Federal Agency for Cartography and Geodesy

Ground-Based Space Weather Observations

Geodetic Observatory Wettzell

Ground-Based Space Weather Observation Sites

Objective

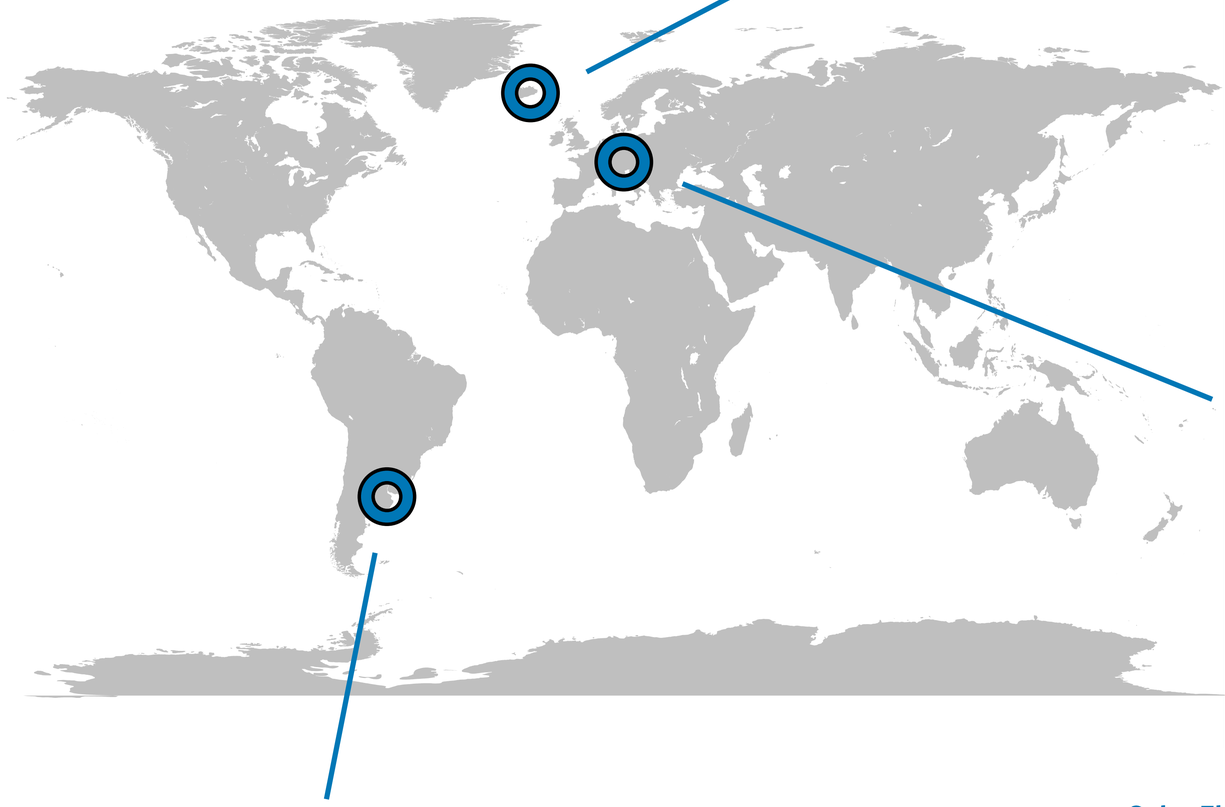
The Federal Agency for Cartography and Geodesy (BKG) is a German higher federal authority in the portfolio of the Federal Ministry of the Interior and Community. With the Geodetic Observatory Wettzell (GOW), the BKG operates one of the world's most important geodetic observatories.

In addition, the BKG is currently establishing ground-based measurement infrastructure to assess the impact of space weather on Galileo services. The focus is on the following observations:

The solar radio flux is measured at different frequencies with at least one modern radio telescope which has been developed for this purpose.

Specialized GNSS receivers at selected locations are used to monitor variations within the ionosphere. We focus on the total electron content and on the scintillation indices.

We also monitor fluctuations in the Earth's magnetic field using vector magnetometers at different latitudes.



GNSS Monitoring Station in Hofn, Iceland

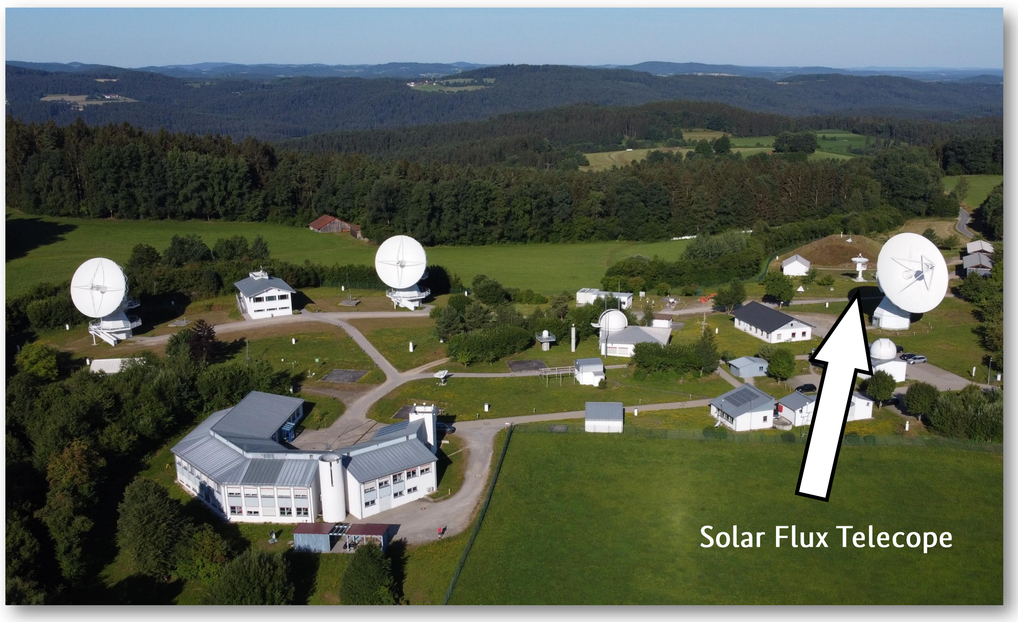
This monitoring station is both a EUREF and IGS station. The station is operated by the BKG together with Landmælingar Íslands and is located in Hofn, Iceland. A scintillation receiver and a vector magnetometer will be added to the station.

blue: commissioned by the end of 2023

grey: planned for 2024

Geodetic Observatory Wettzell, Germany

The Geodetic Observatory Wettzell is recognized as a GGOS Core Site and is equipped with all the space geodetic techniques, including three radio telescopes for Very Long Baseline Interferometry (VLBI), two Satellite Laser Ranging (SLR) systems, a large ring laser, various GNSS reference stations, a DORIS beacon and a time/frequency laboratory. A scintillation receiver and a magnetometer for measuring the absolute magnetic flux density are already in operation. The Solar Flux Telescope will be commissioned at the end of 2023. A vector magnetometer is to follow.



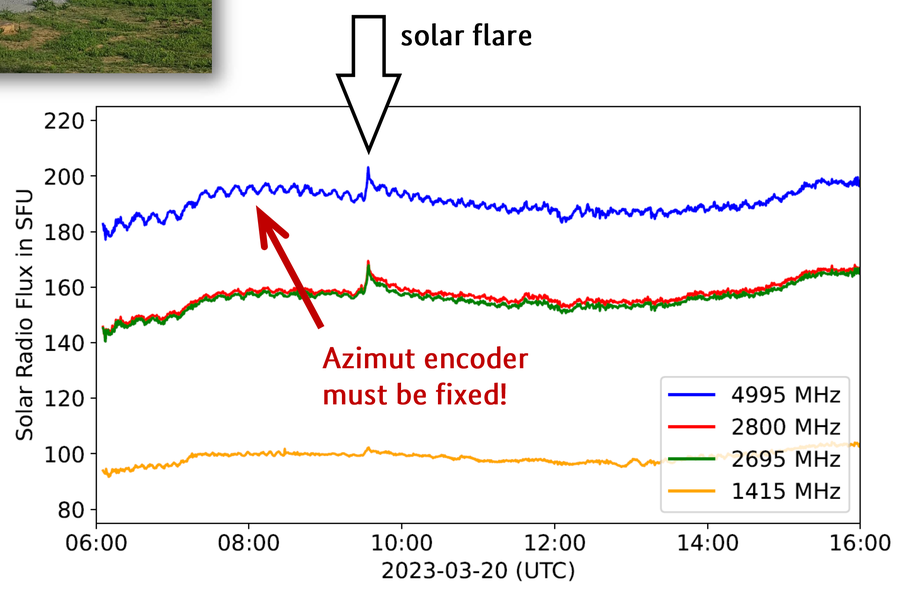
Argentinean-German Geodetic Observatory, Argentina

Among other systems, the Argentinean-German Geodetic Observatory (AGGO) operates a VLBI telescope, a SLR station and GNSS receivers. The station is located near La Plata, Argentina.

A scintillation receiver and a vector magnetometer will be added to the station. The possibility of adding another Solar Flux Telescope is currently being evaluated.

Solar Flux Telescope

The Solar Flux Telescope shown on the left is used to directly observe the solar radio flux per unit frequency in the radio wave range. The telescope has an aperture of five meters. Among other frequencies, observations are made at 2800 MHz to determine the F10.7 index (corresponding to a wavelength of 10.7 cm). On the lower right you see a first test measurement recorded during the perihelion of the Parker Soral Probe.



Further information

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BKG
Wir geben Orientierung.