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Temperature influences in receiver clock modelling

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In Precise Point Positioning (PPP), hardware delays at the receiver site (receiver, cables, antenna, ...) are always difficult to be separated from the estimated receiver clock parameters. As a result, they are partially or fully contained in the estimated "apparent" clocks and will influence the deterministic and stochastic modelling of the receiver clock behaviour. In this contribution, using three years of data, the receiver clock corrections of a set of high-precision Hydrogen Masers (H-Masers) connected to stations of the ESA/ESOC network and the International GNSS Service (IGS) are firstly characterized concerning clock offsets, drifts, modified Allan deviations and stochastic parameters. In a second step, the apparent behaviour of the clocks is modelled with the help of a low-order polynomial and a known temperature coefficient (Weinbach, 2013). The correlations between the temperature and the hardware delays generated by different types of antennae are then analysed looking at daily, 3-day and weekly time intervals. The outcome of these analyses is crucial, if we intend to model the receiver clocks in the ground station network to improve the estimation of station-related parameters like coordinates, troposphere zenith delays and ambiguities.

References:
Weinbach, U. (2013) Feasibility and impact of receiver clock modeling in precise GPS data analysis. Dissertation, Leibniz Universität Hannover, Germany.