**Responses to Reviewers**

**Reviewer #B**

Initially, the authors thank all the sound recommendations for the article. The word and expression corrections suggested by the reviewer and the insertion of the acronyms' complete nomenclature were adjusted and are in red throughout the article. The other suggestions and answers are listed in the following paragraphs, and the corrections are highlighted in yellow.

1. O título não reflete esta restrição. Recomendo alterar o título para frisar este escopo ou adicionar um subtítulo com esse conteúdo.

Following your advice, we have changed the title to QPEC: *QGIS Toolkit for Evaluating Geospatial Data Positional Accuracy according to the Brazilian Cartographic Accuracy Standard.*

1. Há vários termos com variação de grafia do inglês britânico (organised) para o americano (organized). Cabe ao editor se pronunciar se há preferência, e ao autor, manter o padrão definido, ou seja, todos britânicos ou todos americanos.

Thank you for the comment, the spelling has been revised to British English.

1. Rever a redação

In order to clarify the meaning, we have changed the phrase as your suggestion on page 6:

“*The EP of each class is 60.8% of the PEC (EP = 0.608\*PEC), which corresponds to a 90% probability in the normal distribution*”

1. Verificar <https://mathworld.wolfram.com/Studentst-Distribution.html>

Thank you for the comment. The calculations and procedures for applying the student t-test and chi-square test were entered in section 2.

1. Espera-se que nesta seção o(s) autor(es) descrevam as etapas da metodologia proposta e os conjuntos de dados utilizados em seus desenvolvimento e teste.

Following your advice,we have inserted in section 2 the explanation of all statistical tests performed and on pages 9 and 10 of section session 3 we have added the following paragraphs:

*“QGIS uses a SQL-like language to implement conditions in scripts. The initial calculations and statistical analysis elements were derived from the entry features. For point features, the initial values are the X and Y coordinates. These were used to calculate the main parameters: count, mean and stdev (Standard Deviation) and sqrt (Square Root). Besides the mathematical operations, the buffer of each pair of features was obtained in the case of linear features. The intersections between their areas were sufficient for the statistical procedures. Figures 4, 5 and 6 detail the applications developed…”*

*“The example described in Figure 1 refers to applying the chi-square test for a sample of point features at a scale of 1:10,000. First, the result is calculated based on Equation 3, and the value found is compared with tabulated information of the referred test. Then, using conditionals "CASE", "WHEN", and "THEN", the PEC PCD classes were tested until all of them were accepted or rejected at the evaluated scale.*

*The methodological steps used in this work correspond to the statistical tests of Merchant (1982) and Galo & Camargo (1994) for the punctual features, as well as the application of the methodology proposed by the ET-CQDG (DSG 2015) to apply the PEC PCD. In addition, the double buffer method was applied to the linear features, as Santos (2015) and Santos et al. (2016) described. Both approaches were presented in section 2…”*

The datasets were presented and further detailed on page 10: “*Sets of point and linear feature samples from Salvador-BA were used, with 20 features for each. Reference data were extracted from reference vector files from the 2006 Cartographic and Cadastral System of the Municipality of Salvador (SICAD). The homologous features evaluated corresponded to data obtained from the OpenStreetMap (OSM) collaborative mapping platform from 2018. The choice of sample size was based on criteria adopted by Merchant (1982), where 20 features in a given area are sufficient to assess cartographic product quality…”*

1. De acordo com a ISO 19157 (e adotado nas ET-CQDG), a quantidade de pontos por amostragem dependem do tamanho dos lotes analisados. Logo uma região com 100 itens demandará uma amostra diferente de outra com 500.

In order to clarify to the reader the procedure adopted, the following complement has been inserted in the text quoted:

*“...It is worth mentioning that the ET-CQDG (DSG 2015) already establishes a series of advanced sampling criteria, which are based on ISO 19.157 (ISO 2013), where procedures are described as a function of the size of the area (lots). However, since this is not the focus of this work, the statistic considered by Merchant (1982) was adopted.”*

1. Indicar a fonte.

Thank you for the suggestion, the data source is IBGE (2022) and has been inserted in the map and text.

1. Sendo assim, os erros decorrentes da projeção podem afetar os resultados. Além disso or produtos com coordenadas geográficas não estão sendo avaliados, uma vez que a transformação de sistemas de coordenadas deformará o produto original.

Thank you for the comment, to clarify that this transformation was performed for point features and specific to the application of the PEC PCD (which is tabulated in meters), the text part has been changed as follows:

“...*software in metric coordinates. Since these are point features, this configuration allows us to obtain the discrepancies, calculate the DEs in meters, and apply the PEC PCD definitions*”

1. Não eram 20?

Thank you for the question. To answer the question the following paragraph has been added on page 12:

*“This threshold used for the sample size was established according to the premises of the mentioned statistical method. In samples where the number of elements is greater than 30, for instance, the z test (Normal Distribution) must be applied, which will be implemented in the future to complement the tools developed. Besides, it is vital to comment that the minimum number of 20 elements refers to the quantity established by Merchant (1982) for evaluating the positional accuracy of cartographic products. This value was established in the sample selection to validate the developed tools that could be higher or lower based on the user's needs. As discussed above, if the t Student test is chosen and the sample size exceeds 30, the statistical analysis will not be performed.”.*

1. Maior ou menor?

To answer the question the following text has been added on page 12:

*This value was established in the sample selection to validate the developed tools that could be higher or lower based on the user's needs. As discussed above, if the t Student test is chosen and the sample size exceeds 30, the statistical analysis will not be performed.”.*

1. Não deveria constar a fase de amostragem antes de calcular as distâncias euclidianas?

On page 12 the following sentence was inserted:

*“Also, before entering the data to perform the computations, an initial step that must be performed is the selection of feature samples…”*

1. O ideal é calcular a DM, testar com uma classe e, caso reprovado, testar com limite de padrão inferior, até que o resultado seja compatível com nova algum dos padrões.

Following his comment, in order for the reader to understand how the algorithm presents the results, the following text has been added on page 15:

“The user can then choose the scale with which to determine the PEC PCD, and when running the process, each class displays the result of the conditionals that are part of the algorithm. It is relevant to mention that the scales used here are the standard ones of the Brazilian systematic mapping, addressed in the ET-CQDG (DSG 2015) and ET-ADGV (DSG 2011).”

1. Em que consiste a análise: em verificar se a feição está contida no buffer da feição homóloga de referência?

In order to improve the understanding of the method applied, in section two, all methodological steps for applying the double buffer method were inserted, and Figure 1, which shows the delimitation of the polygons for obtaining the Average Discrepancy, was inserted.

In addition, the following paragraph was adjusted on page 16 for a better understanding of the methodological procedures.

*“After verifying if the buffer entered by the user conforms to any test scale, the next step is to check if there is any PEC PCD class (A, B, C or D) in which the sample is accepted. Otherwise, the message "Not applicable" is displayed. Then, the DM of each feature is calculated and tested. This step verifies if 90% of DM’'s are less or equal to each class' value in the PEC PCD. This analysis is performed simultaneously with the RMSE verification; it is also necessary to be less than or equal to the EP of the evaluated class. As previously presented, this metric is associated with the EP of the PEC PCD that corresponds to this percentage. If this condition is met, the class found will be shown. Otherwise, the message "Rejected" will be displayed”.*

1. Rever redação.

The wording has been changed and rewritten as follows:

*“From the methodology procedures applied, the tools developed show to be promising since the positional accuracy of punctual and linear features in QGIS can be obtained, selecting the desired statistical test or analysis and visualising the behaviour of discrepancies in a given region.”*

1. Não vejo necessidade de manter as duas frases.

It is right, the second sentence has been removed.

1. O que é classificado no PEC-PCD é o produto, levando em conta a estatística do conjunto de pontos. Consequentemente, é equivocado associar uma classificação para cada ponto. O exemplo mostra todos os pontos com o mesmo padrão, logo não é possível afirmar se foi analisado ponto a ponto ou se não foi escolhida a melhor forma de representar o resultado, repetindo-o em todas as linhas.

In order to address this issue, the following text has been inserted on page 17:

*“Although the results in Figure 8 presented rows of each sample feature, these are equivalent to the final global analysis performed from the combination of the whole set. Such an approach justifies that all values in each column, except for DE, present the same answer. In this context, the sample was rejected on 1:1,000, 1:2,000 and 1: 5,000. On scales 1:10,000 and 1:25,000, classes D and B were achieved, respectively, and from 1:50,000, class A was obtained.”*

1. Apesar da importância dessa avaliação, ela não está associada à acurácia posicional absoluta.

Rightly so, the column containing the result has been removed.

1. De acordo com as ET-CQDG, os métodos empregados são aderentes ao Decreto n° 89.817, de 20 de junho de 1984, base legal para o PEC. Portanto, esta deve ser a referência para os resultados até sua revogação formal.

Throughout the text modifications have been made to highlight that the legal basis of the PEC is Decree-Law 89.817, mainly in section 2.

1. Não está comentado no texto o motivo de exibir os resultados codificados na forma de quartis.

On page 21 the following clarification has been added to justify the quartiles.

*“In order to make the visualisation of results standardised and interoperable, the DEs and DMs were classified into quartiles. Quartiles 1 and 4 represent the smallest and largest discrepancy range, which gradually increases in the intermediate quartiles. This aspect makes it possible to identify regions with the same characteristics and allows obtaining new parameters for modelling the data based on the characteristics of a particular region. Furthermore, given the described issues, the quartiles were differentiated by the colour value, in which the lowest quartiles are lighter and get darker as they increase.”*

1. Neste caso, seria importante colocar no mapa da figura 8 as principais cidades, de modo a melhor caracterizar onde estão as periferias.

This part of the text was replaced by a sentence that addressed heterogeneity in the results in a more general way.

1. Há métricas próprias para calcular a distância entre conjuntos de pontos como a distância de Haussdorf, mas nenhuma norma formal prevê esse cálculo. Todas as medidas de acurácia posicional absoluta estão relacionadas a localizações, de modo que o mais razoável seria avaliar os vértices das feições.

Indeed, the suggestion has been inserted in the recommendations for future work on page 23 as follows:

*“Furthermore, in analysing the linear features, it is advisable to explore other metrics for evaluating the positional quality, mainly those aimed at vertex verification, such as the Hausdorff Distance method.”*

**Reviewer #E**

Initially, the authors thank all the sound recommendations for the article. The word and expression corrections suggested by the reviewer and the insertion of the acronyms' complete nomenclature were adjusted and are in red throughout the article. The other suggestions and answers are listed in the following paragraphs, and the corrections are highlighted in yellow.

1. I have a question. This evaluation was performed for point and linear features or using point and linear features? Maybe, it is clear during the text, but here in the abstract there is confused

The summary has been rewritten for clarity.

1. Revise the writing

We have carried out a complete revision to the language of the article, thank you for the insight.

1. How were the discrepancies obtained? Automatically or manually?

The summary has been rewritten for clarity.

1. What means corresponding scales? Make more clear. Didi you refer to magnitude of the discrepancies?

The summary has been rewritten for clarity.

1. You need to verify the English demanded by the journal. American or Britannic language ?

Thank you for the comment, the spelling has been revised to British English.

1. Keep the English term

Thank you for your suggestion. The keyword has been changed to Plugin for QGIS.

1. What does it mean ?

In order to clarify the meaning, we have changed the phrase as your suggestion on page 2:

“*Unfortunately, many cartographic products are delivered with an unclear quality due to non-adherence to standards and legislation and the immediate use perspective, thus opposing the reuse of geospatial data*”.

1. It is important cite references to support your ideas.

We have inserted (page 2) new bibliographic references that address the evaluation of the positional accuracy of geospatial data from comparing different cartographic products. The added references were:

* Silva Júnior, J. A. D., França, T. M. S. & Moraes, V. S. D. 2022. ‘Avaliação da acurácia planimétrica de imagens Google Earth numa zona urbana e rural o Estado de Pernambuco, Brasil.’ *Revista cartográfica*, vol. 105, pp. 117-133. <https://doi.org/10.35424/rcarto.i105.1386>.
* Pedreira, W. J. P., Oliveira, J. de A. & Santos, P. S. 2020. ‘Avaliação da Acurácia Altimétrica usando a tecnologia VANT’. Caminhos De Geografia, vol. 21, no. 73, pp. 209–222. <http://www.seer.ufu.br/index.php/caminhosdegeografia/article/view/48071>.
* Luz, C. C., Antunes, A. F. B. 2015. ‘Validação da tecnologia VANT na atualização de bases de dados cartográficos geológicos – Estudo de caso: Sistema cárstico do rio João Rodrigues’. *Revista Brasileira de Cartografia*, no 67/7.

1. Is there some legislation in Brazil that discuss the quality of cartographic products ? It is important give a overview about the legislation in this segment.

In the second paragraph (page 2), the following text was added: "*In Brazil, for example, the Brazilian standard for evaluating the positional accuracy of geospatial data is given by Decree-Law No. 89,817 of 1984 (BRASIL 1984). This standard was denominated Standard of Cartographic Accuracy (PEC). It was updated to the Standard of Cartographic Accuracy for Digital Cartographic Products (PEC-PCD) in one of the topics of the Technical Specification for the Acquisition of Vector Geospatial Data - ET-ADGV (DSG 2011), created by the Directorate of Geographic Service (DSG) in 2011. Furthermore, in 2015 the DSG developed the Technical Specification for Quality Control of Geospatial Data - ET-CQDG (DSG 2015), which establishes methodologies for the quality assessment of geospatial data based on the International Organization for Standardization (ISO) 19157 (ISO 2013). Further details regarding the PEC-PCD are presented in section 2.*"

1. It is important cite references to support your ideas.

Thanks for your suggestion. On page 5 the following text has been added:

“*It is possible to notice that the presented tools emphasise the discrepancies' calculation and statistical analysis of a specific sample. Unfortunately, complete GIS applications in this context are still scarce. It would be helpful in these solutions to enable the entry of layers and simultaneously display quality spatial behaviour maps and the attribute table classification values, according to the statistical analysis performed.*”

1. ???

Thanks for your suggestion. The word "reference" has been removed from this sentence.

1. What approach?

The beginning of the sentence has been changed to make the reference to Big Data clearer.

1. I suggest to include this paper. It is a very relevant paper in data assessment. Assessment of UAV-based digital surface model and the effects of quantity and distribution of ground control points <https://doi.org/10.1080/01431161.2020.1800122>

Thanks for your suggestion. We have added (page 4) more references on positional accuracy assessment to improve the theoretical background of the paper and included your proposal as indicated:

“*Within the scope of geospatial data services available on the web, there is the research by Silva Júnior, França, and Moraes (2022) that evaluated the planimetric positional accuracy of Google Earth images. In research by Pedreira, Oliveira, and Santos (2020) and Pessoa et al. (2020), for example, the altimetric positional accuracy of a Digital Elevation Model (DEM) generated from a UAV was evaluated respectively. The positional error of Digital Surface Models (DSM) obtained in the post-processing of data acquired with UAV concerning the number and distribution of control points on the ground...”*

1. Revise the writing

Since other suggestions were made in this same paragraph, it has been entirely rewritten.

1. What were the mythologies?

We have added (page 5) the following paragraph to make the description more explicit:

“*For the point features assessment, it implements the methods of Merchant (1982) and Galo & Camargo (1994), combined with the conditions established by the ET-CQDG (DSG 2015). For the linear features, it applied the double buffer method developed by Santos (2015). Section 2 details the application of the explained methods.*”.

1. It is important you highlight the main contributions. Besides, it is very relevant you mention how are the main differences comparing with previous works.

As proposed, we have inserted on pages 5 and 6 the existing applications and our main contribution:

*“Regarding developing applications in geospatial data quality, extensive research has focused on creating open-source tools to compare cartographic products. The objective is to evaluate the positional discrepancies and data behaviour through statistical tests and reported errors. Garcia-Balboa, Ureña-Câmera & Xavier (2021), for example, developed a web application, ICPos, in which it is possible to evaluate the positional accuracy based on the insertion of control points using different quality standards. As highlighted by the authors, in ICPos, it is possible to calculate and automatically create a complete report for the input data according to the user's specifications. Besides ICPos, researchers such as Zanetti et al. (2016), Soares et al. (2018) and Barbosa, Meirelles & Santos (2021) evaluated the positional accuracy of features from the GeoPEC software. GeoPEC, developed by researchers at the Federal University of Viçosa, Brazil, allows the evaluation of the positional accuracy of cartographic products based on the PEC PCD from the insertion of coordinates of point features. It also allows for statistical tests associated with sampling, normality and identification of data error trends.*

*Santos (2015) and Santos et al. (2016) developed models in the ArcGIS Model Builder tool to obtain discrepancies between linear features from different methods. Teixeira and Santos (2019) developed similar applications in QGIS and compared the magnitude of the discrepancies obtained. Foz et al. (2021) also implemented quality control processes in cartographic series updating from GIS and Computer Aided Design (CAD) data combination.*

*It is possible to notice that the presented tools emphasise the discrepancies' calculation and statistical analysis of a specific sample. Unfortunately, complete GIS applications in this context are still scarce. It would be helpful in these solutions to enable the entry of layers and simultaneously display quality spatial behaviour maps and the attribute table classification values, according to the statistical analysis performed. In this way, this work aimed at developing QGIS 3.X software tools to evaluate the positional accuracy of punctual and linear features. For the point features assessment, it implements the methods of Merchant (1982) and Galo & Camargo (1994), combined with the conditions established by the ET-CQDG (DSG 2015). For the linear features, it applied the double buffer method developed by Santos (2015).”*

1. In my point of view, this section does not belongs the introduction section. It is a new section. Suggestion: 2. Methods for the Assessment of Planimetric Positional Accuracy of Geospatial Data in Brazil

Thanks for the suggestion. The change was made based on your suggestion.

1. Discuss and describe more about the QGIS functions used to build the process

As asked, the main functions used in the tool development process have been inserted on pages 10 and 11.

“*This conditional sorting was performed using scripts. QGIS uses a SQL-like language to implement conditions in scripts. The initial calculations and statistical analysis elements were derived from the entry features. For point features, the initial values are the X and Y coordinates. These were used to calculate the main parameters: count, mean and stdev (Standard Deviation) and sqrt (Square Root). Besides the mathematical operations, the buffer of each pair of features was obtained in the case of linear features. The intersections between their areas were sufficient for the statistical procedures. Figures 5, 6 and 7 detail the applications developed.*”

“*The example described in Figure 2 refers to applying the chi-square test for a sample of point features at a scale of 1:10,000. First, the result is calculated based on Equation 3, and the value found is compared with tabulated information of the referred test. Then, using conditionals "CASE", "WHEN", and "THEN", the PEC PCD classes were tested until all of them were accepted or rejected at the evaluated scale.*

*The methodological steps used in this work correspond to the statistical tests of Merchant (1982) and Galo & Camargo (1994) for the punctual features, as well as the application of the methodology proposed by the ET-CQDG (DSG 2015) to apply the PEC PCD. In addition, the double buffer method was applied to the linear features, as Santos (2015) and Santos et al. (2016) described. Both approaches were presented in section 2.*”

1. Improve the image quality.

Thank you, the figure has been replaced by one of better quality.

1. In order to give more details to the reader, I suggest you include two images. One containing the spatial distribution of point features in study area, and another with linear features. Besides, I encourage you show some examples of point and linear features used.

Figure 9 showing the spatial distribution of point and linear features has been added.

1. What year are these data?

The data is from 2018 and this information has been inserted in the text.

1. Improve the image quality

Thank you, the figure has been replaced by one of better quality.

1. 30 or 20 ?

To answer the question the following paragraph has been added on page 12:

*“This threshold used for the sample size was established according to the premises of the mentioned statistical method. In samples where the number of elements is greater than 30, for instance, the z test (Normal Distribution) must be applied, which will be implemented in the future to complement the tools developed. Besides, it is vital to comment that the minimum number of 20 elements refers to the quantity established by Merchant (1982) for evaluating the positional accuracy of cartographic products. This value was established in the sample selection to validate the developed tools that could be higher or lower based on the user's needs. As discussed above, if the t Student test is chosen and the sample size exceeds 30, the statistical analysis will not be performed.”.*

1. Give more details about the Quartiles of DEs. Include a brief description in the text

On page 21, the following explanation has been added to justify using quartiles in the analysis.

*“In order to make the visualisation of results standardised and interoperable, the DEs and DMs were classified into quartiles. Quartiles 1 and 4 represent the smallest and largest discrepancy range, which gradually increases in the intermediate quartiles. This aspect makes it possible to identify regions with the same characteristics and allows obtaining new parameters for modelling the data based on the characteristics of a particular region. Furthermore, given the described issues, the quartiles were differentiated by the colour value, in which the lowest quartiles are lighter and get darker as they increase.”*

1. Explain the reason that several scales were tested

The following text has been added on page 15:

*It is relevant to mention that the scales used here are the standard ones of the Brazilian systematic mapping, addressed in the ET-CQDG (DSG 2015) and ET-ADGV (DSG 2011).*

1. Include the link

The following links have been added in the text, as requested by the reviewer: electronic: https://github.com/eliasnaim/Plugin\_PECPCD and https://github.com/eliasnaim/AcuraciaPosicional\_PEC-PCD.

1. Where the parameters are inserted ? (level of significance, buffer size, for example). Include a imagem illustrating the these parameters

In order to provide clarification on the issues raised in section two, all statistical procedures, significance levels, and parameters for applying positional accuracy tests have been inserted, and the following text has been added on page 19:

*“The input data for evaluating the point and linear features are the reference data from the SICAD database and the evaluated data from OSM. Vertices of pavements and curbs were the punctual features, and the linear features, in their entirety, were formed by road axes. With a significance level of 90% in the punctual features, the PEC PCD value for class A corresponded to 14m and EP of 8.5m. In classes B and C, these values were 7m and 4.25m and 2.8 and 1.7m. With the same significance level of 90% for the linear features, class A was reached at the scale of 1:25,000, corresponding to a PEC PCD of 14m (buffer size) and EP of 8.5m.*

*Such values are valuable because they guide the decision-making by managers and users for specific applications based on the quality of the available data. Moreover, they make it possible to determine how statistically accurate they are when evaluated together.”*

1. This result table is confused. For each point is referred a class. However, the classification should be attributed to the product. The output should be revised

To explain how to insert the results into the attributes table, the following text has been developed for page 17:

*“Although the results in Figure 8 presented rows of each sample feature, these are equivalent to the final global analysis performed from the combination of the whole set. Such an approach justifies that all values in each column, except for DE, present the same answer. In this context, the sample was rejected on 1:1,000, 1:2,000 and 1: 5,000. On scales 1:10,000 and 1:25,000, classes D and B were achieved, respectively, and from 1:50,000, class A was obtained.”*

1. Improve the image quality

Thank you, the figure has been replaced by one of better quality. .

1. Improve the quality image

Thank you, the figure has been replaced by one of better quality.

1. It not clear

In agreement, the text has been amended.

1. Where are these values?

We have inserted in the text the location of the quartile in which these results are presented. The text has been rewritten as follows:

*“…in Figure 8 since the values ranged from 0.56m (quartil 1) to 10.99m (quartil 4). l Na categoria em questão, 11 feições estavam no quartil 1, 3 no quartil 2, 4 no quartil 5 e 2 no quartil 4. Furthermore, não foram apresentadas tendências de erros na amostra de feições pontuais…”*

1. This discussion should be improved. There are so much information that were not introducted previous. I suggest to give more details about the figure 8, before show the figure. What do it mean the colors?

In fact, the "Results" section was expanded to "Results and Discussions" in which analyses of the results obtained and the aspects found were explained.

On page 19 the following paragraph was added

*“The input data for evaluating the point and linear features are the reference data from the SICAD database and the evaluated data from OSM. Vertices of pavements and curbs were the punctual features, and the linear features, in their entirety, were formed by road axes. With a significance level of 90% in the punctual features, the PEC PCD value for class A corresponded to 14m and EP of 8.5m. In classes B and C, these values were 7m and 4.25m and 2.8 and 1.7m. With the same significance level of 90% for the linear features, class A was reached at the scale of 1:25,000, corresponding to a PEC PCD of 14m (buffer size) and EP of 8.5m.*

*Such values are valuable because they guide the decision-making by managers and users for specific applications based on the quality of the available data. Moreover, they make it possible to determine how statistically accurate they are when evaluated together.”*

On page 20 the following paragraph was added:

*“In order to make the visualisation of results standardised and interoperable, the DEs and DMs were classified into quartiles. Quartiles 1 and 4 represent the smallest and largest discrepancy range, which gradually increases in the intermediate quartiles. This aspect makes it possible to identify regions with the same characteristics and allows obtaining new parameters for modelling the data based on the characteristics of a particular region. Furthermore, given the described issues, the quartiles were differentiated by the colour value, in which the lowest quartiles are lighter and get darker as they increase.”*

On pages 21 and 22 a number of paragraphs have been added to the existing ones to improve the analysis, and a graph has been inserted (Figure 10) showing the magnitude of the discrepancies.