THE AUSTRALIAN BASELINE SEA LEVEL MONITORING PROJECT

MONTHLY DATA REPORT

JUNE 2000

NOTES ON THE DATA FOR JUNE 2000

Sea level data return this month was excellent for most stations, the exceptions being Esperance and Burnie (Figures 1 and 15). The Esperance gauge remains disconnected while harbour works are in progress. Battery power to the Burnie gauge was exhausted prior to a scheduled maintenance visit, following storm damage sustained by the tide hut in May.

Looking at the sea level anomalies this month (Figure 10), all mainland stations in operation exhibited a decrease in sea level anomaly. The anomalies for Groote Eylandt, Hillarys and Port Kembla were slightly negative whilst the anomalies for the remaining stations were slightly positive. The sea level anomaly at Cocos Islands, the only non-mainland based Baseline gauge, remained negative.

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 June 21st. Residual heights attained during this event were approximately one metre. When the peak elevation of the residuals coincides with the high tide the resultant increased sea level is defined as a storm surge.

The coast at St Kilda, a small settlement approximately 20 km north of Adelaide, generally consists of shallow tidal flats. Minor flooding occurred at St Kilda, as a result of the combined high tide and meteorological effects of June 21st.

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 June 2000 are compared with the long-term June values. These comparisons are shown in Figure 16. Please remember that the long-term ranges are calculated using the historical sets of June data for each station ***excluding*** the current month of data.

The mean barometric pressure recorded for June was quite consistent with the long-term June means for the Baseline stations. Record high barometric pressures were recorded at Port Stanvac, Portland, Rosslyn Bay and Cape Ferguson. Barometric pressure was not recorded at Port Kembla due to a malfunctioning circuit board at the site that rendered the sensor inoperable. (This also accounts for the absence of pressure-adjusted residuals for Port Kembla in Figure 3.)

A similar comparison was made between the long-term spread of June air temperature data and that which occurred this month. There are no significant differences between the long-term June mean and the June 2000 mean at each station. Figure 16 indicates record low air temperatures were recorded at Groote Eylandt and Cape Ferguson. A record high air temperature was recorded at Hillarys. There was no air temperature recorded for Broome due to damage sustained by the sensor during Tropical Cyclone Rosita which struck the west coast town in April.

The water temperature mean values for June 2000 show considerable difference to the long-term mean for most locations (Figure 16). The sites that vary significantly exhibit a mean temperature lower than the long-term mean. Groote Eylandt, Darwin, Broome, Rosslyn Bay and Cape Ferguson all recorded June means lower than the long-term means. Record low water temperatures were also observed at these sites. A record low water temperature was also observed at Portland. A record high water temperature was reported at Cocos Islands. The water temperature observations at Port Stanvac are suspected of being erroneous and need to be treated with caution until the technicians visit the site and the validity of the data can be established. These values have been removed from Figure 8.

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 in Trend (mm/yr)
Cocos Islands	Sep 1992	+6.8	-0.2
Groote Eylandt	Sep 1993	+34.0	-0.7
Darwin	May 1990	+18.6	+0.0
Broome	Nov 1991	+26.8	-0.1
Hillarys	Nov 1991	+23.3	-0.1
Esperance	Mar 1992	+15.7	+0.0*
Thevenard	Mar 1992	+8.7	+0.1
Port Stanvac	Jun 1992	+7.3	+0.1
Portland	Jul 1991	+3.7	+0.0
Lorne	Jan 1993	+2.0	+0.1
Stony Point	Jan 1993	+2.7	+0.1
Burnie	Sep 1992	+4.5	+0.2
Spring Bay	May 1991	+3.0	-0.1
Port Kembla	Jul 1991	+2.9	-0.3
Rosslyn Bay	Jun 1992	+9.3	-0.2
Cape Ferguson	Sep 1991	+11.4	+0.0

(* indicates that no sea level data was available)

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:

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

JUNE 2000
SIX MINUTE OBSERVATIONS FROM SEAFRAME STATIONS (m)

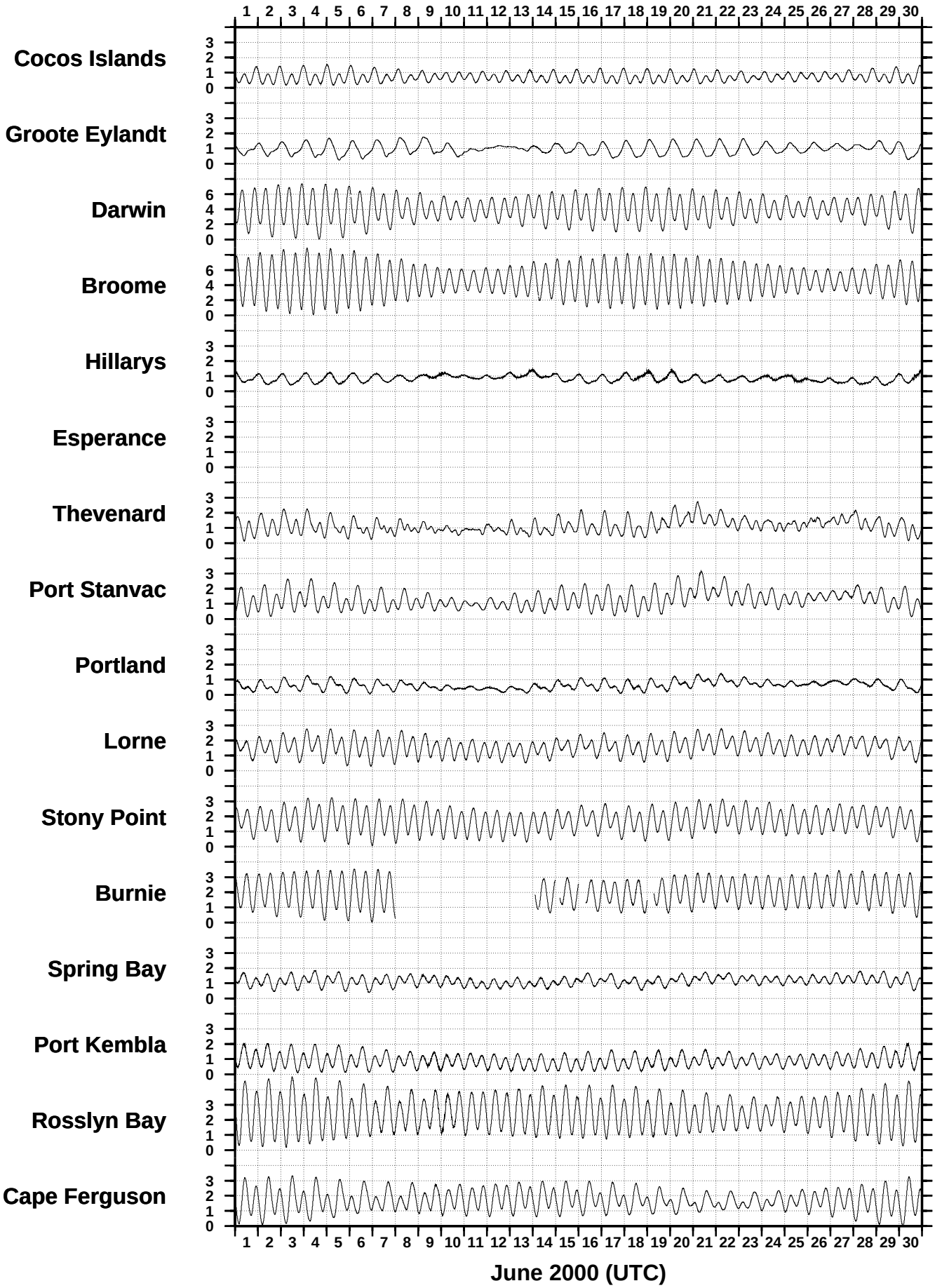


Figure 2

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

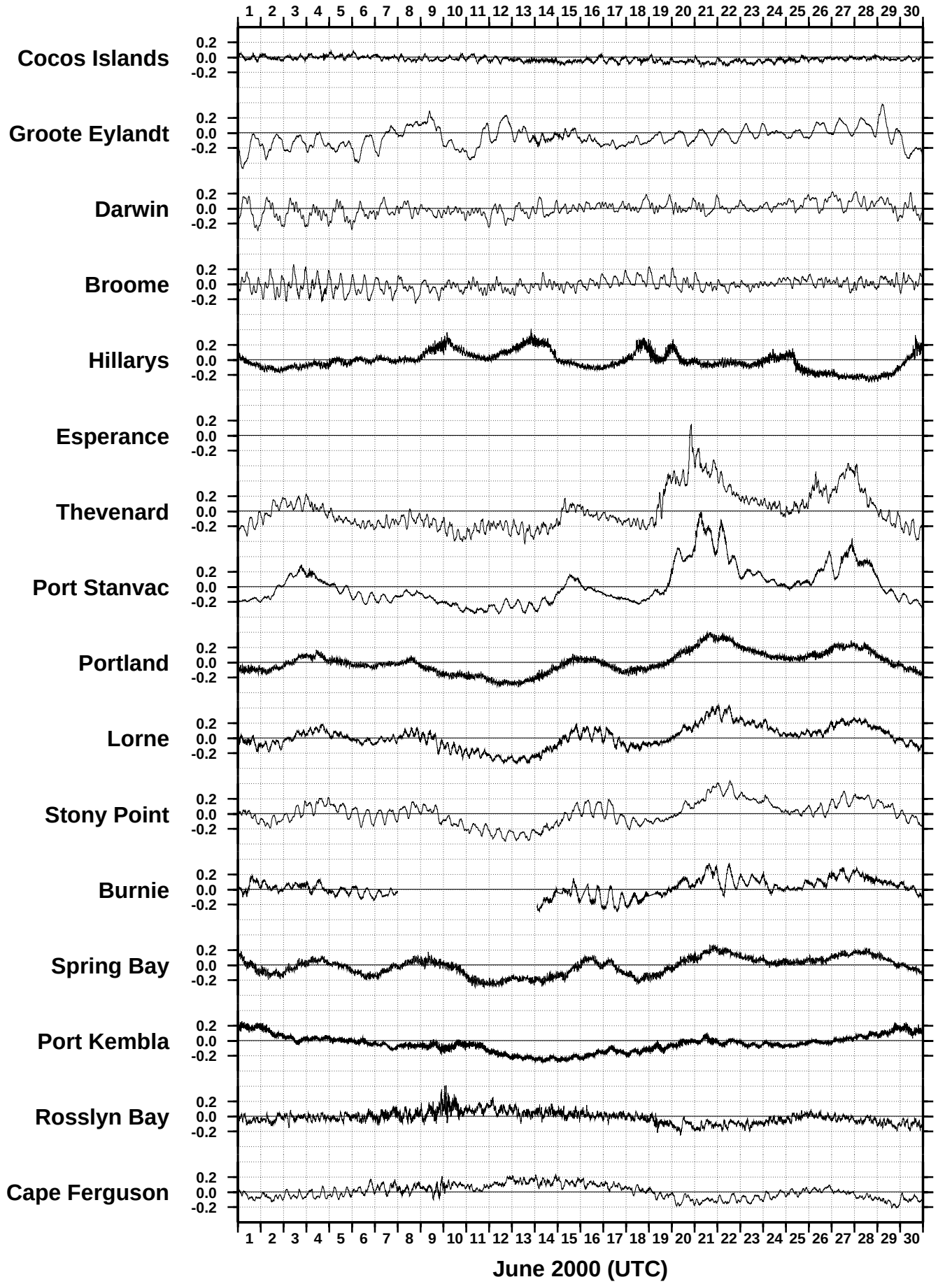


Figure 3

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

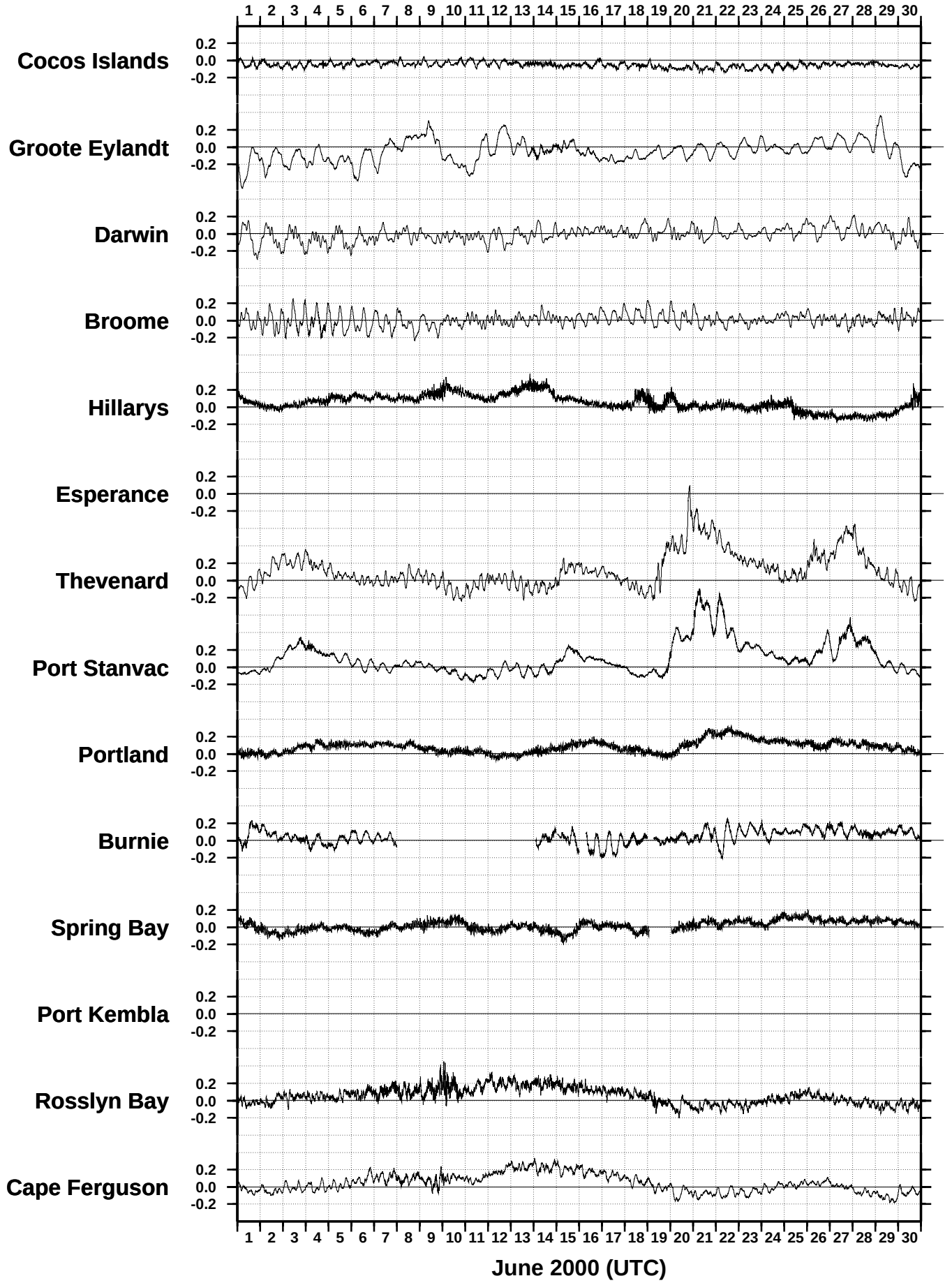


Figure 4

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

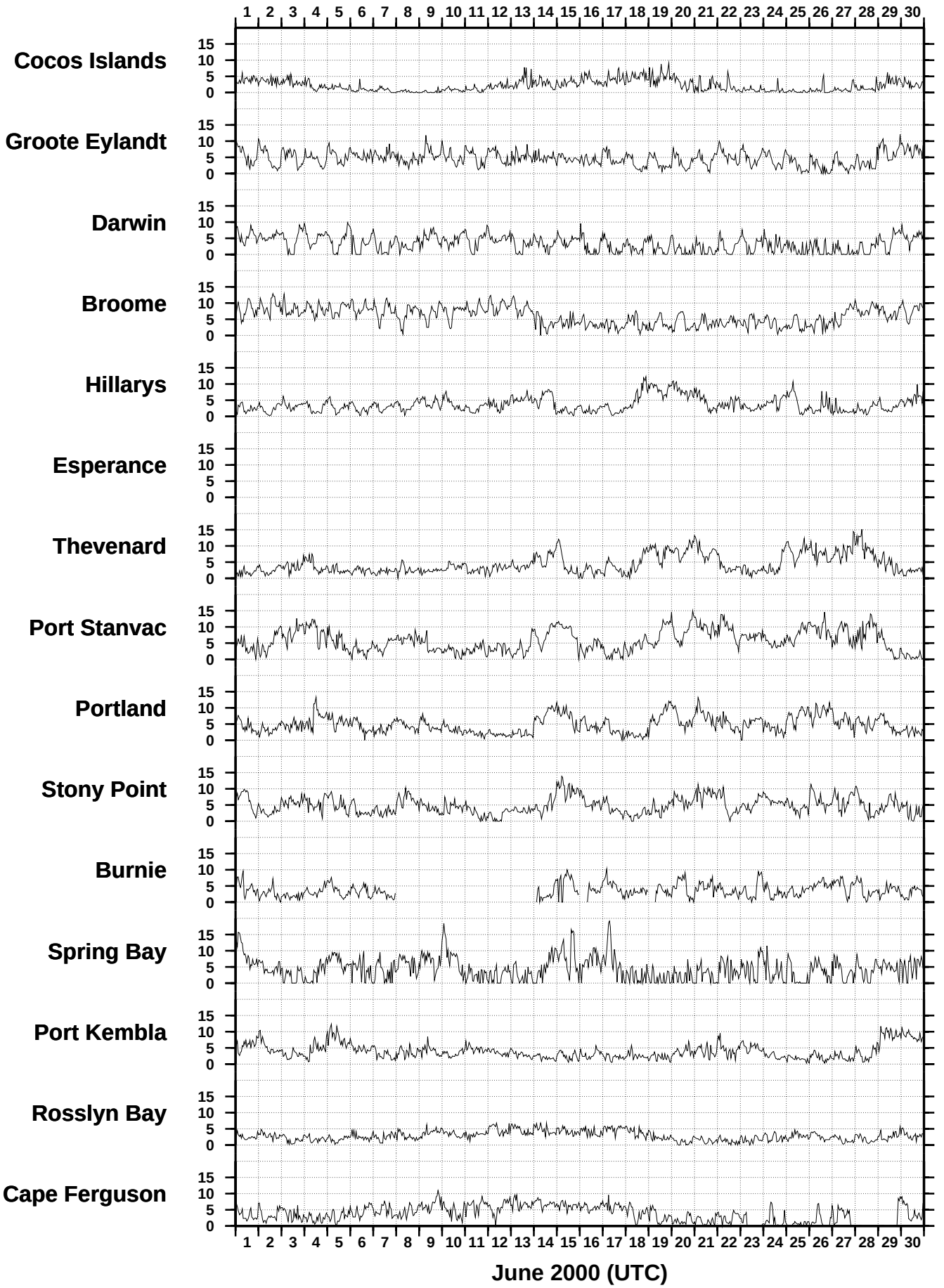


Figure 5

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

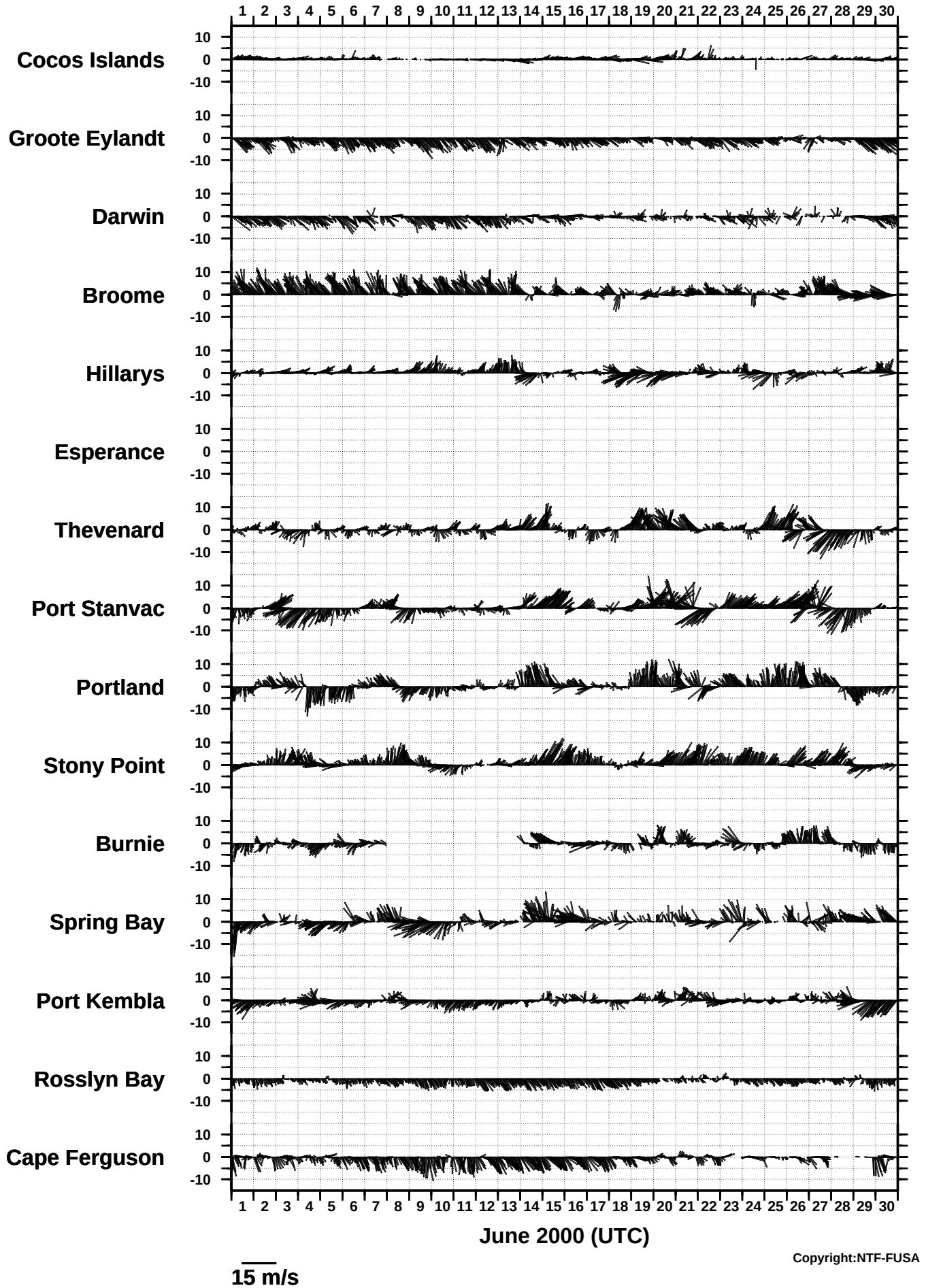


Figure 6

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

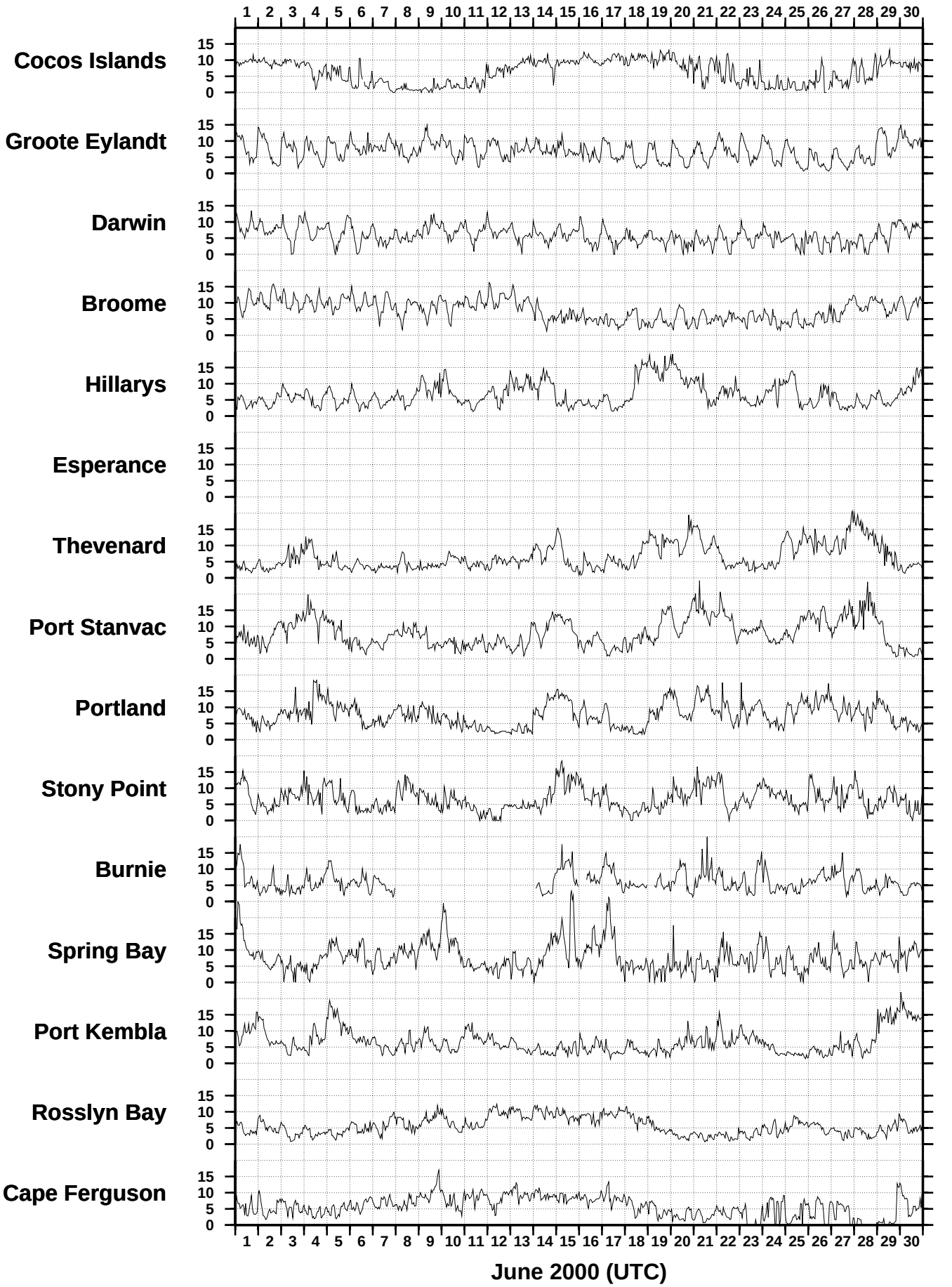


Figure 7

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

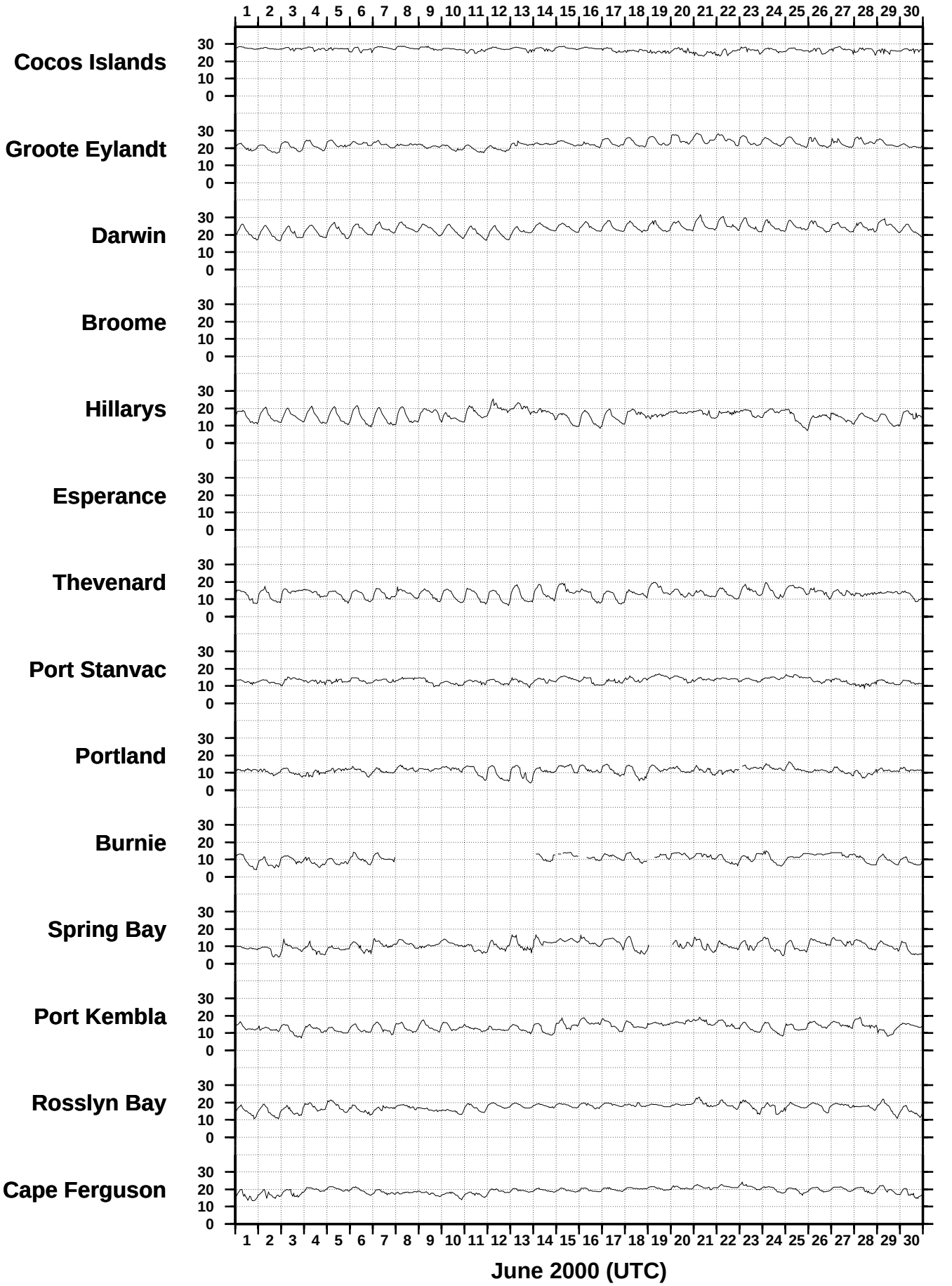


Figure 8

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

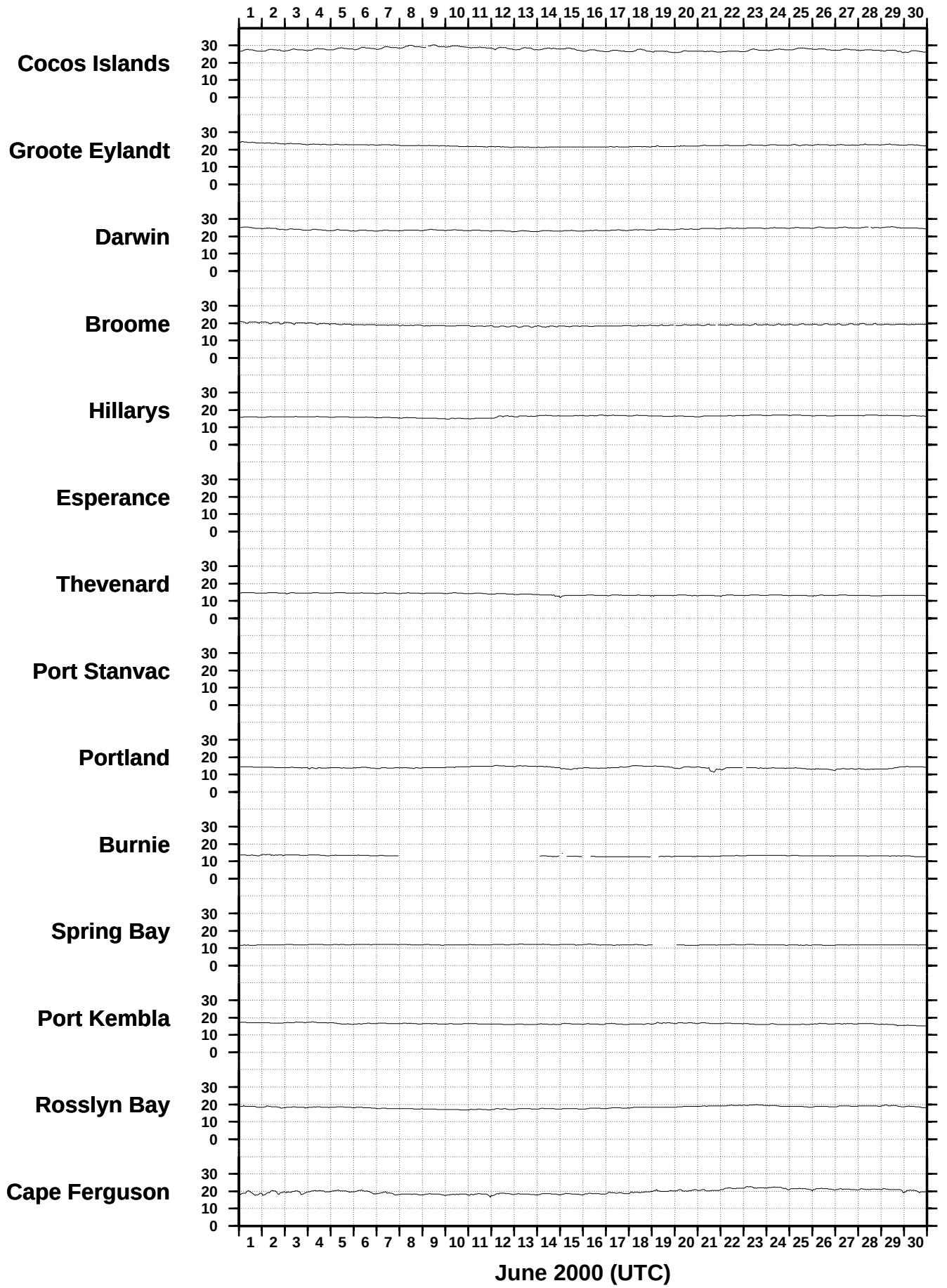


Figure 9

JUNE 2000
HOURLY ATMOSPHERIC PRESSURE FROM SEAFRAME STATIONS (hPa)

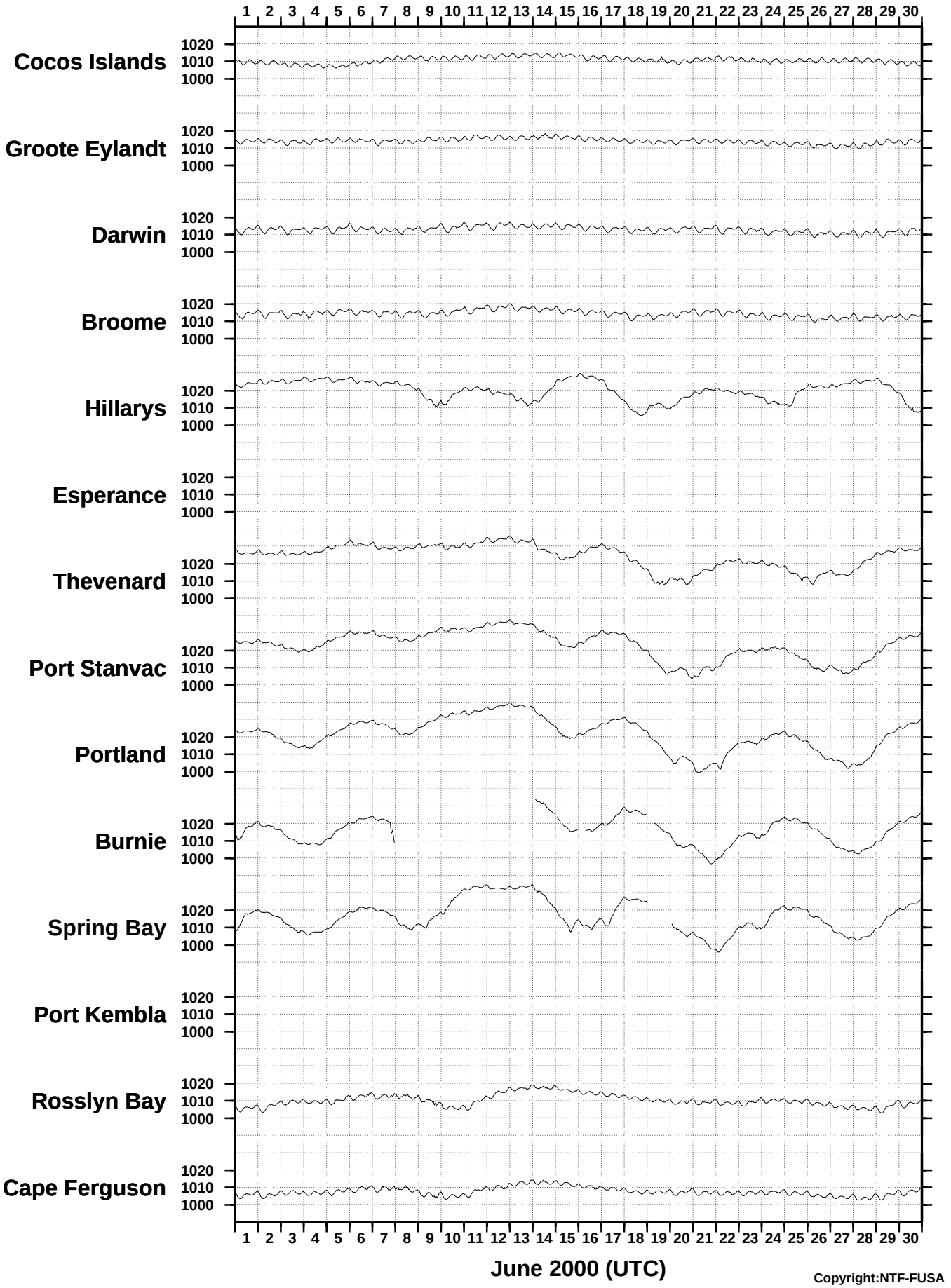


Figure 10

SEA LEVEL ANOMALIES THROUGH JUNE 2000 (m)

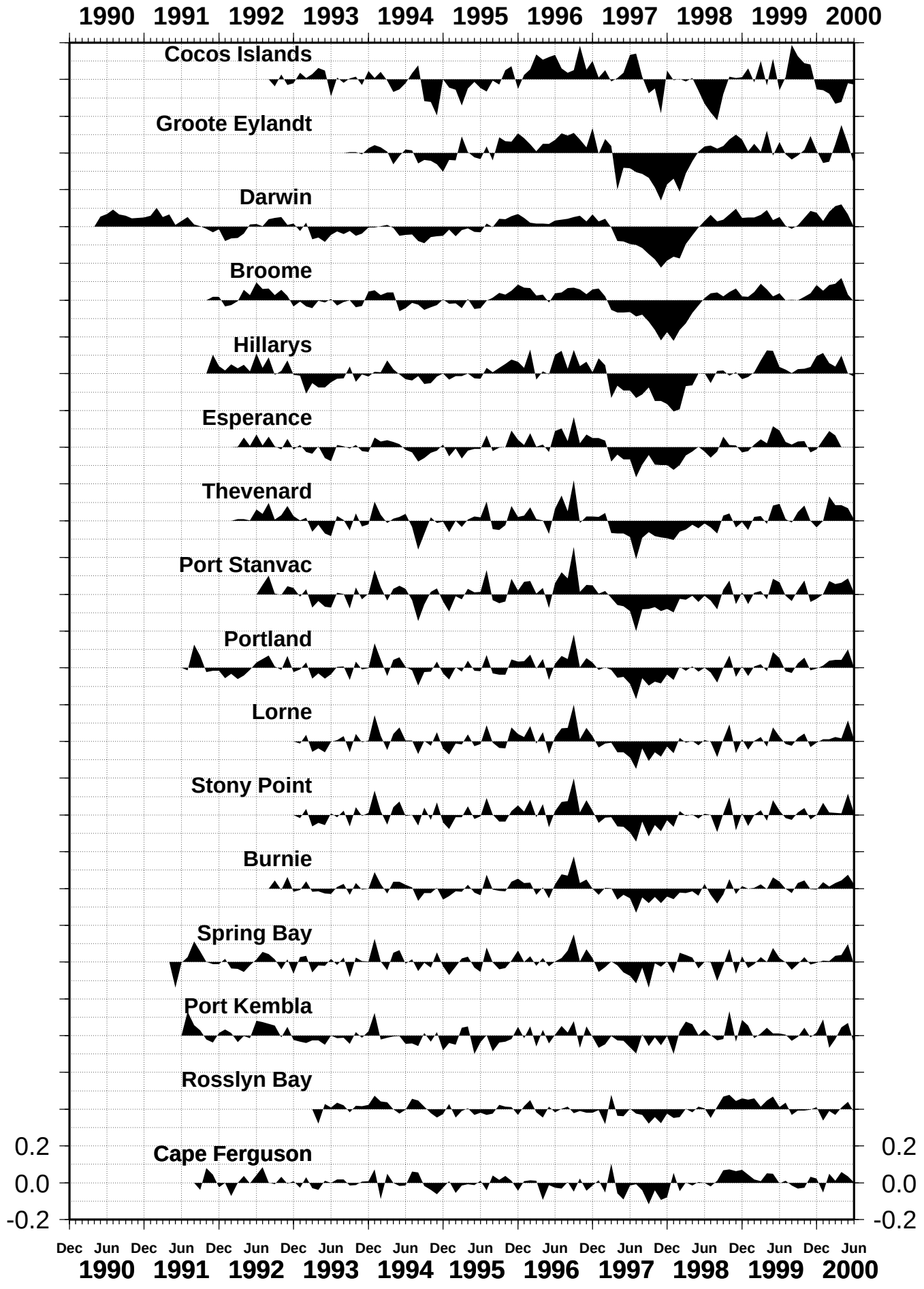


Figure 11

BAROMETRIC PRESSURE ANOMALIES THROUGH JUNE 2000 (hPa)

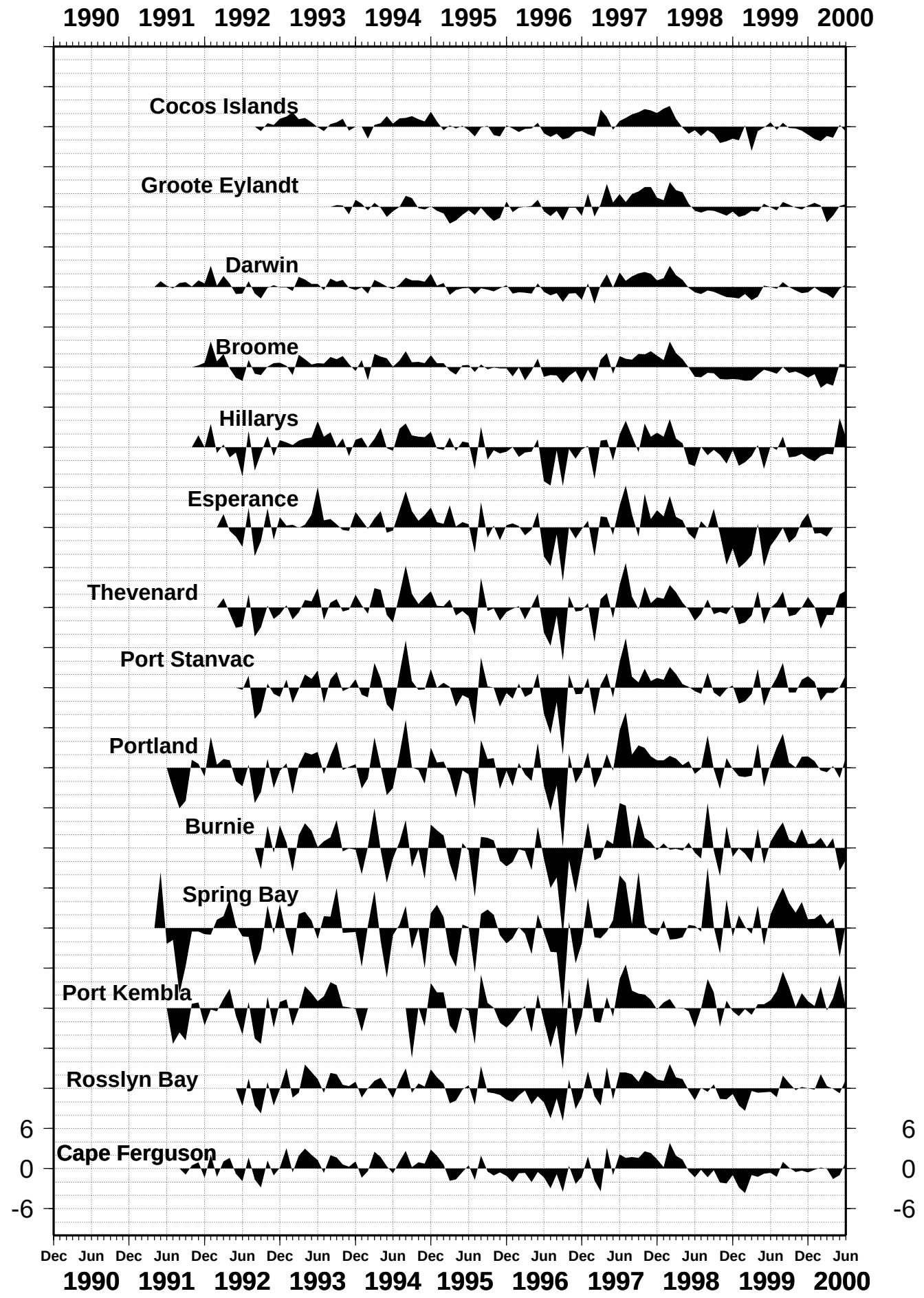


Figure 12

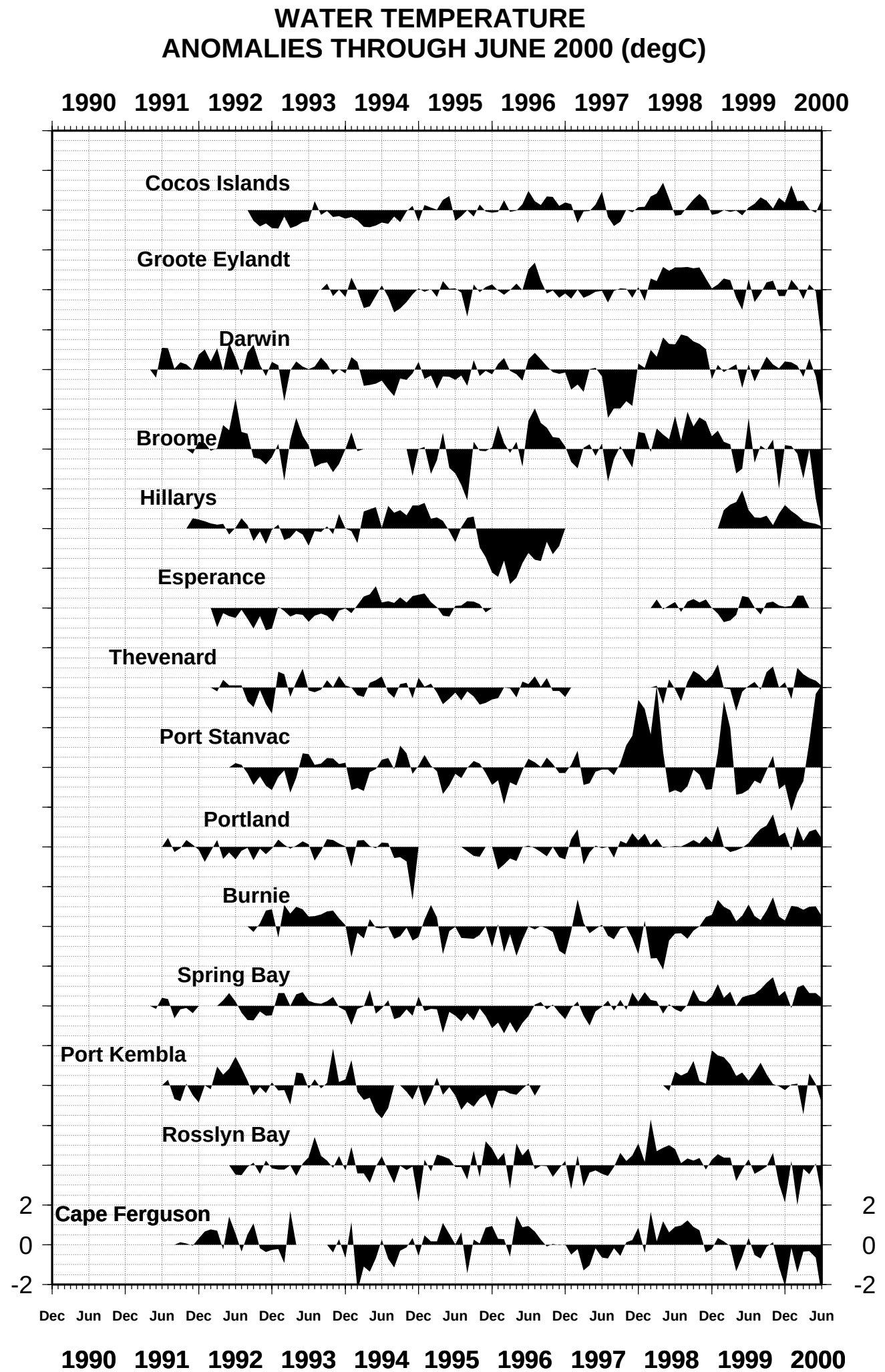

WATER TEMPERATURE
ANOMALIES THROUGH JUNE 2000 (degC)
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000
Cocos Islands
Groote Eylandt
Darwin
Broome
Hillarys
Esperance
Thevenard
Port Stanvac
Portland
Burnie
Spring Bay
Port Kembla
Rosslyn Bay
Cape Ferguson
2
0
-2
Dec Jun Dec Jun Dec Jun Dec Jun Dec Jun Dec Jun Dec Jun Dec Jun Dec Jun Dec Jun Dec Jun Dec Jun Dec Jun
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000

Figure 13

AIR TEMPERATURE ANOMALIES THROUGH JUNE 2000 (degC)

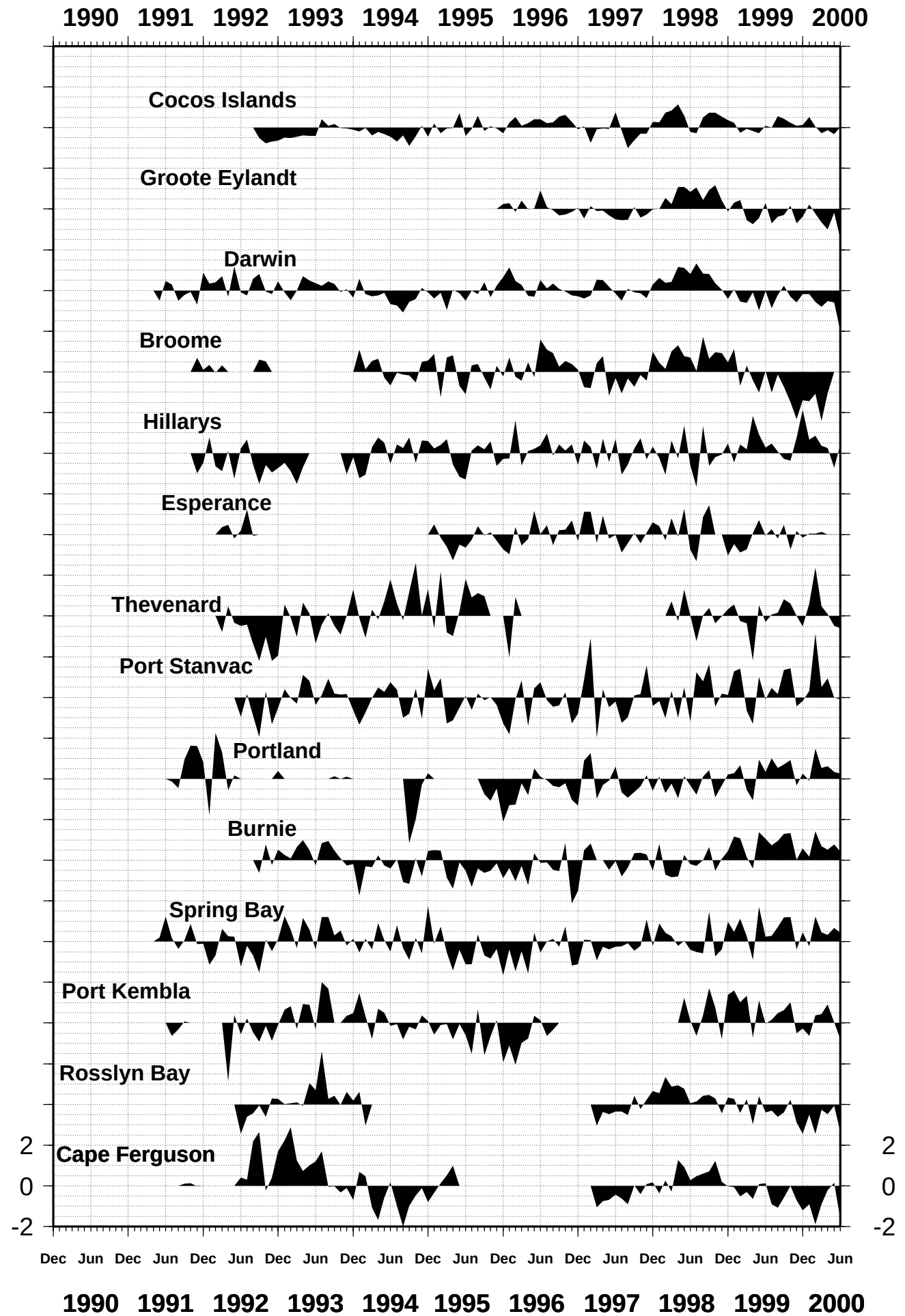


Figure 14

SEA LEVEL TRENDS THROUGH JUNE 2000 (mm/year)

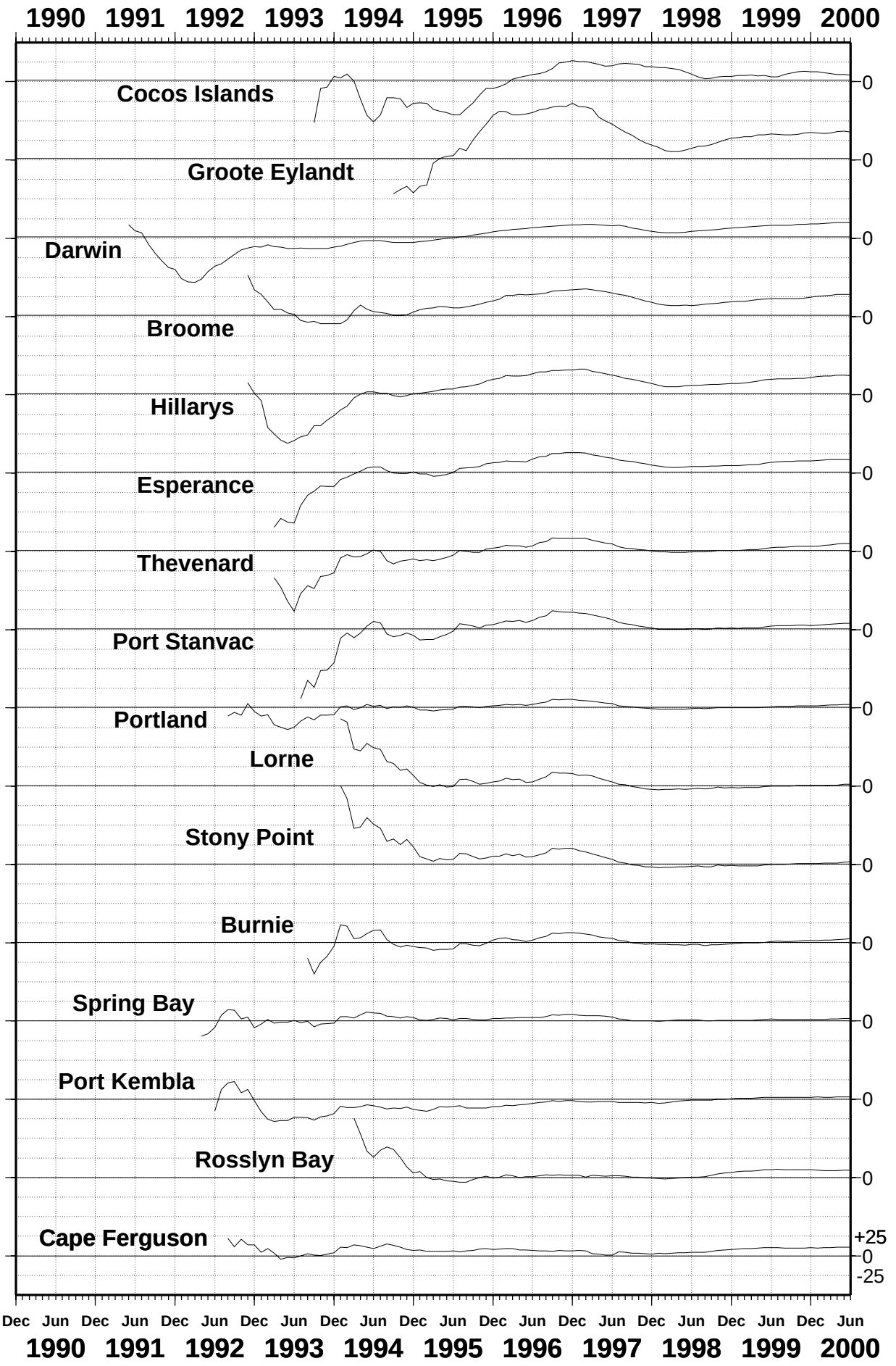


Figure 15

SEA LEVEL DATA RETURN

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

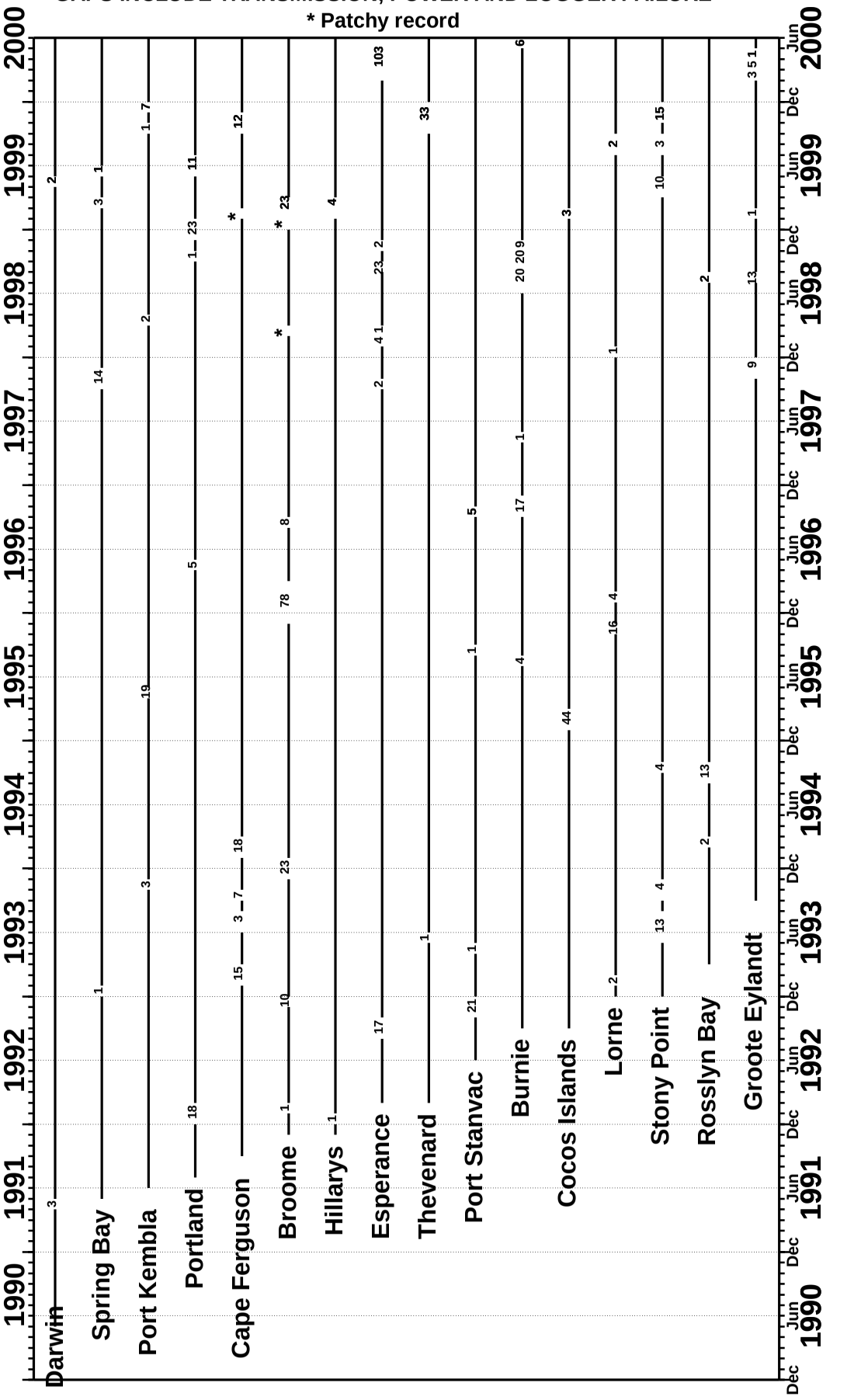
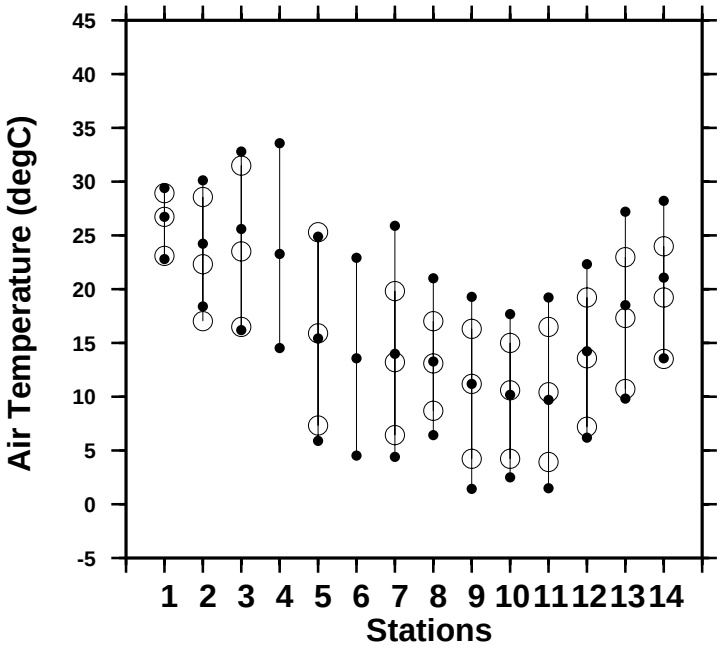
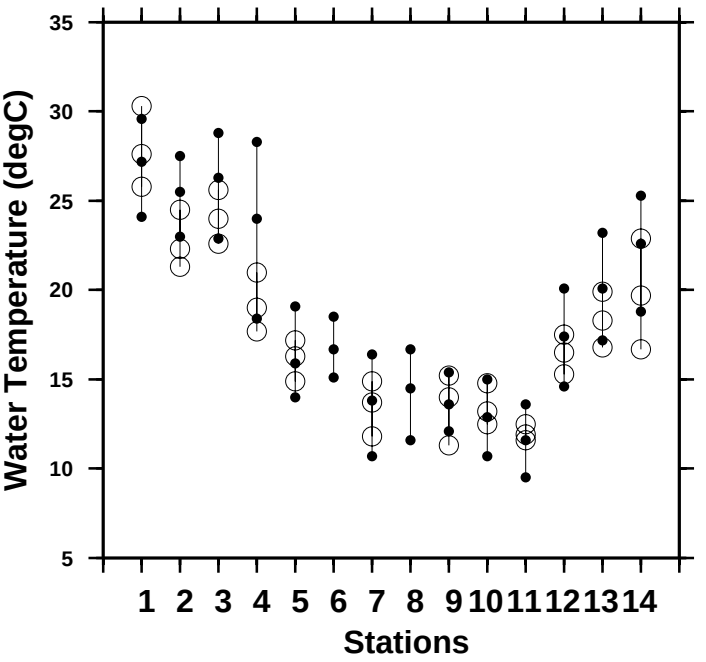
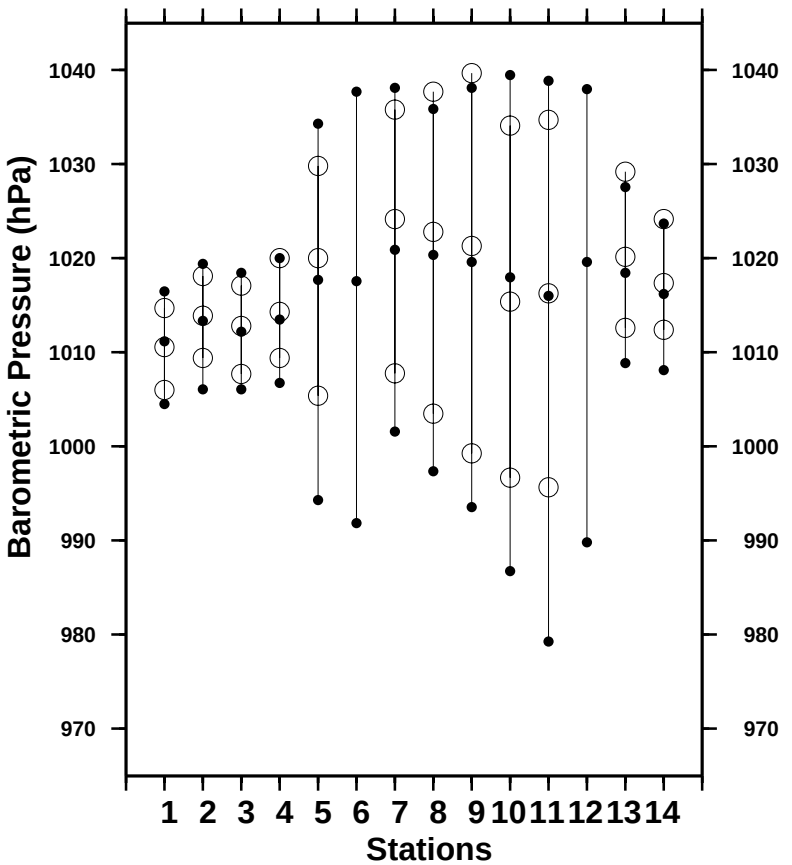


Figure 16

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

June 2000 Maximum
June 2000 Mean
June 2000 Minimum

Long Term June Maximum
Long Term June Mean
Long Term June Minimum