

THE AUSTRALIAN BASELINE SEA LEVEL MONITORING PROJECT

MONTHLY DATA REPORT

NOVEMBER 2000



NOTES ON THE DATA FOR NOVEMBER 2000

Sea level data return this month was excellent at all stations. At Groote Eylandt there are some small spikes in the sea level record this month. These coincide with times of high wind gusts and speeds, so have been left in the record as they correspond to a natural phenomenon.

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) the majority of the stations have very small anomalies (with the exception of Cocos Islands, which is strongly positive). Sea level anomalies in the south, east of Thevenard, are all slightly negative. Of the remaining stations, the anomalies at Darwin and Groote Eylandt are slightly positive, Broome is slightly negative, Hillarys, Esperance, Cape Ferguson and Rosslyn Bay are close to zero.

The barometric pressure anomalies, presented in Figure 11, correlate reasonably 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 November 7th. 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 November 2000 are compared with the long-term November values. These comparisons are shown in Figure 16. Please remember that the long-term ranges are calculated using the historical sets of November data for each station *excluding* the current month of data.

The mean barometric pressures for November for all of the stations (with the exceptions of Burnie, Spring Bay and Portland) were slightly lower than the long term November means. Baseline record low barometric pressures were recorded at Darwin, Broome, Hillarys and Cape Ferguson this month.

A similar comparison was made between the long-term spread of November air temperature data and that which occurred this month. There are no significant differences between the long-term November mean and the November 2000 mean at each station. Figure 16 indicates that Baseline record high air temperatures (which were close to the long term maximum) were recorded at Groote Eylandt, Esperance, Port Stanvac and Burnie.

The water temperature mean values for November 2000 were quite consistent with the long-term means for all locations (Figure 16). Eight of the Baseline stations this month exhibited record high water temperatures.

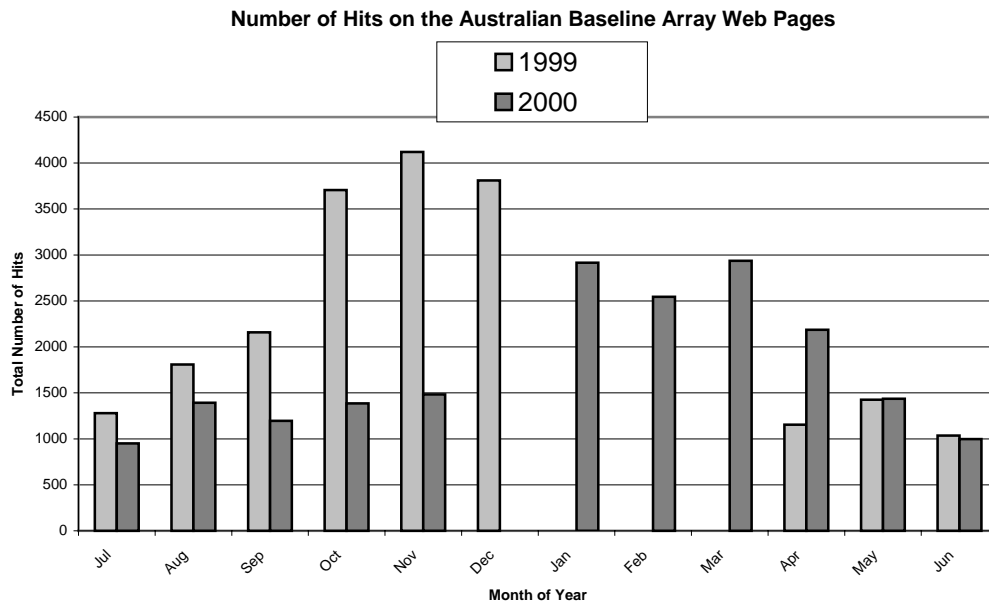
The month of commencement of operation of each gauge is listed in Table 1. Also shown is the short-term sea level trend for the entire record and the change from the previous month's analysis. Figure 14 shows the short-term sea level trends for each station.

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	+9.9	+0.7
Groote Eylandt	Sep 1993	+34.4	+0.1
Darwin	May 1990	+19.2	+0.0
Broome	Nov 1991	+27.4	-0.3
Hillarys	Nov 1991	+23.3	+0.0
Esperance	Mar 1992	+16.3	+0.0
Thevenard	Mar 1992	+11.4	-0.1
Port Stanvac	Jun 1992	+9.9	-0.3
Portland	Jul 1991	+5.1	-0.2
Lorne	Jan 1993	+4.0	-0.5
Stony Point	Jan 1993	+4.3	-0.6
Burnie	Sep 1992	+5.8	-0.2
Spring Bay	May 1991	+3.6	-0.4
Port Kembla	Jul 1991	+3.7	-0.3
Rosslyn Bay	Jun 1992	+8.9	+0.0
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 had 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.

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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

NOVEMBER 2000
SIX MINUTE OBSERVATIONS FROM SEAFRAME STATIONS (m)

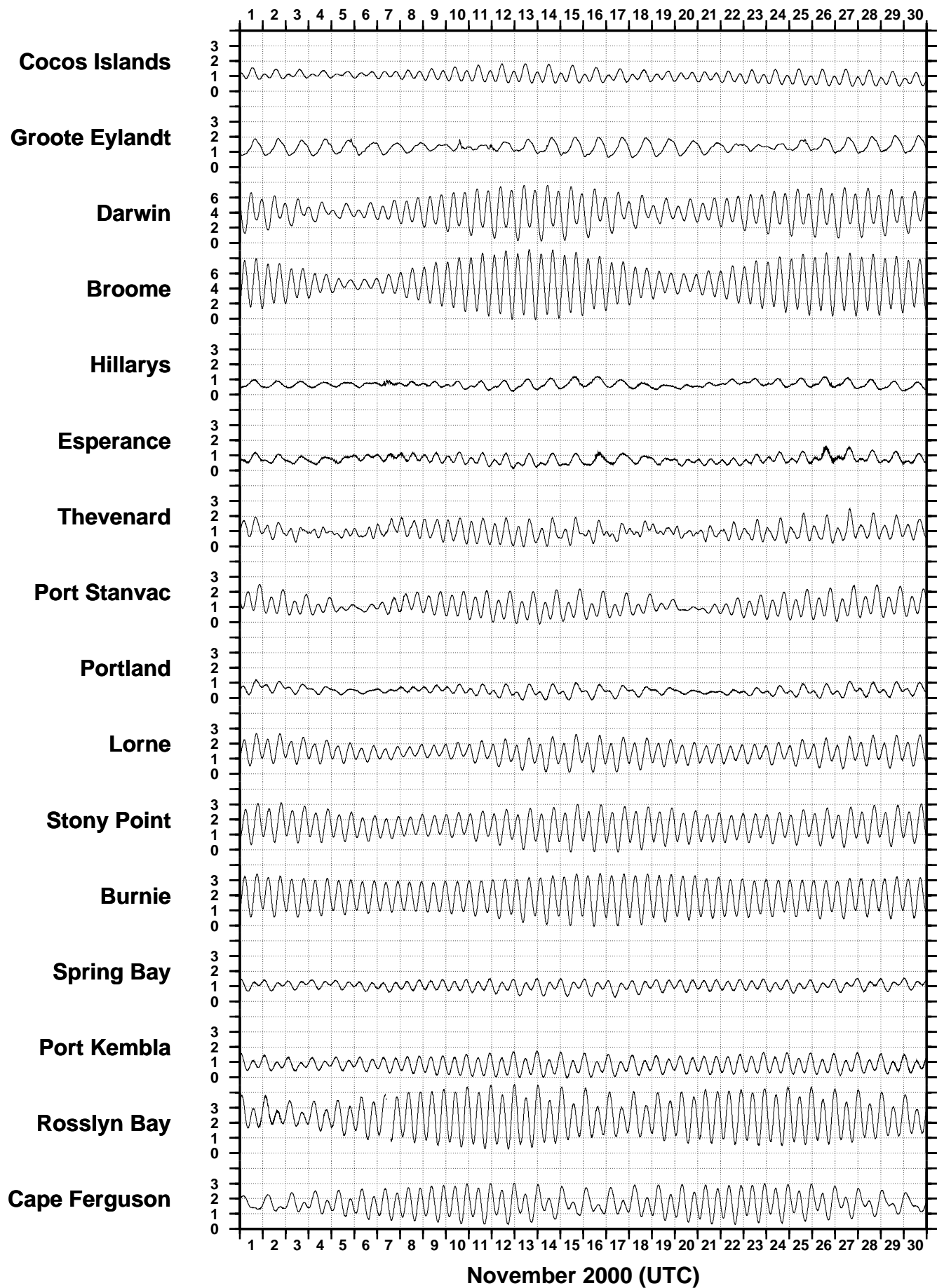


Figure 2

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

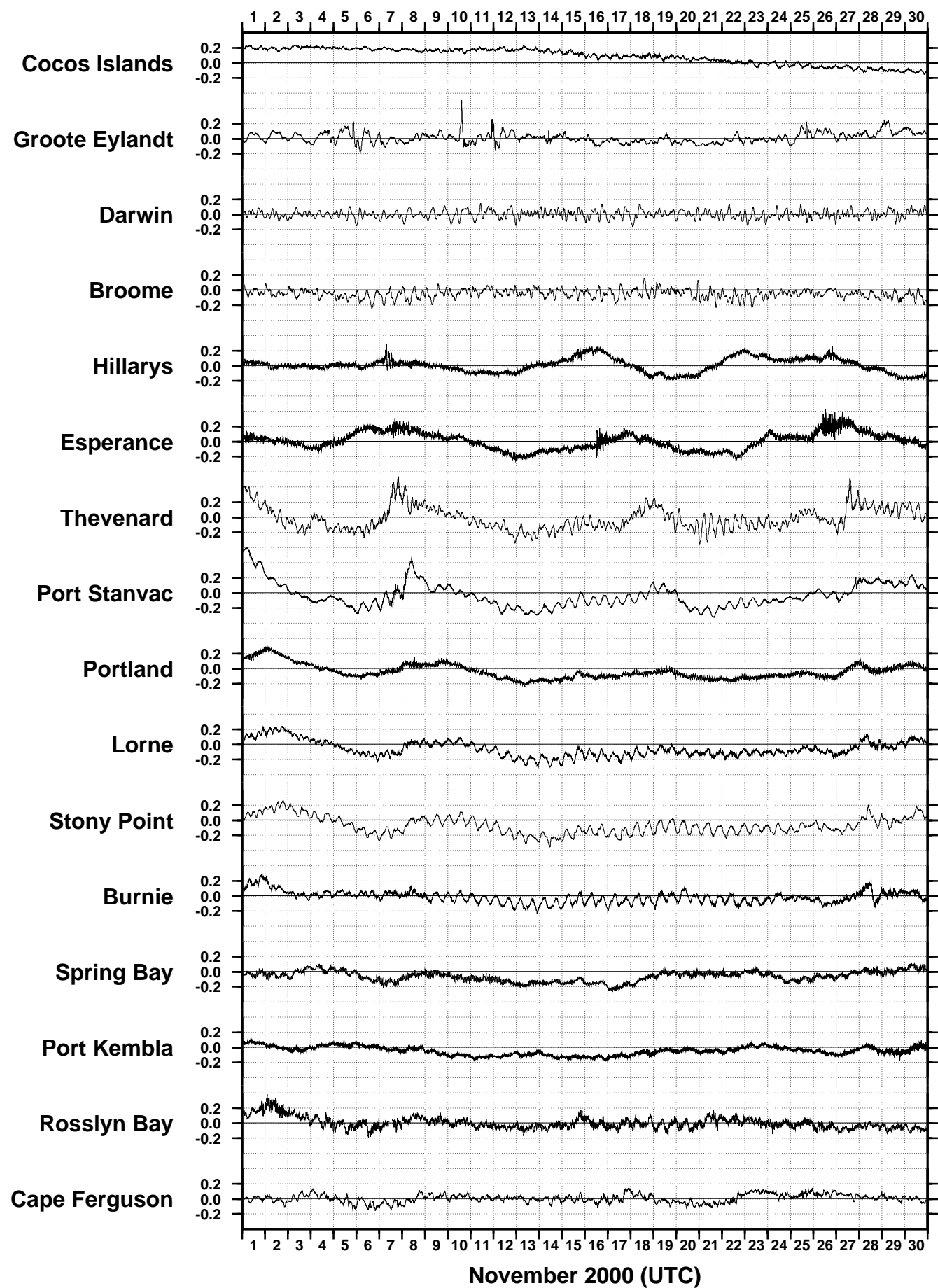


Figure 3

NOVEMBER 2000

RESIDUALS AT SIX MINUTE INTERVALS FROM SEAFRAME STATIONS (m)

ADJUSTED FOR ATMOSPHERIC PRESSURE

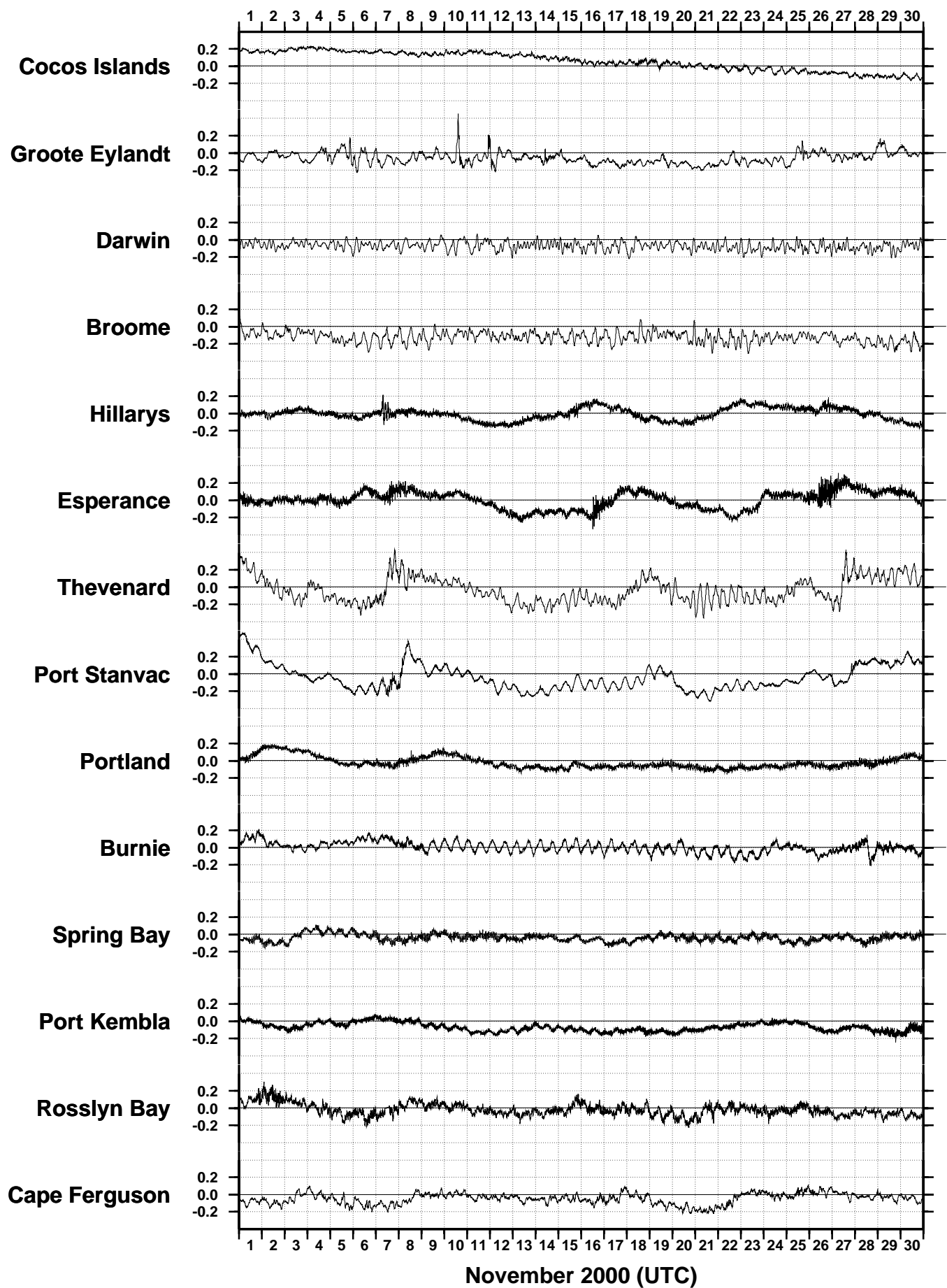


Figure 4

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

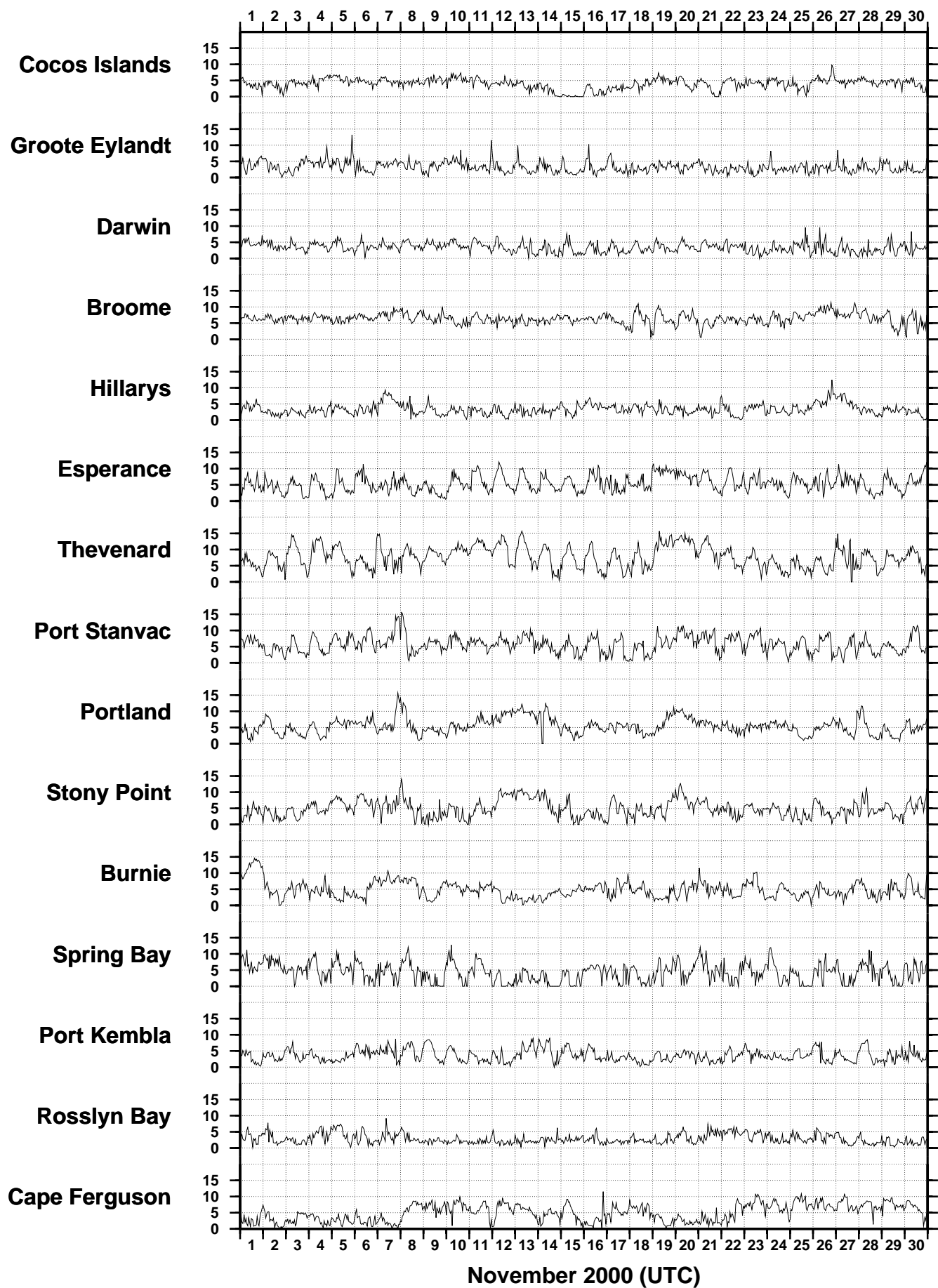


Figure 5

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

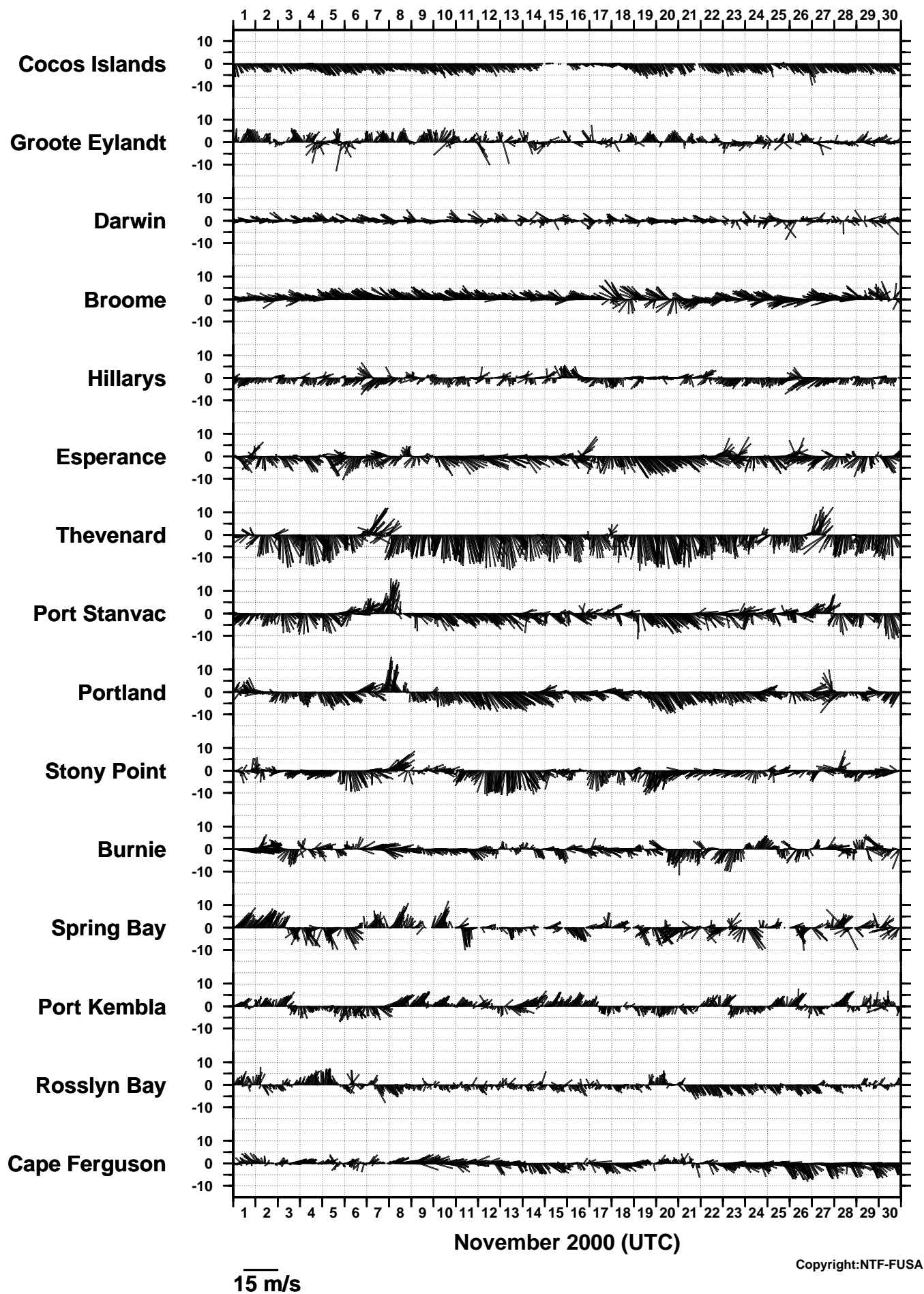


Figure 6

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

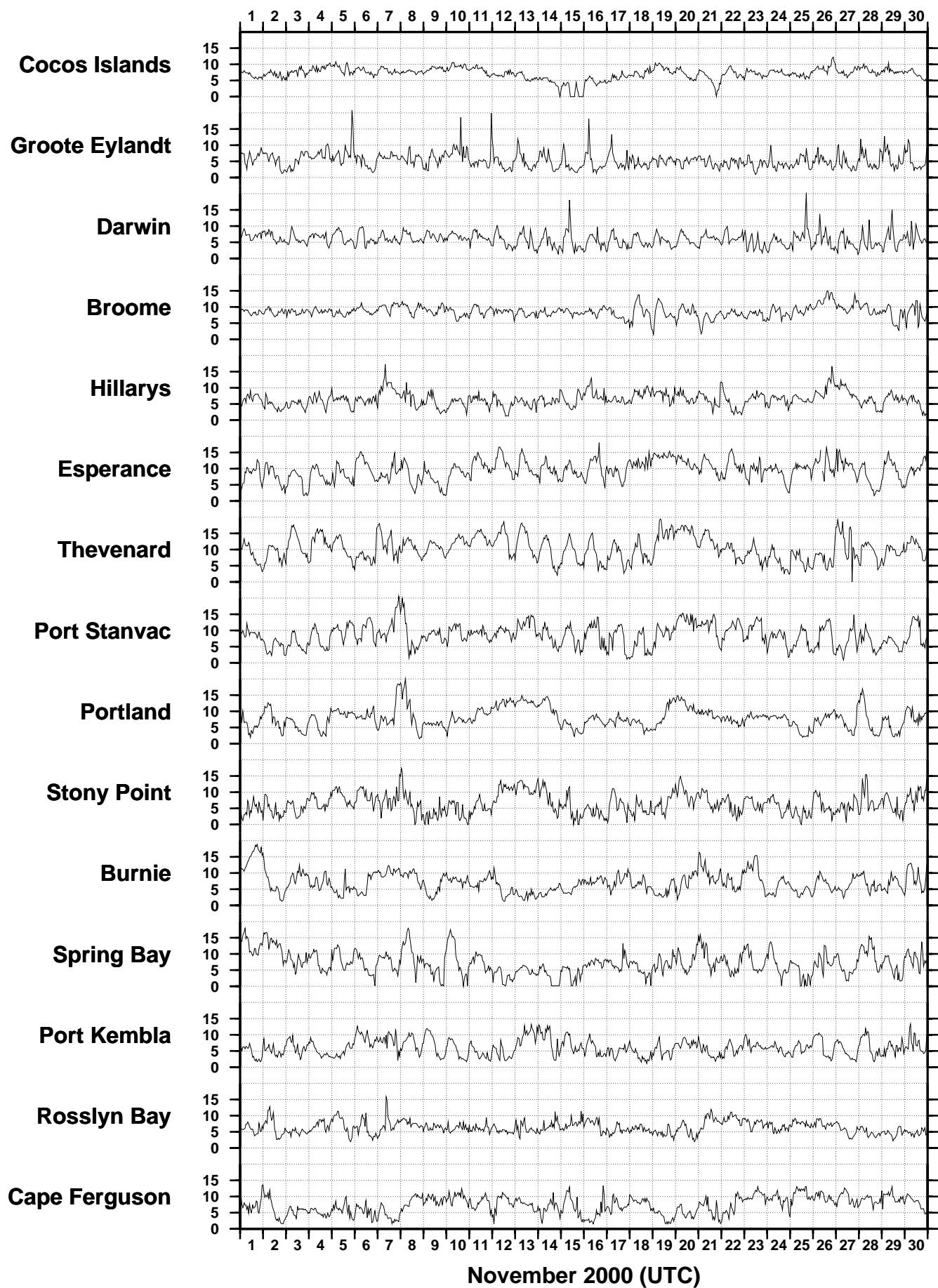


Figure 7

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

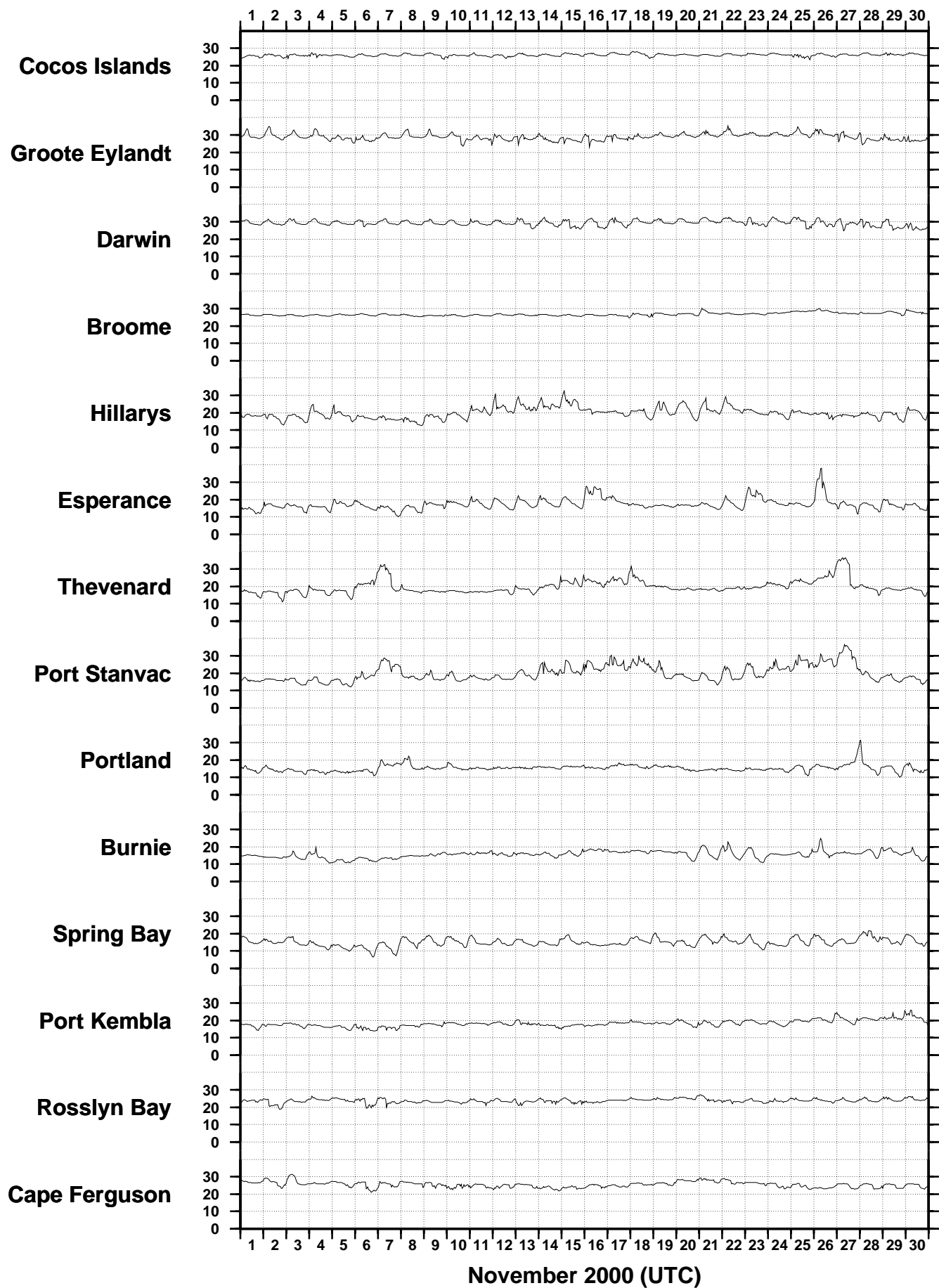


Figure 8

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

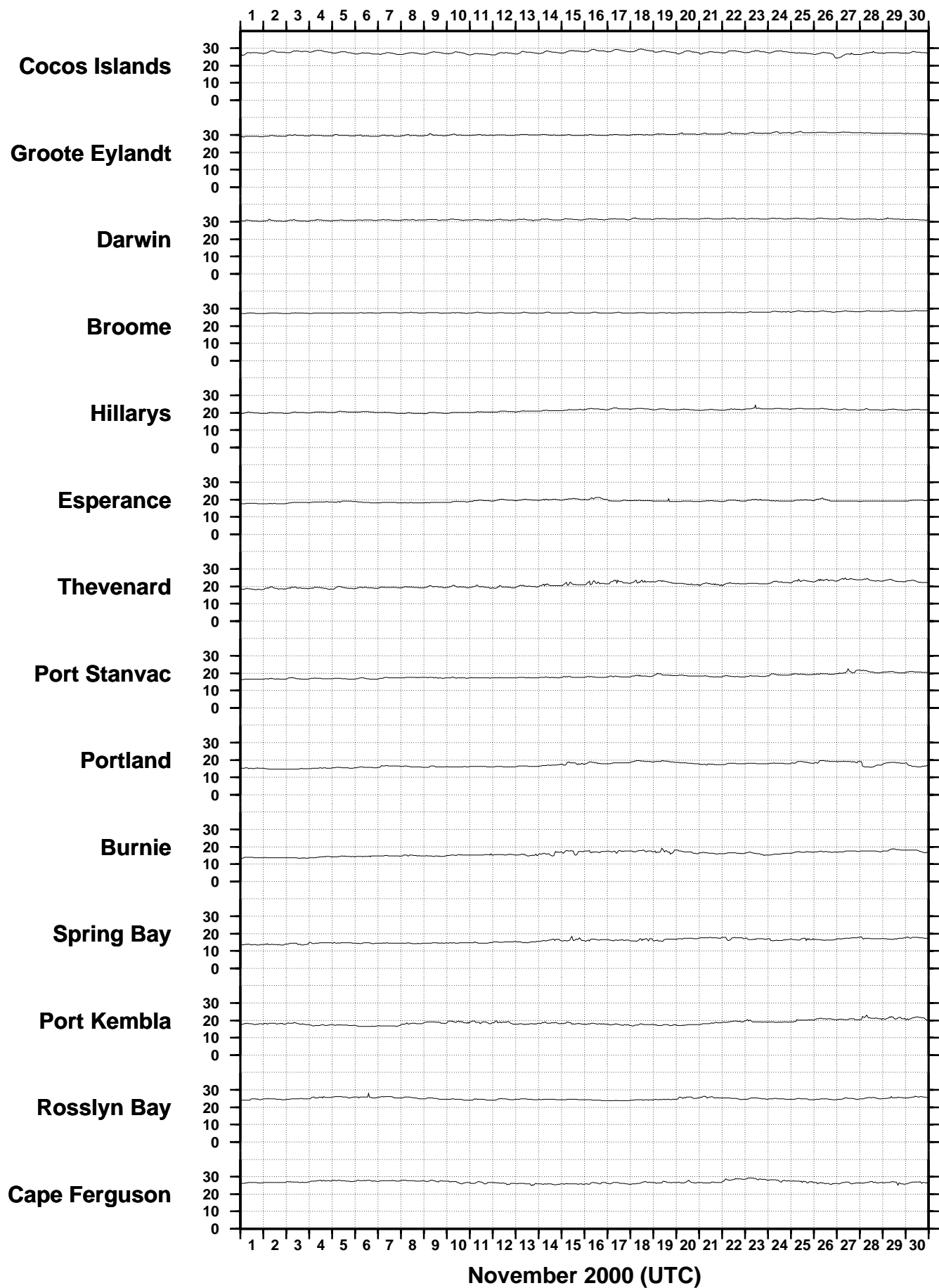


Figure 9

NOVEMBER 2000
HOURLY ATMOSPHERIC PRESSURE FROM SEAFRAME STATIONS (hPa)

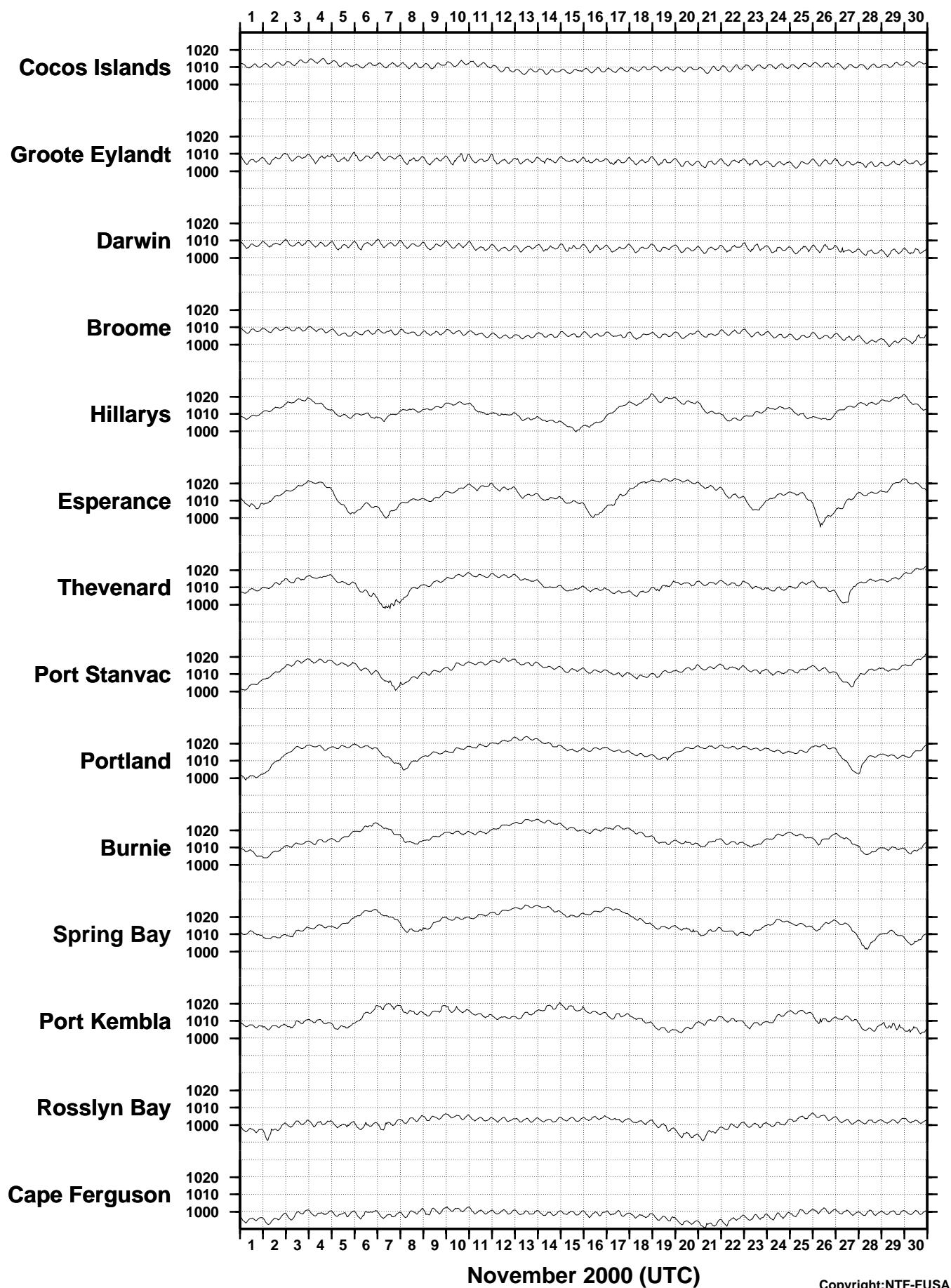


Figure 10
SEA LEVEL ANOMALIES THROUGH NOVEMBER 2000 (m)

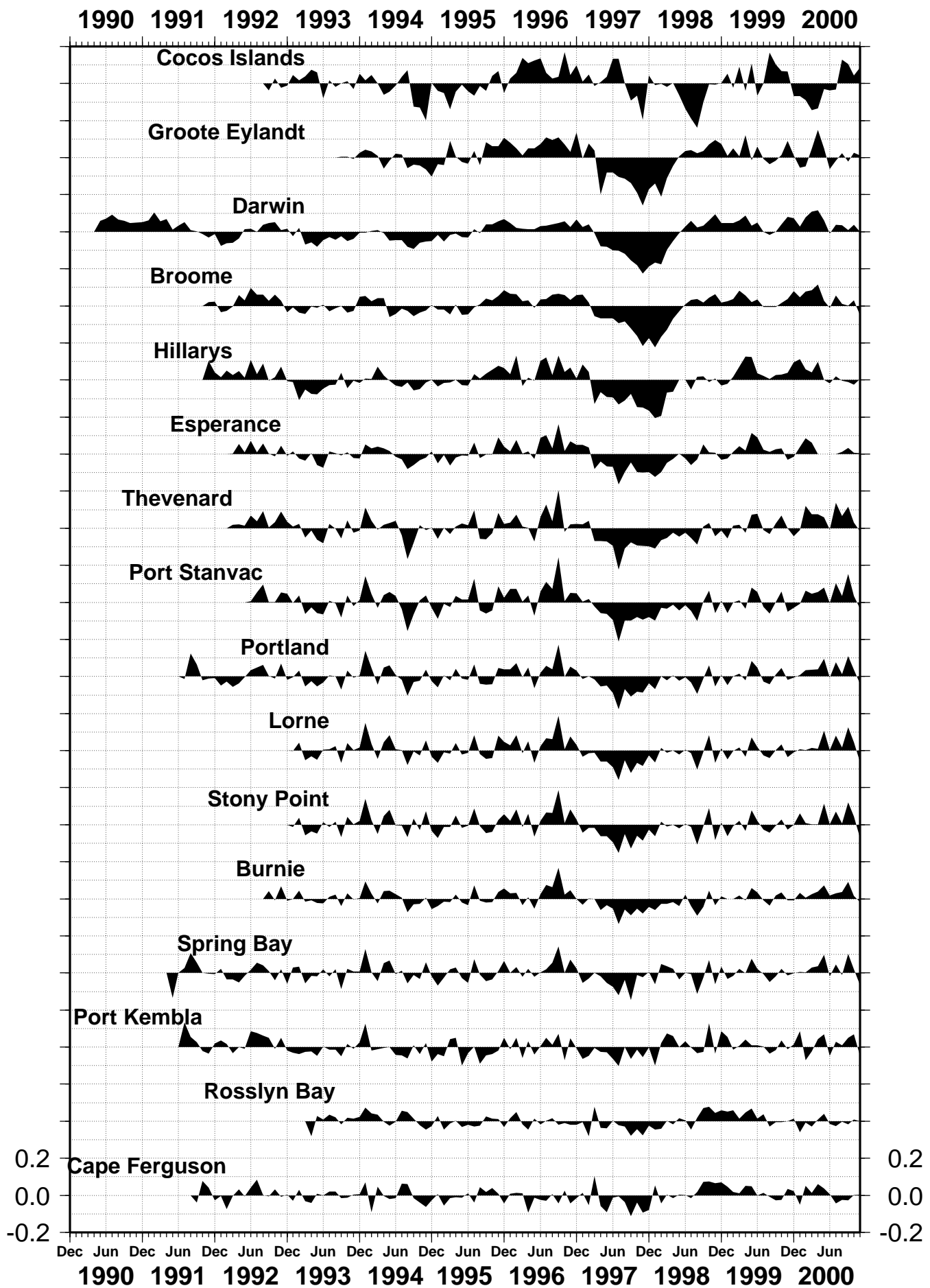


Figure 11

**BAROMETRIC PRESSURE ANOMALIES
THROUGH NOVEMBER 2000 (hPa)**

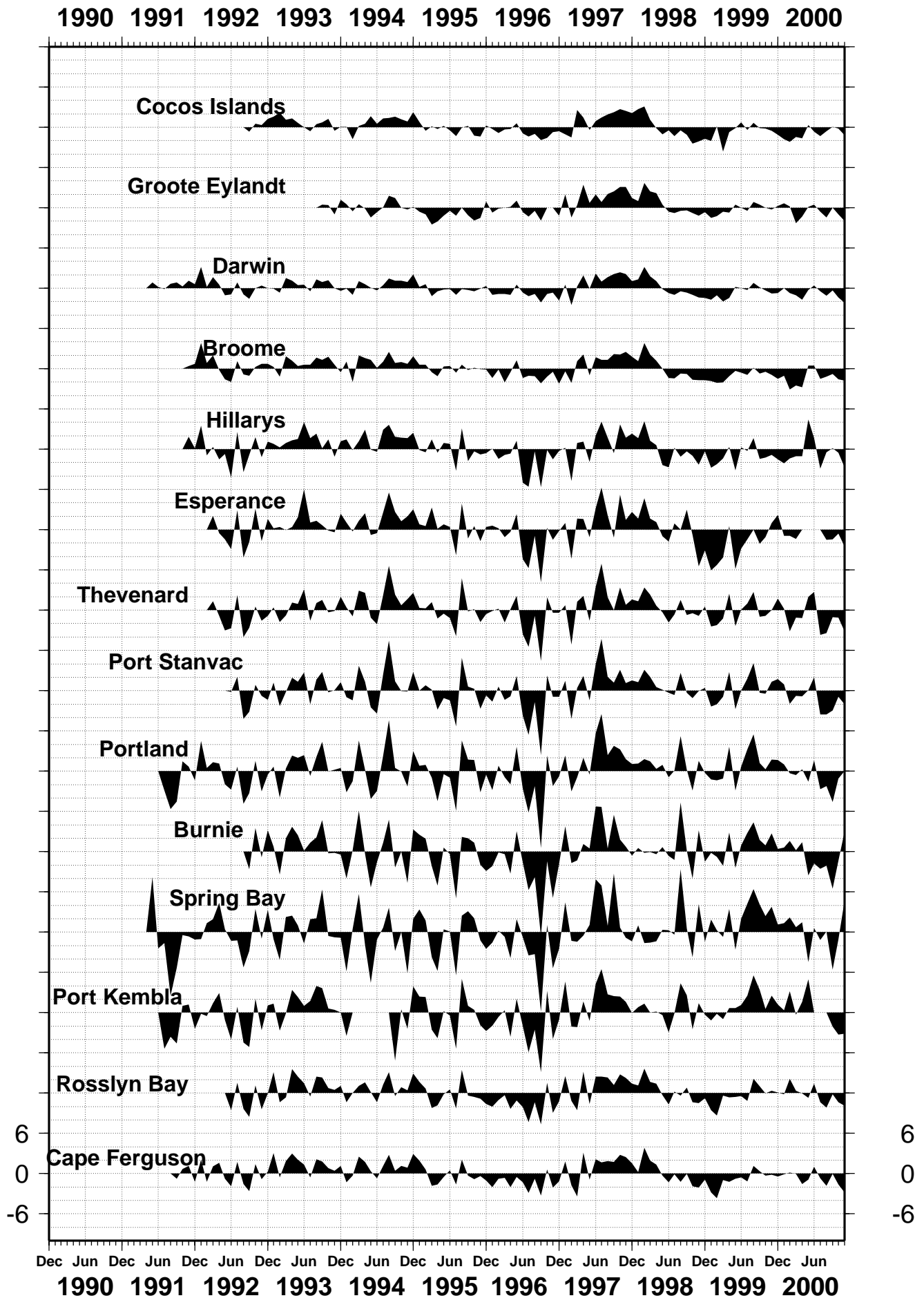


Figure 12

WATER TEMPERATURE
ANOMALIES THROUGH NOVEMBER 2000 (degC)

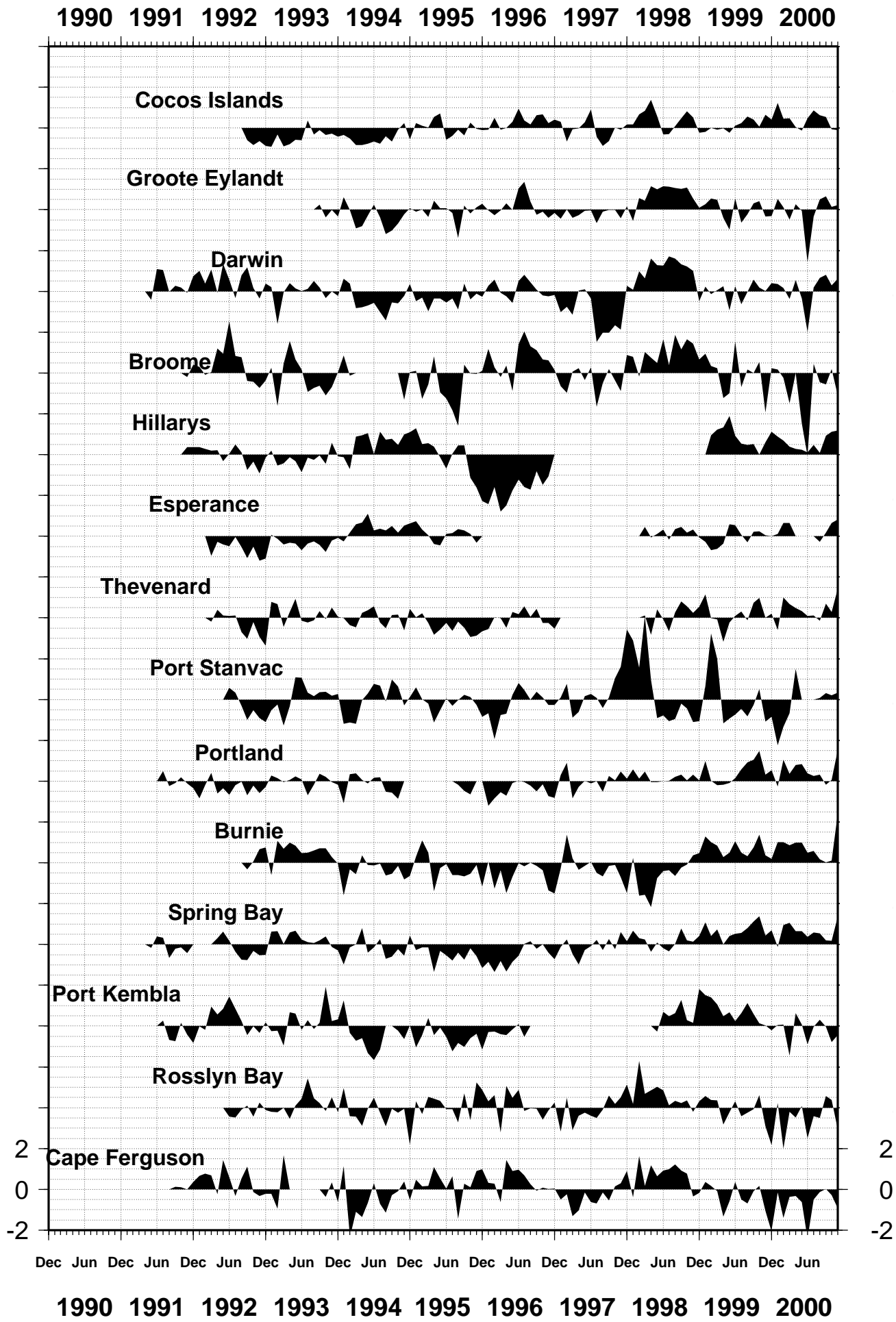


Figure 13

**AIR TEMPERATURE ANOMALIES
THROUGH NOVEMBER 2000 (degC)**

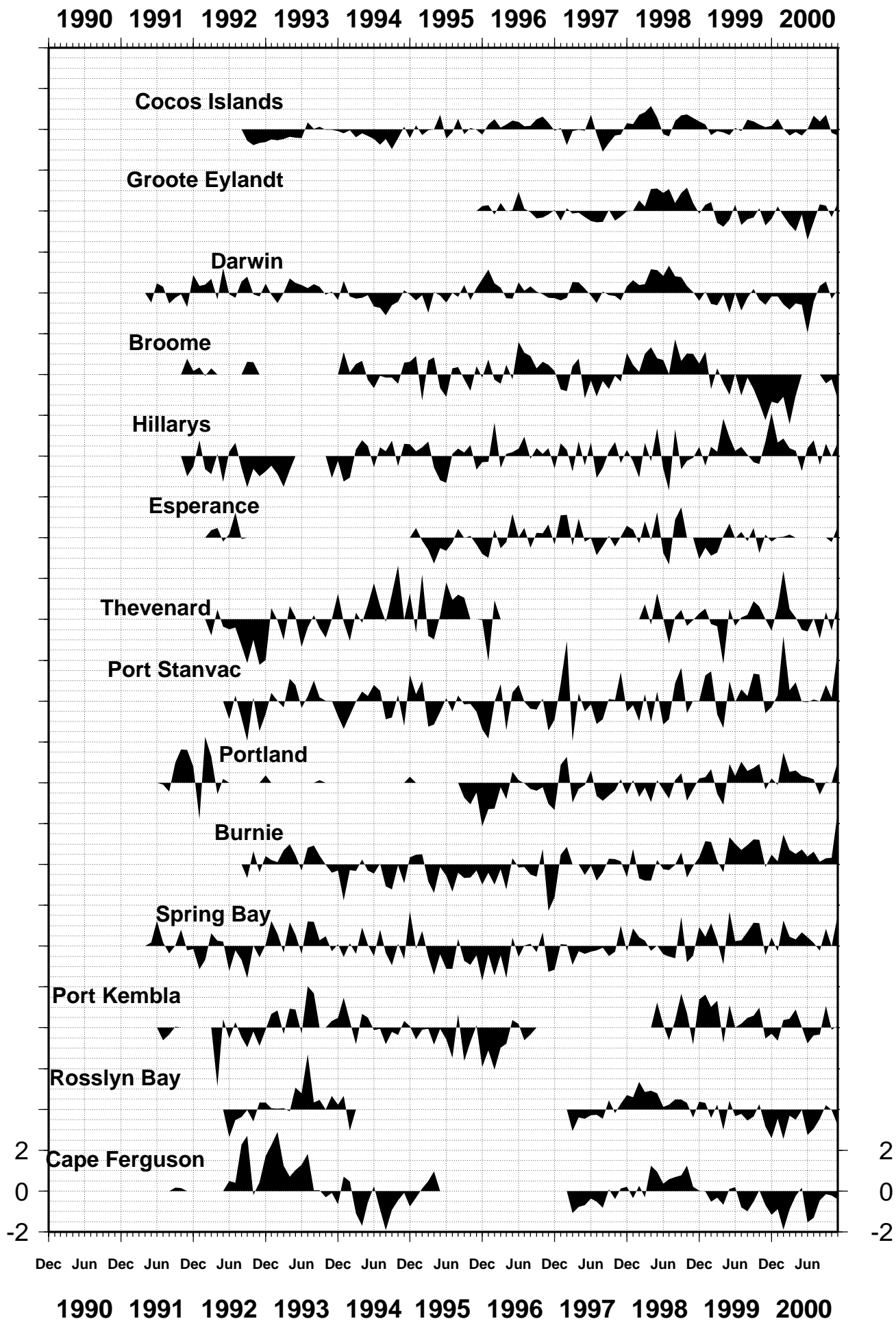
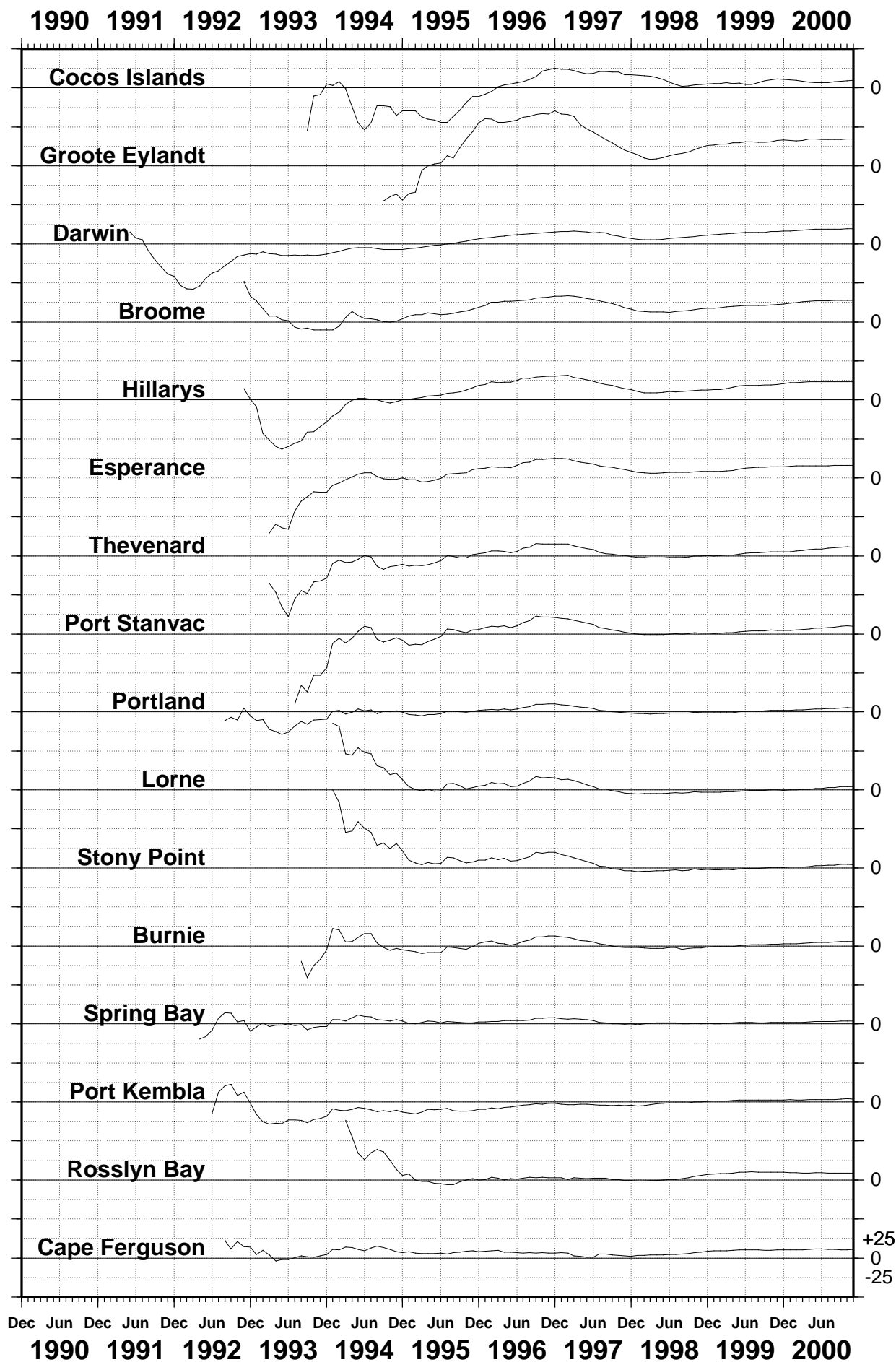


Figure 14

SEA LEVEL TRENDS THROUGH NOVEMBER 2000 (mm/year)



SEA LEVEL DATA RETURN

Figure 15

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

* Patchy record

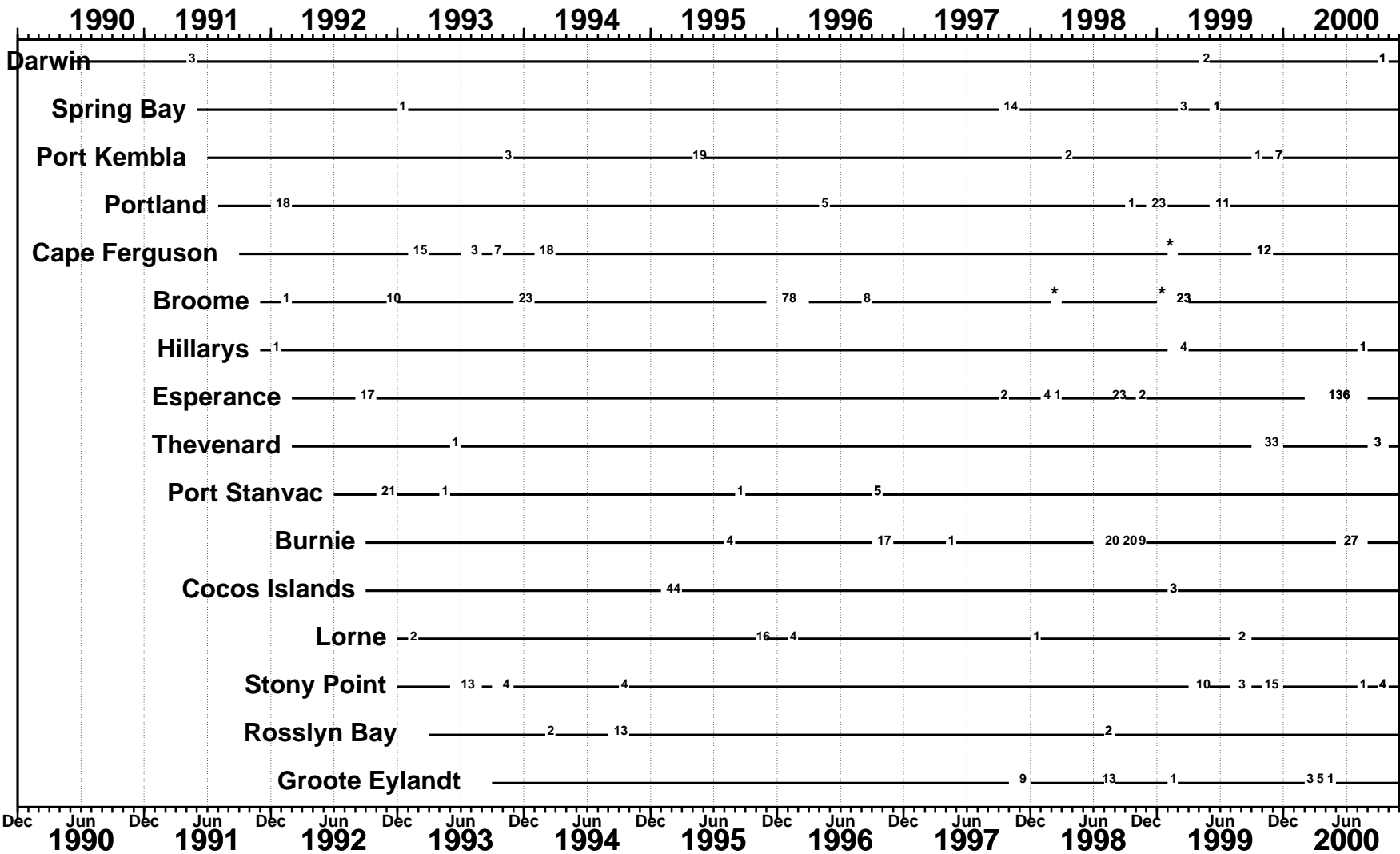


Figure 16

Comparison of November 2000 Max, Min & Mean with
Long Term November Values.

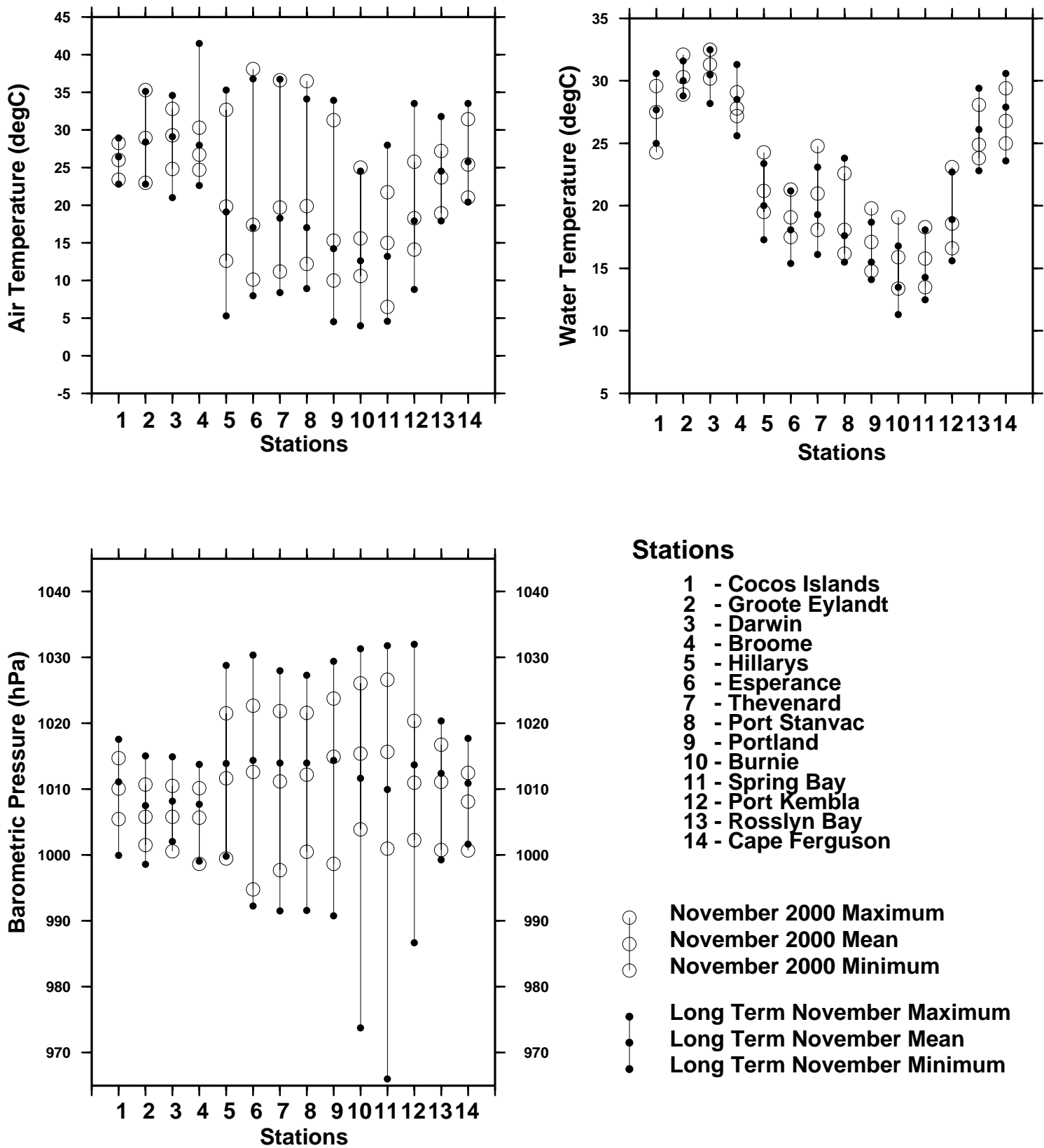


Figure 17

MONTHLY MEAN SEA LEVELS TO NOVEMBER 2000 (m)

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

