



Monumentation and initial installation of IGS station ADIS with GNSS antenna

The IGS station ADIS

In a joint effort of

- Geophysical Observatory of Addis Ababa University (GOAAU),
 - Federal Agency for Cartography and Geodesy, Frankfurt am Main (BKG), and
 - Institute of Physical Geodesy, Technische Universität Darmstadt (IPGD)
- a continuously operating GNSS reference station has been established at the Addis Ababa University in Ethiopia. It has been accepted by the IGS in July 2007. Since March 2008 ADIS is equipped with a combined GPS+GLONASS receiver.

Beside the upload capability of hourly and daily RINEX files ADIS is equipped with a real-time capability. The "Networked Transport of RTCM via Internet Protocol" (Ntrip) is used for real-time data streaming of 1 Hz data in RTCM 3.0 format.

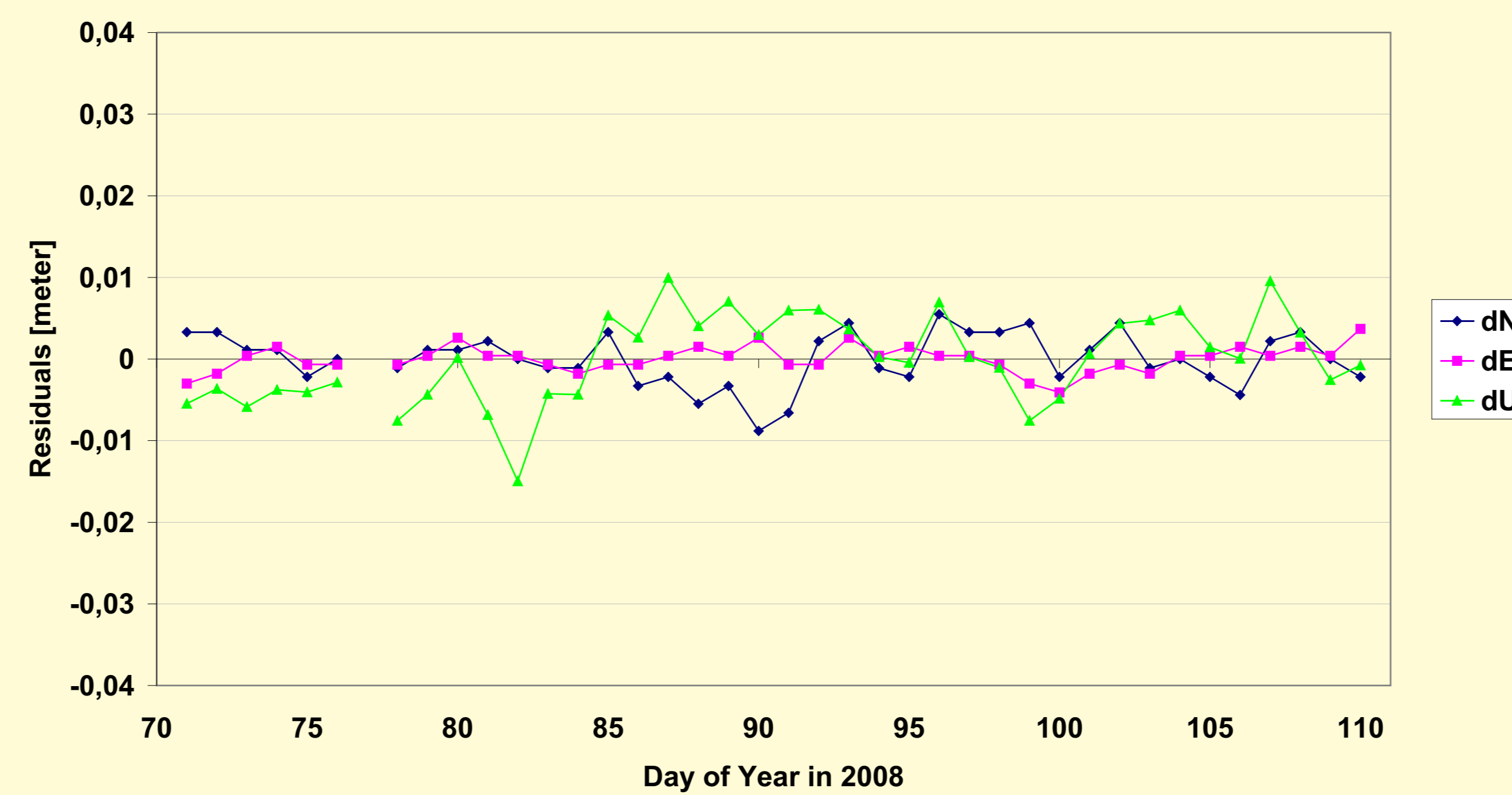
Initial ITRF2005 coordinate estimation

The precise ITRF2005 coordinates of ADIS have been determined by a multi day network differential solution with respect to the closest permanent stations in Africa, Europe and Antarctica. Data of 61 days in 2007 were processed using the Bernese GNSS Software 5.0. On the other hand, a PPP solution with BSW 5.0 has been processed using the IGS final products for 38 days in 2008. The estimated coordinates are (epoch 2008-03-22):

Network solution (ITRF2005): $4913652.795\text{m} \pm 5.5\text{mm}$ $3945922.647\text{m} \pm 6.2\text{mm}$ $995383.304\text{m} \pm 9.9\text{mm}$
 PPP solution (IGS05): $4913652.796\text{m} \pm 5.0\text{mm}$ $3945922.652\text{m} \pm 4.0\text{mm}$ $995383.300\text{m} \pm 2.0\text{mm}$

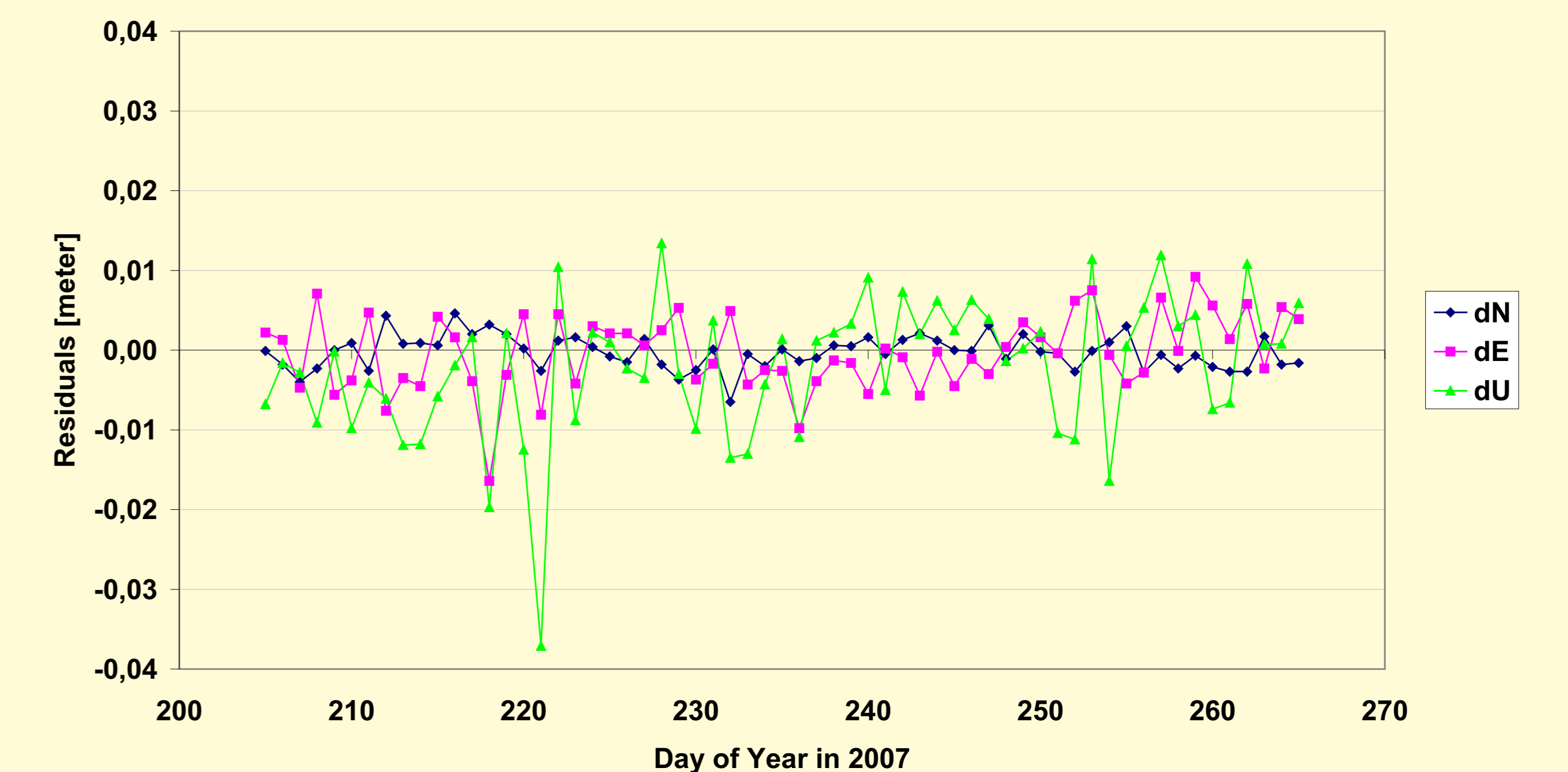
The agreement of both solutions is very good. Obviously, the PPP solution shows a good repeatability over this short time span.

PPP residual time series



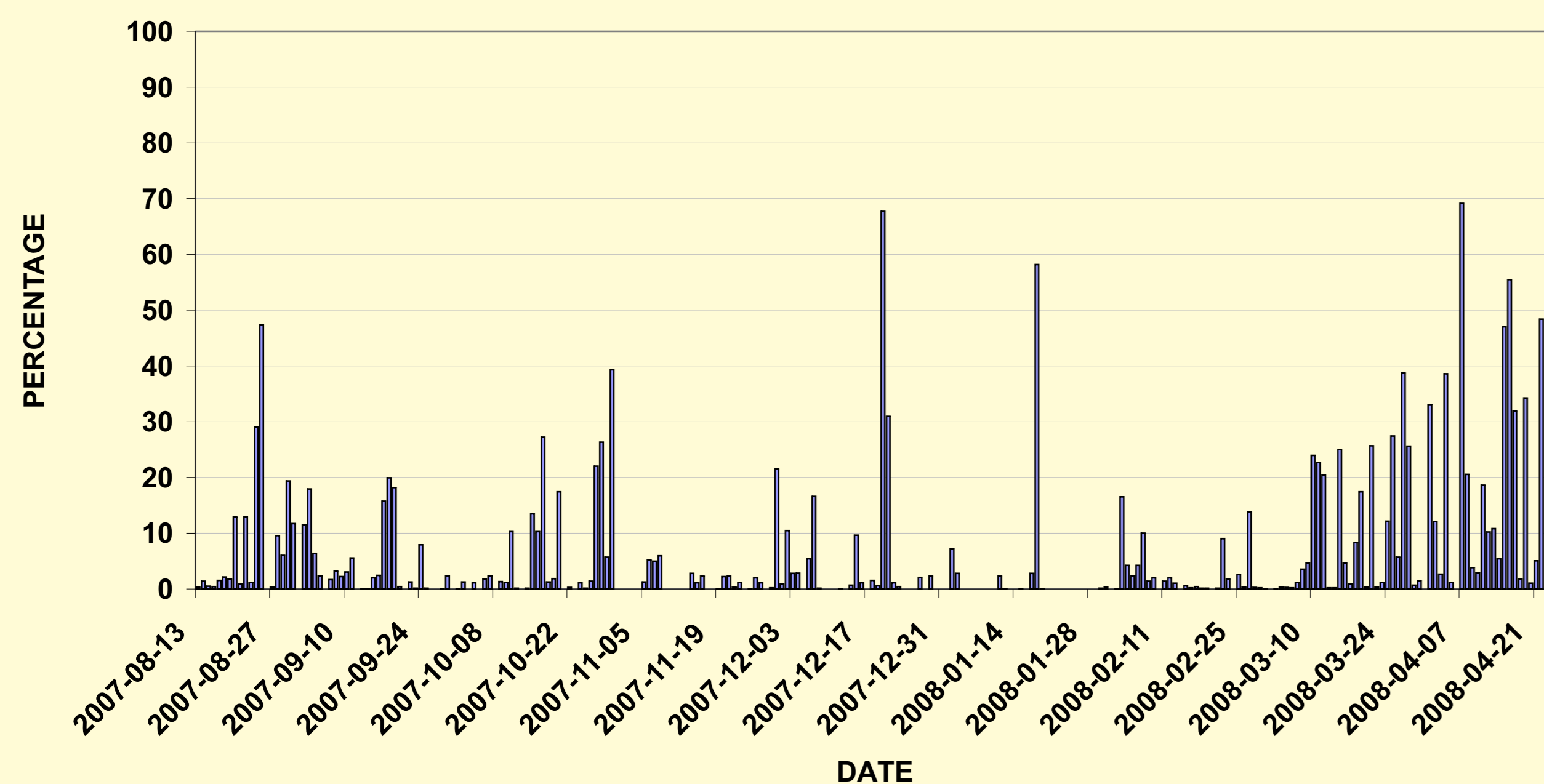
Time series of daily PPP results (differences to the mean) for ADIS after replacement of the receiver in March 2008.

PDGPS residual time series

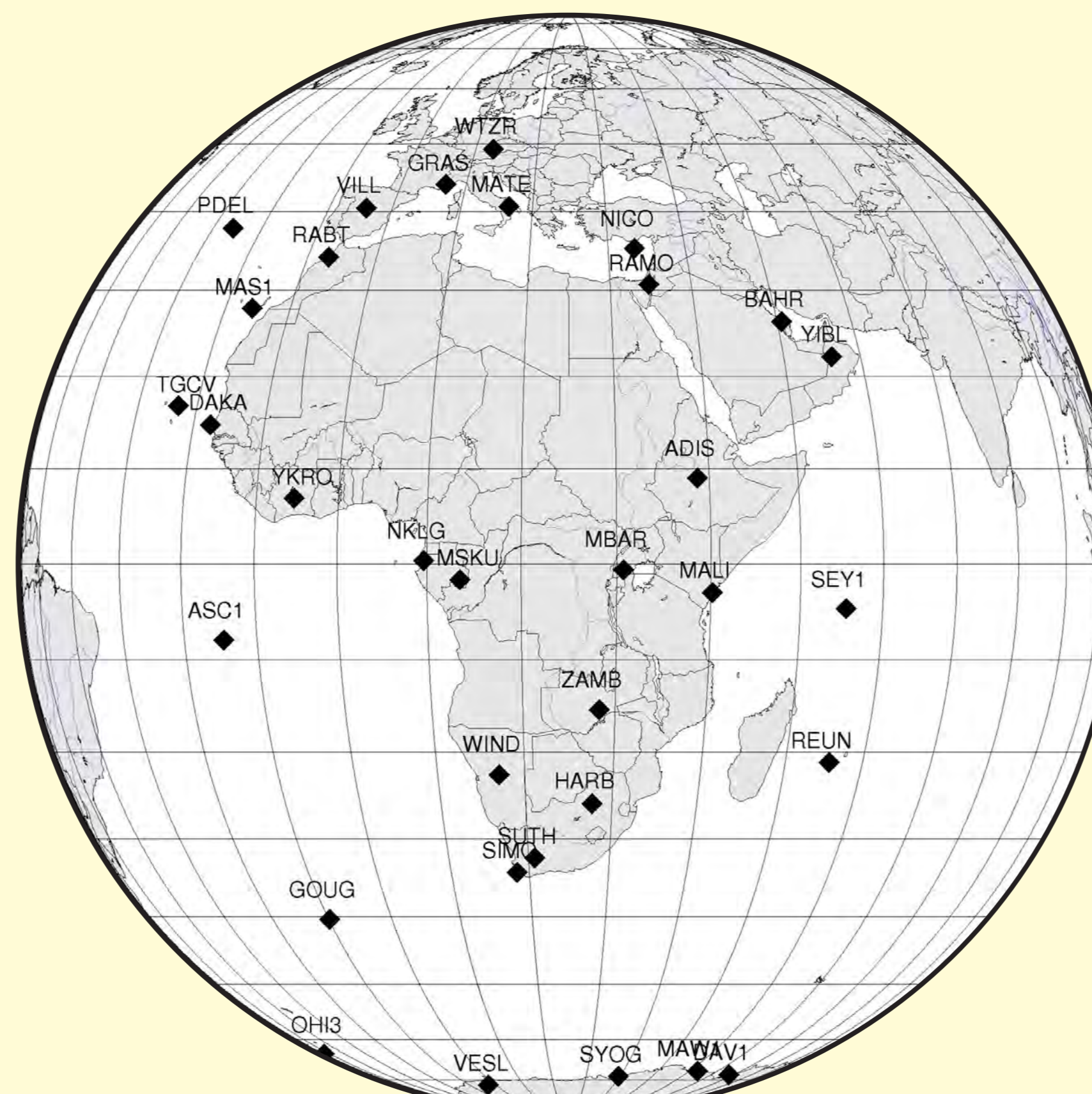


Time series of daily PDGPS results (differences to the mean) for ADIS from 61 days network solution in 2007.

Daily outages of real-time data stream



Daily outages of the real-time data stream of ADIS monitored by BKG. There has been a degradation since the beginning of March 2008 most likely due to power rationing and internet connection problems. The hourly data upload via ftp is not affected in general.



Sub-network of IGS stations used for the initial estimation of ITRF2005 coordinates of the IGS station ADIS. It can be seen that ADIS is filling a gap in the Eastern part of Africa.

ADIS' role for Geodesy and Geodynamics

East-Africa is situated in the collision zone of various tectonic plates and sub-plates (Nubian, Somalian and Arabian). With a long-term continuous monitoring of stations on different tectonic plates, at least more than two years, the relative motion can be precisely estimated.

The African Geodetic Reference Frame (AFREF) has been planned as a unified three-dimensional reference frame for Africa, fully consistent with the ITRF. A first solution, AFREF08, is envisaged to be published by mid 2008, based on a two weeks data set (April, 6-19, 2008).

With regard to the high ionospheric activity in the equatorial region ADIS is of particular interest for the upcoming ionosphere-monitoring networks.

References

Leinen, S. et al. - The new IGS station ADIS and its role for Geodesy and Geodynamics, 2008 (in preparation)



Rack with GPS receiver and real-time equipment