THE AUSTRALIAN BASELINE SEA LEVEL MONITORING PROJECT

MONTHLY DATA REPORT

AUGUST 2000

NOTES ON THE DATA FOR AUGUST 2000

Sea level data return this month was good for most stations, the exceptions being Hillarys, Esperance, Stony Point and Burnie (Figures 1 and 15). One day of data is missing at Hillarys due to a routine maintenance visit carried out by the NTF technicians. A new water temperature probe was installed and the bearings replaced on the anemometer. Backup sea level and water temperature sensors were installed.

The harbour works at Esperance have finally reached a point where the gauge could be reconnected. Consequently only 2 days of data have been lost from Esperance this month. Unfortunately, the air temperature sensor and wind anemometer at this site cannot be installed until some more gantry is put into place. This should be done within two to three weeks.

At Stony Point we are missing 1 day of data this month due to technical problems at the site. At Burnie the primary sea level sensor ceased operation on the 19th July. The NTF technicians visited the site and found that the calibration tube had been broken just below the Aquatrak head. The problem was rectified and the gauge recommenced recording sea level data from the 11th August.

At both Broome and Portland this month, data from the backup water temperature sensors were used, as the data from the primary water temperature sensors were erroneous. The NTF technicians also visited Port Stanvac this month. They replaced the water temperature sensor and installed a backup sea level sensor.

As noted last month, the barometric pressure is still not being recorded at Port Kembla due to a malfunctioning circuit board at the site that rendered the sensor inoperable. Also, the failure of the air temperature sensor at Broome due to damage sustained during Tropical Cyclone Rosita, which struck in April, has resulted in the loss of air temperature data for August.

Looking at the sea level anomalies this month (Figure 10) it can be seen that the anomalies for Cape Ferguson and Rosslyn Bay were slightly negative, whilst the anomalies for the remaining Australian stations (with the exceptions of Hillarys and Spring Bay) and Cocos Islands were positive. Stations along the south eastern coastline of Australia exhibited the strongest positive anomalies. The anomalies at Hillarys and Spring Bay were close to zero.

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 August 22nd. Residual heights attained during this event were approximately one 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 was 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.

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 monitoring the water and air temperatures at the Baseline stations with regard to quality control.

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

The mean barometric pressures for August for some of the southern stations (stations 5 to 10) were in general lower than the long term August means. All other stations exhibited a consistent relationship between the August mean and the long term mean.

A similar comparison was made between the long-term spread of August air temperature data and that which occurred this month. There are no significant differences between the long-term August mean and the August 2000 mean at each station. Figure 16 indicates that record high air temperatures were recorded at Cocos Islands (30.2^{o}C) and Darwin (34.1^{o}C) this month over the length of the Baseline data set.

The water temperature mean values for August 2000 were quite consistent with the long-term means for all locations (Figure 16).

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	+7.8	+1.2
Groote Eylandt	Sep 1993	+34.1	+0.3
Darwin	May 1990	+19.0	+0.2
Broome	Nov 1991	+27.5	+0.3
Hillarys	Nov 1991	+23.5	+0.0
Esperance	Mar 1992	+15.9	+0.1
Thevenard	Mar 1992	+10.5	+0.6
Port Stanvac	Jun 1992	+8.7	+0.4
Portland	Jul 1991	+4.4	+0.1
Lorne	Jan 1993	+3.1	+0.2
Stony Point	Jan 1993	+3.6	+0.1
Burnie	Sep 1992	+5.0	+0.3
Spring Bay	May 1991	+3.3	+0.0
Port Kembla	Jul 1991	+3.3	+0.1
Rosslyn Bay	Jun 1992	+9.0	+0.0
Cape Ferguson	Sep 1991	+10.9	–0.2

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.

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 the National Tidal Facility (NTF) for Environment Australia. Staff members of the NTF produce the text, plots and tables.

Further information on the *Monthly Data Report* and other projects conducted by the NTF 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 the *National Tidal Facility* 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 the National Tidal Facility. Some handling fees may be charged. For commercial agencies requesting data, some additional costs may be levied.

Figure 1

AUGUST 2000
SIX MINUTE OBSERVATIONS FROM SEAFRAME STATIONS (m)

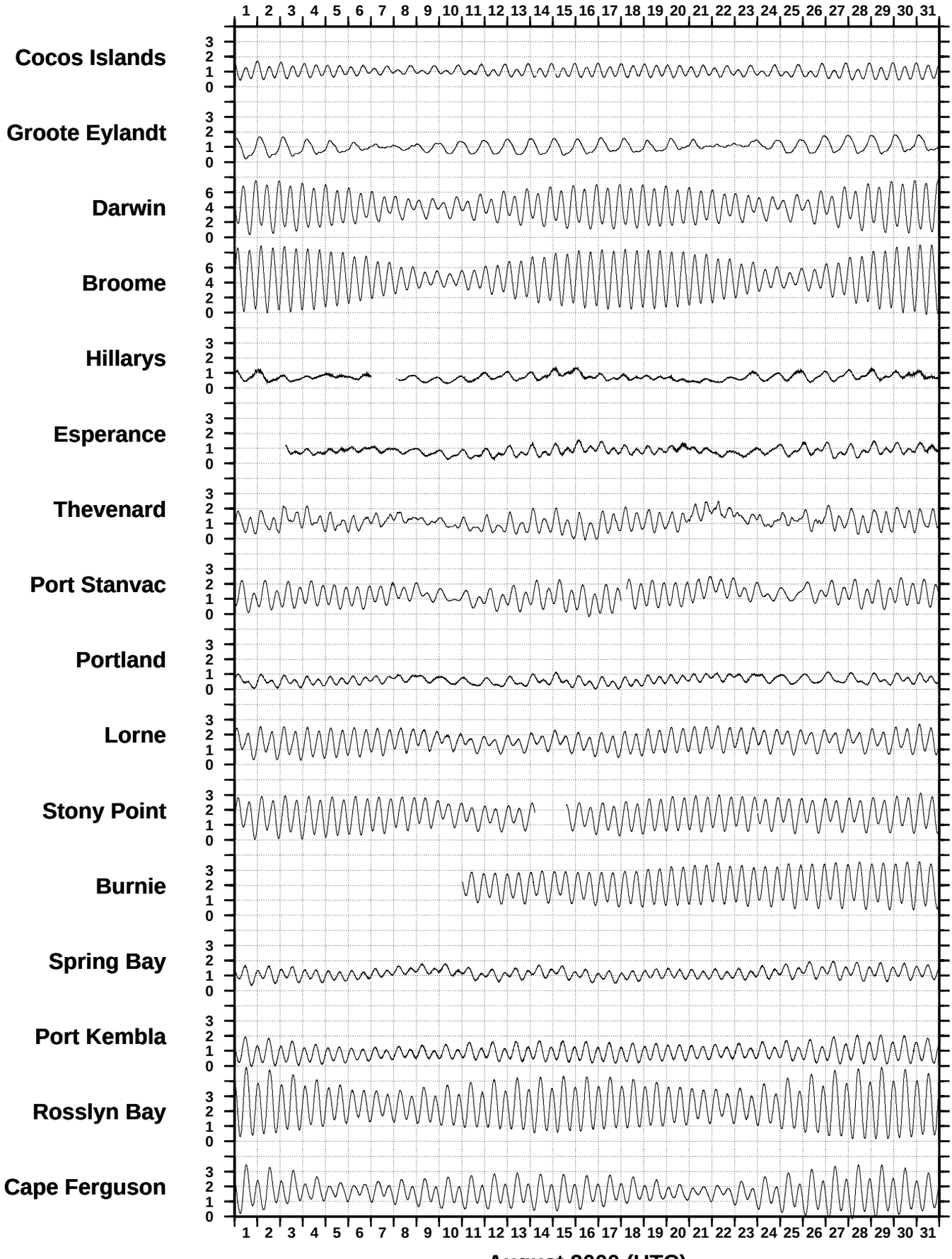


Figure 2

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

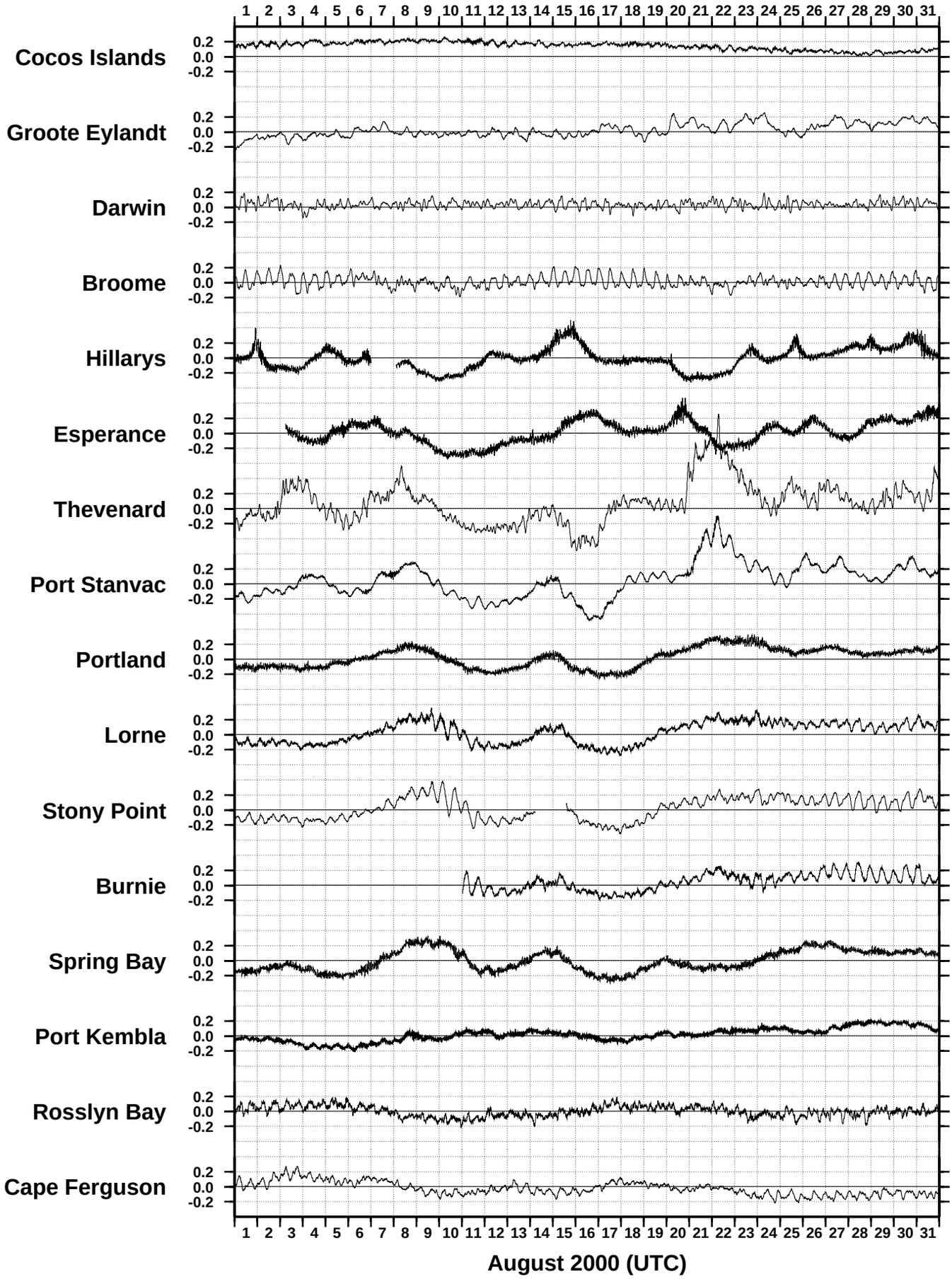


Figure 3

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

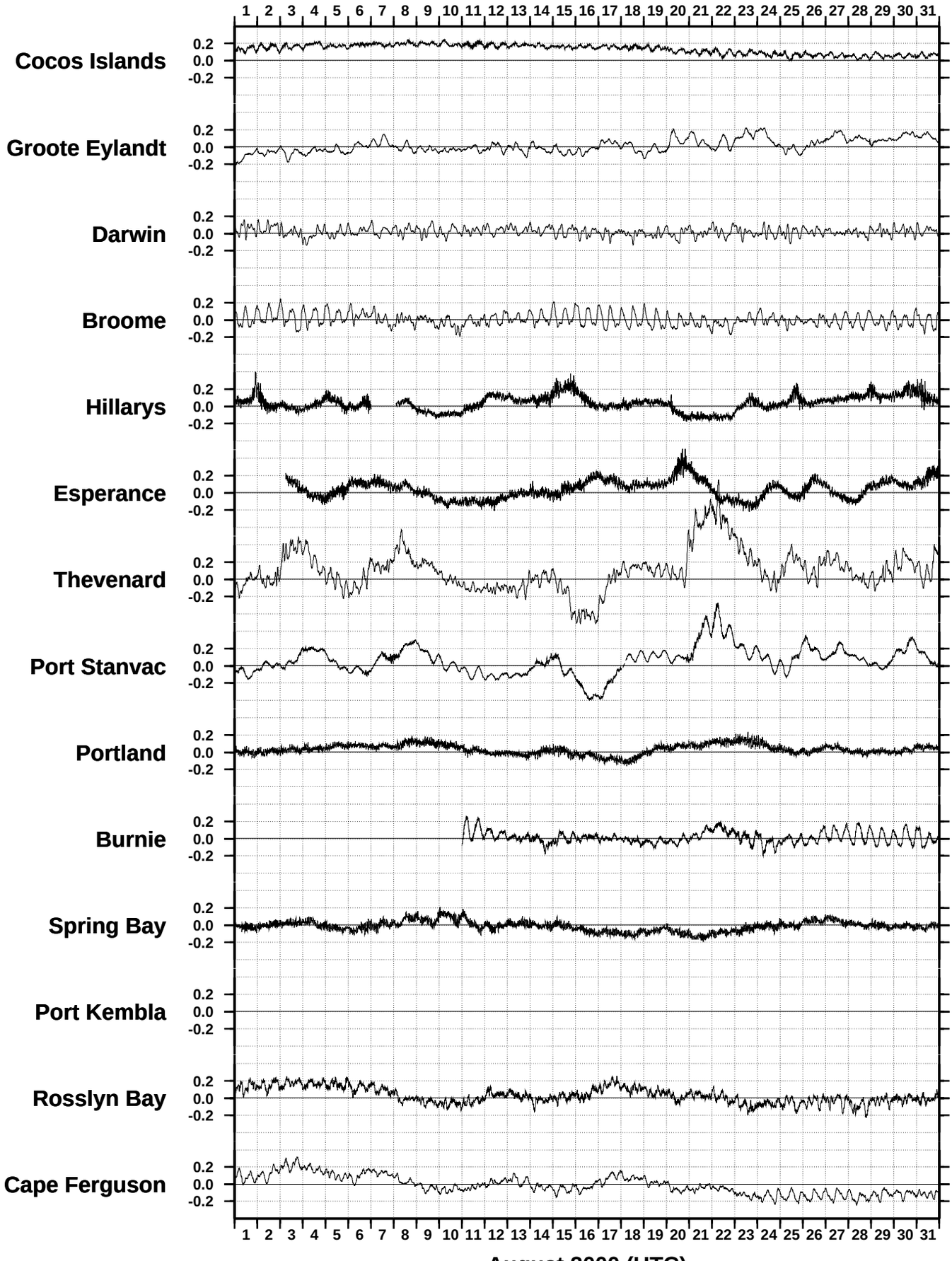


Figure 4

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

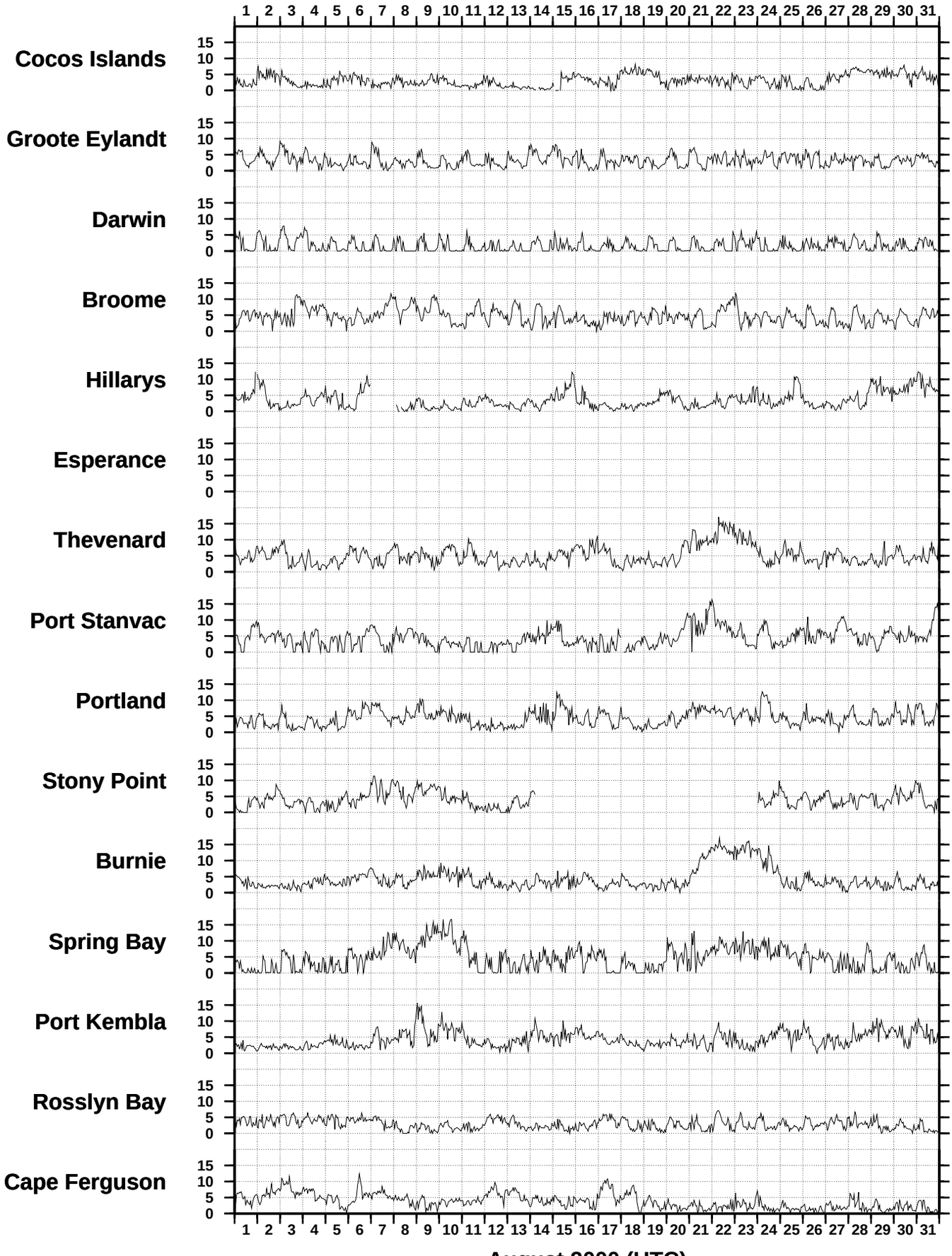


Figure 5

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

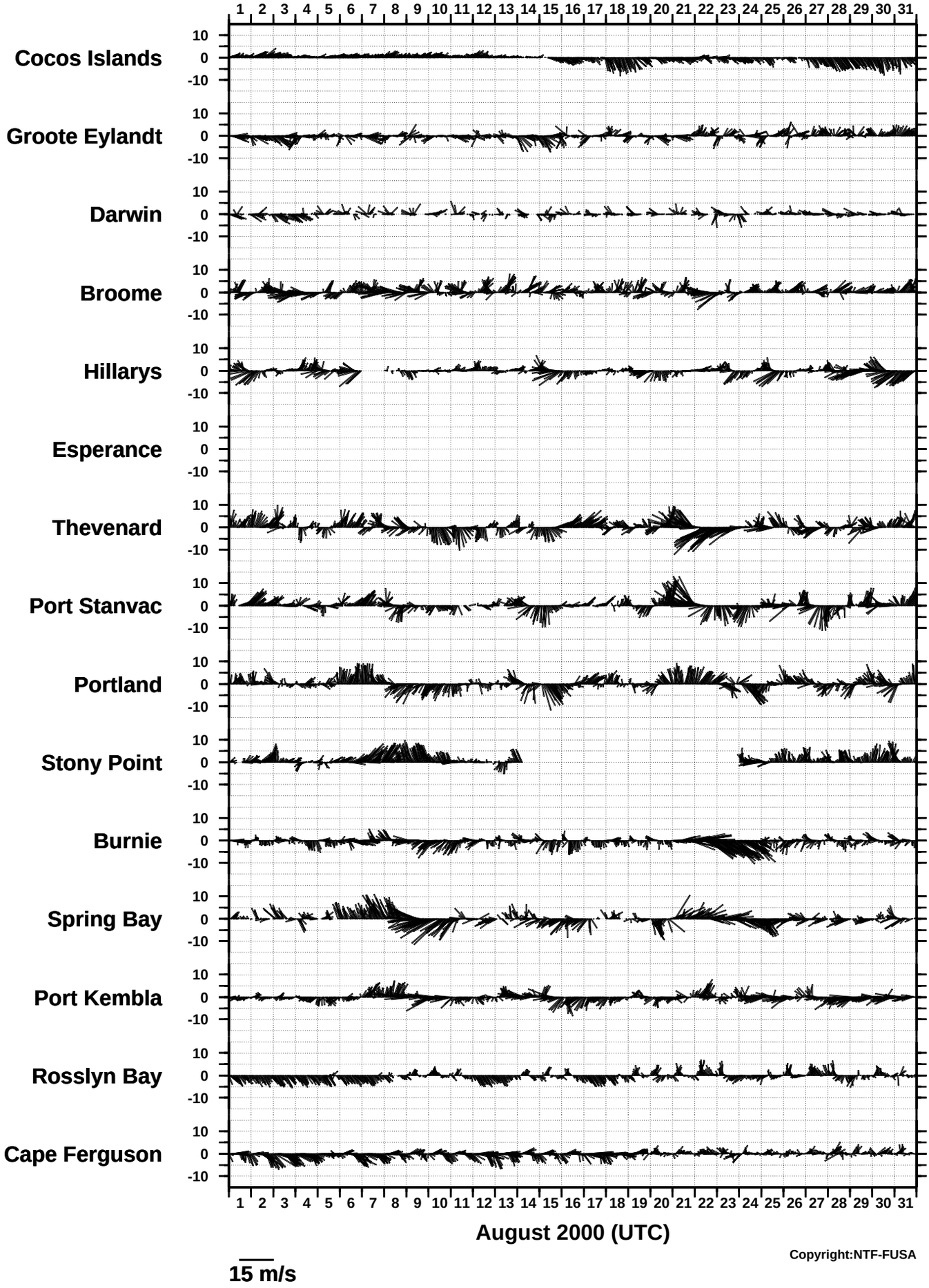


Figure 6

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

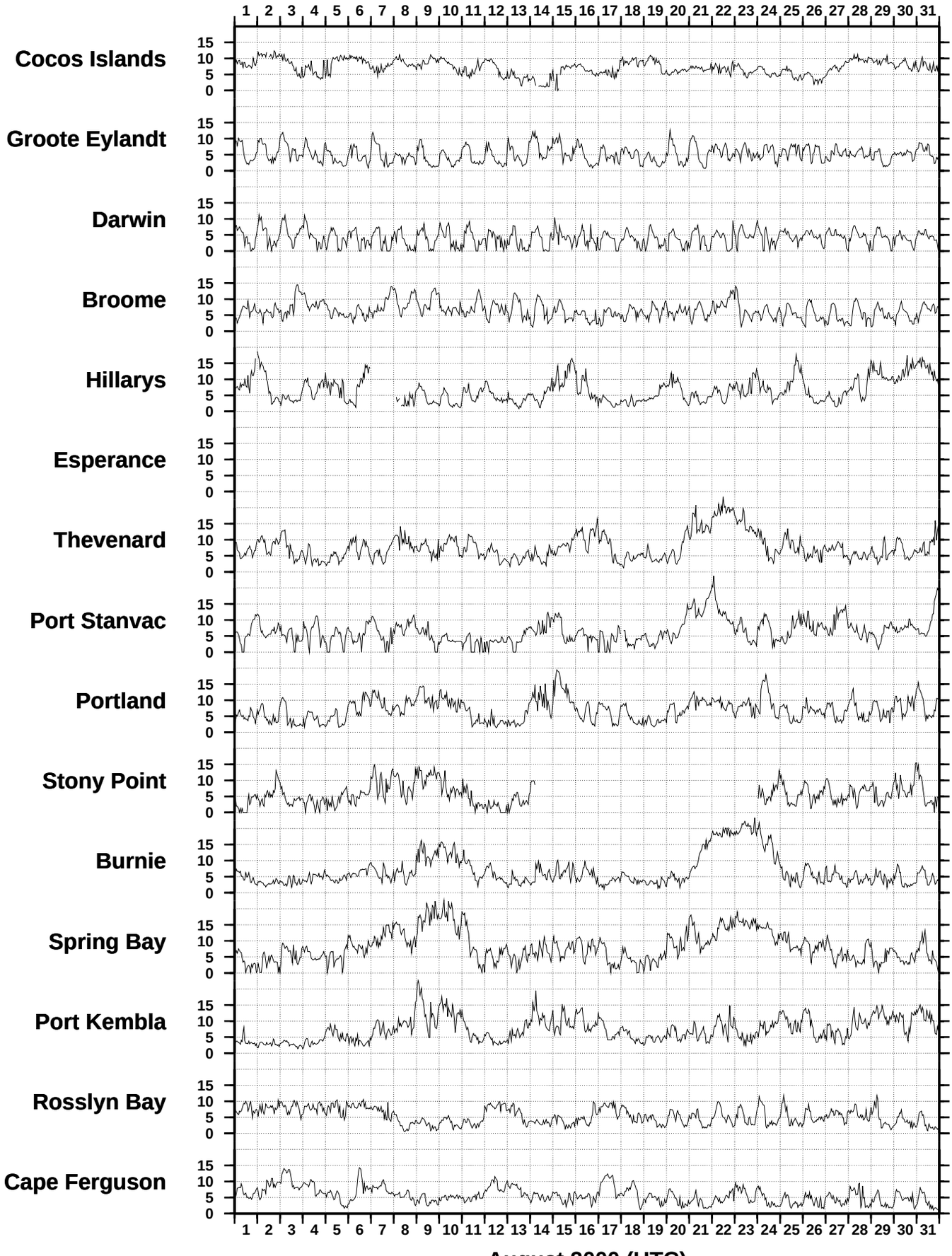


Figure 7

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

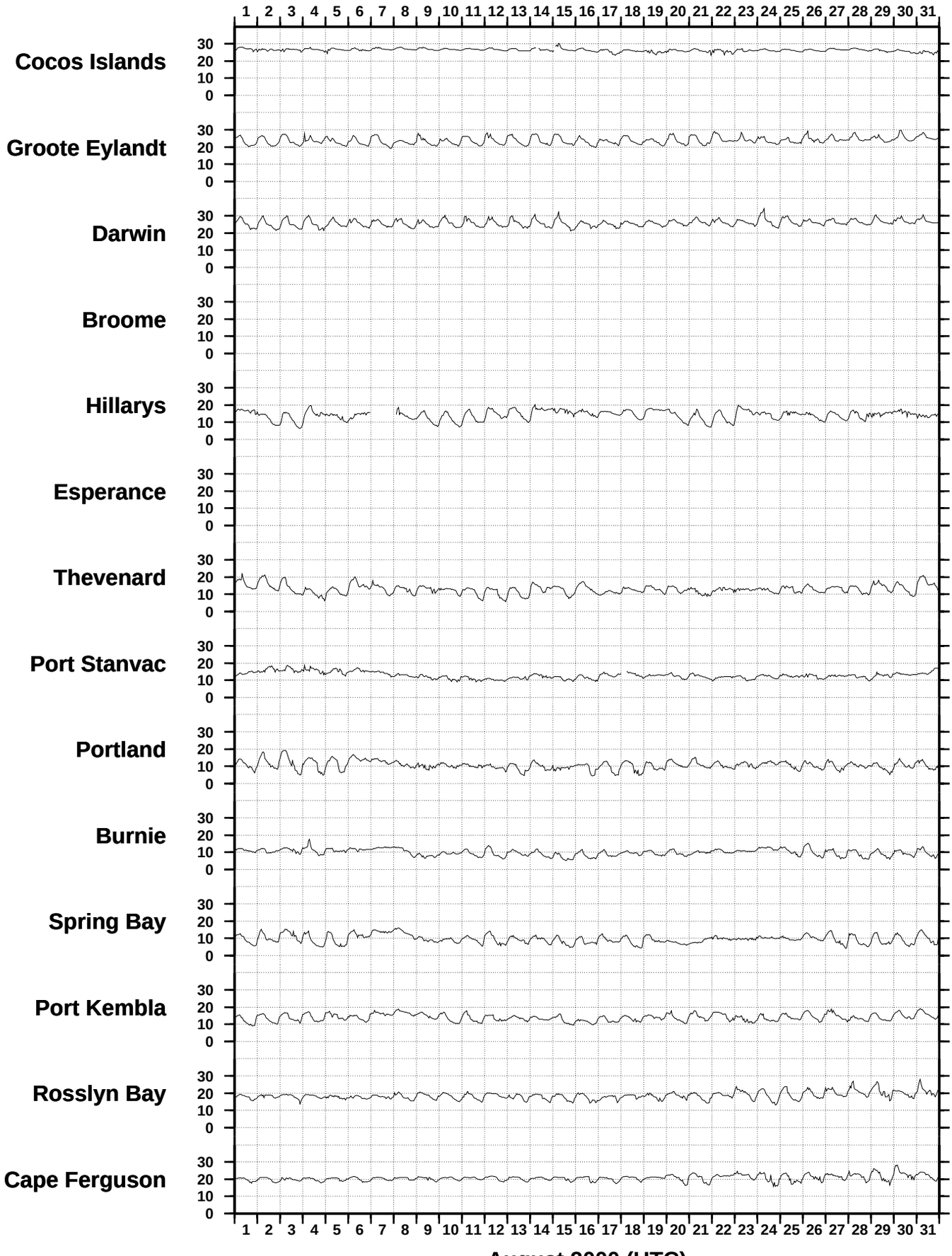


Figure 8

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

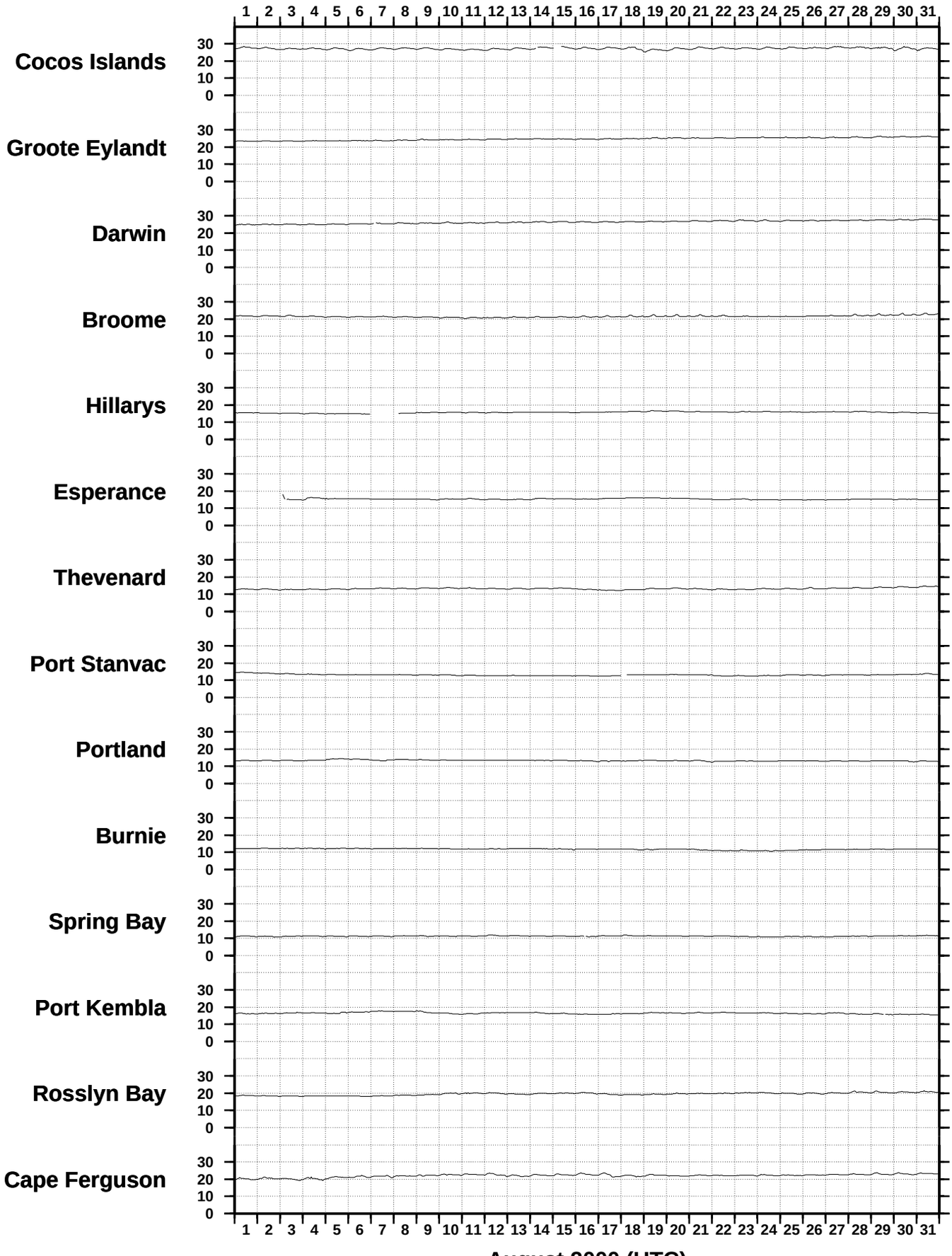


Figure 9

AUGUST 2000
HOURLY ATMOSPHERIC PRESSURE FROM SEAFRAME STATIONS (hPa)

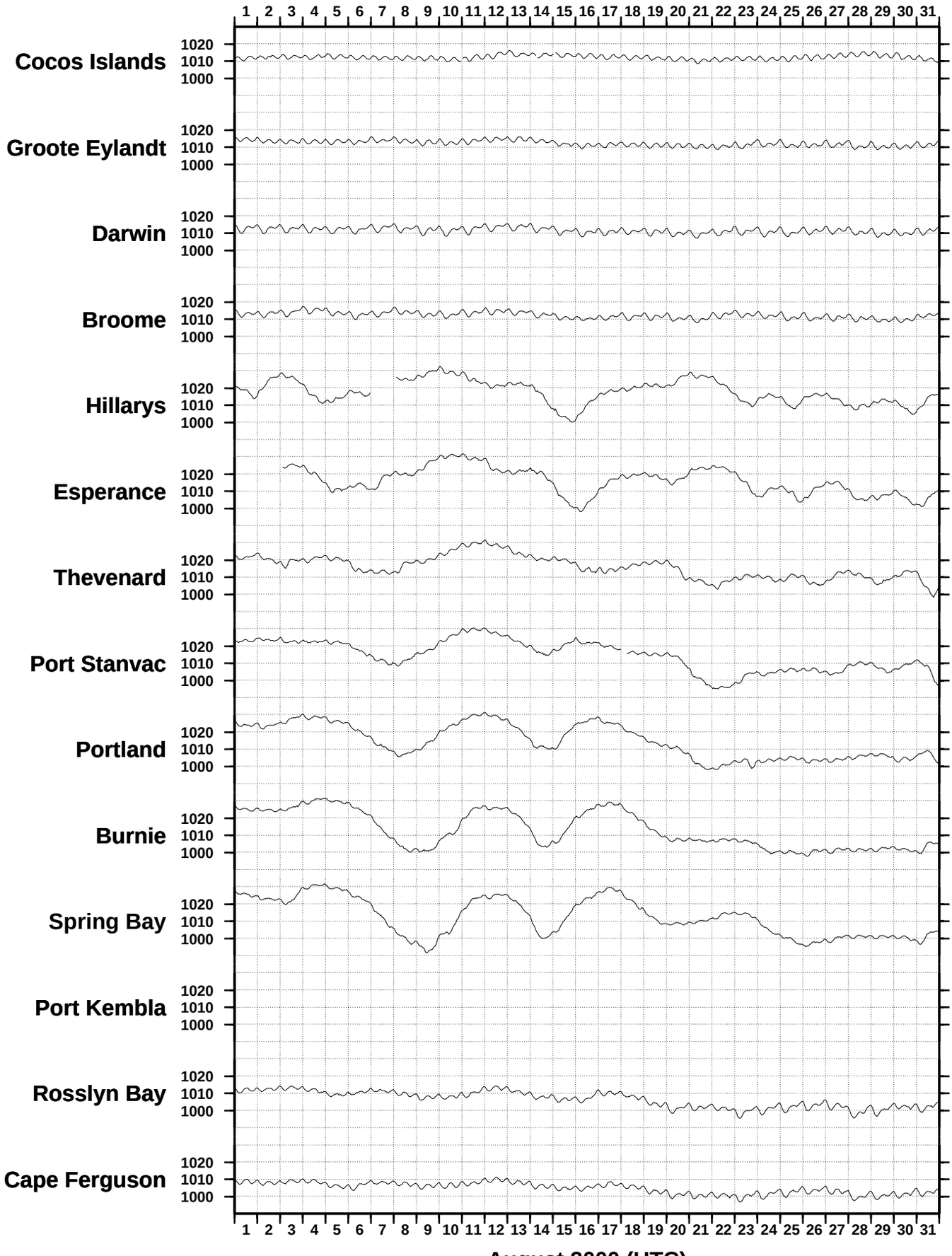


Figure 10

SEA LEVEL ANOMALIES THROUGH AUGUST 2000 (m)

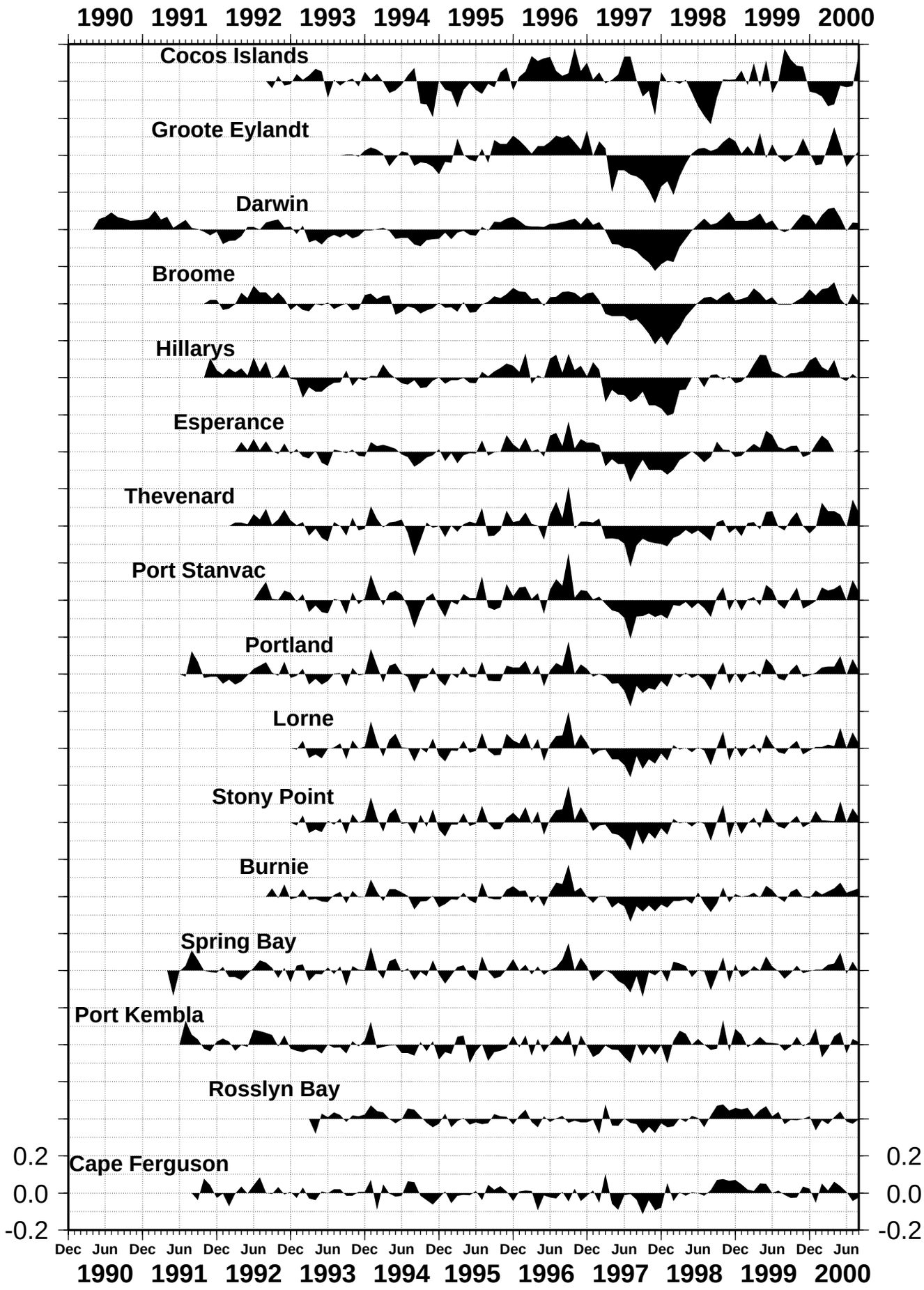


Figure 11

BAROMETRIC PRESSURE ANOMALIES THROUGH AUGUST 2000 (hPa)

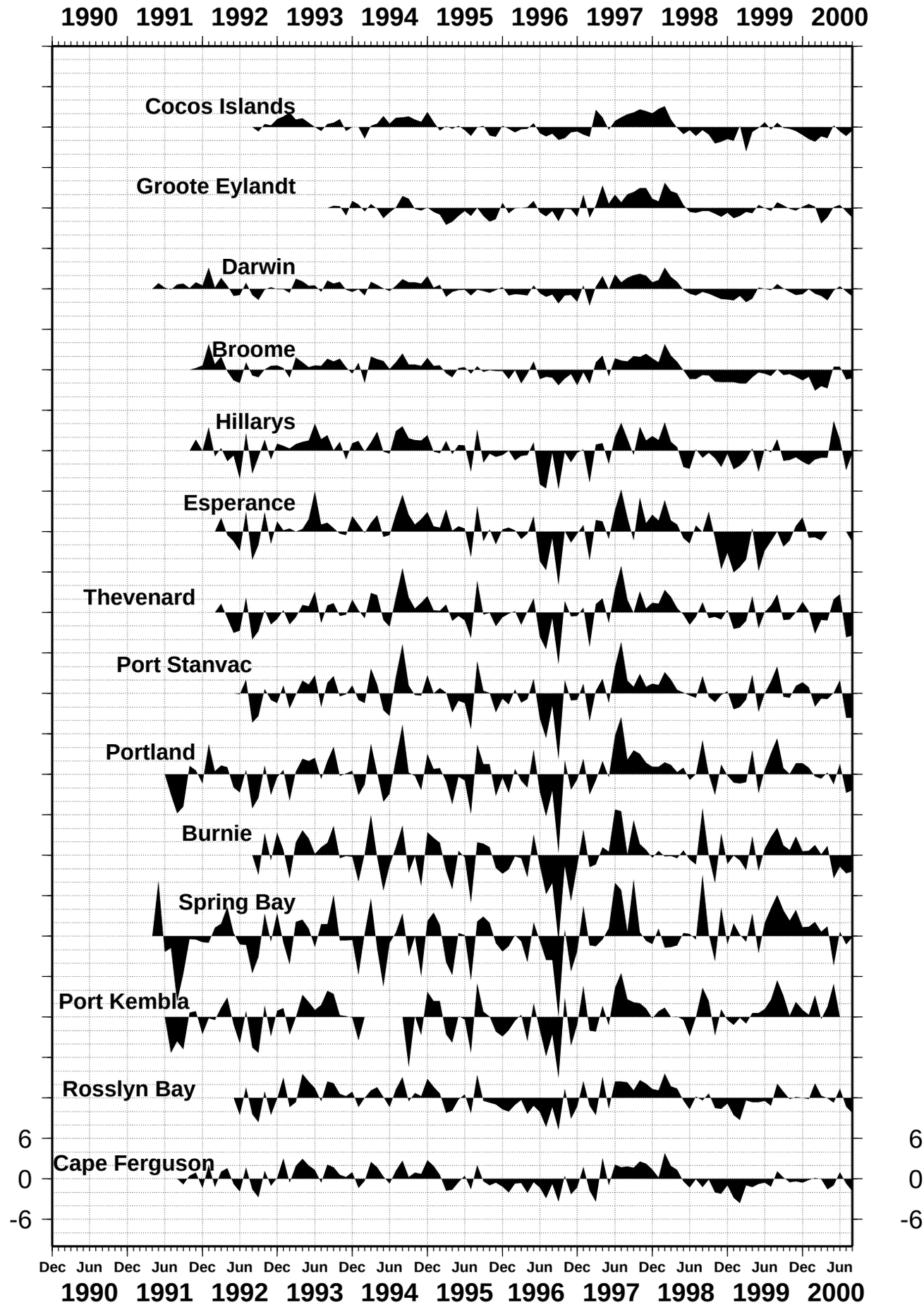


Figure 12

WATER TEMPERATURE ANOMALIES THROUGH AUGUST 2000 (degC)

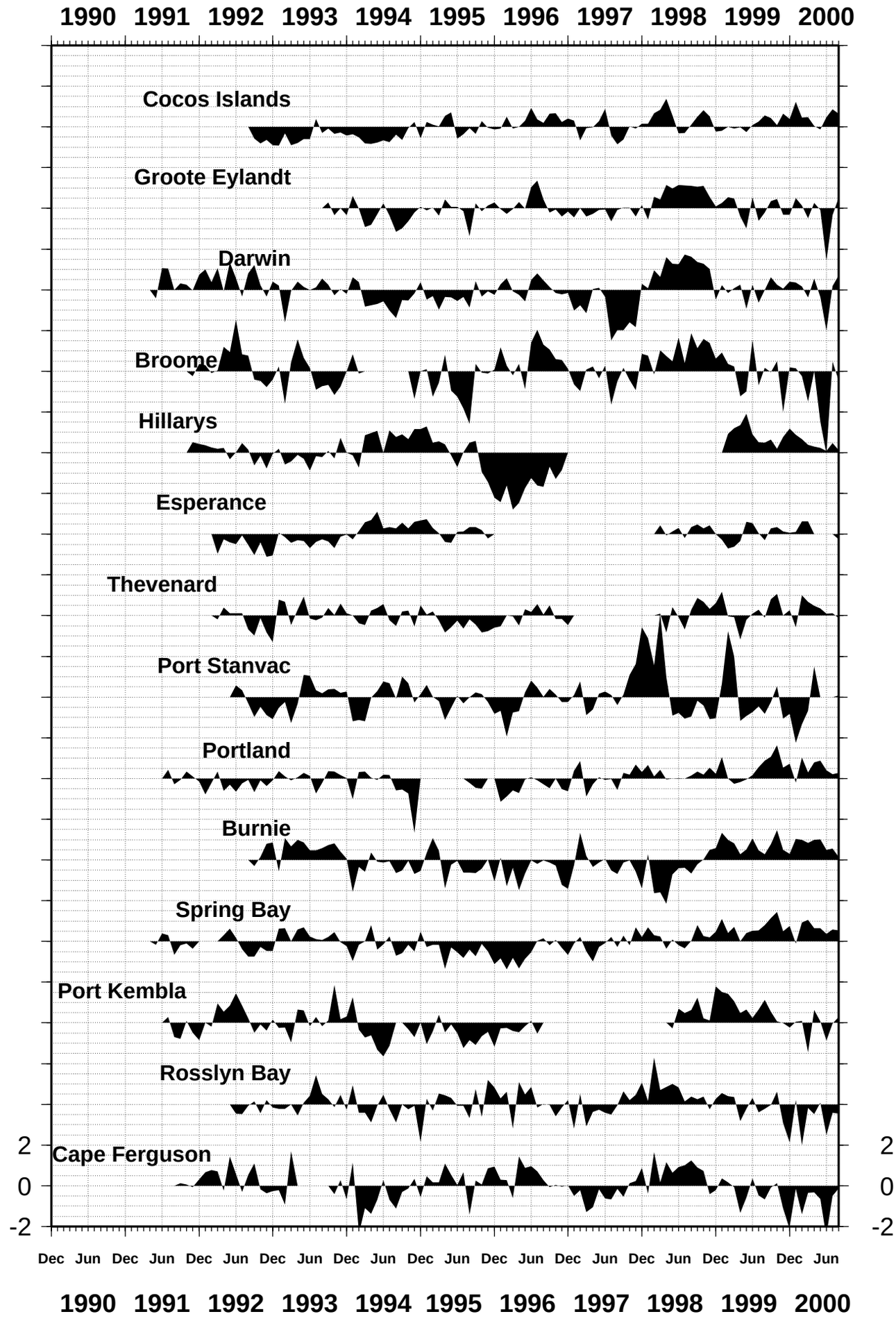


Figure 13

AIR TEMPERATURE ANOMALIES THROUGH AUGUST 2000 (degC)

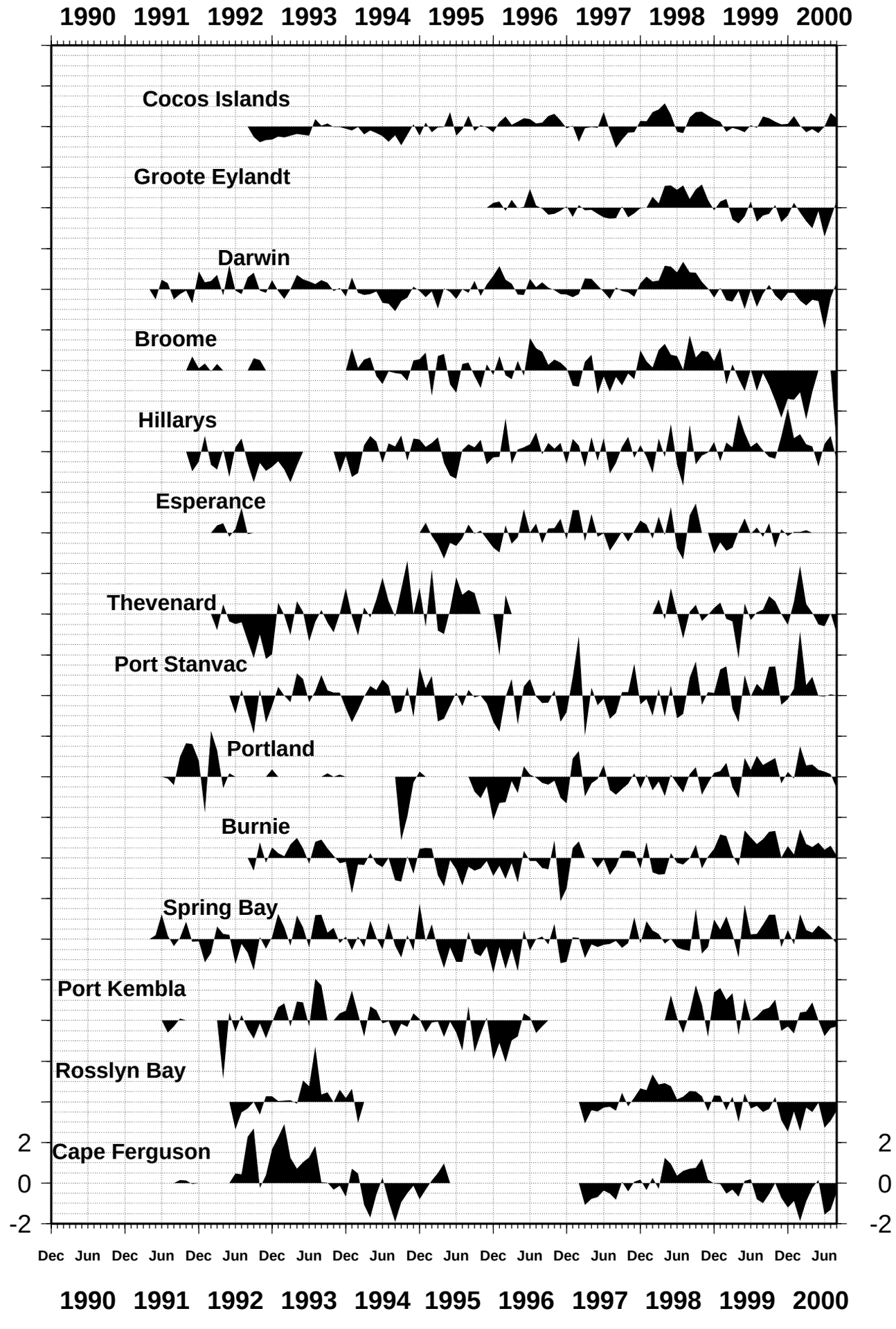


Figure 14

SEA LEVEL TRENDS THROUGH AUGUST 2000 (mm/year)

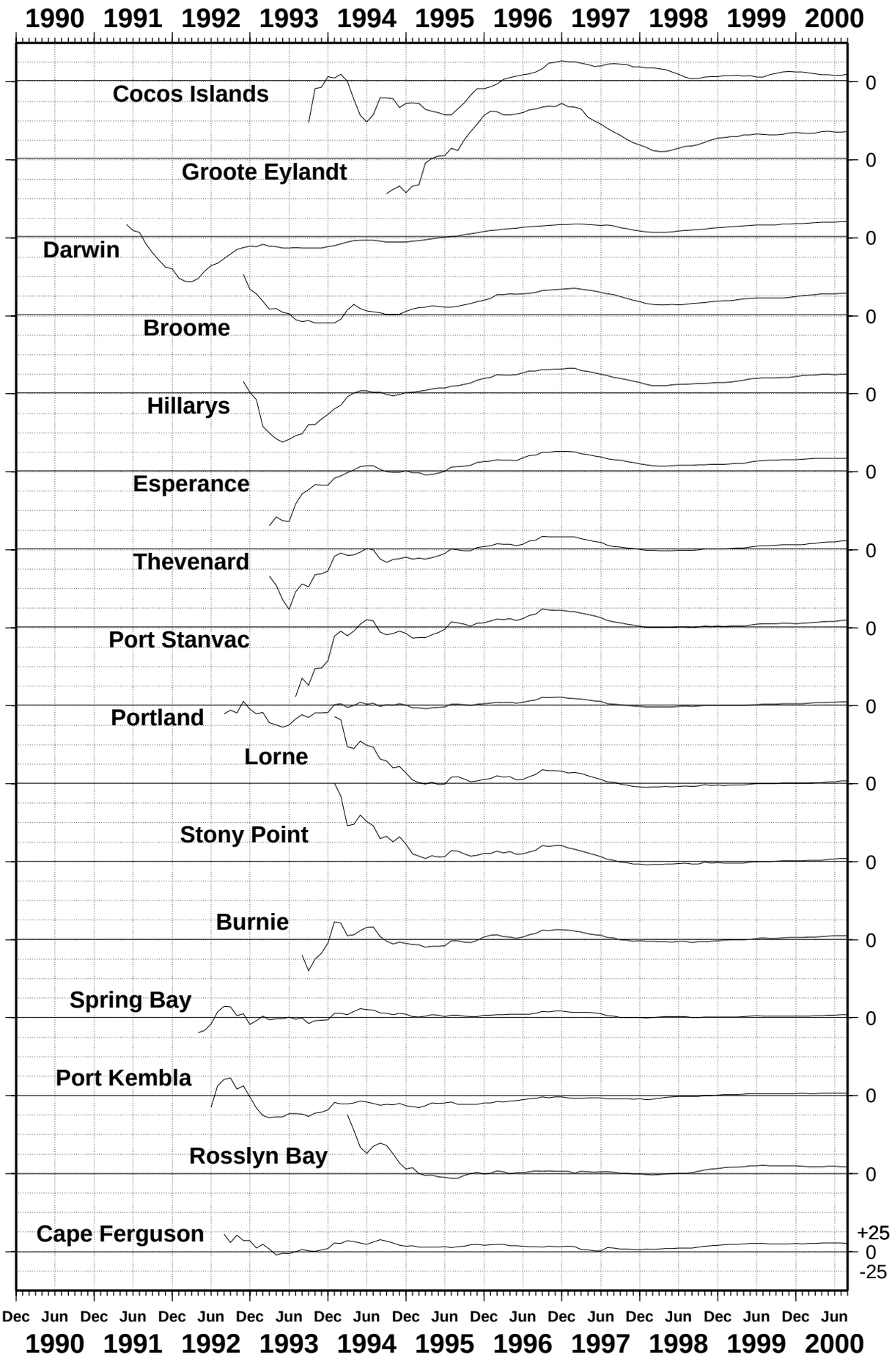


Figure 15

SEA LEVEL DATA RETURN

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

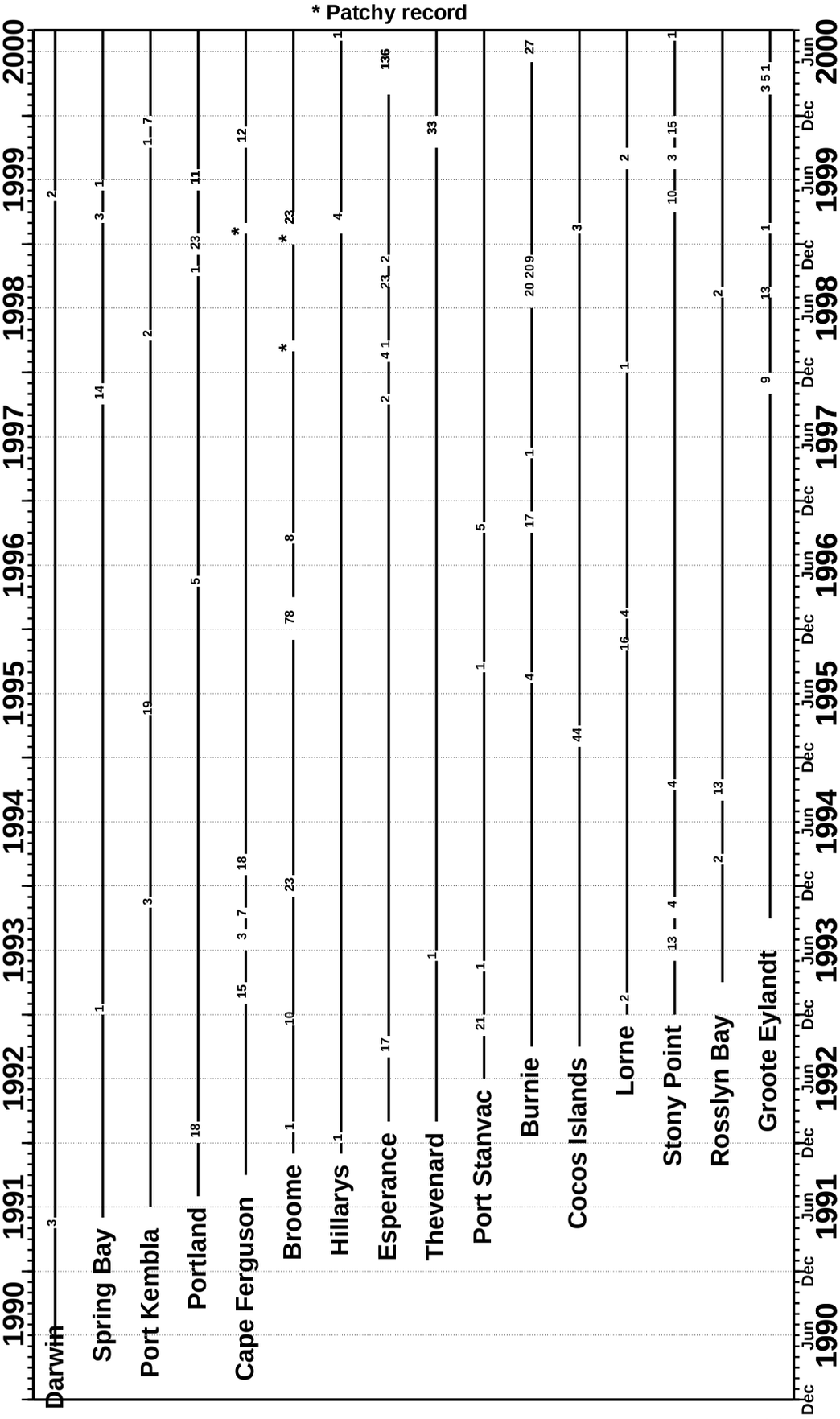
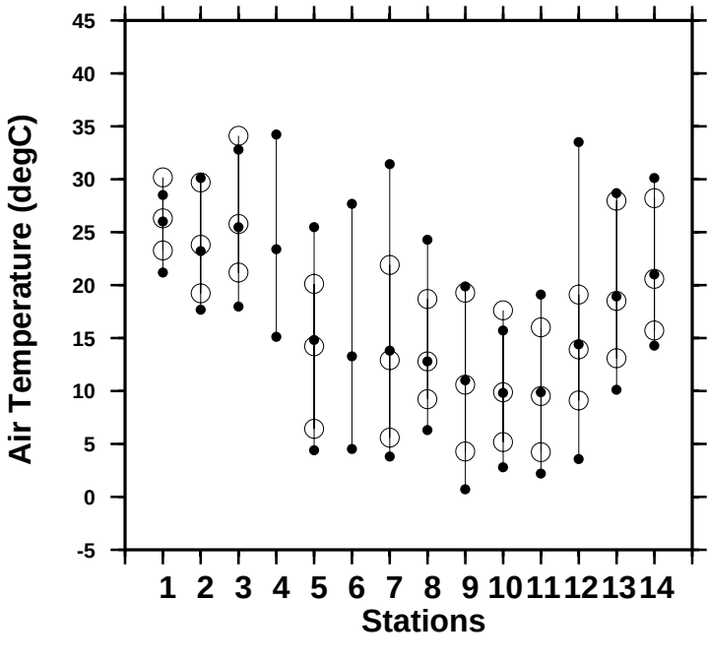
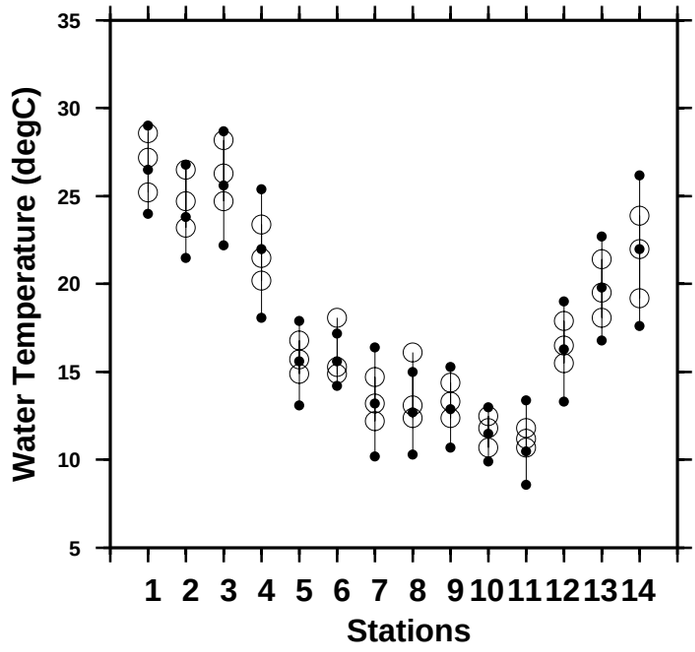
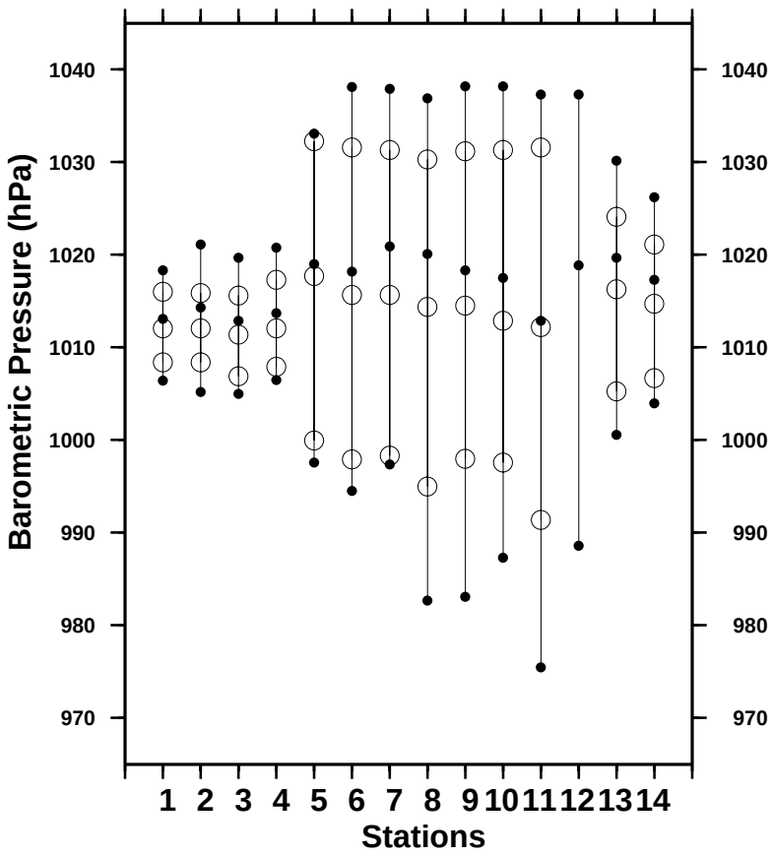


Figure 16

Comparison of August 2000 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 2000 Maximum
August 2000 Mean
August 2000 Minimum

Long Term August Maximum
Long Term August Mean
Long Term August Minimum

Figure 17

MONTHLY MEAN SEA LEVELS TO AUGUST 2000 (m)

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