In areas with poor surface gravimetric coverage, data from CHAMP, GRACE and GOCE missions are contributing to the knowledge of the Earth gravity field, expanding the frequency spectrum to more reliable resolutions. However, nowadays this information remain still limited to spatial resolution of about 85 km in the harmonic development of geopotential. In this condition, it is necessary to use surface data for obtaining shorter wavelengths resolution. An existing problem in this approach is the completion of data on the medium frequencies, usually associated with conventional terrestrial gravimetry. An alternative is to create synthetic data of gravity anomalies based on a realistic modelling of the Earth. Because the data combination from that proposed structure requires specific mathematical tools and procedures, it is necessary to consider that the involved subjects are not fully determined yet. This paper presents a strategy based on merging GOCE mission data, the “GO_CONS_GCF_2_DIR” global geopotential model already available in the degree and order of 240, and Residual Terrain Model (RTM) calculated from SRTM and DTM2006 data. Thus, a synthetic gravity model is presented, allowing to obtain the representation of the Earth's gravity field in middle and high frequencies. Experiments were carried out in a pilot area in the region of Parana, Brazil, between the parallels 22 ° S and 27 ° S and meridians 48 ° W and 55° W, where there are Global Positioning System observations on benchmarks for evaluation purposes.