



SEA LEVEL STATION MONITORING FACILITY

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www.ioc-sealevelmonitoring.org



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Summary

- The sea level station monitoring facility (<http://www.ioc-sealevelmonitoring.org/>) collects and processes in real time data from 1028 sea level measuring stations operated by 164 institutes (station operators) world wide.
- The objective of this service is
 - to provide information about the **operational status** of global and regional networks of real time sea level stations
 - to provide a display service for quick inspection of the **raw data stream** from individual stations.
- The system was build and is operated by Flanders Marine Institute (VLIZ) for UNESCO as part of the GLOSS program of IOC.

Summary

- The station operators push the raw data to the SLMF using different data protocols : the WMO GTS, FTP push, HTTP and even Email. The data is parsed in real-time and stored in the database. The SLMF redistributes the parsed real time data through a series of interfaces (webpages, a rest API, or the GTS) to the different users, including the Tsunami warning centers, the station operators and the scientific community.
- The SLMF database contains the sealevel data, but also metadata, contact information and configuration data about the different stations and their sensors. The team at VLIZ, the station operators and the Tsunami warning centers, maintain the configuration data.

History

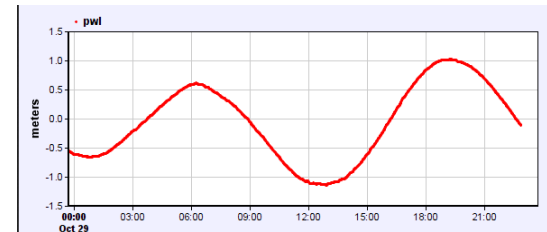
1. Monitoring status of gauges: working yes/no (2006)



- Collect data in realtime

2. Inspect raw data (2007-2008)

- Display graph
 - Download data
- => tsunami evaluation



3. Performance (2011-2012)

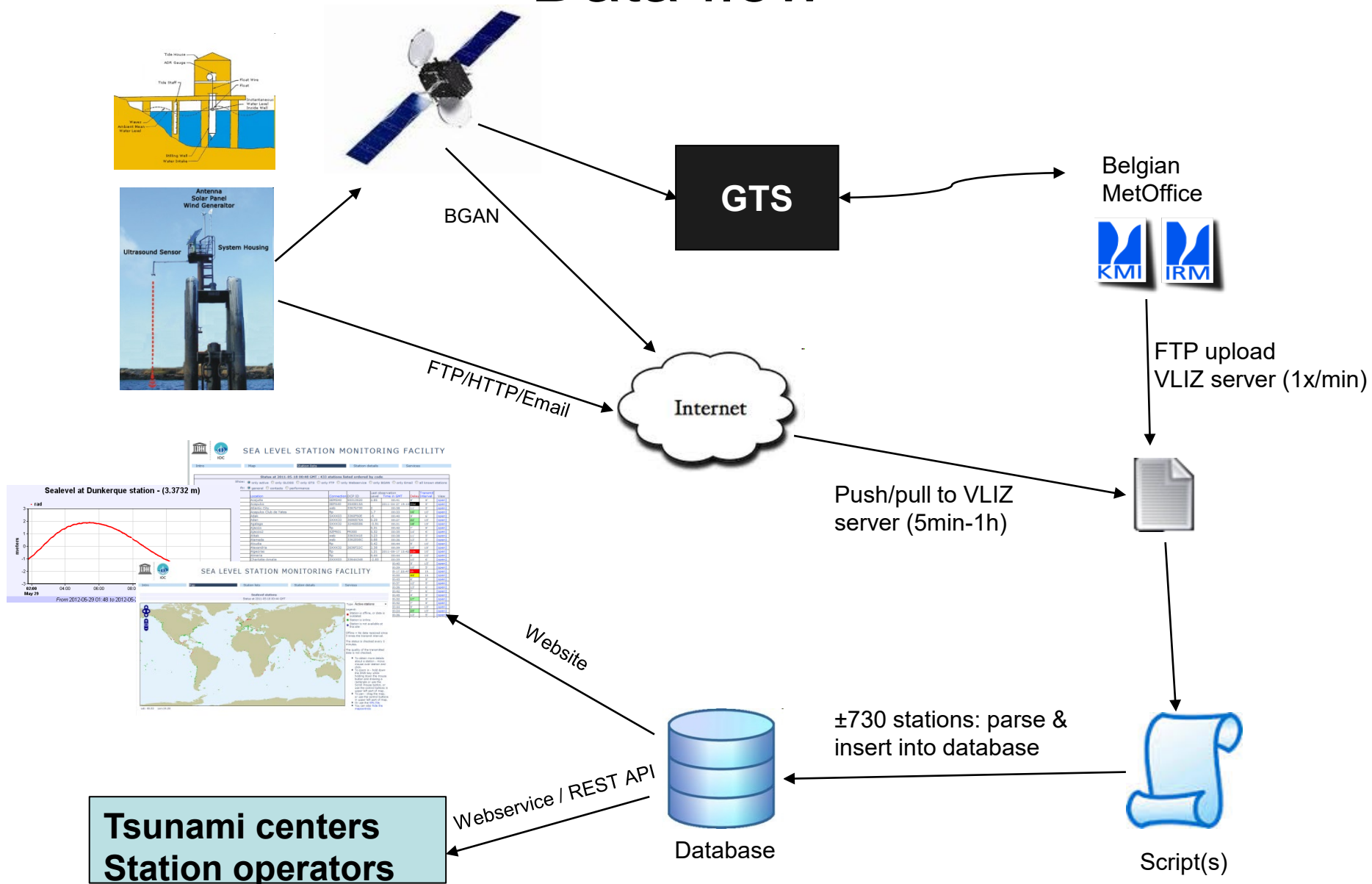
- Expected vs. Arrived
- => Feedback operators



4. Archive data (2013)

- Accessible via webservice
- redundancy

Data flow



Data ingestion

	GTS	FTP	HTTP API	Webservice
Transmit interval (min)	5 ..15	1 .. 60	1..60	5
Total station	541	225	325	58
Typical delay (min)	2 .. 15	2..12	1..15	1-5
Ratio expected/arrived (%)	~100%	<< 80%	~100%	~100%
Mechanism	Push to GTS of WMO	Push to FTP server at VLIZ or pull from station operator FTP	Pull from web api	Push to HTTP server at VLIZ
Notes	Many formats , some standards CREXX, OTT, GOES,	Mostly 1 new file per day per station, updated constantly	Many formats	Almost no delay

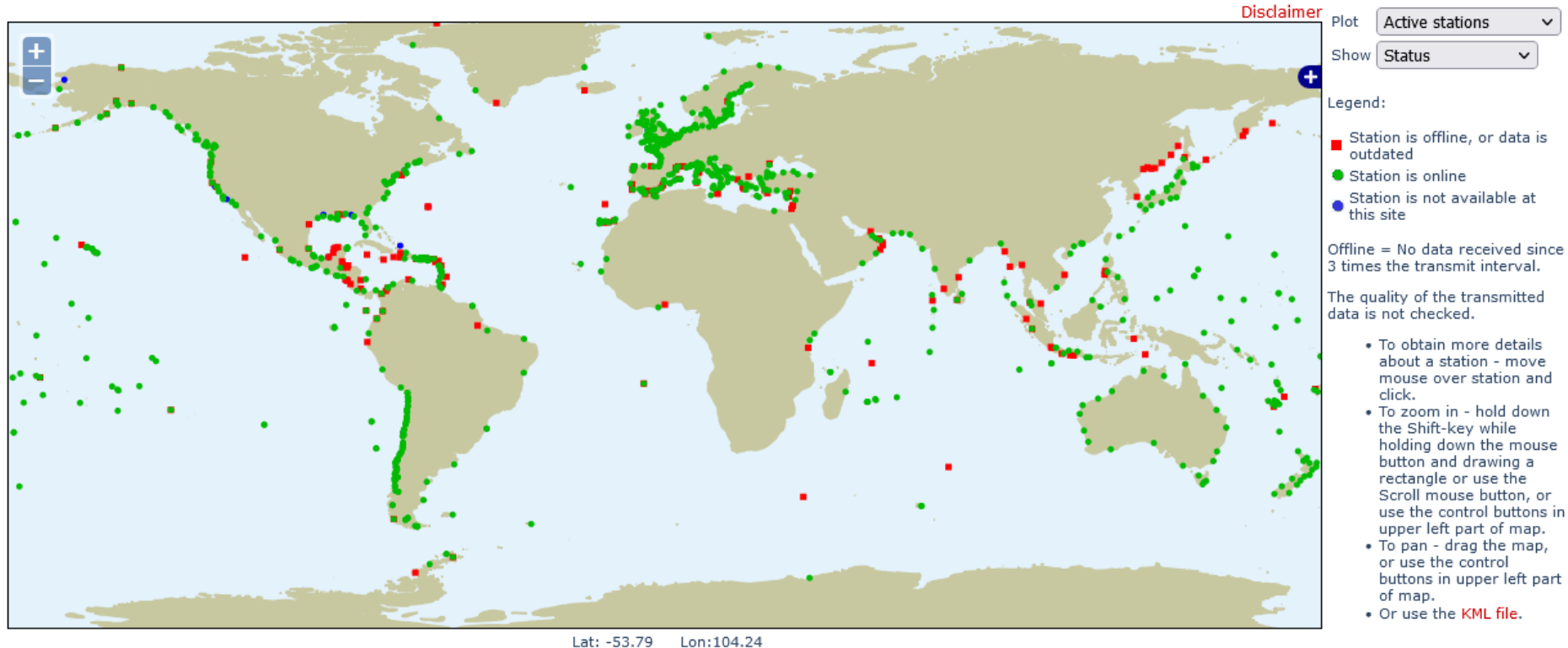


SEA LEVEL STATION MONITORING FACILITY

[Intro](#)[Map](#)[Station lists](#)[Station details](#)[Services & FAQ](#)[GLOSS](#)[Catalog](#)

Sealevel stations

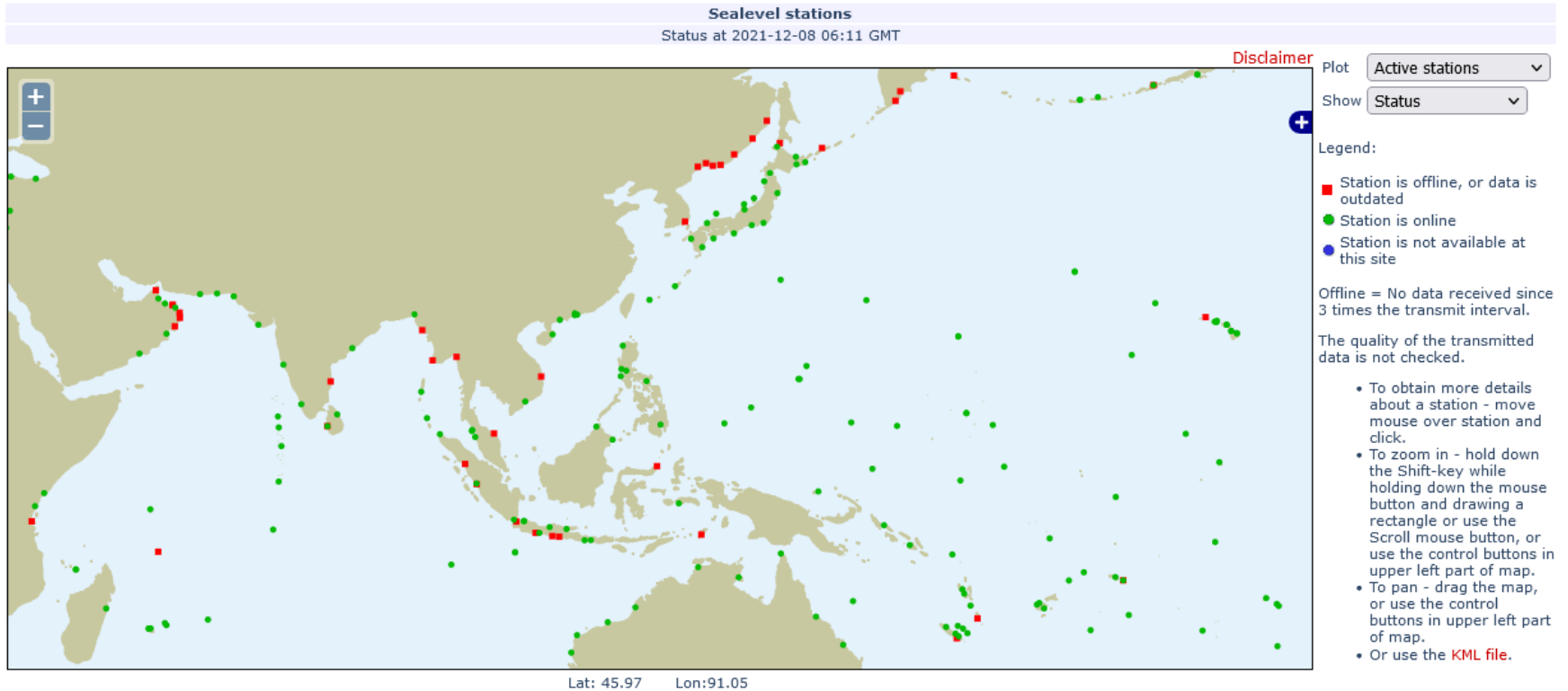
Status at 2021-12-08 14:19 GMT



What stations are operational or offline.

For which data flow GTS / FTP / HTTP /.. ?

South China Sea



List of stations

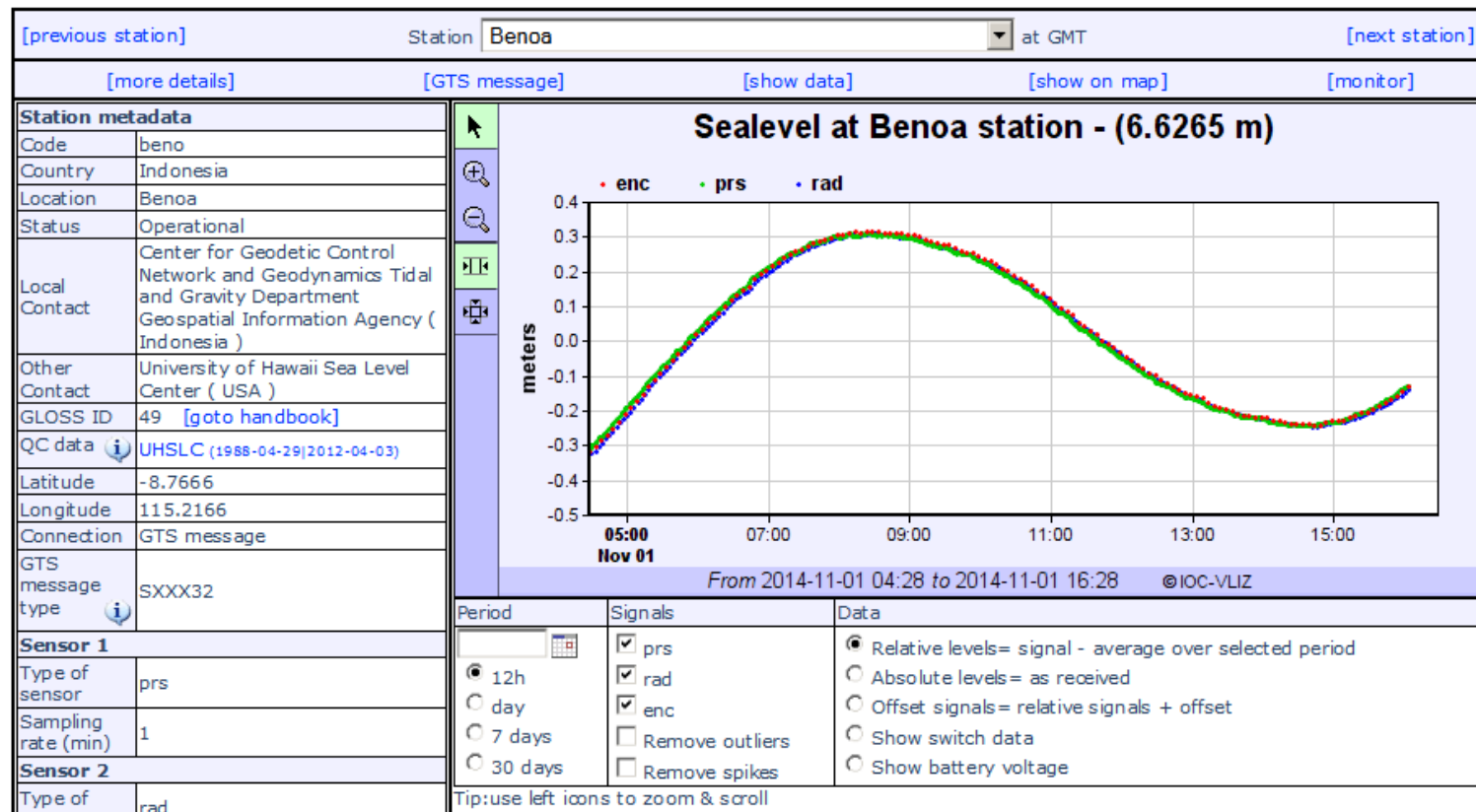


SEA LEVEL STATION MONITORING FACILITY

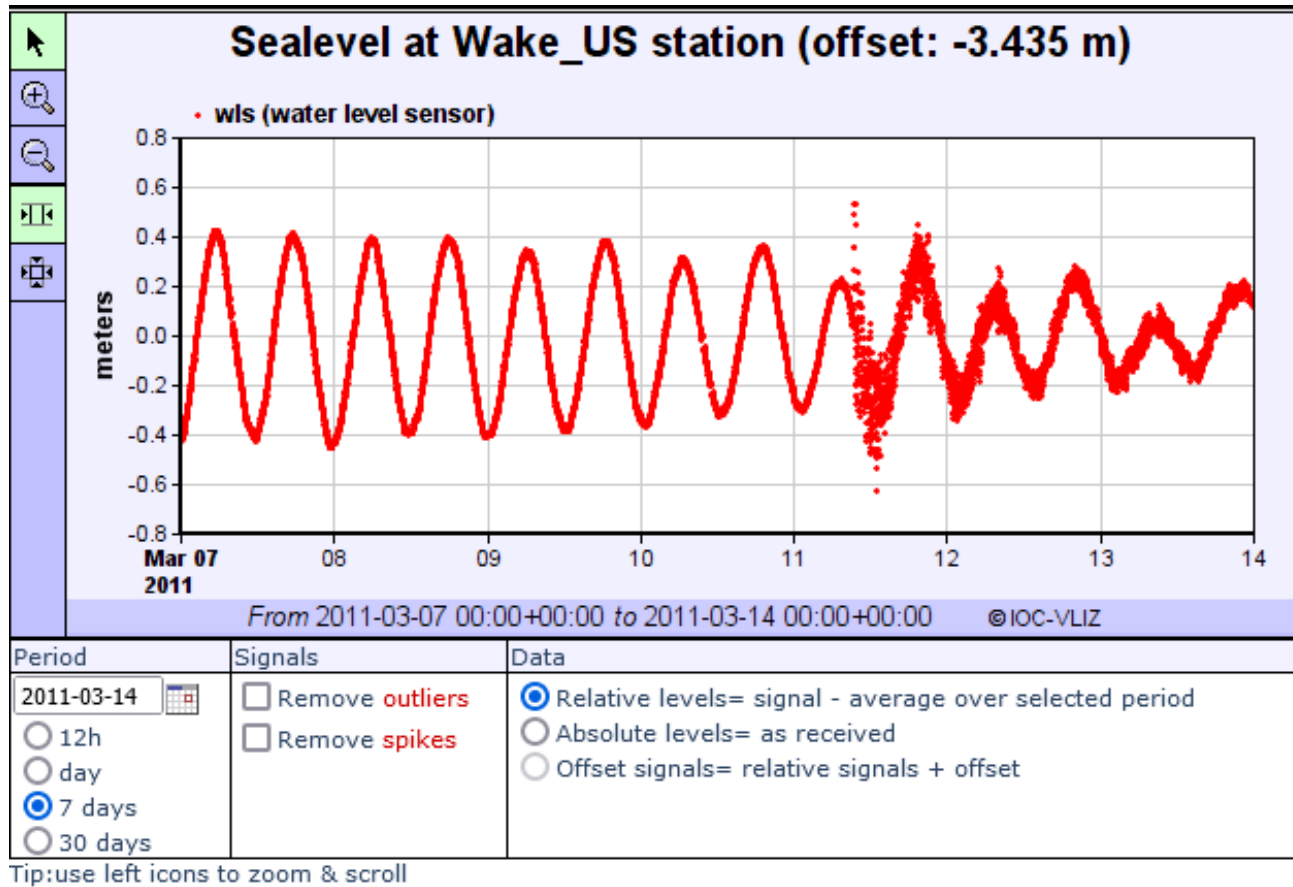
[Intro](#)
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[Services & FAQ](#)
[GLOSS](#)
[Catalog](#)

Status at 2021-12-08 06:17 GMT : 1162 stations listed ordered by country										
Show:	All known stations			Info:	General information					
Code	GLOSS ID	Country	Location	Connection	DCP ID	Last observation Level	Time in GMT	Delay	Transmit Interval	View
blow		Anguilla	Blowing Point	SOAT10	A84006AC	6.75	06:10	8'	5'	[open]
vern	188	Antarctica	Vernadsky - Faraday	SEMS40	3354E632	1.77	06:09	9'	15'	[open]
syow	95	Antarctica	Syowa	web		12.07	04:55	1h	1h	[open]
dumo	131	Antarctica	Dumont d'Urville	ftp		-999	-down-	965d	4h	[open]
ver1	188	Antarctica	Vernadsky - Faraday	SEMS40		1.36	2020-03-05 19:24	642d	15'	[open]
rothe	342	Antarctica	Rothera	SEMS40	6B000D98	1.91	2021-07-21 03:23	140d	15'	[open]
kepo1	187	Antarctica	King Edward Point	SEMS40	6B002B74	0.5	06:01	17'	15'	[open]
parh		Antigua	Parham (Camp Blizard), Antigua	SOAT10	14022214	0.4	2021-04-09 22:43	242d	1h	[open]
barb		Antigua	Barbuda	web		-1.03	2020-12-18 22:42	354d	6'	[open]
barb2		Antigua	Barbuda	SXXX03	334550D8		06:06	12'	6'	[open]
dese	190	Argentina	Puerto Deseado	SEPO40	33912088	6.47	06:04	14'	15'	[open]
ushu	181	Argentina	Ushuaia	SEPO40	334CE50A	5.85	06:04	14'	15'	[open]
madry	191	Argentina	Puerto Madryn	SEPO40	335665D2	4.51	06:04	14'	15'	[open]
plat	192	Argentina	Mar Del Plata	SXXX50	3542B4D2	3.45	-down-	4617d	1h	[open]
plat2	192	Argentina	Mar del Plata	SEPO40	3542B4D2	4.68	06:04	14'	15'	[open]
oran		Aruba	Oranjestad	SONU10	AA300044	-999	2021-04-17 12:46	235d	5'	[open]
pors		Australia	Port Stanavac	SZAU01	61583	-999	-down-	4025d	3'	[open]
trst		Australia	Torres Strait	SZAU01	58170	3.36	06:14	4'	3'	[open]
tbwc		Australia	Twofold Bay	SZAU01	60531	0.63	06:14	4'	3'	[open]
groo		Australia	Groote Eylandt	SZAU01	63511	0.93	06:14	4'	3'	[open]
darw	62	Australia	Darwin	SZAU01	63230	1.24	06:14	4'	3'	[open]
espe	54	Australia	Esperance	SZAU01	62080	0.13	06:14	4'	3'	[open]
thev	308	Australia	Thevenard	SZAU01	62000	0.69	06:14	4'	3'	[open]
spjy		Australia	Southport Jetty	SZAU01	61240	0.02	06:11	7'	3'	[open]
cuvie		Australia	Cape Cuvier Wharf	SZAU01	62385	-999	06:14	4'	3'	[open]
porl	55	Australia	Portland	SZAU01	61410	0.16	06:14	4'	3'	[open]
sprg	56	Australia	Spring Bay	SZAU01	61170	0.76	06:14	4'	3'	[open]
brom	40	Australia	Broome	SZAU01	62650	8.15	06:14	4'	3'	[open]
cocb	46	Australia	Cocos Island	SZIO01	46280	0.49	06:14	4'	3'	[open]
chrs	47	Australia	Christmas Island	SZIO01	46290	0.69	06:14	4'	3'	[open]
ferg	60	Australia	Cape Ferguson	SZAU01	59260	2.31	06:14	4'	3'	[open]
ross		Australia	Rosslyn Bay	SZAU01	59670	2.41	06:14	4'	3'	[open]
pkem		Australia	Port Kembla	SZAU01	60420	0.5	06:14	4'	3'	[open]
pmur		Australia	PtMurat	SZAU01	62430	2.07	06:14	4'	10'	[open]
bapj		Australia	Battery Point	SZAU01	61221	0.37	06:14	4'	3'	[open]
ffcj		Australia	Flying Fish Cove Jetty Christmas Is	SZIO01	46291	0.77	06:14	4'	3'	[open]
gpab		Australia	Geraldton	SZAU01	62290	-999	06:14	4'	3'	[open]

Station details

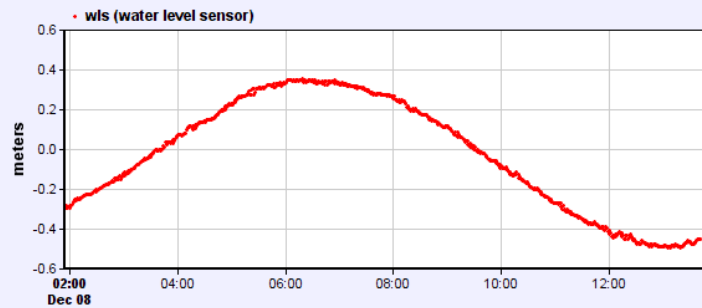


Tsunami signals

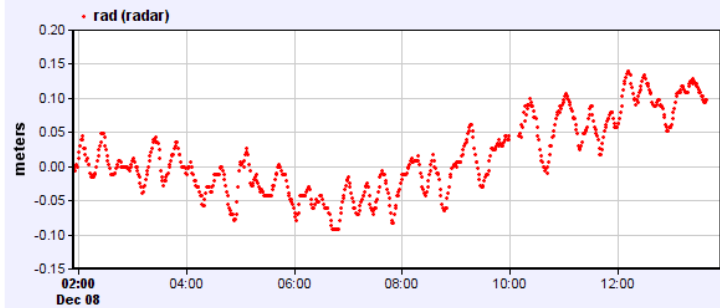


Monitor multiple stations

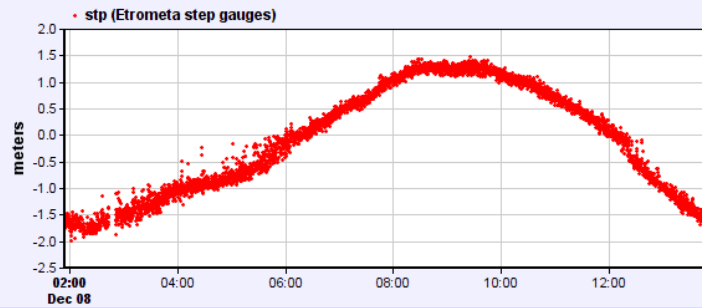
Sealevel at Wake_US station (offset: 0.437 m)



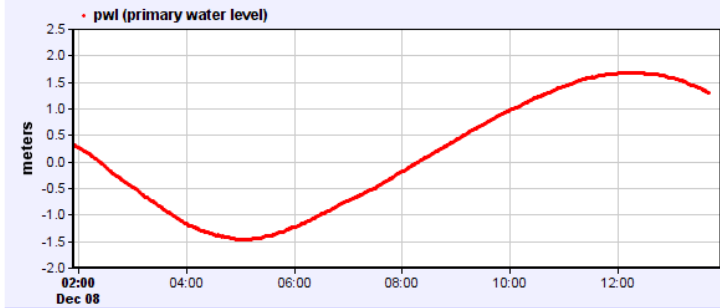
Sealevel at Wakkanai station (offset: 1.9599 m)



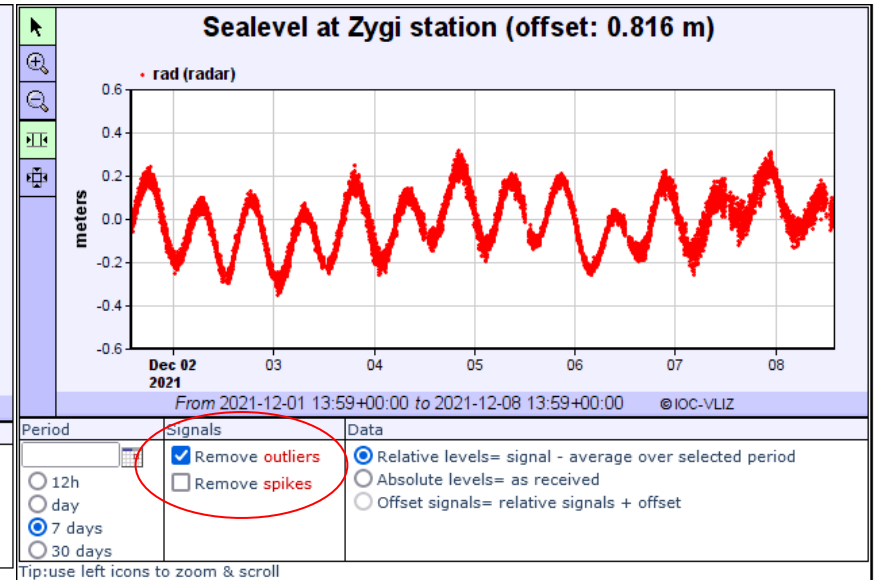
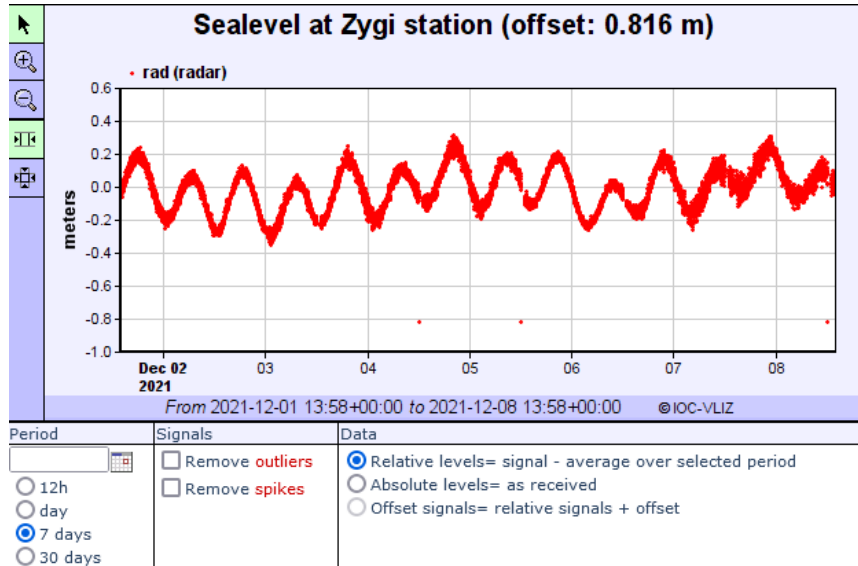
Sealevel at West Bay Harbour station (offset: 0.762 m)



Sealevel at Westport, WA station (offset: 1.0045 m)



Optional quality control



Parsing GTS messages

[previous station]

Station Quarry Bay

at GMT

[next station]

[less details]

[show graph]

[show data]

[show on map]

[monitor]

Station metadata

Code

quar

Country

Hong Kong - China

Location

Quarry Bay

Status

Operational

Added to the system

2014-01-23 14:18:27

Local Contact

Hong Kong Observatory (Hong Kong - China)

GLOSS ID

77 [\[goto handbook\]](#)

Long-term MSL data

UHSLC 329 (1962-2018)

PSMSL 1674 (1986-2020)

PSMSL 1693 (1986-1990)

PSMSL 1891 (1997-2020)

PSMSL 333 (1929-1985)

Latitude

22.2911111

Longitude

114.2133333

Connection

GTS message

GTS message type

SEHK40

GTS station code

QUARYBAY

Transmit interval (min)

10

Transmit lag UTC (sec)

0

Ave. transmit delay (min)

7

Messages received (24h)

138

Messages expected (24h)

144

Sensor 1

flt (float)

Sampling rate (min)

1

GTS format

Units of measure

m

First value

2

Samples

20

Reversed order

no

Performance statistics

Last data measured at

2021-12-08 13:55:00

Last data received at

2021-12-08 14:02:03

Measurements received in 24h

1430

Measurements expected

1440

Performance ratio

99%

Example from 2021-12-07 17:35:00 received at 2021-12-07 17:43:00

SEHK40 VHHH 071735

QUARYBAY 007173500

2620 2610 2610 2600 2600 2590 2590 2580 2570 2560

2550 2540 2540 2530 2530 2520 2510 9999 9999 9999=

SHEK_PIK 007173500

2740 2730 2720 2720 2690 2710 2690 2710 2700 2710

2670 2670 2650 2640 2660 2670 2670 2640 9999 9999=

Message parsing

0

QUARYBAY

1

007173500

2

2620

<-flt

3

2610

4

2610

5

2600

6

2600

7

2590

8

2590

9

2580

10

2570

11

2560

12

2550

13

2540

14

2540

15

2530

16

2530

17

2520

18

2510

19

9999

20

9999

21

9999=

->flt

22

SHEK_PIK

23

007173500

24

2740

25

2730

26

2720

27

2720

28

2690

29

2710

30

2690

31

2710

32

2700

33

2710

34

2670

35

2670

36

2650

37

2640

38

2660

39

2670

40

2670

41

2640

42

9999

43

9999=

44

Data in message

flt 2021-12-07 17:16 2.62

flt 2021-12-07 17:17 2.61

flt 2021-12-07 17:18 2.61

flt 2021-12-07 17:19 2.6

flt 2021-12-07 17:20 2.6

flt 2021-12-07 17:21 2.59

flt 2021-12-07 17:22 2.59

flt 2021-12-07 17:23 2.58

Edit metadata

- Edit most station metadata
- Add/edit sensors
- Add/edit GTS parsing parameters

Select gauge: or [\[Add gauge\]](#)

Gauge details

Code [\[view\]](#)

*Location

Country

*Type

*Latitude

*Longitude

Message interval min

Local contact

Other contact 1

Other contact 2

WMO type (GTS)

DCP ID (GTS)

GlossID

OperatorID (for webservice only)

Status

Status description

Message example

URL (more info)

Sensorid 22

Sensor

Unit

Samples/message

Sample interval min

Offset

Sensorid 82

Sensor

Unit

Samples/message

Sample interval min

Offset

Webservice API users

“Official”/registered users:

- Centre national d'alerte aux tsunamis (CENALT), France
- EU Joint Research Centre (JRC), Europe
- GEMPA, Germany
- Indian National Centre for Ocean Information Services (INCOIS), India
- Instituto de Meteorologia, Departamento de Sismologia e Geofísica, Portugal
- Marine-Earth Science and Technology (JAMSTEC), Japan
- NOAA Center for Tsunami Research, US
- NOAA, NGDC, US
- Pacific Islands Ocean Observing System (PacIOOS)
- Permanent Service for Mean Sea Level (PSMSL), UK
- Service Hydrographique et Océanographique de la Marine (SHOM), France
- University of Tasmania
- => users@ioc-sealevelmonitoring.org

Webservice API

- Machine to machine
- REST
- Standard format: JSON/XML/ASCII
- Registration
- Simple: 4 data types:
 1. data
 2. stationlist
 3. Sensorlist
 4. Station

Query parameters

service.php?query=xxx&format=xxx[&additional partameters]

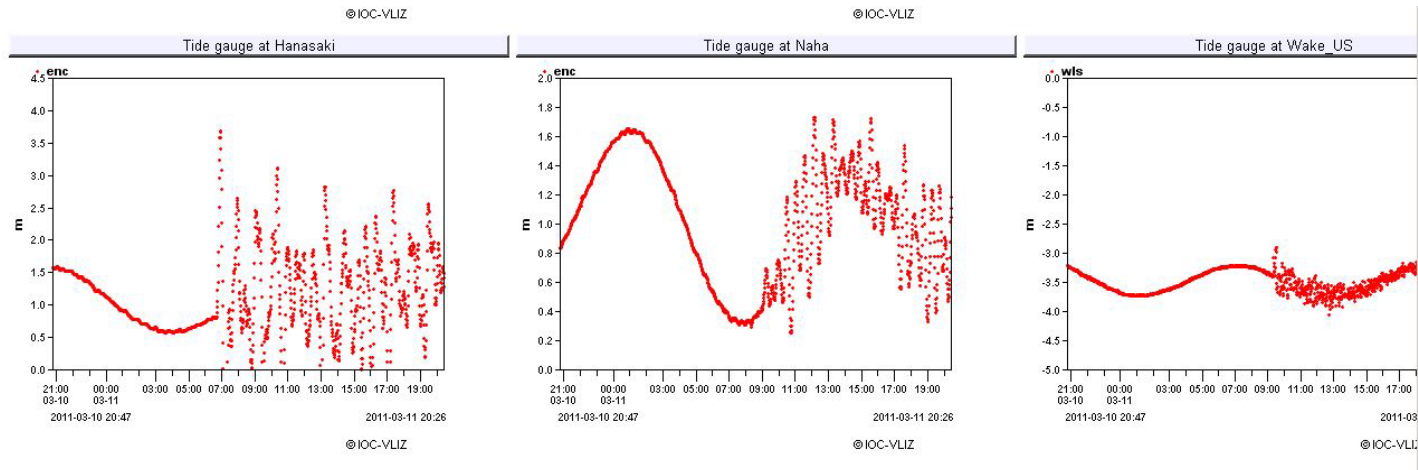
with possible values :

query= "data", "station", "stationlist" , default= null
format= "json", "xml" or sometimes "ascii", default = json
optional additional parameters depend on the query :

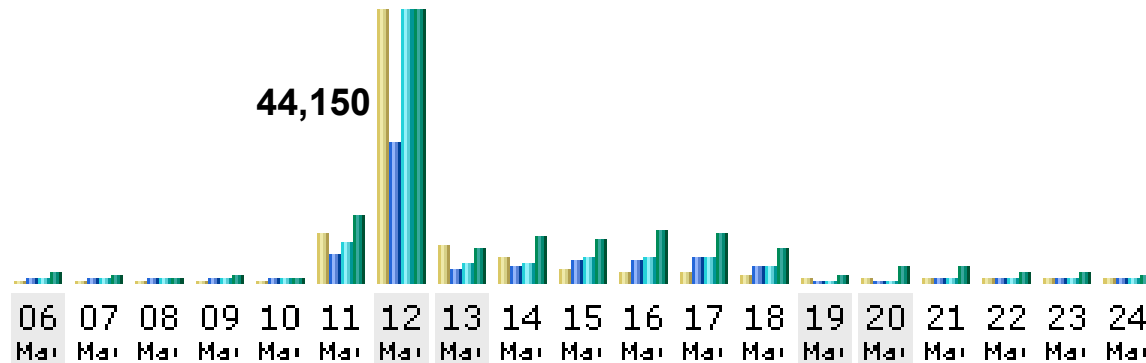
query	additional paramaters	use
data	"code=" + stationcode "timestart=" + ISOdate (YYYY-MM-DDTHH:MM), default = now()-12 hours "timestop=" + ISOdate (YYYY-MM-DDTHH:MM), default = now "format=" "json", "xml" ,"ascii","xtab","html", default = json	will give data for station with code stationcode from timesta timestop ,in the specified format
stationlist	"showall=" "gts","web","bgan" or "g" for GLOSS, default is all "format=" "json", "xml" , default = json "output=" "contacts","performance", default= general	will give stationlist restricted according to the 'showall' para the specified format, 'output' specifies different field lists
sensorlist	"showall=" "gts","web","bgan" or "g" for GLOSS, default is all "format=" "json", "xml" , default = json	will give list of all sensors, with last data and time stamp re: according to the 'showall' parameter ,in the specified forma
station	"code=" + stationcode "format=" "json", "xml" , default = json	will give all details for this station ,in the specified format

Japan Tsunami 2011-03-11

impact on performance



2,901,945



Sealevel Station Catalog (SSC)

<http://www.ioc-sealevelmonitoring.org/ssc>

Goal

Central point for station metadata Updated
by datacenters and/or gauge operators

By

Linking station identifiers of #datacenters
(UHSLC, PSMSL, SONEI, ...) and any
other identifier (GLOSS, PTWC, ...)

SSC Core fields

Very limited fields (4-5) stored in SSC

- Unique Identifier
- Station name
- Country
- Region (optional)
- Lat/lon
- Identifiers (1-n)

Edit station 'SSC-CL-anto'

SSC ID* :

Name* :

Region :

Country* :

Latitude* :

Longitude* :

Cataloglinks

GLOSS ☐ delete

IOC ☐ delete

PTWC ☐ delete

UHSLC ☐ delete

(new)



Sealevel St

SSC ID	Station Name	Country	Latitude	Longitude						
SSC-JP-abas	Abashiri	Japan	44.02	144.28				327	347	[details] [edit]
SSC-SL-aber	Aberdeen Point	Sierra Leone	8.5	-13.23				256		[details] [edit]
SSC-CI-abid	Abidjan	Cote d'Ivoire	5.25	-4				257	230	[details] [edit]
SSC-JP-abur	Aburatsu	Japan	31.35	131.25				82	354	[details] [edit]
SSC-SV-acaj	Acajutla	El Salvador	13.57	-89.84	acaj	acaj		182	82	[details] [edit]
SSC-MX-acap	Acapulco	Mexico	16.83	-99.92	acap	acap		267	316	[details] [edit]
SSC-MX-acya	Acapulco Club de Yates	Mexico	16.84	-99.9	acya			267		[details] [edit]
SSC-US-adak	Adak	United States	51.86	-176.63	adak	adak		302	40	[details] [edit]
SSC-YE-aden	Aden	Yemen	12.79	44.97	aden	aden		3		[details] [edit]

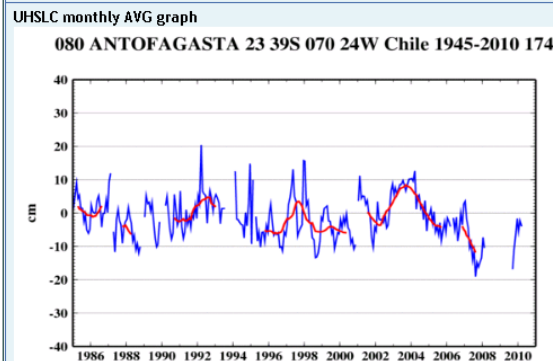
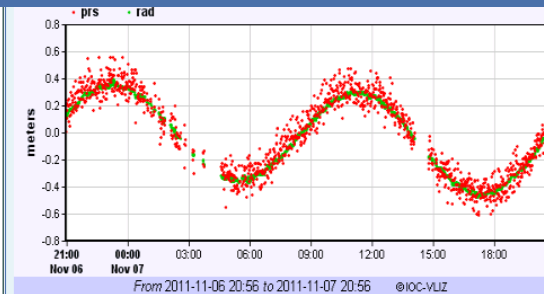
SSC Station detail

Stored
in SSC

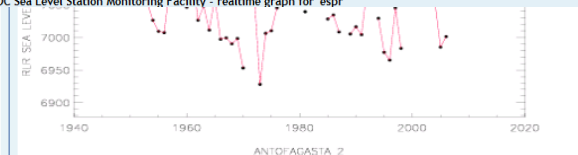
Station catalog metadata [edit]		[station overview]		
SSC ID	SSC-AR-espr			
Station Name	Bahia_Esperanza			
Country	Argentina			
Latitude	-63.33			
Longitude	-56.9166			
DateLastModified	2011-07-17 20:52:53			
Linked codes				
Codes	IOC:espr	GLOSS:185	UHSLC:601	PTWC:espr
Location	Bahia Esperanza AR	Bahia Esperanza	Esperanza	Bahia Esperanza AR
Latitude	-63.33	-63.3	-63.395 (= 63 23.7)	-63.3977
Longitude	-56.9166	-56.91666	-56.995 (= 056 59. W)	-56.9958
Sensors	pwl, bwl	Acoustic	N/A	pwl, bwl

Compare
metadata

Linked
via
Web-
service

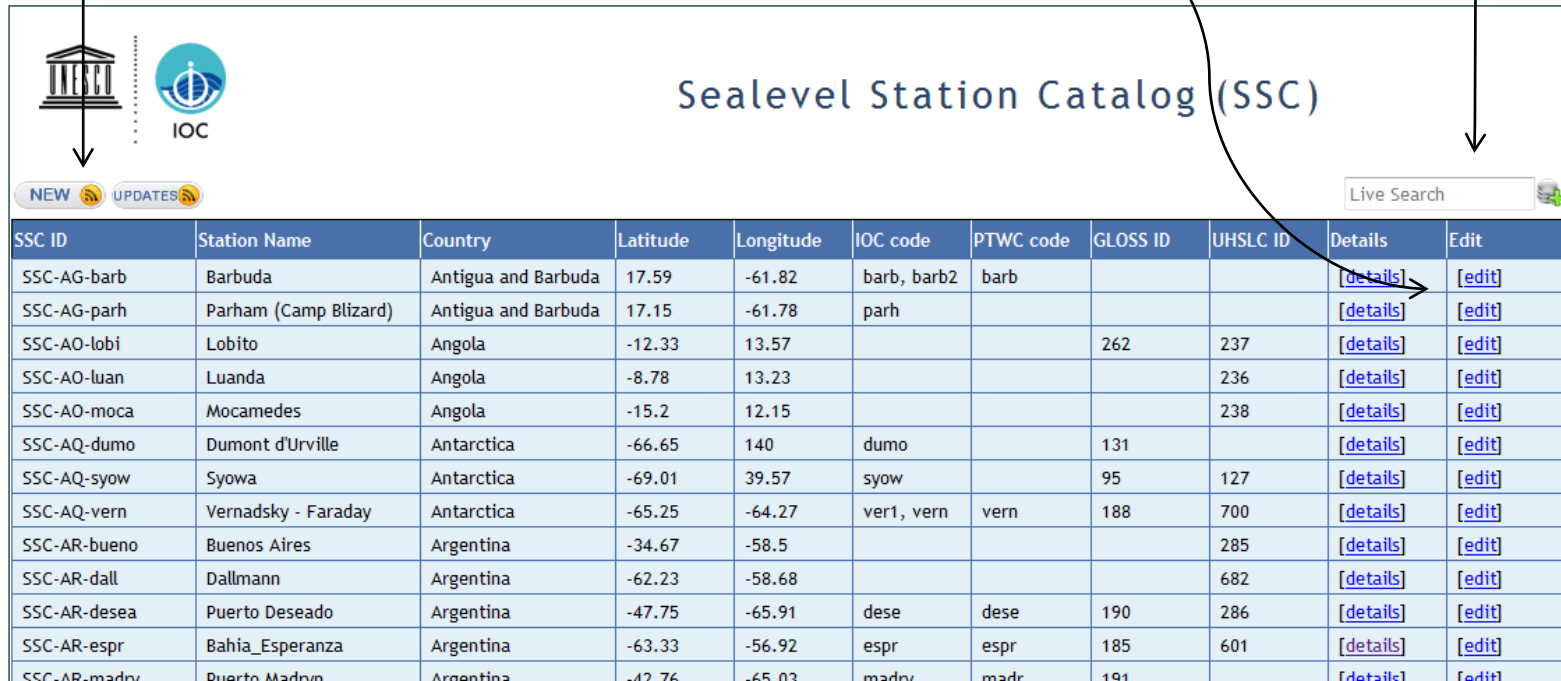


Distributed metadata source: GLOSS Station Handbook	
Ocean	Southern
Operational	Yes
Responsible country	Argentina
Additional parameters	water/air temperature, wind direction/speed,
Tide gauge benchmarks	Benchmark bolt inside tide gauge hut adjacent
Benchmark relationships	Tide gauge zero (TGZ): Local Chart Datum TG.
Auxiliary benchmarks	AUX: Pilar de referencia ubicado en cercailas
Other relevant codes	UHSLC 601
Distributed metadata source: PTWC COMP META file	
DCP ID	334D4708
WMO	XXXXXX
Samp Rate	30
Num# Samp	2
Unit	F
Scale	1,0000
Xmt Int.	060
Fst Min.	0028
HAR	0
Owner	UHSLC
Data availability	
IOC Sea Level Station Monitoring Facility - realtime graph for 'espr'	



SSC functionalities

- Live search
- RSS feeds
- Anyone can go in and edit
- Cache linked data (performance)



Sealevel Station Catalog (SSC)

NEW  UPDATES 

Live Search 

SSC ID	Station Name	Country	Latitude	Longitude	IOC code	PTWC code	GLOSS ID	UHSLC ID	Details	Edit
SSC-AG-barb	Barbuda	Antigua and Barbuda	17.59	-61.82	barb, barb2	barb			[details]	[edit]
SSC-AG-parh	Parham (Camp Blizard)	Antigua and Barbuda	17.15	-61.78	parh				[details]	[edit]
SSC-AO-lobi	Lobito	Angola	-12.33	13.57			262	237	[details]	[edit]
SSC-AO-luan	Luanda	Angola	-8.78	13.23				236	[details]	[edit]
SSC-AO-moca	Mocamedes	Angola	-15.2	12.15				238	[details]	[edit]
SSC-AQ-dumo	Dumont d'Urville	Antarctica	-66.65	140	dumo		131		[details]	[edit]
SSC-AQ-syow	Syowa	Antarctica	-69.01	39.57	syow		95	127	[details]	[edit]
SSC-AQ-vern	Vernadsky - Faraday	Antarctica	-65.25	-64.27	ver1, vern	vern	188	700	[details]	[edit]
SSC-AR-bueno	Buenos Aires	Argentina	-34.67	-58.5				285	[details]	[edit]
SSC-AR-dall	Dallmann	Argentina	-62.23	-58.68				682	[details]	[edit]
SSC-AR-desea	Puerto Deseado	Argentina	-47.75	-65.91	dese	dese	190	286	[details]	[edit]
SSC-AR-espr	Bahia Esperanza	Argentina	-63.33	-56.92	espr	espr	185	601	[details]	[edit]
SSC-AR-madr	Puerto Madryn	Argentina	-47.76	-65.03	madr	madr	191		[details]	[edit]

Thank you

www.ioc-sealevelmonitoring.org

info@ioc-sealevelmonitoring.org



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