ACTIVITIES OF THE ASTROGEODETIC OBSERVATORY IN JÓZEFOSŁAW IN THE LAST DECADE

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Introduction

Astrogeodetic Observatory in Józefosław which belongs to the Institute of Geodesy and Geodetic Astronomy of the Warsaw University of Technology started to perform observations in 1955. First of them was time service which started in February 1958, coordinated by BIA. From 1969 astrogeodetic measurements have been done with aim to determine the parameters of the Earth rotation. In 1991 the Observatory was joined to the International GPS Service for Geodynamics (IGS) and started to operate as a permanent IGS station. There have been made many observations and scientific researches, such as: GPS in the frame of IGS/IGLOS/ERF; tidal observations; absolute gravity measurements; changes of the vertical according to astrogeodetic and gravimetric measurements. These studies on RTK and DOPSS measurements using mobile phone for data transmission are performed since 1998. WUT EUREF Local Analysis Centre, one of the 16 Local Analysis Centres acting in Europe, is a very important part of the Observatory. The Centre makes continuous service of one-hour solution in the frame of EUREF network, processes national and international GPS campaigns, models atmosphere and troposphere parameters, compute tidal components and changes of the vertical according to astrogeodetic and gravimetric measurements. This paper presents current state of the art of the Observatory’s activities and deals with the acting of it and operating of the WUT EUREF Local Analysis Centre.

Automatic GPS Service

New project started in our Institute will put into operation a service which will allow users to operate their own GPS data through our Internet Web site. The user is requested to fill out the form (on the right) and send it to our local computer. Then our system begins downloads all necessary things to make processing, process data and afterwards sends results back to the user. It is based on Bernese 4.2 GPS Processing Software.

Data acquisition system at the Józefosław Observatory

The Analysis Centre Consists of two sections, the EUREF Analysis Centre and CERSOP Data Processing Centre. The EUREF Local Analysis Centre has been engaged 1998 in day-to-day service.

Józefosław GPS time series from WUT solutions

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Tidal gravity measurement

Tidal gravity observations conducted with the help of two LaCoste&Romberg gravimeters, model D and model ET.

To assess ZTD accuracy radiosonde profile derived ZT were compared to post processed solutions

The figures on the below shows changes of the components north west and the different session length.

As a result of the data analyses the following results were obtained:

-10

-5

0

5

10

Time [hours]

Experiment for the evaluation of potential time resolution of ZTD estimations in small network

Distribution RTK measurements using of RTCM 2.2 by Internet

Investigation of ZTD behavior and IPW usefulness derived by GPS

We use two standard ZTD products (IGS and EPN) and separate AC solutions (including WUT EPN, LAC), tropospheric solutions of special projects (such as CERSOP) and our experimental tropo solutions. Combined ZTD (made of individual AC solutions) became one of the standard products of IGS (1998) and EPN (2001). Below we show some interesting quantities for this combinations.

Pre-analysis were made using TSOFT. The spikes, steps and small gaps were removed from the data. Additionally the sampling rate was changed from 1 minutes to 1 hour using low-pass filter. This data was then analysed by ETERNA 3.4. Local pressure data was joint to the gravity observations with the regression coefficient of 3.45 hPa per m²/s². Instrumental phase lag was determined using ETSTEP. For ET-26 it is 103.7 hours but was not considered in the analysis. The result of analyses are:

Analysis of the vertical component of gravity (mGal)