

**THE AUSTRALIAN BASELINE SEA LEVEL
MONITORING PROJECT**

MONTHLY DATA REPORT

MARCH 2006



Australian Government

Bureau of Meteorology

This report was prepared under the Australian Greenhouse Science Program for the Australian Greenhouse Office, supported by the National Tidal Centre, Bureau of Meteorology.



Australian Government

Bureau of Meteorology

**National Tidal Centre
Bureau of Meteorology
Australia**

GPO Box 421
Kent Town, SA 5071
Australia

Tel: (+618) 8366 2730
Fax: (+618) 8366 2651
Website: <http://www.bom.gov.au/oceanography/>

Quality Certification:

I authorise the issue of this Australian Baseline Sea Level Monitoring Project Monthly Data Report for March 2006 in accordance with National Tidal Centre Quality Assurance procedures.

William Mitchell
Manager - National Tidal Centre

The Australian Baseline Sea Level Monitoring Project

Monthly Data Report

MARCH 2006

INTRODUCTION

The mission of the project is to monitor changes in sea level around Australia. It involves the operation and maintenance of an array of high-resolution sea level gauges and associated meteorological instruments (see Figure B) and management of a quality controlled national database of observations that is made available to the scientific and wider communities.

The Baseline Array and a similar array in the South Pacific have been widely acknowledged in the global science community as two of the most accurate and reliable sources for information on sea level and climate change anywhere in the world.

This report is one of a series of monthly data reports that provide tables and figures summarising the data collected to date. The accompanying text relates primarily to the quality of the data rather than its interpretation. Periodic scientific evaluation of the data in the context of climate variability and climate change is provided in an annual data report.

Sea level trends are derived from the record, however readers are cautioned against drawing any conclusions from short duration records, particularly when used in isolation from other phenomena. The sea level record includes natural variability, such as El Niño events and the effects of atmospheric, oceanographic and geological processes. Vertical movement of the instrumentation relative to local topography is monitored and the results are listed on the Geoscience Australia web site. Movement of each station relative to the International Terrestrial Reference Frame is not monitored. It is important to note that as the sea level record becomes longer, the short-term trend estimate becomes more stable and reliable.

NOTES ON THE DATA FOR MARCH 2006

Sea level data return (Figures 1 and 17) in March was good for most stations with the exception of some small gaps at Rosslyn Bay and Cape Ferguson due to equipment calibration and maintenance.

The residuals (Figures 2 and 3), the 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) such as the passage of Tropical Cyclone “Larry” north of the Cape Ferguson site. A sharp increase in the residual (Figure 2) and pressure adjusted residual (Figure 3) sea level is evident between the 19th and 20th of March.

Figure 10 compares the mean, maximum and minimum values for air temperature, water temperature and barometric pressure for March 2006 with the long-term March values.

Note that the long-term ranges are calculated using the historical sets of March data for each station **excluding** the current month of data.

The air and water temperatures for March 2006 were generally consistent with the long-term March ranges for all sites.

The barometric pressures for March 2006 were generally consistent with the long-term March ranges with the exception of a record minimum pressure of 992.7 hPa at Esperance.

Figure 11 shows the monthly mean sea levels with respect to an arbitrary fixed offset from the zero of the tide gauge. The mean sea level plot shows seasonal variations in sea level, in contrast to the sea level anomalies plot (Figure 12), which has the seasonal signal removed from the data.

The sea level anomalies (Figure 12) were generally near zero at all sites in March.

Figure 13 shows the evolution of the short-term sea level trend for each site during the life of the Australian Baseline Sea Level Monitoring Project. Table 1 lists the commencement of operation, the latest sea level trend, and the change in trend with respect to the previous month's analysis.

Barometric pressure anomalies (Figure 14) were slightly negative across the northern coastline this month and near zero elsewhere.

It is difficult to relate the water and air temperature anomalies (Figures 15 and 16) 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 check the water and air temperature data.

The number of hits to the Australian Baseline Sea Level Monitoring project web pages from 2003 to March 2006 is given in Figure A. A new software package to count web-hits was implemented in October 2005 and the results since then may be lower due to an improved ability to exclude hits from search engines as distinct from visits and "roaming".

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.

Table 1: Tide gauge installation date, position, short-term sea level trends and change in trend from the previous month for the Australian Baseline array through March 2006.

Location	Lat / Long	Installation Date	Trend (mm/yr)	Change from previous month
Cocos Islands	12°07'00"S / 96°53'31"E	Sep 1992	+10.8	+0.2
Groote Eylandt	13°51'36"S / 136°24'57"E	Sep 1993	+7.1	+0.4
Darwin	12°28'19"S / 130°50'45"E	May 1990	+8.0	+0.1
Broome	18°00'03"S / 122°13'06"E	Nov 1991	+9.9	0.0
Hillarys	31°49'32"S / 115°44'19"E	Nov 1991	+8.1	+0.1
Esperance	33°52'24"S / 121°53'42"E	Mar 1992	+5.5	+0.1
Thevenard	32°09'02"S / 133°38'25"E	Mar 1992	+4.8	+0.1
Port Stanvac	35°06'35"S / 138°27'55"E	Jun 1992	+6.2	+0.1
Portland	38°20'38"S / 141°36'49"E	Jul 1991	+3.3	+0.1
Lorne	38°30'00"S / 143°59'00"E	Jan 1993	+2.9	+0.1
Stony Point	38°22'00"S / 145°13'00"E	Jan 1993	+2.5	+0.1
Burnie	41°03'00"S / 145°54'53"E	Sep 1992	+3.1	0.0
Spring Bay	42°32'47"S / 147°55'51"E	May 1991	+4.0	0.0
Port Kembla	34°28'26"S / 150°54'43"E	Jul 1991	+4.2	-0.1
Roslyn Bay	23°09'40"S / 150°47'24"E	Jun 1992	+2.4	-0.1
Cape Ferguson	19°16'39"S / 147°03'31"E	Sep 1991	+2.9	+0.1

Figure A: Number of hits on the Australian Baseline Sea Level Monitoring Project web pages from 2003 to March 2006. Note that the web hits for February 2005 are not available due to technical difficulties. See note on page 2 with respect to the new web hit software.

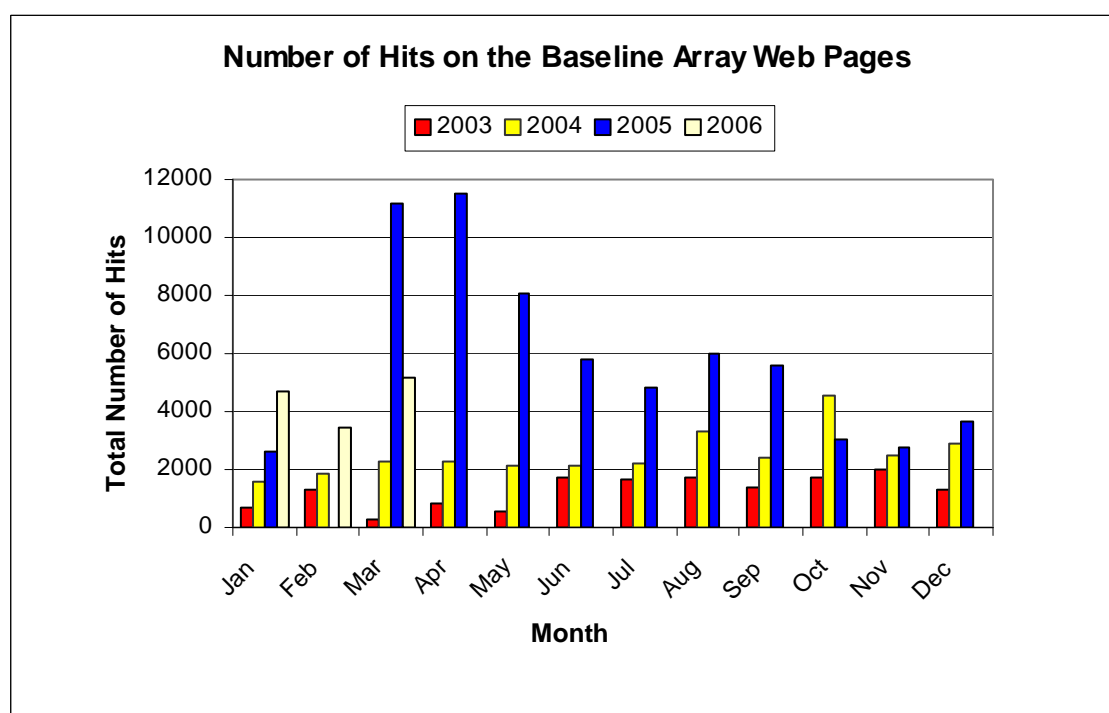
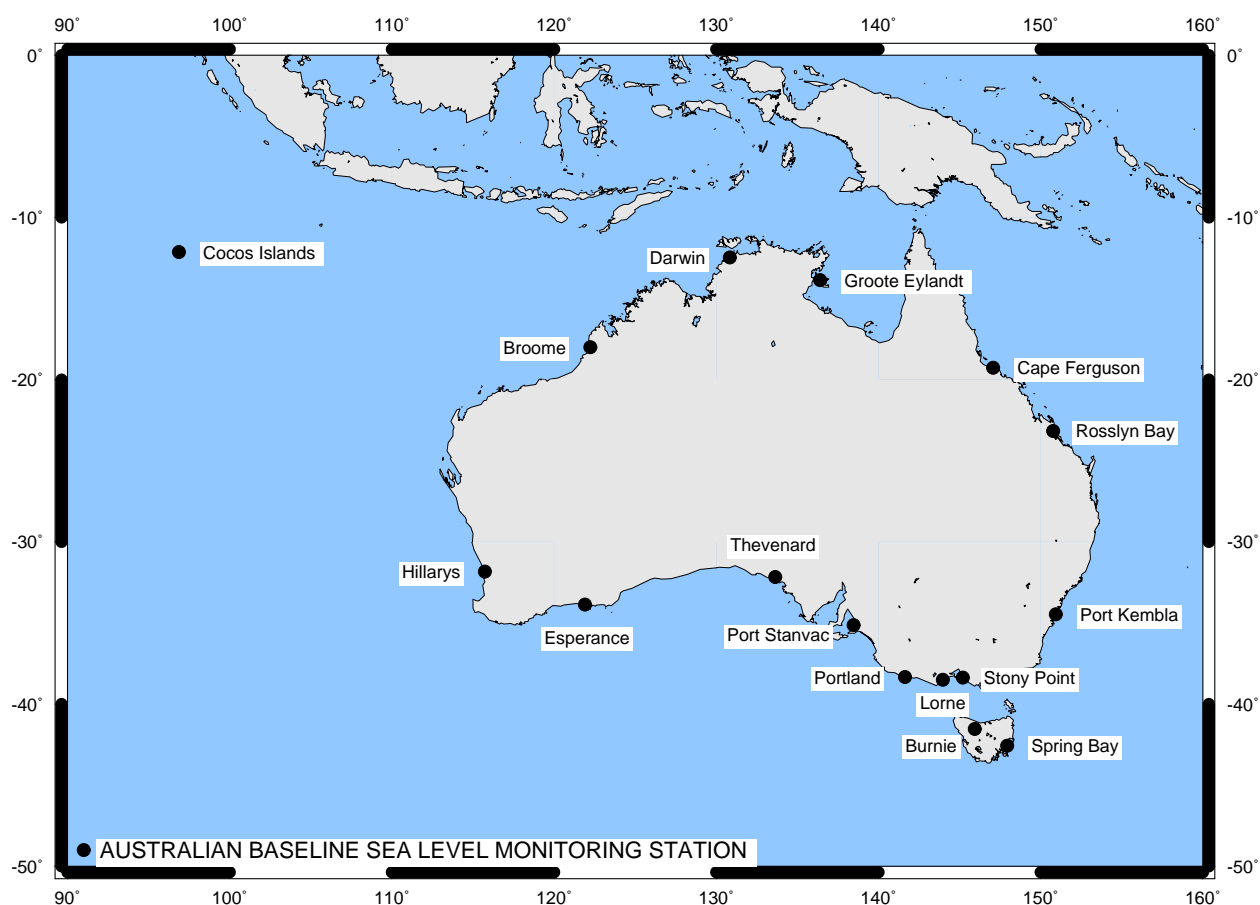


Figure B: Australian Baseline Sea Level Monitoring Project sites.



The *Monthly Data Report* is prepared by the NTC, Bureau of Meteorology for Environment Australia. Staff members produce the text, plots and tables.

Further information on the *Monthly Data Report* and other projects conducted by the NTC, Bureau of Meteorology can be obtained from the following address.

National Tidal Centre
Bureau of Meteorology
GPO BOX 421, Kent Town SA 5071
Tel: [+61 8] 8366 2730
Fax: [+61 8] 8366 2651
Website: <http://www.bom.gov.au/oceanography/>

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 NTC, Bureau of Meteorology shall be liable for any loss or injury whatsoever arising from the use of the data. The Commonwealth of Australia holds copyright for material contained in this document.

Individuals and organisations are advised that quality controlled six-minute or hourly data from these stations are available on request from the NTC, Bureau of Meteorology. Some handling fees may be charged. For commercial agencies requesting data, some additional costs may be levied.

Figure 1

MARCH 2006
SIX MINUTE SEA LEVEL OBSERVATIONS (m)

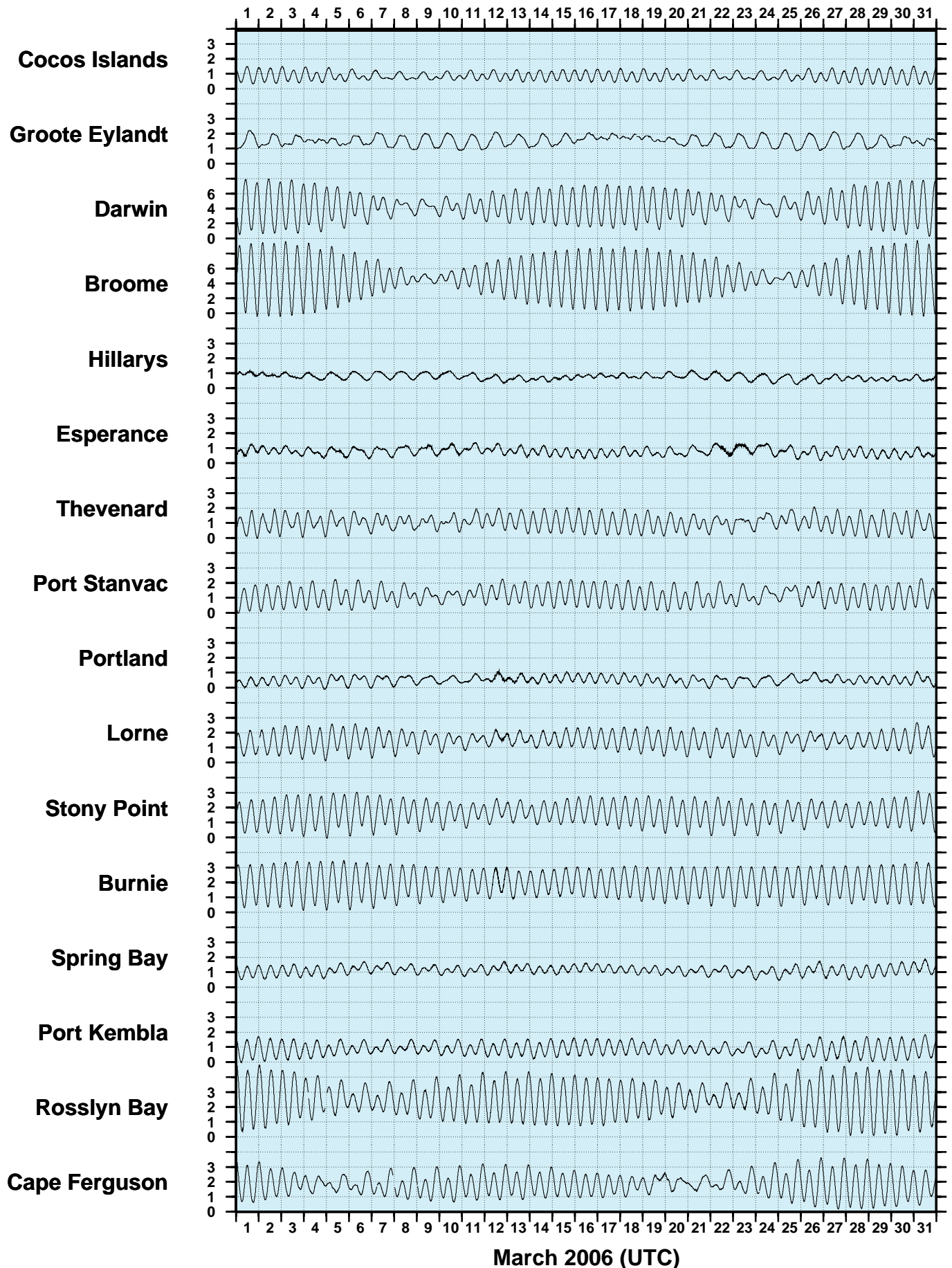


Figure 2
MARCH 2006
SIX MINUTE RESIDUAL WATER LEVELS (m)

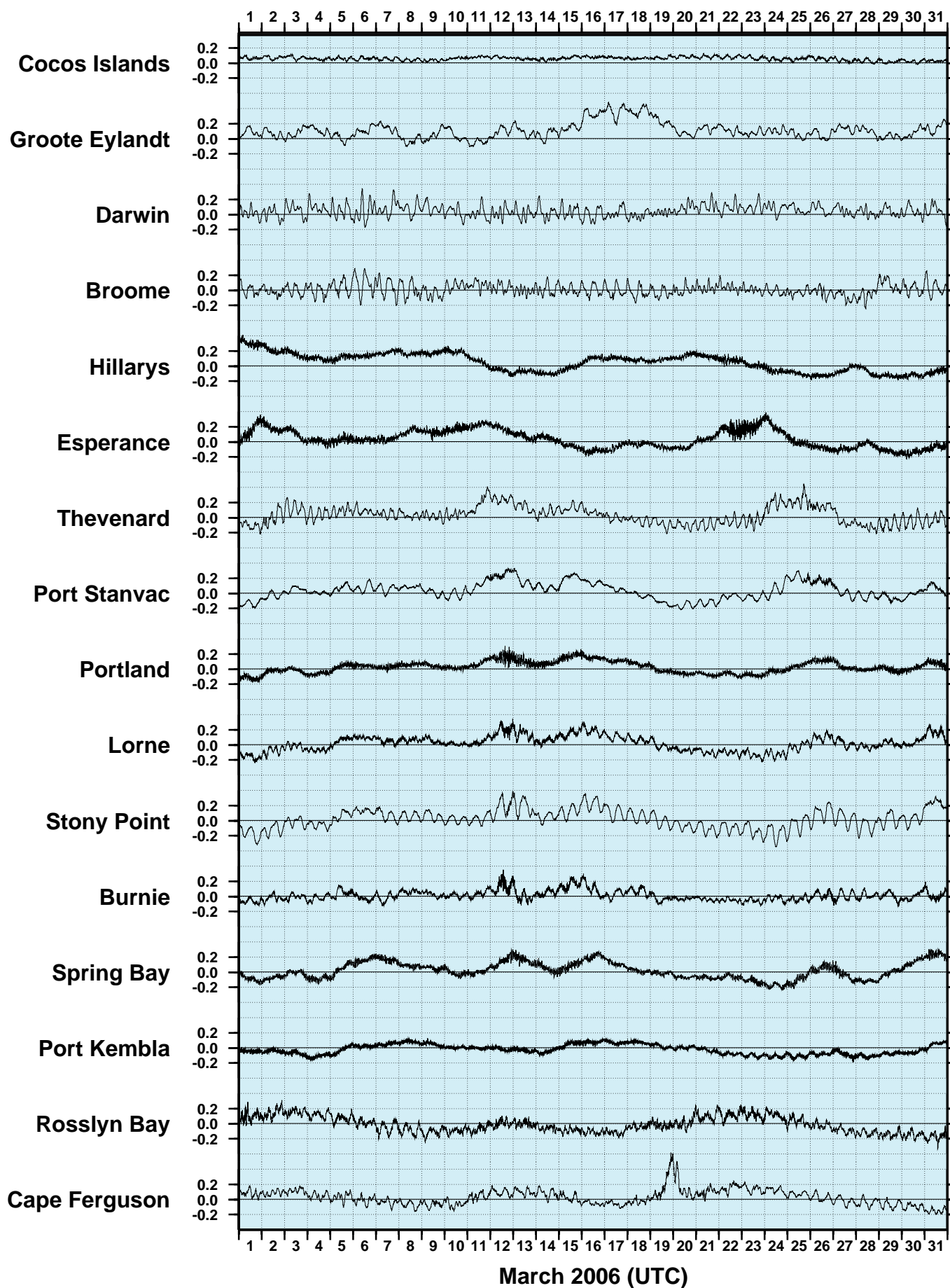


Figure 3
MARCH 2006
SIX MINUTE RESIDUALS
ADJUSTED FOR ATMOSPHERIC PRESSURE (m)

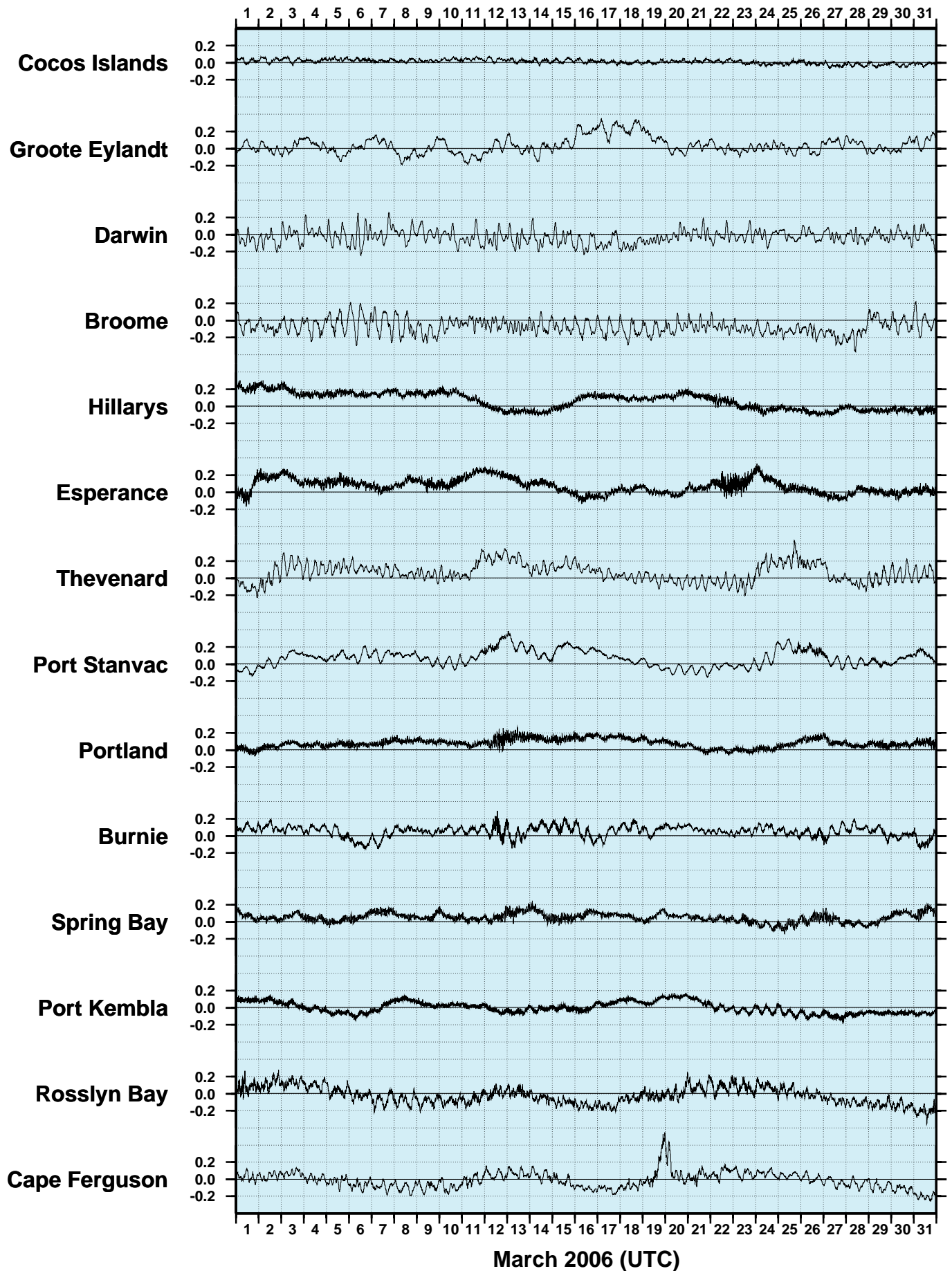


Figure 4

**MARCH 2006
HOURLY WIND SPEEDS (m/s)**

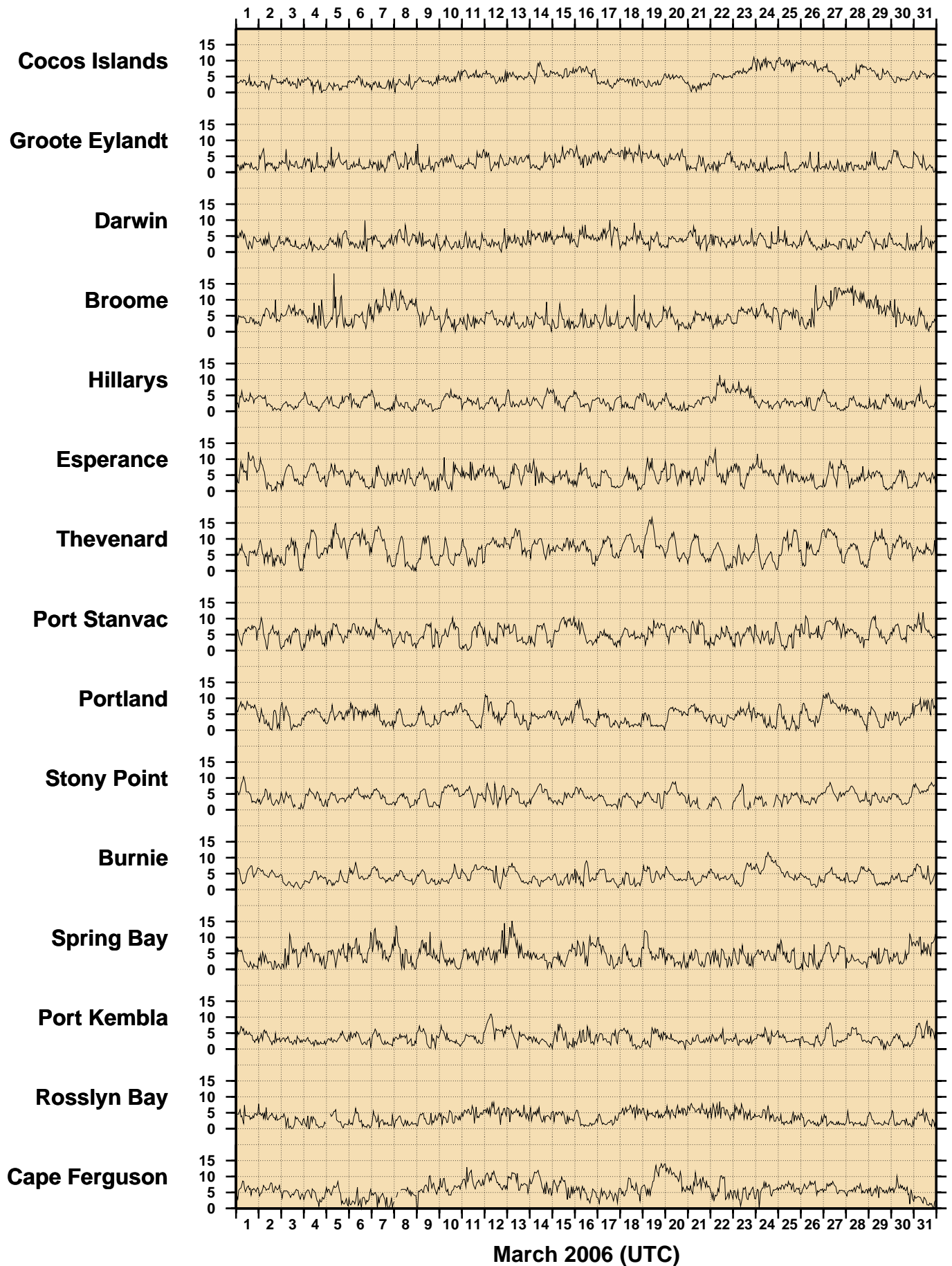


Figure 5

MARCH 2006
HOURLY INCIDENT WINDS (m/s, deg True)

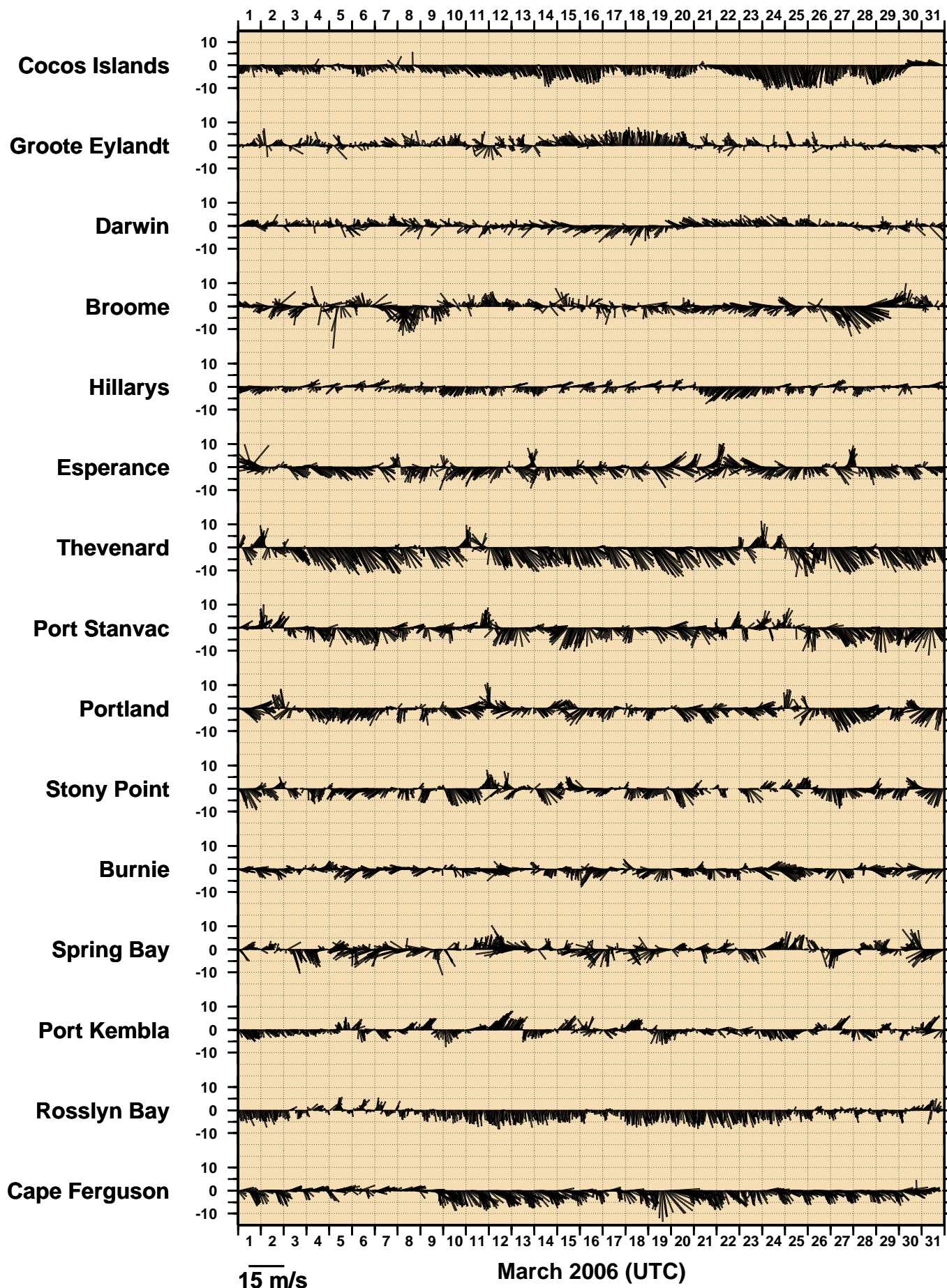


Figure 6

MARCH 2006
HOURLY MAXIMUM WIND GUSTS (m/s)

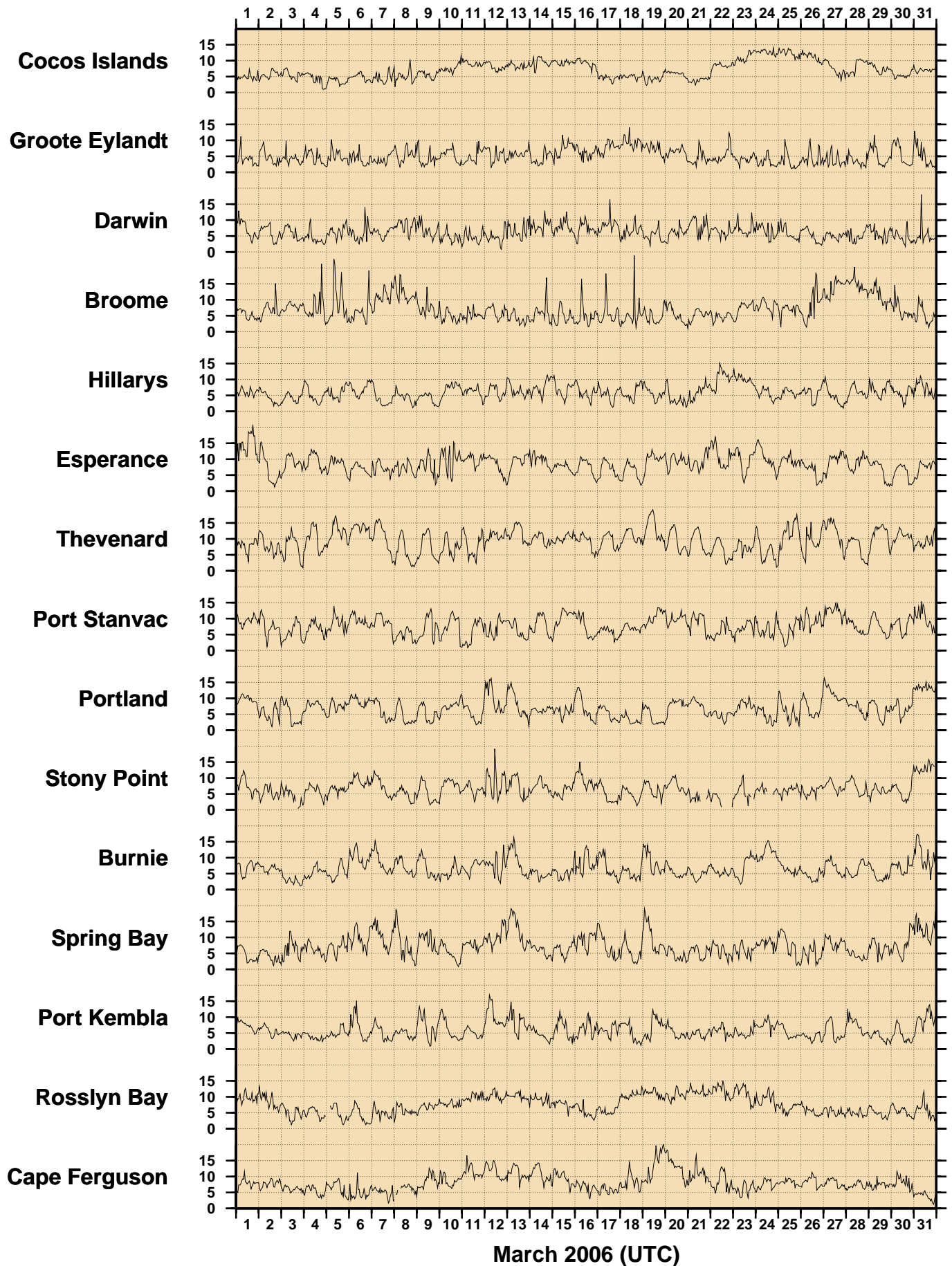


Figure 7

MARCH 2006
HOURLY AIR TEMPERATURES (°C)

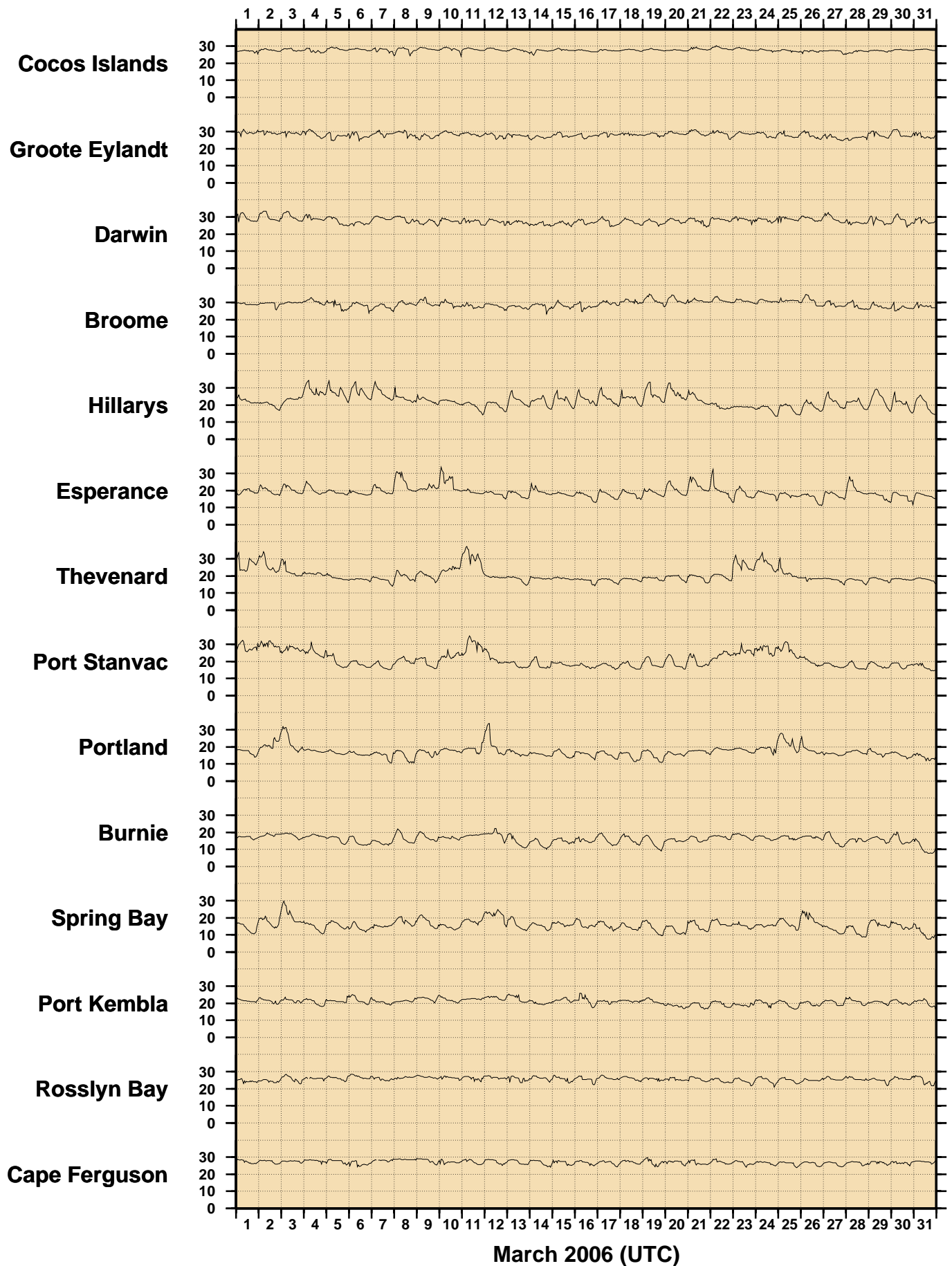
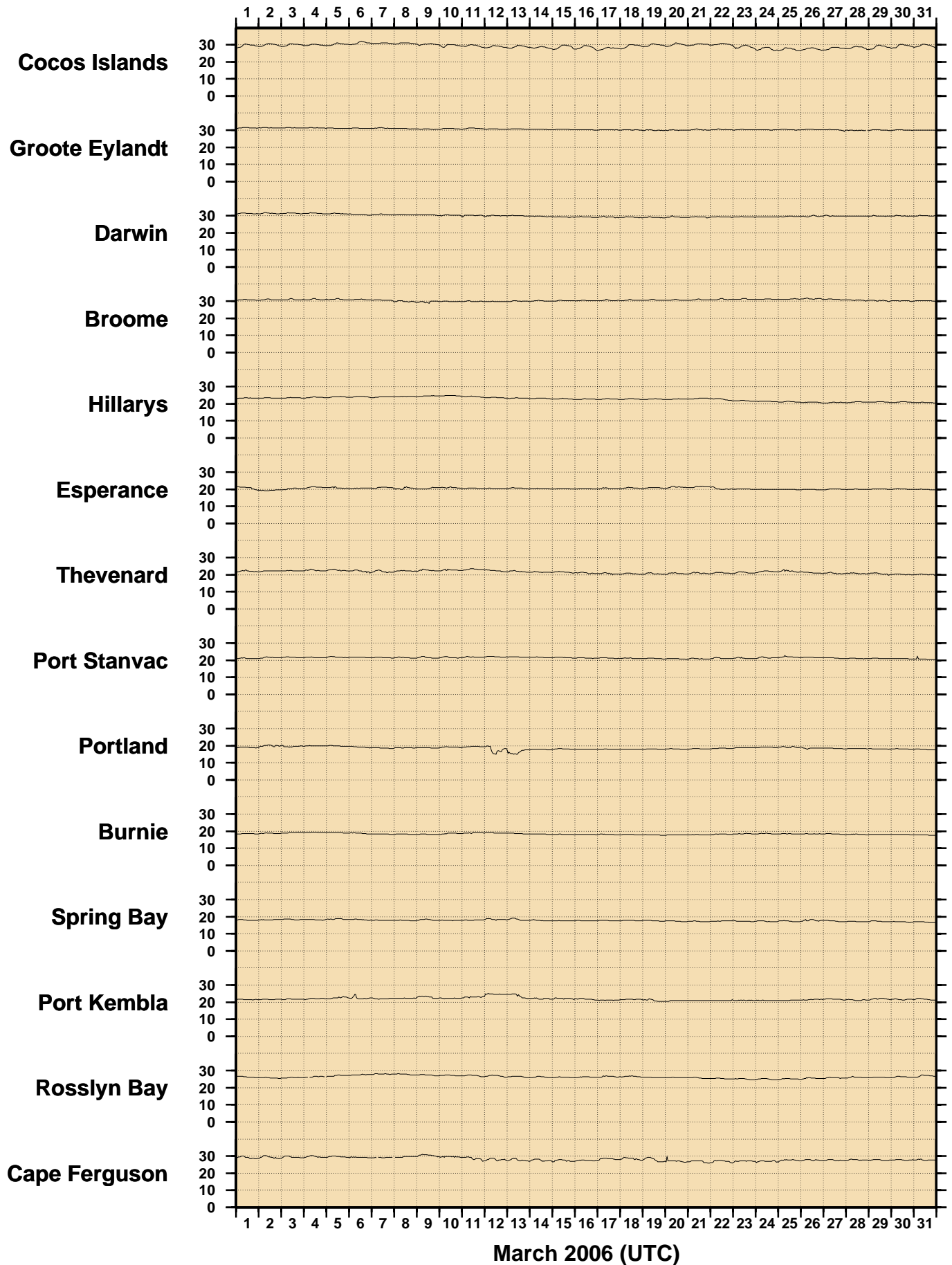


Figure 8

MARCH 2006
HOURLY WATER TEMPERATURES (°C)



MARCH 2006
HOURLY ATMOSPHERIC PRESSURE (hPa)

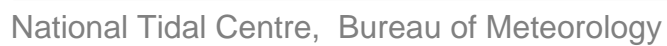
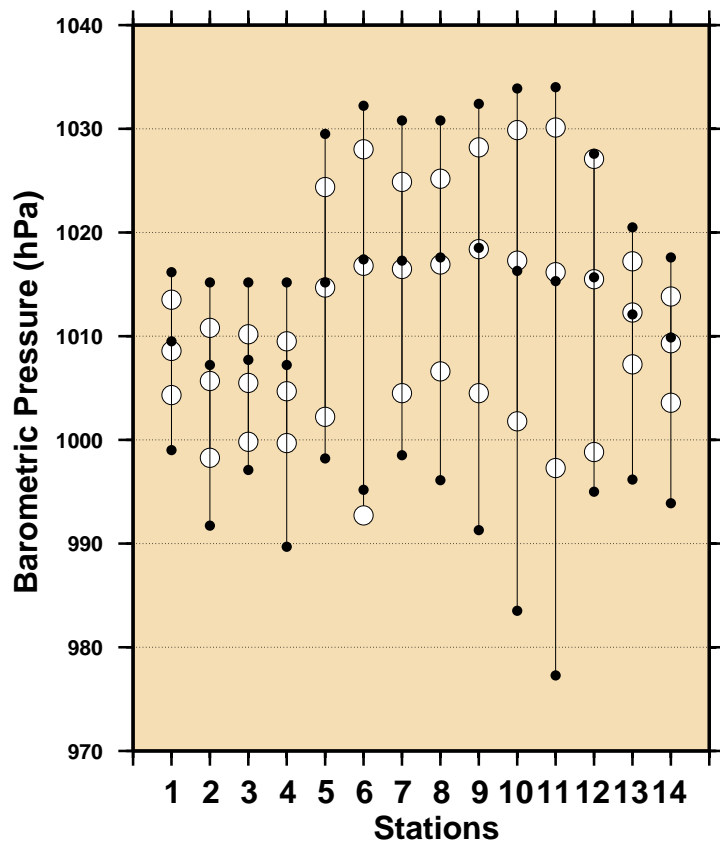
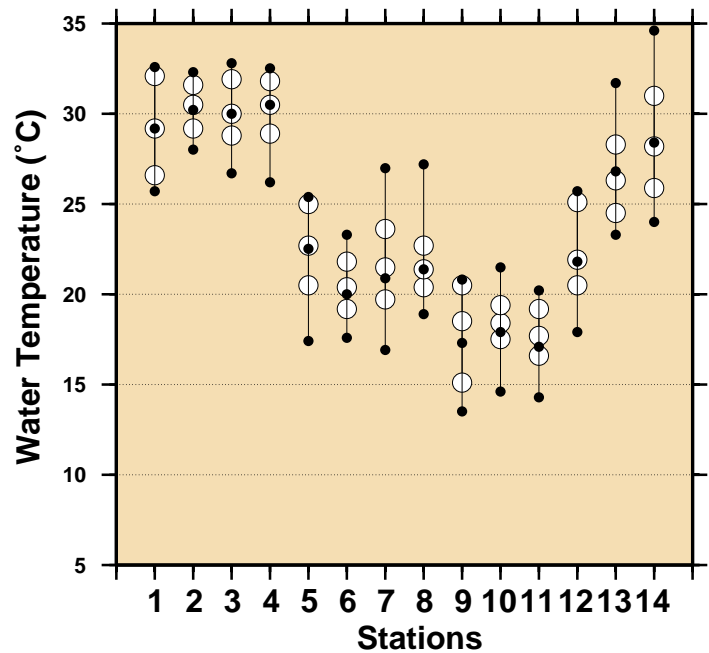
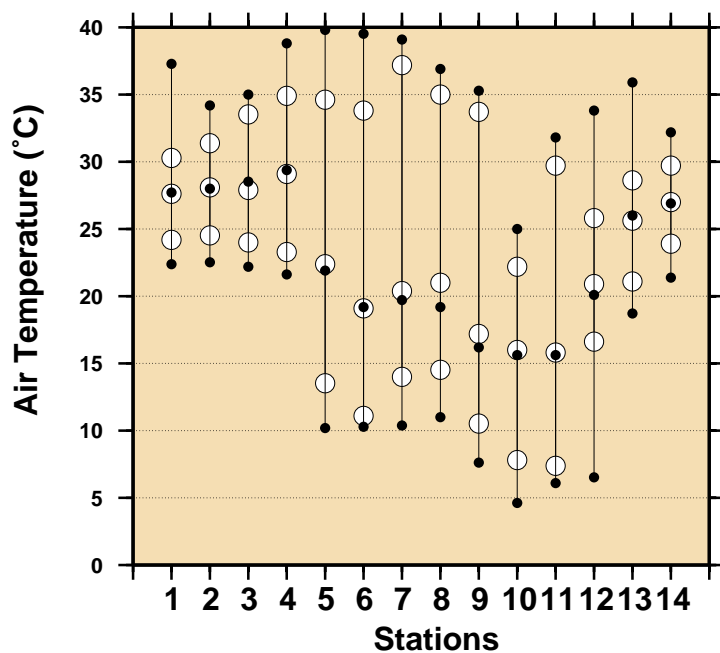


Figure 10
Comparison of March 2006 Max, Min & Mean with
Long Term March Values.



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

- March 2006 Maximum
- ◐ March 2006 Mean
- March 2006 Minimum
- Long Term March Maximum
- Long Term March Mean
- Long Term March Minimum

Figure 11

MONTHLY MEAN SEA LEVELS TO MARCH 2006 (m)

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

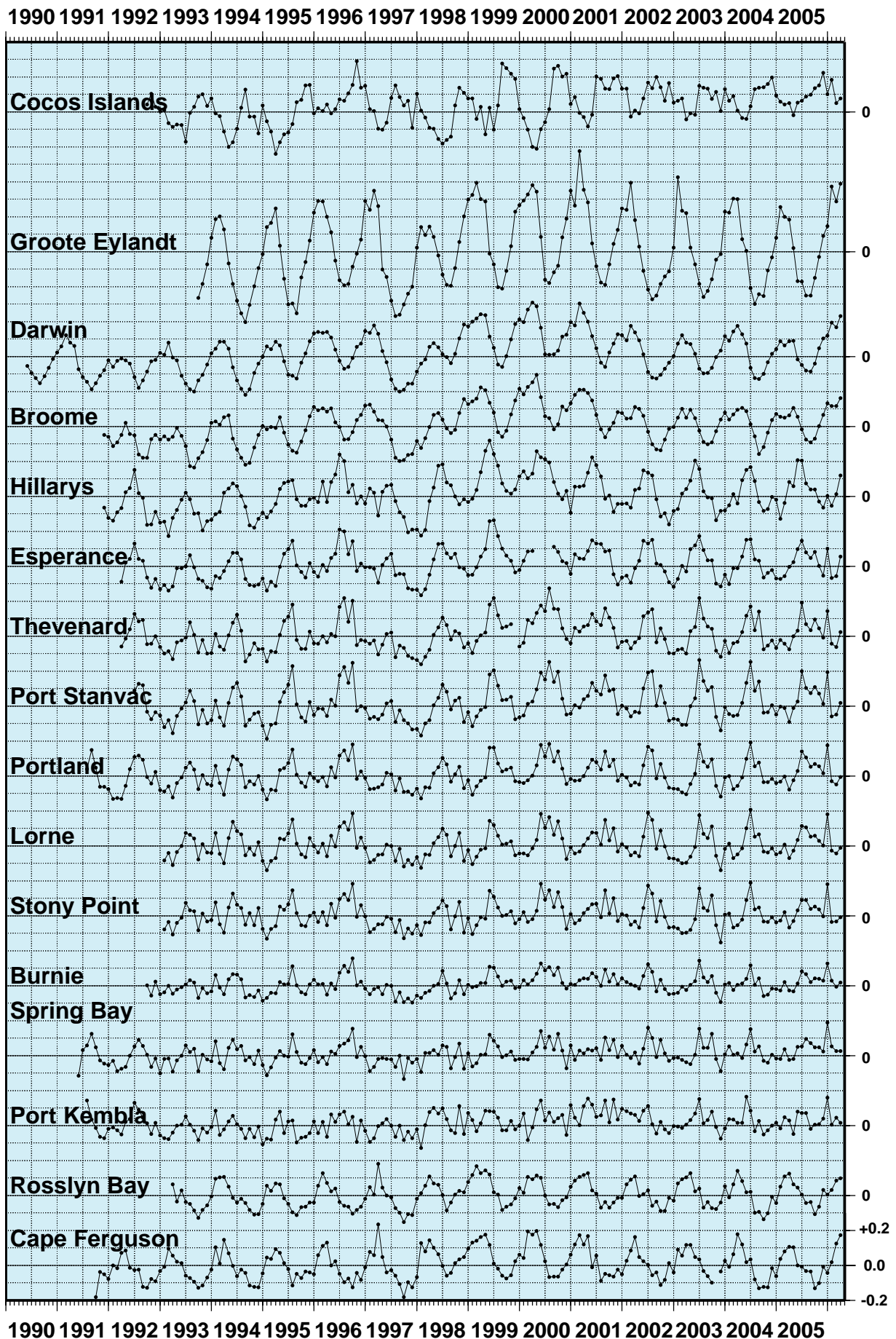


Figure 12
SEA LEVEL ANOMALIES THROUGH MARCH 2006 (m)

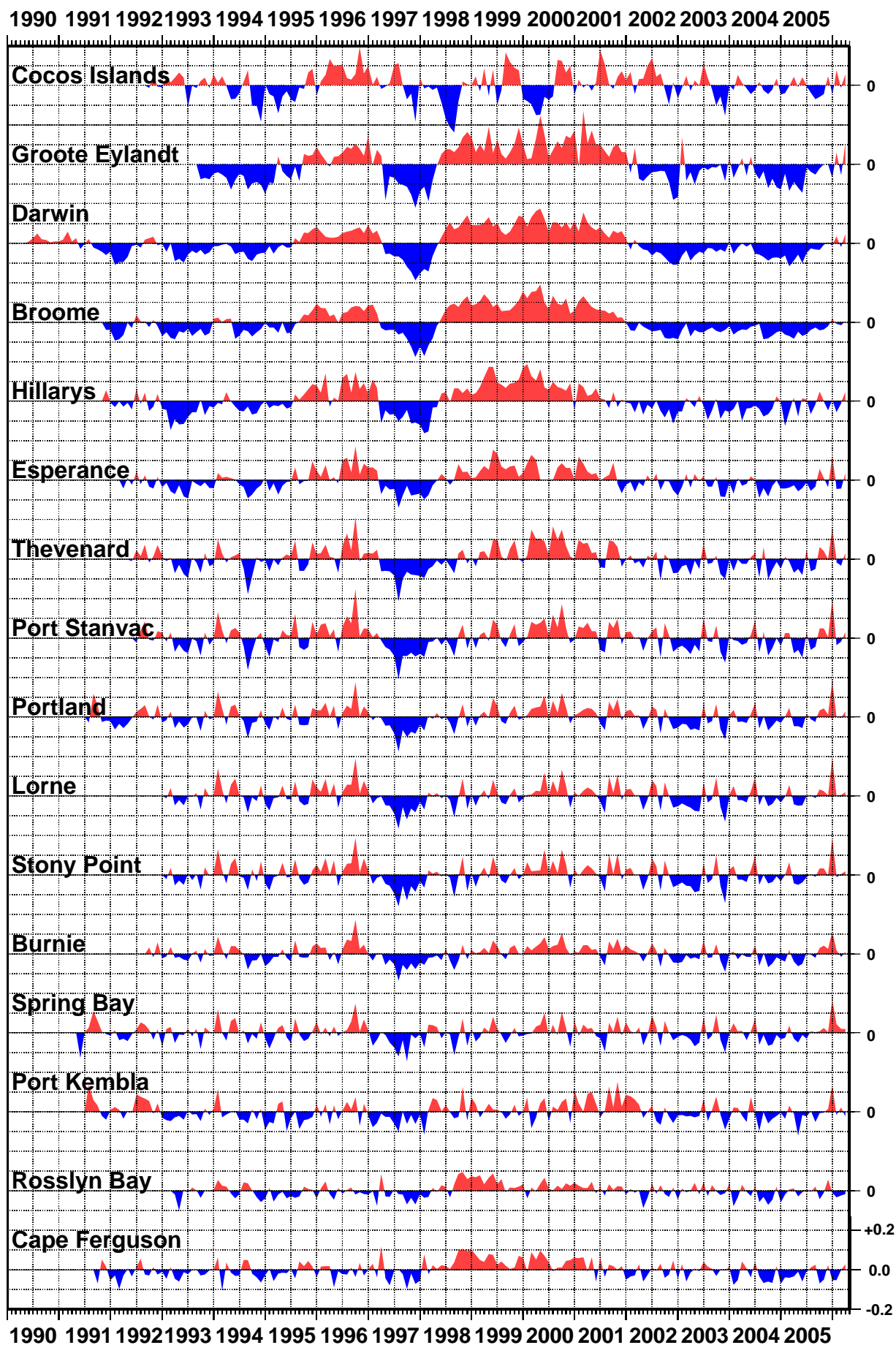


Figure 13

SEA LEVEL TRENDS THROUGH MARCH 2006 (mm/year)

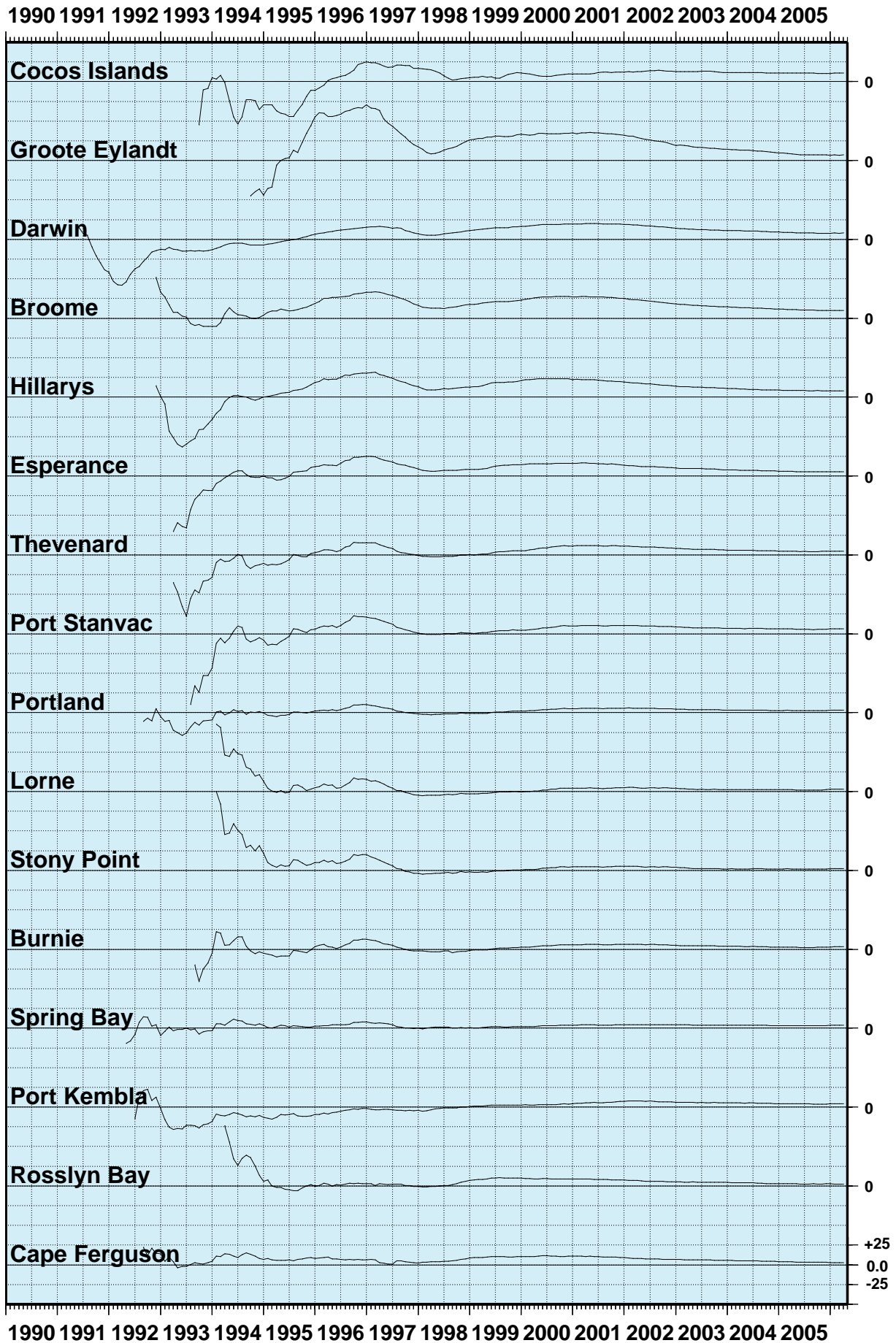


Figure 14

BAROMETRIC PRESSURE ANOMALIES THROUGH MARCH 2006 (hPa)

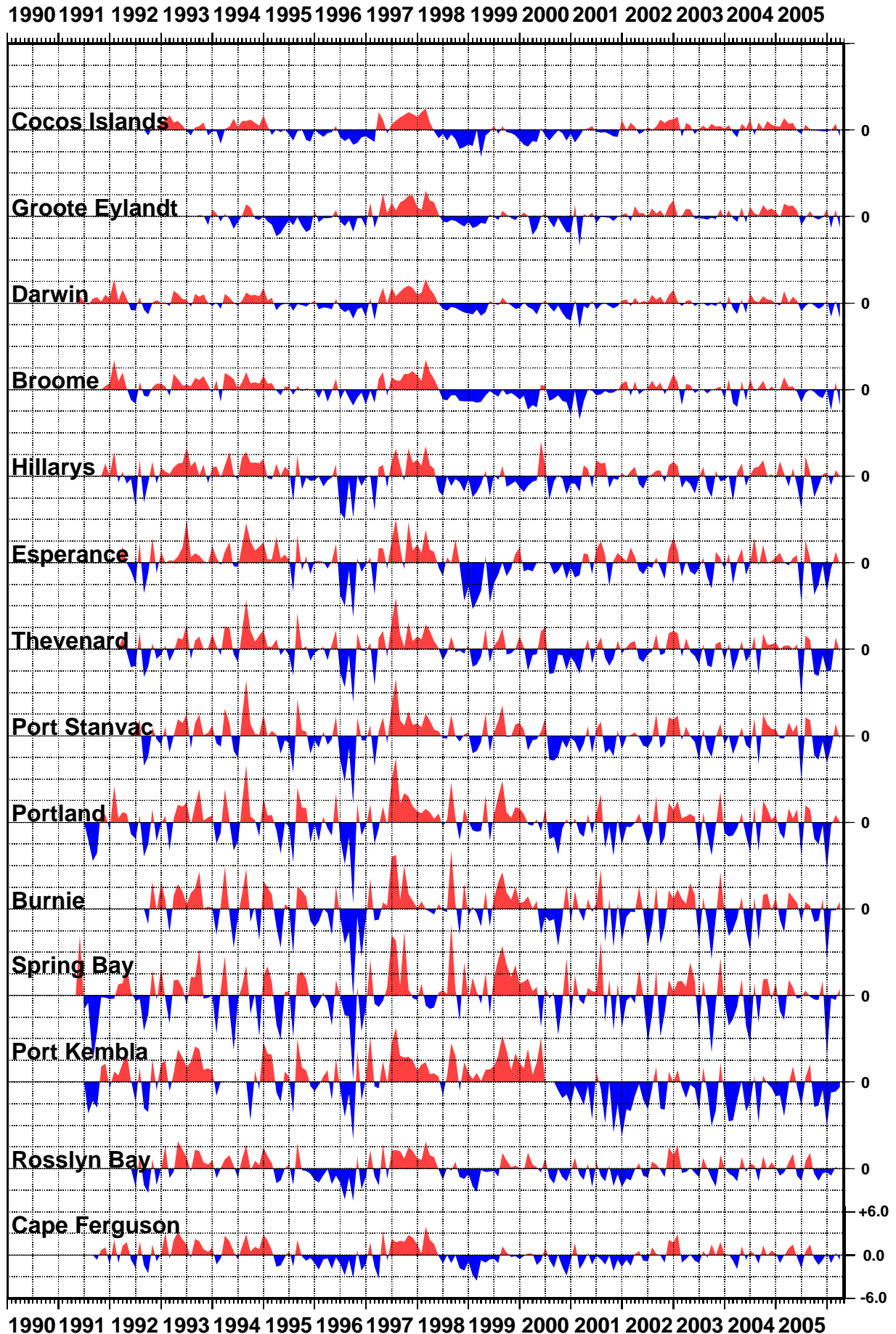


Figure 15

WATER TEMPERATURE ANOMALIES THROUGH MARCH 2006 (°C)

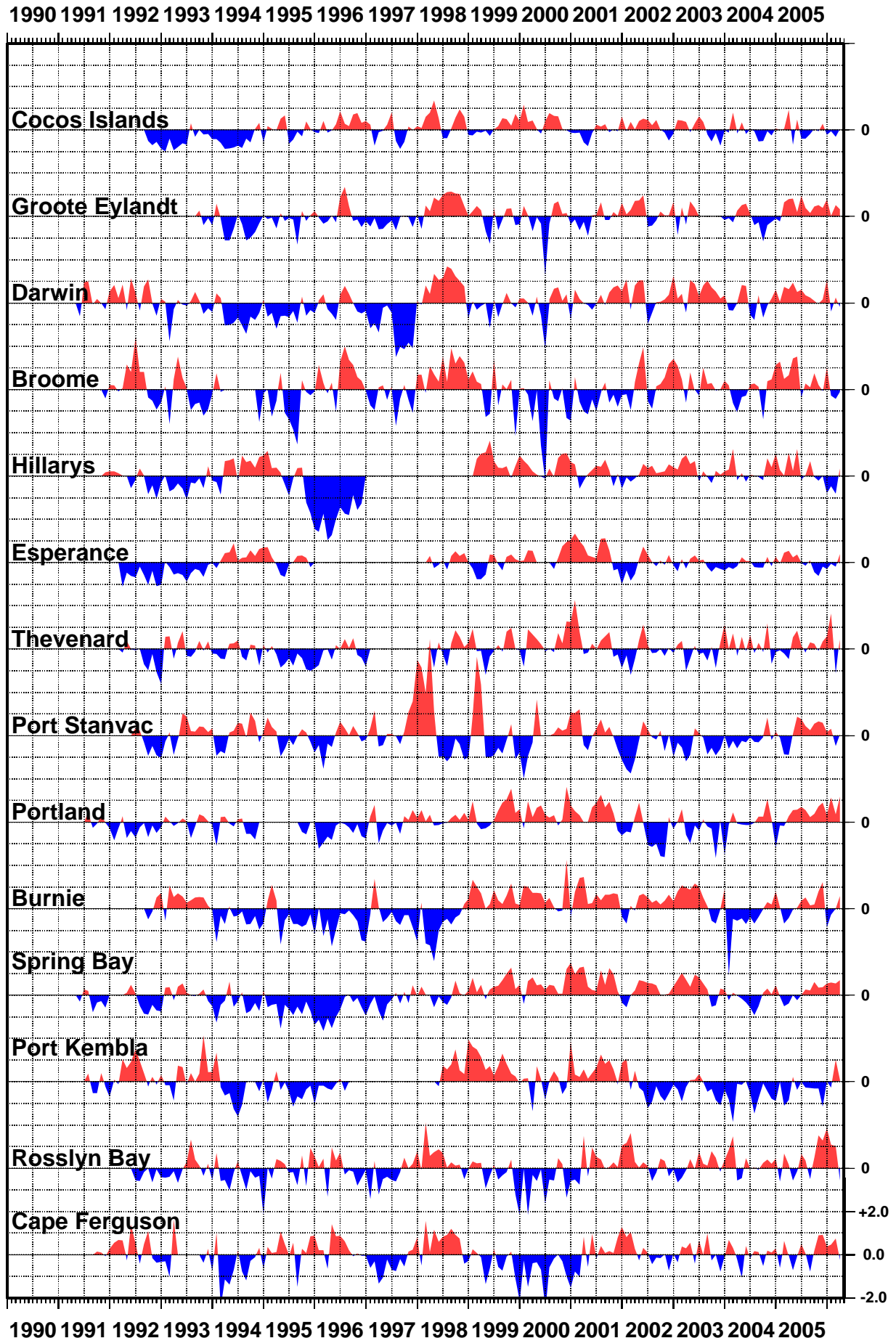


Figure 16
AIR TEMPERATURE ANOMALIES
THROUGH MARCH 2006 (°C)

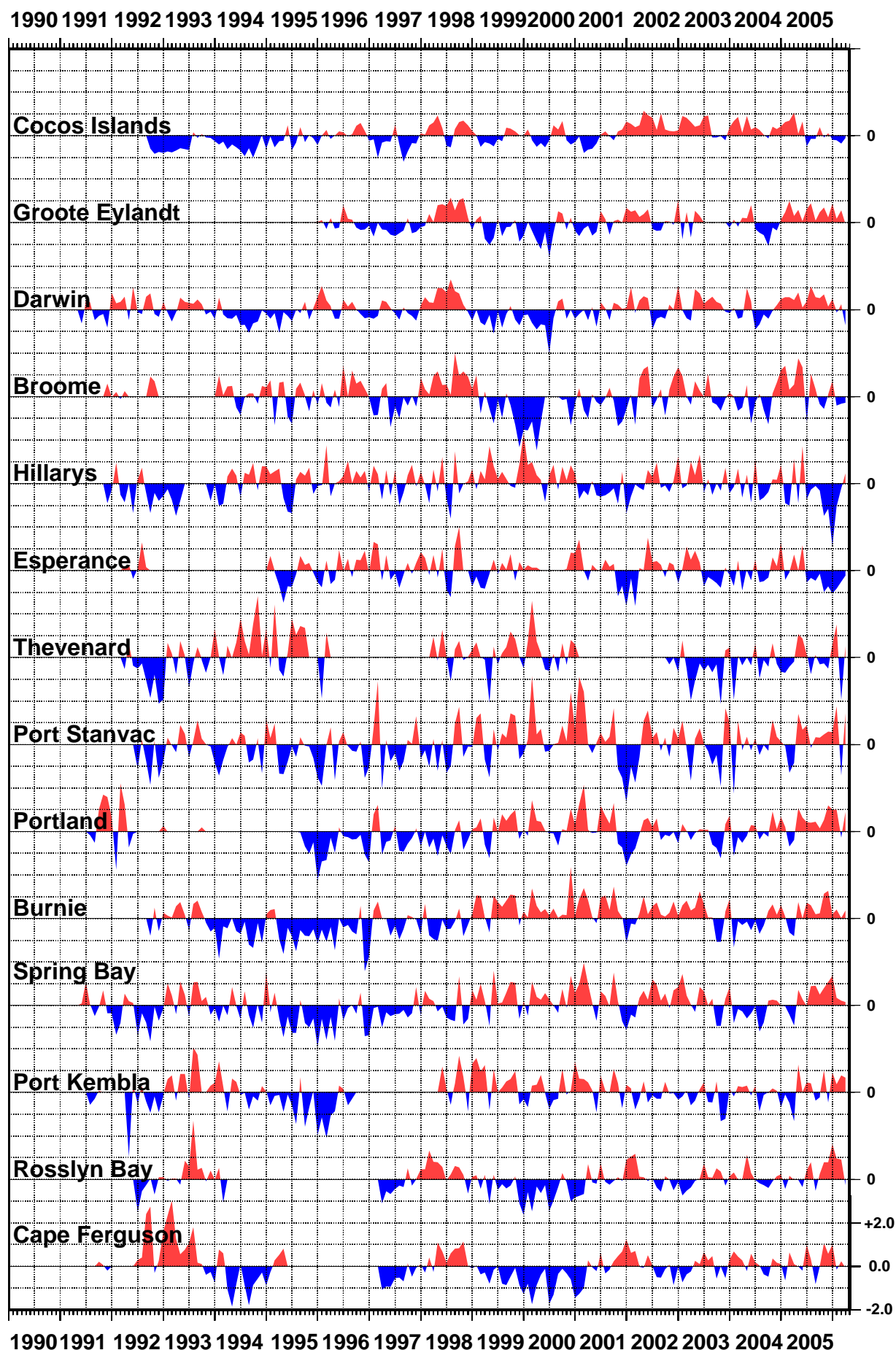


Figure 17 SEA LEVEL DATA RETURN

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

* Patchy record

