



Global gravimetric geoid model based a new method

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The geoid, defined as the equipotential surface nearest to the mean sea level, plays a key role in physical geodesy and unification of height datum system. In this study, we introduce a new method, which is quite different from the conventional geoid modeling methods (e.g., Stokes method, Molodensky method), to determine the global gravimetric geoid (GGG). Based on the new method, using the data base of the external Earth gravity field model EGM2008, digital topographic model DTM2006.0 and crust density distribution model CRUST2.0, we first determined the inner geopotential field until to the depth of D , and then established a GGG model, the accuracy of which is evaluated by comparing with the observations from USA, AUS, some parts of Canada, and some parts of China. The main idea of the new method is stated as follows. Given the geopotential field (e.g. EGM2008) outside the Earth, we may determine the inner geopotential field until to the depth of D by using Newtonian integral, once the density distribution model (e.g. CRUST2.0) of a shallow layer until to the depth D is given. Then, based on the definition of the geoid (i.e. an equipotential surface nearest to the mean sea level) one may determine the GGG. This study is supported by Natural Science Foundation China (grant No.40974015; No.41174011; No.41021061; No.41128003).