

THE AUSTRALIAN BASELINE SEA LEVEL MONITORING PROJECT

MONTHLY DATA REPORT

AUGUST 2002



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Quality Certification:

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

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NOTES ON THE DATA FOR AUGUST 2002

Sea level data return this month was excellent at all stations (Figures 1 and 15). 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 give the result of elevated or depressed sea level observations.

The air temperature sensor at Thevenard remained faulty and the data has consequently been removed from the record.

The wind speed and wind gusts at Stony Point were recording zero values for relatively long periods throughout August. These erroneous values and the corresponding incident winds have been removed (Figures 4, 5 and 6).

The sea level anomalies (Figure 10) were again positive at Cocos Islands in August and changed from slightly positive to slightly negative at Thevenard, Port Stanvac, Portland, Lorne, Stony Point, Burnie and Spring Bay. The sea level anomalies remained negative at all other sites in August. The barometric pressure anomalies (Figure 11) were positive for all sites during August.

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. Also note that for several stations there were no backup water temperature sensors in operation, so the quality of this data is unknown. Similarly, air temperatures are compared to the temperature recorded by a sensor located in the upper levels of the environmental housing of the tide gauge. These will not exactly agree, as in locations where the housing is in the sun, the housing temperature will be higher than the actual air temperature. The temperature fluctuations inside the housing will also be less pronounced compared to the actual temperature fluctuations. This is due to the smaller amount of ventilation within the environmental housing. This can be used as a rough guide in determining the quality of air temperature data, but it is not an exact measure, and so is not used to fill the gaps.

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

For most stations the mean air temperatures for August 2002 were consistent with the long term August means. A record maximum air temperature of 31.9°C was recorded at Cocos Islands and a record minimum of 20.8°C was also recorded at Cocos Islands. Failure of the air temperature sensor at Thevenard meant that no comparison could be made.

The mean water temperatures recorded at all sites for August 2002 were quite consistent with the long-term August values.

The barometric pressures were consistent with the long-term August values at all sites for August 2002.

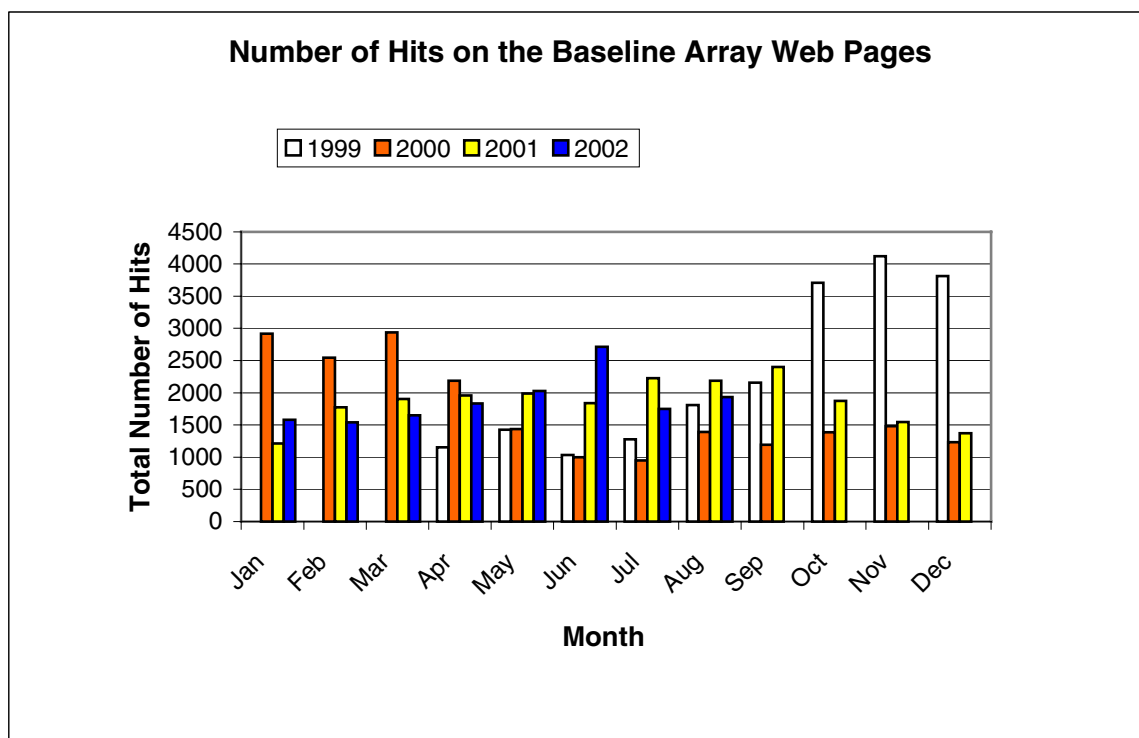
Figure 14 shows the short-term sea level trends for each SEAFRAME location included in the Australian Baseline Sea Level Monitoring Project. Table 1 lists the commencement of operation, the sea level trend for the entire record (plotted in Figure 14) and the change in trend with respect to the previous month's analysis.

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 August 2002.

Location	Installation Date	Sea Level Trend (mm/yr)	Change from previous month
Cocos Islands	Sep 1992	+14.2	+0.2
Groote Eylandt	Sep 1993	+24.4	-0.8
Darwin	May 1990	+16.1	-0.4
Broome	Nov 1991	+20.7	-0.5
Hillarys	Nov 1991	+15.8	-0.4
Esperance	Mar 1992	+11.3	-0.5
Thevenard	Mar 1992	+9.2	-0.7
Port Stanvac	Jun 1992	+9.2	-0.6
Portland	Jul 1991	+5.1	-0.4
Lorne	Jan 1993	+4.5	-0.5
Stony Point	Jan 1993	+4.3	-0.5
Burnie	Sep 1992	+5.7	-0.4
Spring Bay	May 1991	+4.3	-0.3
Port Kembla	Jul 1991	+6.8	-0.4
Rosslyn Bay	Jun 1992	+5.9	0.0
Cape Ferguson	Sep 1991	+7.5	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, which has the seasonal signal removed from the data. Table 2 gives the number of hits to the Australian Baseline Sea Level Monitoring project web pages from 1999 to August 2002.

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:

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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

**AUGUST 2002
SIX MINUTE OBSERVATIONS (m)**

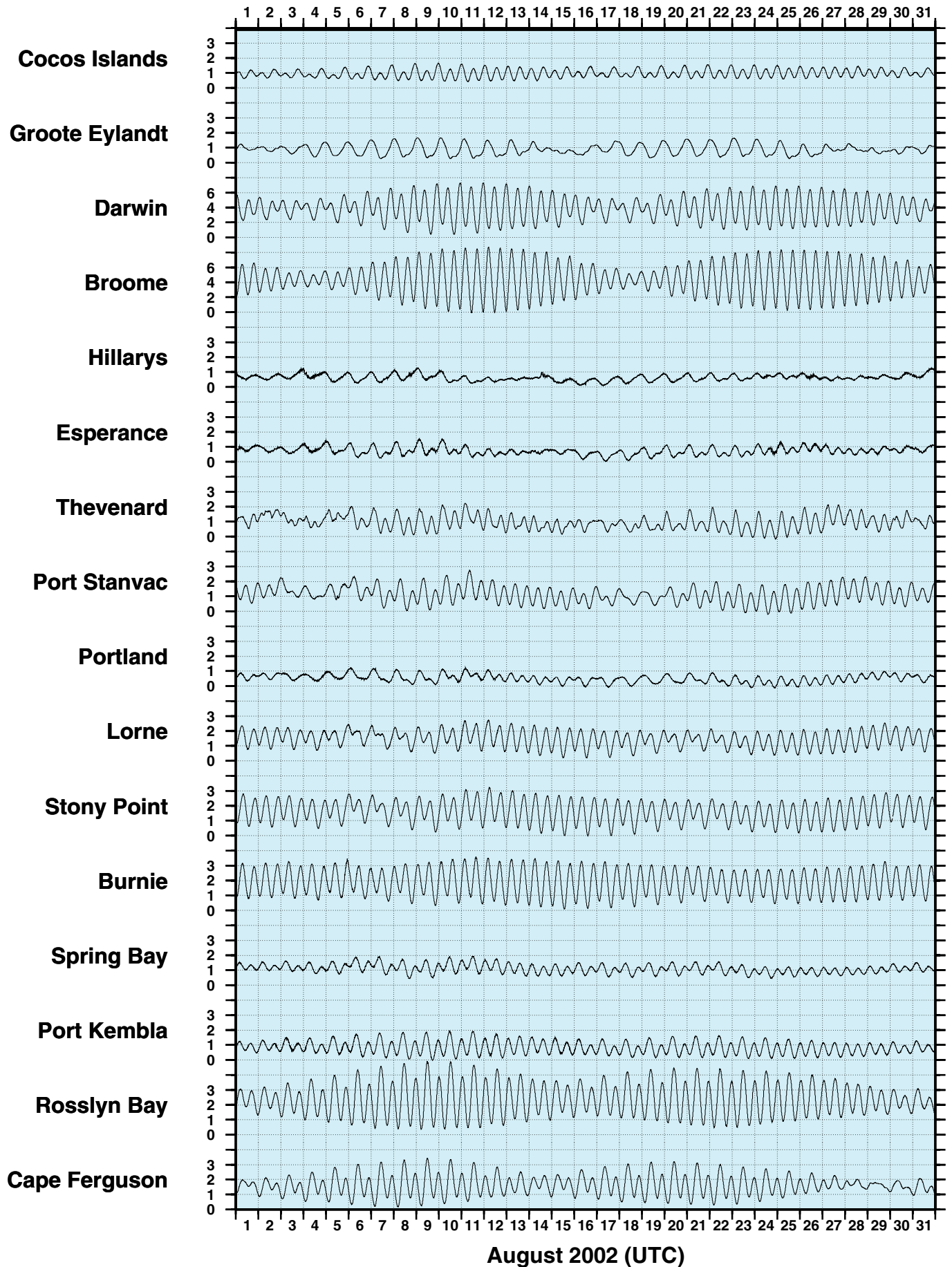


Figure 2

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

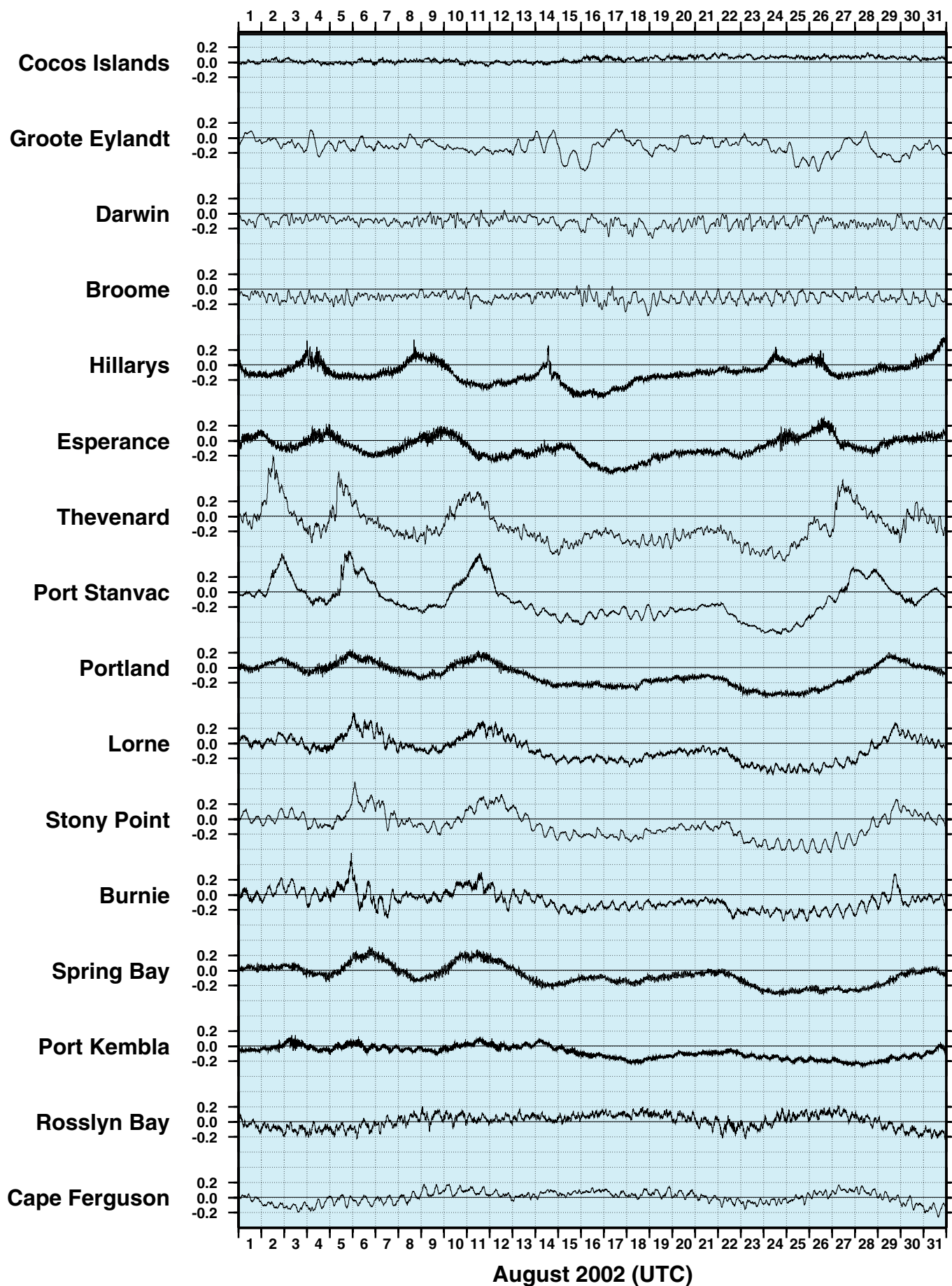


Figure 3
AUGUST 2002
SIX MINUTE RESIDUALS
ADJUSTED FOR ATMOSPHERIC PRESSURE (m)

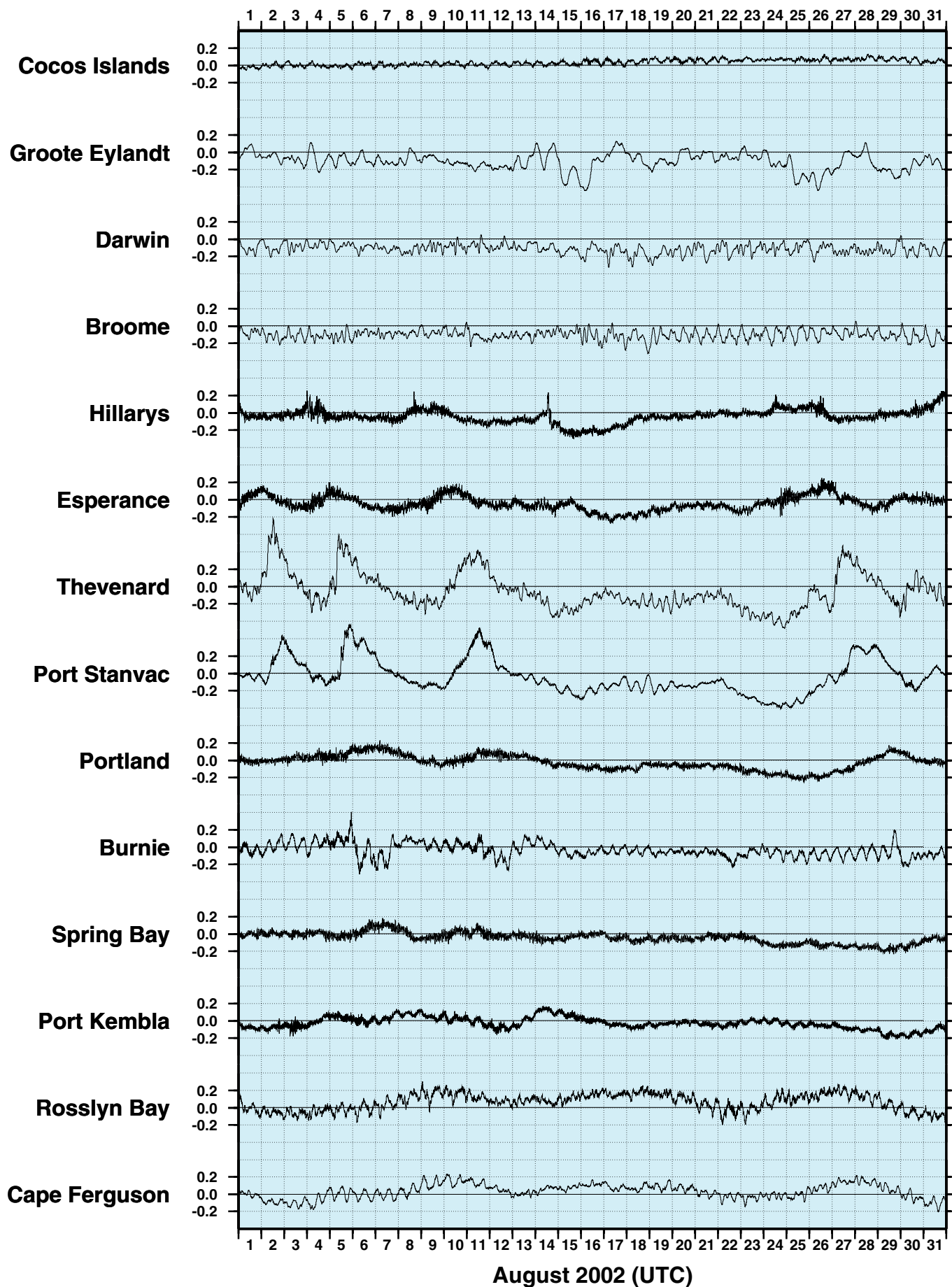


Figure 4

AUGUST 2002
HOURLY WIND SPEEDS (m/s)

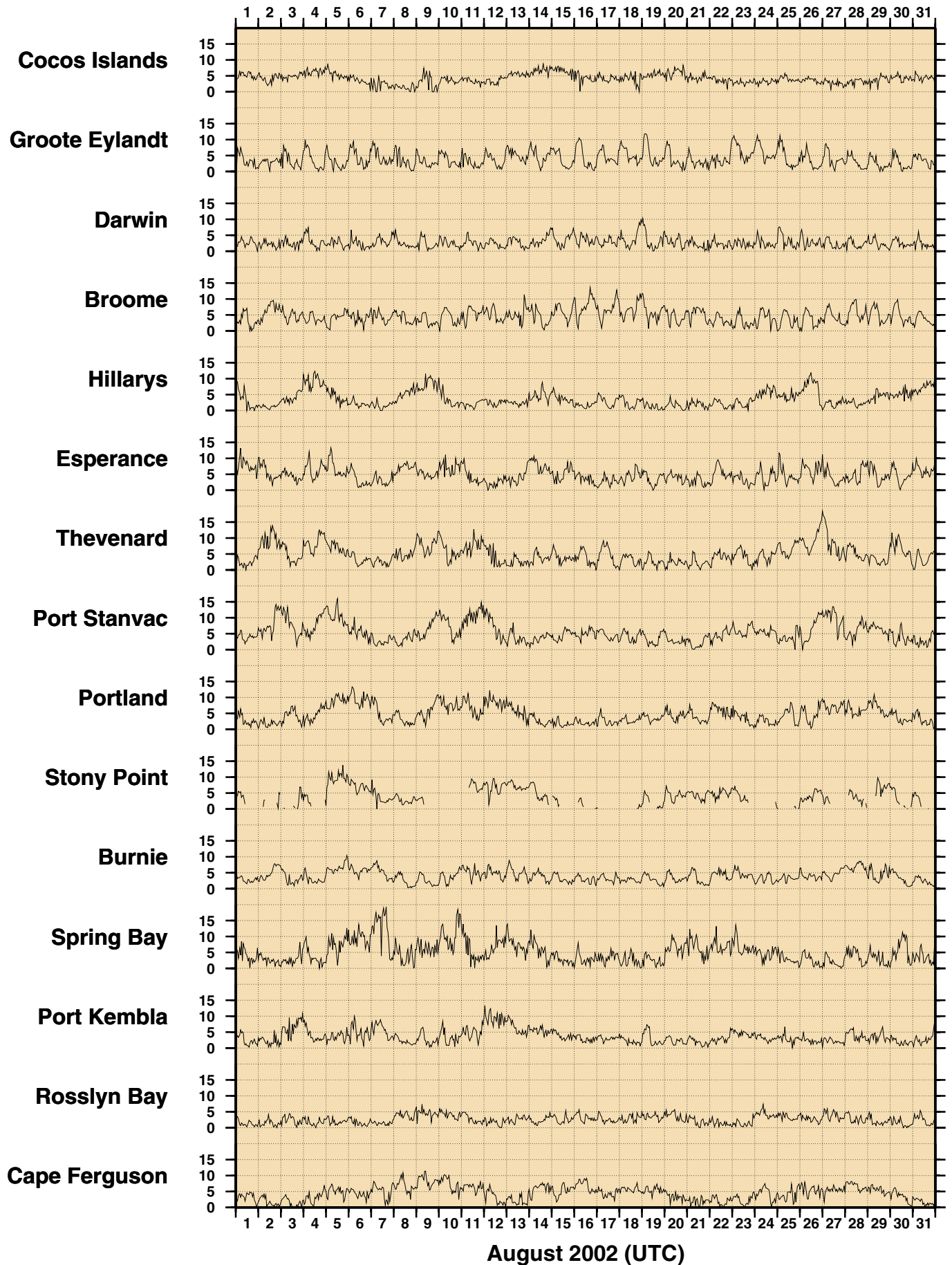


Figure 5

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

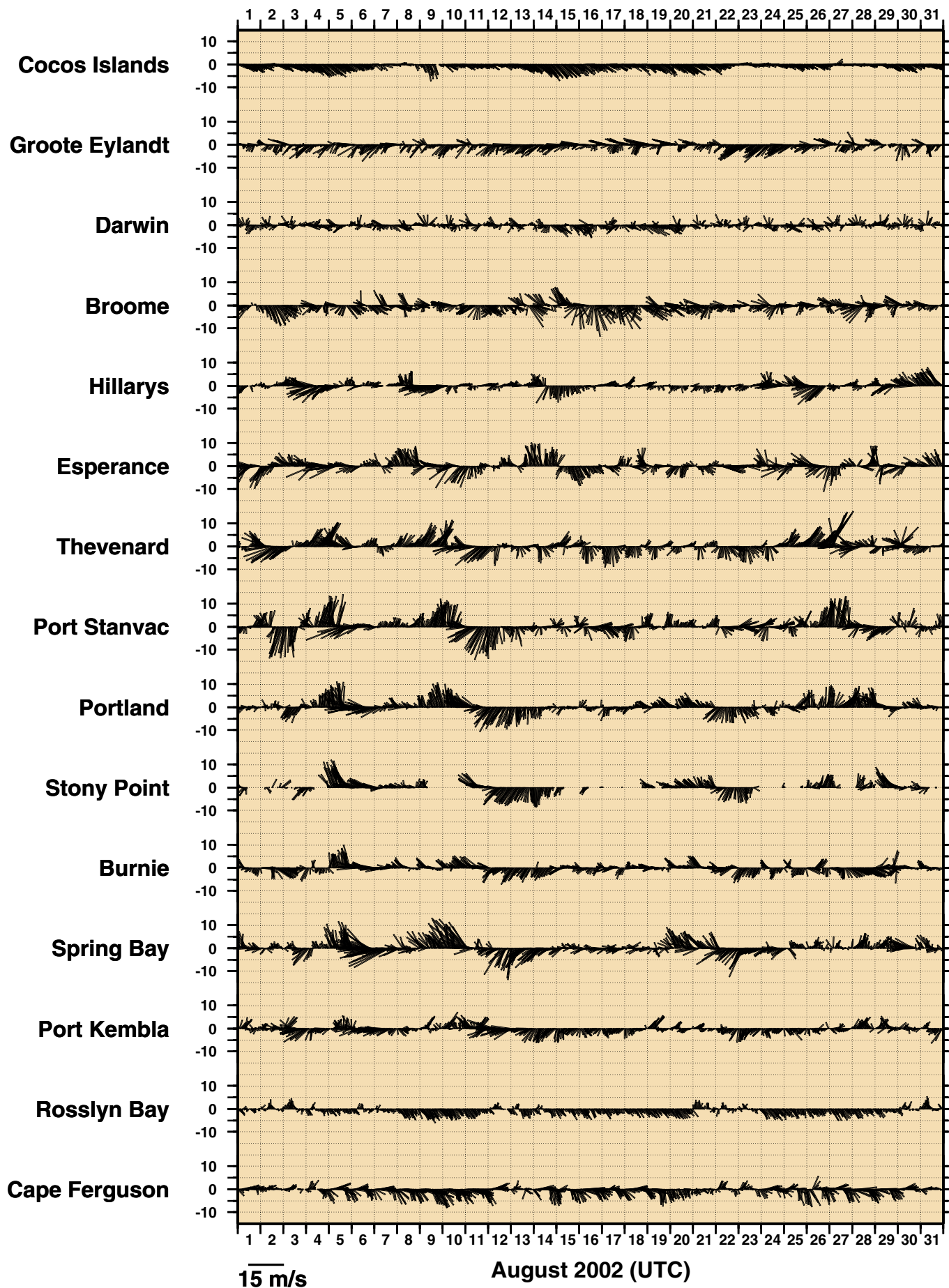


Figure 6

AUGUST 2002
HOURLY MAXIMUM WIND GUSTS (m/s)

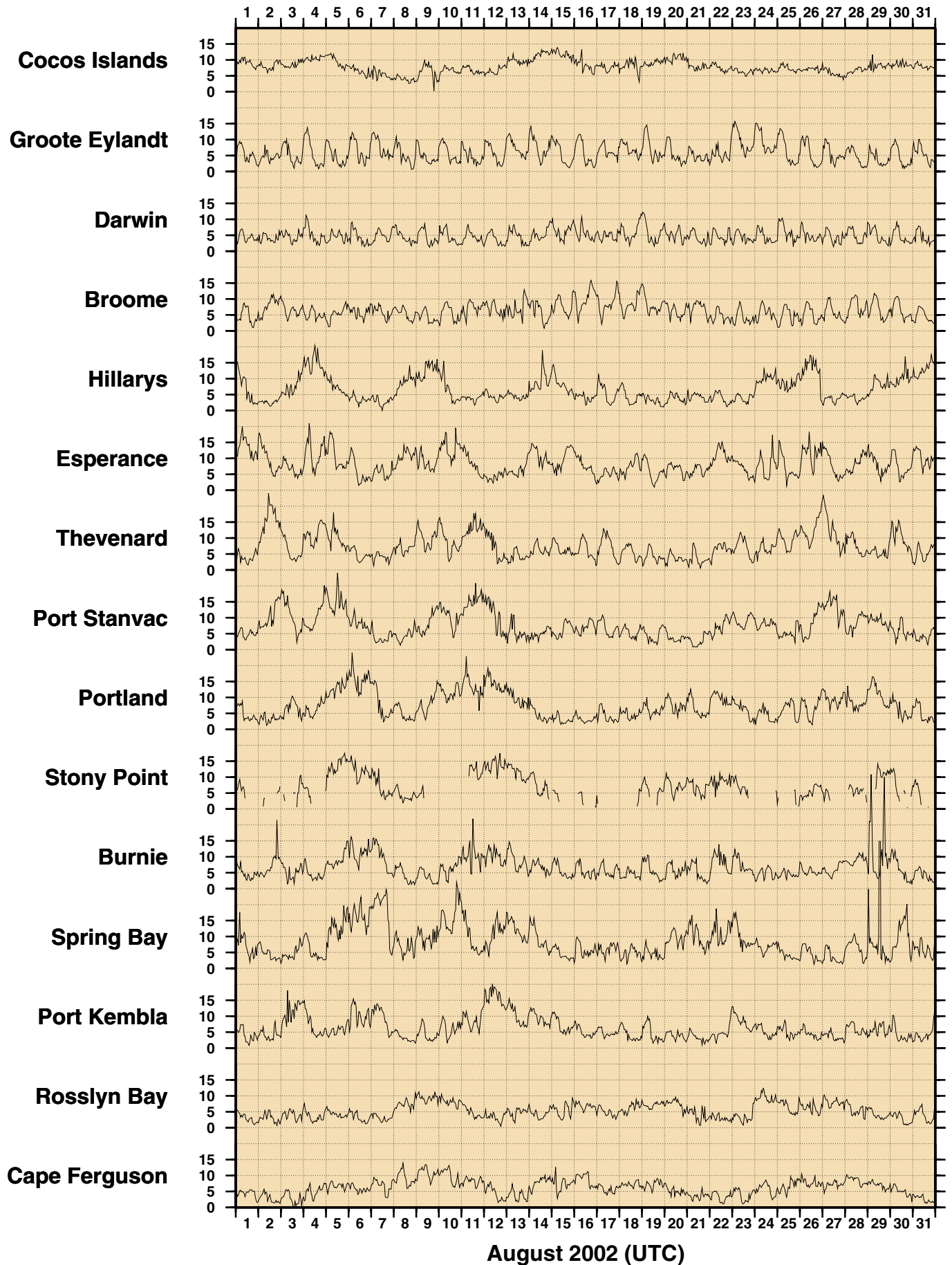


Figure 7

AUGUST 2002
HOURLY AIR TEMPERATURES (°C)

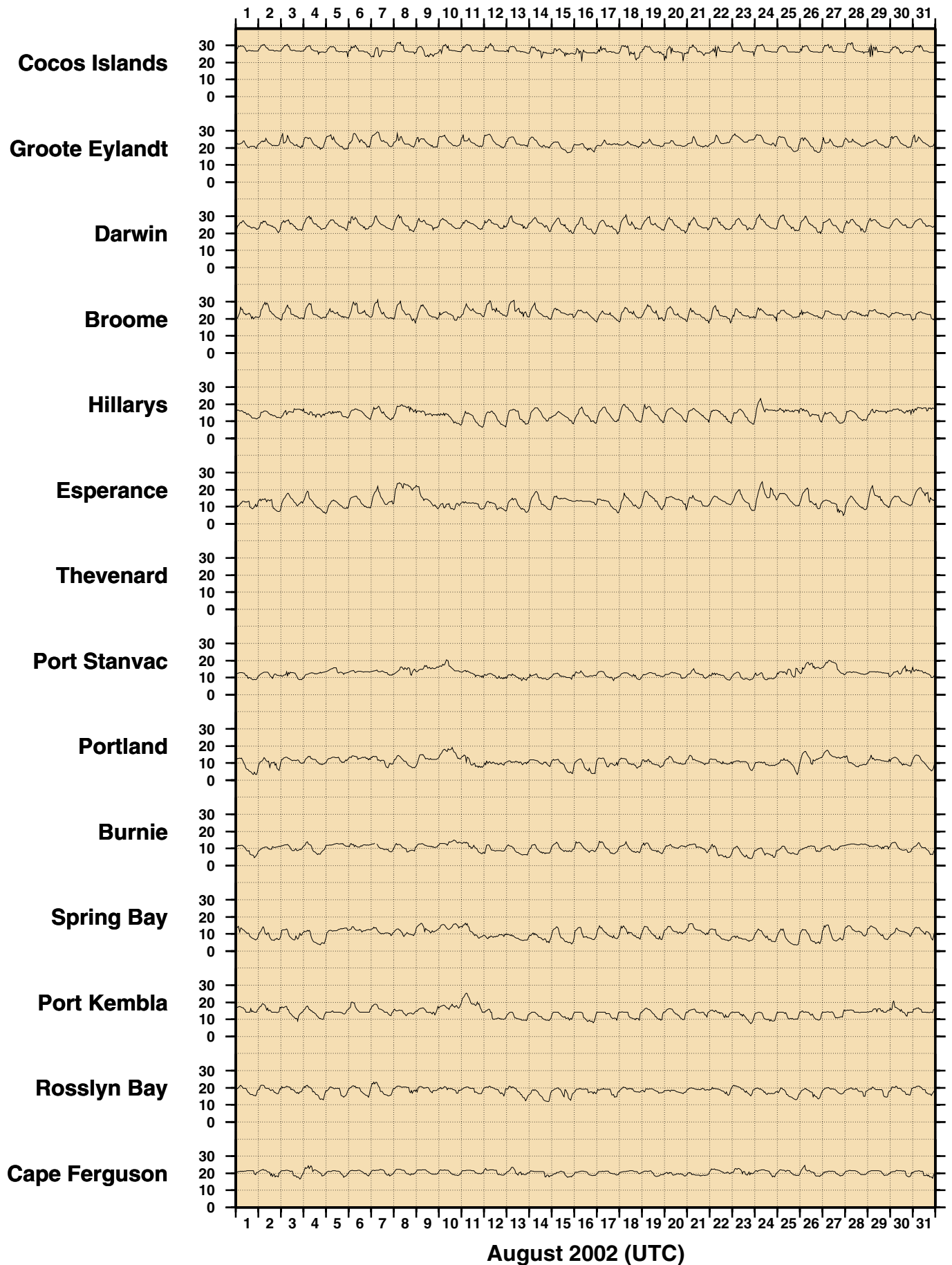


Figure 8

AUGUST 2002
HOURLY WATER TEMPERATURES (°C)

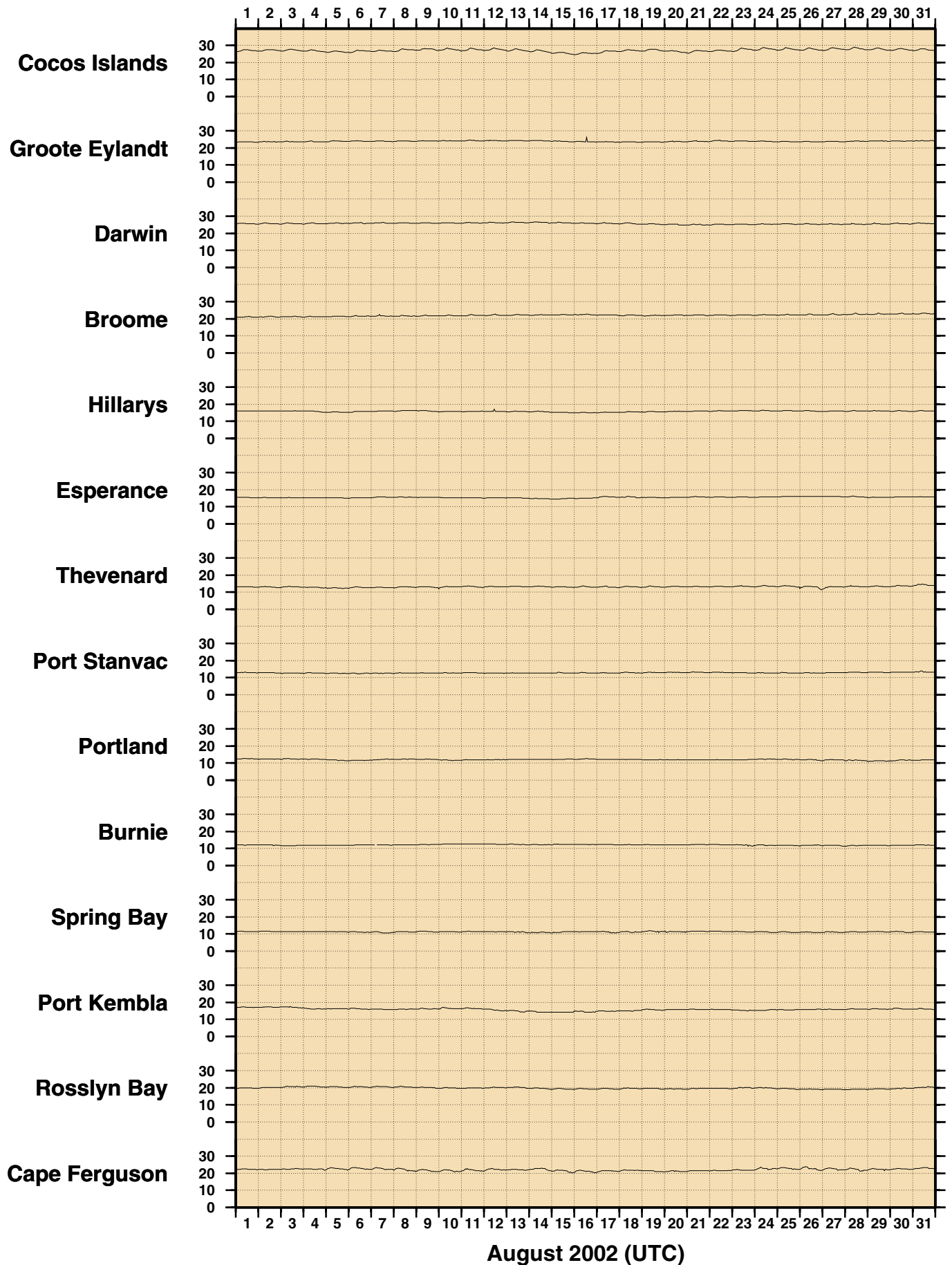


Figure 9

AUGUST 2002
HOURLY ATMOSPHERIC PRESSURE (hPa)

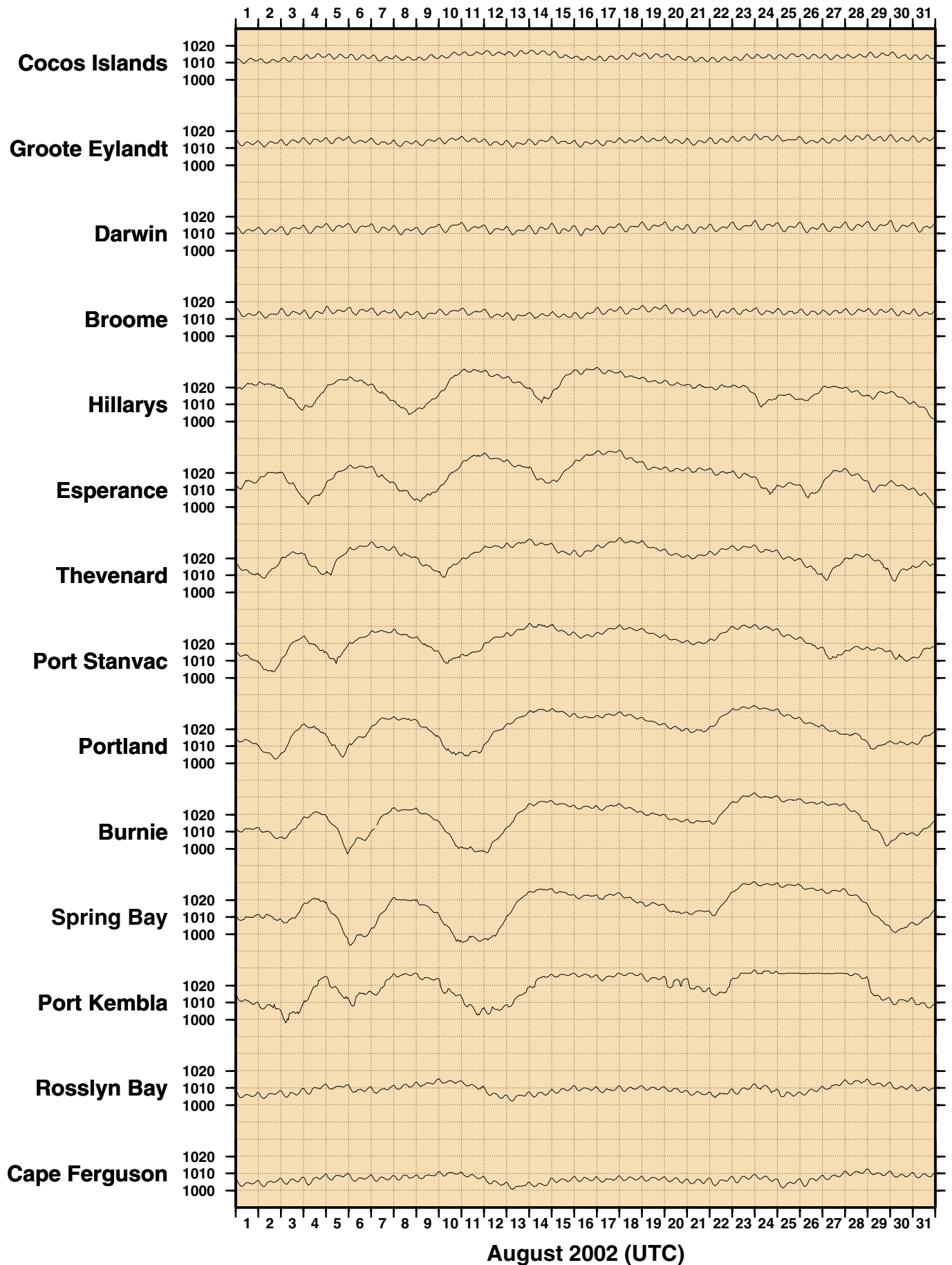


Figure 10
SEA LEVEL ANOMALIES THROUGH AUGUST 2002 (m)

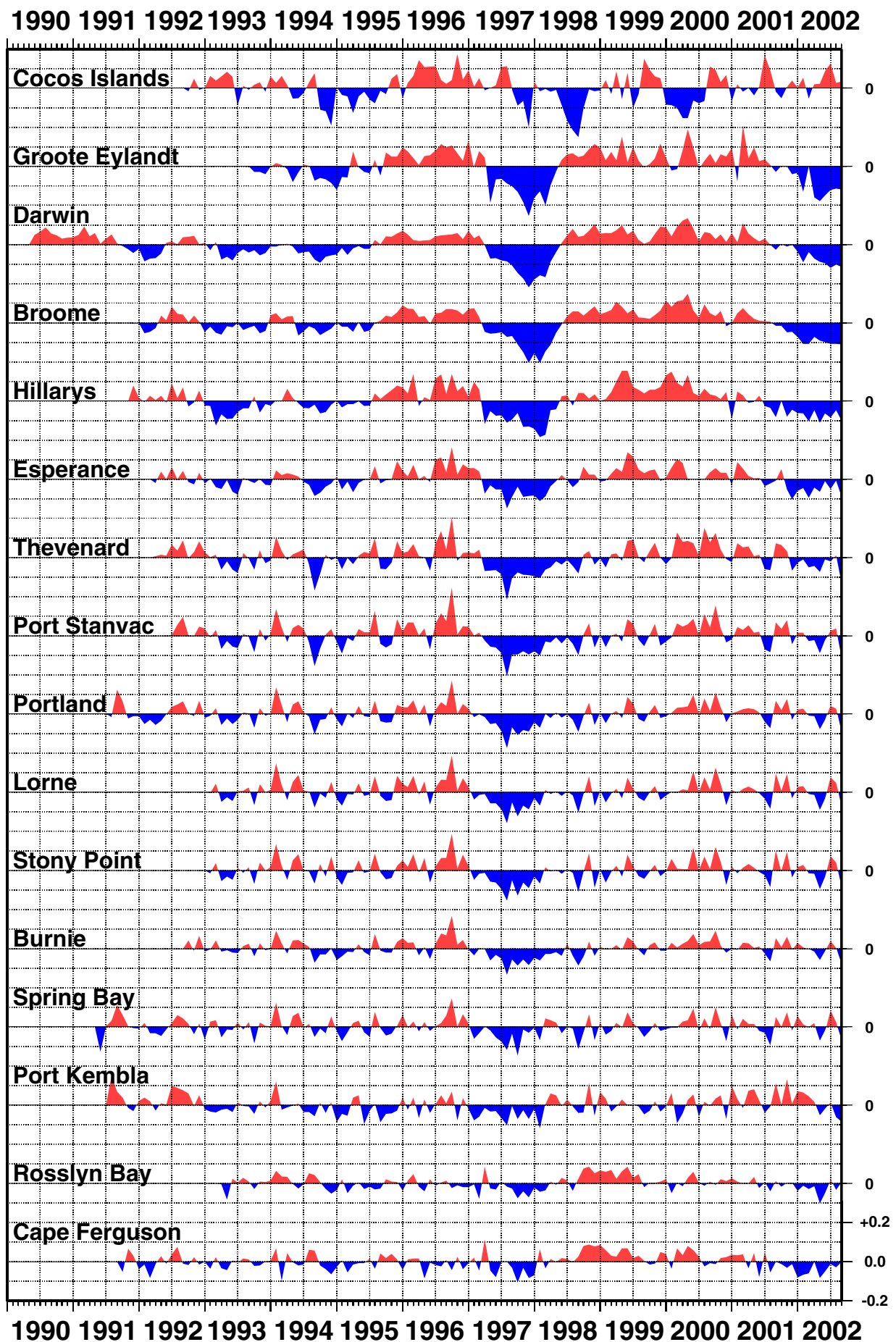


Figure 11

BAROMETRIC PRESSURE ANOMALIES THROUGH AUGUST 2002 (hPa)

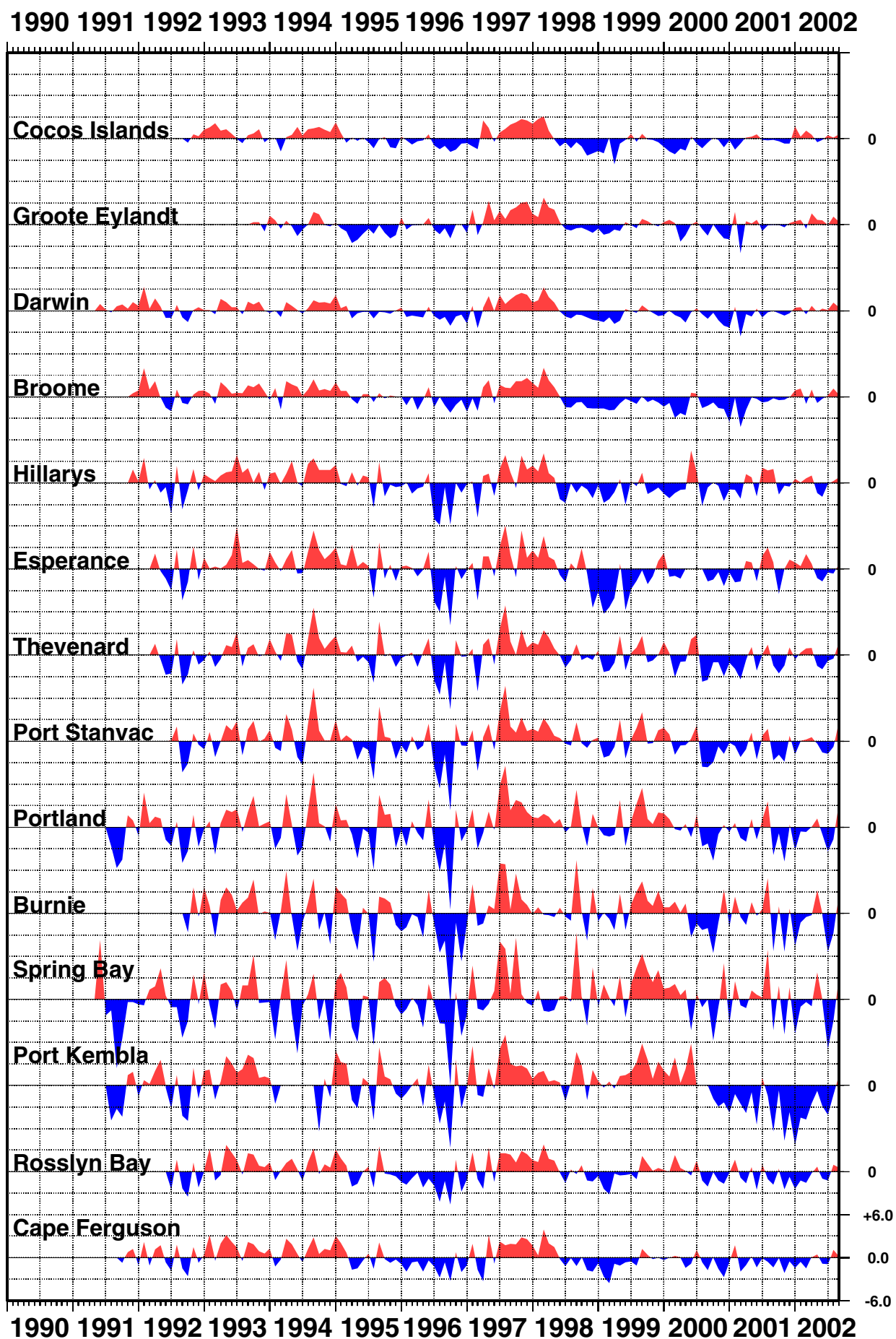
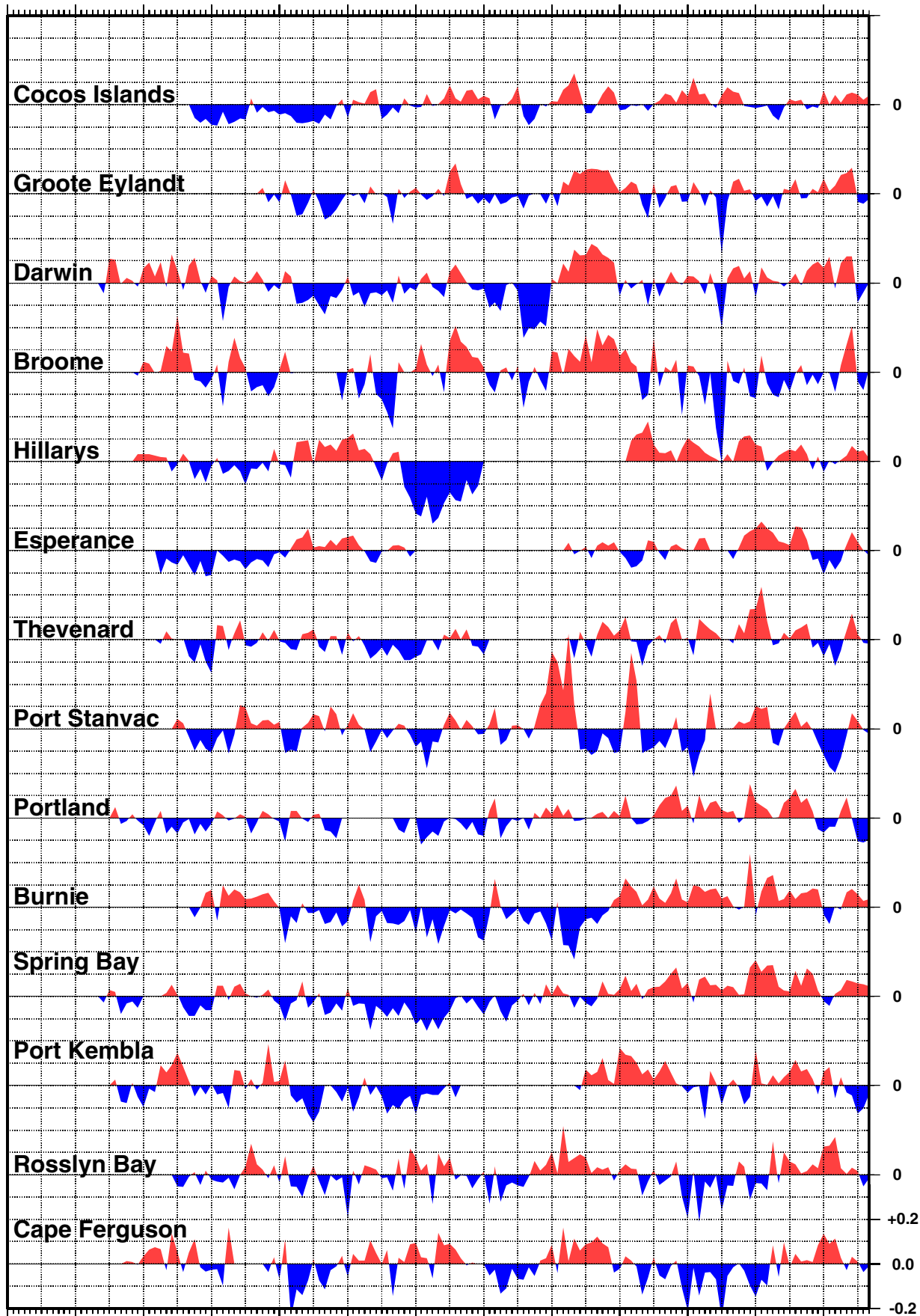


Figure 12

WATER TEMPERATURE ANOMALIES THROUGH AUGUST 2002 (°C)

1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002



1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002

Figure 13

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

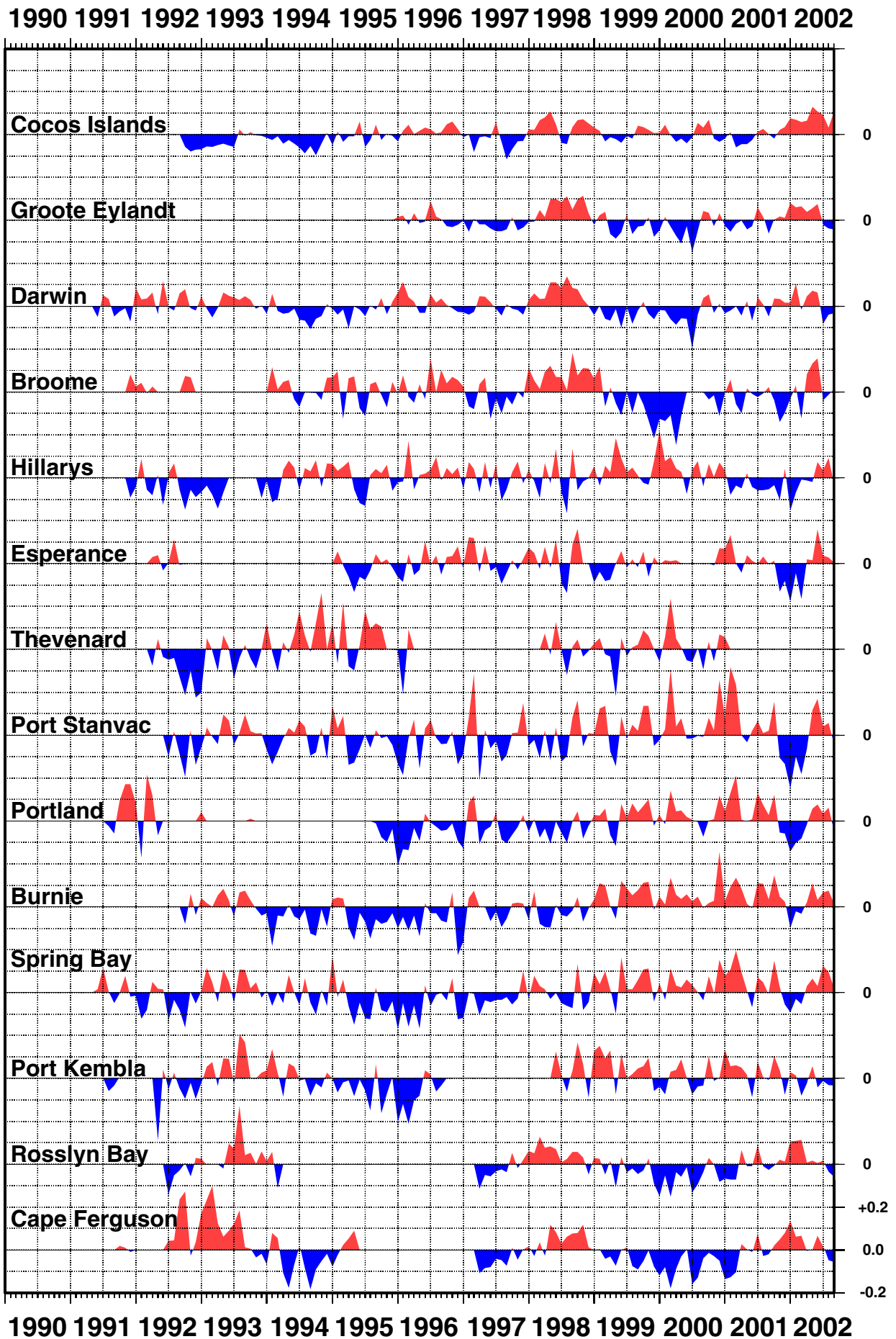


Figure 14

SEA LEVEL TRENDS THROUGH AUGUST 2002 (mm/year)

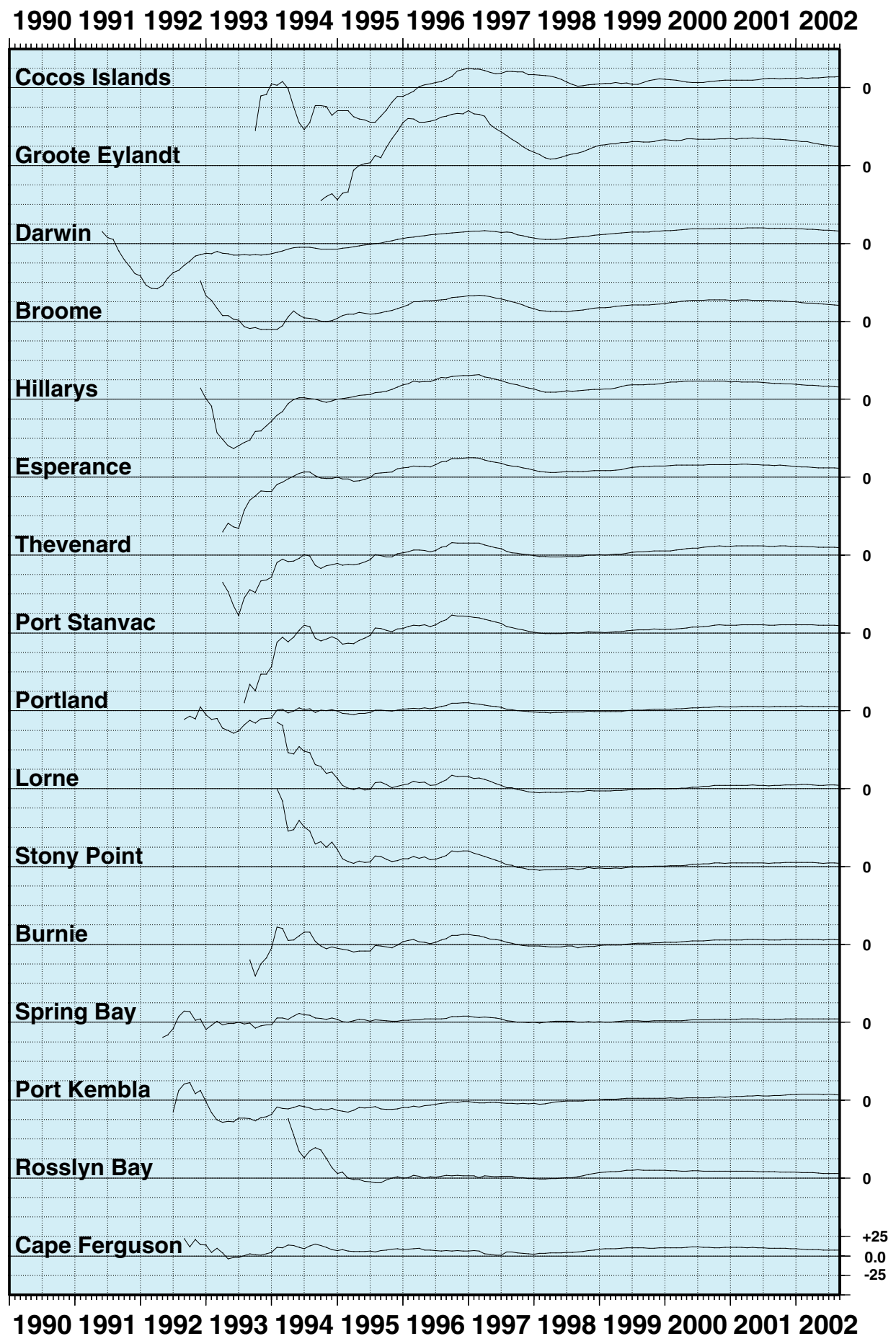


Figure 15 SEA LEVEL DATA RETURN

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

* Patchy record

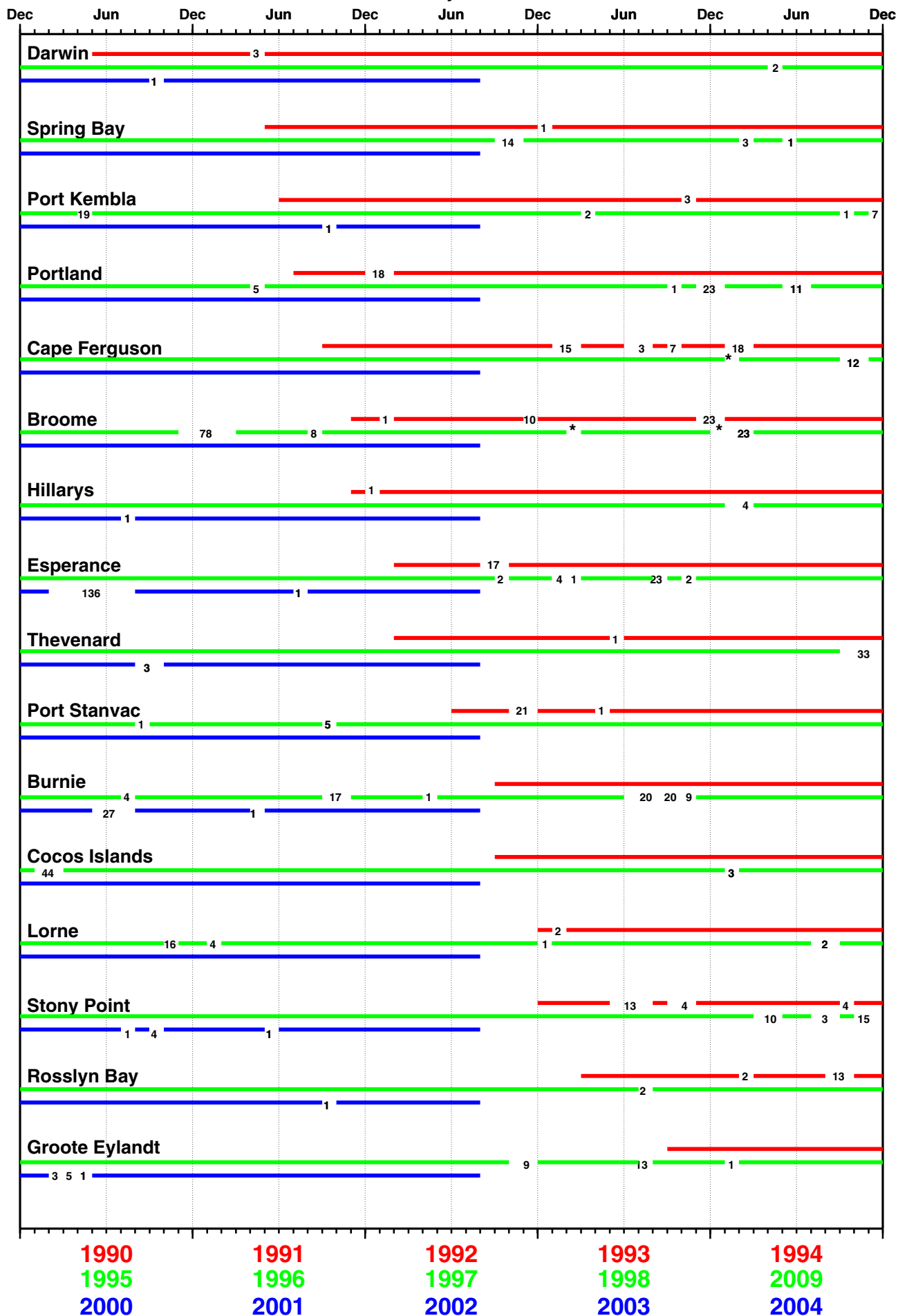
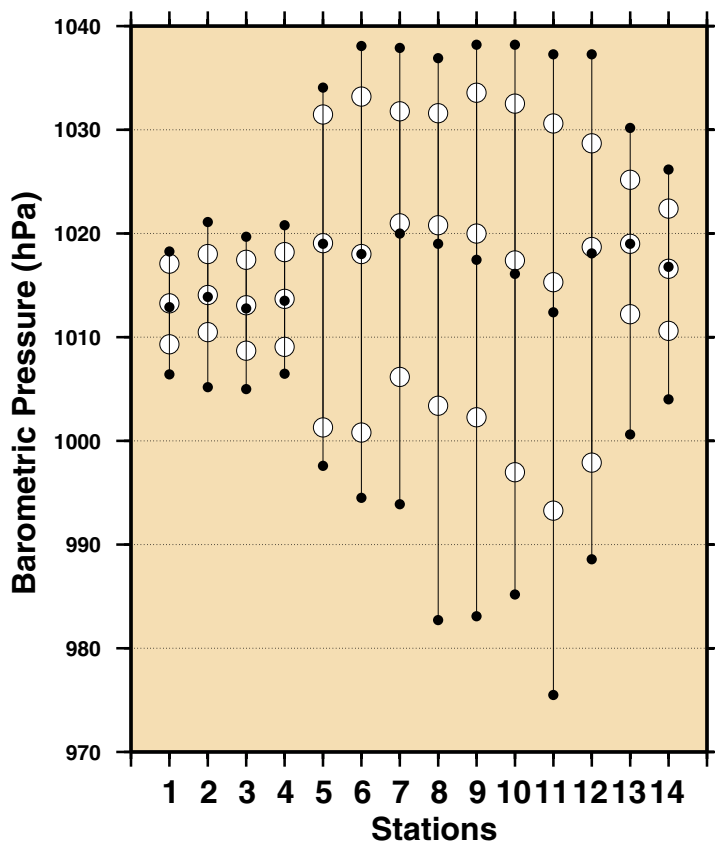
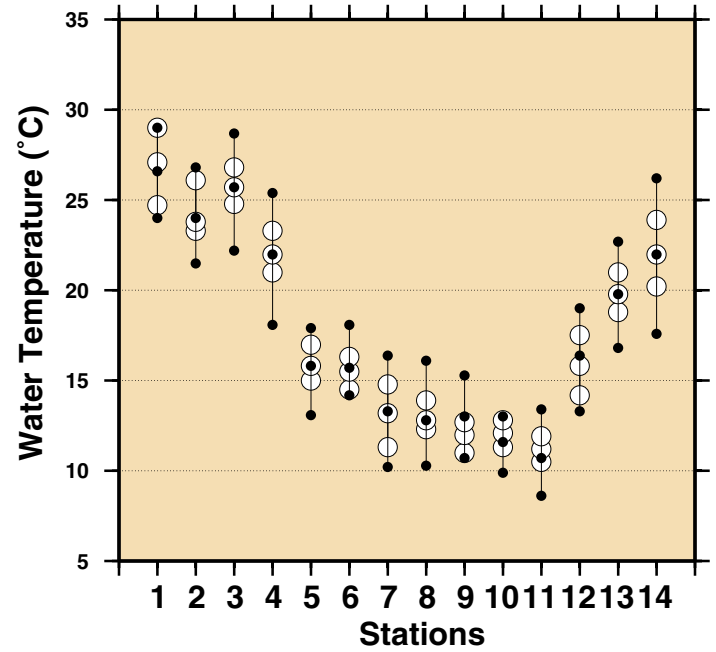
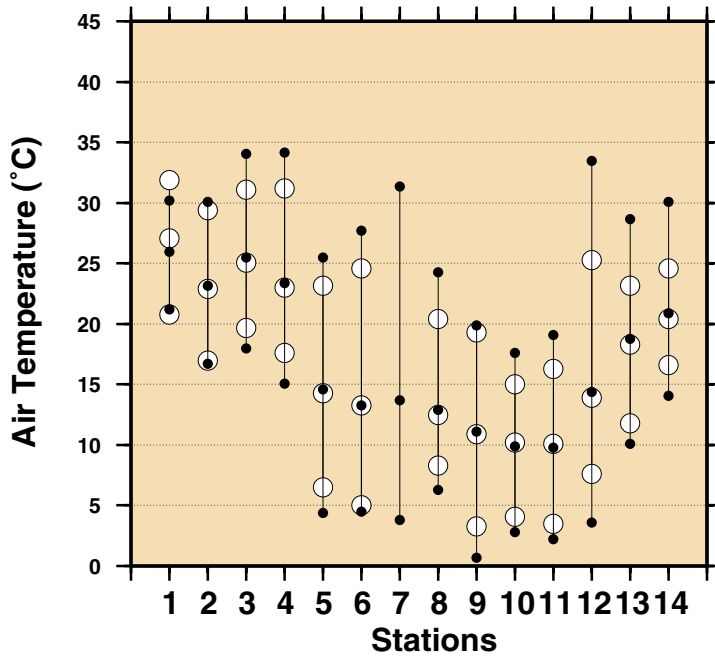


Figure 16

Comparison of August 2002 Max, Min & Mean with Long Term August 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

- August 2002 Maximum
- August 2002 Mean
- August 2002 Minimum
- Long Term August Maximum
- Long Term August Mean
- Long Term August Minimum

Figure 17

MONTHLY MEAN SEA LEVELS TO AUGUST 2002 (m)

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

