Altimetric reference for Amazon area : first experiments

P. KOSUTH, D. BLITZKOW, I.O. CAMPOS, R.F. BUENO, C.A. CORREA E CASTRO, J. CALLEDE

Knowledge of the altitude above mean sea level of the main hydrometric stations is a prerequisite for an in-depth understanding of rivers hydrodynamics and sedimentologic processes, particularly for the use of models. In tropical regions with dense forest cover, usual geometric land leveling can hardly, if ever, be achieved. This is the case of the Amazon river network where only two of the 220 hydrometric stations in Brazil have been leveled. In such regions, alternative geodesic techniques have to be implemented. This paper presents an altimetric study of the downstream reach of the Amazon River (seven stations on 800 km) using GPS technique for geometric height determination and geoid model to convert geometric to orthometric heights. For these seven stations the average precision on the geometric height was 0.075m (from 0.02m to 0.16m). A comparison of orthometric heights in Santarem derived (1) from available geometric leveling and (2) from GPS measurement coupled with geoid model shows a difference (1)-(2) ranging from –0.103m to +0.743m depending on the geoid model. The development of such "autonomous" altimetric techniques would allow improved monitoring of river networks, including for the study of flooded areas dynamics.

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