



Modeling the effect of hydrology loading on VLBI crustal displacements

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We study the effect of hydrologic loading on measured VLBI site position variations. To investigate this, we remove contributions from atmospheric pressure loading and nontidal ocean loading as well as from troposphere mapping function errors and thermal deformation of VLBI antennas. Here, the mapping function error is corrected by applying the IMF mapping function [Niell, 2003] based on NCEP numerical weather model atmosphere fields. We evaluate the soil moisture and snow loading displacement series generated from the hydrology models of Milly and Shmakin [2002] and from Rodell et al. [2004]. The considered contributions to site vertical variation are significant (several mm) at the annual frequency with additional smaller signals at multiples of the annual frequency. We also evaluate the effect of interannual hydrology variations on site position rates and reference frame scale variation. To investigate remaining signals in the VLBI time series, we study the correlation of VLBI and GPS baseline length and site position time series at co-located sites.