THE AUSTRALIAN BASELINE SEA LEVEL MONITORING PROJECT

MONTHLY DATA REPORT

JUNE 2005

Australian Government

Bureau of Meteorology

This report was prepared under the Australian Greenhouse Science Program for the Australian Greenhouse Office, supported by the National Tidal Centre, Bureau of Meteorology.

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Quality Certification:

I authorise the issue of this Australian Baseline Sea Level Monitoring Project Monthly Data Report for June 2005 in accordance with National Tidal Centre Quality Assurance procedures.

William Mitchell
Manager - National Tidal Centre

The Australian Baseline Sea Level Monitoring Project

Monthly Data Report

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INTRODUCTION

The mission of this project is to operate and maintain a national array of high-resolution sea level gauges and associated meteorological instruments, in order to acquire observations that are quality controlled and processed to build a national database of information that is accessible by the scientific and wider communities.

The Baseline Array, and a similar array in the South Pacific, have been widely acknowledged in the global science community as two of the most accurate and reliable sources for information on sea level and climate change anywhere in the world.

The visualisation techniques included in this report, and the comments provided, are for the purposes of quality control analysis. Interpretation of the sea level record for trends or climatic episodes is not the purpose of these reports. Provisional interpretation may be undertaken from time to time for reporting purposes and may be found in other publications.

Readers are cautioned against drawing any conclusions from short duration records, particularly when used in isolation from other phenomena. The sea level record includes natural variability, such as El Niño events and the effects of atmospheric, oceanographic and geological processes. Vertical movement of the instrumentation relative to local topography is monitored and the results are listed on the Geoscience Australia web site. Movement of each station relative to the International Terrestrial Reference Frame is not monitored. It is important to note that as the sea level record becomes longer, the short-term trend estimate becomes more stable and reliable.

NOTES ON THE DATA FOR JUNE 2005

Sea level data return (Figures 1 and 17) in June was good for all stations.

The residuals (Figures 2 and 3), the difference between the observations and the tidal predictions, are the non-tidal components of the sea level observations. The residuals are primarily the consequence of short-term meteorological effects (Figures 5 and 9).

Wind speed and wind gust data from Stony Point continued to be intermittently erroneous during June. These values and the corresponding incident wind directions have been removed (Figures 4, 5 and 6).

Figure 10 compares the mean, maximum and minimum values for air temperature, water temperature and barometric pressure for the current month with the long-term June values. Note that the long-term ranges are calculated using the historical sets of June data for each station ***excluding*** the current month of data.

The air temperatures for June 2005 were generally consistent with the long term June air temperatures for most sites. The maximum air temperature at Port Stanvac (22.8ºC) was above the previous June maxima. The minimum air temperature at Cocos Islands (21.2ºC) was below the previous June minima.

The water temperatures for June 2005 were generally consistent with the long-term June water temperatures for most sites. The maximum water temperature at Port Stanvac (17.0ºC) was above the previous June maxima.

The barometric pressures for June 2005 were generally consistent with the long-term June barometric pressures for most sites. The minimum barometric pressure at Broome (1004.9hPa), Port Stanvac (991.4hPa), Portland (984.2hPa) and Cape Ferguson (1006.5hPa) were below previous June minima.

Figure 11 shows the monthly mean sea levels with respect to an arbitrary fixed offset from the zero of the tide gauge. The mean sea level plot shows seasonal variations in sea level, in contrast to the sea level anomalies plot (Figure 12), which has the seasonal signal removed from the data.

The sea level anomalies (Figure 12) were negative at most sites and changed from negative to positive at Thevenard, Port Stanvac, Portland, Lorne, Burnie and Rosslyn Bay and remained positive at Hillarys.

Figure 13 shows the evolution of the short-term sea level trend for each site during the life of the Australian Baseline Sea Level Monitoring Project. Table 1 lists the commencement of operation, the latest sea level trend, and the change in trend with respect to the previous month's analysis.

Barometric pressure anomalies (Figure 14) were negative at all sites during June.

It is difficult to relate the water and air temperature anomalies (Figures 15 and 16) directly to those of barometric pressure and sea level without considering other effects, such as localised currents, wind speeds and directions. The anomalies are primarily used to quality check the water and air temperature data.

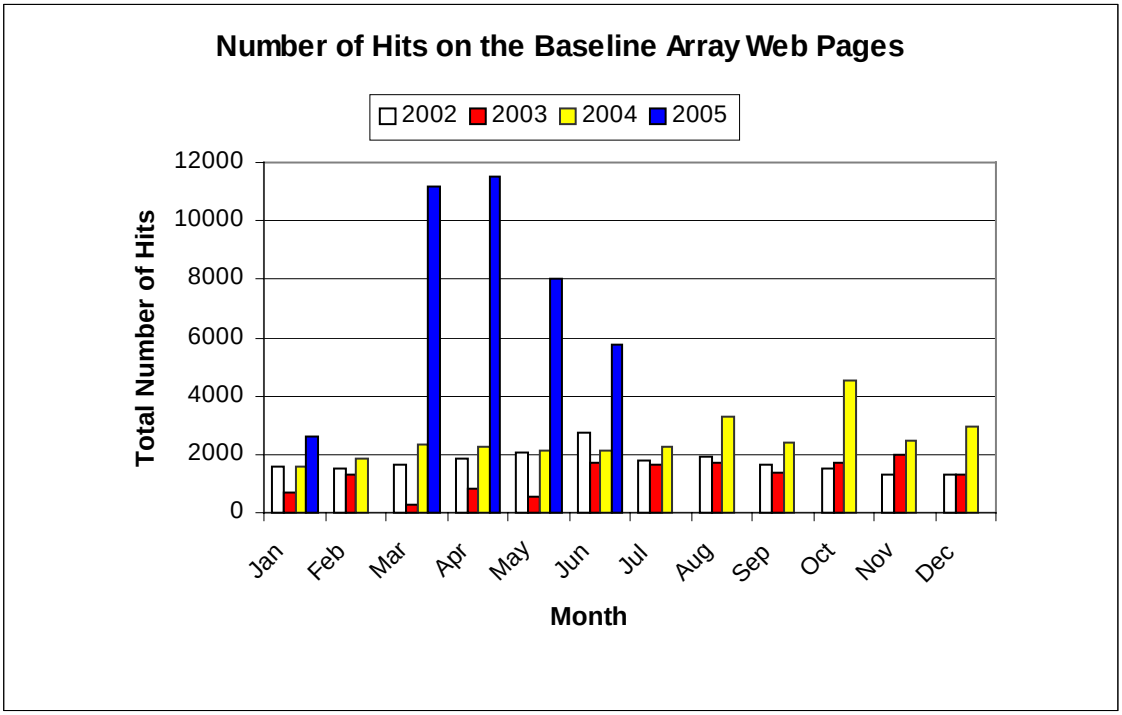
The number of hits to the Australian Baseline Sea Level Monitoring project web pages from 2002 to June 2005 is given in Table 2.

Please note: Tide gauges at Stony Point and Lorne do not record air temperature, water temperature and barometric pressure data and are not present in Figures 3,7,8,9,11,12,13 and 16. The tide gauge at Lorne does not record wind data and is not present in Figures 4, 5 and 6.

Table 1: Tide gauge installation dates, short-term sea level trends and change in trend from the previous month for the Australian Baseline array through June 2005.

Location	Installation Date	Sea Level Trend (mm/yr)	Change from previous month
Cocos Islands	Sep 1992	+11.0	0.0
Groote Eylandt	Sep 1993	+7.3	-0.1
Darwin	May 1990	+8.1	-0.1
Broome	Nov 1991	+10.4	-0.2
Hillarys	Nov 1991	+8.3	0.0
Esperance	Mar 1992	+5.5	0.0
Thevenard	Mar 1992	+4.4	+0.1
Port Stanvac	Jun 1992	+5.7	+0.1
Portland	Jul 1991	+2.6	+0.1
Lorne	Jan 1993	+1.9	0.0
Stony Point	Jan 1993	+1.6	0.0
Burnie	Sep 1992	+2.4	0.0
Spring Bay	May 1991	+3.2	-0.1
Port Kembla	Jul 1991	+4.0	-0.1
Rosslyn Bay	Jun 1992	+2.6	0.0
Cape Ferguson	Sep 1991	+3.4	0.0

Table 2: Number of hits on the Australian Baseline Sea Level Monitoring Project web pages from 2002 to June 2005. Note that the web hits for February 2005 are not available due to technical difficulties.



The *Monthly Data Report* is prepared by the NTC, Bureau of Meteorology for Environment Australia. Staff members produce the text, plots and tables.

Further information on the *Monthly Data Report* and other projects conducted by the NTC, Bureau of Meteorology can be obtained from the following address.

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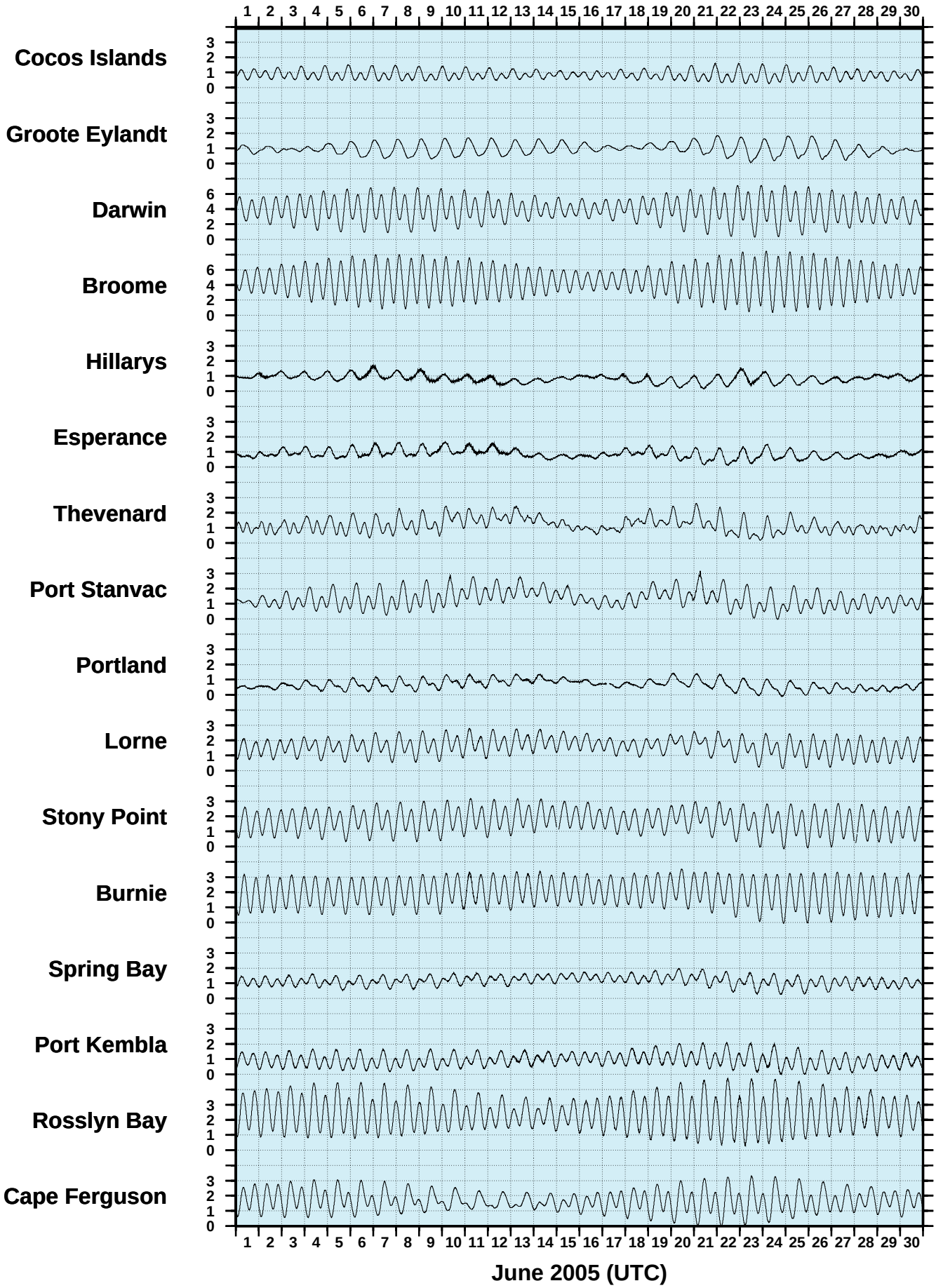
Please note the following:

Individuals and organisations are advised that quality controlled six-minute or hourly data from these stations are available on request from the NTC, Bureau of Meteorology. Some handling fees may be charged. For commercial agencies requesting data, some additional costs may be levied.

Figure 1

JUNE 2005
SIX MINUTE SEA LEVEL OBSERVATIONS (m)



National Tidal Centre, Bureau of Meteorology

Figure 2

JUNE 2005
SIX MINUTE RESIDUAL WATER LEVELS (m)

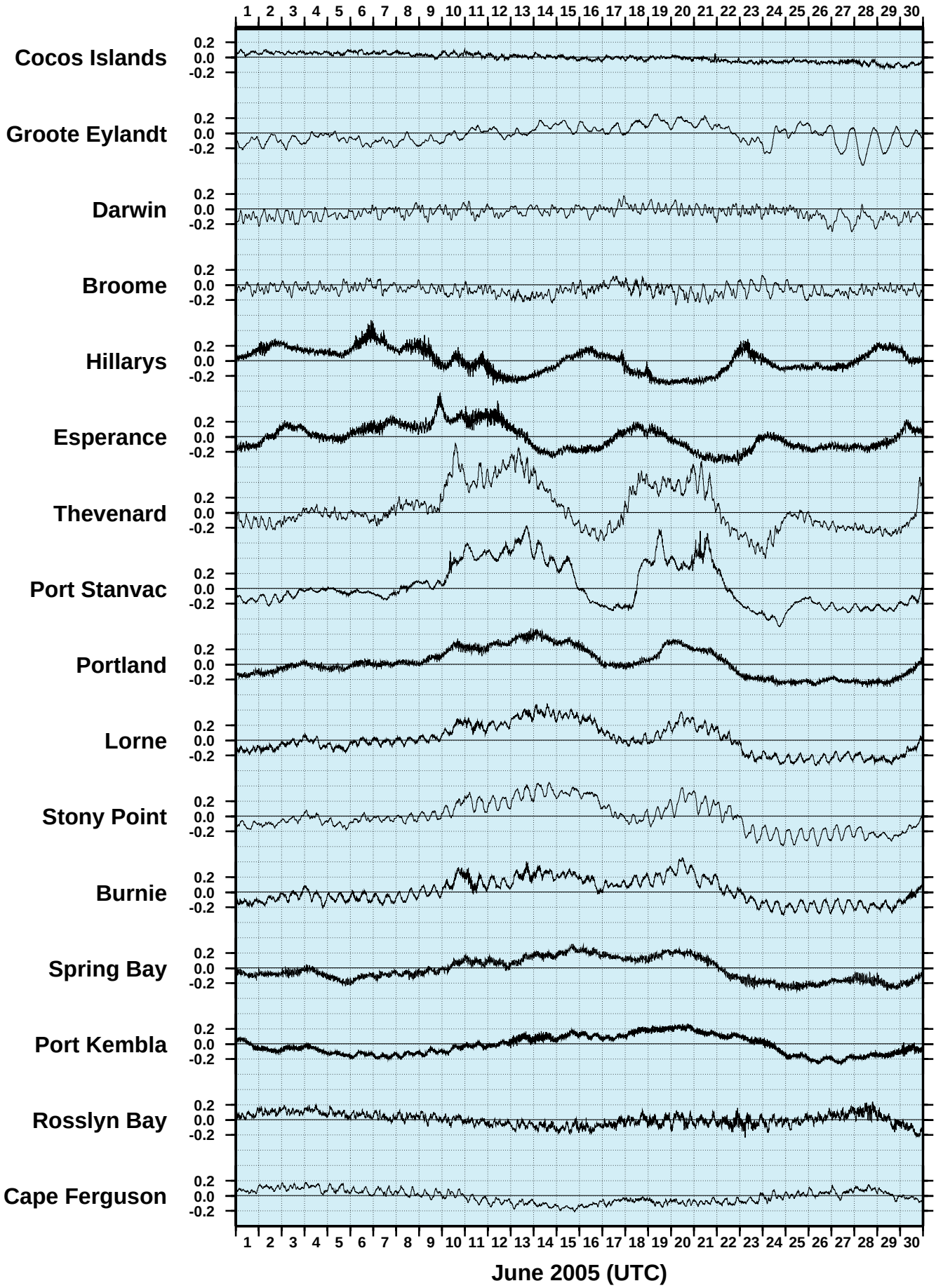


Figure 3

JUNE 2005
SIX MINUTE RESIDUALS
ADJUSTED FOR ATMOSPHERIC PRESSURE (m)

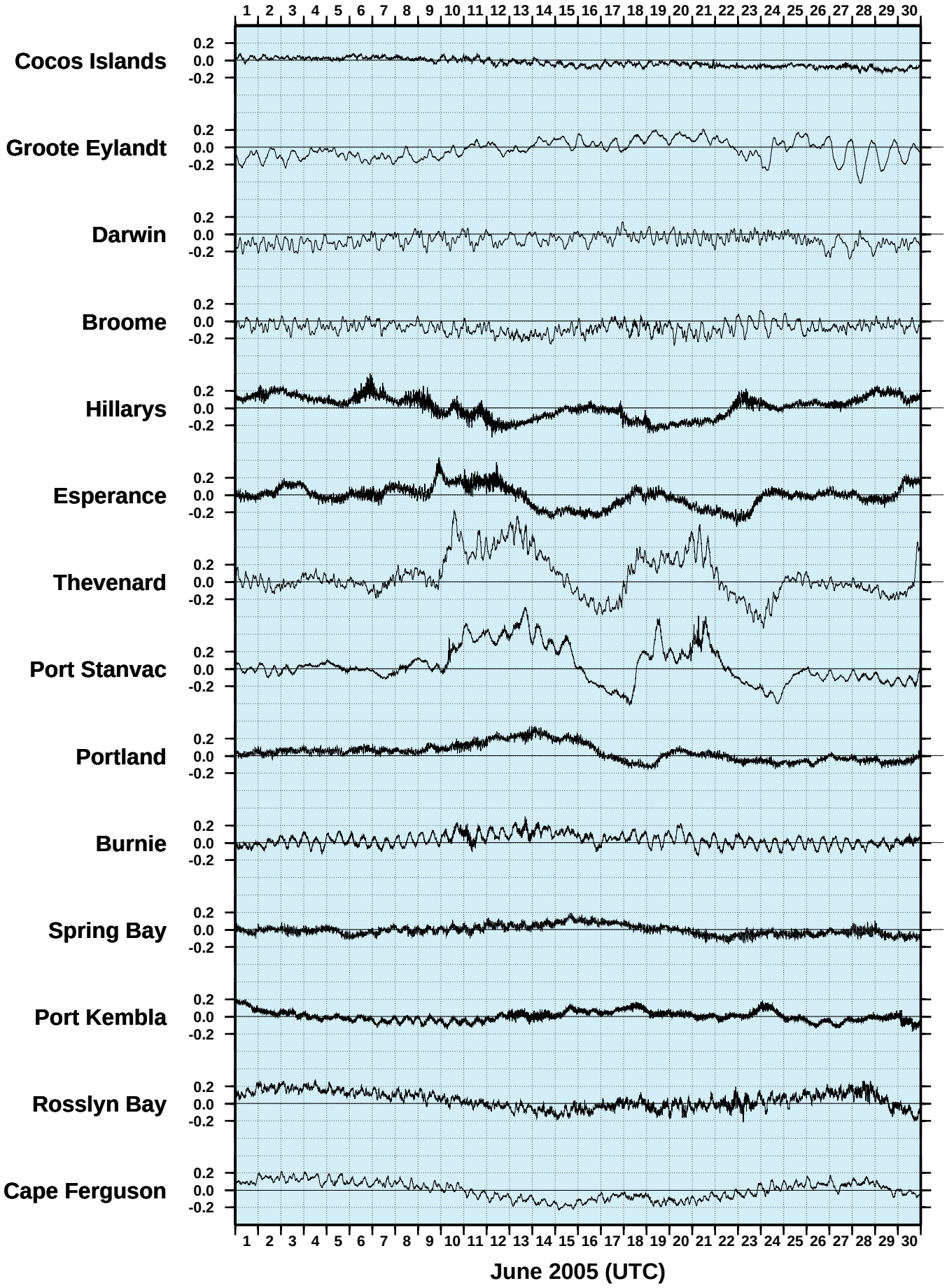


Figure 4

JUNE 2005
HOURLY WIND SPEEDS (m/s)

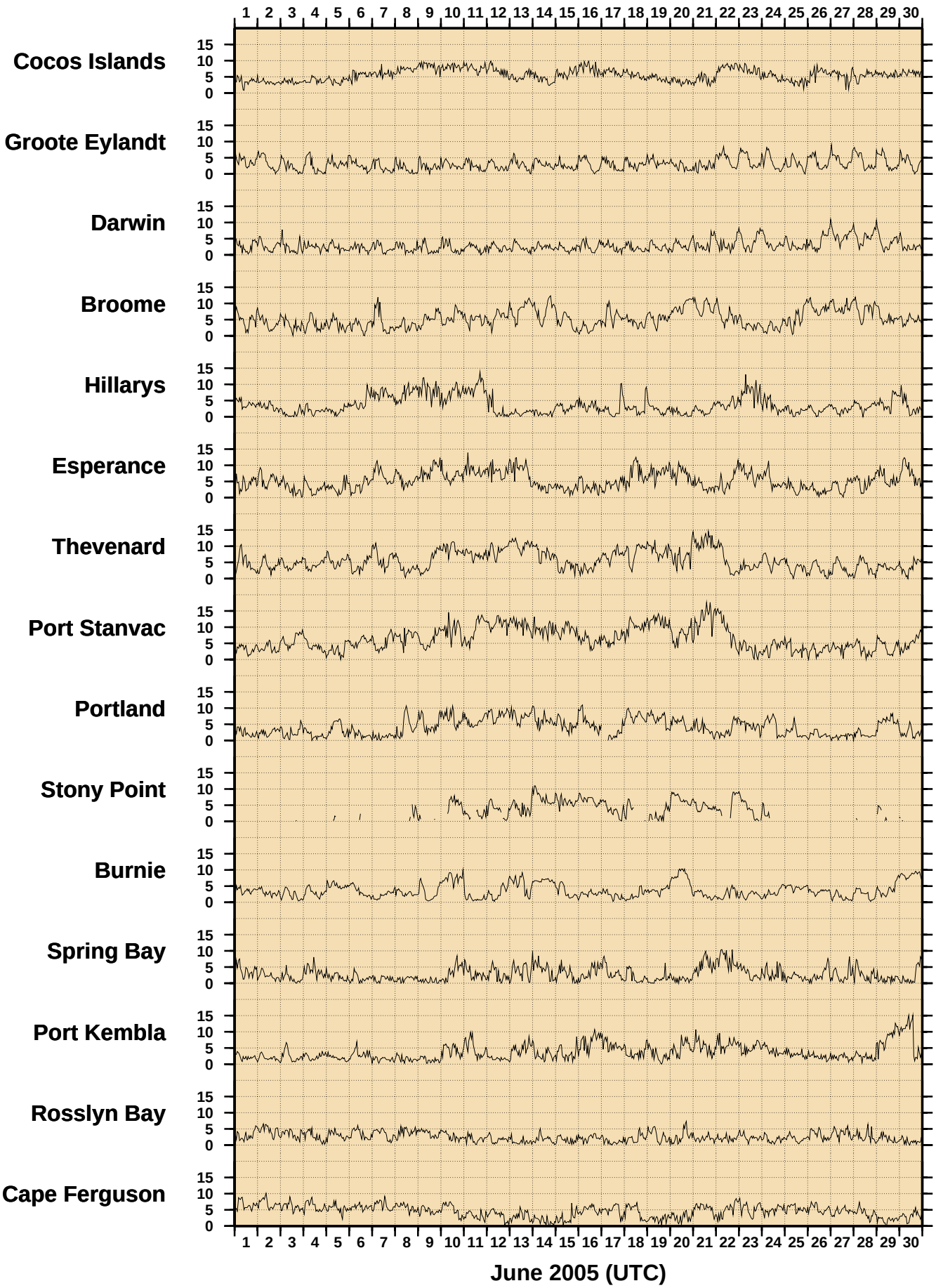


Figure 5

JUNE 2005
HOURLY INCIDENT WINDS (m/s, deg True)

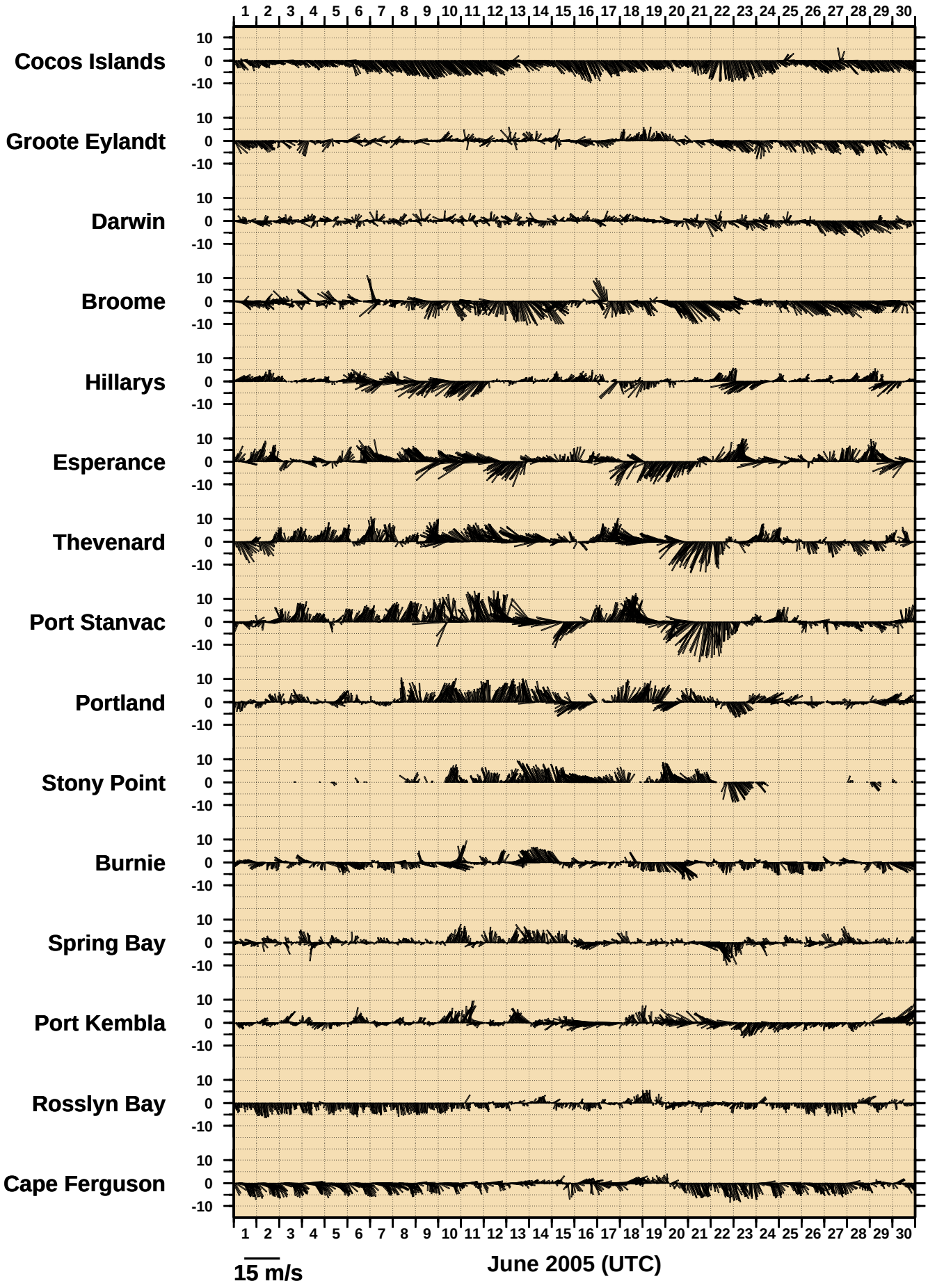


Figure 6

JUNE 2005
HOURLY MAXIMUM WIND GUSTS (m/s)

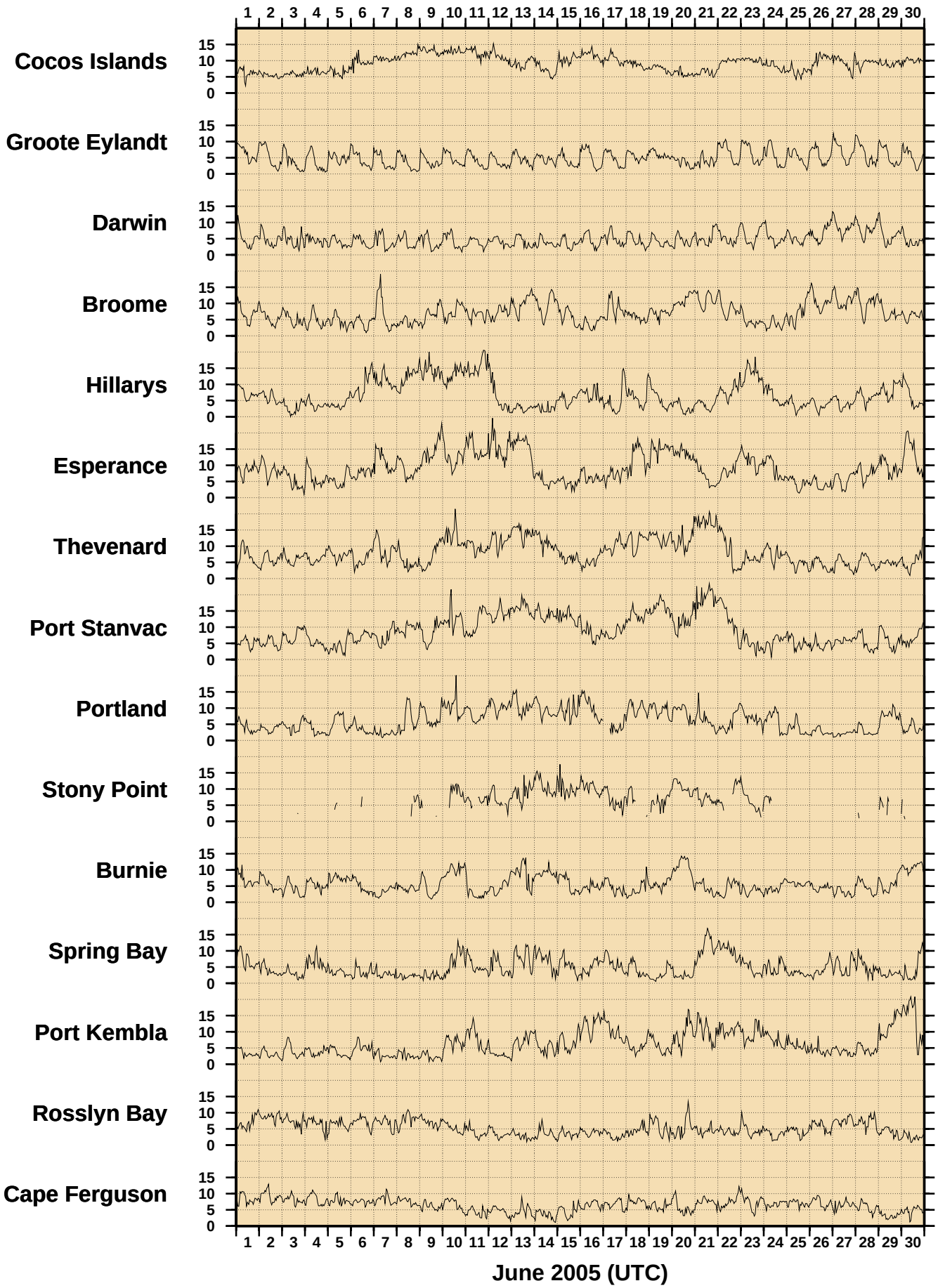


Figure 7

JUNE 2005
HOURLY AIR TEMPERATURES (°C)

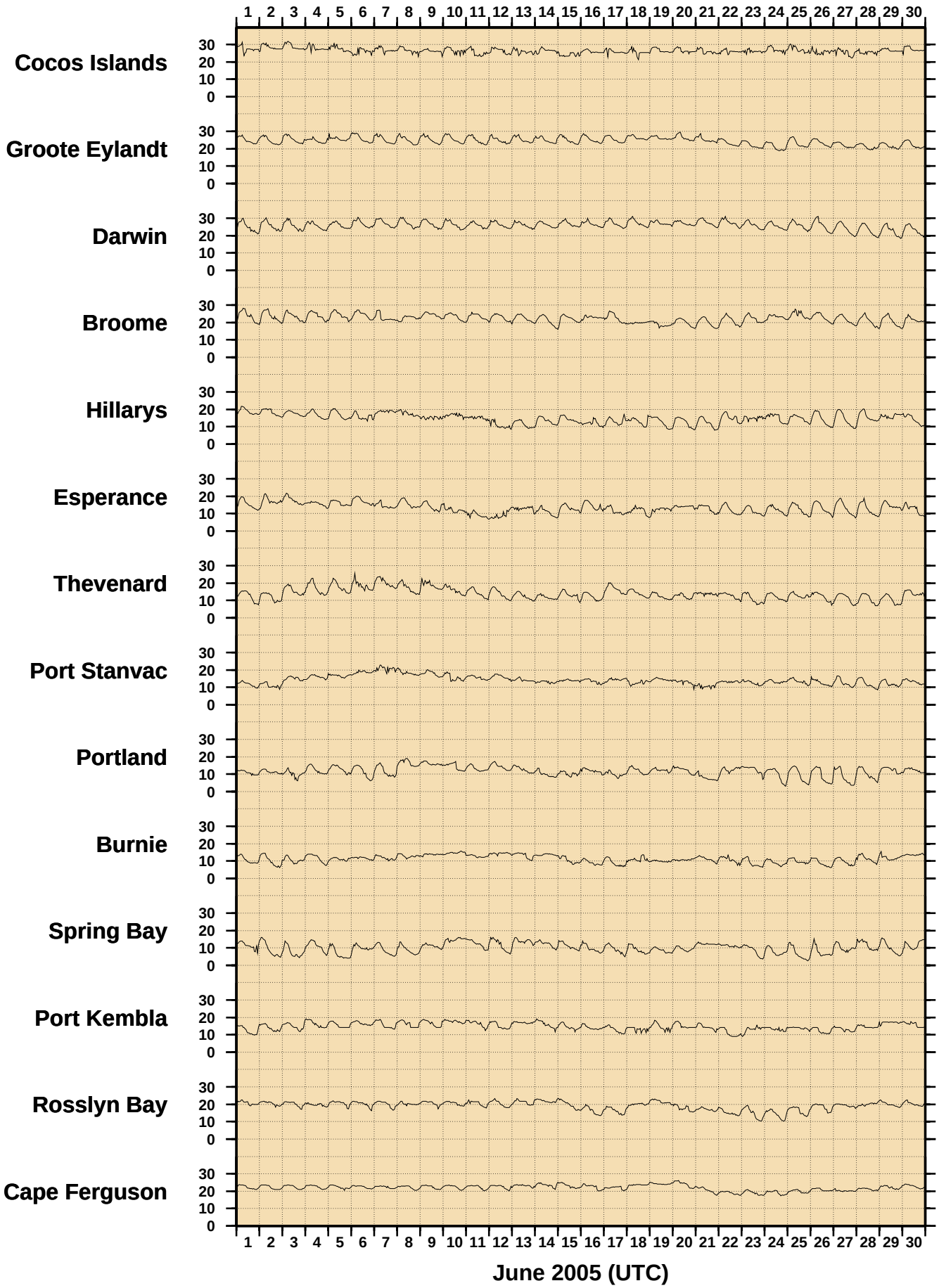


Figure 8

JUNE 2005
HOURLY WATER TEMPERATURES (˚C)

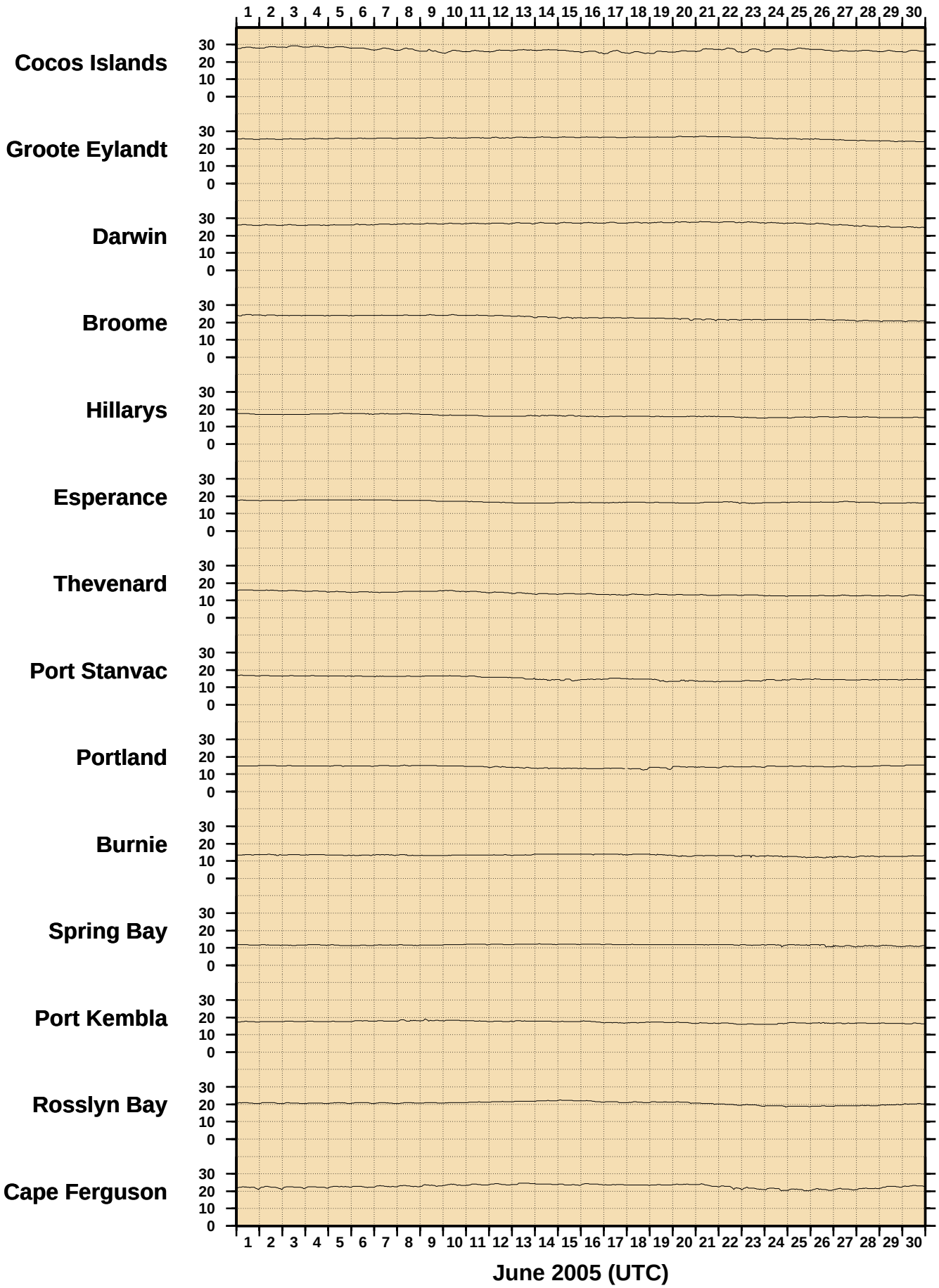


Figure 9

JUNE 2005
HOURLY ATMOSPHERIC PRESSURE (hPa)

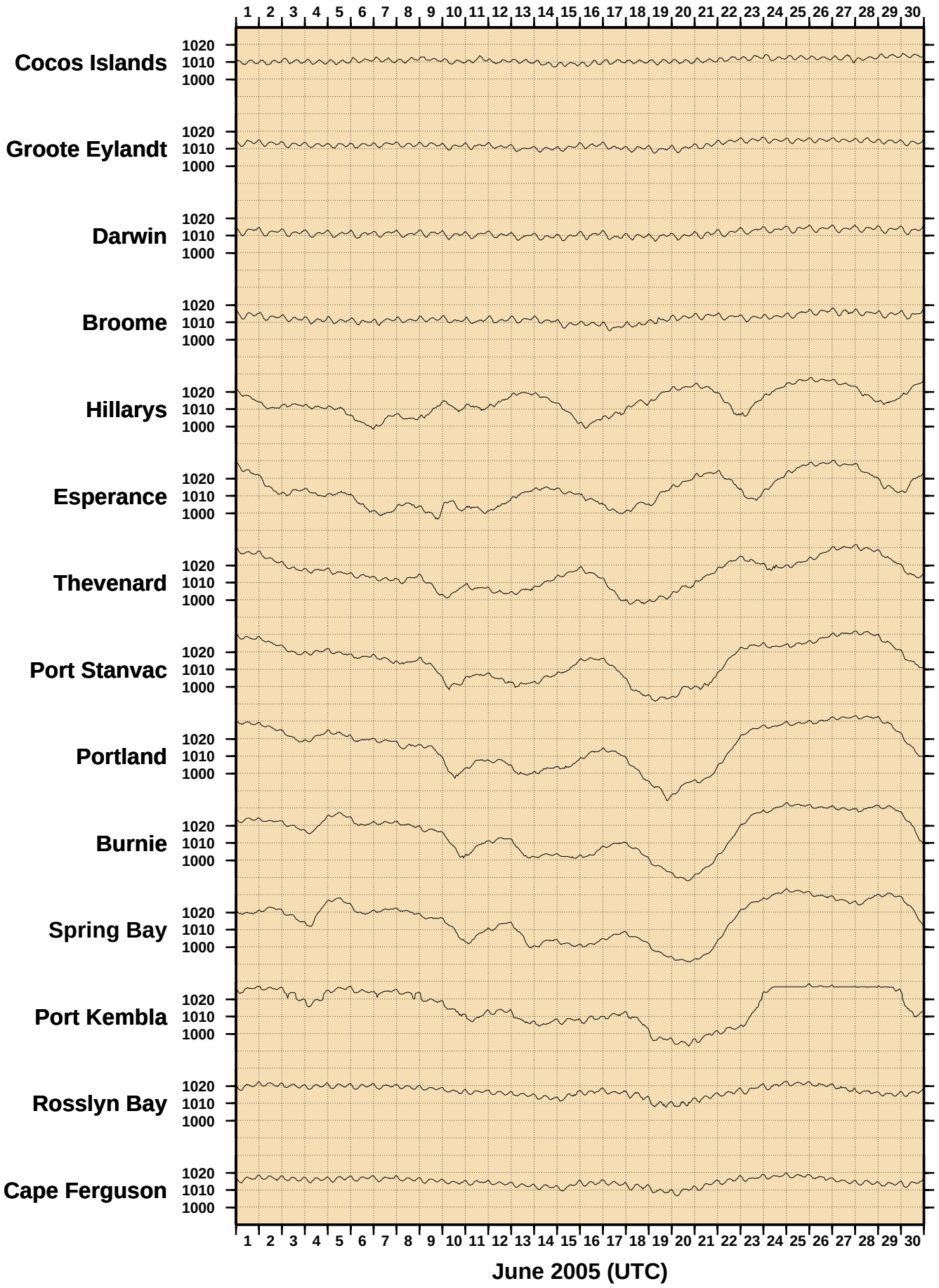
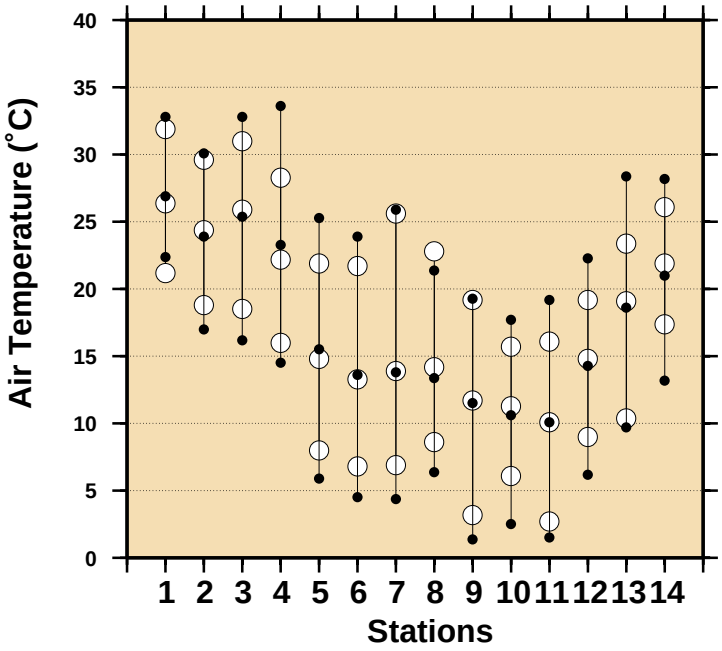
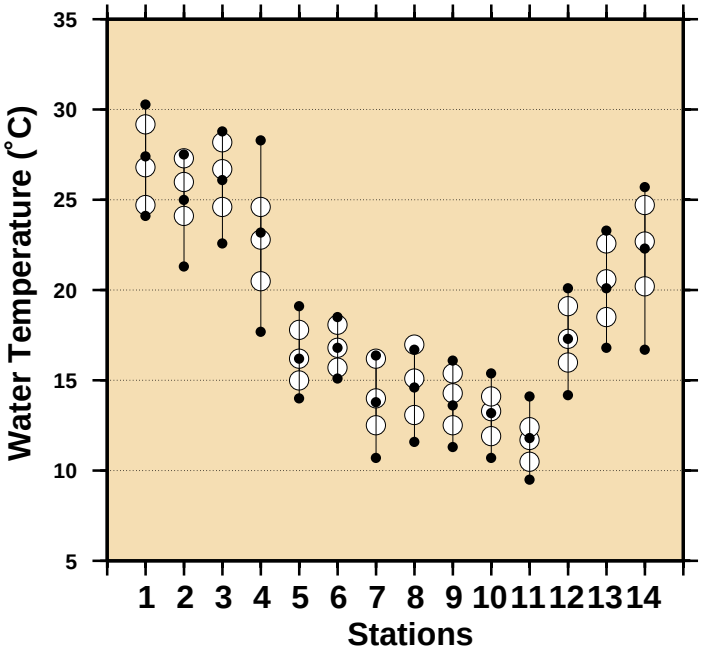
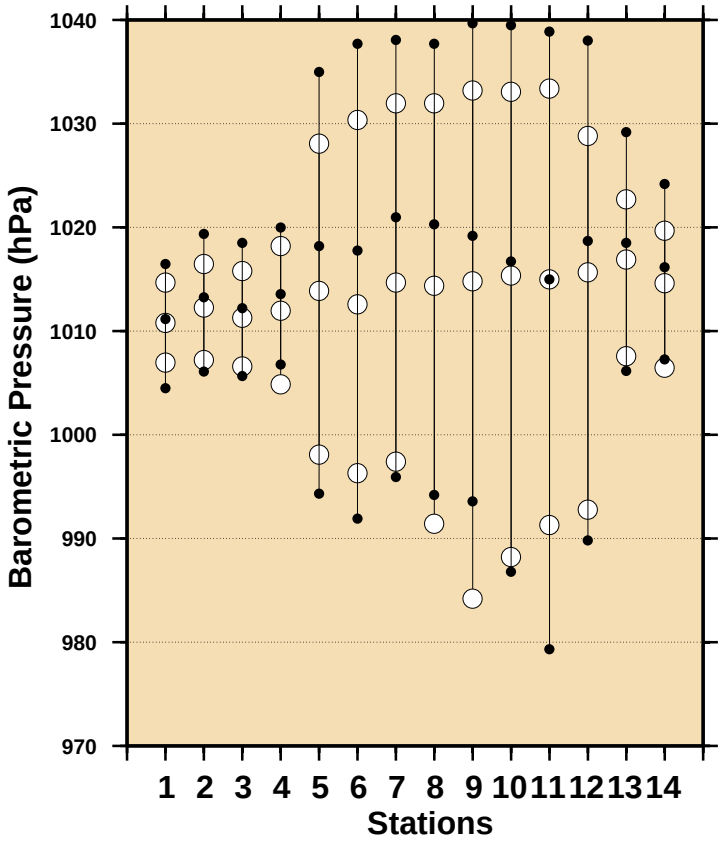


Figure 10

Comparison of June 2005 Max, Min & Mean with Long Term June Values.







Stations

1 - Cocos Islands
2 - Groote Eylandt
3 - Darwin
4 - Broome
5 - Hillarys
6 - Esperance
7 - Thevenard
8 - Port Stanvac
9 - Portland
10 - Burnie
11 - Spring Bay
12 - Port Kembla
13 - Rosslyn Bay
14 - Cape Ferguson

June 2005 Maximum
June 2005 Mean
June 2005 Minimum

Long Term June Maximum
Long Term June Mean
Long Term June Minimum

Figure 11
MONTHLY MEAN SEA LEVELS TO JUNE 2005 (m)

The zero line represents an arbitrary fixed offset from the zero of the tide gauge.

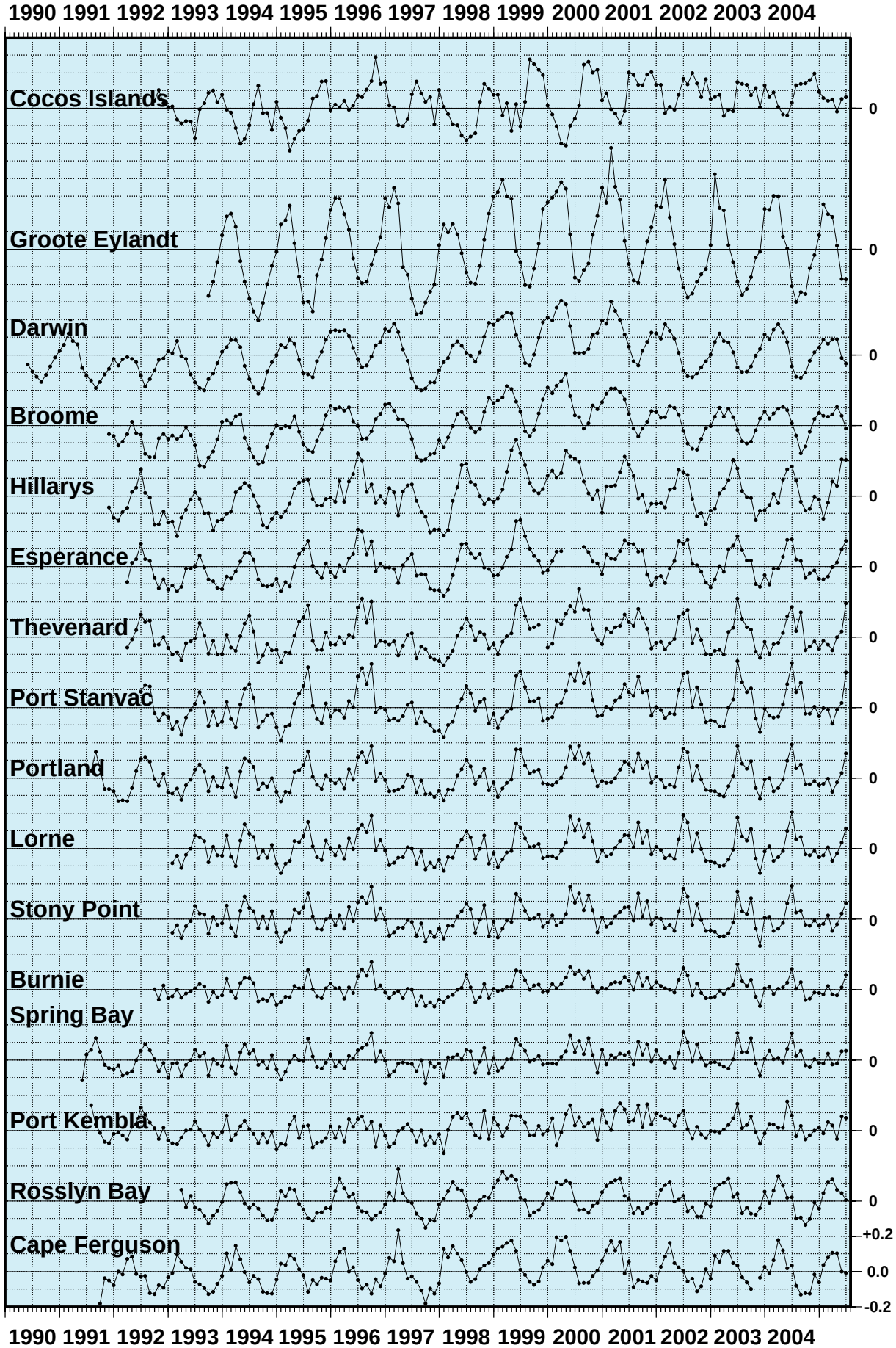


Figure 12

SEA LEVEL ANOMALIES THROUGH JUNE 2005 (m)

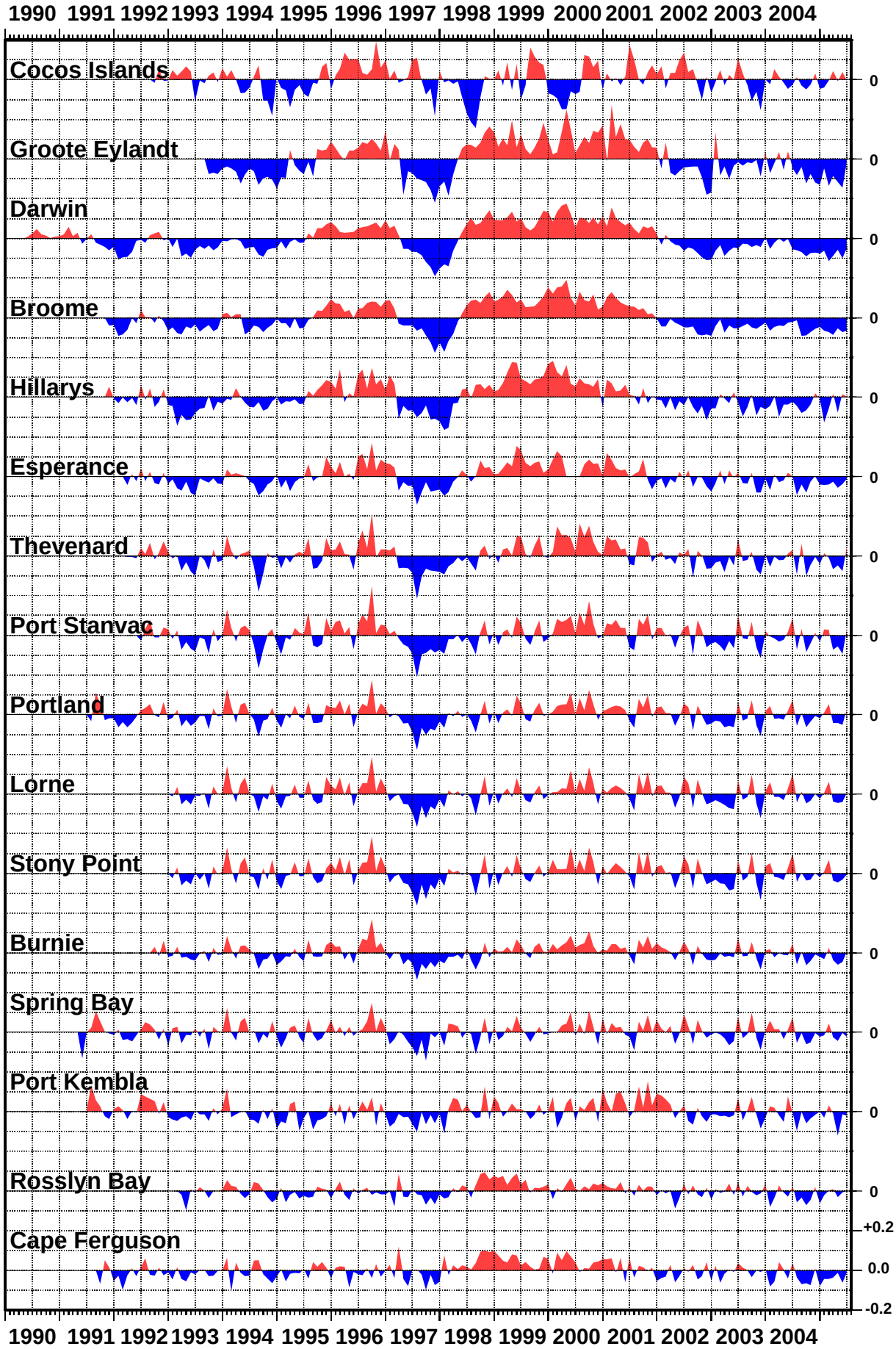


Figure 13

SEA LEVEL TRENDS THROUGH JUNE 2005 (mm/year)

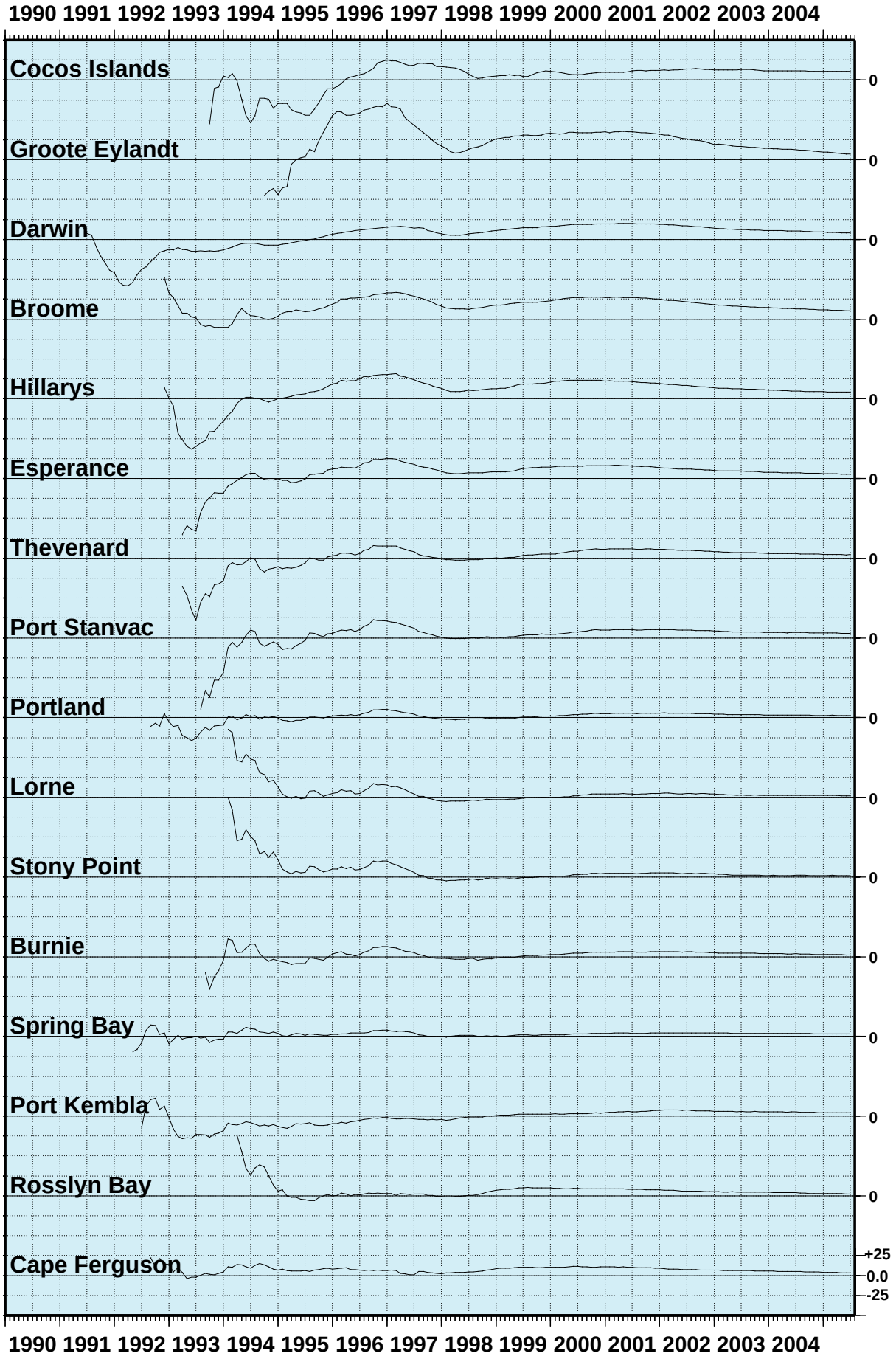


Figure 14

BAROMETRIC PRESSURE ANOMALIES THROUGH JUNE 2005 (hPa)

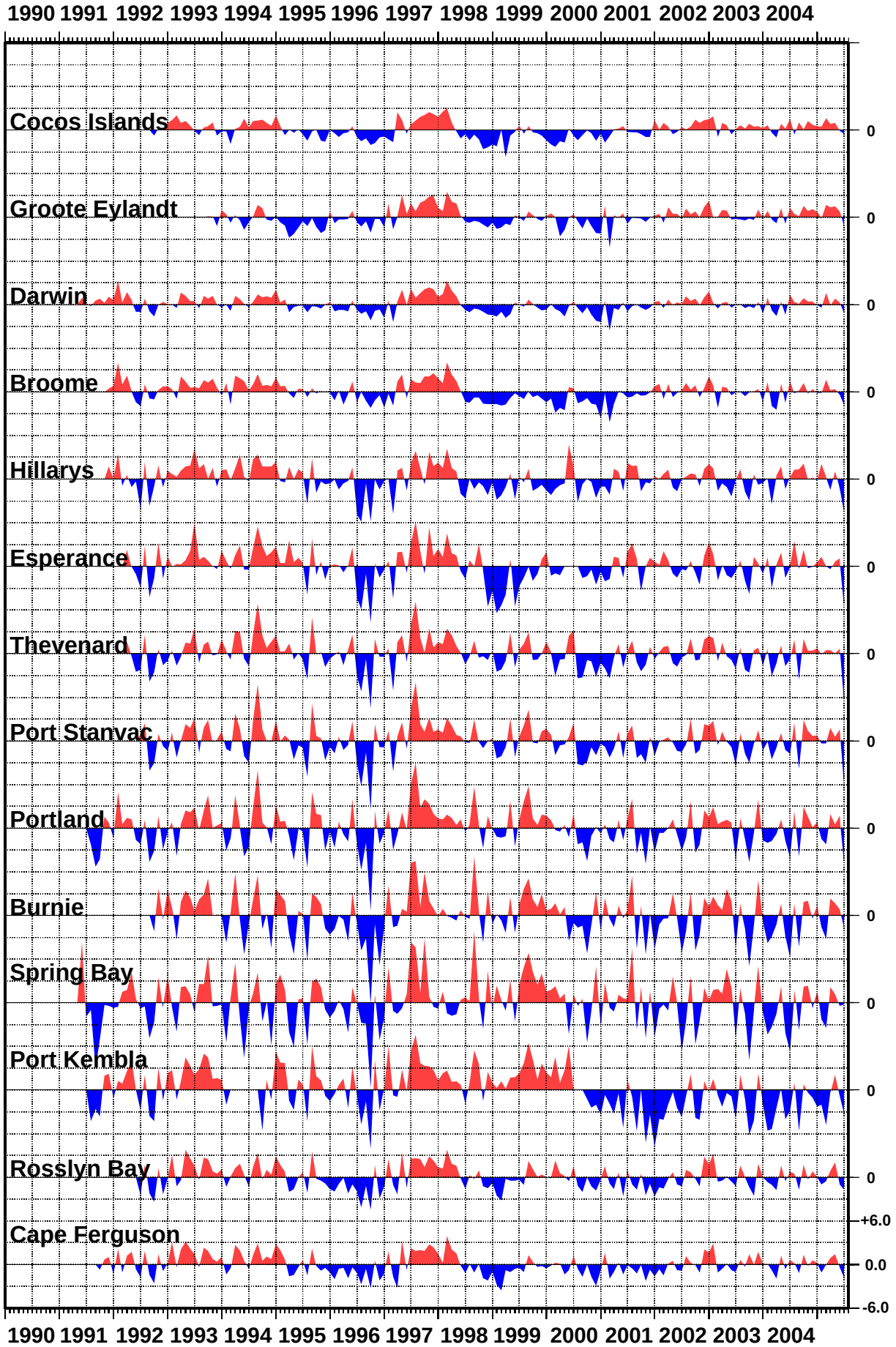


Figure 15

WATER TEMPERATURE ANOMALIES THROUGH JUNE 2005 (˚C)

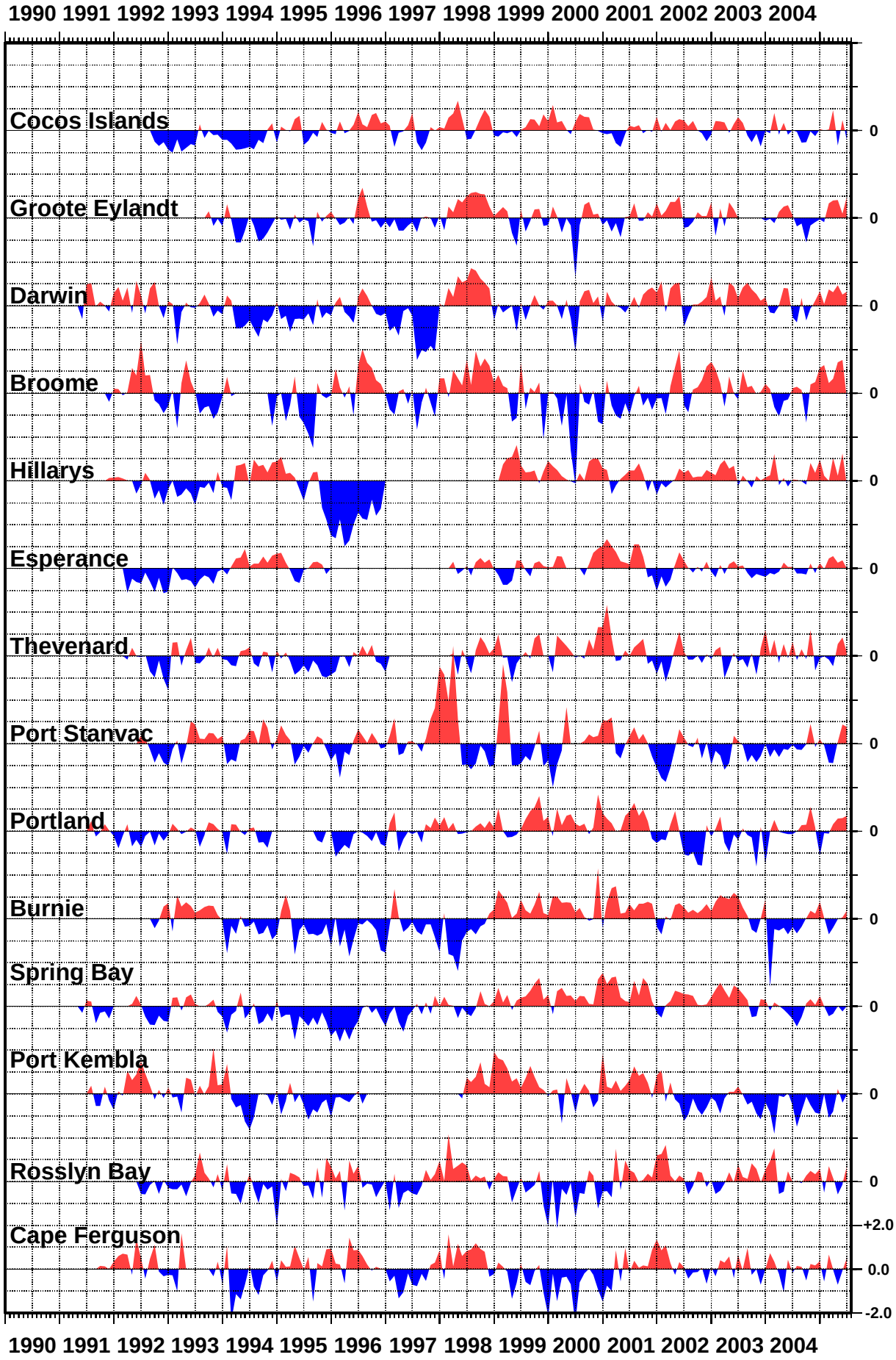


Figure 16

AIR TEMPERATURE ANOMALIES THROUGH JUNE 2005 (°C)

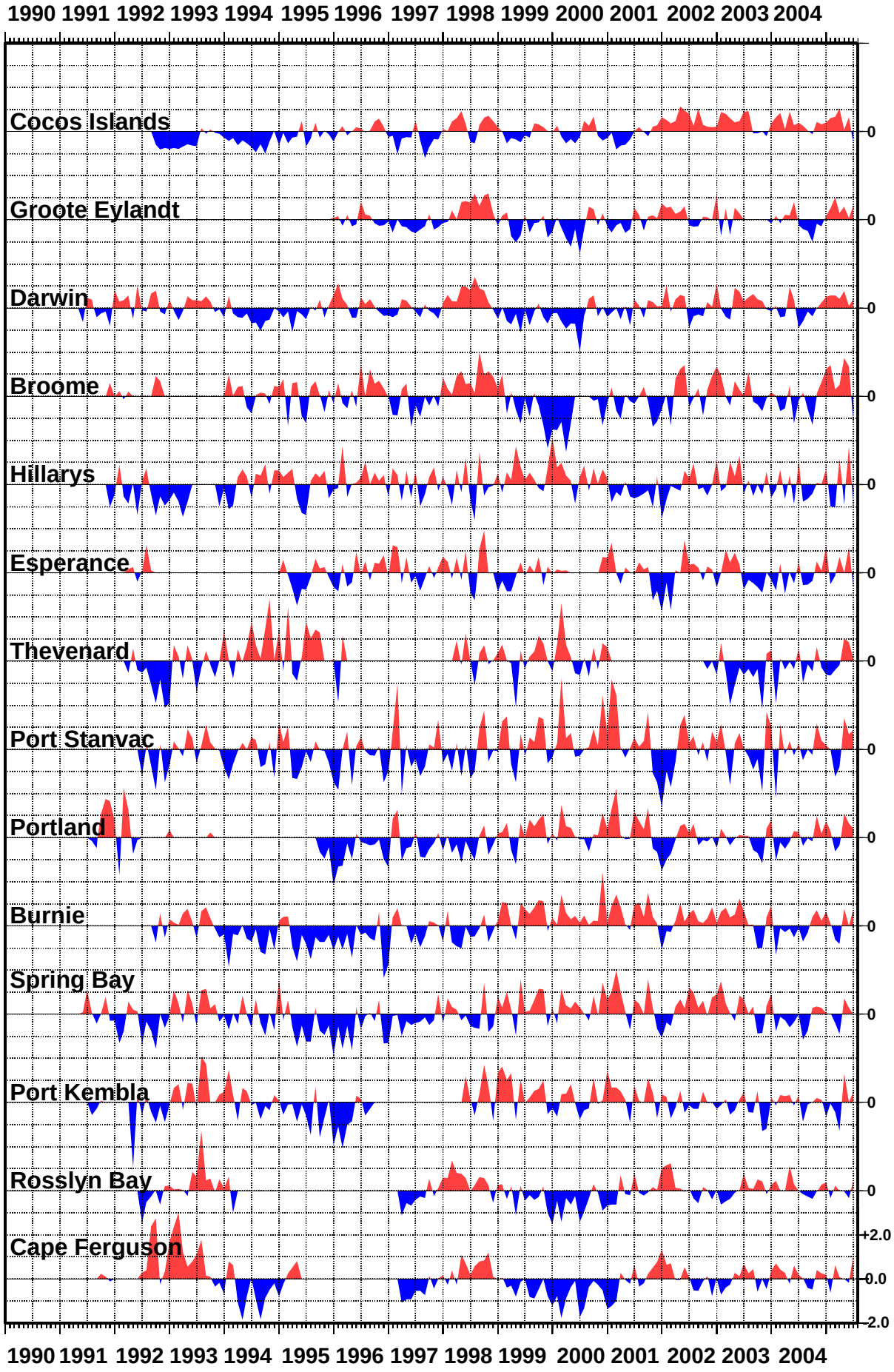


Figure 17

SEA LEVEL DATA RETURN

THE NUMBER OF DAYS OF MISSING DATA ARE INDICATED
GAPS INCLUDE TRANSMISSION, POWER AND LOGGER FAILURE
*** Patchy record**

National Tidal Centre, Bureau of Meteorology