THE AUSTRALIAN BASELINE SEA LEVEL MONITORING PROJECT

MONTHLY DATA REPORT

MAY 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.

Australian Government

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Quality Certification:

I authorise the issue of this Australian Baseline Sea Level Monitoring Project Monthly Data Report for May 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 MAY 2005

Sea level data return (Figures 1 and 17) in May 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 May. 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 May values. Note that the long-term ranges are calculated using the historical sets of May data for each station ***excluding*** the current month of data.

The air temperatures for May 2005 were generally consistent with the long term May air temperatures for most sites. The maximum air temperature at Cocos Islands (26.7ºC) was above the previous May maxima.

The water temperatures for May 2005 were generally consistent with the long-term May water temperatures for all sites.

The barometric pressures for April 2005 were generally consistent with the long-term April barometric pressures for all sites.

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 of the sites in May 2005 with the exception of Cocos Islands and Hillarys where the anomalies changed from negative to positive.

Figure 13 shows the evolution of the short-term sea level trends for each site included in the Australian Baseline Sea Level Monitoring Project. Table 1 lists the commencement of operation, the sea level trend for the entire record (plotted in Figure 13) and the change in trend with respect to the analysis of the previous month.

Barometric pressure anomalies (Figure 14) decreased at most sites during May 2005. They changed from being positive to sightly negative at Broome, Hillarys, Port Kembla, Rosslyn Bay and Cape Ferguson and increased at Esperance, Thevenard, Port Stanvac and Portland.

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.

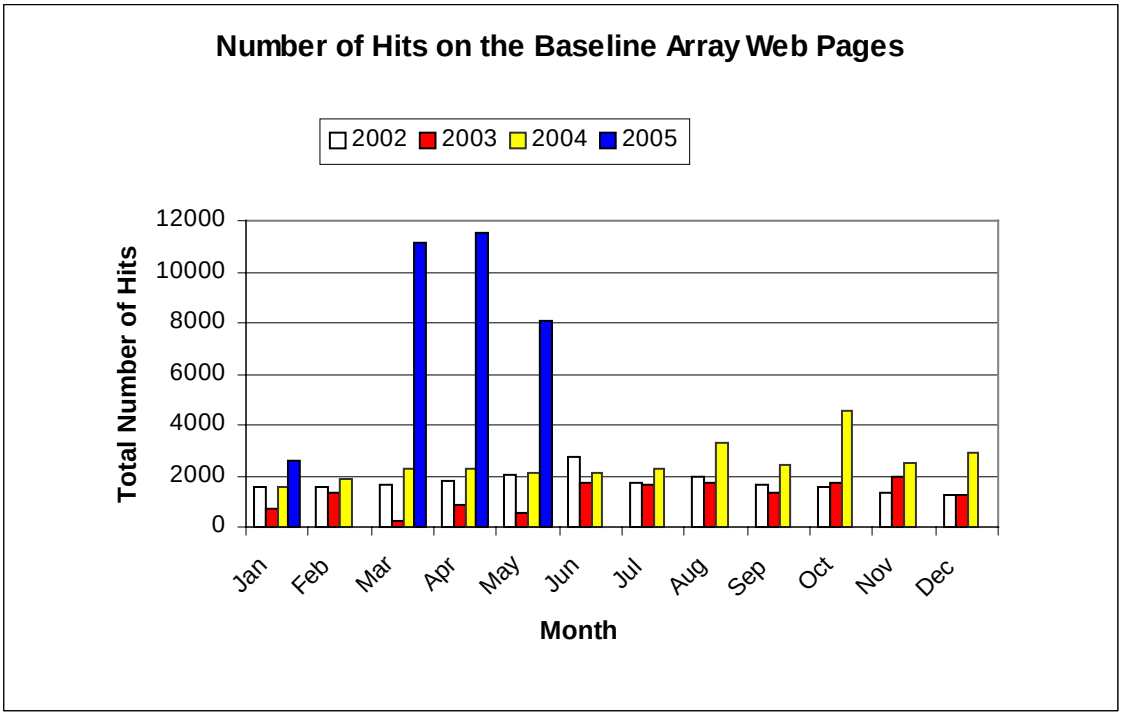
The number of hits to the Australian Baseline Sea Level Monitoring project web pages from 2002 to May 2005 is given in Table 2.

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 May 2005.

Location	Installation Date	Sea Level Trend (mm/yr)	Change from previous month
Cocos Islands	Sep 1992	+11.0	+0.1
Groote Eylandt	Sep 1993	+7.4	-0.6
Darwin	May 1990	+8.2	-0.2
Broome	Nov 1991	+10.5	-0.2
Hillarys	Nov 1991	+8.3	0.0
Esperance	Mar 1992	+5.5	-0.1
Thevenard	Mar 1992	+4.3	-0.2
Port Stanvac	Jun 1992	+5.6	-0.3
Portland	Jul 1991	+2.5	-0.1
Lorne	Jan 1993	+1.9	-0.1
Stony Point	Jan 1993	+1.6	-0.1
Burnie	Sep 1992	+2.4	-0.1
Spring Bay	May 1991	+3.2	0.0
Port Kembla	Jul 1991	+4.0	0.0
Rosslyn Bay	Jun 1992	+2.6	0.0
Cape Ferguson	Sep 1991	+3.4	-0.2

Table 2: Number of hits on the Australian Baseline Sea Level Monitoring Project web pages from 2002 to May 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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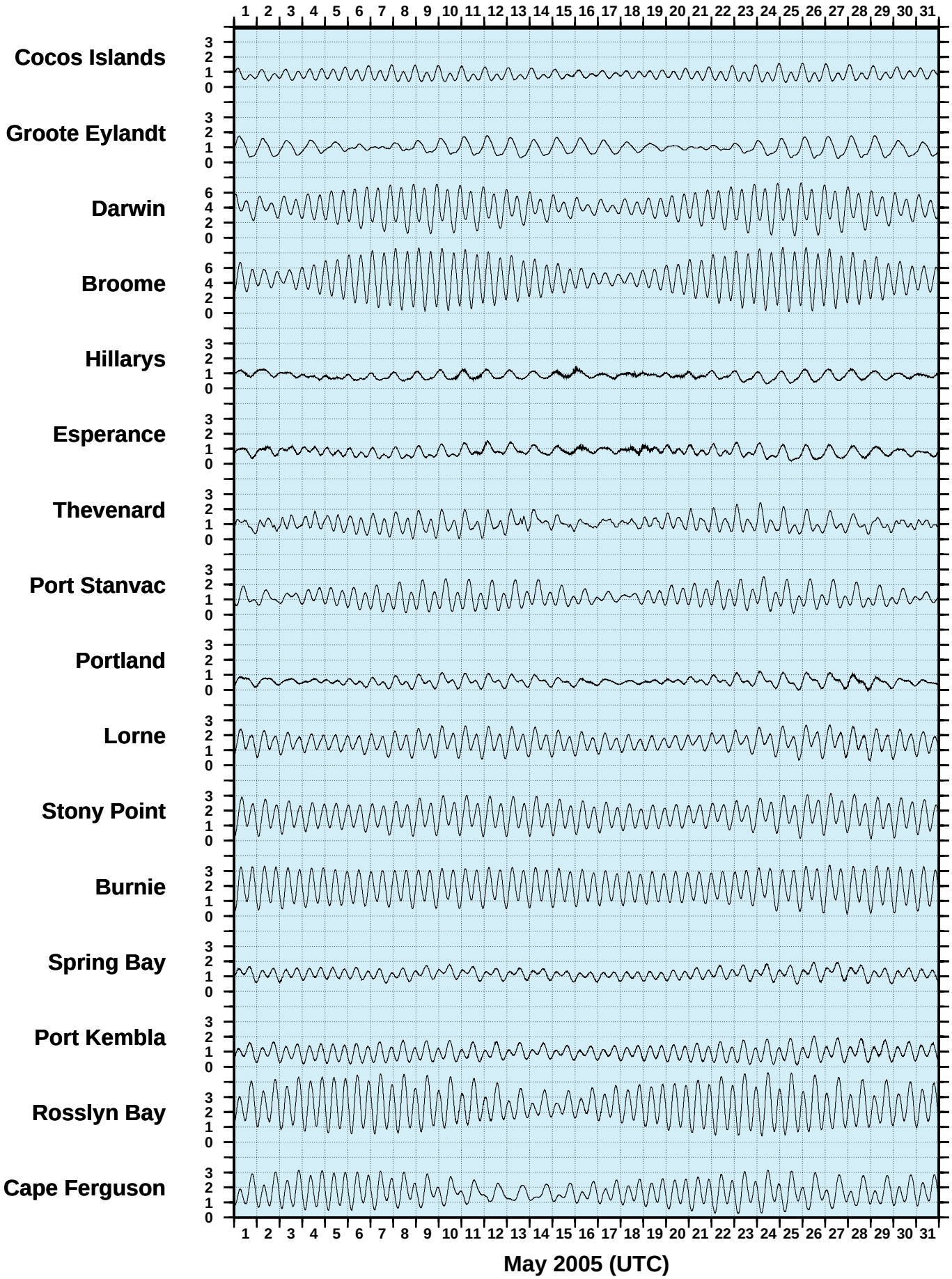
Please note the following:

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

MAY 2005
SIX MINUTE SEA LEVEL OBSERVATIONS (m)



National Tidal Centre, Bureau of Meteorology

Figure 2

MAY 2005
SIX MINUTE RESIDUAL WATER LEVELS (m)

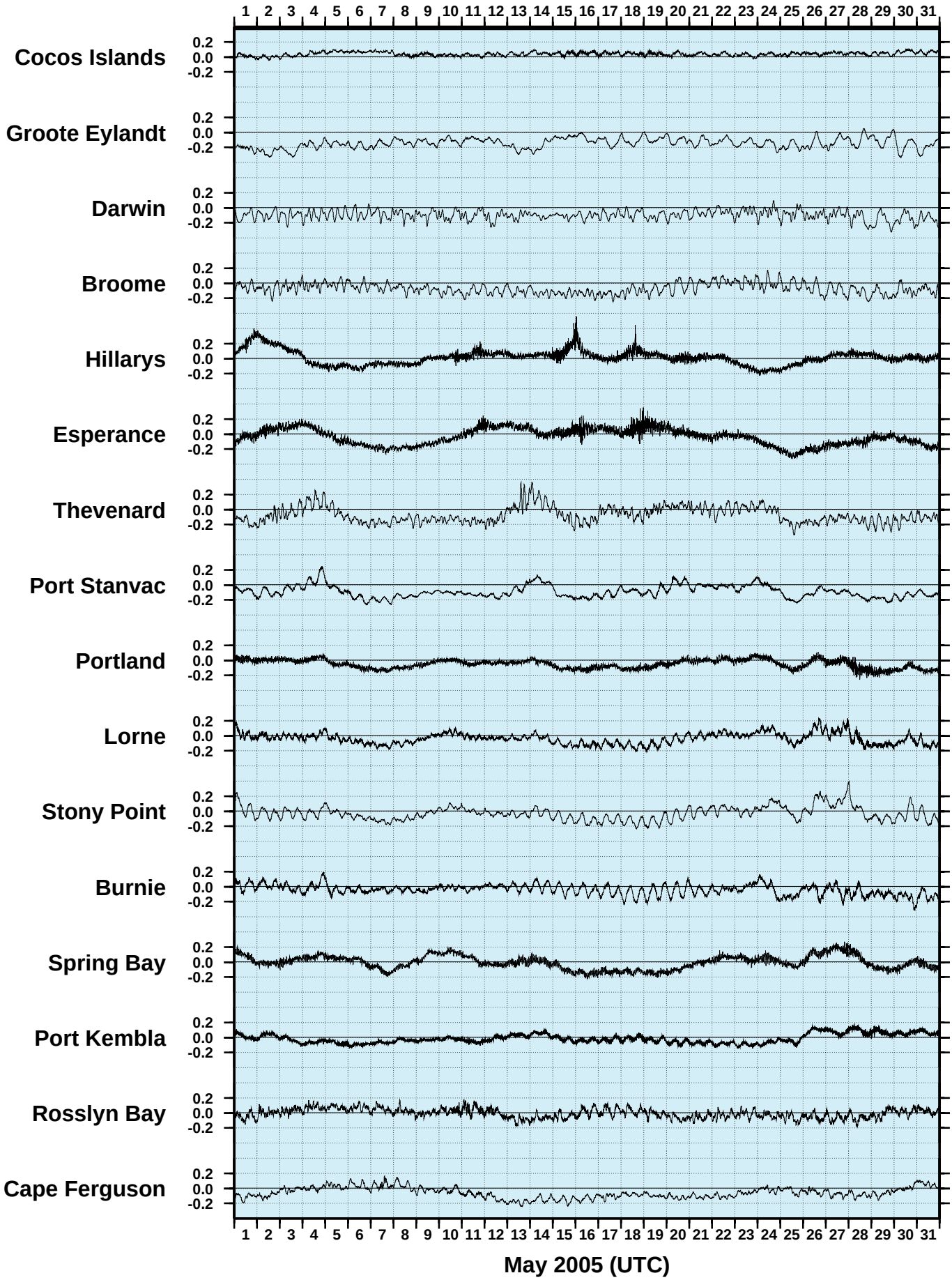


Figure 3

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

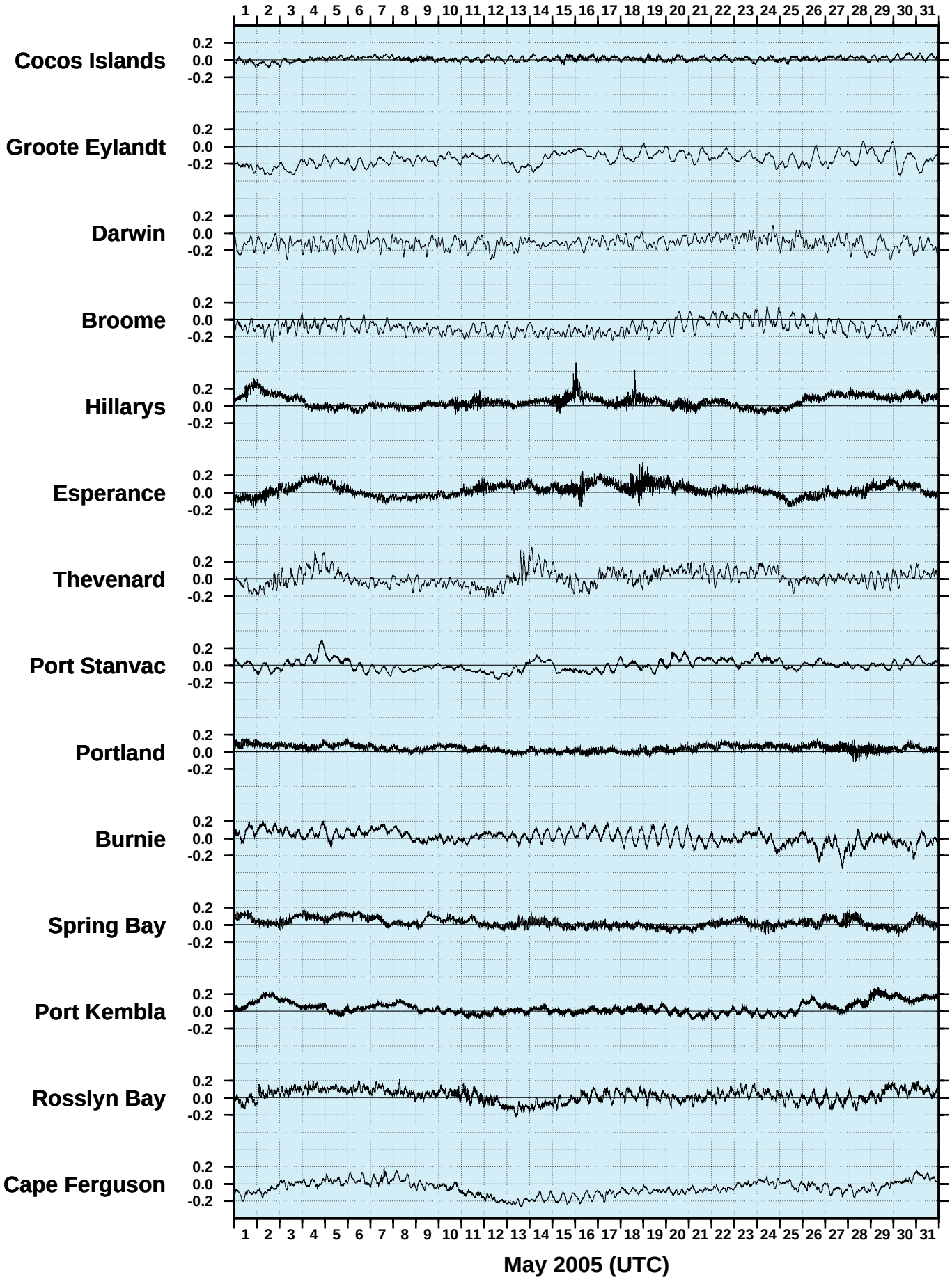


Figure 4

MAY 2005
HOURLY WIND SPEEDS (m/s)

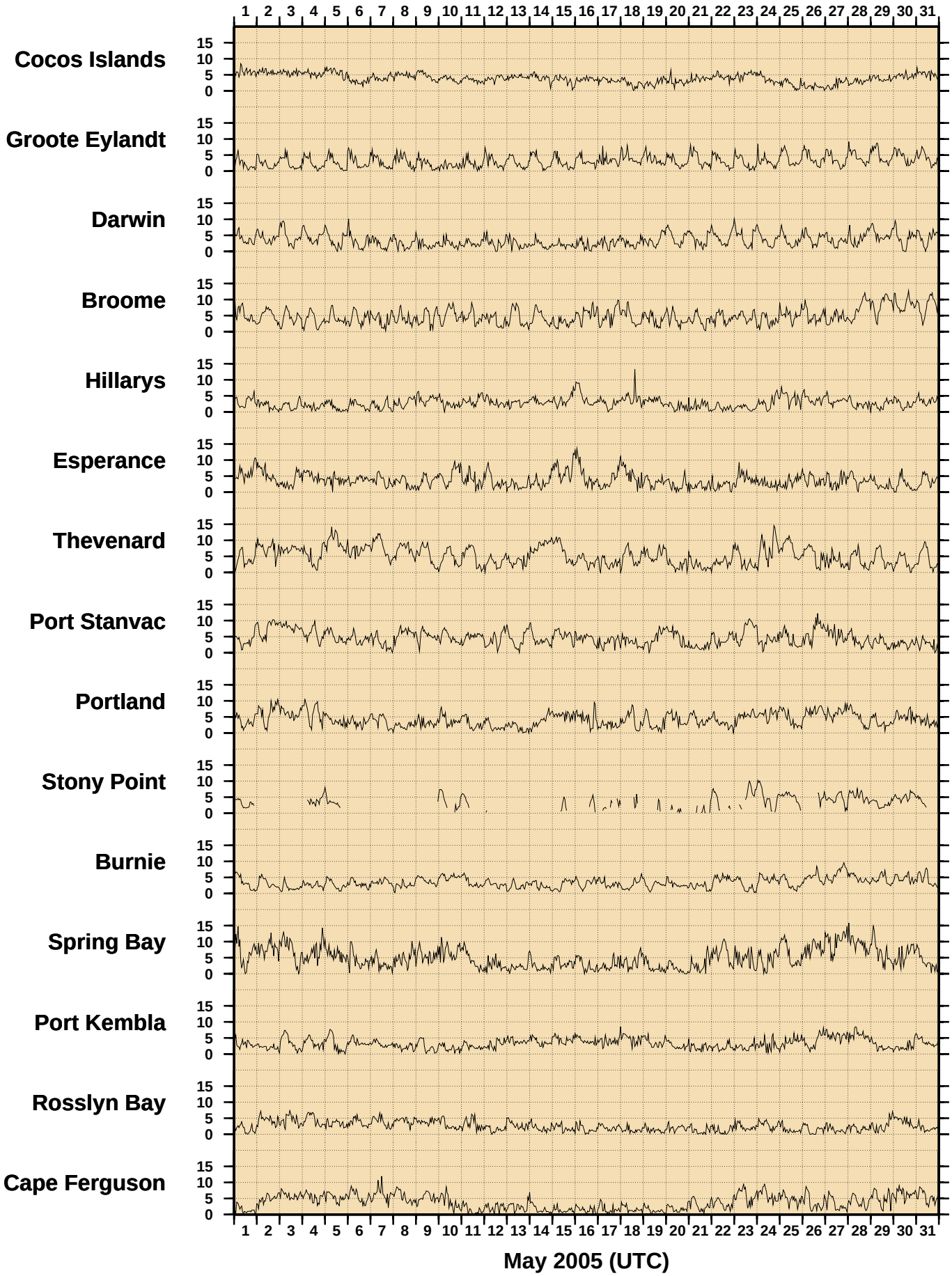


Figure 5

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

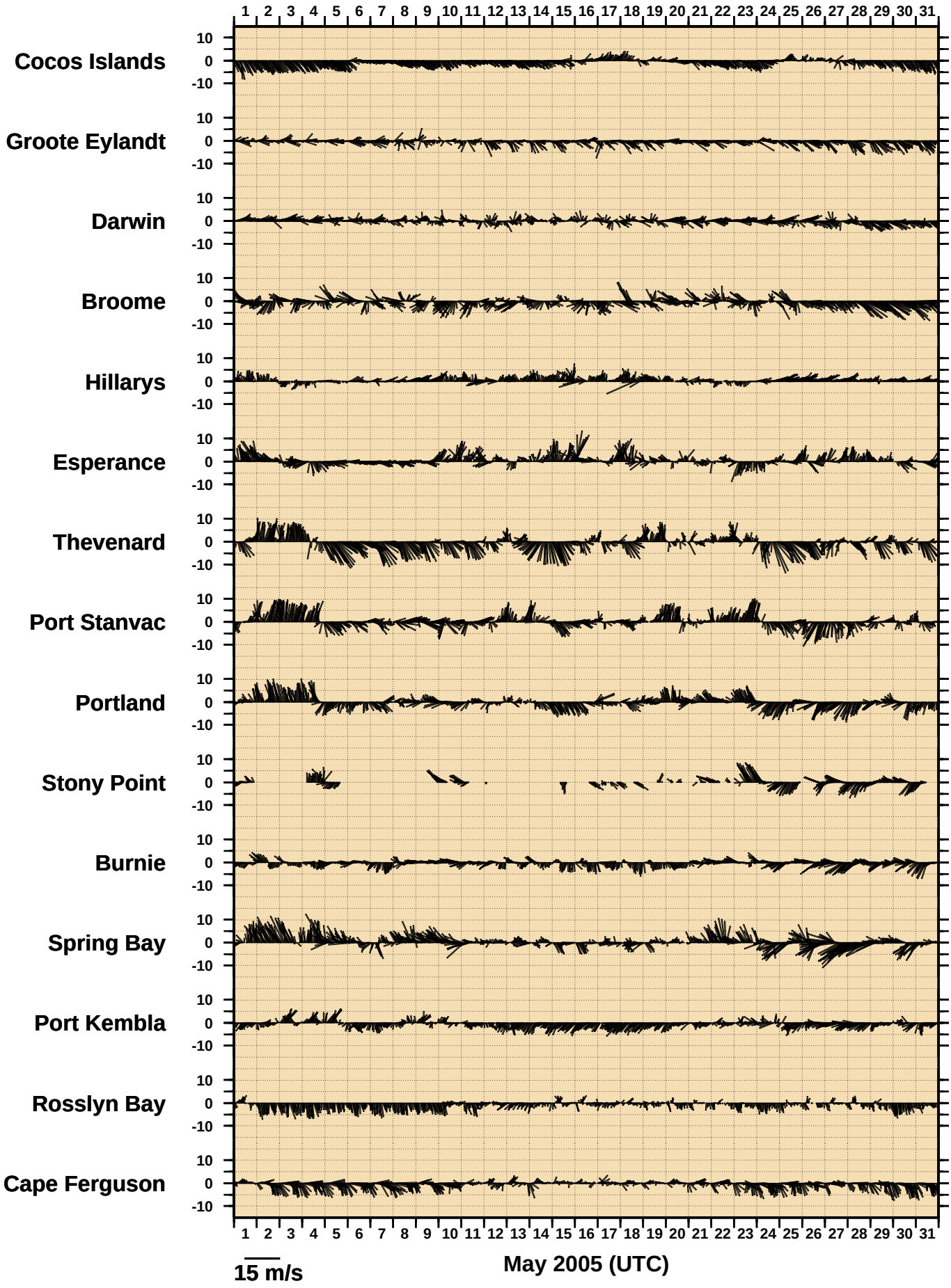


Figure 6

MAY 2005
HOURLY MAXIMUM WIND GUSTS (m/s)

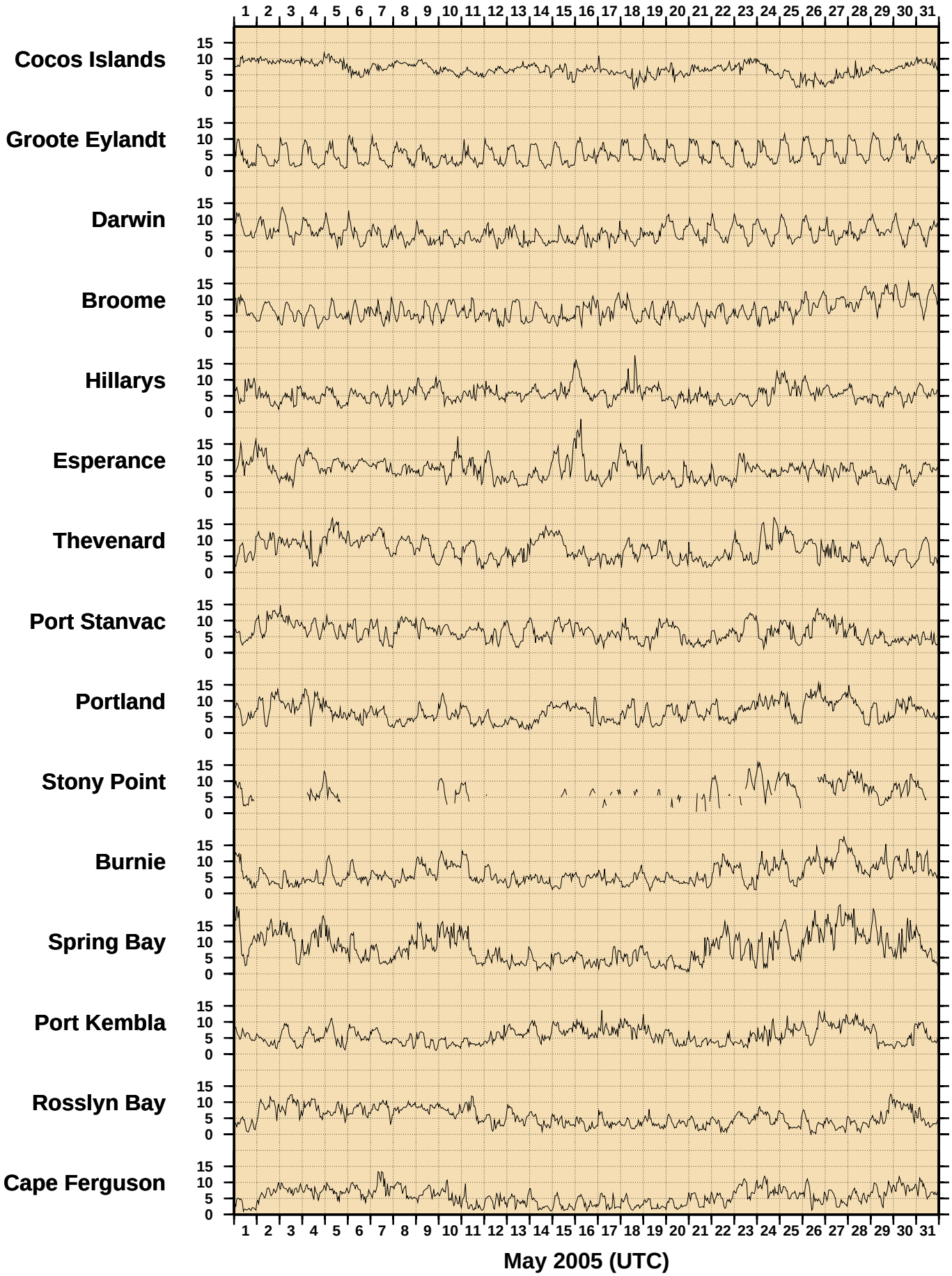


Figure 7

MAY 2005
HOURLY AIR TEMPERATURES (°C)

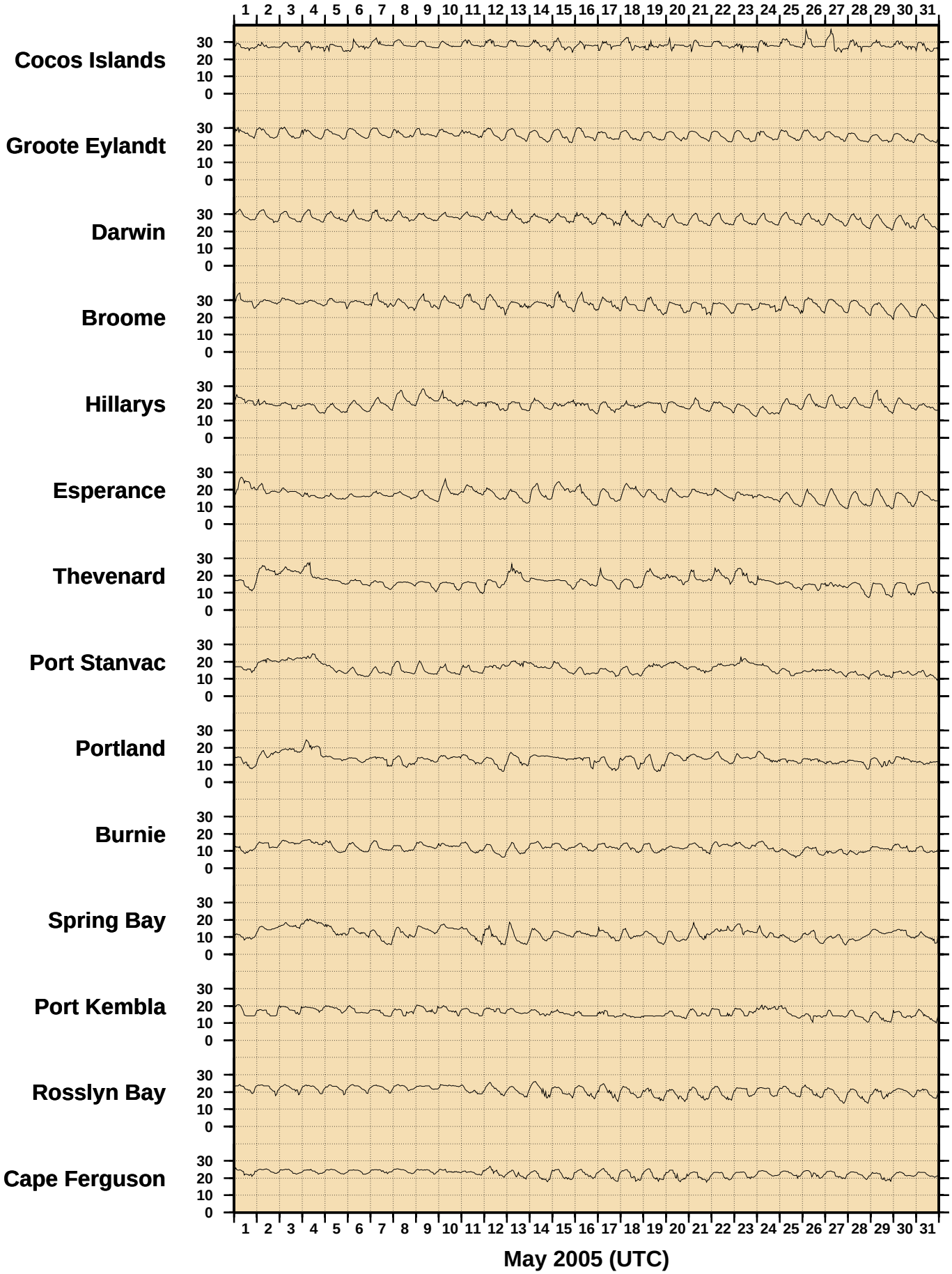


Figure 8

MAY 2005
HOURLY WATER TEMPERATURES (˚C)

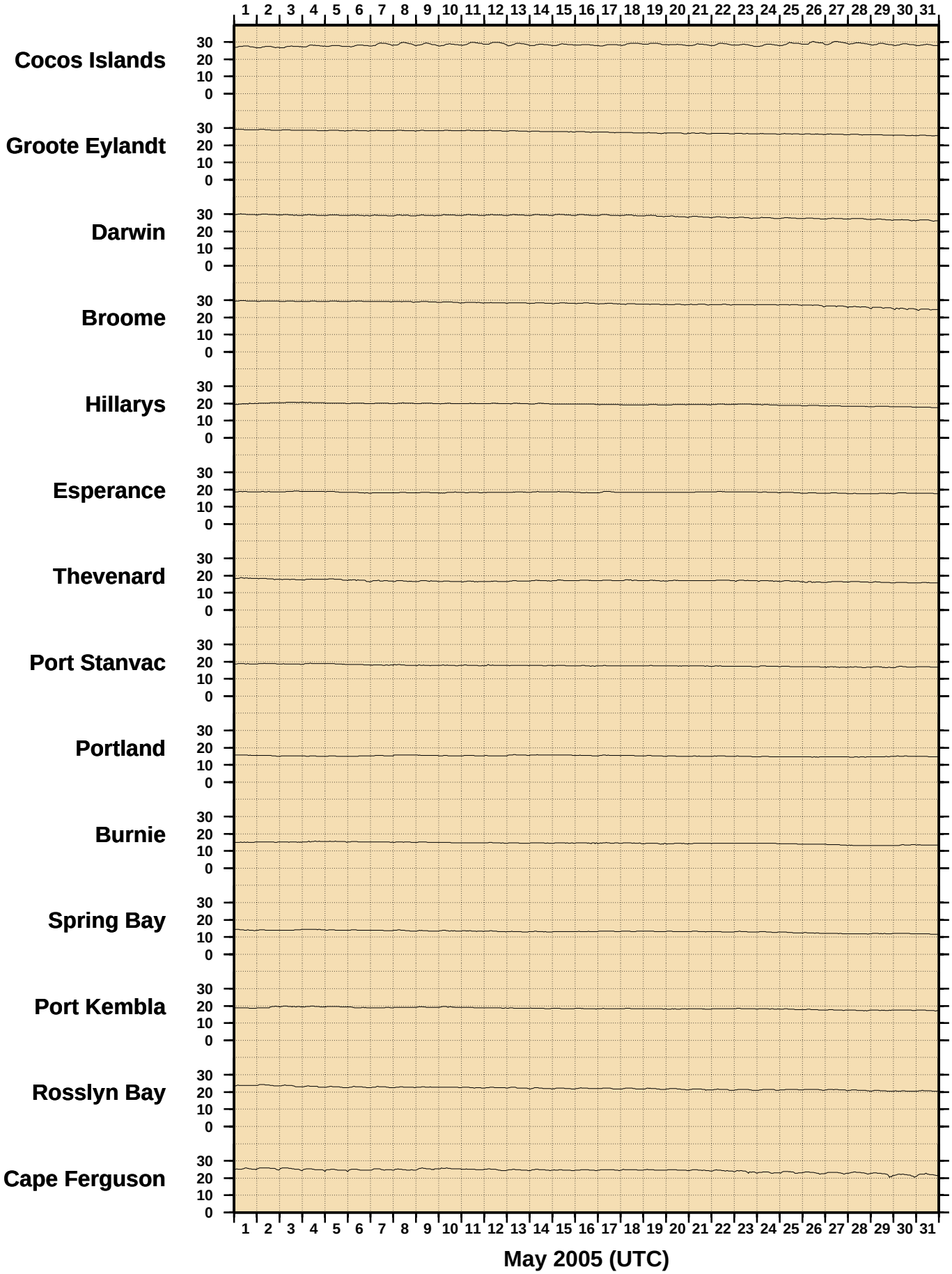


Figure 9

MAY 2005
HOURLY ATMOSPHERIC PRESSURE (hPa)

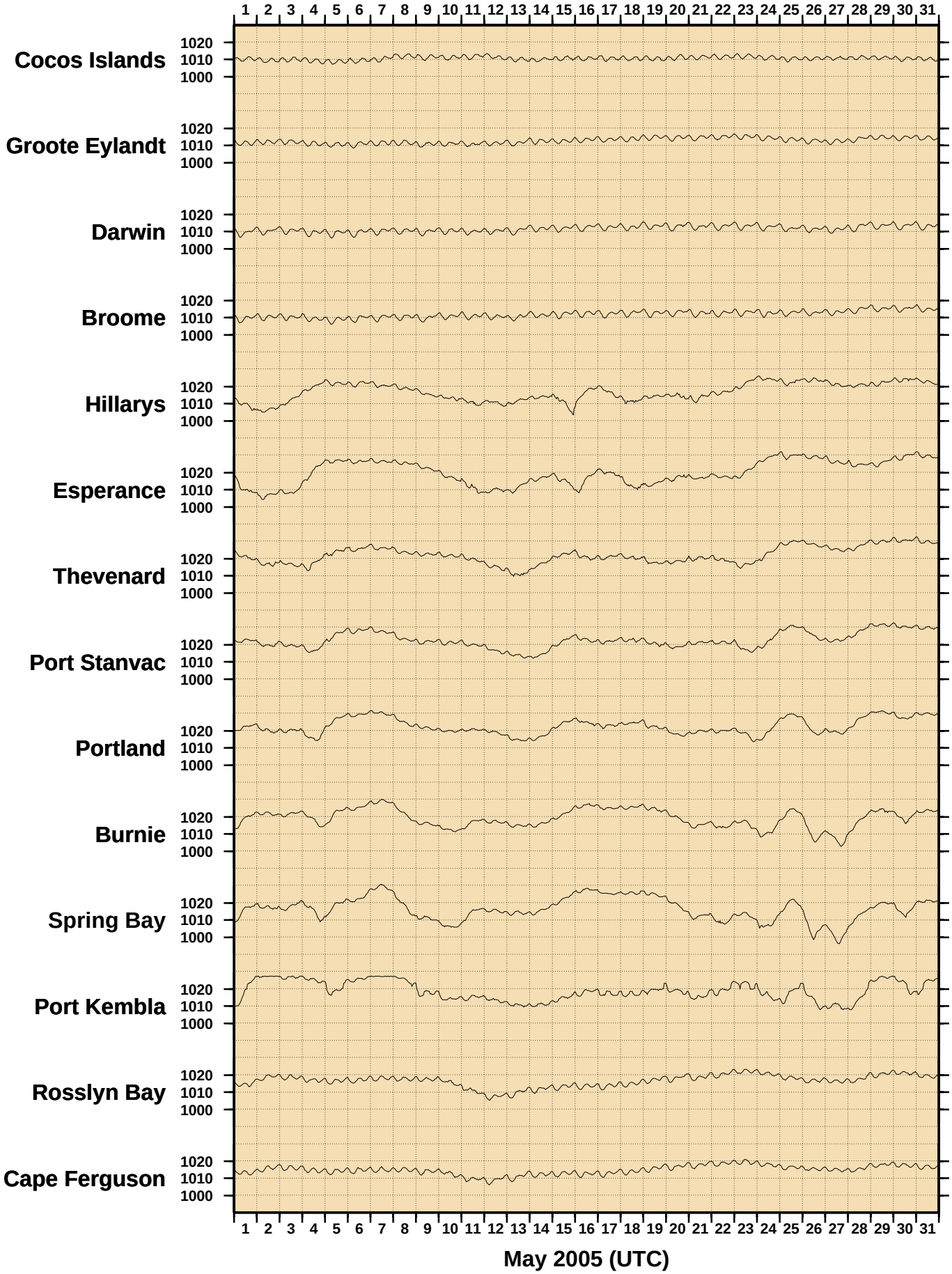
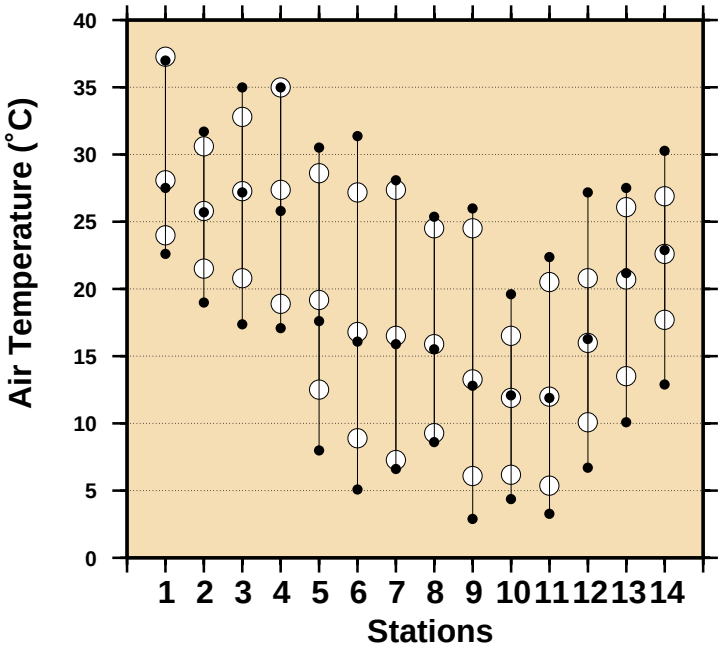
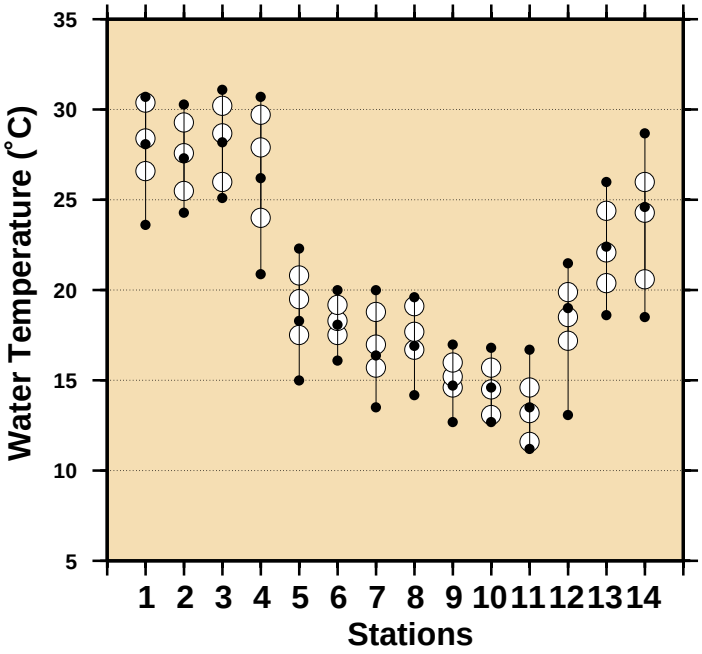
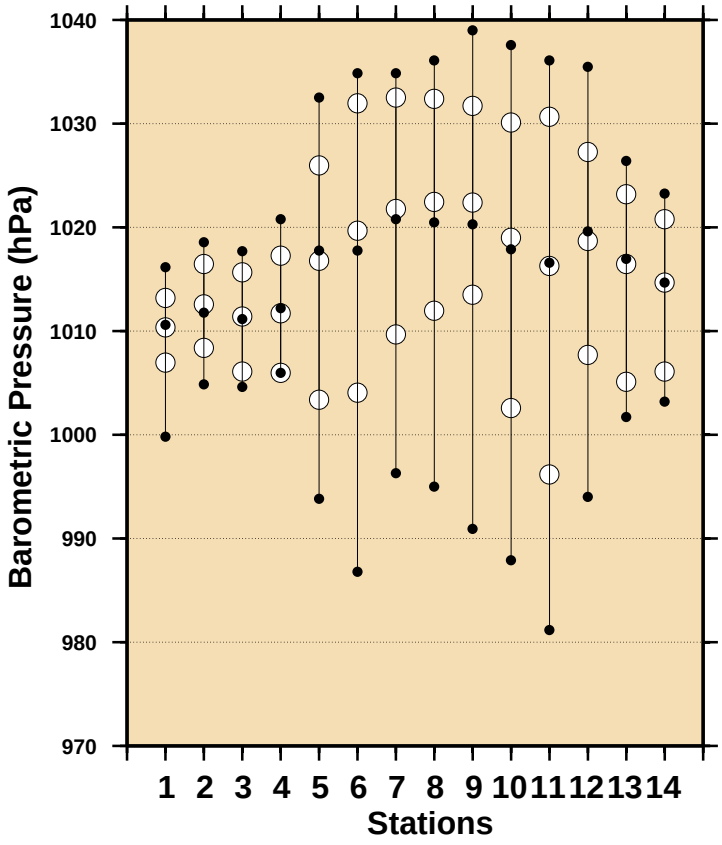


Figure 10

Comparison of May 2005 Max, Min & Mean with Long Term May 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

May 2005 Maximum
May 2005 Mean
May 2005 Minimum

Long Term May Maximum
Long Term May Mean
Long Term May Minimum

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

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

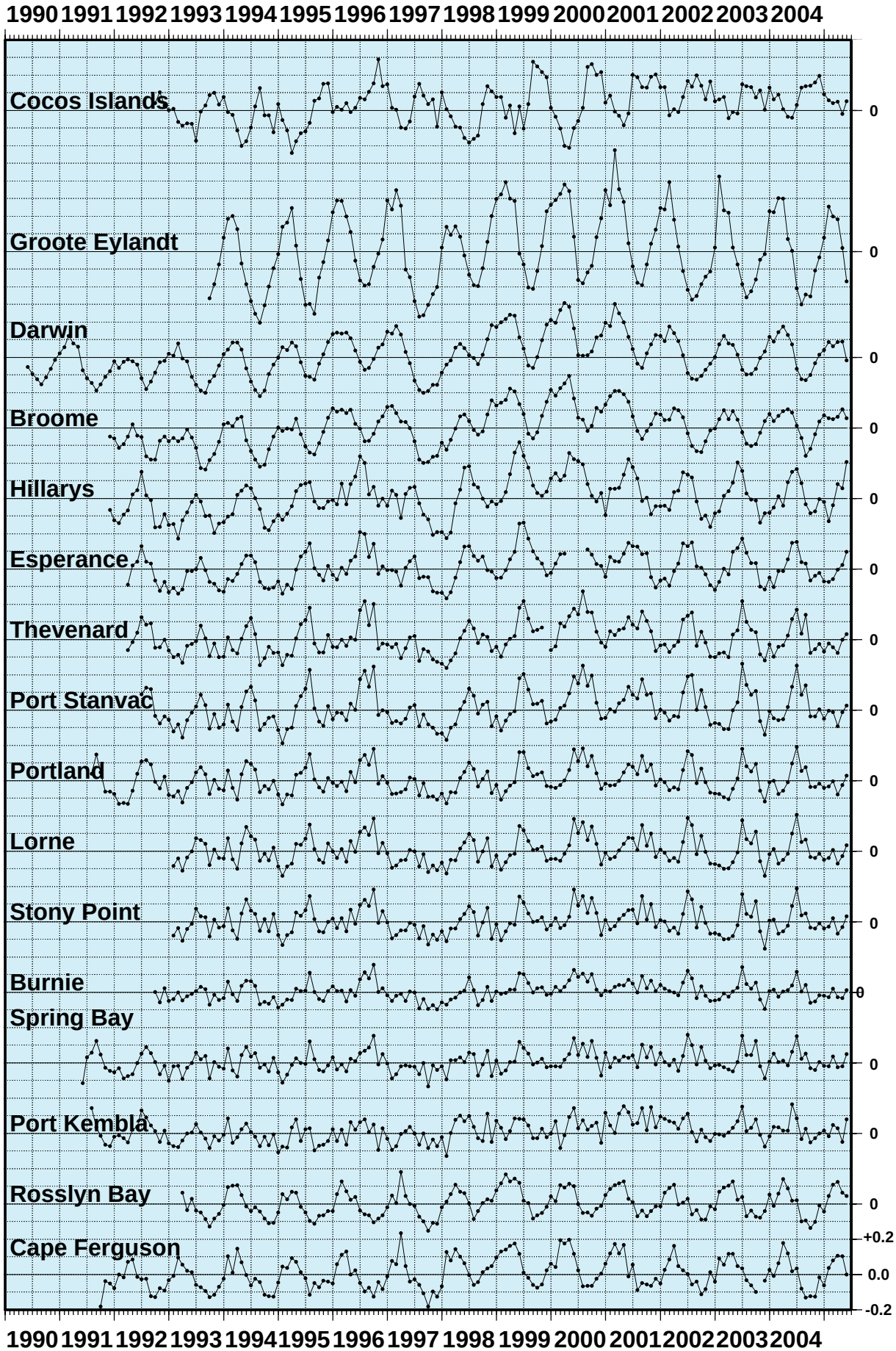


Figure 12

SEA LEVEL ANOMALIES THROUGH MAY 2005 (m)

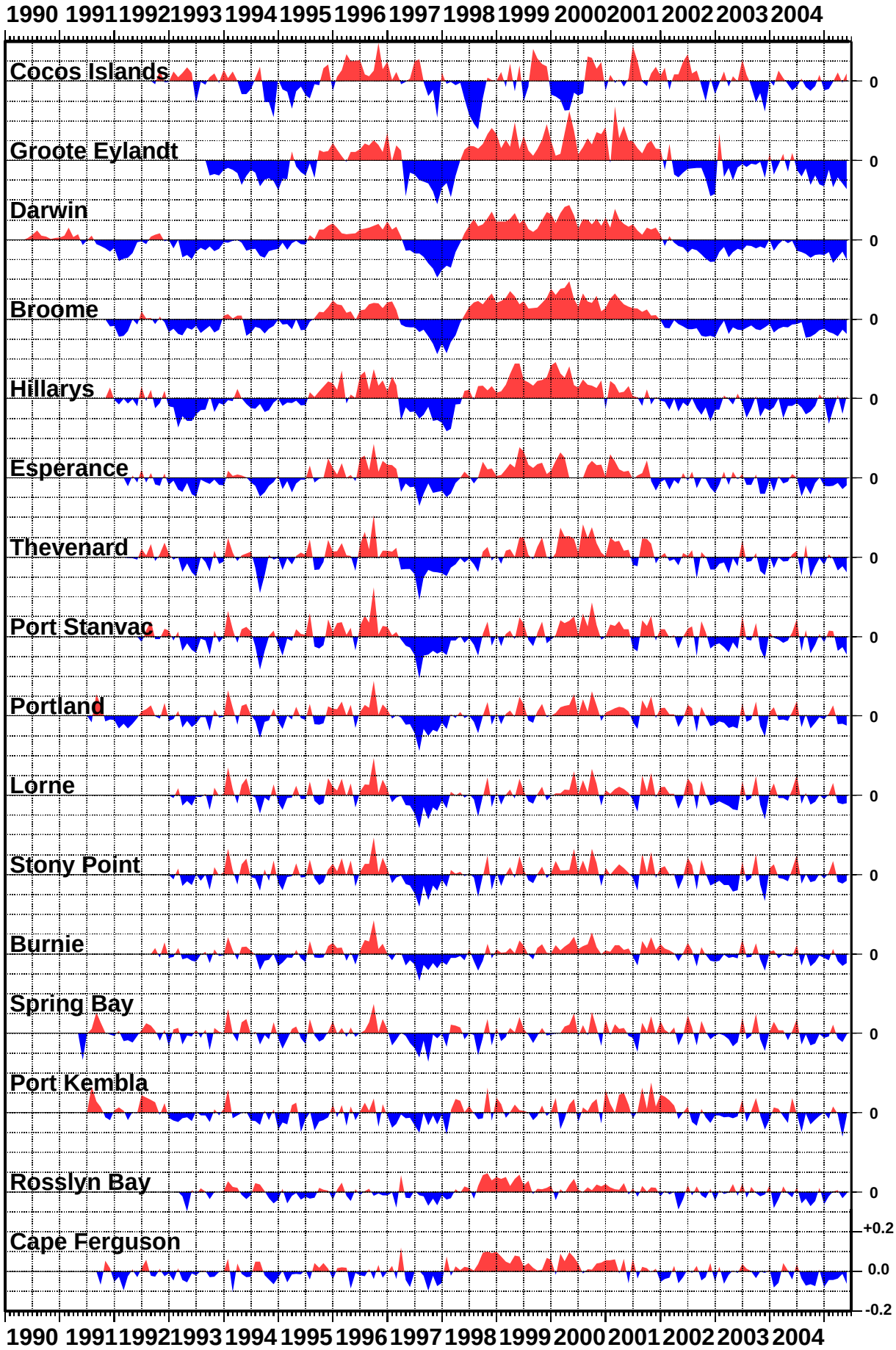


Figure 13

SEA LEVEL TRENDS THROUGH MAY 2005 (mm/year)

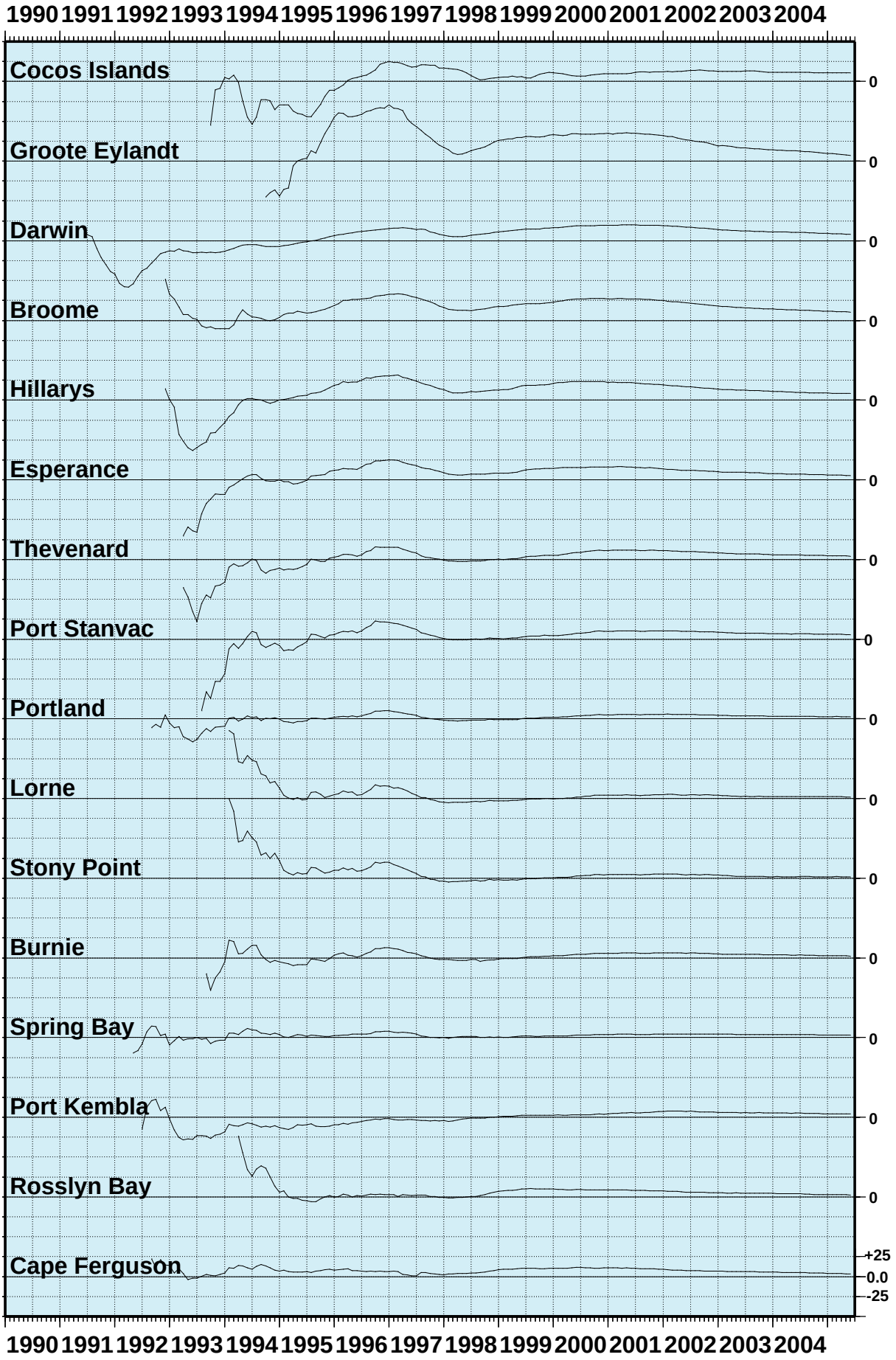


Figure 14

BAROMETRIC PRESSURE ANOMALIES THROUGH MAY 2005 (hPa)

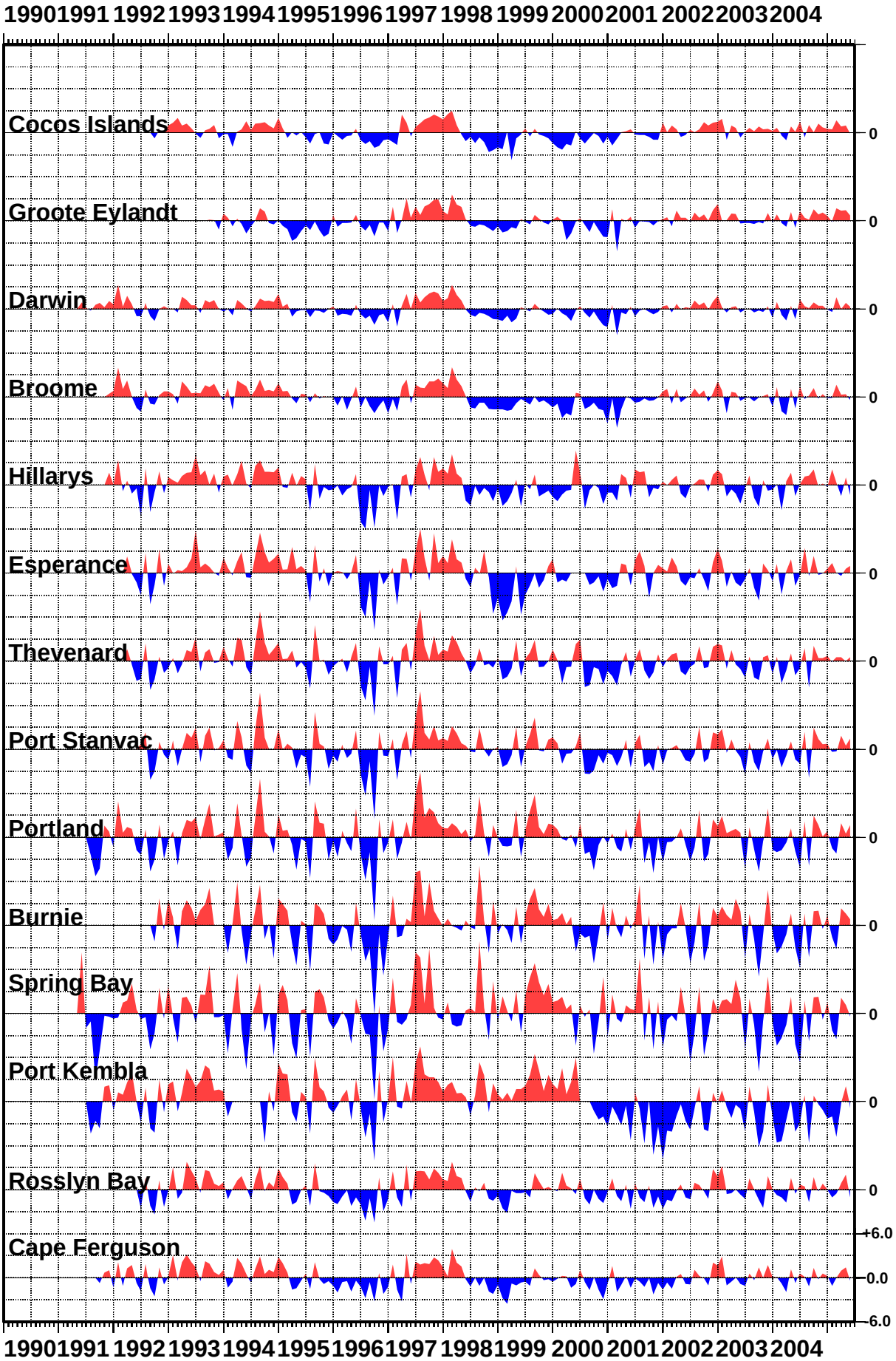


Figure 15

WATER TEMPERATURE ANOMALIES THROUGH MAY 2005 (˚C)

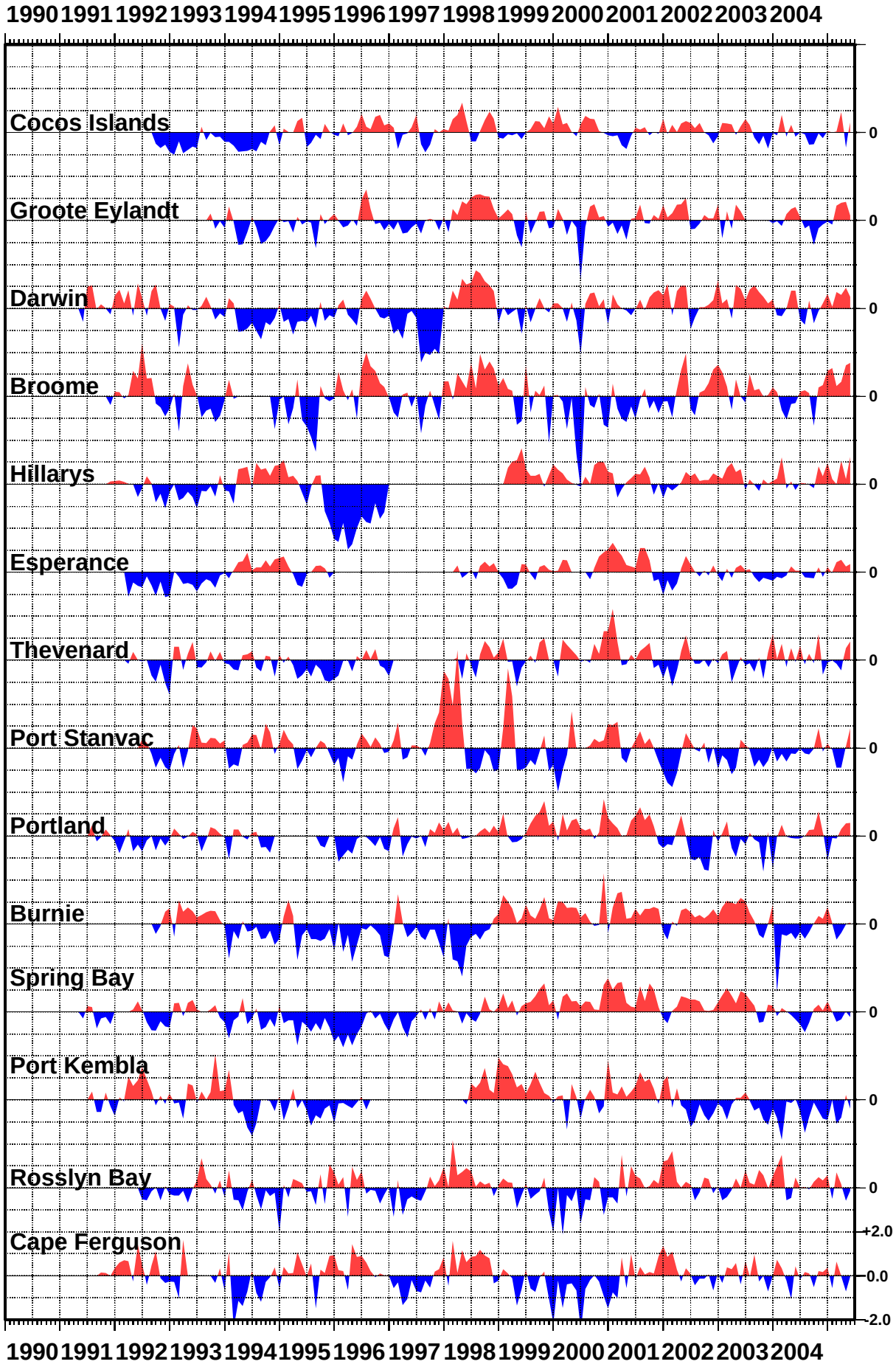


Figure 16

AIR TEMPERATURE ANOMALIES THROUGH MAY 2005 (°C)

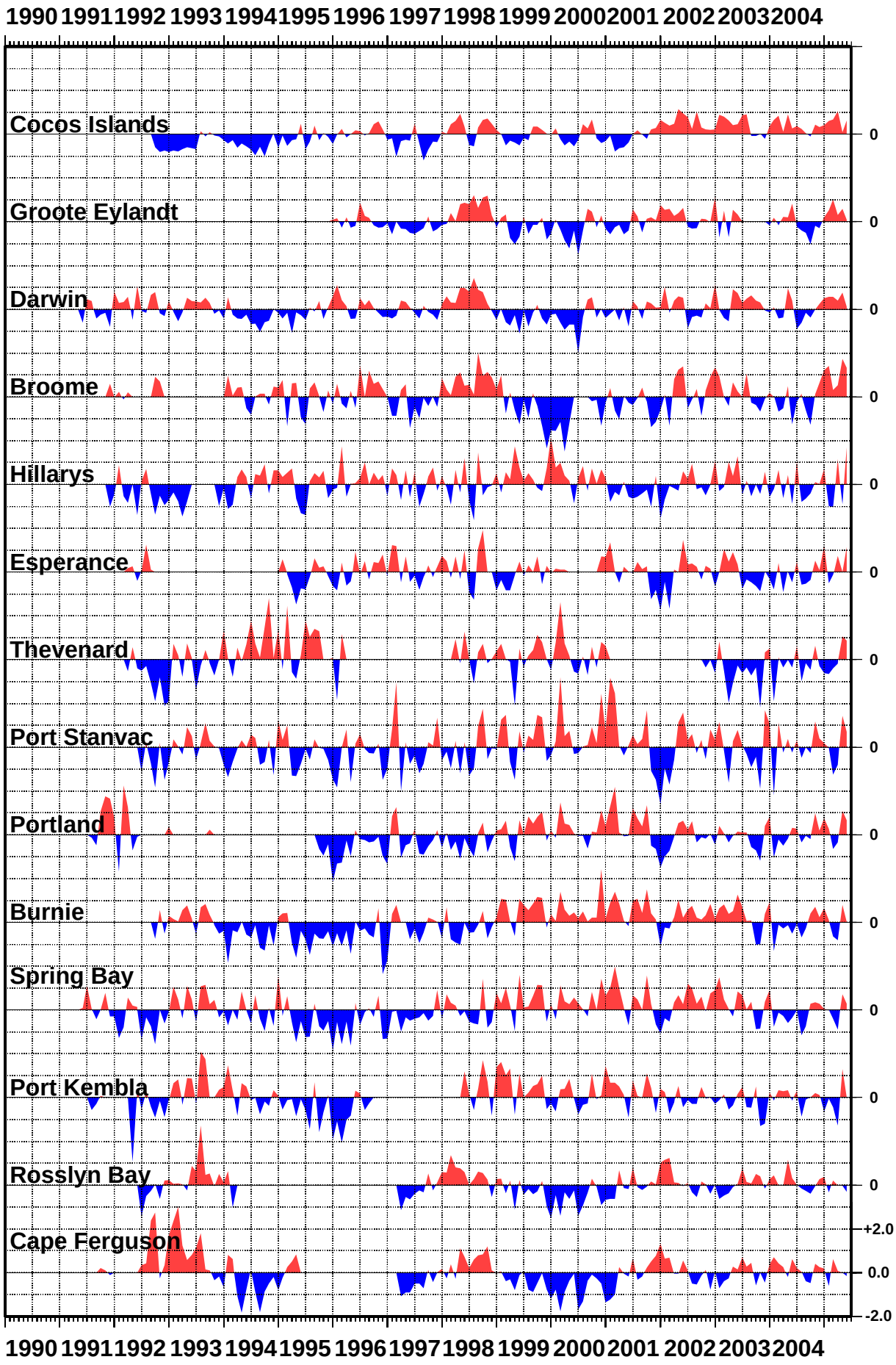
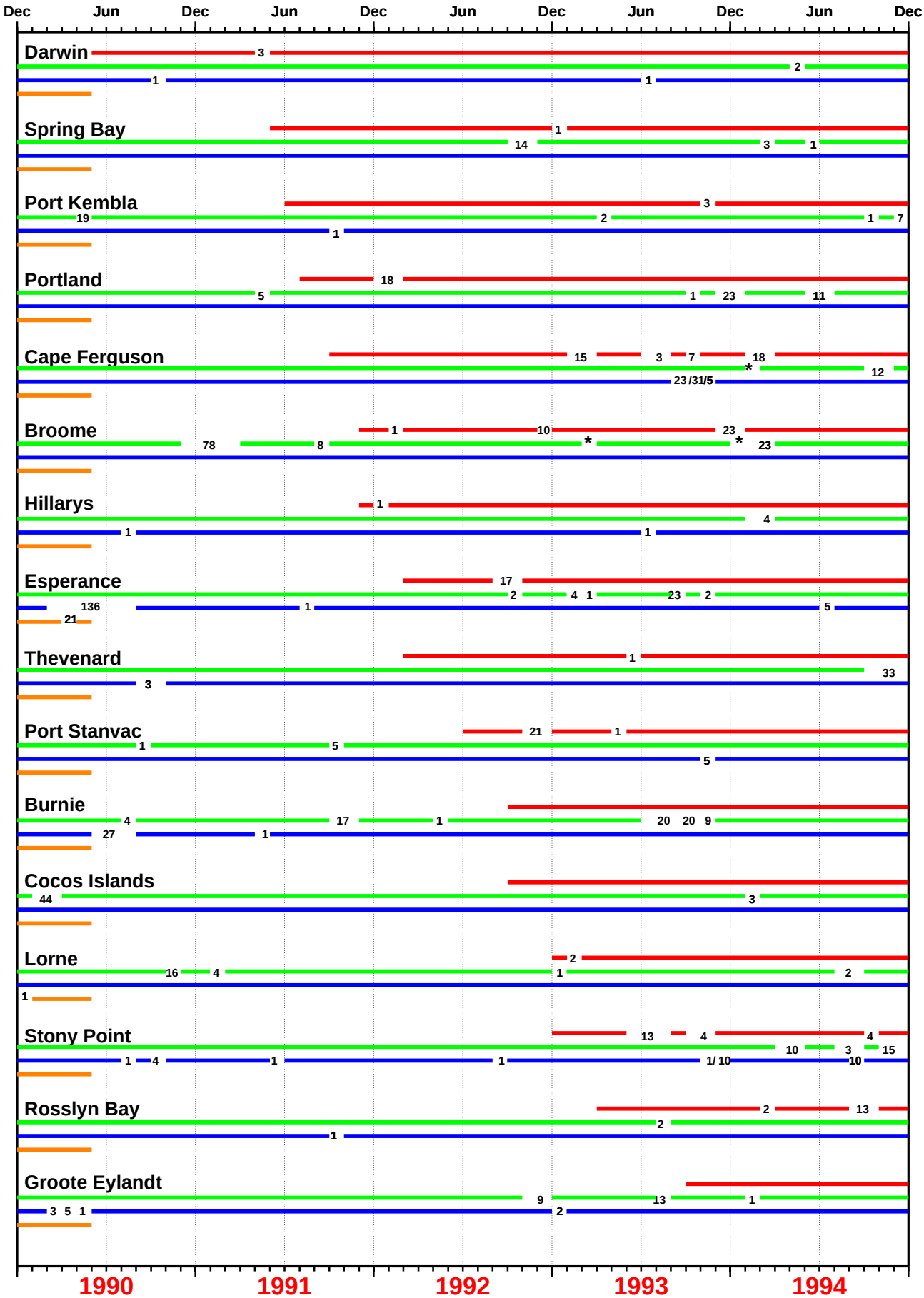


Figure 17

SEA LEVEL DATA RETURN

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



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