

THE AUSTRALIAN BASELINE SEA LEVEL MONITORING PROJECT

MONTHLY DATA REPORT

DECEMBER 2002



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 December 2002 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

DECEMBER 2002

NOTES ON THE DATA FOR DECEMBER 2002

Sea level data return in December was excellent at most stations (Figures 1 and 15), the only exception being Groote Eylandt where numerous small gaps were introduced into the data when the gauge was intermittently resetting (local technical staff are investigating the problem).

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 December. 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 all sites in December.

The barometric pressure anomalies (Figure 11) remained positive at most sites in December except for Port Kembla where it changed from positive to slightly negative.

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 December values. Note that the long-term ranges are calculated using the historical sets of December data for each station *excluding* the current month of data.

For most stations the mean air temperatures for December 2002 were generally consistent with the long term December means. Record maximum air temperatures were recorded at Groote Eylandt (36.6°C) and Port Kembla (32.4°C) in December. Record minimum air temperatures were recorded at Cocos Islands (22.3°C) and Hillarys (10.4°C) in December.

The mean water temperatures recorded at all sites in December 2002 were generally consistent with the long-term December values. Record maximum water temperatures were recorded at Darwin (32.7°C) and Thevenard (25.0°C) in December. A record minimum water temperature of 17.4°C was recorded at Port Stanvac in December.

The mean barometric pressures were generally higher in December 2002 than the long-term December values at most sites. Record maximum barometric pressures were recorded at Cocos Islands (1017.9 hPa), Groote Eylandt (1014.2 hPa), Darwin (1014.2 hPa), Broome (1013.6 hPa), Esperance (1029.7 hPa), Thevenard (1029.2 hPa), Port Stanvac (1026.9 hPa), Rosslyn Bay (1020.5 hPa) and Cape Ferguson (1017.1 hPa). The minimum Barometric pressures were higher in December 2002 than the long-term minimum December 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.

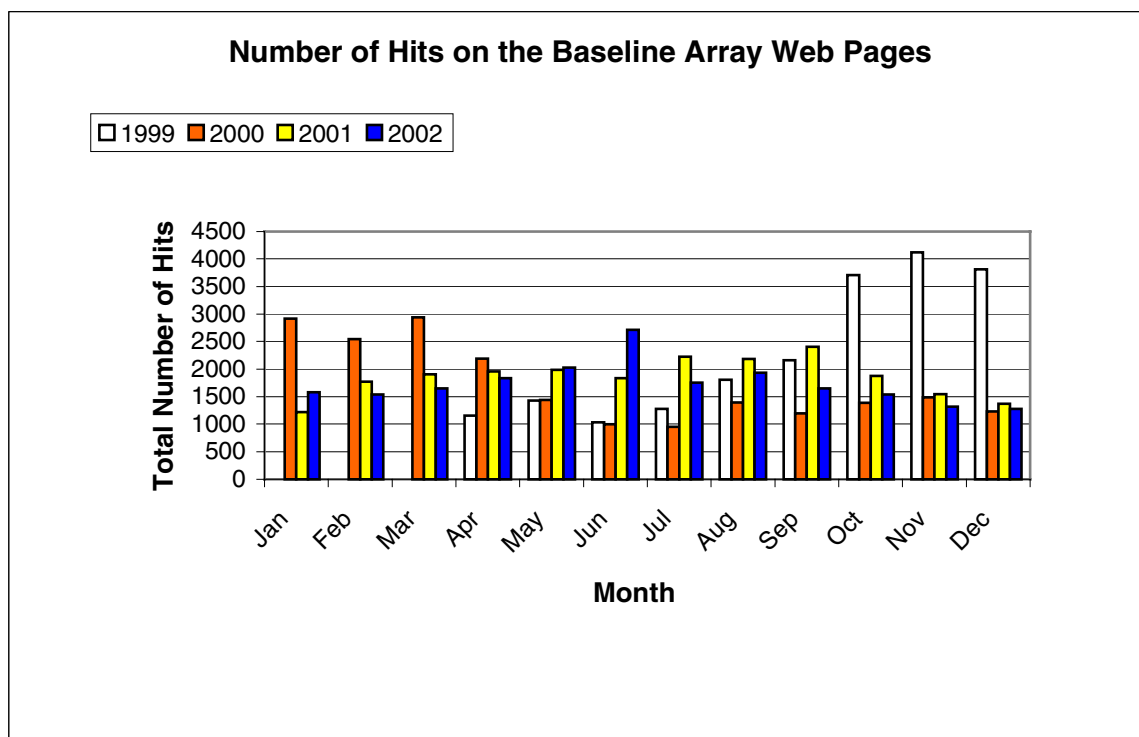
Table 1: Tide gauge installation dates, short-term sea level trends and change in trend from the previous month for the Australian Baseline array to December 2002.

Location	Installation Date	Sea Level Trend (mm/yr)	Change from previous month
Cocos Islands	Sep 1992	+12.8	-0.4
Groote Eylandt	Sep 1993	+19.2	-1.5
Darwin	May 1990	+14.1	-0.5
Broome	Nov 1991	+18.2	-0.6
Hillarys	Nov 1991	+13.8	-0.4
Esperance	Mar 1992	+10.0	-0.5
Thevenard	Mar 1992	+8.2	-0.4
Port Stanvac	Jun 1992	+8.8	-0.3
Portland	Jul 1991	+4.6	-0.2
Lorne	Jan 1993	+4.1	-0.3
Stony Point	Jan 1993	+3.9	-0.3
Burnie	Sep 1992	+5.0	-0.3
Spring Bay	May 1991	+4.3	-0.1
Port Kembla	Jul 1991	+6.2	-0.1
Rosslyn Bay	Jun 1992	+5.1	-0.3
Cape Ferguson	Sep 1991	+6.7	-0.3

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 1999 to December 2002 is given in Table 2.

Table 2: Number of hits on the Australian Baseline Sea Level Monitoring Project web pages from 1999 to 2002.



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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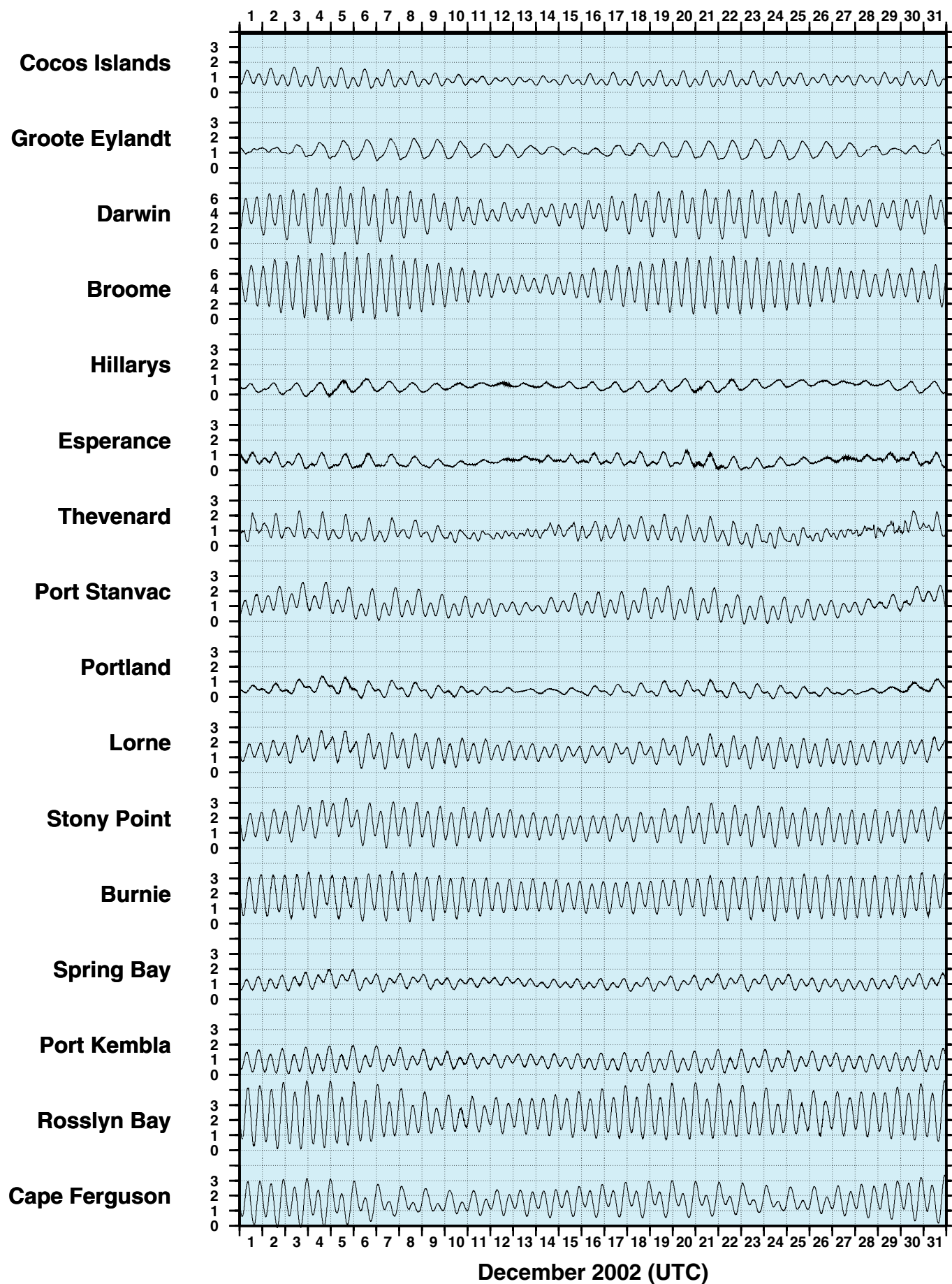
Please note the following:

While all care has been taken in the collection, analysis and compilation of the data, it is supplied on the condition that neither the *Commonwealth of Australia* nor *NTF Australia* shall be liable for any loss or injury whatsoever arising from the use of the data. The Commonwealth of Australia holds copyright for material contained in this document.

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

**DECEMBER 2002
SIX MINUTE SEA LEVEL OBSERVATIONS (m)**



December 2002 (UTC)

Figure 2

**DECEMBER 2002
SIX MINUTE RESIDUAL WATER LEVELS (m)**

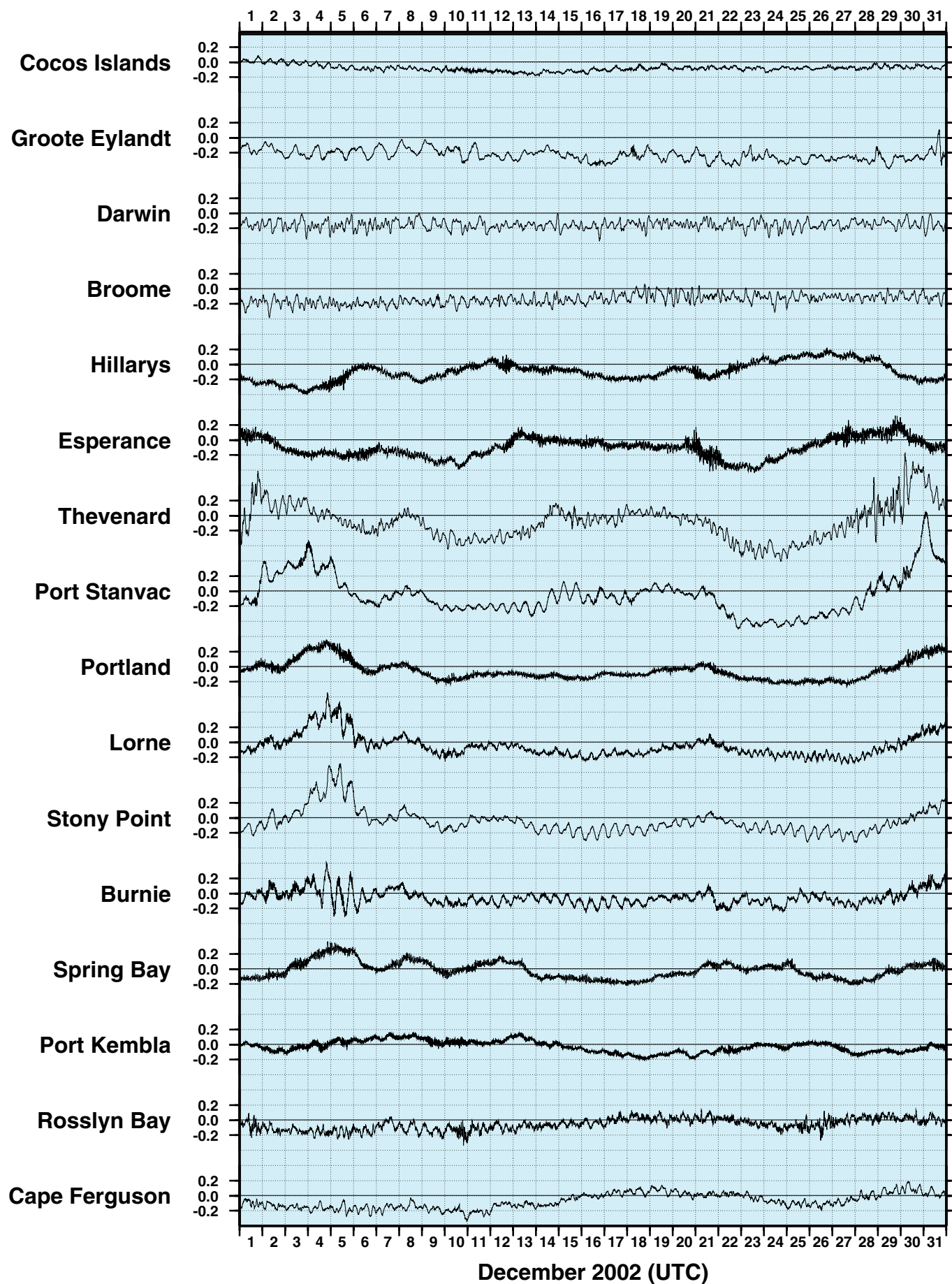


Figure 3
DECEMBER 2002
SIX MINUTE RESIDUALS
ADJUSTED FOR ATMOSPHERIC PRESSURE (m)

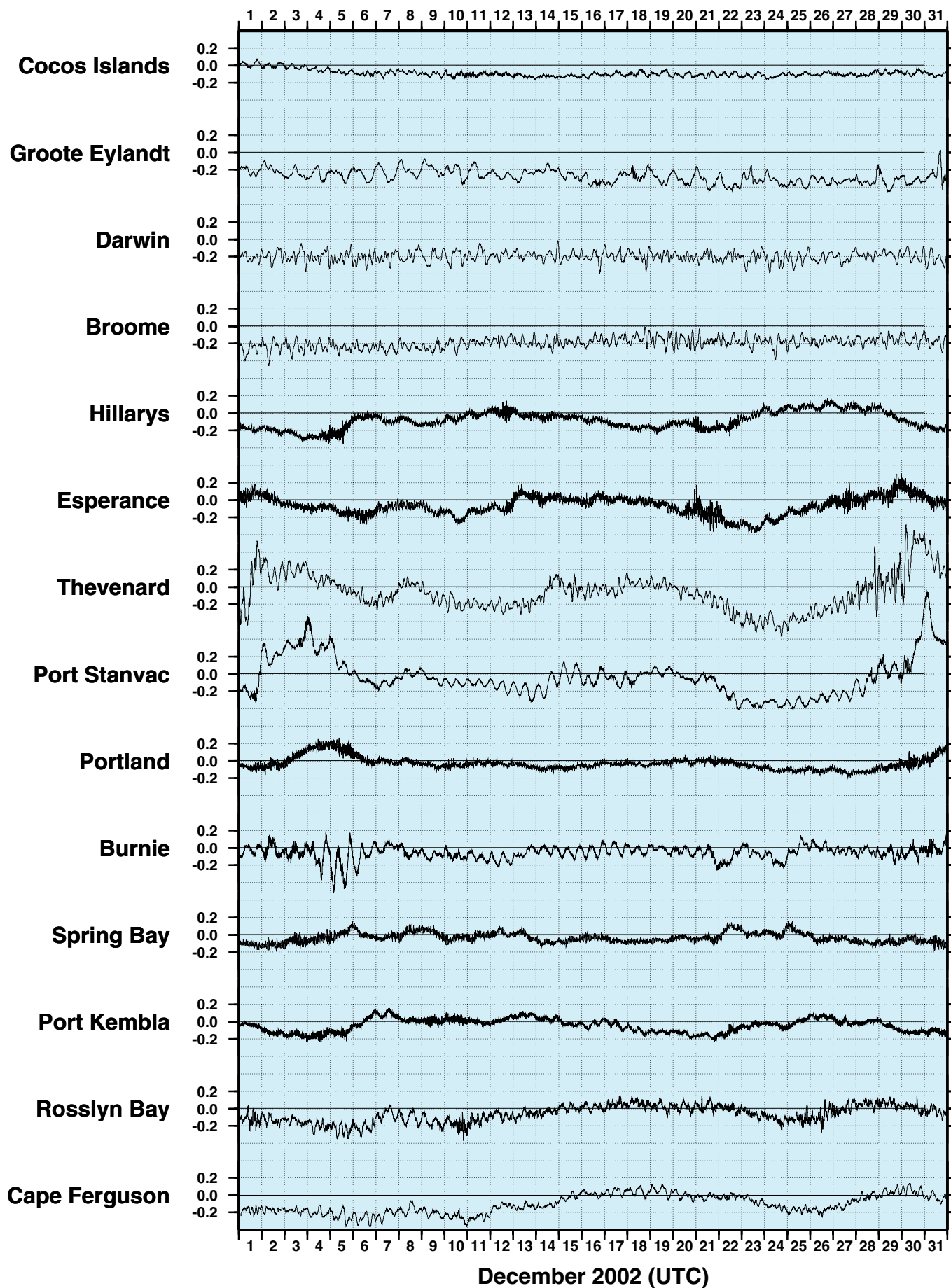


Figure 4

DECEMBER 2002
HOURLY WIND SPEEDS (m/s)

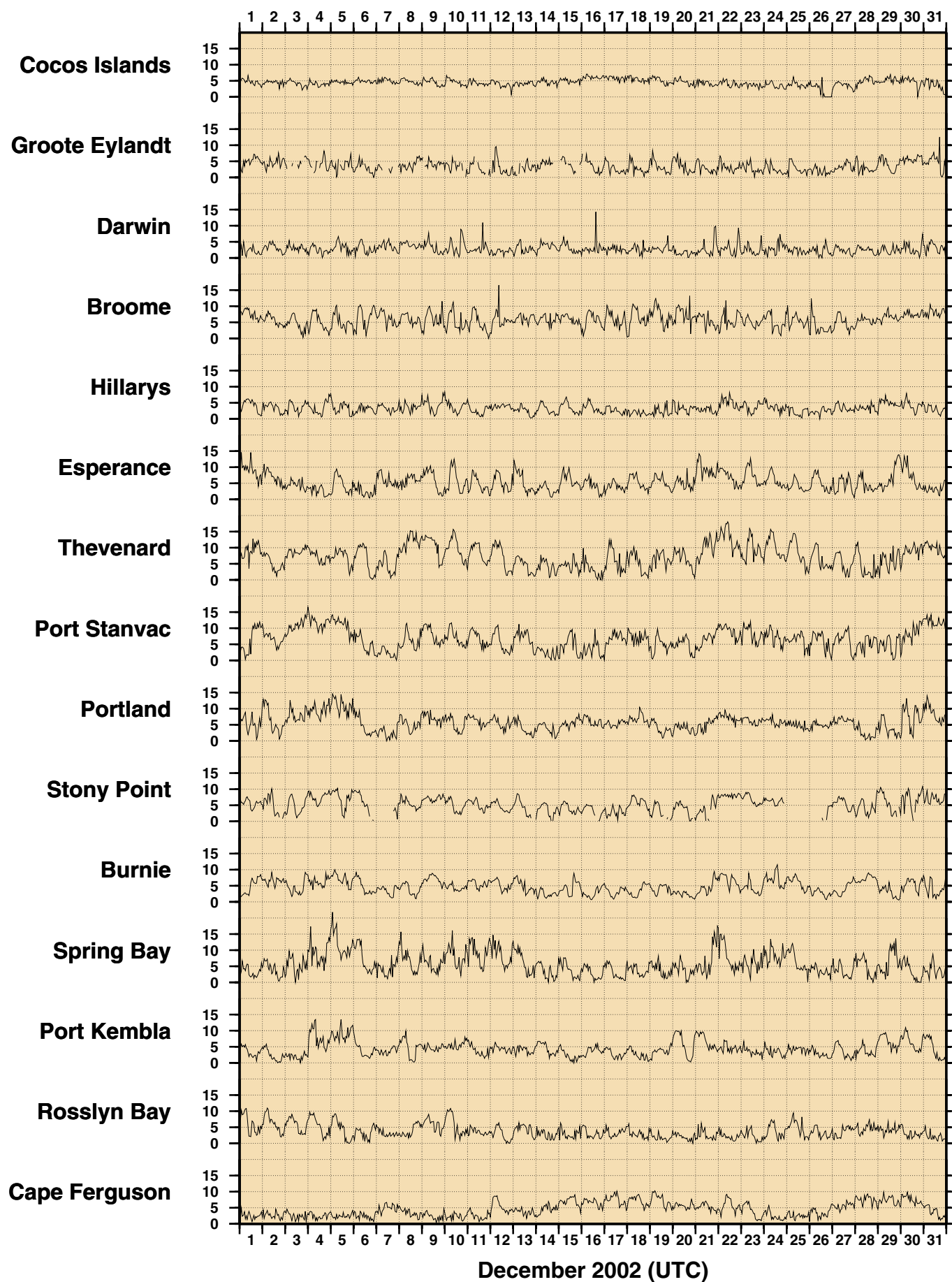


Figure 5

DECEMBER 2002
HOURLY INCIDENT WINDS (m/s, deg True)

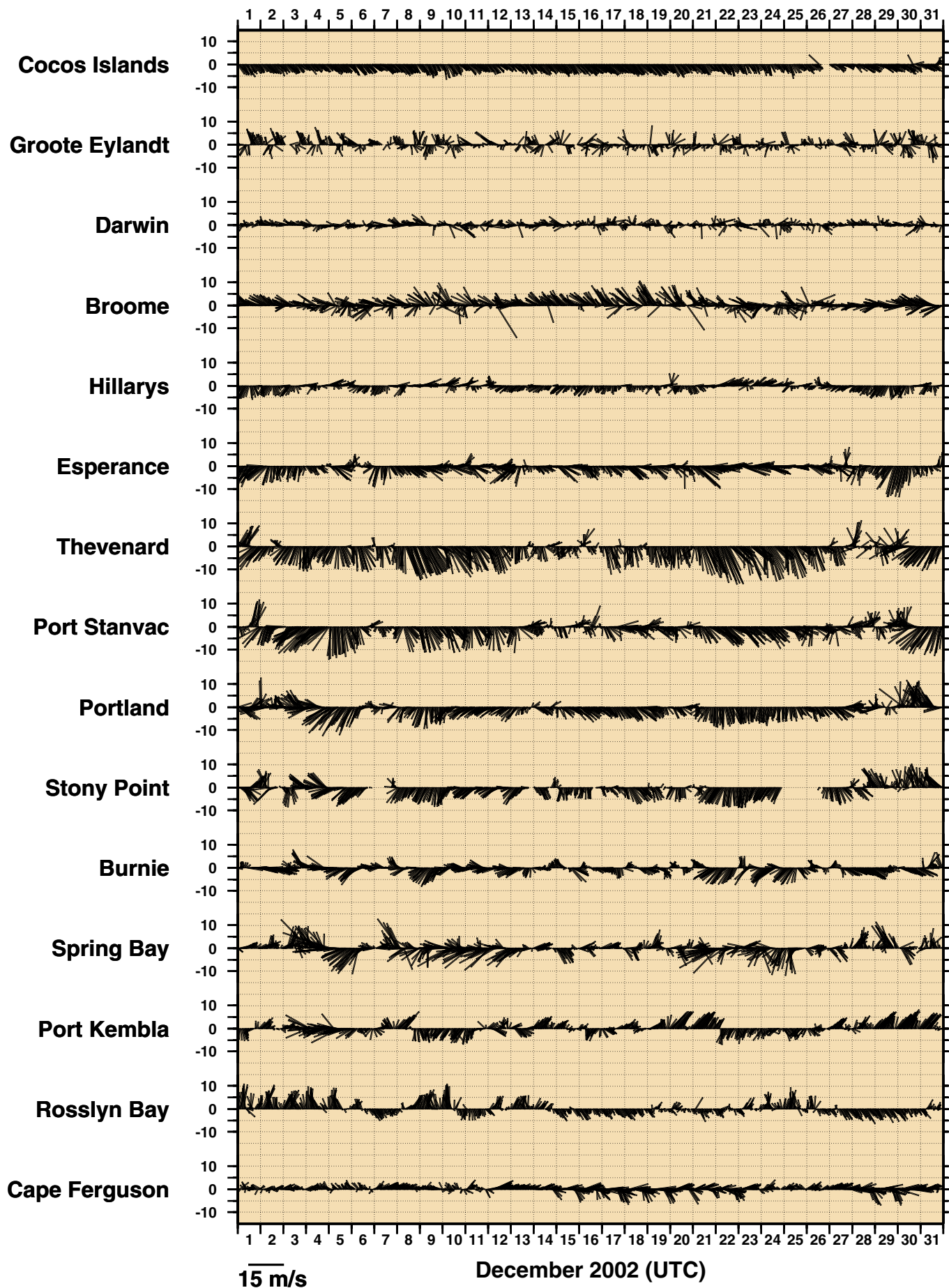


Figure 6

DECEMBER 2002
HOURLY MAXIMUM WIND GUSTS (m/s)

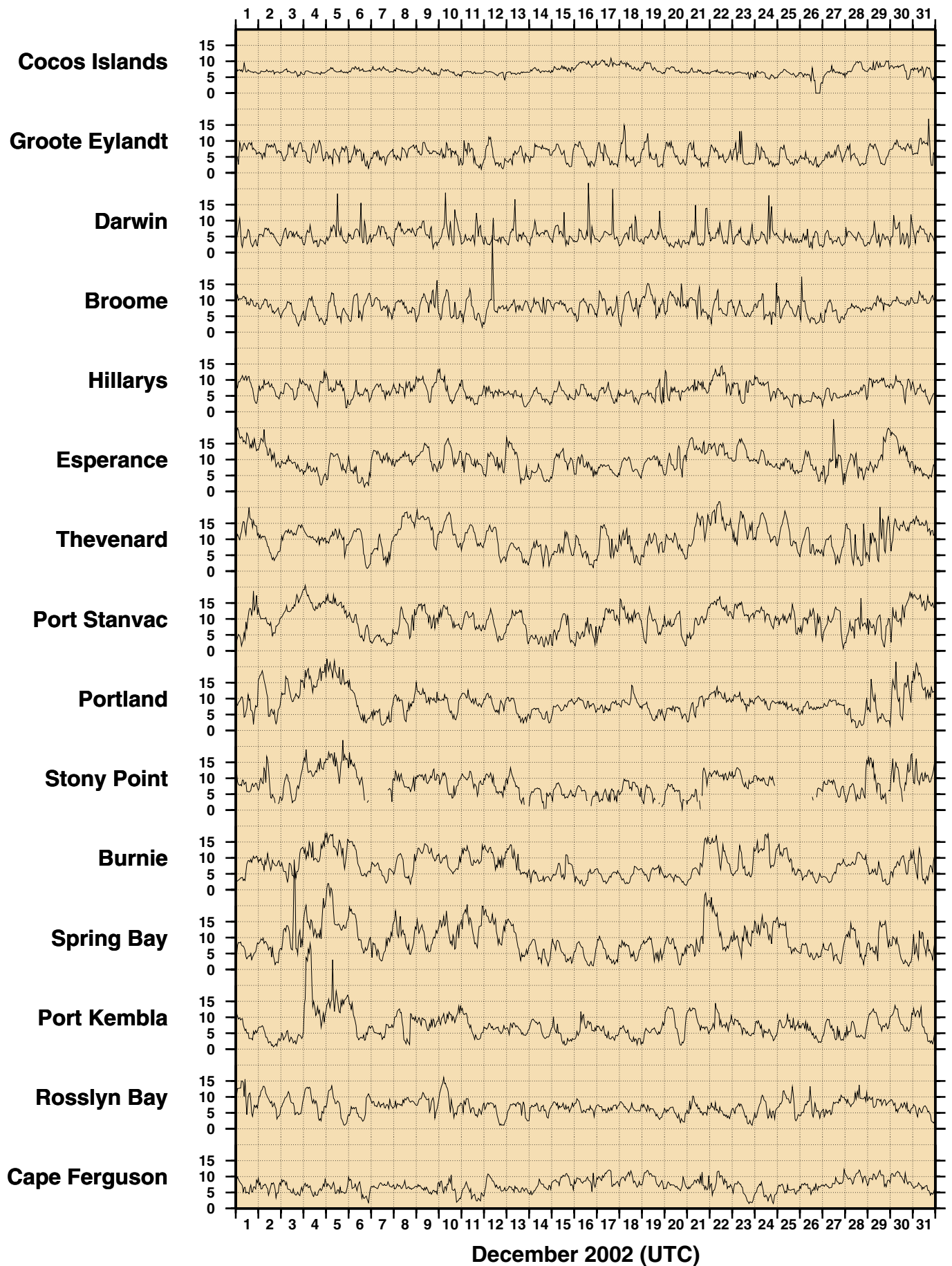


Figure 7

DECEMBER 2002
HOURLY AIR TEMPERATURES (°C)

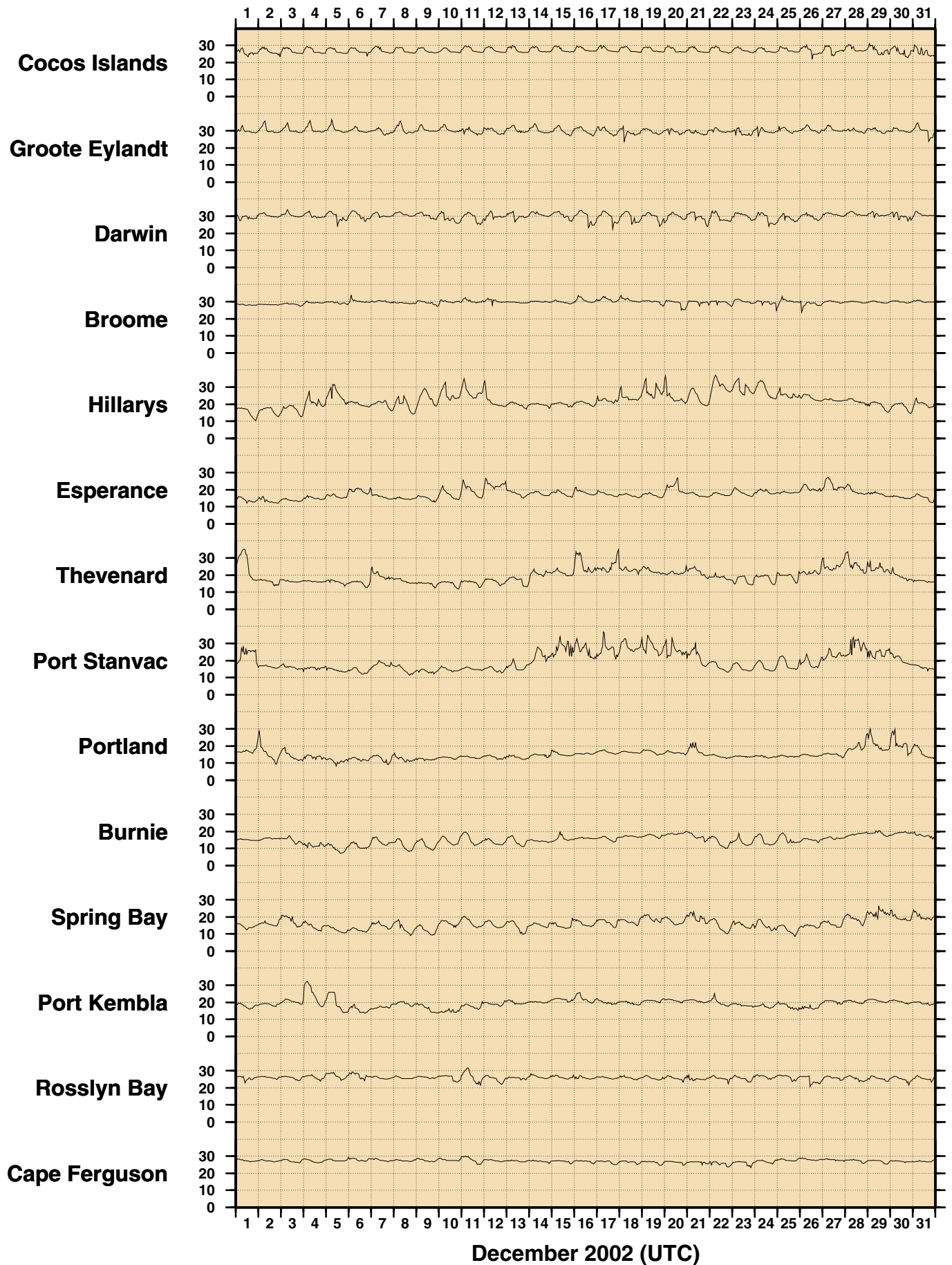


Figure 8

DECEMBER 2002
HOURLY WATER TEMPERATURES (°C)

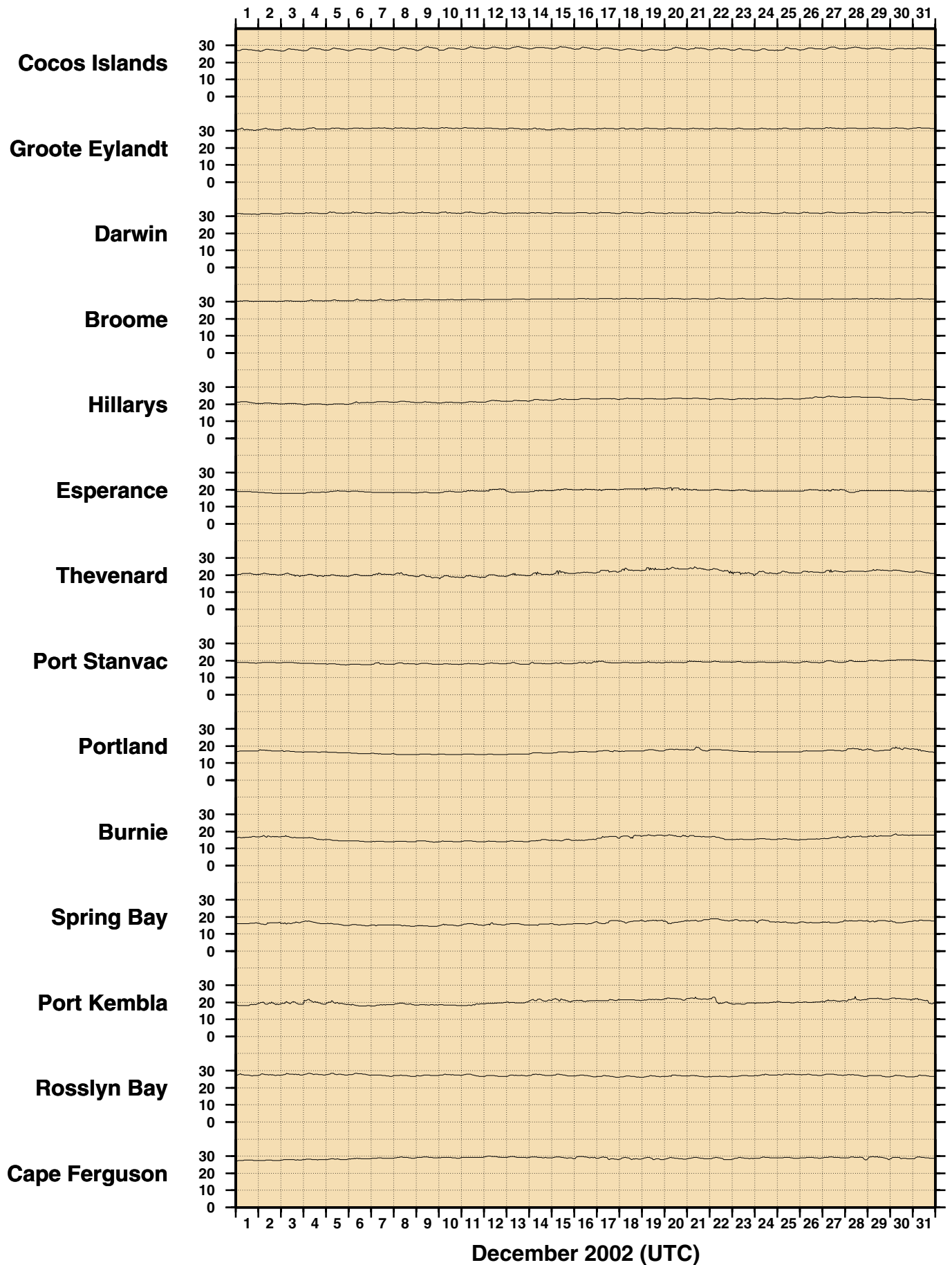


Figure 9

DECEMBER 2002
HOURLY ATMOSPHERIC PRESSURE (hPa)

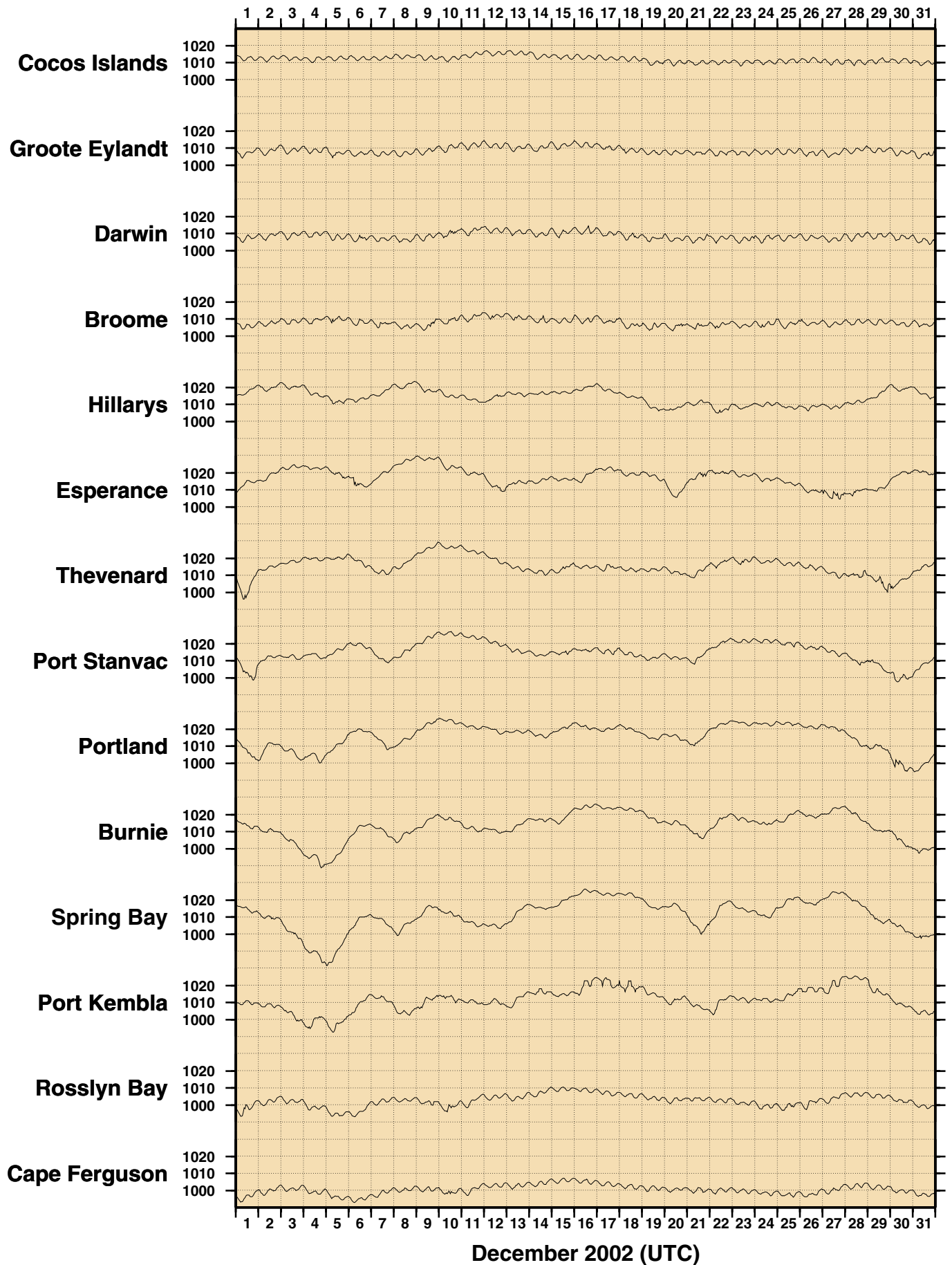


Figure 10
SEA LEVEL ANOMALIES THROUGH DECEMBER 2002 (m)

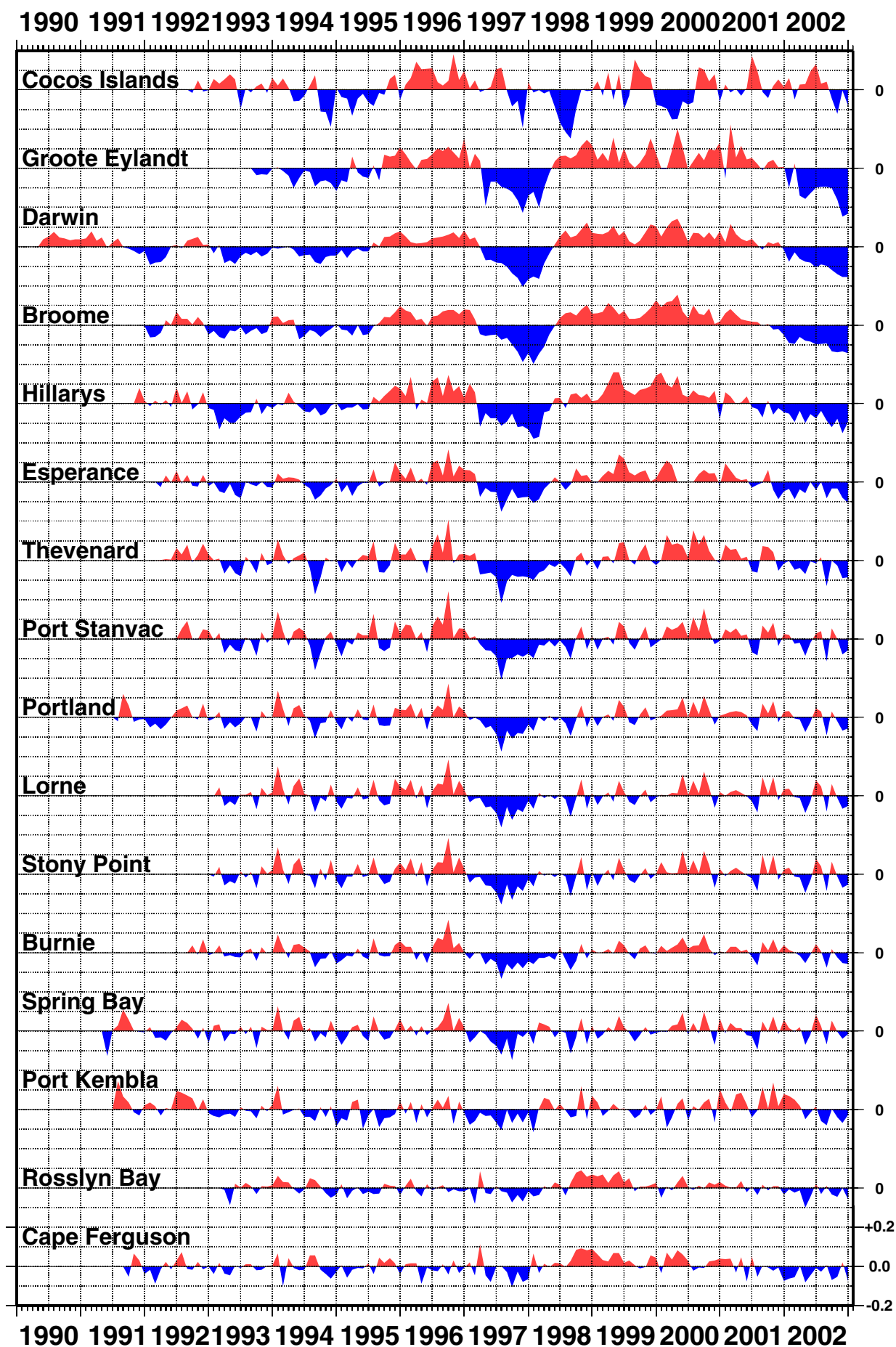


Figure 11

**BAROMETRIC PRESSURE ANOMALIES
THROUGH DECEMBER 2002 (hPa)**

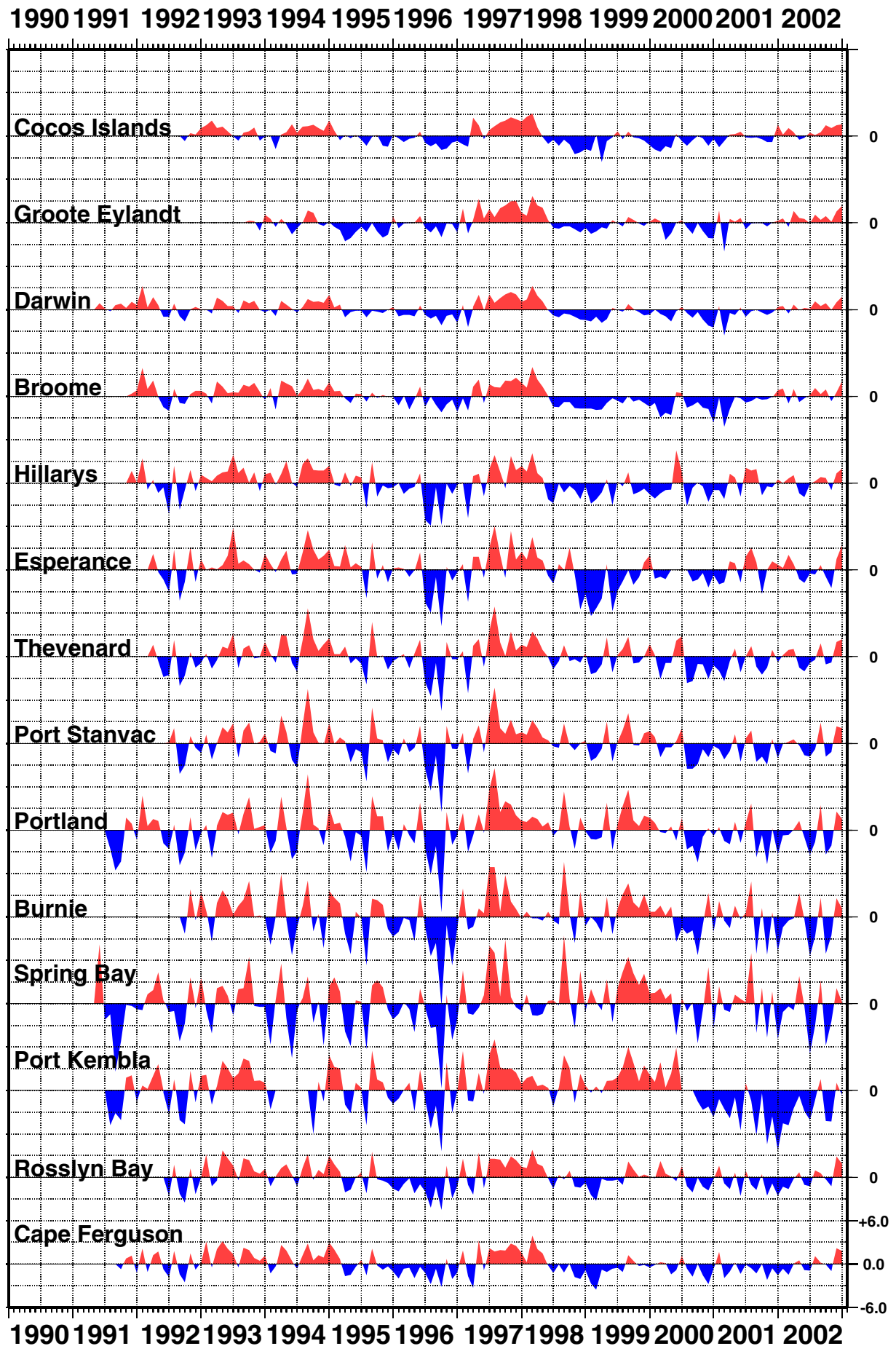


Figure 12

WATER TEMPERATURE ANOMALIES THROUGH DECEMBER 2002 (°C)

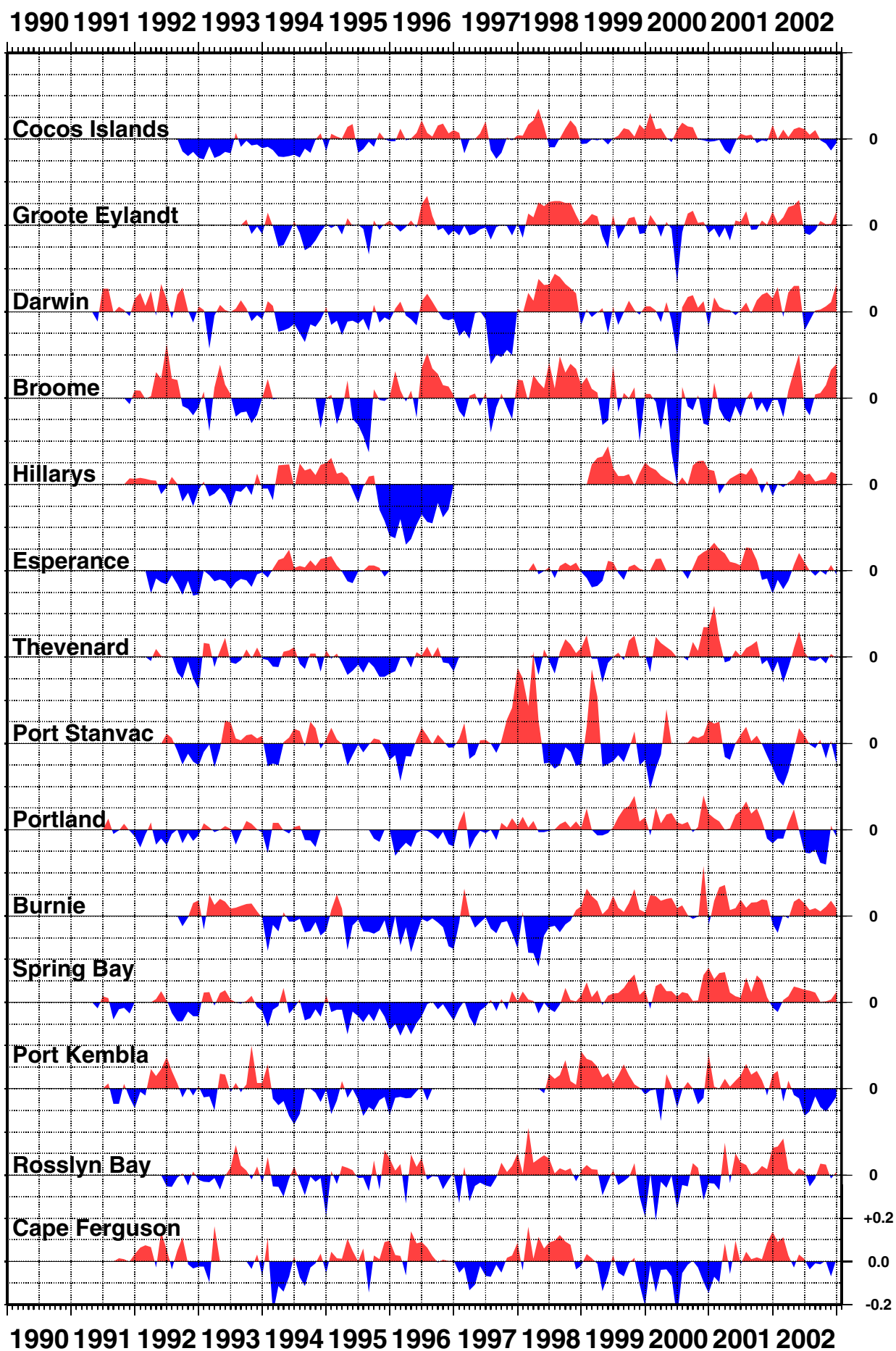


Figure 13

**AIR TEMPERATURE ANOMALIES
THROUGH DECEMBER 2002 (°C)**

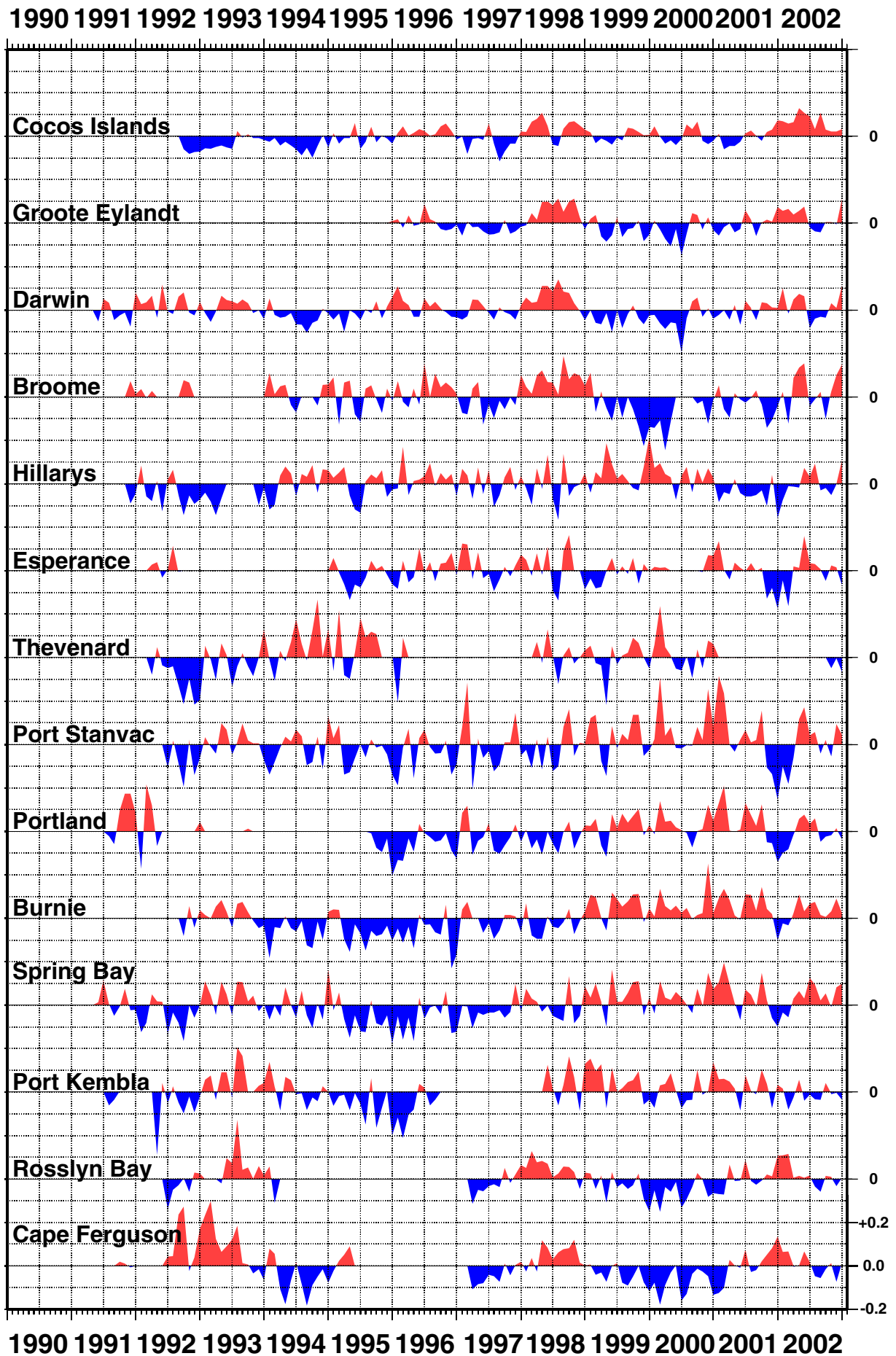


Figure 14

SEA LEVEL TRENDS THROUGH DECEMBER 2002 (mm/year)

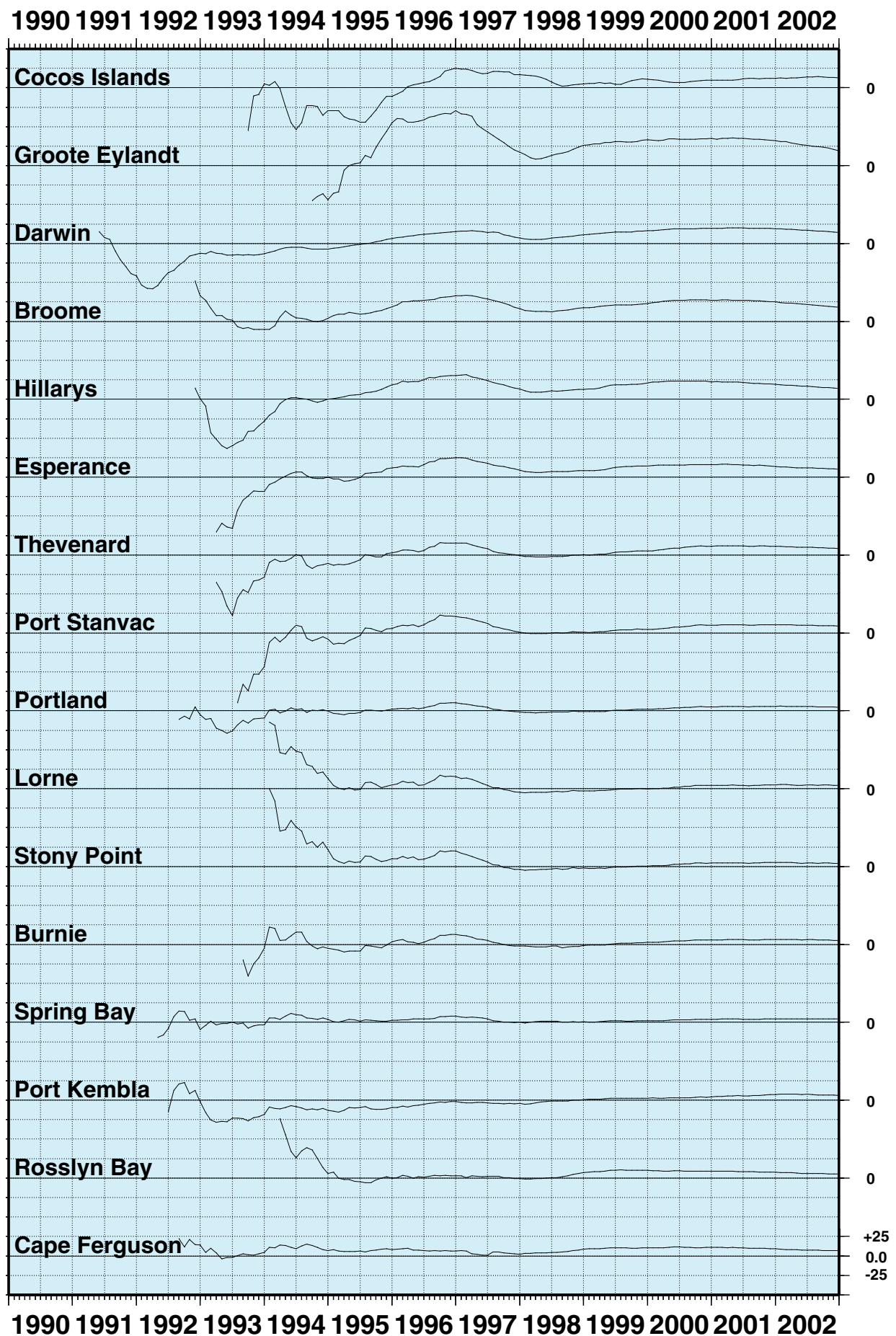


Figure 15 SEA LEVEL DATA RETURN

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

* Patchy record

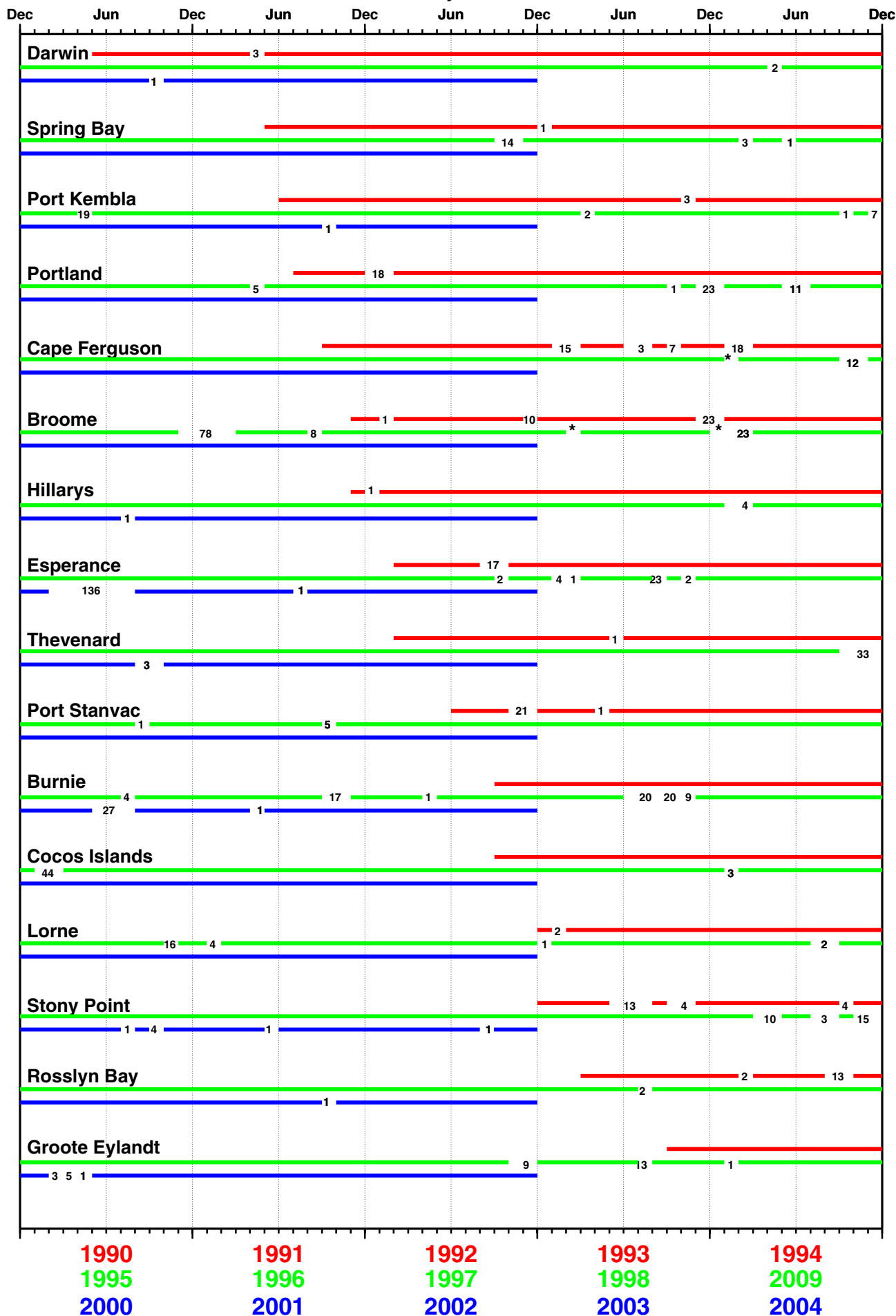
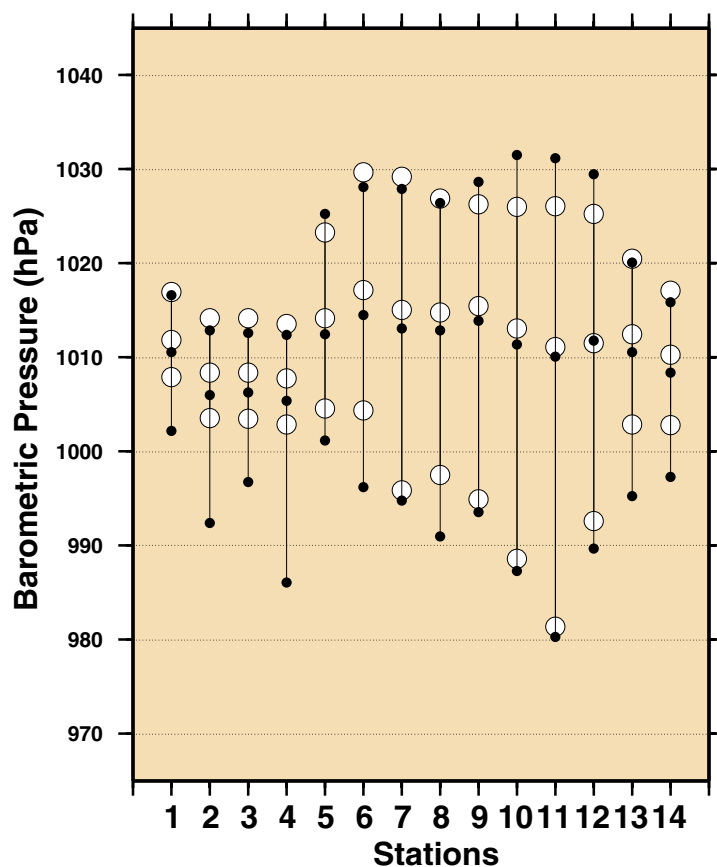
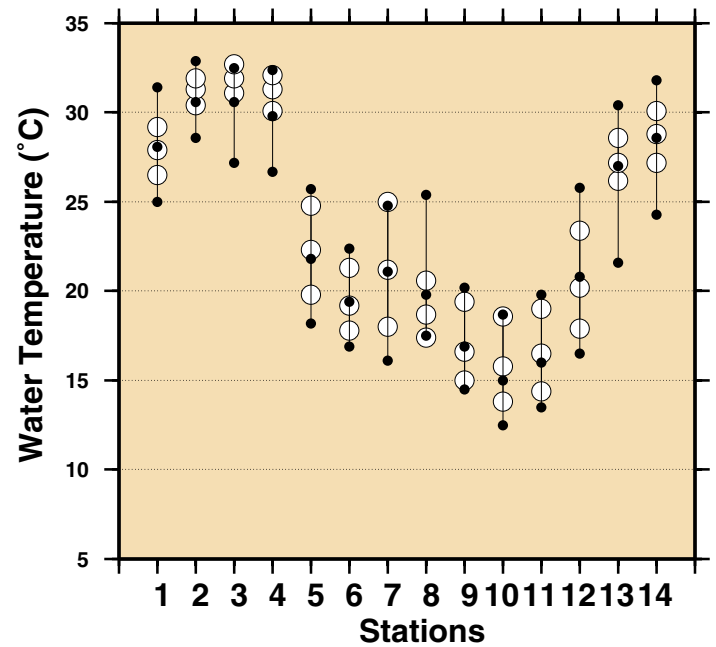
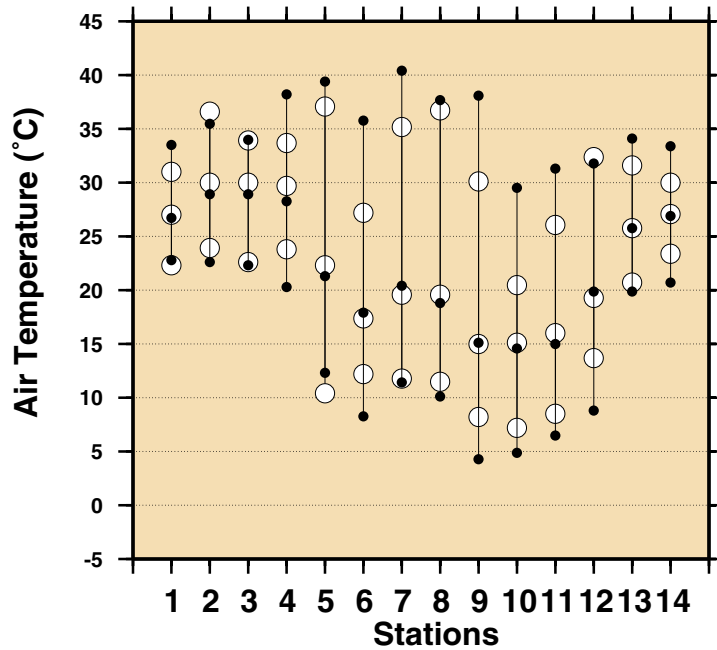


Figure 16
Comparison of December 2002 Max, Min & Mean with
Long Term December Values.



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

○ December 2002 Maximum
 ○ December 2002 Mean
 ○ December 2002 Minimum

● Long Term December Maximum
 ● Long Term December Mean
 ● Long Term December Minimum

Figure 17

MONTHLY MEAN SEA LEVELS TO DECEMBER 2002 (m)

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

