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2016 年港灣環境資訊網觀測資料年報
(馬祖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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傅怡釧、陳鈞彥、林珂如、謝佳紘

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<tr><td colspan="4">摘要：
本港灣環境資訊網觀測海氣象資料年報，包括馬祖海域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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ABSTRACT:

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

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目　錄

誌　　謝

2016 年港灣環境資訊網觀測風力資料，蒐集之馬祖海域風力資料，除本中心自行觀測之外，在馬祖氣象站(**測站 E**) 、馬祖海上浮標(**測站 Y**)等觀測風力資料，係交通部**中央氣象局(CWB)**提供，謹致謝忱。

2016 年港灣環境資訊網觀測波浪資料，蒐集之馬祖海域波浪資料，除本中心自行觀測之外，在馬祖海上浮標(**測站 Y**)觀測波浪資料，係交通部**中央氣象局(CWB)**提供，謹致謝忱。

2016 年港灣海氣象觀測潮汐資料，蒐集之馬祖海域潮汐觀測資料，除本中心自行觀測之外，在馬祖(**測站 F**)觀測潮汐資料，係交通部**中央氣象局**提供，謹致謝忱。

第一章　2016 年馬祖海域觀測風力資料

馬祖海域風之觀測係 2012 年 10 月本中心**(IHMT)**安裝 Young Brand 風速計於馬祖**福澳**港辦事處頂樓 (稱**測站 W**) ，其位置如附圖 1。2015 年 9 月本中心於北竿、西莒、東引及東莒等 4 處增設風速站(稱**測站 B**、**測站 C**、**測站 D** 及**測站 I**) 。

測站 E 之風速儀屬中央氣象局**(CWB)**所有，**測站 Y(**海域資料浮標) 之風速儀也屬屬中央氣象局所有。馬祖海域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 **Y 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 馬祖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
W	26°9'36"N	119°56'37"E	2012/10-2016/11(觀測中)	港研中心	福澳港
E	26°10'10"N	119°55'23"E	2004/01-2016/11(觀測中)	中央氣象局	福澳港區
Y	26°22'36"N	120°31'53"E	2010/07-2016/11(觀測中)	中央氣象局	馬祖資料浮標
B	26°12'25"N	119°58'3.5"E	2015/09-2016/11(觀測中)	港研中心	北竿港
C	25°58'11"N	119°55'55"E	2015/09-2016/11(觀測中)	港研中心	西莒港
D	26°9'36"N	119°56'37"E	2015/09-2016/11(觀測中)	港研中心	東引港
I	26°21'49”N	120°29'2.5”E	2015/09-2016/11(觀測中)	港研中心	東莒港

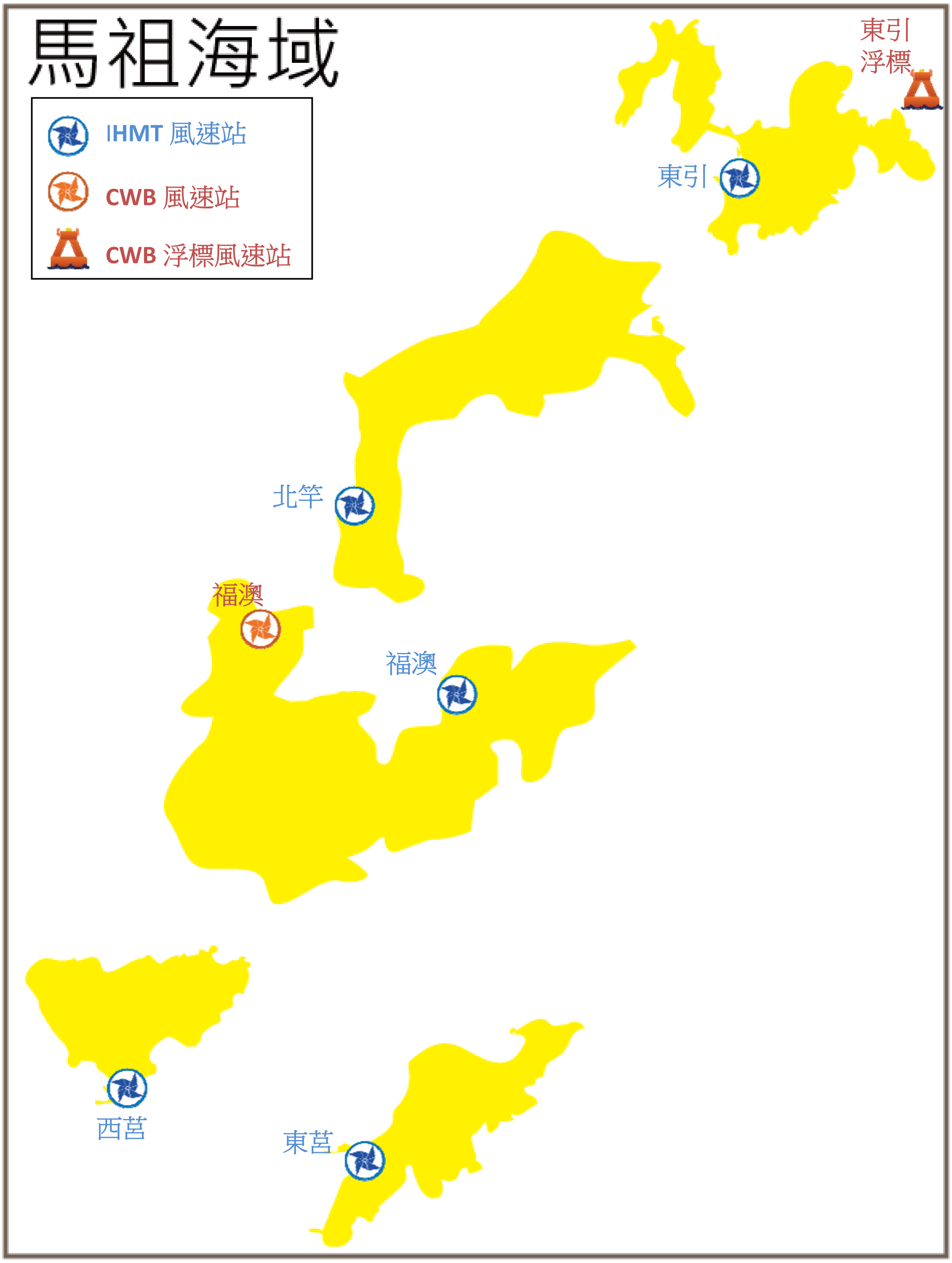

圖 1 馬祖海域風力觀測站位置示意圖

表1.1a 2016年每月馬祖海域修補前各測站觀測風力資料紀錄統計表

年/月 港區	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域
測站	W	Y	E	B	C	D	I	
2015/12月	744 (100%)	294 (39.5%)	744 (100%)	546 (73.4%)	*	239 (32.1%)	*	*
2016/ 1月	743 (99.9%)	*	743 (99.9%)	500 (67.2%)	*	255 (34.3%)	*	*
2016/ 2月	692 (99.4%)	*	696 (100%)	386 (55.5%)	*	209 (30.0%)	*	*
2016/ 3月	724 (97.3%)	680 (91.4%)	744 (100%)	327 (44.0%)	*	222 (29.8%)	*	*
2016/ 4月	719 (99.9%)	720 (100%)	720 (100%)	240 (33.3%)	*	*	*	*
2016/ 5月	728 (97.8%)	744 (100%)	744 (100%)	742 (99.7%)	*	*	*	*
2016/ 6月	499 (69.3%)	720 (100%)	720 (100%)	718 (99.7%)	470 (65.3%)	55 (7.6%)	539 (74.9%)	*
2016/ 7月	743 (99.9%)	744 (100%)	744 (100%)	735 (98.8%)	720 (96.8%)	736 (98.9%)	731 (98.3%)	*
2016/ 8月	744 (100%)	744 (100%)	744 (100%)	736 (98.9%)	736 (98.9%)	734 (98.7%)	736 (98.9%)	*
2016/ 9月	720 (100%)	720 (100%)	720 (100%)	719 (99.9%)	719 (99.9%)	719 (99.9%)	719 (99.9%)	*
2016/10月	680 (91.4%)	744 (100%)	744 (100%)	741 (99.6%)	742 (99.7%)	579 (77.8%)	90 (12.1%)	*
2016/11月	606 (84.2%)	720 (100%)	720 (100%)	712 (98.9%)	705 (97.9%)	495 (68.8%)	704 (97.8%)	*
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年每月馬祖海域修補後各測站風力資料統計表

年/月 港區	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域
測站	W	Y	E	B	C	D	I	
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 Ma-Tsu Seas of MSY0 at 2016

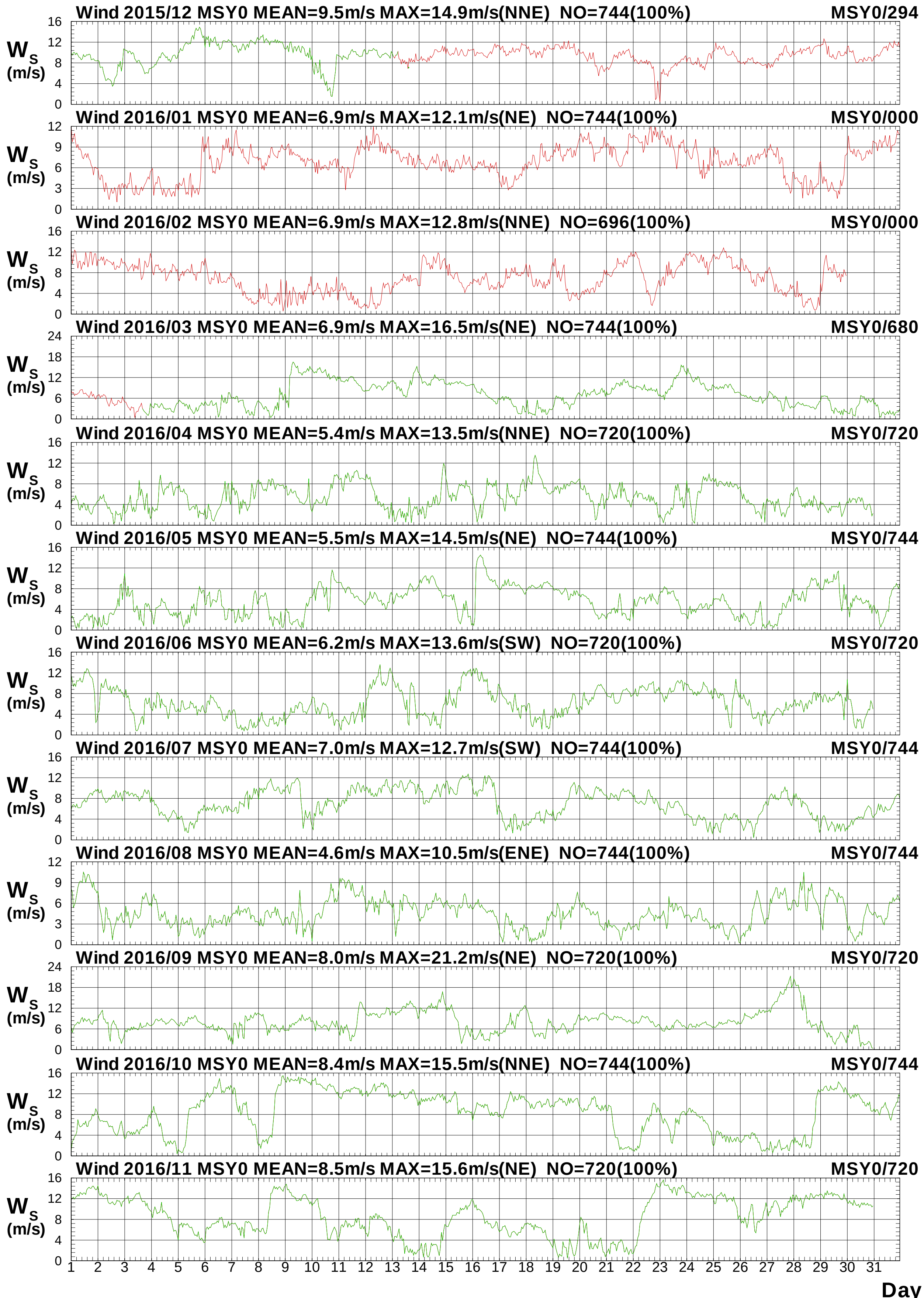

圖 1.1a　2016年每月馬祖海域 Y 站修補前後之風速比較圖

W15CMSY0.1HA W15CMSY0.1H0 W161MSY0.1HA W161MSY0.1H0 W162MSY0.1HA W162MSY0.1H0 W163MSY0.1HA W163MSY0.1H0 W164MSY0.1HA W164MSY0.1H0 W165MSY0.1HA W165MSY0.1H0	Institute of Harbor & Marine Technology

Wind Direction in Ma-Tsu Seas of MSY0 at 2016

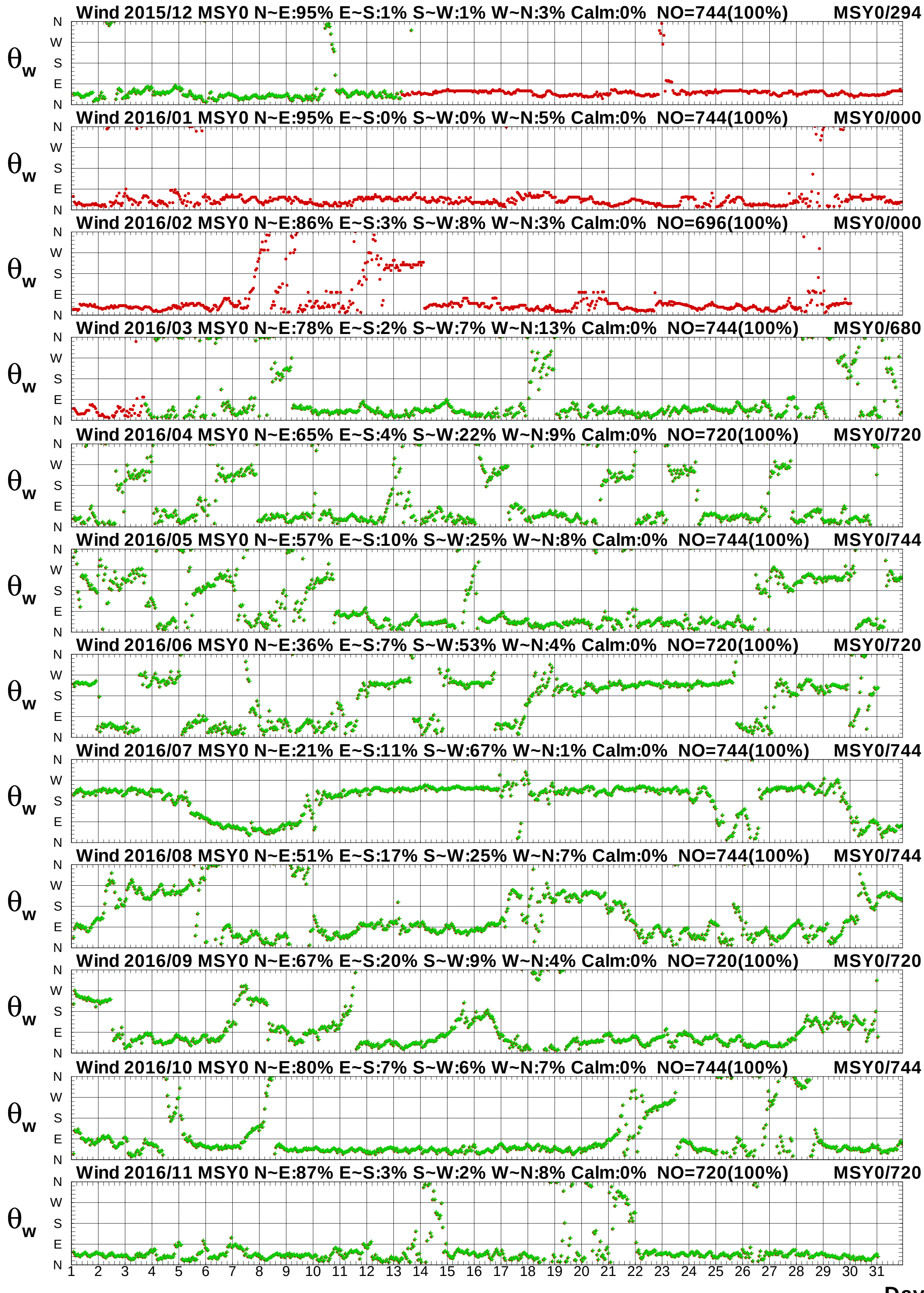

圖 1.1b　2016年每月馬祖海域 Y 站修補前後之風向比較圖

W15CMSY0.1HA W15CMSY0.1H0 W161MSY0.1HA W161MSY0.1H0 W162MSY0.1HA W162MSY0.1H0
W163MSY0.1HA W163MSY0.1H0 W164MSY0.1HA W164MSY0.1H0 W165MSY0.1HA W165MSY0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

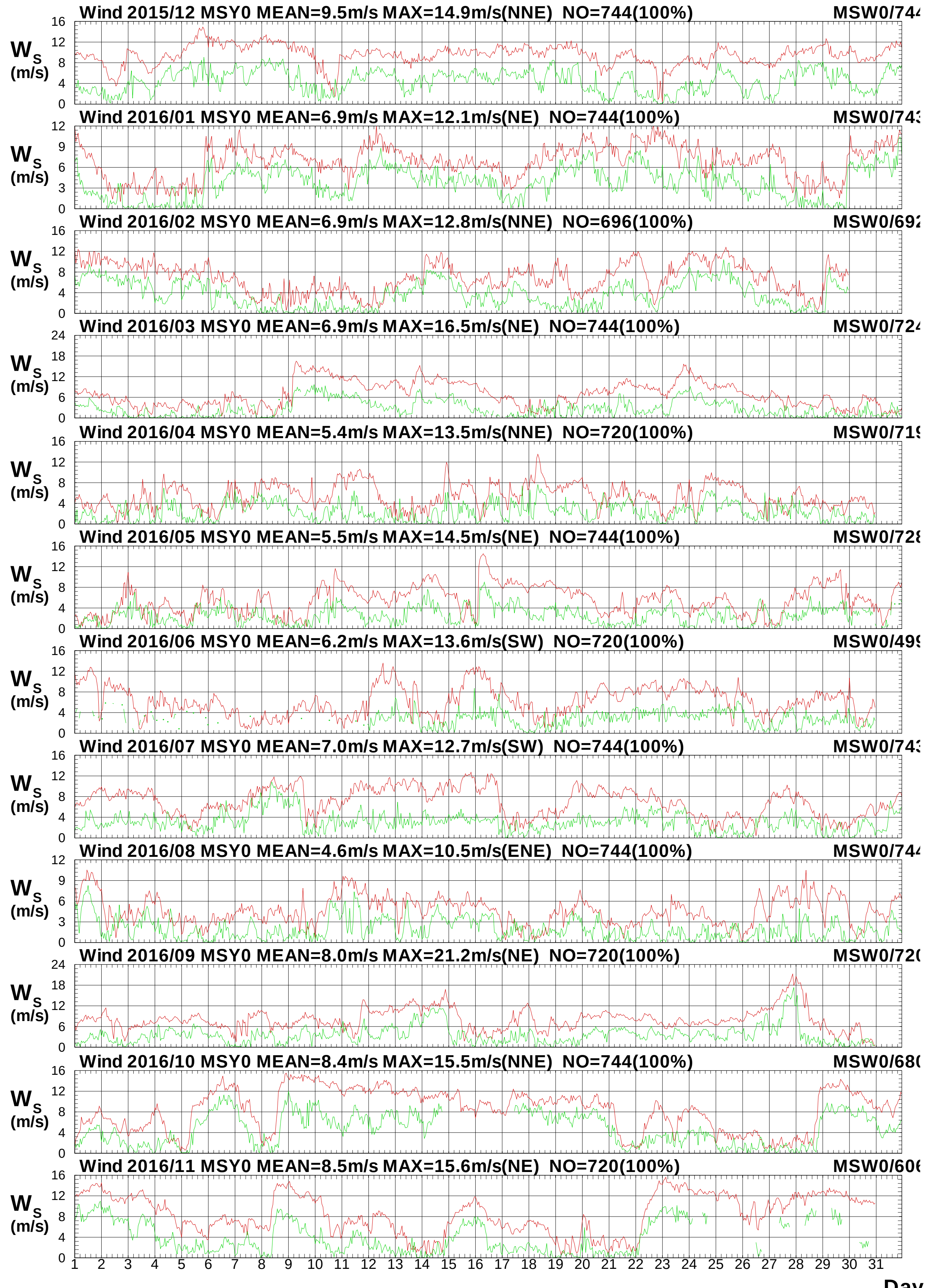

圖 1.2a　2016年每月馬祖海域 Y 站與 W 站風速比較圖

W15CMSY0.1HA W15CMSW0.1H0 W161MSY0.1HA W161MSW0.1H0 W162MSY0.1HA W162MSW0.1H0
W163MSY0.1HA W163MSW0.1H0 W164MSY0.1HA W164MSW0.1H0 W165MSY0.1HA W165MSW0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

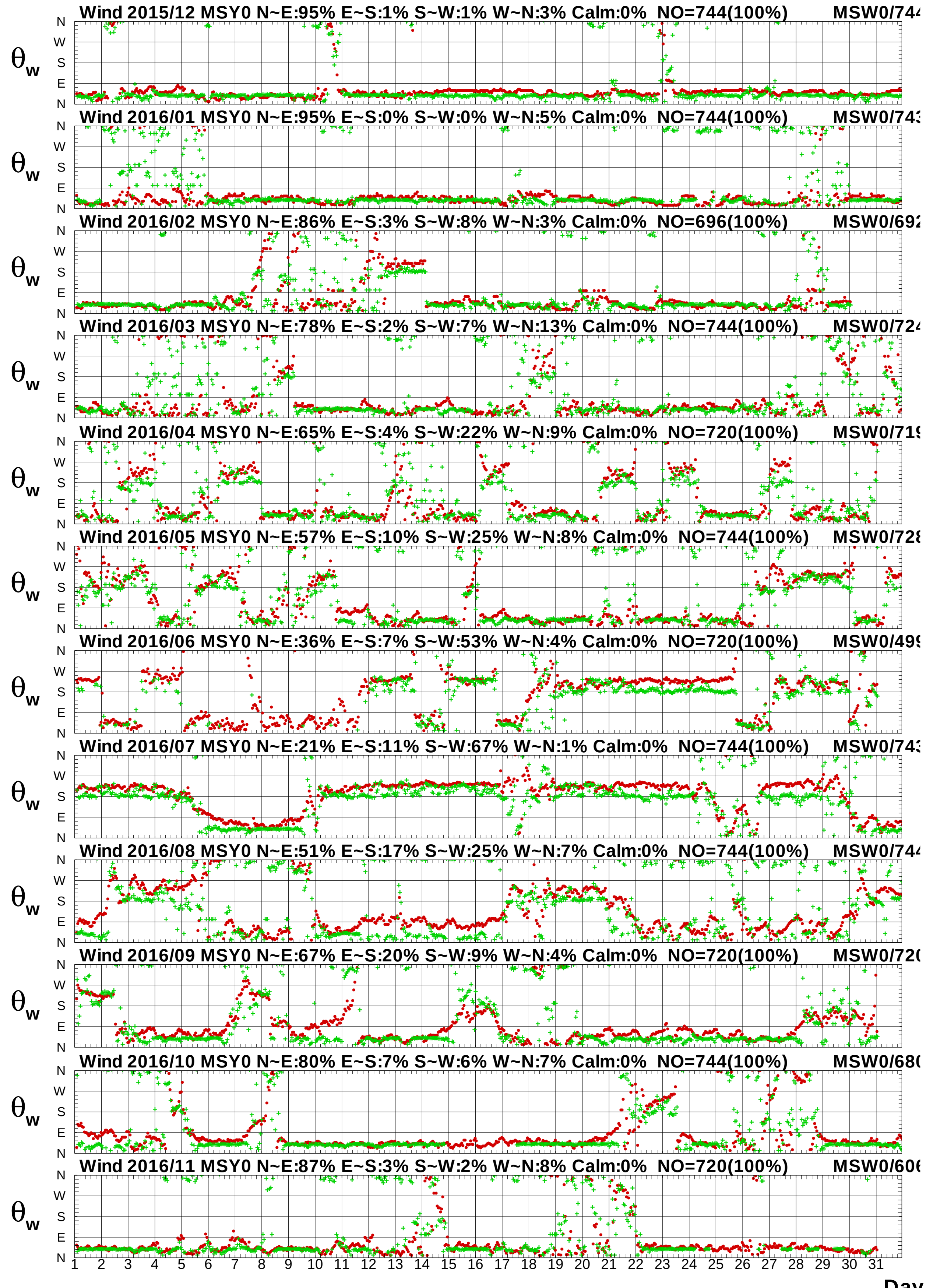

圖 1.2b　2016年每月馬祖海域 Y 站與 W 站風向比較圖

W15CMSY0.1HA W15CMSW0.1H0 W161MSY0.1HA W161MSW0.1H0 W162MSY0.1HA W162MSW0.1H0
W163MSY0.1HA W163MSW0.1H0 W164MSY0.1HA W164MSW0.1H0 W165MSY0.1HA W165MSW0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

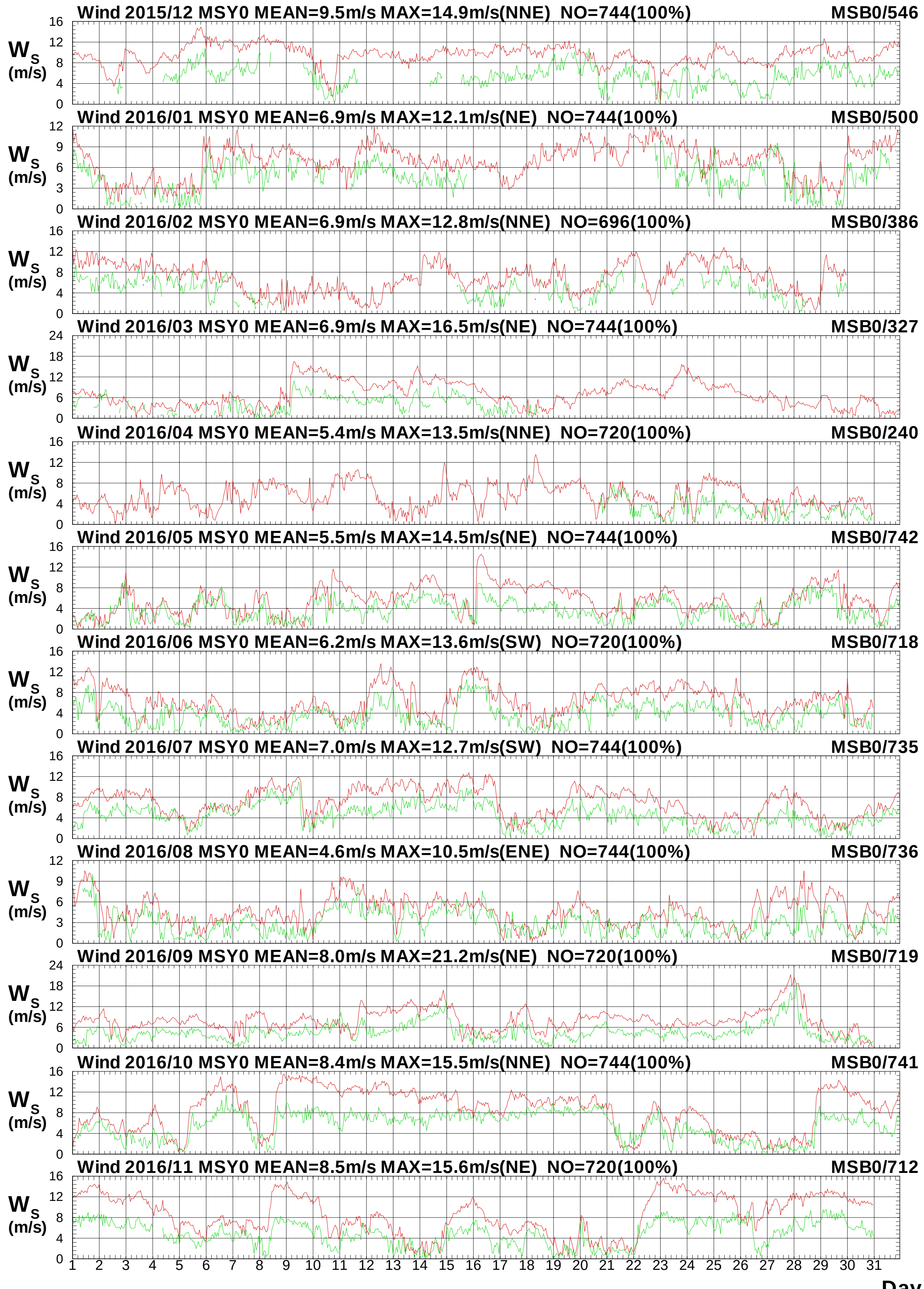

圖 1.3a　2016年每月馬祖海域 Y 站與 B 站風速比較圖

W15CMSY0.1HA W15CMSB0.1H0 W161MSY0.1HA W161MSB0.1H0 W162MSY0.1HA W162MSB0.1H0
W163MSY0.1HA W163MSB0.1H0 W164MSY0.1HA W164MSB0.1H0 W165MSY0.1HA W165MSB0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

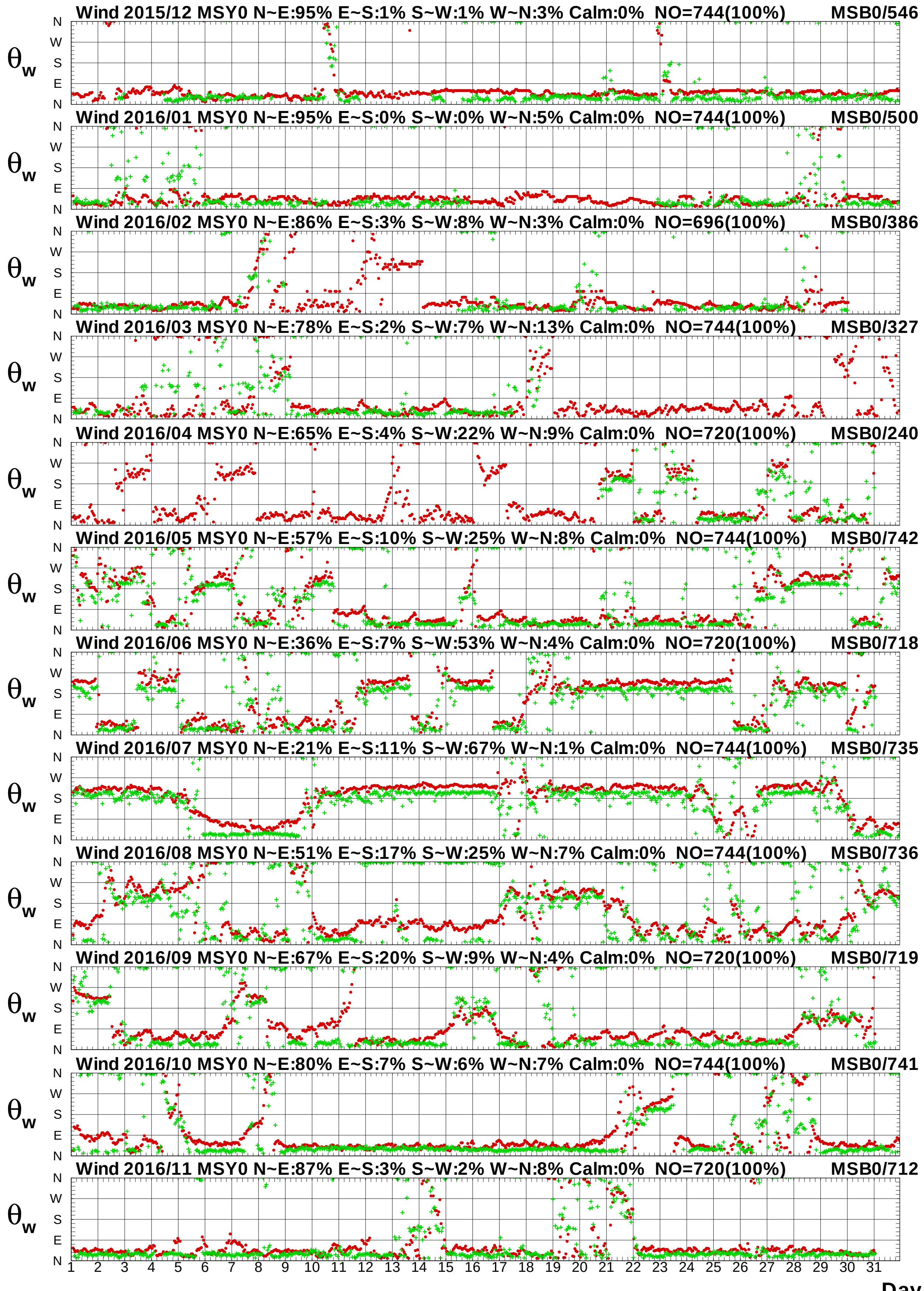

圖 1.3b　2016年每月馬祖海域 Y 站與 B 站風向比較圖

W15CMSY0.1HA W15CMSB0.1H0 W161MSY0.1HA W161MSB0.1H0 W162MSY0.1HA W162MSB0.1H0
W163MSY0.1HA W163MSB0.1H0 W164MSY0.1HA W164MSB0.1H0 W165MSY0.1HA W165MSB0.1H0

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2017/05/16

Wind Speed in Ma-Tsu Seas of MSY0 at 2016

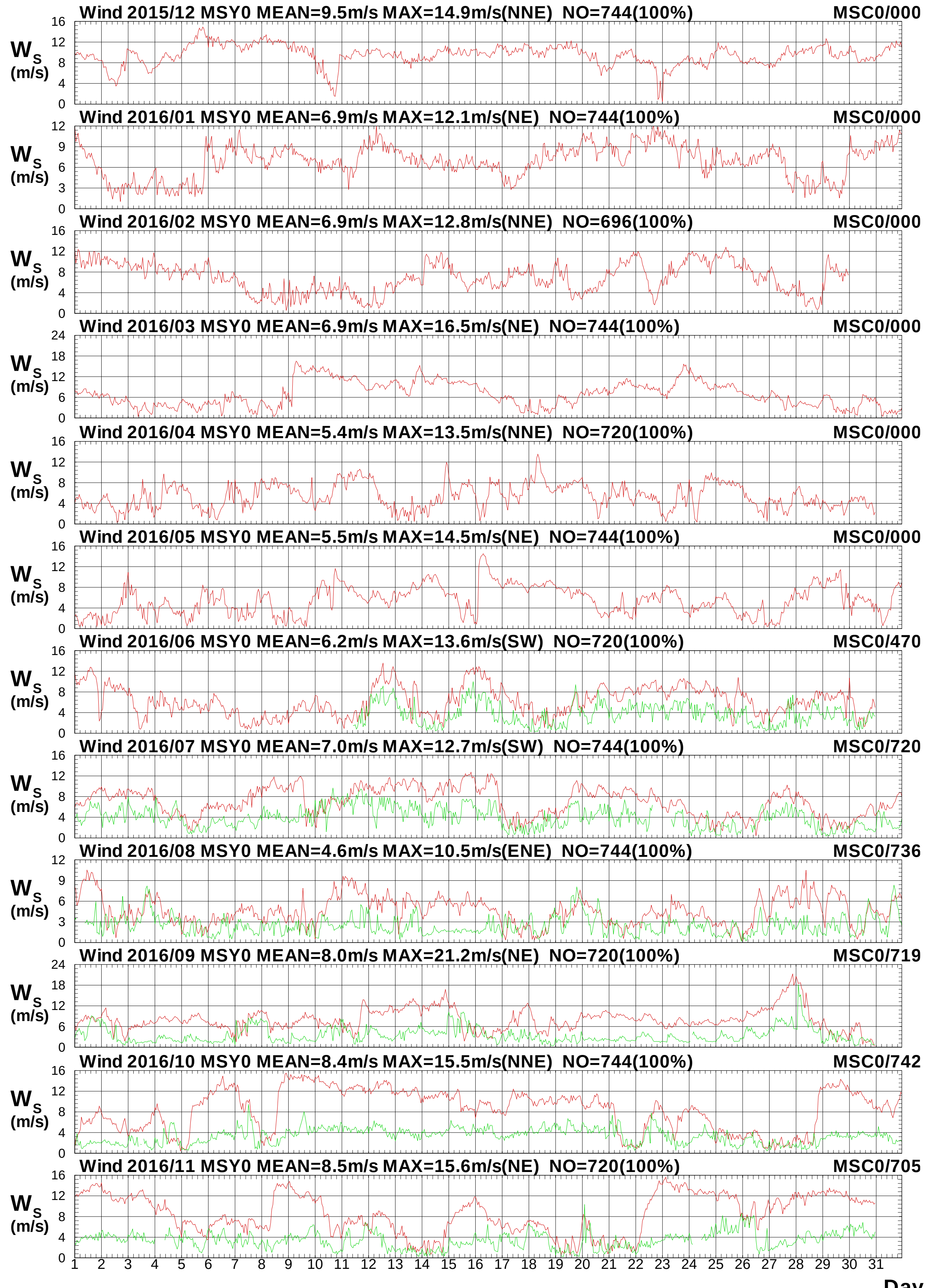

圖 1.4a　2016年每月馬祖海域 Y 站與 C 站風速比較圖

W15CMSY0.1HA W15CMSC0.1H0 W161MSY0.1HA W161MSC0.1H0 W162MSY0.1HA W162MSC0.1H0
W163MSY0.1HA W163MSC0.1H0 W164MSY0.1HA W164MSC0.1H0 W165MSY0.1HA W165MSC0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

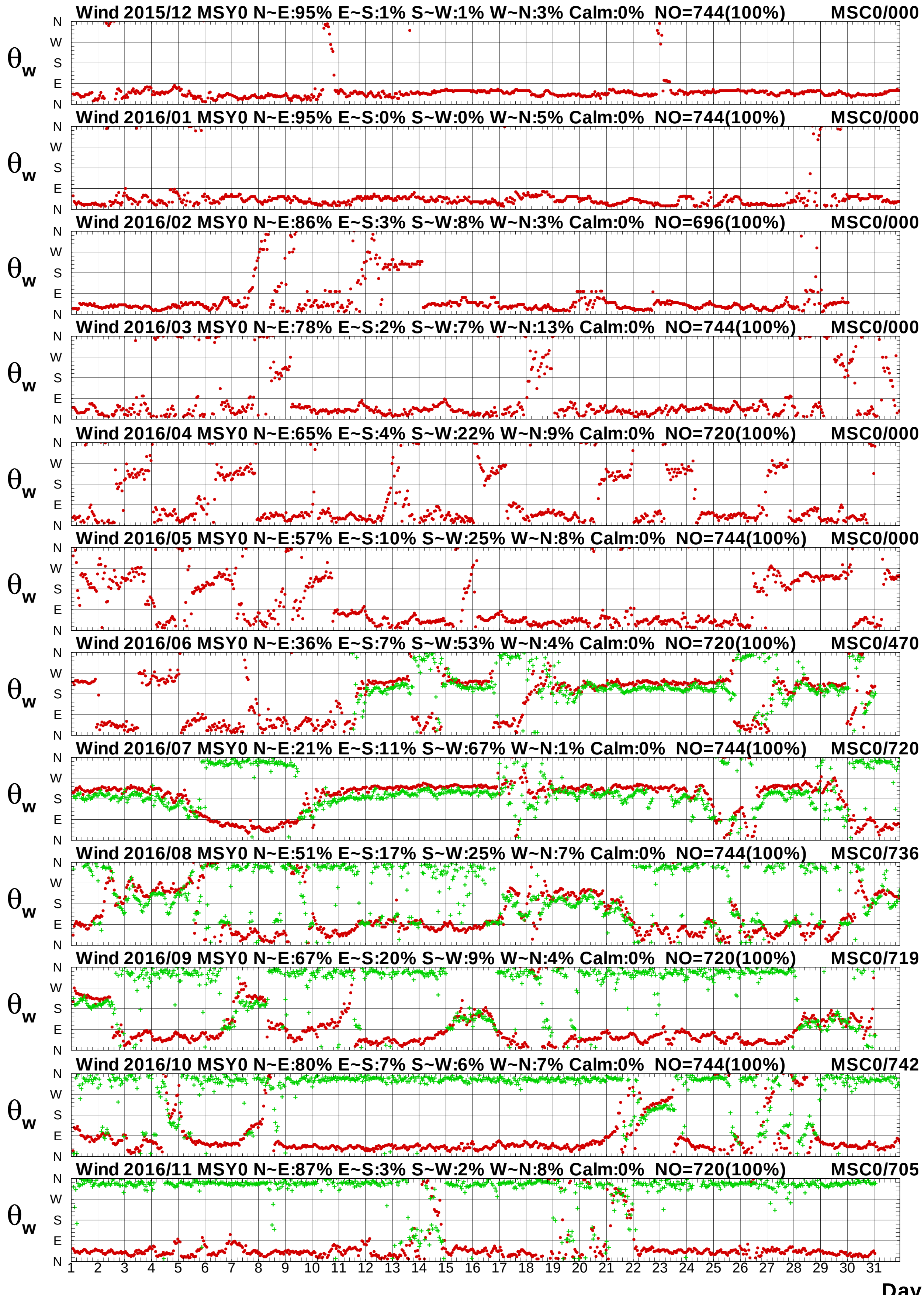

圖 1.4b　2016年每月馬祖海域 Y 站與 C 站風向比較圖

W15CMSY0.1HA W15CMSC0.1H0 W161MSY0.1HA W161MSC0.1H0 W162MSY0.1HA W162MSC0.1H0
W163MSY0.1HA W163MSC0.1H0 W164MSY0.1HA W164MSC0.1H0 W165MSY0.1HA W165MSC0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

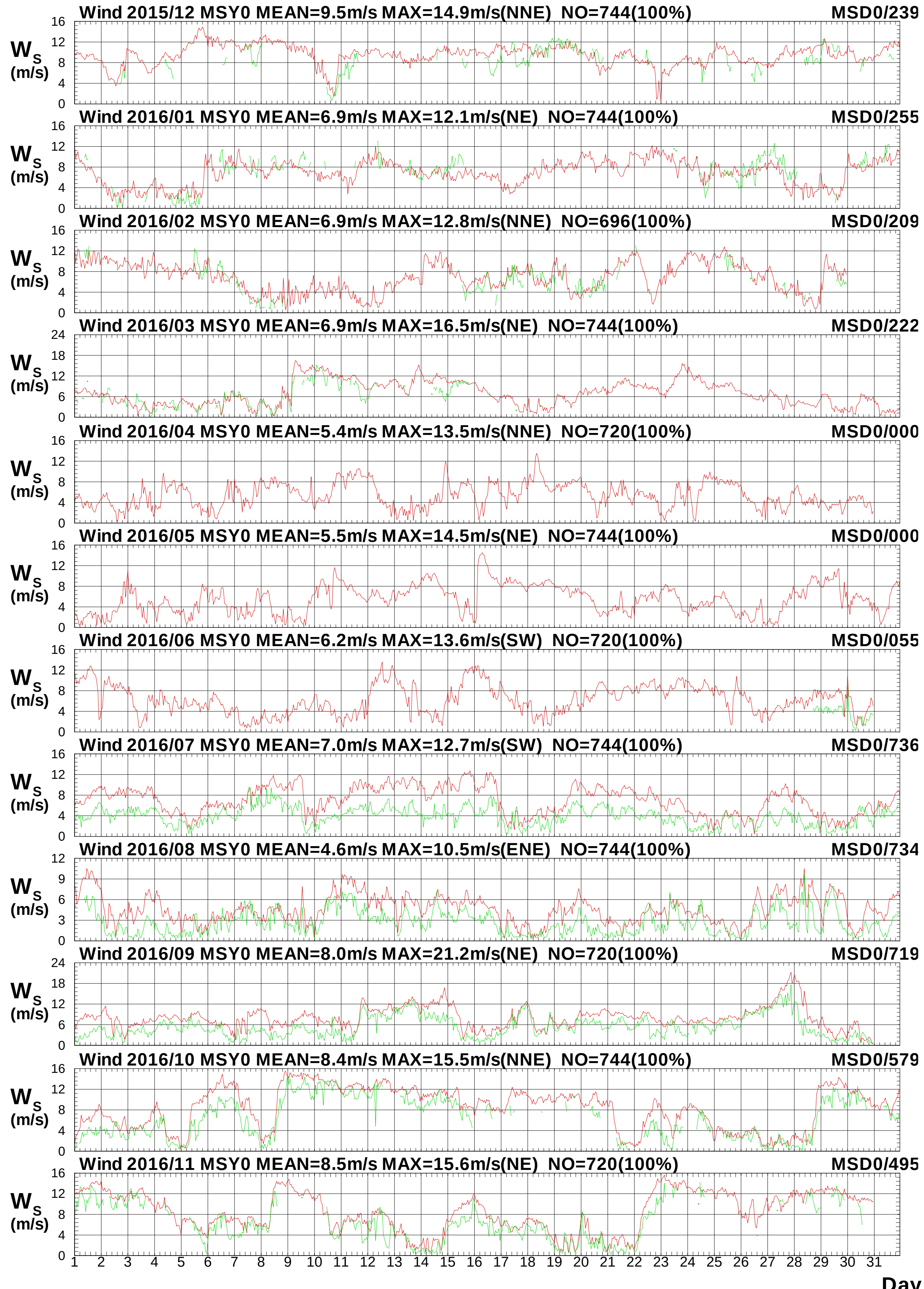

圖 1.5a　2016年每月馬祖海域 Y 站與 D 站風速比較圖

W15CMSY0.1HA W15CMSD0.1H0 W161MSY0.1HA W161MSD0.1H0 W162MSY0.1HA W162MSD0.1H0
W163MSY0.1HA W163MSD0.1H0 W164MSY0.1HA W164MSD0.1H0 W165MSY0.1HA W165MSD0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

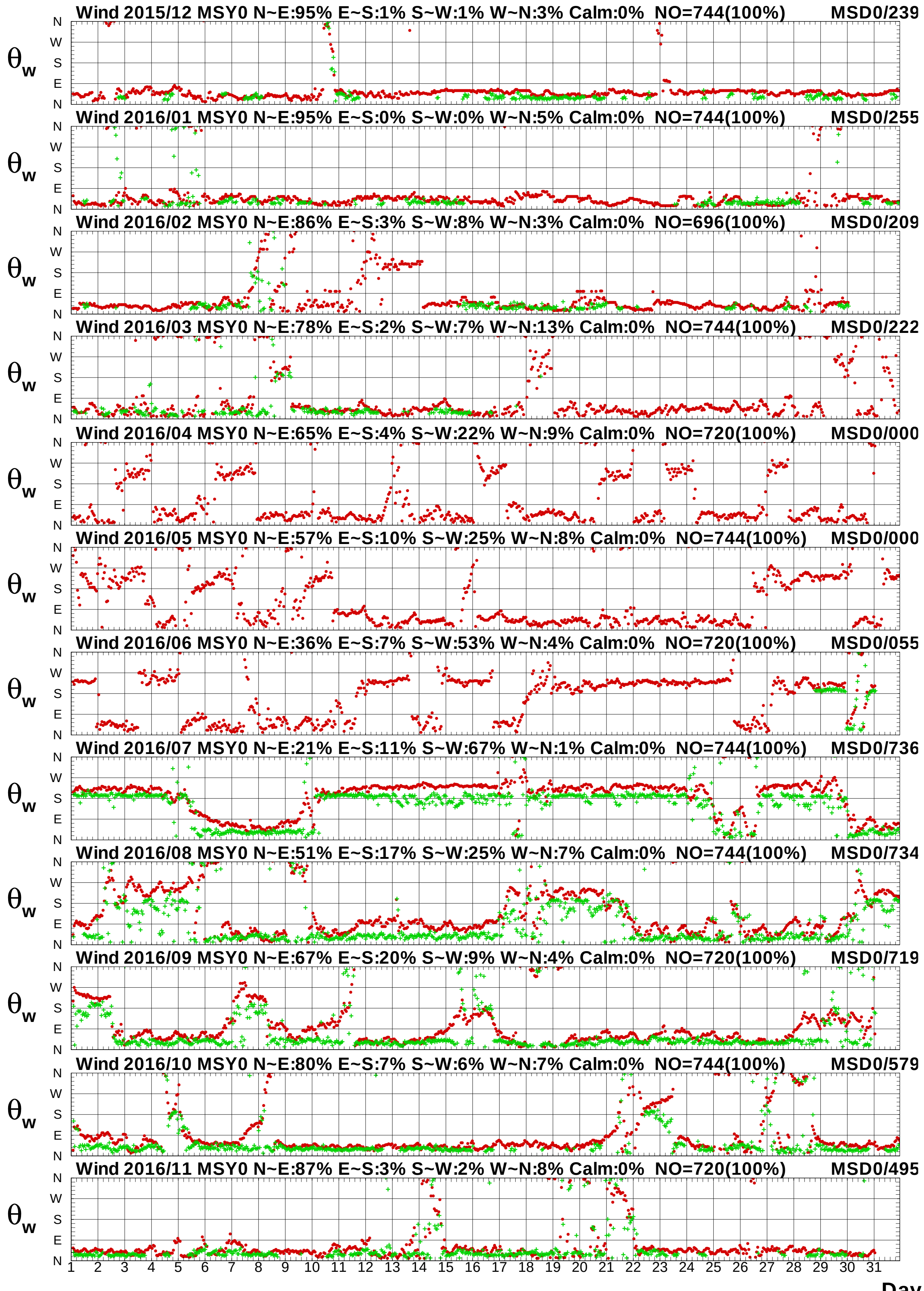

圖 1.5b　2016年每月馬祖海域 Y 站與 D 站風向比較圖

W15CMSY0.1HA W15CMSD0.1H0 W161MSY0.1HA W161MSD0.1H0 W162MSY0.1HA W162MSD0.1H0
W163MSY0.1HA W163MSD0.1H0 W164MSY0.1HA W164MSD0.1H0 W165MSY0.1HA W165MSD0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

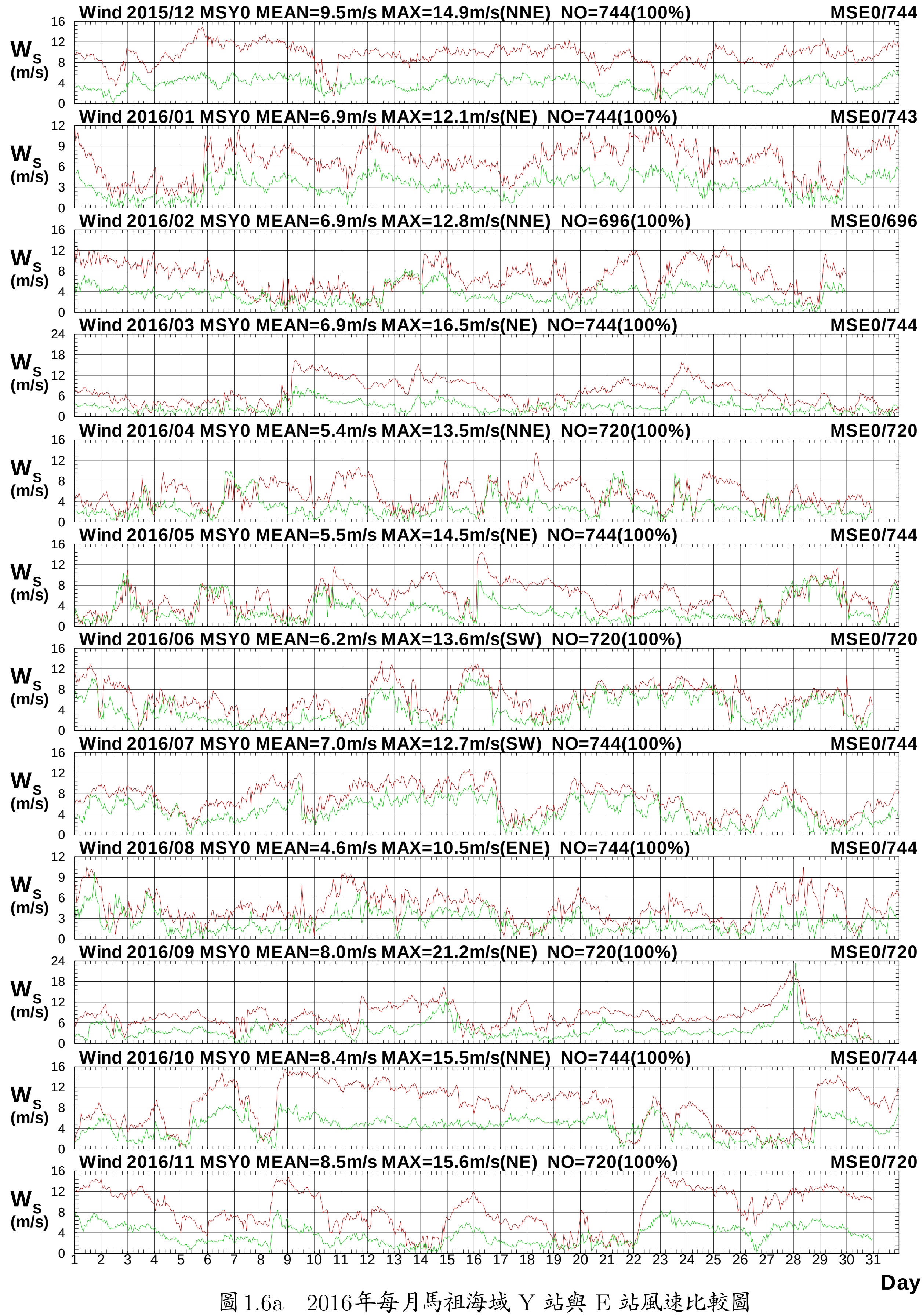

圖 1.6a　2016年每月馬祖海域 Y 站與 E 站風速比較圖

W15CMSY0.1HA W15CMSE0.1H0 W161MSY0.1HA W161MSE0.1H0 W162MSY0.1HA W162MSE0.1H0 W163MSY0.1HA W163MSE0.1H0 W164MSY0.1HA W164MSE0.1H0 W165MSY0.1HA W165MSE0.1H0	Institute of Harbor & Marine Technology

Wind Direction in Ma-Tsu Seas of MSY0 at 2016

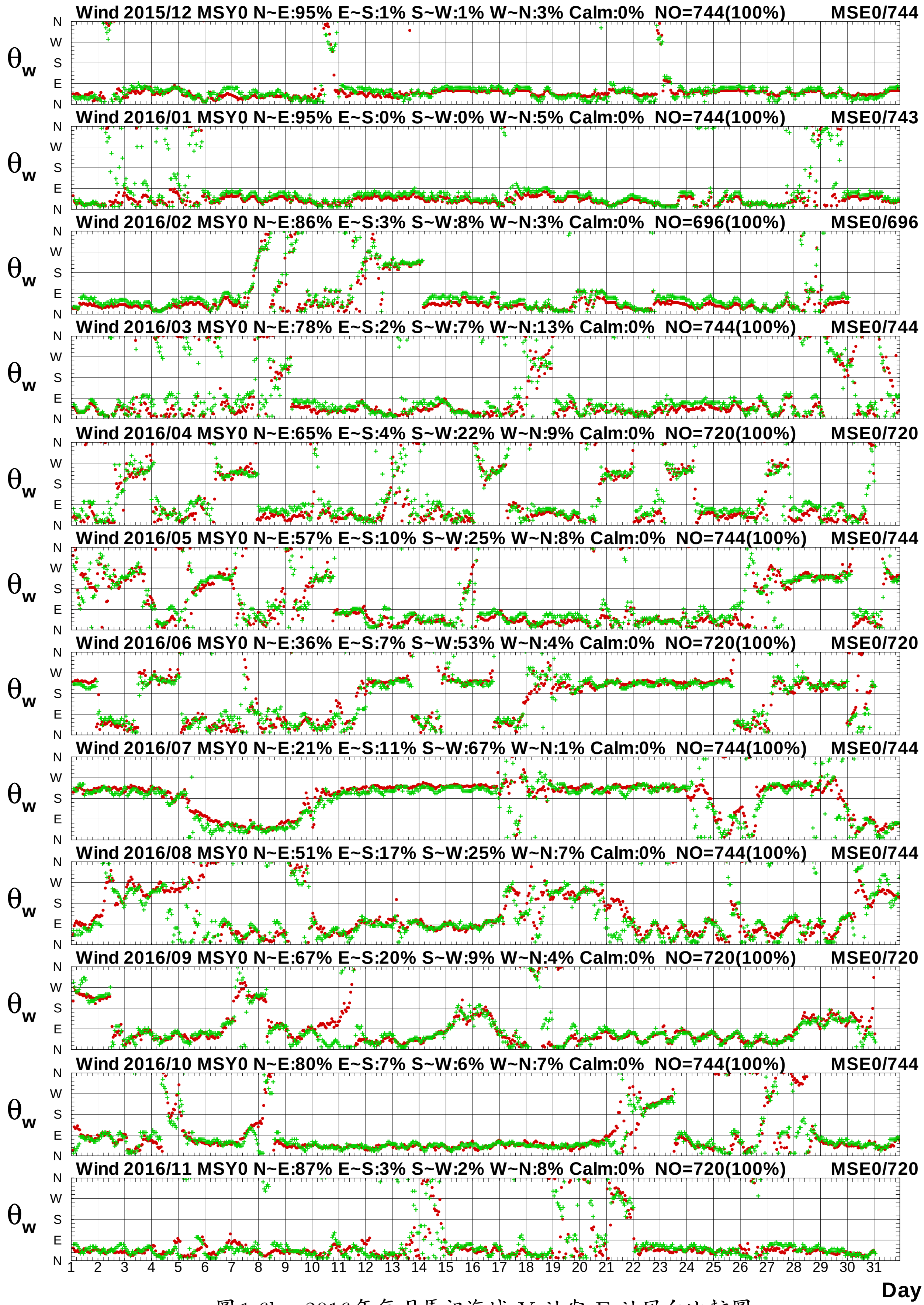

圖 1.6b　2016年每月馬祖海域 Y 站與 E 站風向比較圖

W15CMSY0.1HA W15CMSE0.1H0 W161MSY0.1HA W161MSE0.1H0 W162MSY0.1HA W162MSE0.1H0
W163MSY0.1HA W163MSE0.1H0 W164MSY0.1HA W164MSE0.1H0 W165MSY0.1HA W165MSE0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

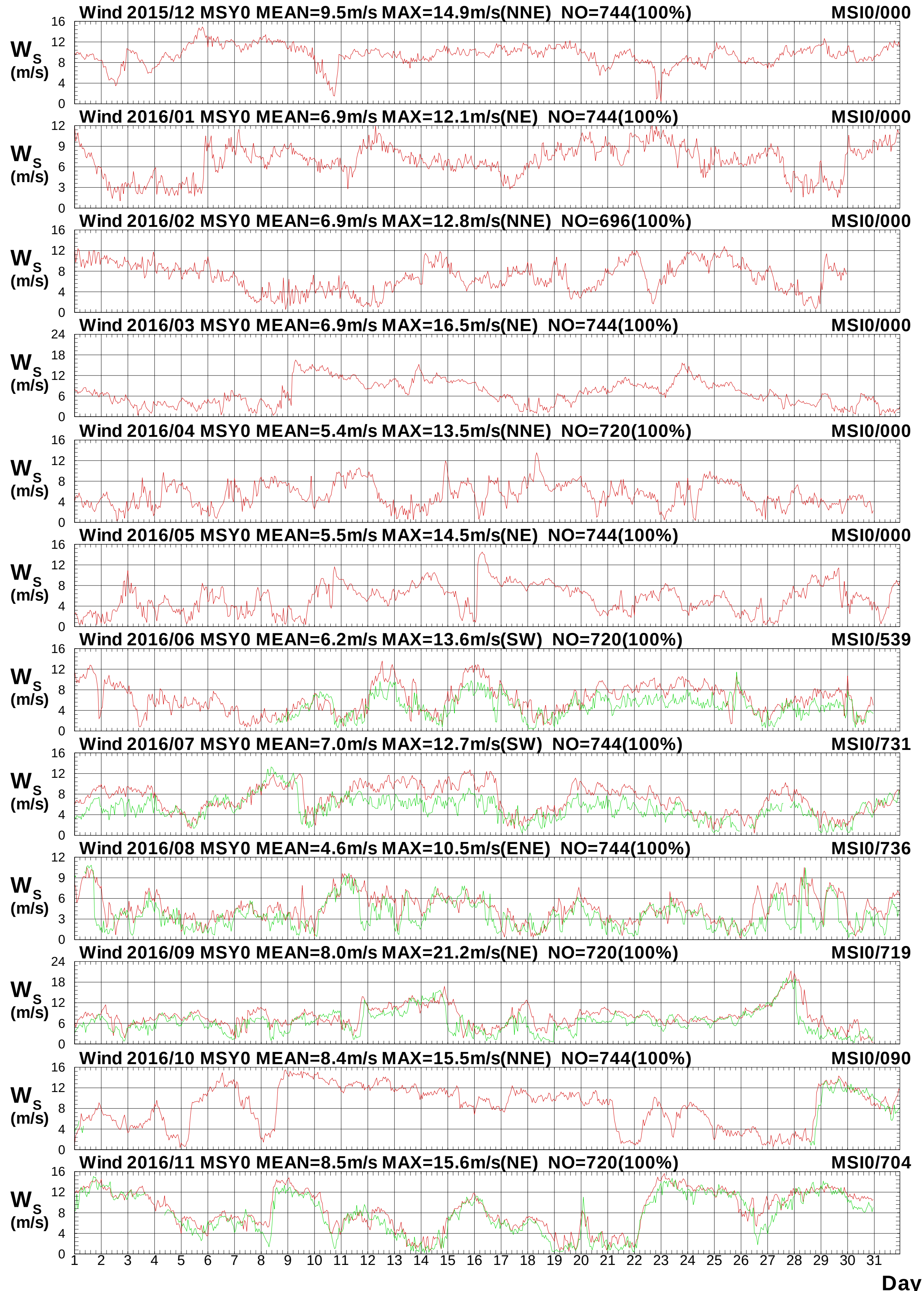

圖 1.7a　2016年每月馬祖海域 Y 站與 I 站風速比較圖

W15CMSY0.1HA W15CMSI0.1H0 W161MSY0.1HA W161MSI0.1H0 W162MSY0.1HA W162MSI0.1H0
W163MSY0.1HA W163MSI0.1H0 W164MSY0.1HA W164MSI0.1H0 W165MSY0.1HA W165MSI0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

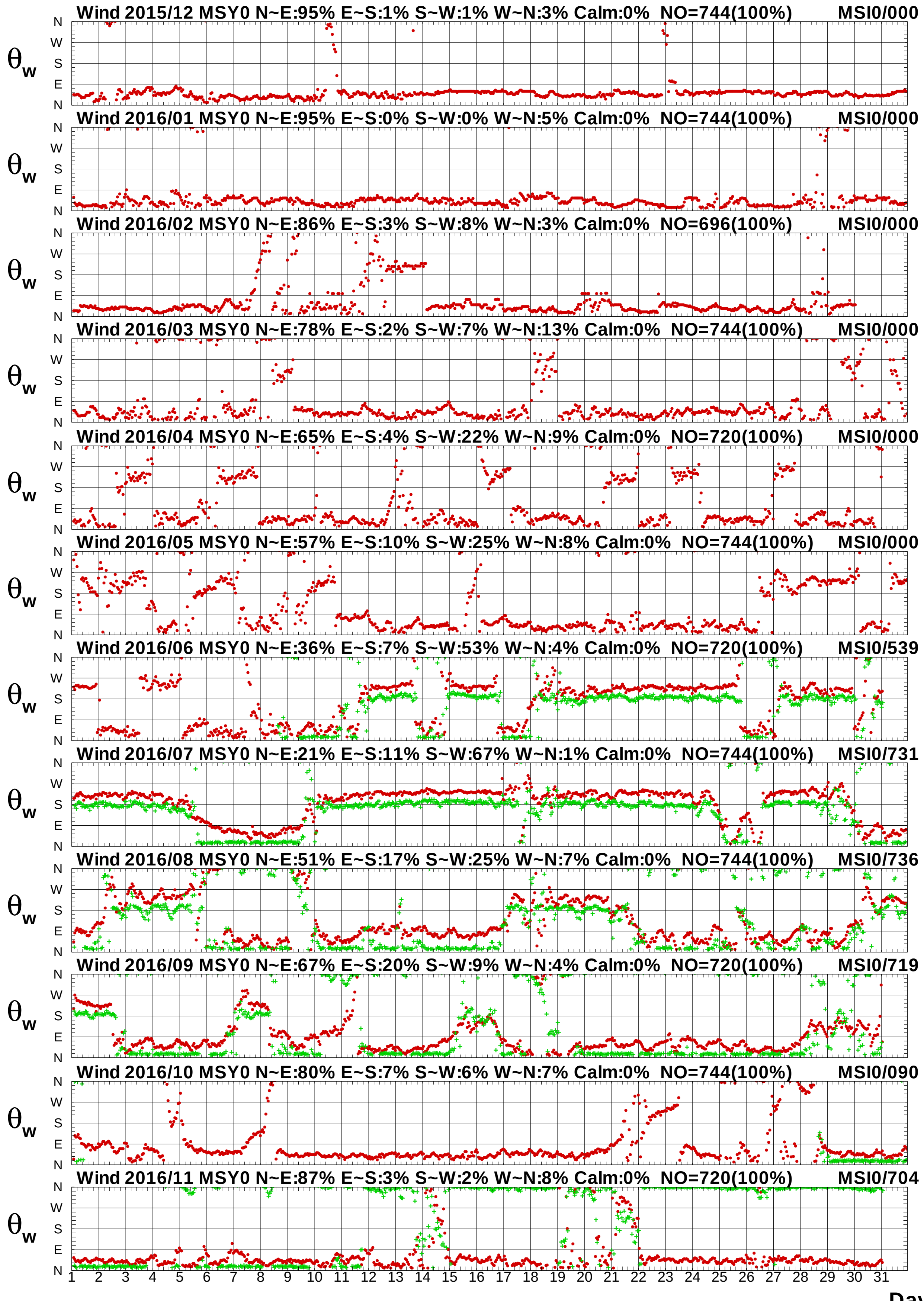

圖 1.7b 2016年每月馬祖海域 Y 站與 I 站風向比較圖

W15CMSY0.1HA W15CMSI0.1H0 W161MSY0.1HA W161MSI0.1H0 W162MSY0.1HA W162MSI0.1H0 W163MSY0.1HA W163MSI0.1H0 W164MSY0.1HA W164MSI0.1H0 W165MSY0.1HA W165MSI0.1H0	Institute of Harbor & Marine Technology

Wind Speed in Ma-Tsu Seas of MSY0 at 2016

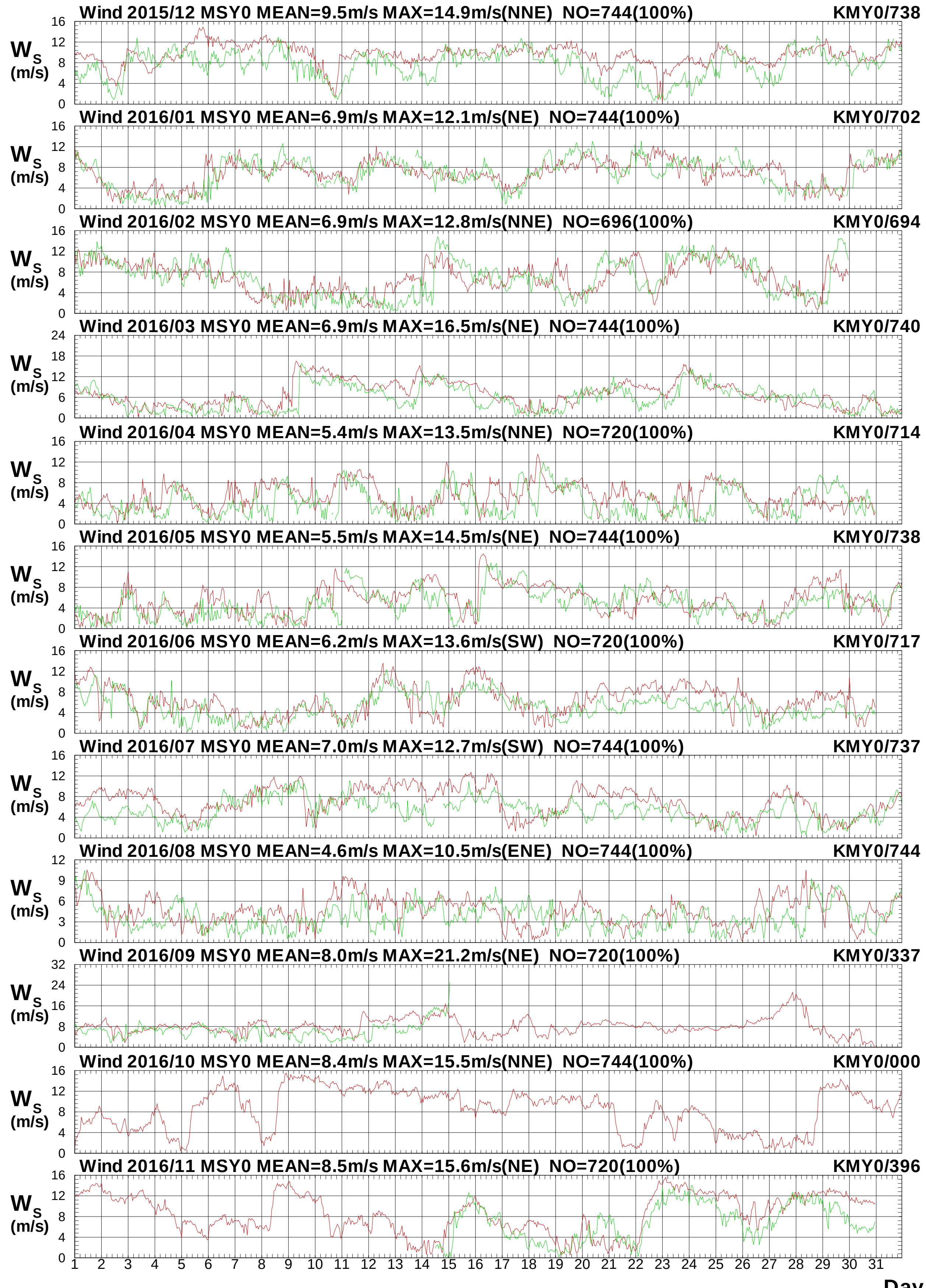

圖 1.8a　2016年每月馬祖海域 Y 站與金門海域 Y 站風速圖

W15CMSY0.1HA W15CKMY0.1H0 W161MSY0.1HA W161KMY0.1H0 W162MSY0.1HA W162KMY0.1H0
W163MSY0.1HA W163KMY0.1H0 W164MSY0.1HA W164KMY0.1H0 W165MSY0.1HA W165KMY0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

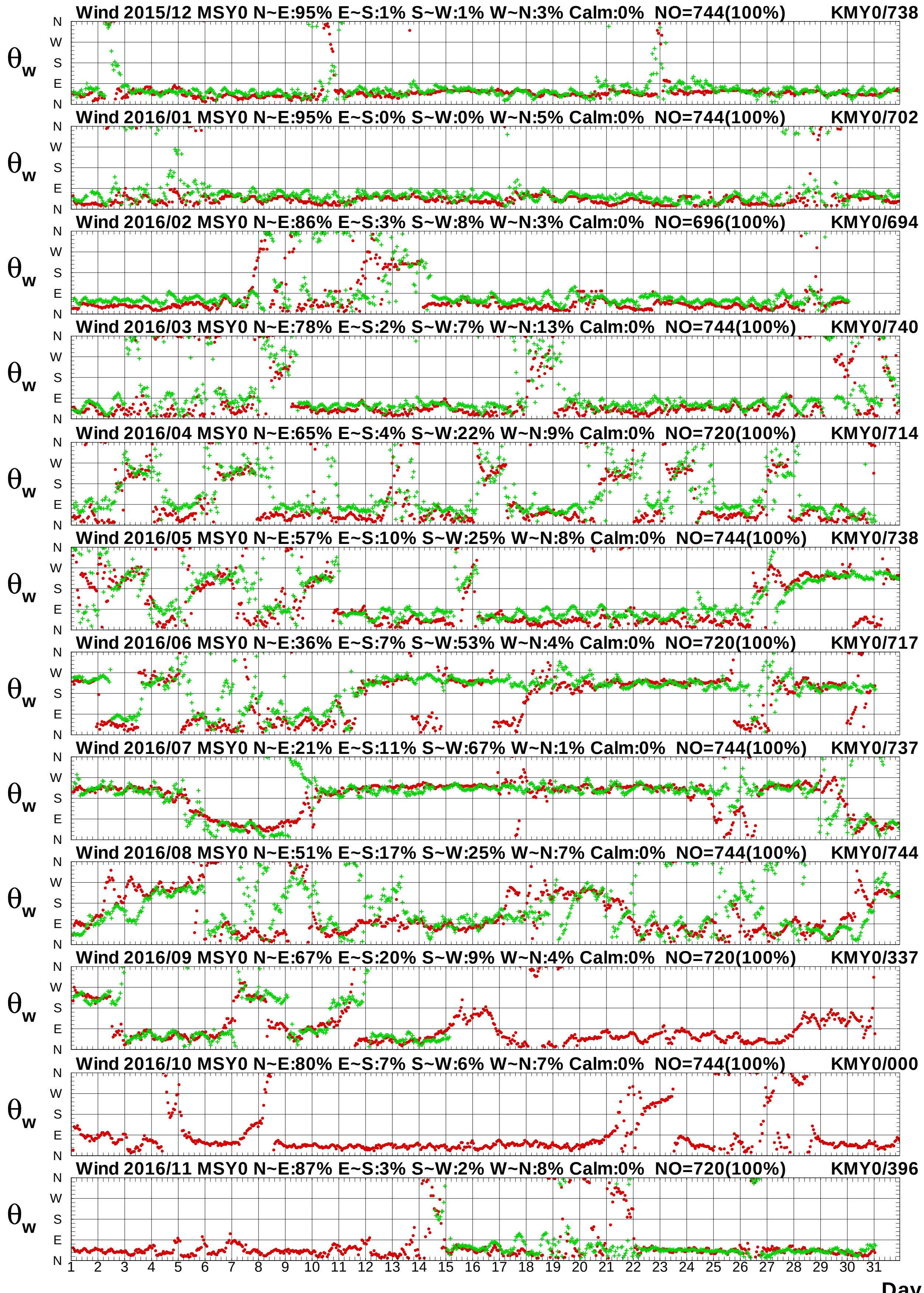

圖 1.8b　2016年每月馬祖海域 Y 站與金門海域 Y 站風向圖

W15CMSY0.1HA W15CKMY0.1H0 W161MSY0.1HA W161KMY0.1H0 W162MSY0.1HA W162KMY0.1H0
W163MSY0.1HA W163KMY0.1H0 W164MSY0.1HA W164KMY0.1H0 W165MSY0.1HA W165KMY0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

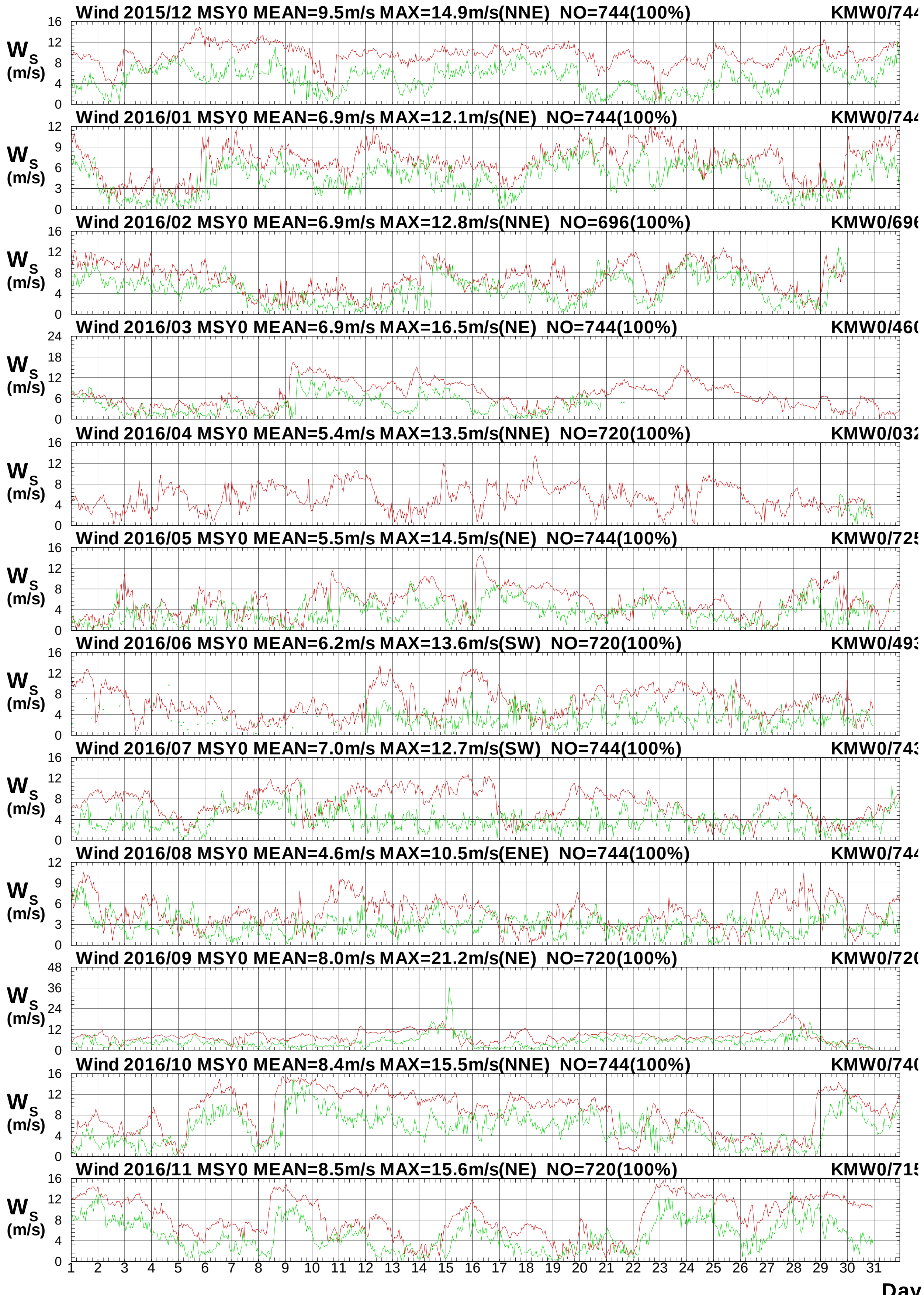

圖 1.9a　2016年每月馬祖海域 Y 站與金門海域 W 站風速圖

W15CMSY0.1HA W15CKMW0.1H0 W161MSY0.1HA W161KMW0.1H0 W162MSY0.1HA W162KMW0.1H0
W163MSY0.1HA W163KMW0.1H0 W164MSY0.1HA W164KMW0.1H0 W165MSY0.1HA W165KMW0.1H0

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CURW4K.BAT(CURW4KV.DAT)

2017/05/16

Wind Direction in Ma-Tsu Seas of MSY0 at 2016

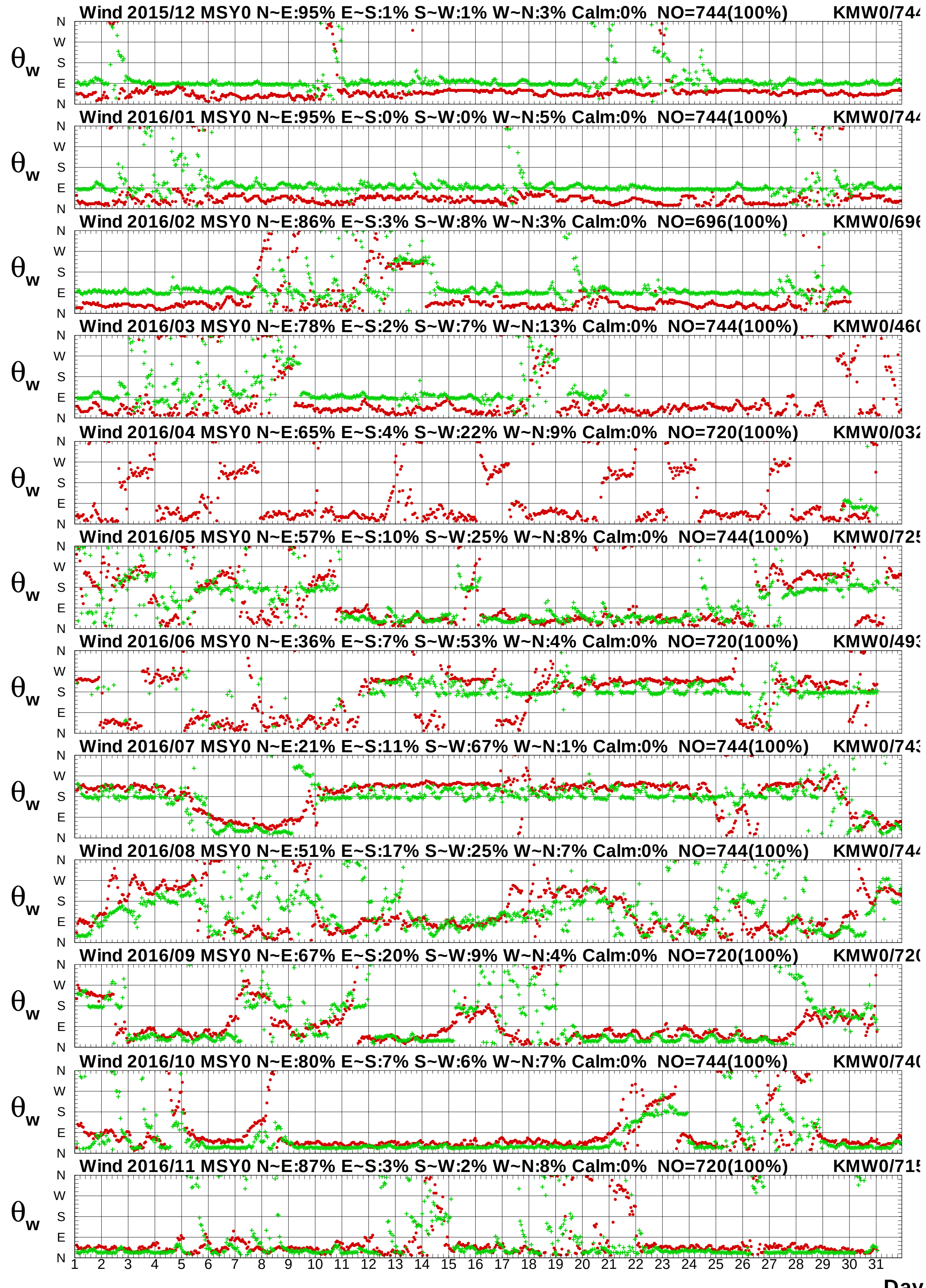

圖 1.9b　2016年每月馬祖海域 Y 站與金門海域 W 站風向圖

W15CMSY0.1HA W15CKMW0.1H0 W161MSY0.1HA W161KMW0.1H0 W162MSY0.1HA W162KMW0.1H0
W163MSY0.1HA W163KMW0.1H0 W164MSY0.1HA W164KMW0.1H0 W165MSY0.1HA W165KMW0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

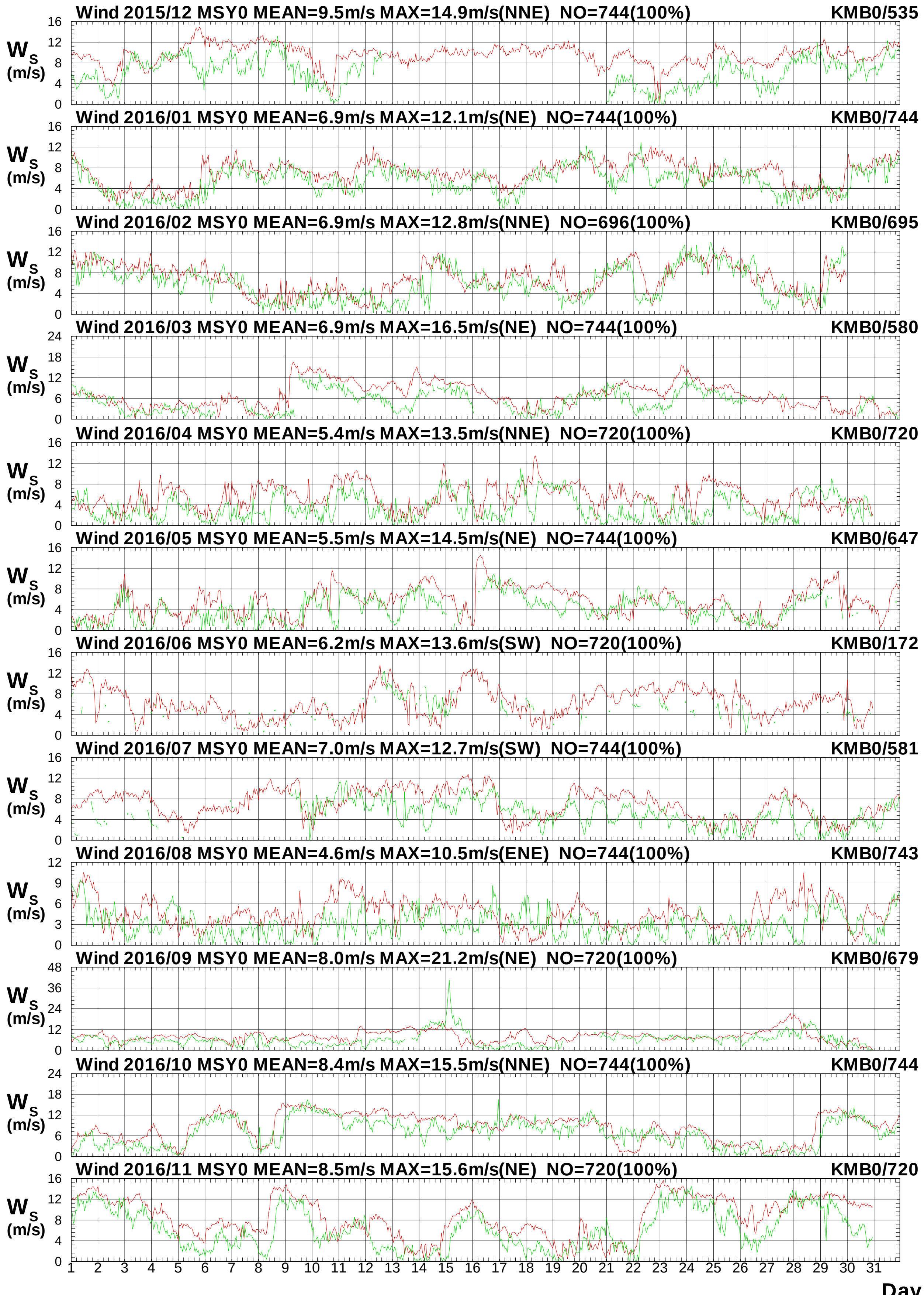

圖 1.10a　2016年每月馬祖海域 Y 站與金門海域 B 站風速圖

W15CMSY0.1HA W15CKMB0.1H0 W161MSY0.1HA W161KMB0.1H0 W162MSY0.1HA W162KMB0.1H0 W163MSY0.1HA W163KMB0.1H0 W164MSY0.1HA W164KMB0.1H0 W165MSY0.1HA W165KMB0.1H0	Institute of Harbor & Marine Technology

Wind Direction in Ma-Tsu Seas of MSY0 at 2016

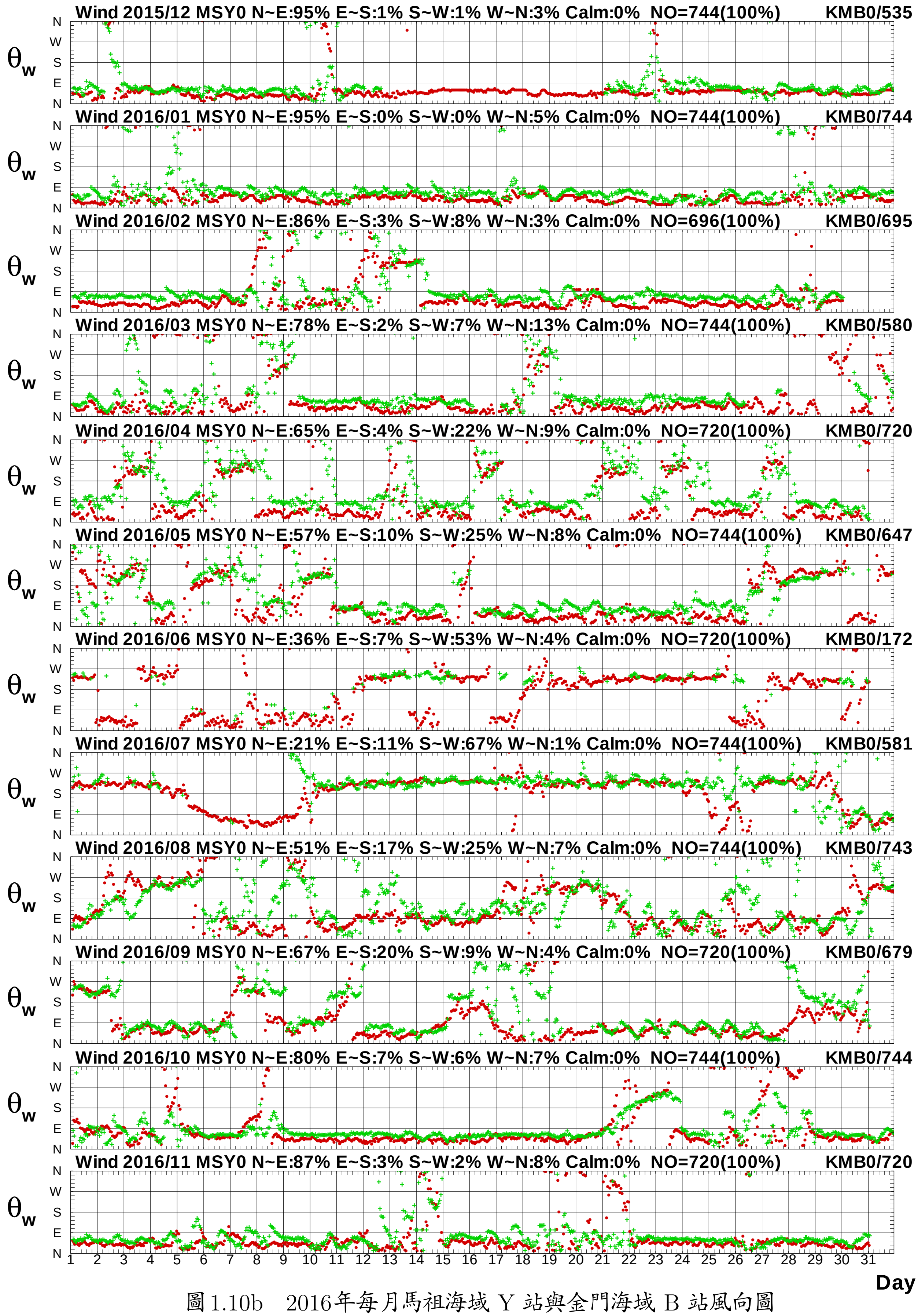

圖 1.10b　2016年每月馬祖海域 Y 站與金門海域 B 站風向圖

W15CMSY0.1HA W15CKMB0.1H0 W161MSY0.1HA W161KMB0.1H0 W162MSY0.1HA W162KMB0.1H0
W163MSY0.1HA W163KMB0.1H0 W164MSY0.1HA W164KMB0.1H0 W165MSY0.1HA W165KMB0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

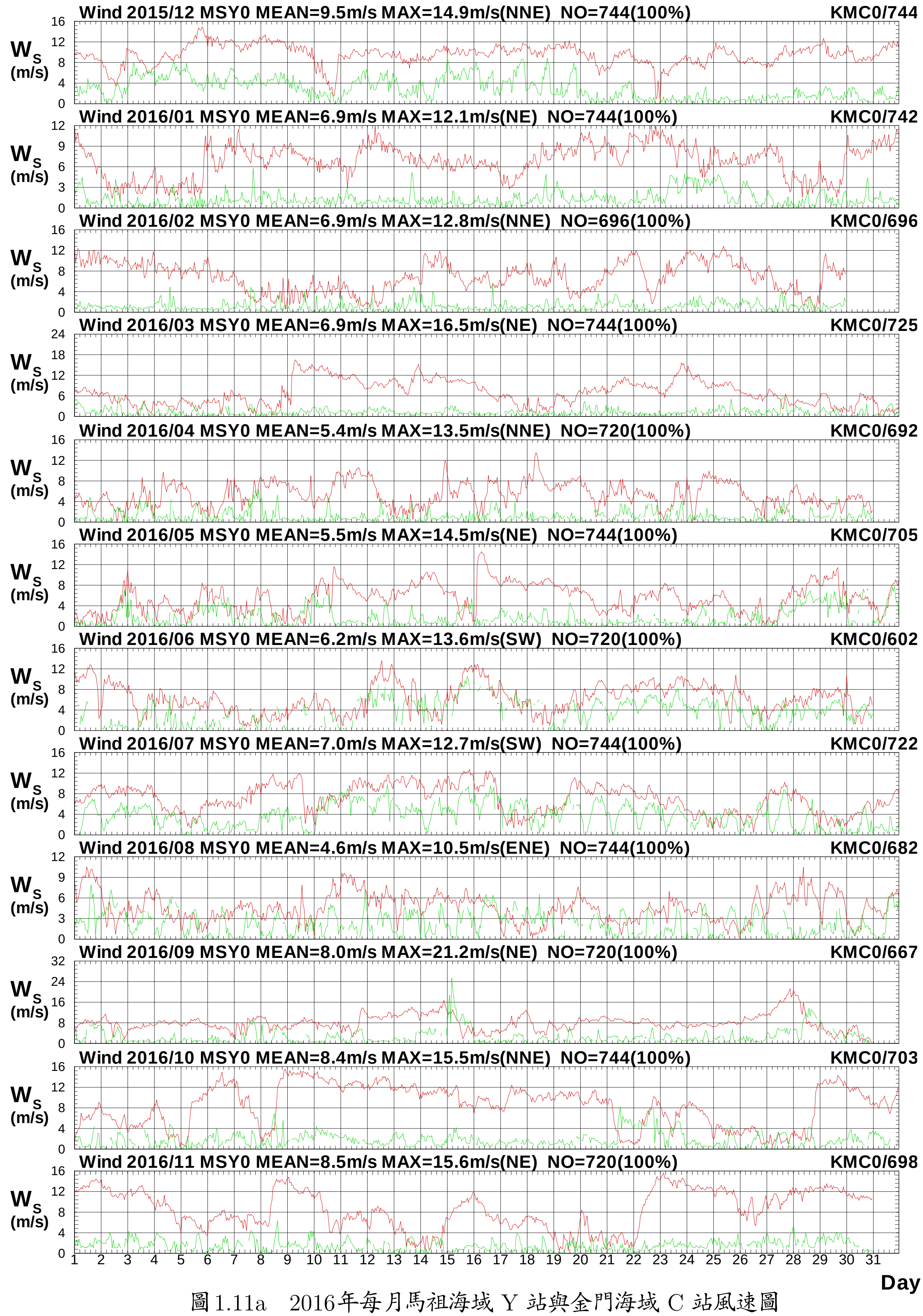

圖 1.11a　2016年每月馬祖海域 Y 站與金門海域 C 站風速圖

W15CMSY0.1HA W15CKMC0.1H0 W161MSY0.1HA W161KMC0.1H0 W162MSY0.1HA W162KMC0.1H0
W163MSY0.1HA W163KMC0.1H0 W164MSY0.1HA W164KMC0.1H0 W165MSY0.1HA W165KMC0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

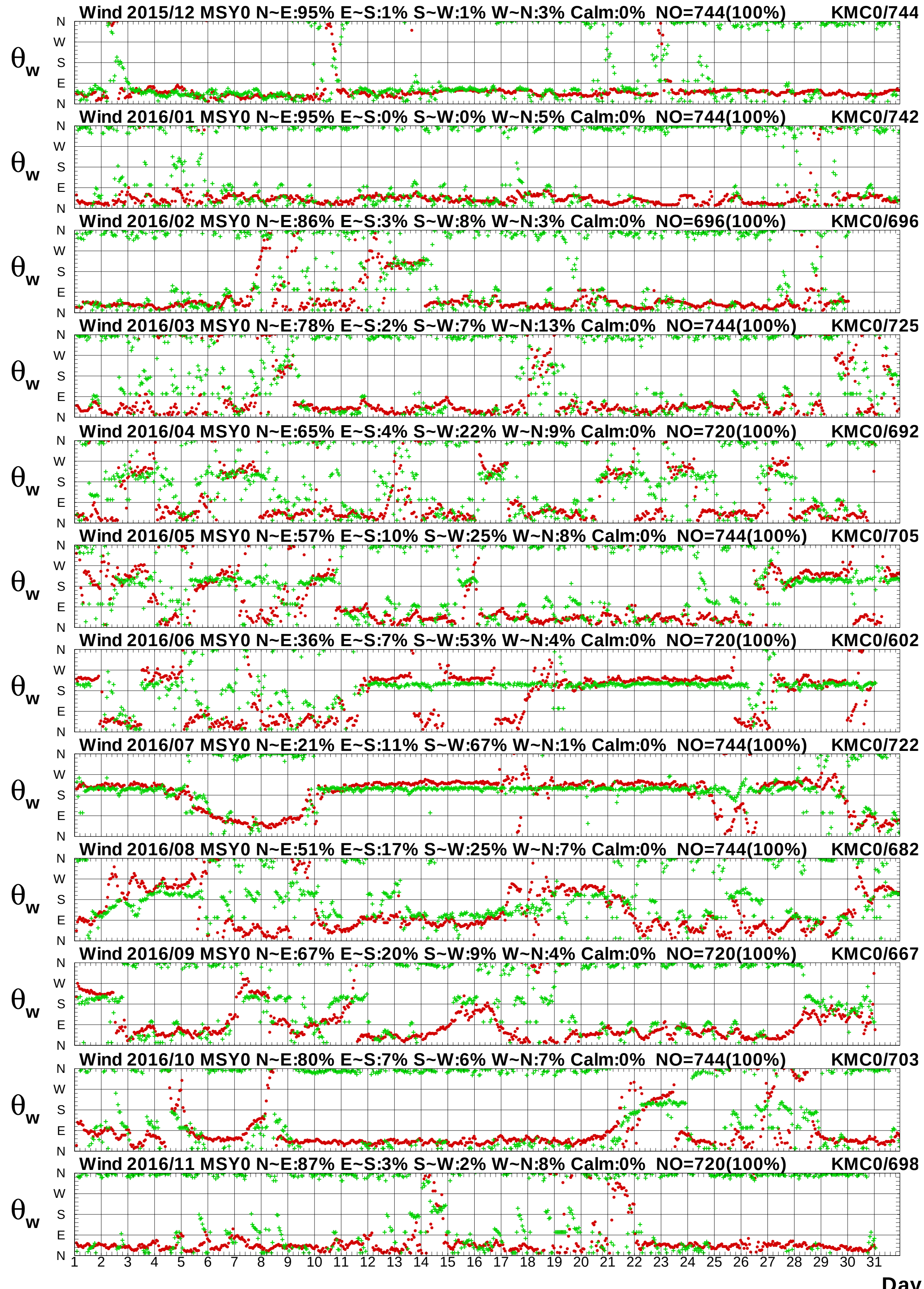

圖 1.11b　2016年每月馬祖海域 Y 站與金門海域 C 站風向圖

W15CMSY0.1HA W15CKMC0.1H0 W161MSY0.1HA W161KMC0.1H0 W162MSY0.1HA W162KMC0.1H0 W163MSY0.1HA W163KMC0.1H0 W164MSY0.1HA W164KMC0.1H0 W165MSY0.1HA W165KMC0.1H0	Institute of Harbor & Marine Technology

Wind Speed in Ma-Tsu Seas of MSY0 at 2016

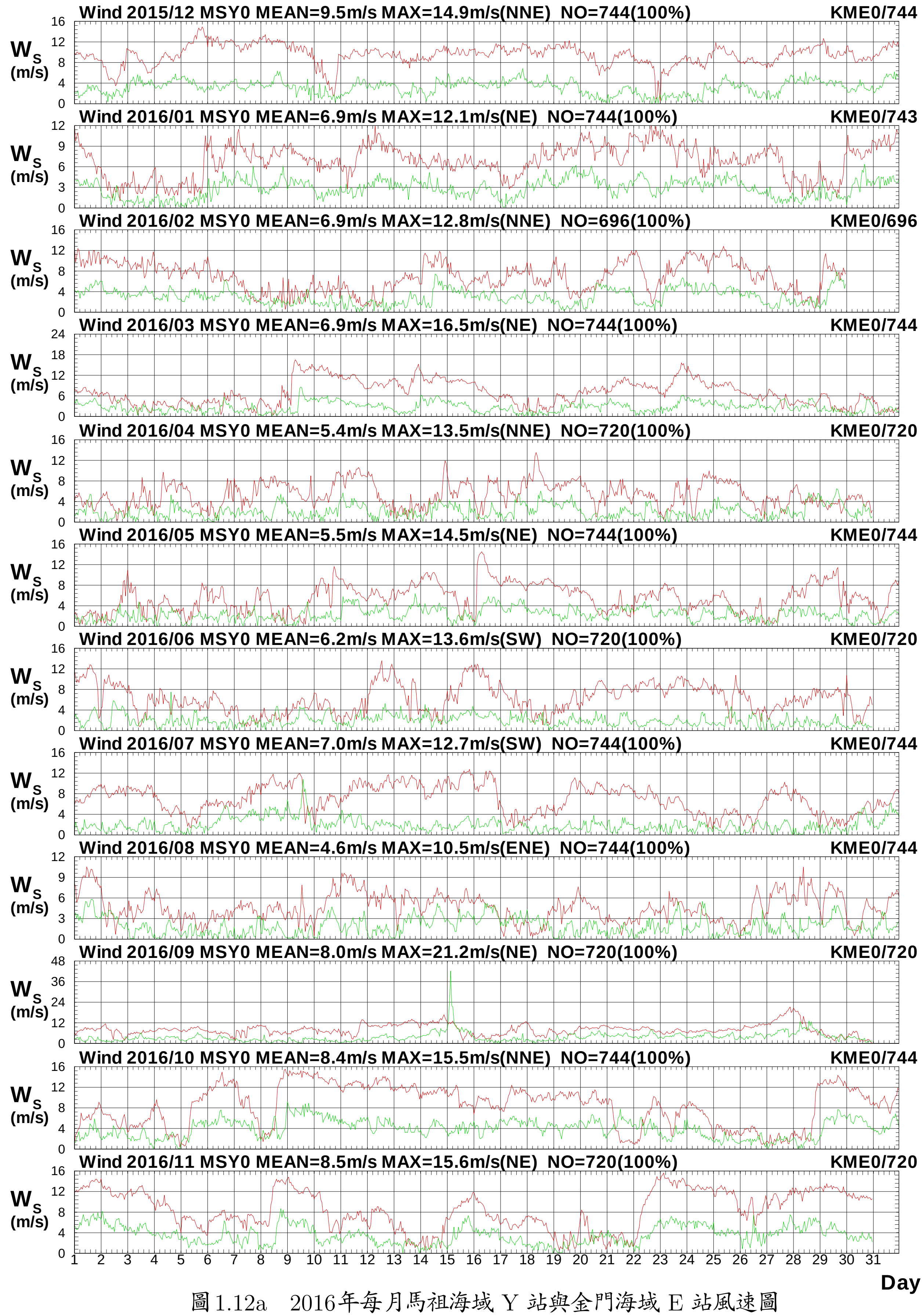

圖 1.12a　2016年每月馬祖海域 Y 站與金門海域 E 站風速圖

W15CMSY0.1HA W15CKME0.1H0 W161MSY0.1HA W161KME0.1H0 W162MSY0.1HA W162KME0.1H0
W163MSY0.1HA W163KME0.1H0 W164MSY0.1HA W164KME0.1H0 W165MSY0.1HA W165KME0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

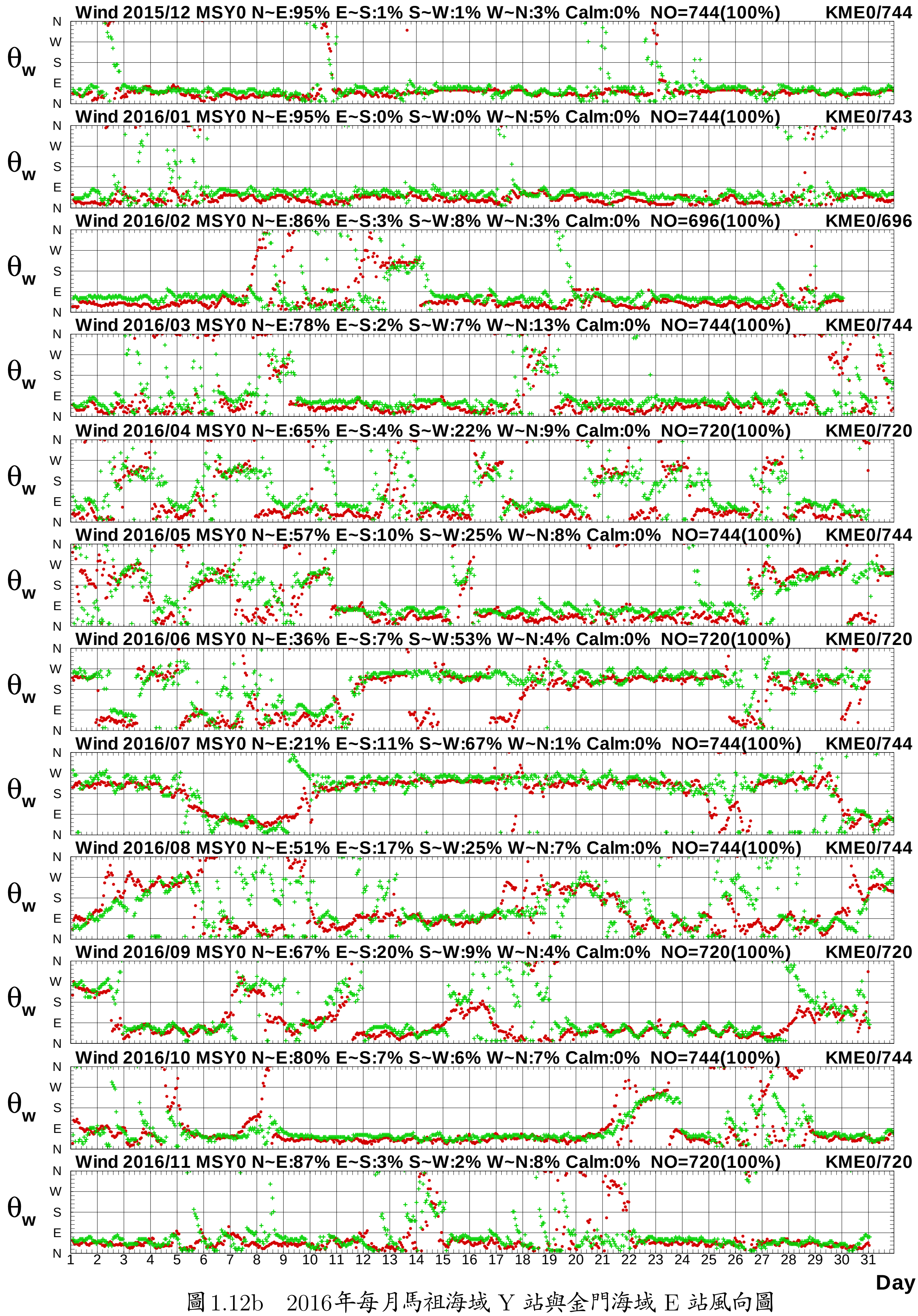

圖 1.12b　2016年每月馬祖海域 Y 站與金門海域 E 站風向圖

W15CMSY0.1HA W15CKME0.1H0 W161MSY0.1HA W161KME0.1H0 W162MSY0.1HA W162KME0.1H0
W163MSY0.1HA W163KME0.1H0 W164MSY0.1HA W164KME0.1H0 W165MSY0.1HA W165KME0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

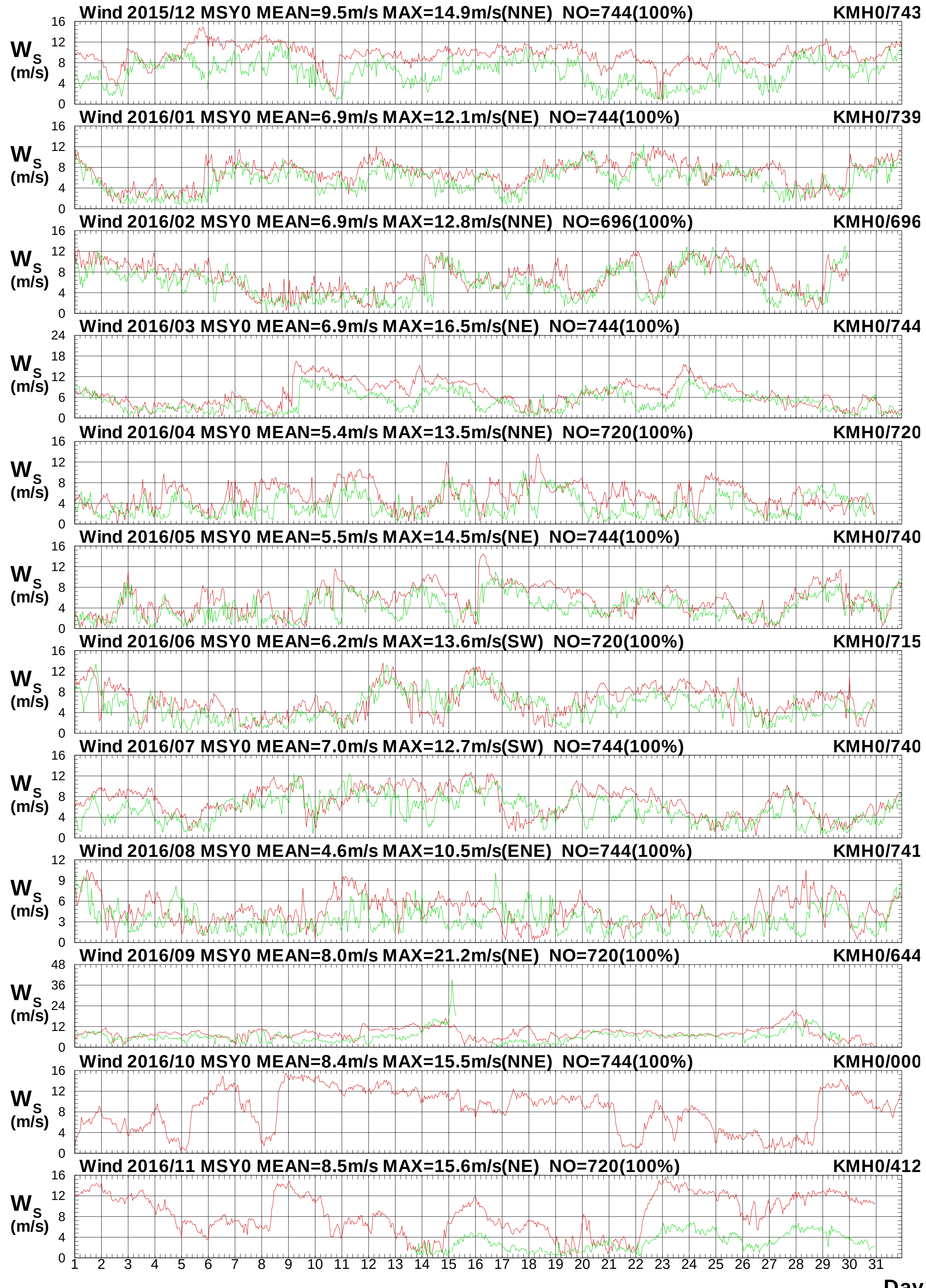

圖 1.13a　2016年每月馬祖海域 Y 站與金門海域 H 站風速圖

W15CMSY0.1HA W15CKMH0.1H0 W161MSY0.1HA W161KMH0.1H0 W162MSY0.1HA W162KMH0.1H0
W163MSY0.1HA W163KMH0.1H0 W164MSY0.1HA W164KMH0.1H0 W165MSY0.1HA W165KMH0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

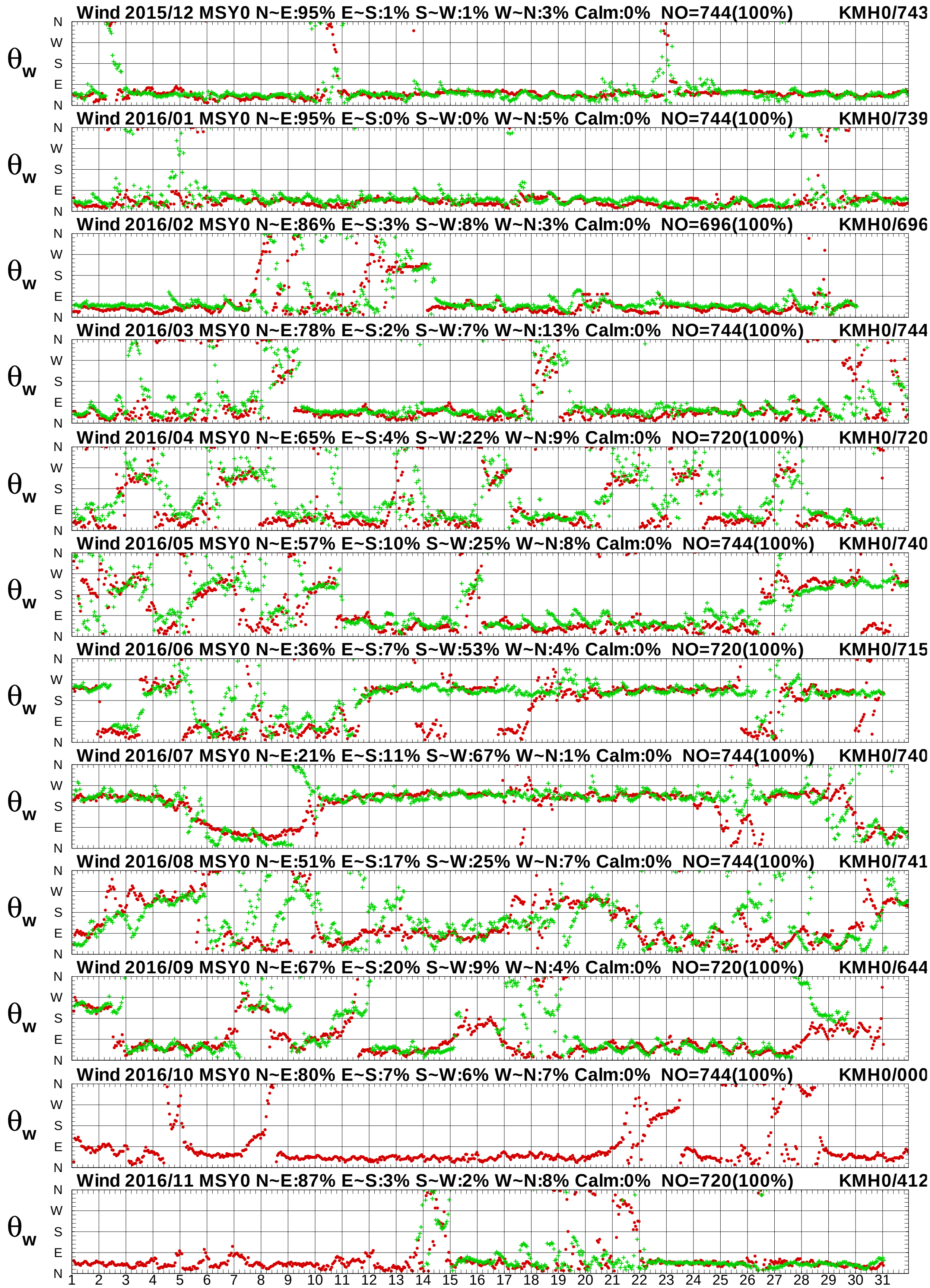

圖 1.13b　2016年每月馬祖海域 Y 站與金門海域 H 站風向圖

W15CMSY0.1HA W15CKMH0.1H0 W161MSY0.1HA W161KMH0.1H0 W162MSY0.1HA W162KMH0.1H0
W163MSY0.1HA W163KMH0.1H0 W164MSY0.1HA W164KMH0.1H0 W165MSY0.1HA W165KMH0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

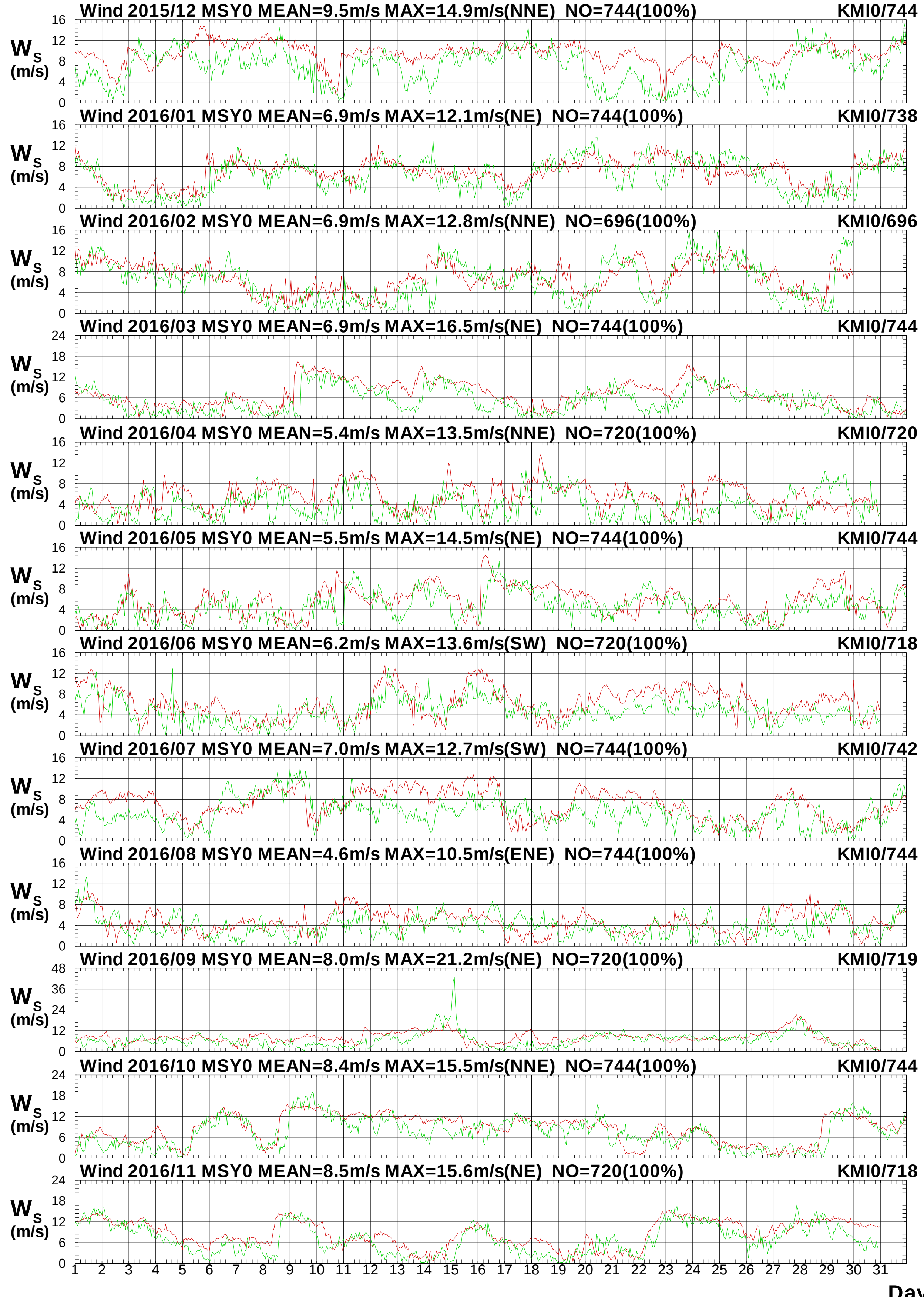

圖 1.14a　2016年每月馬祖海域 Y 站與金門海域 I 站風速圖

W15CMSY0.1HA W15CKMI0.1H0 W161MSY0.1HA W161KMI0.1H0 W162MSY0.1HA W162KMI0.1H0
W163MSY0.1HA W163KMI0.1H0 W164MSY0.1HA W164KMI0.1H0 W165MSY0.1HA W165KMI0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

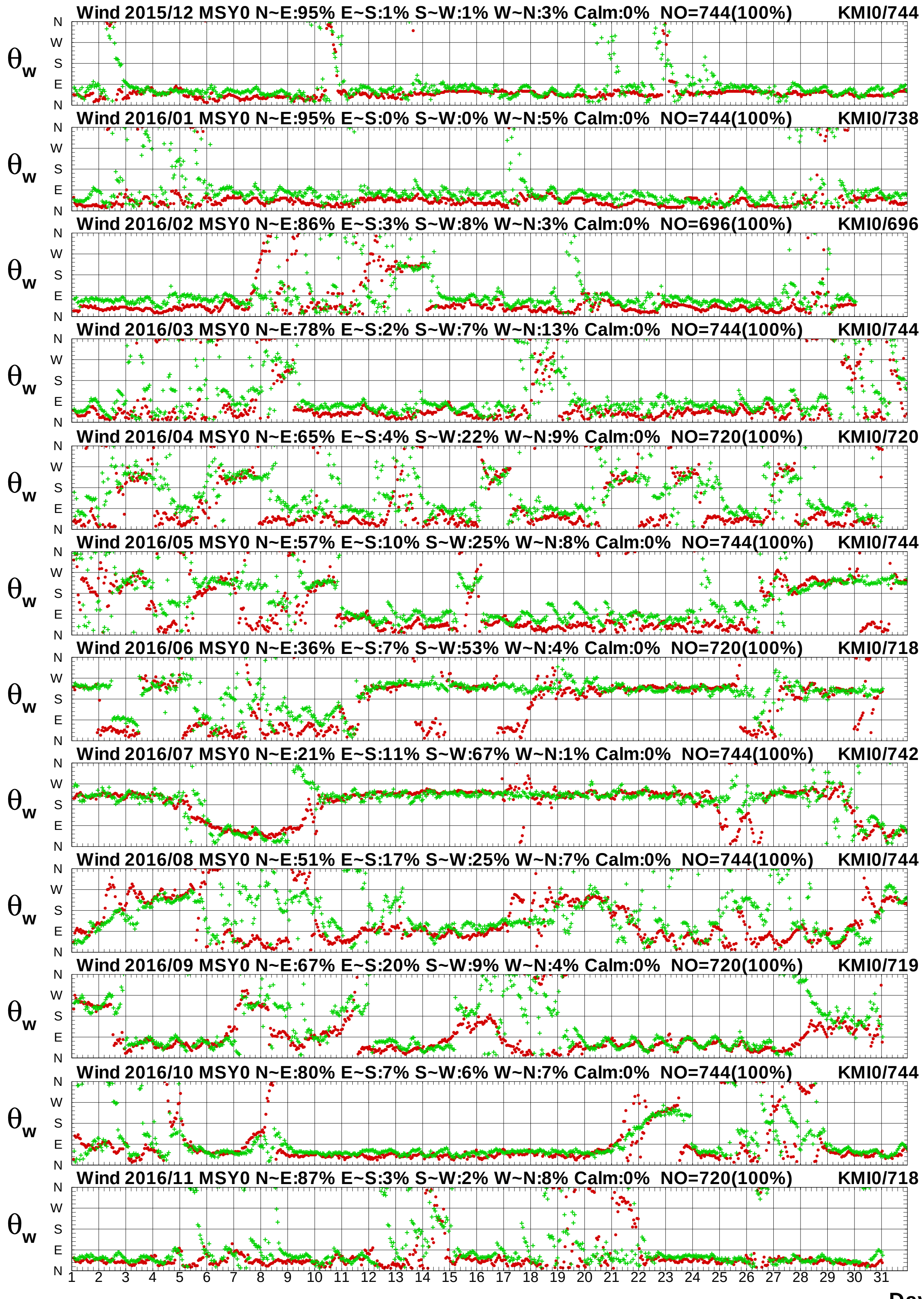

圖 1.14b　2016年每月馬祖海域 Y 站與金門海域 I 站風向圖

W15CMSY0.1HA W15CKMI0.1H0 W161MSY0.1HA W161KMI0.1H0 W162MSY0.1HA W162KMI0.1H0
W163MSY0.1HA W163KMI0.1H0 W164MSY0.1HA W164KMI0.1H0 W165MSY0.1HA W165KMI0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

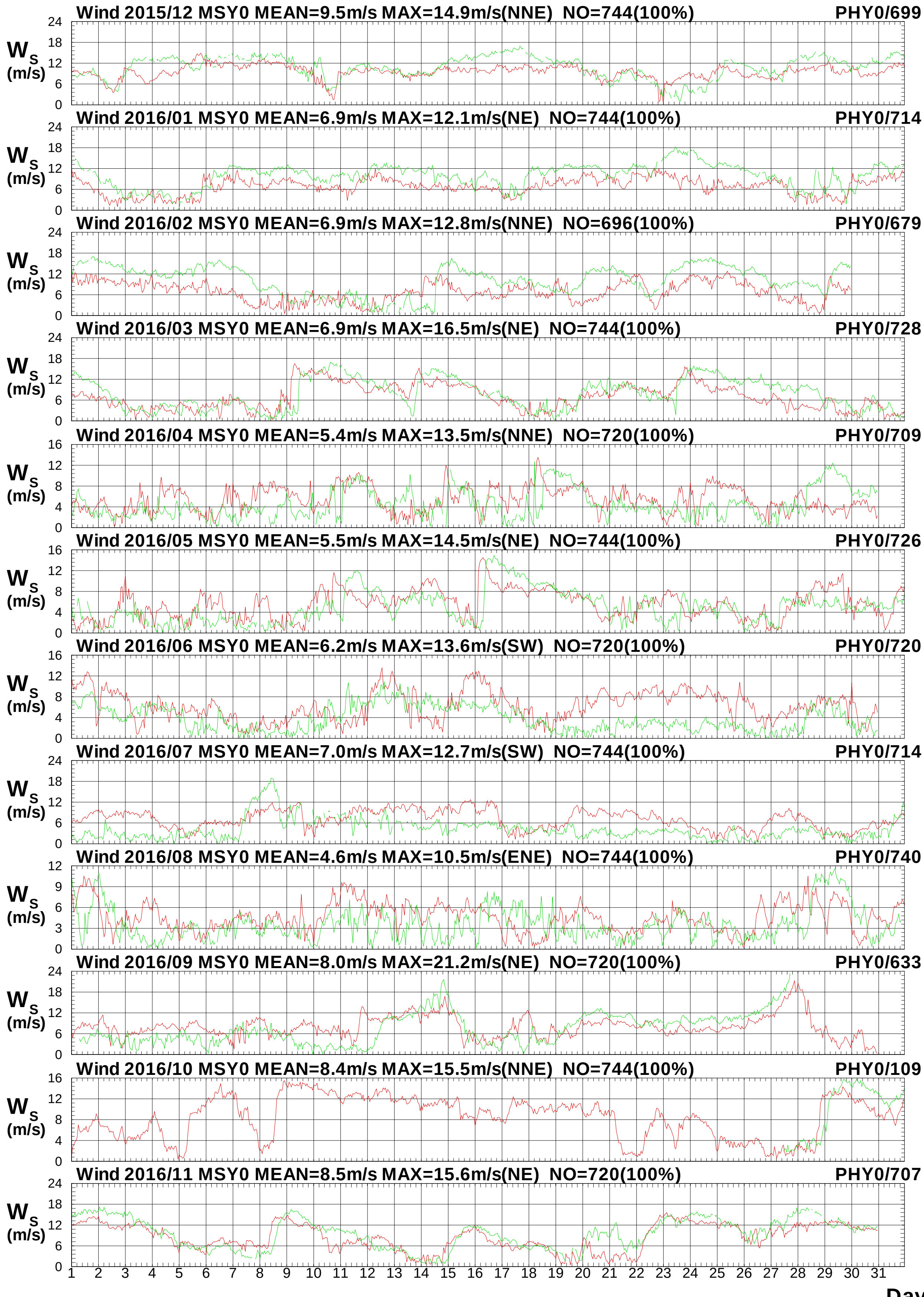

圖 1.15a　2016年每月馬祖海域 Y 站與澎湖海域 Y 站風速圖

W15CMSY0.1HA W15CPHY0.1H0 W161MSY0.1HA W161PHY0.1H0 W162MSY0.1HA W162PHY0.1H0
W163MSY0.1HA W163PHY0.1H0 W164MSY0.1HA W164PHY0.1H0 W165MSY0.1HA W165PHY0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

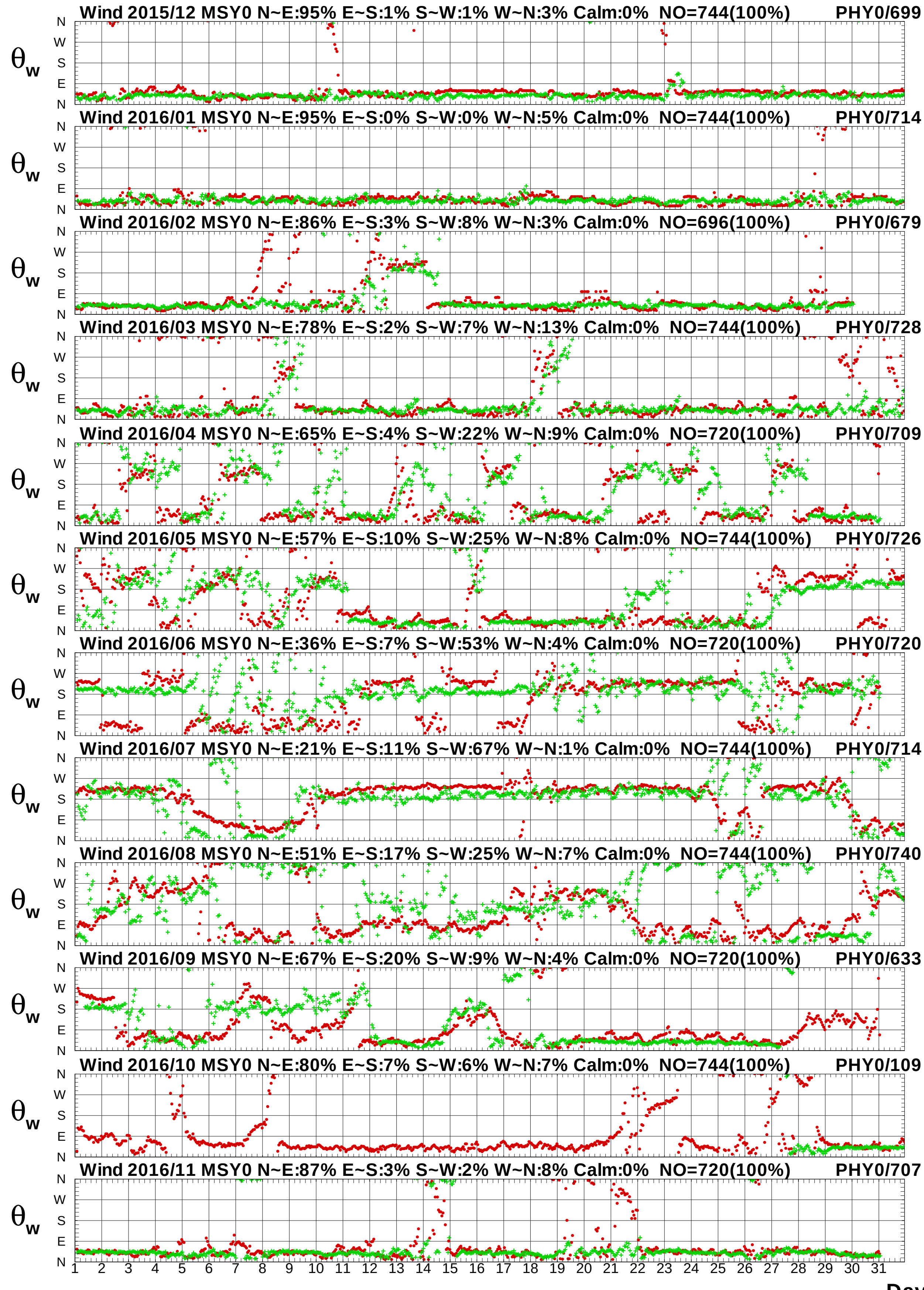

圖 1.15b　2016年每月馬祖海域 Y 站與澎湖海域 Y 站風向圖

W15CMSY0.1HA W15CPHY0.1H0 W161MSY0.1HA W161PHY0.1H0 W162MSY0.1HA W162PHY0.1H0
W163MSY0.1HA W163PHY0.1H0 W164MSY0.1HA W164PHY0.1H0 W165MSY0.1HA W165PHY0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

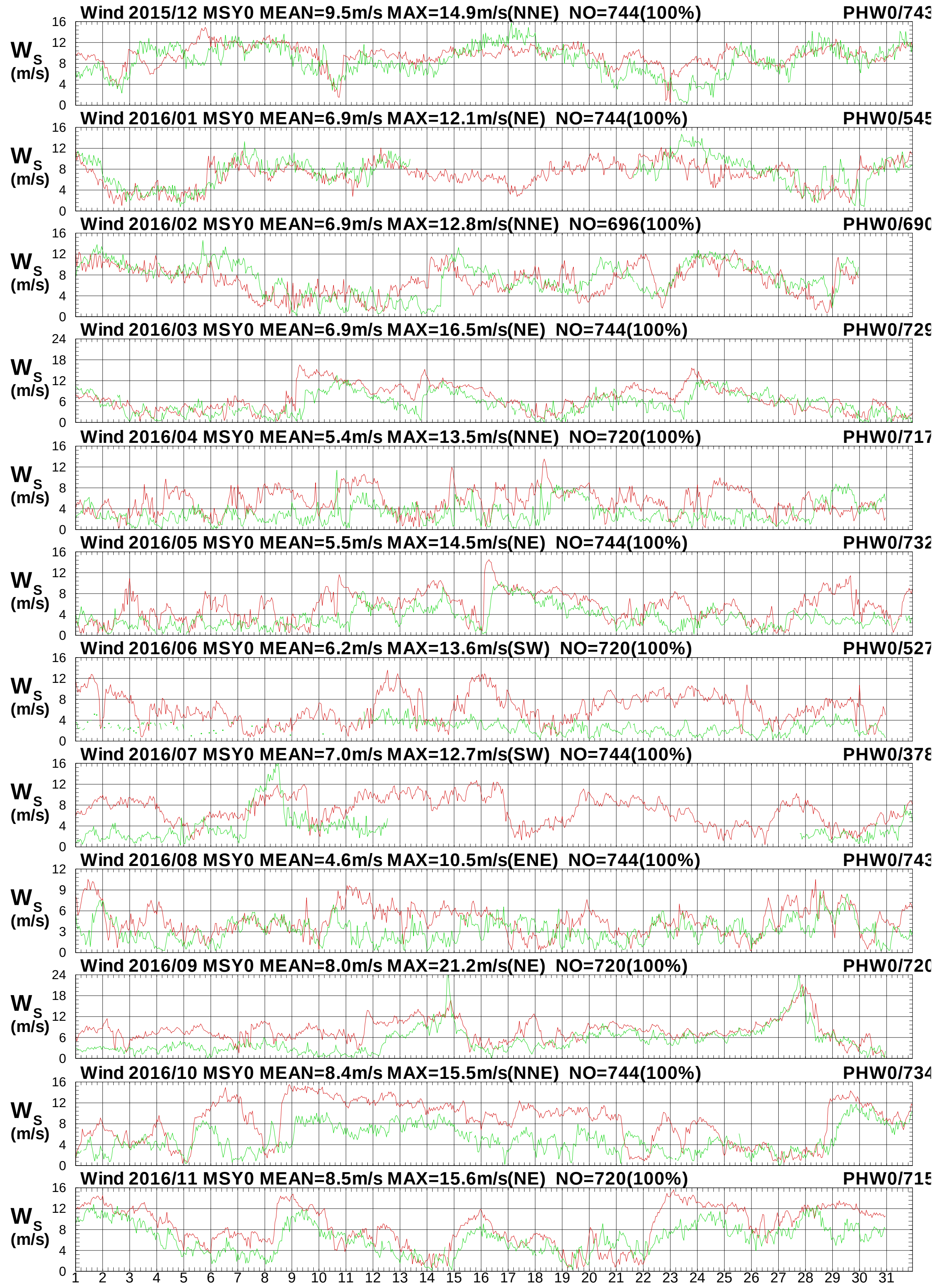

圖 1.16a　2016年每月馬祖海域 Y 站與澎湖海域 W 站風速圖

W15CMSY0.1HA W15CPHW0.1H0 W161MSY0.1HA W161PHW0.1H0 W162MSY0.1HA W162PHW0.1H0
W163MSY0.1HA W163PHW0.1H0 W164MSY0.1HA W164PHW0.1H0 W165MSY0.1HA W165PHW0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

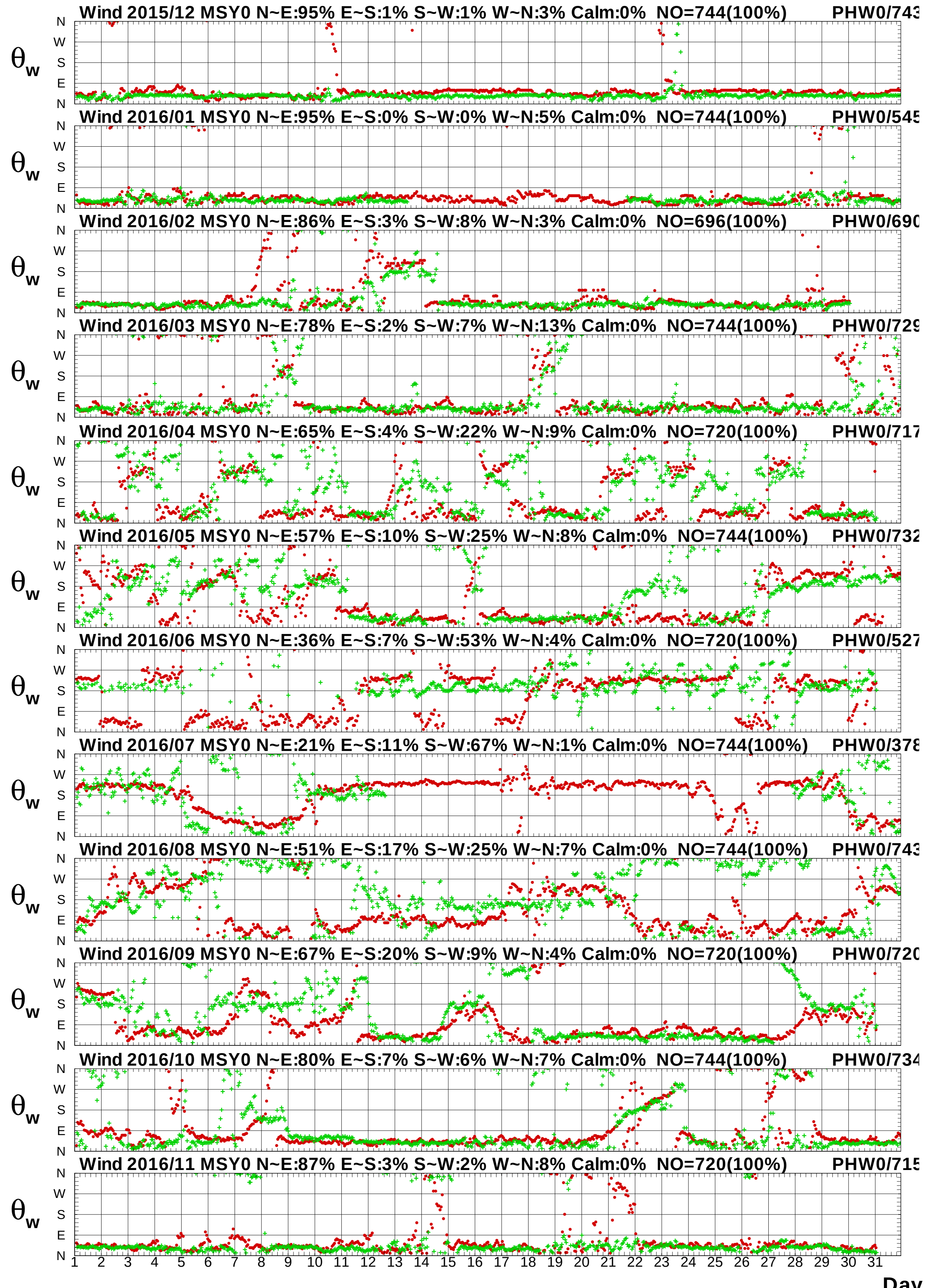

圖 1.16b　2016年每月馬祖海域 Y 站與澎湖海域 W 站風向圖

W15CMSY0.1HA W15CPHW0.1H0 W161MSY0.1HA W161PHW0.1H0 W162MSY0.1HA W162PHW0.1H0
W163MSY0.1HA W163PHW0.1H0 W164MSY0.1HA W164PHW0.1H0 W165MSY0.1HA W165PHW0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

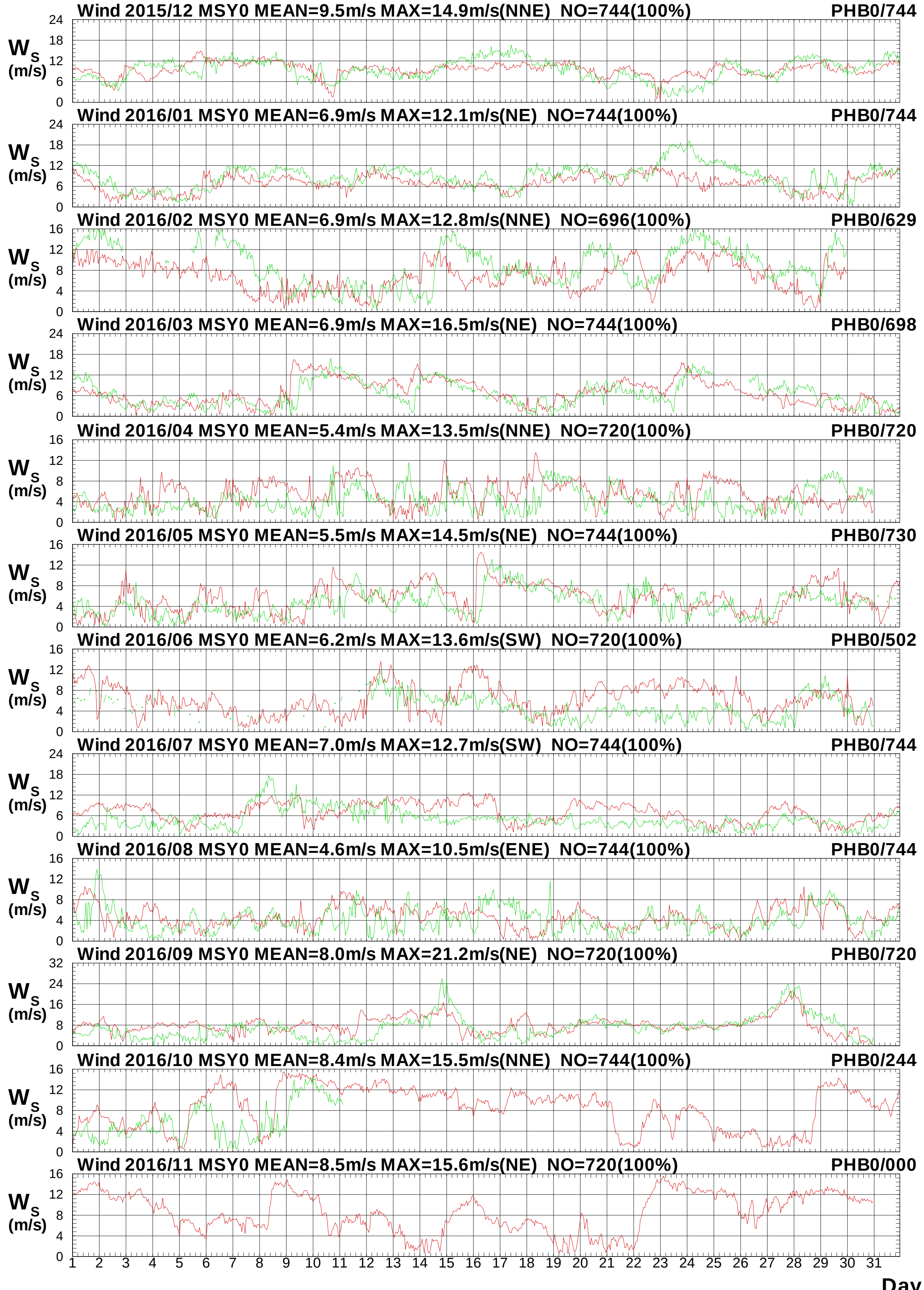

圖 1.17a　2016年每月馬祖海域 Y 站與澎湖海域 B 站風速圖

W15CMSY0.1HA W15CPHB0.1H0 W161MSY0.1HA W161PHB0.1H0 W162MSY0.1HA W162PHB0.1H0
W163MSY0.1HA W163PHB0.1H0 W164MSY0.1HA W164PHB0.1H0 W165MSY0.1HA W165PHB0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

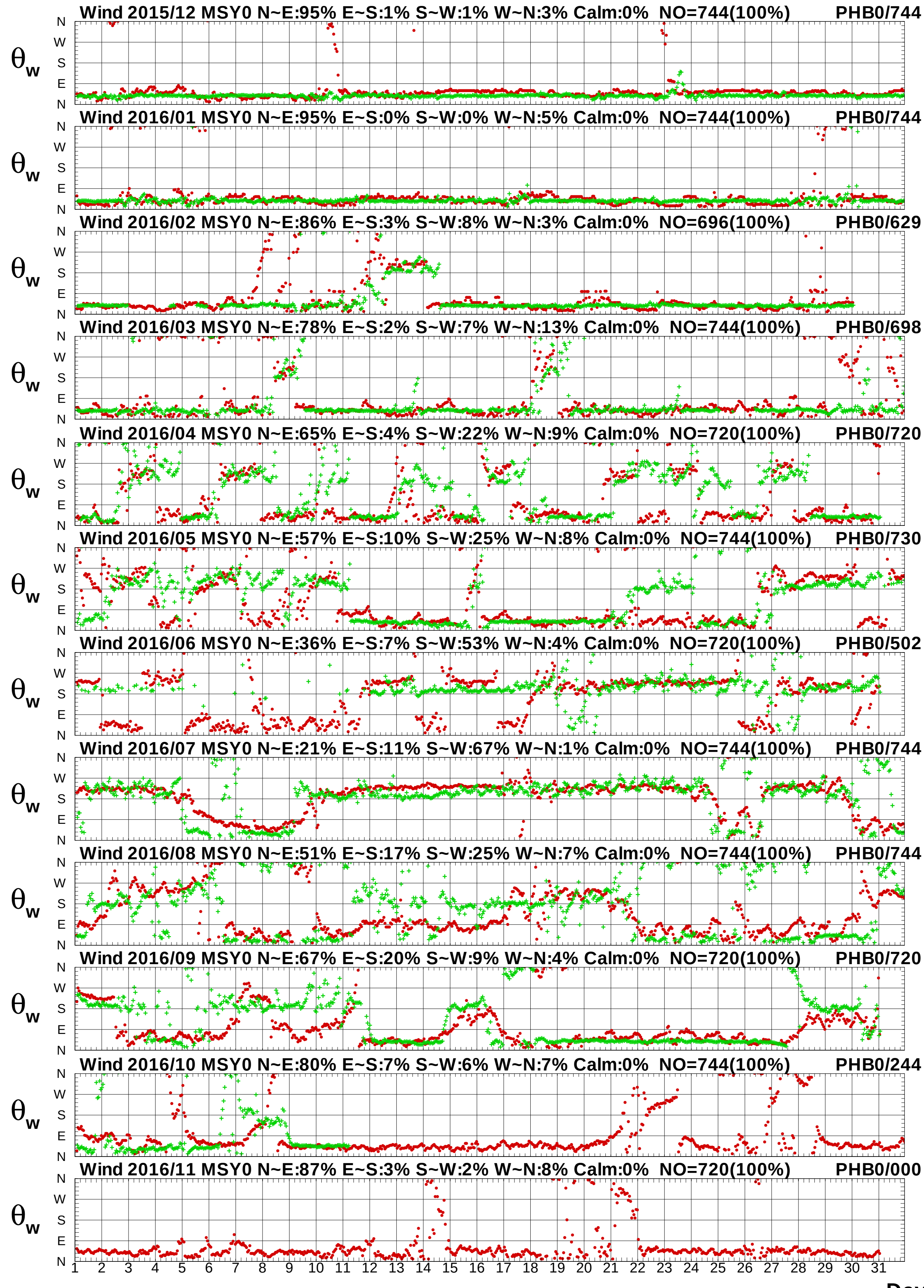

圖 1.17b　2016年每月馬祖海域 Y 站與澎湖海域 B 站風向圖

W15CMSY0.1HA W15CPHB0.1H0 W161MSY0.1HA W161PHB0.1H0 W162MSY0.1HA W162PHB0.1H0
W163MSY0.1HA W163PHB0.1H0 W164MSY0.1HA W164PHB0.1H0 W165MSY0.1HA W165PHB0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

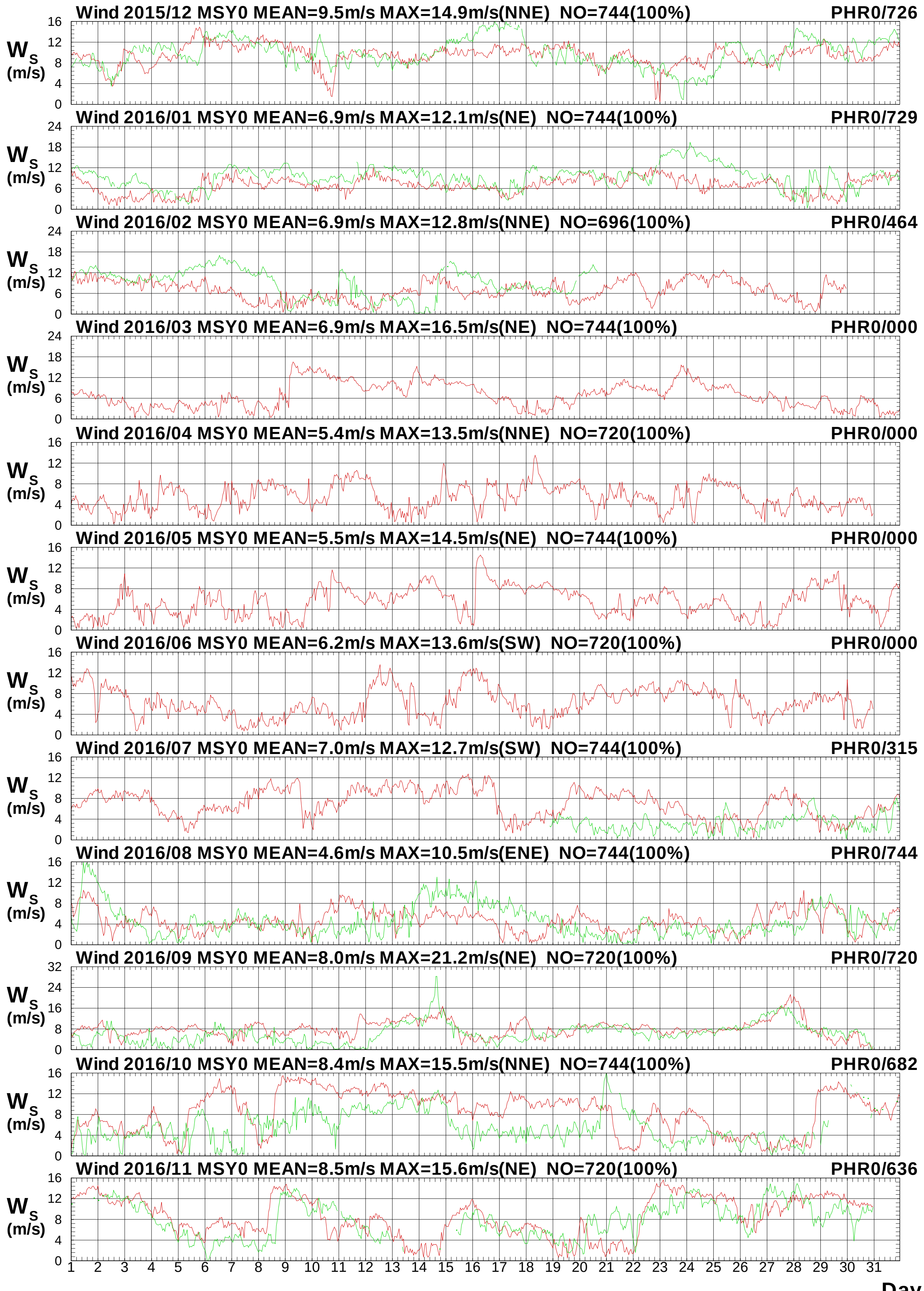

圖 1.18a　2016年每月馬祖海域 Y 站與澎湖海域 R 站風速圖

W15CMSY0.1HA W15CPHR0.1H0 W161MSY0.1HA W161PHR0.1H0 W162MSY0.1HA W162PHR0.1H0
W163MSY0.1HA W163PHR0.1H0 W164MSY0.1HA W164PHR0.1H0 W165MSY0.1HA W165PHR0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

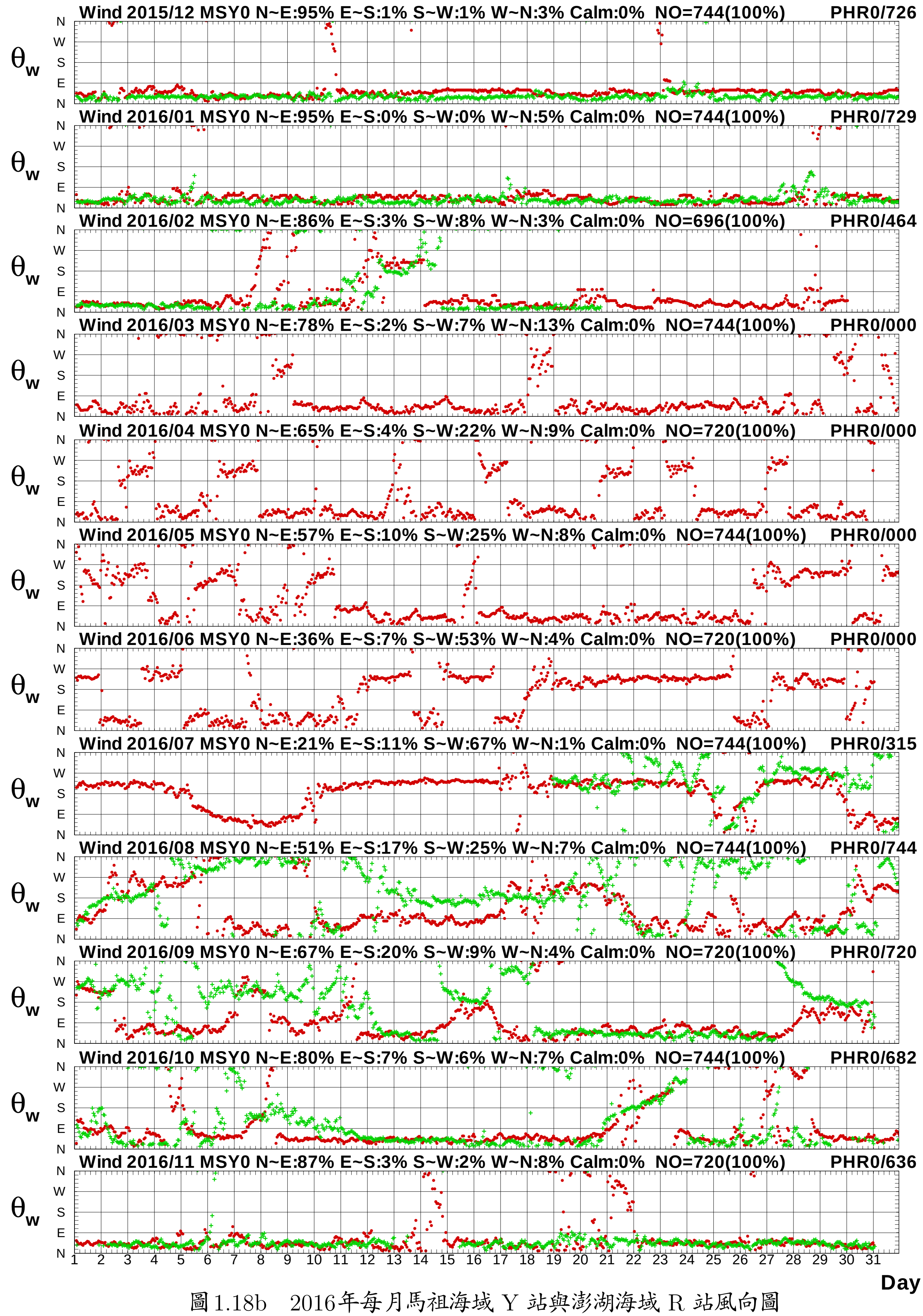

圖 1.18b 2016年每月馬祖海域 Y 站與澎湖海域 R 站風向圖

W15CMSY0.1HA W15CPHR0.1H0 W161MSY0.1HA W161PHR0.1H0 W162MSY0.1HA W162PHR0.1H0
W163MSY0.1HA W163PHR0.1H0 W164MSY0.1HA W164PHR0.1H0 W165MSY0.1HA W165PHR0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

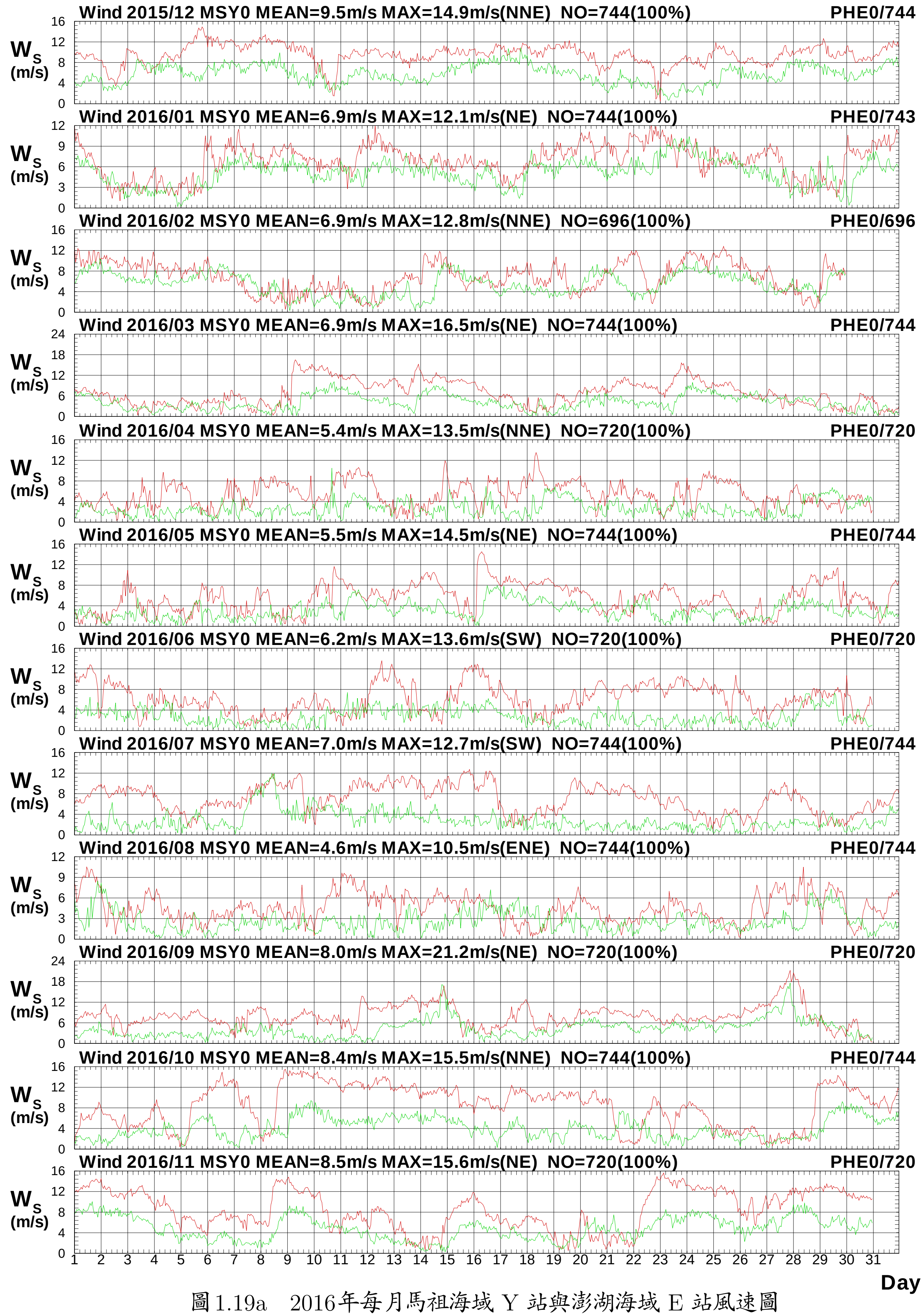

圖 1.19a　2016年每月馬祖海域 Y 站與澎湖海域 E 站風速圖

W15CMSY0.1HA W15CPHE0.1H0 W161MSY0.1HA W161PHE0.1H0 W162MSY0.1HA W162PHE0.1H0
W163MSY0.1HA W163PHE0.1H0 W164MSY0.1HA W164PHE0.1H0 W165MSY0.1HA W165PHE0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

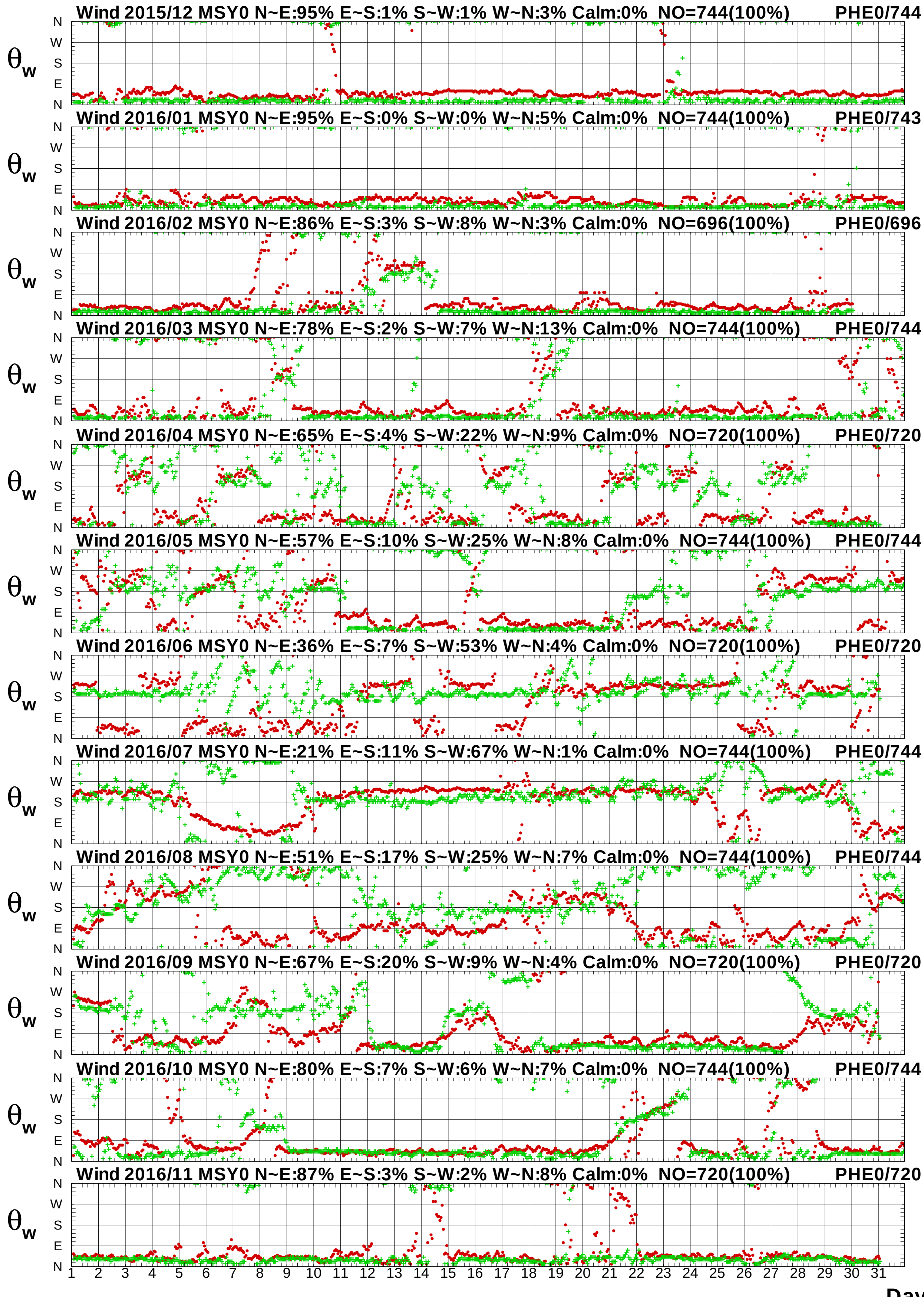

圖 1.19b　2016年每月馬祖海域 Y 站與澎湖海域 E 站風向圖

W15CMSY0.1HA W15CPHE0.1H0 W161MSY0.1HA W161PHE0.1H0 W162MSY0.1HA W162PHE0.1H0
W163MSY0.1HA W163PHE0.1H0 W164MSY0.1HA W164PHE0.1H0 W165MSY0.1HA W165PHE0.1H0

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Wind Speed in Ma-Tsu Seas of MSY0 at 2016

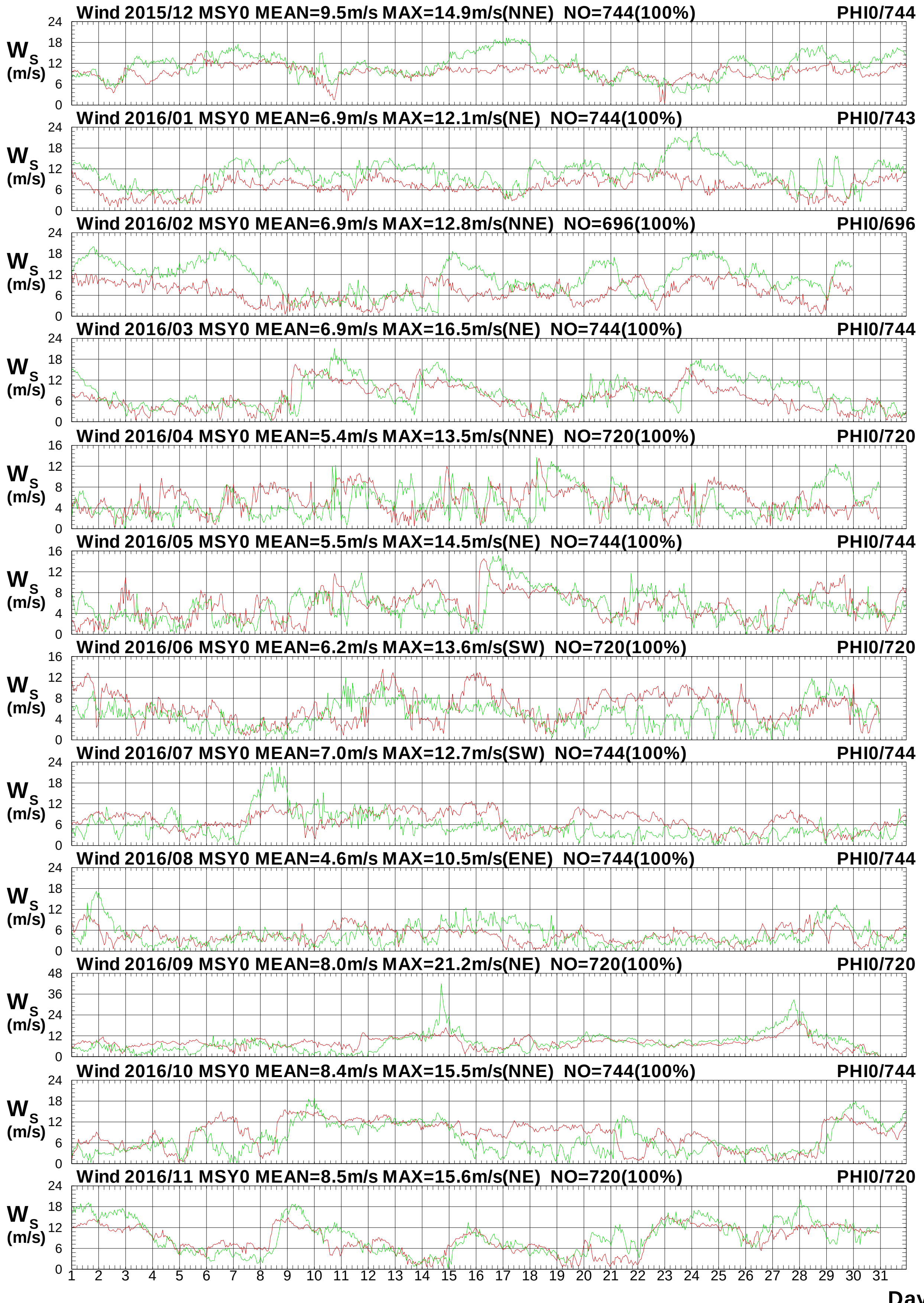

圖 1.20a　2016年每月馬祖海域 Y 站與澎湖海域 I 站風速圖

W15CMSY0.1HA W15CPHI0.1H0 W161MSY0.1HA W161PHI0.1H0 W162MSY0.1HA W162PHI0.1H0
W163MSY0.1HA W163PHI0.1H0 W164MSY0.1HA W164PHI0.1H0 W165MSY0.1HA W165PHI0.1H0

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Wind Direction in Ma-Tsu Seas of MSY0 at 2016

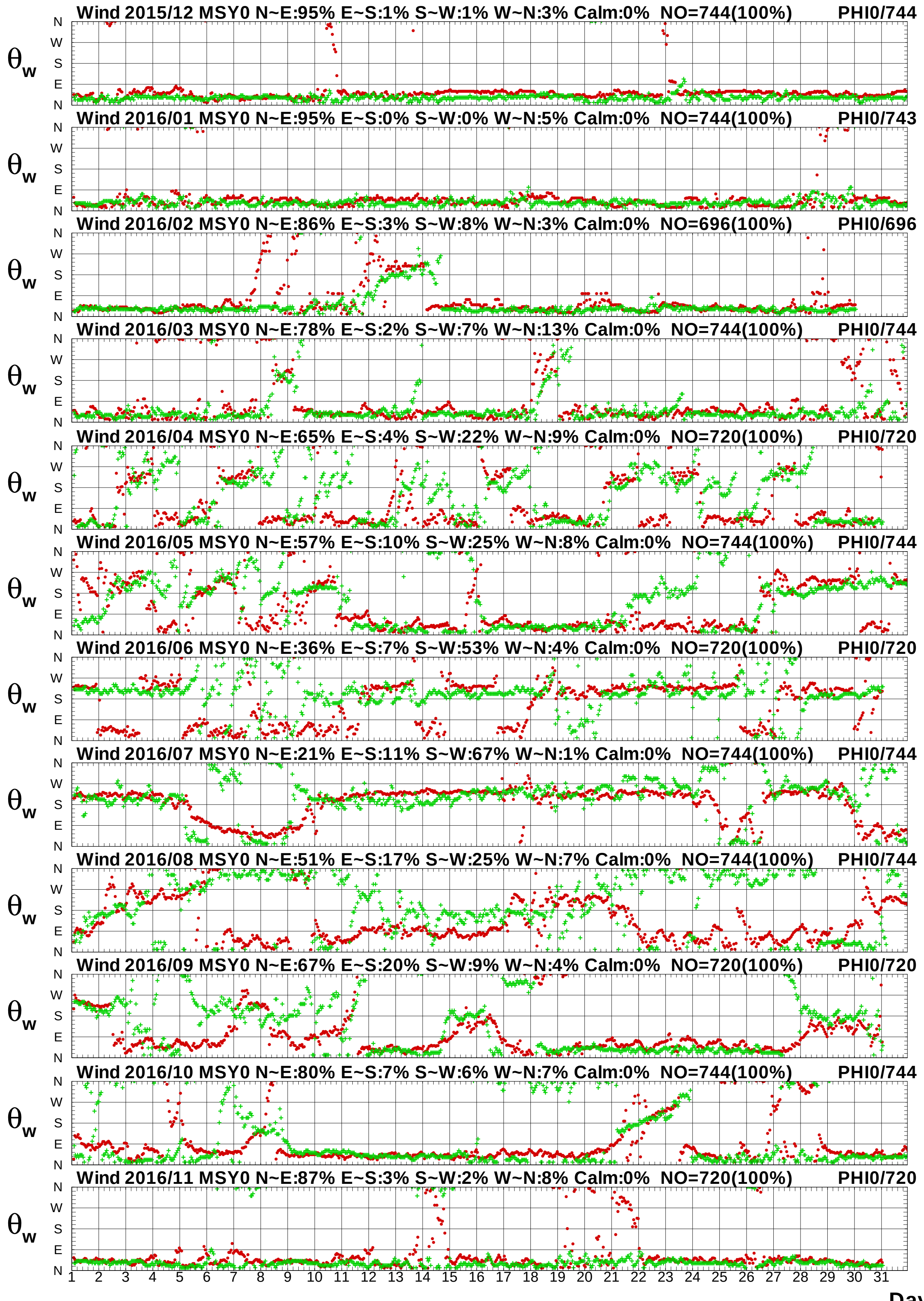

圖 1.20b　2016年每月馬祖海域 Y 站與澎湖海域 I 站風向圖

W15CMSY0.1HA W15CPHI0.1H0 W161MSY0.1HA W161PHI0.1H0 W162MSY0.1HA W162PHI0.1H0
W163MSY0.1HA W163PHI0.1H0 W164MSY0.1HA W164PHI0.1H0 W165MSY0.1HA W165PHI0.1H0

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第二章　2016 年馬祖海域觀測波浪資料

馬祖海域風之觀測係 2014 年 10 月本中心**(IHMT)**安裝挪威 NORTEK 公司潮波流儀(AWAC)於馬祖福澳港區(稱**測站 X**)，其位置如附圖 2。2015 年 9 月本中心於北竿、西莒、東引及東莒等 4 處增設潮波流儀 AWAC(稱**測站 A**、**測站 1**、**測站 2** 及**測站 3**)。

測站 Y 之波浪儀也屬屬中央氣象局**(CWB)**所有。馬祖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 **Y 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 馬祖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
X	26°09'87"N	119°56'11"E	2014/10-2016/11(觀測中)	港研中心	馬祖福澳港 AWCP
A	26°12'18"N	119°58'1 "E	2015/09-2016/11(觀測中)	港研中心	北竿港區 AWCP
1	25°58'8 "N	119°55'54 "E	2015/09-2016/11(觀測中)	港研中心	西莒 AWCP
2	26°21'55 "N	120°29'2 "E	2015/09-2016/11(觀測中)	港研中心	東引 AWCP
3	25°57'31 "N	119°57'47 "E	2015/09-2016/11(觀測中)	港研中心	東莒 AWCP
Y	26°22'36"N	120°31'53"E	2010/08-2016/11(觀測中)	中央氣象局	馬祖資料浮標

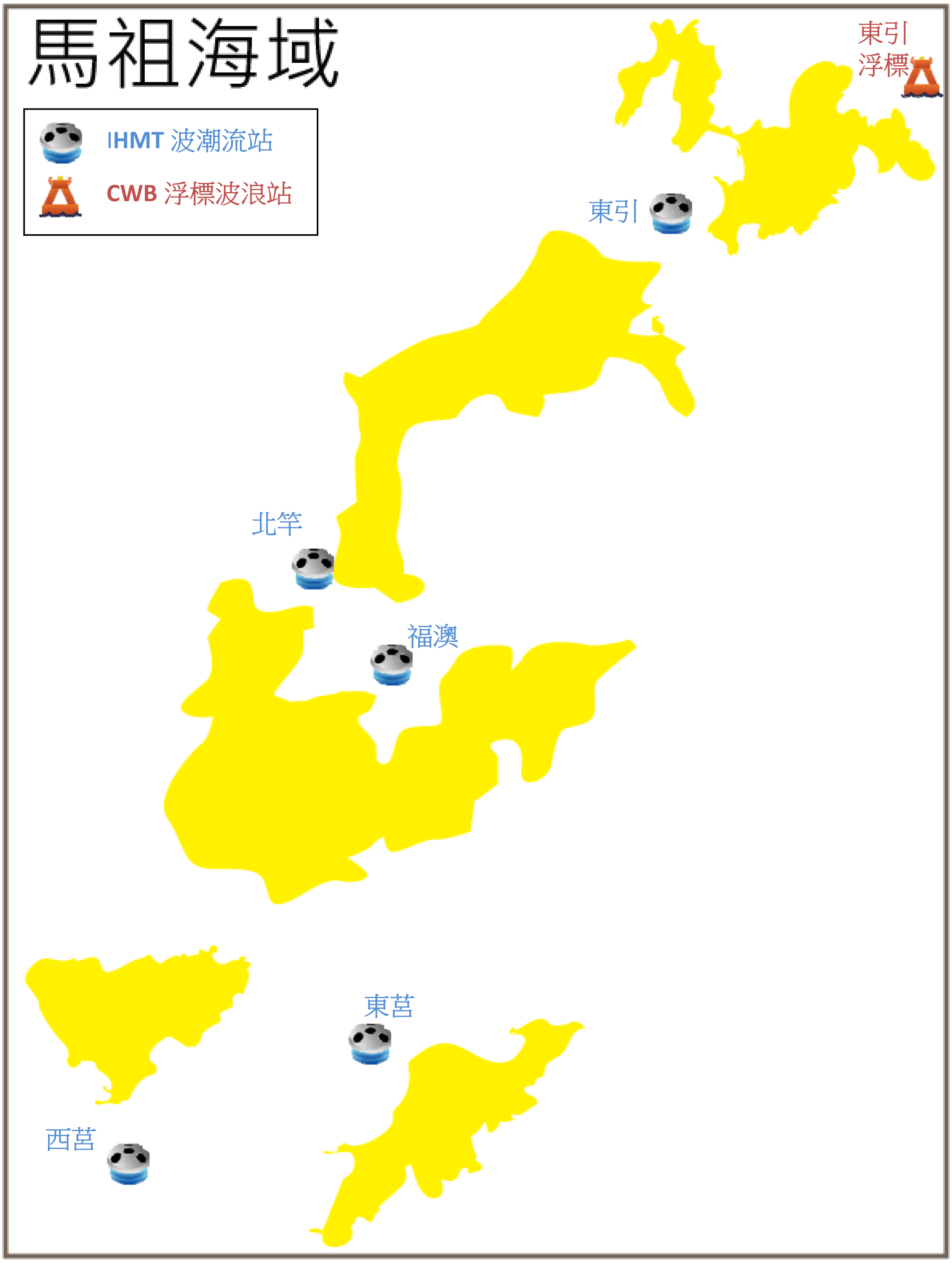

圖 2 馬祖海域波浪觀測站位置示意圖

表2.1a 2016年每月馬祖海域修補前各測站觀測波浪資料紀錄統計表

年/月 港區	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域
測站	Y	X	A	1	2	3		
2015/12月	268 (36.0%)	698 (93.8%)	741 (99.6%)	*	393 (52.8%)	587 (78.9%)	*	*
2016/ 1月	*	573 (77.0%)	737 (99.1%)	*	*	718 (96.5%)	*	*
2016/ 2月	*	636 (91.4%)	691 (99.3%)	*	*	690 (99.1%)	*	*
2016/ 3月	672 (90.3%)	659 (88.6%)	733 (98.5%)	*	*	657 (88.3%)	*	*
2016/ 4月	712 (98.9%)	694 (96.4%)	714 (99.2%)	*	*	*	*	*
2016/ 5月	735 (98.8%)	739 (99.3%)	740 (99.5%)	*	*	*	*	*
2016/ 6月	714 (99.2%)	705 (97.9%)	702 (97.5%)	124 (17.2%)	15 (2.1%)	138 (19.2%)	*	*
2016/ 7月	739 (99.3%)	741 (99.6%)	743 (99.9%)	737 (99.1%)	743 (99.9%)	744 (100%)	*	*
2016/ 8月	738 (99.2%)	703 (94.5%)	741 (99.6%)	739 (99.3%)	722 (97.0%)	743 (99.9%)	*	*
2016/ 9月	715 (99.3%)	556 (77.2%)	710 (98.6%)	680 (94.4%)	717 (99.6%)	718 (99.7%)	*	*
2016/10月	742 (99.7%)	396 (53.2%)	741 (99.6%)	588 (79.0%)	738 (99.2%)	592 (79.6%)	*	*
2016/11月	714 (99.2%)	702 (97.5%)	706 (98.1%)	*	701 (97.4%)	700 (97.2%)	*	*
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年每月馬祖海域修補後各測站波浪資料統計表

年/月 港區	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域
測站		Y	X	A	1	2	3	
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 Ma-Tsu Seas of MSY0 at 2016

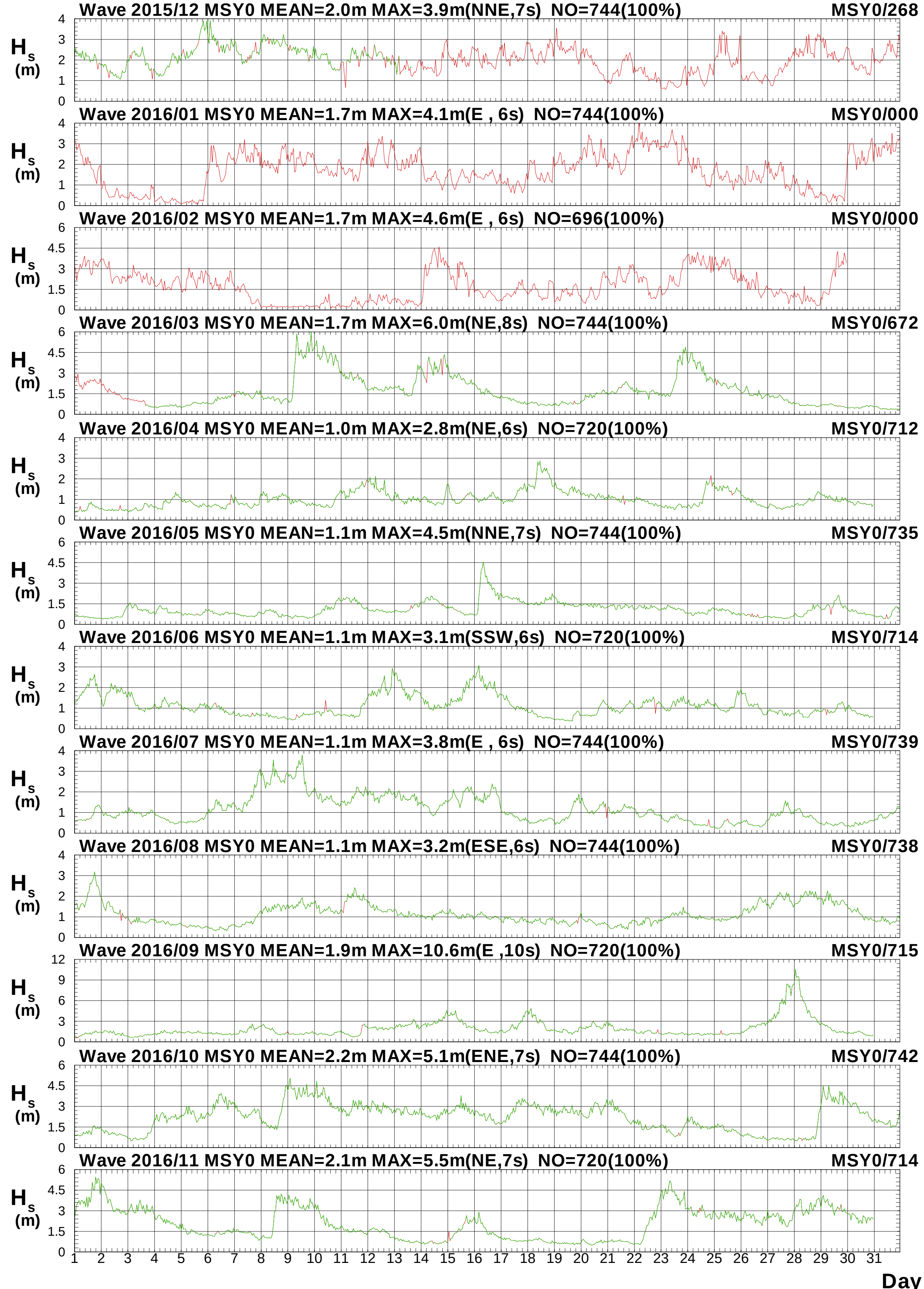

圖 2.1a 2016年每月馬祖海域 Y 站修補前後之波高比較圖

V15CMSY0.1HA V15CMSY0.1H0 V161MSY0.1HA V161MSY0.1H0 V162MSY0.1HA V162MSY0.1H0
V163MSY0.1HA V163MSY0.1H0 V164MSY0.1HA V164MSY0.1H0 V165MSY0.1HA V165MSY0.1H0

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Wave T_p in Ma-Tsu Seas of MSY0 at 2016

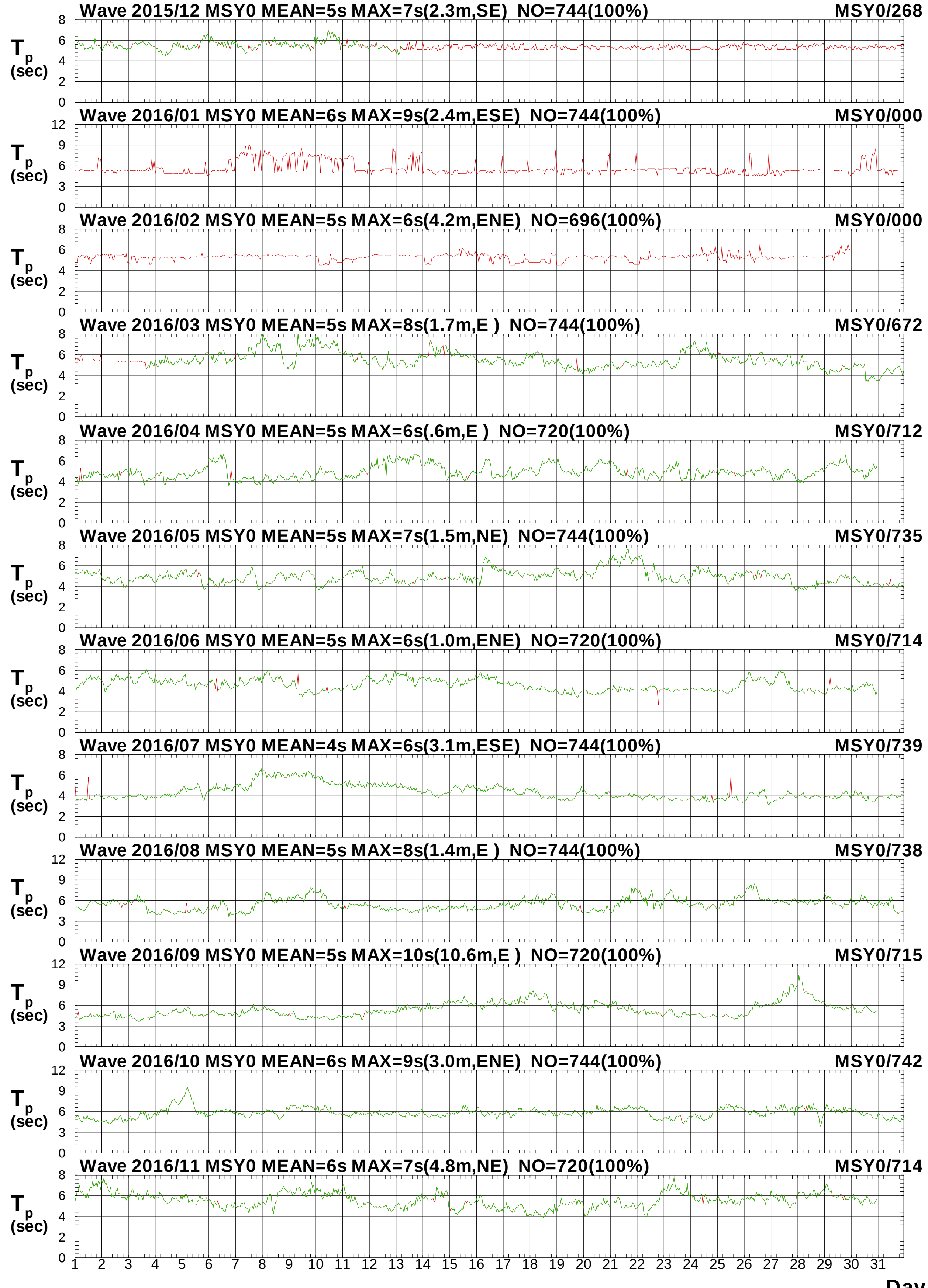

圖 2.1b　2016年每月馬祖海域 Y 站修補前後之週期比較圖

V15CMSY0.1HA V15CMSY0.1H0 V161MSY0.1HA V161MSY0.1H0 V162MSY0.1HA V162MSY0.1H0
V163MSY0.1HA V163MSY0.1H0 V164MSY0.1HA V164MSY0.1H0 V165MSY0.1HA V165MSY0.1H0

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Wave Direction in Ma-Tsu Seas of MSY0 at 2016

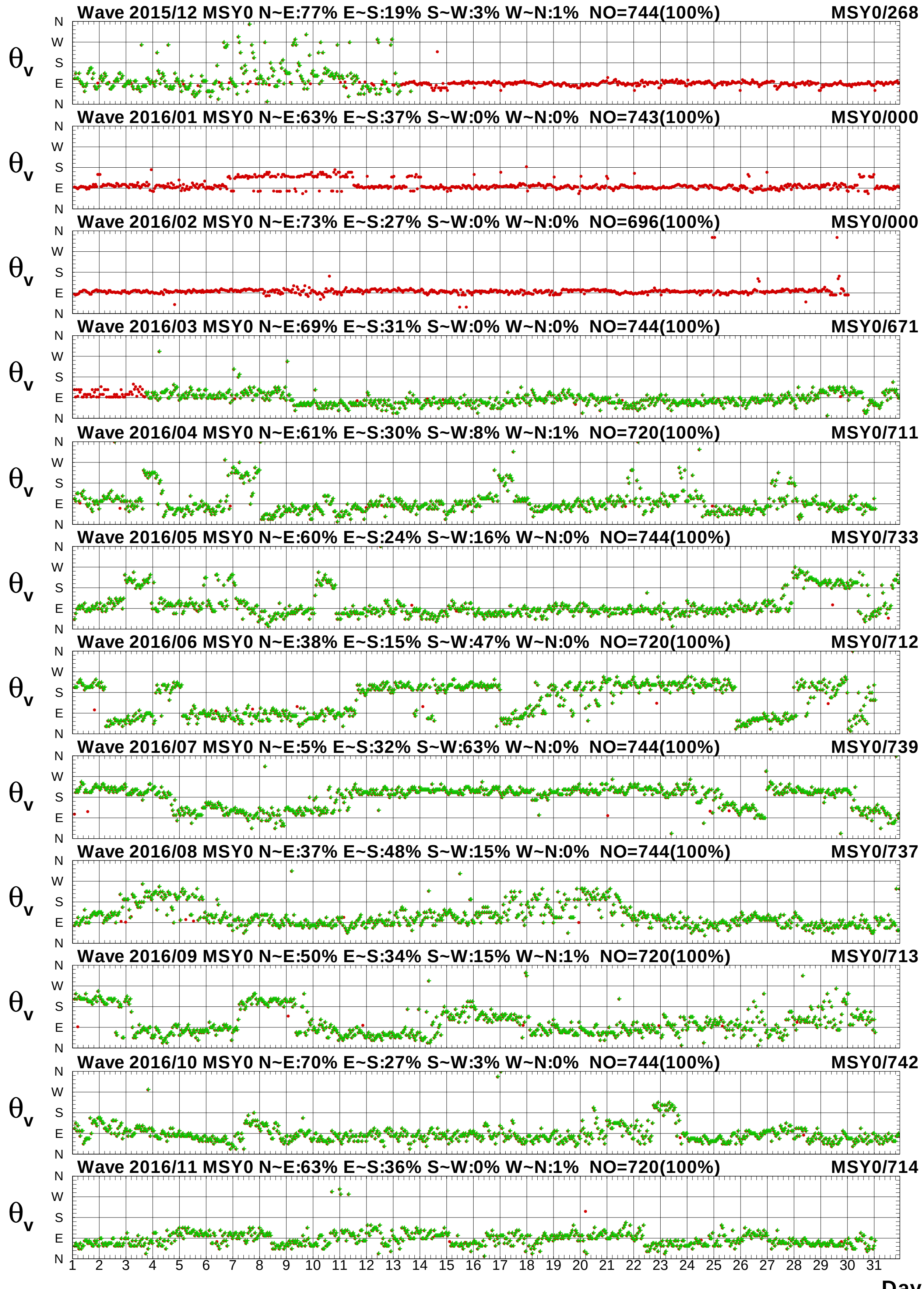

圖 2.1c　2016年每月馬祖海域 Y 站修補前後之波向比較圖

V15CMSY0.1HA V15CMSY0.1H0 V161MSY0.1HA V161MSY0.1H0 V162MSY0.1HA V162MSY0.1H0
V163MSY0.1HA V163MSY0.1H0 V164MSY0.1HA V164MSY0.1H0 V165MSY0.1HA V165MSY0.1H0

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Wave H_s in Ma-Tsu Seas of MSY0 at 2016

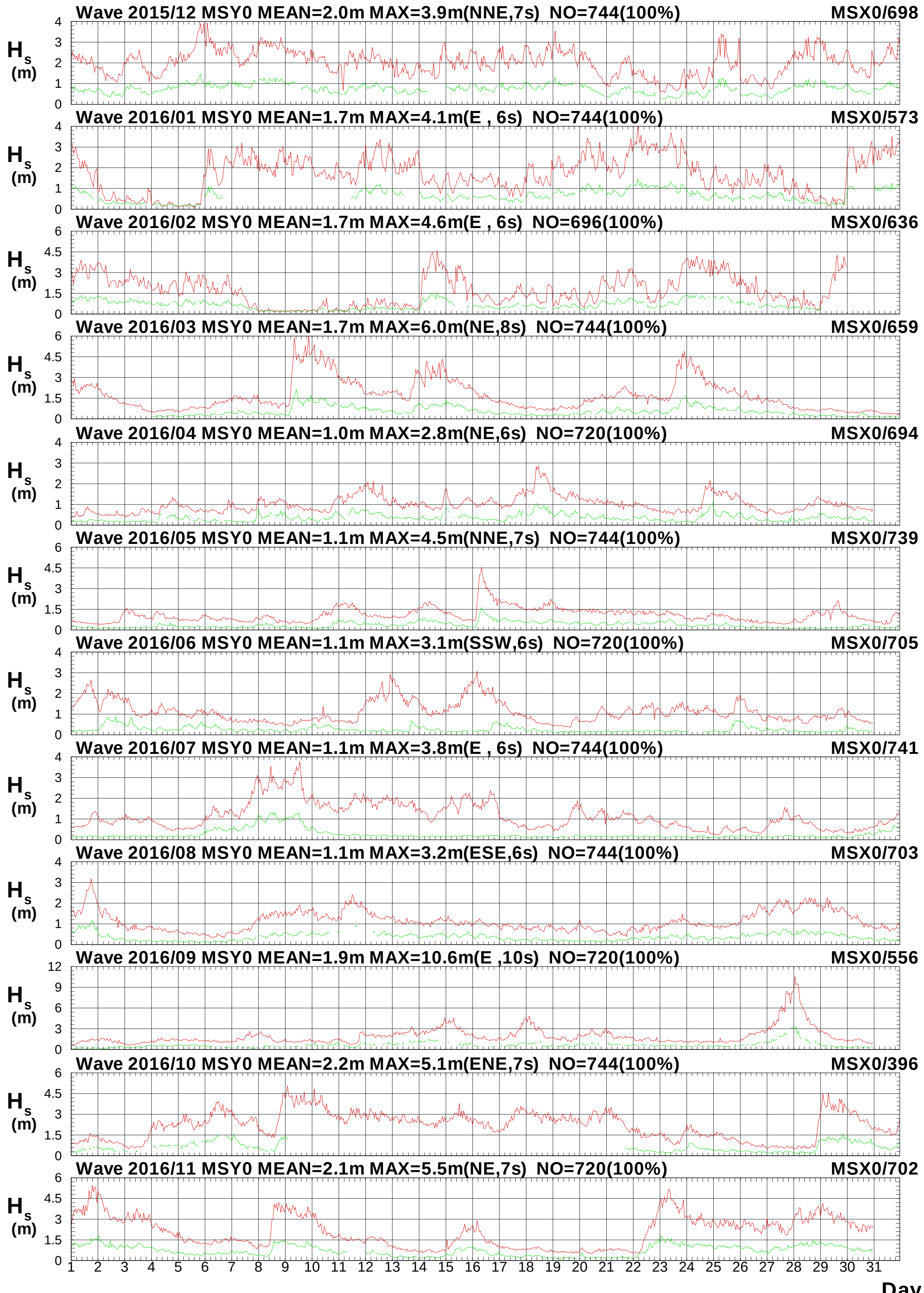

圖 2.2a　2016年每月馬祖海域 Y 站與 X 站波高比較圖

V15CMSY0.1HA V15CMSX0.1H0 V161MSY0.1HA V161MSX0.1H0 V162MSY0.1HA V162MSX0.1H0
V163MSY0.1HA V163MSX0.1H0 V164MSY0.1HA V164MSX0.1H0 V165MSY0.1HA V165MSX0.1H0

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Wave T_p in Ma-Tsu Seas of MSY0 at 2016

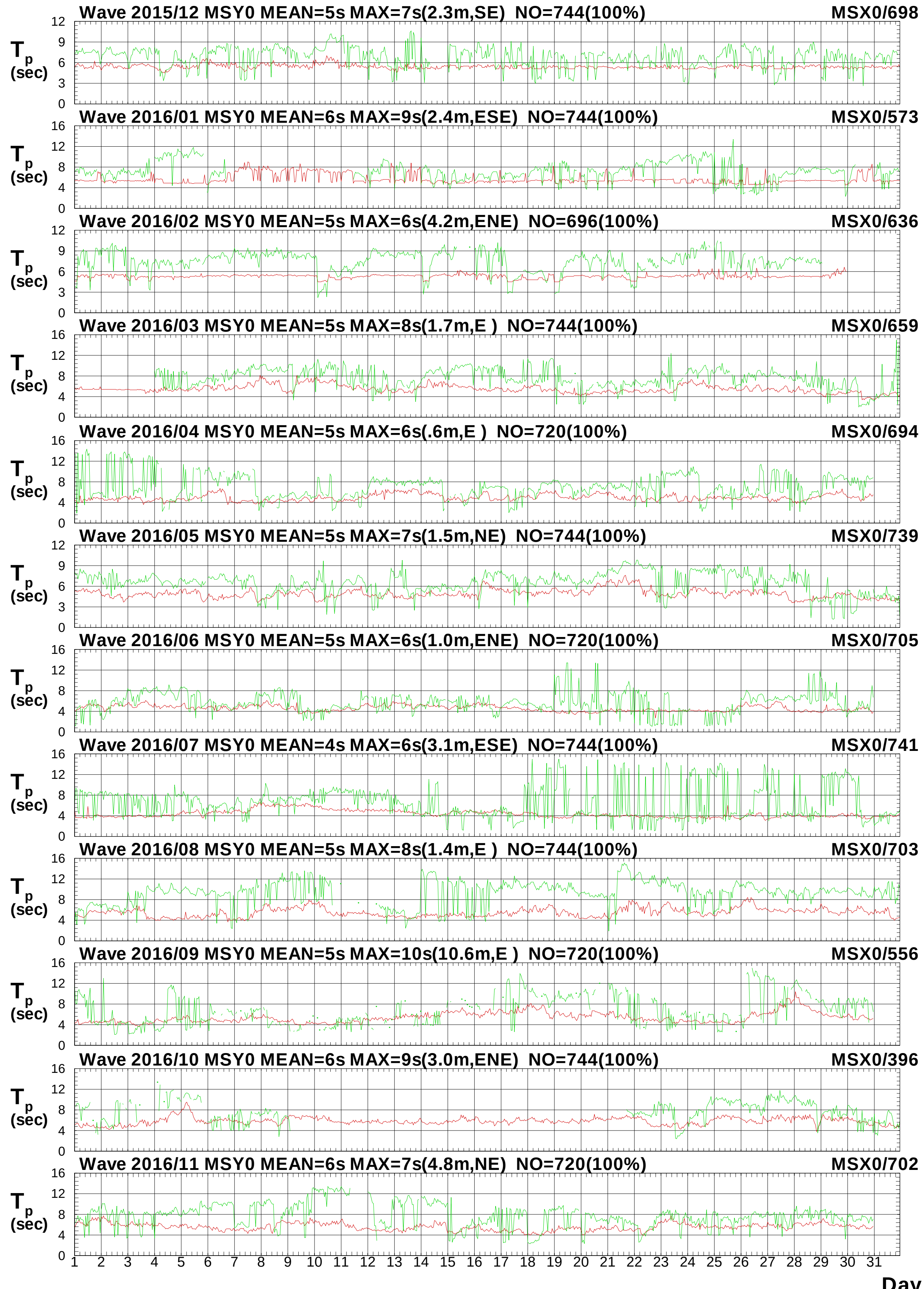

圖 2.2b　2016年每月馬祖海域 Y 站與 X 站週期比較圖

V15CMSY0.1HA V15CMSX0.1H0 V161MSY0.1HA V161MSX0.1H0 V162MSY0.1HA V162MSX0.1H0
V163MSY0.1HA V163MSX0.1H0 V164MSY0.1HA V164MSX0.1H0 V165MSY0.1HA V165MSX0.1H0

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Wave Direction in Ma-Tsu Seas of MSY0 at 2016

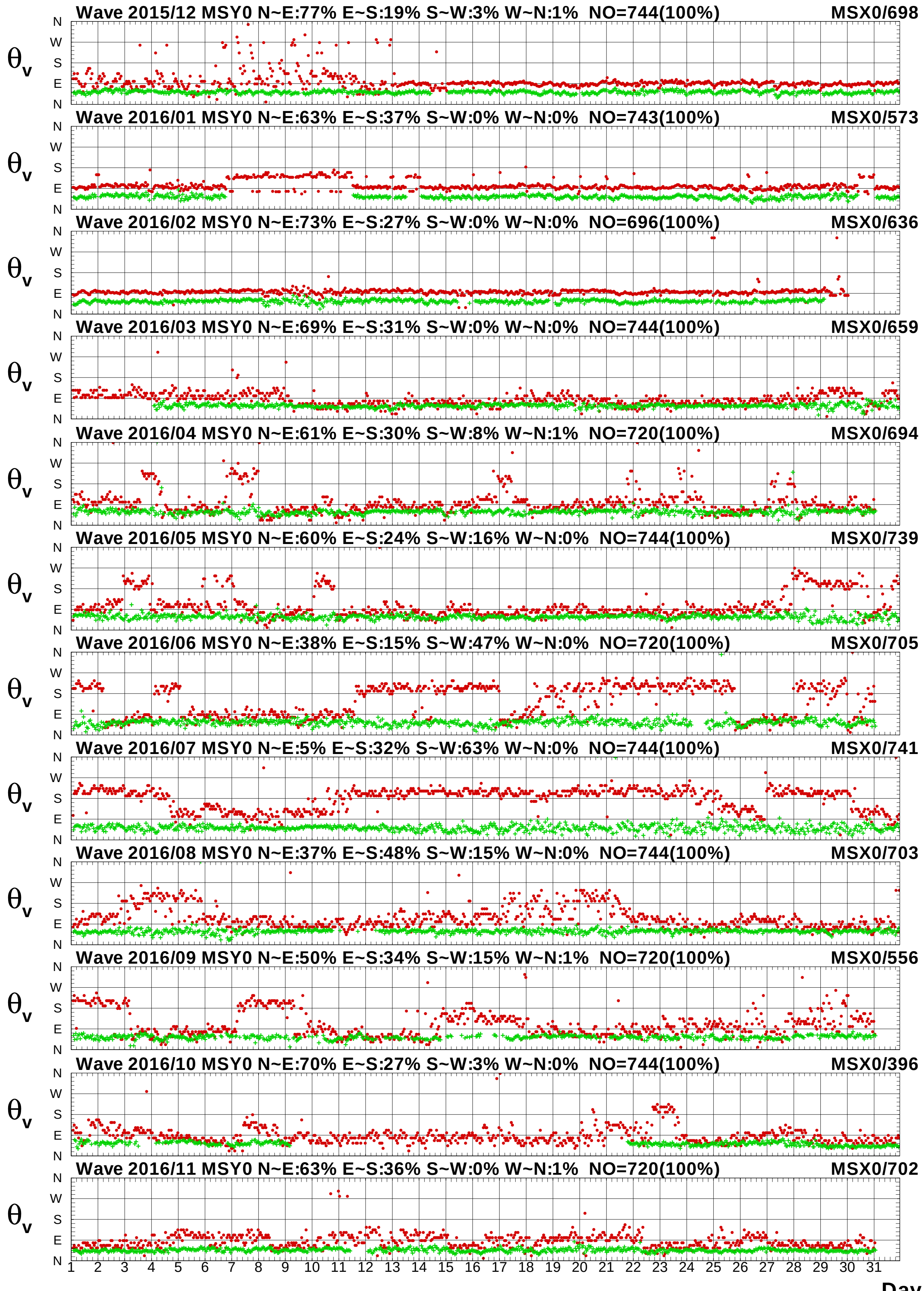

圖 2.2c　2016年每月馬祖海域 Y 站與 X 站波向比較圖

V15CMSY0.1HA V15CMSX0.1H0 V161MSY0.1HA V161MSX0.1H0 V162MSY0.1HA V162MSX0.1H0
V163MSY0.1HA V163MSX0.1H0 V164MSY0.1HA V164MSX0.1H0 V165MSY0.1HA V165MSX0.1H0

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Wave H_s in Ma-Tsu Seas of MSY0 at 2016

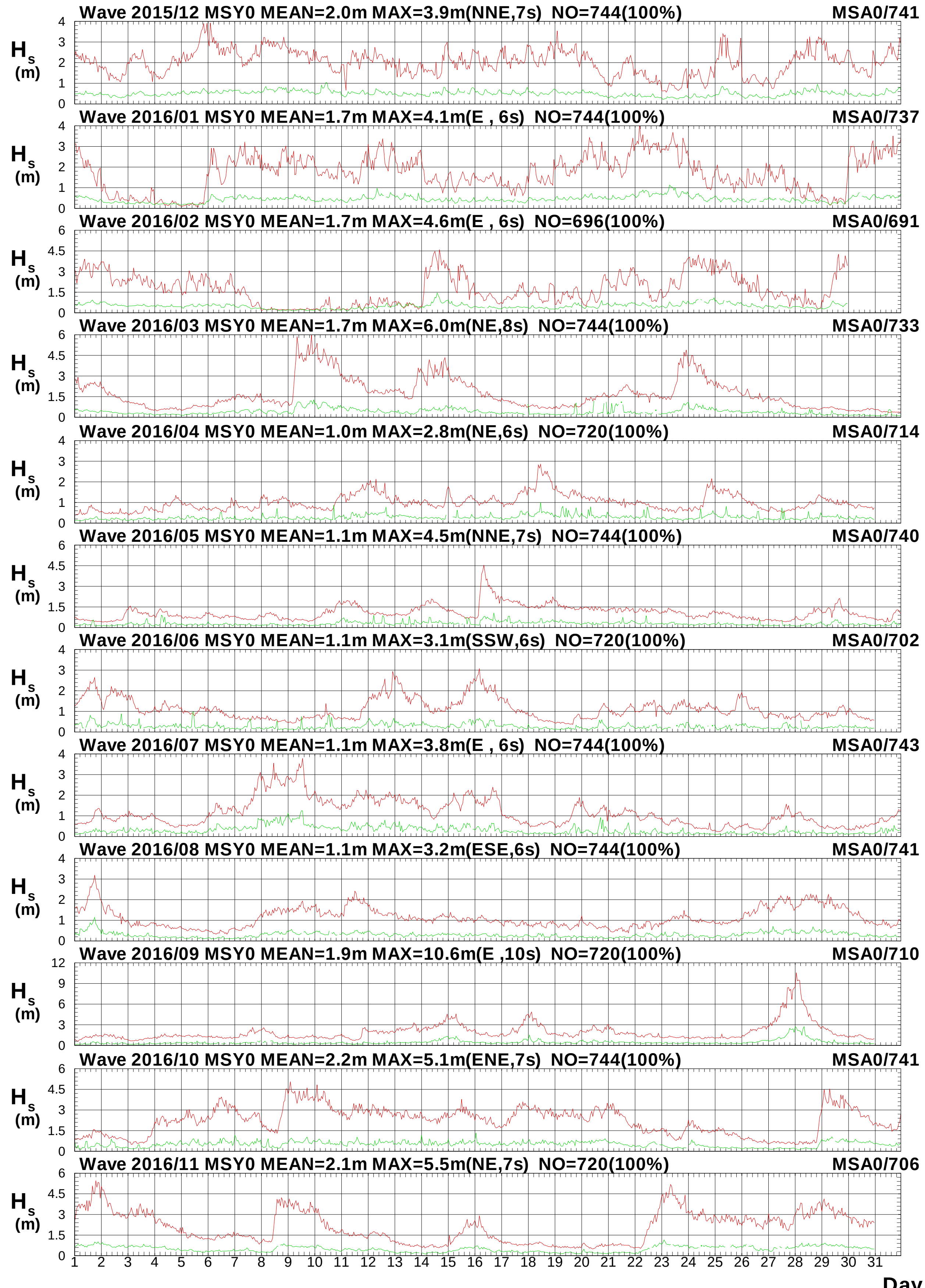

圖 2.3a　2016年每月馬祖海域 Y 站與 A 站波高比較圖

V15CMSY0.1HA V15CMSA0.1H0 V161MSY0.1HA V161MSA0.1H0 V162MSY0.1HA V162MSA0.1H0 V163MSY0.1HA V163MSA0.1H0 V164MSY0.1HA V164MSA0.1H0 V165MSY0.1HA V165MSA0.1H0	Institute of Harbor & Marine Technology

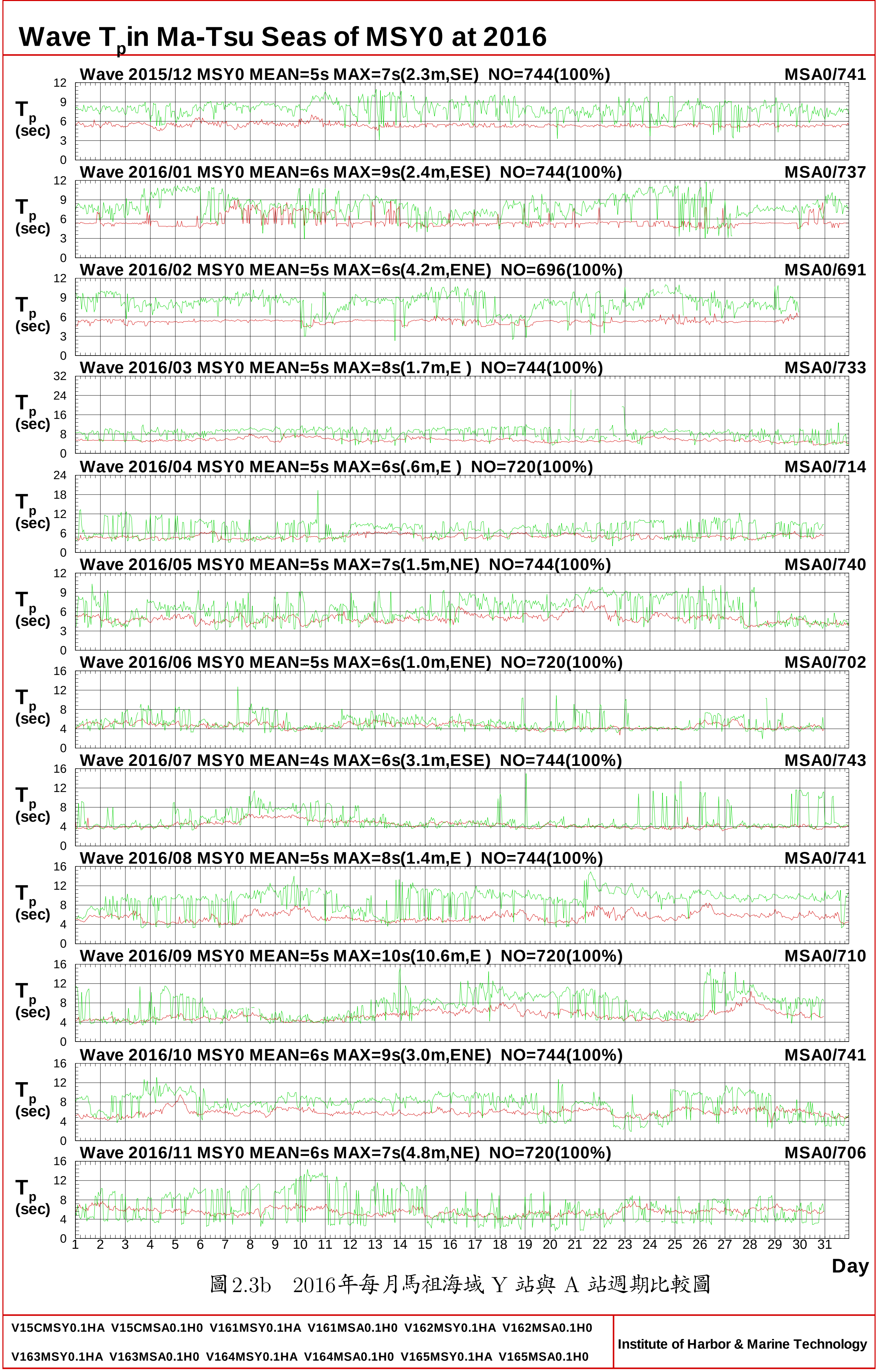

圖 2.3b　2016年每月馬祖海域 Y 站與 A 站週期比較圖

Wave Direction in Ma-Tsu Seas of MSY0 at 2016

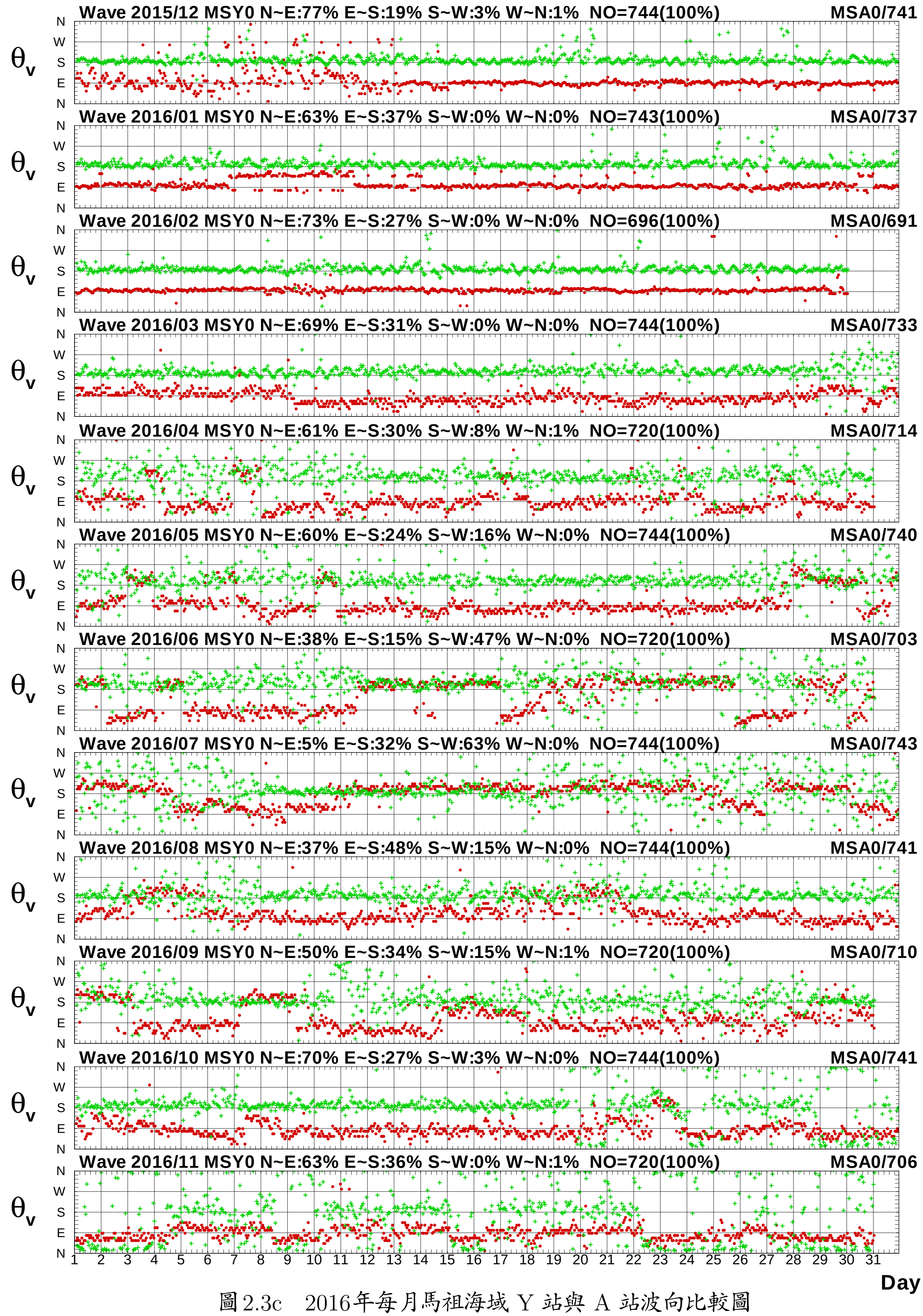

圖 2.3c　2016年每月馬祖海域 Y 站與 A 站波向比較圖

V15CMSY0.1HA V15CMSA0.1H0 V161MSY0.1HA V161MSA0.1H0 V162MSY0.1HA V162MSA0.1H0 V163MSY0.1HA V163MSA0.1H0 V164MSY0.1HA V164MSA0.1H0 V165MSY0.1HA V165MSA0.1H0	Institute of Harbor & Marine Technology

Wave H_s in Ma-Tsu Seas of MSY0 at 2016

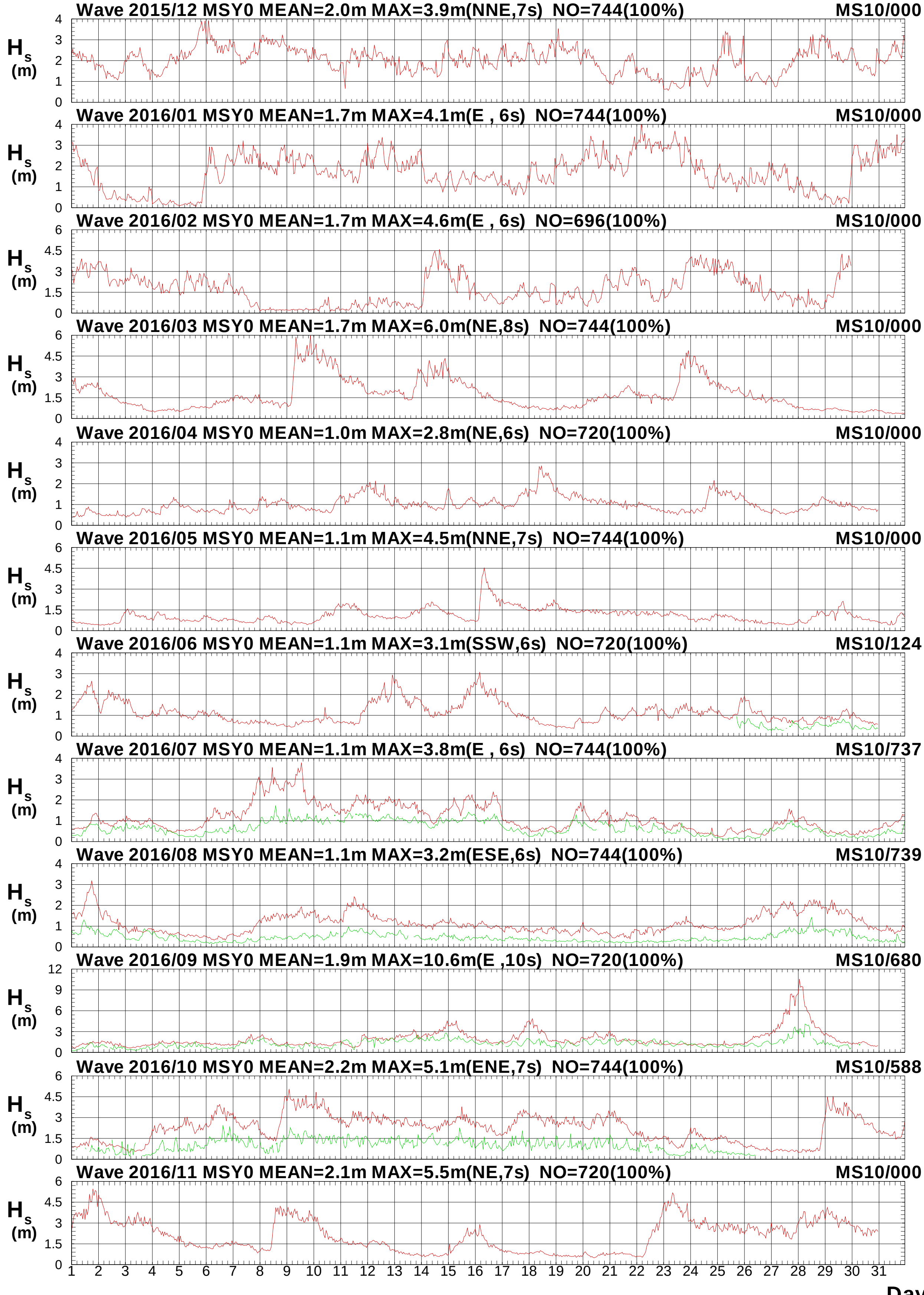

圖 2.4a 2016年每月馬祖海域 Y 站與1站波高比較圖

V15CMSY0.1HA V15CMS10.1H0 V161MSY0.1HA V161MS10.1H0 V162MSY0.1HA V162MS10.1H0
V163MSY0.1HA V163MS10.1H0 V164MSY0.1HA V164MS10.1H0 V165MSY0.1HA V165MS10.1H0

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Wave T_p in Ma-Tsu Seas of MSY0 at 2016

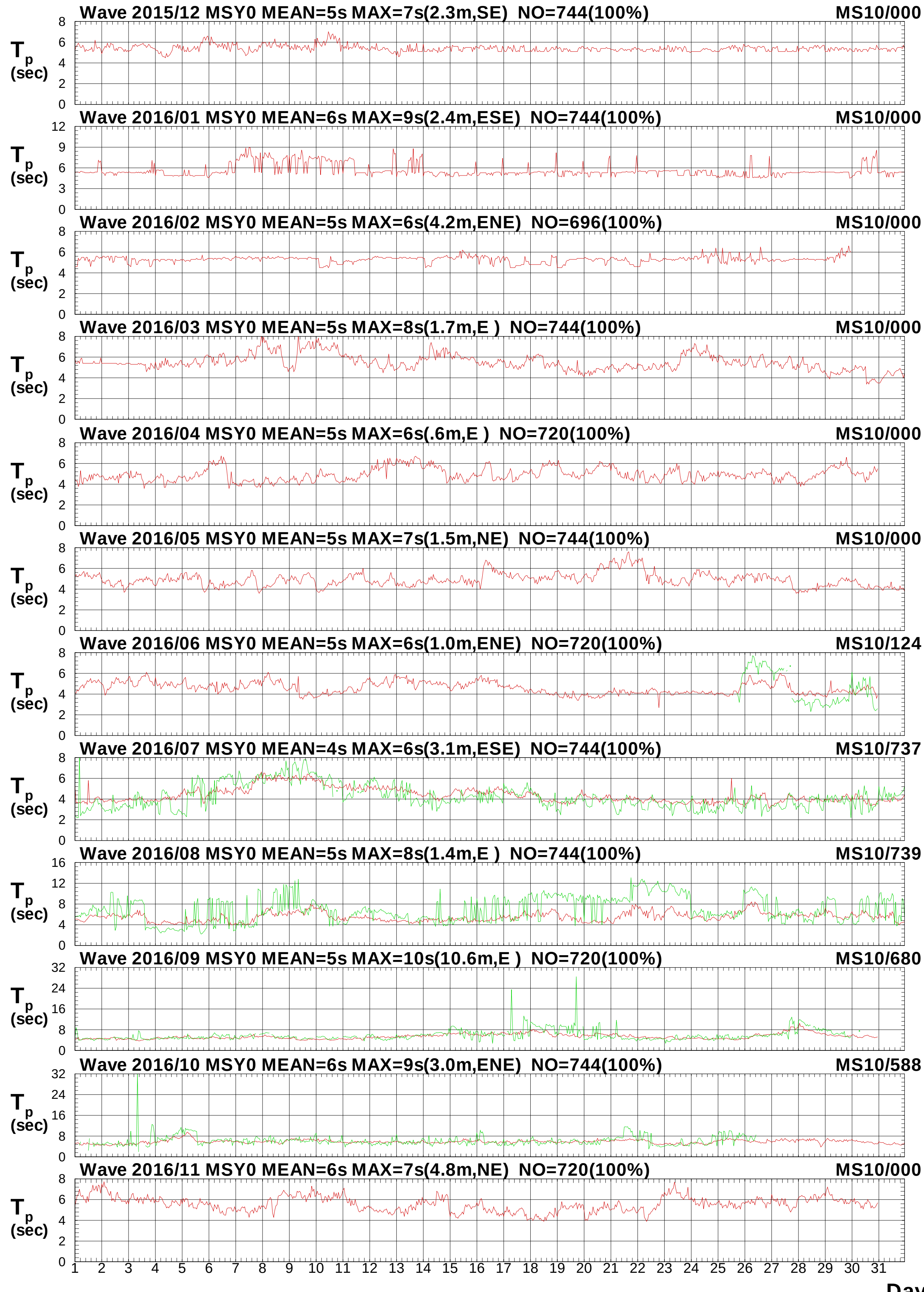

圖 2.4b　2016年每月馬祖海域 Y 站與1站週期比較圖

V15CMSY0.1HA V15CMS10.1H0 V161MSY0.1HA V161MS10.1H0 V162MSY0.1HA V162MS10.1H0
V163MSY0.1HA V163MS10.1H0 V164MSY0.1HA V164MS10.1H0 V165MSY0.1HA V165MS10.1H0

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Wave Direction in Ma-Tsu Seas of MSY0 at 2016

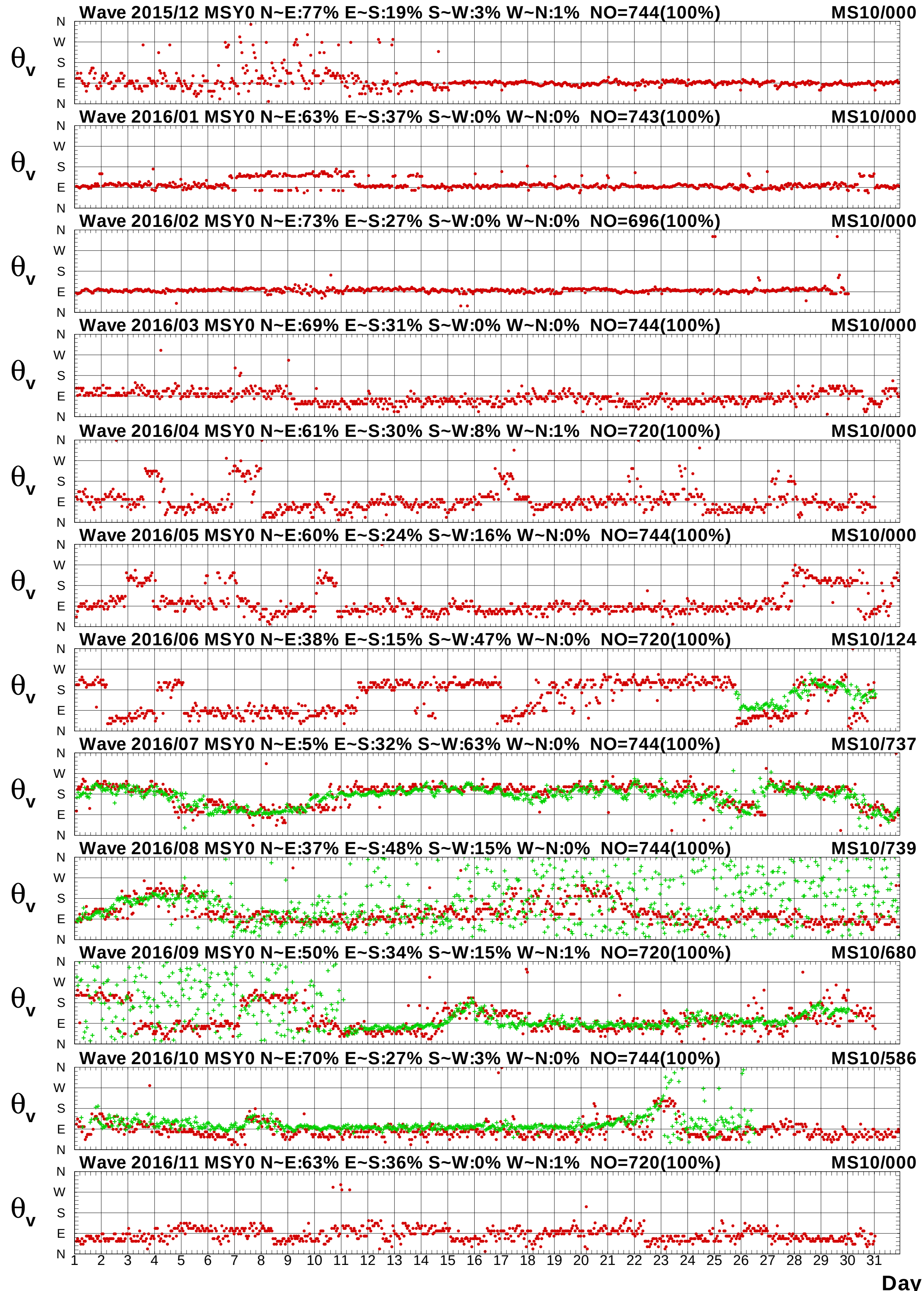

圖 2.4c　2016年每月馬祖海域 Y 站與 1 站波向比較圖

V15CMSY0.1HA V15CMS10.1H0 V161MSY0.1HA V161MS10.1H0 V162MSY0.1HA V162MS10.1H0
V163MSY0.1HA V163MS10.1H0 V164MSY0.1HA V164MS10.1H0 V165MSY0.1HA V165MS10.1H0

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Wave H_s in Ma-Tsu Seas of MSY0 at 2016

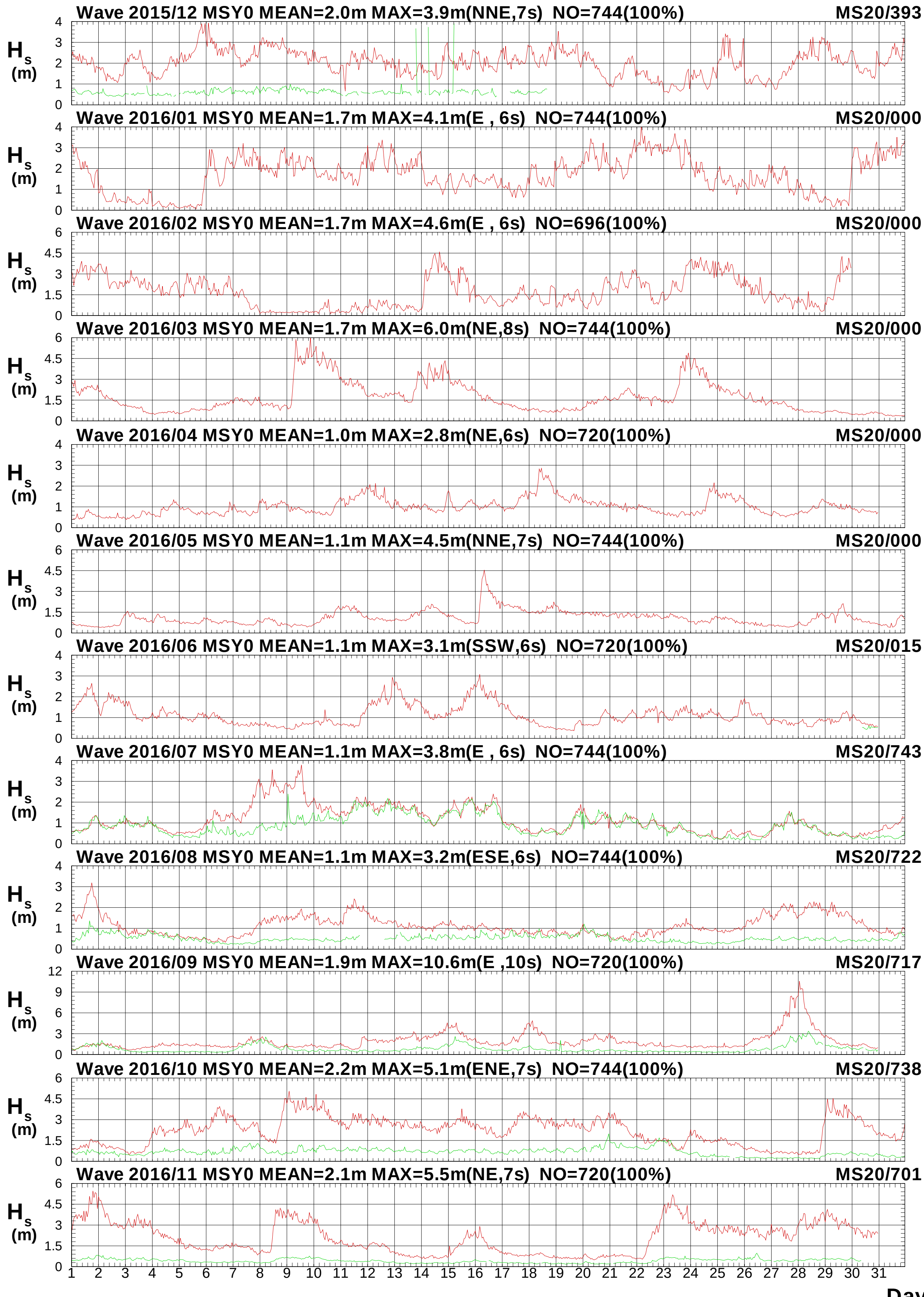

圖2.5a　2016年每月馬祖海域 Y 站與2站波高比較圖

V15CMSY0.1HA V15CMS20.1H0 V161MSY0.1HA V161MS20.1H0 V162MSY0.1HA V162MS20.1H0
V163MSY0.1HA V163MS20.1H0 V164MSY0.1HA V164MS20.1H0 V165MSY0.1HA V165MS20.1H0

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Wave T_p in Ma-Tsu Seas of MSY0 at 2016

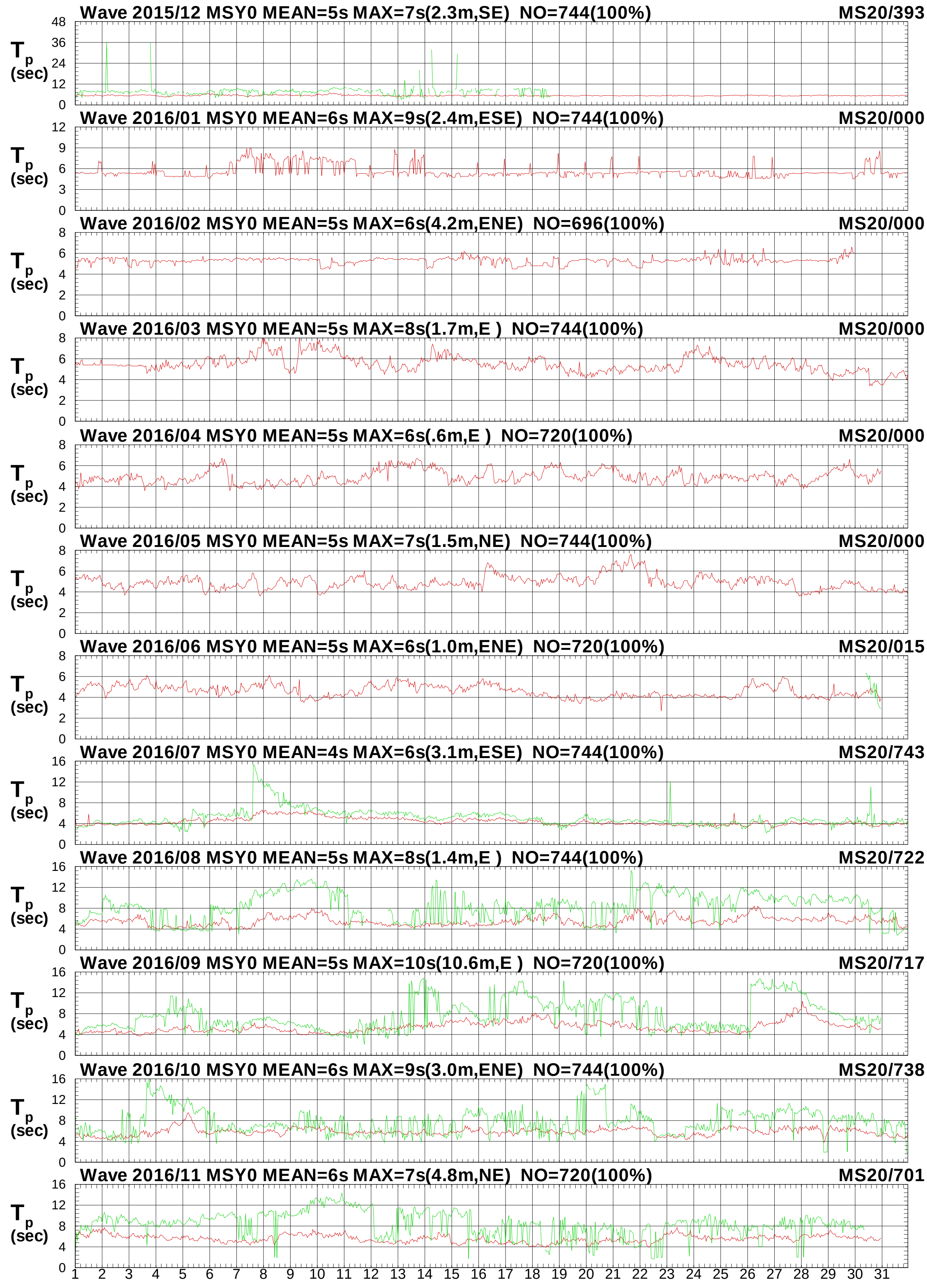

圖2.5b 2016年每月馬祖海域 Y 站與2站週期比較圖

V15CMSY0.1HA V15CMS20.1H0 V161MSY0.1HA V161MS20.1H0 V162MSY0.1HA V162MS20.1H0
V163MSY0.1HA V163MS20.1H0 V164MSY0.1HA V164MS20.1H0 V165MSY0.1HA V165MS20.1H0

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Wave Direction in Ma-Tsu Seas of MSY0 at 2016

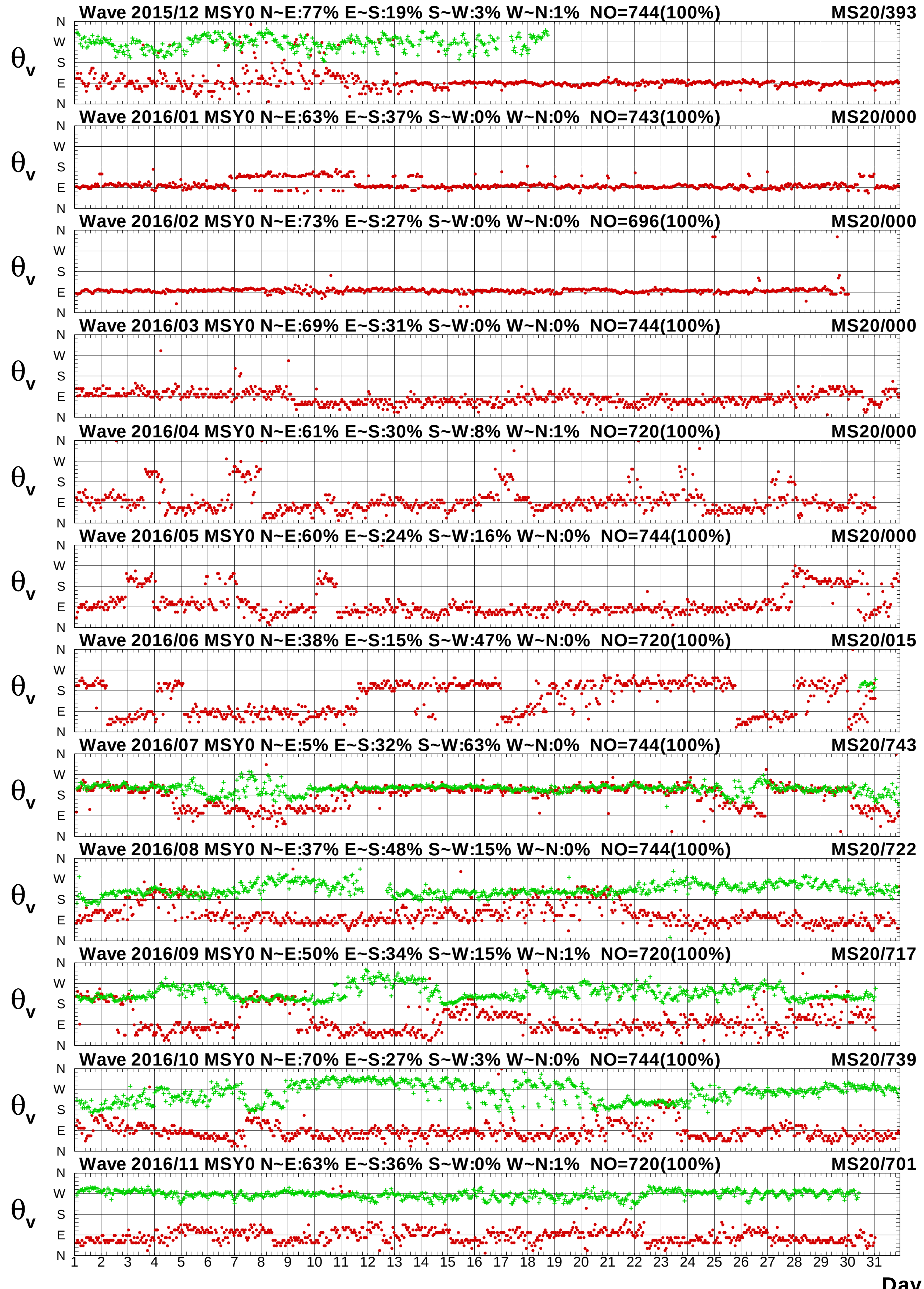

圖2.5c 2016年每月馬祖海域 Y 站與2站波向比較圖

V15CMSY0.1HA V15CMS20.1H0 V161MSY0.1HA V161MS20.1H0 V162MSY0.1HA V162MS20.1H0

V163MSY0.1HA V163MS20.1H0 V164MSY0.1HA V164MS20.1H0 V165MSY0.1HA V165MS20.1H0

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Wave H_s in Ma-Tsu Seas of MSY0 at 2016

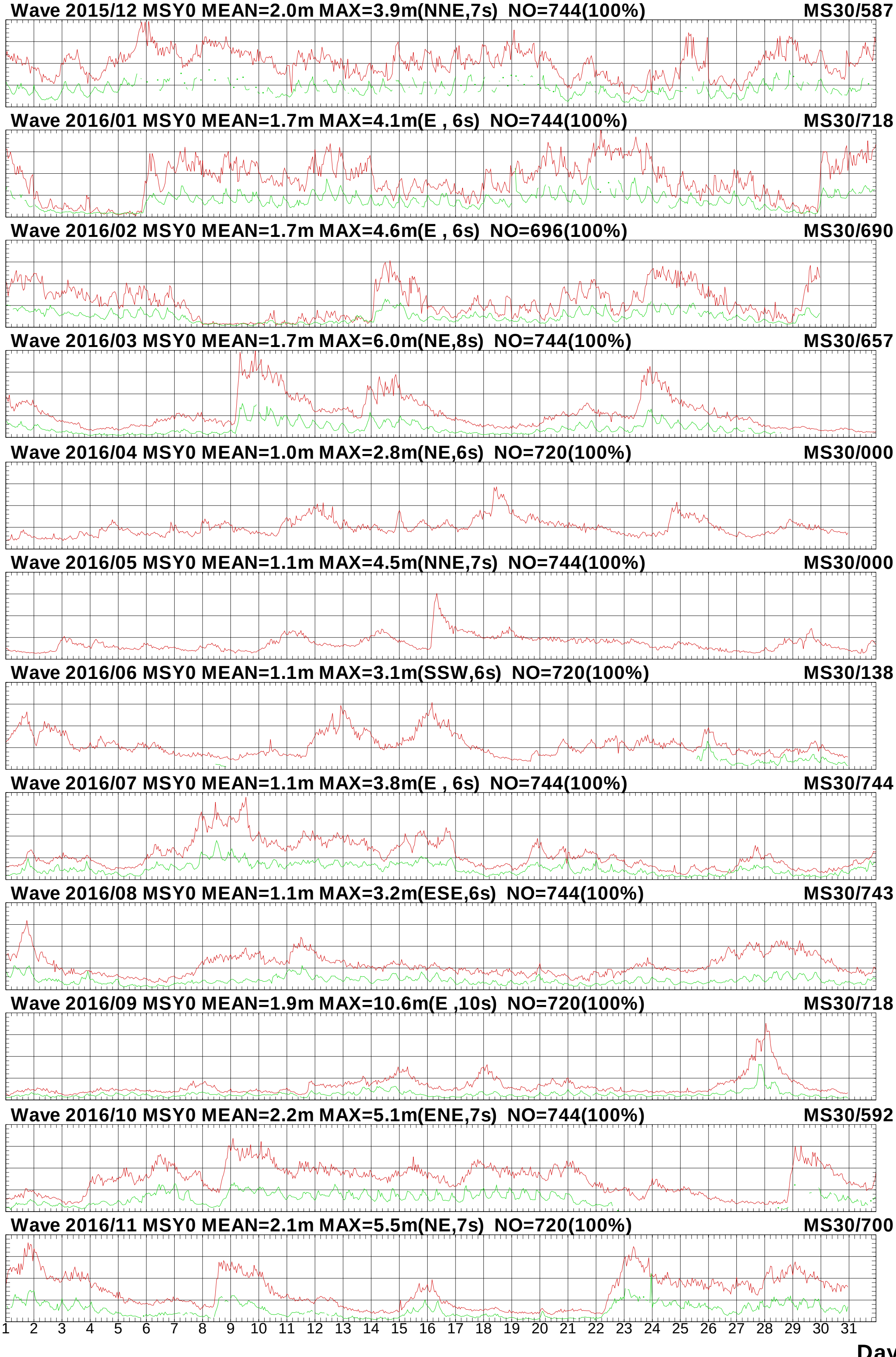

圖 2.6a　2016年每月馬祖海域 Y 站與3站波高比較圖

V15CMSY0.1HA V15CMS30.1H0 V161MSY0.1HA V161MS30.1H0 V162MSY0.1HA V162MS30.1H0
V163MSY0.1HA V163MS30.1H0 V164MSY0.1HA V164MS30.1H0 V165MSY0.1HA V165MS30.1H0

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Wave T_p in Ma-Tsu Seas of MSY0 at 2016

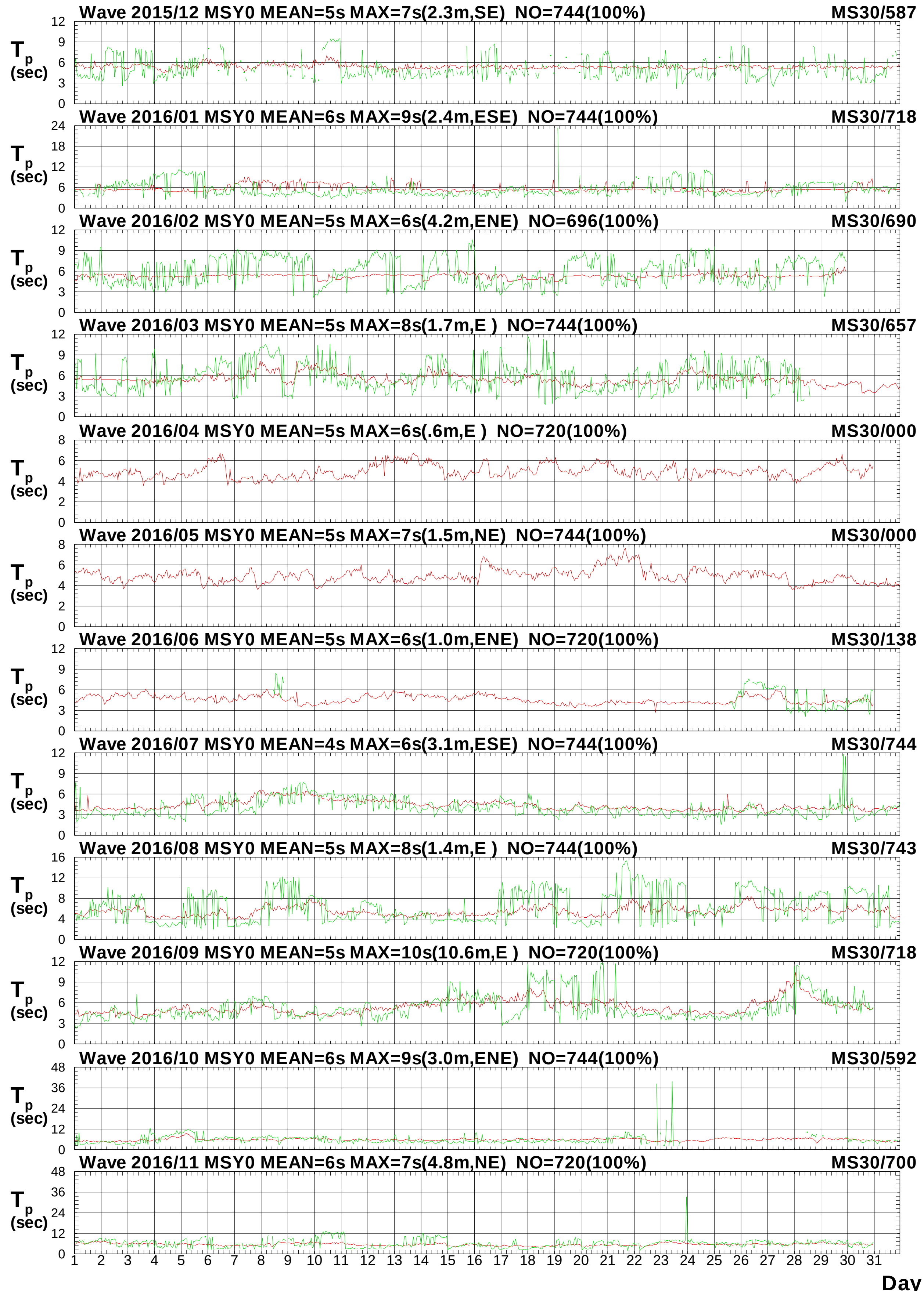

圖 2.6b　2016年每月馬祖海域 Y 站與3站週期比較圖

V15CMSY0.1HA V15CMS30.1H0 V161MSY0.1HA V161MS30.1H0 V162MSY0.1HA V162MS30.1H0
V163MSY0.1HA V163MS30.1H0 V164MSY0.1HA V164MS30.1H0 V165MSY0.1HA V165MS30.1H0

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Wave Direction in Ma-Tsu Seas of MSY0 at 2016

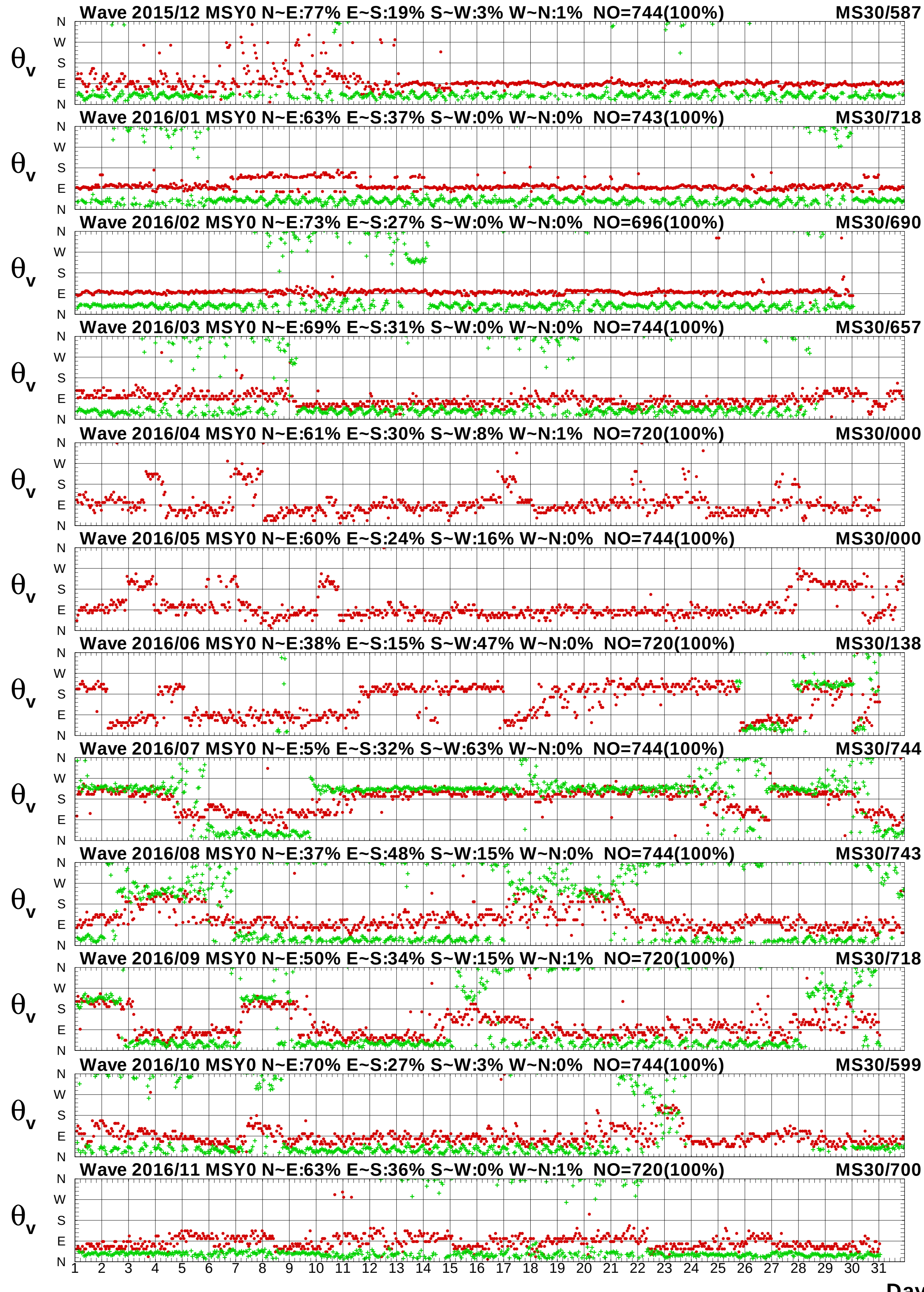

圖2.6c　2016年每月馬祖海域 Y 站與3站波向比較圖

V15CMSY0.1HA V15CMS30.1H0 V161MSY0.1HA V161MS30.1H0 V162MSY0.1HA V162MS30.1H0
V163MSY0.1HA V163MS30.1H0 V164MSY0.1HA V164MS30.1H0 V165MSY0.1HA V165MS30.1H0

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Wave H_s in Ma-Tsu Seas of MSY0 at 2016

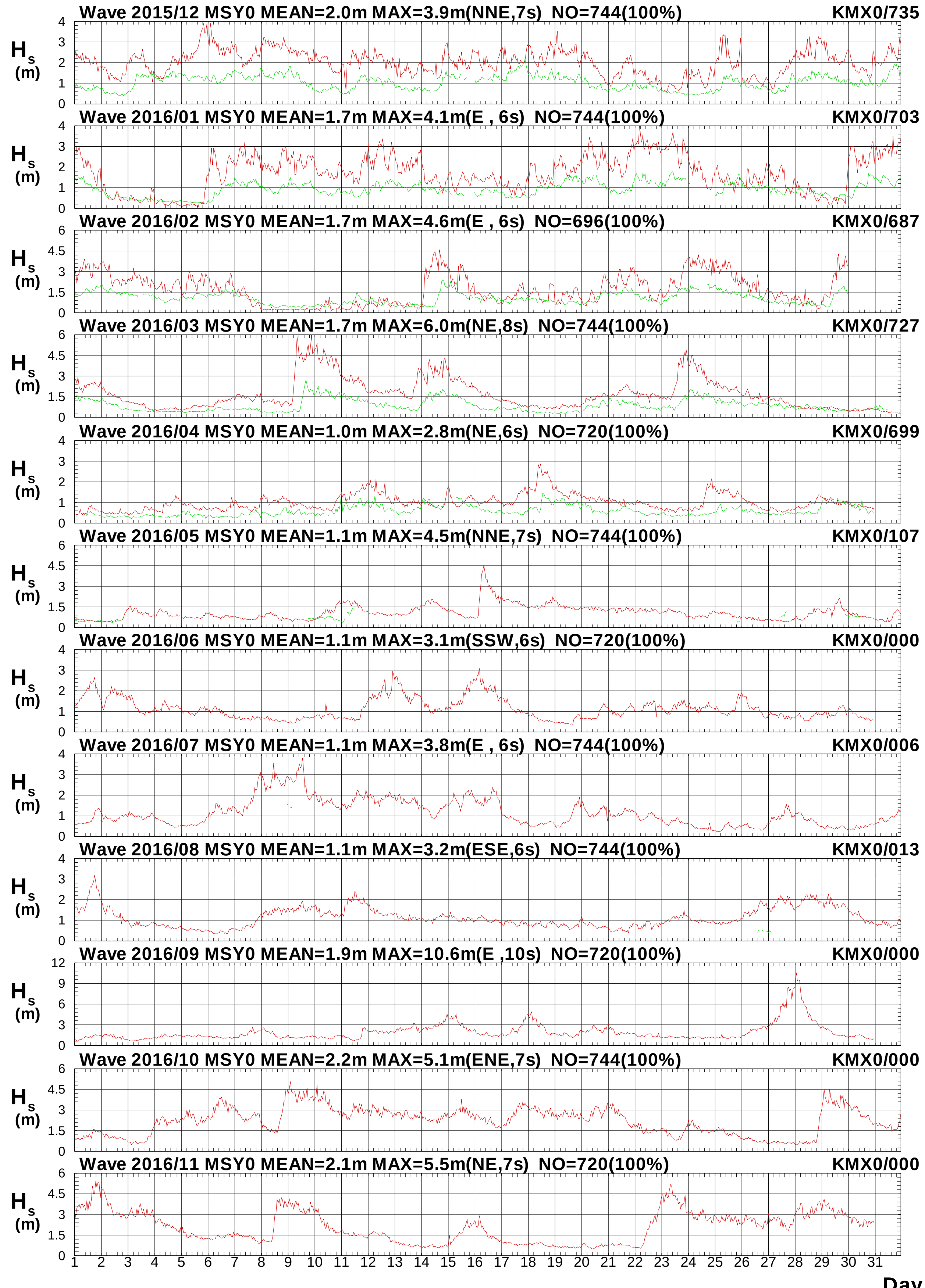

圖2.7a 2016年每月馬祖海域 Y 站與金門海域 X 站波高圖

V15CMSY0.1HA V15CKMX0.1H0 V161MSY0.1HA V161KMX0.1H0 V162MSY0.1HA V162KMX0.1H0
V163MSY0.1HA V163KMX0.1H0 V164MSY0.1HA V164KMX0.1H0 V165MSY0.1HA V165KMX0.1H0

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Wave T_p in Ma-Tsu Seas of MSY0 at 2016

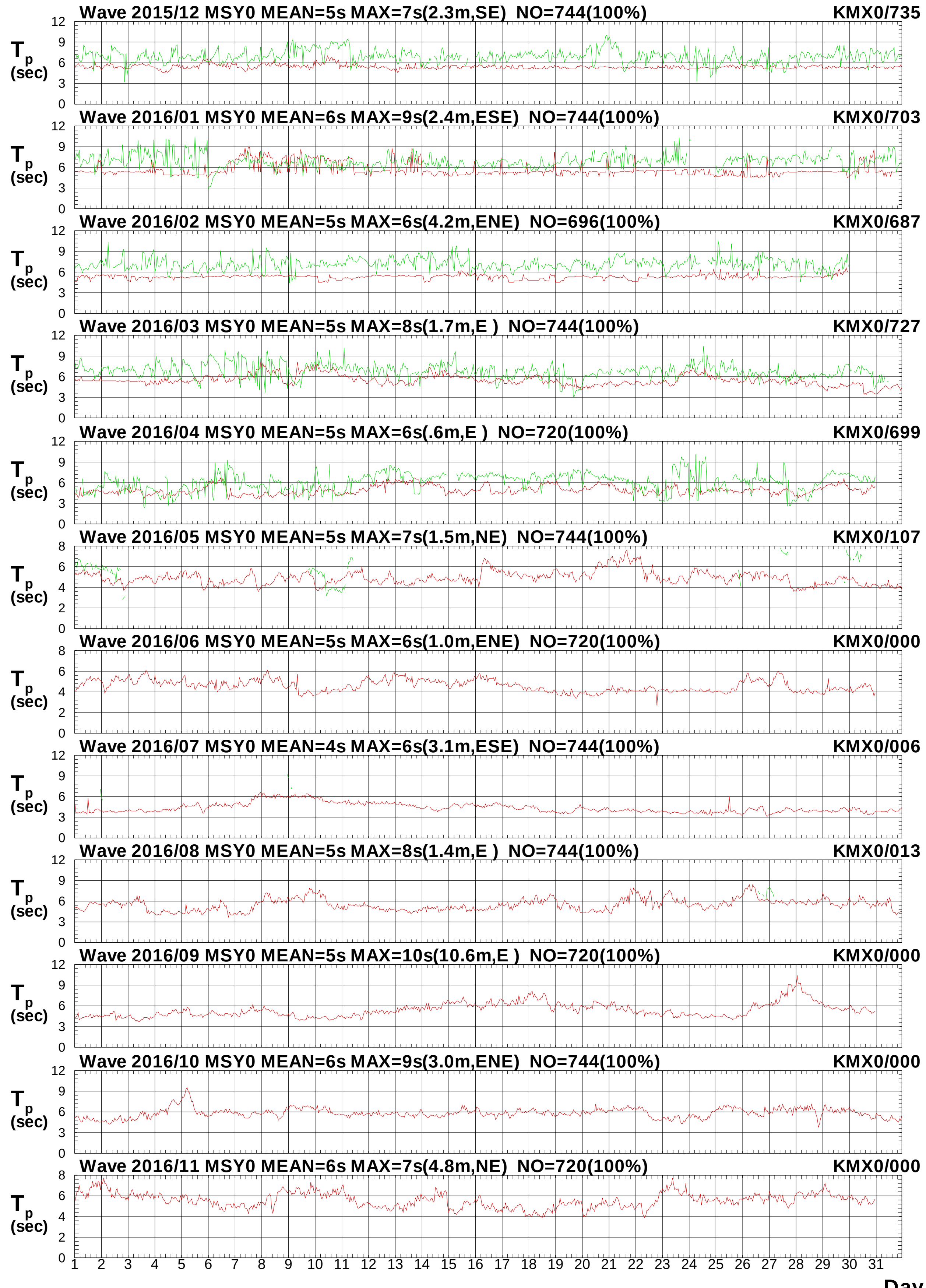

圖 2.7b　2016年每月馬祖海域 Y 站與金門海域 X 站週期圖

V15CMSY0.1HA V15CKMX0.1H0 V161MSY0.1HA V161KMX0.1H0 V162MSY0.1HA V162KMX0.1H0
V163MSY0.1HA V163KMX0.1H0 V164MSY0.1HA V164KMX0.1H0 V165MSY0.1HA V165KMX0.1H0

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CURV4P.BAT(CURV4KV.DAT)

2017/06/27

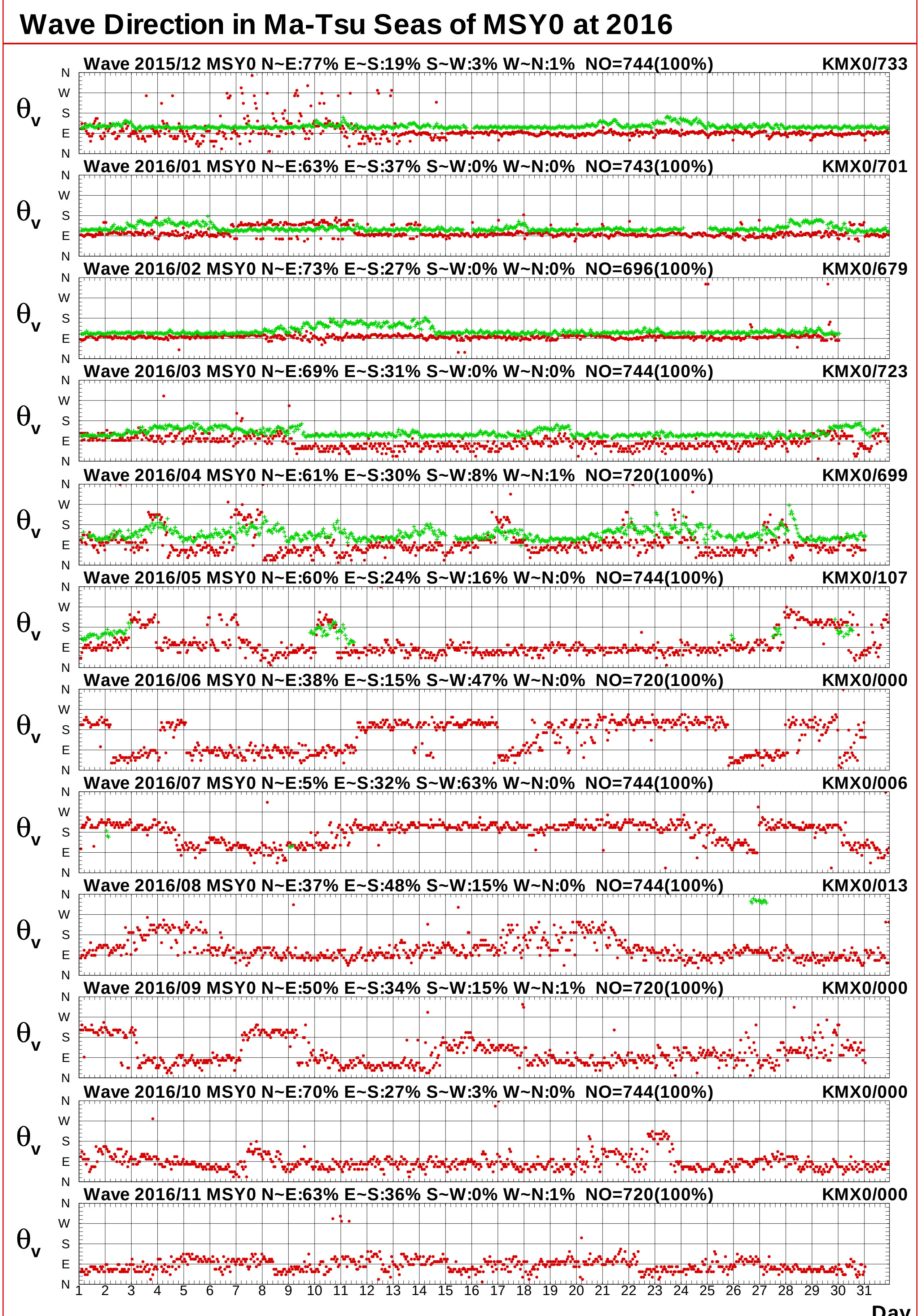

圖 2.7c　2016年每月馬祖海域 Y 站與金門海域 X 站波向圖

V15CMSY0.1HA V15CKMX0.1H0 V161MSY0.1HA V161KMX0.1H0 V162MSY0.1HA V162KMX0.1H0
V163MSY0.1HA V163KMX0.1H0 V164MSY0.1HA V164KMX0.1H0 V165MSY0.1HA V165KMX0.1H0

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Wave H_s in Ma-Tsu Seas of MSY0 at 2016

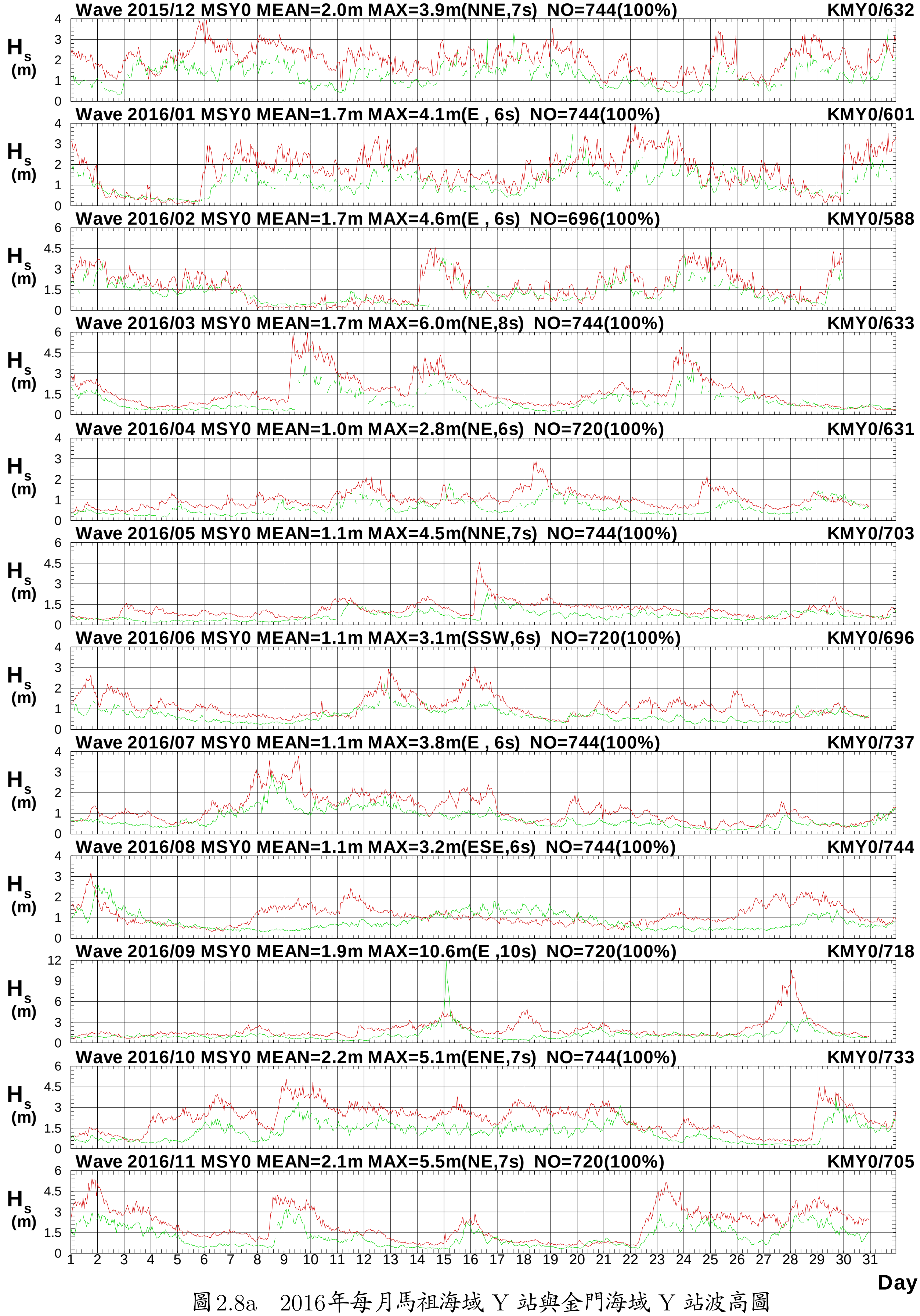

圖 2.8a 2016年每月馬祖海域 Y 站與金門海域 Y 站波高圖

V15CMSY0.1HA V15CKMY0.1H0 V161MSY0.1HA V161KMY0.1H0 V162MSY0.1HA V162KMY0.1H0
V163MSY0.1HA V163KMY0.1H0 V164MSY0.1HA V164KMY0.1H0 V165MSY0.1HA V165KMY0.1H0

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Wave T_p in Ma-Tsu Seas of MSY0 at 2016

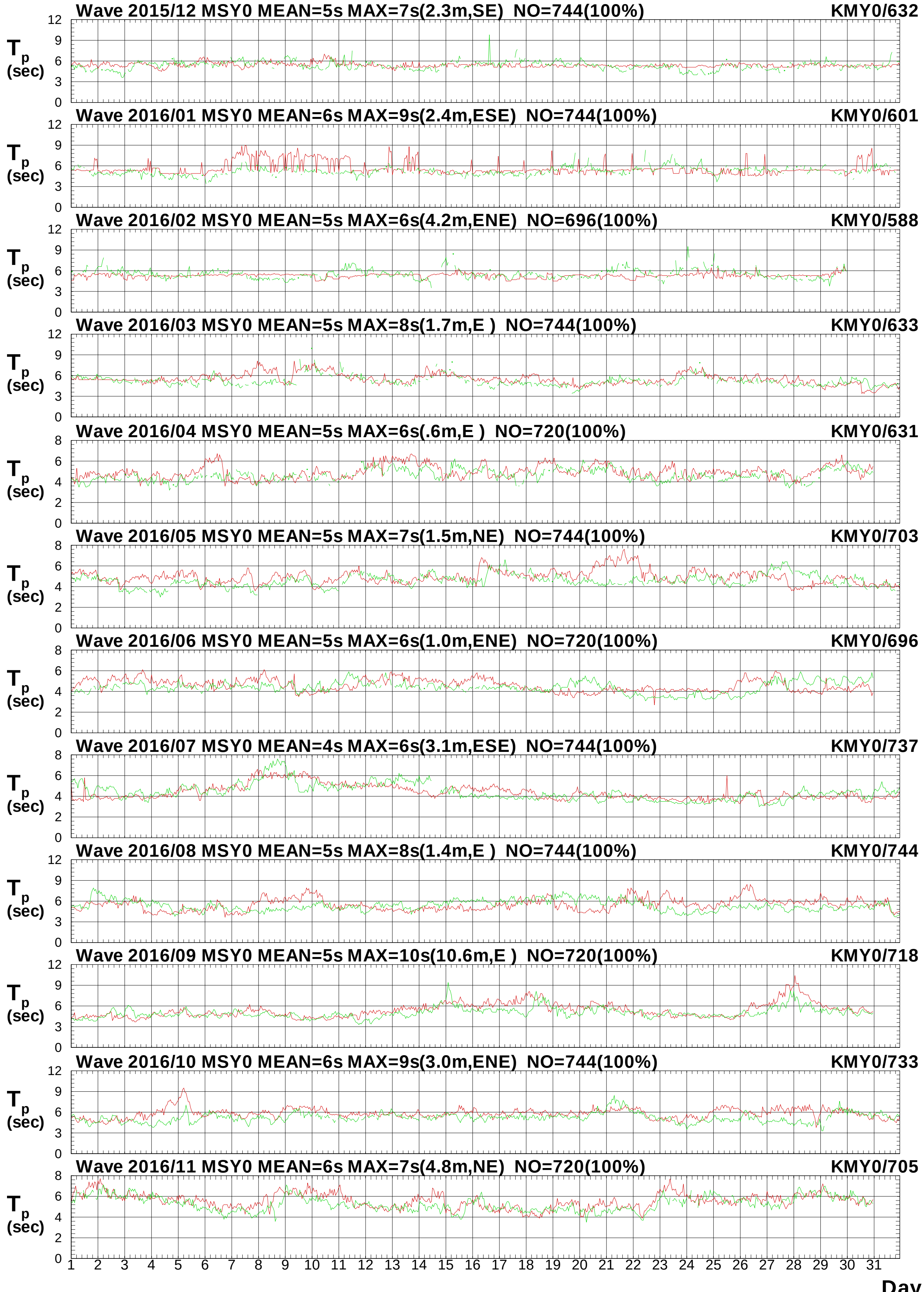

圖 2.8b　2016年每月馬祖海域 Y 站與金門海域 Y 站週期圖

V15CMSY0.1HA V15CKMY0.1H0 V161MSY0.1HA V161KMY0.1H0 V162MSY0.1HA V162KMY0.1H0
V163MSY0.1HA V163KMY0.1H0 V164MSY0.1HA V164KMY0.1H0 V165MSY0.1HA V165KMY0.1H0

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Wave Direction in Ma-Tsu Seas of MSY0 at 2016

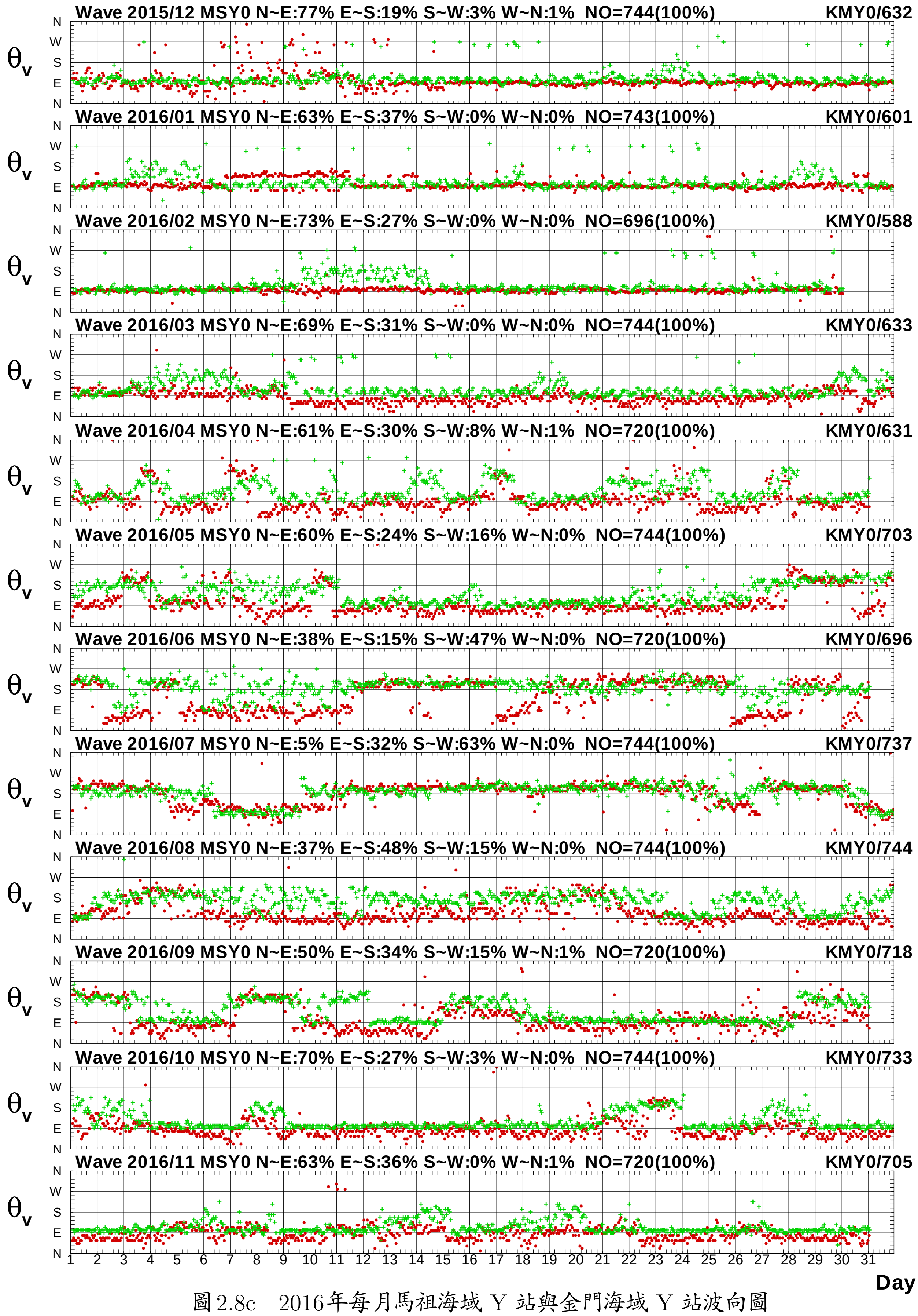

圖2.8c 2016年每月馬祖海域 Y 站與金門海域 Y 站波向圖

V15CMSY0.1HA V15CKMY0.1H0 V161MSY0.1HA V161KMY0.1H0 V162MSY0.1HA V162KMY0.1H0
V163MSY0.1HA V163KMY0.1H0 V164MSY0.1HA V164KMY0.1H0 V165MSY0.1HA V165KMY0.1H0

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Wave H_s in Ma-Tsu Seas of MSY0 at 2016

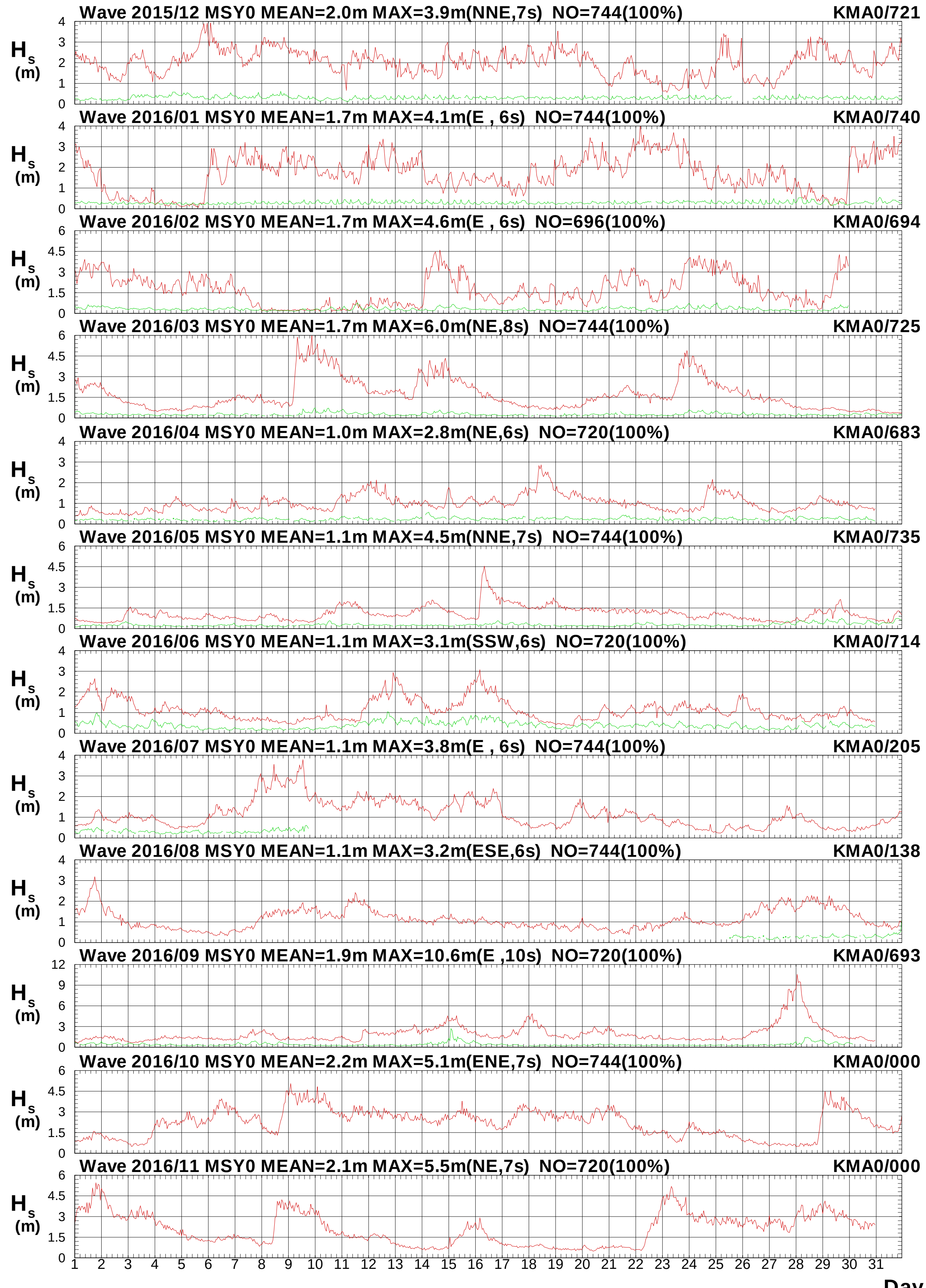

圖 2.9a　2016年每月馬祖海域 Y 站與金門海域 A 站波高圖

V15CMSY0.1HA V15CKMA0.1H0 V161MSY0.1HA V161KMA0.1H0 V162MSY0.1HA V162KMA0.1H0
V163MSY0.1HA V163KMA0.1H0 V164MSY0.1HA V164KMA0.1H0 V165MSY0.1HA V165KMA0.1H0

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Wave T_p in Ma-Tsu Seas of MSY0 at 2016

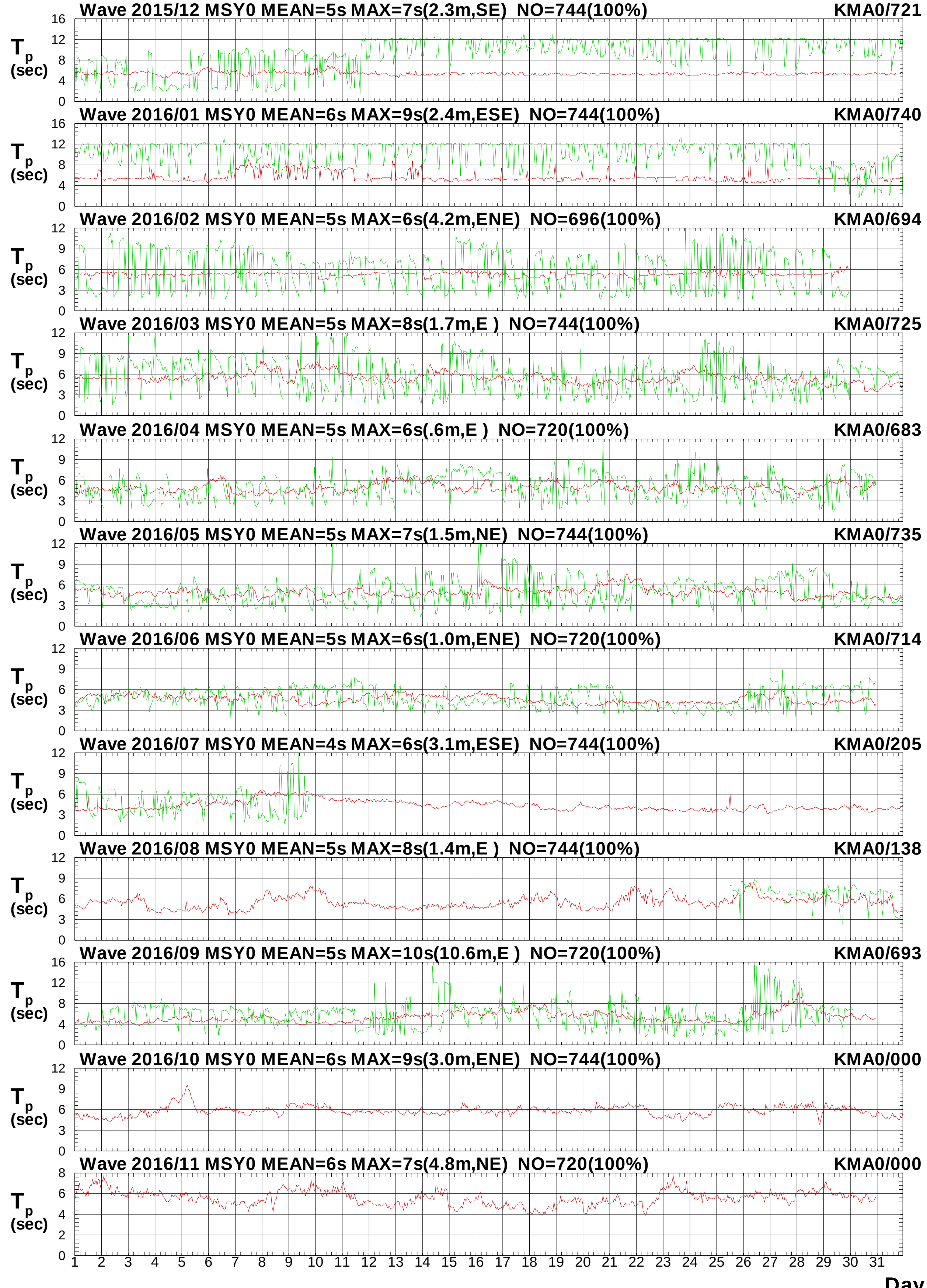

圖 2.9b　2016年每月馬祖海域 Y 站與金門海域 A 站週期圖

V15CMSY0.1HA V15CKMA0.1H0 V161MSY0.1HA V161KMA0.1H0 V162MSY0.1HA V162KMA0.1H0
V163MSY0.1HA V163KMA0.1H0 V164MSY0.1HA V164KMA0.1H0 V165MSY0.1HA V165KMA0.1H0

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Wave Direction in Ma-Tsu Seas of MSY0 at 2016

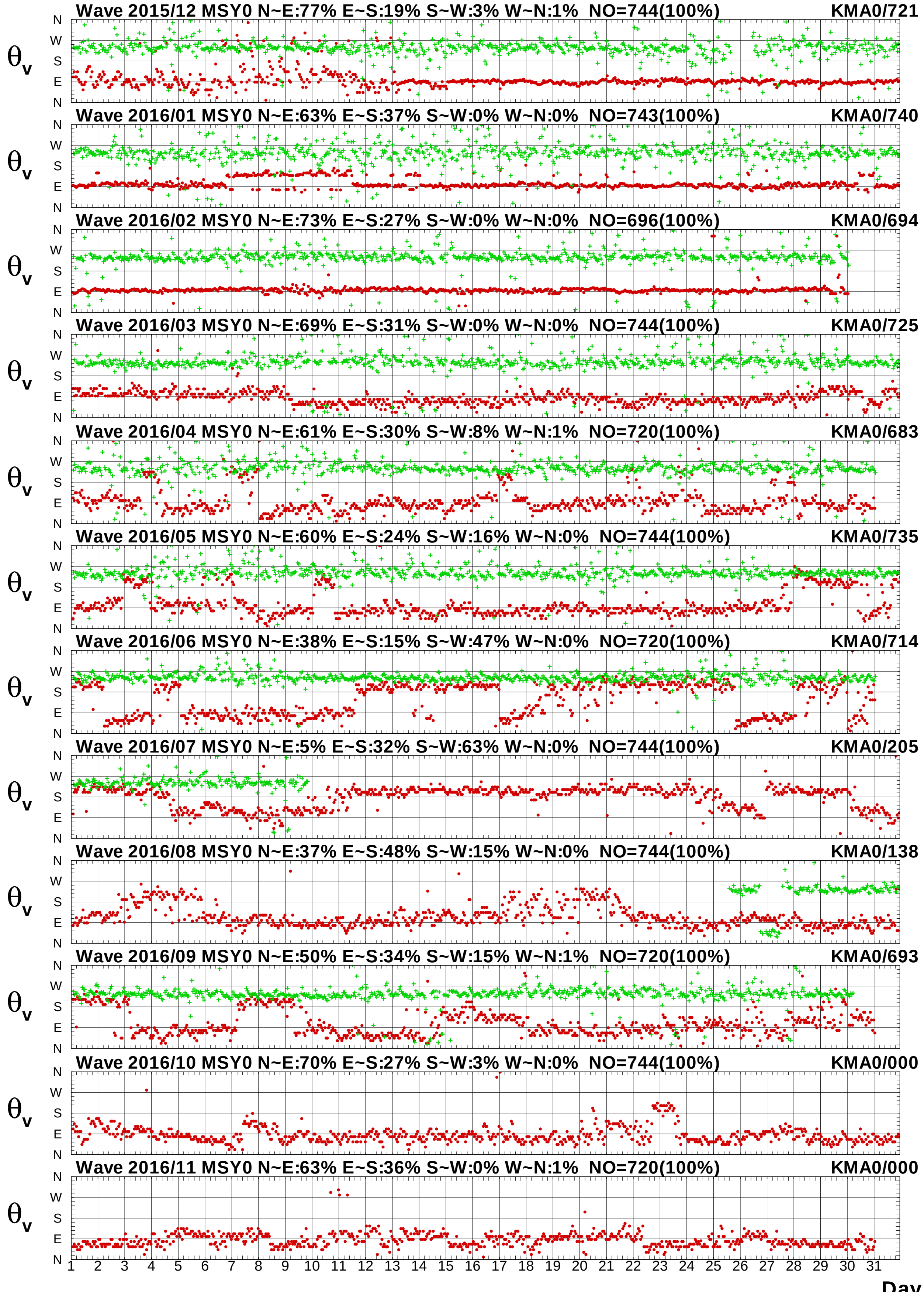

圖 2.9c　2016年每月馬祖海域 Y 站與金門海域 A 站波向圖

V15CMSY0.1HA V15CKMA0.1H0 V161MSY0.1HA V161KMA0.1H0 V162MSY0.1HA V162KMA0.1H0
V163MSY0.1HA V163KMA0.1H0 V164MSY0.1HA V164KMA0.1H0 V165MSY0.1HA V165KMA0.1H0

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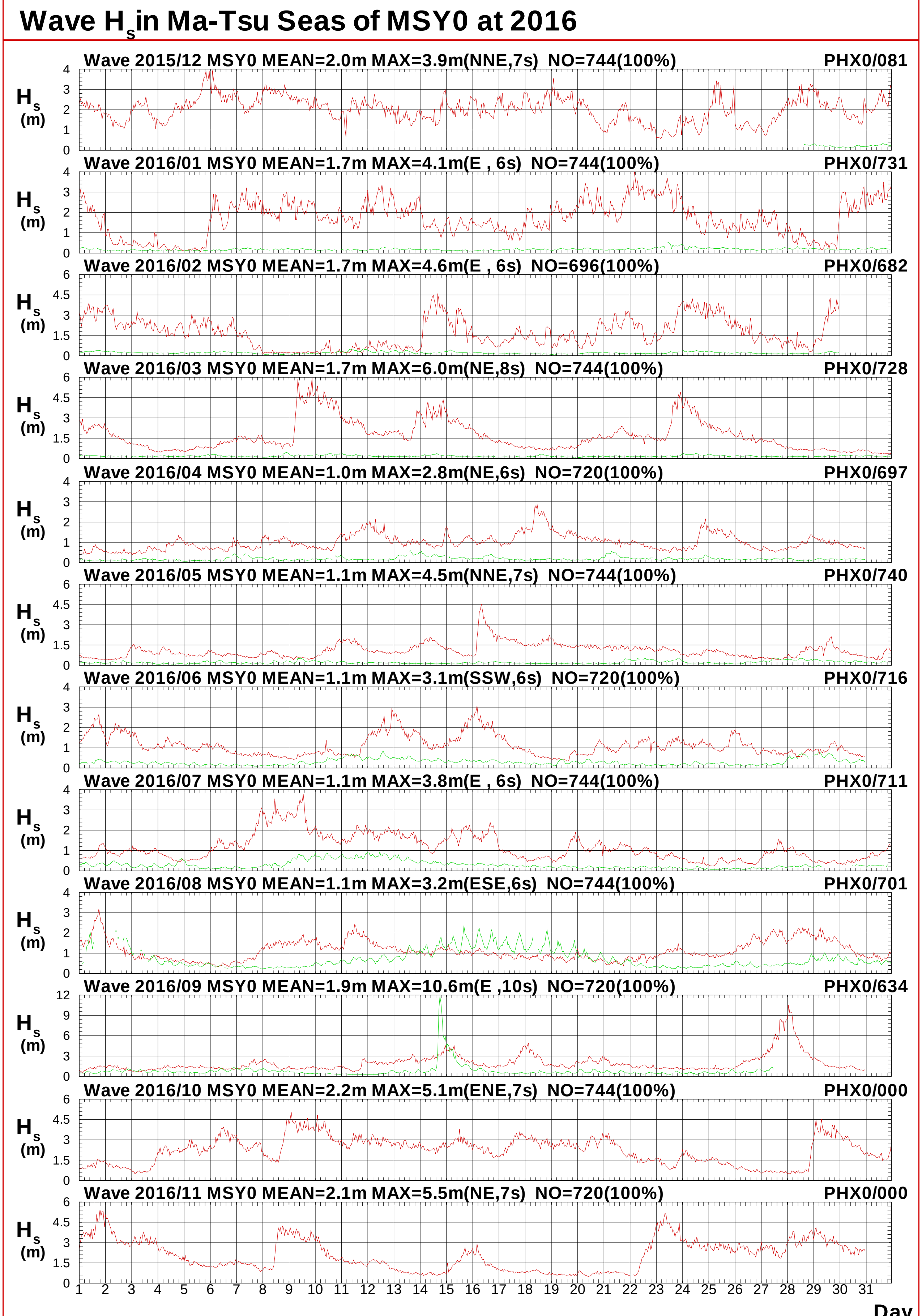

圖 2.10a　2016年每月馬祖海域 Y 站與澎湖海域 X 站波高圖

V15CMSY0.1HA V15CPHX0.1H0 V161MSY0.1HA V161PHX0.1H0 V162MSY0.1HA V162PHX0.1H0
V163MSY0.1HA V163PHX0.1H0 V164MSY0.1HA V164PHX0.1H0 V165MSY0.1HA V165PHX0.1H0

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CURV4P.BAT(CURV4KV.DAT)

2017/06/27

Wave T_p in Ma-Tsu Seas of MSY0 at 2016

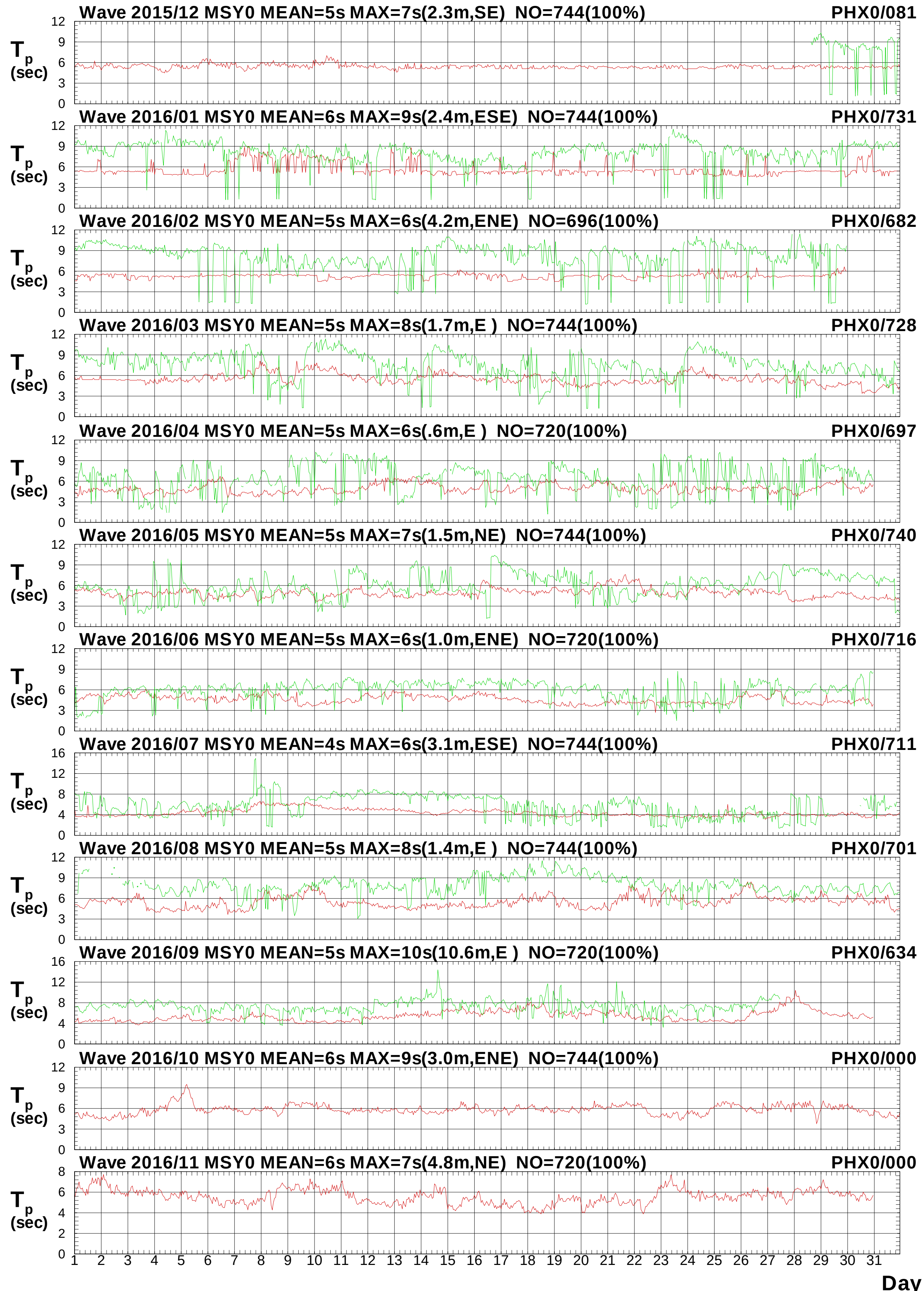

圖2.10b　2016年每月馬祖海域 Y 站與澎湖海域 X 站週期圖

V15CMSY0.1HA V15CPHX0.1H0 V161MSY0.1HA V161PHX0.1H0 V162MSY0.1HA V162PHX0.1H0 V163MSY0.1HA V163PHX0.1H0 V164MSY0.1HA V164PHX0.1H0 V165MSY0.1HA V165PHX0.1H0	Institute of Harbor & Marine Technology

Wave Direction in Ma-Tsu Seas of MSY0 at 2016

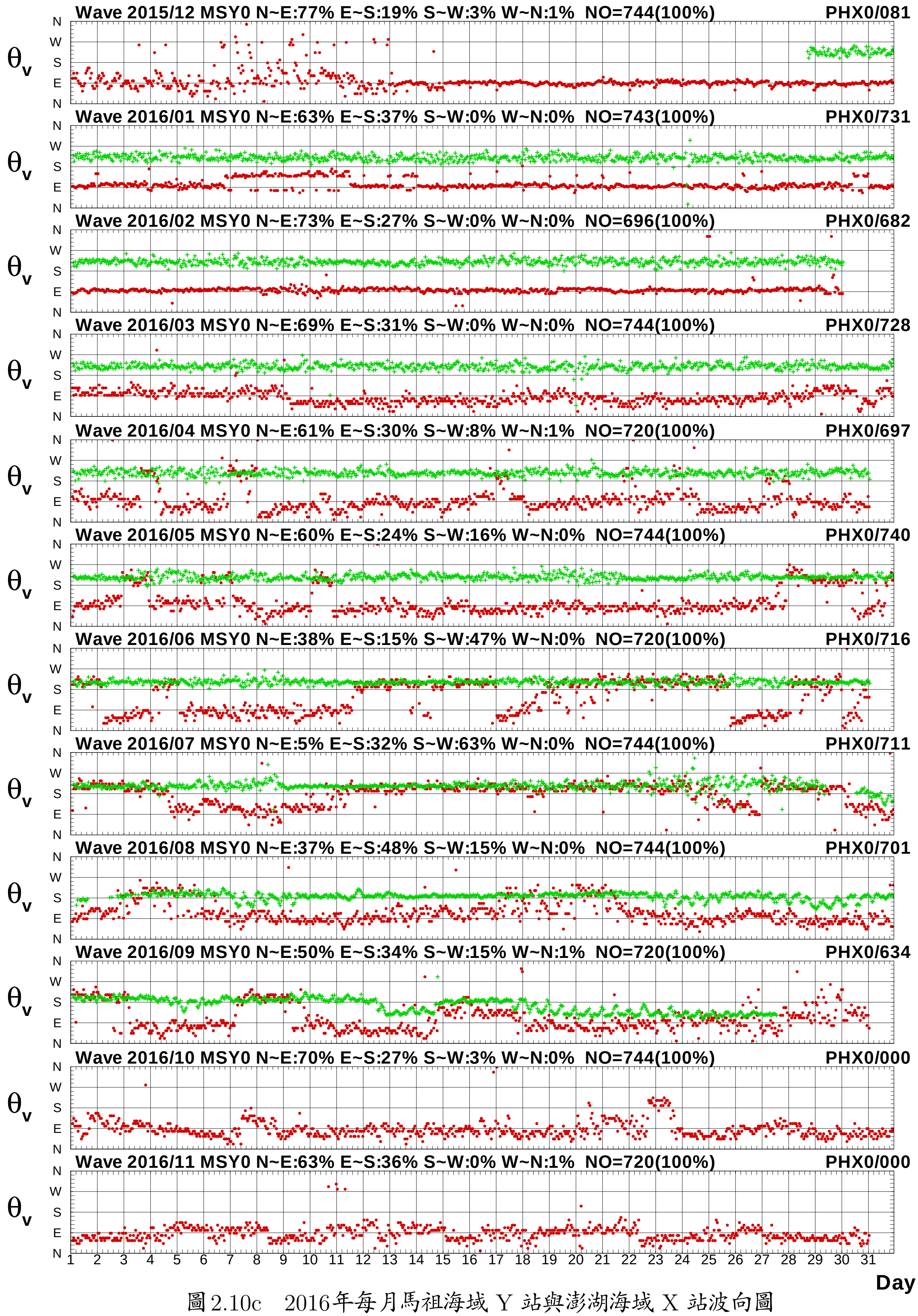

圖 2.10c 2016年每月馬祖海域 Y 站與澎湖海域 X 站波向圖

V15CMSY0.1HA V15CPHX0.1H0 V161MSY0.1HA V161PHX0.1H0 V162MSY0.1HA V162PHX0.1H0
V163MSY0.1HA V163PHX0.1H0 V164MSY0.1HA V164PHX0.1H0 V165MSY0.1HA V165PHX0.1H0

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Wave H_s in Ma-Tsu Seas of MSY0 at 2016

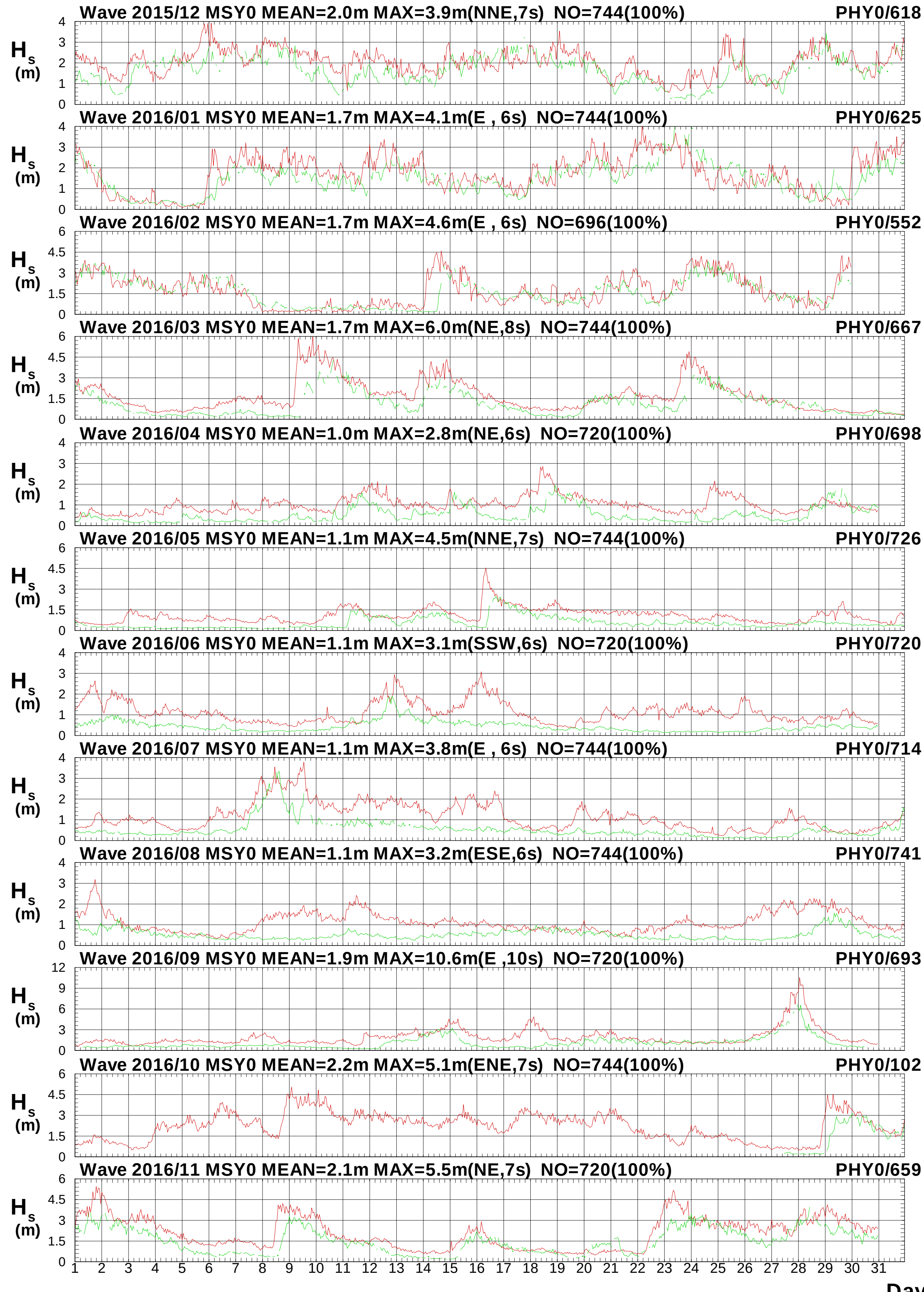

圖2.11a　2016年每月馬祖海域 Y 站與澎湖海域 Y 站波高圖

V15CMSY0.1HA V15CPHY0.1H0 V161MSY0.1HA V161PHY0.1H0 V162MSY0.1HA V162PHY0.1H0
V163MSY0.1HA V163PHY0.1H0 V164MSY0.1HA V164PHY0.1H0 V165MSY0.1HA V165PHY0.1H0

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Wave T_p in Ma-Tsu Seas of MSY0 at 2016

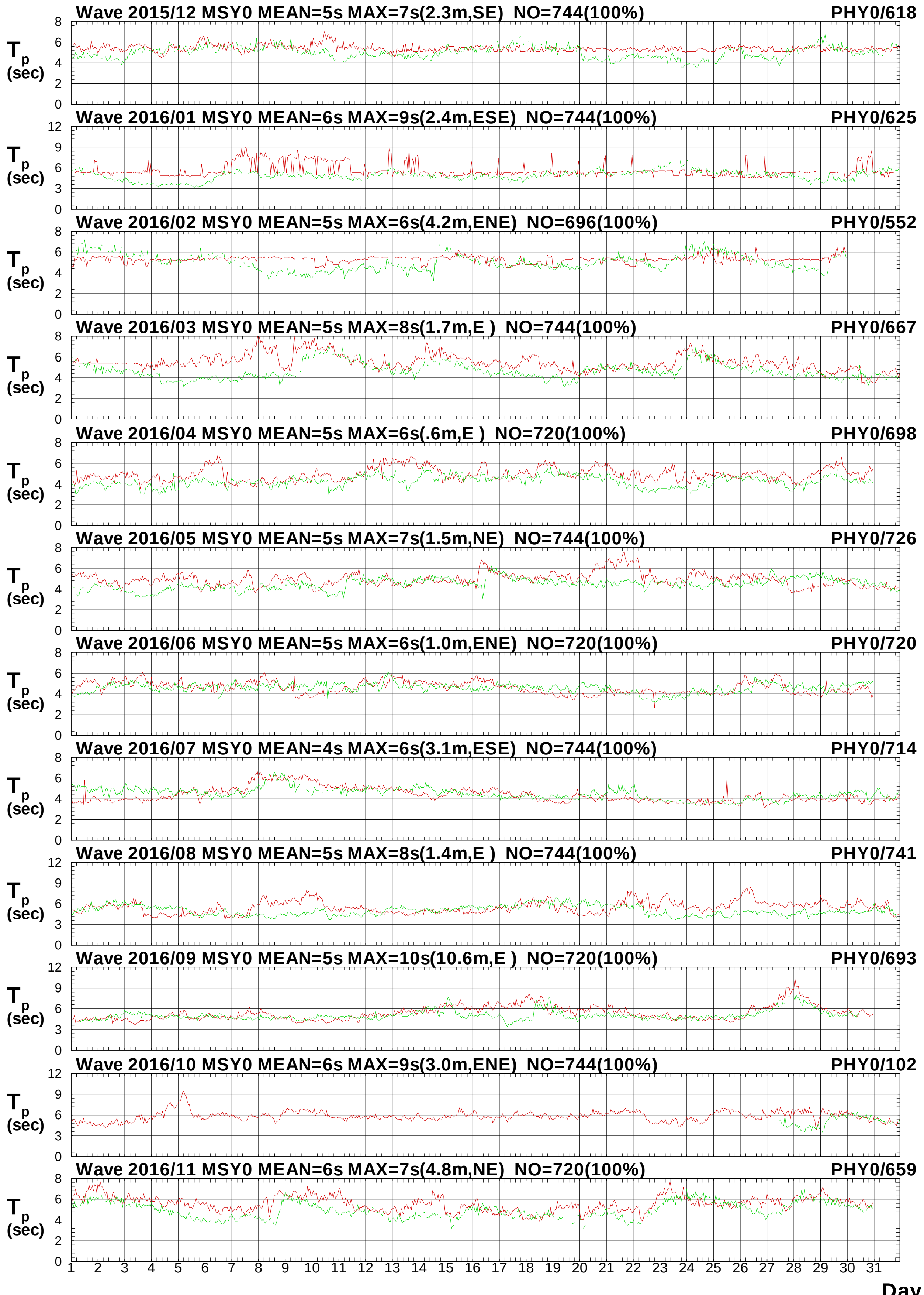

圖2.11b　2016年每月馬祖海域 Y 站與澎湖海域 Y 站週期圖

V15CMSY0.1HA V15CPHY0.1H0 V161MSY0.1HA V161PHY0.1H0 V162MSY0.1HA V162PHY0.1H0 V163MSY0.1HA V163PHY0.1H0 V164MSY0.1HA V164PHY0.1H0 V165MSY0.1HA V165PHY0.1H0	Institute of Harbor & Marine Technology

Wave Direction in Ma-Tsu Seas of MSY0 at 2016

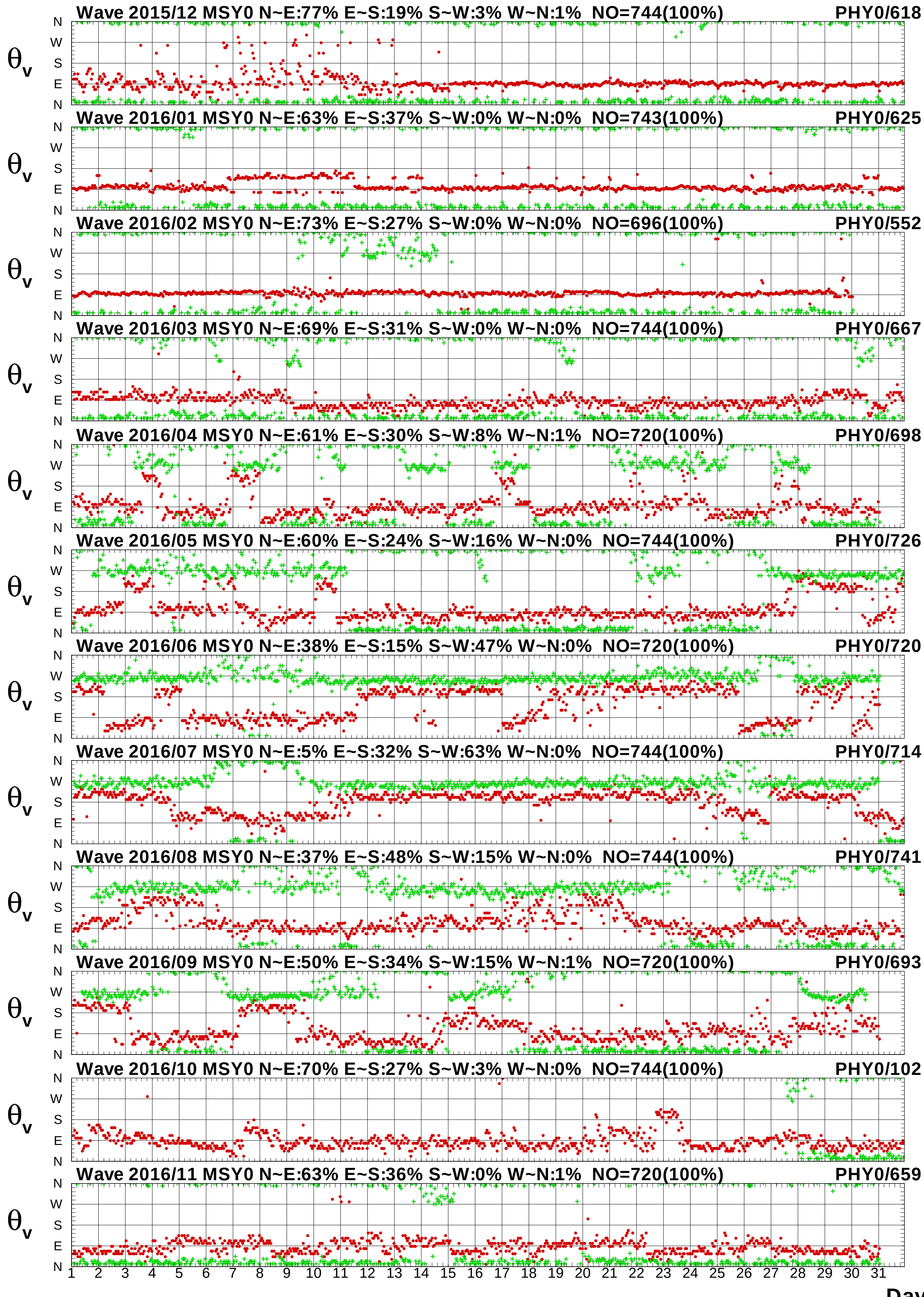

圖 2.11c　2016年每月馬祖海域 Y 站與澎湖海域 Y 站波向圖

V15CMSY0.1HA V15CPHY0.1H0 V161MSY0.1HA V161PHY0.1H0 V162MSY0.1HA V162PHY0.1H0
V163MSY0.1HA V163PHY0.1H0 V164MSY0.1HA V164PHY0.1H0 V165MSY0.1HA V165PHY0.1H0

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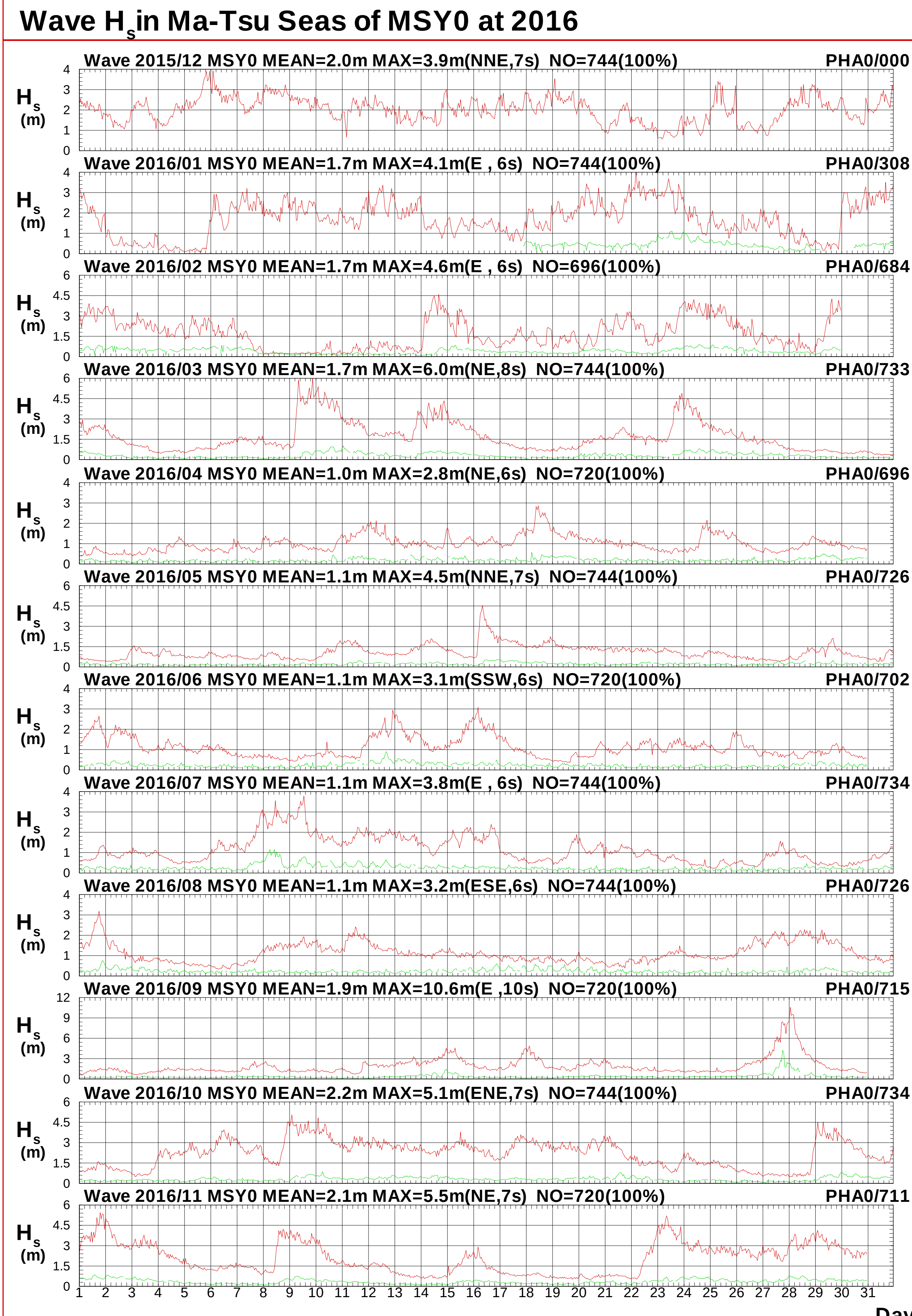

圖 2.12a　2016年每月馬祖海域 Y 站與澎湖海域 A 站波高圖

V15CMSY0.1HA V15CPHA0.1H0 V161MSY0.1HA V161PHA0.1H0 V162MSY0.1HA V162PHA0.1H0
V163MSY0.1HA V163PHA0.1H0 V164MSY0.1HA V164PHA0.1H0 V165MSY0.1HA V165PHA0.1H0

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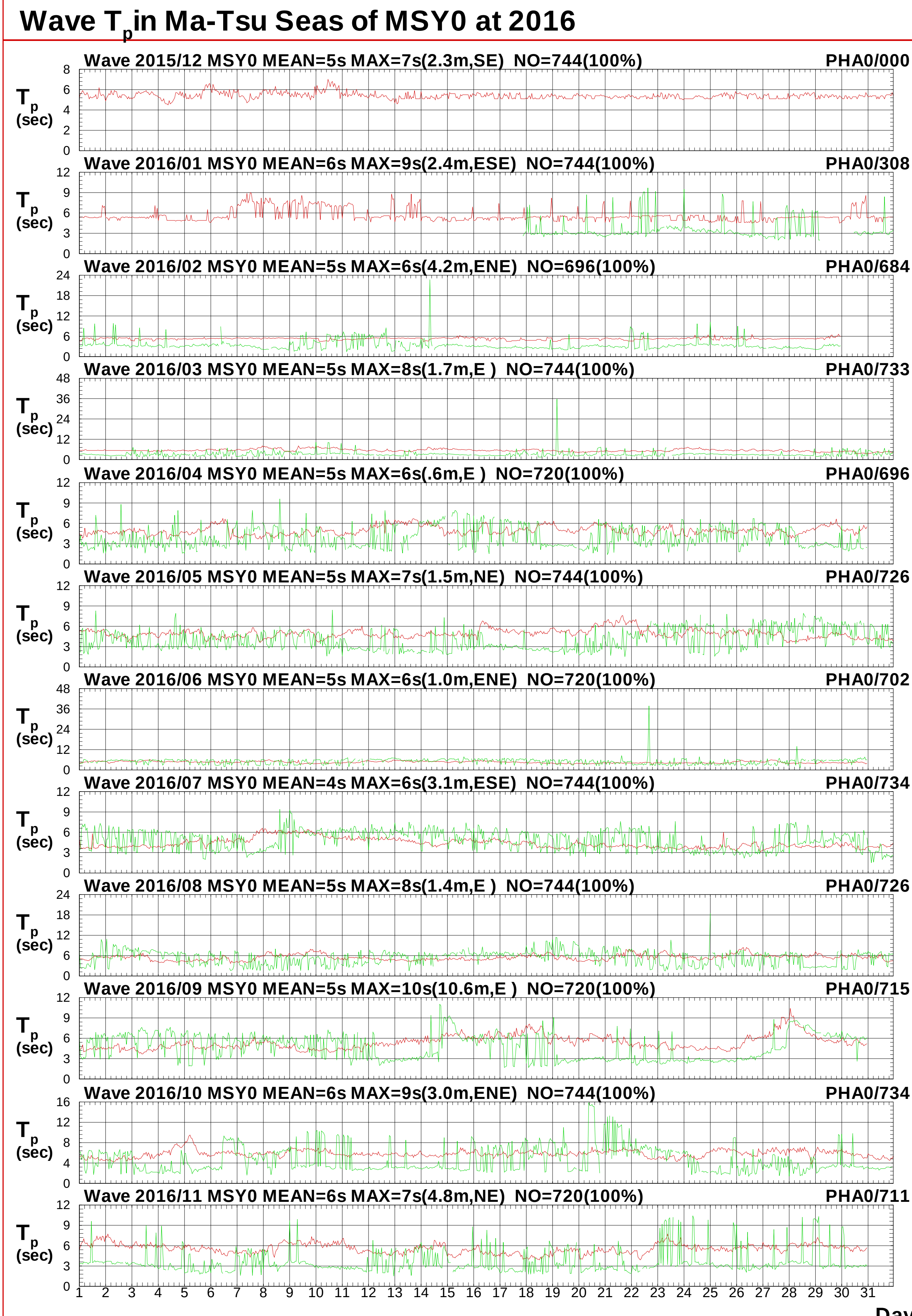

圖2.12b　2016年每月馬祖海域 Y 站與澎湖海域 A 站週期圖

V15CMSY0.1HA V15CPHA0.1H0 V161MSY0.1HA V161PHA0.1H0 V162MSY0.1HA V162PHA0.1H0
V163MSY0.1HA V163PHA0.1H0 V164MSY0.1HA V164PHA0.1H0 V165MSY0.1HA V165PHA0.1H0

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Wave Direction in Ma-Tsu Seas of MSY0 at 2016

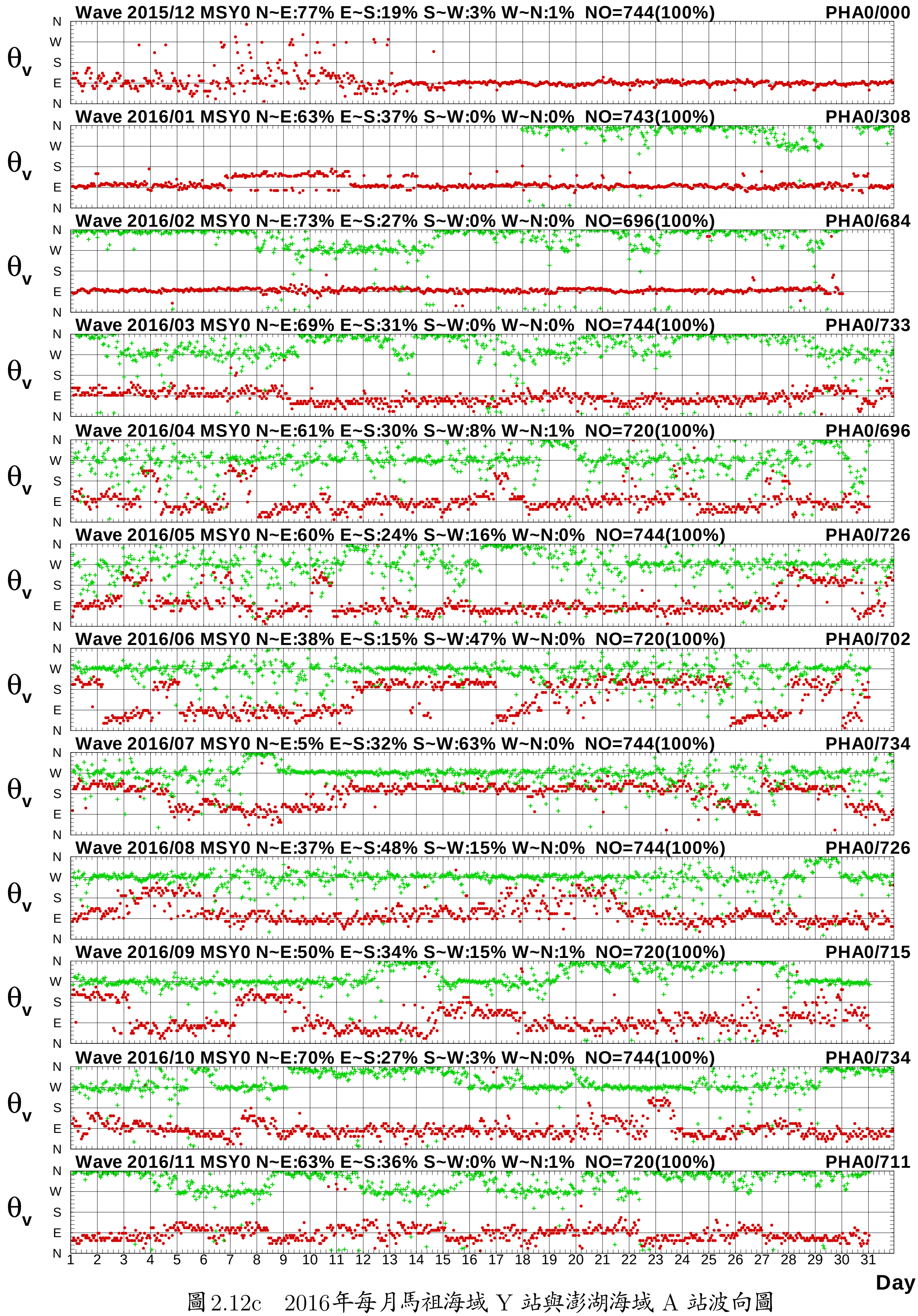

圖 2.12c　2016年每月馬祖海域 Y 站與澎湖海域 A 站波向圖

V15CMSY0.1HA V15CPHA0.1H0 V161MSY0.1HA V161PHA0.1H0 V162MSY0.1HA V162PHA0.1H0
V163MSY0.1HA V163PHA0.1H0 V164MSY0.1HA V164PHA0.1H0 V165MSY0.1HA V165PHA0.1H0

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Wave H_s in Ma-Tsu Seas of MSY0 at 2016

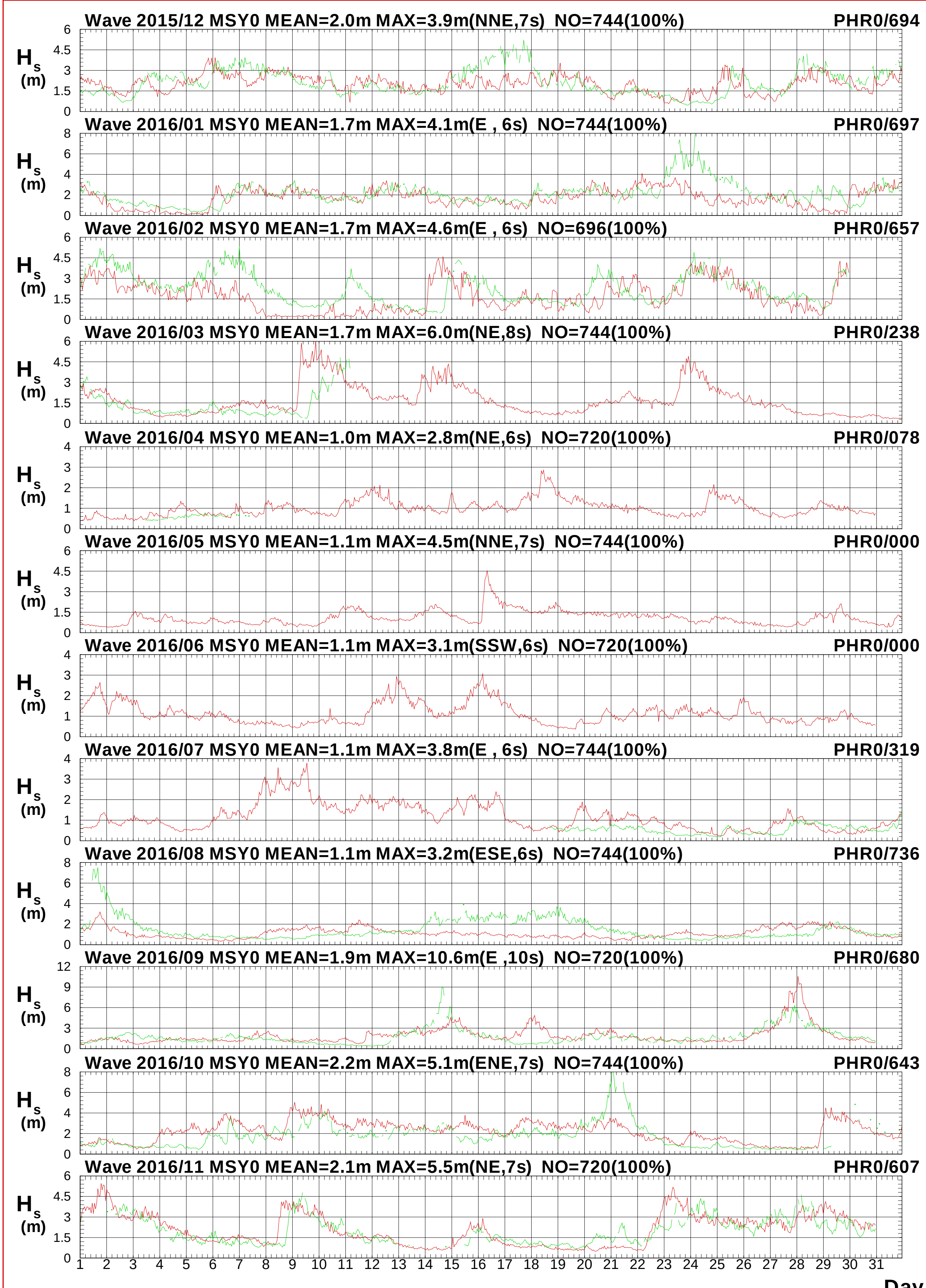

圖 2.13a　2016年每月馬祖海域 Y 站與澎湖海域 R 站波高圖

V15CMSY0.1HA V15CPHR0.1H0 V161MSY0.1HA V161PHR0.1H0 V162MSY0.1HA V162PHR0.1H0
V163MSY0.1HA V163PHR0.1H0 V164MSY0.1HA V164PHR0.1H0 V165MSY0.1HA V165PHR0.1H0

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Wave T_p in Ma-Tsu Seas of MSY0 at 2016

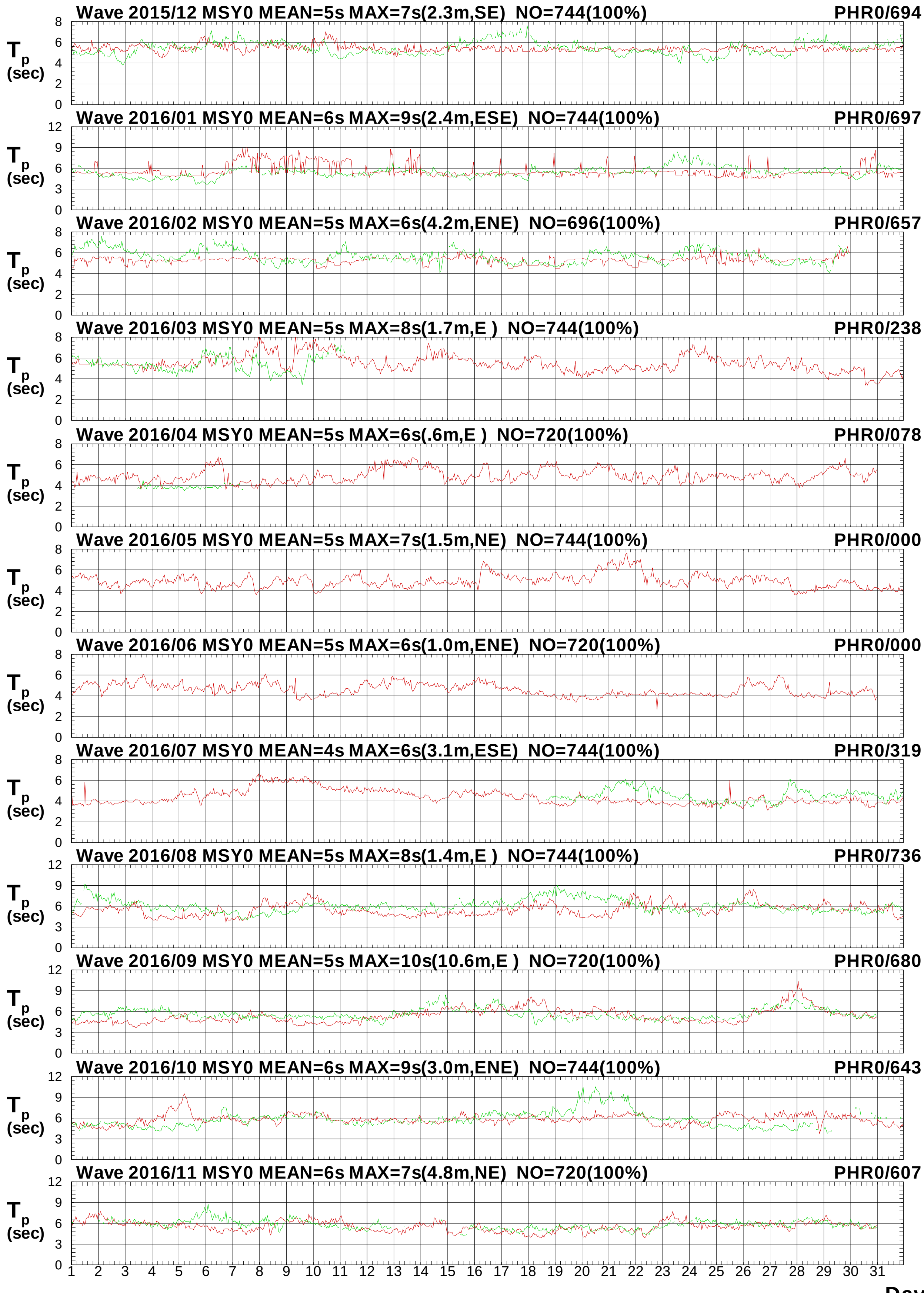

圖 2.13b　2016年每月馬祖海域 Y 站與澎湖海域 R 站週期圖

V15CMSY0.1HA V15CPHR0.1H0 V161MSY0.1HA V161PHR0.1H0 V162MSY0.1HA V162PHR0.1H0
V163MSY0.1HA V163PHR0.1H0 V164MSY0.1HA V164PHR0.1H0 V165MSY0.1HA V165PHR0.1H0

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Wave Direction in Ma-Tsu Seas of MSY0 at 2016

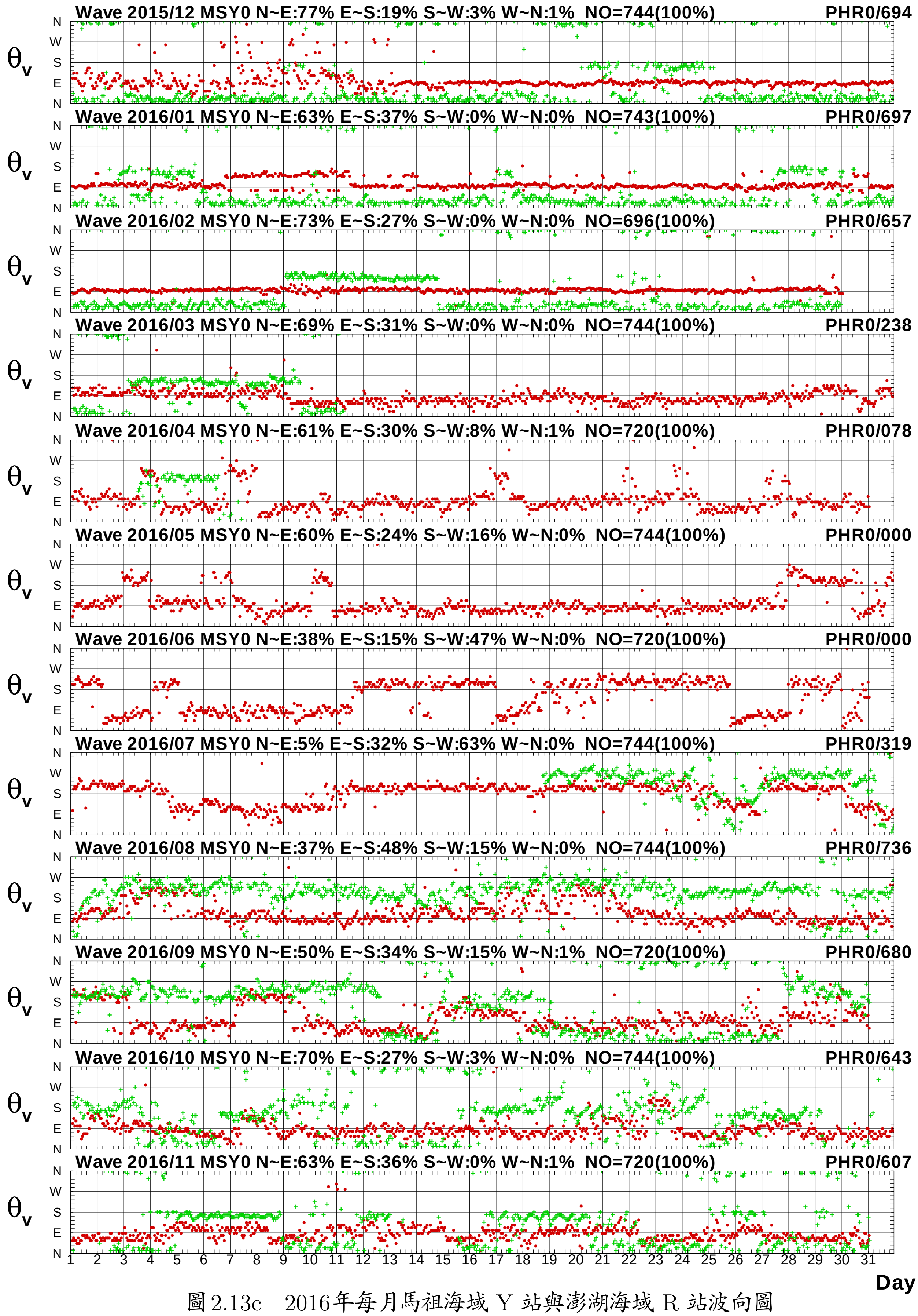

圖 2.13c　2016年每月馬祖海域 Y 站與澎湖海域 R 站波向圖

V15CMSY0.1HA V15CPHR0.1H0 V161MSY0.1HA V161PHR0.1H0 V162MSY0.1HA V162PHR0.1H0
V163MSY0.1HA V163PHR0.1H0 V164MSY0.1HA V164PHR0.1H0 V165MSY0.1HA V165PHR0.1H0

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第三章　2016年馬祖海域觀測潮汐資料

馬祖海域潮位之觀測2013年10月本中心安裝潮位計於馬祖福澳港區(稱**測站 T**)，其位置如附圖3。2014年10月本中心安裝AWAC系統於福澳港附近海域(稱**測站 X**)。2015年9月於北竿、西莒、東引及東莒等港區安裝潮位計(稱**測站 S**、**測站 G**、**測站 L**及**測站 M**)，同時於北竿、西莒、東引及東莒等港區附近海域安裝AWAC系統(稱**測站 A**、**測站 1**、**測站 2**及**測站 3**)。**測站 F**之潮位儀屬中央氣象局所有。馬祖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，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**等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 馬祖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	26°09'36"N	119°56'37"E	2013/10-2016/11(觀測中)	港研中心	福澳港區潮位站
S	26°12'15"N	119°58'1"E	2015/09-2016/11(觀測中)	港研中心	北竿港區潮位站
G	25°58'9"N	119°55'57"E	2015/09-2016/11(觀測中)	港研中心	西莒港區潮位站
L	26°21'50"N	120°29'2"E	2015/09-2016/11(觀測中)	港研中心	東引港區潮位站
M	25°57'31"N	119°57'49"E	2015/09-2016/11(觀測中)	港研中心	東莒港區潮位站
F	26° 9'42"N	119°56'36E	2004/01-2016/11(觀測中)	中央氣象局	馬祖潮位站
X	26°09'87"N	119°56'11"E	2014/10-2016/11(觀測中)	港研中心	福澳港區外海
A	26°12'18"N	119°58'1 "E	2015/09-2016/11(觀測中)	港研中心	北竿港區外海
1	25°58'8 "N	119°55'54 "E	2015/09-2016/11(觀測中)	港研中心	西莒港區外海
2	26°21'55 "N	120°29'2 "E	2015/09-2016/11(觀測中)	港研中心	東引港區外海
3	25°57'31 "N	119°57'47 "E	2015/09-2016/11(觀測中)	港研中心	東莒港區外海

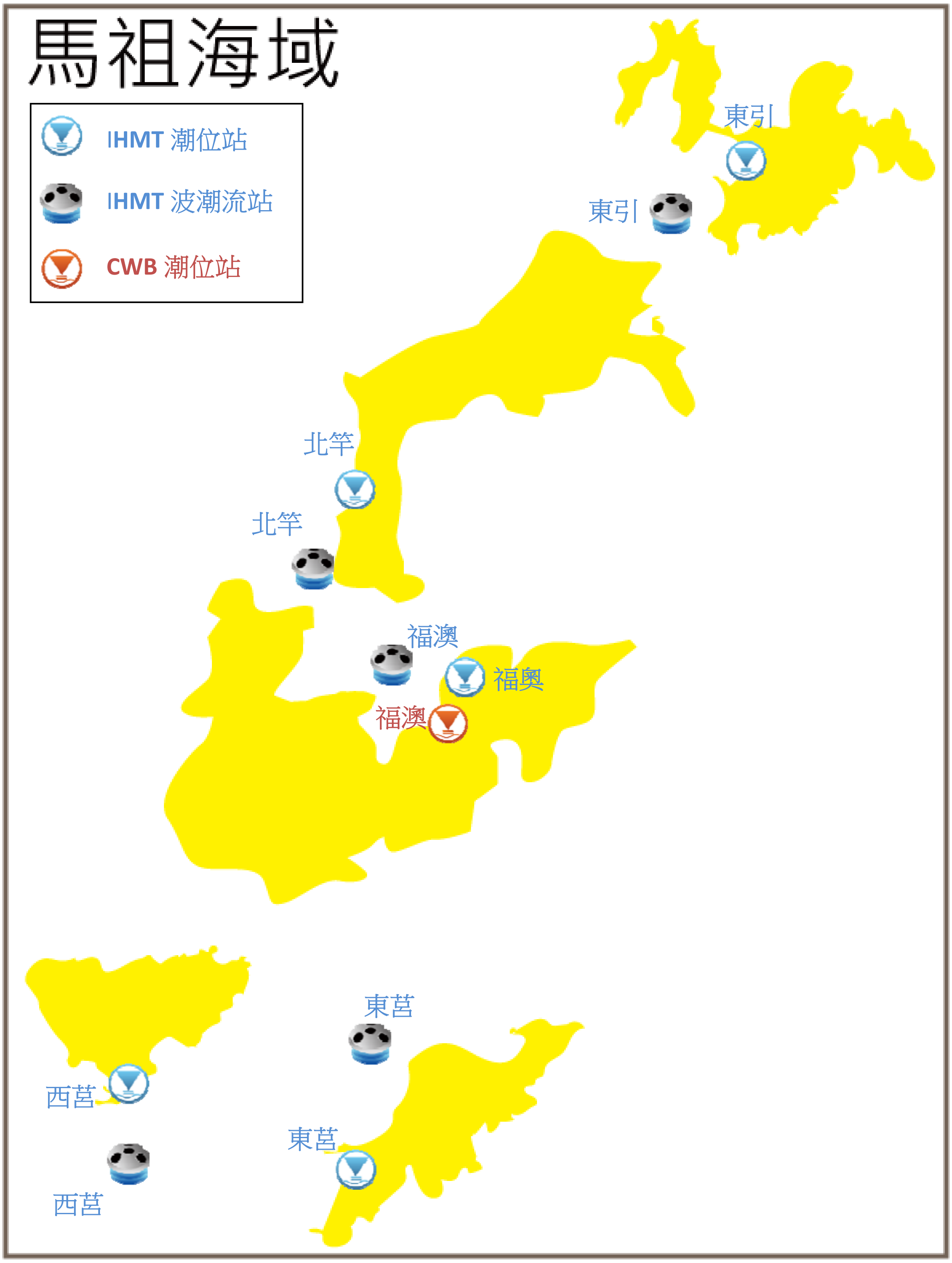

圖 3 馬祖海域潮汐觀測站位置示意圖

表3.1a 2016年每月馬祖海域修補前各測站觀測潮汐資料紀錄統計表

年/月 港區	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域
測站	T	X	F	S	G	L	M	A
2015/12月	742 (99.7%)	699 (94.0%)	*	742 (99.7%)	744 (100%)	742 (99.7%)	*	741 (99.6%)
2016/ 1月	744 (100%)	573 (77.0%)	*	734 (98.7%)	744 (100%)	744 (100%)	*	738 (99.2%)
2016/ 2月	696 (100%)	638 (91.7%)	*	696 (100%)	696 (100%)	696 (100%)	*	692 (99.4%)
2016/ 3月	743 (99.9%)	659 (88.6%)	*	742 (99.7%)	742 (99.7%)	744 (100%)	79 (10.6%)	737 (99.1%)
2016/ 4月	720 (100%)	696 (96.7%)	*	720 (100%)	719 (99.9%)	716 (99.4%)	719 (99.9%)	714 (99.2%)
2016/ 5月	744 (100%)	739 (99.3%)	*	743 (99.9%)	743 (99.9%)	742 (99.7%)	744 (100%)	742 (99.7%)
2016/ 6月	720 (100%)	706 (98.1%)	*	720 (100%)	720 (100%)	718 (99.7%)	720 (100%)	705 (97.9%)
2016/ 7月	744 (100%)	741 (99.6%)	*	744 (100%)	579 (77.8%)	743 (99.9%)	744 (100%)	743 (99.9%)
2016/ 8月	744 (100%)	704 (94.6%)	*	744 (100%)	194 (26.1%)	744 (100%)	744 (100%)	741 (99.6%)
2016/ 9月	720 (100%)	556 (77.2%)	*	720 (100%)	*	719 (99.9%)	644 (89.4%)	710 (98.6%)
2016/10月	744 (100%)	396 (53.2%)	*	744 (100%)	130 (17.5%)	743 (99.9%)	*	741 (99.6%)
2016/11月	720 (100%)	702 (97.5%)	*	720 (100%)	720 (100%)	720 (100%)	*	706 (98.1%)
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年每月馬祖海域修補後各測站潮汐資料統計表

年/月 港區	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域
測站	T	X	F	S	G	L	M	A
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	*	*	*	*	*	*	*	*

Tidal Level in Ma-Tsu Seas of MST0 at 2016

1 8 15 22

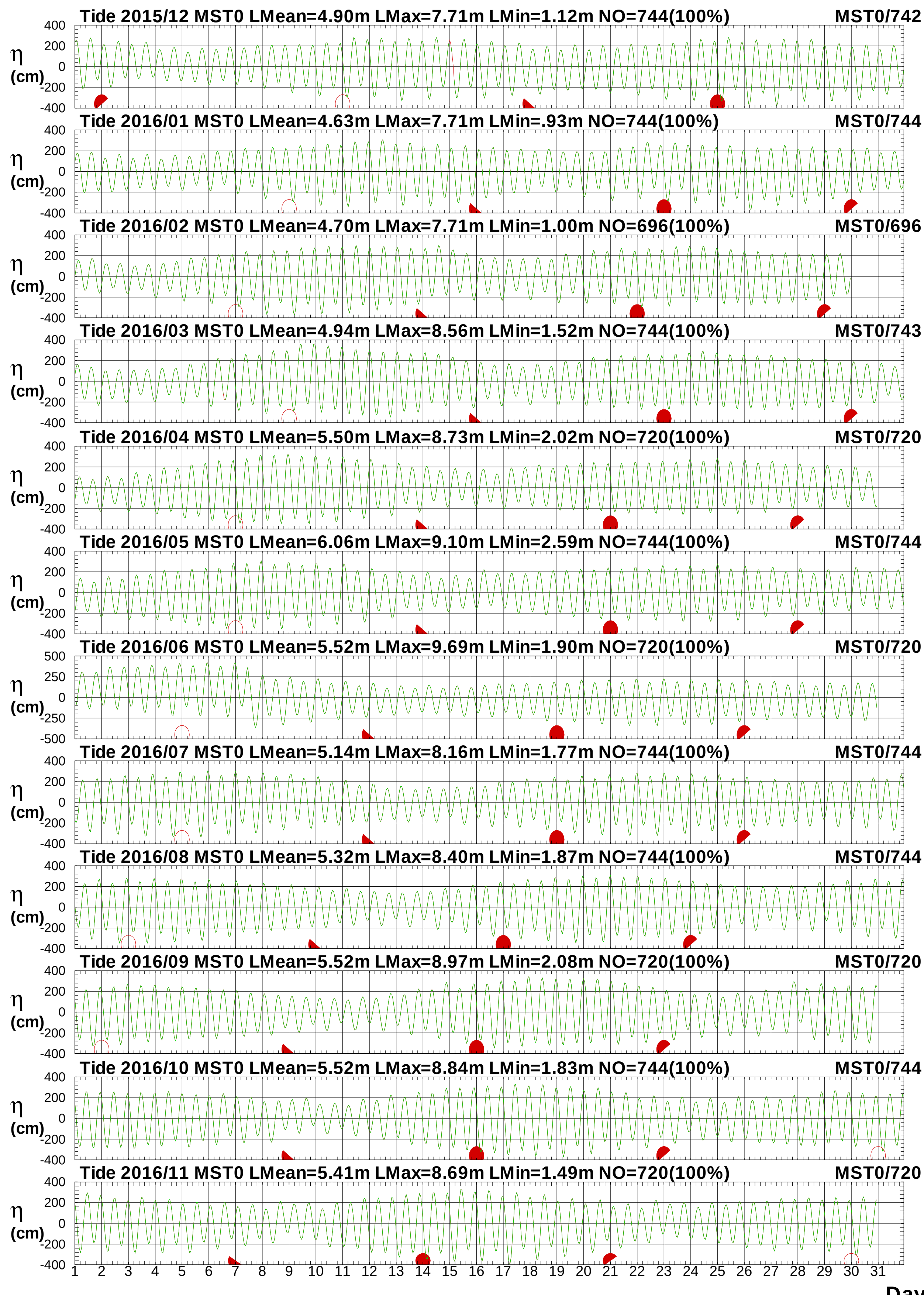

圖 3.1.1　2016年每月馬祖海域 T 站修補前後之潮位比較圖

T15CMST0.1HA T15CMST0.1H0 T161MST0.1HA T161MST0.1H0 T162MST0.1HA T162MST0.1H0 T163MST0.1HA T163MST0.1H0 T164MST0.1HA T164MST0.1H0 T165MST0.1HA T165MST0.1H0	Institute of Harbor & Marine Technology

Tidal Level in Ma-Tsu Seas of MST0 at 2016

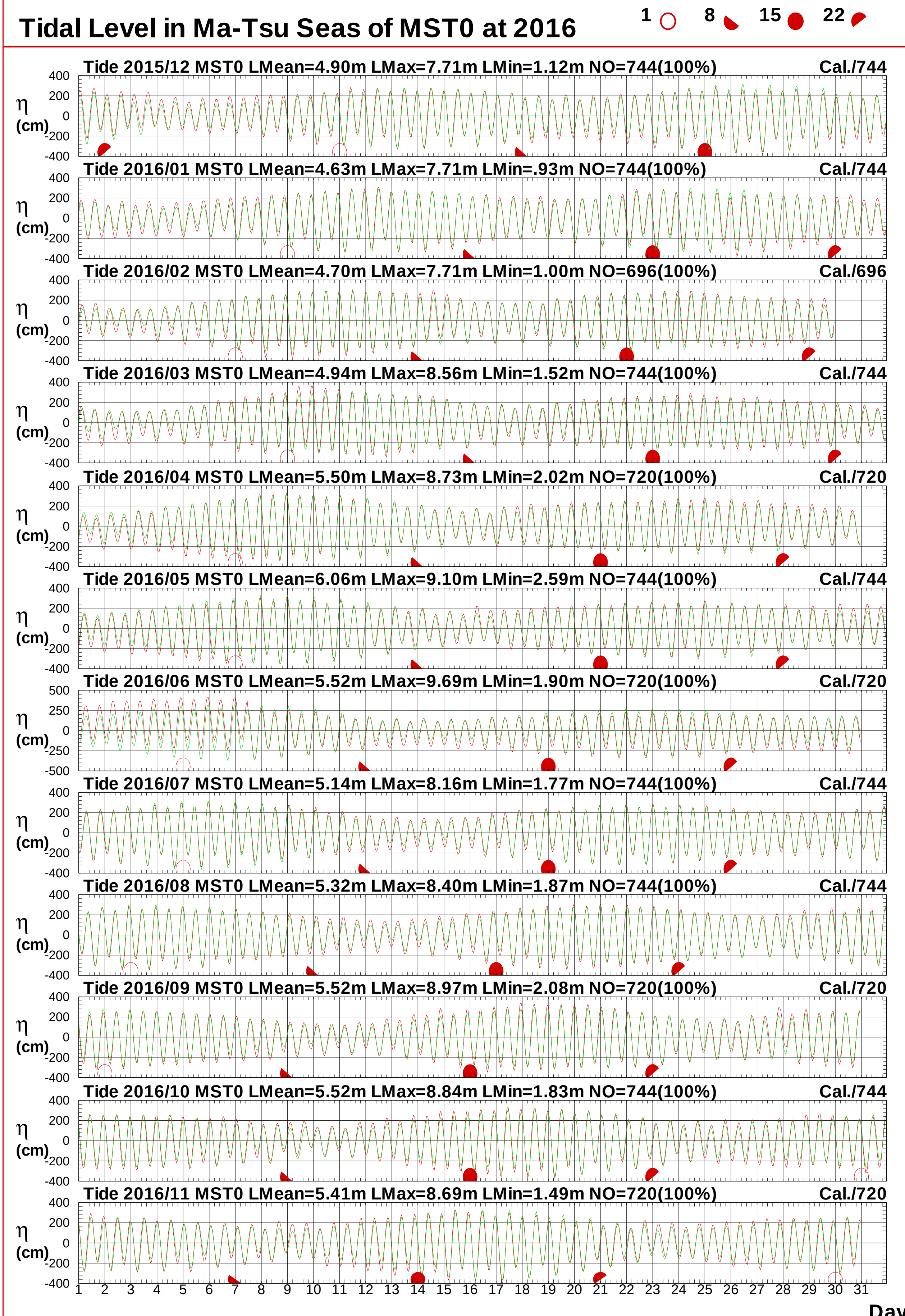

圖 3.1.2　2016年每月馬祖海域 T 站潮位歷線圖 (綠線: 天文潮)

T15CMST0.1HA T15CMST0.1HC T161MST0.1HA T161MST0.1HC T162MST0.1HA T162MST0.1HC T163MST0.1HA T163MST0.1HC T164MST0.1HA T164MST0.1HC T165MST0.1HA T165MST0.1HC	Institute of Harbor & Marine Technology

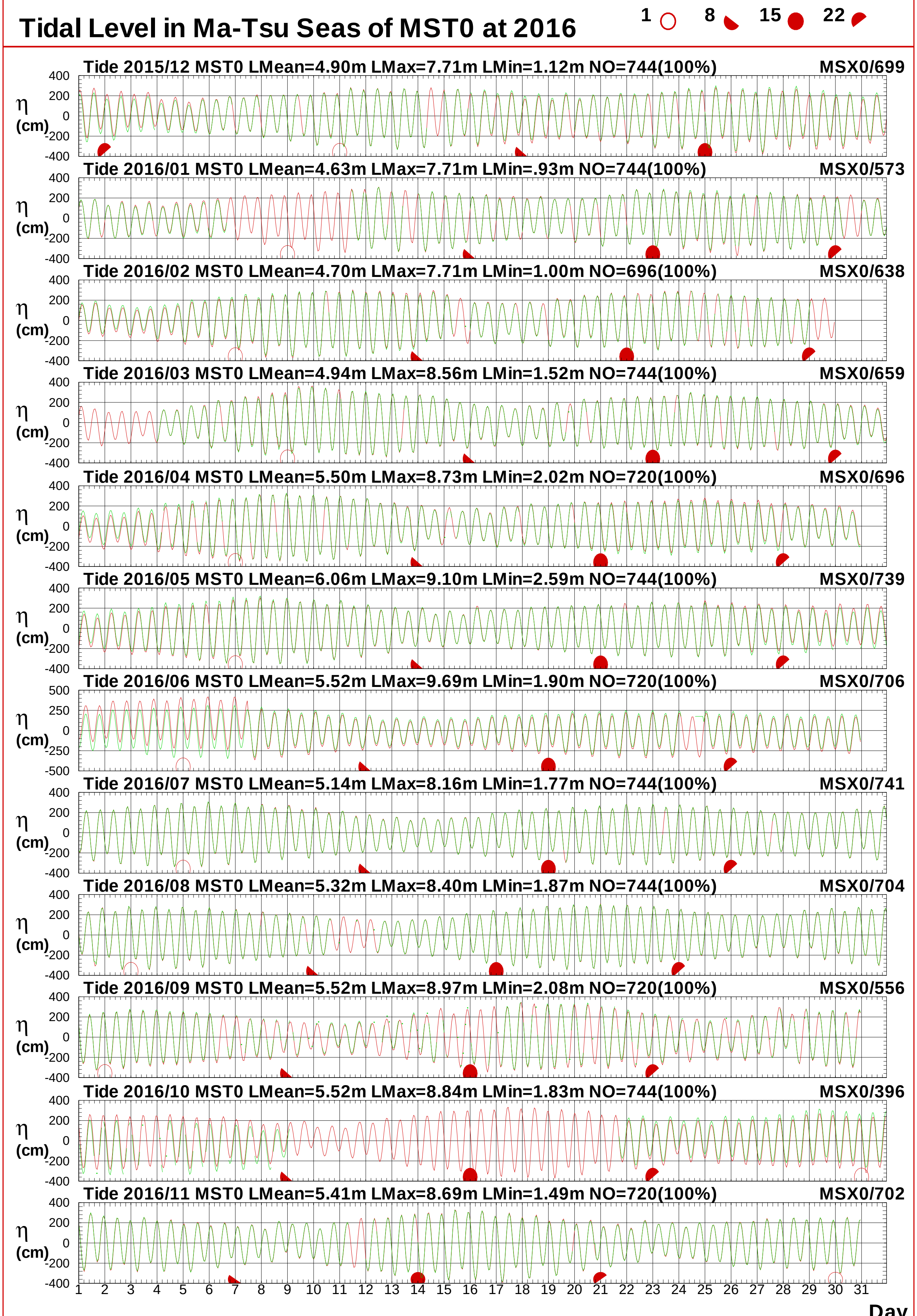

圖 3.1.3　2016年每月馬祖海域 T 站與 X 站潮位比較圖

T15CMST0.1HA T15CMSX0.1H0 T161MST0.1HA T161MSX0.1H0 T162MST0.1HA T162MSX0.1H0
T163MST0.1HA T163MSX0.1H0 T164MST0.1HA T164MSX0.1H0 T165MST0.1HA T165MSX0.1H0

Institute of Harbor & Marine Technology

CURT4K.BAT(CURT4KV.DAT)

2017/07/03

Tidal Level in Ma-Tsu Seas of MST0 at 2016

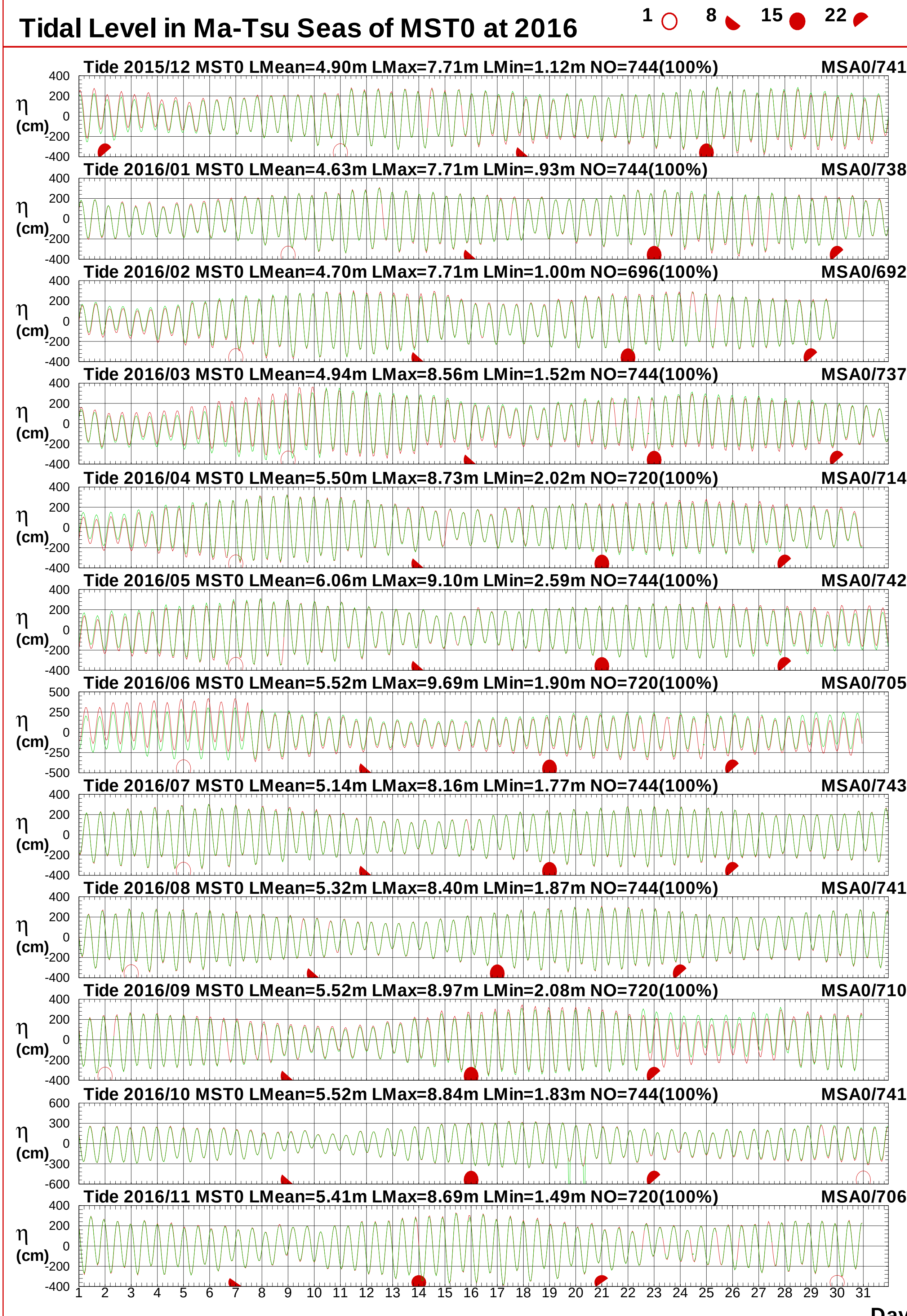

圖3.1.4 2016年每月馬祖海域 T 站與 A 站潮位比較圖

T15CMST0.1HA T15CMSA0.1H0 T161MST0.1HA T161MSA0.1H0 T162MST0.1HA T162MSA0.1H0
T163MST0.1HA T163MSA0.1H0 T164MST0.1HA T164MSA0.1H0 T165MST0.1HA T165MSA0.1H0

Institute of Harbor & Marine Technology

Tidal Level in Ma-Tsu Seas of MST0 at 2016

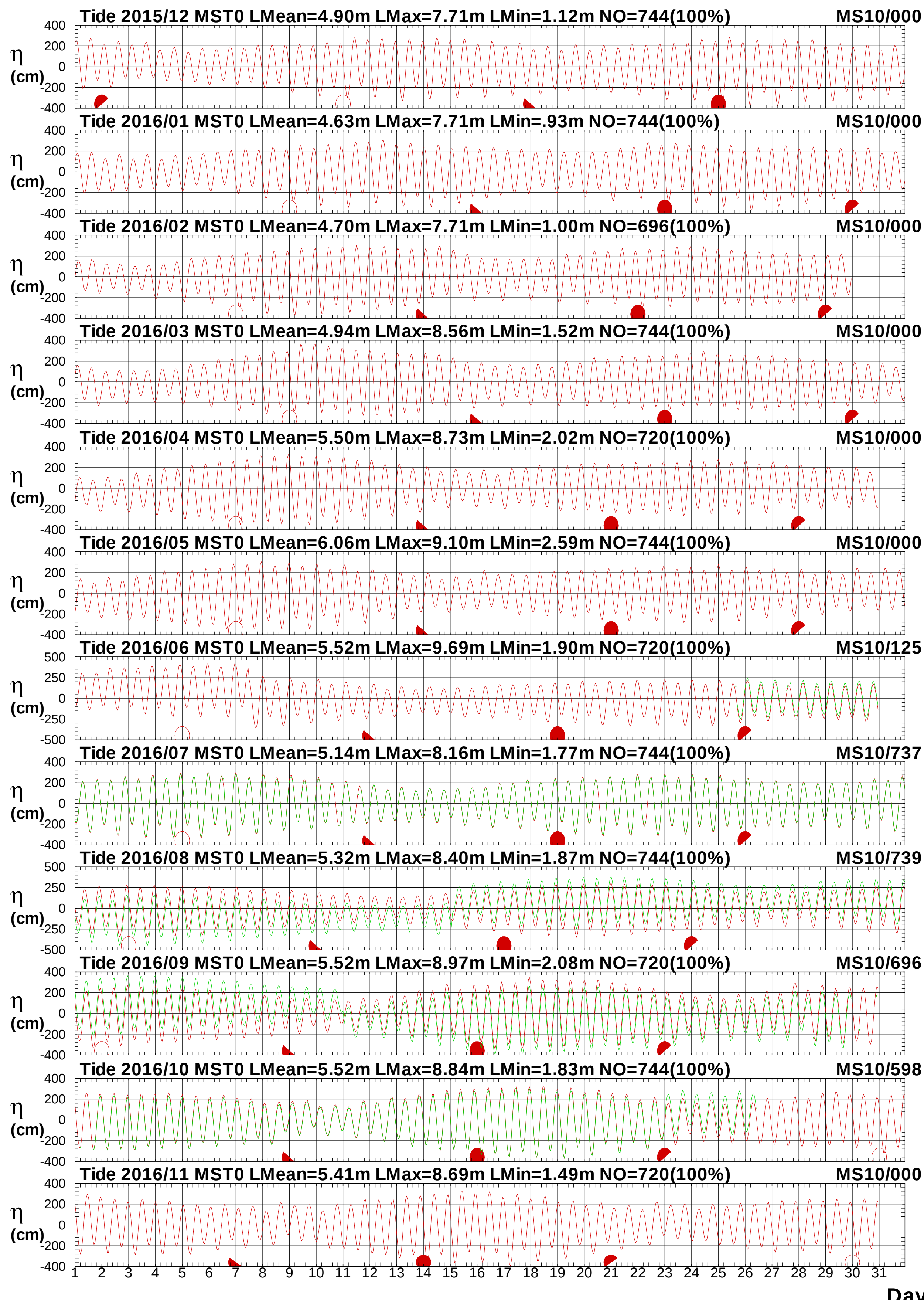

圖 3.1.5　2016年每月馬祖海域 T 站與1站潮位比較圖

T15CMST0.1HA T15CMS10.1H0 T161MST0.1HA T161MS10.1H0 T162MST0.1HA T162MS10.1H0 T163MST0.1HA T163MS10.1H0 T164MST0.1HA T164MS10.1H0 T165MST0.1HA T165MS10.1H0	Institute of Harbor & Marine Technology

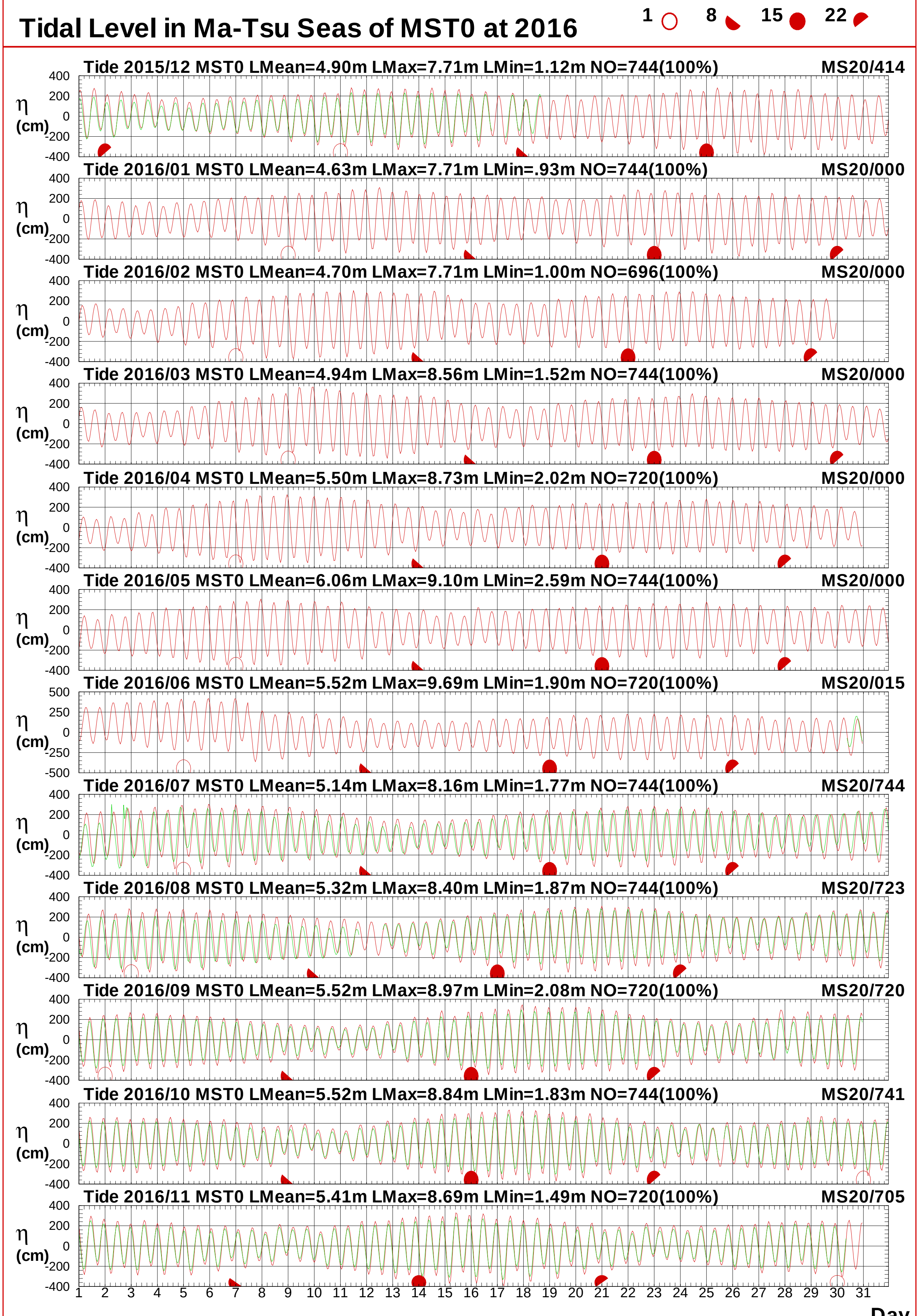

圖3.1.6　2016年每月馬祖海域 T 站與2站潮位比較圖

T15CMST0.1HA T15CMS20.1H0 T161MST0.1HA T161MS20.1H0 T162MST0.1HA T162MS20.1H0
T163MST0.1HA T163MS20.1H0 T164MST0.1HA T164MS20.1H0 T165MST0.1HA T165MS20.1H0

Institute of Harbor & Marine Technology

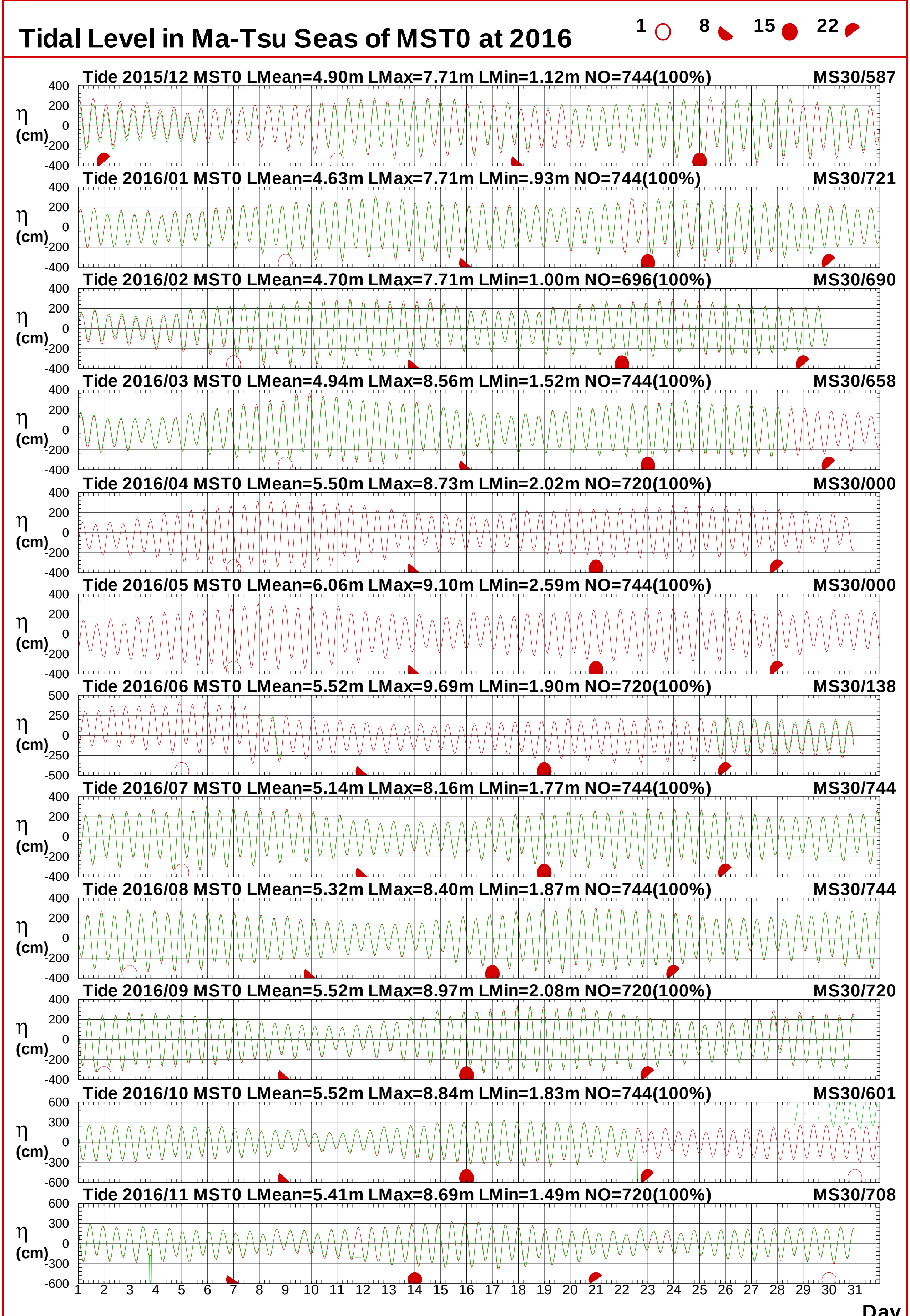

圖 3.1.7　2016年每月馬祖海域 T 站與3站潮位比較圖

T15CMST0.1HA T15CMS30.1H0 T161MST0.1HA T161MS30.1H0 T162MST0.1HA T162MS30.1H0

T163MST0.1HA T163MS30.1H0 T164MST0.1HA T164MS30.1H0 T165MST0.1HA T165MS30.1H0

Institute of Harbor & Marine Technology

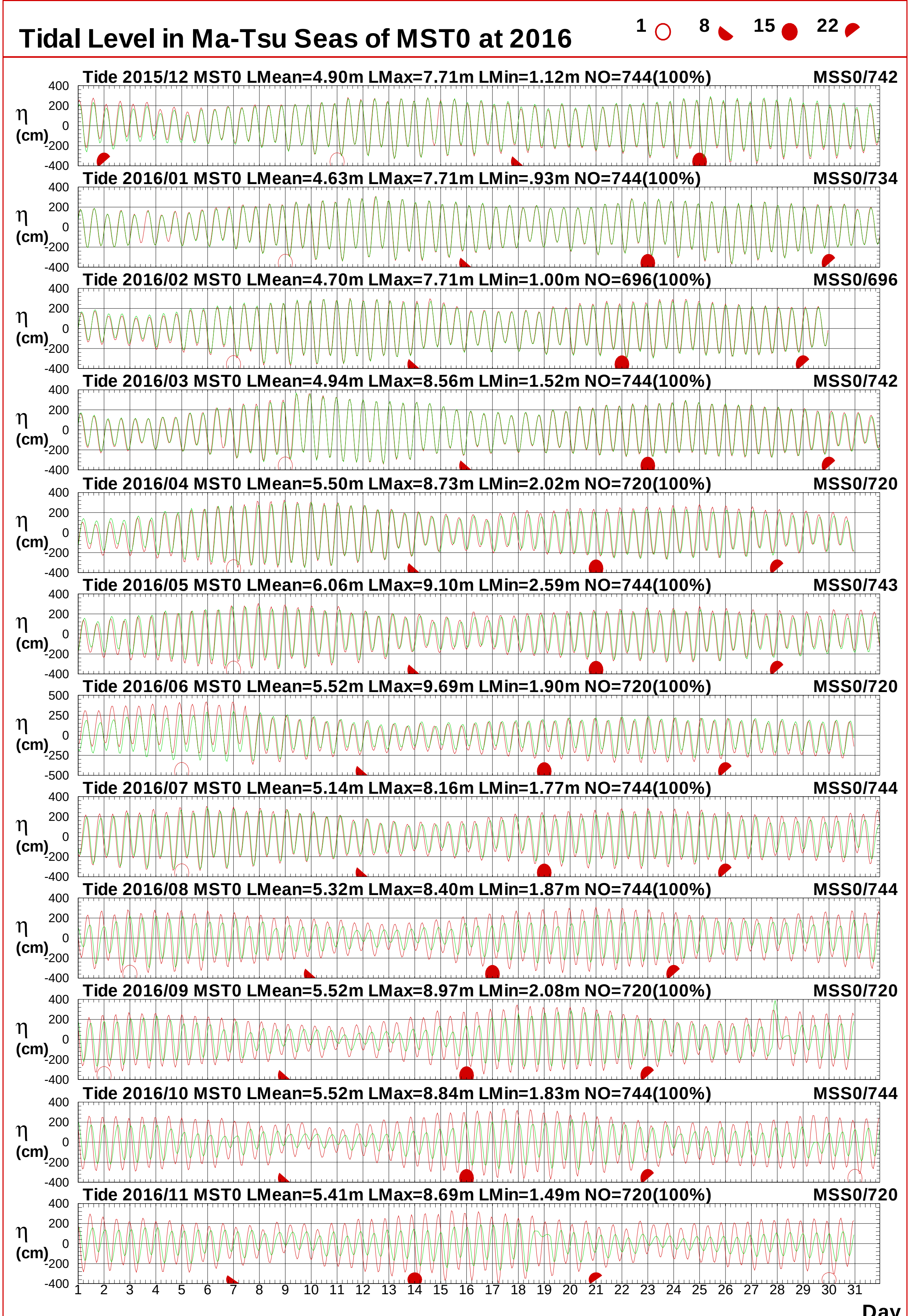

圖3.1.8　2016年每月馬祖海域 T 站與 S 站潮位比較圖

T15CMST0.1HA T15CMSS0.1H0 T161MST0.1HA T161MSS0.1H0 T162MST0.1HA T162MSS0.1H0 T163MST0.1HA T163MSS0.1H0 T164MST0.1HA T164MSS0.1H0 T165MST0.1HA T165MSS0.1H0	Institute of Harbor & Marine Technology

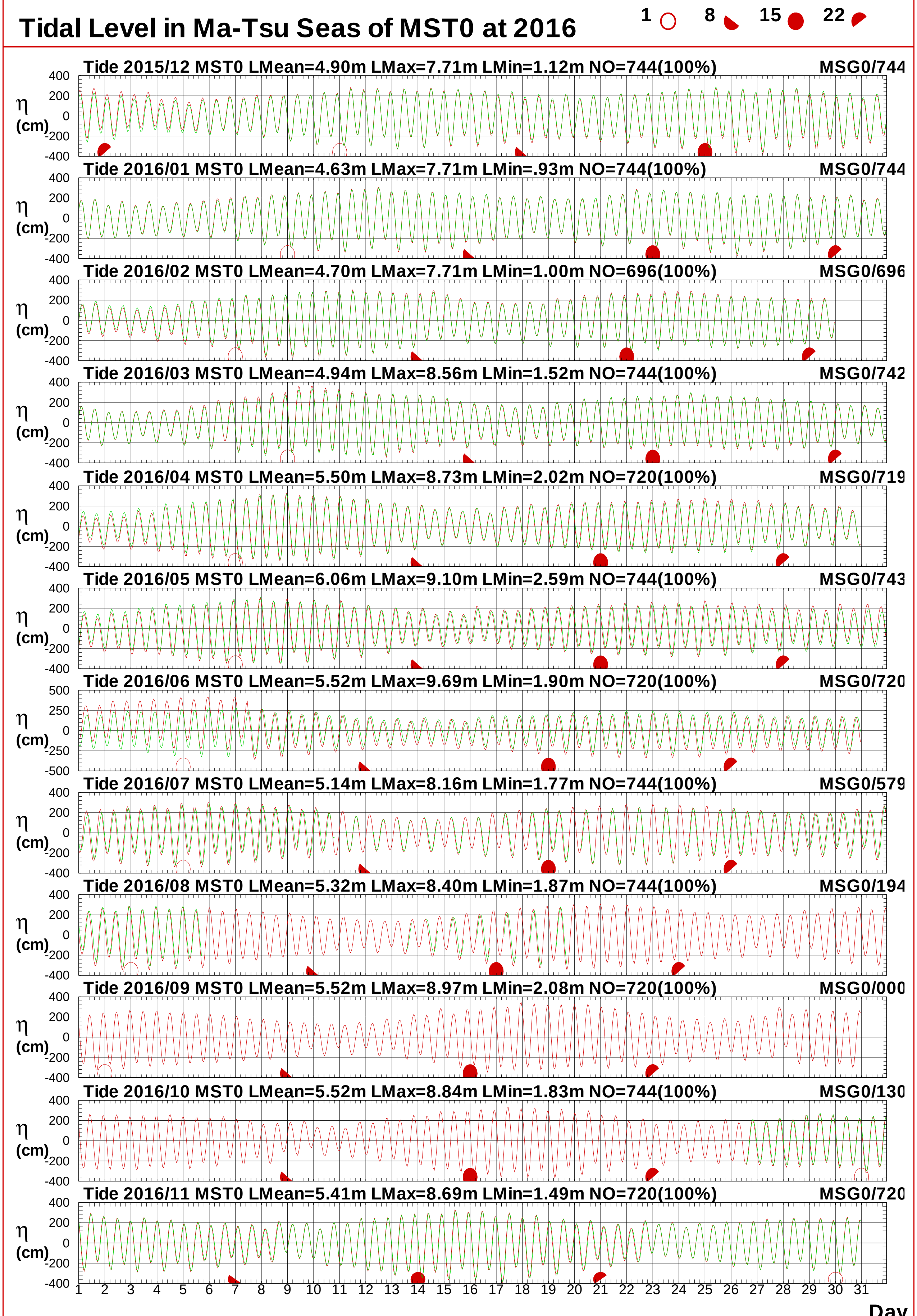

圖 3.1.9　2016年每月馬祖海域 T 站與 G 站潮位比較圖

T15CMST0.1HA T15CMSG0.1H0 T161MST0.1HA T161MSG0.1H0 T162MST0.1HA T162MSG0.1H0 T163MST0.1HA T163MSG0.1H0 T164MST0.1HA T164MSG0.1H0 T165MST0.1HA T165MSG0.1H0	Institute of Harbor & Marine Technology

Tidal Level in Ma-Tsu Seas of MST0 at 2016

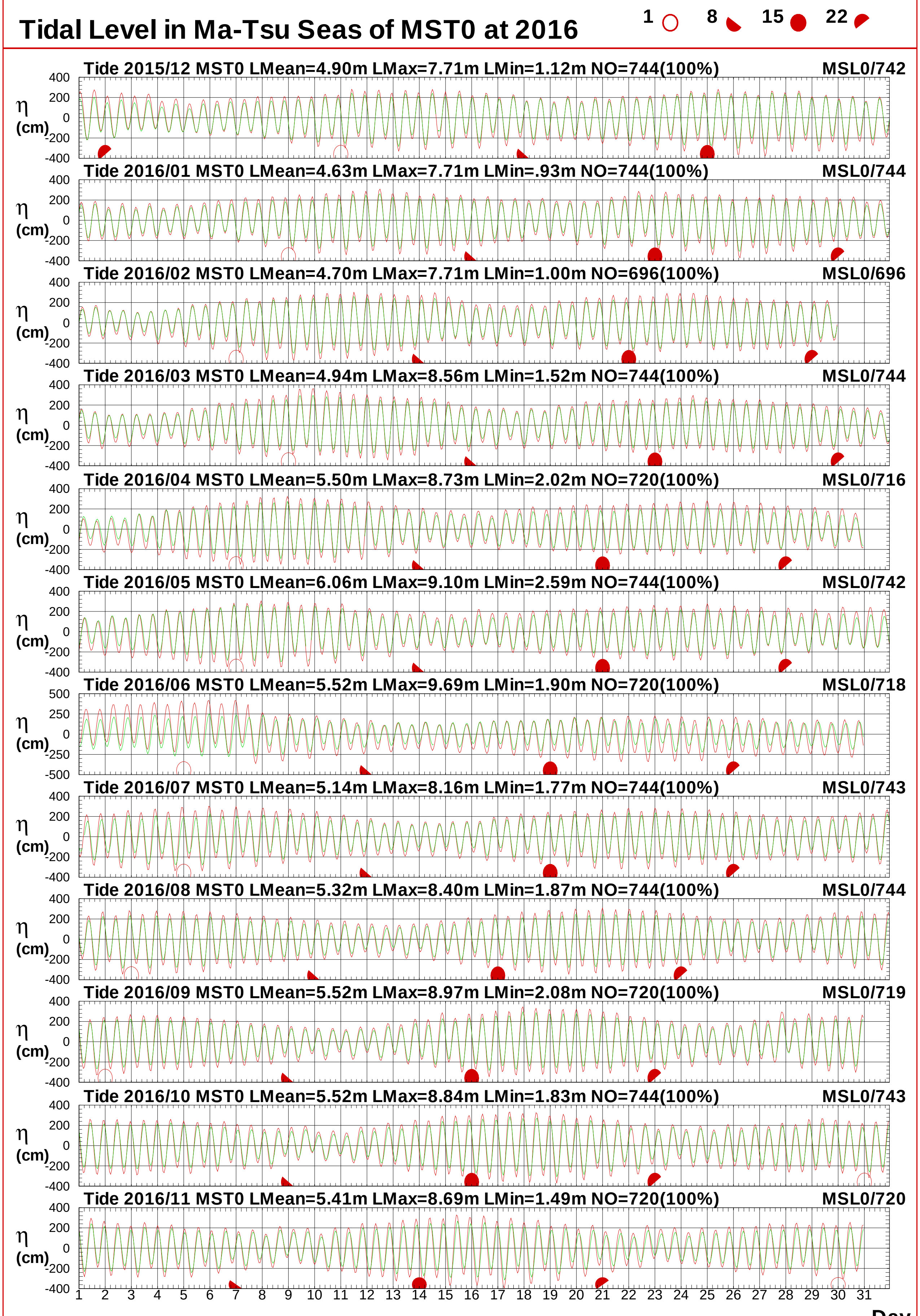

圖 3.1.10　2016年每月馬祖海域 T 站與 L 站潮位比較圖

T15CMST0.1HA T15CMSL0.1H0 T161MST0.1HA T161MSL0.1H0 T162MST0.1HA T162MSL0.1H0
T163MST0.1HA T163MSL0.1H0 T164MST0.1HA T164MSL0.1H0 T165MST0.1HA T165MSL0.1H0

Institute of Harbor & Marine Technology

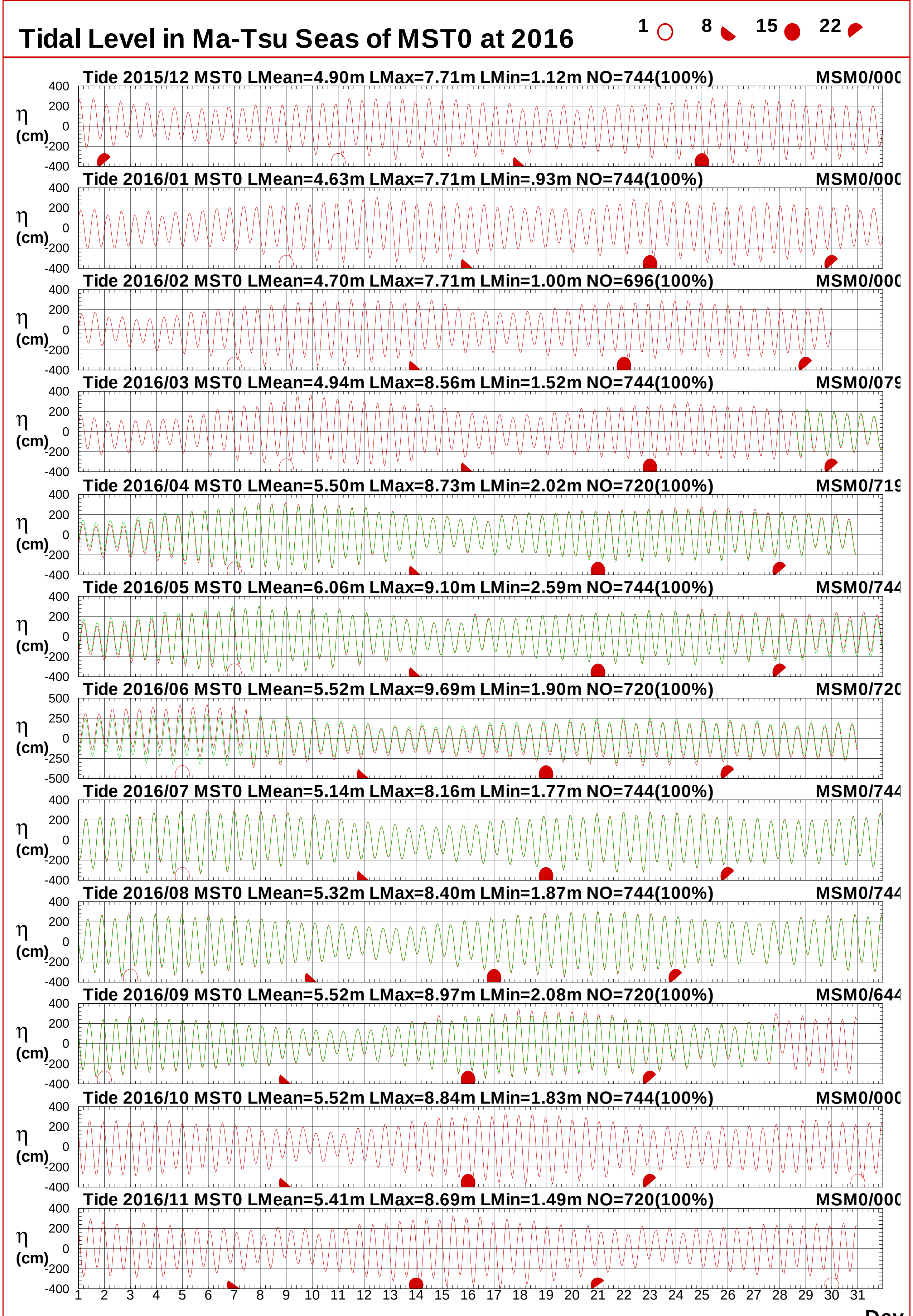

圖 3.1.11　2016年每月馬祖海域 T 站與 M 站潮位比較圖

T15CMST0.1HA T15CMSM0.1H0 T161MST0.1HA T161MSM0.1H0 T162MST0.1HA T162MSM0.1H0
T163MST0.1HA T163MSM0.1H0 T164MST0.1HA T164MSM0.1H0 T165MST0.1HA T165MSM0.1H0

Institute of Harbor & Marine Technology

第四章　2016 年馬祖海域觀測海流資料

馬祖海域海流之觀測係 2014 年 10 月本中心**(IHMT)**安裝挪威 NORTEK 公司表面波浪監測系統於馬祖港福澳港區(稱**測站 X**) ，其位置如附圖 4。2015 年 9 月本中心於北竿、西莒、東引及東莒等 4 處增設潮波流儀 AWAC(稱**測站 A**、**測站 1**、**測站 2** 及**測站 3**) 。馬祖海域各測站歷年觀測海流資料蒐集概況如表 4。

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 馬祖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
X	26°09'87"N	119°56'11"E	2014/10-2016/11(觀測中)	港研中心	馬祖福澳港 AWCP
A	26°12'18"N	119°58'1 "E	2015/09-2016/11(觀測中)	港研中心	北竿港區 AWCP
1	25°58'8 "N	119°55'54 "E	2015/09-2016/11(觀測中)	港研中心	西莒 AWCP
2	26°21'55 "N	120°29'2 "E	2015/09-2016/11(觀測中)	港研中心	東引 AWCP
3	25°57'31 "N	119°57'47 "E	2015/09-2016/11(觀測中)	港研中心	東莒 AWCP

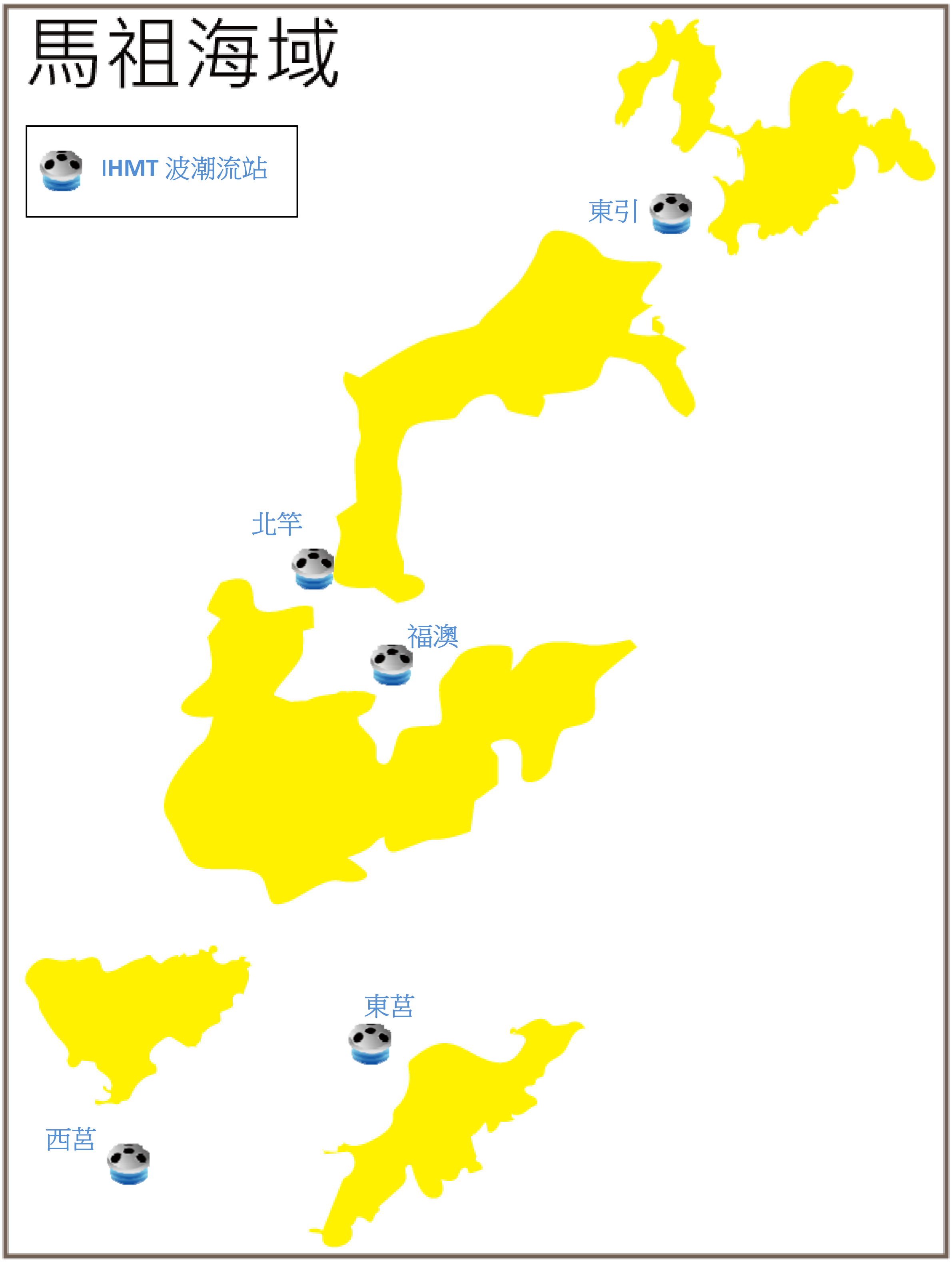

圖 4 馬祖海域海流觀測站位置示意圖

表4.1a 2016年每月馬祖海域各測站觀測海流資料紀錄統計表

年/月 港區	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域
測站	X	Y	A	1	2	3		
2015/12月	699 (94.0%)	*	741 (99.6%)	*	414 (55.6%)	587 (78.9%)	*	*
2016/ 1月	573 (77.0%)	*	738 (99.2%)	*	*	721 (96.9%)	*	*
2016/ 2月	638 (91.7%)	*	692 (99.4%)	*	*	690 (99.1%)	*	*
2016/ 3月	659 (88.6%)	*	737 (99.1%)	*	*	658 (88.4%)	*	*
2016/ 4月	696 (96.7%)	*	714 (99.2%)	*	*	*	*	*
2016/ 5月	739 (99.3%)	*	742 (99.7%)	*	*	*	*	*
2016/ 6月	706 (98.1%)	*	705 (97.9%)	125 (17.4%)	15 (2.1%)	138 (19.2%)	*	*
2016/ 7月	741 (99.6%)	*	743 (99.9%)	737 (99.1%)	744 (100%)	744 (100%)	*	*
2016/ 8月	704 (94.6%)	*	741 (99.6%)	739 (99.3%)	723 (97.2%)	744 (100%)	*	*
2016/ 9月	556 (77.2%)	*	710 (98.6%)	696 (96.7%)	720 (100%)	720 (100%)	*	*
2016/10月	396 (53.2%)	*	741 (99.6%)	598 (80.4%)	741 (99.6%)	601 (80.8%)	*	*
2016/11月	702 (97.5%)	*	706 (98.1%)	*	705 (97.9%)	708 (98.3%)	*	*
2016/冬季	1910 (87.5%)	*	2171 (99.4%)	*	414 (19.0%)	1998 (91.5%)	*	*
2016/春季	2094 (94.8%)	*	2193 (99.3%)	*	*	658 (29.8%)	*	*
2016/夏季	2151 (97.4%)	*	2189 (99.1%)	1601 (72.5%)	1482 (67.1%)	1626 (73.6%)	*	*
2016/秋季	1654 (75.7%)	*	2157 (98.8%)	1294 (59.2%)	2166 (99.2%)	2029 (92.9%)	*	*
2016/整年	7809 (88.9%)	*	8710 (99.2%)	2895 (33.0%)	4062 (46.2%)	6311 (71.8%)	*	*
起始年月	2015/12	*	2015/12	2016/06	2015/12	2015/12	*	*
結束年月	2016/11	*	2016/11	2016/10	2016/11	2016/11	*	*

ST-X: 港灣技術研究中心觀測 X 站流速資料

表4.1b 2016年每月馬祖海域計算潮流各測站資料統計表

年/月 港區	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域	馬祖海域
測站	X	Y	A	1	2	3		
2015/12月	744 (100%)	*	744 (100%)	744 (100%)	744 (100%)	744 (100%)	*	*
2016/ 1月	744 (100%)	*	744 (100%)	744 (100%)	744 (100%)	744 (100%)	*	*
2016/ 2月	696 (100%)	*	696 (100%)	696 (100%)	696 (100%)	696 (100%)	*	*
2016/ 3月	744 (100%)	*	744 (100%)	744 (100%)	744 (100%)	744 (100%)	*	*
2016/ 4月	720 (100%)	*	720 (100%)	720 (100%)	720 (100%)	720 (100%)	*	*
2016/ 5月	744 (100%)	*	744 (100%)	744 (100%)	744 (100%)	744 (100%)	*	*
2016/ 6月	720 (100%)	*	720 (100%)	720 (100%)	720 (100%)	720 (100%)	*	*
2016/ 7月	744 (100%)	*	744 (100%)	744 (100%)	744 (100%)	744 (100%)	*	*
2016/ 8月	744 (100%)	*	744 (100%)	744 (100%)	744 (100%)	744 (100%)	*	*
2016/ 9月	720 (100%)	*	720 (100%)	720 (100%)	720 (100%)	720 (100%)	*	*
2016/10月	744 (100%)	*	744 (100%)	744 (100%)	744 (100%)	744 (100%)	*	*
2016/11月	720 (100%)	*	720 (100%)	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 Ma-Tsu Seas of MSX0 at 2016

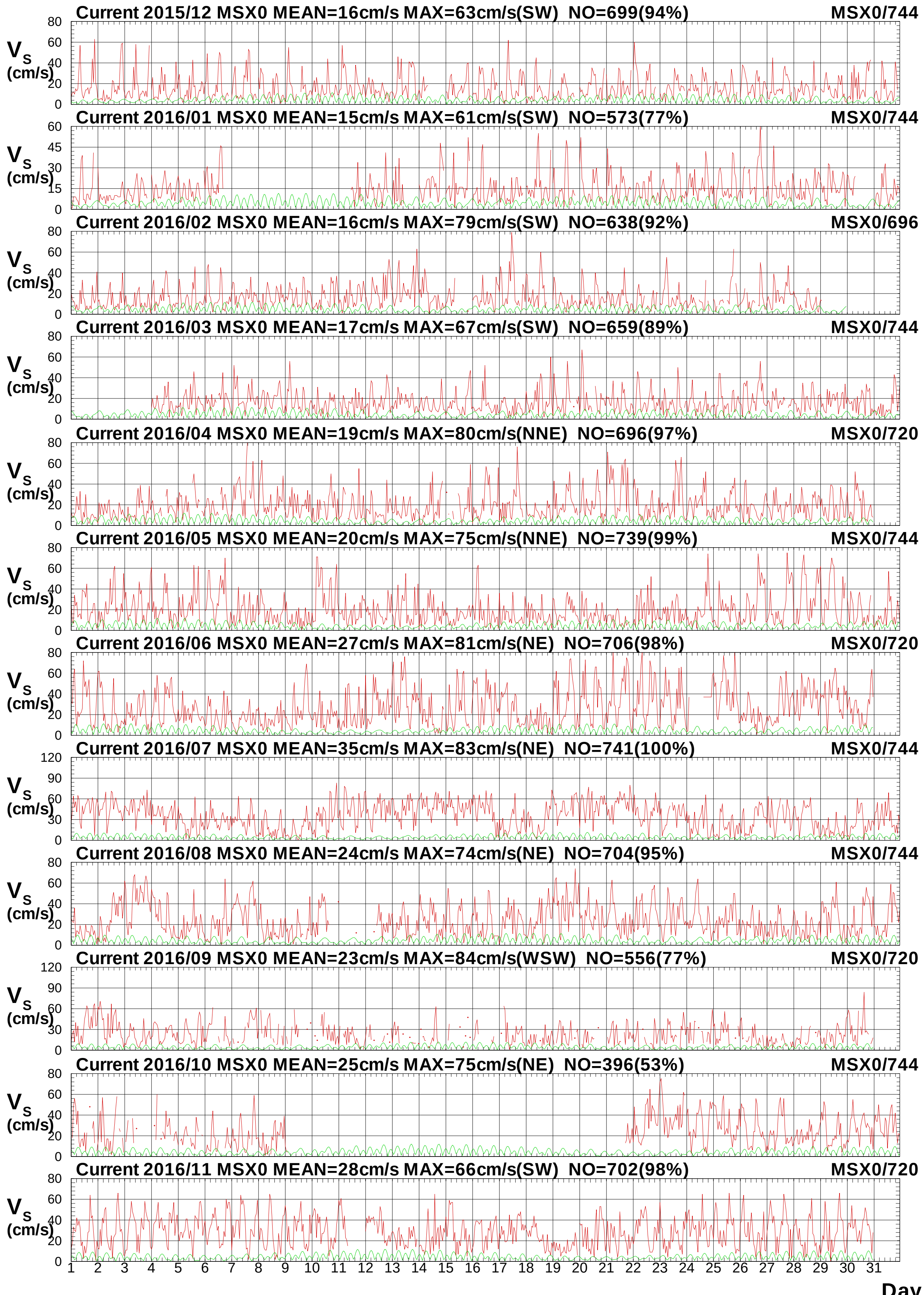

圖 4.1a　2016年每月馬祖海域 X 站觀測與潮流流速比較圖

C15CMSX0.1H0 C15CMSX0.1HD C161MSX0.1H0 C161MSX0.1HD C162MSX0.1H0 C162MSX0.1HD
C163MSX0.1H0 C163MSX0.1HD C164MSX0.1H0 C164MSX0.1HD C165MSX0.1H0 C165MSX0.1HD

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Current Direction in Ma-Tsu Seas of MSX0 at 2016

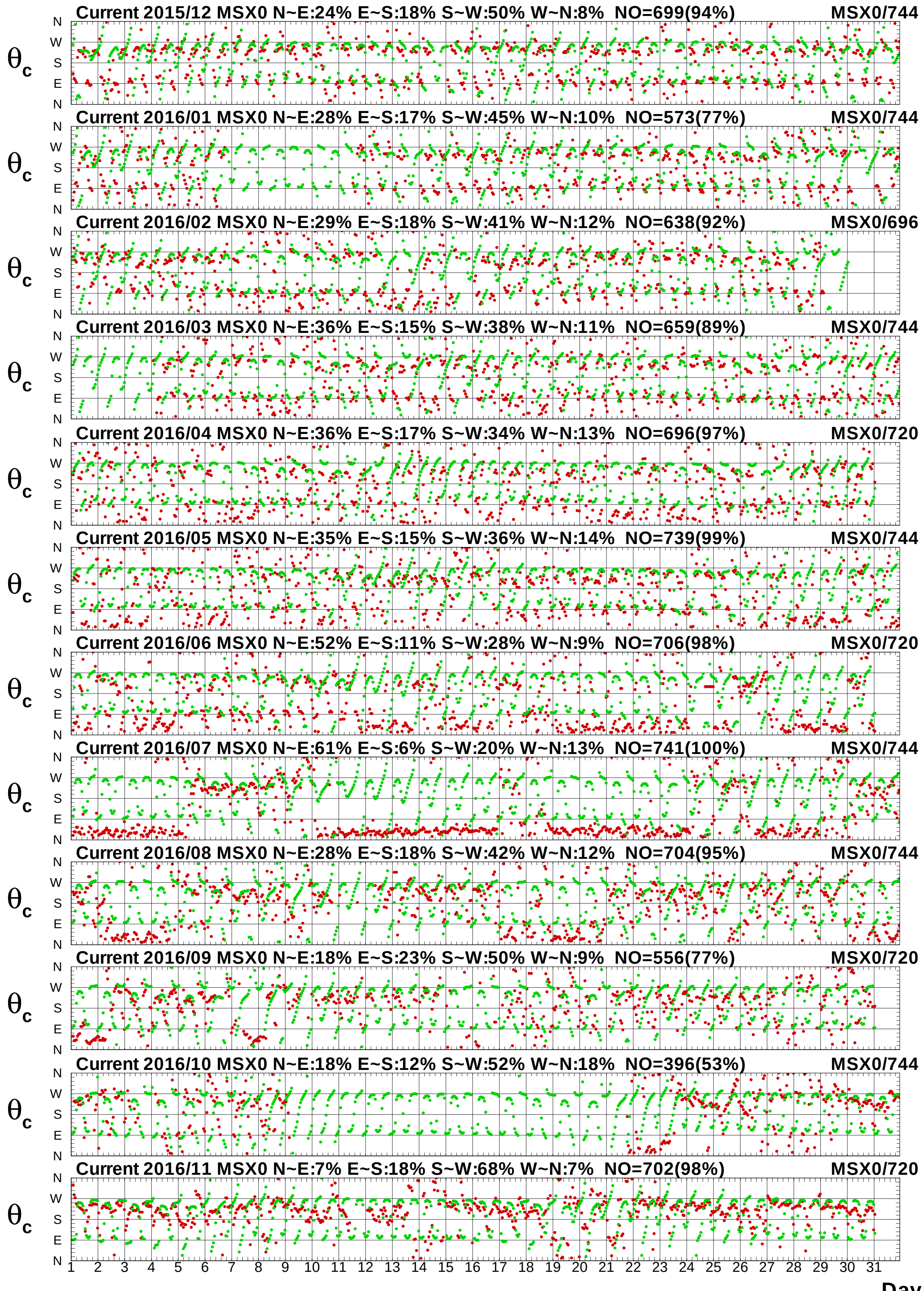

圖 4.1b　2016年每月馬祖海域 X 站觀測與潮流流向比較圖

C15CMSX0.1H0 C15CMSX0.1HD C161MSX0.1H0 C161MSX0.1HD C162MSX0.1H0 C162MSX0.1HD C163MSX0.1H0 C163MSX0.1HD C164MSX0.1H0 C164MSX0.1HD C165MSX0.1H0 C165MSX0.1HD	Institute of Harbor & Marine Technology

Current Speed in Ma-Tsu Seas of MSX0 at 2016

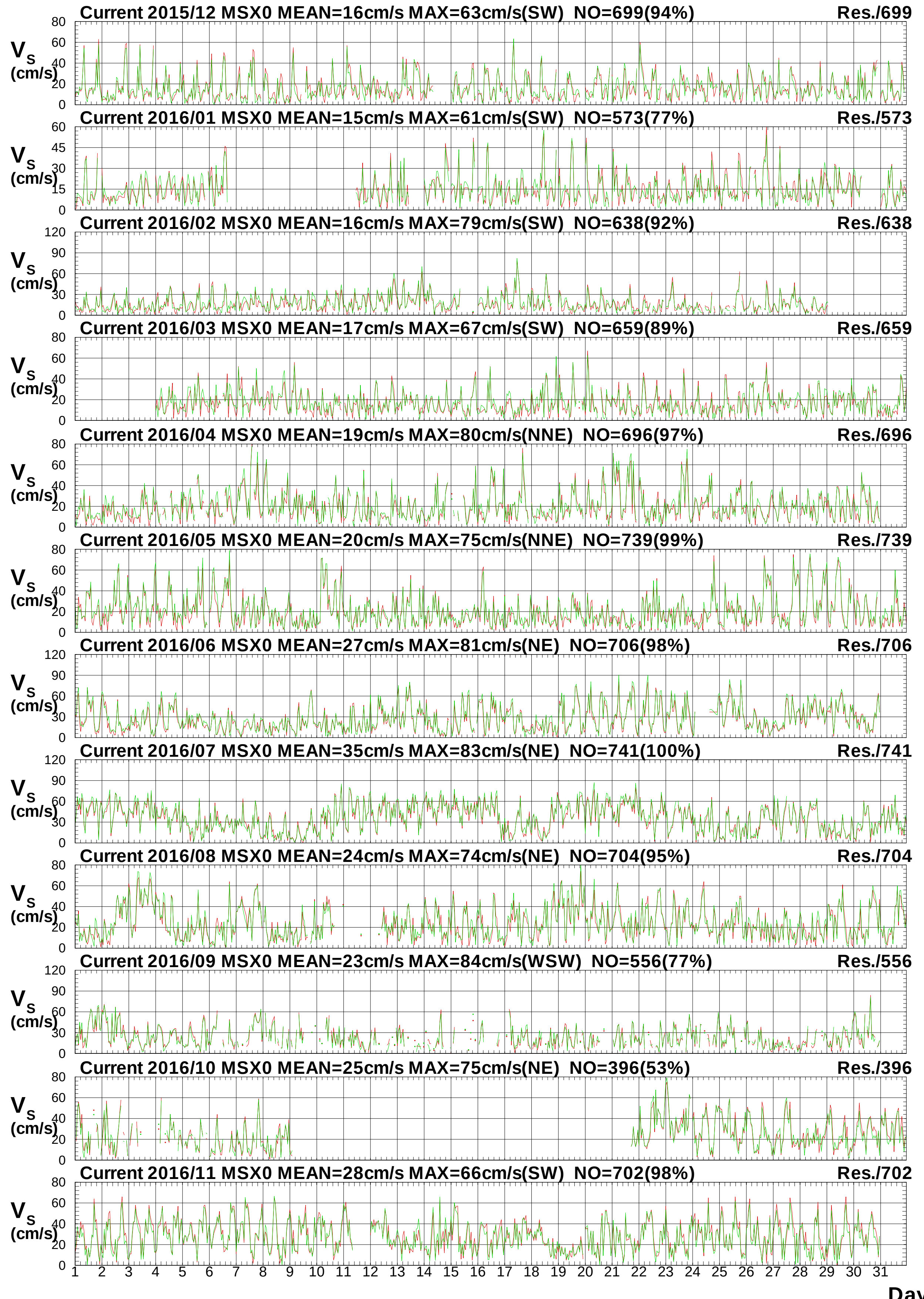

圖 4.2a　2016年每月馬祖海域 X 站觀測與非潮流速比較圖

C15CMSX0.1H0 C15CMSX0.1HR C161MSX0.1H0 C161MSX0.1HR C162MSX0.1H0 C162MSX0.1HR
C163MSX0.1H0 C163MSX0.1HR C164MSX0.1H0 C164MSX0.1HR C165MSX0.1H0 C165MSX0.1HR

Institute of Harbor & Marine Technology

Current Direction in Ma-Tsu Seas of MSX0 at 2016

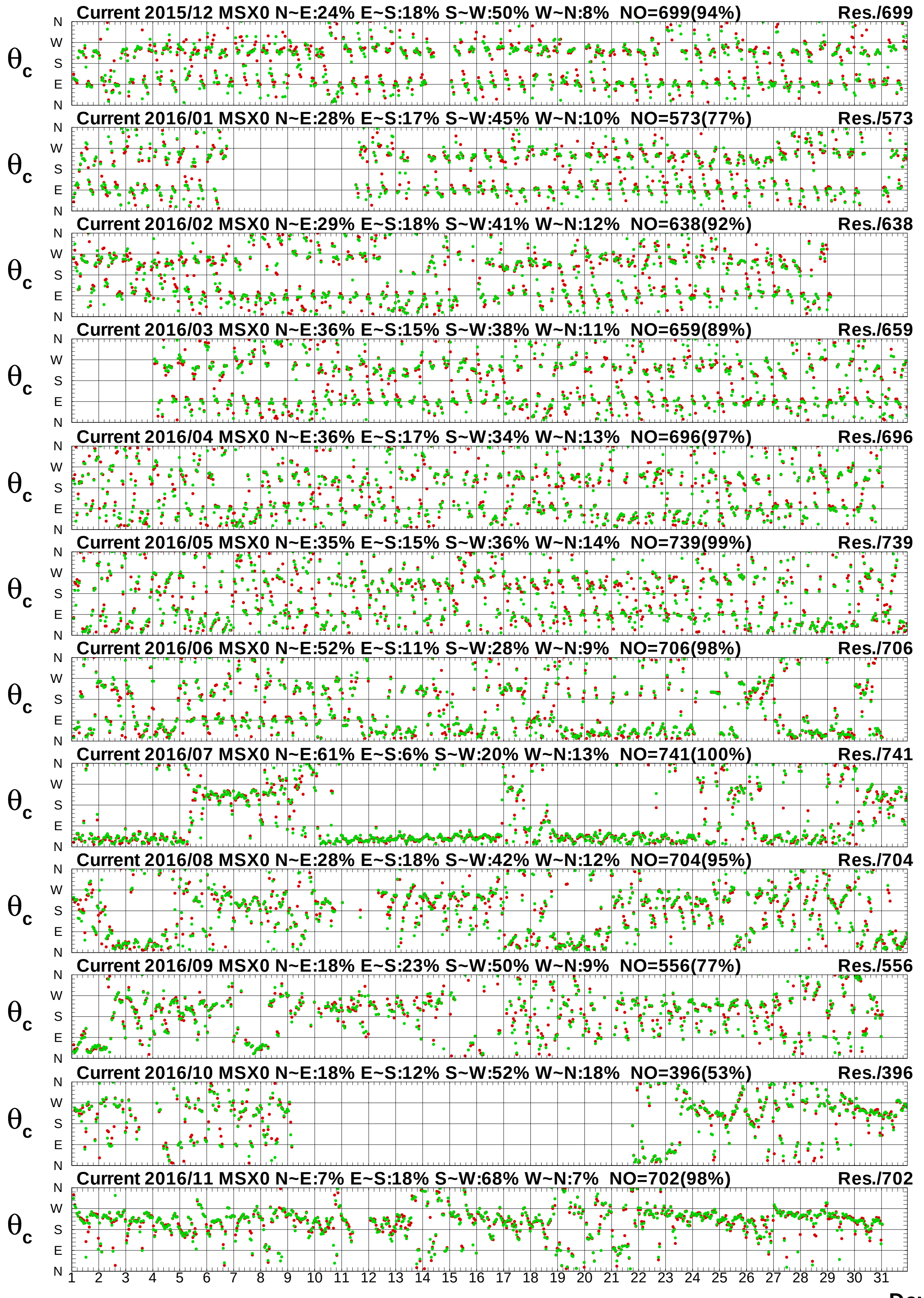

圖 4.2b　2016年每月馬祖海域 X 站觀測與非潮流向比較圖

C15CMSX0.1H0 C15CMSX0.1HR C161MSX0.1H0 C161MSX0.1HR C162MSX0.1H0 C162MSX0.1HR C163MSX0.1H0 C163MSX0.1HR C164MSX0.1H0 C164MSX0.1HR C165MSX0.1H0 C165MSX0.1HR	Institute of Harbor & Marine Technology

Current Speed in Ma-Tsu Seas of MSA0 at 2016

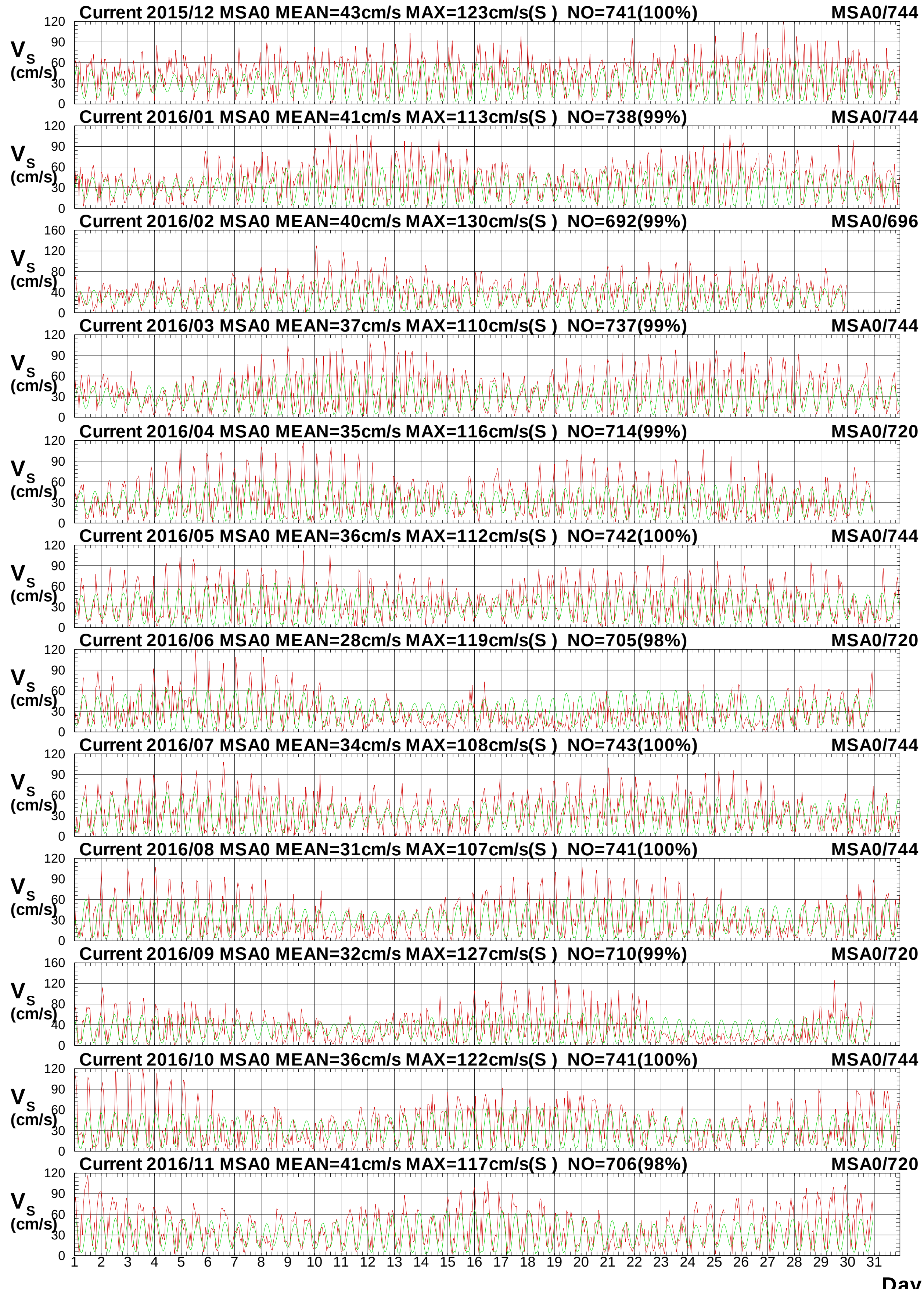

圖 4.3a　2016年每月馬祖海域 A 站觀測與潮流流速比較圖

C15CMSA0.1H0 C15CMSA0.1HD C161MSA0.1H0 C161MSA0.1HD C162MSA0.1H0 C162MSA0.1HD

C163MSA0.1H0 C163MSA0.1HD C164MSA0.1H0 C164MSA0.1HD C165MSA0.1H0 C165MSA0.1HD

Institute of Harbor & Marine Technology

Current Direction in Ma-Tsu Seas of MSA0 at 2016

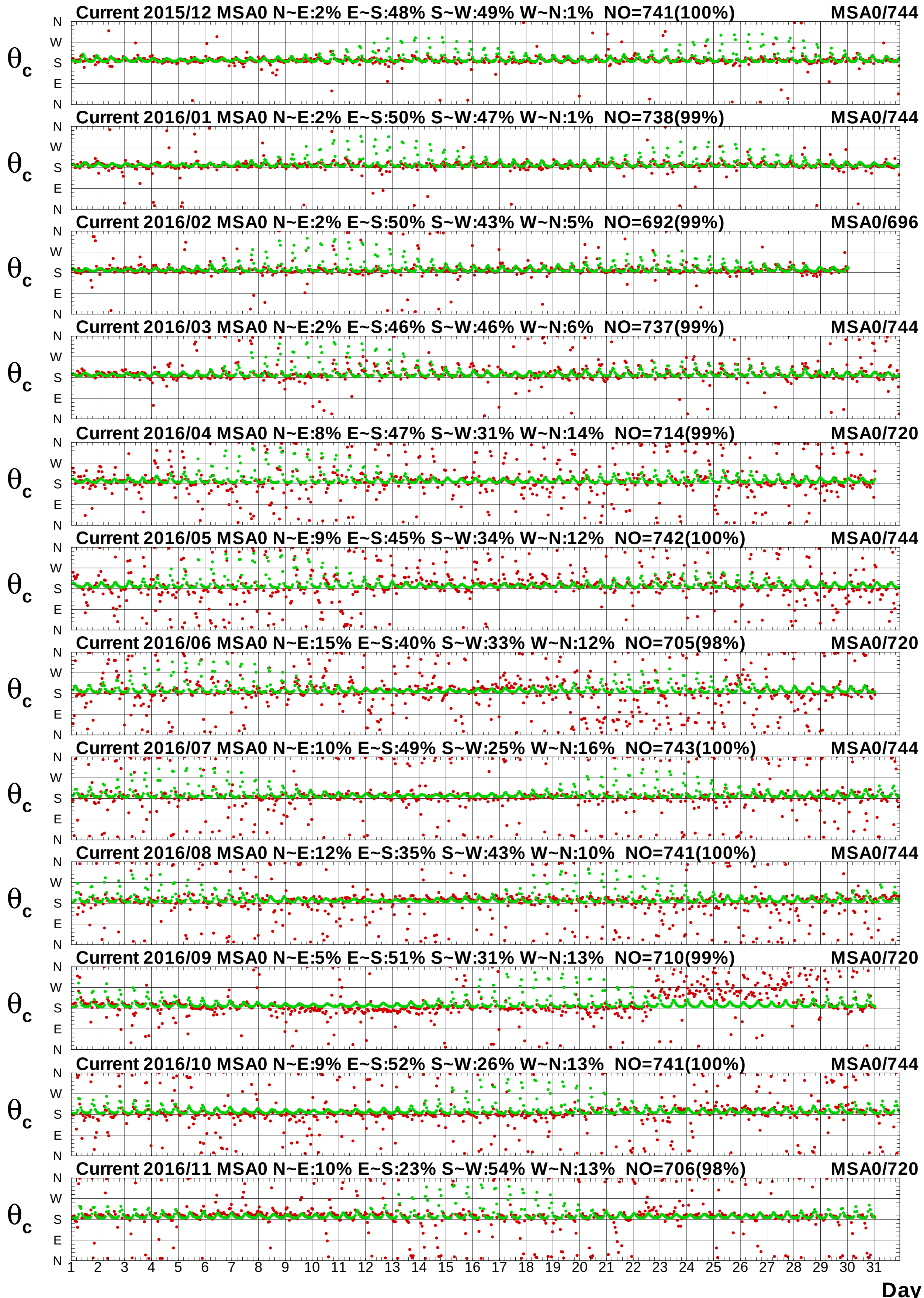

圖 4.3b　2016年每月馬祖海域 A 站觀測與潮流流向比較圖

C15CMSA0.1H0 C15CMSA0.1HD C161MSA0.1H0 C161MSA0.1HD C162MSA0.1H0 C162MSA0.1HD C163MSA0.1H0 C163MSA0.1HD C164MSA0.1H0 C164MSA0.1HD C165MSA0.1H0 C165MSA0.1HD	Institute of Harbor & Marine Technology

Current Speed in Ma-Tsu Seas of MSA0 at 2016

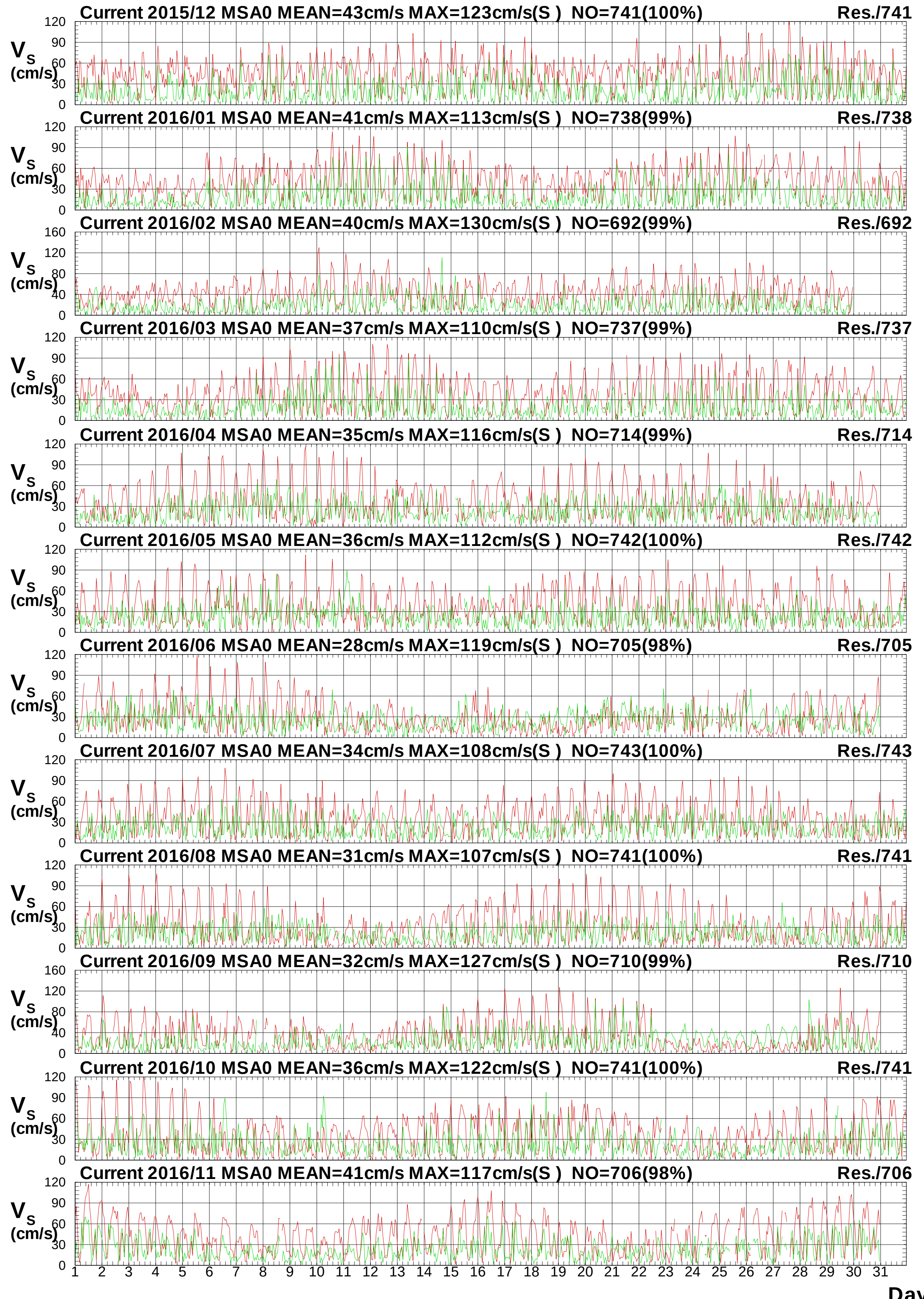

圖 4.4a　2016年每月馬祖海域 A 站觀測與非潮流速比較圖

C15CMSA0.1H0 C15CMSA0.1HR C161MSA0.1H0 C161MSA0.1HR C162MSA0.1H0 C162MSA0.1HR C163MSA0.1H0 C163MSA0.1HR C164MSA0.1H0 C164MSA0.1HR C165MSA0.1H0 C165MSA0.1HR	Institute of Harbor & Marine Technology

Current Direction in Ma-Tsu Seas of MSA0 at 2016

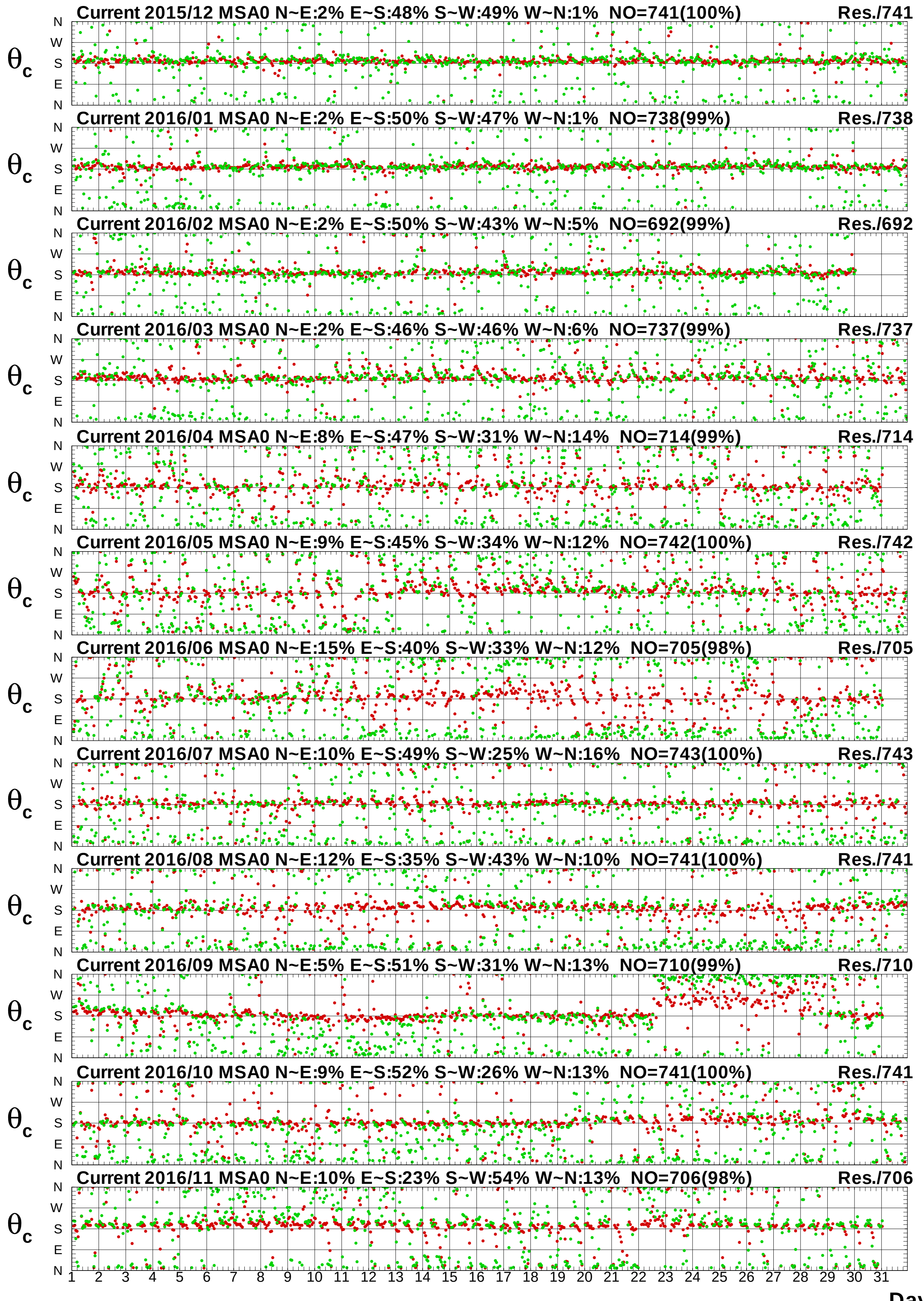

圖 4.4b　2016年每月馬祖海域 A 站觀測與非潮流向比較圖

C15CMSA0.1H0 C15CMSA0.1HR C161MSA0.1H0 C161MSA0.1HR C162MSA0.1H0 C162MSA0.1HR
C163MSA0.1H0 C163MSA0.1HR C164MSA0.1H0 C164MSA0.1HR C165MSA0.1H0 C165MSA0.1HR

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Current Speed in Ma-Tsu Seas of MS10 at 2016

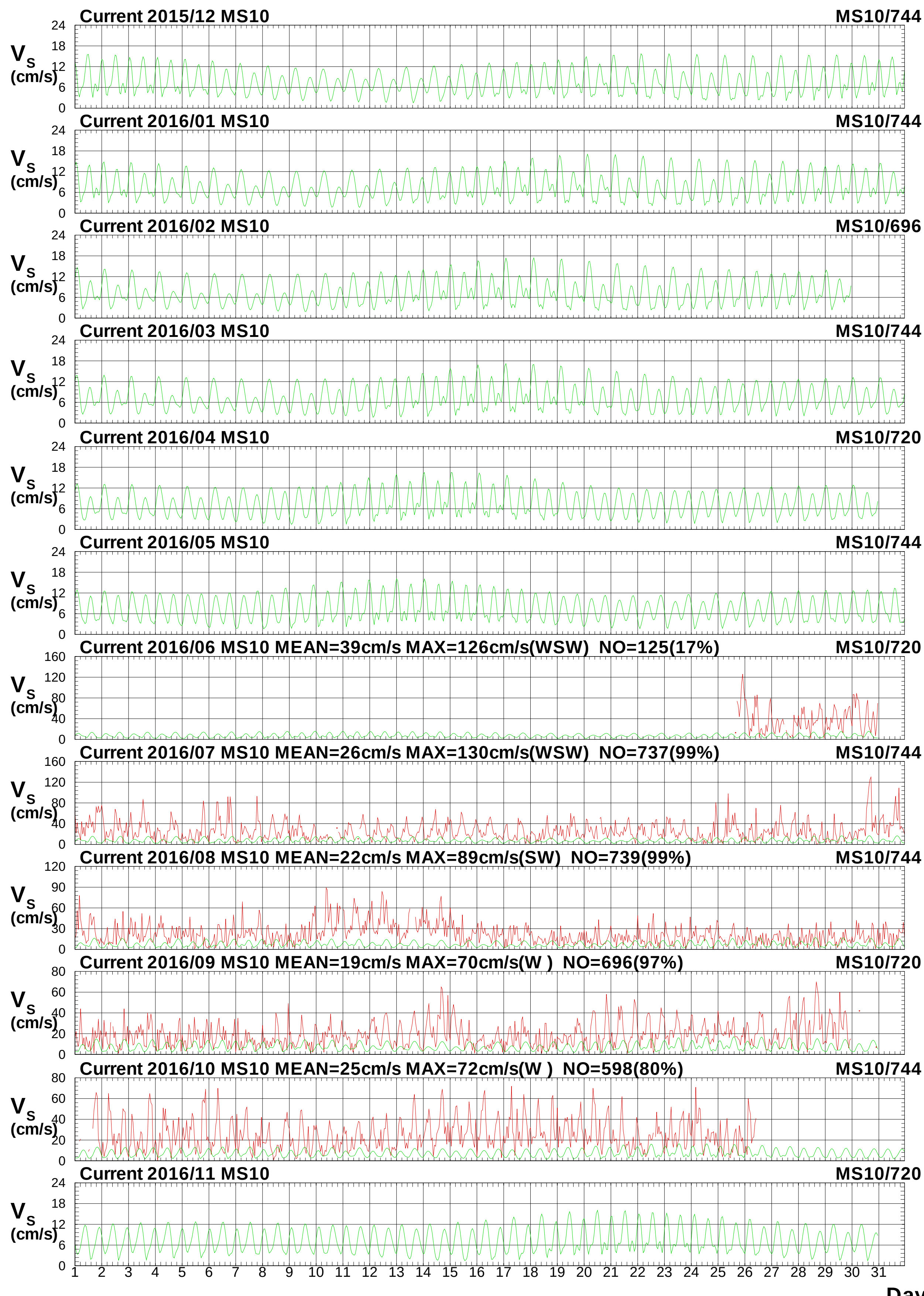

圖 4.5a　2016年每月馬祖海域1站觀測與潮流流速比較圖

C15CMS10.1H0 C15CMS10.1HD C161MS10.1H0 C161MS10.1HD C162MS10.1H0 C162MS10.1HD C163MS10.1H0 C163MS10.1HD C164MS10.1H0 C164MS10.1HD C165MS10.1H0 C165MS10.1HD	Institute of Harbor & Marine Technology

Current Direction in Ma-Tsu Seas of MS10 at 2016

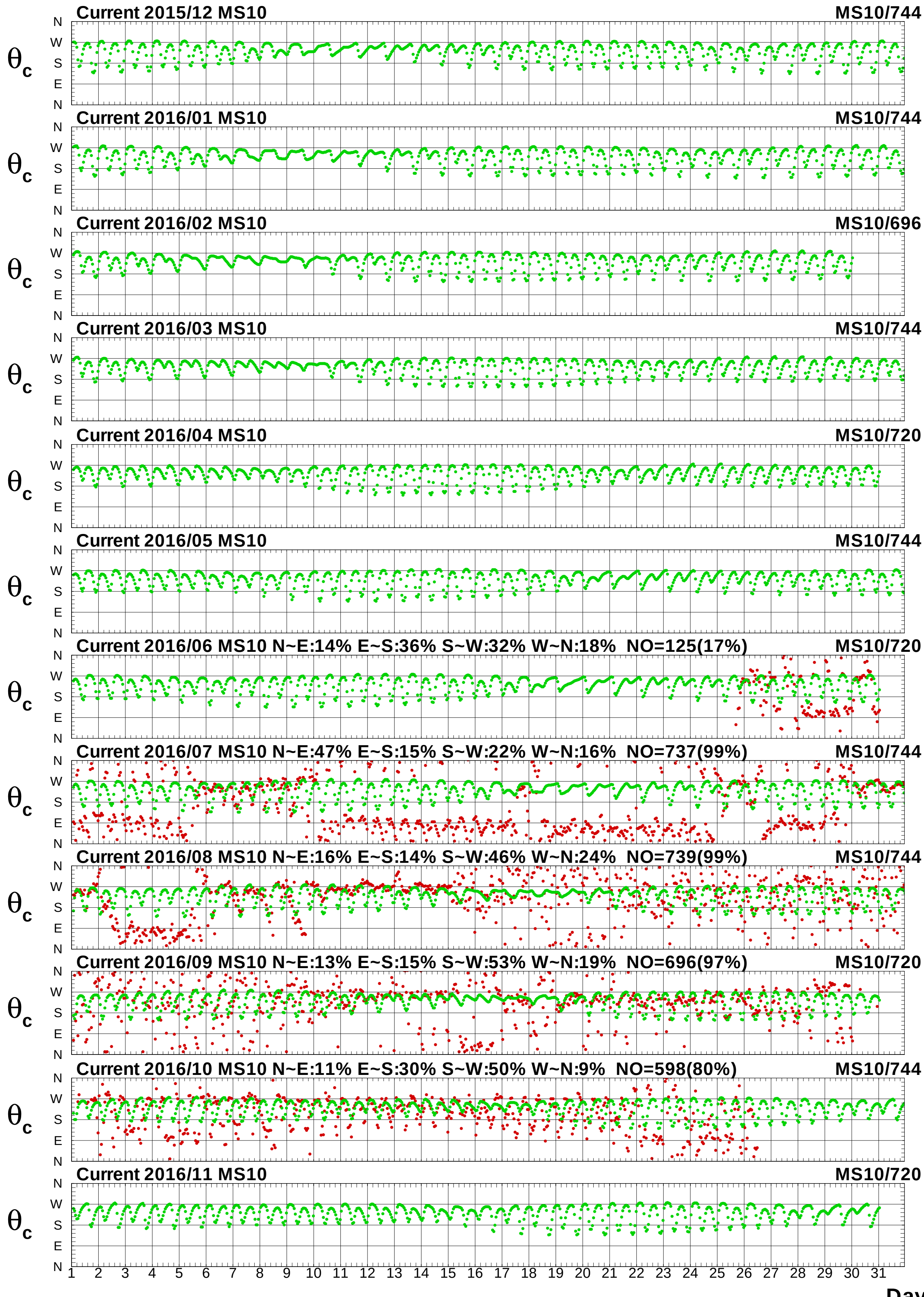

圖 4.5b　2016年每月馬祖海域1站觀測與潮流流向比較圖

C15CMS10.1H0 C15CMS10.1HD C161MS10.1H0 C161MS10.1HD C162MS10.1H0 C162MS10.1HD C163MS10.1H0 C163MS10.1HD C164MS10.1H0 C164MS10.1HD C165MS10.1H0 C165MS10.1HD	Institute of Harbor & Marine Technology

Current Speed in Ma-Tsu Seas of MS10 at 2016

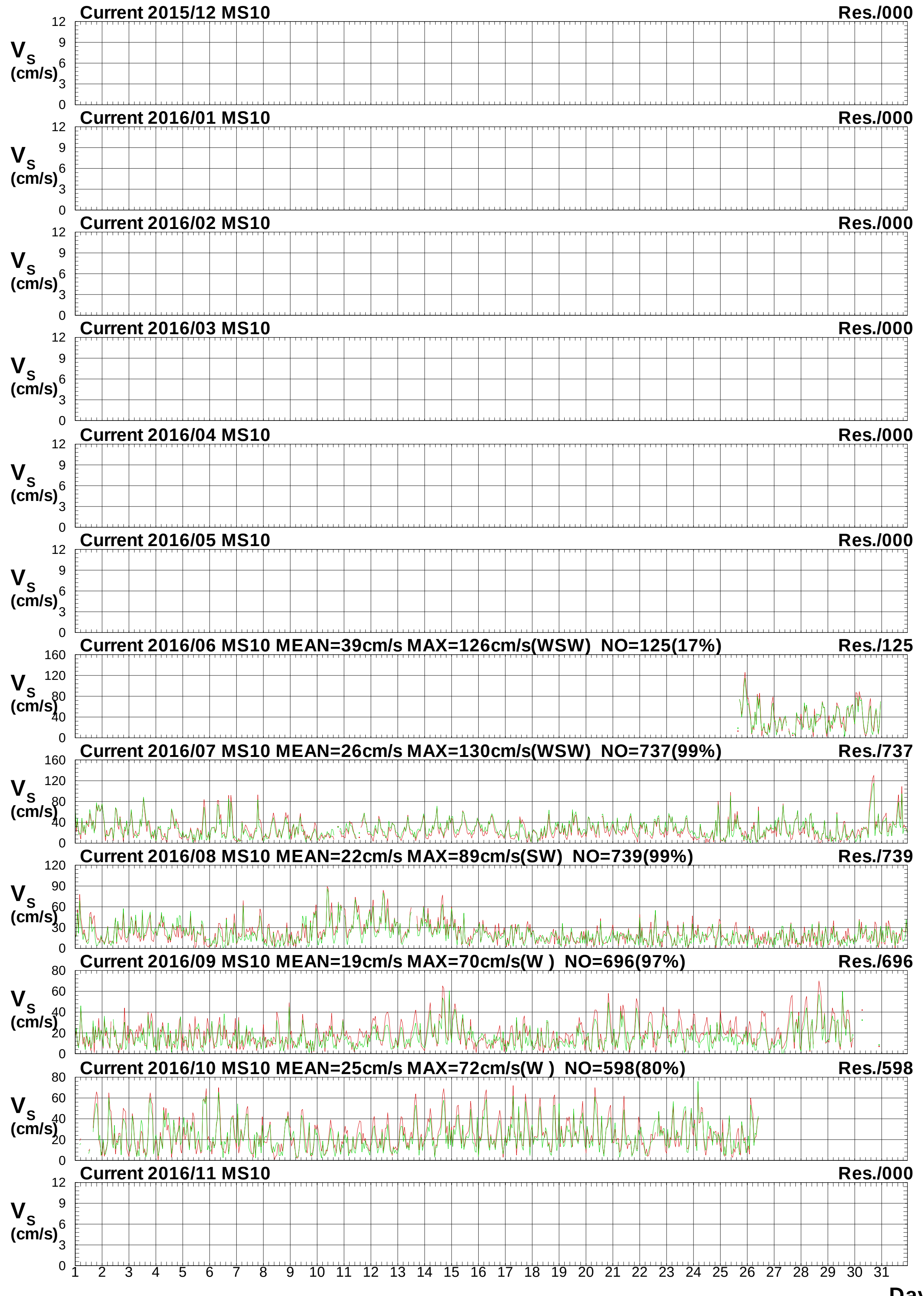

圖 4.6a　2016年每月馬祖海域1站觀測與非潮流速比較圖

C15CMS10.1H0 C15CMS10.1HR C161MS10.1H0 C161MS10.1HR C162MS10.1H0 C162MS10.1HR C163MS10.1H0 C163MS10.1HR C164MS10.1H0 C164MS10.1HR C165MS10.1H0 C165MS10.1HR	Institute of Harbor & Marine Technology

Current Direction in Ma-Tsu Seas of MS10 at 2016

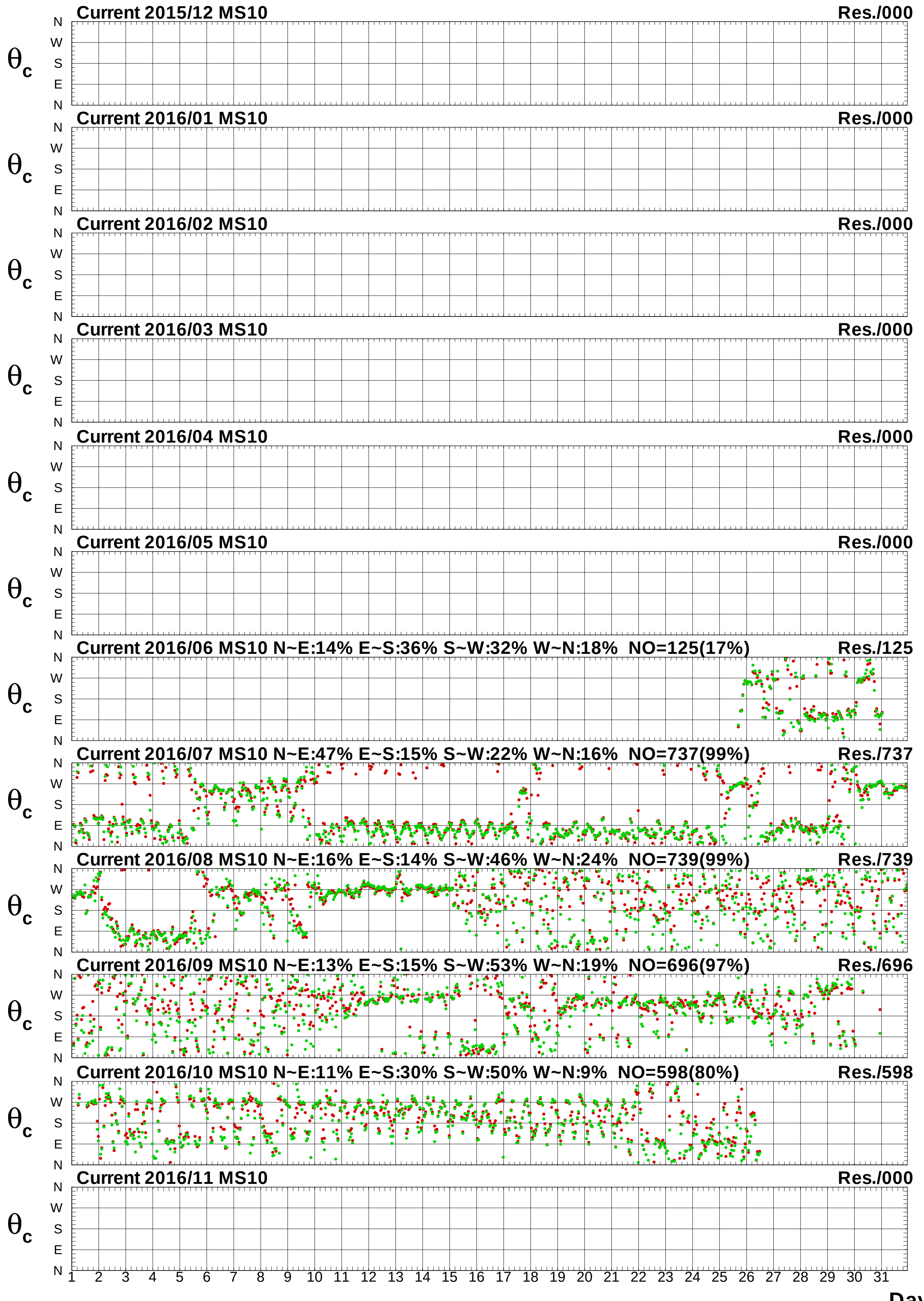

圖 4.6b　2016年每月馬祖海域1站觀測與非潮流向比較圖

C15CMS10.1H0 C15CMS10.1HR C161MS10.1H0 C161MS10.1HR C162MS10.1H0 C162MS10.1HR C163MS10.1H0 C163MS10.1HR C164MS10.1H0 C164MS10.1HR C165MS10.1H0 C165MS10.1HR	Institute of Harbor & Marine Technology

Current Speed in Ma-Tsu Seas of MS20 at 2016

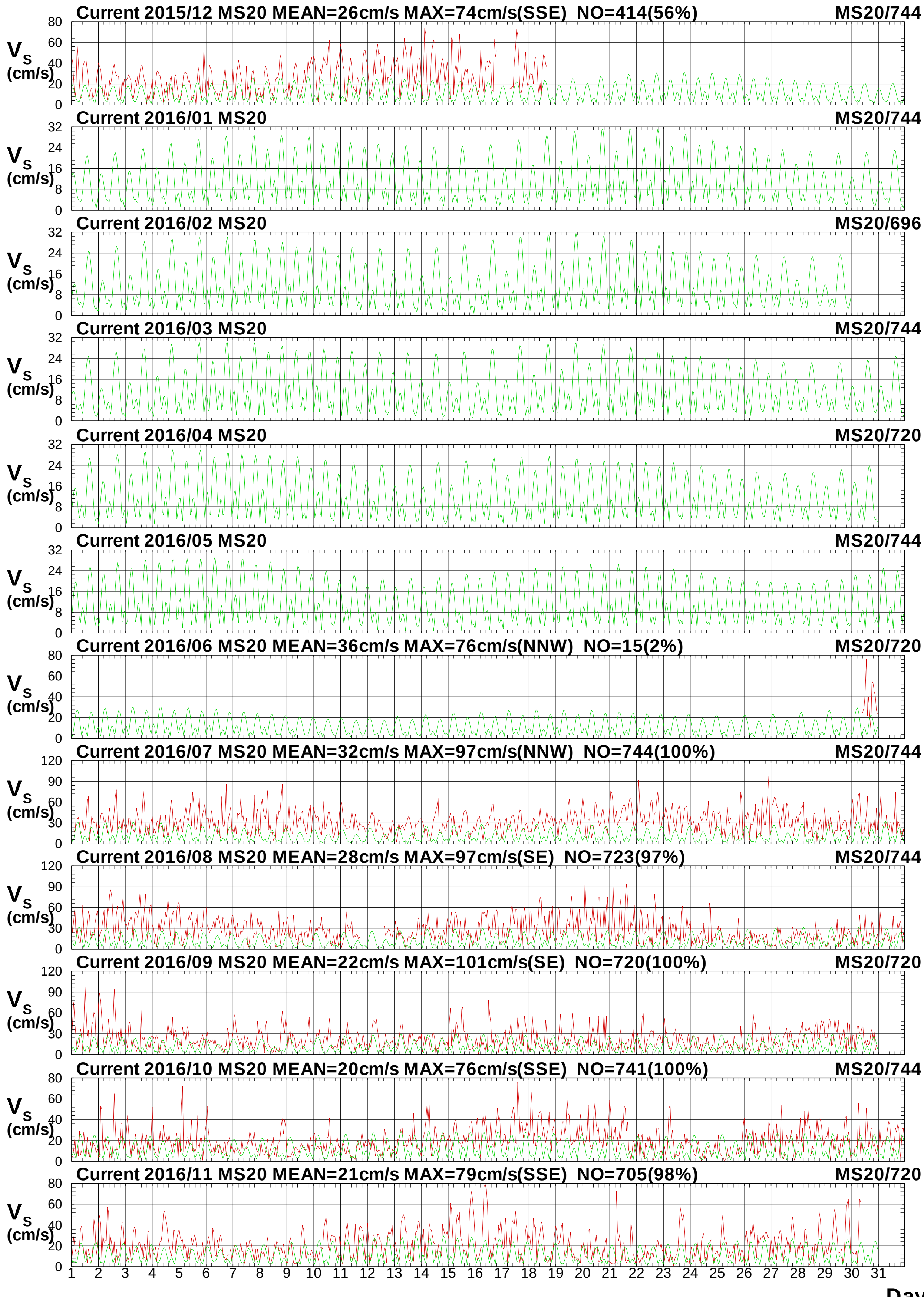

圖 4.7a　2016年每月馬祖海域2站觀測與潮流流速比較圖

C15CMS20.1H0 C15CMS20.1HD C161MS20.1H0 C161MS20.1HD C162MS20.1H0 C162MS20.1HD
C163MS20.1H0 C163MS20.1HD C164MS20.1H0 C164MS20.1HD C165MS20.1H0 C165MS20.1HD

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Current Direction in Ma-Tsu Seas of MS20 at 2016

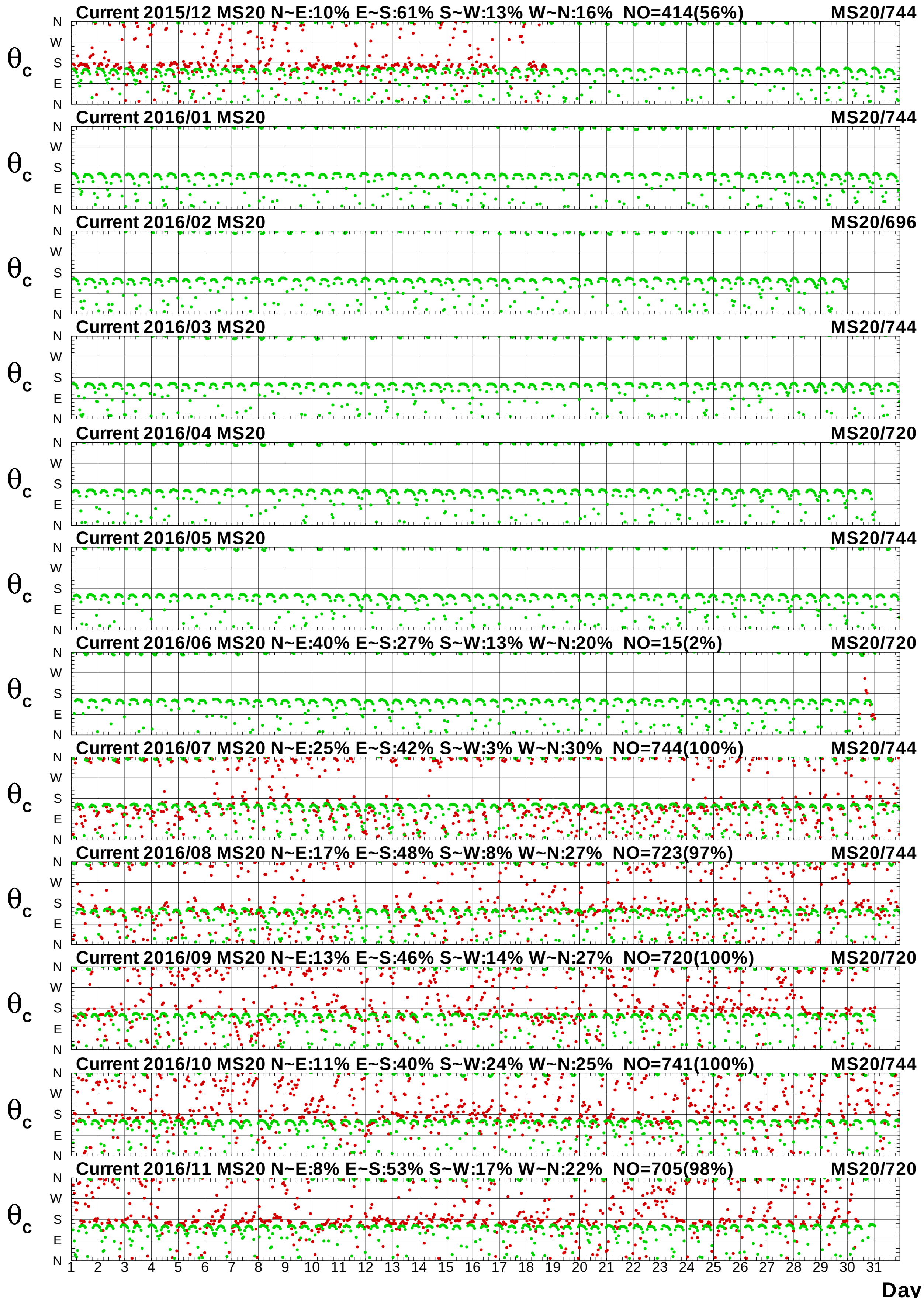

圖 4.7b　2016年每月馬祖海域2站觀測與潮流流向比較圖

C15CMS20.1H0 C15CMS20.1HD C161MS20.1H0 C161MS20.1HD C162MS20.1H0 C162MS20.1HD
C163MS20.1H0 C163MS20.1HD C164MS20.1H0 C164MS20.1HD C165MS20.1H0 C165MS20.1HD

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Current Speed in Ma-Tsu Seas of MS20 at 2016

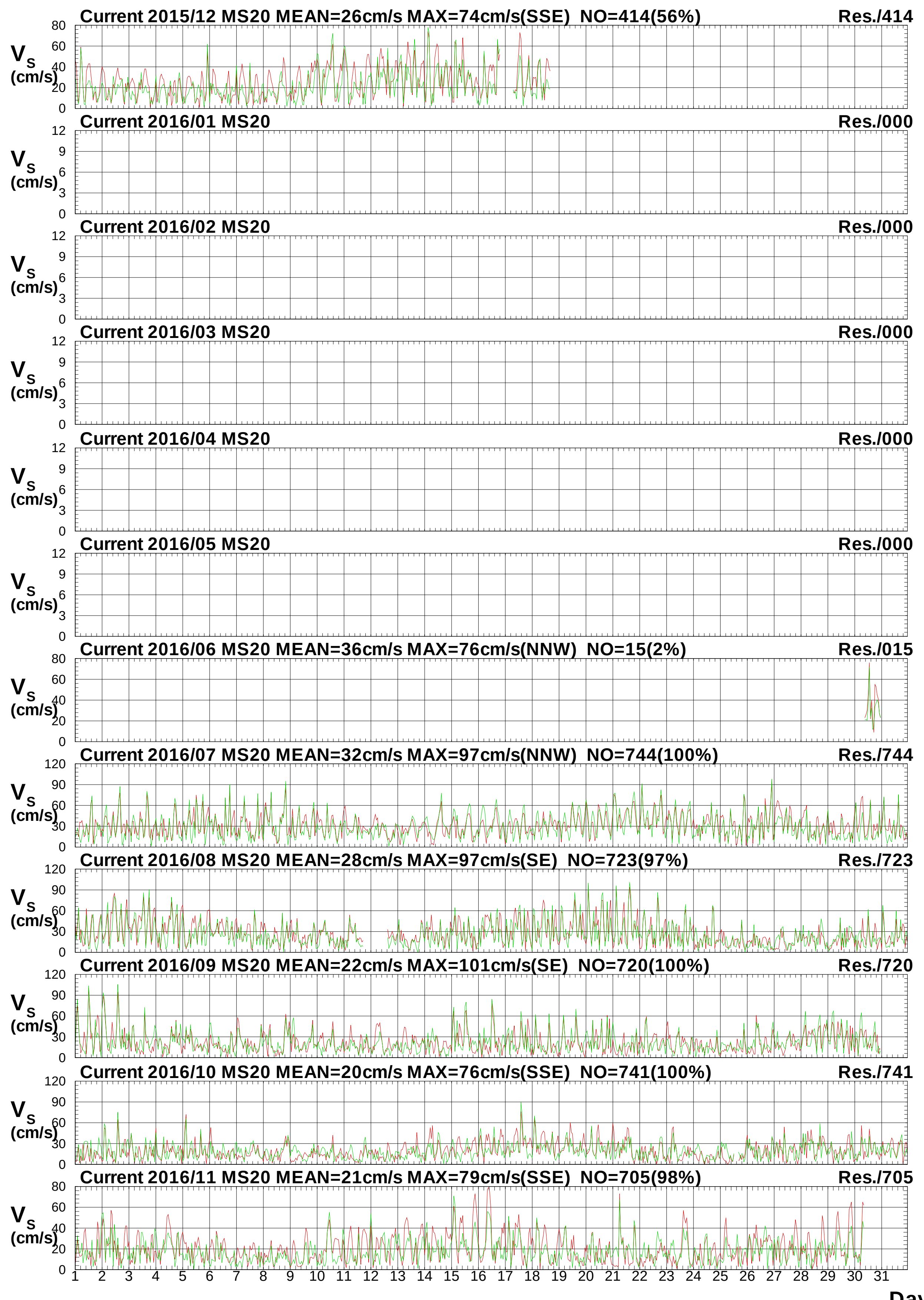

圖 4.8a　2016年每月馬祖海域2站觀測與非潮流速比較圖

C15CMS20.1H0 C15CMS20.1HR C161MS20.1H0 C161MS20.1HR C162MS20.1H0 C162MS20.1HR C163MS20.1H0 C163MS20.1HR C164MS20.1H0 C164MS20.1HR C165MS20.1H0 C165MS20.1HR	Institute of Harbor & Marine Technology

Current Direction in Ma-Tsu Seas of MS20 at 2016

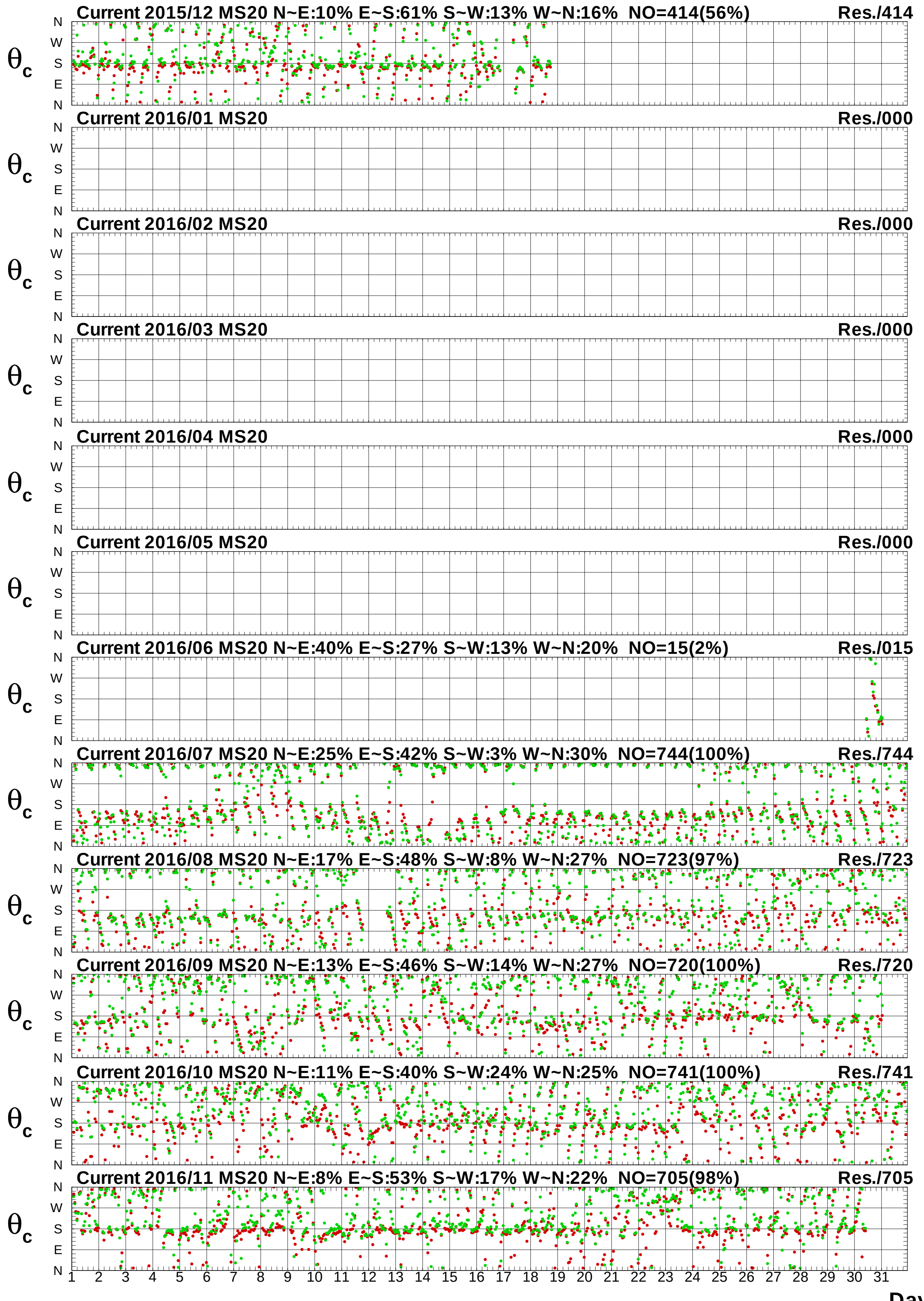

圖 4.8b　2016年每月馬祖海域2站觀測與非潮流向比較圖

C15CMS20.1H0 C15CMS20.1HR C161MS20.1H0 C161MS20.1HR C162MS20.1H0 C162MS20.1HR C163MS20.1H0 C163MS20.1HR C164MS20.1H0 C164MS20.1HR C165MS20.1H0 C165MS20.1HR	Institute of Harbor & Marine Technology

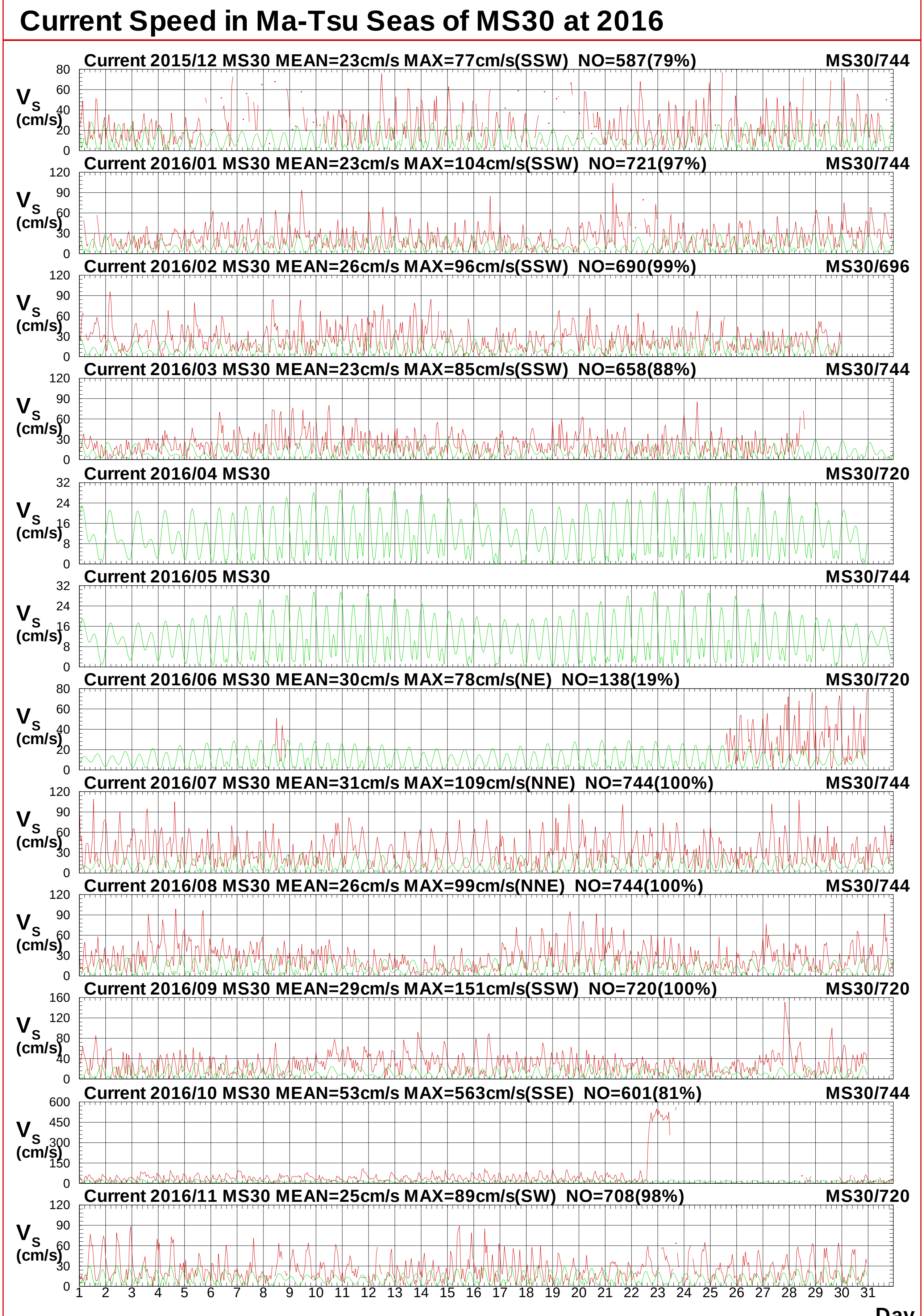

圖 4.9a　2016年每月馬祖海域3站觀測與潮流流速比較圖

C15CMS30.1H0 C15CMS30.1HD C161MS30.1H0 C161MS30.1HD C162MS30.1H0 C162MS30.1HD
C163MS30.1H0 C163MS30.1HD C164MS30.1H0 C164MS30.1HD C165MS30.1H0 C165MS30.1HD

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Current Direction in Ma-Tsu Seas of MS30 at 2016

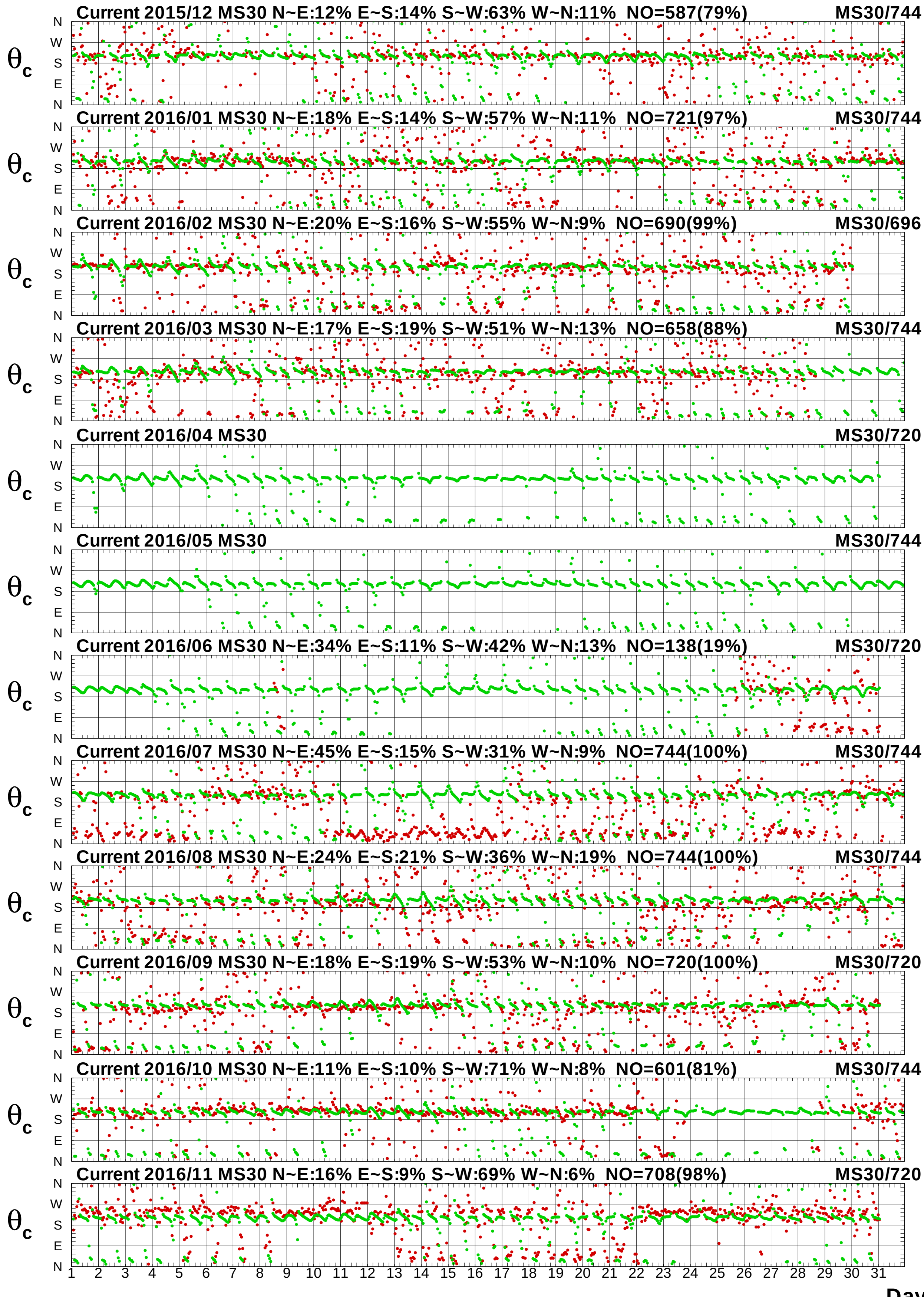

圖 4.9b　2016年每月馬祖海域3站觀測與潮流流向比較圖

C15CMS30.1H0 C15CMS30.1HD C161MS30.1H0 C161MS30.1HD C162MS30.1H0 C162MS30.1HD C163MS30.1H0 C163MS30.1HD C164MS30.1H0 C164MS30.1HD C165MS30.1H0 C165MS30.1HD	Institute of Harbor & Marine Technology

Current Speed in Ma-Tsu Seas of MS30 at 2016

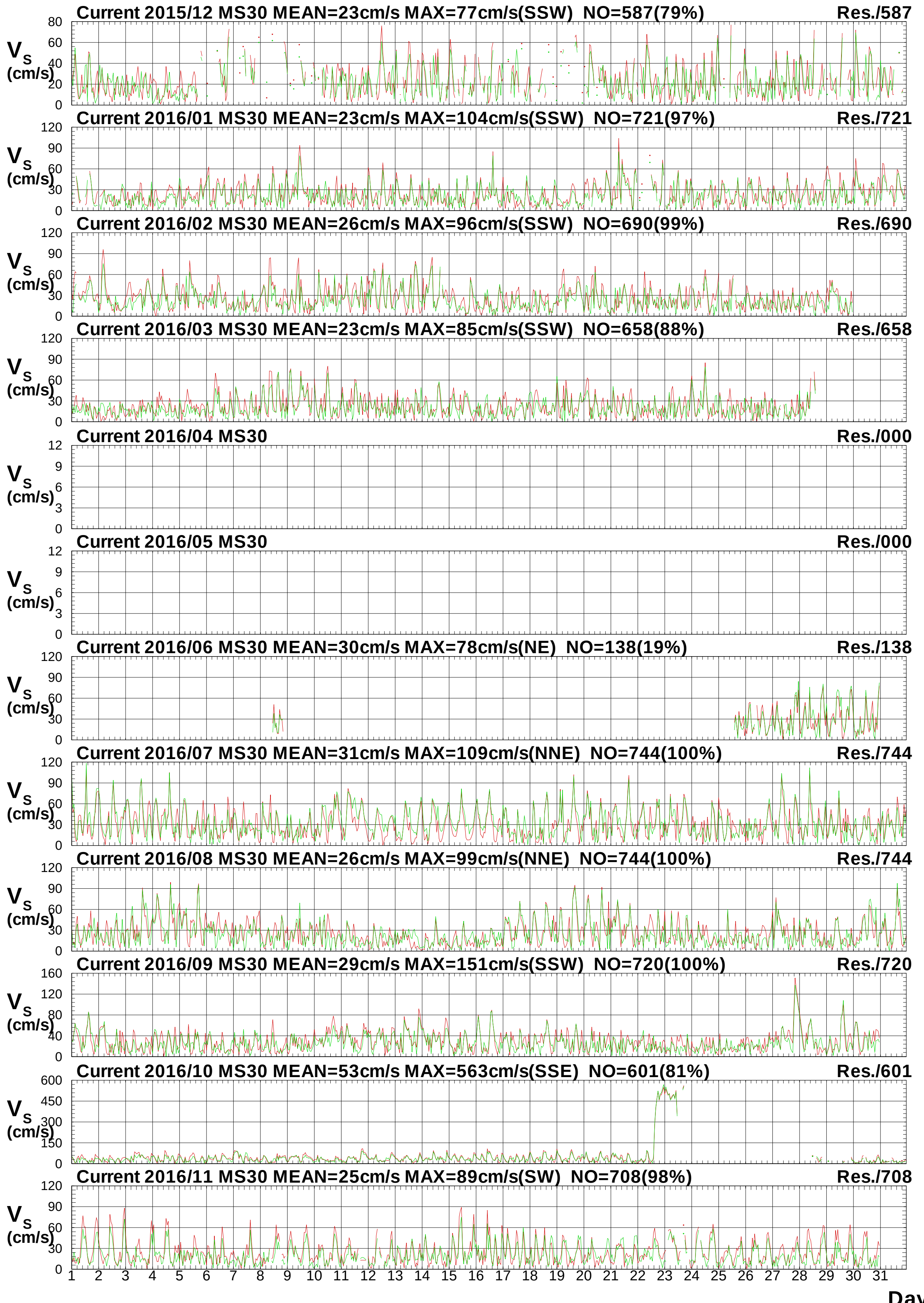

圖 4.10a　2016年每月馬祖海域3站觀測與非潮流速比較圖

C15CMS30.1H0 C15CMS30.1HR C161MS30.1H0 C161MS30.1HR C162MS30.1H0 C162MS30.1HR
C163MS30.1H0 C163MS30.1HR C164MS30.1H0 C164MS30.1HR C165MS30.1H0 C165MS30.1HR

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Current Direction in Ma-Tsu Seas of MS30 at 2016

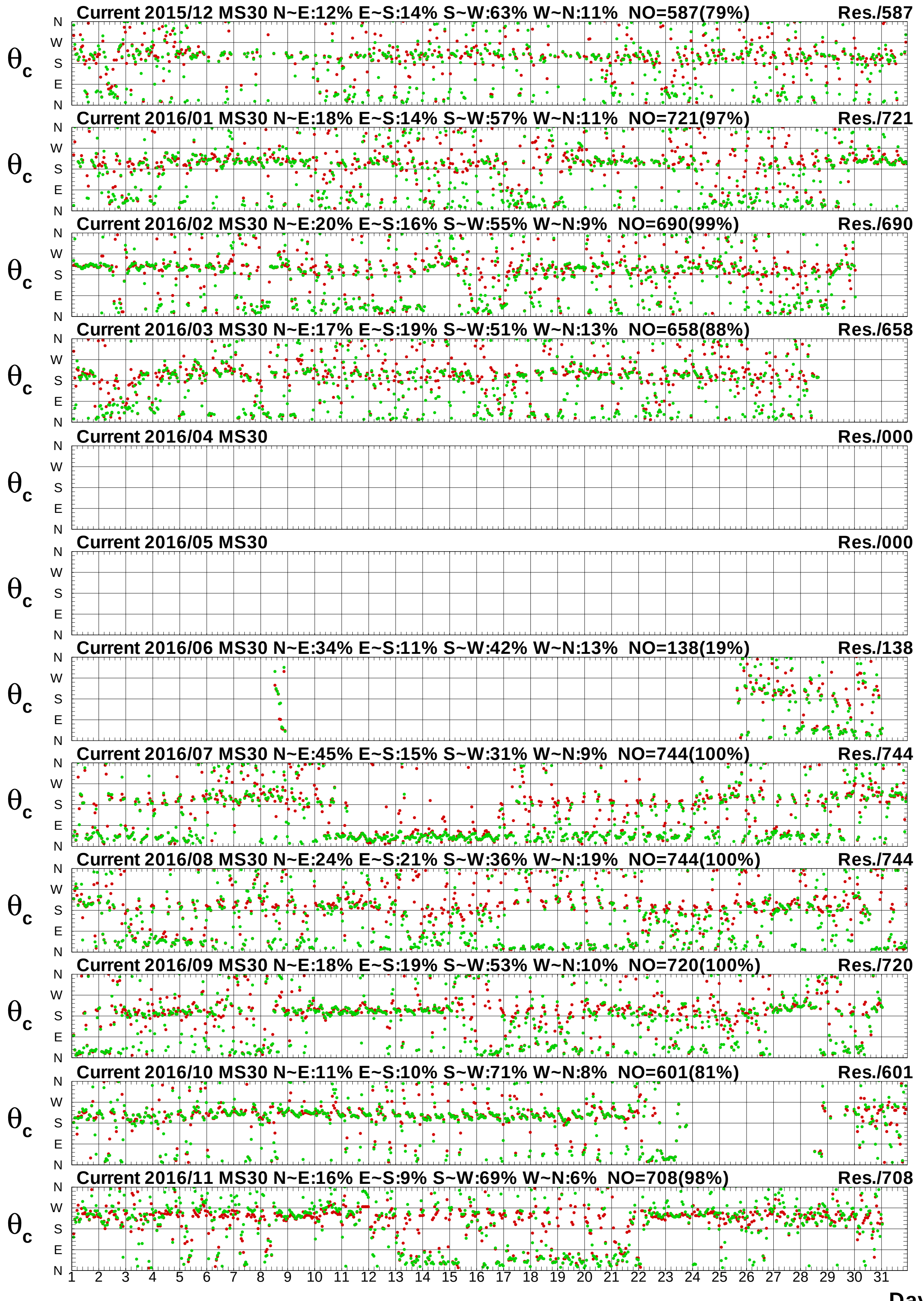

圖 4.10b　2016年每月馬祖海域3站觀測與非潮流向比較圖

C15CMS30.1H0 C15CMS30.1HR C161MS30.1H0 C161MS30.1HR C162MS30.1H0 C162MS30.1HR C163MS30.1H0 C163MS30.1HR C164MS30.1H0 C164MS30.1HR C165MS30.1H0 C165MS30.1HR	Institute of Harbor & Marine Technology

Current Speed in Ma-Tsu Seas of MSX0 at 2016

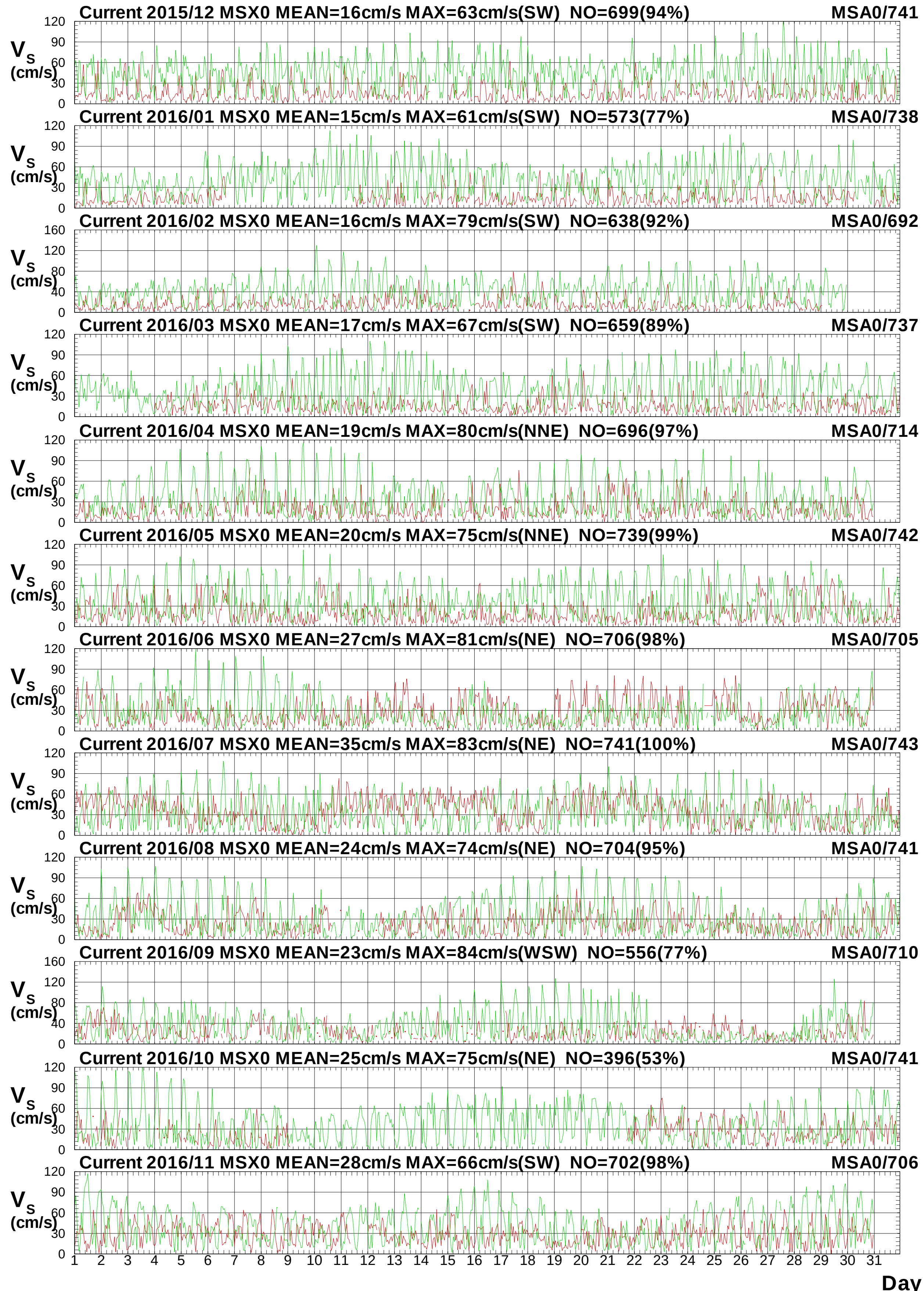

圖 4.11a　2016年每月馬祖海域 X 站與 A 站流速比較圖

C15CMSX0.1H0 C15CMSA0.1H0 C161MSX0.1H0 C161MSA0.1H0 C162MSX0.1H0 C162MSA0.1H0 C163MSX0.1H0 C163MSA0.1H0 C164MSX0.1H0 C164MSA0.1H0 C165MSX0.1H0 C165MSA0.1H0	Institute of Harbor & Marine Technology

Current Direction in Ma-Tsu Seas of MSX0 at 2016

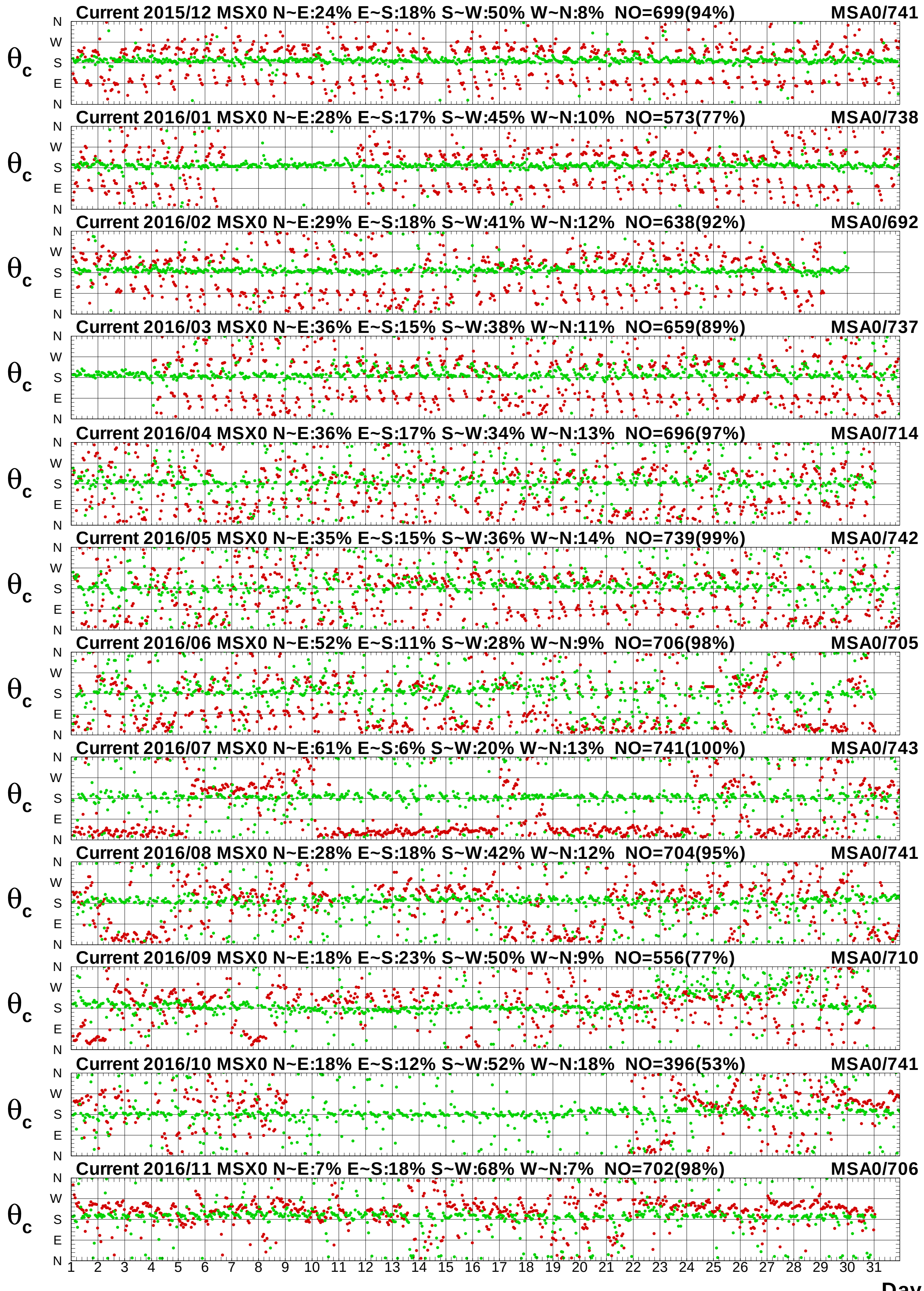

圖 4.11b 2016年每月馬祖海域 X 站與 A 站流向比較圖

C15CMSX0.1H0 C15CMSA0.1H0 C161MSX0.1H0 C161MSA0.1H0 C162MSX0.1H0 C162MSA0.1H0
C163MSX0.1H0 C163MSA0.1H0 C164MSX0.1H0 C164MSA0.1H0 C165MSX0.1H0 C165MSA0.1H0

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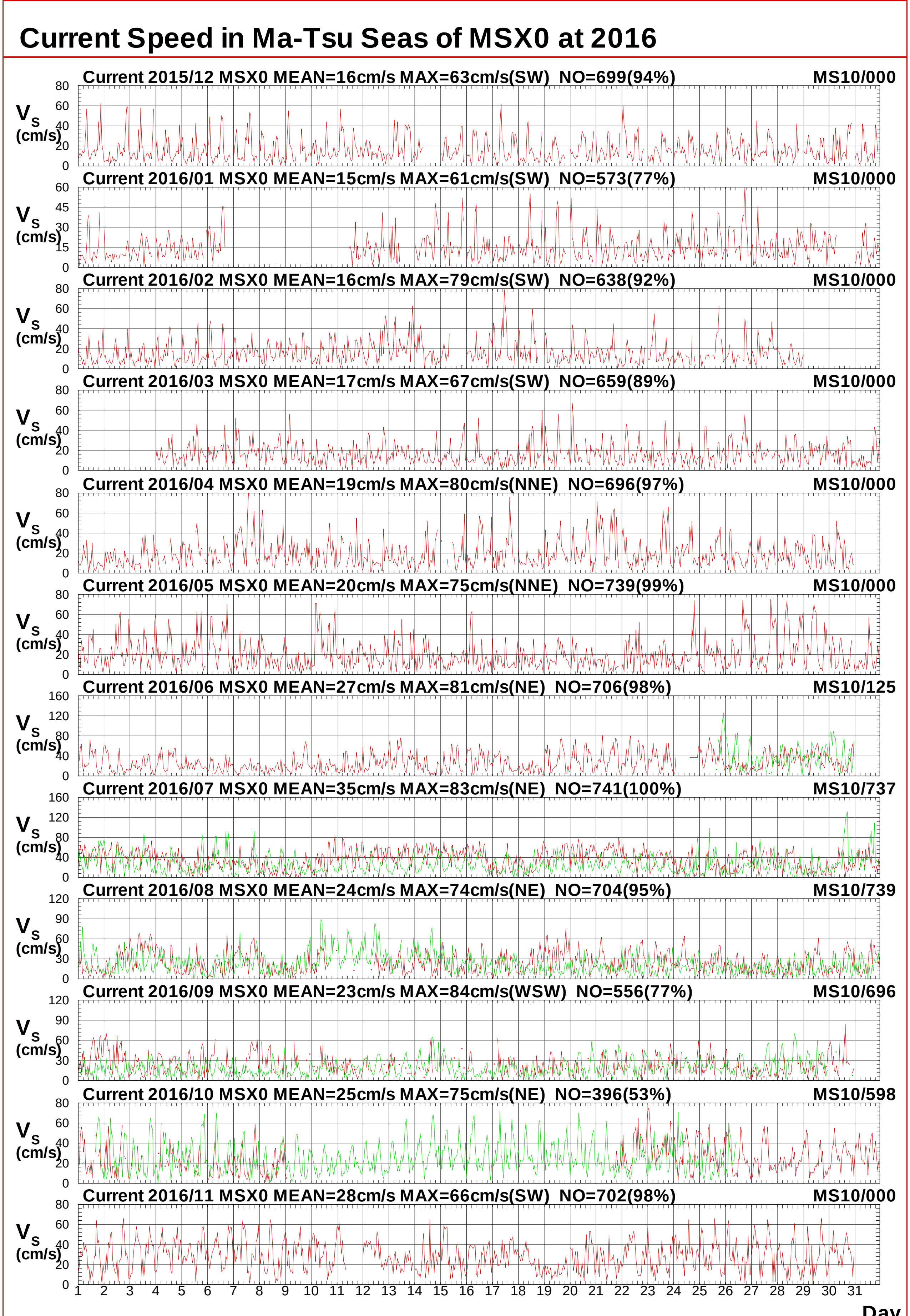

圖 4.12a　2016年每月馬祖海域 X 站與1站流速比較圖

C15CMSX0.1H0 C15CMS10.1H0 C161MSX0.1H0 C161MS10.1H0 C162MSX0.1H0 C162MS10.1H0
C163MSX0.1H0 C163MS10.1H0 C164MSX0.1H0 C164MS10.1H0 C165MSX0.1H0 C165MS10.1H0

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2017/06/28

Current Direction in Ma-Tsu Seas of MSX0 at 2016

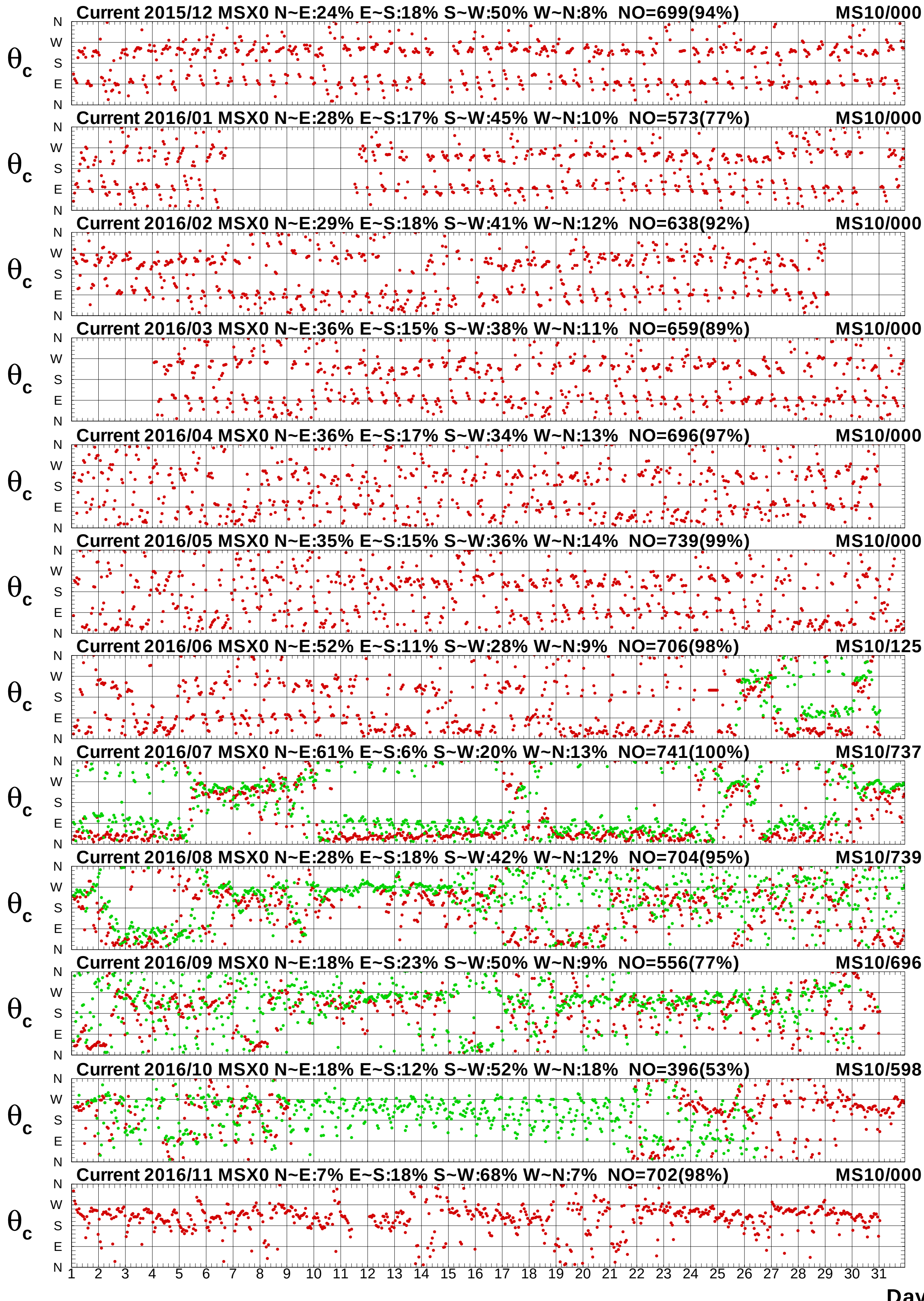

圖 4.12b　2016年每月馬祖海域 X 站與1站流向比較圖

C15CMSX0.1H0 C15CMS10.1H0 C161MSX0.1H0 C161MS10.1H0 C162MSX0.1H0 C162MS10.1H0
C163MSX0.1H0 C163MS10.1H0 C164MSX0.1H0 C164MS10.1H0 C165MSX0.1H0 C165MS10.1H0

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