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Sites Relative Vertical Motion Estimate from VLBI Baselines

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A new method of determining relative vertical motion between two separated sites is presented by investigating the length variation of the VLBI baseline they formed. On the basis of principle and mathematical model of it, considerable attention is paid to the sensitivity of the baseline length rate to its station relative vertical motion and potential extracting capability of this station relative vertical motion. It is shown that both the detecting sensitivity and extracting capability are proportional to the baseline length. For a super long baseline of 12,000km, 1cm of stations relative vertical motion can be detected in the baseline length variation as large as 0.94cm, which indicates a nearly full extracting capability, but simply 0.47cm for a mid-length of 6,000km baseline, about half loss of the measure precision. Therefore, it can be concluded that this approach is much more likely to apply for specific baselines of length up to 10,000km to effectively detect and extract the relative vertical motion in global scale.