Interactive comment on "Regional Ionosphere Mapping Using Zero Difference GPS Carrier Phase" *by* Heba Tawfeek et al.

Anonymous Referee #1

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ANGEO-2018-121 Title: Regional Ionosphere Mapping Using Zero Difference GPS Carrier Phase Authors: Heba Tawfeek et al.

General comments: This manuscript presented an algorithm capable of producing local ionosphere map using carrier phase observations over a single GPS station. In my opinion, this manuscript doesn't contain new ideas, and the experiment is too simple and can't support your conclusions. 1. The algorithm is new? What is the detail information about the ZDPID software? 2. There is no information about your local ionosphere model, spherical harmonic expansion? two-dimensional Taylor series expansion? 3. You still use the code observations in your algorithm. 4. You selected two IGS stations to model the local ionosphere map, why you selected another three stations in the same way? 5. The GIM is generated with about 300 world wide GNSS

stations, why you compare the GIM with your local ionosphere map? Yes, there will be differences in this comparison, but how do you convince me that your result is correct? The assessment method is not appropriate. 6. Figure 3-4, 7-9 can't represent the local ionosphere VTEC well. Figure 6 and 10 should be plotted with professional software. 7. How does your algorithm in your paper improve the temporal and spatial resolution of GIM.

Specific comments: 1. The title "Regional ionosphere mapping using zero difference GPS carrier phase" may be not appropriate. "Regional" can be replaced by "local", "zero difference" can be replaced by "a single station". 2. In the Abstract part, P1. Line 25-38 should be rewritten. 3. In the Introduction part, there is no information about the ionosphere mapping with carrier phase observations. 4. P.2 Line 42, 45, introduce all the abbreviations, e.g. GNSS, VTEC. . . . . . 5. P.2 Line 73, what is the symbol gama? 6. Equation (5), 1-2a, -2b, 0, 2 in your manuscript is different from 1-2a, -2b, 1, 0 in Xu, 2004, what is the difference? 7. P.3 Line 81, What do you mean "To fix the ambiguities to its most accurate float values"? In general, we fix the ambiguities means that the ambiguities are set as integer values. 8. P.4. Line 95, what is the difference between X and n? 9. P.4 Line 114, equation (10) ? 10. Equation (12) DCB is differential code bias, not the differential carrier phase hardware delay bias. 11. P.4 Line 126. DCBs from IONEX file is for code observations not for carrier phase. 12. Section 5 is to general, can be deleted. 13. P.11 Line 250, what do you mean "the mean TEC values"? above the station? Over the local area?

Technical corrections: 1. This manuscript is not presented with a professional format. It is very hard for me to read and to understand your meaning. 2. P.11 Line 251 "is ranges from . . . . . ."