

3.6.1.3 Natural Resources, Canada (NRCan)

The activities related to ITRS CC for 2004 also overlap some IGS priorities for the Reference Frame Working Group. They are mainly related to 1) the maintenance of the IGS realization of the ITRF2000, 2) the reanalysis of weekly combinations and 3) the preparation of station coordinates discontinuity tables.

The alignment of the IGS products to ITRF2000 provides a convenient way for the GPS community to have access to ITRF. The IGS SINEX solutions are aligned to an intermediate solution to improve their internal consistency. This intermediate solution, the so-called “IGS realizations of ITRF”, is itself aligned to ITRF2000. The original IGS realization of ITRF2000 included 54 globally distributed stations. It was used from GPS week 1143 (01/12/02), until GPS week 1252 (04/01/10), when it had ~40–43 active stations remaining in the realization. Starting with GPS week 1253, a new IGS realization of ITRF2000 was used, nominally including 99 active stations. The main objective of this denser realization was to improve the stability. As experienced with earlier realizations, the IGS realization network tends to “decay” at a rate of about 5–10% per year. Some stations have to be removed due to time series discontinuities; others do stop contributing timely data required for their participation. So far, 6 stations had to be removed from the IGS Reference Frame realization, at 3 different epochs: 1) FAIR, MAG0, SFER and YSSK excluded starting at GPS week 1268 (04/04/25), 2) KOKB excluded starting at GPS week 1274 (04/06/06) and 3) TRO1 excluded starting at GPS week 1284 (04/08/15). In the production environment, it sometimes requires a few weeks to confirm anomalous station behavior. For the reprocessed solutions contributing to ITRF, stations are excluded starting at the time anomalies do occur. Figure 1 shows the weekly Reference Frame stations usage by the AC, GNAAC and combined IGS solution.

The reanalysis effort contributed to improve the IGS weekly solutions and indirectly the upcoming ITRF2004. Occasionally, AC/GNAAC solutions missed the combination deadline; however, when available, they were included in the reanalyzed solutions. Some known modeling problems were also corrected. Reported incorrect antenna heights were also corrected from the time they occurred, thus removing some “artificial” discontinuities. From time to time, the improvements made in the reprocessed solutions, were included in the IGS cumulative solution. Critical information such as DOME #, may also have prevented some station coordinates estimates from being released in the official solutions. When such information became available, corresponding station coordinates could be released in the weekly reprocessed solutions.

Station coordinates time series are sometimes affected by discontinuities. Properly accounted for discontinuities are essen-

tial to improve the ITRF. Those discontinuities can be caused by geophysical events such as earthquake, or for GPS, also be caused by changes in the station local environment or electronics. Changes in equipment performance, combined with different processing strategy may also influence the magnitude of observed discontinuities. The detection of large discontinuities is easy. However, smaller discontinuities are more difficult to correctly identify, and may potentially be biased by the analyst interpretation. Coordinates time series from IGS, JPL, MIT and SIO were compared to help identify discontinuities. EUREF and NAREF time series as well as very valuable feedback from the regional centers analysts helped to identify several discontinuities and ensure consistency between the global and regional solutions. Correlation with known geophysical events or equipment changes often helped explain small discontinuities; this significantly improved the discontinuity detection confidence level. Several people contributed to the detection/identification of discontinuities, thus reducing analyst bias, their contribution is acknowledged. The relentless effort of all the people contributing to IGS is also acknowledged.

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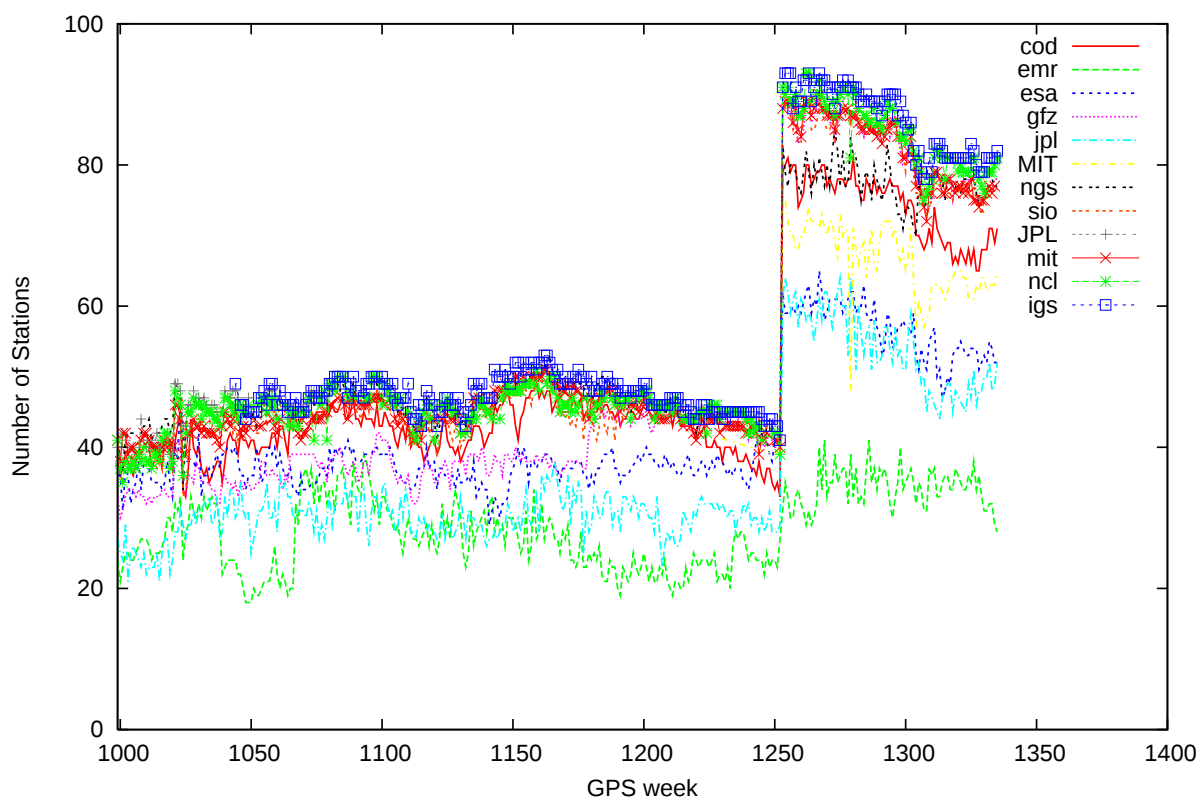


Fig. 1: Evolution of the Reference Frame stations usage. For a colour version of this figure see the online version of this report.