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Impact of sub-network configuration on global scale GPS processing

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In a global GPS processing, like the re-processing campaign started by the IGS last year, it is usual to have between 50 and 80 IGS Reference Stations per day. At the University of La Rochelle (ULR) TIGA Analysis Center, the daily tracking network processed from 1997 to 2008 varies between 80 to 190 stations.
The GPS processing time increases exponentially with the number of stations available. In order to overcome this limitation, it is usual to split the whole network in several sub-networks, using common stations to link again the solutions. Using the double-differenced approach within the GAMIT software, we set the limit up to 50 stations per sub-network.
Five global, manually-selected, permanent sub-networks, called here "static sub-networks", were used at the ULR TAC for the first GPS re-processing in 2006. With this configuration, the stations for each sub-networks are always the same, even if they are not available for a specific processing day, making the geometry worse and using an unnecessary number of sub-networks.
This scheme is compared with a new station distribution using global, automatic, daily-variable sub-networks, called here "dynamic sub-networks". These dynamic sub-networks are extracted based on an a priori knowledge of the daily available stations and the three-dimensional distance between them. In such a way that closer stations are distributed in different sub-networks, in order to obtain a regular distribution based on geometry. The link stations are selected dynamically too, with the same criteria, but using only IGS Reference Frame stations, normally one at the North and South Poles and another four near the Equator.
In this work, we compare static versus dynamic approach and we show the influence of the station distribution on the GPS processing quality and on the reference frame realization.
The dynamic sub-networks show a noticeable improvement in the percentage of fixed ambiguities, especially before the year 2000. Other parameters, like position repeatability and transformation parameters with respect to a stacked solution, are compared too.