



On the geodetic fundamental parameters and the definition of the reference ellipsoid

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Considering the facts that (1) presentation of the global geocentric coordinates derived from Global Navigation Satellite Systems (GNSS) require a global reference ellipsoid. (2) The geoid's potential value W_0 can be computed from the observable quantities to a high degree of accuracy. (3) The geoid computation needs the geoid's potential value in the setup of its Boundary Value Problem (BVP). (4) The reference ellipsoid used for the geoid computation needs to be a level ellipsoid, i.e. an equipotential surface of the Somigliana-Pizzetti reference field with geoid's potential as its potential value. (5) Consistency of the GNSS positioning and gravity field modeling in global scale requires a common reference ellipsoid. (6) Unification of global height systems need referring of all the height datums to an officially recommended geoid's potential value. We propose redefinition of the parameters used for the computation of the reference ellipsoid GRS 80 as following set of 4 parameters: (1) geoid's potential value W_0 , (2) geocentric gravitational constant GM (including the mass of the atmosphere), (3) angular velocity of the Earth ω , and (4) second spherical zonal harmonic J_2 . Reasons for such proposal are given with all details in the paper.