V164PNZ0.1H0 V165KHX0.1HA V165PNZ0.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

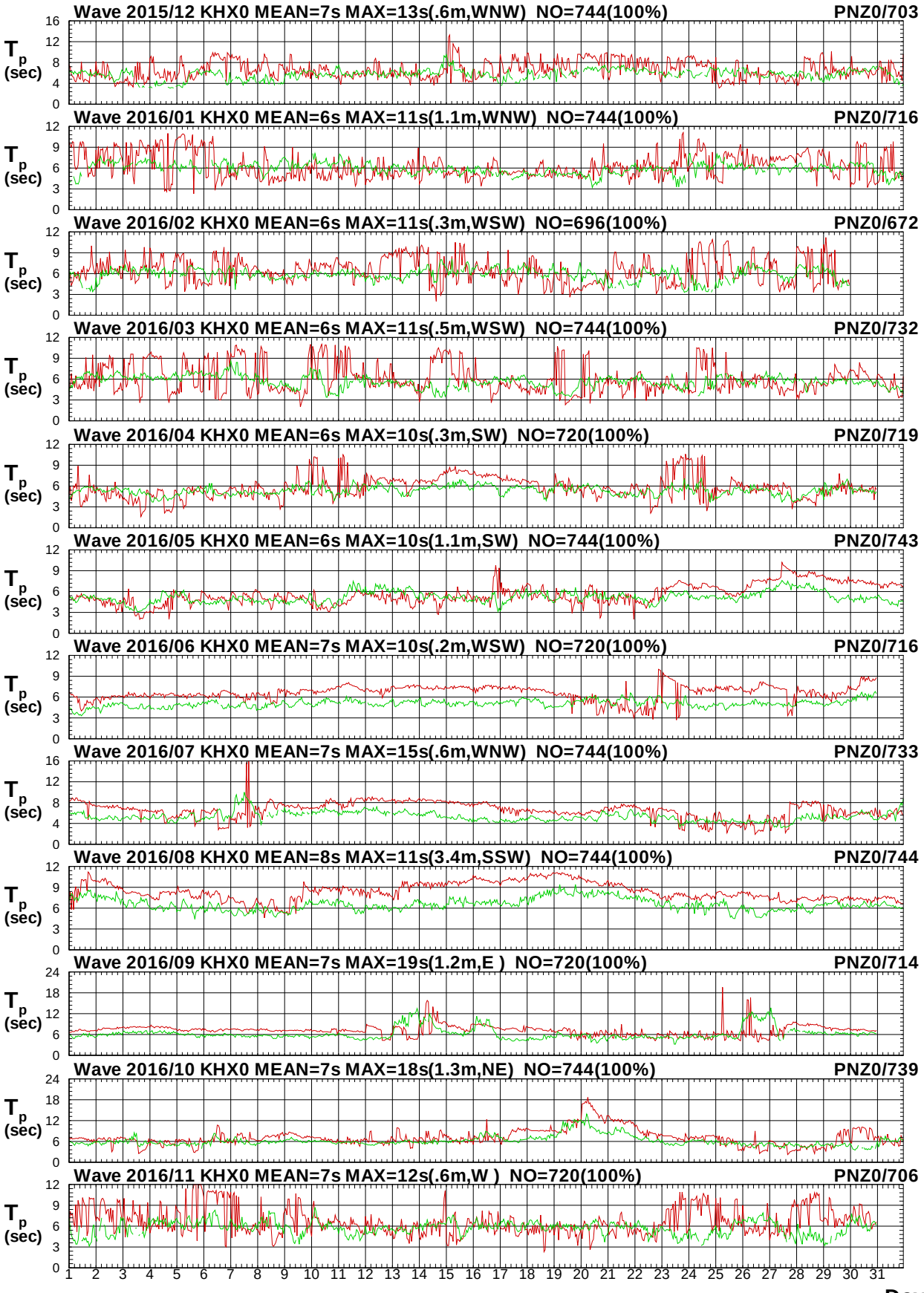


圖 2.6b　2016年每月高雄海域 X 站與屏東海域 Z 站週期圖

V15CKHX0.1HA V15CPNZ0.1H0 V161KHX0.1HA V161PNZ0.1H0 V162KHX0.1HA V162PNZ0.1H0
V163KHX0.1HA V163PNZ0.1H0 V164KHX0.1HA V164PNZ0.1H0 V165KHX0.1HA V165PNZ0.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

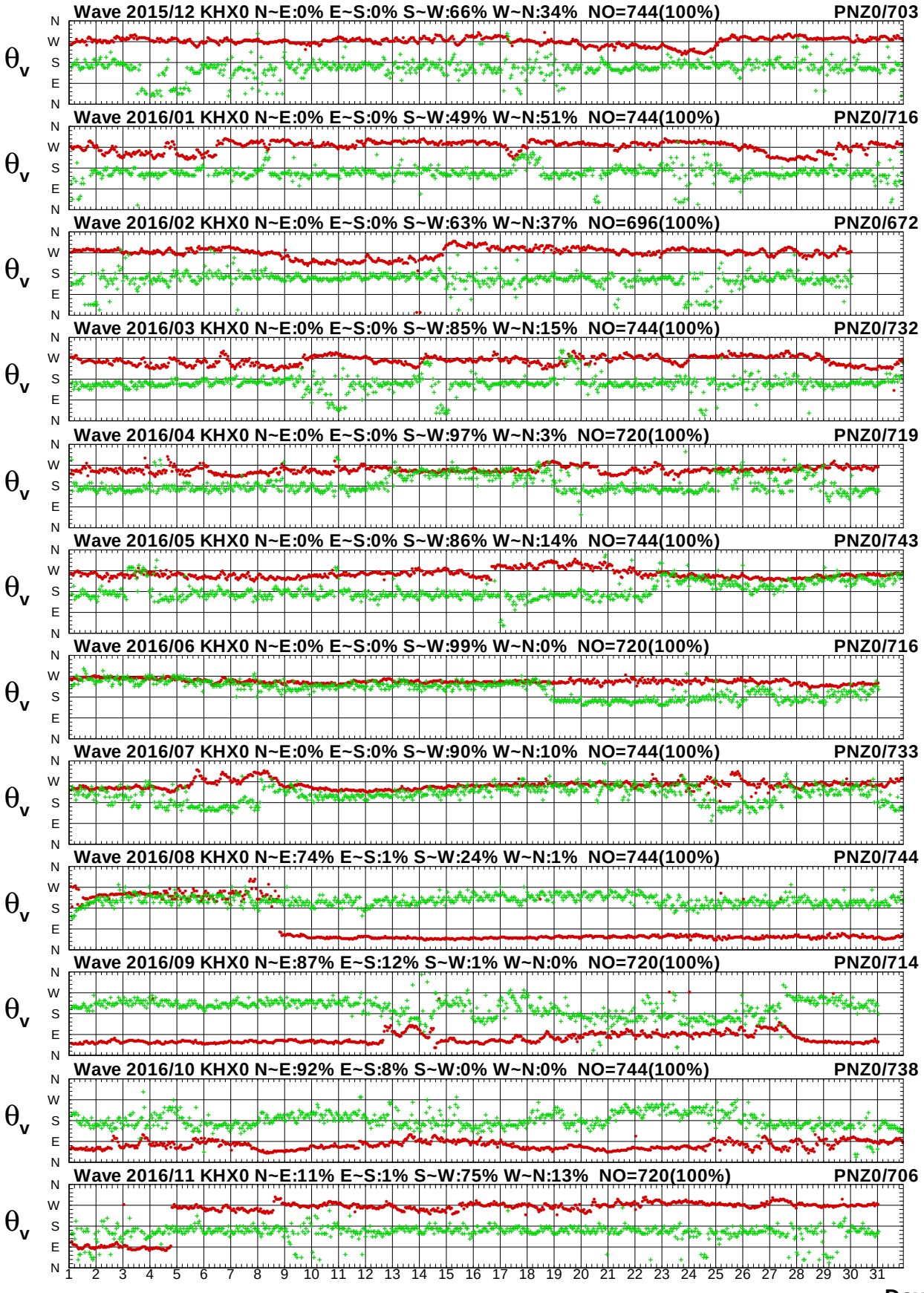


圖 2.6c　2016年每月高雄海域 X 站與屏東海域 Z 站波向圖

V15CKHX0.1HA V15CPNZ0.1H0 V161KHX0.1HA V161PNZ0.1H0 V162KHX0.1HA V162PNZ0.1H0
V163KHX0.1HA V163PNZ0.1H0 V164KHX0.1HA V164PNZ0.1H0 V165KHX0.1HA V165PNZ0.1H0

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# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

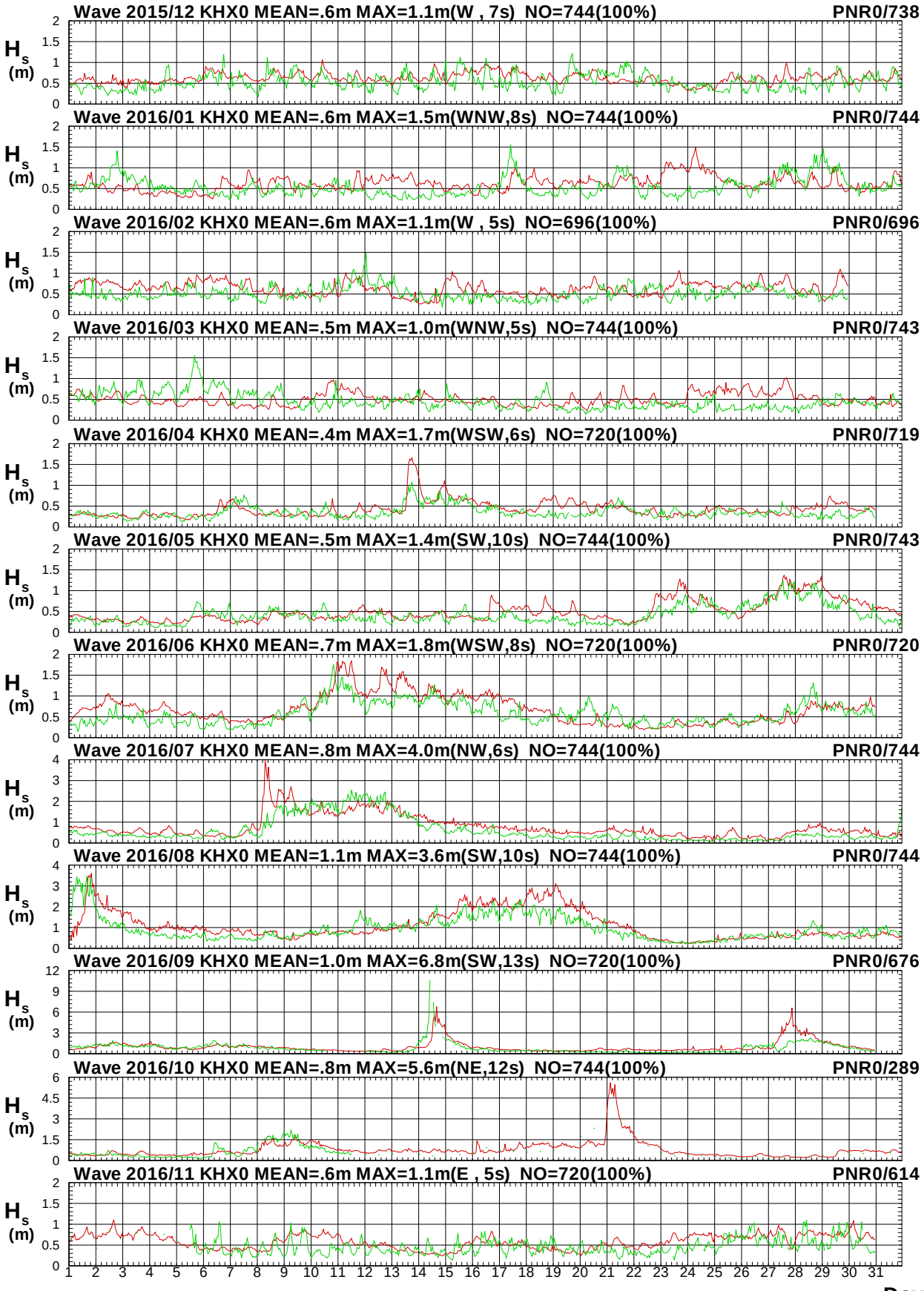


圖 2.7a　2016年每月高雄海域 X 站與屏東海域 R 站波高圖

V15CKHX0.1HA V15CPNR0.1H0 V161KHX0.1HA V161PNR0.1H0 V162KHX0.1HA V162PNR0.1H0
V163KHX0.1HA V163PNR0.1H0 V164KHX0.1HA V164PNR0.1H0 V165KHX0.1HA V165PNR0.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

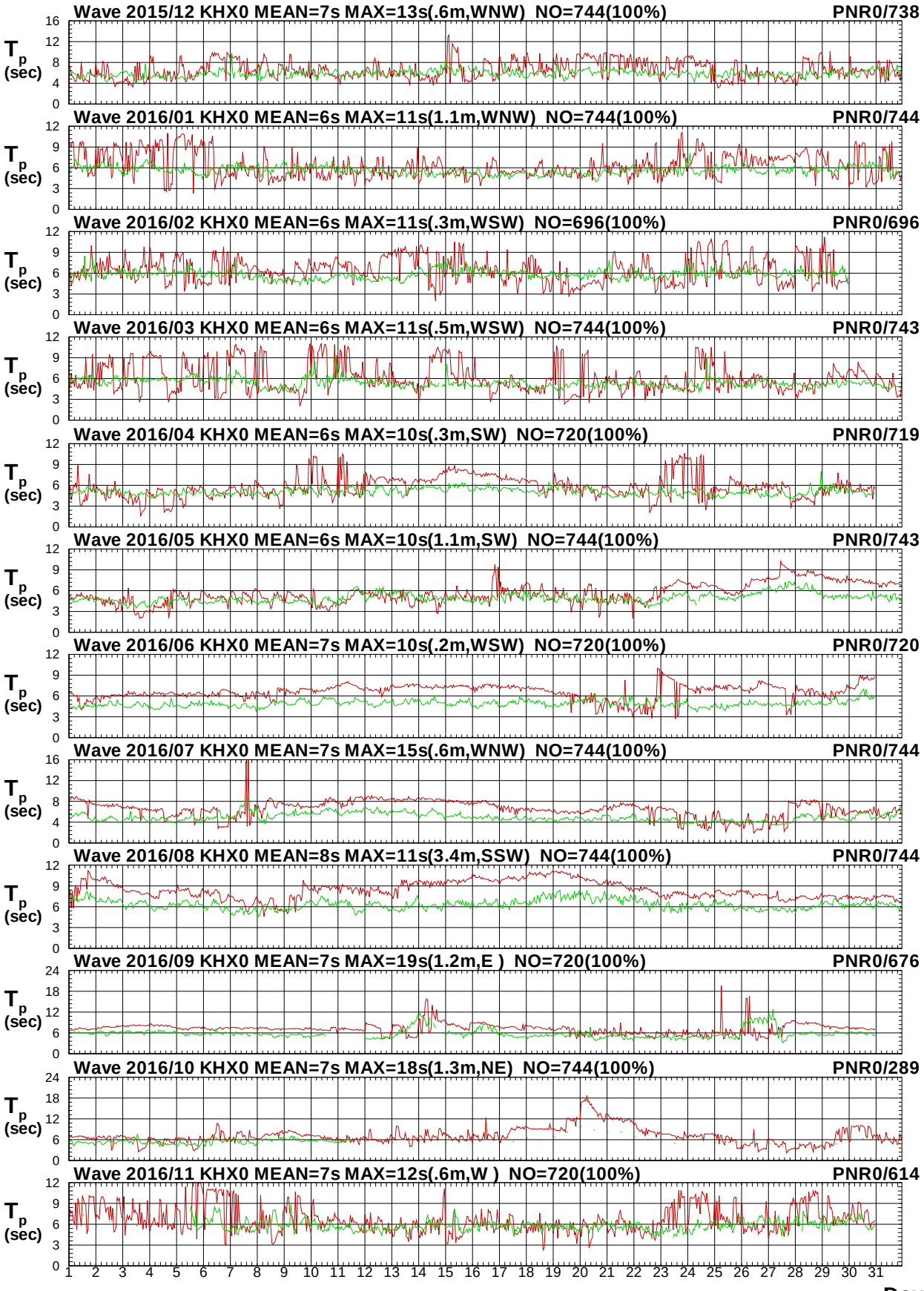


圖 2.7b　2016年每月高雄海域 X 站與屏東海域 R 站週期圖

V15CKHX0.1HA V15CPNR0.1H0 V161KHX0.1HA V161PNR0.1H0 V162KHX0.1HA V162PNR0.1H0
V163KHX0.1HA V163PNR0.1H0 V164KHX0.1HA V164PNR0.1H0 V165KHX0.1HA V165PNR0.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

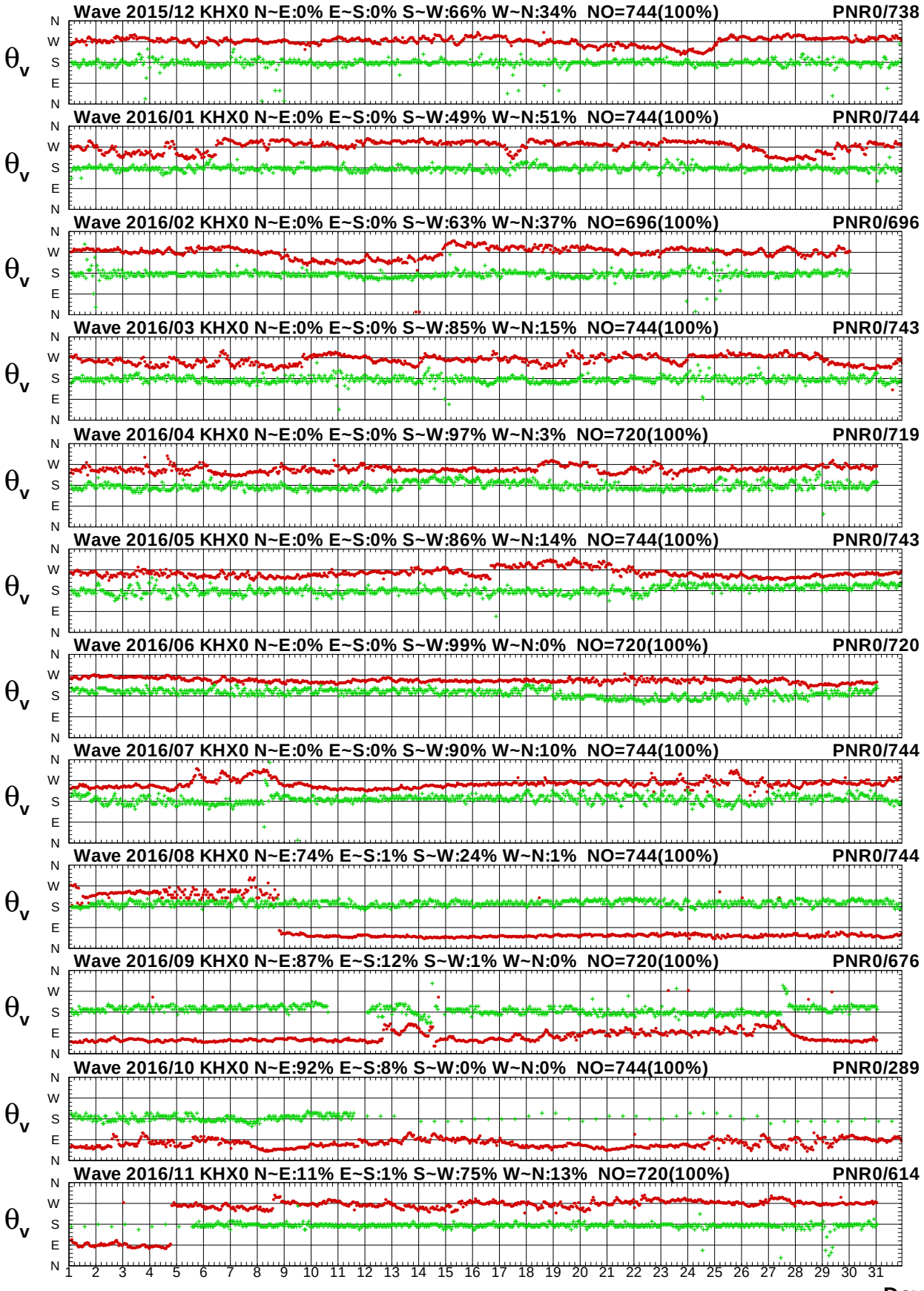


圖 2.7c　2016年每月高雄海域 X 站與屏東海域 R 站波向圖

# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

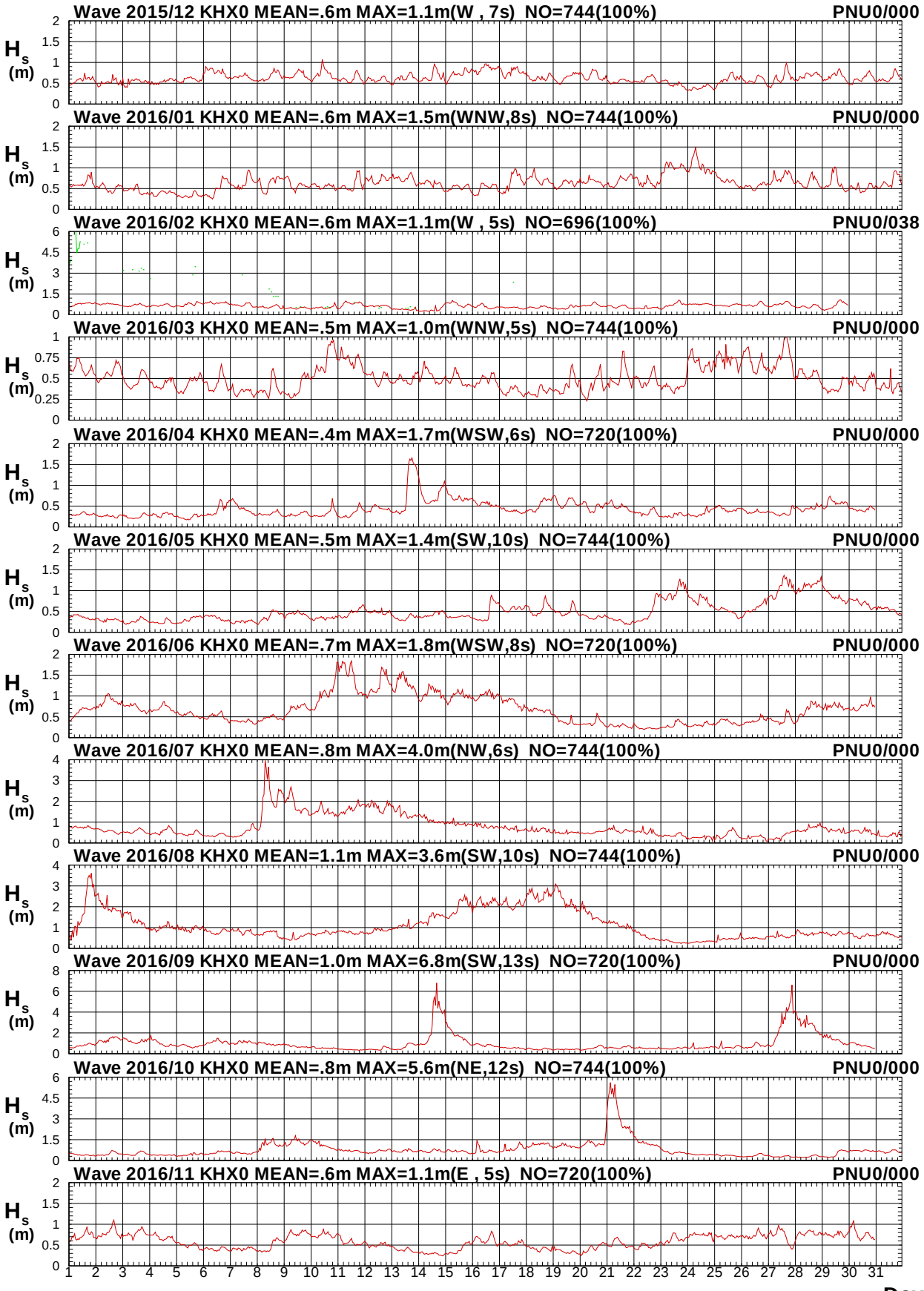


圖 2.8a　2016年每月高雄海域 X 站與屏東海域 U 站波高圖

V15CKHX0.1HA V15CPNU0.1H0 V161KHX0.1HA V161PNU0.1H0 V162KHX0.1HA V162PNU0.1H0
V163KHX0.1HA V163PNU0.1H0 V164KHX0.1HA V164PNU0.1H0 V165KHX0.1HA V165PNU0.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

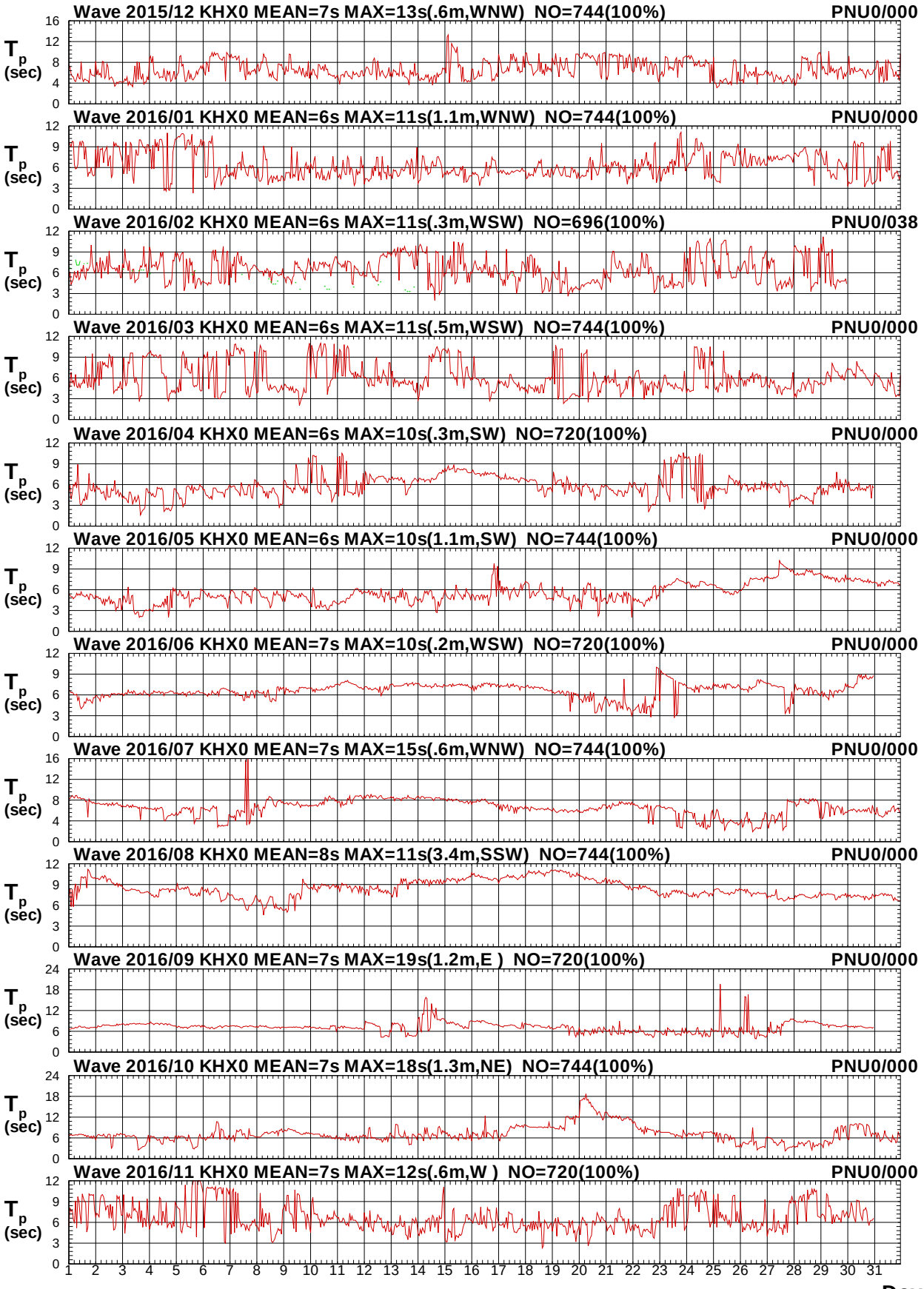


圖 2.8b　2016年每月高雄海域 X 站與屏東海域 U 站週期圖

V15CKHX0.1HA V15CPNU0.1H0 V161KHX0.1HA V161PNU0.1H0 V162KHX0.1HA V162PNU0.1H0
V163KHX0.1HA V163PNU0.1H0 V164KHX0.1HA V164PNU0.1H0 V165KHX0.1HA V165PNU0.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

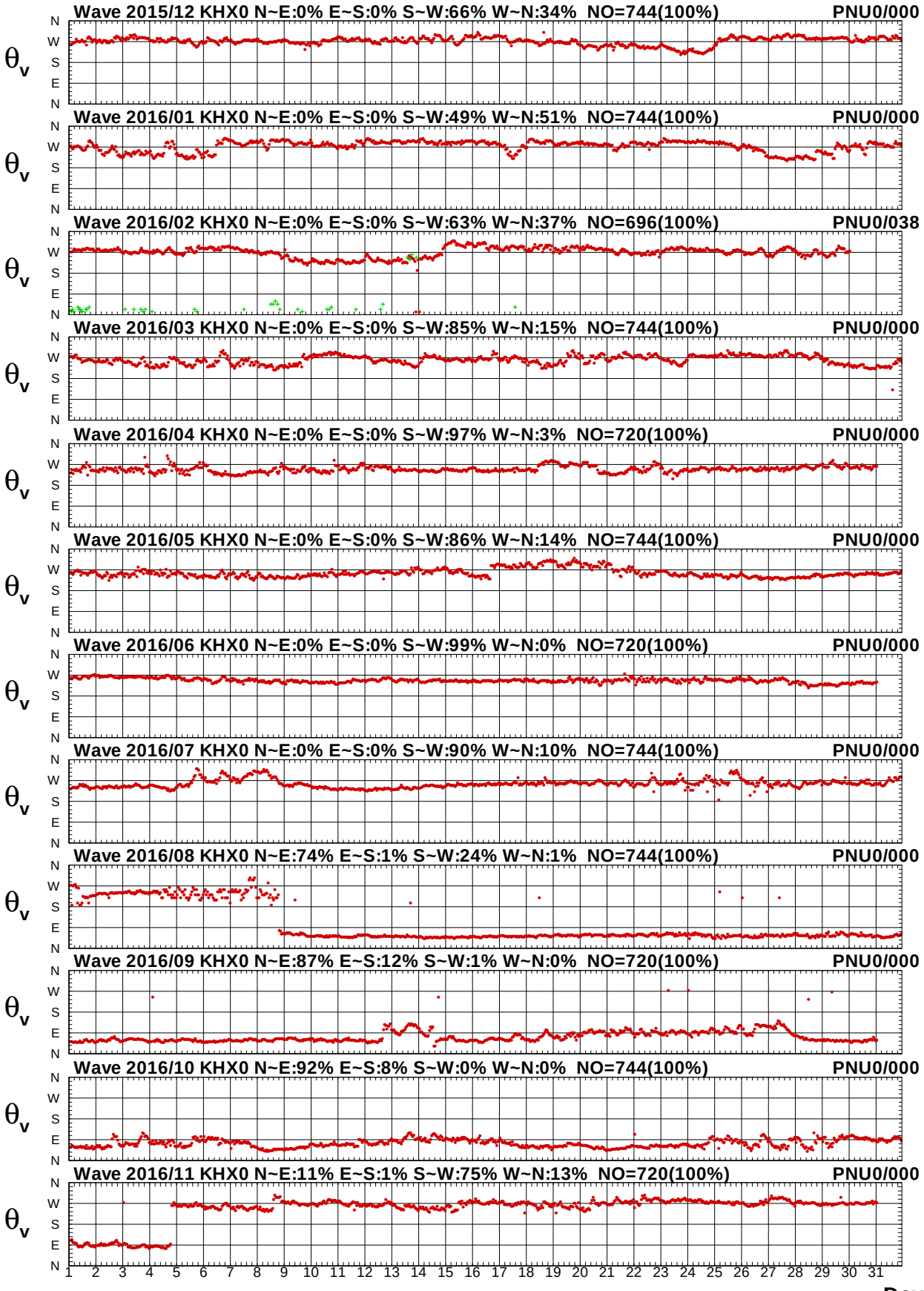


圖 2.8c　2016年每月高雄海域 X 站與屏東海域 U 站波向圖

V15CKHX0.1HA V15CPNU0.1H0 V161KHX0.1HA V161PNU0.1H0 V162KHX0.1HA V162PNU0.1H0
V163KHX0.1HA V163PNU0.1H0 V164KHX0.1HA V164PNU0.1H0 V165KHX0.1HA V165PNU0.1H0

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# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

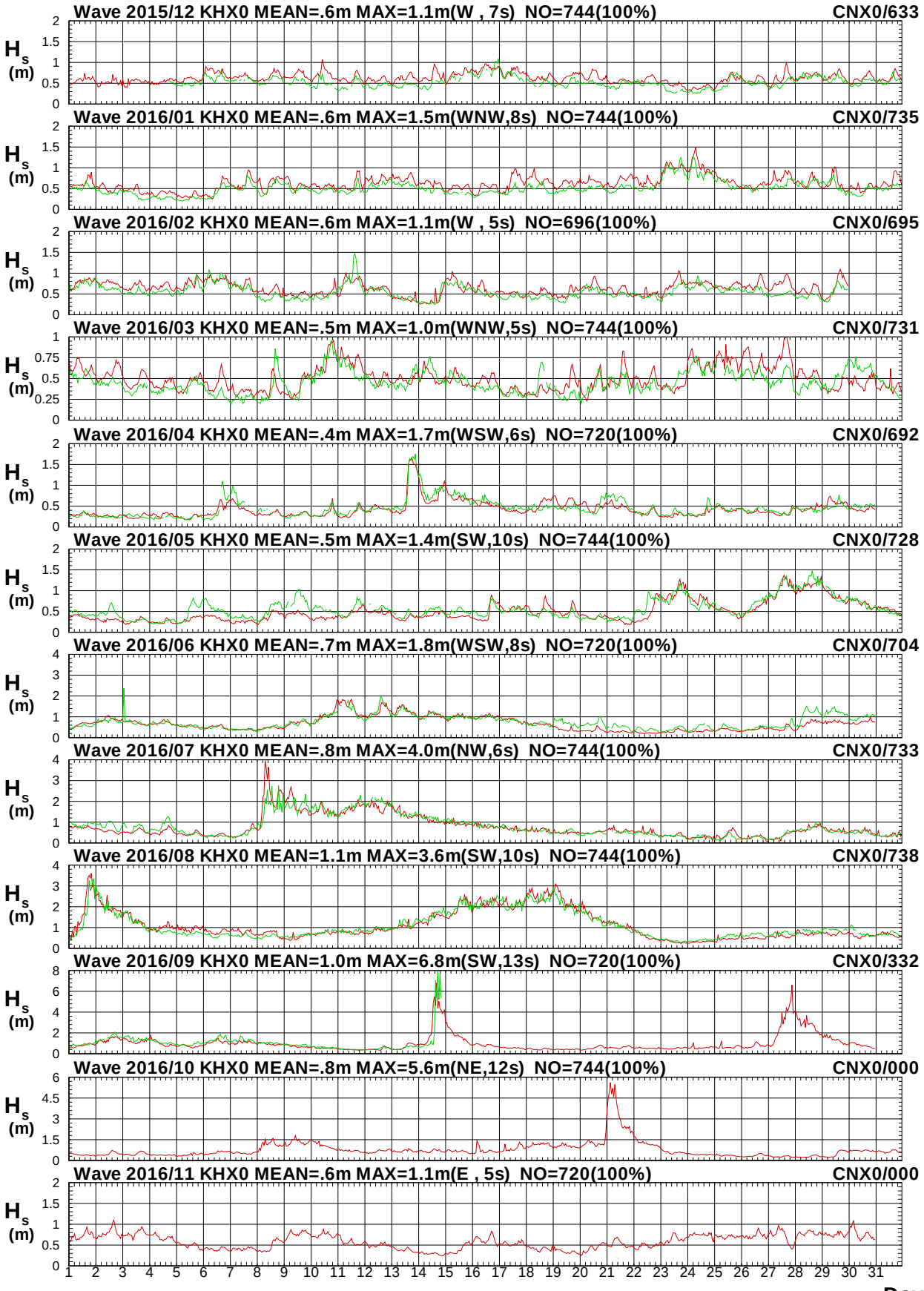


圖 2.9a　2016年每月高雄海域 X 站與嘉南海域 X 站波高圖

V15CKHX0.1HA V15CCNX0.1H0 V161KHX0.1HA V161CNX0.1H0 V162KHX0.1HA V162CNX0.1H0
V163KHX0.1HA V163CNX0.1H0 V164KHX0.1HA V164CNX0.1H0 V165KHX0.1HA V165CNX0.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

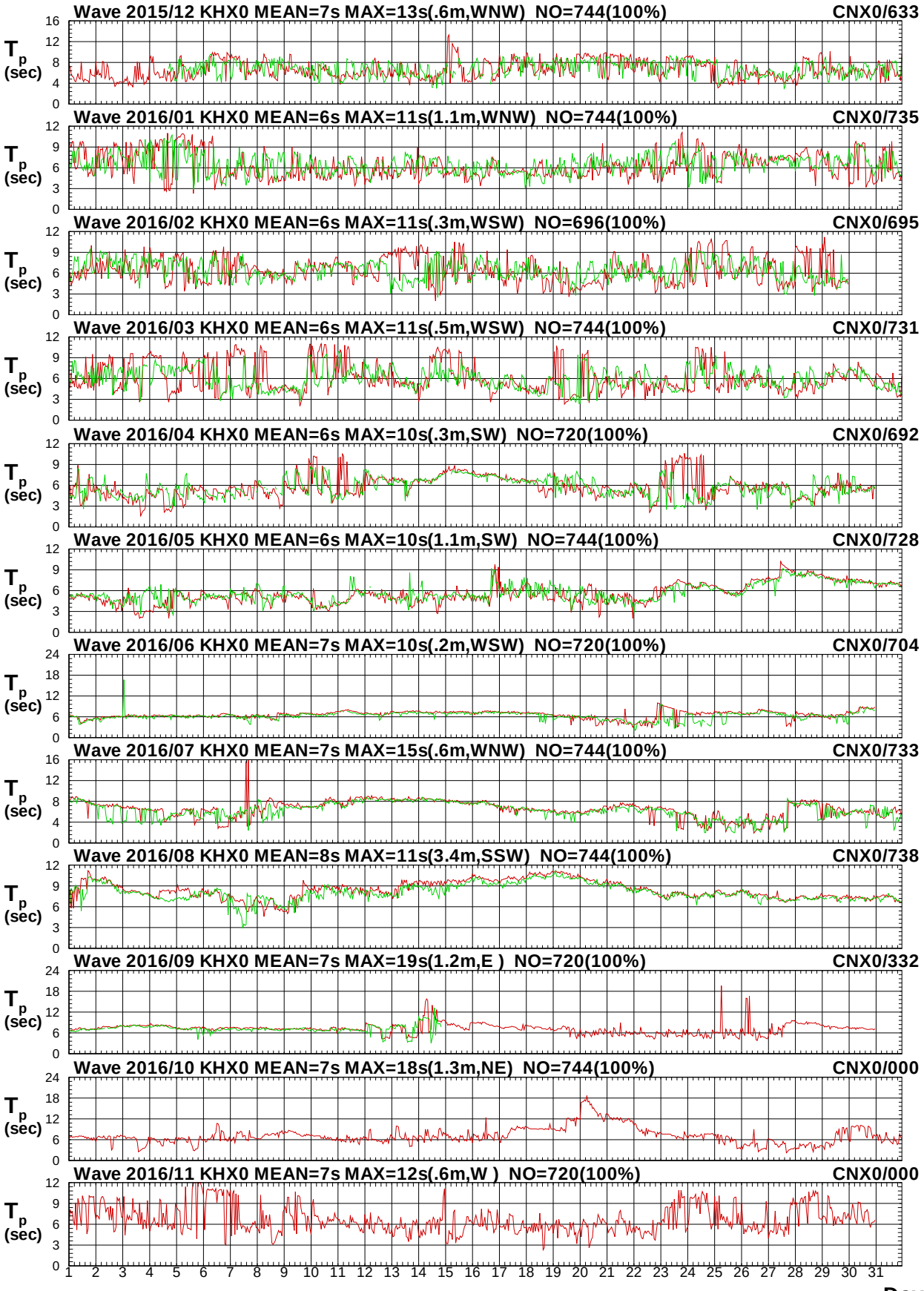


圖 2.9b　2016年每月高雄海域 X 站與嘉南海域 X 站週期圖

V15CKHX0.1HA V15CCNX0.1H0 V161KHX0.1HA V161CNX0.1H0 V162KHX0.1HA V162CNX0.1H0
V163KHX0.1HA V163CNX0.1H0 V164KHX0.1HA V164CNX0.1H0 V165KHX0.1HA V165CNX0.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

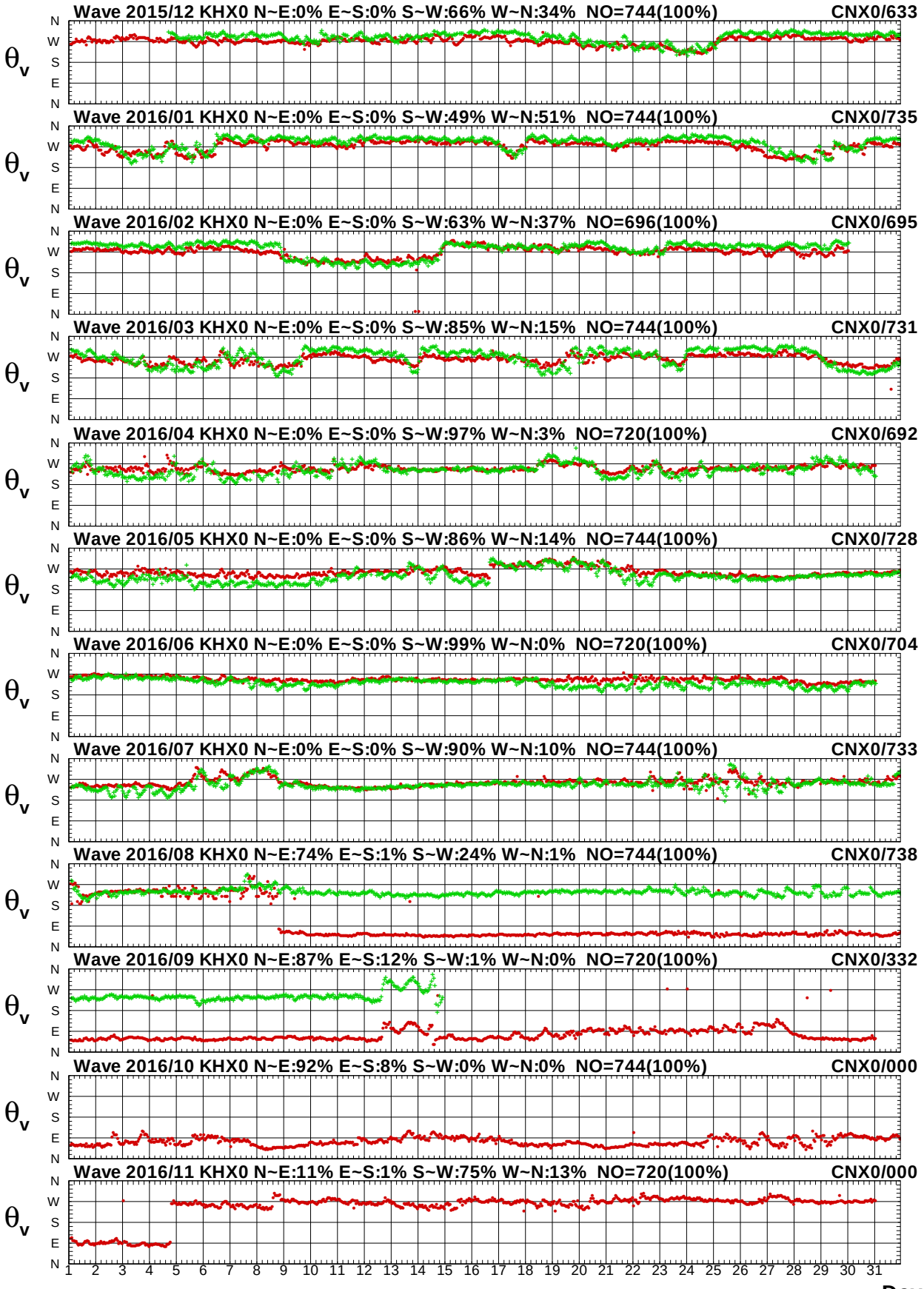


圖 2.9c　2016年每月高雄海域 X 站與嘉南海域 X 站波向圖

# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

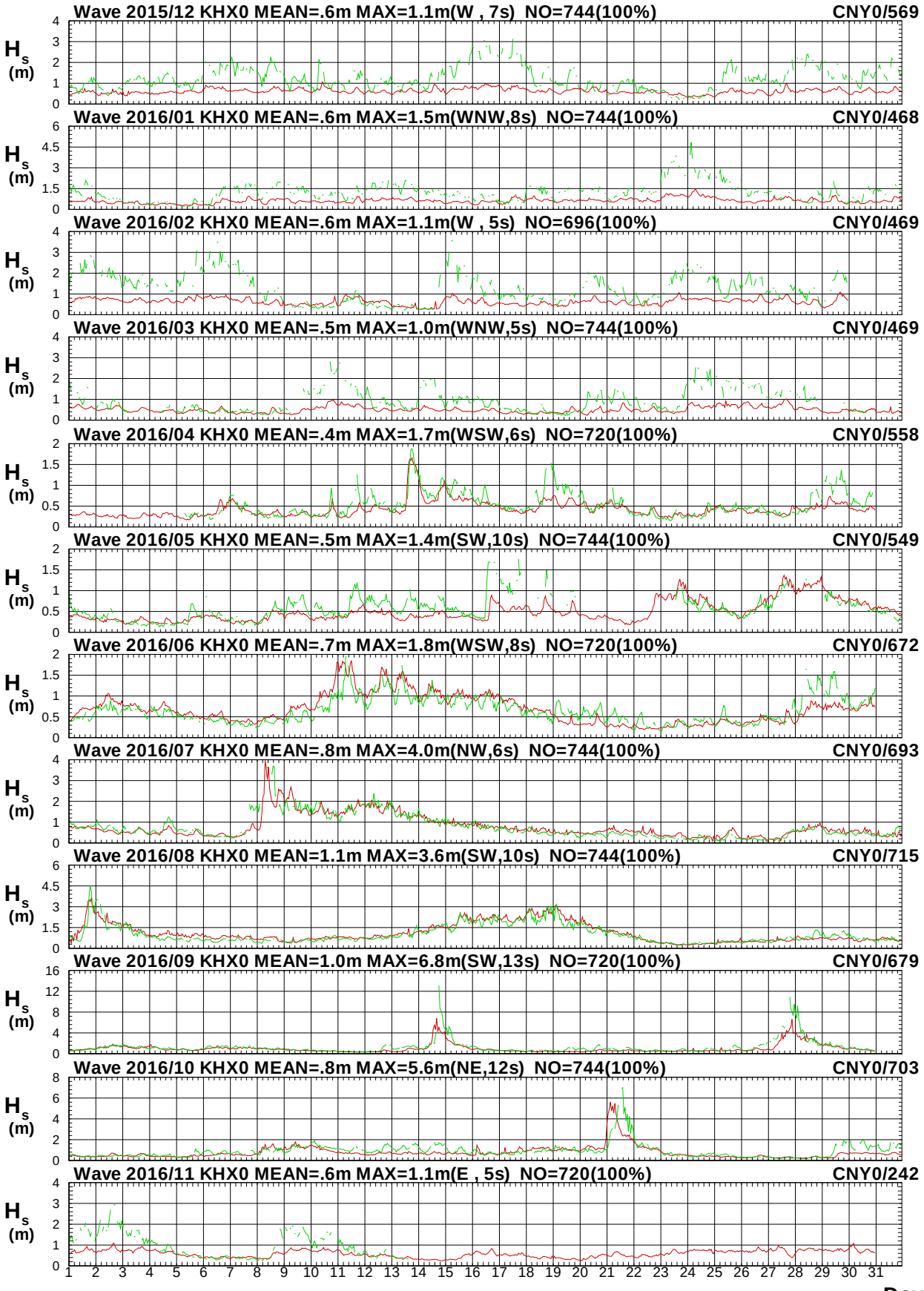


圖 2.10a　2016年每月高雄海域 X 站與嘉南海域 Y 站波高圖

V15CKHX0.1HA V15CCNY0.1H0 V161KHX0.1HA V161CNY0.1H0 V162KHX0.1HA V162CNY0.1H0
V163KHX0.1HA V163CNY0.1H0 V164KHX0.1HA V164CNY0.1H0 V165KHX0.1HA V165CNY0.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

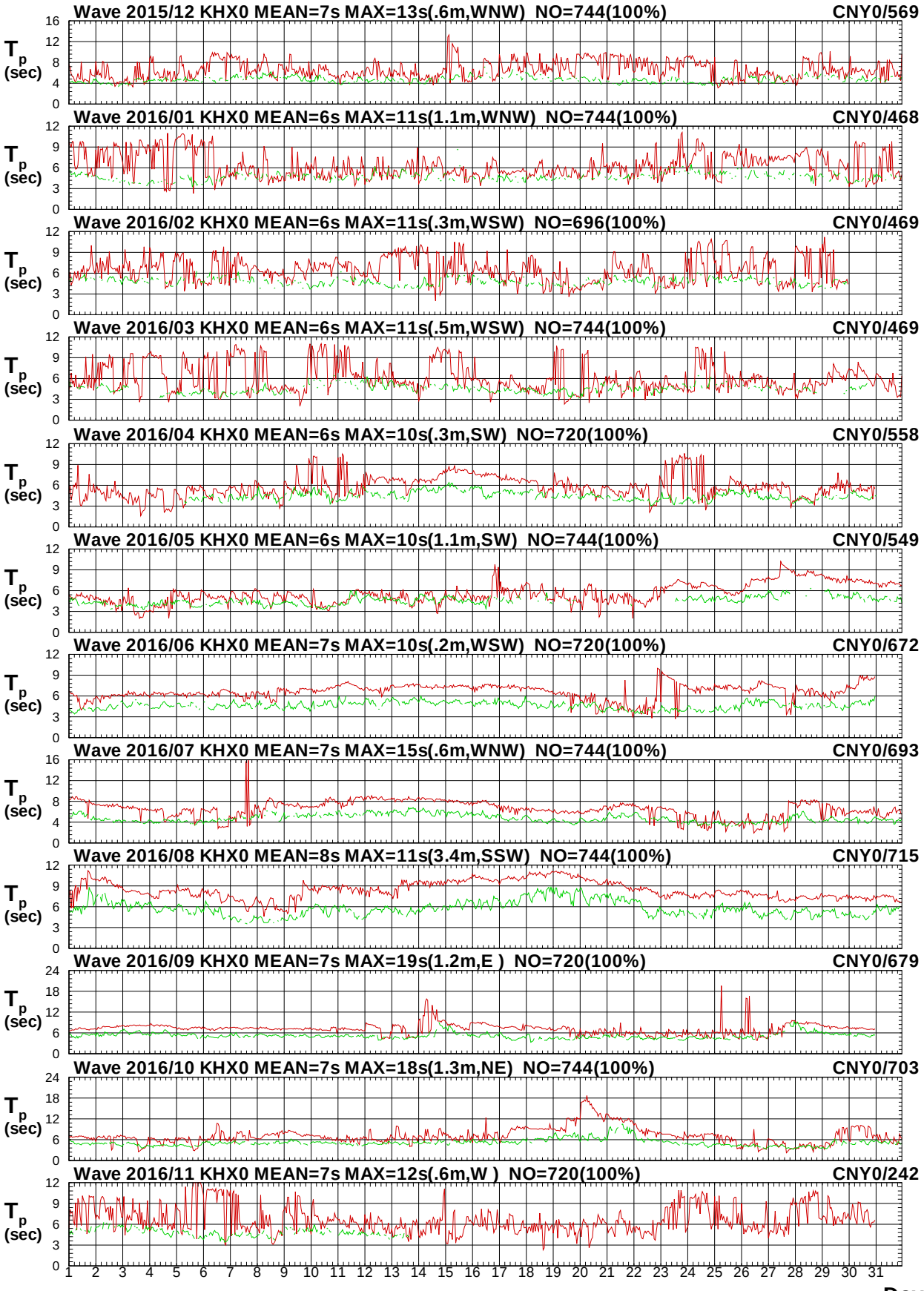


圖 2.10b　2016年每月高雄海域 X 站與嘉南海域 Y 站週期圖

V15CKHX0.1HA V15CCNY0.1H0 V161KHX0.1HA V161CNY0.1H0 V162KHX0.1HA V162CNY0.1H0
V163KHX0.1HA V163CNY0.1H0 V164KHX0.1HA V164CNY0.1H0 V165KHX0.1HA V165CNY0.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

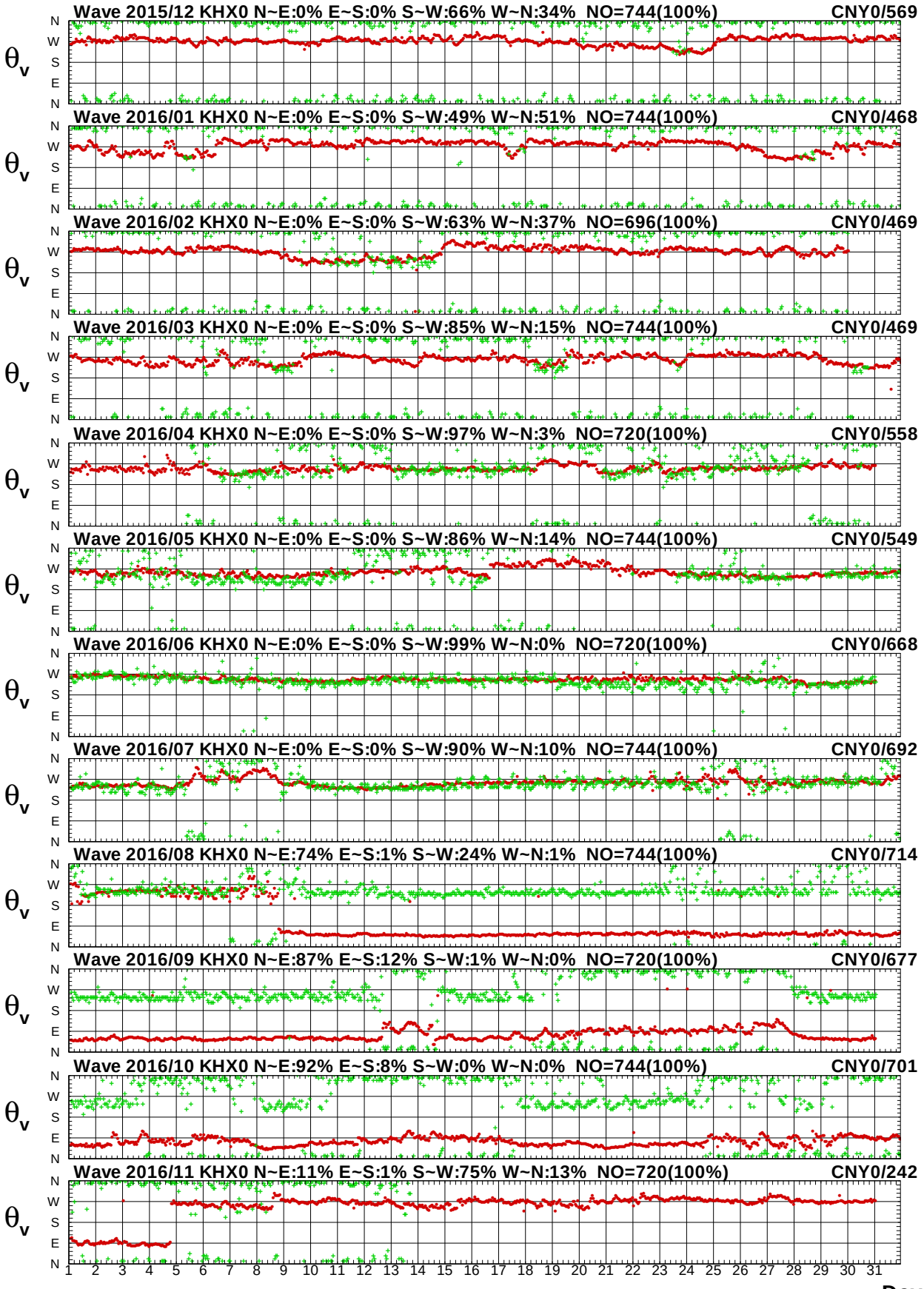


圖2.10c　2016年每月高雄海域 X 站與嘉南海域 Y 站波向圖

V15CKHX0.1HA V15CCNY0.1H0 V161KHX0.1HA V161CNY0.1H0 V162KHX0.1HA V162CNY0.1H0
V163KHX0.1HA V163CNY0.1H0 V164KHX0.1HA V164CNY0.1H0 V165KHX0.1HA V165CNY0.1H0

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# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

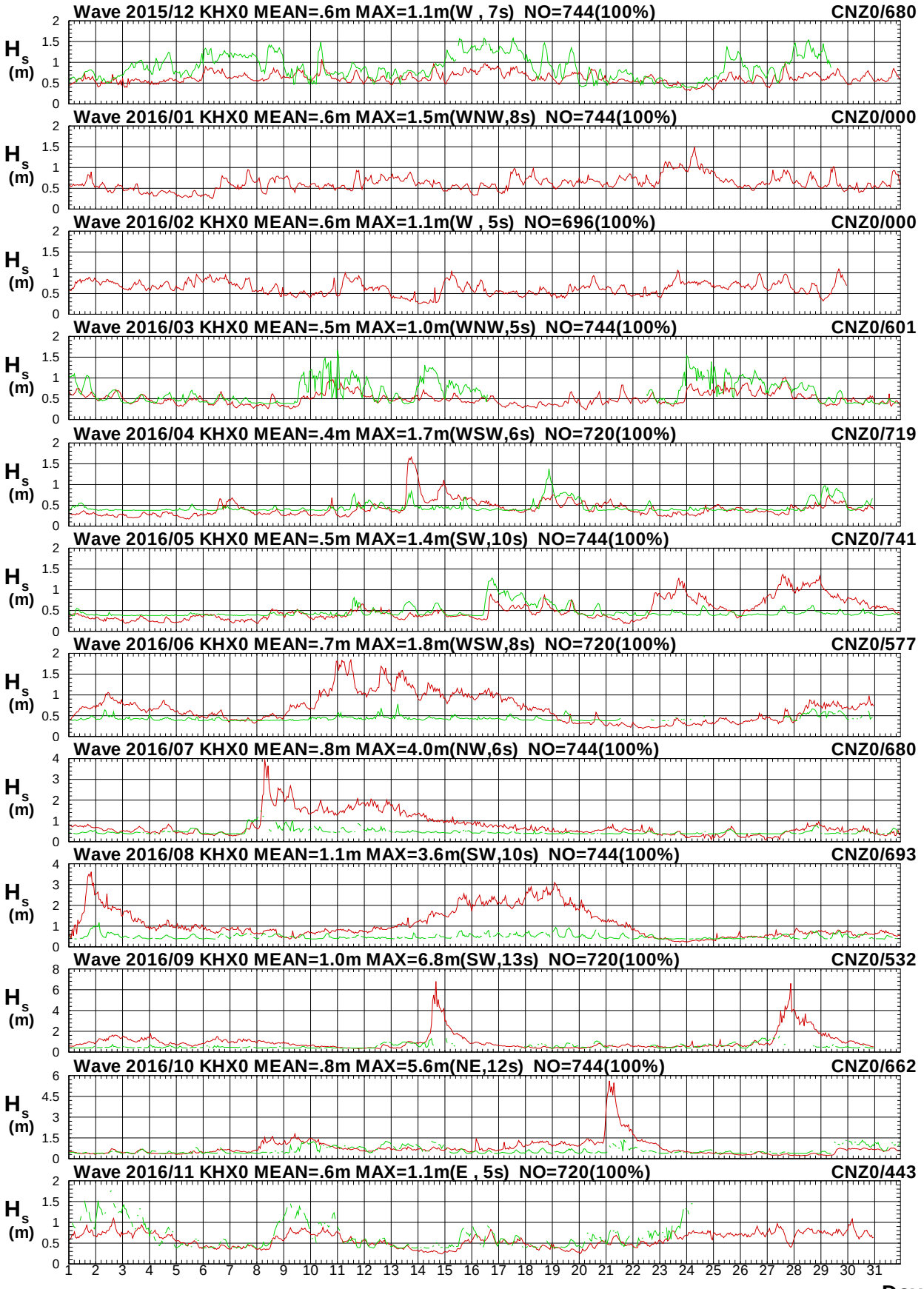


圖2.11a　2016年每月高雄海域 X 站與嘉南海域 Z 站波高圖

V15CKHX0.1HA V15CCNZ0.1H0 V161KHX0.1HA V161CNZ0.1H0 V162KHX0.1HA V162CNZ0.1H0
V163KHX0.1HA V163CNZ0.1H0 V164KHX0.1HA V164CNZ0.1H0 V165KHX0.1HA V165CNZ0.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

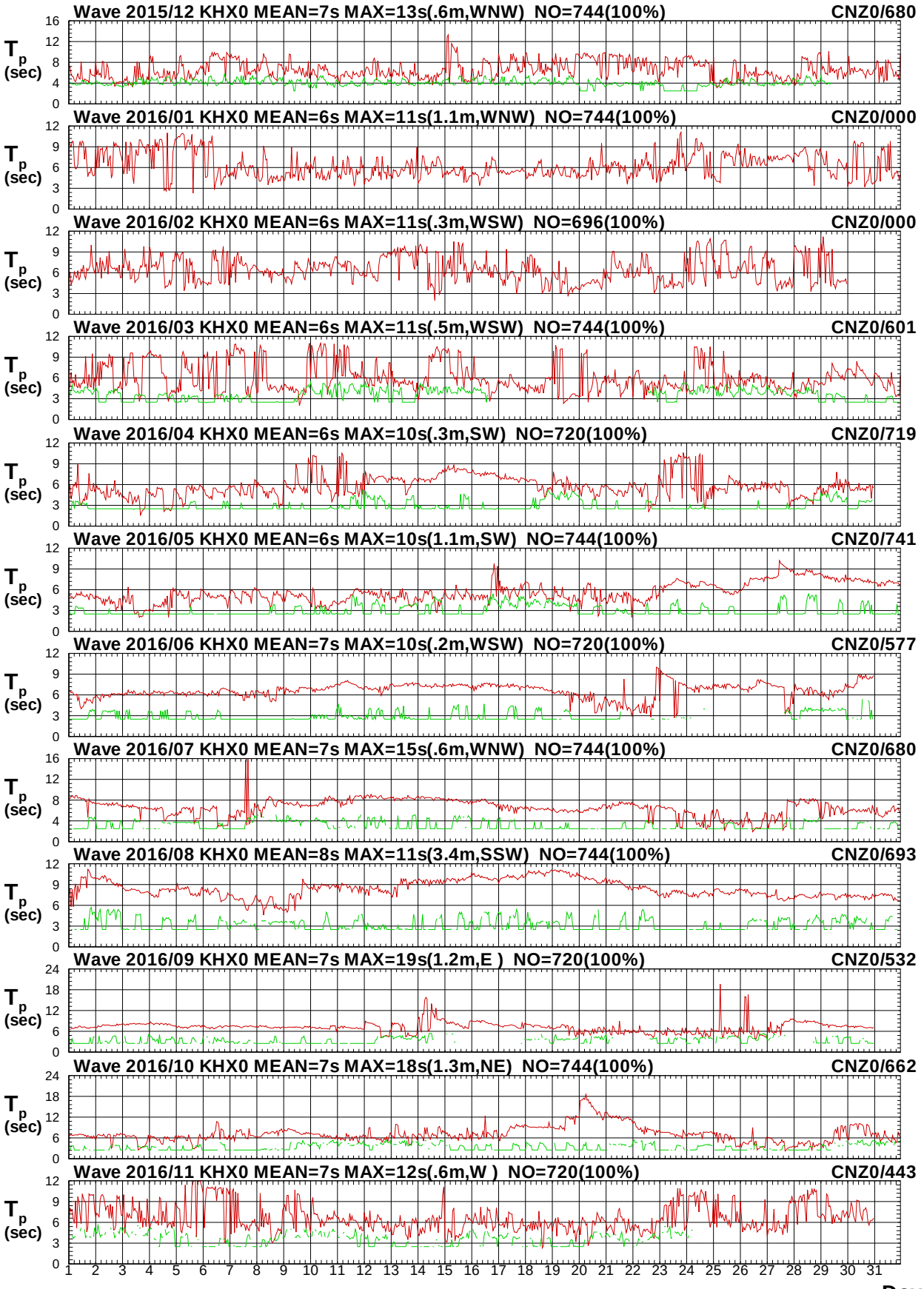


圖2.11b　2016年每月高雄海域 X 站與嘉南海域 Z 站週期圖

V15CKHX0.1HA V15CCNZ0.1H0 V161KHX0.1HA V161CNZ0.1H0 V162KHX0.1HA V162CNZ0.1H0
V163KHX0.1HA V163CNZ0.1H0 V164KHX0.1HA V164CNZ0.1H0 V165KHX0.1HA V165CNZ0.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

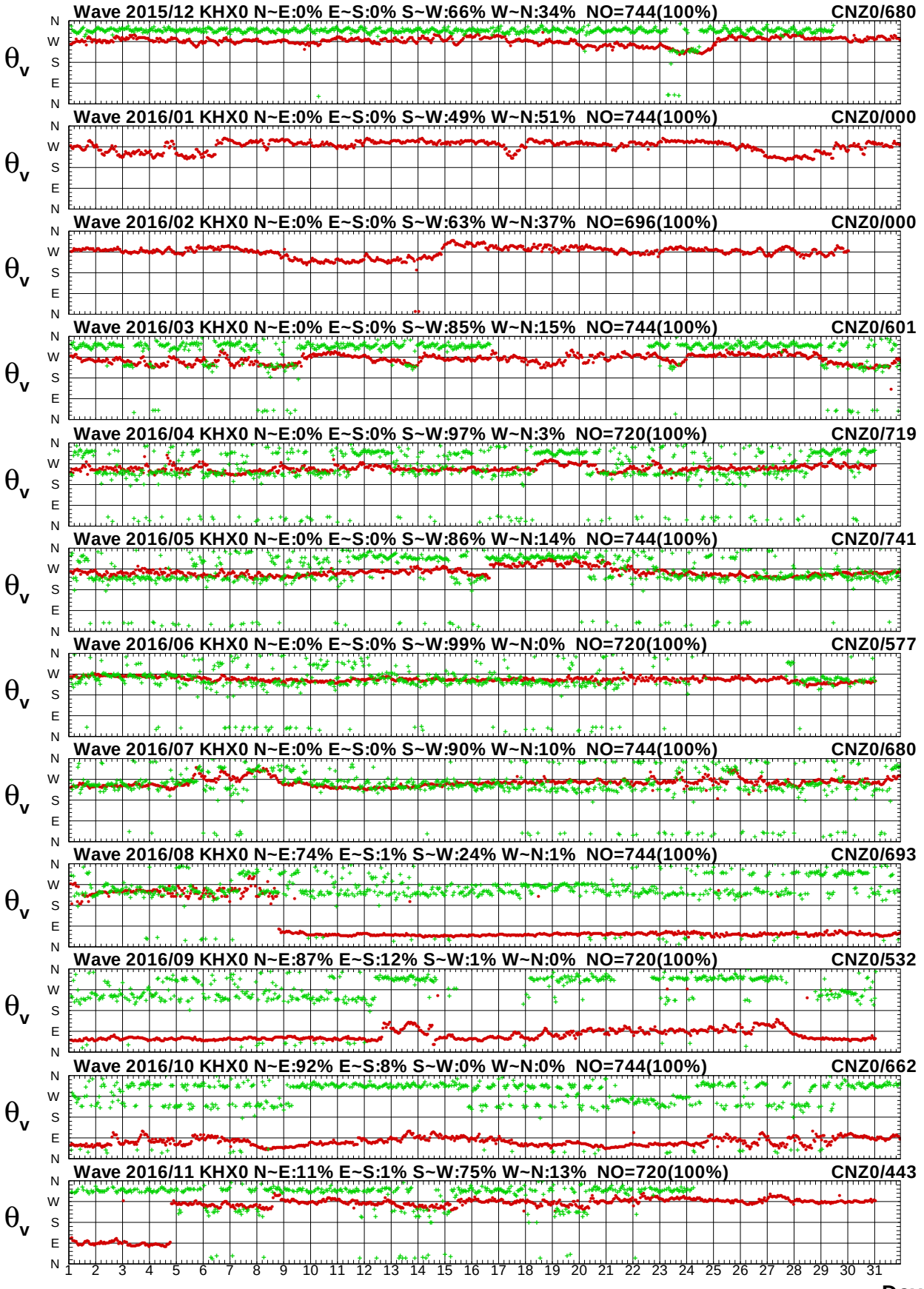


圖2.11c　2016年每月高雄海域 X 站與嘉南海域 Z 站波向圖

V15CKHX0.1HA V15CCNZ0.1H0 V161KHX0.1HA V161CNZ0.1H0 V162KHX0.1HA V162CNZ0.1H0
V163KHX0.1HA V163CNZ0.1H0 V164KHX0.1HA V164CNZ0.1H0 V165KHX0.1HA V165CNZ0.1H0

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# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

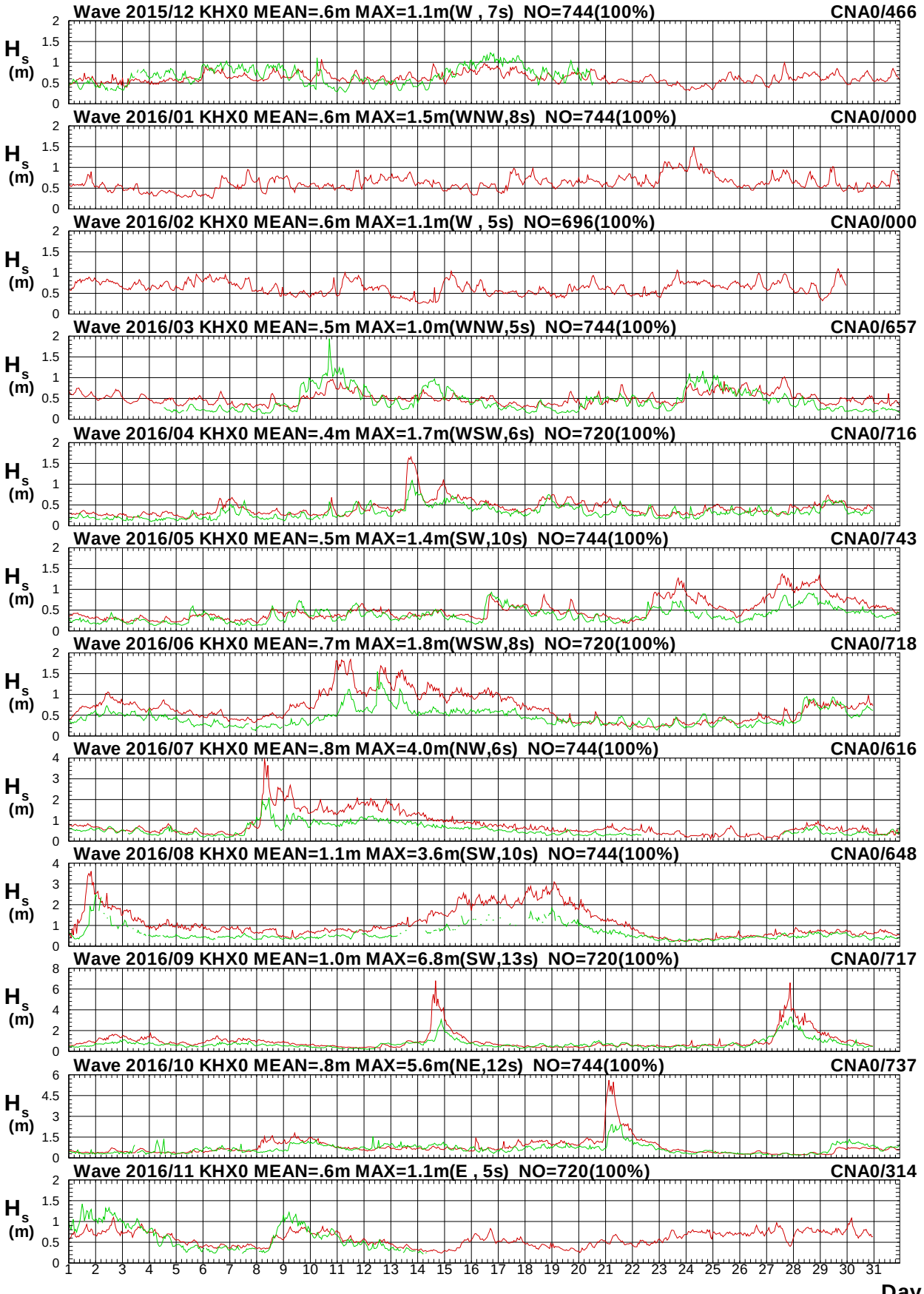


圖 2.12a　2016年每月高雄海域 X 站與嘉南海域 A 站波高圖

V15CKHX0.1HA V15CCNA0.1H0 V161KHX0.1HA V161CNA0.1H0 V162KHX0.1HA V162CNA0.1H0
V163KHX0.1HA V163CNA0.1H0 V164KHX0.1HA V164CNA0.1H0 V165KHX0.1HA V165CNA0.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

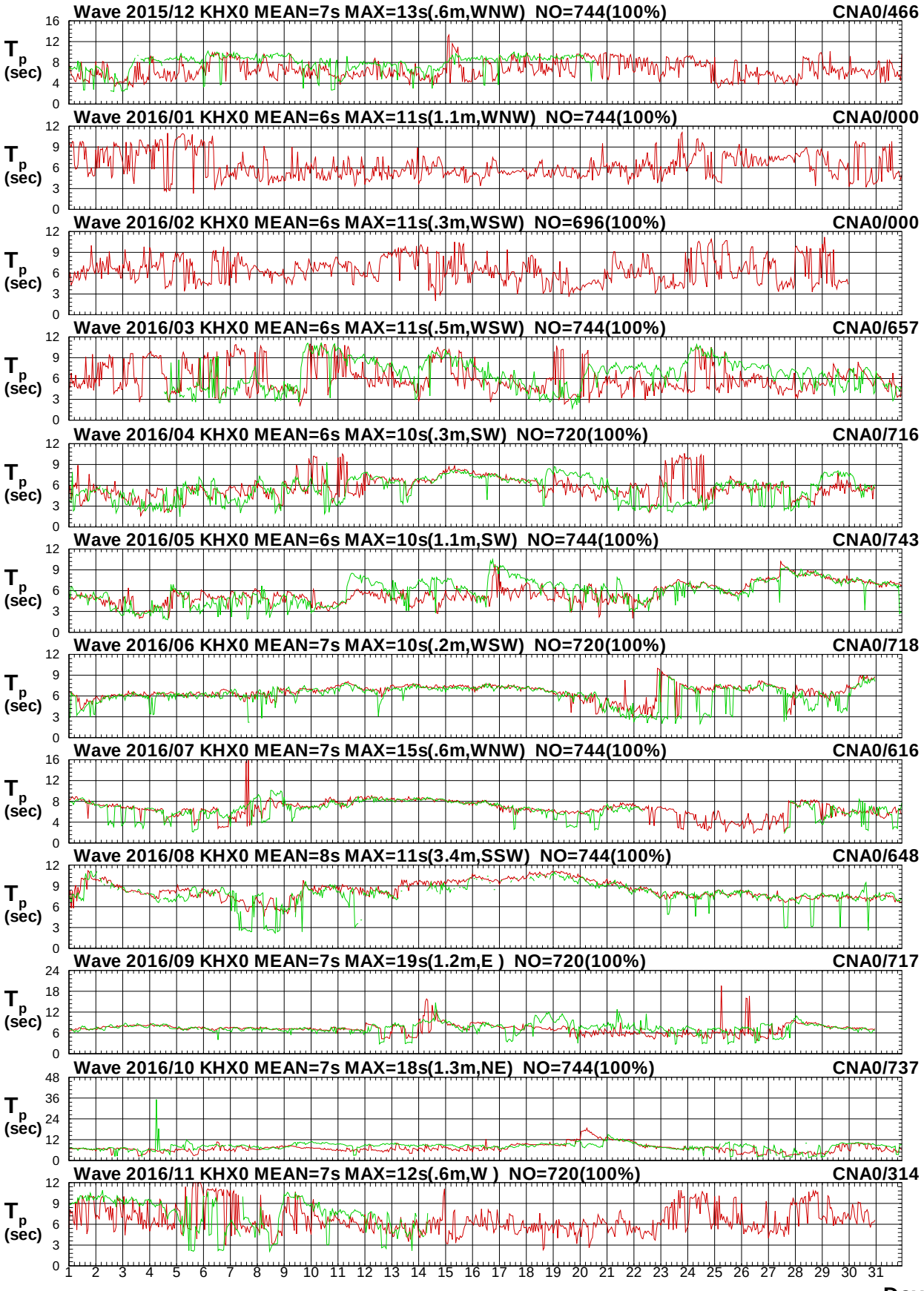


圖 2.12b　2016年每月高雄海域 X 站與嘉南海域 A 站週期圖

V15CKHX0.1HA V15CCNA0.1H0 V161KHX0.1HA V161CNA0.1H0 V162KHX0.1HA V162CNA0.1H0
V163KHX0.1HA V163CNA0.1H0 V164KHX0.1HA V164CNA0.1H0 V165KHX0.1HA V165CNA0.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

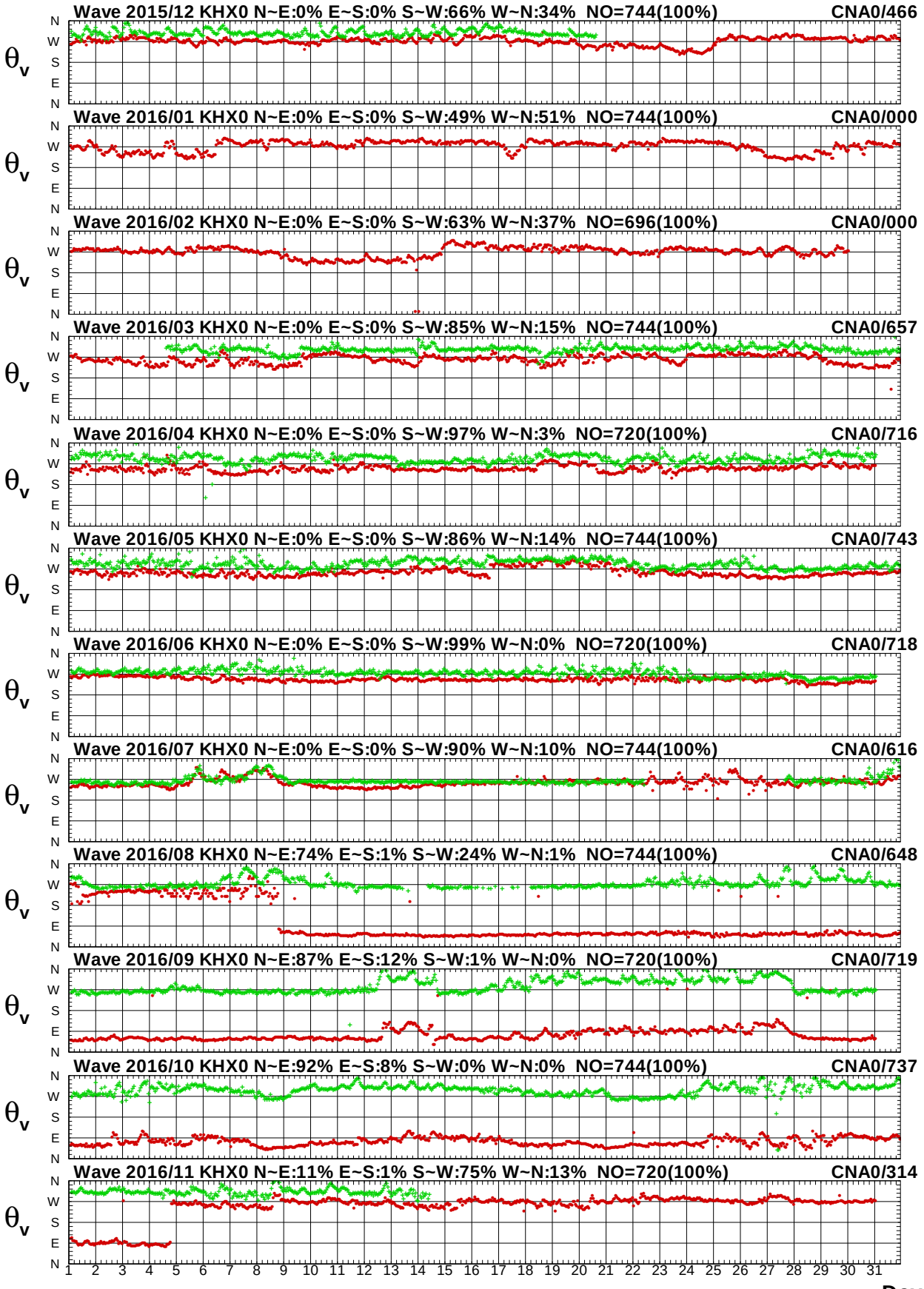


圖 2.12c　2016年每月高雄海域 X 站與嘉南海域 A 站波向圖

V15CKHX0.1HA V15CCNA0.1H0 V161KHX0.1HA V161CNA0.1H0 V162KHX0.1HA V162CNA0.1H0
V163KHX0.1HA V163CNA0.1H0 V164KHX0.1HA V164CNA0.1H0 V165KHX0.1HA V165CNA0.1H0

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# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

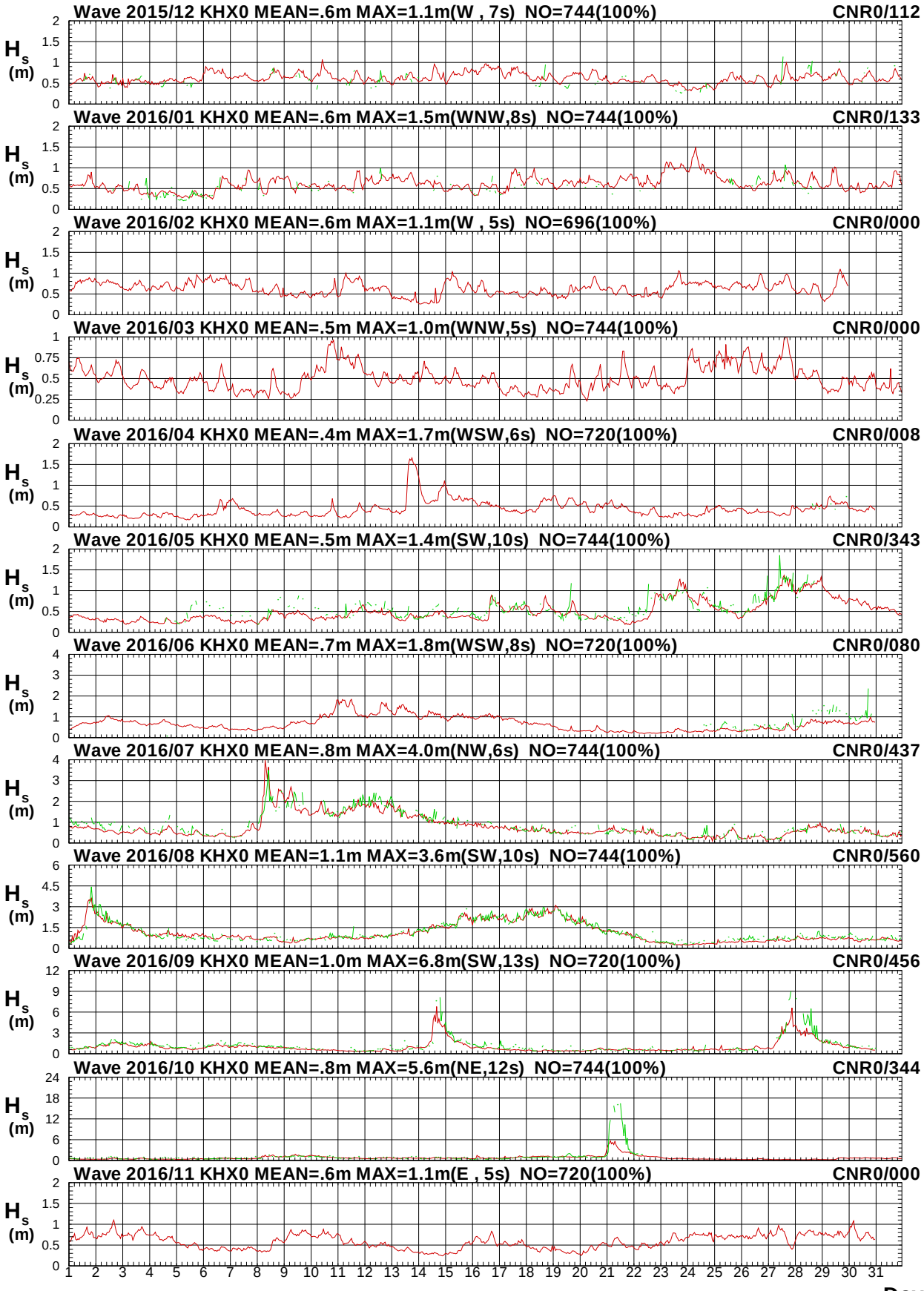


圖 2.13a　2016年每月高雄海域 X 站與嘉南海域 R 站波高圖

V15CKHX0.1HA V15CCNR0.1H0 V161KHX0.1HA V161CNR0.1H0 V162KHX0.1HA V162CNR0.1H0
V163KHX0.1HA V163CNR0.1H0 V164KHX0.1HA V164CNR0.1H0 V165KHX0.1HA V165CNR0.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

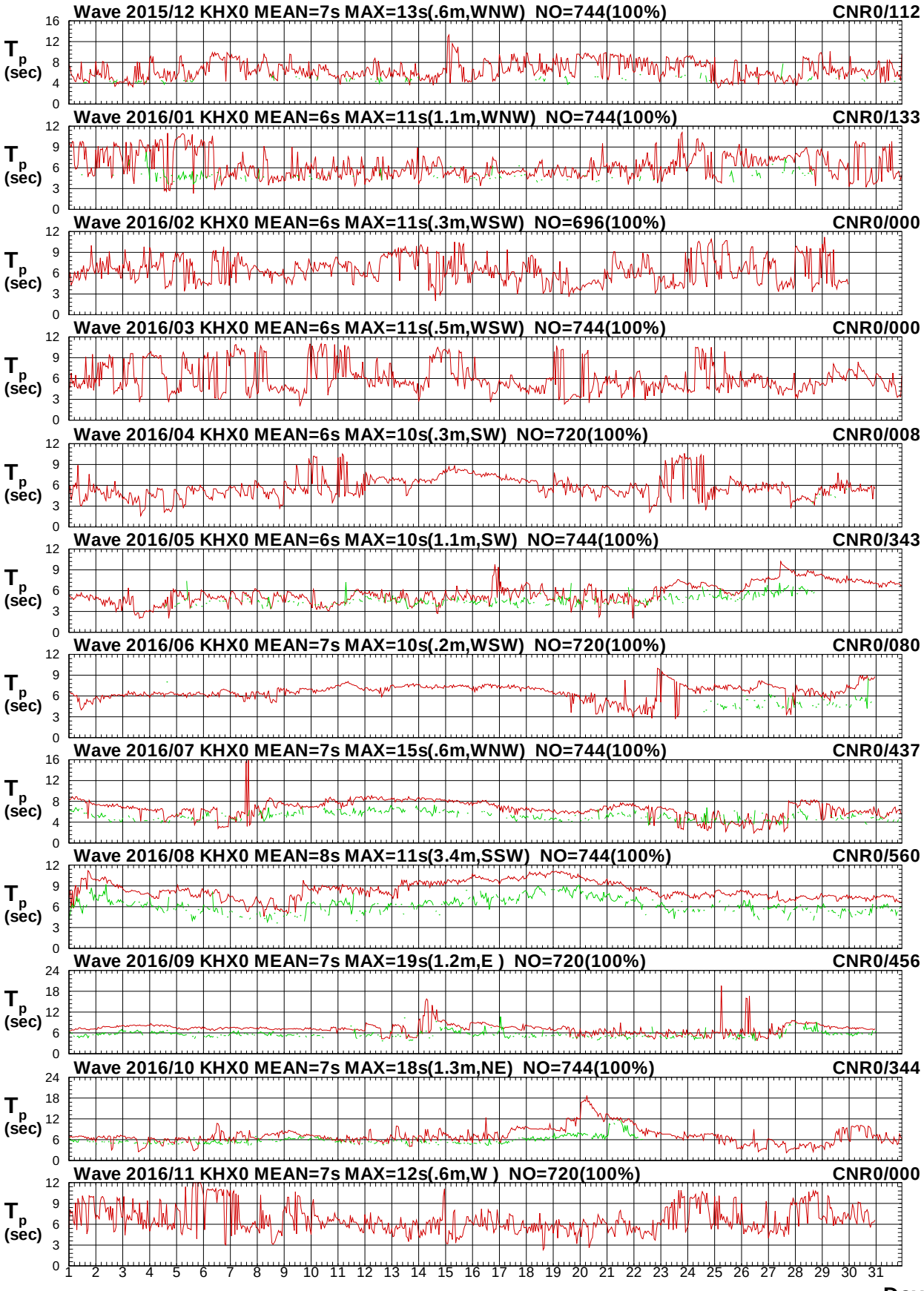


圖 2.13b　2016年每月高雄海域 X 站與嘉南海域 R 站週期圖

V15CKHX0.1HA V15CCNR0.1H0 V161KHX0.1HA V161CNR0.1H0 V162KHX0.1HA V162CNR0.1H0
V163KHX0.1HA V163CNR0.1H0 V164KHX0.1HA V164CNR0.1H0 V165KHX0.1HA V165CNR0.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

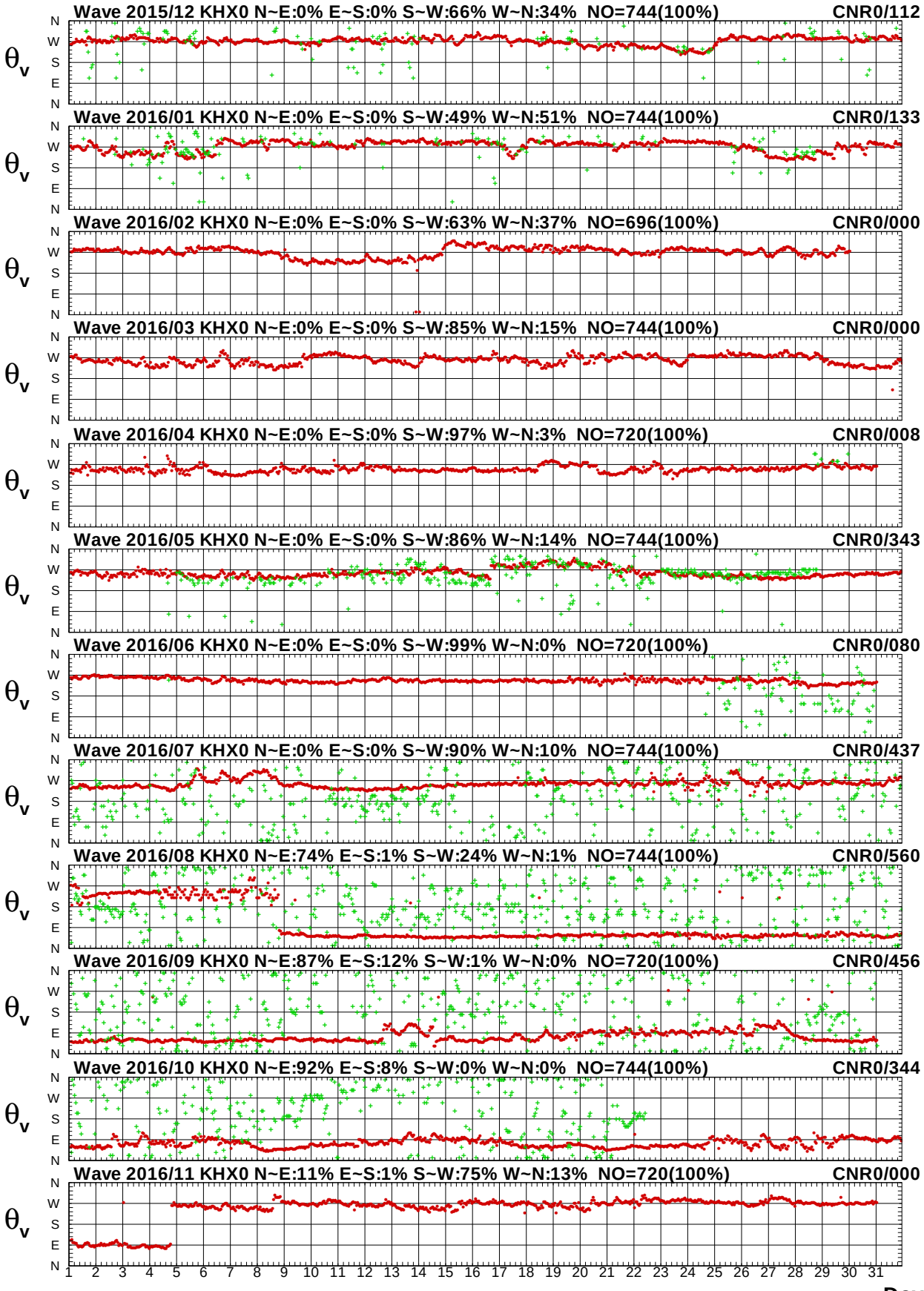


圖2.13c　2016年每月高雄海域 X 站與嘉南海域 R 站波向圖

V15CKHX0.1HA V15CCNR0.1H0 V161KHX0.1HA V161CNR0.1H0 V162KHX0.1HA V162CNR0.1H0
V163KHX0.1HA V163CNR0.1H0 V164KHX0.1HA V164CNR0.1H0 V165KHX0.1HA V165CNR0.1H0

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# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

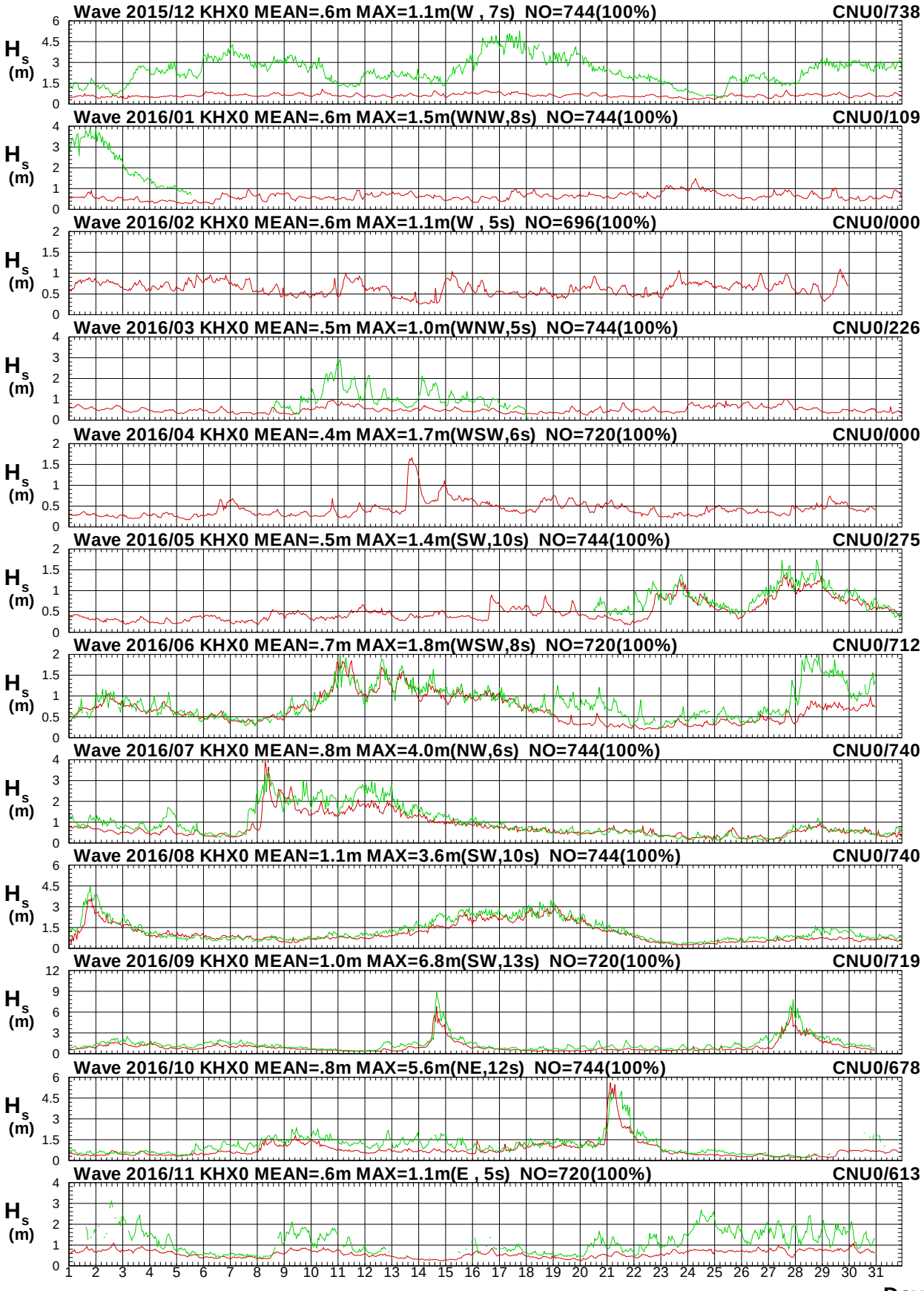


圖 2.14a　2016年每月高雄海域 X 站與嘉南海域 U 站波高圖

V15CKHX0.1HA V15CCNU0.1H0 V161KHX0.1HA V161CNU0.1H0 V162KHX0.1HA V162CNU0.1H0
V163KHX0.1HA V163CNU0.1H0 V164KHX0.1HA V164CNU0.1H0 V165KHX0.1HA V165CNU0.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

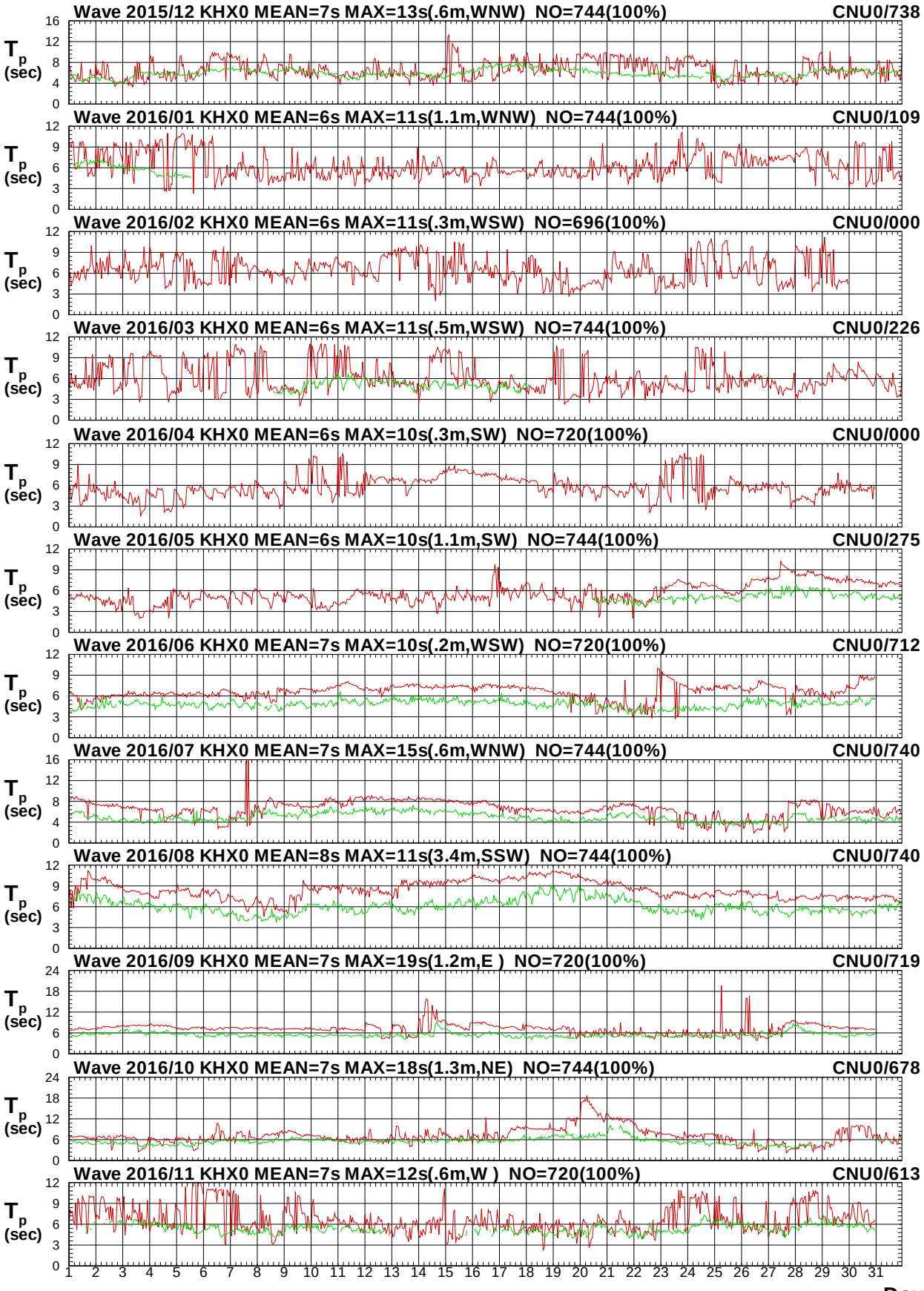


圖 2.14b　2016年每月高雄海域 X 站與嘉南海域 U 站週期圖

V15CKHX0.1HA V15CCNU0.1H0 V161KHX0.1HA V161CNU0.1H0 V162KHX0.1HA V162CNU0.1H0
V163KHX0.1HA V163CNU0.1H0 V164KHX0.1HA V164CNU0.1H0 V165KHX0.1HA V165CNU0.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

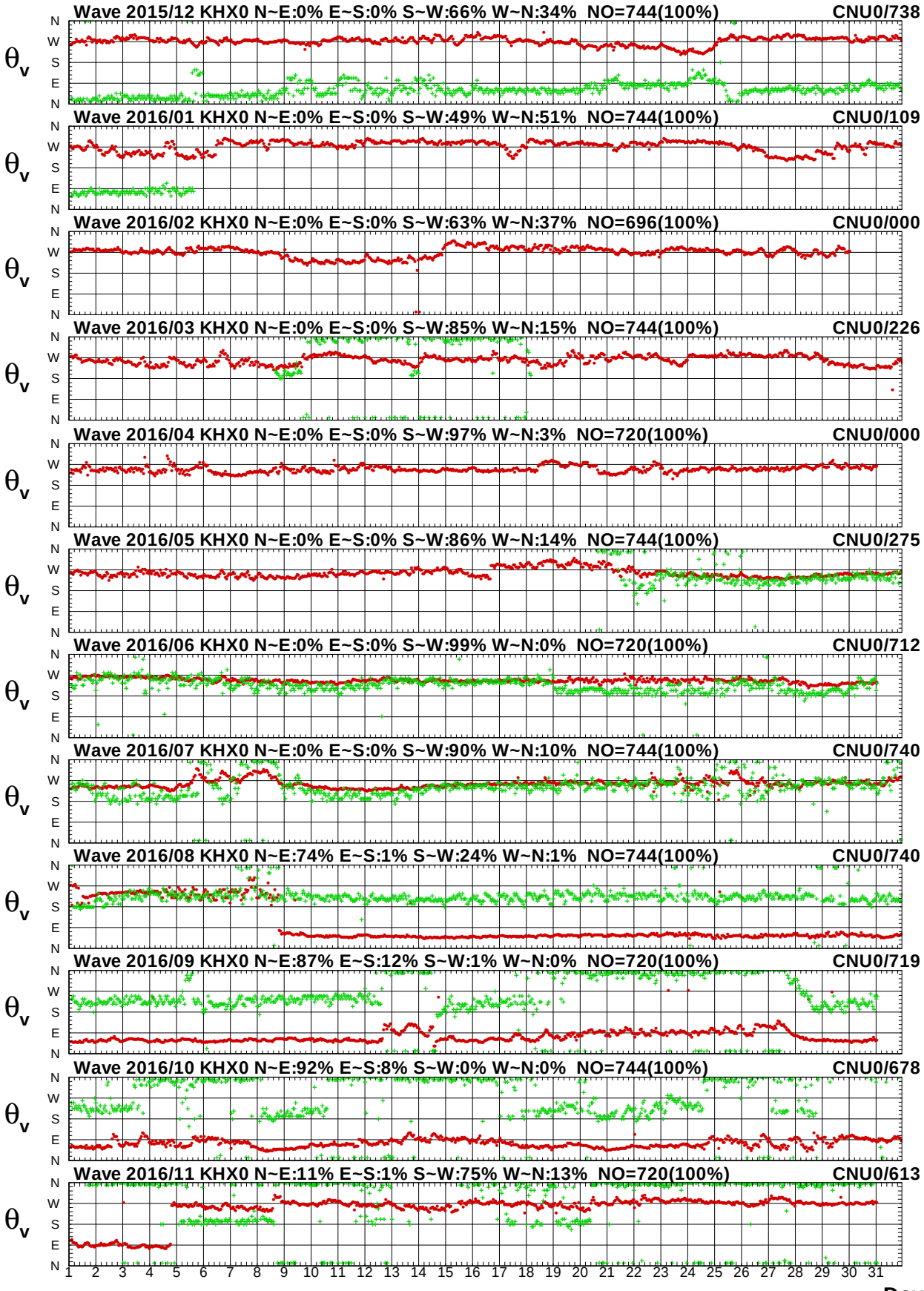


圖2.14c　2016年每月高雄海域 X 站與嘉南海域 U 站波向圖

V15CKHX0.1HA V15CCNU0.1H0 V161KHX0.1HA V161CNU0.1H0 V162KHX0.1HA V162CNU0.1H0
V163KHX0.1HA V163CNU0.1H0 V164KHX0.1HA V164CNU0.1H0 V165KHX0.1HA V165CNU0.1H0

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# Wave $H_s$ in Kao-Hsiung Seas of KHX0 at 2016

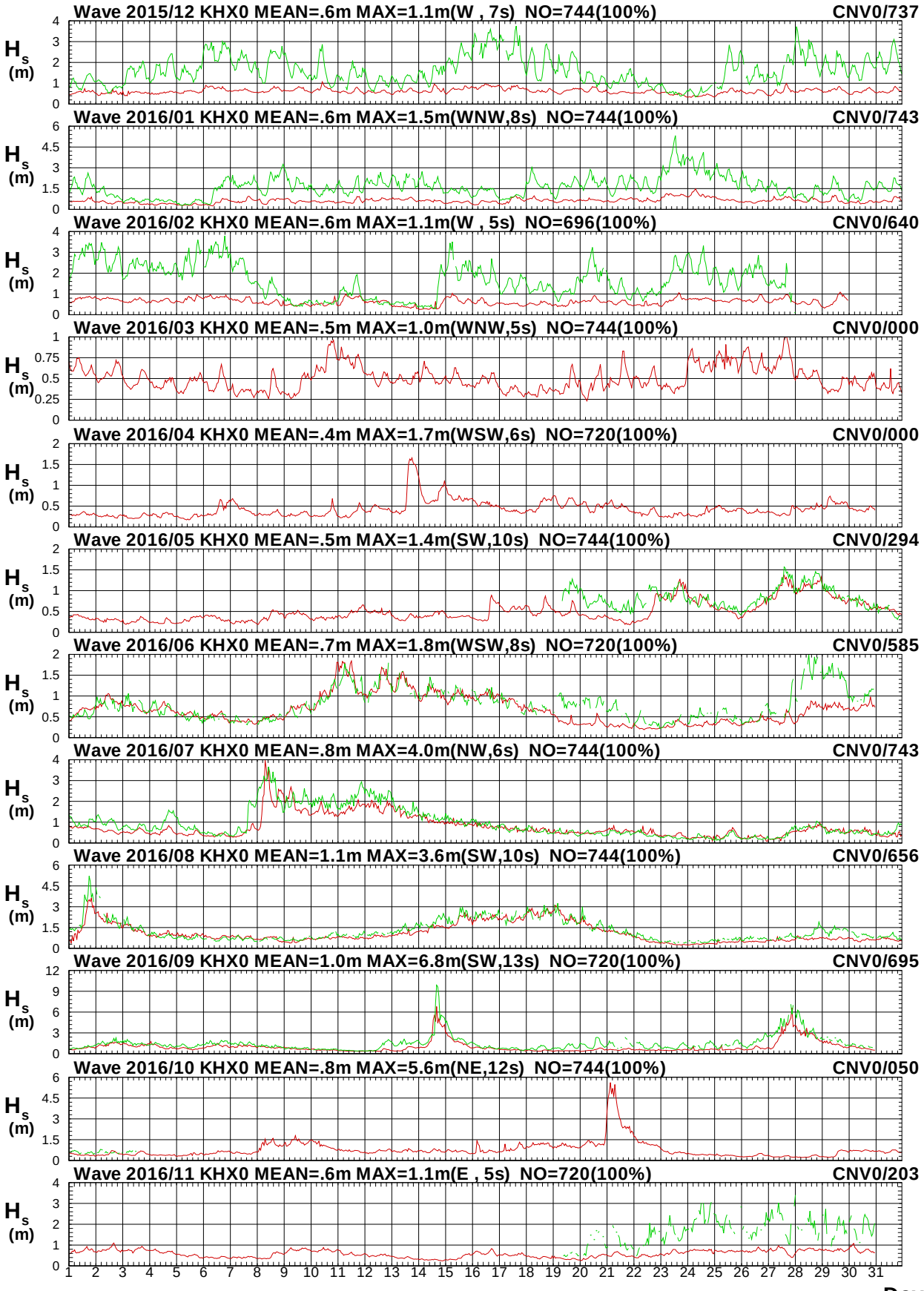


圖 2.15a　2016年每月高雄海域 X 站與嘉南海域 V 站波高圖

V15CKHX0.1HA V15CCNV0.1H0 V161KHX0.1HA V161CNV0.1H0 V162KHX0.1HA V162CNV0.1H0
V163KHX0.1HA V163CNV0.1H0 V164KHX0.1HA V164CNV0.1H0 V165KHX0.1HA V165CNV0.1H0

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# Wave $T_p$ in Kao-Hsiung Seas of KHX0 at 2016

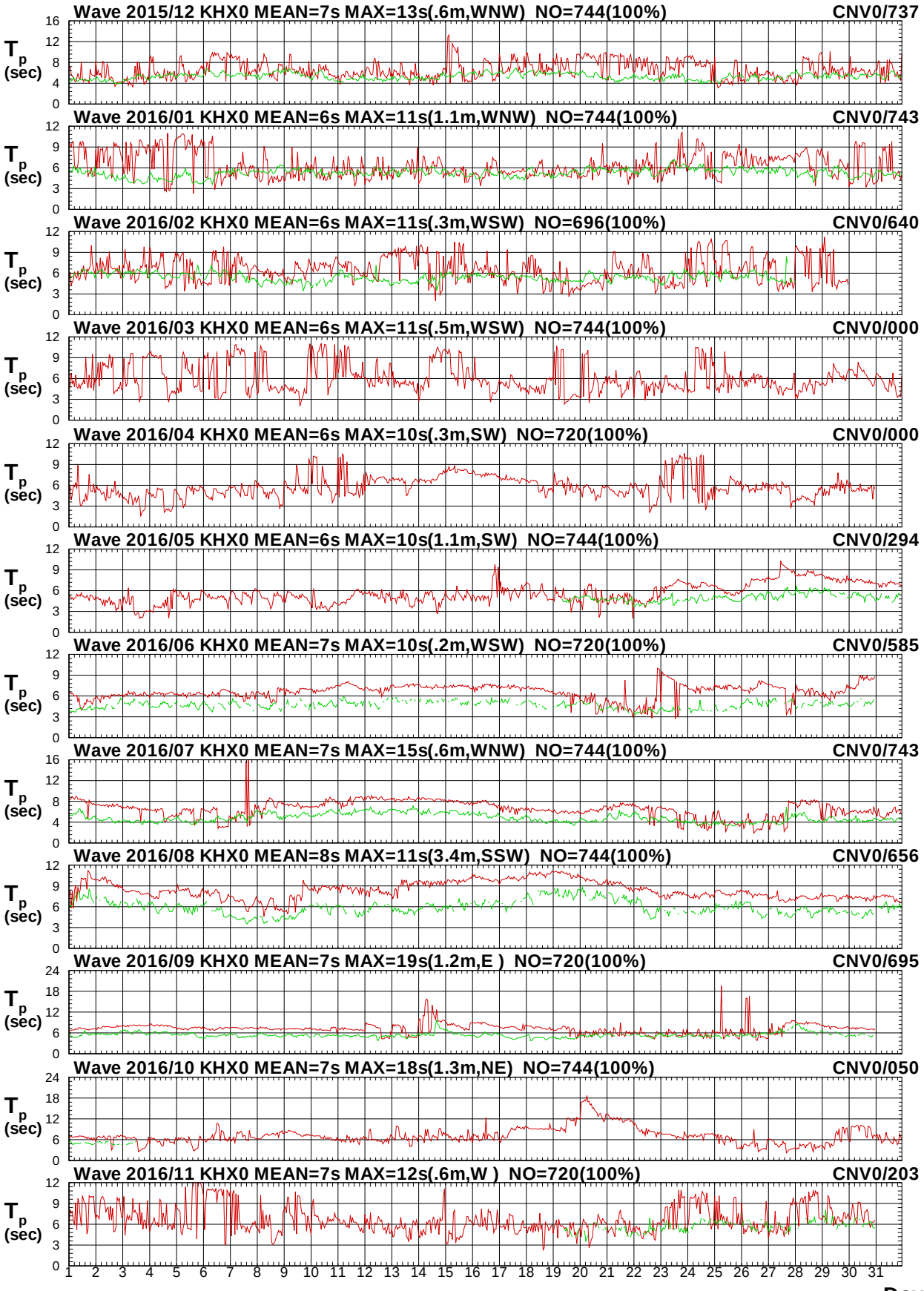


圖 2.15b　2016年每月高雄海域 X 站與嘉南海域 V 站週期圖

V15CKHX0.1HA V15CCNV0.1H0 V161KHX0.1HA V161CNV0.1H0 V162KHX0.1HA V162CNV0.1H0
V163KHX0.1HA V163CNV0.1H0 V164KHX0.1HA V164CNV0.1H0 V165KHX0.1HA V165CNV0.1H0

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# Wave Direction in Kao-Hsiung Seas of KHX0 at 2016

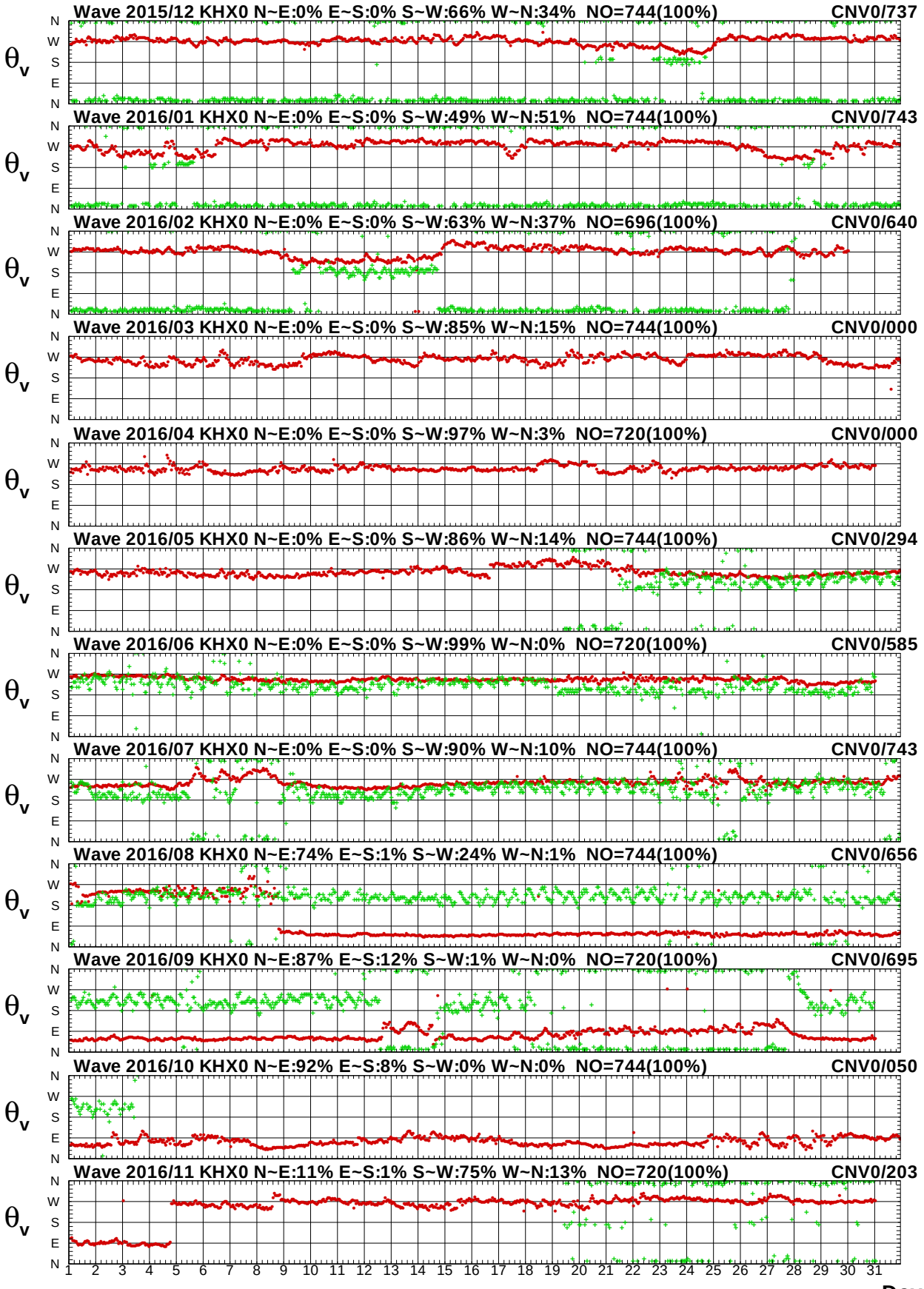


圖2.15c　2016年每月高雄海域 X 站與嘉南海域 V 站波向圖

V15CKHX0.1HA V15CCNV0.1H0 V161KHX0.1HA V161CNV0.1H0 V162KHX0.1HA V162CNV0.1H0
V163KHX0.1HA V163CNV0.1H0 V164KHX0.1HA V164CNV0.1H0 V165KHX0.1HA V165CNV0.1H0

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# 第三章　2016 年高雄海域觀測潮汐資料

高雄海域潮汐之觀測本中心於 2000 年 12 月在高雄一港口與二港口間海域(稱**測站 X0**)，其位置如附圖 3，安置 AWCP 即時傳送監測系統，也具量測水位功能，本站於 2005 年 8 月移至第二港口附近海域(稱**測站 X1**)，另於 2013 年 12 月於第一港口及第二港口附近海域(**稱測站 A** 及**測站 1**)，增設潮波儀。潮汐觀測早期 1992 年 1 月由本中心於港區安置潮位站(稱**測站 L**) ，2003 年 6 月本所港研中心在 10 號碼頭(稱**測站 T**)，增加安裝一具 Water Log 公司壓力式潮位儀監測系統。高雄港附近潮汐**測站 F** 之潮汐儀屬中央氣象局所有。高雄海域各測站歷年觀測潮汐資料蒐集概況如表 3。

潮位**測站 X** 等潮波流儀，以壓力感測器測得水壓變化時間序列，取樣方式為每一小時取前 10 分鐘之水位變化，然後加以平均得出該小時之平均水位值。**測站 T** 潮位資料取樣方式為每 6 分鐘量測一次水位變化。**測站 F** 資料由中央氣象局提供。

本潮汐年報以取經檢核或修補後之 **T 站**資料作為**主要觀測站**，2016 年各觀測站修補前每月觀測潮汐資料記錄期間統計表，如表 3.1a，2016 年各觀測站修補後每月觀測潮汐資料記錄期間統計表，如表 3.1b，**主要觀測站修補前後**每月潮汐歷線比較圖，如圖 3.1.1，**主要觀測站**與**調和分析計算潮位**每月潮汐歷線比較圖，如圖 3.1.2，**主要觀測站**與**次要觀測站**每月潮汐歷線比較圖，如圖 3.1.3 以後。

**表 3 高雄海域觀測潮汐資料蒐集概況表(統計時間至 2016 年 11 月)**

| 測站 | 緯度 | 經度 | 觀測期間 | 觀測單位 | 備註 |
|---|---|---|---|---|---|
| T | 22°32'52"N | 120°17'18"E | 2003/06-2016/11(觀測中) | 港研中心 | 高港 10 號碼頭 |
| X0 | 22°34'23"N | 120°16'09"E | 2000/12-2005/08 | 港研中心 | 高雄中洲外海 |
| X1 | 22°32'34"N | 120°17'38"E | 2005/08-2016/11(觀測中) | 港研中心 | 高雄 2 港口外海 |
| A | 22°38'36"N | 120°14'13"E | 2014/04-2016/11(觀測中) | 港研中心 | 高雄 1 港口外海 |
| 1 | | | 2014/12-2016/11(觀測中) | 港研中心 | 高雄 2 港口外海 |
| L | | 120°17'18"E | 1992/06-2003/12 | 港研中心 | 高雄 2 港區 |
| F | 22°36'52"N | 120°17'18"E | 1988/01-2016/11(觀測中) | 中央氣象局 | 高雄 1 港區 |

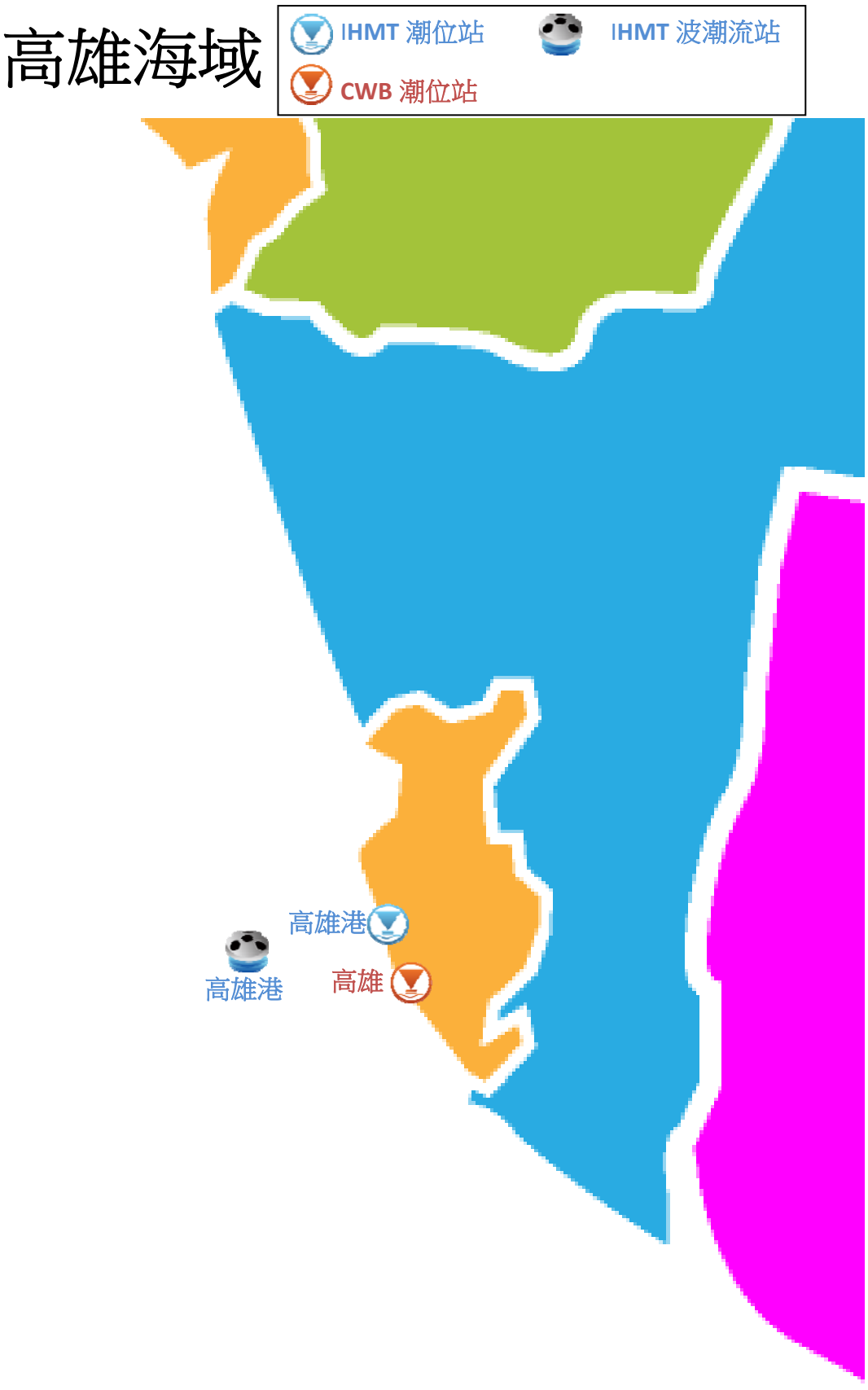


圖 3 高雄海域潮汐觀測站位置示意圖

# 表3.1a 2016年每月高雄海域修補前各測站觀測潮汐資料紀錄統計表

| 年/月 港區 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 |
|---|---|---|---|---|---|---|---|---|
| 測站 | T | X | F | A | 1 | 2 | L | |
| **2015/12**月 | 744 (100%) | 738 (99.2%) | * | * | 252 (33.9%) | 491 (66.0%) | * | * |
| **2016/ 1**月 | 744 (100%) | 743 (99.9%) | * | * | * | 744 (100%) | * | * |
| **2016/ 2**月 | 696 (100%) | 692 (99.4%) | * | * | * | 696 (100%) | * | * |
| **2016/ 3**月 | 744 (100%) | 743 (99.9%) | * | * | * | 744 (100%) | * | * |
| **2016/ 4**月 | 720 (100%) | 718 (99.7%) | * | * | * | 720 (100%) | * | * |
| **2016/ 5**月 | 744 (100%) | 738 (99.2%) | * | * | * | 744 (100%) | * | * |
| **2016/ 6**月 | 720 (100%) | 720 (100%) | * | * | * | 720 (100%) | * | * |
| **2016/ 7**月 | 744 (100%) | 706 (94.9%) | * | * | * | 744 (100%) | * | * |
| **2016/ 8**月 | 744 (100%) | 623 (83.7%) | * | * | * | 744 (100%) | * | * |
| **2016/ 9**月 | 720 (100%) | 715 (99.3%) | * | * | * | 720 (100%) | * | * |
| **2016/10**月 | 744 (100%) | 734 (98.7%) | * | * | * | 744 (100%) | * | * |
| **2016/11**月 | 720 (100%) | 705 (97.9%) | * | * | * | 177 (24.6%) | * | * |
| **2016/**冬季 | * | * | * | * | * | * | * | * |
| **2016/**春季 | * | * | * | * | * | * | * | * |
| **2016/**夏季 | * | * | * | * | * | * | * | * |
| **2016/**秋季 | * | * | * | * | * | * | * | * |
| **2016/**整年 | * | * | * | * | * | * | * | * |
| 起始年月 | * | * | * | * | * | * | * | * |
| 結束年月 | * | * | * | * | * | * | * | * |

# 表3.1b 2016年每月高雄海域修補後各測站潮汐資料統計表

| 年/月 港區 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 |
|---|---|---|---|---|---|---|---|---|
| 測站 | T | X | F | A | 1 | 2 | L | |
| 2015/12月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/ 1月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/ 2月 | 696 (100%) | * | * | * | * | * | * | * |
| 2016/ 3月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/ 4月 | 720 (100%) | * | * | * | * | * | * | * |
| 2016/ 5月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/ 6月 | 720 (100%) | * | * | * | * | * | * | * |
| 2016/ 7月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/ 8月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/ 9月 | 720 (100%) | * | * | * | * | * | * | * |
| 2016/10月 | 744 (100%) | * | * | * | * | * | * | * |
| 2016/11月 | 720 (100%) | * | * | * | * | * | * | * |
| 2016/冬季 | * | * | * | * | * | * | * | * |
| 2016/春季 | * | * | * | * | * | * | * | * |
| 2016/夏季 | * | * | * | * | * | * | * | * |
| 2016/秋季 | * | * | * | * | * | * | * | * |
| 2016/整年 | * | * | * | * | * | * | * | * |
| 起始年月 | * | * | * | * | * | * | * | * |
| 結束年月 | * | * | * | * | * | * | * | * |

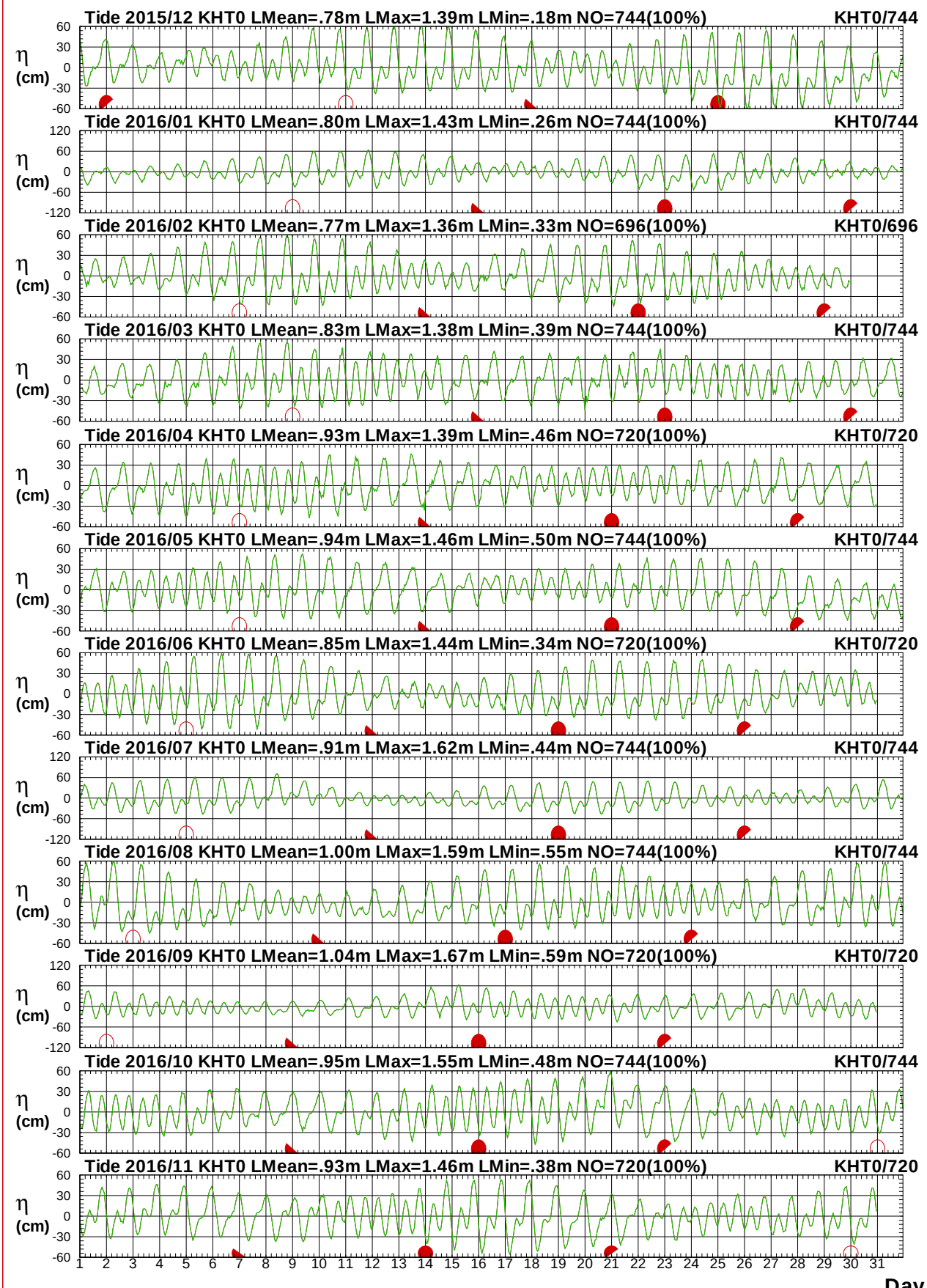


圖3.1.1　2016年每月高雄海域 T 站修補前後之潮位比較圖

T15CKHT0.1HA T15CKHT0.1H0 T161KHT0.1HA T161KHT0.1H0 T162KHT0.1HA T162KHT0.1H0
T163KHT0.1HA T163KHT0.1H0 T164KHT0.1HA T164KHT0.1H0 T165KHT0.1HA T165KHT0.1H0

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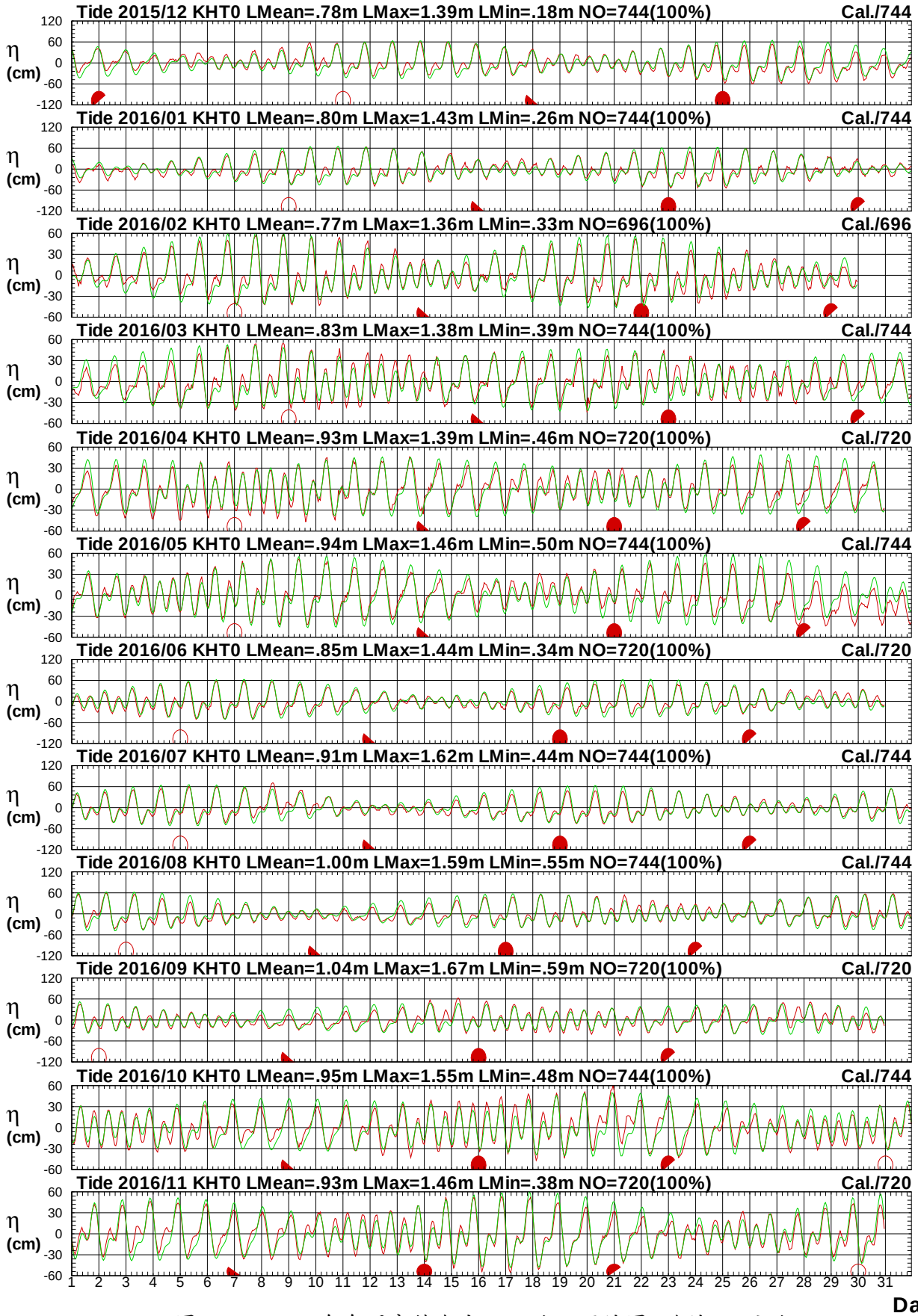


圖 3.1.2　2016年每月高雄海域 T 站潮位歷線圖 (綠線: 天文潮)

T15CKHT0.1HA T15CKHT0.1HC T161KHT0.1HA T161KHT0.1HC T162KHT0.1HA T162KHT0.1HC
T163KHT0.1HA T163KHT0.1HC T164KHT0.1HA T164KHT0.1HC T165KHT0.1HA T165KHT0.1HC

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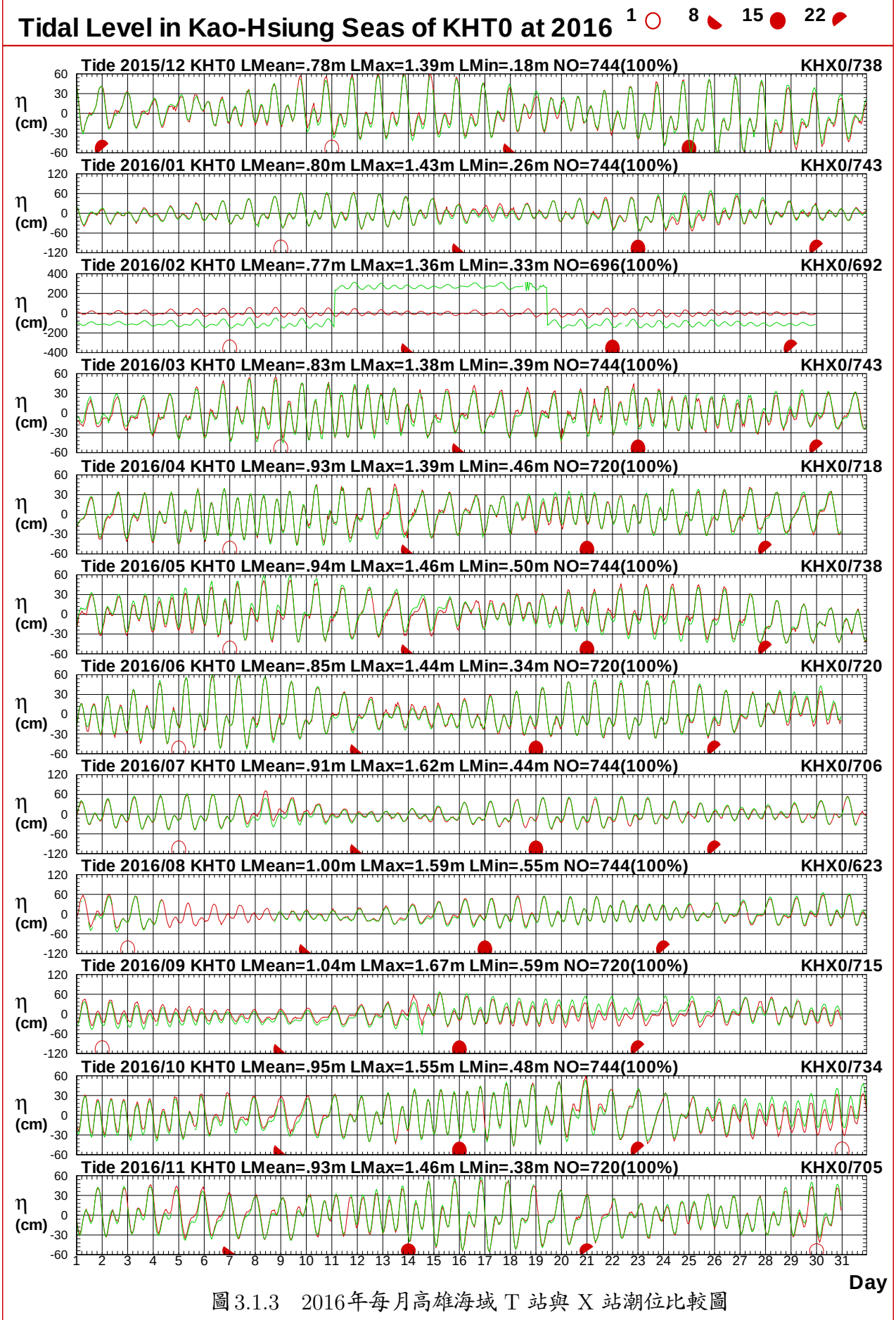


圖3.1.3　2016年每月高雄海域 T 站與 X 站潮位比較圖

T15CKHT0.1HA T15CKHX0.1H0 T161KHT0.1HA T161KHX0.1H0 T162KHT0.1HA T162KHX0.1H0
T163KHT0.1HA T163KHX0.1H0 T164KHT0.1HA T164KHX0.1H0 T165KHT0.1HA T165KHX0.1H0

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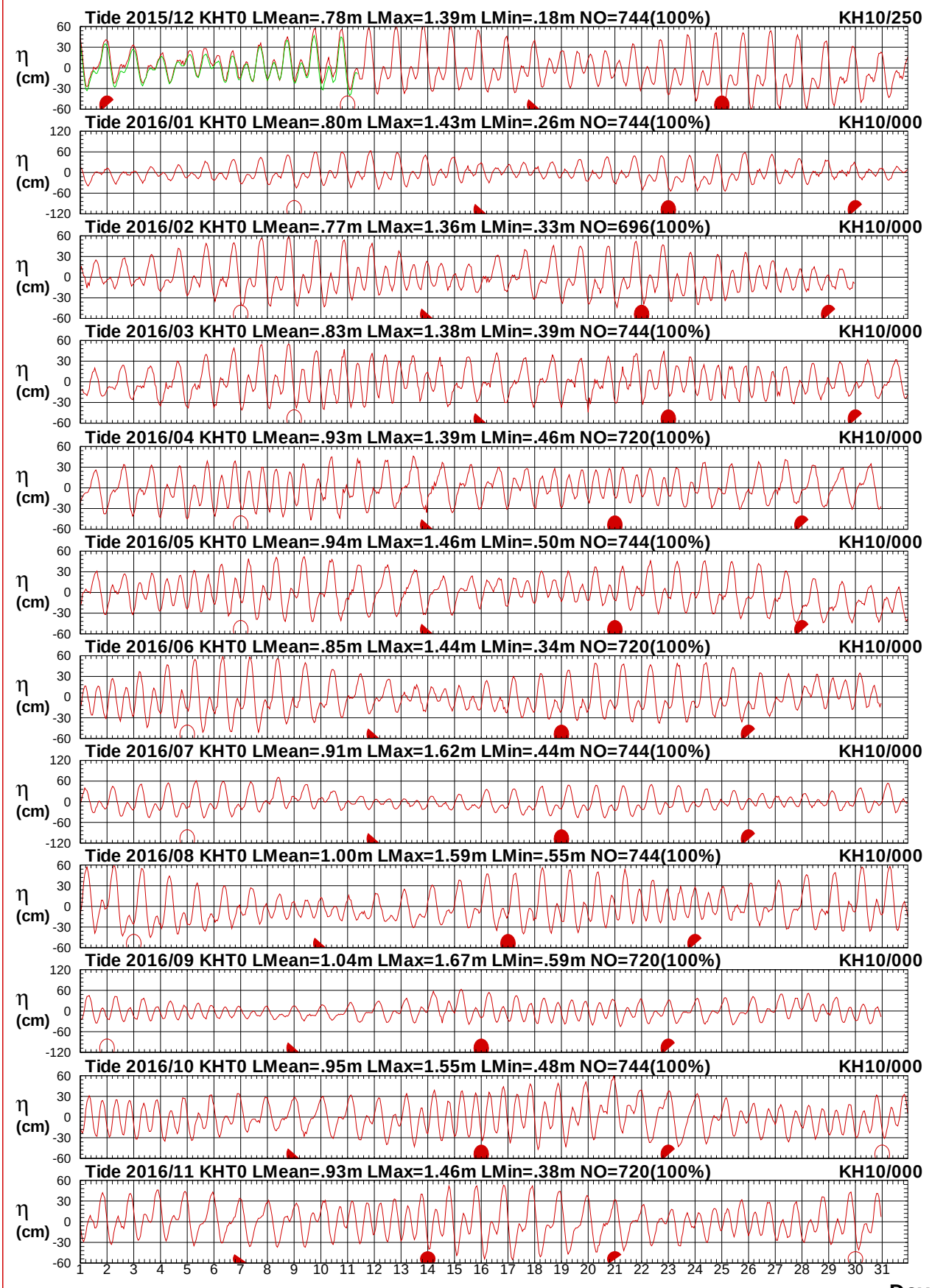


圖3.1.4　2016年每月高雄海域 T 站與1站潮位比較圖

T15CKHT0.1HA T15CKH10.1H0 T161KHT0.1HA T161KH10.1H0 T162KHT0.1HA T162KH10.1H0
T163KHT0.1HA T163KH10.1H0 T164KHT0.1HA T164KH10.1H0 T165KHT0.1HA T165KH10.1H0

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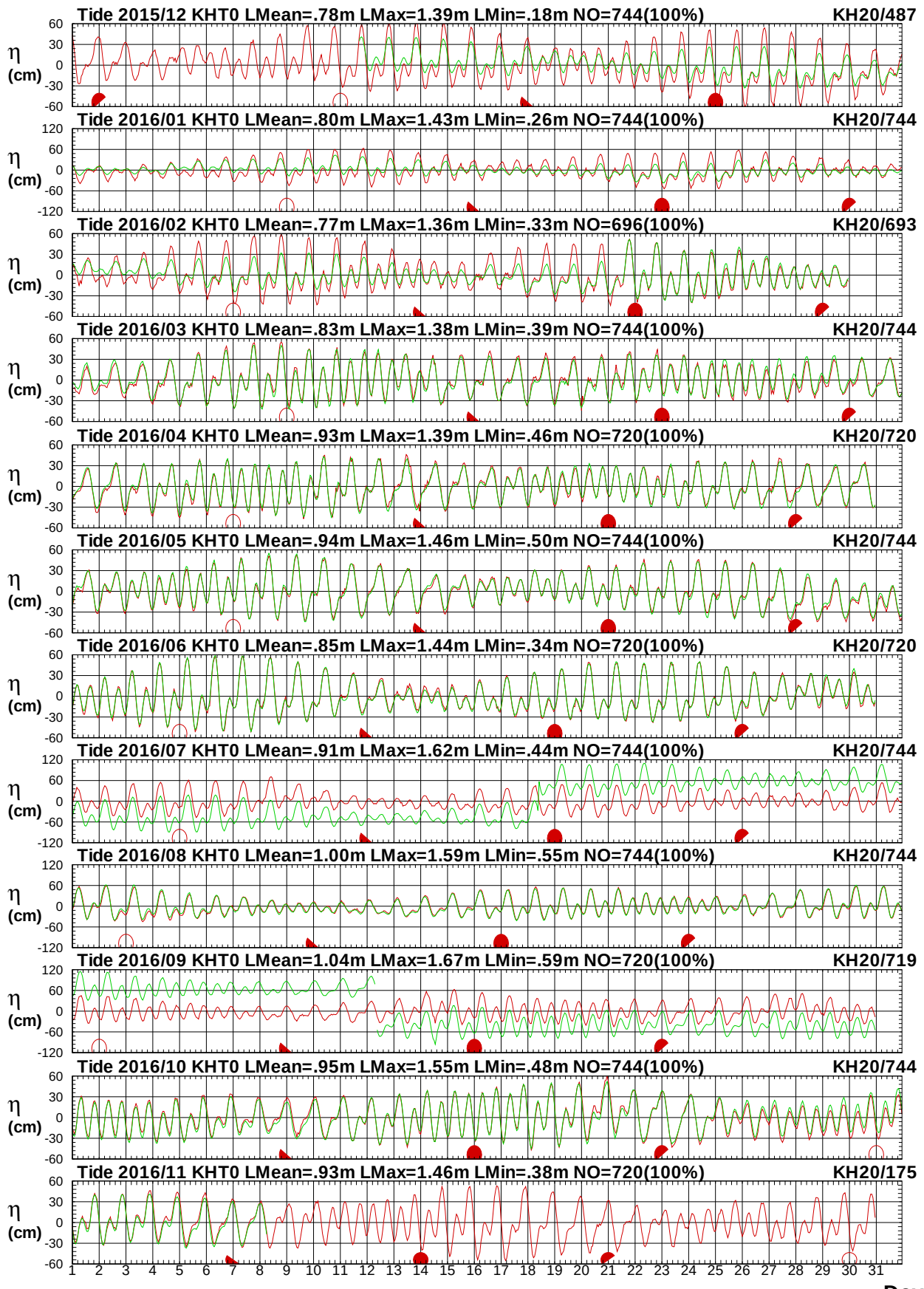


圖3.1.5　2016年每月高雄海域 T 站與2站潮位比較圖

T15CKHT0.1HA T15CKH20.1H0 T161KHT0.1HA T161KH20.1H0 T162KHT0.1HA T162KH20.1H0
T163KHT0.1HA T163KH20.1H0 T164KHT0.1HA T164KH20.1H0 T165KHT0.1HA T165KH20.1H0

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# 第四章　2016 年高雄海域觀測海流資料

高雄海域海流觀測係本中心**(IHMT)**2000 年 12 月於中區污水處理廠附近海域安置 NORTEK 公司之剖面海流與海流即時監測系統(**測站 X0**)，如圖 4，以進行長期觀測。本站於 2005 年 8 月移至第二港口附近海(**稱測站 X1**)，水深約 18m;另於 2014 年 4 月及 12 月分別於第一港口及第二港口附近海(**稱測站 A 及測站 1)**，增設潮波流儀。

**測站 Z**(彌陀外海浮標站)之海流儀則屬水利署**(WRA)**所有。高雄海域各測站歷年觀測海流資料蒐集概況如表 4。

剖面海流流速的量測可以依照使用在不同水深即自固定在海床上之儀器位置到水表面來設定量測不同的間距，高雄港觀測站水深間距設定為 1 公尺；每小時連續量測 600 秒，再將總和平均代表其數樣每一間距層之海流流速、流向等資料，記錄在感應器內，並每隔 1 小時經由海底電纜傳訊回接收站之電腦中儲存。

本海流年報 2016 年各觀測站每月**觀測海流**資料記錄期間統計表，如表 4.1a，2016 年各觀測站每月**計算潮流**資料統計表，如表 4.1b。2016 年**各觀測站觀測海流**與**計算潮流(殘餘流)**歷線比較圖，**各觀測站觀測海流**與其他測站觀測海流歷線比較圖，如圖 4.1 以後。

**表 4 高雄海域觀測海流資料蒐集概況表(統計時間至 2016 年 11 月)**

| 測站 | 緯度 | 經度 | 觀測期間 | 觀測單位 | 備註 |
|---|---|---|---|---|---|
| X0 | 22°34'23"N | 120°16'09"E | 2000/12-2005/08 | 港研中心 | 高雄中洲外海 |
| X1 | 22°32'34"N | 120°17'38"E | 2005/08-2016/11(觀測中) | 港研中心 | 高雄 2 港口外海 |
| A | 22°38'36"N | 120°14'13"E | 2014/04-2015/03 | 港研中心 | 高雄 1 港口外海 |
| 1 | | | 2014/12-2015/12 | 港研中心 | 高雄 2 港口外海 |
| 1 | | | 2015/12-2016/11 | 港研中心 | 高雄 2 港口外海 |
| Z | 22°45'50"N | 120°09'49"E | 2012/09-2016/11(觀測中) | 水利署 | 彌陀外海浮標站 |

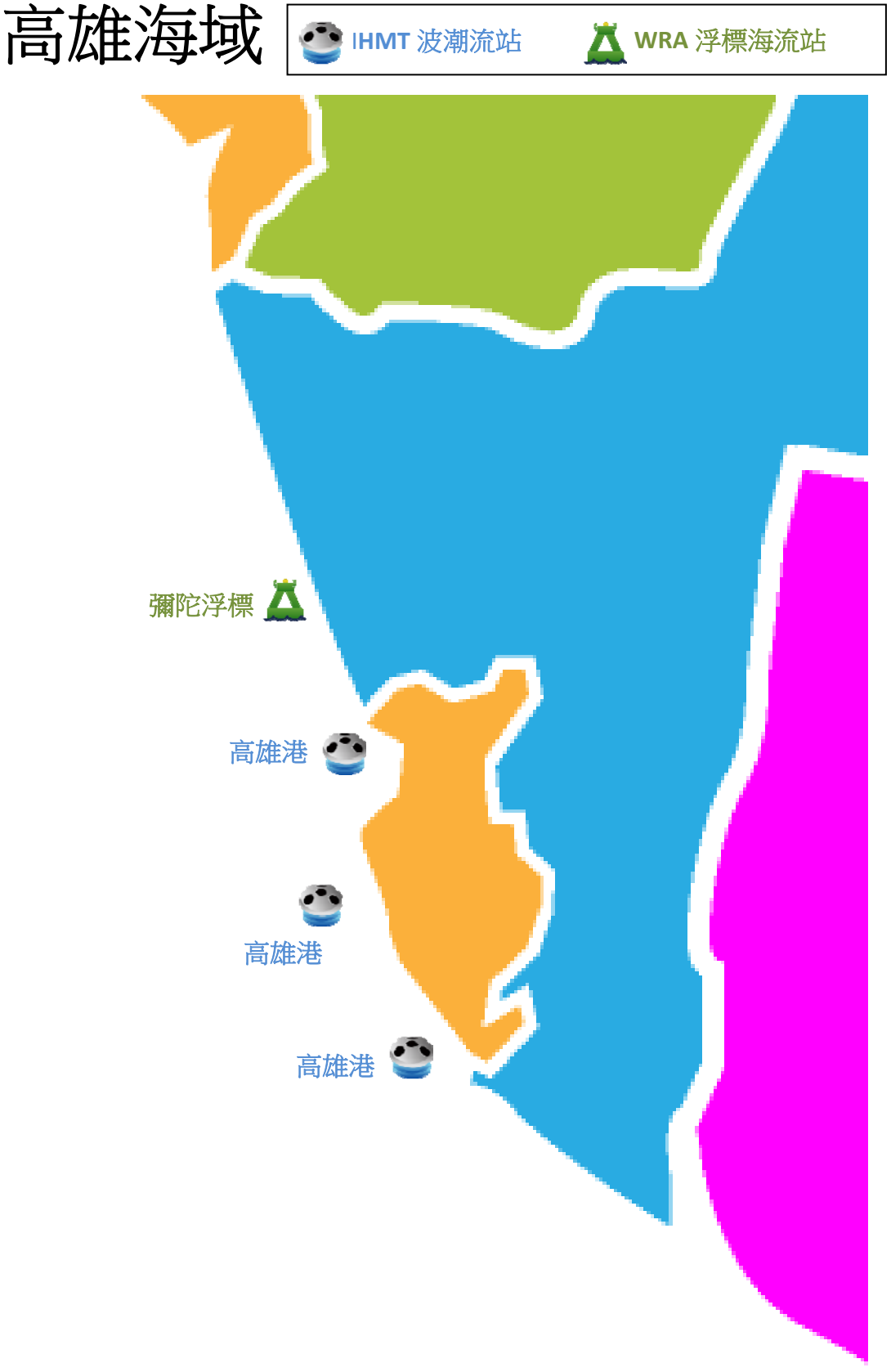


圖 4 高雄海域海流觀測站位置示意圖

# 表4.1a 2016年每月高雄海域各測站觀測海流資料紀錄統計表

| 年/月 港區 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 |
|---|---|---|---|---|---|---|---|---|
| 測站 | X | Z | A | 1 | 2 | | | |
| 2015/12月 | 738 (99.2%) | 681 (91.5%) | * | 252 (33.9%) | 491 (66.0%) | * | * | * |
| 2016/ 1月 | 743 (99.9%) | 682 (91.7%) | * | * | 744 (100%) | * | * | * |
| 2016/ 2月 | 692 (99.4%) | 627 (90.1%) | * | * | 696 (100%) | * | * | * |
| 2016/ 3月 | 743 (99.9%) | 652 (87.6%) | * | * | 744 (100%) | * | * | * |
| 2016/ 4月 | 718 (99.7%) | 545 (75.7%) | * | * | 720 (100%) | * | * | * |
| 2016/ 5月 | 738 (99.2%) | 478 (64.2%) | * | * | 744 (100%) | * | * | * |
| 2016/ 6月 | 720 (100%) | 376 (52.2%) | * | * | 720 (100%) | * | * | * |
| 2016/ 7月 | 706 (94.9%) | 190 (25.5%) | * | * | 744 (100%) | * | * | * |
| 2016/ 8月 | 623 (83.7%) | * | * | * | 744 (100%) | * | * | * |
| 2016/ 9月 | 715 (99.3%) | 164 (22.8%) | * | * | 720 (100%) | * | * | * |
| 2016/10月 | 734 (98.7%) | 689 (92.6%) | * | * | 744 (100%) | * | * | * |
| 2016/11月 | 705 (97.9%) | 670 (93.1%) | * | * | 177 (24.6%) | * | * | * |
| 2016/冬季 | 2173 (99.5%) | 1990 (91.1%) | * | 252 (11.5%) | 1931 (88.4%) | * | * | * |
| 2016/春季 | 2199 (99.6%) | 1675 (75.9%) | * | * | 2208 (100%) | * | * | * |
| 2016/夏季 | 2049 (92.8%) | 566 (25.6%) | * | * | 2208 (100%) | * | * | * |
| 2016/秋季 | 2154 (98.6%) | 1523 (69.7%) | * | * | 1641 (75.1%) | * | * | * |
| 2016/整年 | 8575 (97.6%) | 5754 (65.5%) | * | 252 ( 2.9%) | 7988 (90.9%) | * | * | * |
| 起始年月 | 2015/12 | 2015/12 | * | 2015/12 | 2015/12 | * | * | * |
| 結束年月 | 2016/11 | 2016/11 | * | 2015/12 | 2016/11 | * | * | * |

ST-X: 港灣技術研究中心觀測 X 站流速資料

# 表4.1b 2016年每月高雄海域計算潮流各測站資料統計表

| 年/月 港區 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 | 高雄海域 |
|---|---|---|---|---|---|---|---|---|
| 測站 | X | A | A | 1 | 2 | | | |
| 2015/12月 | 744 (100%) | * | * | 744 (100%) | 744 (100%) | * | * | * |
| 2016/ 1月 | 744 (100%) | * | * | 743 (99.9%) | 744 (100%) | * | * | * |
| 2016/ 2月 | 696 (100%) | * | * | 696 (100%) | 696 (100%) | * | * | * |
| 2016/ 3月 | 744 (100%) | * | * | 744 (100%) | 744 (100%) | * | * | * |
| 2016/ 4月 | 720 (100%) | * | * | 720 (100%) | 720 (100%) | * | * | * |
| 2016/ 5月 | 744 (100%) | * | * | 744 (100%) | 744 (100%) | * | * | * |
| 2016/ 6月 | 720 (100%) | * | * | 720 (100%) | 720 (100%) | * | * | * |
| 2016/ 7月 | 744 (100%) | * | * | 744 (100%) | 744 (100%) | * | * | * |
| 2016/ 8月 | 744 (100%) | * | * | 744 (100%) | 744 (100%) | * | * | * |
| 2016/ 9月 | 720 (100%) | * | * | 720 (100%) | 720 (100%) | * | * | * |
| 2016/10月 | 744 (100%) | * | * | 744 (100%) | 744 (100%) | * | * | * |
| 2016/11月 | 720 (100%) | * | * | 720 (100%) | 720 (100%) | * | * | * |
| 2016/冬季 | * | * | * | * | * | * | * | * |
| 2016/春季 | * | * | * | * | * | * | * | * |
| 2016/夏季 | * | * | * | * | * | * | * | * |
| 2016/秋季 | * | * | * | * | * | * | * | * |
| 2016/整年 | * | * | * | * | * | * | * | * |
| 起始年月 | * | * | * | * | * | * | * | * |
| 結束年月 | * | * | * | * | * | * | * | * |

Cal.X: 港灣技術研究中心潮流 X 站計算資料

# Current Speed in Kao-Hsiung Seas of KHX0 at 2016

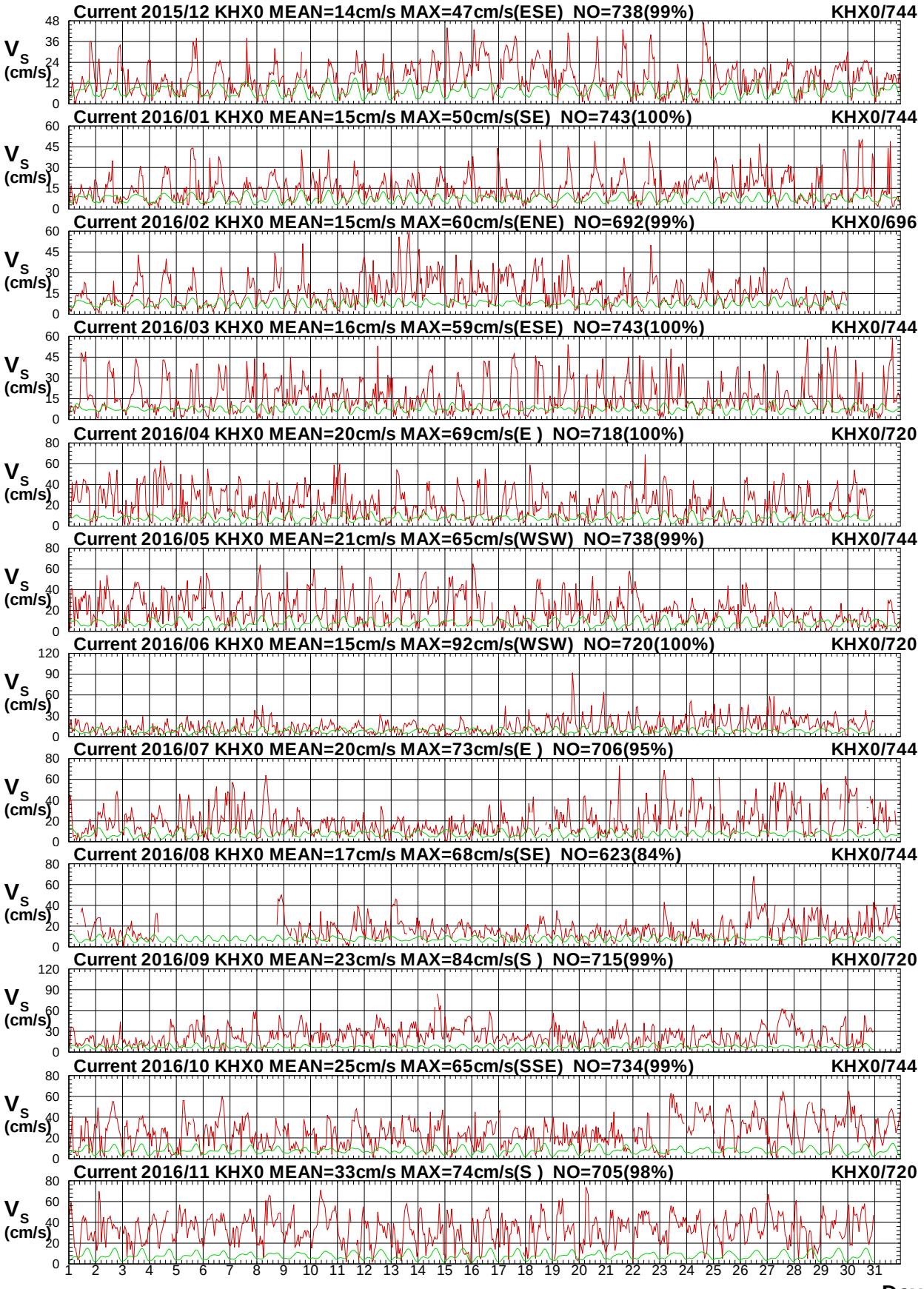


圖 4.1a　2016年每月高雄海域 X 站觀測與潮流流速比較圖

C15CKHX0.1H0 C15CKHX0.1HD C161KHX0.1H0 C161KHX0.1HD C162KHX0.1H0 C162KHX0.1HD
C163KHX0.1H0 C163KHX0.1HD C164KHX0.1H0 C164KHX0.1HD C165KHX0.1H0 C165KHX0.1HD

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# Current Direction in Kao-Hsiung Seas of KHX0 at 2016

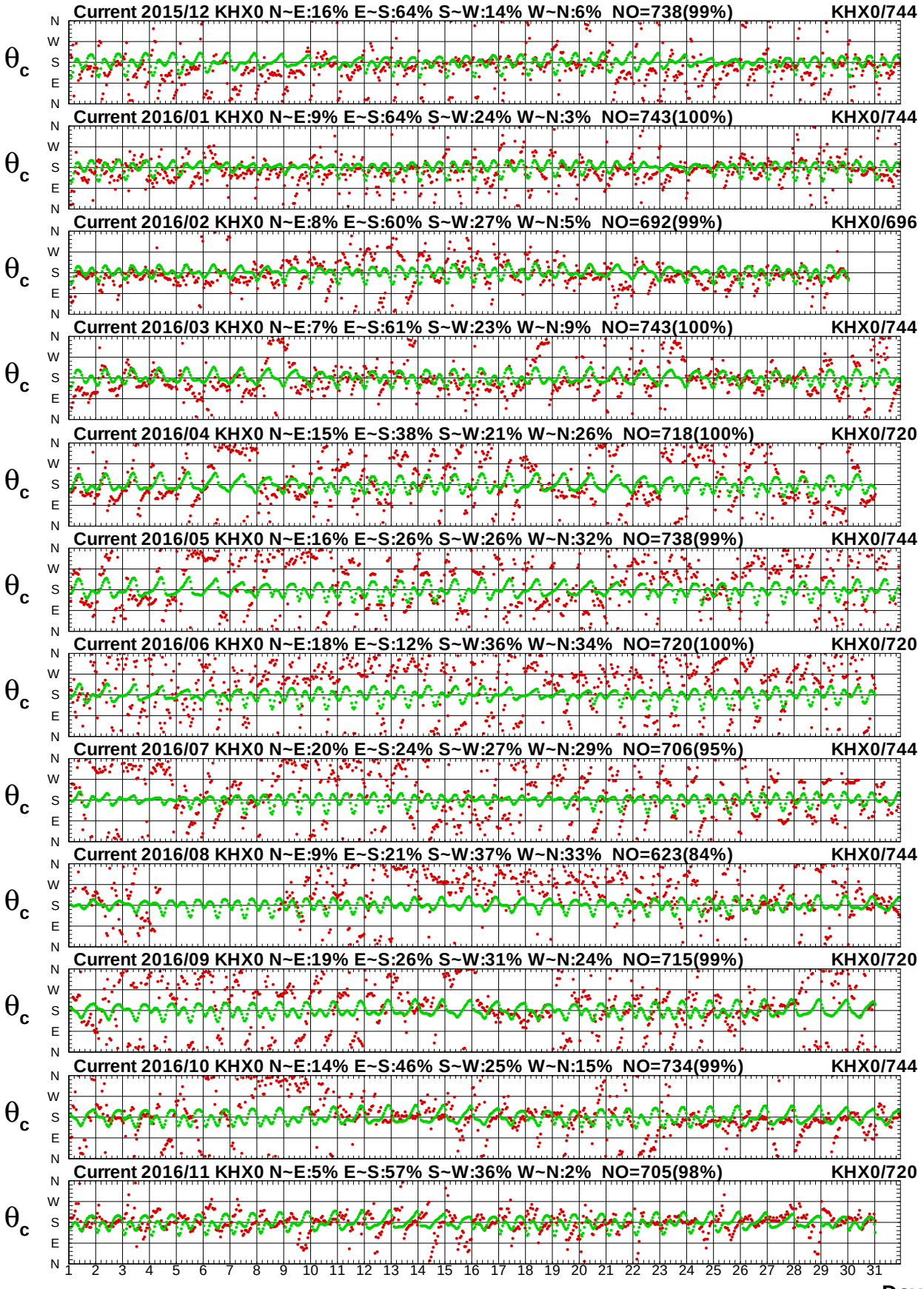


圖4.1b　2016年每月高雄海域 X 站觀測與潮流流向比較圖

# Current Speed in Kao-Hsiung Seas of KHX0 at 2016

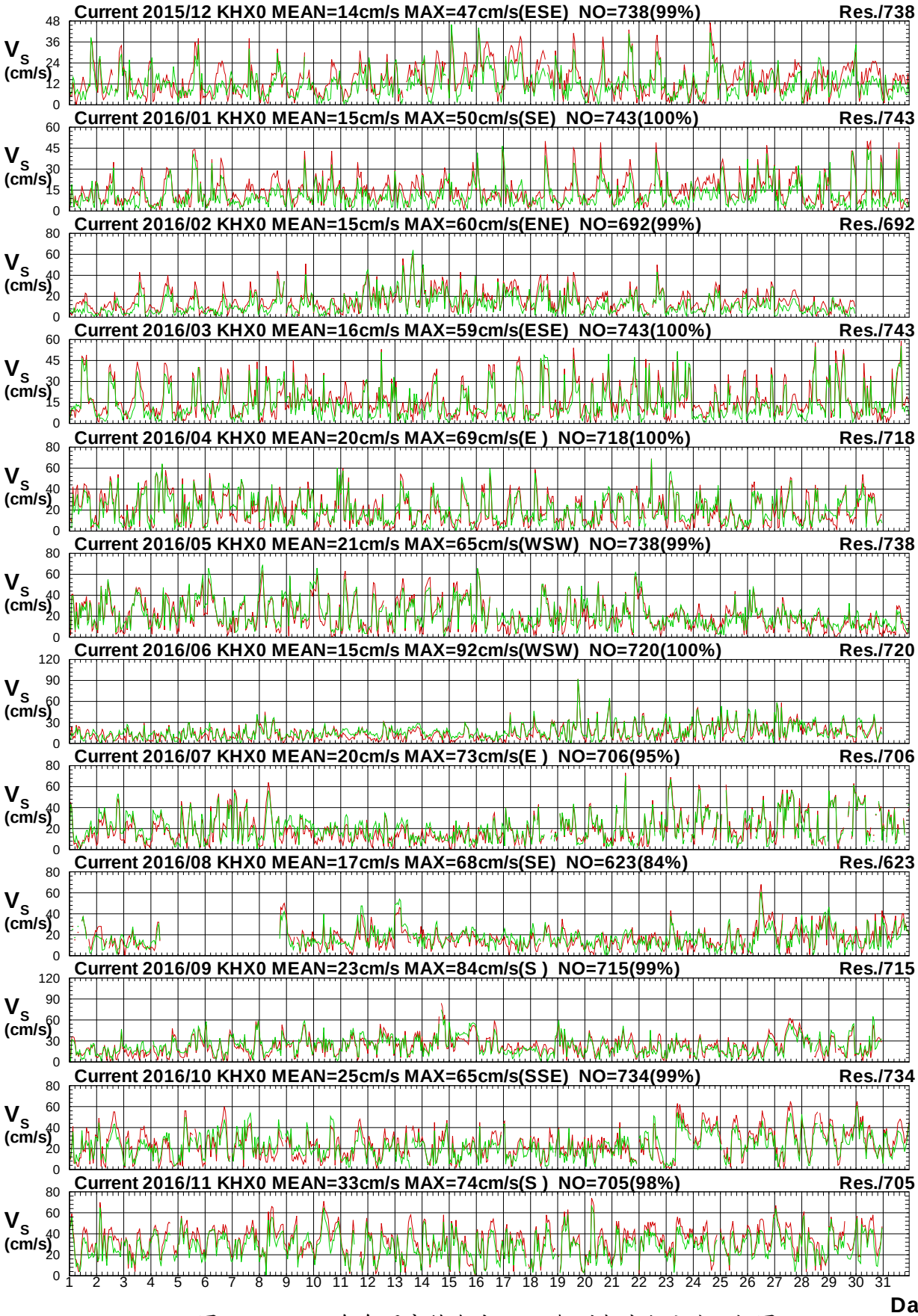


圖 4.2a　2016年每月高雄海域 X 站觀測與非潮流速比較圖

C15CKHX0.1H0 C15CKHX0.1HR C161KHX0.1H0 C161KHX0.1HR C162KHX0.1H0 C162KHX0.1HR
C163KHX0.1H0 C163KHX0.1HR C164KHX0.1H0 C164KHX0.1HR C165KHX0.1H0 C165KHX0.1HR

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# Current Direction in Kao-Hsiung Seas of KHX0 at 2016

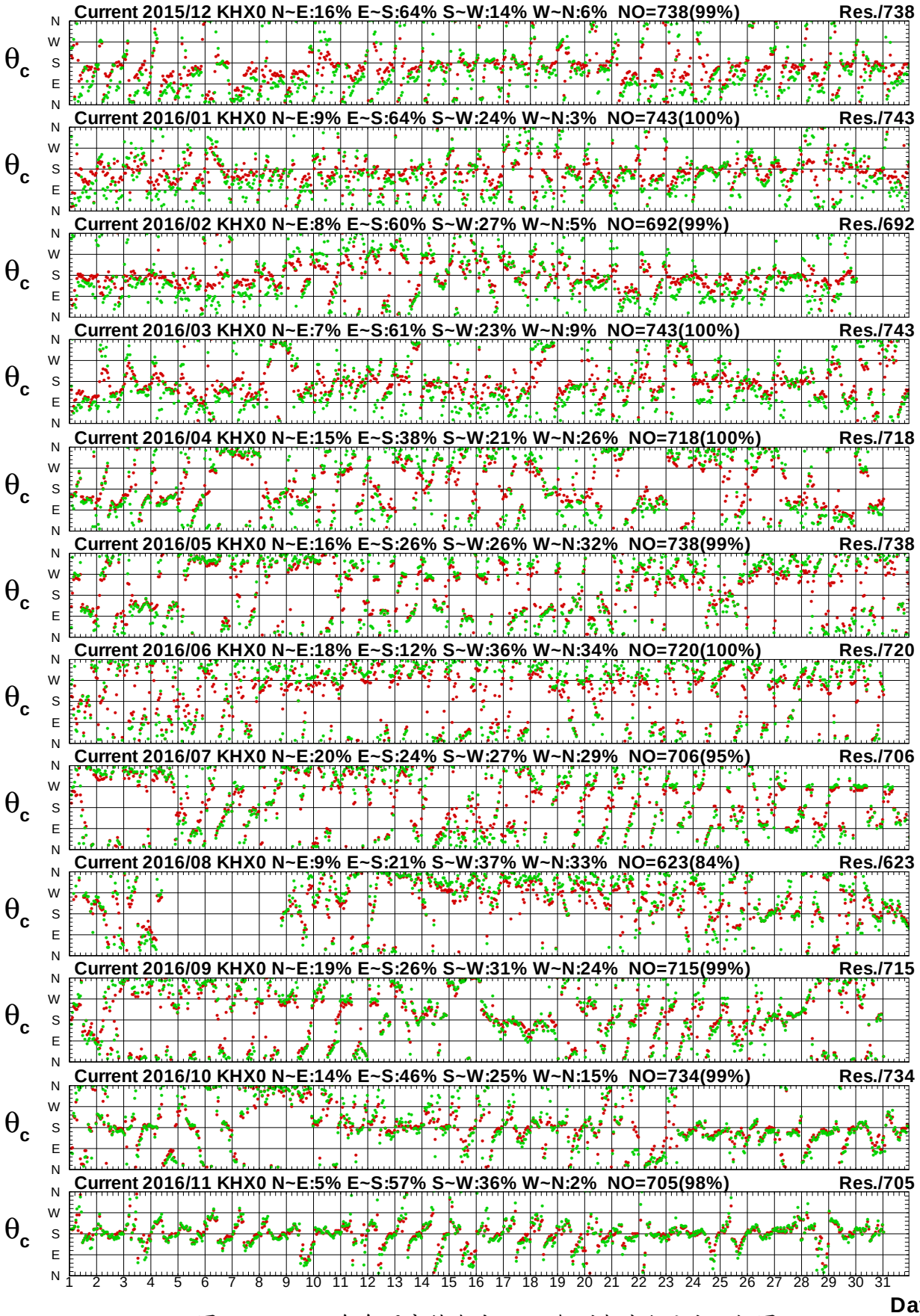


圖 4.2b　2016年每月高雄海域 X 站觀測與非潮流向比較圖

C15CKHX0.1H0 C15CKHX0.1HR C161KHX0.1H0 C161KHX0.1HR C162KHX0.1H0 C162KHX0.1HR
C163KHX0.1H0 C163KHX0.1HR C164KHX0.1H0 C164KHX0.1HR C165KHX0.1H0 C165KHX0.1HR

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# Current Speed in Kao-Hsiung Seas of KHZ0 at 2016

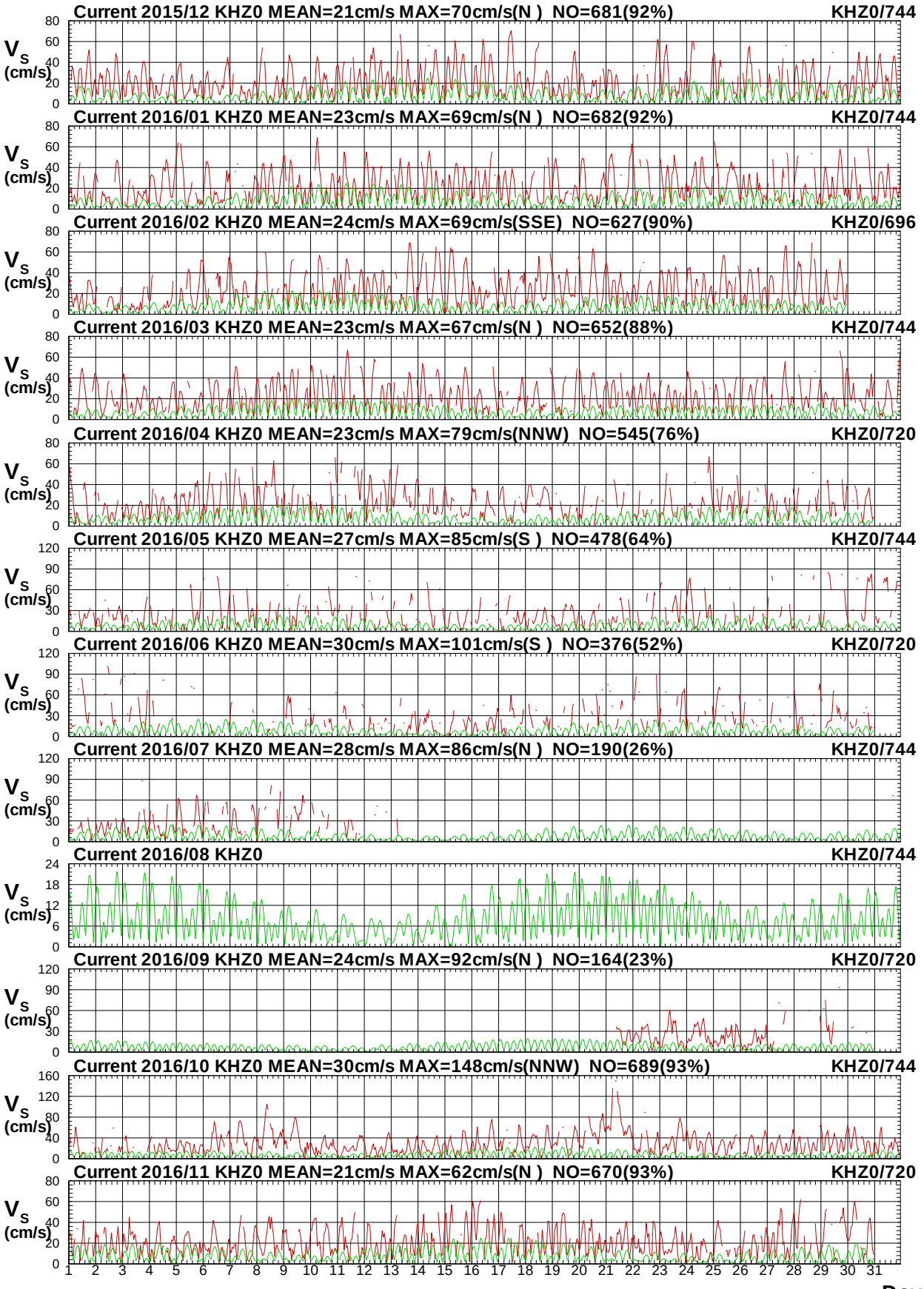


圖 4.3a　2016年每月高雄海域 Z 站觀測與潮流流速比較圖

C15CKHZ0.1H0 C15CKHZ0.1HD C161KHZ0.1H0 C161KHZ0.1HD C162KHZ0.1H0 C162KHZ0.1HD
C163KHZ0.1H0 C163KHZ0.1HD C164KHZ0.1H0 C164KHZ0.1HD C165KHZ0.1H0 C165KHZ0.1HD

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# Current Direction in Kao-Hsiung Seas of KHZ0 at 2016

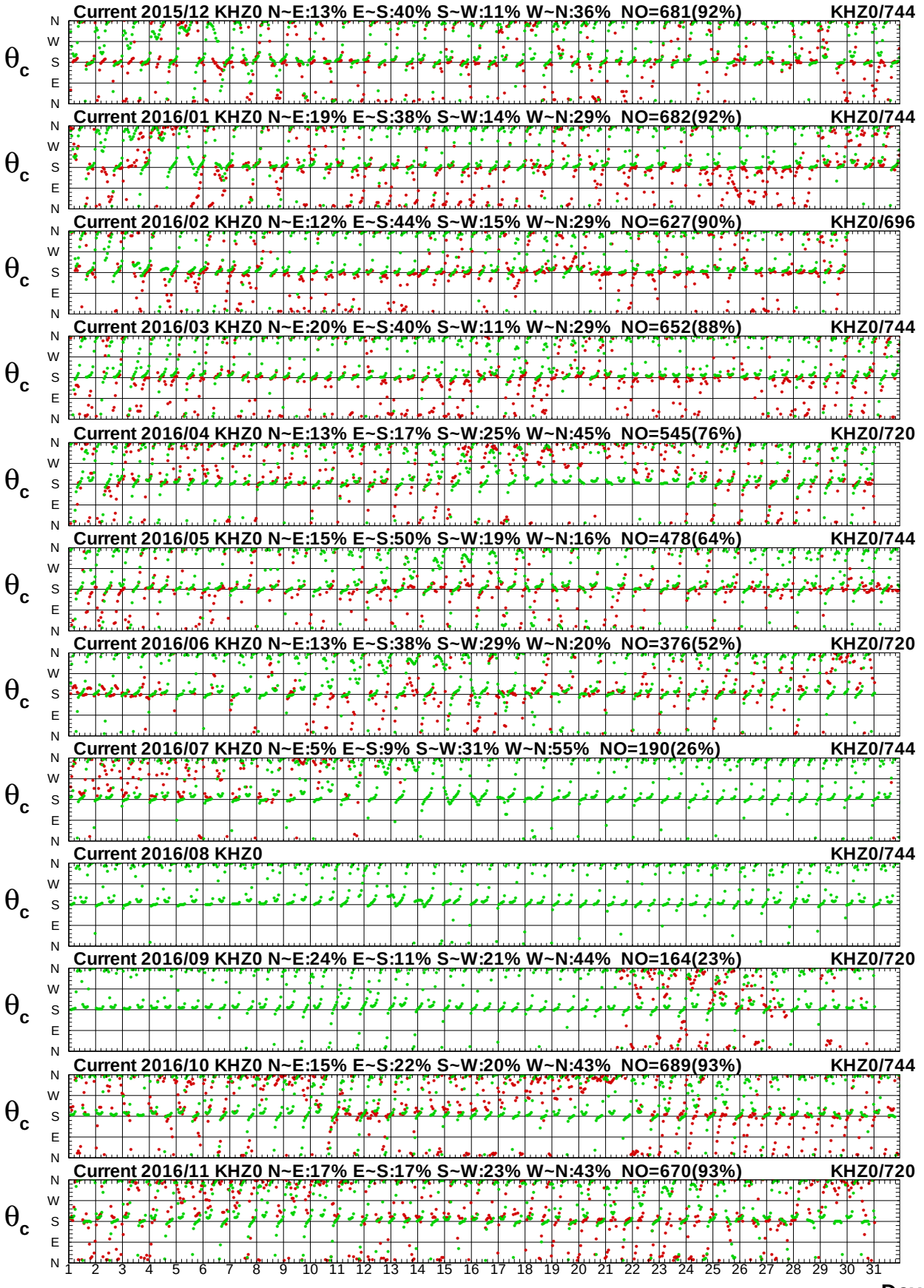


圖 4.3b　2016年每月高雄海域 Z 站觀測與潮流流向比較圖

C15CKHZ0.1H0 C15CKHZ0.1HD C161KHZ0.1H0 C161KHZ0.1HD C162KHZ0.1H0 C162KHZ0.1HD
C163KHZ0.1H0 C163KHZ0.1HD C164KHZ0.1H0 C164KHZ0.1HD C165KHZ0.1H0 C165KHZ0.1HD

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# Current Speed in Kao-Hsiung Seas of KHZ0 at 2016

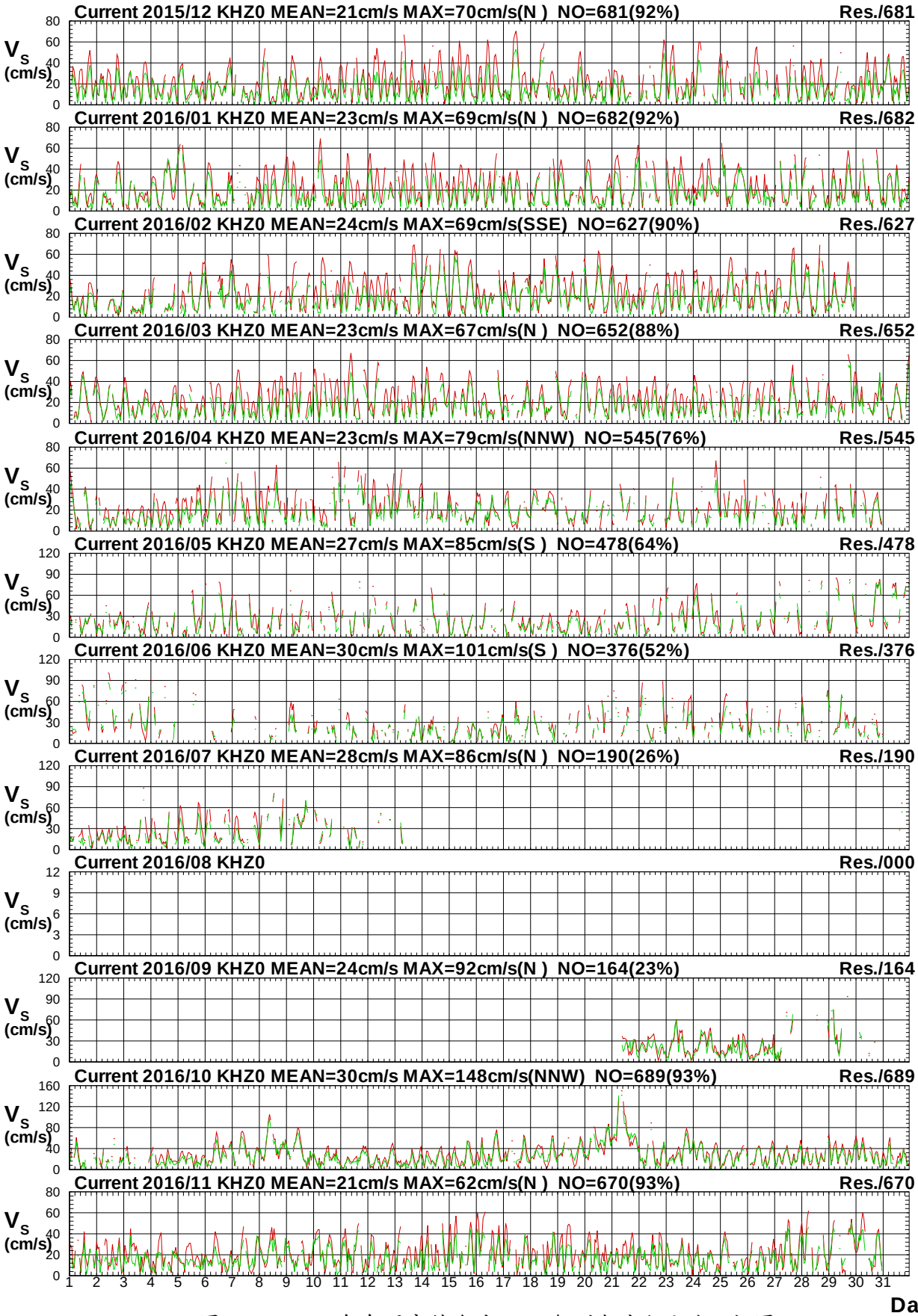


圖 4.4a　2016年每月高雄海域 Z 站觀測與非潮流速比較圖

C15CKHZ0.1H0 C15CKHZ0.1HR C161KHZ0.1H0 C161KHZ0.1HR C162KHZ0.1H0 C162KHZ0.1HR
C163KHZ0.1H0 C163KHZ0.1HR C164KHZ0.1H0 C164KHZ0.1HR C165KHZ0.1H0 C165KHZ0.1HR

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# Current Direction in Kao-Hsiung Seas of KHZ0 at 2016

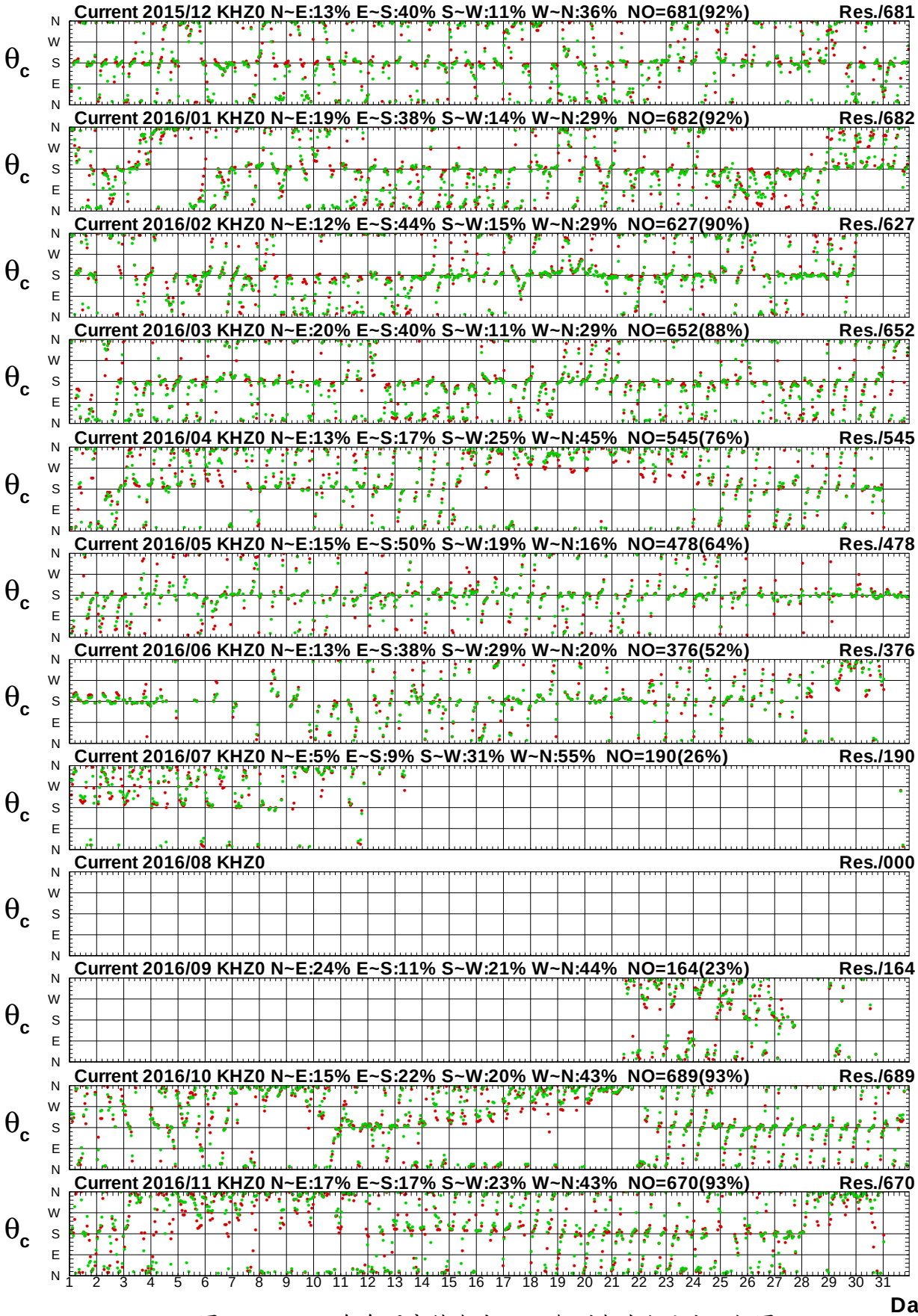


圖 4.4b　2016年每月高雄海域 Z 站觀測與非潮流向比較圖

C15CKHZ0.1H0 C15CKHZ0.1HR C161KHZ0.1H0 C161KHZ0.1HR C162KHZ0.1H0 C162KHZ0.1HR
C163KHZ0.1H0 C163KHZ0.1HR C164KHZ0.1H0 C164KHZ0.1HR C165KHZ0.1H0 C165KHZ0.1HR

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# Current Speed in Kao-Hsiung Seas of KH10 at 2016

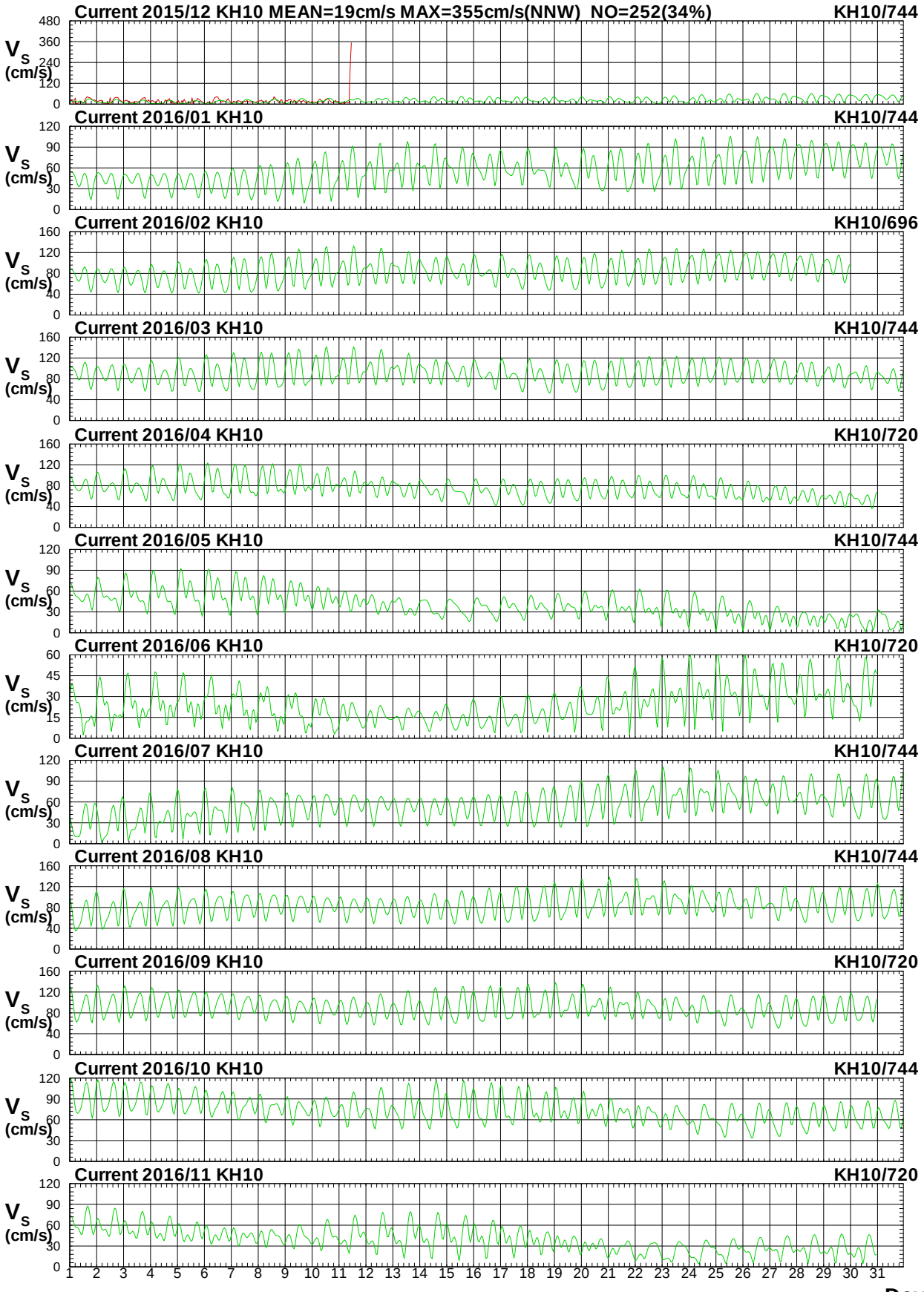


圖4.5a　2016年每月高雄海域1站觀測與潮流流速比較圖

C15CKH10.1H0 C15CKH10.1HD C161KH10.1H0 C161KH10.1HD C162KH10.1H0 C162KH10.1HD
C163KH10.1H0 C163KH10.1HD C164KH10.1H0 C164KH10.1HD C165KH10.1H0 C165KH10.1HD

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# Current Direction in Kao-Hsiung Seas of KH10 at 2016

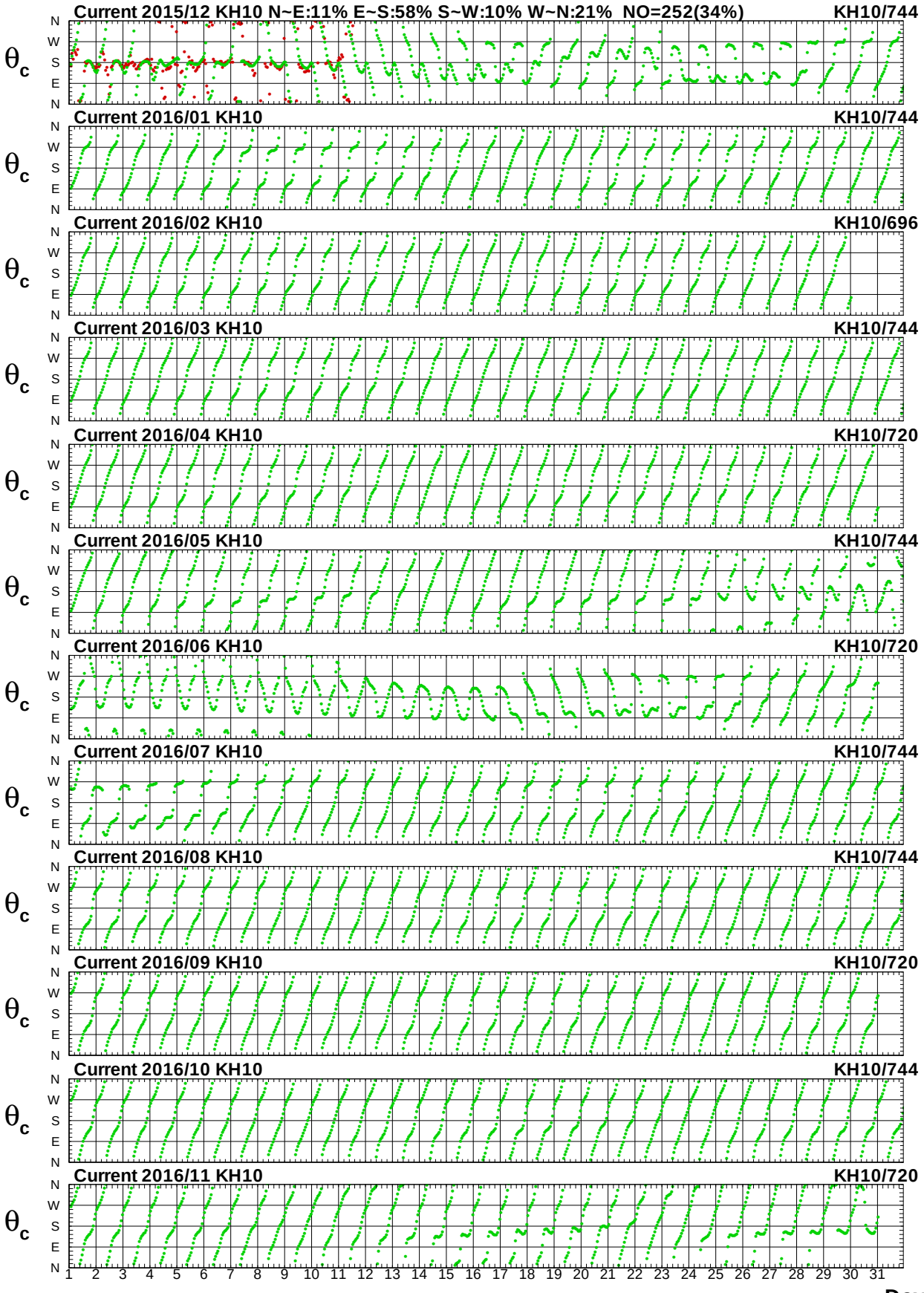


圖 4.5b　2016年每月高雄海域1站觀測與潮流流向比較圖

C15CKH10.1H0 C15CKH10.1HD C161KH10.1H0 C161KH10.1HD C162KH10.1H0 C162KH10.1HD
C163KH10.1H0 C163KH10.1HD C164KH10.1H0 C164KH10.1HD C165KH10.1H0 C165KH10.1HD

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# Current Speed in Kao-Hsiung Seas of KH20 at 2016

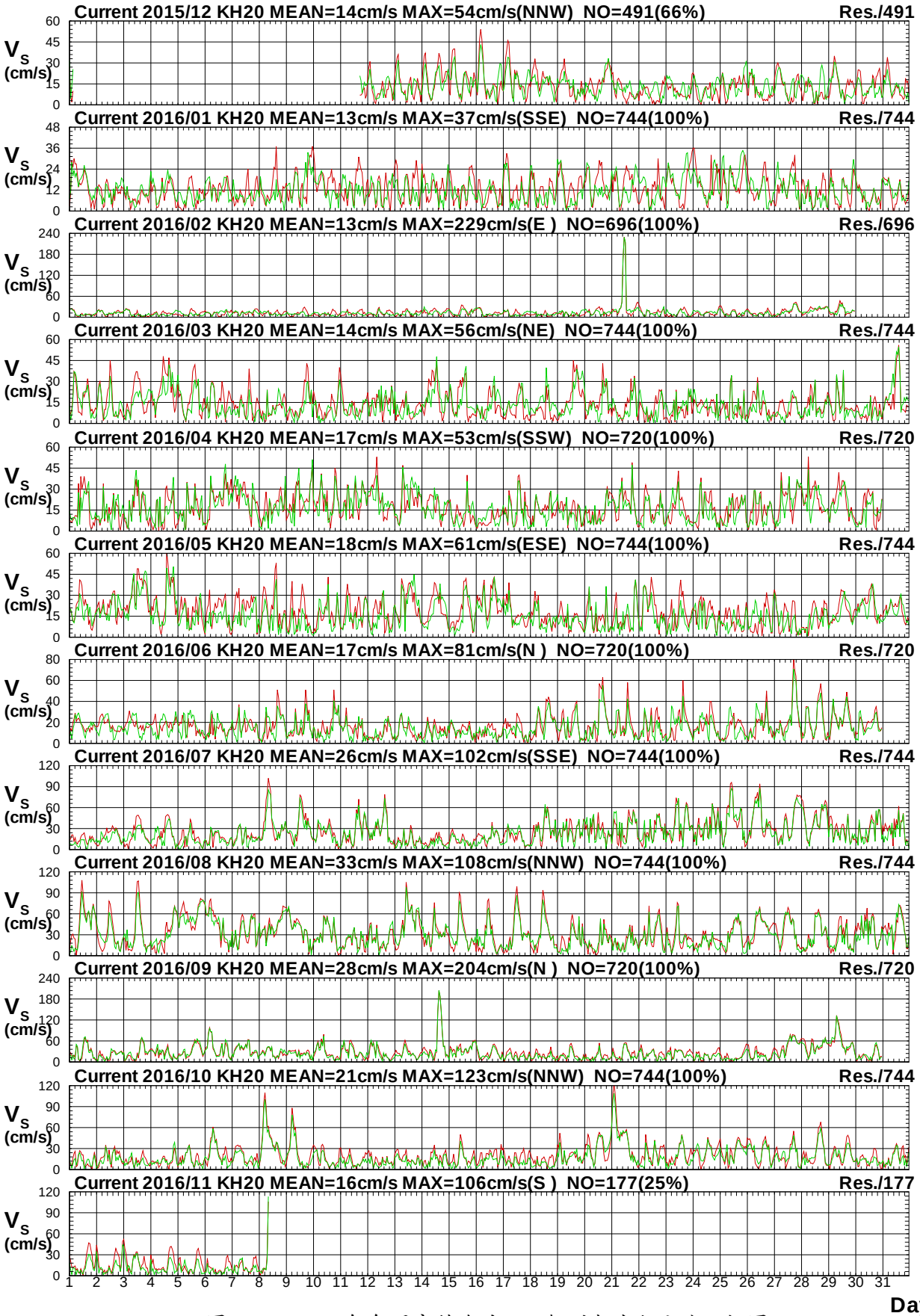


圖 4.6a　2016年每月高雄海域2站觀測與非潮流速比較圖

C15CKH20.1H0 C15CKH20.1HR C161KH20.1H0 C161KH20.1HR C162KH20.1H0 C162KH20.1HR
C163KH20.1H0 C163KH20.1HR C164KH20.1H0 C164KH20.1HR C165KH20.1H0 C165KH20.1HR

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# Current Direction in Kao-Hsiung Seas of KH20 at 2016

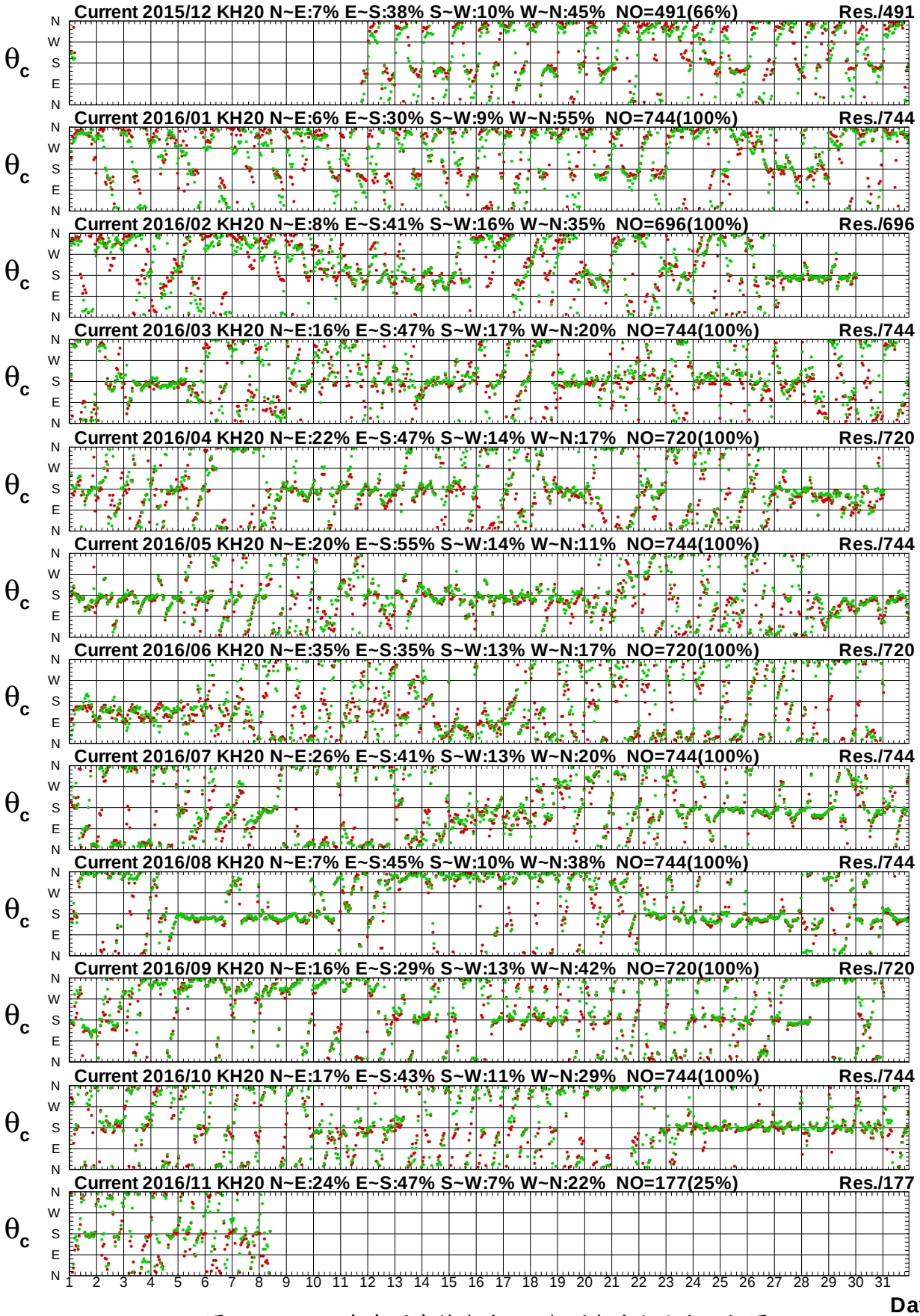


圖 4.6b　2016年每月高雄海域2站觀測與非潮流向比較圖

C15CKH20.1H0 C15CKH20.1HR C161KH20.1H0 C161KH20.1HR C162KH20.1H0 C162KH20.1HR
C163KH20.1H0 C163KH20.1HR C164KH20.1H0 C164KH20.1HR C165KH20.1H0 C165KH20.1HR

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# Current Speed in Kao-Hsiung Seas of KH20 at 2016

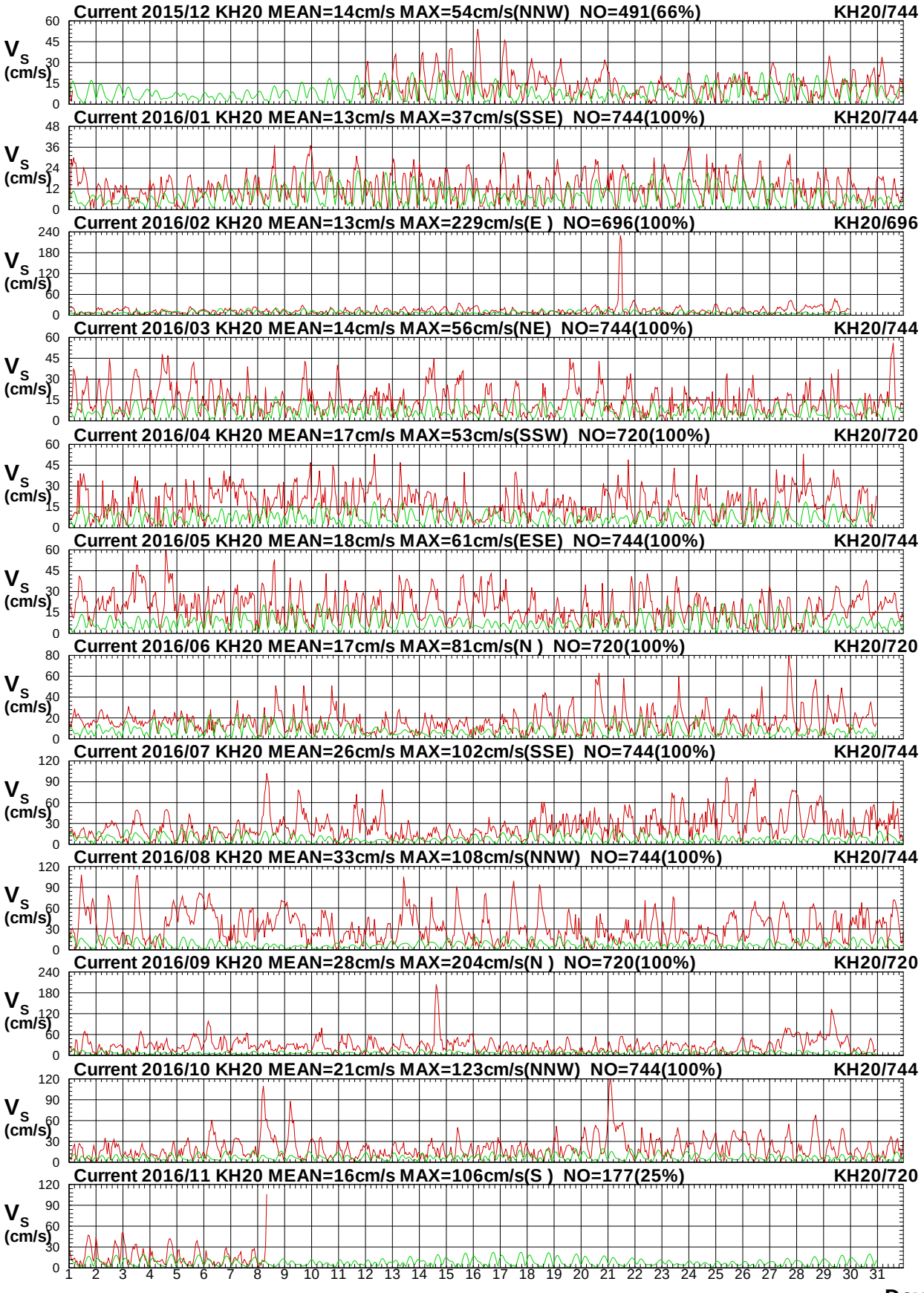


圖 4.7a　2016年每月高雄海域2站觀測與潮流流速比較圖

C15CKH20.1H0 C15CKH20.1HD C161KH20.1H0 C161KH20.1HD C162KH20.1H0 C162KH20.1HD
C163KH20.1H0 C163KH20.1HD C164KH20.1H0 C164KH20.1HD C165KH20.1H0 C165KH20.1HD

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# Current Direction in Kao-Hsiung Seas of KH20 at 2016

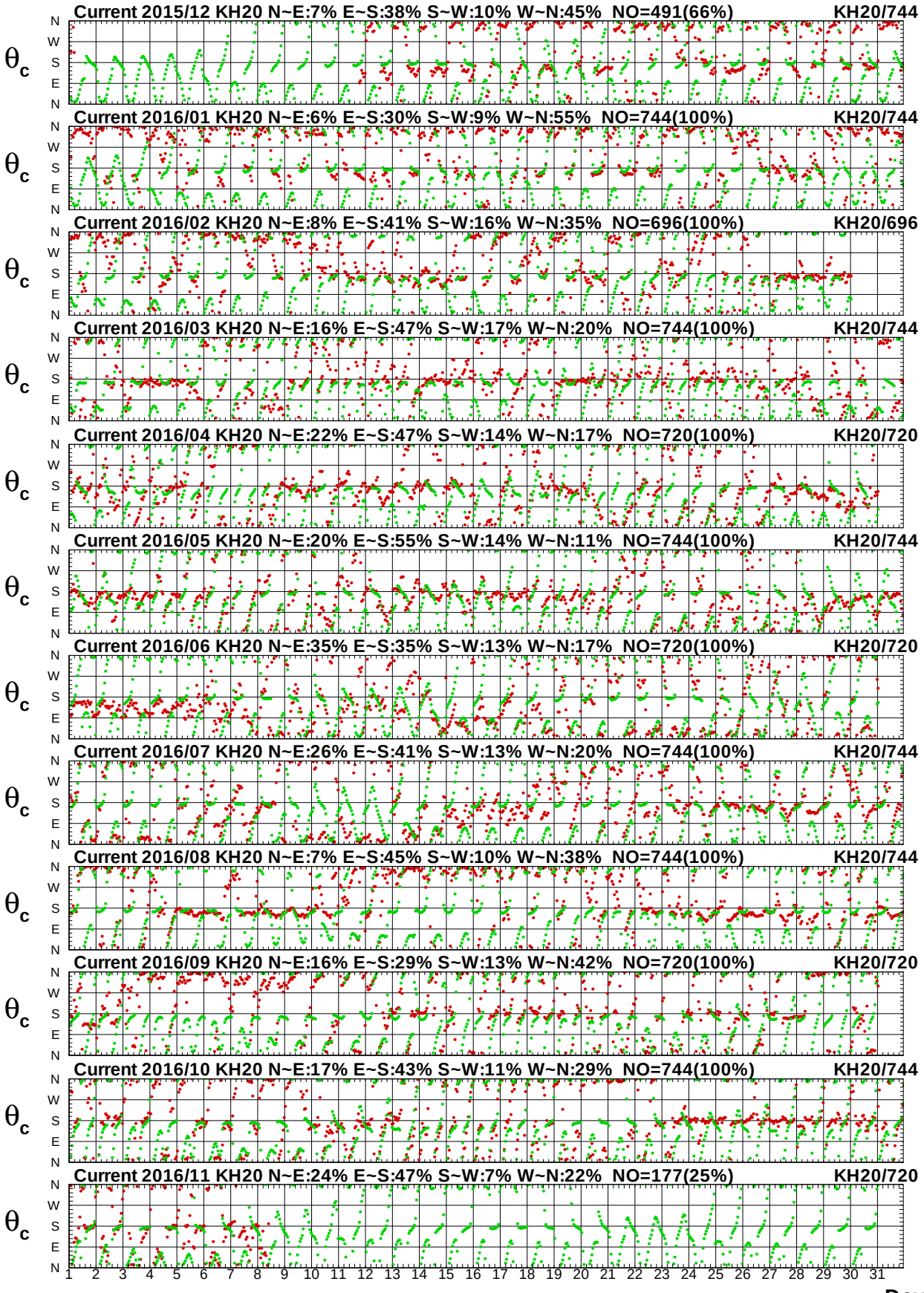


圖 4.7b　2016年每月高雄海域2站觀測與潮流流向比較圖

C15CKH20.1H0 C15CKH20.1HD C161KH20.1H0 C161KH20.1HD C162KH20.1H0 C162KH20.1HD
C163KH20.1H0 C163KH20.1HD C164KH20.1H0 C164KH20.1HD C165KH20.1H0 C165KH20.1HD

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# Current Speed in Kao-Hsiung Seas of KH20 at 2016

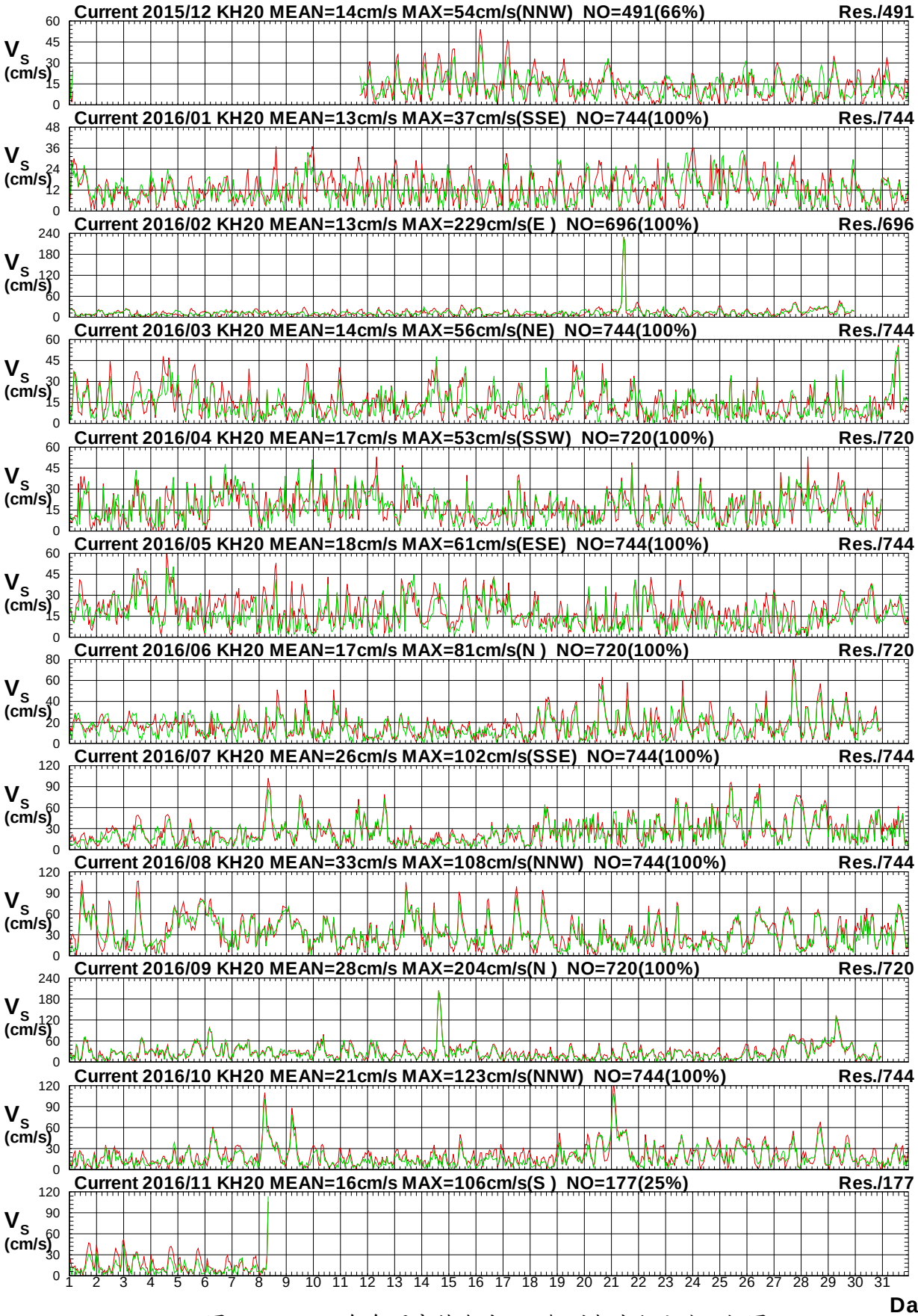


圖 4.8a　2016年每月高雄海域2站觀測與非潮流速比較圖

C15CKH20.1H0 C15CKH20.1HR C161KH20.1H0 C161KH20.1HR C162KH20.1H0 C162KH20.1HR
C163KH20.1H0 C163KH20.1HR C164KH20.1H0 C164KH20.1HR C165KH20.1H0 C165KH20.1HR

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# Current Direction in Kao-Hsiung Seas of KH20 at 2016

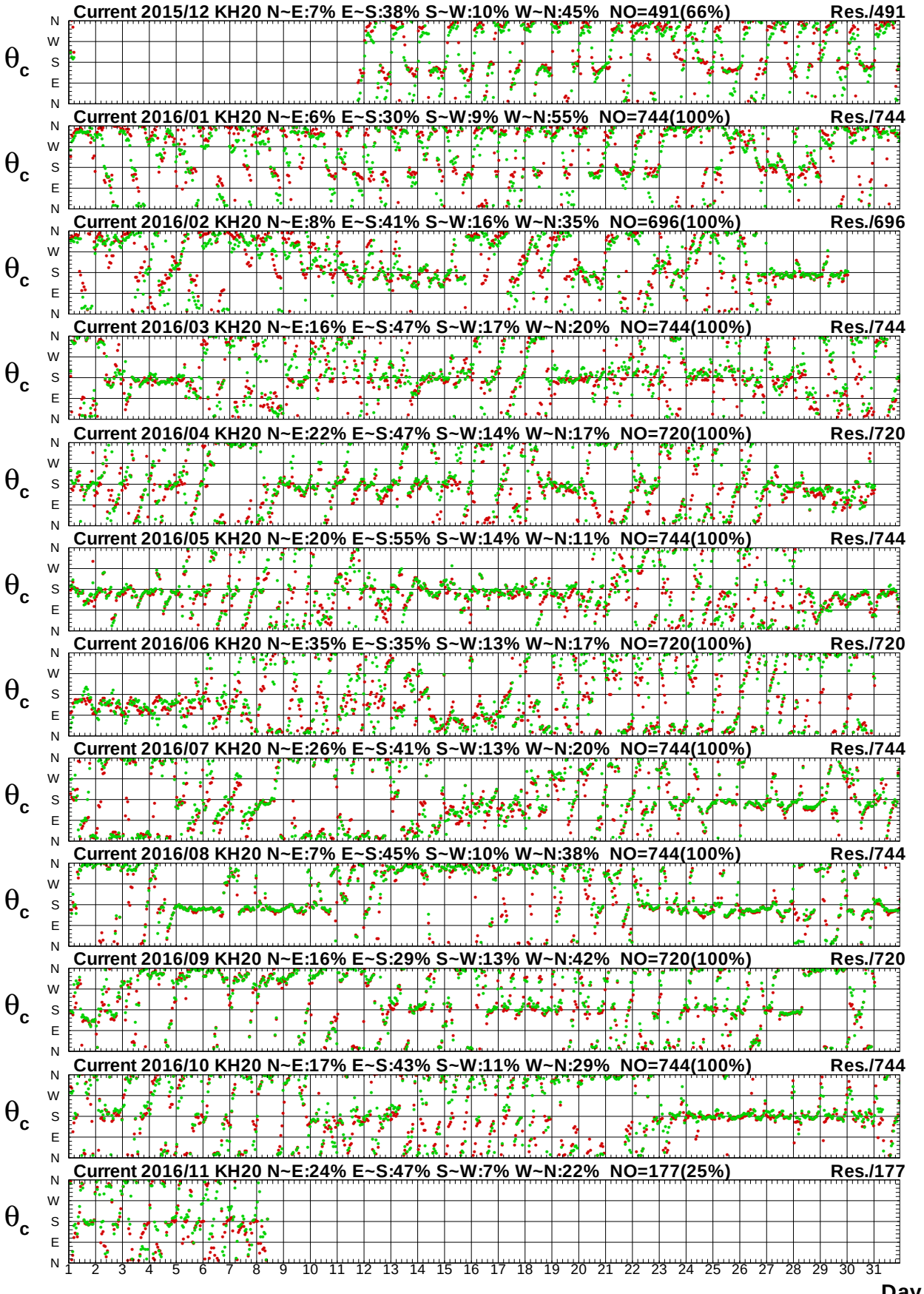


圖 4.8b　2016年每月高雄海域2站觀測與非潮流向比較圖

C15CKH20.1H0 C15CKH20.1HR C161KH20.1H0 C161KH20.1HR C162KH20.1H0 C162KH20.1HR
C163KH20.1H0 C163KH20.1HR C164KH20.1H0 C164KH20.1HR C165KH20.1H0 C165KH20.1HR

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# Current Speed in Kao-Hsiung Seas of KHX0 at 2016

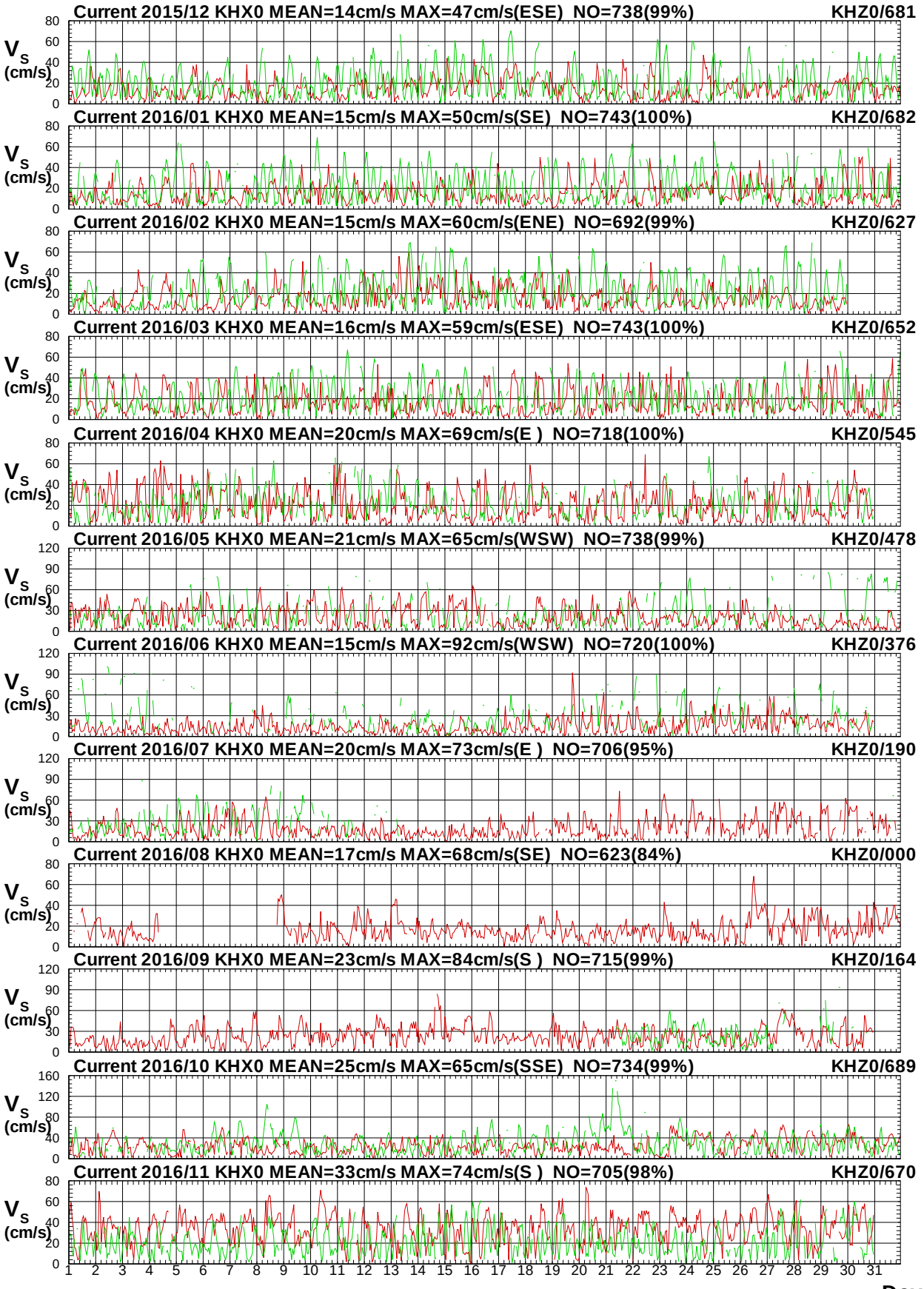


圖 4.9a　2016年每月高雄海域 X 站與 Z 站流速比較圖

C15CKHX0.1H0 C15CKHZ0.1H0 C161KHX0.1H0 C161KHZ0.1H0 C162KHX0.1H0 C162KHZ0.1H0
C163KHX0.1H0 C163KHZ0.1H0 C164KHX0.1H0 C164KHZ0.1H0 C165KHX0.1H0 C165KHZ0.1H0

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# Current Direction in Kao-Hsiung Seas of KHX0 at 2016

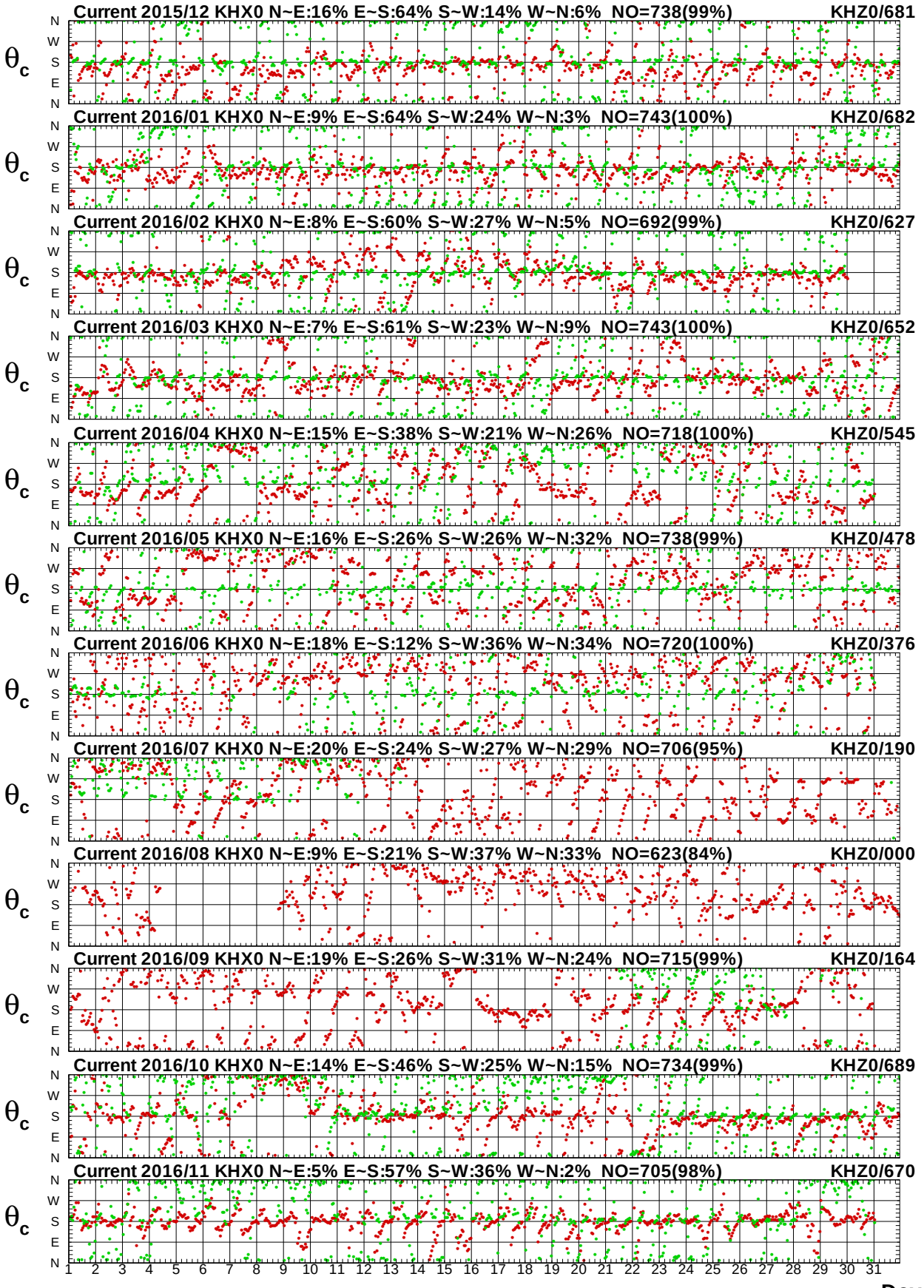


圖 4.9b　2016年每月高雄海域 X 站與 Z 站流向比較圖

C15CKHX0.1H0 C15CKHZ0.1H0 C161KHX0.1H0 C161KHZ0.1H0 C162KHX0.1H0 C162KHZ0.1H0
C163KHX0.1H0 C163KHZ0.1H0 C164KHX0.1H0 C164KHZ0.1H0 C165KHX0.1H0 C165KHZ0.1H0

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# Current Speed in Kao-Hsiung Seas of KHX0 at 2016

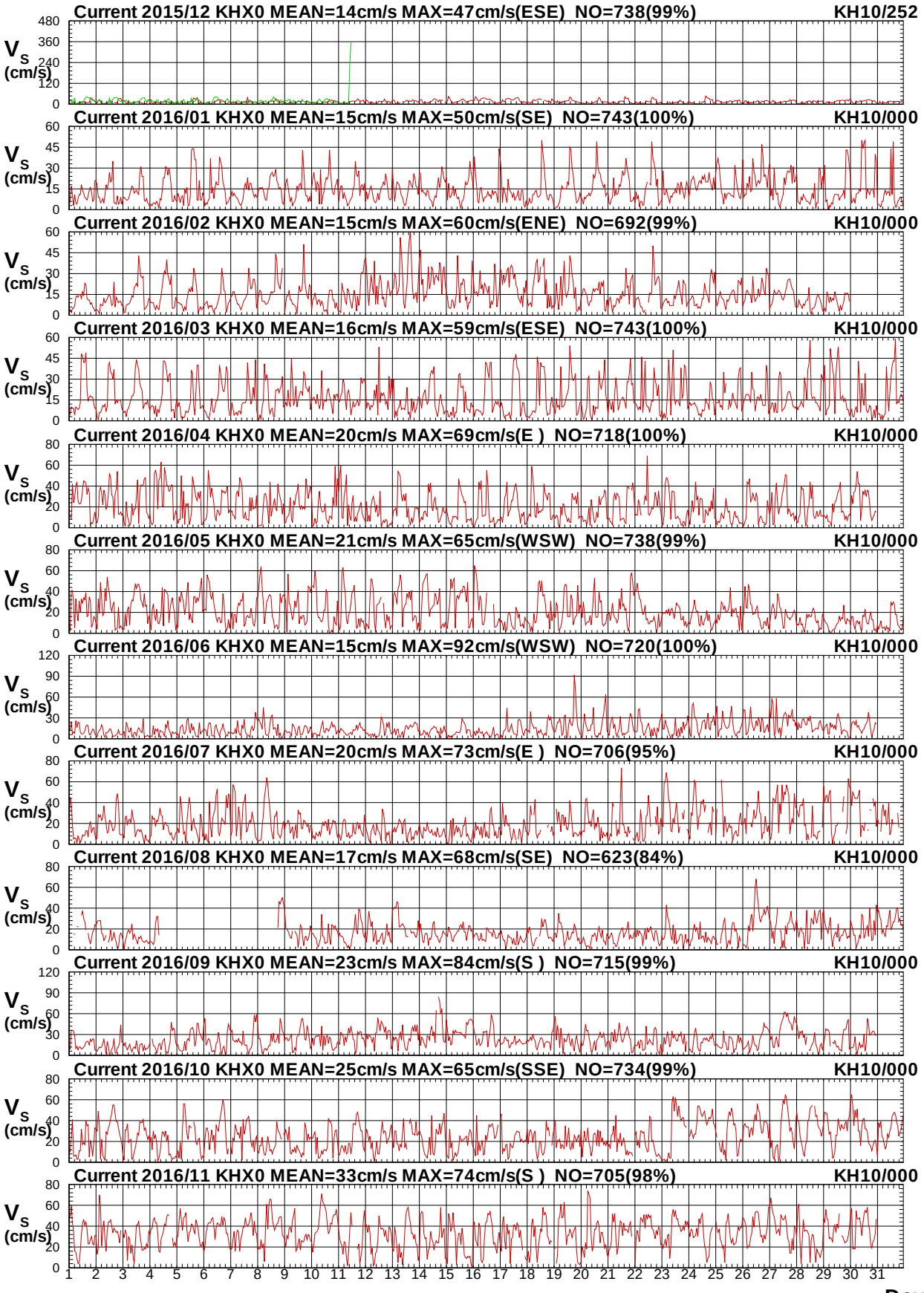


圖4.10a　2016年每月高雄海域 X 站與1站流速比較圖

C15CKHX0.1H0 C15CKH10.1H0 C161KHX0.1H0 C161KH10.1H0 C162KHX0.1H0 C162KH10.1H0
C163KHX0.1H0 C163KH10.1H0 C164KHX0.1H0 C164KH10.1H0 C165KHX0.1H0 C165KH10.1H0

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# Current Direction in Kao-Hsiung Seas of KHX0 at 2016

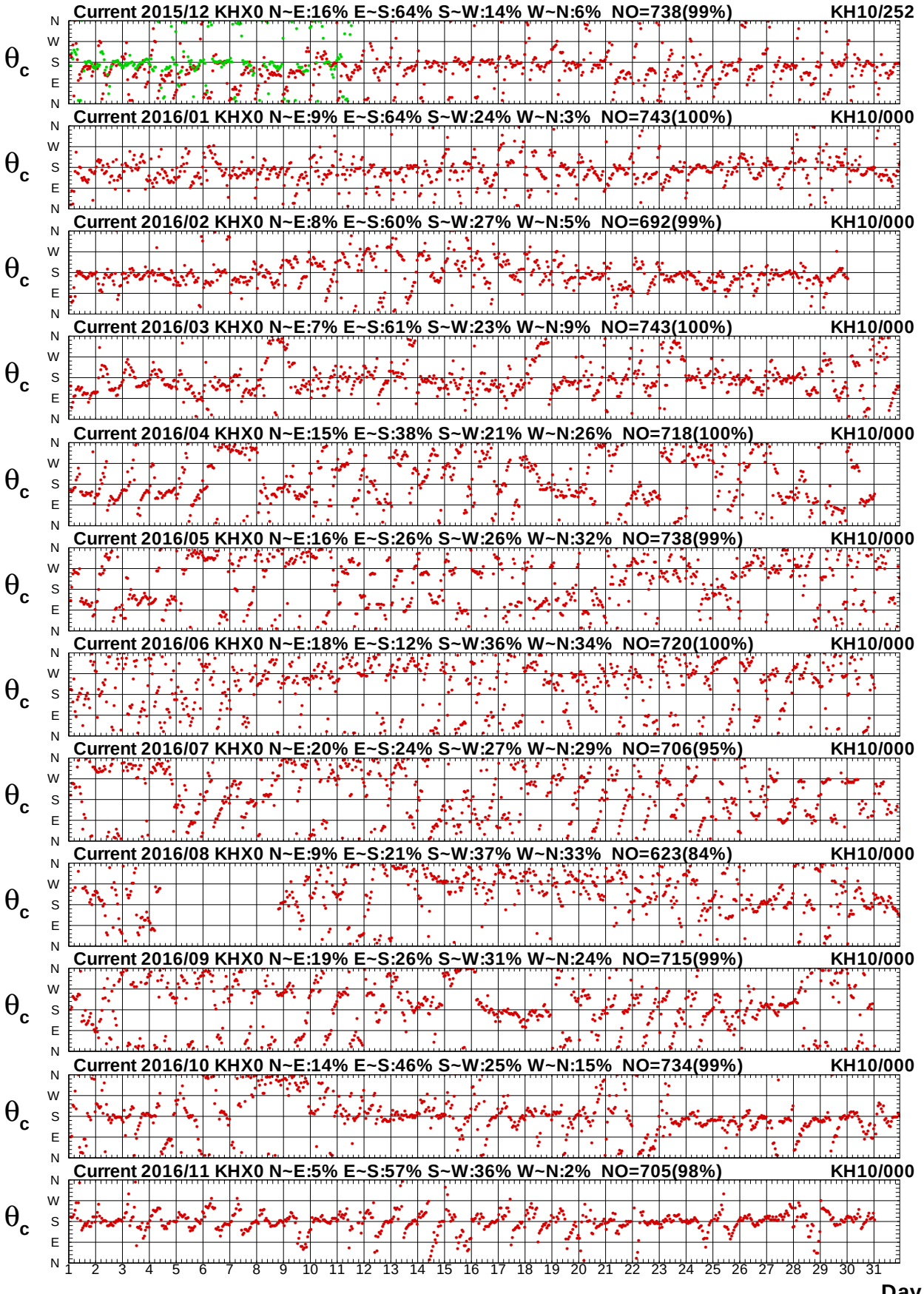


圖 4.10b　2016年每月高雄海域 X 站與1站流向比較圖

C15CKHX0.1H0 C15CKH10.1H0 C161KHX0.1H0 C161KH10.1H0 C162KHX0.1H0 C162KH10.1H0
C163KHX0.1H0 C163KH10.1H0 C164KHX0.1H0 C164KH10.1H0 C165KHX0.1H0 C165KH10.1H0

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# Current Speed in Kao-Hsiung Seas of KHX0 at 2016

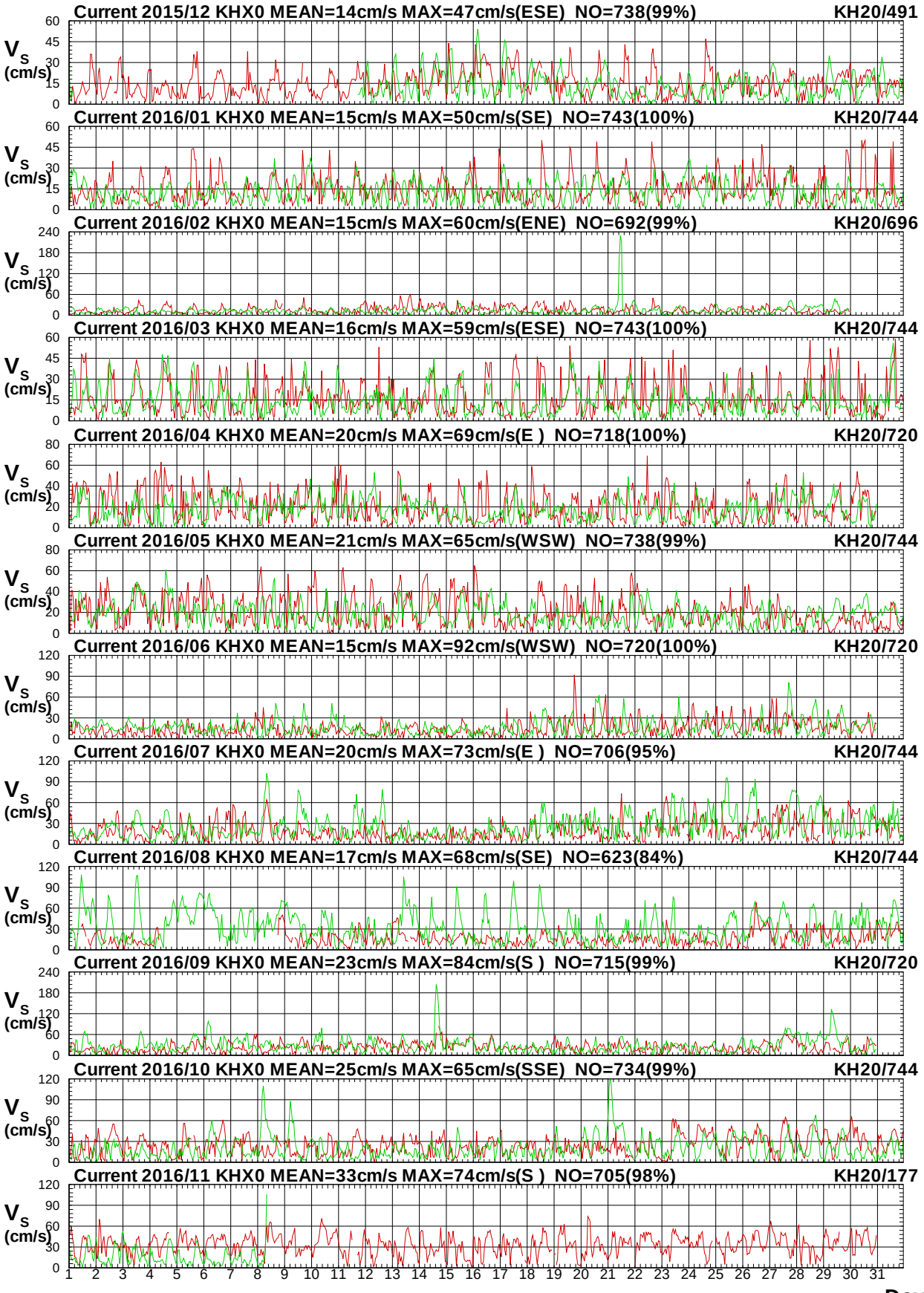


圖4.11a　2016年每月高雄海域 X 站與2站流速比較圖

C15CKHX0.1H0 C15CKH20.1H0 C161KHX0.1H0 C161KH20.1H0 C162KHX0.1H0 C162KH20.1H0
C163KHX0.1H0 C163KH20.1H0 C164KHX0.1H0 C164KH20.1H0 C165KHX0.1H0 C165KH20.1H0

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# Current Direction in Kao-Hsiung Seas of KHX0 at 2016

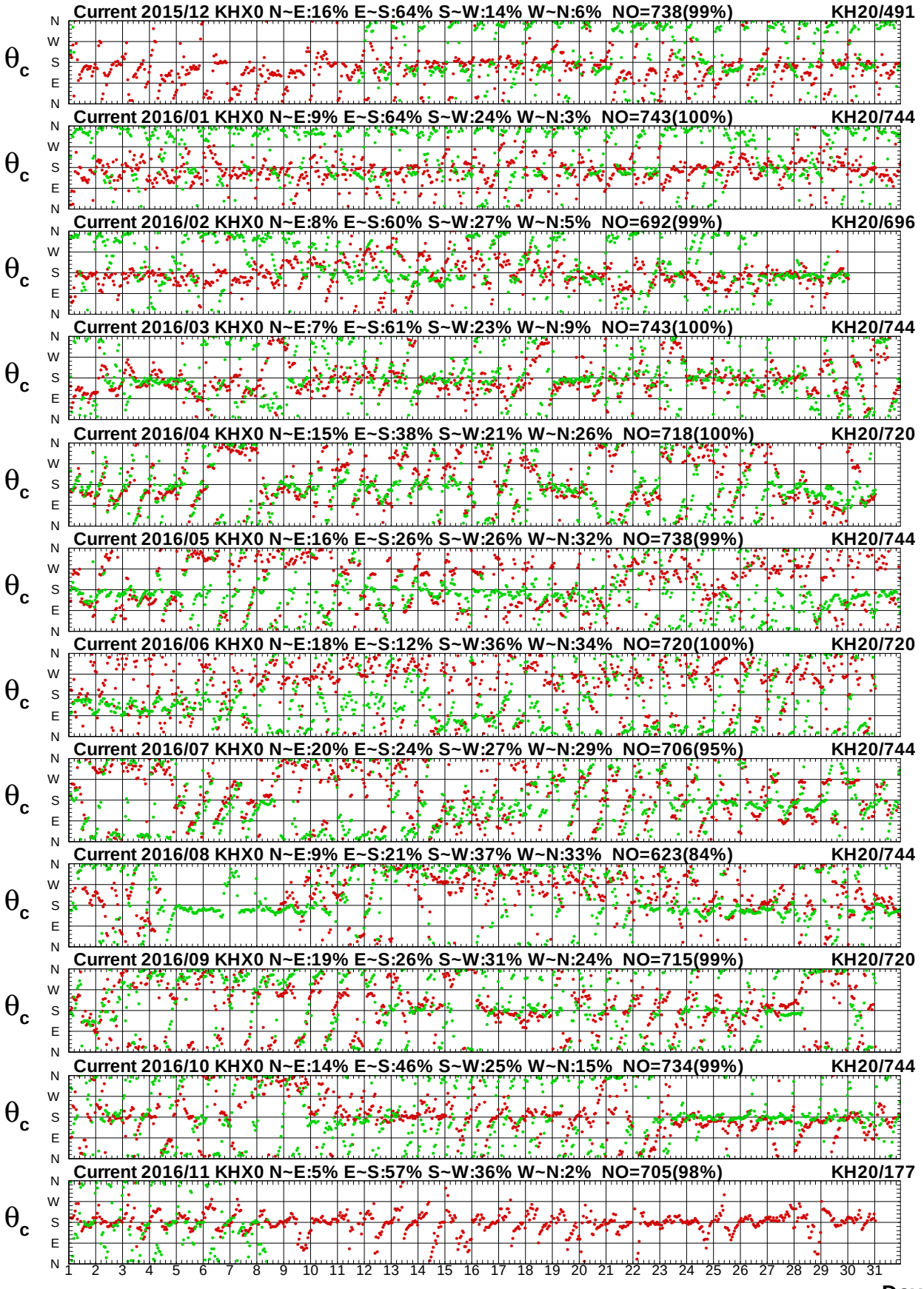


圖4.11b　2016年每月高雄海域 X 站與2站流向比較圖

C15CKHX0.1H0 C15CKH20.1H0 C161KHX0.1H0 C161KH20.1H0 C162KHX0.1H0 C162KH20.1H0
C163KHX0.1H0 C163KH20.1H0 C164KHX0.1H0 C164KH20.1H0 C165KHX0.1H0 C165KH20.1H0

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