

**THE AUSTRALIAN BASELINE SEA LEVEL  
MONITORING PROJECT**

**MONTHLY DATA REPORT**

**OCTOBER 2003**



This report was prepared under the Australian Greenhouse Science Program for the Australian Greenhouse Office, supported by NTF Australia at the Flinders University of South Australia.



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**Quality Certification:**

I authorise the issue of this Australian Baseline Sea Level Monitoring Project Monthly Data Report for October 2003 in accordance with National Tidal Facility Australia Quality Assurance procedures.

William Mitchell  
A/Director - National Tidal Facility Australia

# The Australian Baseline Sea Level Monitoring Project

## Monthly Data Report

OCTOBER 2003

### NOTES ON THE DATA FOR OCTOBER 2003

Sea level data return (Figures 1 & 15) in October was excellent for most stations with the exception of Cape Ferguson where the tide gauge has been de-commissioned for wharf maintenance by the Queensland EPA (since the 8<sup>th</sup> of September).

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 5 and 9).

Wind speed and wind gust data from Stony Point was intermittently erroneous throughout October. The cause is suspected to be software related. The wind data (including wind direction) from Cocos Islands was also erroneous in October. These suspect values, and consequently, the corresponding incident wind directions have been removed (Figures 4, 5 and 6). At Groote Eylandt the air and water temperature and wind direction sensors (which share the same input/output module) continued to record erroneous values (Figures 7 and 8). The data for these three sensors have been removed from the record (along with the incident wind information).

The sea level anomalies (Figure 10) changed from being positive to negative at Port Stanvac, Portland, Lorne, Stony Point, Burnie, Spring Bay, and Port Kembla and remained negative at all other sites in October.

The barometric pressure anomalies (Figure 11) continued to be positive at Cocos Islands and changed from negative to positive at Broome, Hillarys, Esperance and Thevenard. The barometric pressure anomalies remained negative at all other sites in October.

It is difficult to relate the water and air temperature anomalies (Figures 12 and 13) directly to those of barometric pressure and sea level without considering other effects, such as localised currents, wind speeds and directions. The anomalies are primarily used to quality control the water and air temperature data.

Figure 14 compares the mean, maximum and minimum values for air temperature, water temperature and barometric pressure for the current month with the long-term October values. Note that the long-term ranges are calculated using the historical sets of October data for each station *excluding* the current month of data.

For all stations the mean air temperature for October 2003 was generally consistent with the long term October mean. The minimum air temperature at Cocos Islands (21.4°C), Port Stanvac (7.7°C) and Burnie (3.9°C) was lower than the previously recorded minima.

The October 2003 mean water temperature for most sites was also consistent with the long-term October averages. The minimum water temperature at Portland (11.1°C) and Port Kembla (15.1°C) was lower than the previously recorded minima.

The mean barometric pressure for October 2003 was consistent with the long-term October mean for each site. The minimum barometric pressure at Darwin (1003.1hPa), Port Stanvac (992.5hPa) and Thevenard (993.1hPa) was lower than the previously recorded minima.

Figure 16 shows the monthly mean sea levels with respect to an arbitrary fixed offset from the zero of the tide gauge. The plot clearly shows a visual correlation in seasonal signals between stations, in contrast to the sea level anomalies plot (Figure 10), which has the seasonal signal removed from the data.

Figure 17 shows the short-term sea level trends for each SEAFRAME location included in the Australian Baseline Sea Level Monitoring Project. Table 1 lists the commencement of operation, the sea level trend for the entire record (plotted in Figure 17) and the change in trend with respect to the analysis of the previous month.

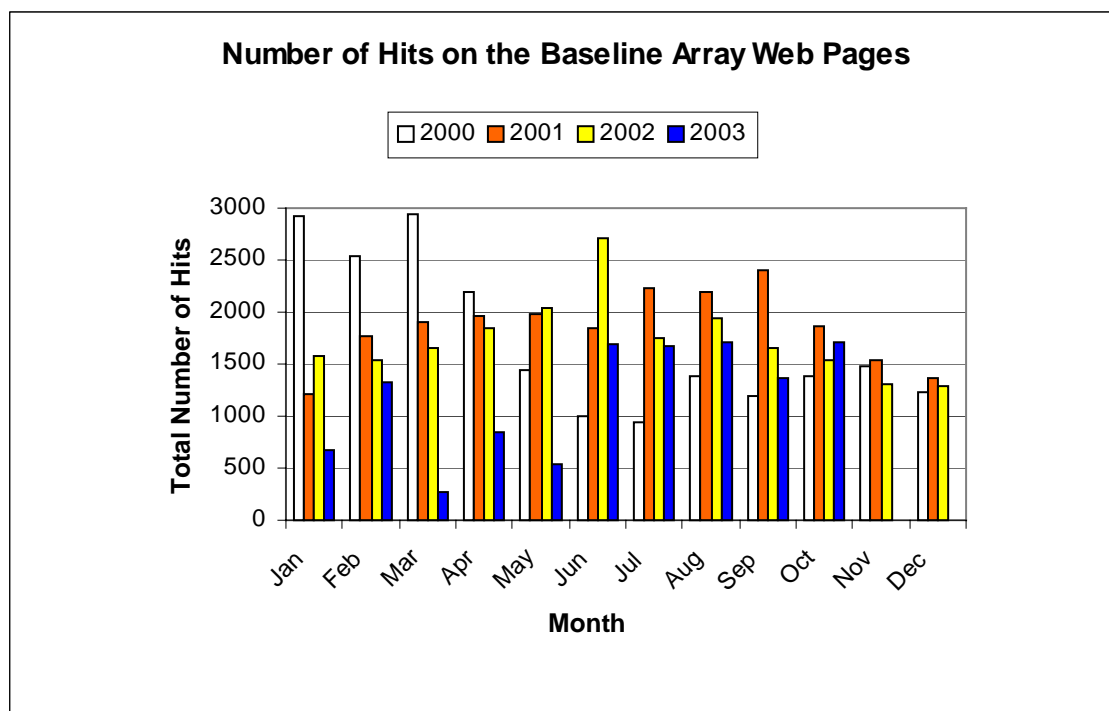
**Table 1: Tide gauge installation dates, short-term sea level trends and change in trend from the previous month for the Australian Baseline array to October 2003.**

Location	Installation Date	Sea Level Trend (mm/yr)	Change from previous month
Cocos Islands	Sep 1992	+12.2	-0.3
Groote Eylandt	Sep 1993	+15.0	-0.3
Darwin	May 1990	+11.6	-0.2
Broome	Nov 1991	+14.8	-0.3
Hillarys	Nov 1991	+11.5	-0.4
Esperance	Mar 1992	+8.3	-0.4
Thevenard	Mar 1992	+6.5	-0.3
Port Stanvac	Jun 1992	+7.3	-0.3
Portland	Jul 1991	+3.5	-0.2
Lorne	Jan 1993	+2.7	-0.3
Stony Point	Jan 1993	+2.3	-0.3
Burnie	Sep 1992	+4.2	-0.2
Spring Bay	May 1991	+3.9	-0.1
Port Kembla	Jul 1991	+5.7	-0.1
Roslyn Bay	Jun 1992	+4.5	-0.2
Cape Ferguson	Sep 1991	n/a*	n/a

\* Due to decommissioning of the Cape Ferguson tide gauge, no trend was calculated for October.

The number of hits to the Australian Baseline Sea Level Monitoring project web pages from 2000 to October 2003 is given in Table 2.

**Table 2: Number of hits on the Australian Baseline Sea Level Monitoring Project web pages from 2000 to October 2003.**



*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

**OCTOBER 2003**  
**SIX MINUTE SEA LEVEL OBSERVATIONS (m)**

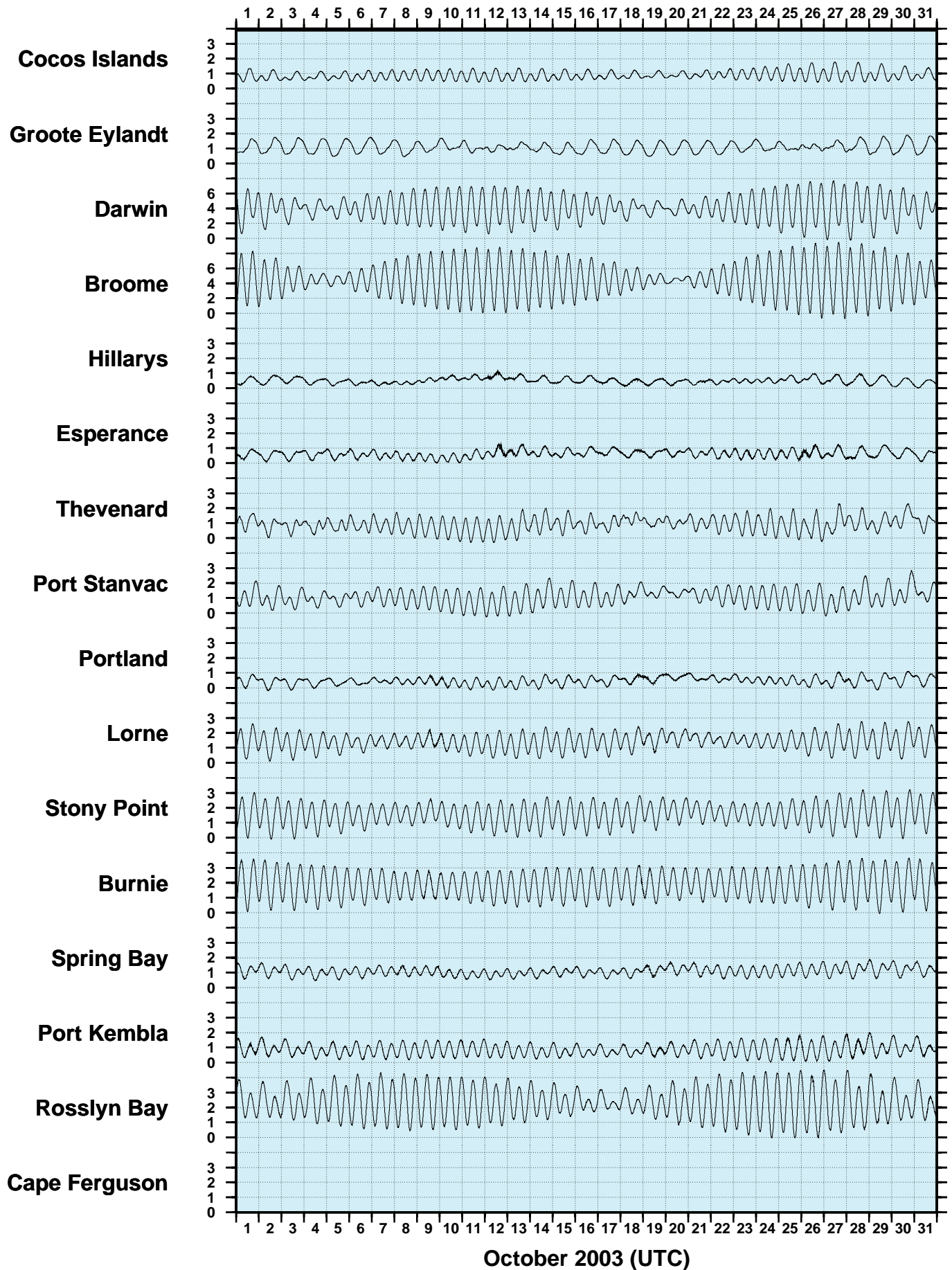
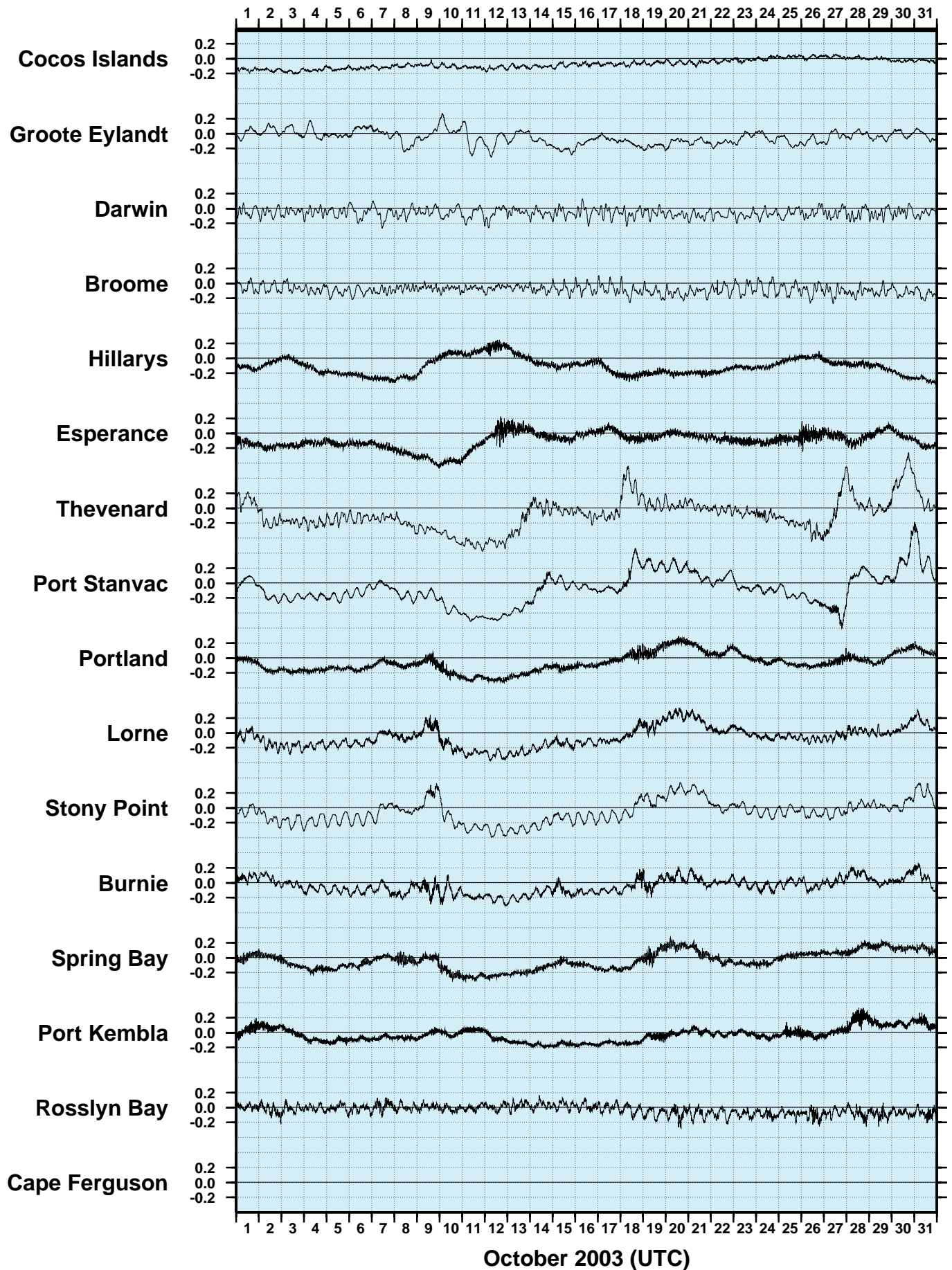


Figure 2

OCTOBER 2003  
SIX MINUTE RESIDUAL WATER LEVELS (m)





**Figure 3**  
**OCTOBER 2003**  
**SIX MINUTE RESIDUALS**  
**ADJUSTED FOR ATMOSPHERIC PRESSURE (m)**

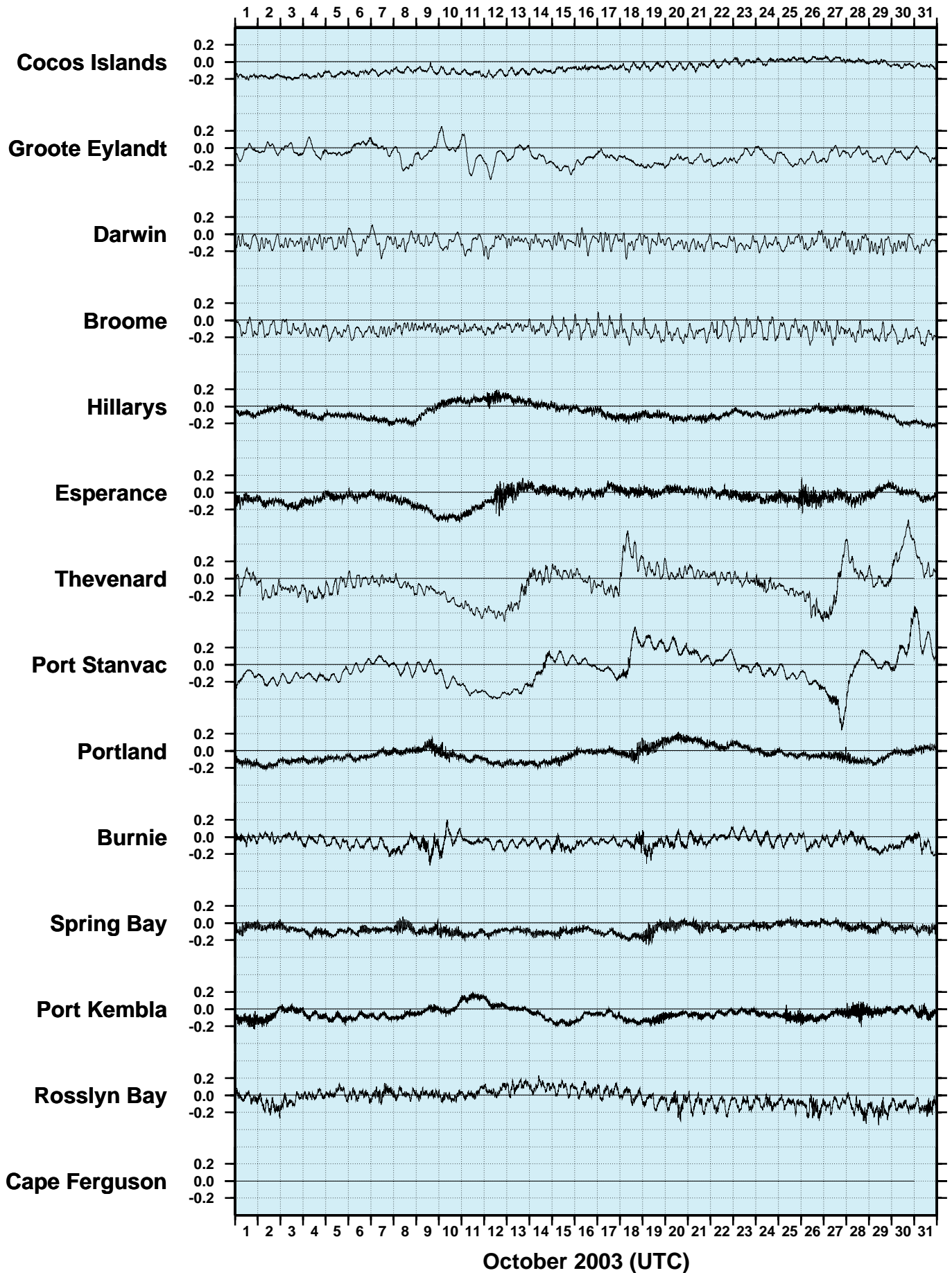


Figure 4

**OCTOBER 2003  
HOURLY WIND SPEEDS (m/s)**

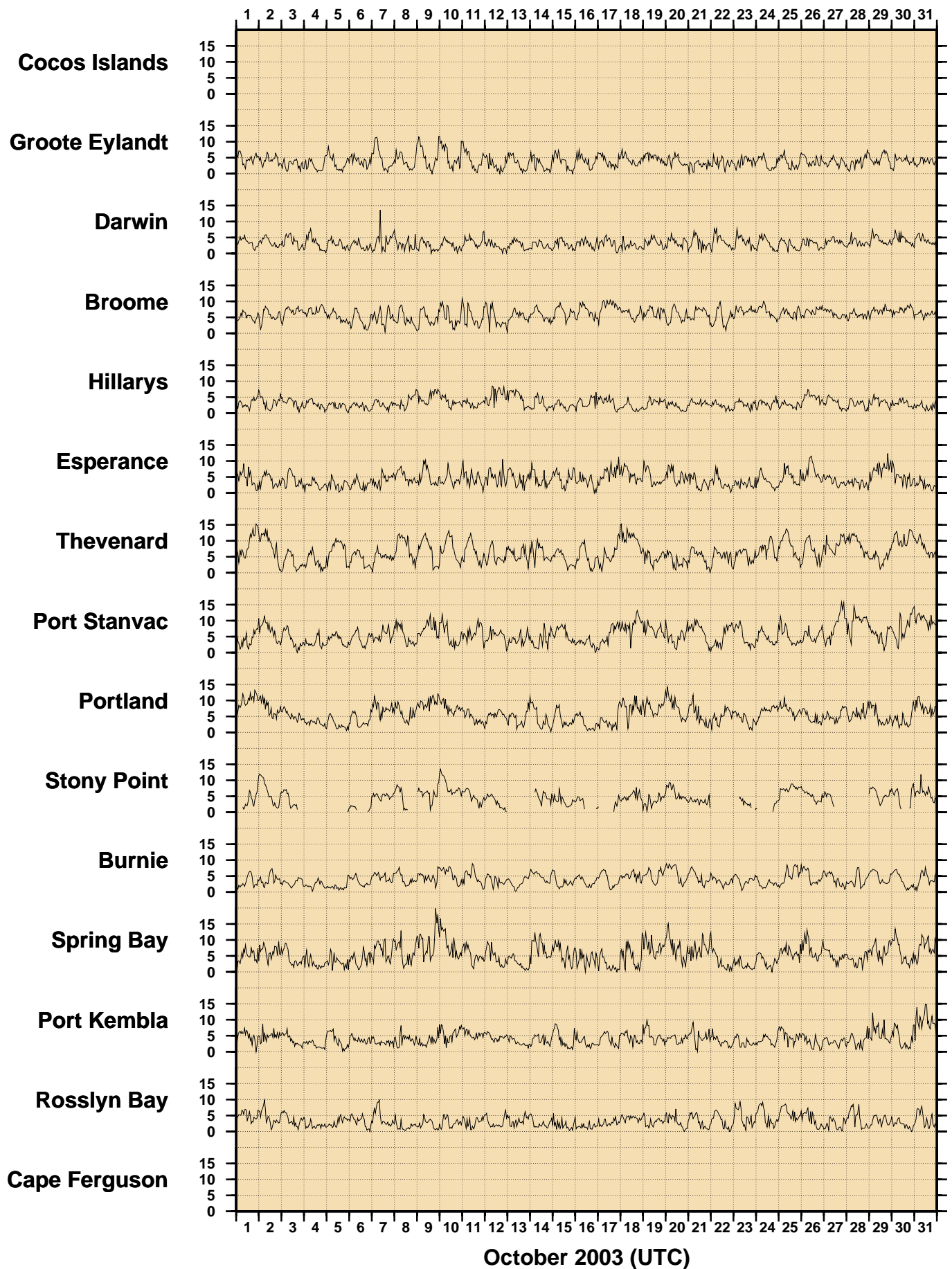


Figure 5

OCTOBER 2003  
HOURLY INCIDENT WINDS (m/s, deg True)

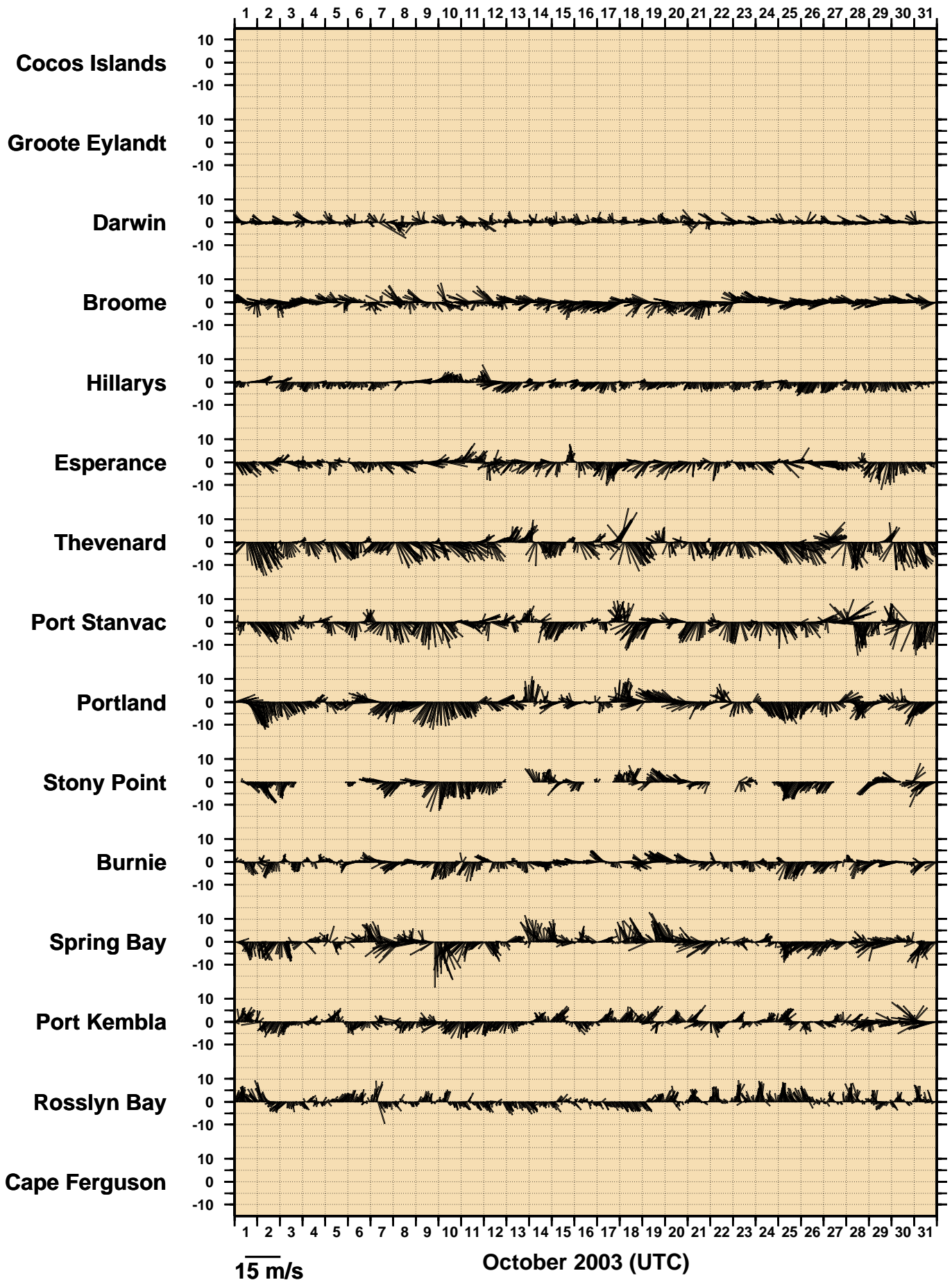


Figure 6

**OCTOBER 2003**  
**HOURLY MAXIMUM WIND GUSTS (m/s)**

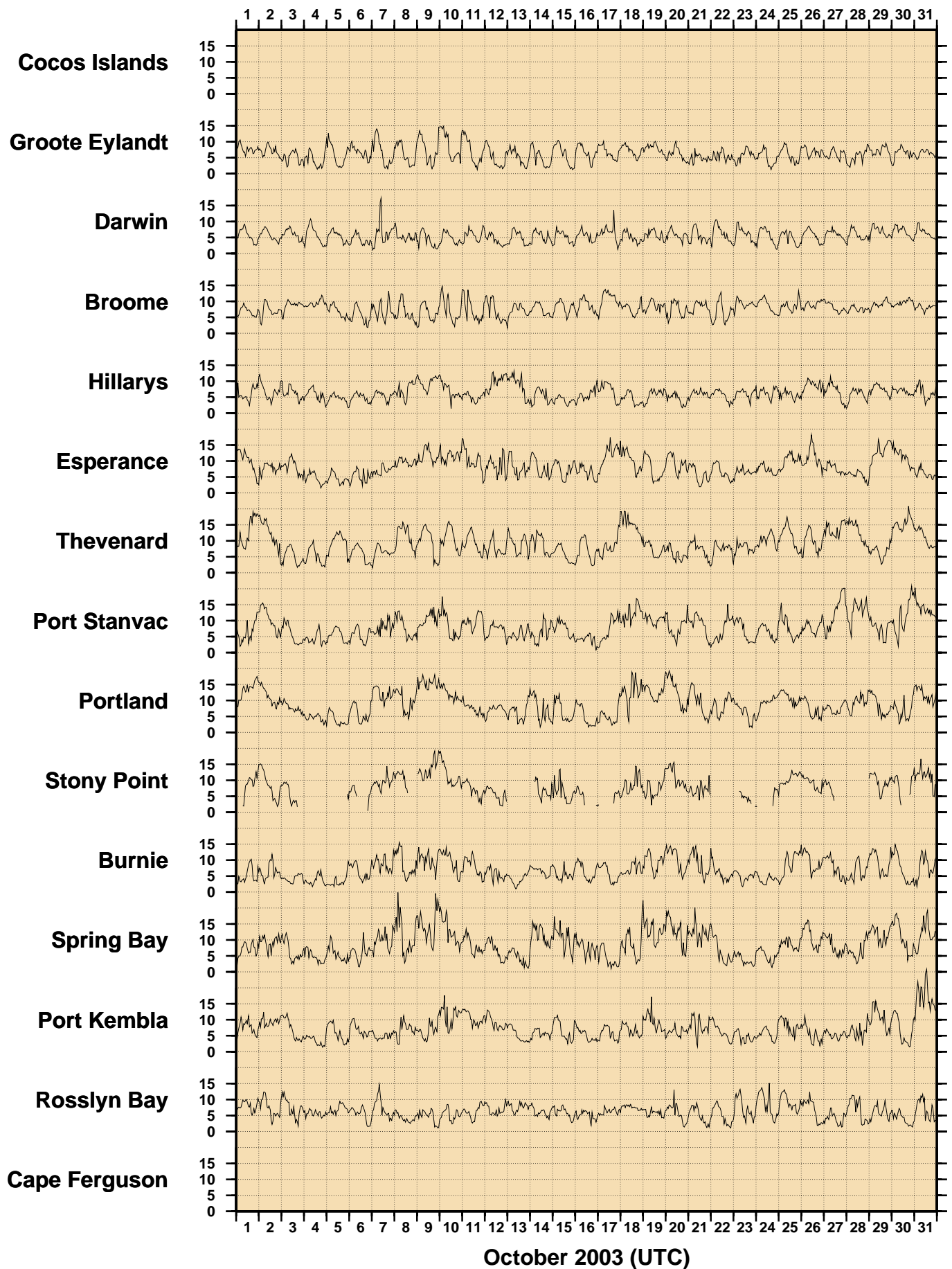




Figure 7

OCTOBER 2003  
HOURLY AIR TEMPERATURES (°C)

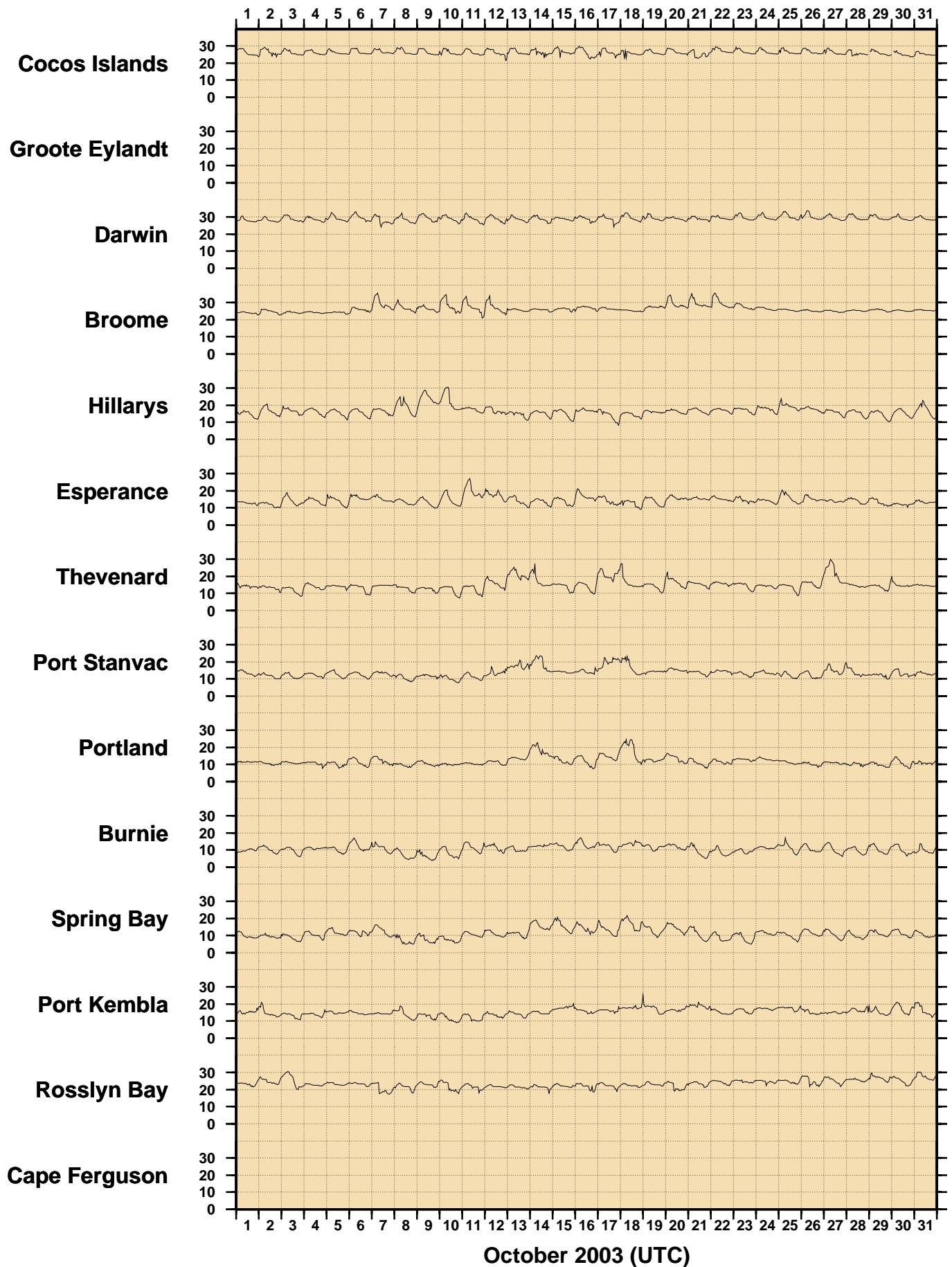


Figure 8

OCTOBER 2003  
HOURLY WATER TEMPERATURES (°C)

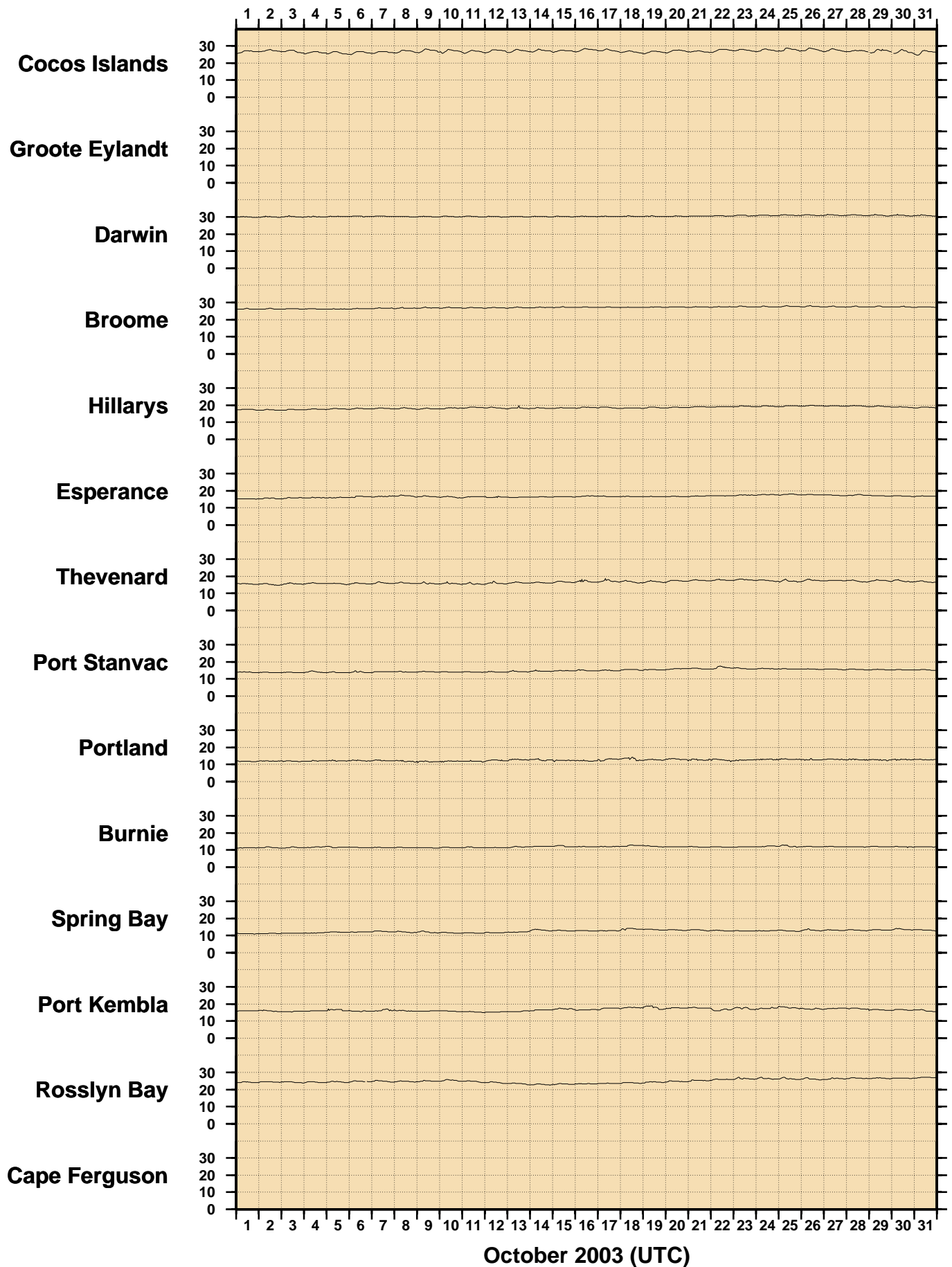
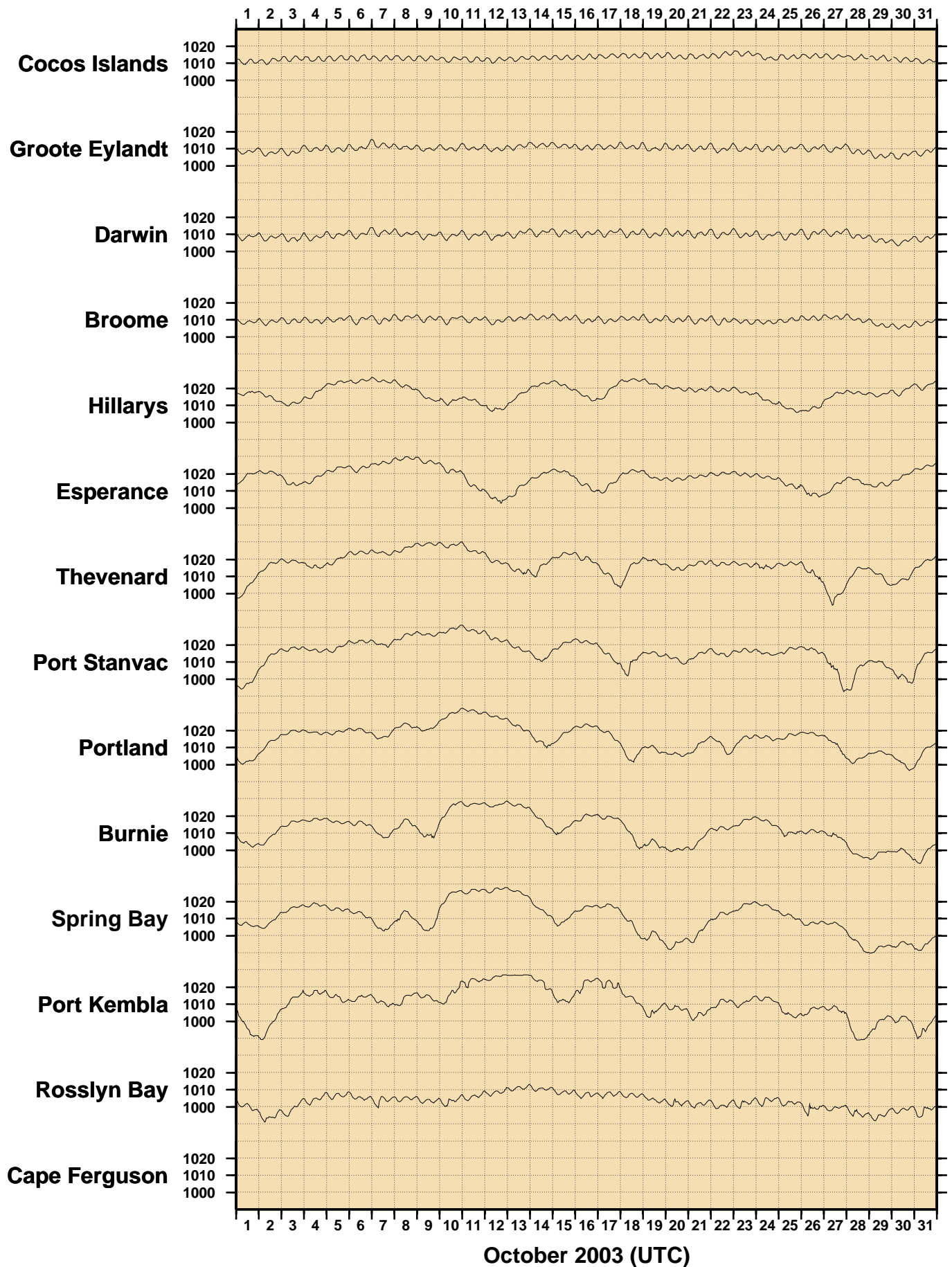


Figure 9

**OCTOBER 2003  
HOURLY ATMOSPHERIC PRESSURE (hPa)**



**Figure 10**  
**SEA LEVEL ANOMALIES THROUGH OCTOBER 2003 (m)**

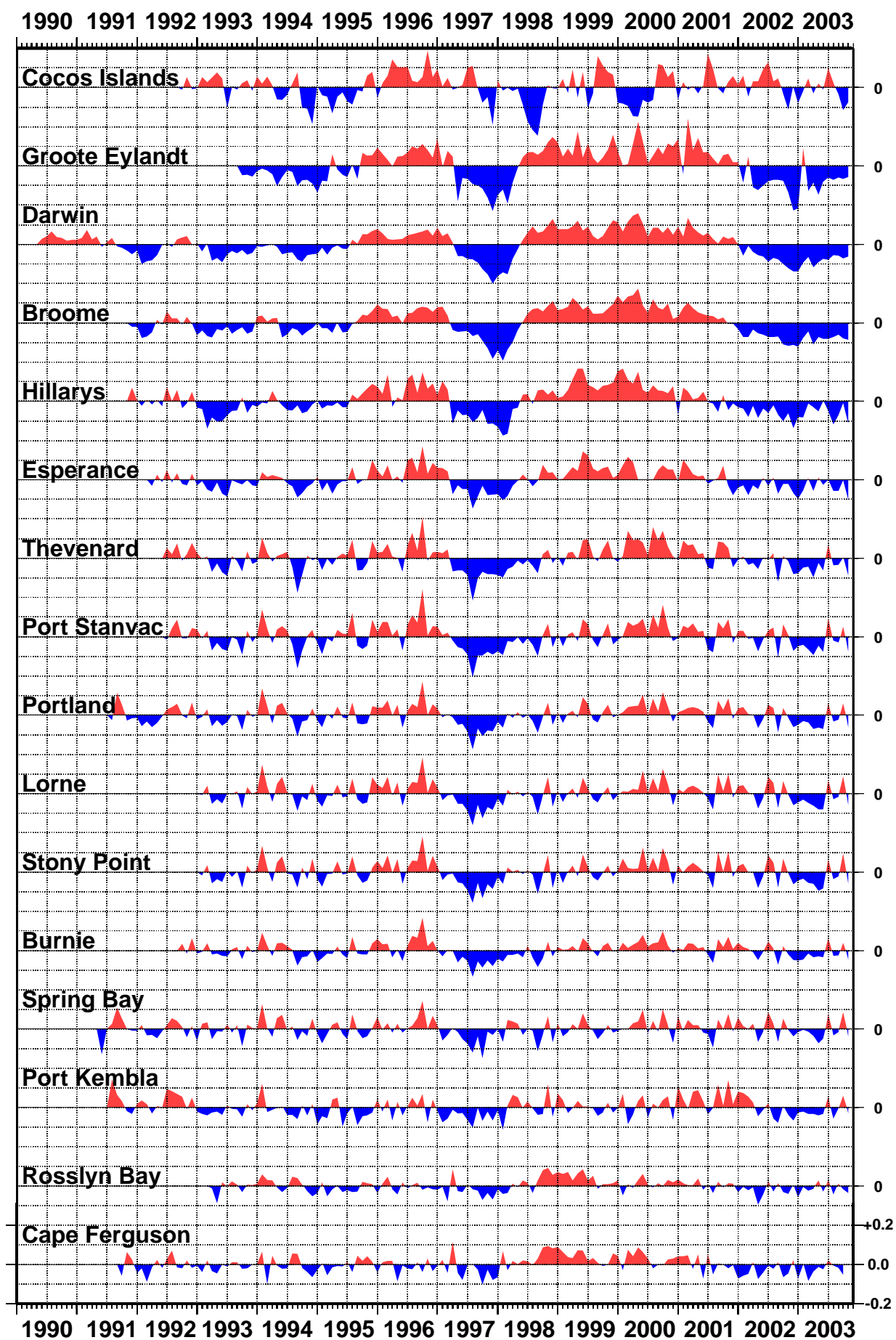




Figure 11

# BAROMETRIC PRESSURE ANOMALIES THROUGH OCTOBER 2003 (hPa)

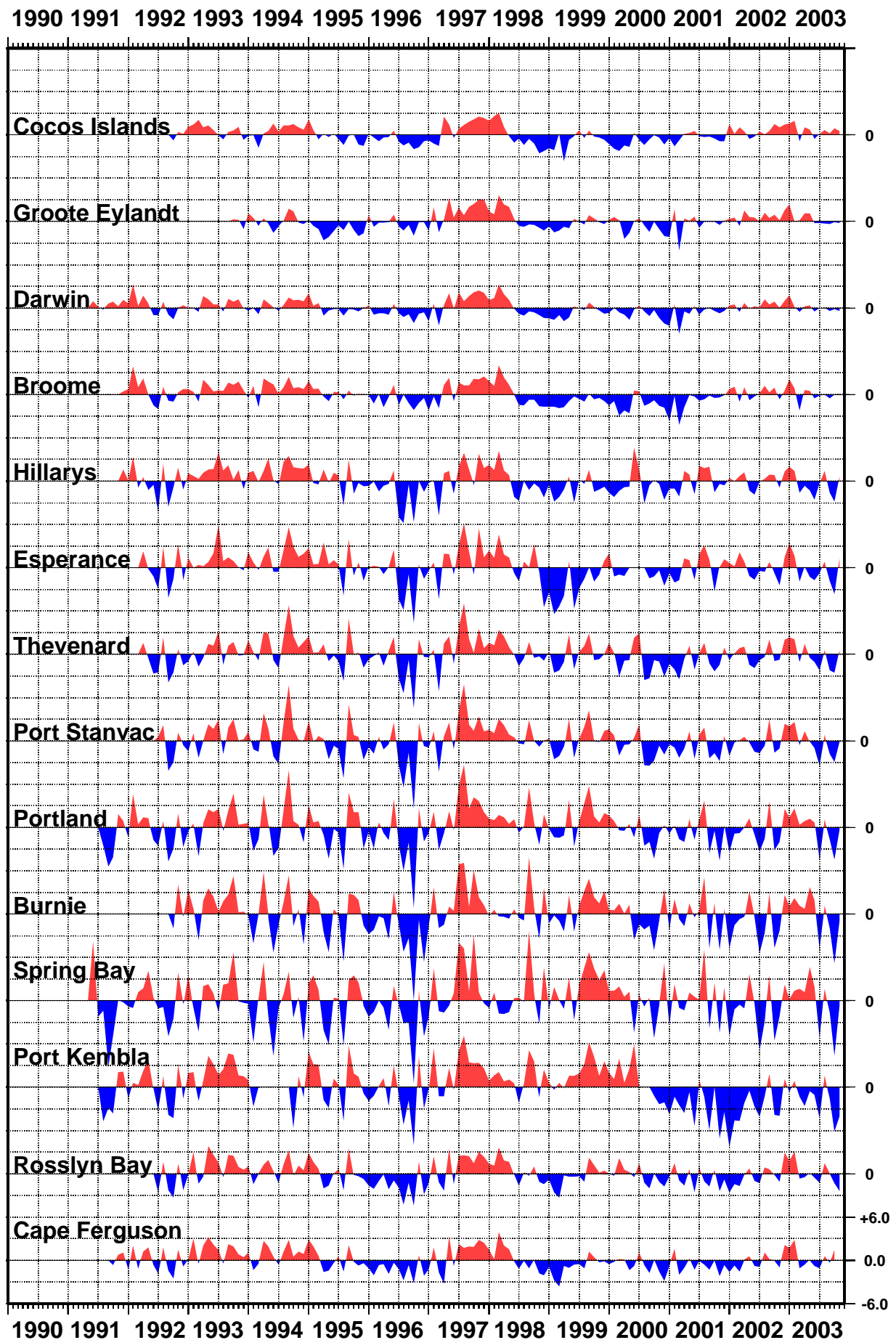
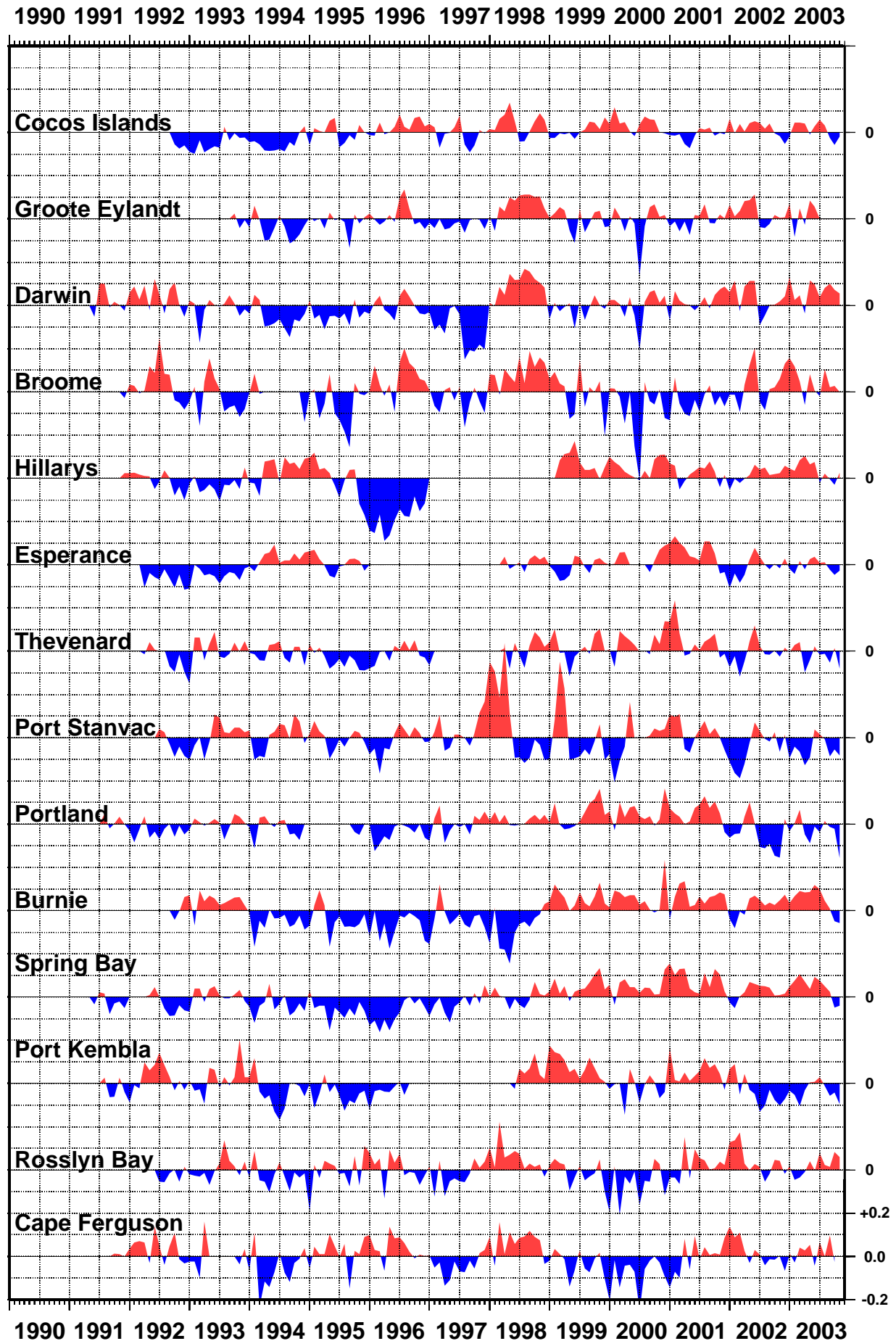
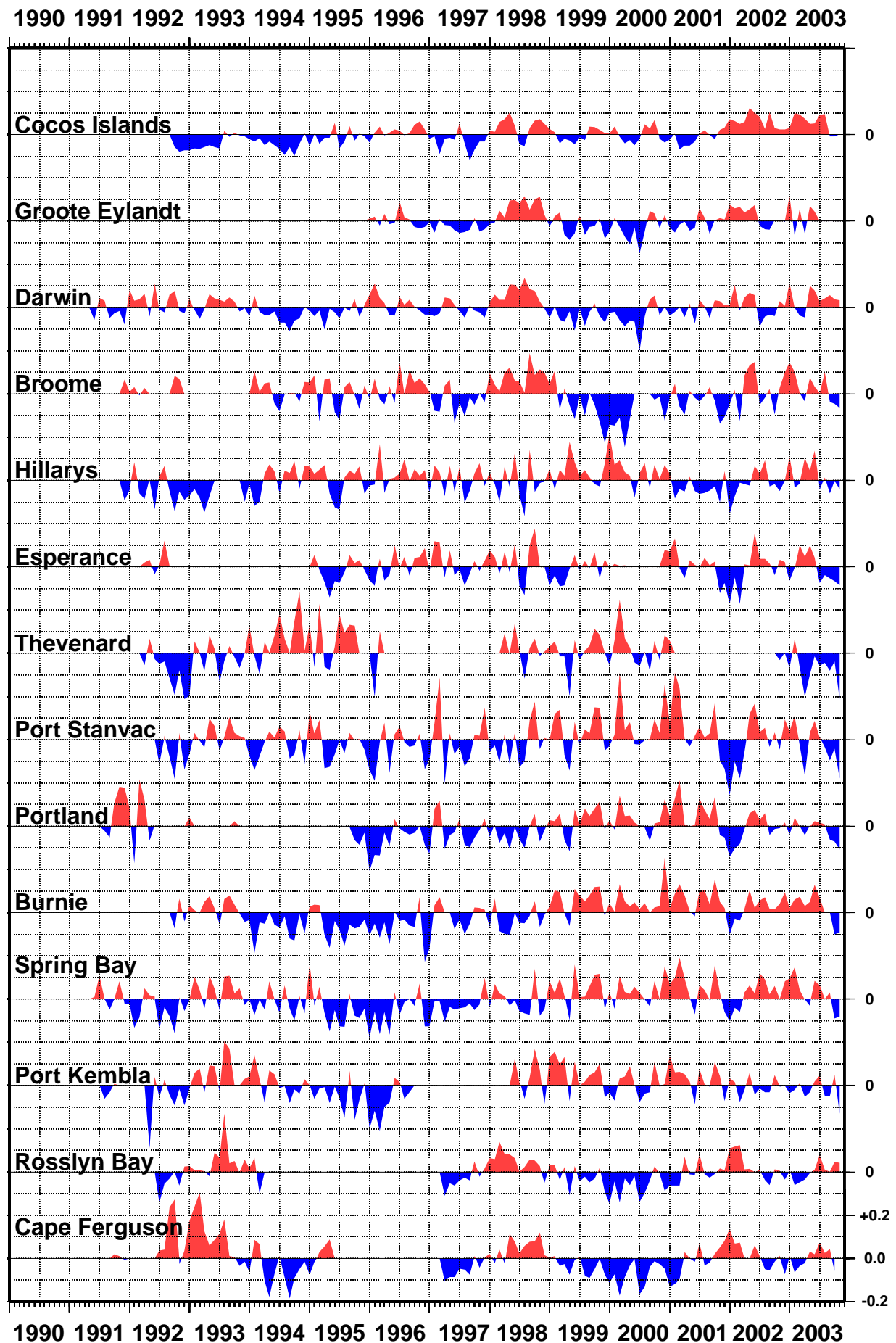


Figure 12

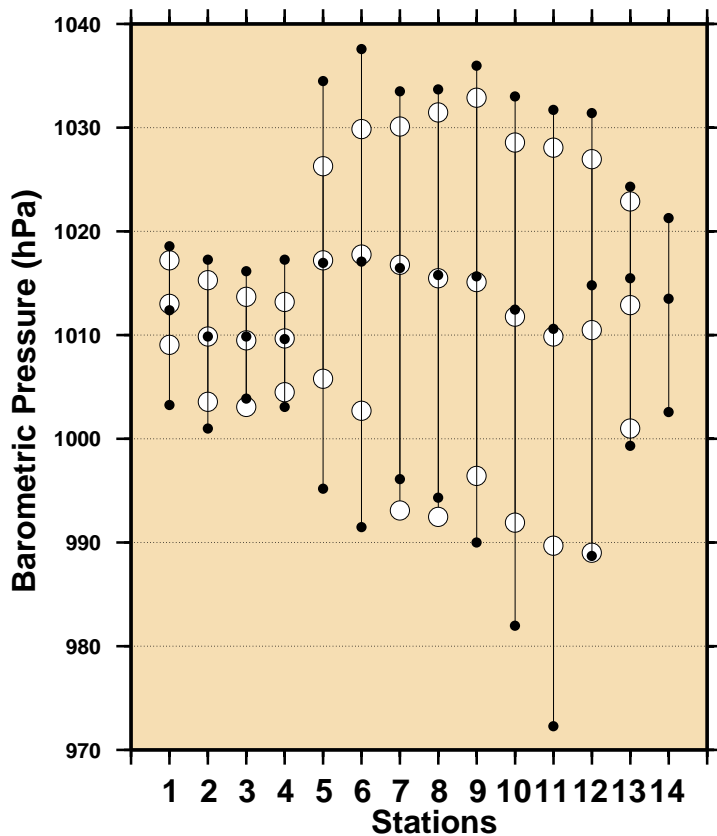
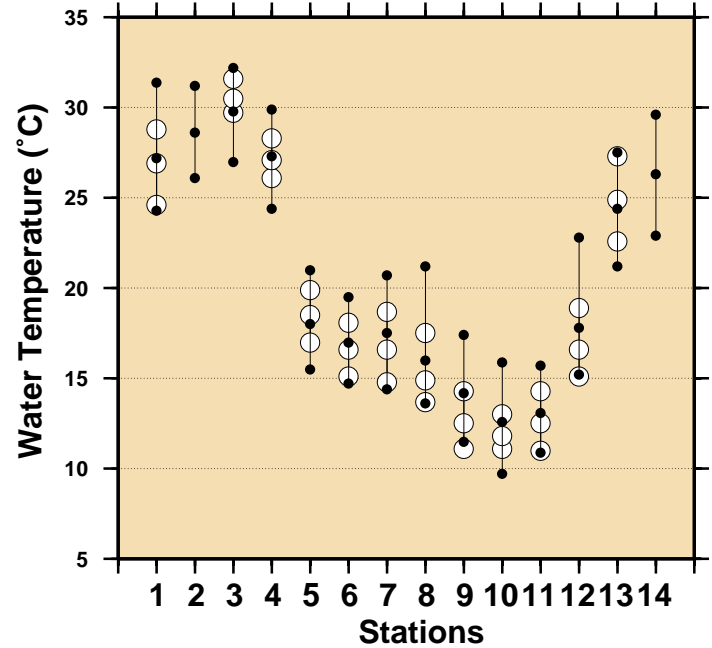
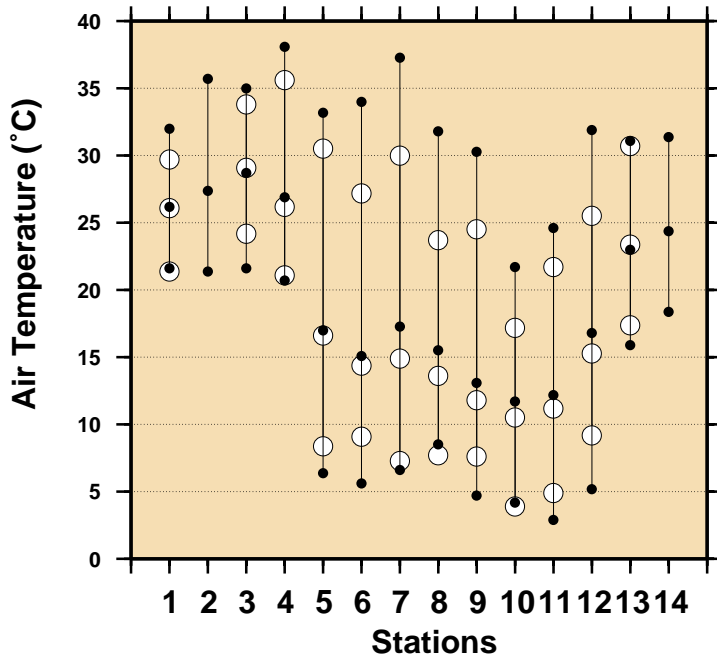
# WATER TEMPERATURE ANOMALIES THROUGH OCTOBER 2003 (°C)



**Figure 13**  
**AIR TEMPERATURE ANOMALIES**  
**THROUGH OCTOBER 2003 (°C)**



**Figure 14**  
**Comparison of October 2003 Max, Min & Mean with**  
**Long Term October Values.**



### Stations

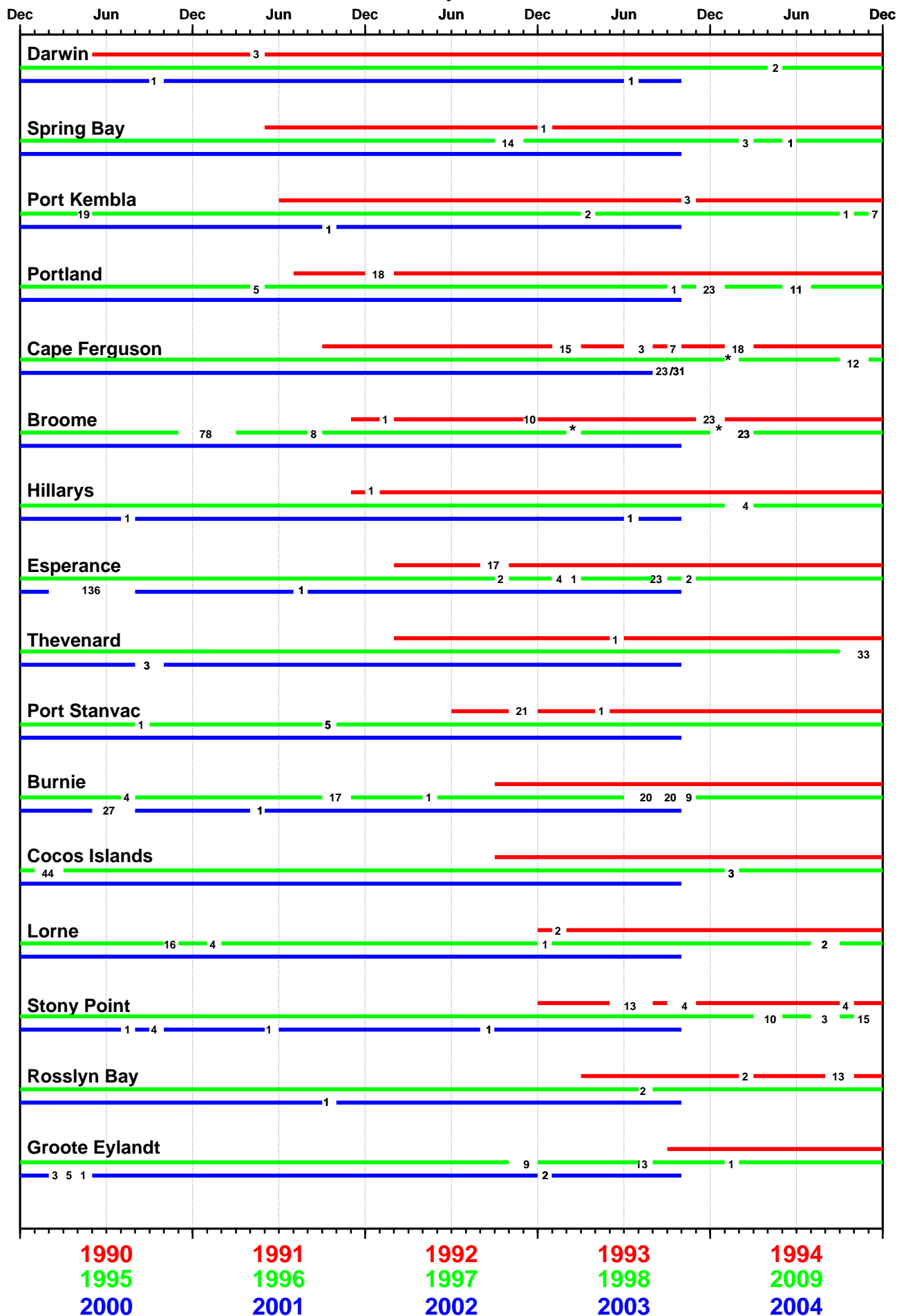
- 1 - Cocos Islands
- 2 - Groote Eylandt (Temp. data na)
- 3 - Darwin
- 4 - Broome
- 5 - Hillarys
- 6 - Esperance
- 7 - Thevenard
- 8 - Port Stanvac
- 9 - Portland
- 10 - Burnie
- 11 - Spring Bay
- 12 - Port Kembla
- 13 - Rosslyn Bay
- 14 - Cape Ferguson (no data)

- October 2003 Maximum
- October 2003 Mean
- October 2003 Minimum
- Long Term October Maximum
- Long Term October Mean
- Long Term October Minimum

# 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

## MONTHLY MEAN SEA LEVELS TO OCTOBER 2003 (m)

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

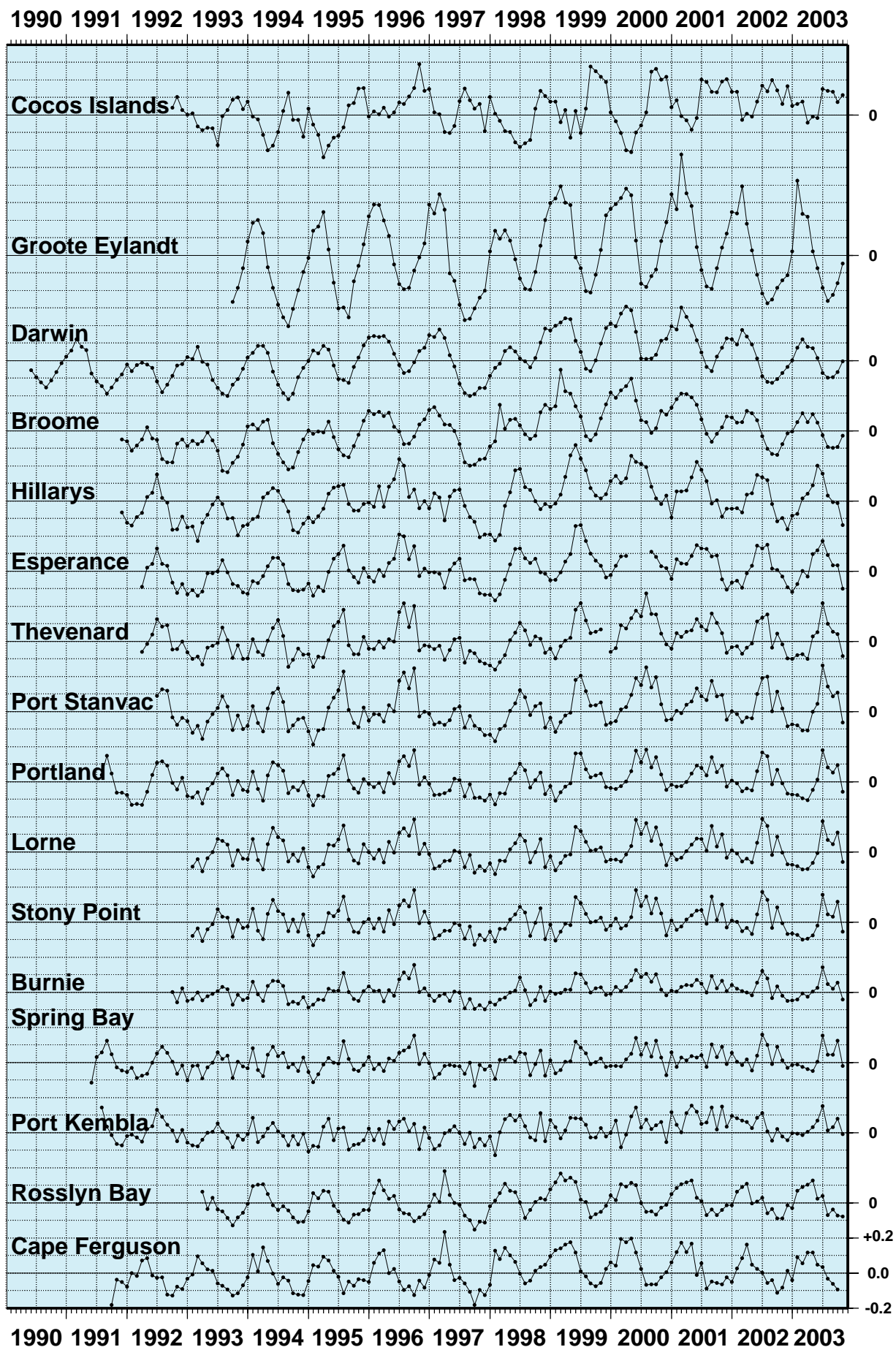


Figure 17

## SEA LEVEL TRENDS THROUGH OCTOBER 2003 (mm/year)

