THE TRANSFORMATION FROM CAMPO INCHAUSPE 69 TO POSGAR ARGENTINE FRAMES

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ABSTRACT:

The Instituto Geografico Militar (IGM) has recently adopted the POSGAR'94 (Posiciones Geodesicas Argentinas) frame as the realization of the national reference system of Argentina. This frame has been established trough GPS observation aiming to realize as closely as possible the WGS system. PGA94 (POSGAR'94) has replaced the old classical frame Campo Inchauspe'69 (CAI69) to which most of the cartographic surveys made by the IGM has been tied.
The usual procedure to convert geodetic latitude and longitude from CAI69 to WGS84 has been based on the use of the Molodensky's formulae, by introducing to corresponding Da and Df values and datum shifts DX, DY, DZ. These shifts were determined by the former DMA (USA), using 19 CAI69 points whose WGS84 coordinates were determined by means of TRANSIT observations. Coordinate differences of more than 100 m may expected between CAI69 and WGS84, mainly due to the different shape and center location of the two ellipsoids involved.
Several approaches were investigated to establish a transformation for the horizontal geodetic coordinates from CAI69 to PGA94. As a result, a set of values for multi-regression formulae was recently computed based on 50 common points with a good distribution through the country. This transformation is valid for the whole country and has a precision of ± 1 m (1σ).
The current transformation allows to exploit a great deal for existing cartographic information tied to CAI69. It has the necessary accuracy to convert most of this information which was produced mainly by the IGM, since the largest scale available is 1:50,000. The integration of different surveys into a land or geographic information system (LIS or GIS) requires as a "sine qua non" condition their tie to a unique reference system. The CAI69 coordinates transformed to PGA94 can provide a good reference for low and medium precision users.