

Report of the Russian Federation to the 14th Session of the IOC Group of Experts on the Global Sea Level Observing System

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National tide gauge network

The Russian tide gauge network consists of more than 100 active stations, which are located at the coast and islands of 13 seas and the Pacific Ocean. This national sea level network is maintained by the Federal Hydrometeorology and Environmental Monitoring Service (FHEMS). Sea level data from these stations are collected by the regional centers of FHEMS. Most of these data on the regular basis are delivered from the regional centers to the Russian oceanographic data center (RNODC) in Obninsk (Kaluga region). The gauge devices used in these stations are visual tide staffs (mostly), float operated gauges (including digital floating gauges) in stilling wells and gauges with hydrostatic pressure sensors. All devices are of Russian production.

Russian GLOSS core network stations

According to the GLOSS Station Handbook the Russian part of the GLOSS tide gauge network consists of 12 coastal stations:

CODE	LON	LAT	NAME	DATA IN PSMSL
231	14 ⁰ 15' E	78 ⁰ 04' N	Barentsburg (Spitsbergen)	1948 – 2014
274	33 ⁰ 03' E	68 ⁰ 58' N	Murmansk	1952 – 2014
92	150 ⁰ 42' E	59 ⁰ 44' N	Nagaev	1957 – 2014
93	158 ⁰ 39' E	52 ⁰ 59' N	Petropavlovsk-Kamchatsky	1957 – 2014
98	39 ⁰ 04' E	44 ⁰ 06' N	Tuapse	1917 – 2014
312	80 ⁰ 39' E	73 ⁰ 32' N	Dikson	1950 – 2012
97	20 ⁰ 29' E	54 ⁰ 42' N	Kaliningrad	1926 – 1986
313	128 ⁰ 45' E	71 ⁰ 40' N	Tiksi	1949 – 2010
309	173 ⁰ 11' W	64 ⁰ 30' N	Provideniya	1951 – 1983
99	62 ⁰ 35' E	76 ⁰ 14' N	Russkaya Gavan	1953 – 1993
90	145 ⁰ 52' E	44 ⁰ 01' N	Yuzhno-Kurilsk	1948 – 1994
25	93 ⁰ 01' E	66 ⁰ 33' S	Mirny (Antarctica)	-----

On the regular basis, once per year the RNODC sends monthly mean values of a sea level from the active GLOSS stations to the Permanent Service for Mean Sea Level (PSMSL). From Petropavlovsk-Kamchatsky station the RNODC sends monthly mean values of a sea level every month to the Hawaiian University in Honolulu.

Monthly mean values of a sea level measured in 2014 up to January 2015 by automatic sea-level meters at Barentsburg, Murmansk, Nagaevo, Petropavlovsk-Kamchatsky and Tuapse were delivered recently from RNODC to PSMSL.

Monthly mean values of sea level variations at Dikson from 1950 up to 2015 measured now visually by tide staff are available at the website of the Arctic and Antarctic Research Institute: <http://ocean8x.aari.ru/item5/data/level/buildtable.php?pos=45>.

In July 2014, after a long break, sea level measurements by automatic sea-level meter were resumed at Kaliningrad. Next year the data from Kaliningrad will be delivered to PSMSL.

Due to dredging works in ports, float operated gauges and stilling wells were destroyed in June 2013 at Tuapse port and in November 2010 at Tiksi port. In autumn of 2013 sea level measurements at Tuapse were resumed with the help of the automatic hydrostatic pressure tide gauge GMU-4. There is a wish to resume sea level measurements at Tiksi, however it is quite difficult: port is now a private territory, plus shallow coastal waters out of the port, plus severe ice conditions.

Sea level measurements at Providenya were closed in 1991 and at Russkaya Gavan – in 1993. There are no plans now to resume sea level measurements at these places.

At Yuzhno-Kurilsk sea level measurements were resumed at a new place with the help of a float operated gauge in a stilling well. However, the new place for sea level measurements proved to be unfortunate. A tube to the inlet of the stilling well was often filled with sand. The quality of measurements was doubtful and measurements were stopped. Instead of Yuzhno-Kurilsk, there may be suggested another nearby place – Malokurilskoe (146°50', 43°53'), where the float operated gauge in a stilling well is working well.

In Antarctica only episodic non regular sea level measurements were carried out several months per year.

An overview of the GNSS technology in the network

For the last 10 years, short-term measurements of heights and horizontal coordinates of benchmarks near points of sea level observations at Azov, Baltic, Black, Bering, Caspian and Okhotsk seas were carried out with the help of GPS/GLONASS-receivers.

Stationary GPS-receivers have been working for more than 15 years in the vicinity of tide gauges in Nagaevo, Petropavlovsk-Kamchatsky and Tiksi. See details at <http://www.sonel.org>.

**An overview of the data availability.
Web, email etc. addresses of data banks and of sources of further information**

The history of sea level observations in Russia and the Former Soviet Union at coastal hydrometeorological stations extends over many tens and even hundreds of years. As a result of such long time series, rich observational material has been collected. However, most of the data collected before the wide use of computers is stored in a paper form until present. In the RNODC the data from sea level observations at all seas surrounding Russia are represented in electronic form mostly for the period from 1977-78 until present. At the same time, in the frames of various projects in a few subdivisions of the Russian Federal Hydrometeorology and Environmental Monitoring Service, significant efforts have been done towards sea level data collection and transformation of the early data into electronic form. This work is far from the end now, however, a lot of the early data were digitized. A lot of historical monthly mean sea-level data from Russia were delivered to the PSMSL. In total the data (RLR&Metric) from 112 Russian stations are now (as of October 2015) in the database of the PSMSL.

Monthly mean values of sea level variations at many dozens of Russian Arctic stations for all historical period of observations are possible to download from the website of the Arctic and Antarctic Research Institute: <http://ocean8x.aari.ru/index.php?id=507> (section 4).

Latest description of the Russian tsunami warning system is at http://www.ioc-unesco.org/index.php?option=com_oe&task=viewDocumentRecord&docID=14938

Results of processing and analysis of sea-level data from various parts of national tide gauge network can be found in scientific publications. For example:

1. Voinov G.N. About quality of long-term observations of sea level on a stationary network in a coastal zone of northwest and Arctic seas of Russia. *Proceedings of the State Oceanographic Institute*. 2013, issue 214, p. 223-236.
2. Kubryakov A. A., Stanichnyi S. V. The Black Sea level trends from tide gages and satellite altimetry. *Russian Meteorology and Hydrology*. 2013, 38(5), p. 329-333.
3. Navrotskaya, S. E., Chubarenko, B. V. Trends in the variation of the sea level in the lagoons of the Southeastern Baltic. *Oceanology*. 2013, 53(1), p. 13-23.
4. Nikitin O.P. Long-term trends of sea level in the Gulf of Finland of the Baltic Sea and movements of its shores. *Proceedings of MWWD 2010* (ISBN 978-9944-5566-4-4). Editor

Carlo Avanzini. MWWD organization. 2010, 15 p. (The paper can be requested free of charge at organization@mwwd.org).

In 2015 the glossary of main terms and definitions in sea-level science was prepared in Russian by Nikitin O.P. It includes recommended and not recommended for use terms and definitions. The former glossary published by IOC in Manual on sea-level 14 (Russian edition) in 1985 is outdated to some extent now.

National contact points of Russian Federation for sea-level observations and GLOSS

Dr. Oleg NIKITIN,

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- National coordinator and contact point for sea-level observations in seas of the European part of Russia (Baltic, White, Azov, Black and Caspian sea)

Dr. Igor ASHIK,

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- Contact point for sea-level observations in Arctic seas (Barents, Kara, Laptev, East-Siberian and Chukchi sea)

Dr. Youri VOLKOV,

Director, Far-Eastern Hydrometeorological Research Institute (FEHRI), Russian Federal Service for Hydrometeorology & Environmental Monitoring, Vladivostok, hydromet@online.ru

- Contact point for sea-level observations in Far-Eastern seas (Bering, Okhotsk and Japan sea) and Pacific Ocean

SOI, AARI and **FEHRI** are responsible for periodical inspections and quality control of sea-level measurements made by regional and local subdivisions of the Russian Hydrometeoservice in the above listed seas

Dr. Nicolay N. MIKHAILOV

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- Contact point for international sea-level data and information exchange