An efficient algorithm for gravity data from satellite altimetry was very important. In the paper, we firstly reviewed three common methods (Sandwell method, Olgiati method and Hwang method), and found that all of these methods either may have high precision but have not ideal spatial resolution or may have refine spatial resolution but have not theoretical rigorous solution, and which may even lead to complex calculations. Secondly, we introduced an efficient, simple and feasible approach. On any observed point, this method only make use of the residual sea surface height information of the former and the later point along the track. Then according to the residual sea surface height gradient equation (that was directional derivative of the observed point equals to distance between two point in the sea surface divided by the difference of the residual sea surface height of this point), we obtained easily the vertical deflection on the observed point. This method needn’t resolve ill-condition normal equation concerning the residual sea surface height inclination, and the resolution is stable. Obviously, this method was very convenient and high efficient to calculate the vertical deflection on any observed point. At last, we can draw that the difference between the calculated and theoretical model (derived from EGM2008) no more than 10 seconds for vertical deflection of China sea, and can also reflect the high frequency physical information of the earth gravity.

Keywords: altimetry, gravity anomaly, sea surface height, vertical deflection