Non-linear motions in reprocessed GPS station position time series

Sergei Rudenko and Gerd Gendt

GFZ German Research Centre for Geosciences, Department 1, Telegrafenberg A17, D-14473 Potsdam, Germany
(rudenko@gfz-potsdam.de, 49 8153 281735)

Global Positioning System (GPS) data of about 400 globally distributed stations obtained at time span
from 1998 till 2007 were reprocessed using GFZ Potsdam EPOS (Earth Parameter and Orbit System) software
within International GNSS Service (IGS) Tide Gauge Benchmark Monitoring (TIGA) Pilot Project and IGS Data
Reprocessing Campaign with the purpose to determine weekly precise coordinates of GPS stations located
at or near tide gauges. Vertical motions of these stations are used to correct the vertical motions
of tide gauges for local motions and to tie tide gauge measurements to the geocentric reference frame.
Other estimated parameters include daily values of the Earth rotation parameters and their rates, as well as
satellite antenna offsets. The solution GT1 derived is based on using absolute phase center variation model,
ITRF2005 as a priori reference frame, and other new models. The solution contributed also to ITRF2008.
The time series of station positions are analyzed to identify non-linear motions caused by different effects.
The paper presents the time series of GPS station coordinates and investigates apparent non-linear motions
and their influence on GPS station height rates.