

THE AUSTRALIAN BASELINE SEA LEVEL MONITORING PROJECT

MONTHLY DATA REPORT

JULY 2000



NOTES ON THE DATA FOR JULY 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. At Burnie the primary sea level sensor ceased operation by on the 19th July. The NTF technicians are currently looking into the cause of this problem.

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 are erroneous.

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 July.

Looking at the sea level anomalies this month (Figure 10) it can be seen that the anomalies for Groote Eylandt, Cape Ferguson and Rosslyn Bay were slightly negative, whilst the anomalies for the remaining Australian stations were positive. Stations along the south eastern coastline of Australia exhibited the strongest positive anomalies. The sea level anomaly at Cocos Islands, the only Baseline station not on the Australian mainland, remains 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 July 18th. 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 July 2000 are compared with the long-term July values. These comparisons are shown in Figure 16. Please remember that the long-term ranges are calculated using the historical sets of July data for each station *excluding* the current month of data.

The mean barometric pressures recorded for July were quite consistent with the long-term July means for the Baseline stations.

A similar comparison was made between the long-term spread of July air temperature data and that which occurred this month. There are no significant differences between the long-term July mean and the July 2000 mean at each station. Figure 16 indicates that a record low air temperature was recorded at Cape Ferguson and a record high air temperature was recorded at Hillarys.

The water temperature mean values for July 2000 were quite consistent with the long-term means for most locations (Figure 16). A record high water temperature was observed at Cocos Island and Port Stanvac. The water temperature observations at Port Stanvac are suspected of being erroneous and have been removed from Figures 8, 12 and 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	+6.7	-0.1
Groote Eylandt	Sep 1993	+33.9	-0.2
Darwin	May 1990	+18.8	+0.2
Broome	Nov 1991	+27.2	+0.4
Hillarys	Nov 1991	+23.5	+0.1
Esperance	Mar 1992	+15.7	+0.0*
Thevenard	Mar 1992	+9.9	+1.2
Port Stanvac	Jun 1992	+8.3	+1.0
Portland	Jul 1991	+4.3	+0.6
Lorne	Jan 1993	+2.8	+0.8
Stony Point	Jan 1993	+3.5	+0.7
Burnie	Sep 1992	+4.7	+0.2
Spring Bay	May 1991	+3.3	+0.3
Port Kembla	Jul 1991	+3.2	+0.2
Rossllyn Bay	Jun 1992	+9.0	-0.3
Cape Ferguson	Sep 1991	+11.1	-0.3

(* indicates that no sea level data was available)

A new plot has been added to the Monthly Data Report this month which shows the monthly mean sea levels with respect to an arbitrary fixed offset from the zero of the tide gauge (Figure 17). 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 the 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.

Contact address: NATIONAL TIDAL FACILITY
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 the *National Tidal Facility* shall be liable for any loss or injury whatsoever arising from the use of the data. Copyright for material contained in this document is held by the *Commonwealth of Australia*.

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

JULY 2000
SIX MINUTE OBSERVATIONS FROM SEAFRAME STATIONS (m)

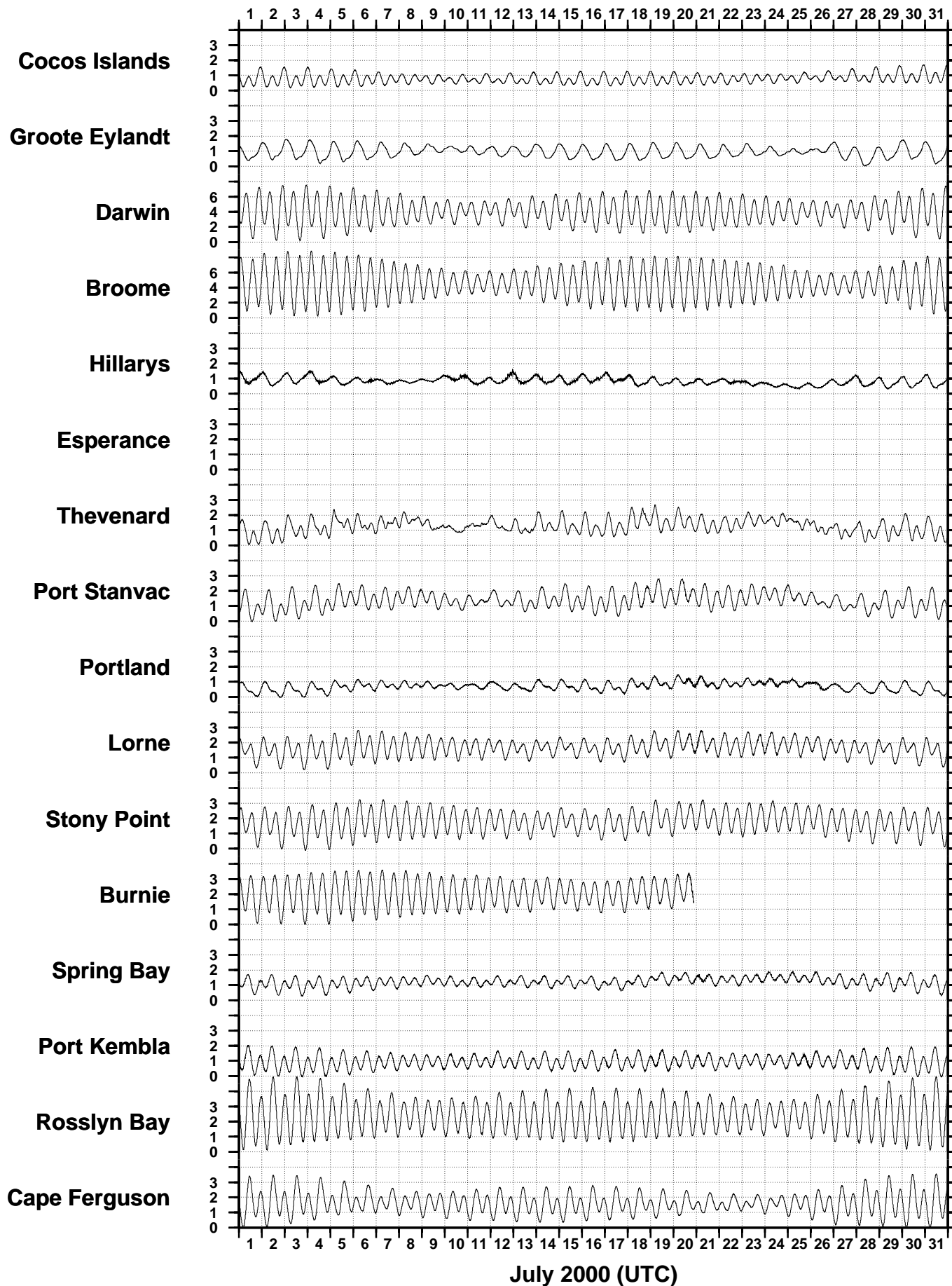


Figure 2

JULY 2000

RESIDUALS AT SIX MINUTE INTERVALS FROM SEAFRAME STATIONS (m)

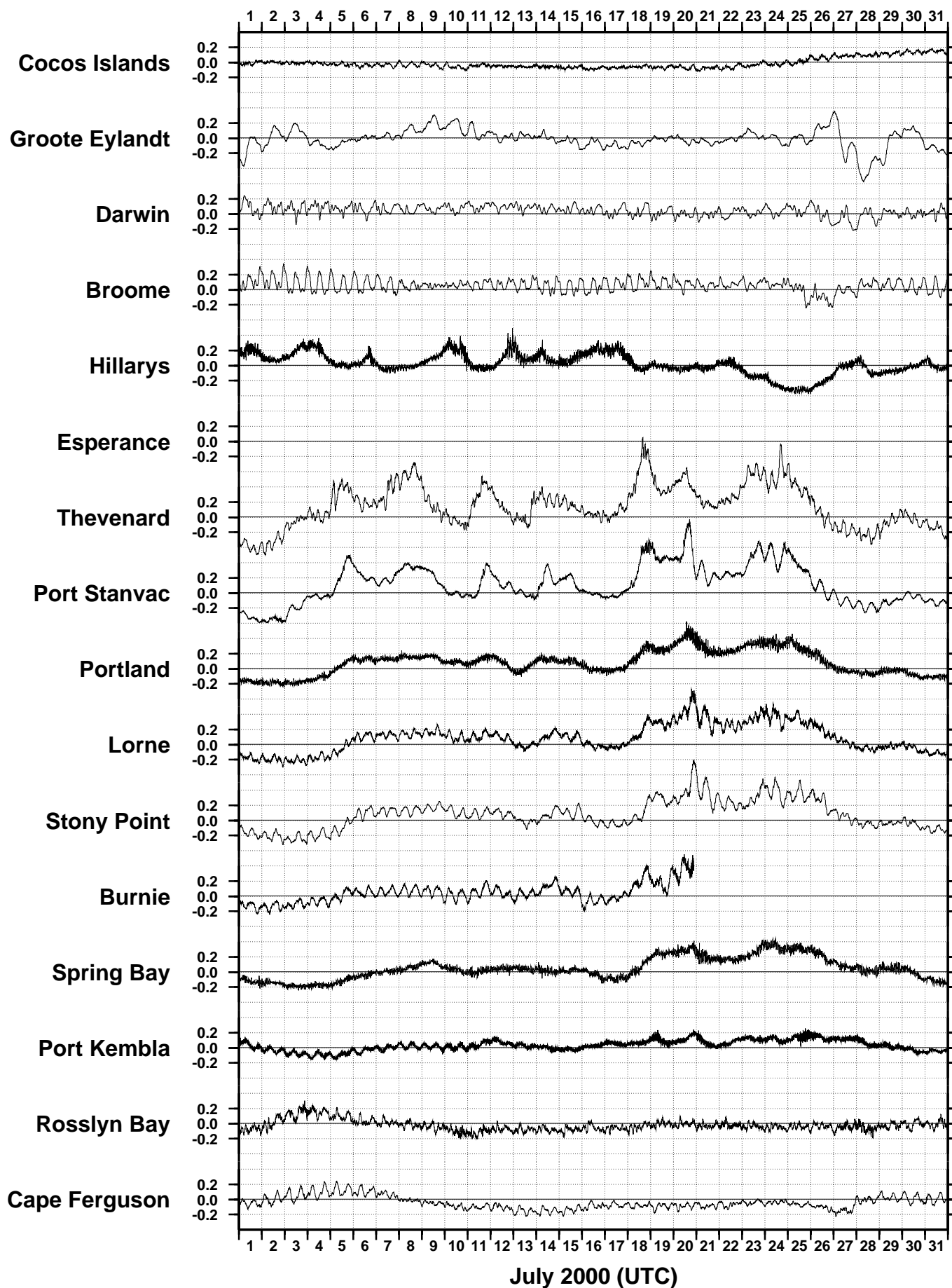


Figure 3

JULY 2000

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

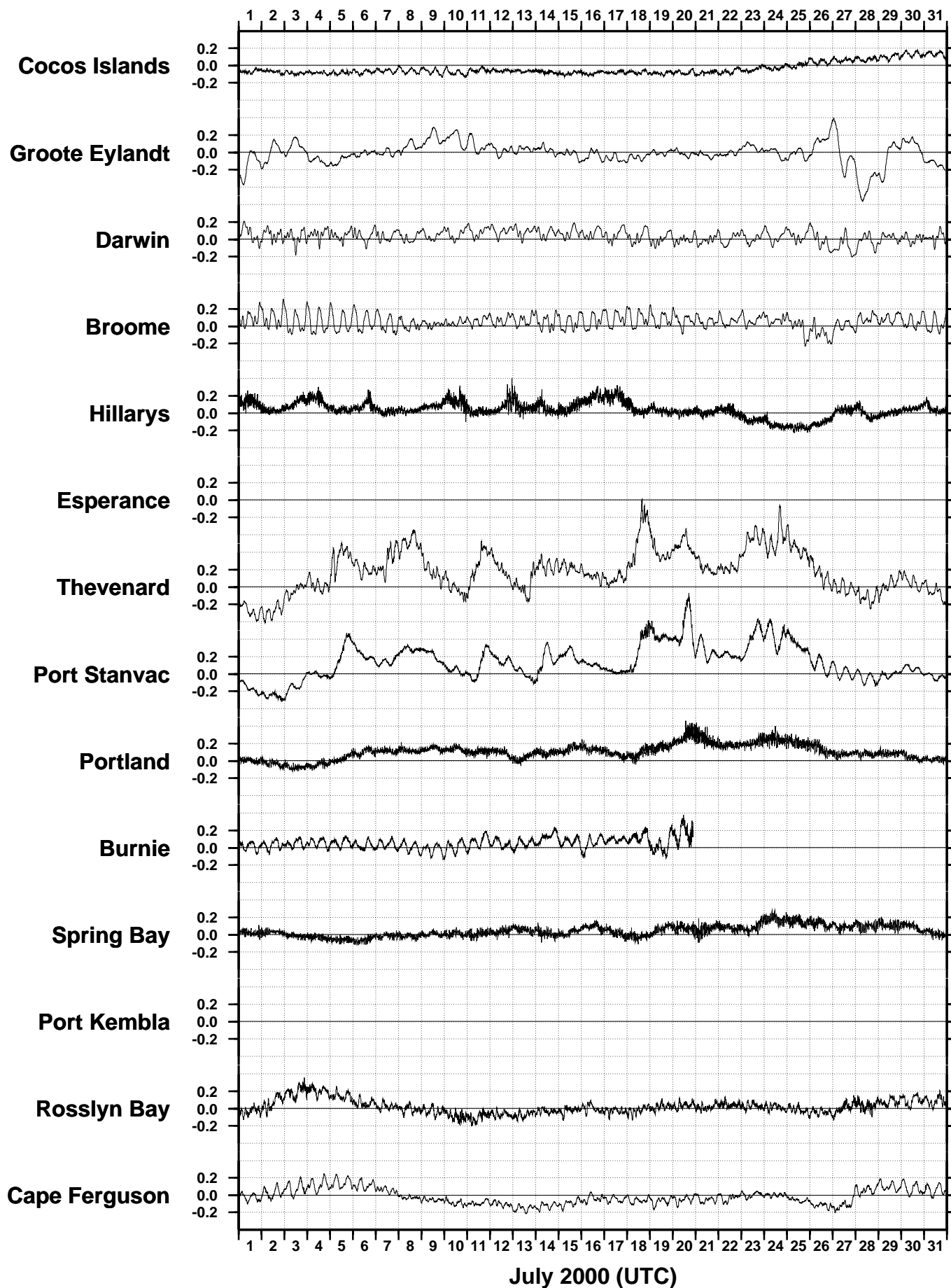


Figure 4

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

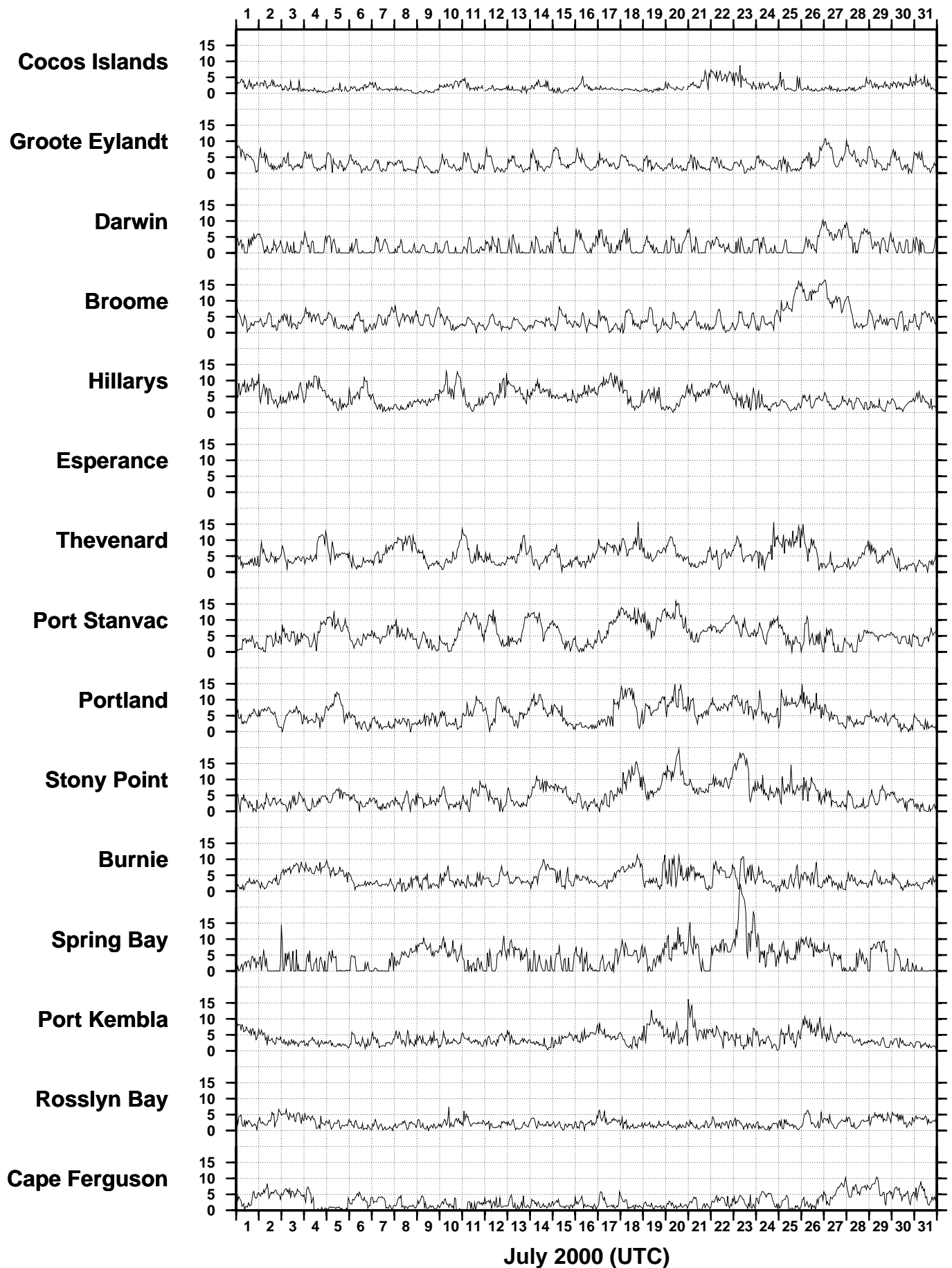


Figure 5

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

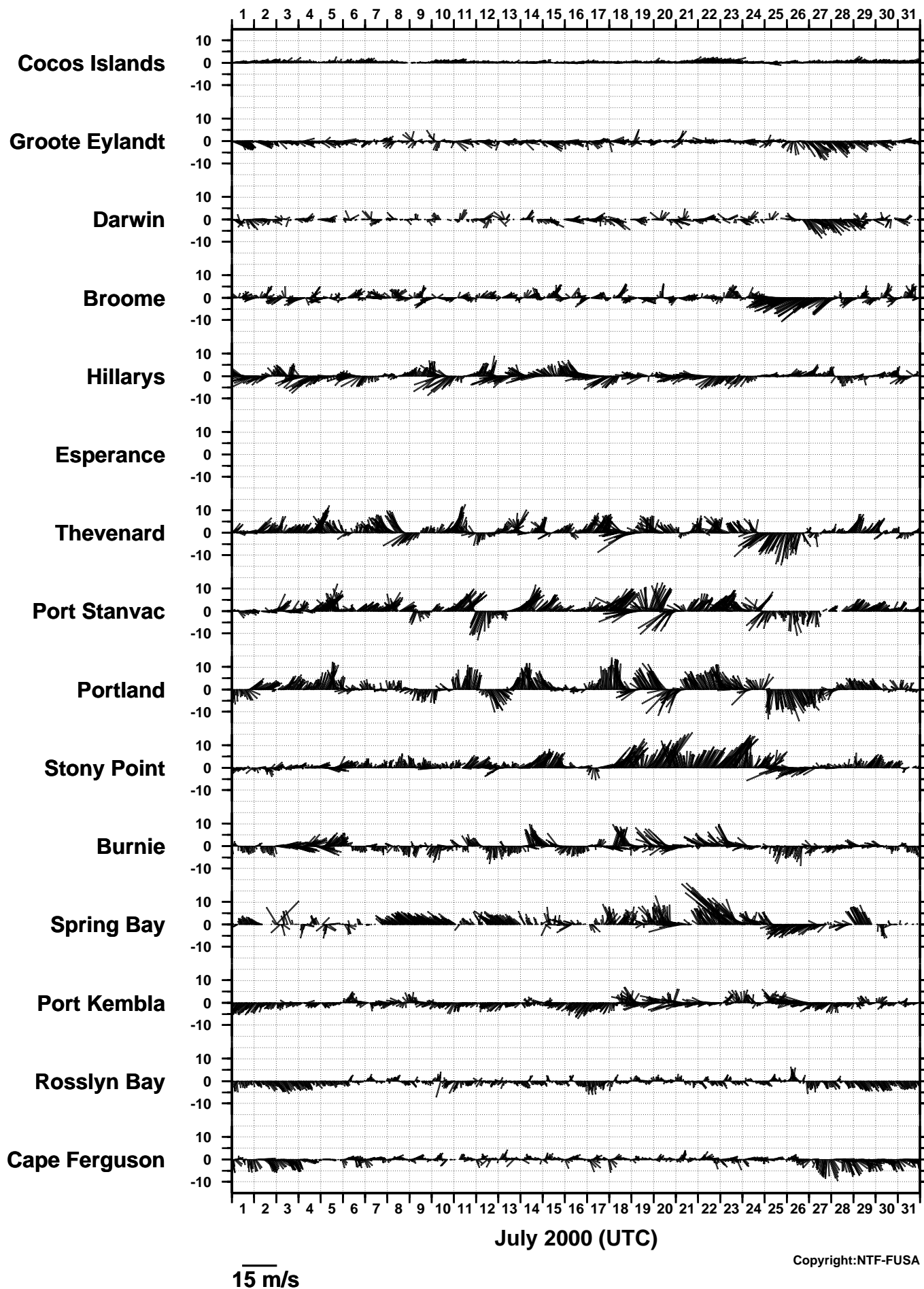


Figure 6

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

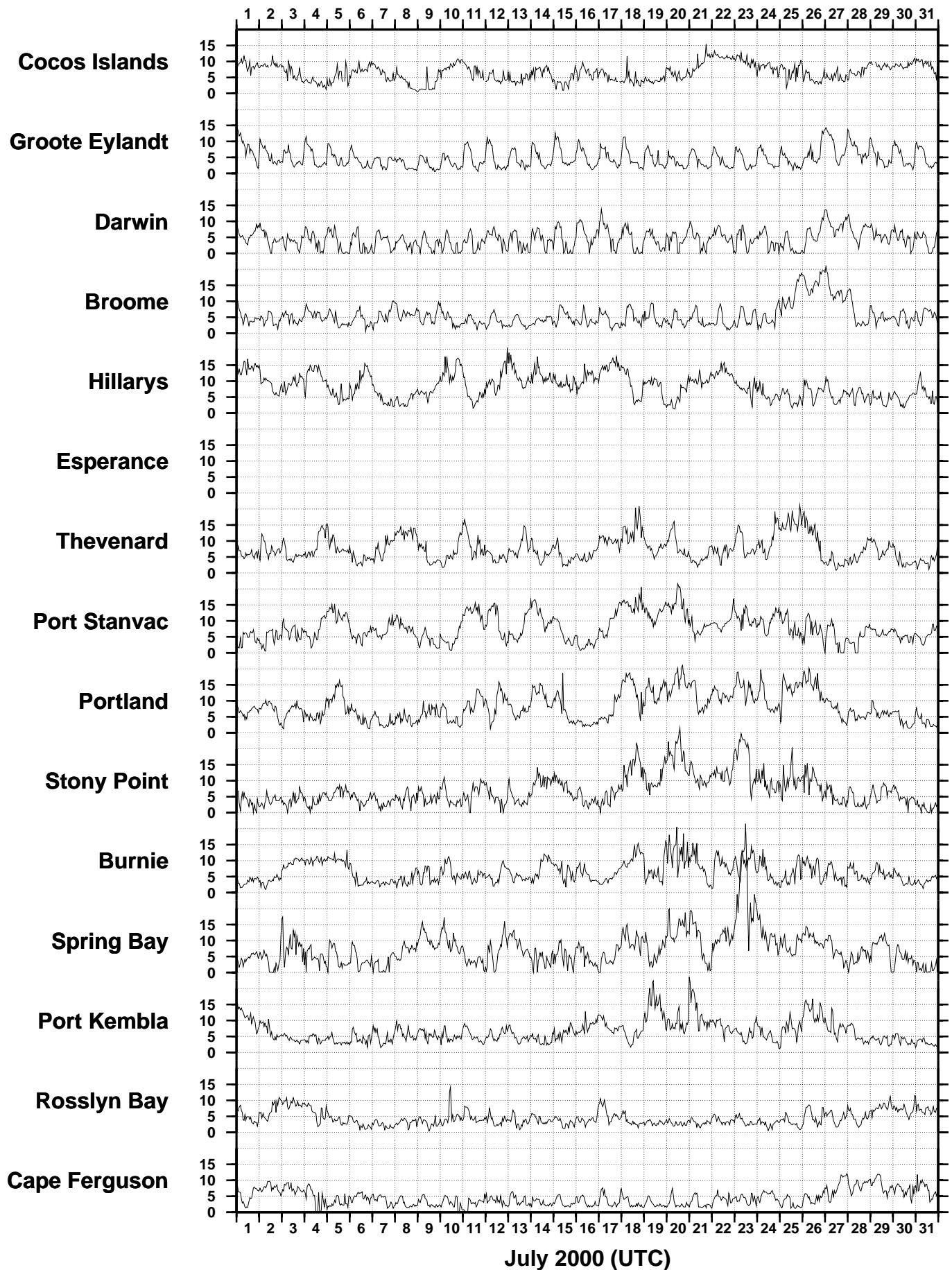


Figure 7

JULY 2000

HOURLY AIR TEMPERATURES FROM SEAFRAME STATIONS (deg C)

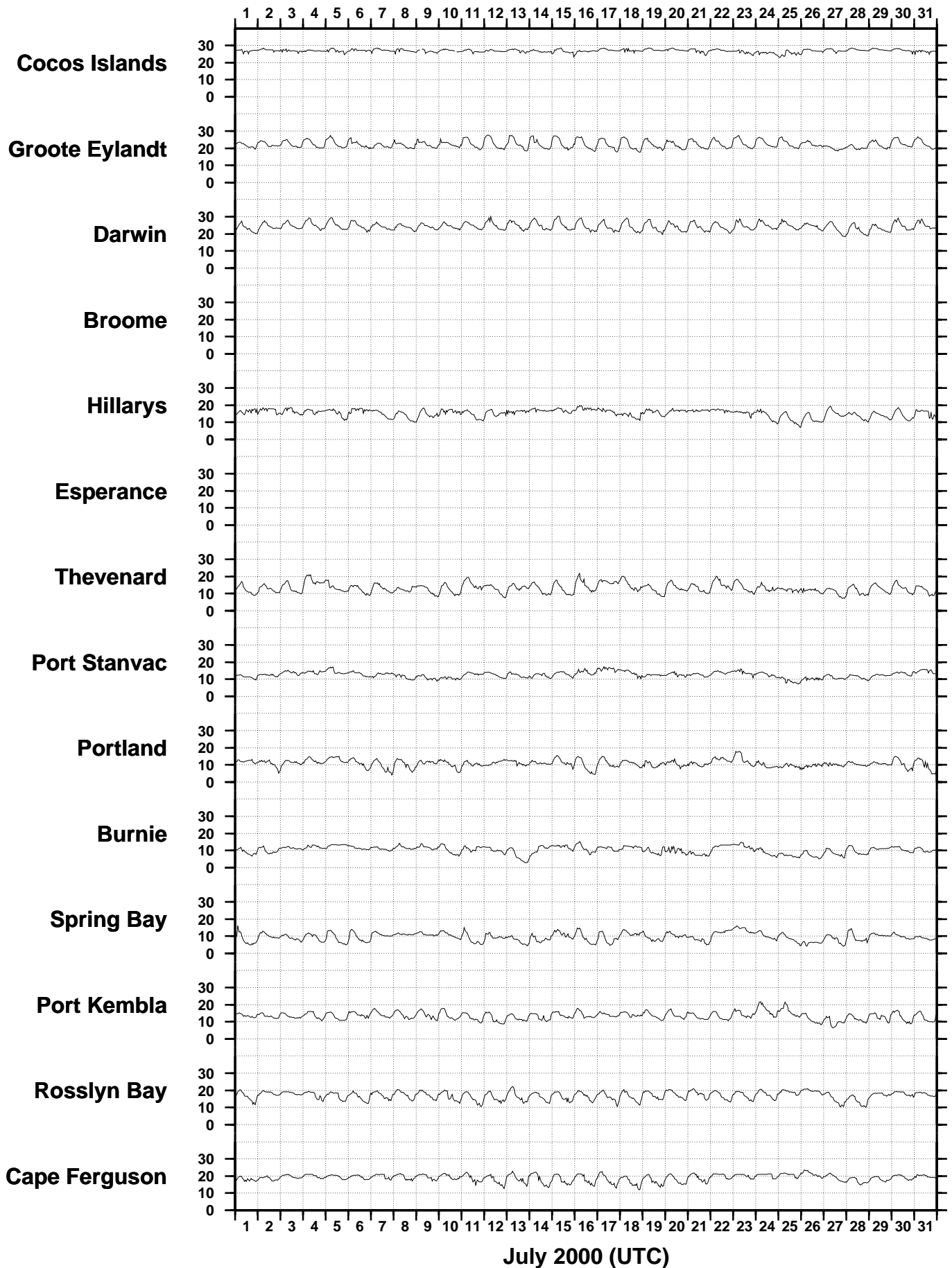


Figure 8

JULY 2000

HOURLY WATER TEMPERATURES FROM SEAFRAME STATIONS (deg C)

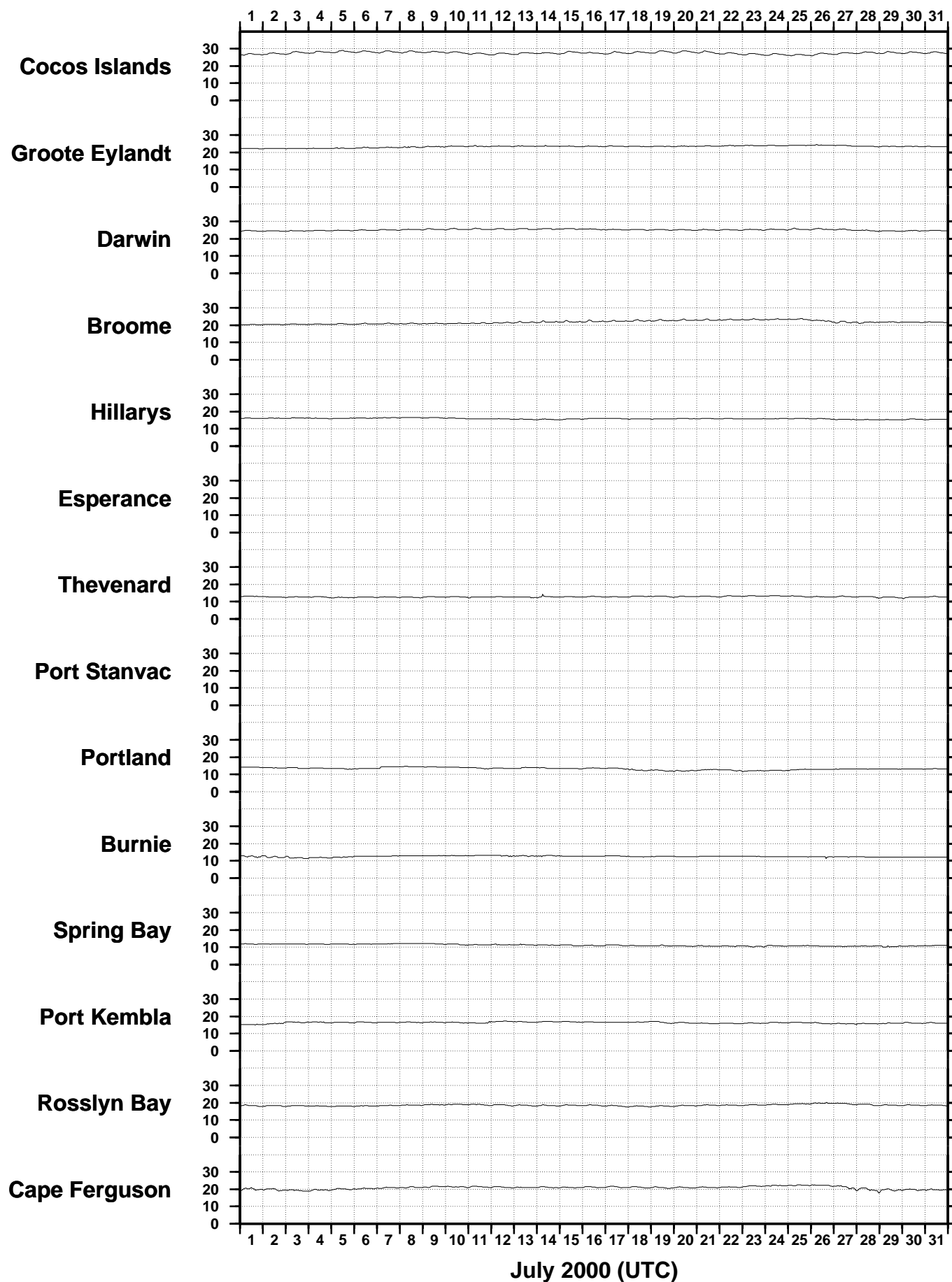
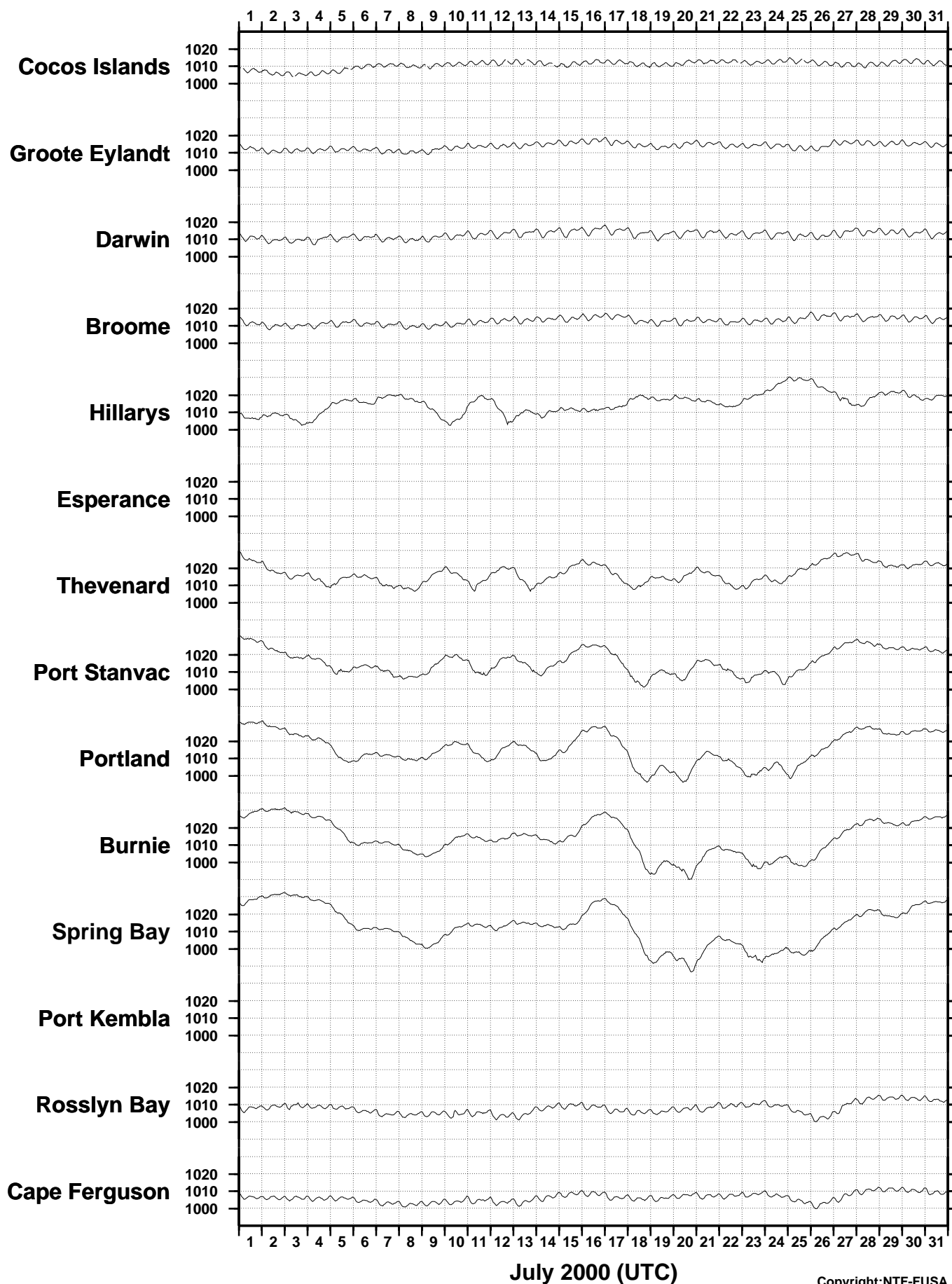


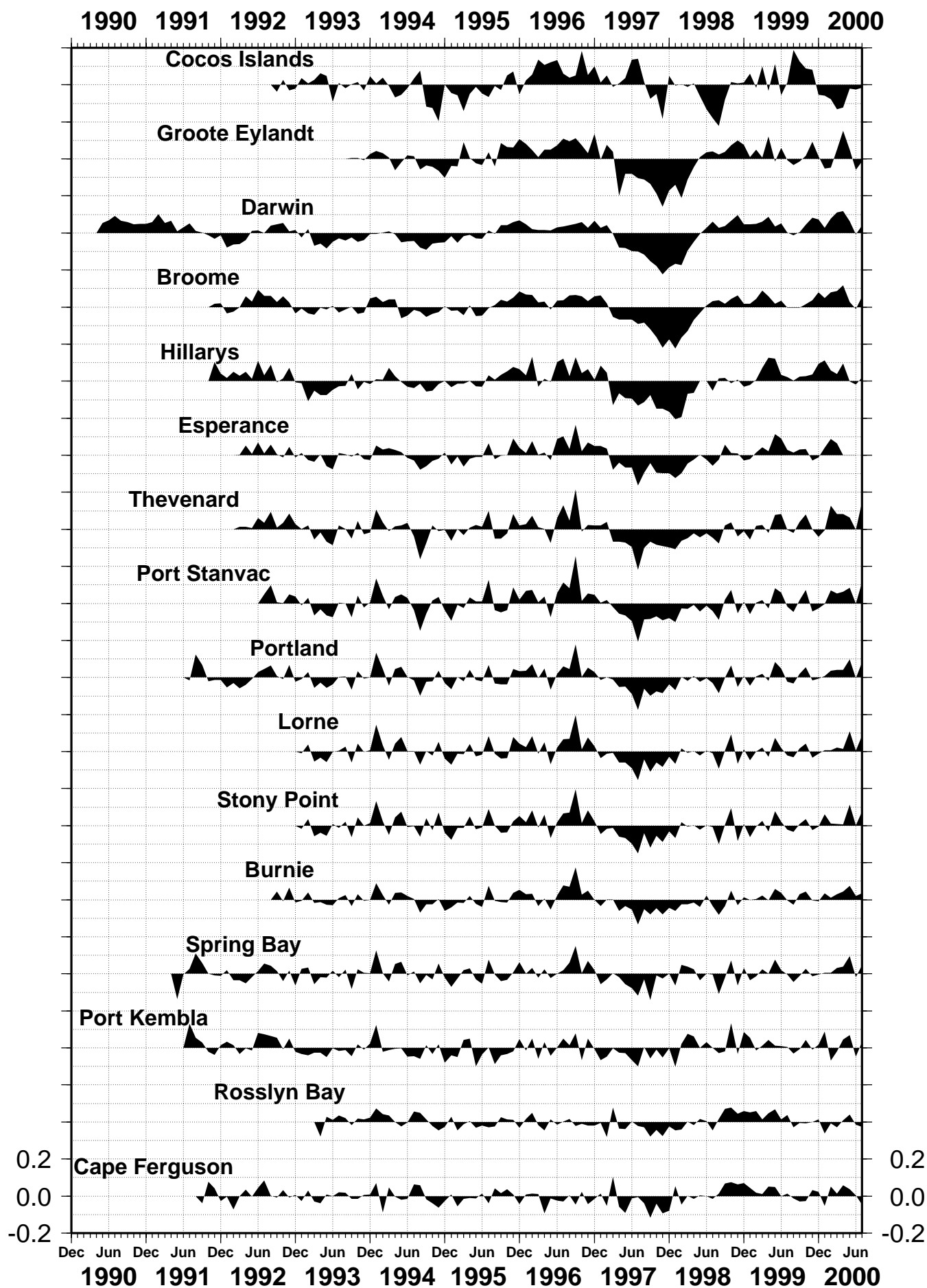
Figure 9

JULY 2000
HOURLY ATMOSPHERIC PRESSURE FROM SEAFRAME STATIONS (hPa)



July 2000 (UTC)

Figure 10
SEA LEVEL ANOMALIES THROUGH JULY 2000 (m)



BAROMETRIC PRESSURE ANOMALIES THROUGH JULY 2000 (hPa)

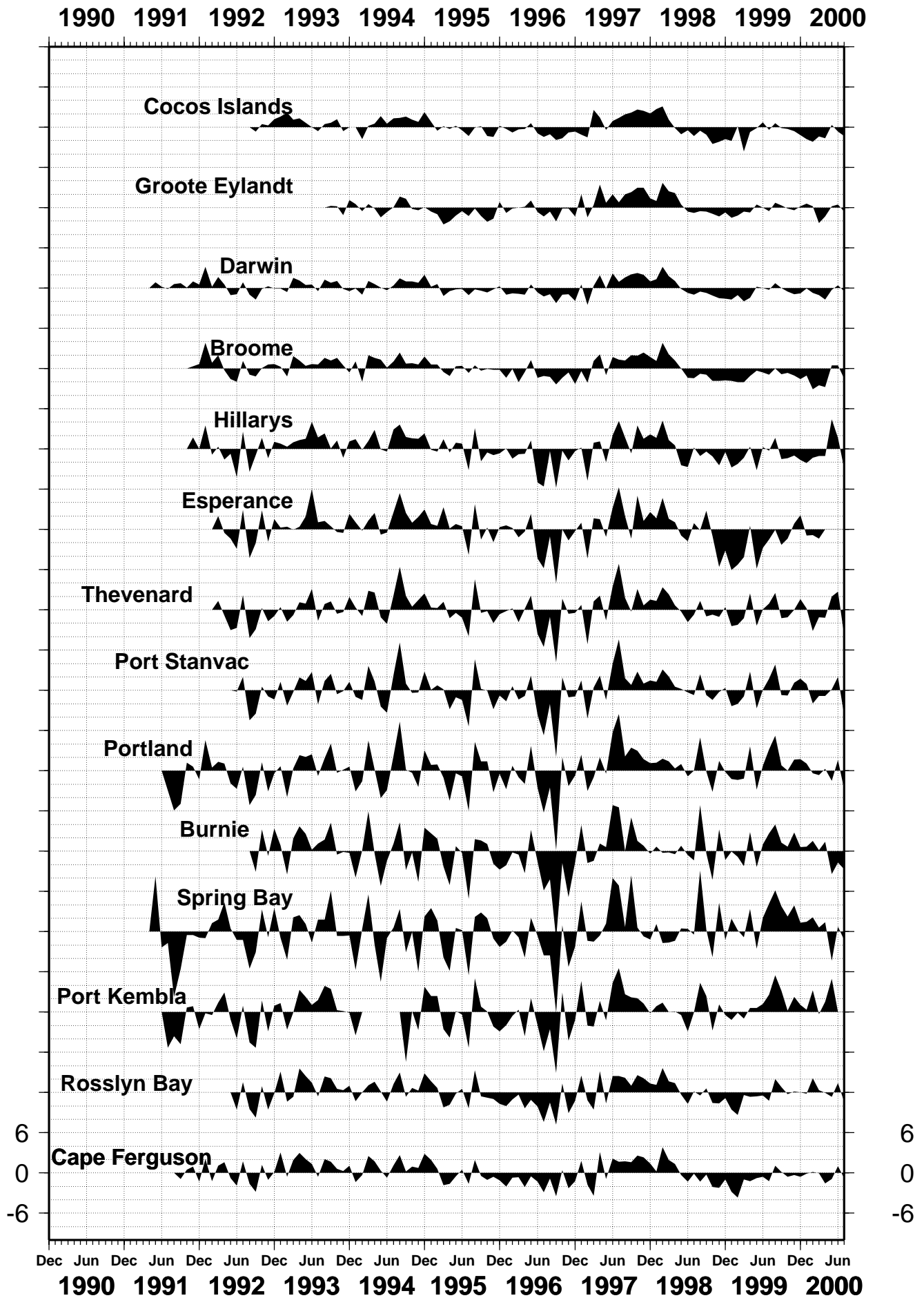


Figure 12

**WATER TEMPERATURE
ANOMALIES THROUGH JULY 2000 (degC)**

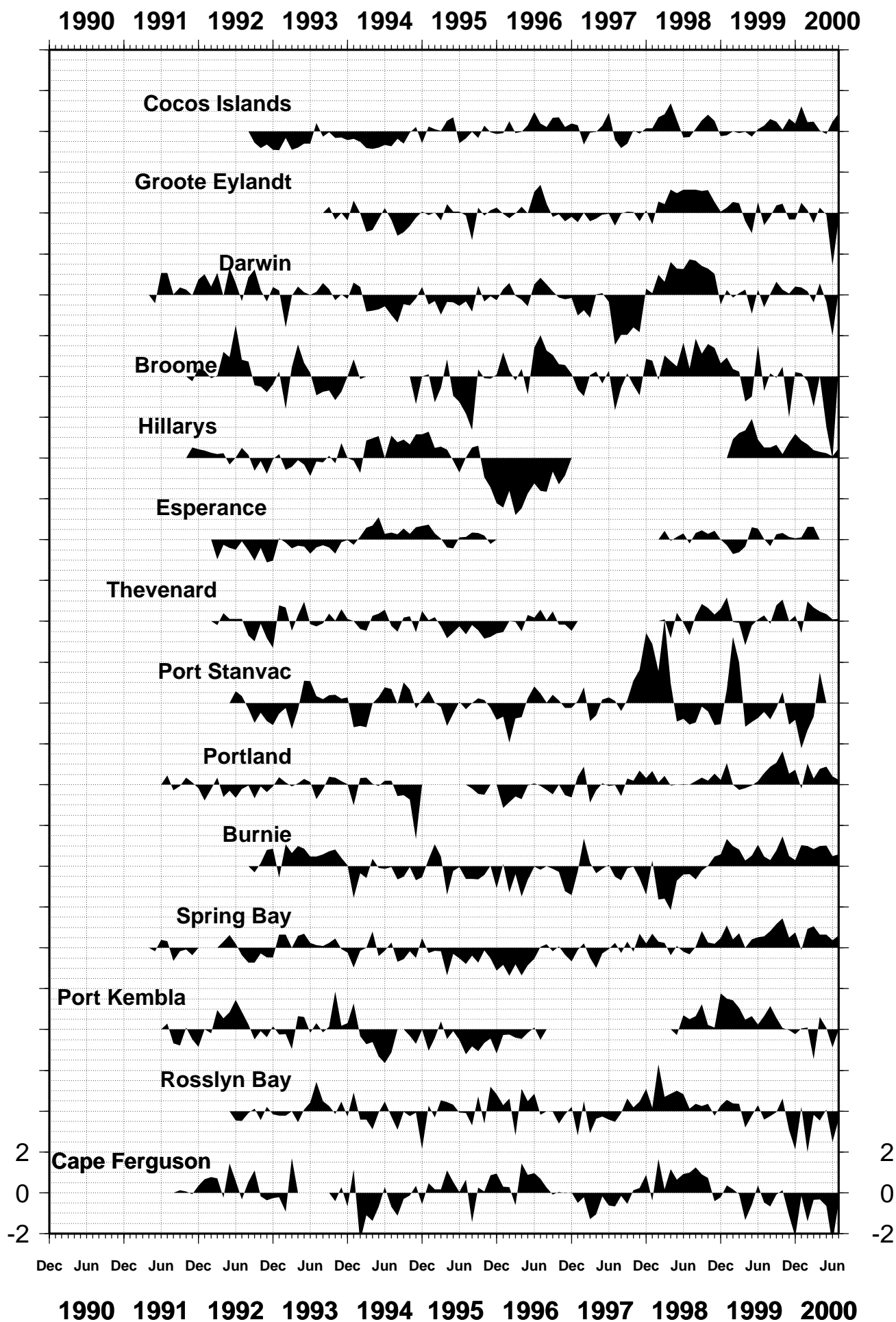


Figure 13

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

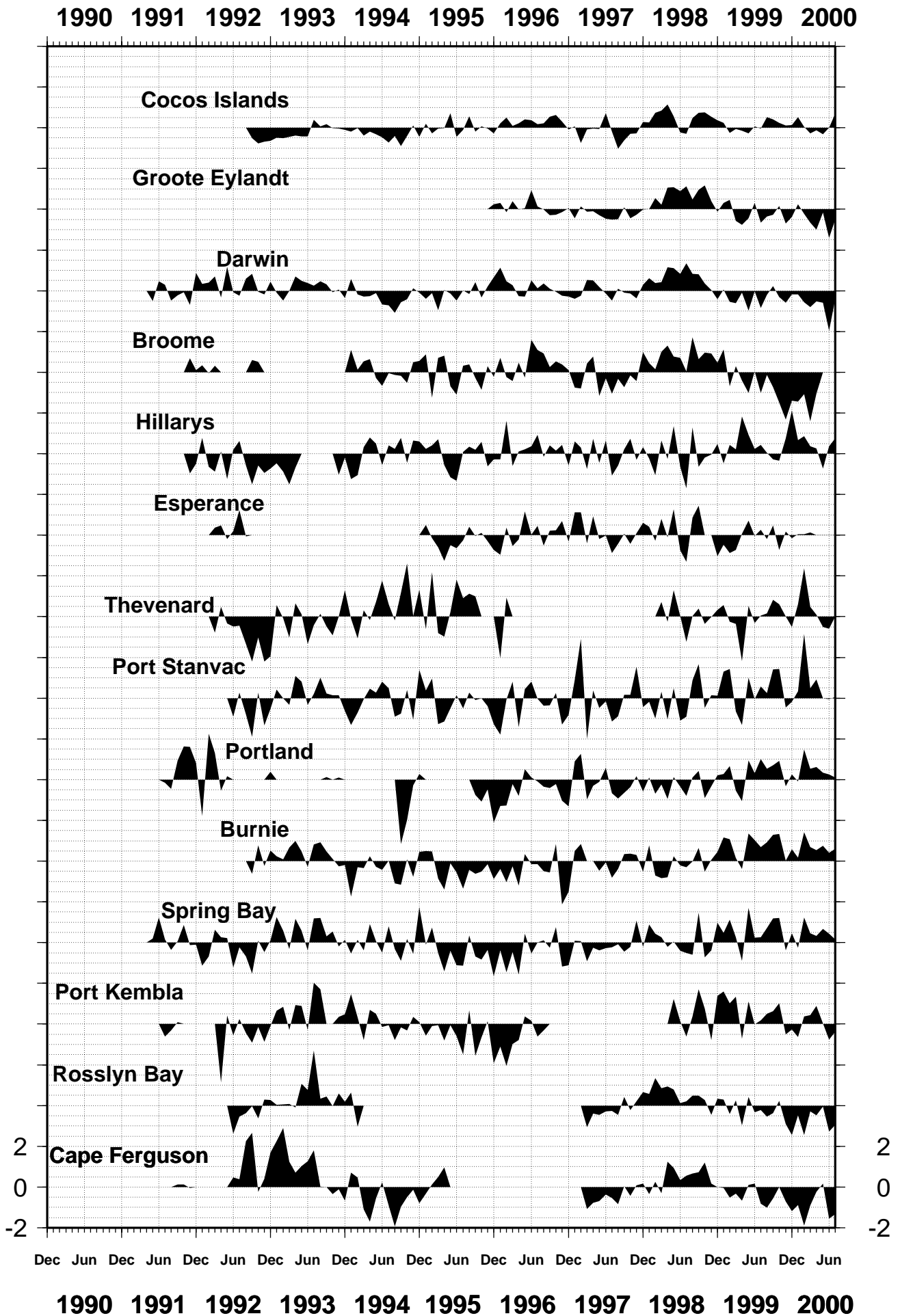
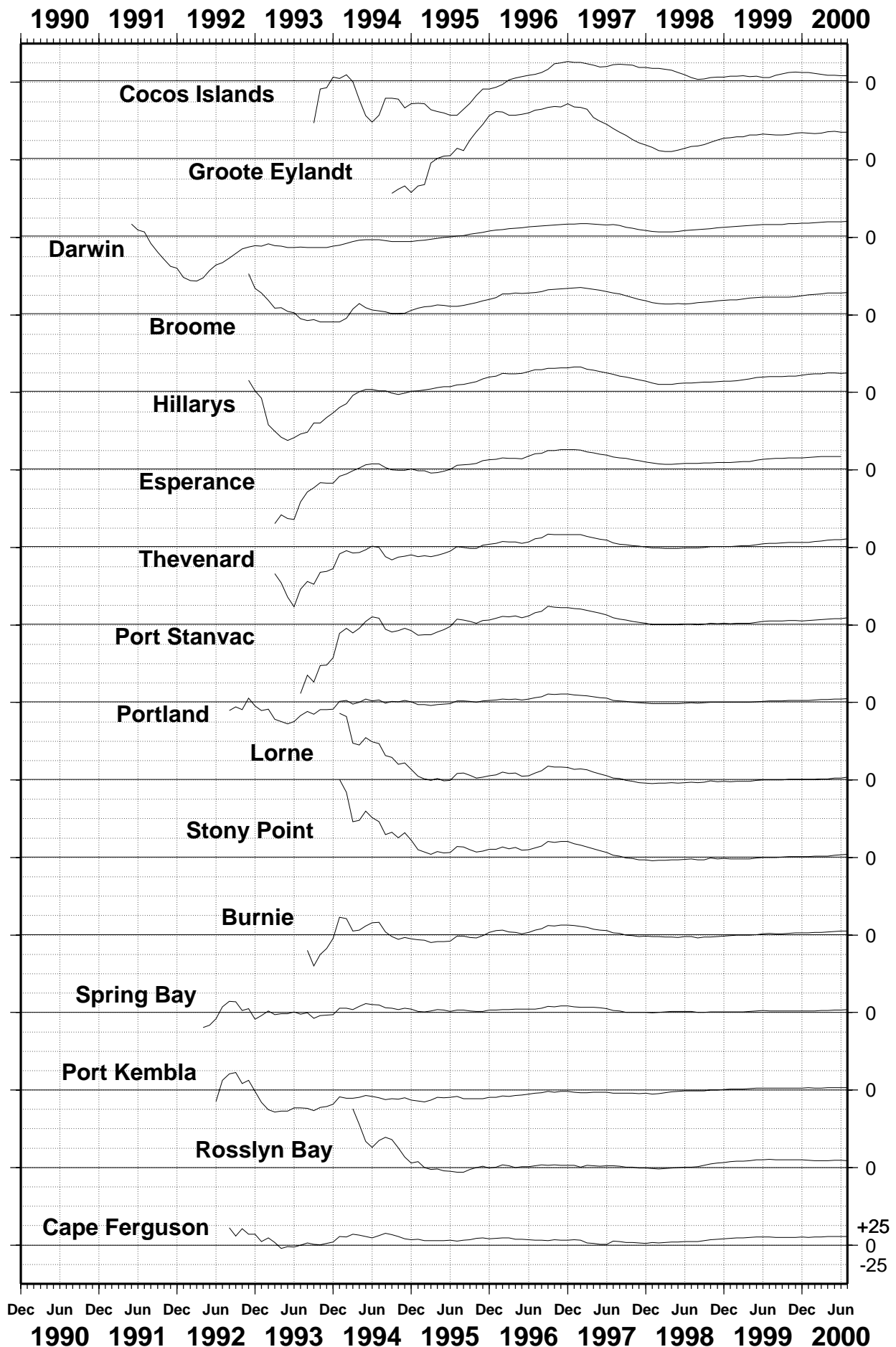


Figure 14

SEA LEVEL TRENDS THROUGH JULY 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

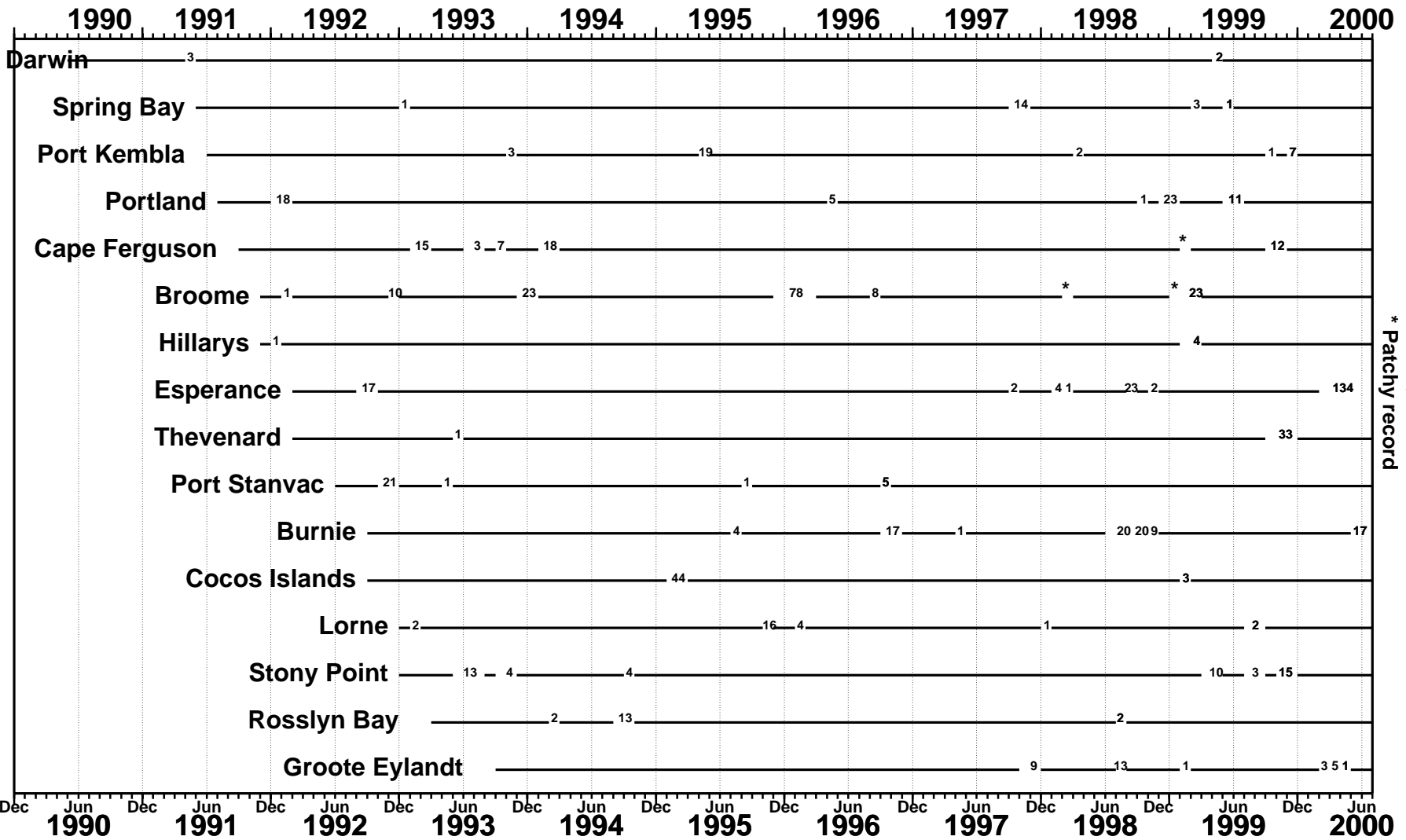
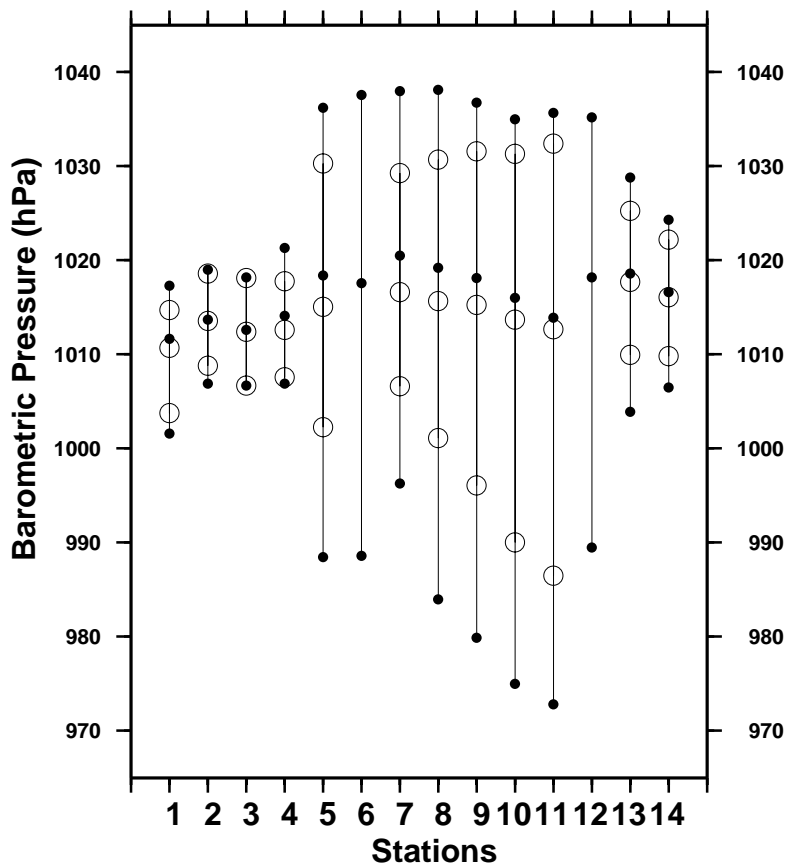
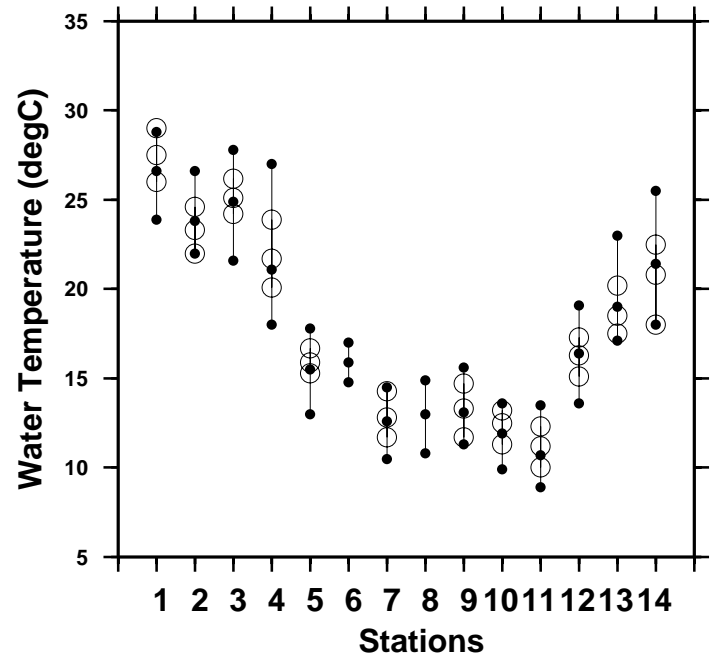
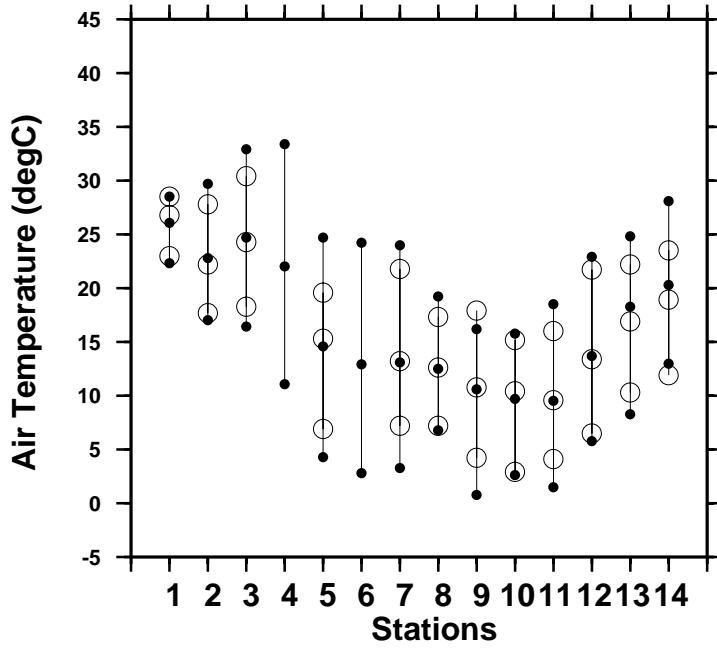


Figure 16

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

- July 2000 Maximum
- July 2000 Mean
- July 2000 Minimum
- Long Term July Maximum
- Long Term July Mean
- Long Term July Minimum

MONTHLY MEAN SEA LEVELS TO JULY 2000 (m)

1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000

