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Contribution of lateral geometric displacements to equivalent load height column coefficients

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In this study, we seek for the relative contribution of seasonal poloidal displacement variations, as well as geoid height changes to the overall determination of equivalent load height column coefficients (ELHCC). Usually, the inversion of poloidal data is performed simultaneously, assuming that the horizontal displacements are significant despite of the low magnitude of lateral load love numbers. The justification for the latter is that, in the case of GPS, the ratio of vertical to lateral variances of global coordinate time series is typically about a factor of ten. Independent estimates of the load inversion were achieved using synthetic GPS SOPAC coordinate time series (for the height and lateral component) and geoid height changes derived from GRACE time-dependent geopotential coefficients. The ELHCC can be estimated independently either from east, north or height displacements. Thus, we can assess the precision of the ELHCC for these three components separately, noting that the east component is insensitive to zonal displacement coefficients. At present, due to the spatial random pattern of seasonal lateral displacements, the contribution of lateral geometric displacements (including east and north components) mainly adds noise to the overall equivalent load height column coefficients.