

THE AUSTRALIAN BASELINE SEA LEVEL MONITORING PROJECT

MONTHLY DATA REPORT

JANUARY 2003



This report was prepared under the Australian Greenhouse Science Program for the Australian Greenhouse Office, supported by NTF Australia at the Flinders University of South Australia.



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Quality Certification:

I authorise the issue of this Australian Baseline Sea Level Monitoring Project Monthly Data Report for January 2003 in accordance with National Tidal Facility Australia Quality Assurance procedures.

Wolfgang Scherer
Director - National Tidal Facility Australia

The Australian Baseline Sea Level Monitoring Project

Monthly Data Report

JANUARY 2003

NOTES ON THE DATA FOR JANUARY 2003

Sea level data return in January was excellent at most stations (Figures 1 and 15). The Groote Eylandt data was the only exception, where numerous small gaps in the data resulted from intermittent resets. The phone link to the Groote Eylandt gauge was lost towards the end of the month and as a result two days of data were not retrieved (local technical staff are investigating these problems).

The residuals (Figures 2 and 3), or 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) and may result in elevated or depressed sea level observations.

The wind speeds and gusts at Stony Point were recording zero values for relatively long periods throughout January. The wind speeds at Groote Eylandt were also recorded as zeros (in the next hour) following each of the above mentioned gauge resets. The wind direction at Groote Eylandt was also erroneous, recording a default value of 270 degrees true after each reset. These erroneous values and the corresponding incident winds have been removed (Figures 4, 5 and 6).

The sea level anomalies (Figure 10) remained negative at most sites in January. The only exception being Groote Eylandt where the sea level anomalies changed from negative to positive.

The barometric pressure anomalies (Figure 11) remained positive at most sites in January with the exception of Port Kembla where the anomalies changed from negative to positive.

With regard to the water and air temperature anomalies in Figures 12 and 13 respectively, it must be noted that there are large gaps in the data for several stations, where the data collected appeared to be erroneous.

It is difficult to relate the water and air temperature anomalies directly to those of barometric pressure and sea level without considering other effects, such as localised currents, wind speeds and directions. However, the anomalies are very useful in controlling the quality of the water and air temperature data at the Baseline stations.

Figure 16 compares the mean, maximum and minimum values for air temperature, water temperature and barometric pressure for the current month with the long-term January values. Note that the long-term ranges are calculated using the historical sets of January data for each station *excluding* the current month of data.

For most stations the mean air temperatures for January 2003 were generally consistent with the long term January means. Record maximum air temperatures were recorded at Cocos Islands (36.4°C) and Esperance (42.2°C) in January. Minimum air temperatures were generally above the record minimum air temperatures for January.

The mean water temperatures recorded at all sites in January 2003 were generally consistent with the long-term January values. A record maximum water temperature was recorded at Broome (32.5°C) in January. A record minimum water temperature of 18.1°C was recorded at Esperance in January 2003.

The mean barometric pressures in January 2003 were generally consistent with the long-term January values at most sites. A record maximum barometric pressure of 1026.0 hPa was recorded at Thevenard. The minimum Barometric pressures were higher in January 2003 than the long-term minimum January values at all sites.

Figure 14 shows the short-term sea level trends for each SEAFRAME location 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 14) and the change in trend with respect to the analysis of the previous month.

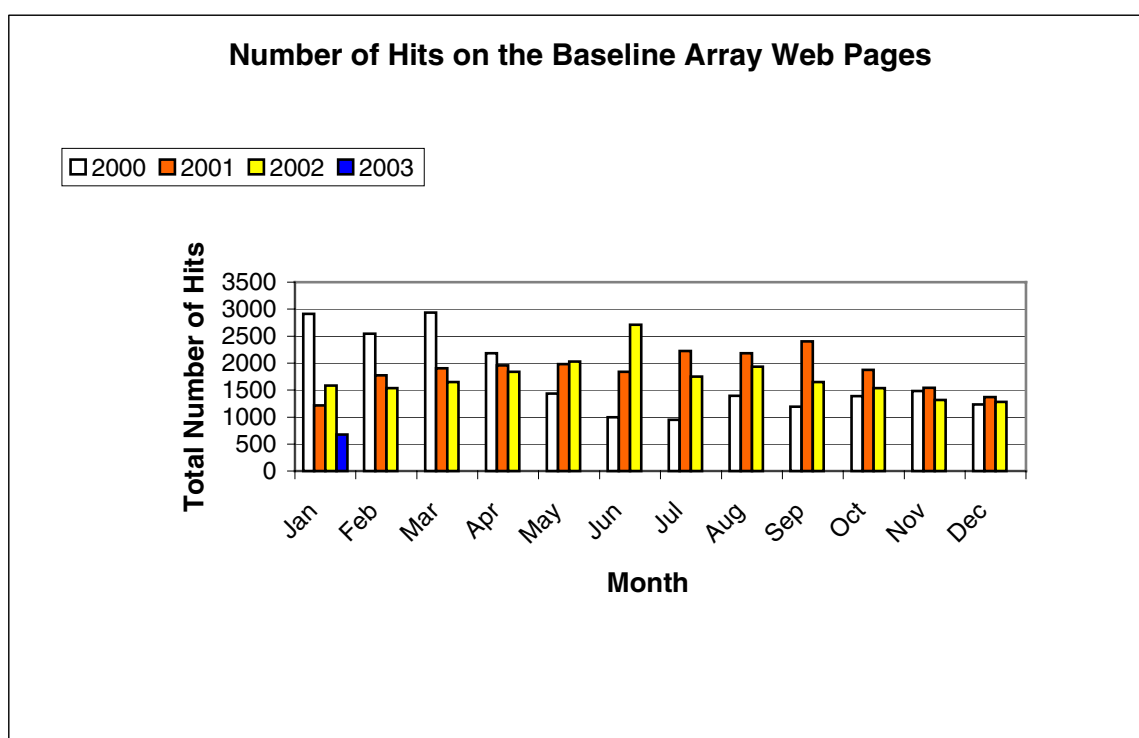
Table 1: Tide gauge installation dates, short-term sea level trends and change in trend from the previous month for the Australian Baseline array to January 2003.

Location	Installation Date	Sea Level Trend (mm/yr)	Change from previous month
Cocos Islands	Sep 1992	+12.7	-0.1
Groote Eylandt	Sep 1993	+19.7	+0.5
Darwin	May 1990	+13.8	-0.3
Broome	Nov 1991	+17.8	-0.4
Hillarys	Nov 1991	+13.4	-0.4
Esperance	Mar 1992	+9.7	-0.3
Thevenard	Mar 1992	+8.0	-0.2
Port Stanvac	Jun 1992	+8.6	-0.2
Portland	Jul 1991	+4.5	-0.2
Lorne	Jan 1993	+3.9	-0.2
Stony Point	Jan 1993	+3.7	-0.2
Burnie	Sep 1992	+4.8	-0.2
Spring Bay	May 1991	+4.3	0.0
Port Kembla	Jul 1991	+6.1	-0.1
Rosslyn Bay	Jun 1992	+5.0	0.0
Cape Ferguson	Sep 1991	+6.6	0.0

Figure 17 shows the monthly mean sea levels with respect to an arbitrary fixed offset from the zero of the tide gauge. This plot clearly shows significant correlation in seasonal signals between stations, in contrast to the sea level anomalies plot (Figure 10), which has the seasonal signal removed from the data.

The number of hits to the Australian Baseline Sea Level Monitoring project web pages from 2000 to January 2003 is given in Table 2.

Table 2: Number of hits on the Australian Baseline Sea Level Monitoring Project web pages from 2000 to 2003.



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.

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

Further information on the *Monthly Data Report* and other projects conducted by NTF Australia can be obtained from the following address.

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

Figure 1

**JANUARY 2003
SIX MINUTE SEA LEVEL OBSERVATIONS (m)**

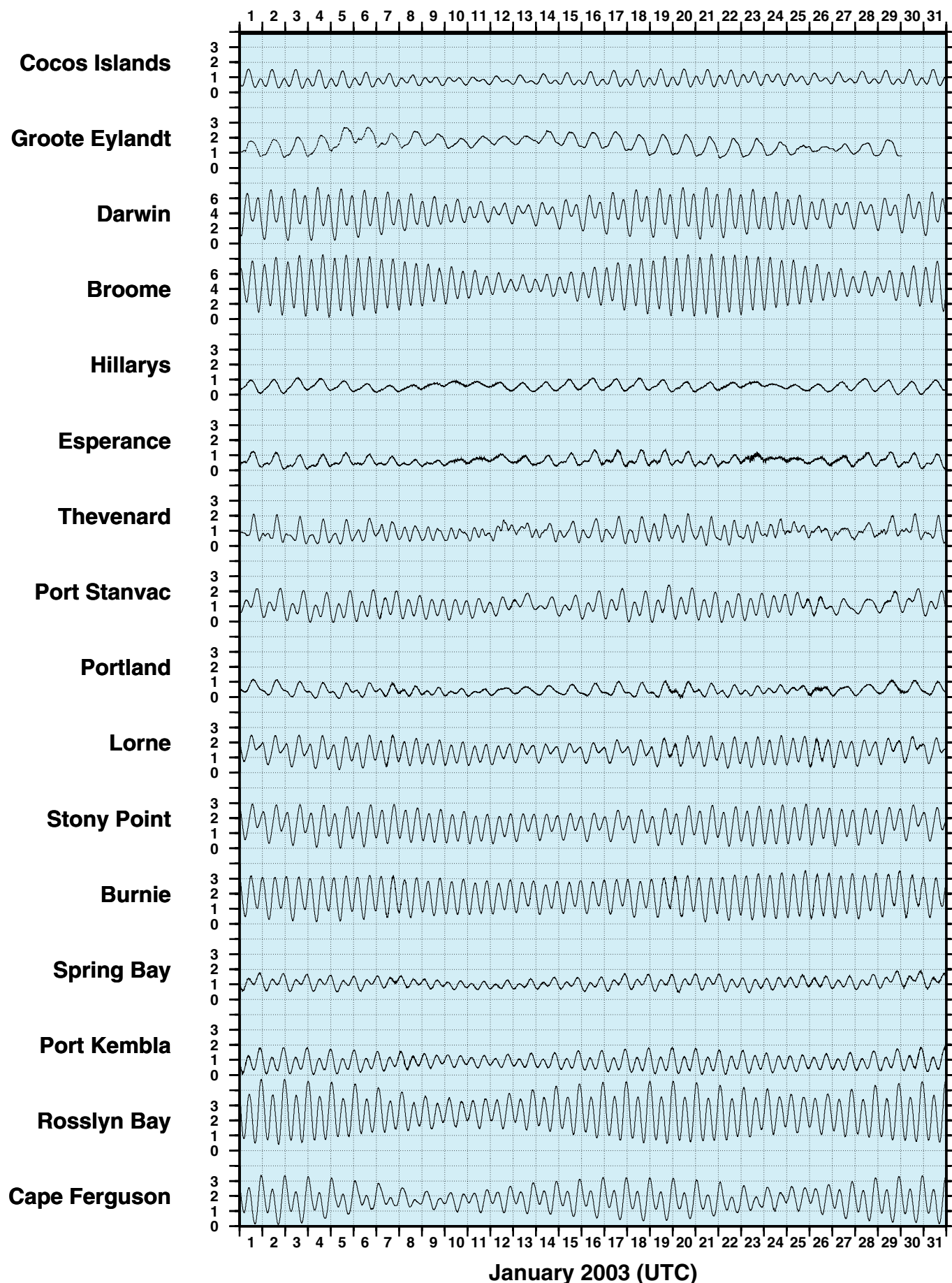


Figure 2

**JANUARY 2003
SIX MINUTE RESIDUAL WATER LEVELS (m)**

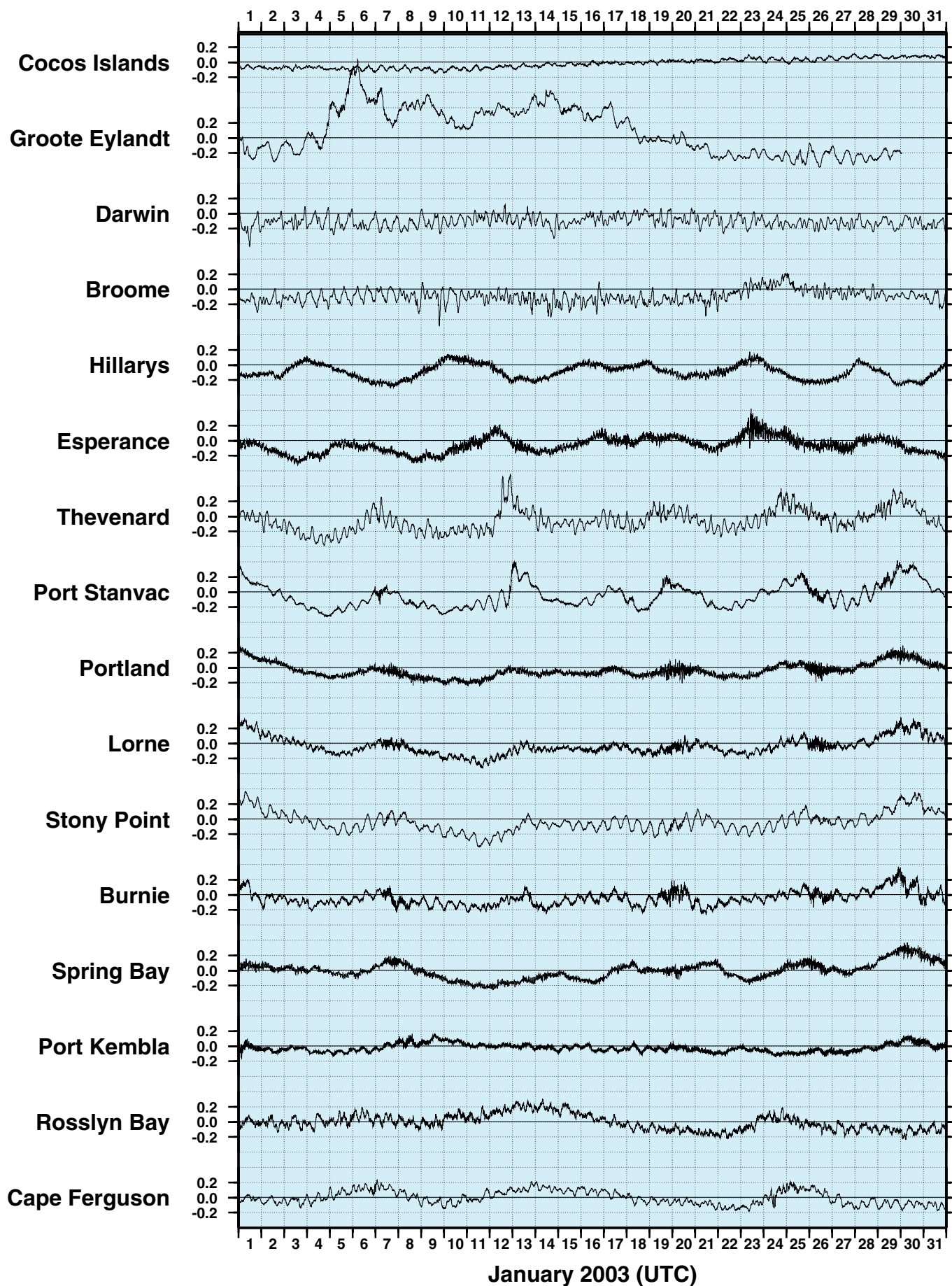


Figure 3
JANUARY 2003
SIX MINUTE RESIDUALS
ADJUSTED FOR ATMOSPHERIC PRESSURE (m)

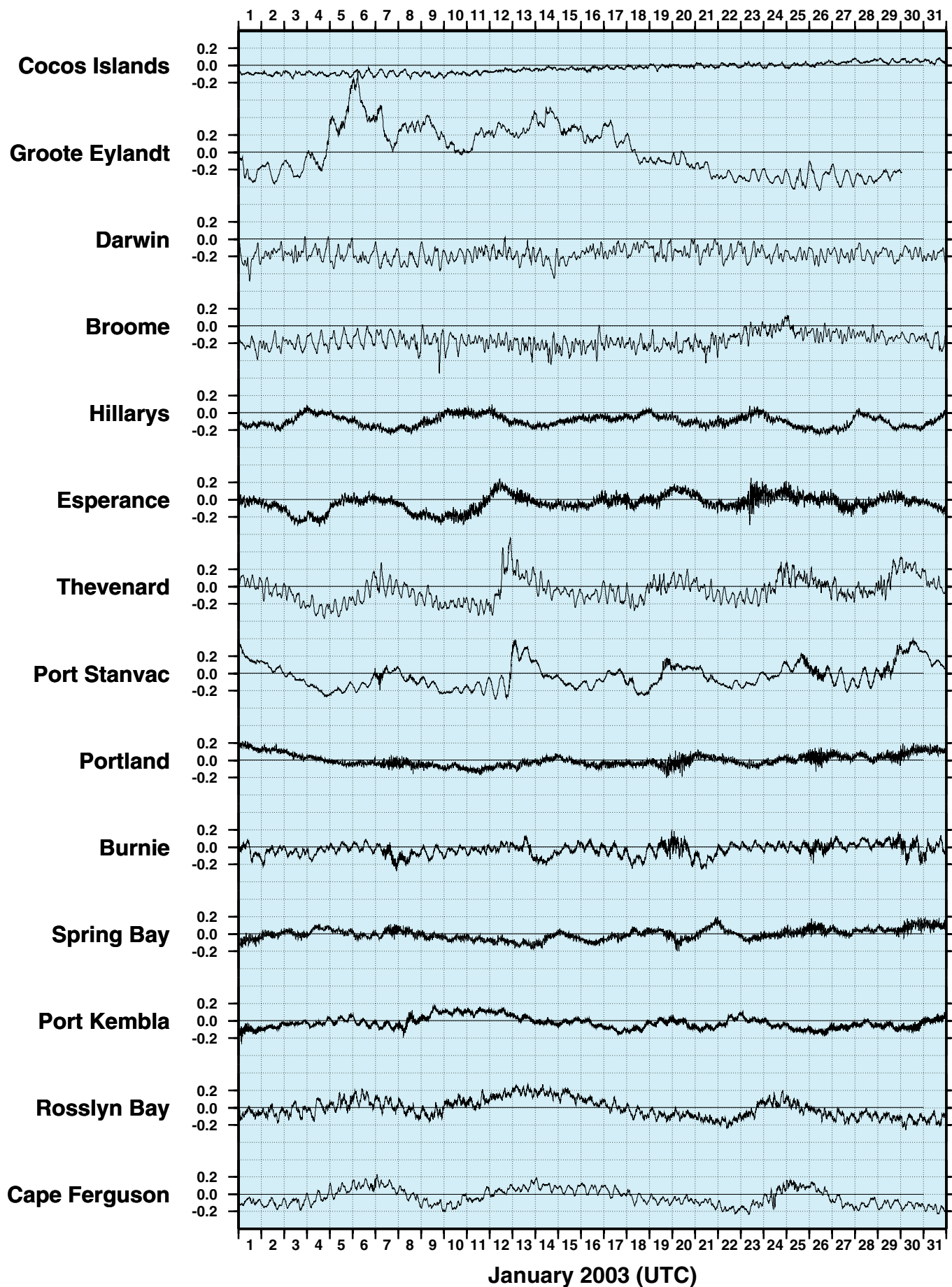


Figure 4

JANUARY 2003
HOURLY WIND SPEEDS (m/s)

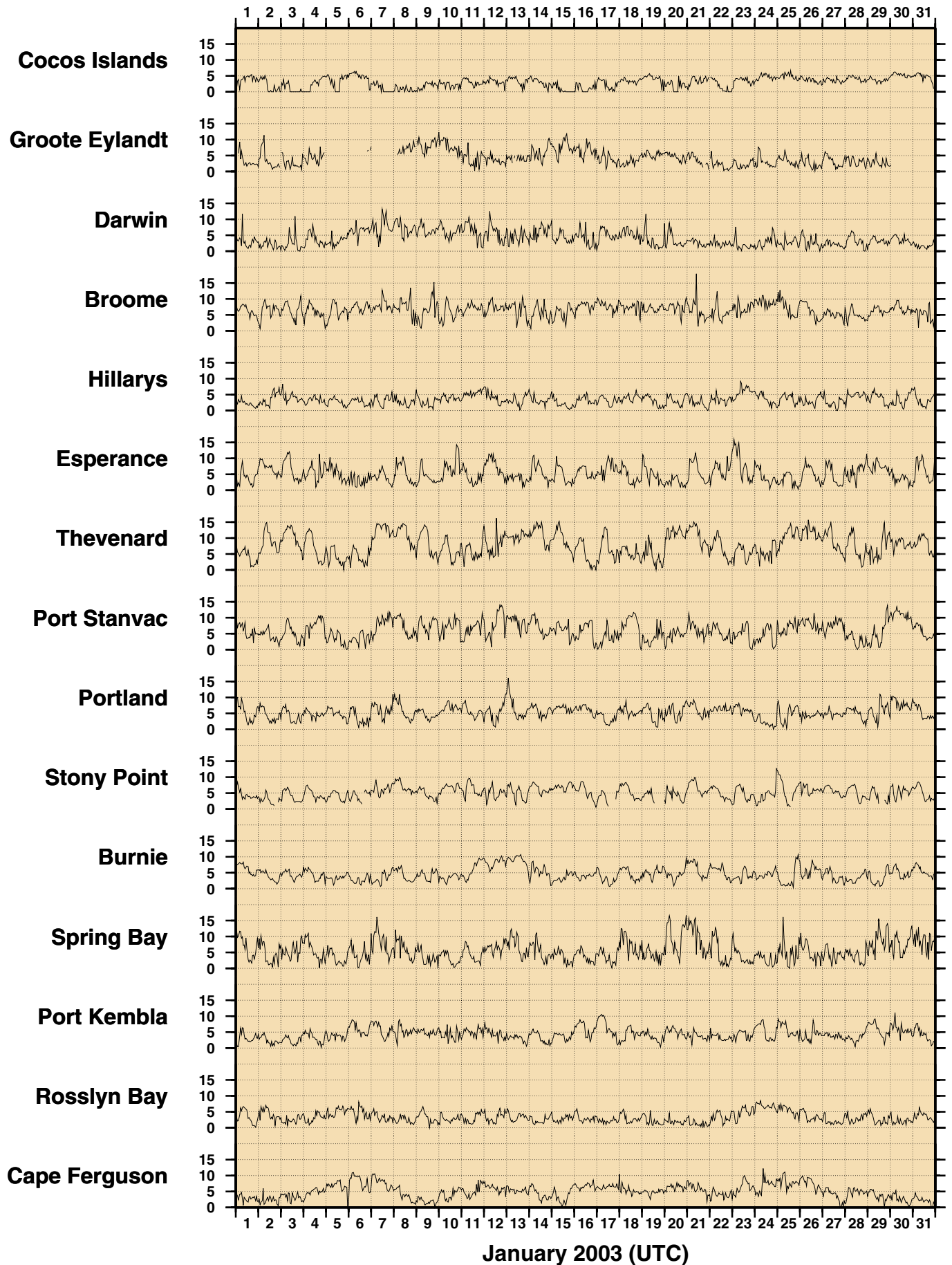


Figure 5

JANUARY 2003
HOURLY INCIDENT WINDS (m/s, deg True)

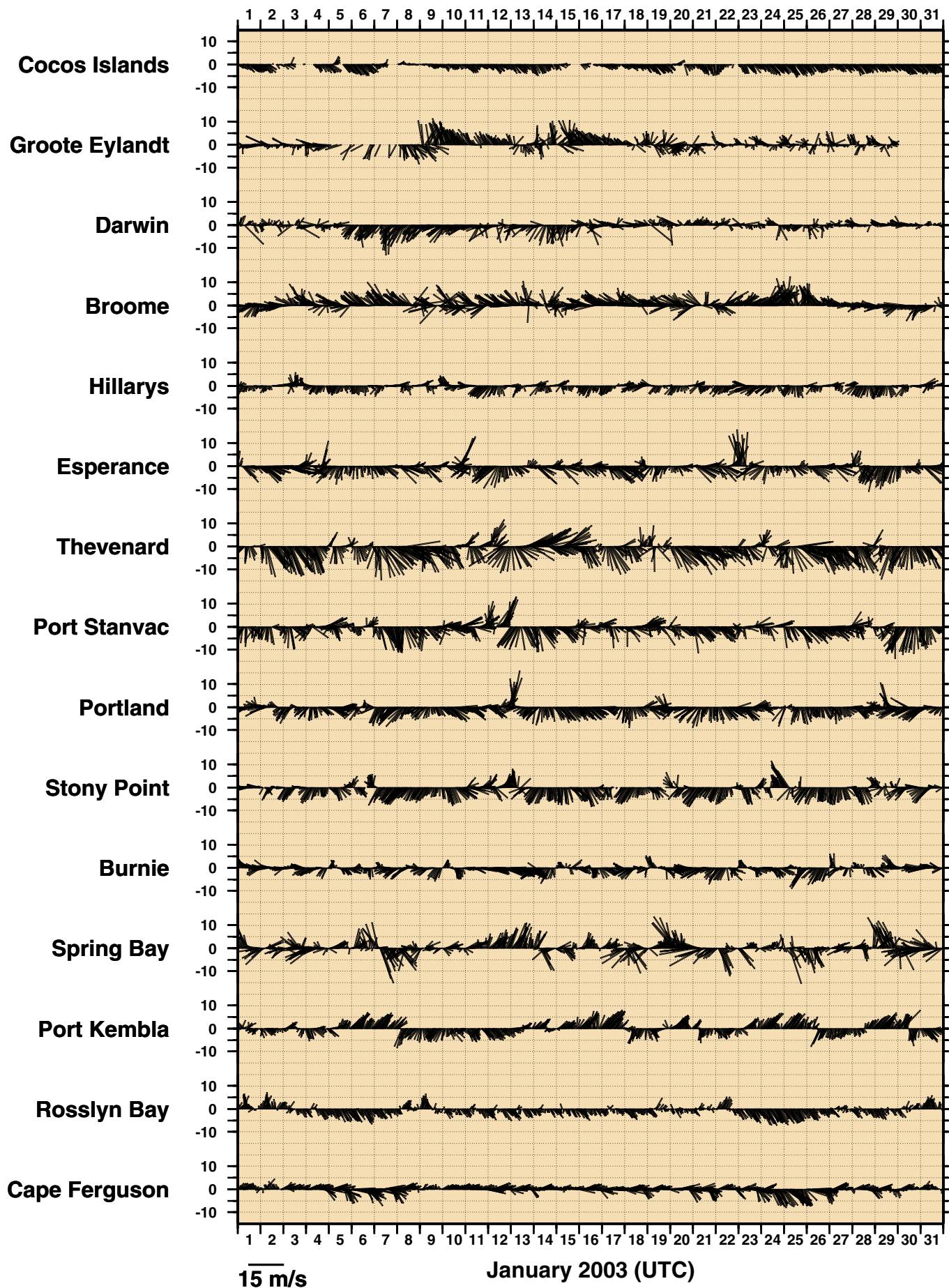


Figure 6

JANUARY 2003
HOURLY MAXIMUM WIND GUSTS (m/s)

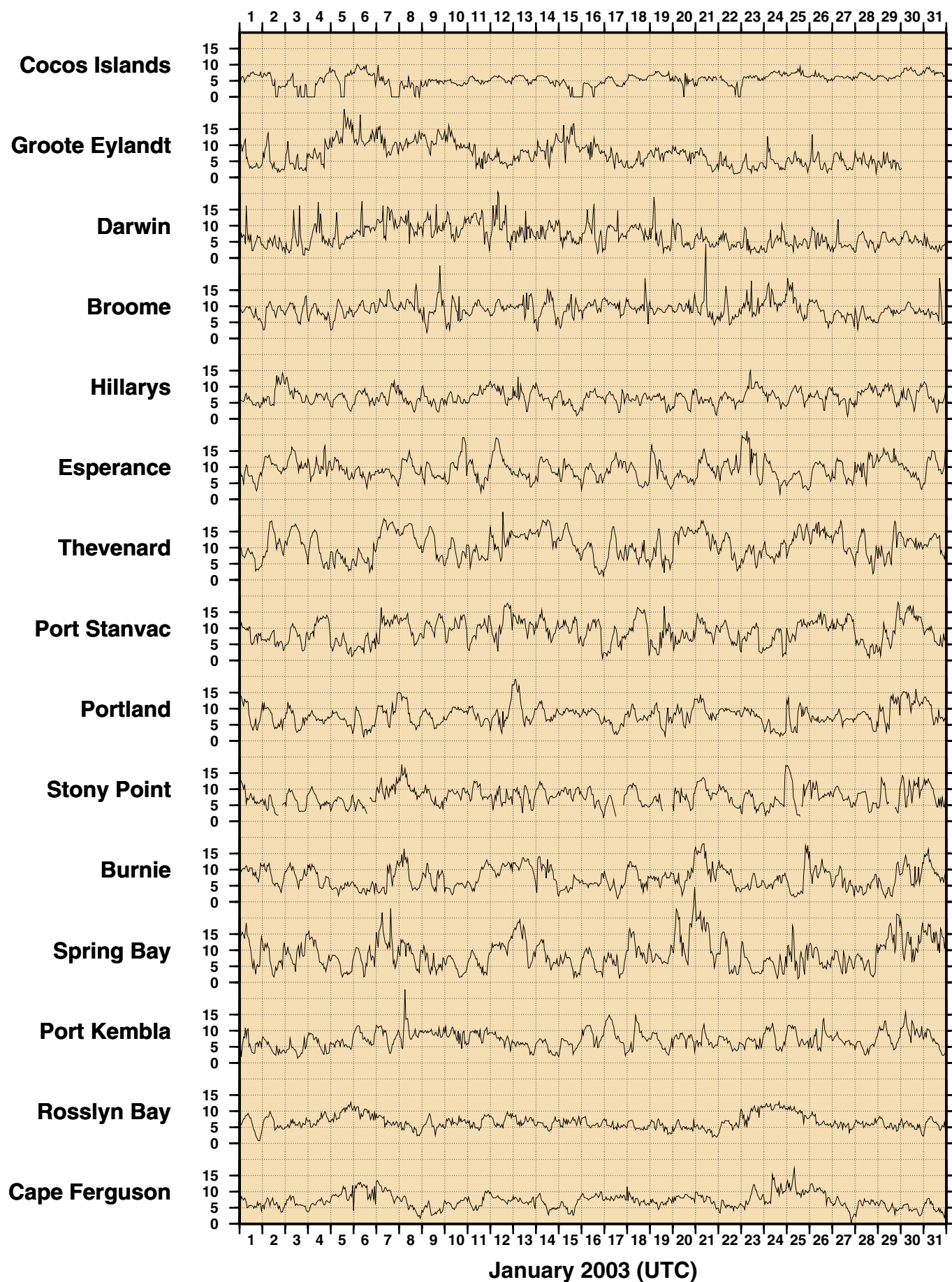


Figure 7

JANUARY 2003
HOURLY AIR TEMPERATURES (°C)

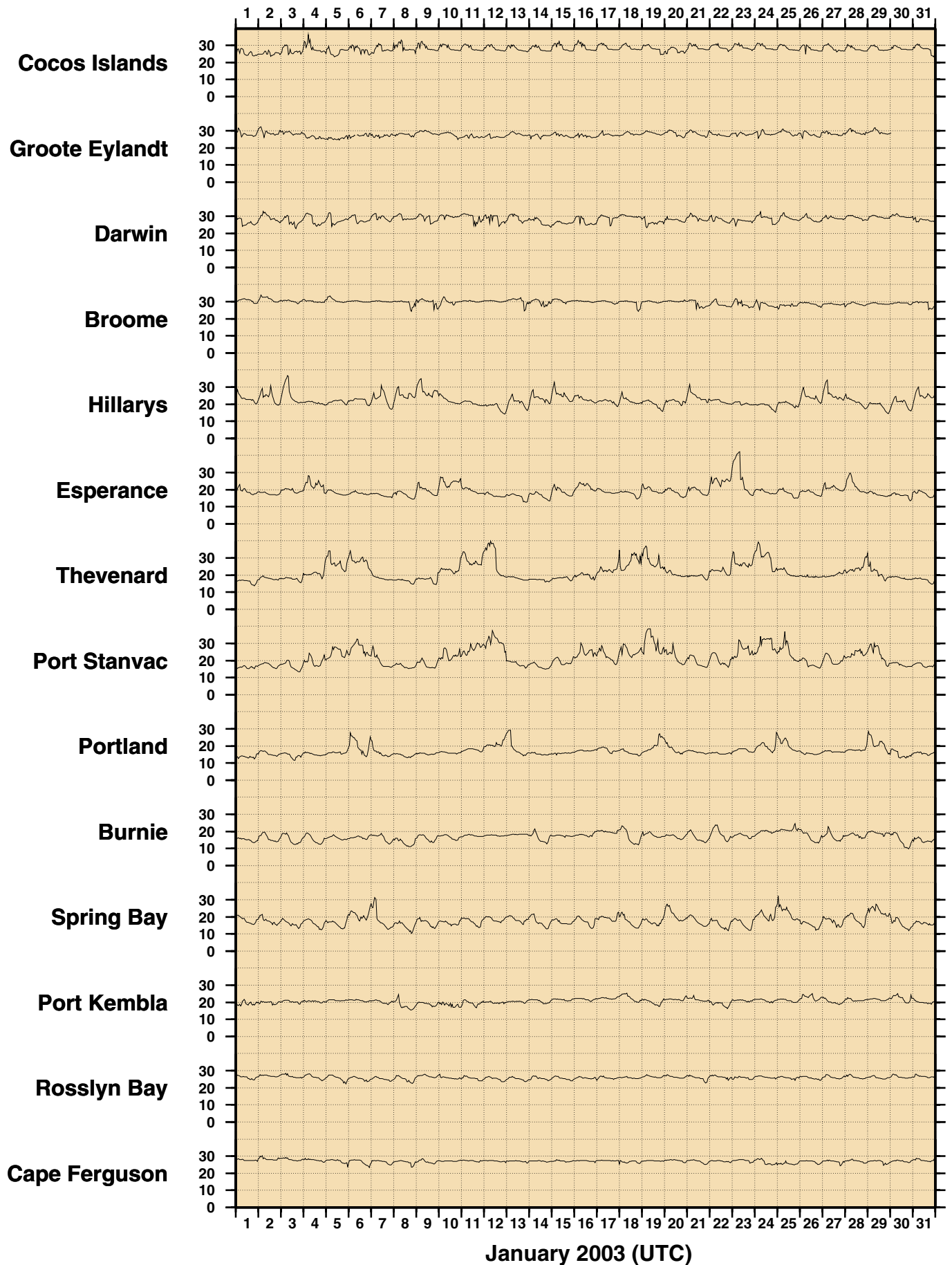


Figure 8

JANUARY 2003
HOURLY WATER TEMPERATURES (°C)

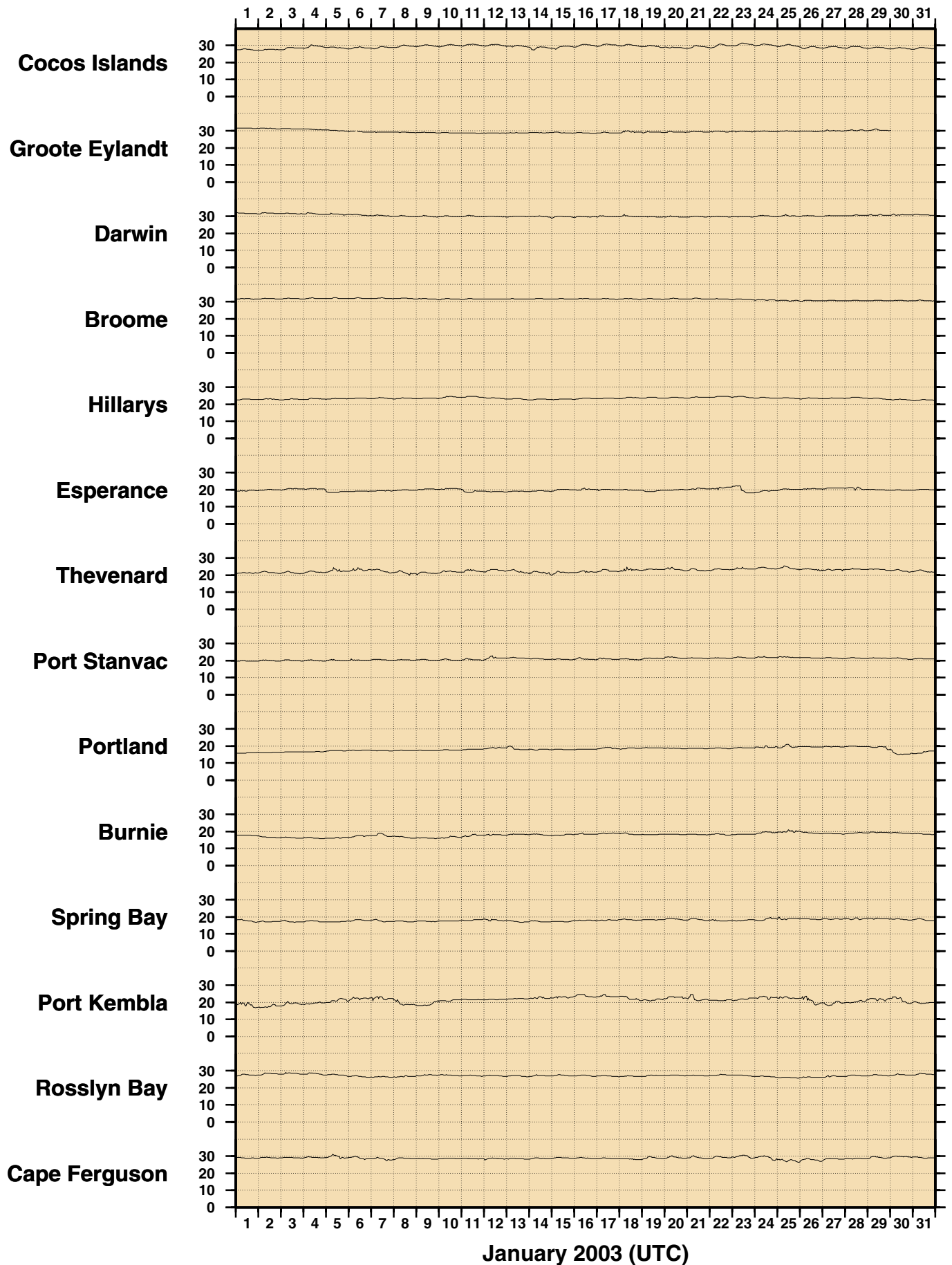


Figure 9

JANUARY 2003
HOURLY ATMOSPHERIC PRESSURE (hPa)

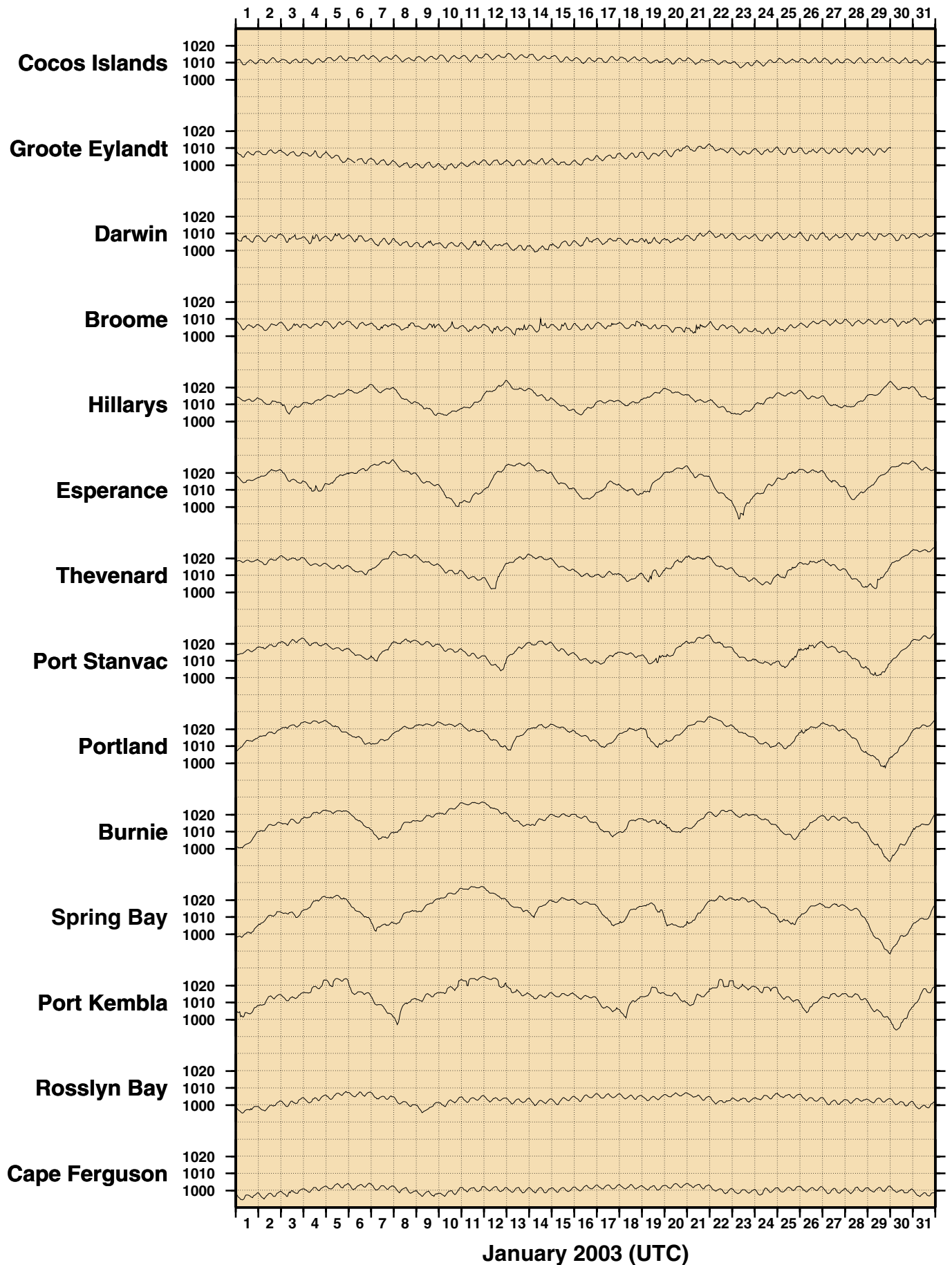


Figure 10
SEA LEVEL ANOMALIES THROUGH JANUARY 2003 (m)

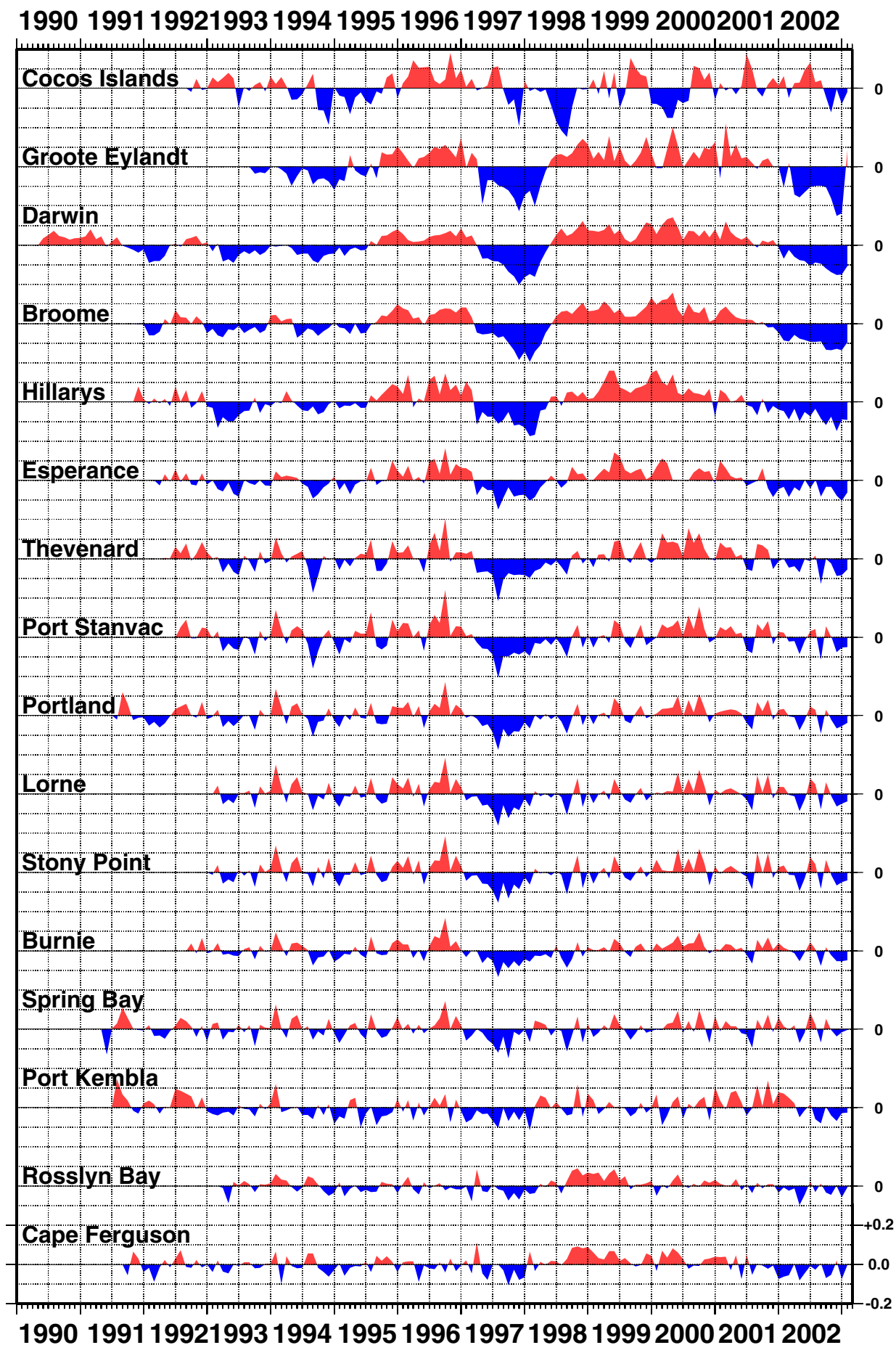


Figure 11

**BAROMETRIC PRESSURE ANOMALIES
THROUGH JANUARY 2003 (hPa)**

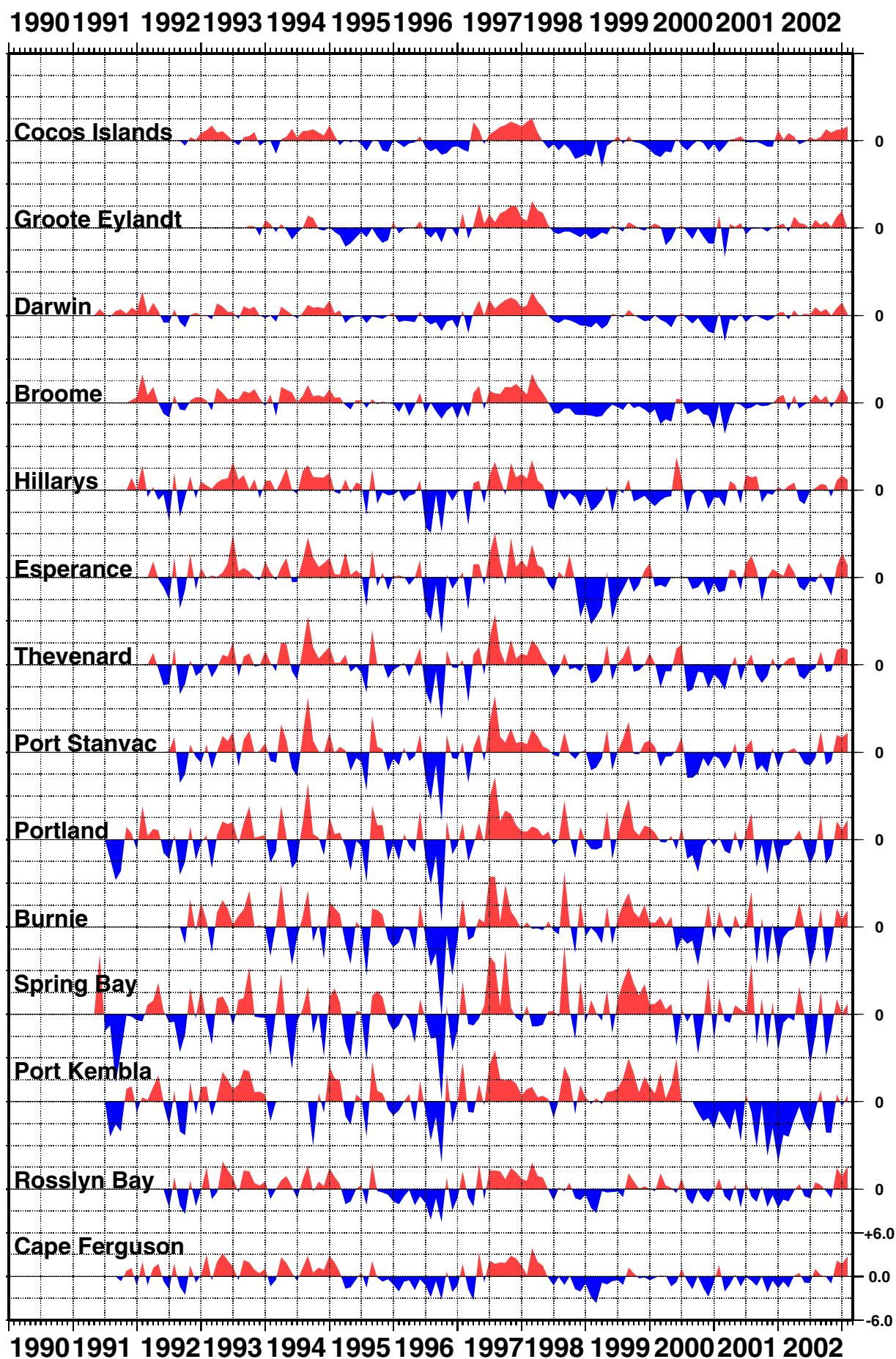


Figure 12

WATER TEMPERATURE ANOMALIES THROUGH JANUARY 2003 (°C)

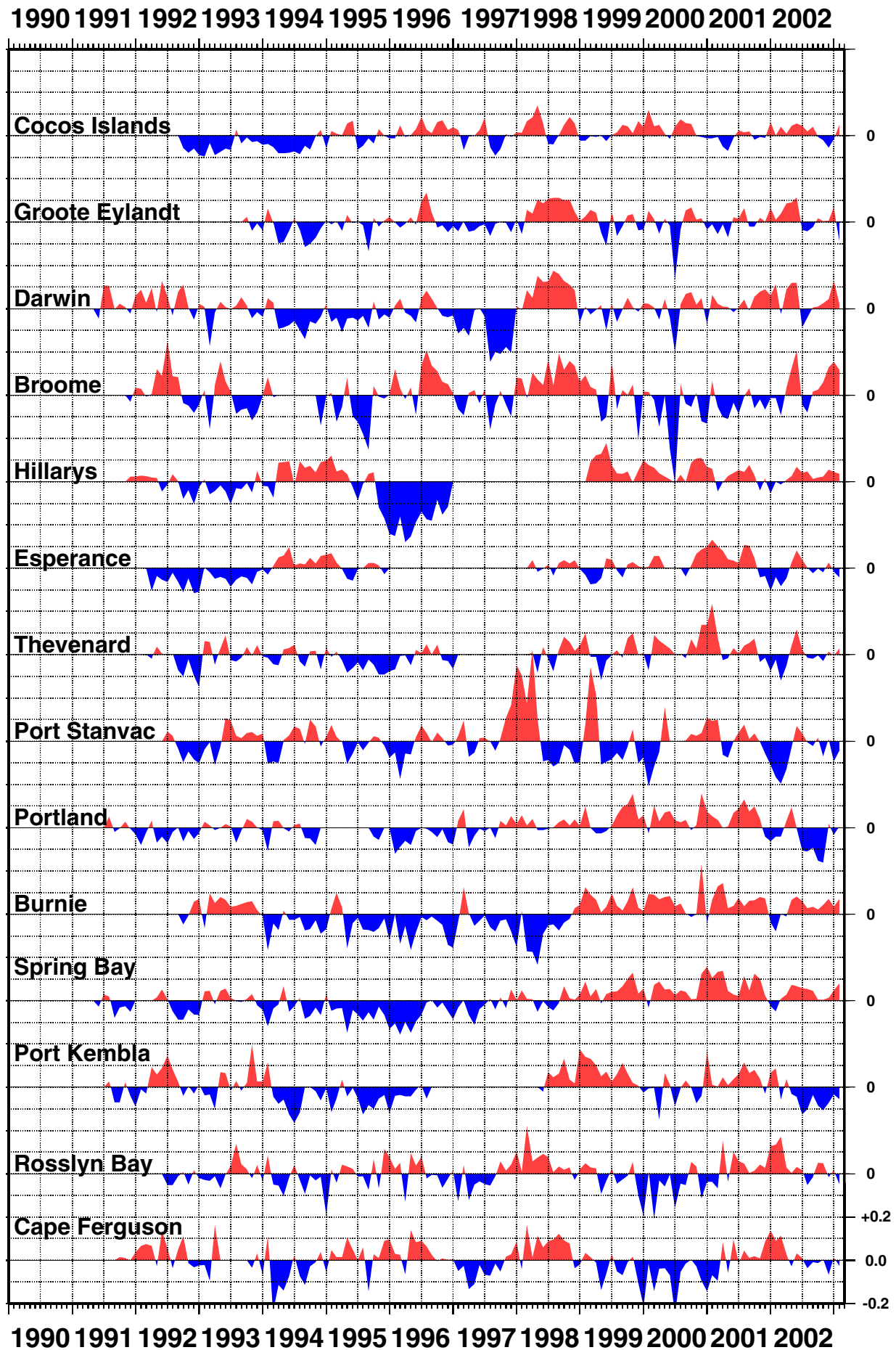


Figure 13

**AIR TEMPERATURE ANOMALIES
THROUGH JANUARY 2003 (°C)**

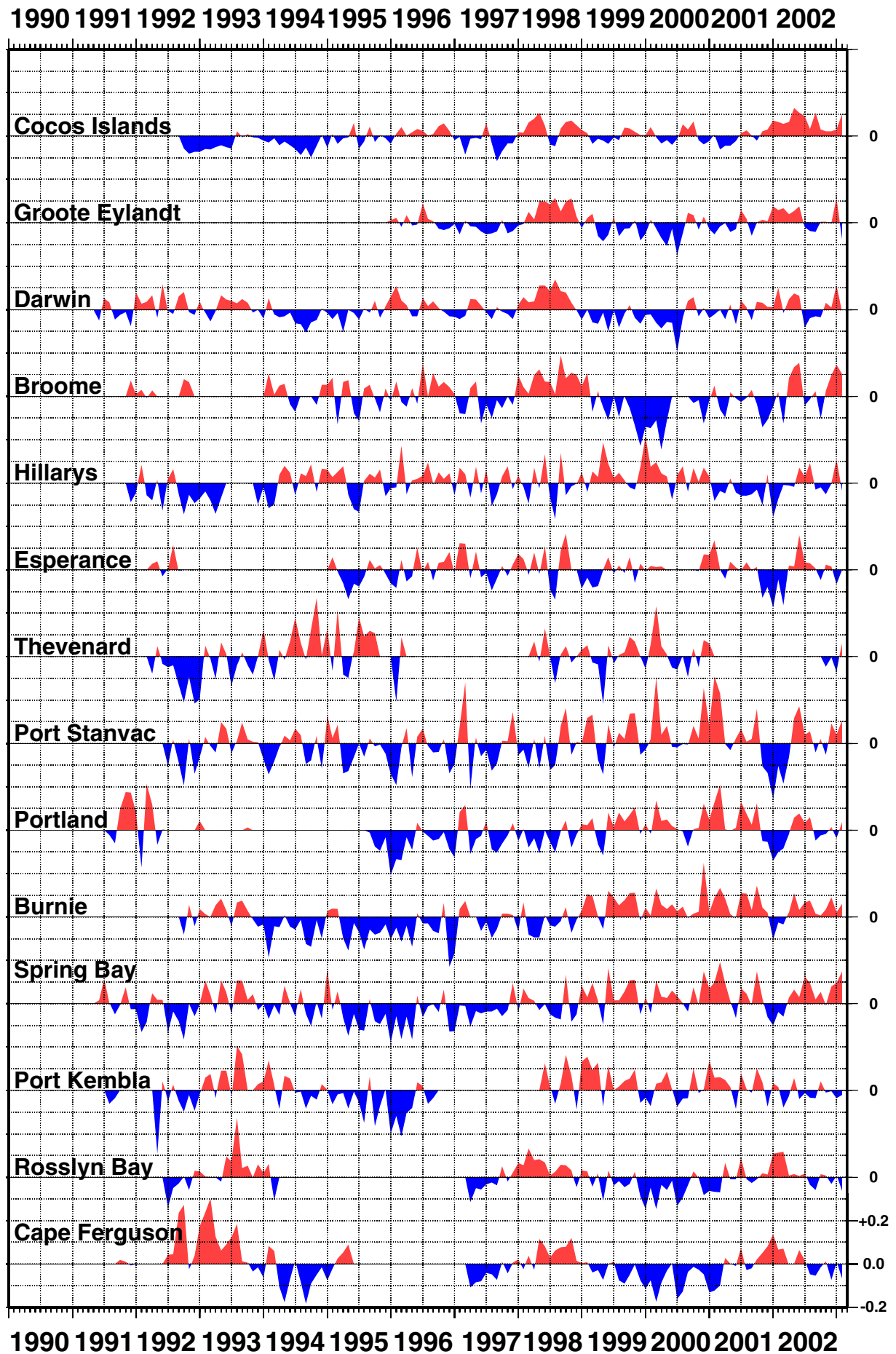


Figure 14

SEA LEVEL TRENDS THROUGH JANUARY 2003 (mm/year)

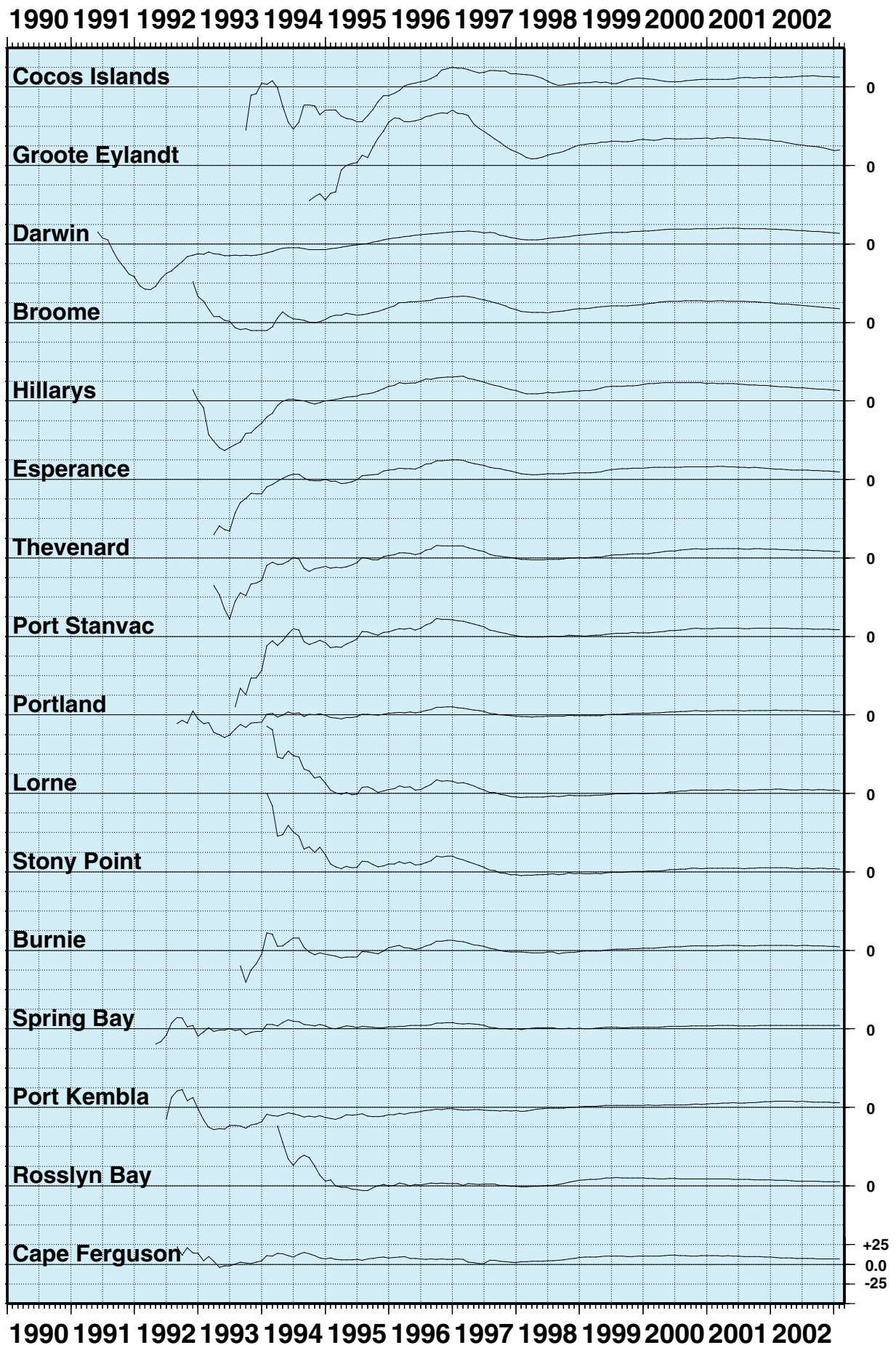


Figure 15 SEA LEVEL DATA RETURN

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

* Patchy record

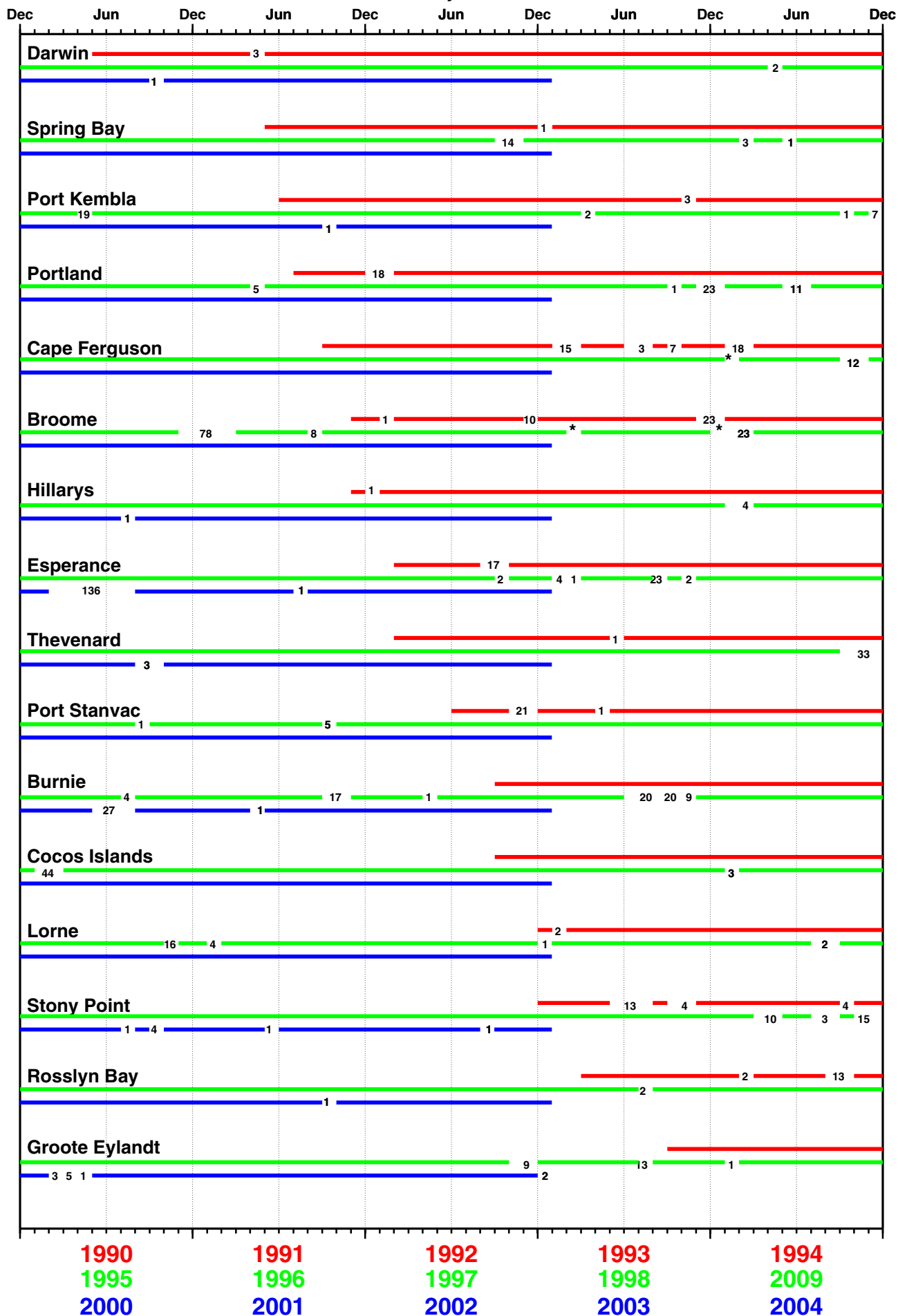
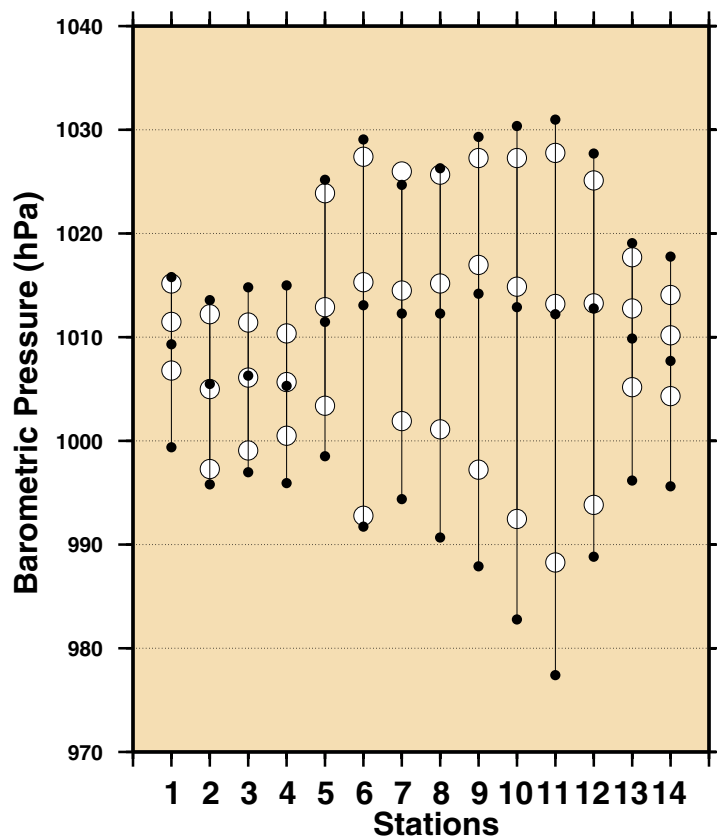
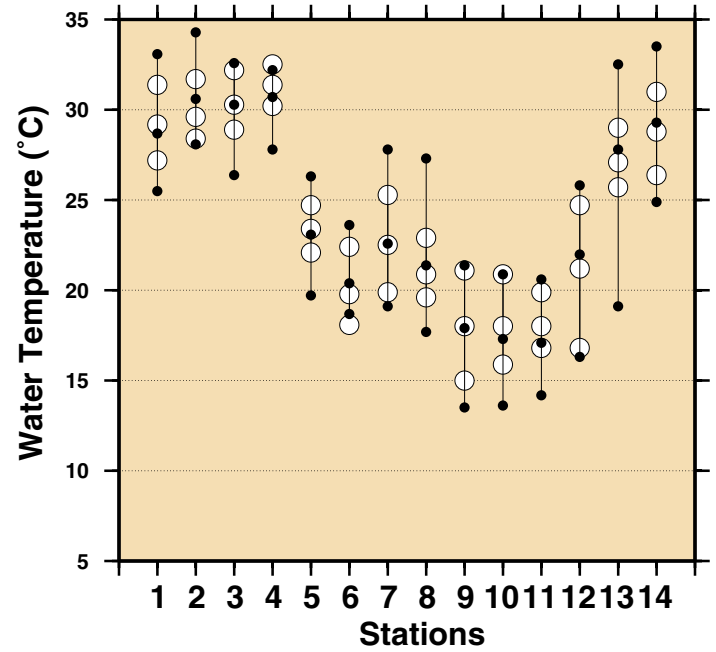
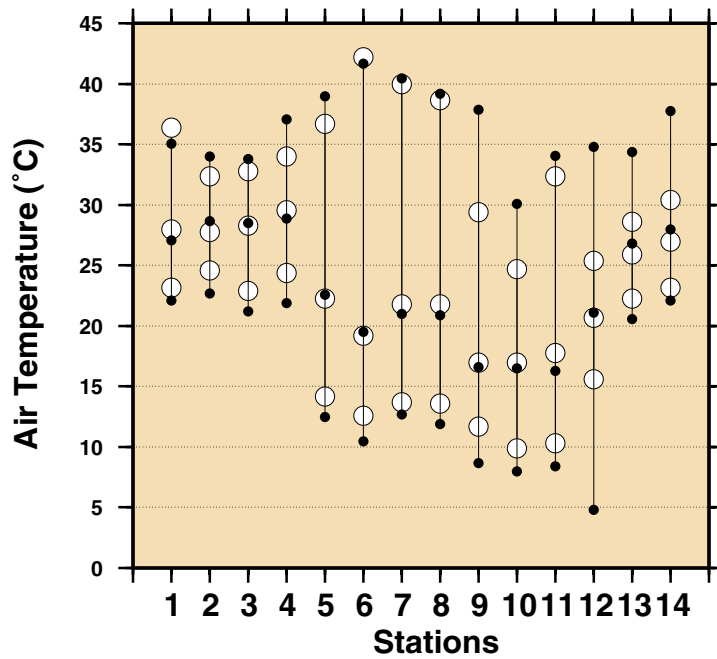


Figure 16
Comparison of January 2003 Max, Min & Mean with
Long Term January Values.



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

- January 2003 Maximum
- January 2003 Mean
- January 2003 Minimum
- Long Term January Maximum
- Long Term January Mean
- Long Term January Minimum

Figure 17
MONTHLY MEAN SEA LEVELS TO JANUARY 2003 (m)

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

