Motivation

Timely availability of GNSS tracking data is a basic condition for generation of best possible analysis products. Data availability problems are highlighted, with the main focus on the data flow of hourly observation files.

CODEx offers high-quality analysis products with regard to all transmitting GNSS satellites. This includes all satellites, marked unusable, or unhealthy, brand new satellites, and, since recently, GPS satellites being repositioned. In all mentioned cases, GNSS problems are highlighted, with the main focus on the data flow of Timely availability of GNSS tracking data is a basic condition for

Availability and Completeness of IGS/IGLOS Tracking Data

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Complete GNSS Tracking

The IGS has been generating orbit and clock products commonly for all transmitting GPS satellites, independent of whether they are declared unusable or not (by the GPS MCC). It is not unusual that one or more GPS (or GLONASS) satellites are marked unusable over a longer period of time. This was recently the case with respect to PRN39 and PRN22. The GPS tracking situation on day 46 of 2004 is illustrated in the histogram plot. More than 50% of the IGS ground receivers did not sample the two satellites.

IGS/IGLOS Hourly Data Flow

For NRT processing, the hourly file latency is a crucial factor. There is actually no reason why not all, or at least a significant fraction of the IGS/IGLOS hourly files should become available within few minutes after the end of each hour, the more so because exclusively stations are involved that are fully automatically operated. A corresponding monthly statistics is attached to the bottom part of this poster. The listing includes all (168) IGS stations that delivered hourly data during September 2003. IGS/IGLOS stations (providing GPS and GLONASS data) are indicated with a plus sign (+). Note that the "min/(max)/mean" delay specified may be considered as "nominal" delay of the station's hourly file submission. The following table, an excerpt from this statistics, shows the situation concerning IGLOS hourly files made available by the BKG data center. Except for CAGZ2, a file latency of generally 3-4 minutes is already achieved here.

For a surprisingly big number of IGS stations, the statistics attached shows serious data flow problems. A dramatic example is, e.g., ZIMJ. The many percentage values far from 100% are something unpleasant.

IGS/IGLOS Hourly Data Latency Statistics, for September 2003

Motivation

Finally, the wish for complete GNSS tracking had to be appreciated. This is, however, only the case concerning GPS/GLONASS-combined tracking. The differences between well performing and poorly behaving GNSS receivers is remarkable in terms of data completeness (not data quality!). For example, missing G02, G03, G08 observations seem to be symptomatic for some Asteorbit Z18 receiver models.

Conclusions

(1) It should be possible to drastically reduce the mean hourly file latency. Desirable would be a maximum delay of 5 minutes, namely for all IGS/IGLOS stations that do not have explicit restrictions in communication. Reviewing the procedures at the IGS/IGLOS data centers would make sense.

(2) Generally all stations should submit their observation files to at least two IGS data centers (for backup). In case of ftp connection problems, "old," not yet submitted files of the previous (24) hours should be uploaded by the stations as soon as ftp connection is reestablished.

(3) At CODE, we started to create daily observation files on the basis of hourly files for all stations where daily files are not available for rapid analysis. The fact that complete sets of 24 hourly files, but no daily files are available 3-5 hours after the end of the day for a number of IGS/IGLOS stations reveals also potential for improvement in terms of daily files.

(4) We consider complete GNSS tracking important for a continuous receiver network, like the IGS/IGLOS network. Javaal GNSS receiver models, for example, are able to operate in "all-in-view" tracking mode. This is, however, only the case concerning IGLOS receivers that have been specifically reconfigured by the station managers (successfully convinced by CODE). An official statement from IGS side addressing this issue would be appreciated. Finally, the wish for complete GNSS tracking had to be manifested when interacting with receiver manufacturers.