

The National Australian Tide Gauge Network

Belinda Ronai

National Tidal Facility Australia, Flinders University of South Australia.

The National Australian Tide Gauge Network is made up of contributions from an array of tide gauges that have been maintained by NTF Australia as part of the ongoing Australian Baseline Sea Level Monitoring Project (ABSLMP) and gauges that belong to the Australian Association of Ports and Marine Authorities (AAPMA). NTF Australia maintains the quality controlled data output from these gauges for use in tidal analysis, prediction and research.

The Australian Baseline Array is comprised of fourteen SEAFRAME stations; Darwin, Broome, Hillarys, Esperance, Thevenard, Port Stanvac, Portland, Burnie, Spring Bay, Port Kembla, Rosslyn Bay, Cape Ferguson, Groote Eylandt and Cocos (Keeling) Islands. Each station records values of sea level, wind speed, direction and gust, air and water temperature and atmospheric pressure. Two sea level sensors are deployed for each station, a primary (AQUATRAK) sensor and a backup pressure sensor in the event of any problems with the primary. Sea level is monitored at six-minute intervals while the meteorological and temperature data is recorded at hourly intervals. All SEAFRAME sites are surveyed regularly to ensure datum consistency and the results are published by AUSLIG on the Internet.

In addition to the above stations, NTF Australia has access to two stations in Victoria (Lorne and Stony Point) for inclusion in the Baseline Array. These stations are customised versions of the full SEAFRAME stations and are funded by the Victorian Channels Authority, whose cooperation is gratefully acknowledged.

Data is downloaded daily from each SEAFRAME gauge via a modem connection. These downloads are monitored on a daily basis and any problems arising can be quickly identified and then rectified. Hopefully within the next year or so the data acquisition system will be upgraded so that we may retrieve the data via satellite connections.

Data retrieved is subject to extensive quality control procedures on a regular basis, which check for timing errors, remove spikes and identify data gaps. Overall, the quality of the data retrieved from the SEAFRAME stations continues to be excellent.

Monthly reports on the data are produced and distributed and are generally available within two weeks of the end of each month, in hard copy form, and on the Internet. These reports provide time series plots of all data output from the SEAFRAME stations, along with various other derived parameters, such as anomalies, trends and mean sea levels. Please see the following web address for the latest monthly report.

<http://www.ntf.flinders.edu.au/TEXT/PRJS/BASE/MRPTS/baseline.html>

All observed and derived data output from the ABSLMP SEAFRAME stations is available on the NTF Australia website database. This database is updated

on a monthly basis and is easily accessible. Please see the following web address:

<http://www.ntf.flinders.edu.au/TEXT/WOCE/baseline.html>

Tide gauge data not part of the ABSLMP is supplied to NTF Australia on an irregular basis each year for quality control, processing and analysis. In total there are about 65 sea level data sets supplied from various locations around Australia as part of the tidal contract between AAPMA and NTF Australia. NTF maintains the AAPMA tidal data for use in tidal analysis, prediction and research. The sea level data is available by request. Please see the following web address:

<http://www.ntf.flinders.edu.au/TEXT/WOCE/aapma.html>

One of the most important uses of sea level data from the National Australian Tide Gauge Network is in its use for determining estimates of sea level rise. Data records need to be at least 25 years in length to produce realistic sea level trend estimates. Thus, data from the SEAFRAME gauges part of the ABSLMP needs to be augmented with historical data from conventional gauges for trend analysis. Research has been undertaken by NTF Australia into estimates of the overall average Australian sea level trend (+0.3 mm/year) in the following two papers.

Australian Mean Sea Level Survey:

<http://www.ntf.flinders.edu.au/TEXT/PRJS/BASE/meansea.html>

Sea Level Rise in Australia and the Pacific:

<http://www.ntf.flinders.edu.au/TEXT/CONF/cook2000/papers/billdoc.pdf>

Following is a listing of the hourly sea level data sets part of the National Australian Tide Gauge Network supplied by NTF Australia to the Fast Delivery WOCE Dataset on a monthly basis:

GLOSS Number	Station name	Latitude	Longitude	Project	Observation Periods	Authority responsible for tide gauge
046	Cocos Is. (Keeling)	12°07'S	096°53'E	Baseline	Float gauge 1985-1994; Acoustic gauge 1992-	NTF Australia
060	Townsville	19°15'S	146°50'E	AAPMA	1948-; Digital data 1959-	Townsville Port Authority
059	Burnett Heads (Bundaberg)	24°46'S	152°23'E	AAPMA	1966-	Bundaberg Port Authority
058	Brisbane (West Inner Bar)	27°22'S	153°10'E	AAPMA	1957-8; 1966-	Marine Operations Branch Queensland Department of Transport
057	Sydney, Fort Denison	33°51'S	151°14'E	AAPMA	1885-	Sydney Ports Corporation
056	Spring Bay	42°33'S	147°56'E	Baseline	Float gauge 1968-1969; Acoustic gauge 1991-	NTF Australia

GLOSS Number	Station name	Latitude	Longitude	Project	Observation Periods	Authority responsible for tide gauge
055	Portland	38°20'S	141°36'E	Baseline	Float gauge 1982-1993; Acoustic gauge 1991-	NTF Australia
308	Thevenard	32°10'S	133°40'E	Baseline	Float gauge 1964-1993; Acoustic gauge 1992-	NTF Australia
054	Esperance	33°52'S	121°54'E	Baseline	Float gauge 1965-; Acoustic gauge 1992-	NTF Australia Deptment of Transport Marine Division WA
040	Broome	18°00'S	122°13'E	Baseline	Float gauge 1966-; Acoustic gauge 1991-	NTF Australia Deptment of Transport Marine Division WA
062	Darwin	12°28'S	130°51'E	Baseline	Float gauge 1958-; Acoustic gauge 1990-	Darwin Port Authority NTF Australia

The remaining National Australian Tide Gauge Network datasets maintained by NTF Australia not supplied to the Fast Delivery WOCE Dataset are listed in the following table:

ANTT Number	Station name	Latitude	Longitude	Project	Observation Periods
46290	Christmas Is.	10°25'S	105°40'E		Sep 1986 - Mar 1988, Aug 1990 - Nov 1991
57700	Norfolk Is.	29°04'S	167°57'E		1985-
57720	Lord Howe Is.	31°31'S	159°04'E		1953-1956, 1957-1977, 1991-
58100	Twin Island	10°28'S	142°26'E	AAPMA	1974 – 1975
58140	Ince Point	10°30'S	142°19'E	AAPMA	1971, 1974-1976, 1988 –
58170	Thursday Island	10°35'S	142°13'E	AAPMA	1983 –
58180	Turtle Head (Hammond Island)	10°31'S	142°13'E	AAPMA	1971, 1974-1976, 1989 –
58180.1	Hammond Rock Lighthouse			AAPMA	1971, 1974–1976
58200	Goods Island	10°34'S	142°10'E	AAPMA	1974–1976, 1989 –
58230	Booby Is.	10°36'S	141°55'E	AAPMA	1970-
59040	Port Douglas	16°29'S	145°28'E	AAPMA	1978, 1987 –
59060	Cairns	16°55'S	145°47'E	AAPMA	1960, 1966–1976, 1978, 1982, 1985 –
59140	Mourilyan Harbour	17°36'S	146°07'E	AAPMA	1984 –
59200	Lucinda Offshore	18°31'S	146°23'E	AAPMA	1985 –
59260	Cape Ferguson	19°17'S	147°03'E	Baseline	1991 –
59300	Abbot Point	19°51'S	148°07'E	AAPMA	1985–1995
59410	Shute Harbour	20°17'S	148°47'E	AAPMA	1982–1984, 1986 –
59450	Bugatti Reef	20°05'S	150°18'E	AAPMA	1982–1983, 1996–1997
59510	Mackay Outer Harbour	21°07'S	149°14'E	AAPMA	1960, 1966–1979, 1984 –
59511	Hay Point	21°16'S	149°19'E	AAPMA	1969, 1985 –
59670	Roslyn Bay	23°10'S	150°47'E	Baseline	1993 –
59690	Port Alma	23°35'S	150°52'E	AAPMA	1985–
59750	Gladstone	23°50'S	151°15'E	AAPMA	1978 –

ANTT Number	Station name	Latitude	Longitude	Project	Observation Periods
59840	Fraser Island (Waddy Point)	24°58'S	153°21'E	AAPMA	1976–1977
59850	Urangan	25°17'S	152°55'E	AAPMA	1996–
59940	Noosa Head	26°23'S	153°06'E	AAPMA	1970–1973
59950	Mooloolaba	26°41'S	153°07'E	AAPMA	1979-1980, 1986 –
59980	Brisbane (West Inner Bar)	27°22'S	153°10'E	WOCE	1957-8; 1966-
60050	Gold Coast Seaway	27°57'S	153°25'E	AAPMA	1986 –
60130	Yamba	29°25'S	153°21'E	AAPMA	1989 –
60310	Newcastle	32°56'S	151°47'E	AAPMA	1957–1958, 1966 –
60390	Botany Bay	33°59'S	151°13'E	AAPMA	1981–1997, 2000 –
60420	Port Kembla	34°29'S	150°55'E	Baseline	1991 –
60420.1	Port Kembla	34°29'S	150°55'E	AAPMA	1957 – 1993
60530	Eden	37°04'S	149°54'E	AAPMA	1957–1958, 1960–1972, 1983–1984, 1989 –
60610	Rabbit Island (Port Welshpool)	38°55'S	146°31'E	AAPMA	1984–1985
60710	Stony Point	38°22'S	145°13'E	Baseline	1993 –
60710.1	Western Port (Stony Point)	38°22'S	145°13'E	AAPMA	1963–1965, 1967–1968, 1981–1992
60720.1	Hovell Pile	38°19'S	144°53'E	VCA	1991–
60726	West Channel Pile	38°11'S	144°48'E	AAPMA	1991–
60730	Port Phillip Heads (Point Lonsdale)	38°18'S	144°37'E	VCA	1962–
60740.1	Queenscliff	38°16'S	144°39'E	VCA	1991–
60770	Geelong (Port Phillip Bay)	38°09'S	144°22'E	AAPMA	1965–1967, 1969 –
60780	Melbourne Williamstown	37°52'S	144°55'E	AAPMA	1966 –
60790	Lorne	38°30'S	143°59'E	Baseline	1993 –
60900	Stanley	40°46'S	145°18'E	AAPMA	1965–1969
60910	Burnie	41°03'S	145°57'E	Baseline	1992 –
60910.1	Burnie	41°03'S	145°57'E	AAPMA	1952–1956, 1965–1976, 1984–1991
60930	Mersey River Devonport	41°11'S	146°22'E	AAPMA	1965–1971, 1974–1976, 1989–1990, 1994 –
60950	Georgetown	41°07'S	146°49'E	AAPMA	1965–1997
61220	Hobart	42°53'S	147°20'E	AAPMA	1960, 1962–1980, 1985, 1987 –
61410	Portland	38°20'S	141°36'E	Baseline	Float gauge 1982-1993; Acoustic gauge 1991-
61460.1	Cape Jaffa	36°57'S	139°40'E	AAPMA	1980–1984
61490	Victor Harbor	35°34'S	138°38'E	AAPMA	1964–
61583	Port Stanvac	35°06'S	138°28'E	Baseline	1992 –
61600	Port Adelaide Outer Harbor	34°47'S	138°29'E	AAPMA	1940 –
61600.1	Port Adelaide Inner Harbor	34°47'S	138°29'E	AAPMA	1960, 1966–1979, 1984 –
61685	Port Giles	35°02'S	137°46'E	AAPMA	1982, 1994 –
61780	Wallaroo	33°54'S	137°36'E	AAPMA	1976, 1980, 1982 –
61800	Port Pirie	33°10'S	138°01'E	AAPMA	1917, 1920, 1930, 1932–1934, 1936–1938, 1940 –
61840	Whyalla	33°01'S	137°36'E	AAPMA	1974, 1987 –

ANTT Number	Station name	Latitude	Longitude	Project	Observation Periods
61900	Port Lincoln	34°43'S	135°52'E	AAPMA	1964 –
62000	Thevenard	32°10'S	133°40'E	Baseline	Float gauge 1964-1993; Acoustic gauge 1992-
62120	Albany	35°02'S	117°53'E	AAPMA	1960, 1966 –
62190	Bunbury	33°19'S	115°39'E	AAPMA	1963–1964, 1966–1986
62230	Fremantle	32°03'S	115°44'E	AAPMA	1893-
62237	Hillarys Boat Harbour	31°49'S	115°44'E	Baseline	1991 –
62290	Geraldton	28°47'S	114°35'E	AAPMA	1963 –
62341	Denham	25°56'S	113°32'E	AAPMA	1979–1980
62370	Carnarvon	24°54'S	113°39'E	AAPMA	1965-
62435	Exmouth	21°56'S	114°09'E	AAPMA	1989–1993, 1998 –
62470	Onslow Beadon Creek	21°39'S	115°08'E	AAPMA	1985 –
62475	Thevenard Island	21°28'S	115°01'E	AAPMA	1987–1991
62490	Barrow Island	20°44'S	115°28'E	AAPMA	1990–1991
62491	Barrow Island Off Shore	20°49'S	115°33'E	AAPMA	1979
62540	Dampier King Bay	20°38'S	116°45'E	AAPMA	1982 –
62540.1	Dampier			AAPMA	1966–1984
62550	Port Walcott (Cape Lambert)	20°35'S	117°11'E	AAPMA	1972, 1983 –
62590	Port Hedland	20°19'S	118°34'E	AAPMA	1960; 1966-
62650	Broome	18°00'S	122°13'E	Baseline	Float gauge 1966-; Acoustic gauge 1991-
62780	Derby	17°17'S	123°36'E	AAPMA	1982–1984
62860	Yampi Sound (Koolan Island)	16°08'S	123°44'E	AAPMA	1983–1985
63090	Wyndham	15°27'S	128°06'E	AAPMA	1966–1982, 1984 –
63480	Gove Harbour (Melville Bay)	12°13'S	136°42'E	AAPMA	1965–1972, 1980 –
63511	Milner Bay	13°50'S	136°30'E	Baseline	1993 –
63511.1	Milner Bay Groote Eylandt	13°50'S	136°30'E	AAPMA	1966, 1971–1977, 1980–1987
63520	Centre Island	15°42'S	136°54'E	AAPMA	1966–1987
63540	Mornington Island	16°40'S	139°10'E	AAPMA	1976–1977
63580	Karumba	17°30'S	140°50'E	AAPMA	1985 –
63620	Weipa (Humbug Point)	12°40'S	141°53'E	AAPMA	1966–1973, 1979–1980, 1984 –