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CORRECTION

Correction to: Report of the IAU Working Group on Cartographic Coordinates and Rotational Elements: 2015

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Abstract

We point out some errors in the most recent report from the International Astronomical Union (IAU) Working Group on Cartographic Coordinates and Rotational Elements (Archinal

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et al. 2018). We correct a sign error in Figs. 1 and 2. We also correct the equation for the prime meridian position (W) of Mars' satellite Phobos in Table 2.

Two separate errors have been made. First, in Figs. 1 and 2 of Archinal et al. (2018), the expression giving the right ascension of the node Q incorrectly has a negative sign. It should read "$90° + \alpha_0$". The corrected versions of both figures are shown below along with the original captions, which were not affected by the error.

Second, there are two mistakes in the equation for the prime meridian position (W) of Mars' satellite Phobos reported in Table 2 of the report. This equation is based on the derivation by Stark et al. (2017) but with a correction to the prime meridian constant W_0 due to the forced libration in longitude, i.e. based on equations 3 and 10 of Burmeister et al. (2018). However, at present the prime meridian of Phobos is defined dynamically, i.e. the prime meridian is defined by the orientation of Phobos with respect to Mars center of

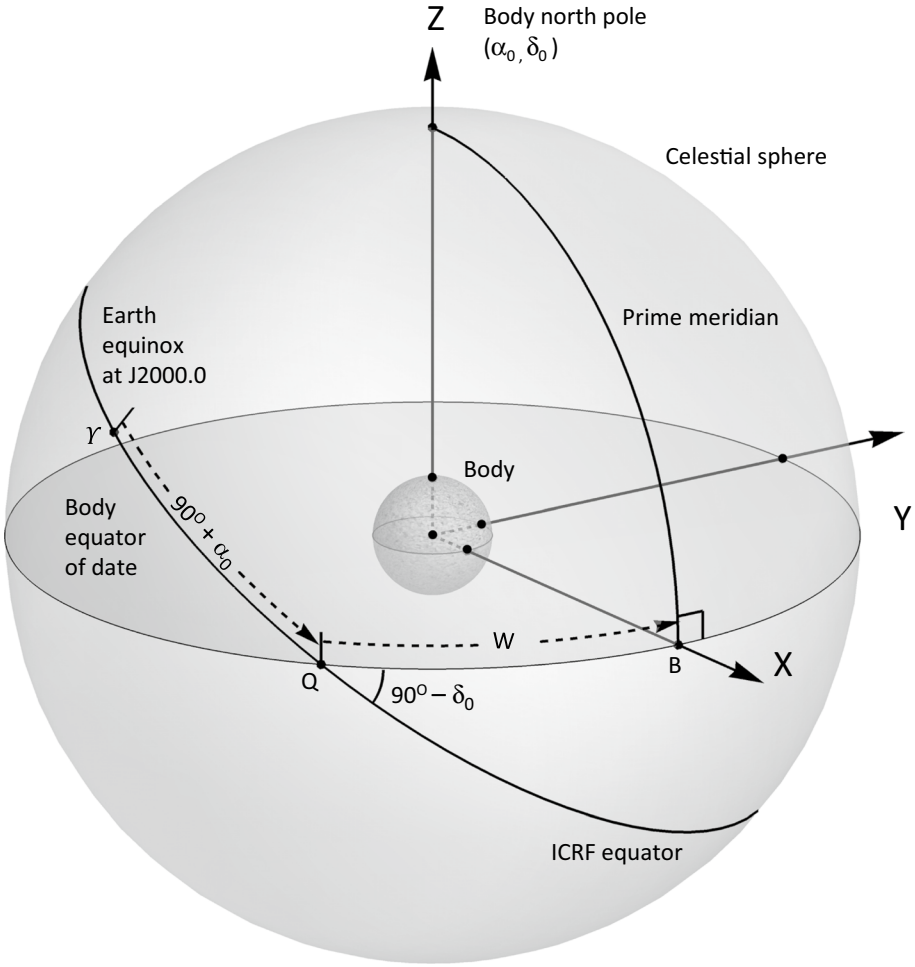

Fig. 1 Reference system used to define orientation of the planets and their satellites. For $W(t) > 0$, body rotation is prograde (e.g. Mercury, Jupiter). For $W(t) < 0$, body rotation is retrograde (e.g. Venus, Uranus)

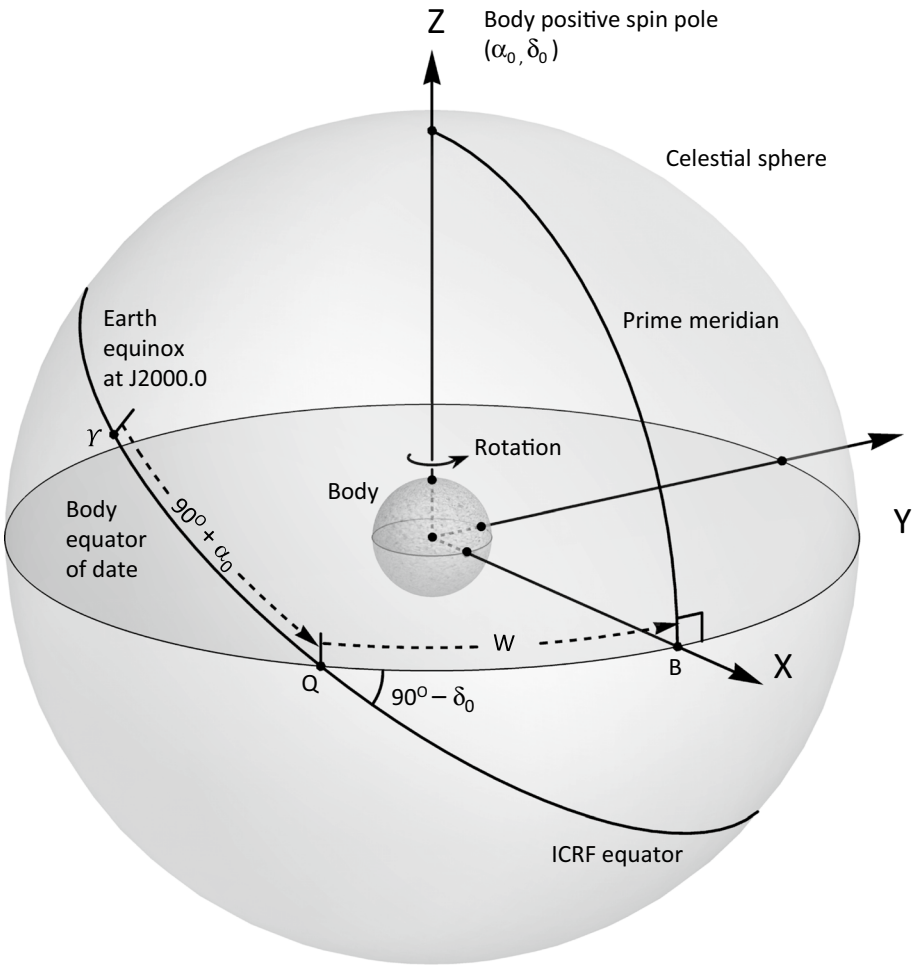

Fig. 2 Reference system used to define the orientation of dwarf planets, minor planets, their satellites, and comets

mass at the time the satellite is passing its pericenter. To maintain this definition, the correction term for W_0 introduced by Burmeister et al. [2018; "p_λ sin(189.6327156°)"] is not appropriate and the value of the prime meridian constant (first term in the equation for W) should have read "35.18774440". In addition, the sign of the last term ["1.143 sin(*M5*)"] was incorrectly shown as positive and should have been negative.

We have reproduced the corresponding portion of Table 2 below, correcting the equation for W, and including the full set of equations for the orientation of Phobos.

Table 2 Recommended values for the direction of the north pole of rotation and the prime meridian of the satellites

α_0, δ_0, W, T, and d have the same meanings as in Table 1 (epoch JD 2451545.0, i.e. 2000 January 1 12 h TDB). Constants have units of degrees			
…			
Mars:	I	Phobos	$\alpha_0 = 317.67071657 - 0.10844326\ T$ $- 1.78428399\ \sin(M1) + 0.02212824\ \sin(M2)$ $- 0.01028251\ \sin(M3) - 0.00475595\ \sin(M4)$ $\delta_0 = 52.88627266 - 0.06134706\ T$ $- 1.07516537\ \cos(M1) + 0.00668626\ \cos(M2)$ $- 0.00648740\ \cos(M3) + 0.00281576\ \cos(M4)$ $W = 35.18774440 + 1128.84475928\ d + 12.72192797\ T^2$ $+ 1.42421769\ \sin(M1) - 0.02273783\ \sin(M2)$ $+ 0.00410711\ \sin(M3) + 0.00631964\ \sin(M4)$ $- 1.143\ \sin(M5)$
where	$M1 = 190.72646643 + 15917.10818695\ T$ $M2 = 21.46892470 + 31834.27934054\ T$ $M3 = 332.86082793 + 19139.89694742\ T$ $M4 = 394.93256437 + 38280.79631835\ T$ $M5 = 189.63271560 + 41215158.18420050\ T$ $+ 12.71192322\ T^2$		
…			

Also in this table (not shown) is a minor typographical error, the declination of the pole position for Deimos, instead of just "δ" should read "δ_0".

The IAU Working Group on Cartographic Coordinates and Rotational Elements takes full responsibility for and regrets these errors.

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