THE AUSTRALIAN BASELINE SEA LEVEL MONITORING PROJECT

MONTHLY DATA REPORT

OCTOBER 2000

NOTES ON THE DATA FOR OCTOBER 2000

Sea level data return this month was good for most stations, the exceptions being Darwin, Thevenard and Stony Point (Figures 1 and 15). Data is missing on the 19th October at Thevenard due to routine maintenance performed by NTF technicians. A new Aquatrak head and wind bird sensor was installed.

Data missing at Stony Point is attributed to maintenance carried out by contractors at the site to replace a damaged CPU board and cabling. We are hoping to recover some of the missing data from the Victorian Channels Authority.

The air temperature sensor and wind anemometer have been installed at Esperance, becoming operational from the 4th October.

At Portland, data from the backup water temperature sensor was used, as the data from the primary water temperature sensor appears to be erroneous.

Looking at the sea level anomalies this month (Figure 10) it can be seen that the majority of the stations exhibit positive anomalies (with the exceptions of Hillarys, which was slightly negative, Cape Ferguson and Rosslyn Bay, which were close to zero). The strongest anomalies were observed east of Thevenard, along the southern coastline of Australia.

The barometric pressure anomalies, presented in Figure 11, correlate well with the sea level anomalies this month. Strongly positive sea level anomalies correspond to strongly negative barometric pressure anomalies as would be expected.

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 4, 6 and 9) and may give the result of elevated sea level observations, as seen for Thevenard and Port Stanvac around October 13th. Residual heights attained during this event were under a metre.

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. Please 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. So although this can be used as a rough gauge in determining the quality of air temperature data, 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 temperatures at the Baseline stations.

The mean, maximum and minimum values for barometric pressure, air and water temperatures at each station for October 2000 are compared with the long-term October values. These comparisons are shown in Figure 16. Please remember that the long-term ranges are calculated using the historical sets of October data for each station ***excluding*** the current month of data.

The mean barometric pressures for October for all of the stations were in general slightly lower than the long term October means. Baseline record low barometric pressures were recorded at Darwin, Port Kembla and Rosslyn Bay this month.

A similar comparison was made between the long-term spread of October air temperature data and that which occurred this month. There are no significant differences between the long-term October mean and the October 2000 mean at each station. Figure 16 indicates that Baseline record high air temperatures were recorded at Esperance (34.0^{o}C) and Rosslyn Bay (31.1^{o}C) this month, whilst Baseline record low air temperatures were recorded at Darwin (21.6 ^{o}C) and at Spring Bay where it reached a chilly 2.9 ^{o}C.

The water temperature mean values for October 2000 were quite consistent with the long-term means for all locations (Figure 16). Record high water temperatures were recorded at Burnie and Spring Bay (15.9^{o}C and 15.7 ^{o}C respectively), and at Hillarys and Esperance (20.8 ^{o}C and 19.5 ^{o}C respectively) this month.

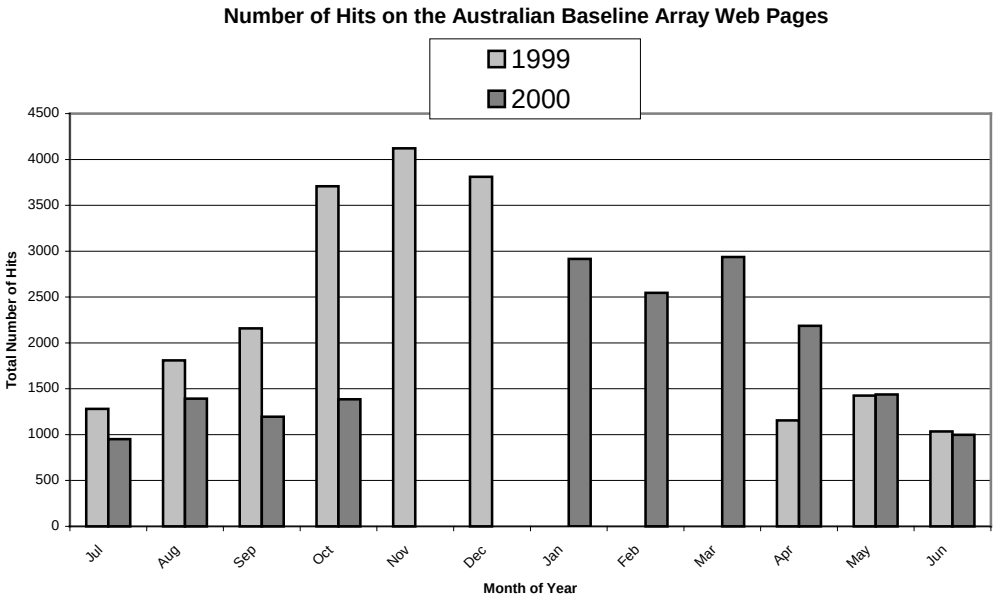
The month of commencement of operation of each gauge is listed in Table 1. Also shown is the short-term sea level trend for the entire record and the change from the previous month's analysis. Figure 14 shows the short-term sea level trends for each station.

Table 1: Installation dates and short-term sea level trends for the Baseline array.

Station	Installation Date	Sea Level Trend (mm/yr)	Change from previous month
Cocos Islands	Sep 1992	+9.2	+0.4
Groote Eylandt	Sep 1993	+34.3	+0.3
Darwin	May 1990	+19.2	+0.2
Broome	Nov 1991	+27.7	+0.2
Hillarys	Nov 1991	+23.2	–0.2
Esperance	Mar 1992	+16.2	+0.1
Thevenard	Mar 1992	+11.5	+0.2
Port Stanvac	Jun 1992	+10.2	+0.3
Portland	Jul 1991	+5.4	+0.2
Lorne	Jan 1993	+4.5	+0.3
Stony Point	Jan 1993	+4.9	+0.3
Burnie	Sep 1992	+5.9	+0.1
Spring Bay	May 1991	+4.0	+0.1
Port Kembla	Jul 1991	+4.0	+0.4
Rosslyn Bay	Jun 1992	+8.9	+0.1
Cape Ferguson	Sep 1991	+10.7	+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.

The following chart shows the number of hits on the Australian Baseline project web pages over 1999 and 2000.



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.

Contact address: NTF Australia
The Flinders University of South Australia
GPO BOX 2100, Adelaide SA 5001
Tel: [+61 8] 8201 7534
Fax: [+61 8] 8201 7523
Email: ntf@flinders.edu.au
Website: http://www.ntf.flinders.edu.au

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.

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

OCTOBER 2000
SIX MINUTE OBSERVATIONS FROM SEAFRAME STATIONS (m)

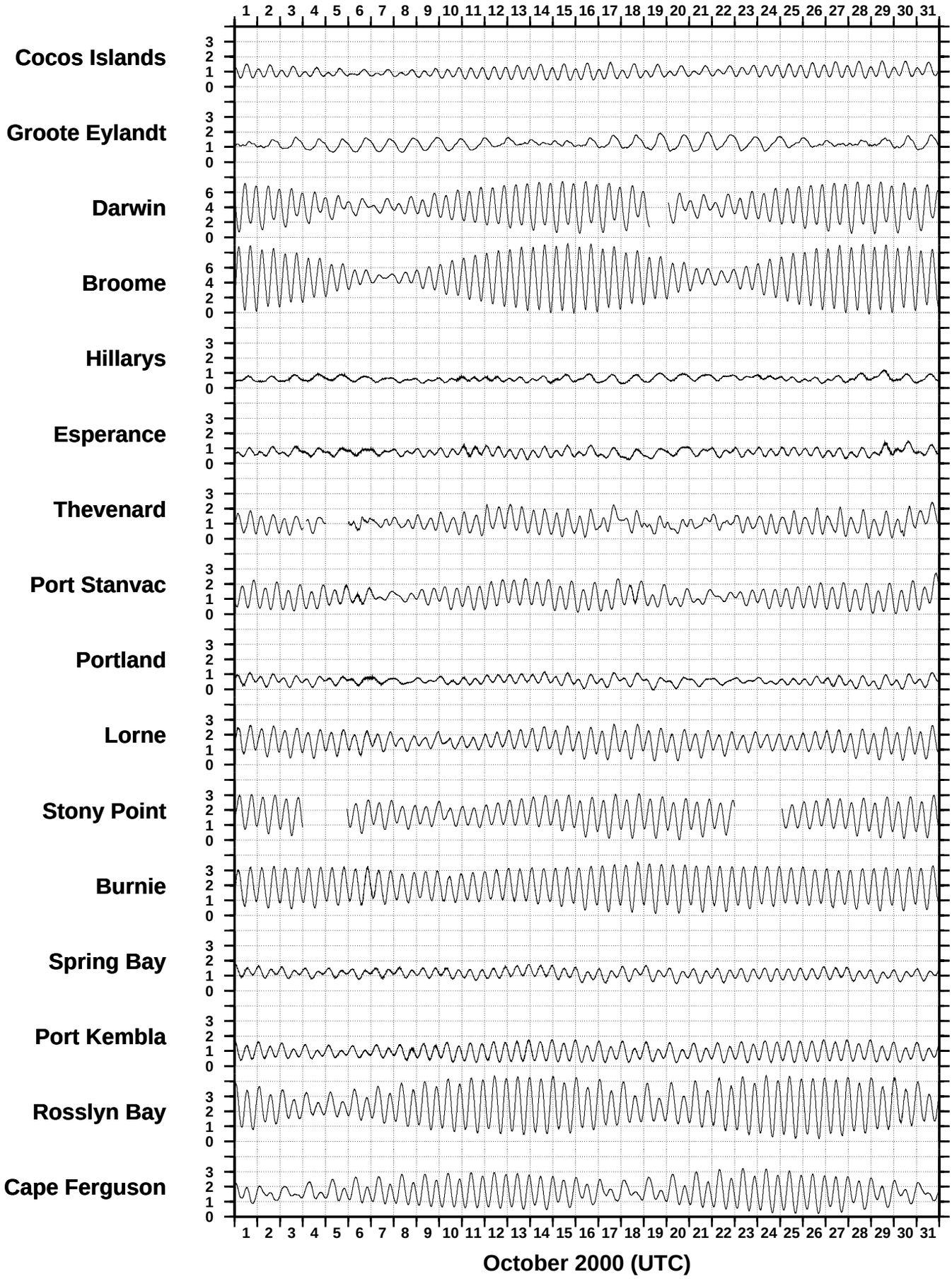


Figure 2

OCTOBER 2000
RESIDUALS AT SIX MINUTE INTERVALS FROM SEAFRAME STATIONS (m)

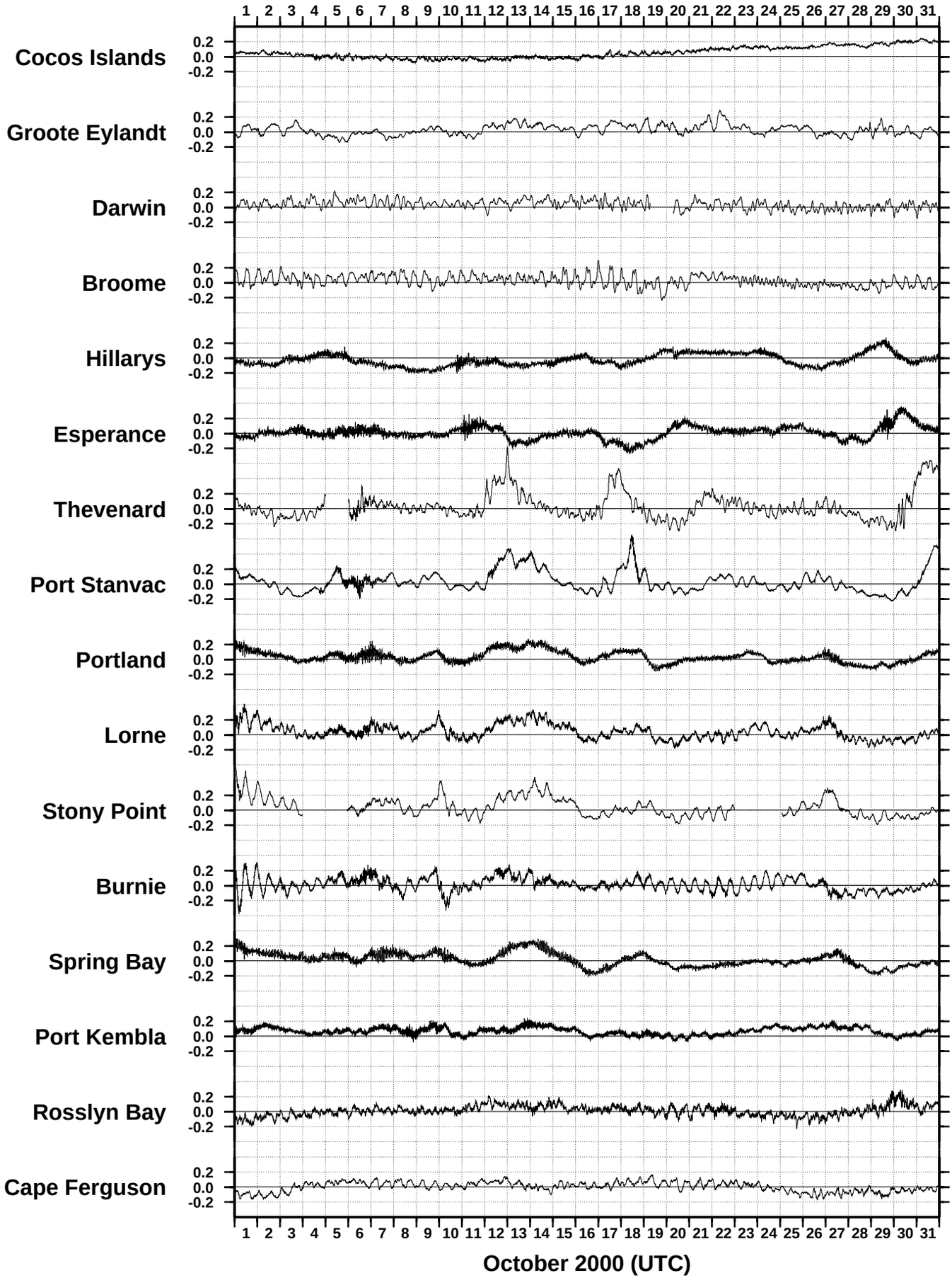


Figure 3

OCTOBER 2000
RESIDUALS AT SIX MINUTE INTERVALS FROM SEAFRAME STATIONS (m)
ADJUSTED FOR ATMOSPHERIC PRESSURE

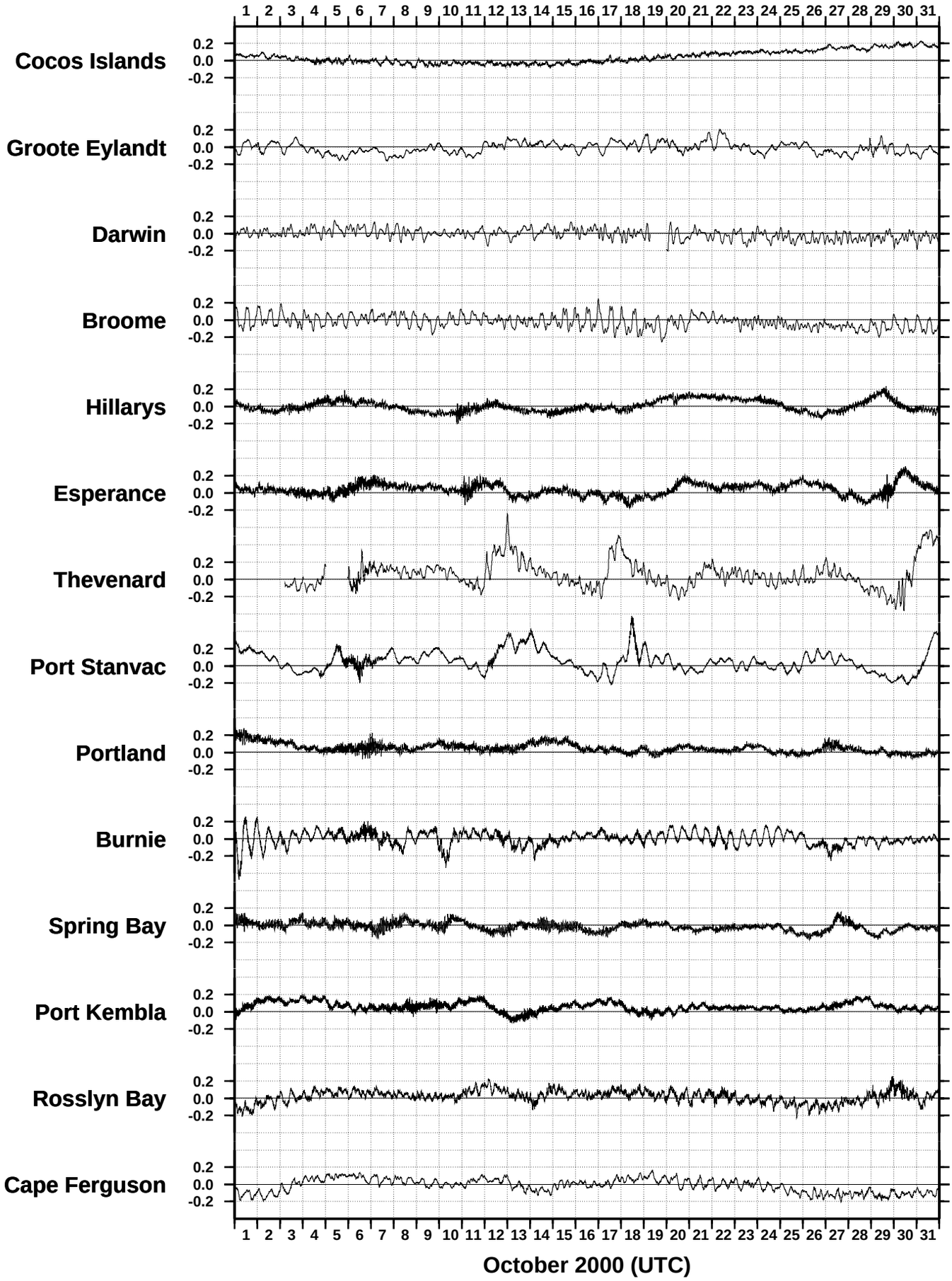


Figure 4

OCTOBER 2000
HOURLY WIND SPEEDS FROM SEAFRAME STATIONS (m/s)

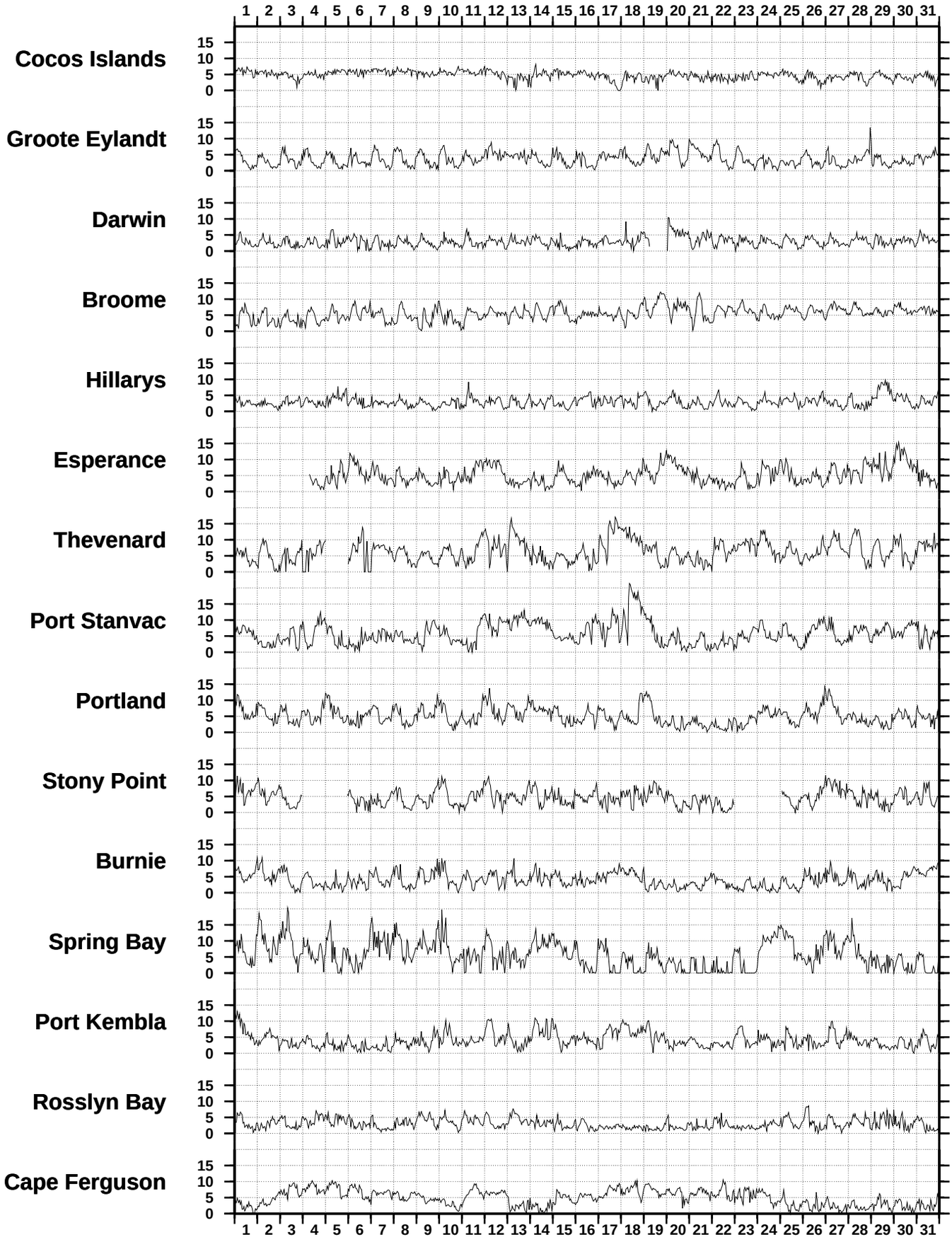


Figure 5

OCTOBER 2000
HOURLY INCIDENT WINDS FROM SEAFRAME STATIONS (m/s, deg True)

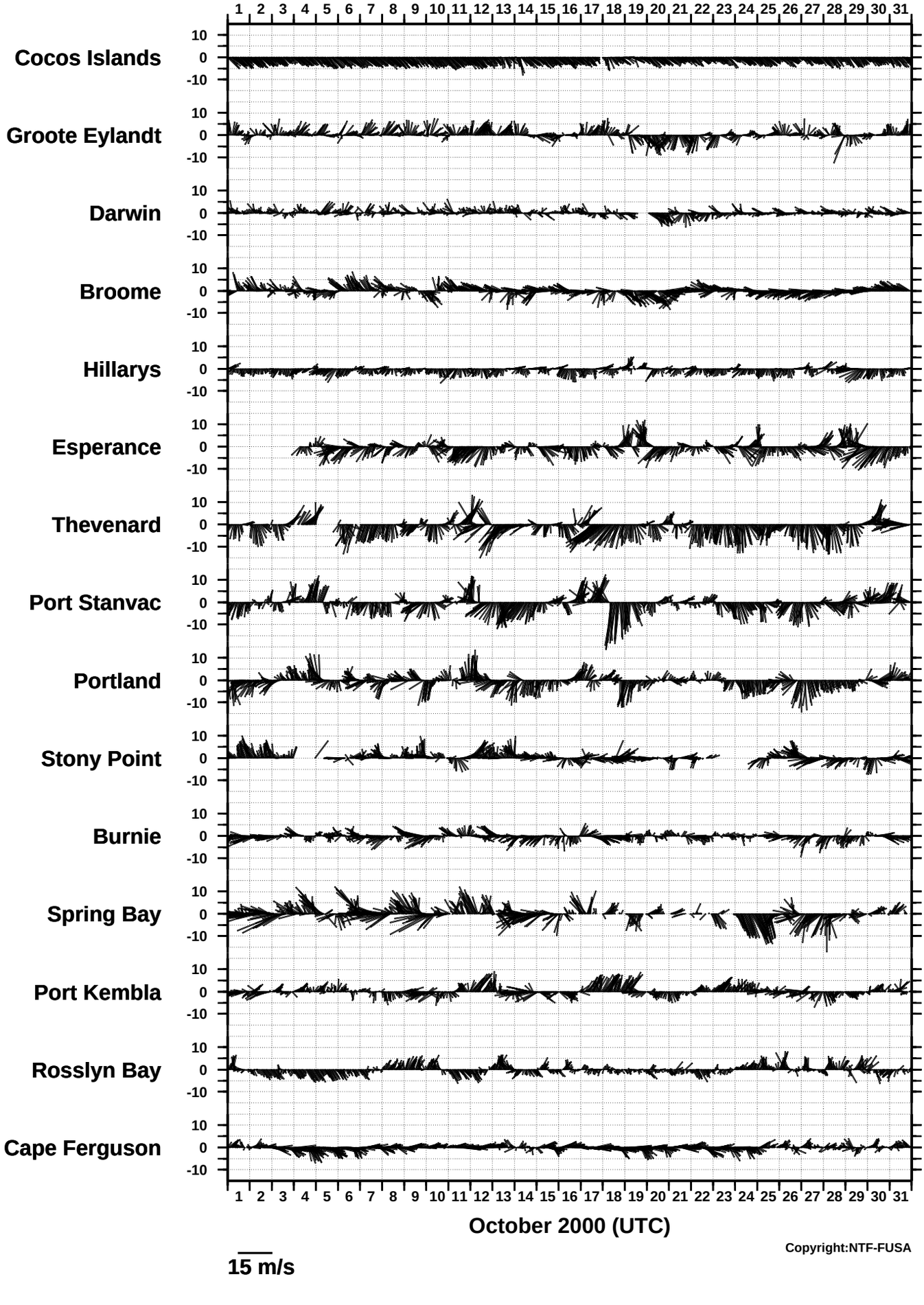


Figure 6

OCTOBER 2000
HOURLY MAXIMUM WIND GUSTS FROM SEAFRAME STATIONS (m/s)

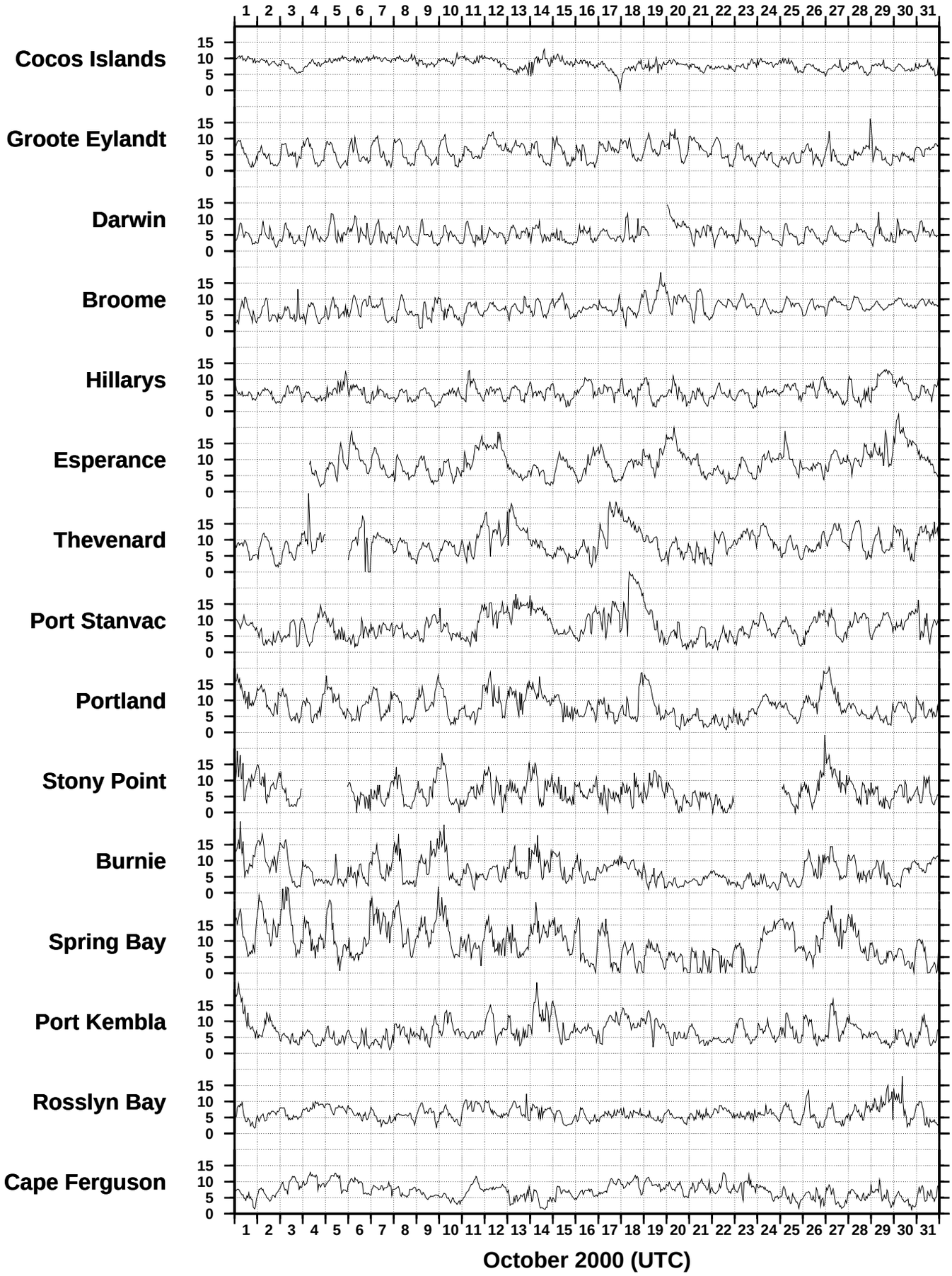


Figure 7

OCTOBER 2000
HOURLY AIR TEMPERATURES FROM SEAFRAME STATIONS (deg C)

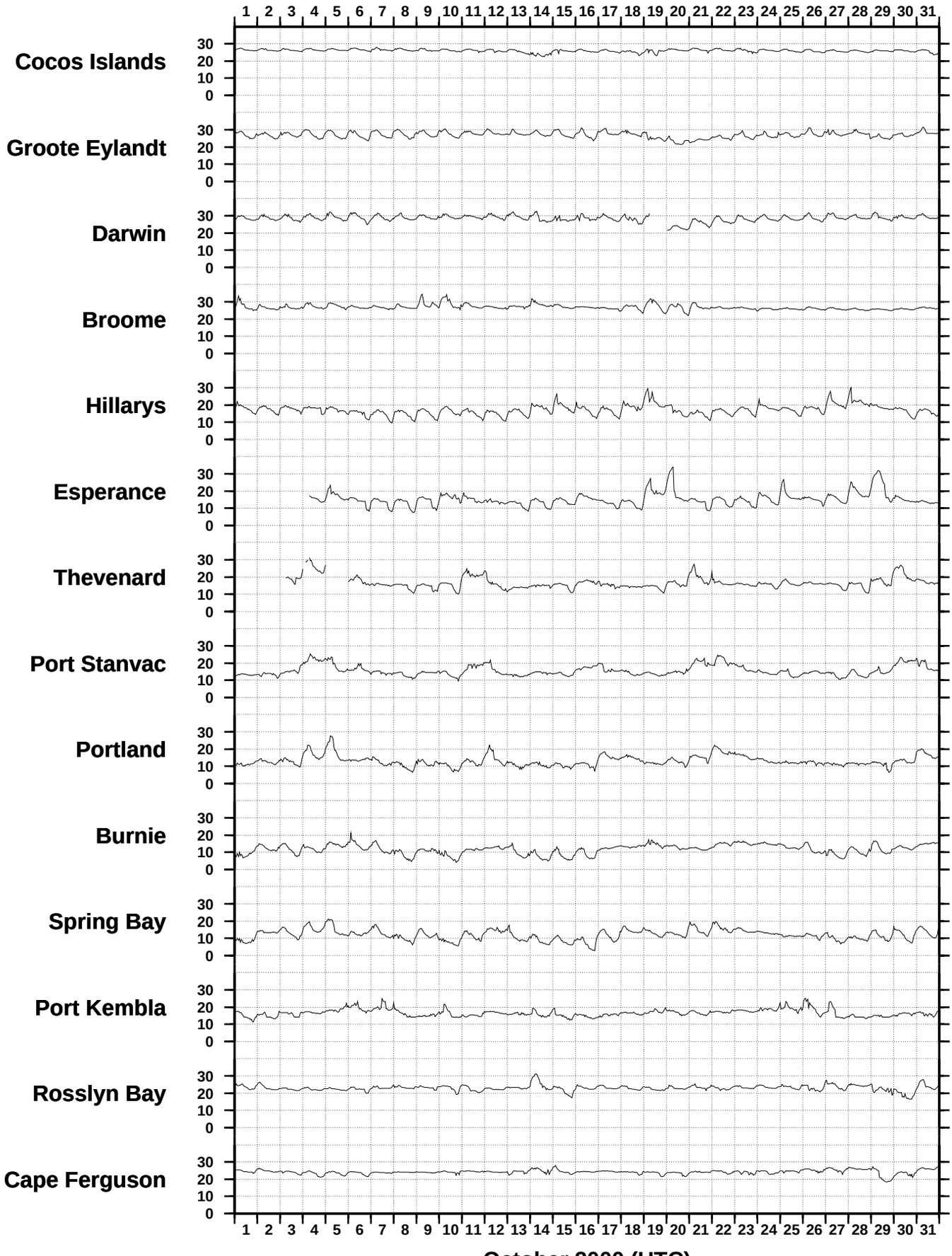


Figure 8

OCTOBER 2000
HOURLY WATER TEMPERATURES FROM SEAFRAME STATIONS (deg C)

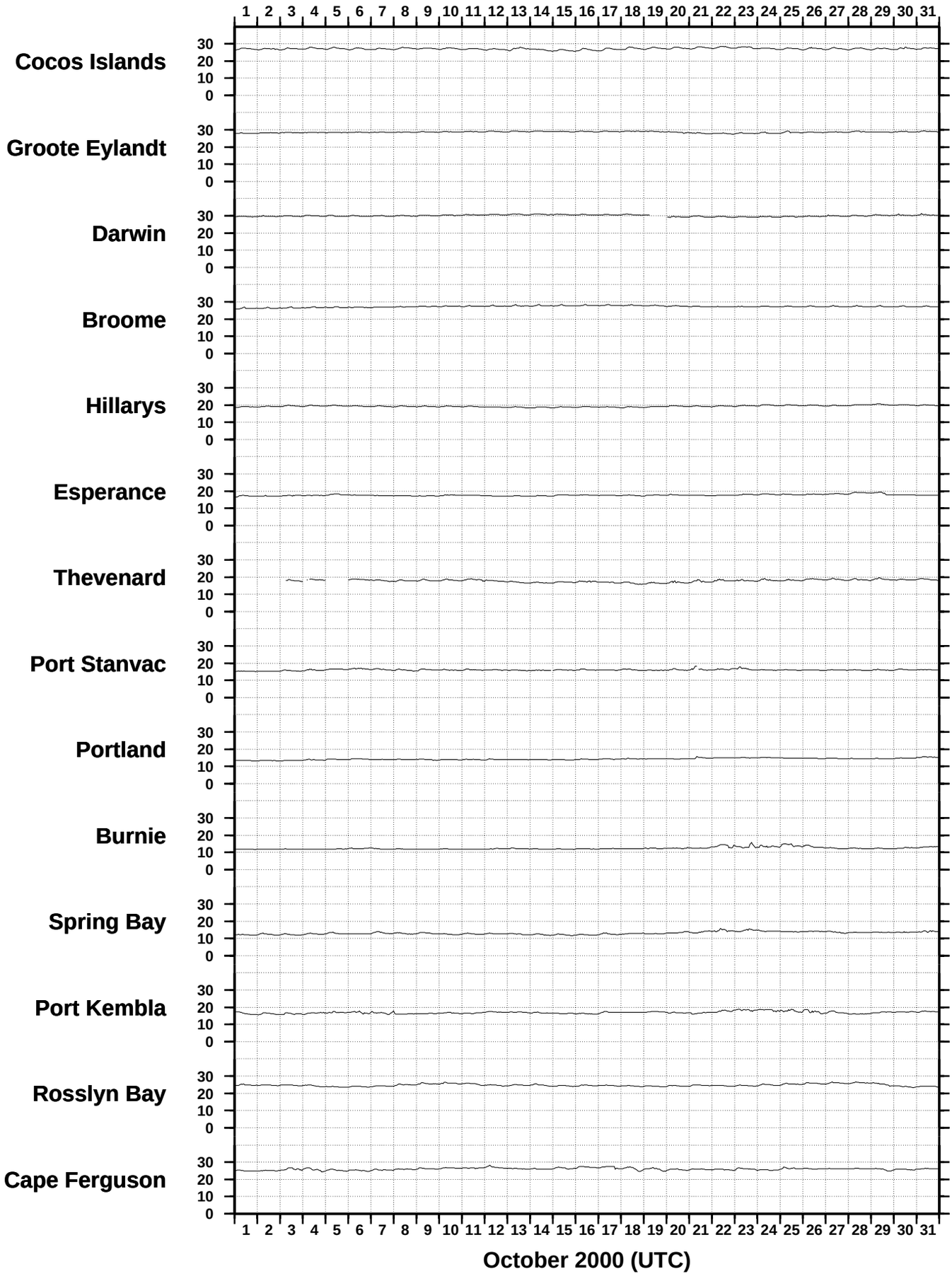


Figure 9

OCTOBER 2000
HOURLY ATMOSPHERIC PRESSURE FROM SEAFRAME STATIONS (hPa)

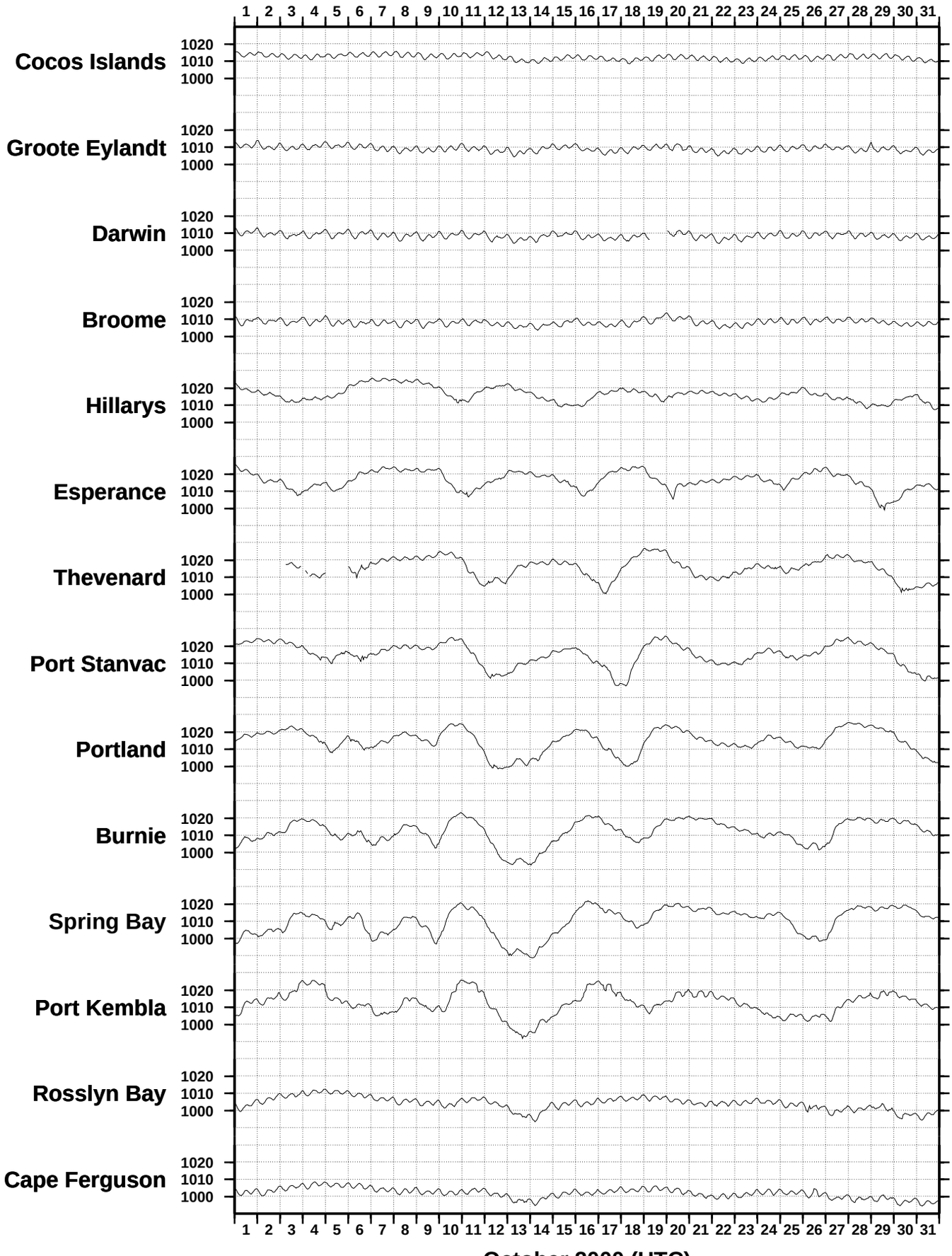


Figure 10

SEA LEVEL ANOMALIES THROUGH OCTOBER 2000 (m)

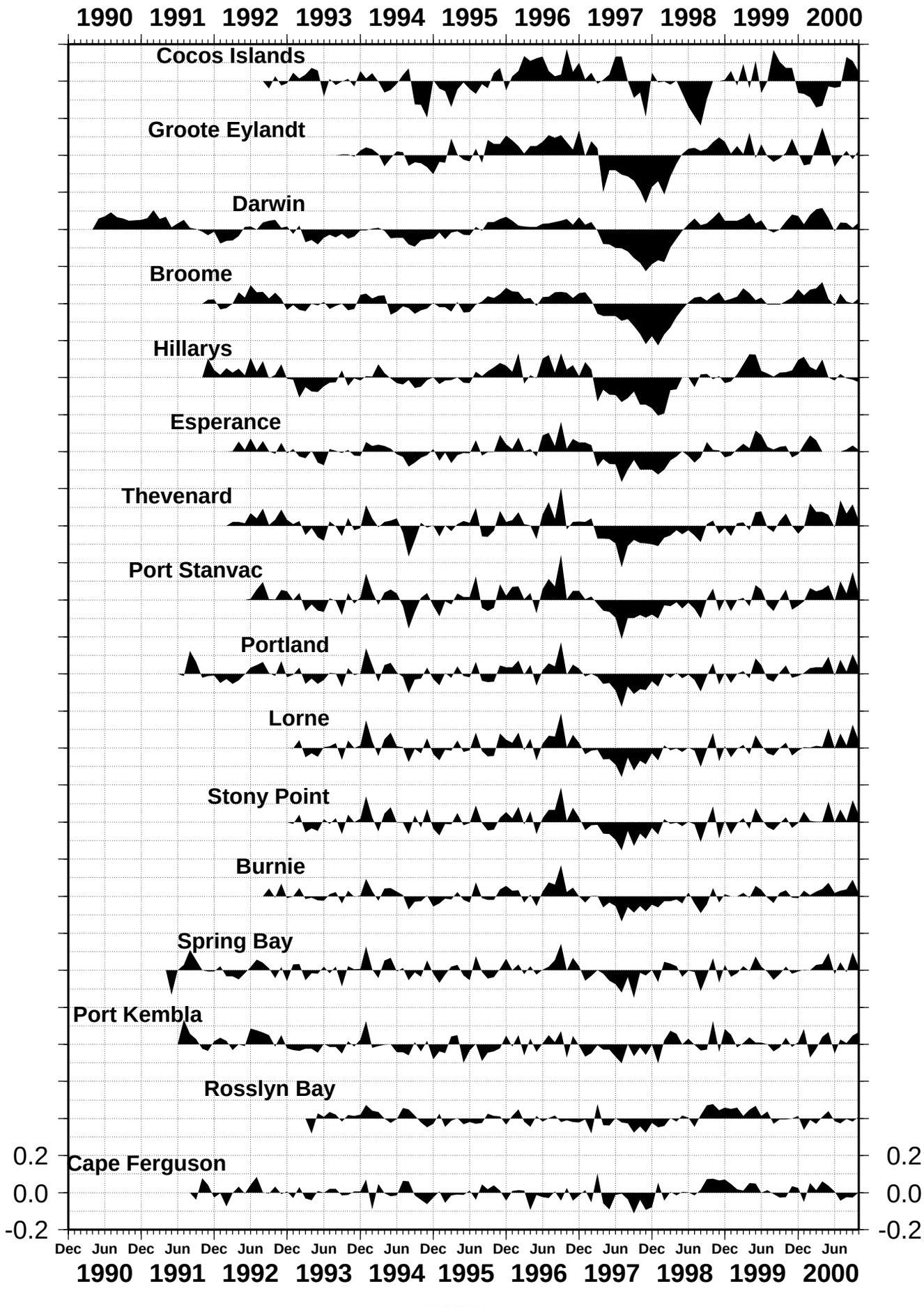


Figure 11

BAROMETRIC PRESSURE ANOMALIES THROUGH OCTOBER 2000 (hPa)

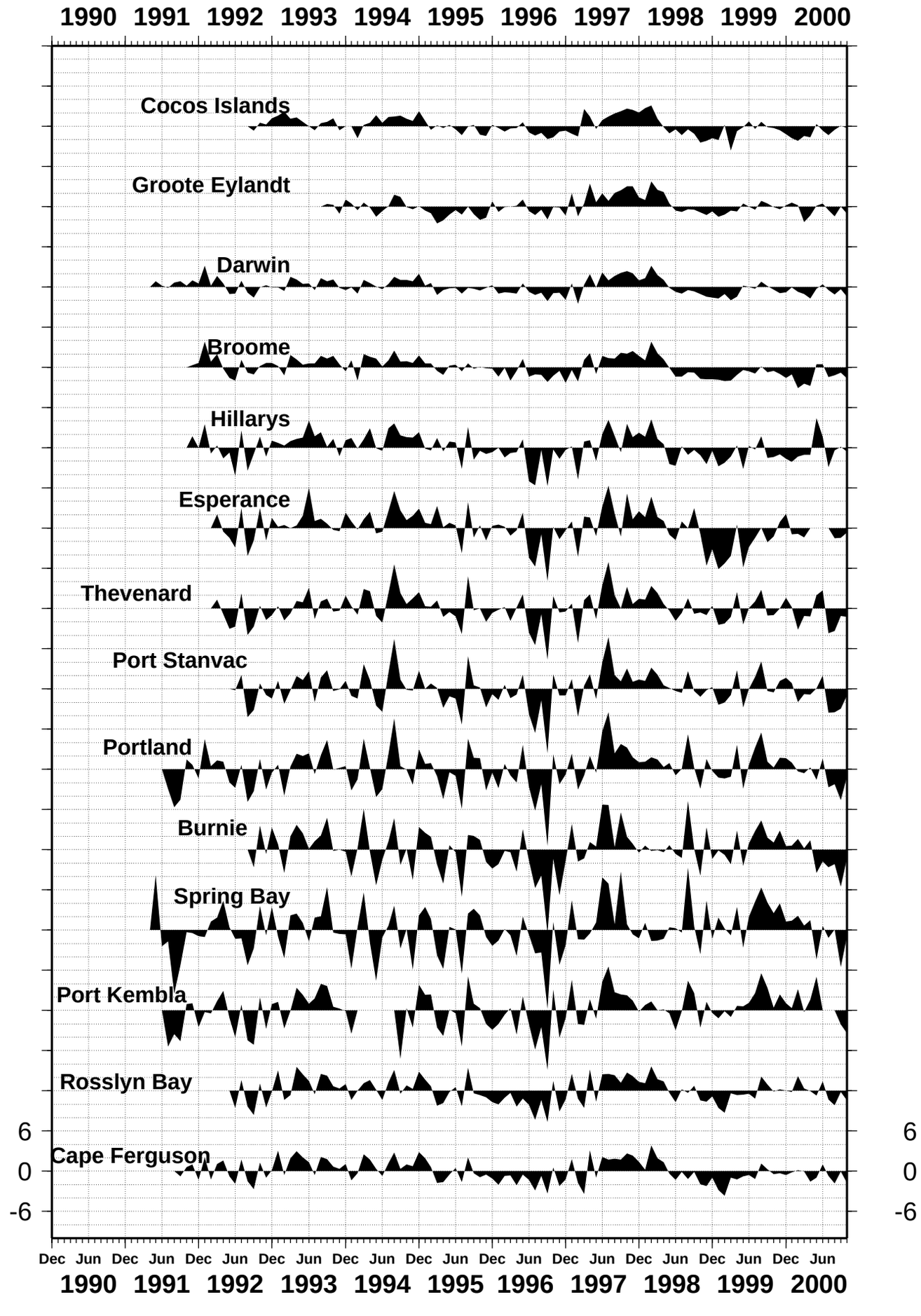


Figure 12

WATER TEMPERATURE ANOMALIES THROUGH OCTOBER 2000 (degC)

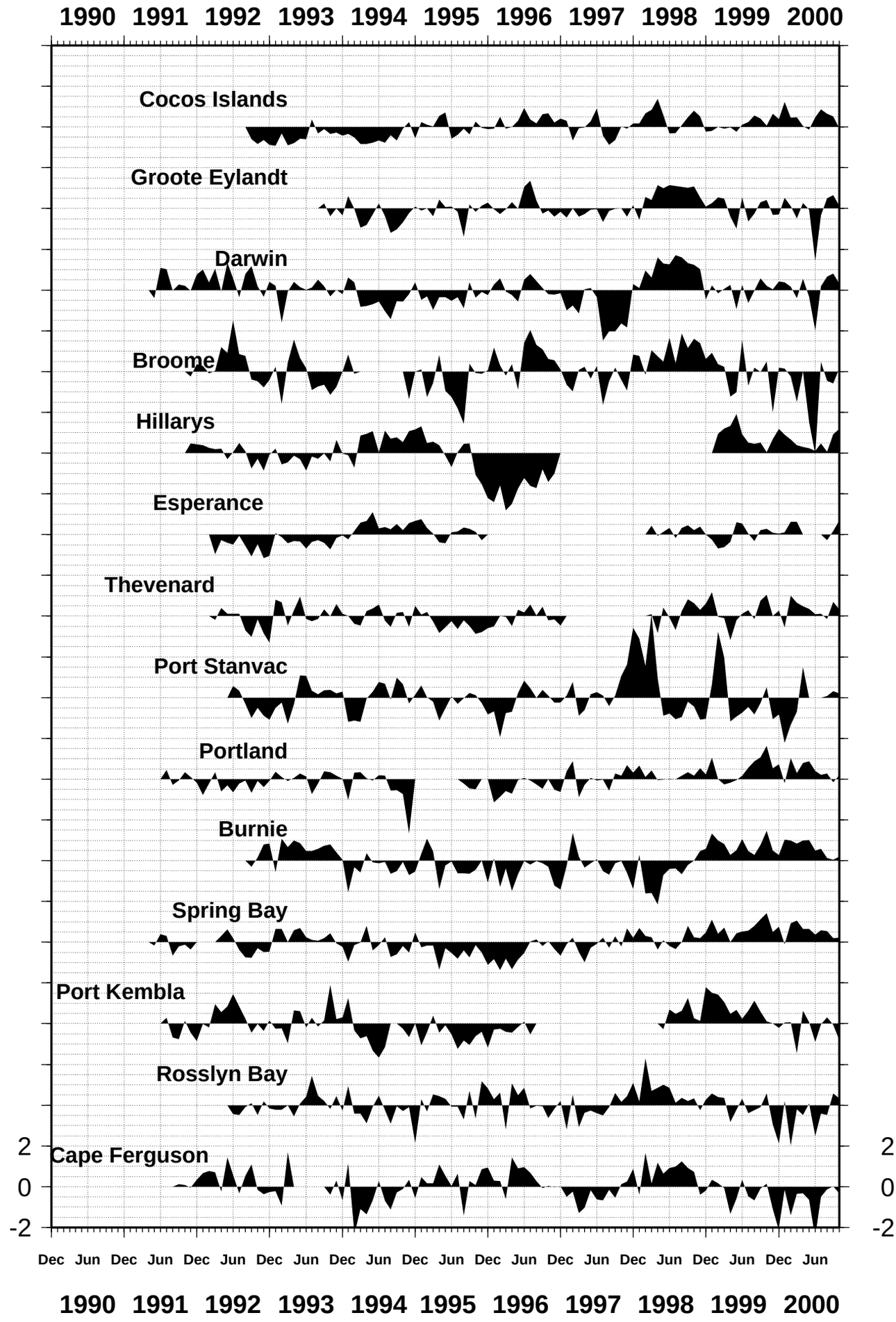


Figure 13

AIR TEMPERATURE ANOMALIES THROUGH OCTOBER 2000 (degC)

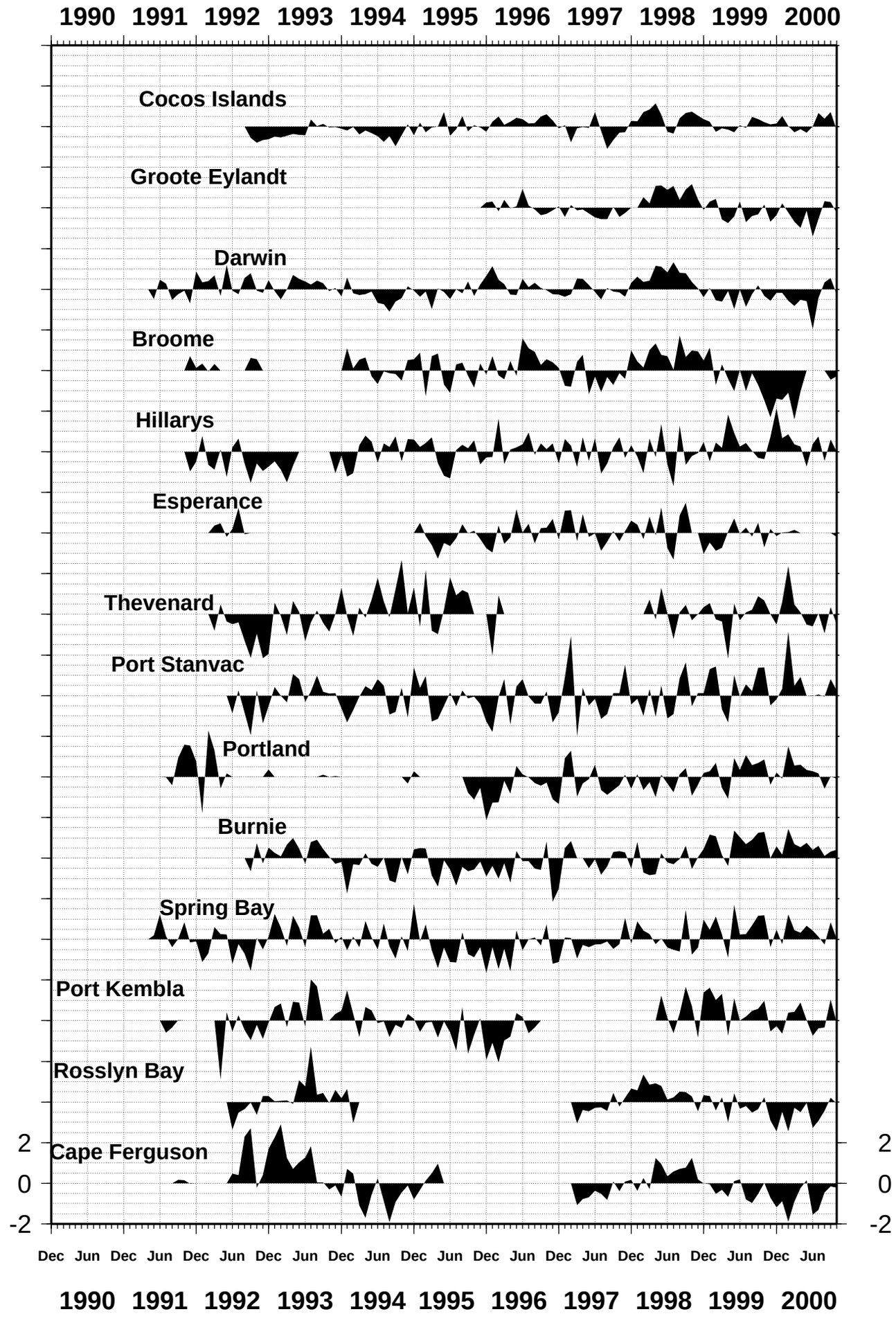


Figure 14

SEA LEVEL TRENDS THROUGH OCTOBER 2000 (mm/year)

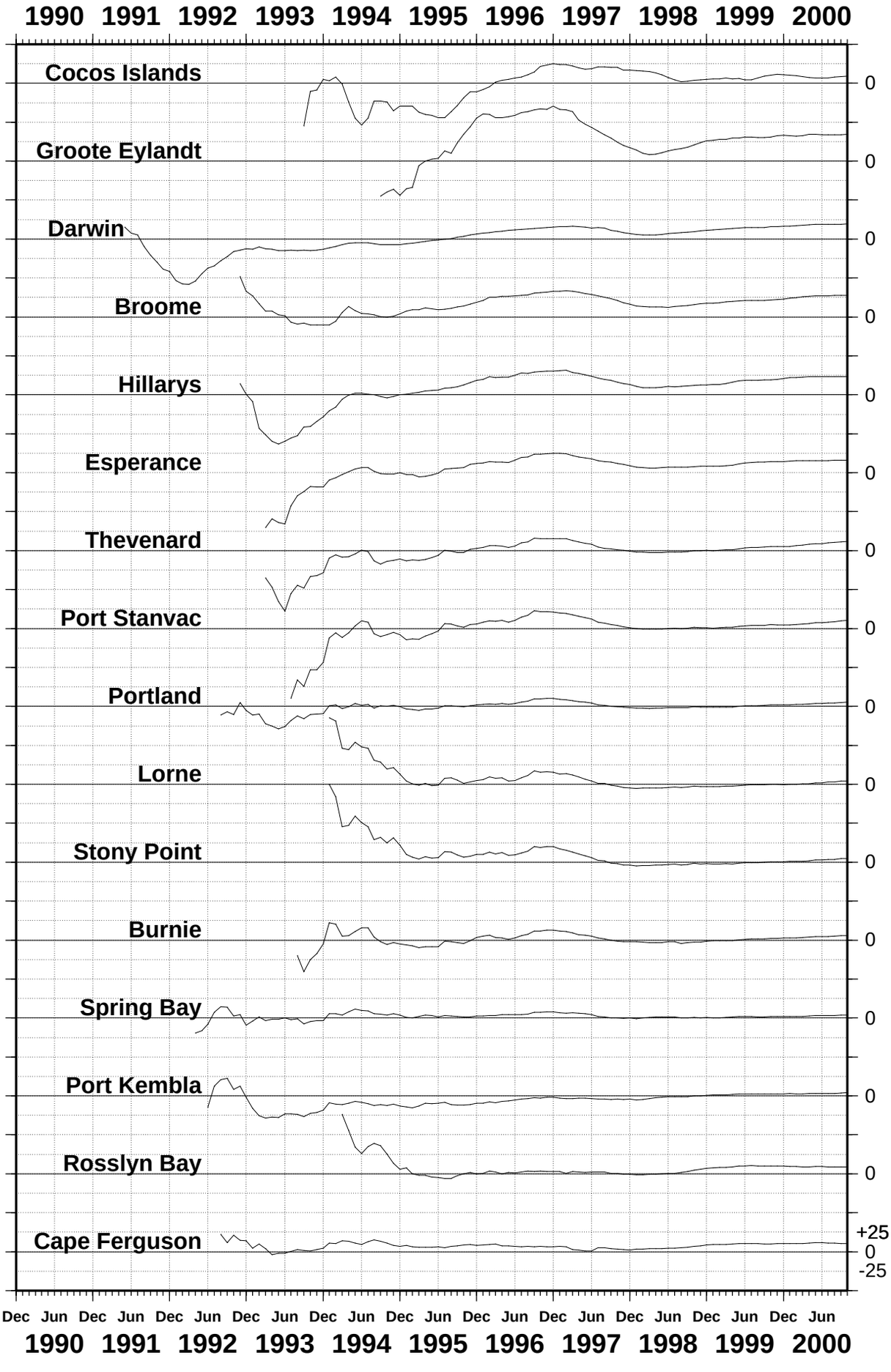


Figure 15

SEA LEVEL DATA RETURN

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

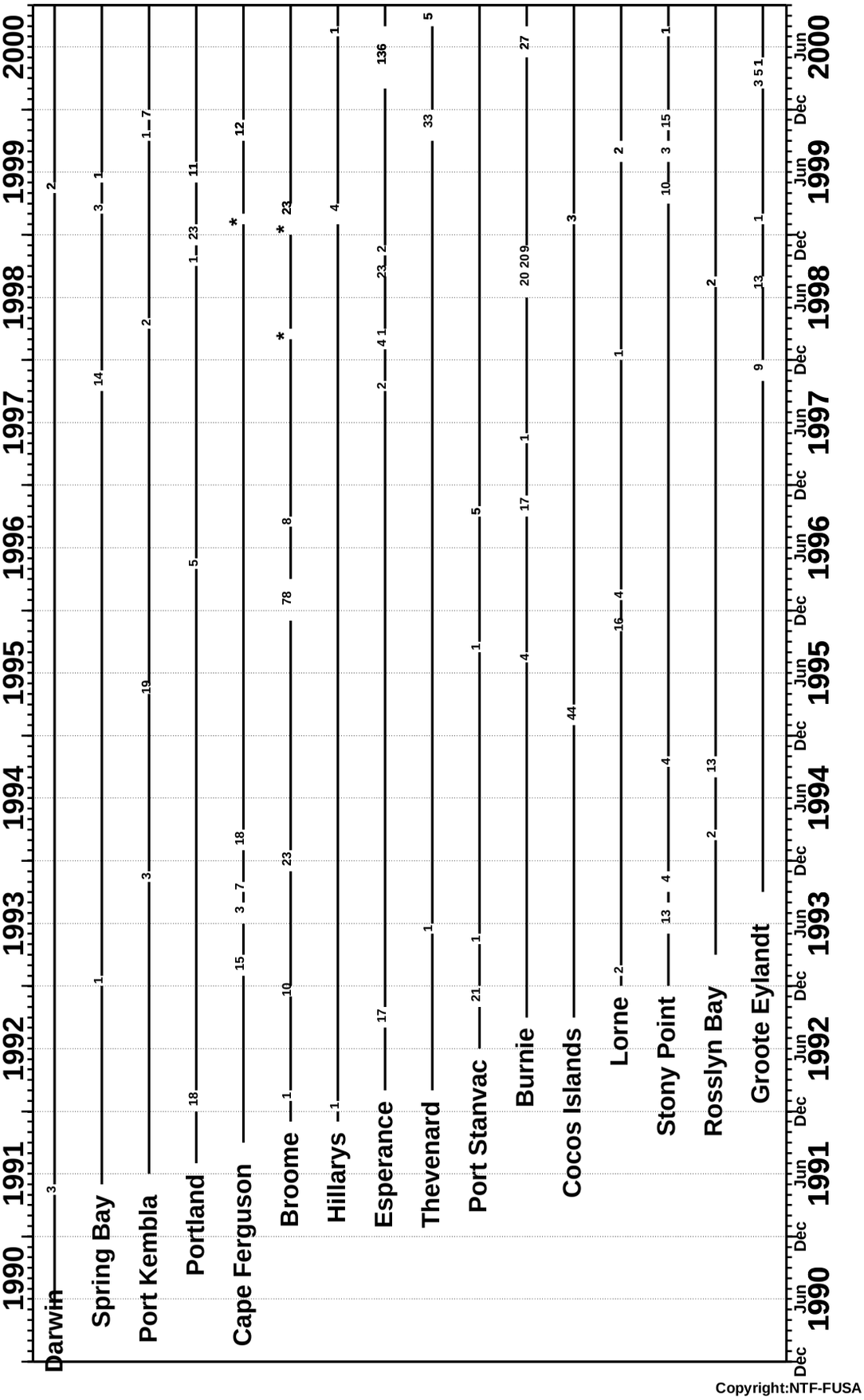
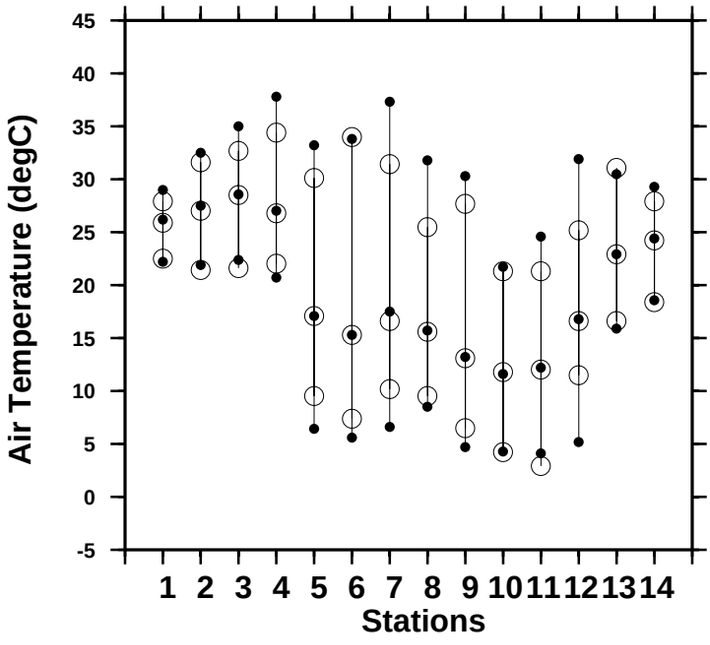
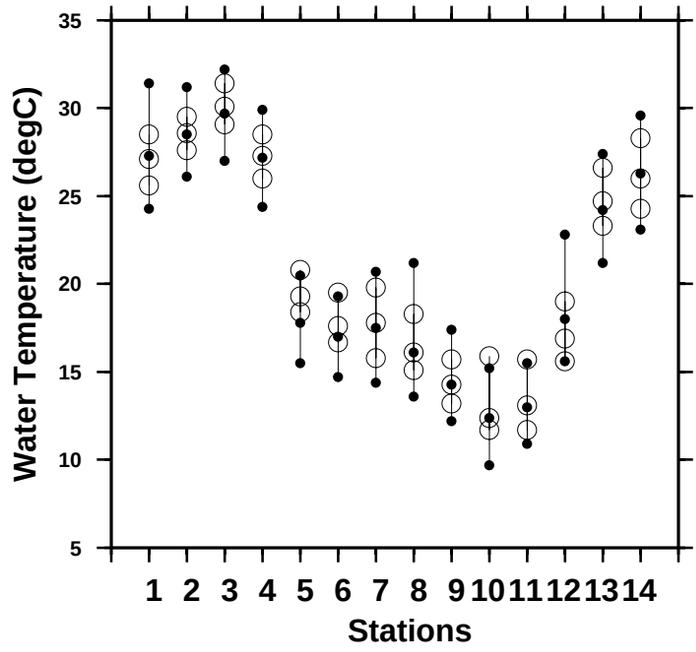
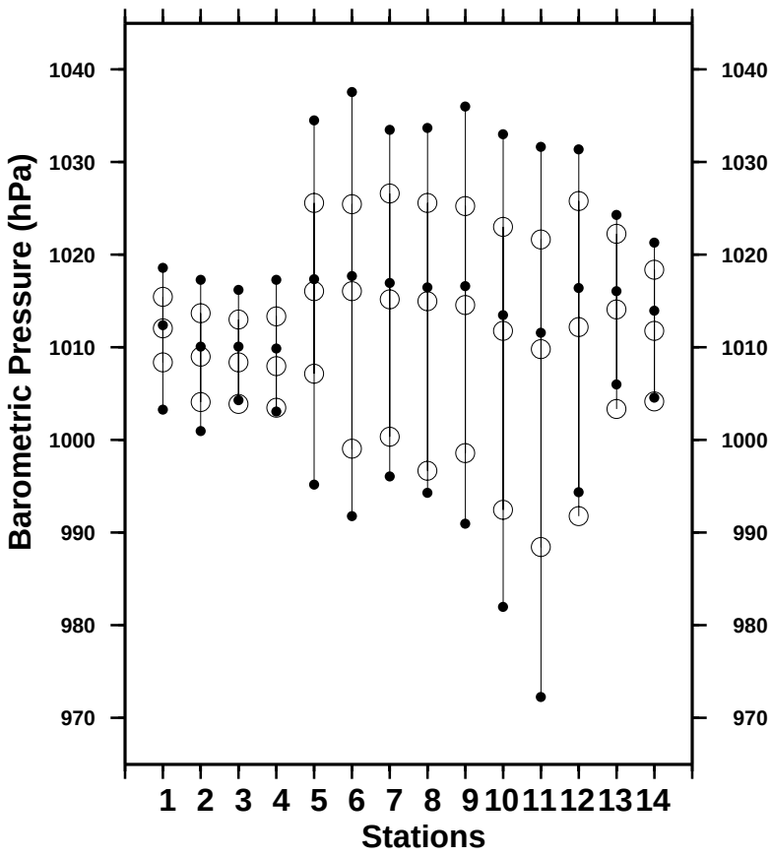


Figure 16

Comparison of October 2000 Max, Min & Mean with Long Term October 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

October 2000 Maximum
October 2000 Mean
October 2000 Minimum

Long Term October Maximum
Long Term October Mean
Long Term October Minimum

Figure 17

MONTHLY MEAN SEA LEVELS TO OCTOBER 2000 (m)

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