

GNSS raw data in Iceland

This service enables the retrieval of raw RINEX data for Icelandic GNSS stations. By selecting a start date and end date for the data and clicking on the download icon, the user can download the most relevant RINEX 24hr data files with 15s sampling frequency.

RINEX is a standard format for GNSS data and is maintained by IGS (International GNSS Service). The data needs to fulfill conditions set in the manual for the RINEX 2.11 standard. Each RINEX file is generally over a 24 hour period, from 00:00 to 00:00 with a 15 Hz sampling frequency. RINEX data files contain, in addition to the GNSS data itself, detailed information in each file's header on the location of the GNSS station, its international DOMES (Directory Of MERIT Sites) number, if applicable, the antenna and receiver that were used to measure the data, the number of satellites that were detected, the sampling frequency of the data, and more. To reduce the size of the RINEX files, they are compressed with the UNIX compression standard (.Z).

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1.0          COMPACT RINEX FORMAT          CRINEX VERS / TYPE
RNX2CRX ver.4.0.7          27-Jun-22 00:42          CRINEX PROG / DATE
  2.11          OBSERVATION DATA          M (MIXED)          RINEX VERSION / TYPE
teqc 2019Feb25          IMO          20220627 00:42:38UTC          PGM / RUN BY / DATE
Linux 2.6.32-573.12.1.x86_64|x86_64|gcc|Linux 64|=+          COMMENT
  0.085          (antenna height)          COMMENT
+64.67361036 (latitude)          COMMENT
-17.75441511 (longitude)          COMMENT
1081.455          (elevation)          COMMENT
BIT 2 OF LLI FLAGS DATA COLLECTED UNDER A/S CONDITION          COMMENT
VONC (COGO code)          COMMENT
VONC          MARKER NAME
VONC          MARKER NUMBER
HMF/BGO          UI/IMO          OBSERVER / AGENCY
5236K52175          TRIMBLE NETR9          4.70          REC # / TYPE / VERS
5000113039          TRM57971.00          ANT # / TYPE
  2606031.7694 -834418.7945 5743216.7095          APPROX POSITION XYZ
    0.0000          0.0000          0.0000          ANTENNA: DELTA H/E/N
  1          1          WAVELENGTH FACT L1/2
  8          L1          L2          C1          P1          C2          P2          S1          S2          # / TYPES OF OBSERV
 18          LEAP SECONDS
SNR is mapped to RINEX snr flag value [0-9]          COMMENT
L1 & L2: min(max(int(snr_dBHz/6), 0), 9)          COMMENT
2022          6          26          0          0          0.0000000          GPS          TIME OF FIRST OBS
          END OF HEADER
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An example of a RINEX header for the GNSS station VONC on July 26th 2022. There we have the location of the GNSS station (64.67N, 17.75W, 1081m), its observers (HMF/BGO) and what agency runs it (UI/IMO). We have information on the type of GNSS receiver (Trimble NETR9), its serial number (5236K52175) and its software and firmware version (4.70). It also includes information on the type of antenna (TRM57971.00), its serial number (5000113039) and antenna height (0.085).

The names of RINEX files fulfill the requirements in chapter 4 in the RINEX 2.11 manual, ssssdhmm.yyo, but without mm, d replacing o and the name being in capital letters. The file names are therefore SSSSDDDH.YYD where SSSS is the GNSS station's abbreviated name, DDD is the day of the year, H is the hour of the day (usually 0), YY is the double digit number for the year and D stands for Hatanaka compressed observation file.

Each GNSS data file header is compared with the registered metadata for each station. If there are discrepancies, the one with the wrong information is corrected. If it is not clear which information is correct, then the agency responsible for the data should be contacted.

To further test the data, it can be processed, for example with GAMIT/GLOBK, to create time series. These time series can be inspected for gaps, outliers or other anomalies that could be traced back to the data.

Detailed steps of the data publication and Quality Control process:

- **Step 1.** GNSS data is downloaded to the local data center and converted from its raw format to a RINEX format. Empty and corrupted files are deleted or moved to a different directory from the other data
- **Step 2.** Data standardization and validation of formats. Data is verified, converted (if needed) and homogenized.
- **Step 3.** RINEX headers are checked with correct metadata. Incorrect headers are corrected.
- **Step 4.** Correct data is placed in final directories. Now data is visible to all users who have permission. The data can be published to the IS-EPOS Platform.