Journal of Geodesy (2020) 94:39
https://doi.org/10.1007/s00190-020-01346-y

CORRECTION

Correction to: "Methodology and consistency of slant and vertical assessments for ionospheric electron content models" and to "Consistency of seven different GNSS global ionospheric mapping techniques during one solar cycle"

Manuel Hernández-Pajares[1] · **David Roma-Dollase**[2]

Published online: 16 March 2020

Correction to:
J Geod https://doi.org/10.1007/s00190-017-1032-z and https://doi.org/10.1007/s00190-017-1088-9

In the original publication of the articles, "Methodology and consistency of slant and vertical assessments for ionospheric electron content models" and "Consistency of seven different GNSS global ionospheric mapping techniques during one solar cycle", a common typo affecting the text only (not the computations) has been recently noticed. It compromised the definition of the scaling factor from Global Navigation Satellite Systems ionospheric delay to electron content, which is clarified in this erratum.

In equation 1 of Hernández-Pajares et al. (2017) and in equation 8 of Roma-Dollase et al. (2018), the observed Slant Total Electron Content difference ΔS_o, among two line-of-sights GNSS transmitter-receiver at different times t and elevations above the horizon E, is related with the corresponding difference of geometry-free (ionospheric) combination of carrier phases in length units, $L_I = L_1 - L_2$, by means of the inverse of the scaling factor α, i.e. equation 1.

$$\Delta S_o = S_o(t) - S_o(t_{E_{\max}}) = \frac{1}{\alpha}\left(L_I(t) - L_I(t_{E_{\max}})\right) \tag{1}$$

However there is a typo in the detailed dependence and value of α given in both papers Hernández-Pajares et al. (2017) and Roma-Dollase et al. (2017), mainly consisting in the missing frequency dependent factor. The right and complete expression of α, which has been the one used in the computations of both papers (Hernández-Pajares et al. 2017; Roma-Dollase et al. 2018), is given in next equation 2,

$$\alpha = \frac{q^2}{8\pi^2 m_e \epsilon_0}\left(\frac{1}{f_2^2} - \frac{1}{f_1^2}\right) \simeq 0.105\ \frac{\text{m}}{\text{TECU}} \tag{2}$$

being q and m_e the charge and mass of the electron, respectively, ϵ_0 the dielectric constant in the vacuum, f_1 and f_2 the carrier frequencies corresponding to L_1 and L_2; and the right hand approximation in equation 2 is valid for Global Positioning System frequencies, being 1 TECU = 10^{16} m^{-2} (see Hernández-Pajares et al. (2010, 2011)).

The original article can be found online at https://doi.org/10.1007/s00190-017-1032-z and https://doi.org/10.1007/s00190-017-1088-9.

✉ Manuel Hernández-Pajares
manuel.hernandez@upc.edu

David Roma-Dollase
roma@ieec.cat

[1] UPC-IonSAT res. group, Mod. C3 Campus Nord UPC, c/ Jordi Girona, 1, 08034 Barcelona, Spain

[2] IEEC-ICE-CSIC, UAB Campus, Bellaterra, Spain

References

Hernández-Pajares M, Juan JM, Sanz J, Aragón-Àngel À, García-Rigo A, Salazar D, Escudero M (2011) The ionosphere: effects, GPS modeling and the benefits for space geodetic techniques. J Geod 85(12):887–907. https://doi.org/10.1007/s00190-011-0508-5

Hernández-Pajares M, Roma-Dollase D, Krankowski A, García-Rigo A, Orús-Pérez R (2017) Methodology and consistency of slant and vertical assessments for ionospheric electron content models. J Geod 91:1405–1414. https://doi.org/10.1007/s00190-017-1032-z

Hernández-Pajares M et al (2010) Section 9.4 Ionospheric model for radio techniques of Chapter 9 Models for atmospheric propagation delays of IERS Conventions 2010. In: Petit G., Luzum B. (eds) IERS Technical Note No. 36. Verlag des Bundes amts fur Kartographie und Geodasie, Frankfurt am Main

Roma-Dollase D, Hernández-Pajares M, Krankowski A, Ghoddousi-Fard R, Yuan Y, Li Z, Zhang H, Shi C, Feltens J, Komjathy A, Vergados P, Schaer S, García-Rigo A, Gómez-Cama JM (2017) Comparing vertical and slant performances of seven different global VTEC ionospheric models

Roma-Dollase D, Hernández-Pajares M, Krankowski A, Kotulak K, Ghoddousi-Fard R, Yuan Y, Li Z, Zhang H, Shi C, Wang C, Feltens J, Vergados P, Komjathy A, Schaer S, García-Rigo A, Gómez-Cama JM (2018) Consistency of seven different GNSS global ionospheric mapping techniques during one solar cycle. 92(6):691–706. https://doi.org/10.1007/s00190-017-1088-9