National Report of Korea

Korea Hydrographic and Oceanographic Agency (KHOA)

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1. Overview

The Global Sea Level Observing System (GLOSS) of the IOC has a global network of 290 tide gauge stations and the Republic of Korea (ROK) runs the Korea Ocean Observing and Forecasting System (KOOFS) by linking it with GLOSS to provide ocean observation data.

ROK runs 53 tide gauge stations of which 50 are tidal stations and three are ocean observatories. The tidal stations observe tide level, water temperature, salinity, air temperature/pressure and wind direction/velocity. The ocean observatories tide level, air temperature/pressure, wind direction/velocity and wave. There are 24 tide gauge stations on the west coast; 21 on the south; and eight on the east coast, and each of them collects data every minute.

The tide gauge stations are installed with float type, radar type and laser type tide gauges. 28 stations including Busan and Incheon are installed with float type on the tide wells; 27 stations including Ganghwa daegyo(Ganghwa Bridge) and Janghang where it is difficult to install tide wells use radar type; 13 stations including Geomundo and Ulsan use laser type. 22 stations including Jeju and Busan operate more than two types of tide gauges to identify the regional characteristics and compare tide level data.

2. Introduction to Tidal Stations and Ocean Observatories

As of March 2019, there are 50 tidal stations in operation, of which 24 are located on the west coast; 19 on the south; and seven on the east coast. Data is collected every minute and depending on the station, they observe tide level, water temperature, salinity, air temperature/pressure and wind direction/velocity. There are three ocean observatories, of which two are on the south coast and one on the east coast and they observe tide level, air temperature/pressure, wind direction/velocity and wave.

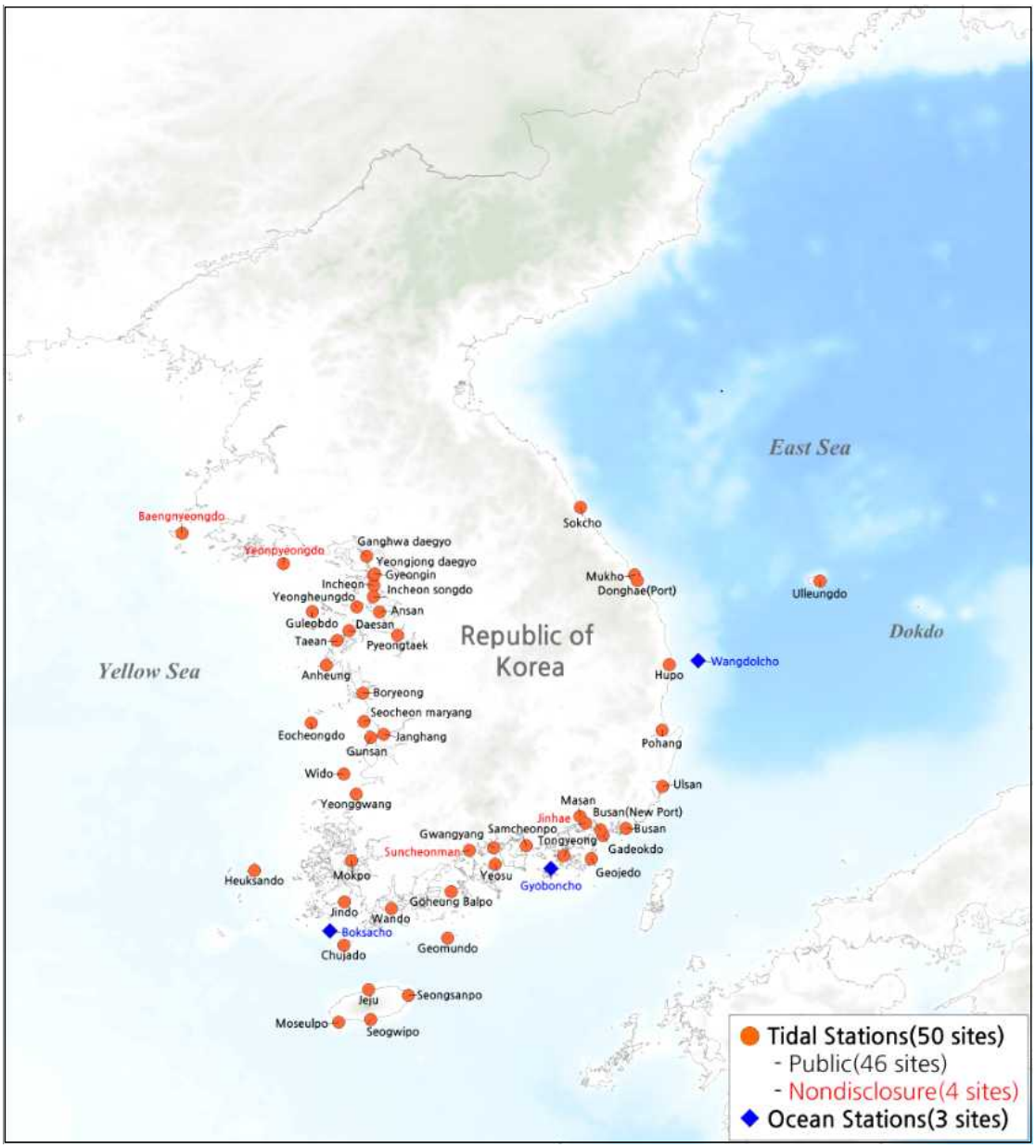


Fig. 1 Map of tide gauge network in Korea

Table 1. Status of tidal stations

The term of collected data : 1 min.					
Sea area	Station	Location(WGS84)		Date of installation/relocation	Observation data
		Latitude	Longitude		
The Yellow Sea	Ganghwa daegyo	37-43-55N	126-31-20E	2006.12.	tide, air pressure
	Yeongjong daegyo	37-32-44N	126-35-04E	2009.12.	tide, air pressure
	Incheon	37-27-07N	126-35-32E	1959. 5. /1973.12./1998.11.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Incheon songdo	37-20-17N	126-35-10E	2001. 1. /2010. 9.	tide, air pressure, air temperature, wind direction/velocity
	Gyeongin(Port)	37-33-39N	126-36-04E	2012.11.	tide, air pressure, air temperature, wind direction/velocity
	Guleobdo	37-11-40N	126-59-42E	2008. 8.	tide, air pressure
	Yeongheungdo	37-14-19N	126-25-43E	2005. 8. /2009. 8.	tide, air pressure, air temperature, wind direction/velocity
	Ansan	37-11-32N	126-38-50E	2002. 1.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Pyeongtaek	36-58-01N	126-49-22E	1992. 6.	tide, air pressure, air temperature, wind direction/velocity, water temperature
	Daesan	37-00-27N	126-21-10E	2002.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature
	Taean	36-54-47N	126-14-20E	2002. 1. /2010.10.	tide, air pressure, air temperature, wind direction/velocity
	Anheung	36-40-25N	126-07-56E	1986.10. /2015.12.	tide, air pressure, air temperature, wind direction/velocity
	Boryeong	36-24-23N	126-29-10E	1985. 8. /2018.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity

The term of collected data : 1 min.

Sea area	Station	Location(WGS84)		Date of installation/relocation	Observation data
		Latitude	Longitude		
The Yellow Sea	Seocheon maryang	36-07-44N	126-29-43E	2006. 1. /2010.10.	tide, air pressure, air temperature, wind direction/velocity
	Janghang	36-00-25N	126-41-15E	2003.12.	tide, air pressure, air temperature, wind direction/velocity
	Eocheongdo	36-07-02N	125-59-05E	2007. 9.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Gunsan	35-58-32N	126-33-47E	1980. 2. /2006.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Wido	35-37-05N	126-18-06E	1984.11. /2005.12.	tide, air pressure, air temperature, wind direction/velocity
	Yeonggwang	35-25-34N	126-25-14E	2001.10.	tide, air pressure, air temperature, wind direction/velocity
	Mokpo	34-46-47N	126-22-32E	1952. 8. /2002. 1.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Heuksando	34-41-03N	125-26-08E	1965. 1. /1978.12./2006.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Jindo	34-22-40N	126-18-31E	2005.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
The Southern Sea	Wando	34-18-56N	126-45-35E	1982.10. /2004.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Goheung Balpo	34-28-52N	127-20-34E	2004.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Suncheonman	34-52-52N	127-31-07E	2010. 1.	tide, air pressure, air temperature, wind direction/velocity
	Yeosu	34-44-50N	127-45-56E	1965. 2. /1987.11./2011.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Geomundo	34-01-42N	127-18-32E	1981.11. /2014.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity

The term of collected data : 1 min.

Sea area	Station	Location(WGS84)		Date of installation/relocation	Observation data
		Latitude	Longitude		
The Southern Sea	Gwangyang	34-54-13N	127-45-17E	2010.10.	tide, air pressure
	Chujado	33-57-43N	126-18-01E	1983.10. /2000.11.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Jeju	33-31-39N	126-32-35E	1964. 1. /1999.10.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Seogwipo	33-14-24N	126-33-42E	1984.11.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Moseulpo	33-12-52N	126-15-04E	2003.11.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Seongsanpo	33-28-29N	126-55-40E	2003.11.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Samcheonpo	34-55-27N	128-04-11E	2013.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Tongyeong	34-49-40N	128-26-05E	1976. 1. /1999. 9.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Geojedo	34-48-05N	128-41-57E	2005.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Masan	35-12-36N	128-35-20E	2002.11. /2005.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Busan (New Port)	35-04-39N	128-47-13E	2011.12.	tide, air pressure, air temperature, wind direction/velocity
	Gadeokdo	35-01-27N	128-48-39E	1976.11.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Busan	35-05-47N	129-02-07E	1955. 2. /1972.12./2012.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity

The term of collected data : 1 min.

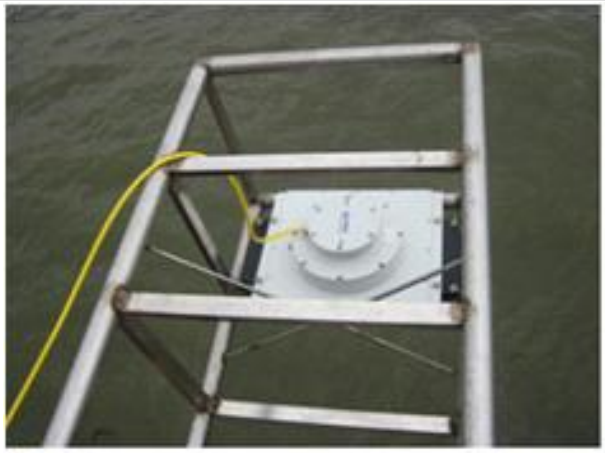
Sea area	Station	Location(WGS84)		Date of installation/relocation	Observation data
		Latitude	Longitude		
The Eastern Sea	Ulsan	35-30-07N	129-23-14E	1962. 9. /1995.10./2005.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Pohang	36-02-50N	129-23-02E	1970.12. /2002. 9.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Hupo	36-40-39N	129-27-11E	2002.10.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Ulleungdo	37-29-29N	130-54-49E	1965. 8. /1977.12./2000.12./2005.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Donghae(Port)	37-29-41N	129-08-38E	2011.12.	tide, air pressure, air temperature, wind direction/velocity
	Mukho	37-33-01N	129-06-59E	1965. 2. /2003. 1.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity
	Sokcho	38-12-26N	128-35-39E	1973.11. /1988.12.	tide, air pressure, air temperature, wind direction/velocity, water temperature, salinity

Table 2. Status of ocean stations

The term of collected data : 1 min.					
Sea area	Station	Location(WGS84)		Date of installation/relocation	Observation data
		Latitude	Longitude		
The Southern Sea	Boksacho	34-05-54N	126-10-06E	2003. /2009. 6.	tide, air pressure, air temperature, wave, wind direction/velocity
	Gyoboncho	34-42-17N	128-18-23E	2001. /2009. 6.	tide, air pressure, air temperature, wave, wind direction/velocity
The Eastern Sae	Wangdolcho	36-43-09N	129-43-57E	2003. /2008.11.	tide, air pressure, air temperature, wave, wind direction/velocity

There are float/radar/laser/water pressure type tide gauges. 28 stations including Busan and Incheon are installed with float type on the tide wells; 27 stations including Ganghwa daegyo(Ganghwa Bridge) and Janghang where it is difficult to install tide wells are installed with radar type which uses microwave; 13 stations including Geomundo and Ulsan use laser type. 22 stations including Jeju and Busan operate more than two types of tide gauges to identify the regional characteristics and compare tide level data.

<Float type>



<Radar type>

<Laser type>

<Water Pressure type>

Fig. 2 The devices of tidal observation

Table 3. Status of tide gauges per tidal station

Sea area	Station	Main tidal gauge	Tidal gauge				
			Float	Radar	Laser	Pressure	Dual tidal gauge
The Yellow Sea	Ganghwa daegyo	Radar	-	O	-	-	-
	Yeongjong daegyo	Radar	-	O	-	-	-
	Incheon	Float	O	-	-	-	Float without chart recorder
	Incheon songdo	Radar	-	O	-	-	-
	Gyeongin(Port)	Radar	-	O	-	-	-
	Guleobdo	Radar	-	O	-	-	-
	Yeongheungdo	Radar	-	O	-	-	-
	Ansan	Float	O	-	-	-	Float without chart recorder
	Pyeongtaek	Radar	-	O	-	-	-
	Daesan	Radar	-	O	-	-	-
	Taean	Radar	-	O	-	-	-
	Anheung	Float	O	-	-	-	-
	Boryeong	Radar	-	O	O	O	Float without chart recorder
	Seocheon maryang	Radar	-	O	-	-	-
	Janghang	Radar	-	O	-	-	-
	Eocheongdo	Float	O	-	-	-	-
	Gunsan	Float	O	-	-	-	Float without chart recorder
	Wido	Radar	-	O	-	-	-
	Yeonggwang	Float	O	-	-	-	-
	Mokpo	Float	O	-	O	-	Float without chart recorder
	Heuksando	Float	O	-	-	-	Float without chart recorder
	Jindo	Float	O	-	-	-	Float without chart recorder
The Southern Sea	Chujado	Float	O	-	O	-	-
	Wando	Float	O	-	-	-	Float without chart recorder
	Goheung Balpo	Float	O	-	-	-	Float without chart recorder
	Yeosu	Radar	-	O	-	-	-
	Geomundo	Float	O	-	O	-	-
	Gwangyang	Radar	-	O	-	-	-
	Jeju	Float	O	-	O	-	Float without chart recorder
	Seogwipo	Float	O	-	-	-	-
	Moseulpo	Float	O	-	-	-	-
	Seongsanpo	Float	O	-	-	-	-
	Samcheonpo	Float	O	-	-	-	Float without chart recorder
	Tongyeong	Float	O	-	-	-	Float without chart recorder
	Geojedo	Float	O	-	O	-	Float without chart recorder
	Masan	Radar	-	O	-	-	-
	Busan(New Port)	Radar	-	O	-	-	-
	Gadeokdo	Float	O	-	-	-	-
	Busan	Float	O	O	-	-	Float without chart recorder
The Eastern Sea	Ulsan	Laser	-	-	O	-	Laser
	Pohang	Radar	-	O	-	-	-
	Hupo	Float	O	-	O	-	-
	Ulleungdo	Float	O	-	O	-	-
	Donghae(Port)	Radar	-	O	-	-	-
	Mukho	Laser	O	-	O	-	-
	Sokcho	Float	O	-	O	-	-
Ocean station	Wangdolcho	Radar	-	O	-	-	-
	Boksacho	Radar	-	O	-	-	-
	Gyoboncho	Radar	-	O	-	-	-

3. GPS observation status / information

Table 4. GPS equipment and observation status at tidal stations

Station	Date of installation	GPS			
		Antenna	Receiver	Method of data collection	Radome
Incheon	2005.07.26	TRM41249.00	iCGRS	PC	TZGD
Jeju	2006.10.18	ASH701945E_M	iCGRS	PC	SCIS
Sokcho	2007.12.06	ASH701945E_M	PolaRx2e	PC	SCIS
Busan	2007.12.06	ASH701945E_M	PolaRx2e	PC	SCIS
Mokpo	2007.12.07	ASH701945E_M	PolaRx2e	PC	SCIS
Hupo	2008.12.02	TRM41249.00	PolaRx2e	Data logger	TZGD
Yeonggwang	2008.12.04	TRM41249.00	PolaRx2e	Data logger	TZGD
Tongyeong	2008.12.12	TRM41249.00	PolaRx2e	Data logger	TZGD
Daesan	2009.11.16	TRM57971.00	NetRS	PC	TZGD
Pohang	2009.11.28	TRM57971.00	NetRS	PC	TZGD
Heuksando	2009.12.20	TRM57971.00	NetRS	PC	TZGD
Yeosu	2011.12.28	JAVRINGANT_DM	PolaRx3e	PC	SCIS

4. Korea RTDB for NEAR-GOOS

Korea RTDB for NEAR-GOOS is a system which analyzes sand provides real-time tide level, tidal current, predicted ocean current and satellite water temperature based on marine GIS information. The system provides real-time and the last 72-hour data of 14 tidal stations, three ocean observatories, two ocean buoys, one HF-radar and three ocean research stations, which is a total of 23 stations. The last 72-hour data can be downloaded in text files and the real-time data is collected every minute.

(http://www.khoa.go.kr/koofs/kor/observation/obs_real.do)

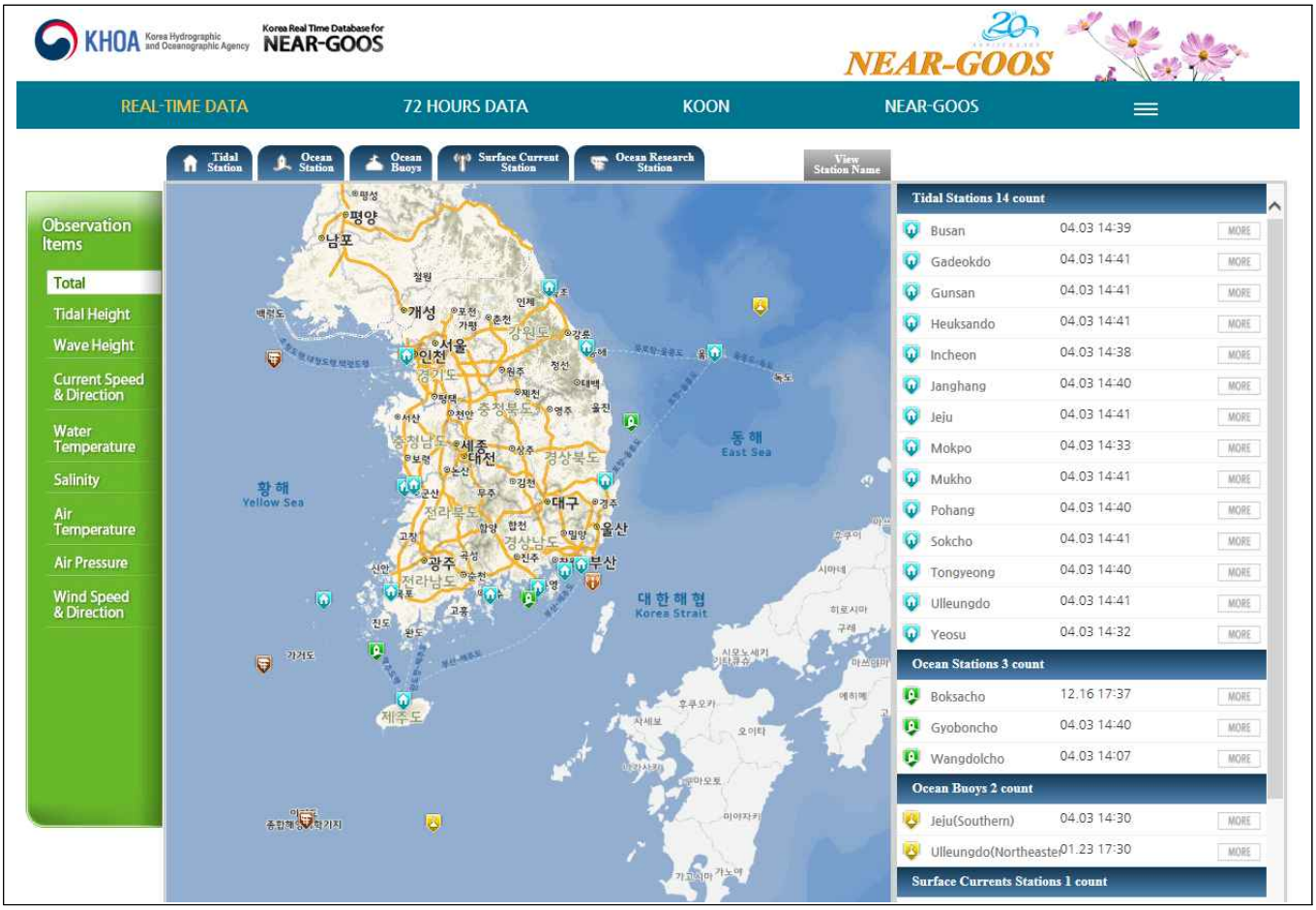


Fig. 3 Korea RTDB for NEAR-GOOS webpage