



Seasonal Effects on GPS PPP Accuracy

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GPS Precise Point Positioning (PPP) is now routinely used in many geophysical applications. Static positioning and 24 h data are requested for high precision results however real life situations do not always let us collect 24 h data. Thus repeated GPS surveys of 8-10 h observation sessions are still used by some research groups. Positioning solutions from shorter data spans are subject to various systematic influences, and the positioning quality as well as the estimated velocity is degraded. Researchers pay attention to the accuracy of GPS positions and of the estimated velocities derived from short observation sessions. Recently some research groups turned their attention to the study of seasonal effects (i.e. meteorological seasons) on GPS solutions. Up to now usually regional studies have been reported. In this study, we adopt a global approach and study the various seasonal effects (including the effect of the annual signal) on GPS solutions produced from short observation sessions. We use the PPP module of the NASA/JPL's GIPSY/OASIS II software and globally distributed GPS stations' data of the International GNSS Service. Accuracy studies previously performed with 10-30 consecutive days of continuous data. Here, data from each month of a year, incorporating two years in succession, is used in the analysis. Our major conclusion is that a reformulation for the GPS positioning accuracy is necessary when taking into account the seasonal effects, and typical one term accuracy formulation is expanded to a two-term one.