



The stability of the estimated GPS DCB and its connection with ionospheric variability

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The stability of the estimated GPS DCB based on GPS observation strongly affects the precision of the ionospheric TEC derived from GPS data. Based on the satellite DCB data from 1999 to 2011 issued by the Center for Orbit Determination in Europe (CODE), the features of the temporal variation of DCB are studied. Summarily, there are three types variation of DCB on different time scales, the first type is the day-to-day variation that exhibits more obviously from 1999 to 2002, the second type is the variation with about one year periodic variation that reveals more obviously from 1999 to 2004, the last type is the monotonously descending tendency from 1999 to 2010. Considering the basic ionospheric approximation in DCB estimation method, the features of the variability of the ionospheric morphology from 1999 to 2010 is also displayed based on the observation of the ionospheric F2 peak electron density. It can be concluded that the variation of the GPS DCB shown in this study is related to the ionospheric variability on different time scales, so the variation of the GPS DCB revealed in this study should not be the real situation for the change of the GPS DCB. No doubt, these kinds of pseudo-variations of DCB will affect the precision of ionospheric TEC derived from GPS data. In addition, in order to obtain the stable and correct DCB of the GPS satellites and receiver, one DCB estimation method insensitive to ionospheric variability should be developed.