Please find below our response and modifications that we have revised in the manuscript following the comments and suggestions.

Editor #1

Comment #1-1. As the Reviewer #1 suggests, the current paper does not fully demonstrate the relationships among the UAS-derived geological interpretation of the fault, independent InSAR LoS interpretation, and the inferred deformation model of the fault. I am not aware of the "classical geological way", but the mixture of methods/results/interpretations for each topic in the current manuscript seems to make it difficult for readers to figure out what is the new point of this study. To avoid this, I would recommend to restructure the entire manuscript (as I originally suggested), or at least, make clear steps in each section of different methods.

Response #1-1: Contrasting to what is said, the plan of our paper is as follow: We first began by (1) locate the Hengchun area active faults by doing photo-interpretation of the high resolution UAS DTM composed of alluvial and muddy lithlogies and where no faults are clearly outcropping. Then we focus on (2) the characterization of active faults from the morphostructural analyses checked in the fields, then (3) to quantify the interseismic displacement of those active faults using both leveling, GPS and PSInSAR dataset. We finally insist on the implication of those interseismic active tectonic displacements towards the Taiwan sensitive infrastructures. We believe that our plan is clear, logic and pedagogic.

Comment #1-2. Moreover, as listed below, there are too many issues that have not been correctly addressed in the authors' revision. It is necessary to clarify all the issues.

Response #1-2. Originally submitted the january 31st 2017, the modification asked by reviewers had been taken into consideration and had been modified through the imposed four major revisions...

Comment #1-3. "we confirm herein our interest to work in the NHESS paper on the whole onshore Hengchun Fault area that is covered by the UAV survey. For instance, the leveling lines 2 (Fig 9) confirm the LOS INSAR displacement of the Hengchun Fault in the southern part.

>> This is not true, as the area of interest of InSAR shown in Fig. 1 is apparently different from the area of leveling survey shown in Fig. 9. Eastern half of both of the leveling survey lines are out of the range, but still values of LoS are given along the line (Fig. 9b, c).

Response #1-3: We follow your suggestions and modified the figures in order to get the same studied area for all the paper. Consequently this comment seems out of scope with this new version.

Comment of the Response #1-3: Fig. 10 covers wider area than the areas of interest shown in Figs. 1, 2, 7, and 9. The eastern half in Fig. 10 could therefore be eliminated.

Response of the new comment #1-3:

- The reason that we have adopted the leveling technique is that it shows good resolution of the vertical component. To verify the InSAR data, we need to have a level reference survey. It is therefore suggested not to eliminate the data and figure of eastern Hengchun Peninsula, as the easternmost and westernmost reference points are on an enclosed curve line of the Class 1 level reference net defined by the country's Satellite Survey Center of Department of Land Administration. For detailed information, please refer to the following website: http://gps.moi.gov.tw/SSCenter/Introduce_E/IntroducePage_E.aspx?Page=Height_E6

- In addition, Fig. 10 gives the two leveling lines existing across the Hengchun Peninsula. It is important to publish the entire section as it reveals the place where are located the active faults in the Hengchun Peninsula associated with vertical components. especially for the Kenting Fault situated East of the Hengchun Fault. That is why we do insist to publish the Fig10 in its original geometry. Anyway, we redraw fig.10 in a better definition and we precise the location of both Hengchun and Kenting Faults.

Comment #1-4 P2 L10: Clarify or remove "by previous authors". Also, use "e.g.," instead of "; among others" and When "e.g.," is used, "etc." is unnecessary.

Response #1-4: Done

Comment #1-5. P2 L11: Avoid using "…" (also for the other portions in the manuscript)

Done >> Not corrected. It remains in many places throughout the manuscript.

Response #1-5: Corrected.

Comment #1-6 P2 L20: Explain "PS-InSAR" here. Particularly, the definition of "PS" is missing throughout the manuscript (c.f. P5 L21, 22).

Done

>> Still missing is the explanation of InSAR (at least, it should be spelled out).

Response #1-6: Now, it is spelled.

Comment #1-7 P4 L5: "work in progress" This wording often appears in this manuscript, but it may not be suitable to regard it as something like a citation. Better to be removed and clarified as a future issue.
We removed the (only) two "work in progress" written in this paper >> >> Not corrected. There still remains this wording in the manuscript.
Response #1-7: We had removed all 'work in progress' in the Manuscript. Moreover, we remove anything which could give working perspectives in this area.

Comment #1-8 P6 L1: The methodological description of "GPS measurement" is missing.
We precise the GPS data used to validate our PS-InSAR results.
>> The details of the "GPS measurement" is still unclear. The authors seemed to use data from static GNSS stations for revealing displacements, as well as kinematic GNSS measurements for GCPs, but these details are not properly provided (some missing and some unclear). Also, detailed description of airborne LiDAR is missing. As noted above, clear descriptions of the methodologies, as well as their results and interpretations, are necessary to be provided separately.
Response #1-8: A paragraph had been added with a new figure (Fig.3), As this paper is not focus on GPS paper, we did not emphasize too much on it, the reference Yu S.B., et al. 1997 is here to fulfill further queries.

Comment of the Response #n1-8: Response #1-8: Even if the focus of this paper is not on GPS (I would recommend this to rephrase as GNSS, a more generic term, if some other satellite data are used such as GLONASS) itself, the only one reference is insufficient to correctly represent the methodology. Not necessarily to be too detailed, but the authors can provide some more details for an objective validation.

Response of the new comment #n1-8: Contrasting to the reviewer 1, as we used the Yu S.B. et. al., 1997 results deduced from its dataset and methodology, so (1) we confirm that GPS is herein the right term; (2) we invite NHESS readers to look at Yu et al. 1997 Tectonophysics paper and the work of his team to get further GPS informations on the used methodology. Anyway we insert in the txt some of the Yu S.B. methodology.

Comment #1-9 Figure 1 caption: "Figure 1a:" --> "(a)", also for b and c.
Done >> Not done.
Response #1-9: We redraw the Fig 1 and with a, b, c…

Comment #1-10 Figure 1 Area of Interest: ... Moreover, the whole leveling line 2 and the eastern half of line 1 are apparently out of the extent of Figure 8, and it is unclear how the PS values were obtained for these areas. These inconsistencies should be clarified.

Response #1-10: We modified the study area in order to have the same for all figures. All the datasets had been processed in the same time.

Comment #1-11 Our study area correspond to the onshore Hengchun Fault surroundings partly covered by the UAS survey acquired and shown in Fig. 1 and 2. Some figures present a smaller extension due to potential political conflicts with sensitive Taiwan infrastructures (Nuclear Power Plant N°3). >> This is not the point, as noted above at (1)

Response #1-11: We fully disagree with the answer given herin "this is not the point" as It was due to political reasons some of our co-authors did not want to publish those results highly sensitive. Anyway, due to the modifications of the extension of the figures this comment is now out of scope as fig.3a and 10 cover effectively the southern Hengchun Peninsula leveling part as well as the Hengchun/Kenting Faults surroundings.

Comment #1-12 Figure 4: Put (a)-(c) in the panels. Better to show the photo location and direction in Figure 2.

Done >> Not corrected. Also, Figure 2 shows the photo location but the direction is unclear.

Response #1-12: The Fig.6 (photograph in the fields) was out of the perimeter of former Fig.1 that is why we added in the previous version submitted in july 2017 the GPS coordonates. As the readers may want to see the exact location of Fig.6, we enlarge to the north the Fig1 in order to locate the outcropping fault (red dot) and the Fang-Shan Village.

Comment #1-13 Figure 5: … Also, “Fang-Shan village” is not shown in Figure 1.

GPS data was and is still given in the legend. >> >> It is never seen anywhere else in the manuscript.

Response #1-13: Fang-Shan village is added on Fig.1 in this new version.

Comment of the Response #n1-12, 13: Response #1-12,13: Fang-Shang (Figure 6 caption) or Feng-Shang (Figure 1 caption)?

Response of the new comment #n1-12, 13: We used herein on this version only "Fang-Shan" city.

Comment #1-14 Figure 6: It would be better to show the rectangular extents of the example areas of Figure 3 (same as in Figure 1). Red (2) and pink (8) lines are hard to differentiate.
This important figure 6 is difficult to read and we would like to avoid to add too many things on it not directly linked to the thematic... that is why we have chosen to draw the quadrangle on Fig. 2. >> Still I cannot clearly identify the pink (8) lines.
Response #1-14: We removed Pink 8 lines in the legend as they were difficult to see on the W coast... see original figure of first submission 31st january 2017.

Comment #1-15 I understand putting less information is better, but still do not understand the correspondence between the coverage by the UAS-derived data and that by the "morphostructural map". Does the western margin of "9: Hengchun valley alluvial and marine deposits" overlaps with the area? If not, how was it mapped?
Response #1-15: the western part of the index 9 has been mapped from the concave shape of the 5m DTM which is situated in transparency in the background of this figure 9. This drawing is basic and common sense from geological mapping: mapping the external limit of flat soft lowlands that correspond to alluvial and marine deposits in such environments. Few of the region outside of the UAS mission area, the existed low resolution DTM was inferred, e.g. from the 5m DTM.

Comment #1-16 Figure 8: If the current A and B show the same displacements, the left one can be omitted. The schematic model of LOS (graphic description including satellite) should be placed in a separate panel, and the flight direction and LOS could be placed in the map panel (like Figure 1).
Ok we remove the Fig 8A, we redraw that figure >> Panel A was removed but the other points were not addressed.
Response #1-16: We separate the different drawings with specific independent quadrangle. Thanks to confirm it has been done in this new version.
Comment of the Response #n1-16: Please provide the satellite orbit path and the line of sight directions projected on the map.
Response of the new comment #n1-16: One may note that the original submission version (january 31st 2017) had already both ascending satellite orbit path with the right lateral LOS directions projected on the Hengchun Peninsula (see top right quadrant). Anyway we added values in the manuscript.

Anonymous Referee #3

Referee #3-1. The main two resulting products are newly interpreted Hengchun Fault in Fig. 6 and the offset of mean LoS velocities between eastern and western part from the Fault. And the authors make an assertion of the active inter-seismic tectonic deformation model of the Fault.

Response #3-1: The purpose of this NHESS submitted paper is to locate, characterize and quantify for the first time the active Hengchun Fault in Southern Taiwan by combining GPS, levelings, PSInSAR and by a detailed photo-interpretation of the high resolution and high precision UAS-DTM and orthophoto of the Hengchun fault area through a precise Morphoneotectonic map of the Hengchun Fault. Contrasting to what was known and published before (see the references), we reveal and quantify herein for the first time the active displacement that affect the Taiwan Nuclear Power plant N°3 and its surroundings.

Referee #3-2. However, the newly interpreted Fault plays a minor role in the proposed tectonic deformation model. Even if detailed distribution of the Fault is revealed using UAS products, the authors do not explain how the distribution effectively works in order to propose the tectonic deformation model nor mention how the distribution differentiates the new model from the previous models. Relation between the detailed interpretation of the Fault and the proposed model is vague**.**

Response #3-2: To this point, the authors listed 3 points as follows:

1. The aim of this paper is not a structural and tectonic analysis in, and only in, the fields of the Hengchun fault as it is not possible to figure out the full frame of the study area from outcropping. Classical microtectonic studies are not possible to carry on in the muddy Kenting Melange and along the alluvial deposits of the Hengchun fault. That is why we develop in this NHESS paper a new approach based on a combination of morphotectonic approaches that associate to various complementary qualitative and quantitative observations.
2. This paper focus on the new inputs of UAS and its derivative products (DTM and orthomosaic) and their structural and tectonic interpretations (morphoneotectonic map) combined to GPS, PSInSAR interferometry and leveling to better understand the active Hengchun Fault in Southern Taiwan. One may note that this paper was not associate with an EGU tectonic session ! If the paper was dedicated to a tectonic session it would have been written differently with different dataset...
3. On the other hand, the global and continuous uplifting through time and subsiding on both sides of the Hengchun fault deformation of Fig. 10a, b, c and Fig.11 and 12 reveal the progressive folding and the coherence of the proposed tectonic model in this NHESS issue.
4. Contrasting to what is said in #3.2 we newly locate, characterize and quantify the

2008-2011 interseismic activity of the Hengchun fault. In addition, we propose a coherent and common sense model that fits with our dataset and previous works.

Referee #3-3. The authors made a crucial mistake that LoS change stands only for vertical component of deformation, i.e., uplift and depression. LoS changes include not only vertical component but also horizontal component of the deformation, however, the authors do not explain enough why vertical component should be paid attention and why horizontal component is not considered.

Response #3-3: Indeed, the InSAR result reveals only the 1D LoS deformation. In order to confirm the displacement revealed by PS-InSAR in the Southern Hengchun Peninsula, we integrated other geodetic techniques including: fixed GPS stations, levelings, InSAR and UAS data, so as able to decipher the activity deformation of the Hengchun fault and nearby area. The PSInSAR results are compared to 3 fixed absolute GPS data (Fig.9, HENC, GS57 and GS59) and two E-W leveling profiles (Fig.10a, b, c) that compare LOS and vertical displacements. Our result is fully coherent and evidenced clearly a simple deformation of the Hengchun Peninsula (see new Fig. 7, 10a, b, c, 11, 12, and our active tectonic model - Fig.14). The GPS and the two leveling profiles of Fig.10a, b, c, and 11 reveal the vertical component of the active inter-seismic Hengchun fault displacement and its surroundings during the same InSAR monitoring time period. Please read carefully the manuscript. Thus, there is no "CRUCIAL MISTAKE", we are fully able to differentiate the planimetric and vertical absolute component through GPS fixed stations, leveling and combined to the LOS PSInSAR data displacement.

Referee #3-4 Fig. 4 infers left lateral movement and Fig. 5 infers EW compression, however, the reviewer could not catch the relation between the newly interpreted Fault and such the field observations. Furthermore, the authors did not mention how the horizontal component of the deformation is interpreted from the LoS change velocity to propose the new model.

Response #3-4: Transpressive motion is the structural/tectonic term where both thrusting and lateral strike-slip motion prevail on the same tectonic fault. It is a basic structural and tectonic notion associated to partitioning of the deformation used in this paper to explain the displacement of the Hengchun Fault which is both transpressive and left-lateral.
Contrasting to what is said The Chelungpu fault that was reactivated during the Chichi earthquake present both this left-lateral transpressive displacements (see the

references on chichi earthquakes). Effectively the motion of the Hengchun Fault of Fig.5, 9, 14 is deduced from the GPS fixed station represented in Fig.1. It is common sense and we cited the paper of Chang et al (2003). In our NHESS paper, the authors illustrated and documented carefully Fig.6: the lateral component in between the hanging wall and the footwall wall of the outcropping fault confirming both a compressive motion and a lateral motion (see Fig.6) that we propose in the regional geodynamic model of Fig.14. And confirmed by all field geodetic measurements (GPS, Levelings, PSInSAR and Field Work).

Contrasting to what is said by **reviewer #3-4**: the Fig. 4 shows on Hengchun Fault both compressive illustrated by the first line of the figure (see a, b,c,d), and left-lateral motions (see 2nd line of the figure: e,f,g,h). Fig. 4 and Fig. 5 are coherent and common sense toward GPS datasets (Chang et al. 2003, and this work).

Referee #3-5. Therefore, the reviewer thinks that it is difficult for the reviewer to judge the acceptance.

Response #3-5: To summarize, in this NHESS paper our PSInSAR results are compared to GPS absolute deformations (Fig.1, 10a,b,c and 11), and two field levelings (Fig. 10a,b,c and 11) that give with no doubt the vertical component of the deformation of the Hengchun fault and of the whole southern peninsula. All is coherent and reveal the simple tectonic model of Fig.14. Of course the deformation deduced from the PSInSAR is only 1D and along the Line of Sight (LoS). That is the reason why in this study, we integrated many other aspects including: GPS, leveling, InSAR and UAS data, so as to be able to decipher the active deformation of the Hengchun Fault and nearby area.

New comments:

The reviewer judged that this manuscript is potentially acceptable, but please consider next addition and comments.

Referee #n3-6. (Preferable addition): Fig. 10b and 10c: line 2 of the caption says “projected on LOS”. Please explain in the text how to project three dimensional GPS-measured velocity (dx, dy, dz) into one dimensional LoS velocity (Hanssen 2001), showing equations and values of (dx, dy, dz).

Response #n3-6: In order to precise our methdology, we added the following sentence: "For each of the 3 fixed GPS stations (HENC, GS57, GS59), it has been calculated an average displacement projected into the radar LOS by taking into consideration the various local incidence angle along the distance axis (Hanssen, 2001)." the reference had been added in the bibliography.

Referee #n3-7. About Figures 11 and 12. The reviewer understood mapping expression of LoS change in Figures 9 and 10; however, the reviewer could not understand how LoS change is able to be projected on vertical (Figure 11) and horizontal (Figure 12). Three-dimensional data are projectable into one-dimensional data, but one-dimensional data such as LoS change does not reveal only vertical and horizontal components of displacement. This paper deals only ascending orbit of PALSAR data, in this case, one-dimensional (elongate or shorten) change is revealed. If the authors calculate not only ascending but descending PALSAR data, they will be able to know the site has uplifting or EW motion (Fujiwara et al. 2000). However, the authors describe "if we generalize, … uplifting toward the LoS" (p.8, L.11) and "uplift" and "subsidence" (p.8, L.16) using Figure 11. Furthermore, the authors describes variations of velocity offset along strike of the fault (p.7, L.26). The reviewer could not understand why such the generalization and assumption is appropriate. Even if photo interpretation support this phenomena, LoS change has information deficiency to support it. The reviewer feels that both photo-interpretation and LoS change is unfairly related and discussed. The reviewer could understand that this paper is not expected to show fault model, but as far as three-dimensional deformation is related to the fault and anticline motion shown in Figure 14, the reviewer thinks that strict evaluation about LoS change is needed. The reviewer guesses that the authors do not have redundant force to calculate descending PALSAR data, or descending PALSAR data may not cover your interesting area. Therefore, how about delete Figures 11 and 12 and re-consider description of assumption and generalization about LoS change in LL.21-28 of p.7, LL.11-19 of p.8, and conclusion?

Response #n3-7: We have divided the above section into 7 separate questions (a to g), and responded these questions accordingly.

a) About Figures 11 and 12. The reviewer understood mapping expression of LoS change in Figures 9 and 10; however, the reviewer could not understand how LoS change is able to be projected on vertical (Figure 11) and horizontal (Figure 12).

Response #n3-7a: We did not project the 1D PS-InSAR LOS into vertical and horizontal... Since the first submission all our PS-InSAR result is within LOS. Just we used Levelings that give the vertical component + the result of 3 fixed GPS stations situated on both sides of the Hengchun fault which gives by analogy the same profile geometry (see Fig. 10, and 11). That is why those 2 figures are of key interest and cannot be removed.

b) Three-dimensional data are projectable into one-dimensional data, but one-dimensional data such as LoS change does not reveal only vertical and horizontal components of displacement....

Response #n3-7b: This is true if you have only PS-InSAR dataset which is not the case herein (South Hengchun Peninsula) as we also have got levelings and GPS fixed stations that give us all the component of the deformation during the monitoring time period.

c) This paper deals only ascending orbit of PALSAR data, in this case, one-dimensional (elongate or shorten) change is revealed. If the authors calculate not only ascending but descending PALSAR data, they will be able to know the site has uplifting or EW motion (Fujiwara et al. 2000). However, the authors describe "if we generalize, … uplifting toward the LoS" (p.8, L.11) and "uplift" and "subsidence" (p.8, L.16) using Figure 11. Furthermore, the authors describes variations of velocity offset along strike of the fault (p.7, L.26). The reviewer could not understand why such the generalization and assumption is appropriate.

Response #n3-7c: As mentionned herein and unfortunately, we do not have the ALOS descending orbit on the Hengchun Peninsula, so we cannot use it to better constrain the radar displacements. But we note that the resulting displacement of the 3 fixed GPS stations situated on both sides of the Hengchun Fault projected in the local radar LOS, and the two vertical Levelings (L1 and L2) acquired in the same time period are coherent with the LOS PS-InSAR displacements. We consequently conclude that the general horizontal displacement is not that important and the LOS displacement is close to the vertical one.

d) Even if photo interpretation support this phenomena, LoS change has information deficiency to support it...

Response #n3-7d: Effectively the PS-InSAR LOS itself and alone is not able to support it but we have other geodetic information that we have taken into account in our interpretation...

e) The reviewer feels that both photo-interpretation and LoS change is unfairly related and discussed....

Response #n3-7e: We publish the new morpho-structural interpretation of the Hengchun Peninsula (which was not done before) with the help of this UAS High resolution survey. Consequently, we propose characterization and quantification for the Hengchun Fault with a simple model that fits with the available dataset. So we disagree with this remark of the reviewer but we agree that more work needs to be done to clarify the displacements of the Kenting Fault and the eastern part of the Hengchun Peninsula. We wanted to write it in the Ms but each time it was asked to remove it...

f) The reviewer could understand that this paper is not expected to show fault model, but as far as three-dimensional deformation is related to the fault and anticline motion shown in Figure 14, the reviewer thinks that strict evaluation about LoS change is needed. The reviewer guesses that the authors do not have redundant force to calculate descending PALSAR data, or descending PALSAR data may not cover your interesting area....

Response #n3-7f: Yes you are right, it is the case.

g) Therefore, how about delete Figures 11 and 12 and re-consider description of assumption and generalization about LoS change in LL.21-28 of p.7, LL.11-19 of p.8, and conclusion?

Response #n3-7g: Of course not. We will not delete those figures that are one key of this paper for the reasons explained above: we have got not only PS-InSAR data but also levelings and GPS dataset that help to constrain the PS-InSAR dataset and help us by comparison with the field structures to explain the deformation of the Hengchun Peninsula.

Referee #n3-8. Here, the reviewer does not intend to cast issue in question, but in Figure 8, the authors use PALSAR pair data, whose Bperp is more than 1,500m. In the reviewer's experience, Bperp more than 1,500m gives low coherent result and be barely acceptable. Perhaps the authors consciously eliminate LoS change data derived from Bperp > 1,500m or STaMPS software automatically discard such low-coherent LoS change data, but in the authors' future work, please pay attention to use PALSAR data pairs that have too long Bperp.

Response #n3-8: Of course, if you process DInSAR radar images with a Bperp > 1km are barely to used, but the interest of PS-InSAR processing (Stamps) allows one to extend a bit the values of perpendicular baselines to a max of 2.5km- see Hooper A., 2009).

Anonymous Referee #4

Referee #4-1. Somewhere in discussion could you emphasize the improvement of using the UAS derived DTM than the 40m DEM? I cannot easily see what can only be resolved with using the new DTM.

Response #4-1: We add the Fig.3 and a paragraph on it, explaining the differences.

Referee #4-2. Page 2, Line 10: I am not sure whether using exclamation point is the best choice of punctuation in this sentence.
Response #4-2: We remove it.

Referee #4-3. Page 2, Line 13: Indicate the power plant in Fig. 1.
Response #4-3: We add it, See orange circle (3)

Referee #4-4 Page 2, Line 21: Write down the full name of InSAR when first mentioned it.
Response #4-4: we add: Persistent Scatterers-Interferometry Synthetic Aperture Radar (PS-InSAR hereafter)

Referee #4-5. Page 3, Line 8: Delete "…".
Response #4-5: We removed in the text of 3 places where "…" remained

Referee #4-6. Page 3, Line 9: "Eighteen" instead of "18" in the beginning of a sentence.
Response #4-6: now it is: Eighteen (18) ground control points

Referee #4-7. Page 5, Line 12: "in" Figure 6
Response #4-7: Done, and now is in Fig. 7.

Referee #4-8. Page 5, Line 21: Need a full citation of Chen's report.
Response #4-8: We cited it and add it in the reference.

Referee #4-9. Section 4: Where is the reference point for the PS analysis? Please indicate the location in Fig. 8.
Response #4-9: Reference points for the PS analysis are white star (4) in Fig 9, it is (and it was) indicated.

Referee #4-10. Page 6, Line 1: might be submitted to → might be subject to.
Response #4-10: Done

Referee #4-11. Page 6, Line 16: Dealing with the Kenting → "Regarding the Kenting" or "With regard to Kenting".
Response #4-11: Regarding the Kenting Fault…

Referee #4-12. Page 6, Line 25-26: Do you mean that the GPS LOS velocity is converted from leveling measurements and GPS horizontal measurements?.

Response #4-12: No, GPS measurements are deduced directly from fixed stations existing in Taiwan. Levelings is a completely independant work and dataset had been processed by Lin Kuan-Chan and Hu Jyr-Ching (co-authors of this NHESS paper).

Referee #4-13. Page 6, Lines 14 and 17: Please avoid using "…".

Response #4-13: Done

Referee #4-14. Page 7, Lines 26: How is the creeping value estimated? If you refer to the difference of surface velocity between the west and east of the Hengchun fault (in stead of creeping along the fault), I will suggest saying "difference in interseismic velocity between west and east of the Hengchun fault with a value of 8 mm/yr". Based on the figure it looks like 8 mm/yr instead of 0.8 mm/yr..

Response #4-14: We agree, we modify it as the reviewer proposed. Yes we put all values of velocities in mm/yr (avoiding cm/yr). We change all velocity units in mm/yr. BUT DTM Resolution and precision are still in cm...

Referee #4-15. Page 8, Lines 6-8: I know this is a schematic model figure, but could you infer the dip angle along strike of the Hengchun fault? Is it a high or low angle fault?.

Response #4-15: Please refer to the cross-section in Fig.1c, and the Hengchun is vertical due to the rectilinearity mapping, Kenting Fault is low dipping fault so as to demonstrates its sinuosity. It was (and is still) also explained in the text, page 8 Line 22. We add Hef... "an almost vertical" fault.

Referee #4-16. Page 8, Line 12: present both left-lateral strike-slip and thrust dip-slip components such as ....

Response #4-16: Done.

Referee #4-17. Page 8, Line 13: Could you provide more examples of faults with this oblique component property?

Response #4-17: We modified as: Chelungpu Fault, etc. (Deffontaines et al. 1997)

Referee #4-18. Page 8, Line 14: Please avoid using both "cm" and "mm" in the same paper.

Response #4-18: Done. We change all velocity units in mm/yr. BUT UAS DTM

Resolution and precision are still in cm.

Referee #4-19. Page 8, Line 116-18: I think this comparison is a bit unfair, as the InSAR derived velocity is in LOS, whereas vertical from marine terrace dating results. If the authors know the fault dip angle they should try fault inversions using different datasets, and then compare the inferred slip in geologic and geodetic time scales. Also I suggest saying "geodetic slip rates" instead of "instantaneous slip rates

Response #4-19: As levelings give us the vertical component of the deformation, the GPS fixed station give us the absolute deformation, thus it is possible to compare the marine terrace dating results. And consequently it is possible to make this comparision.

Yes it is possible to inverse the deformation dataset as we know the Fault dips. However, it is not the aim and the scope of this UAS/NHESS paper. By the way, we are doing this tectonic work independently on a global study of the whole Hengchun peninsula, and planning to submit the study in a Structural/Tectonics journal.

"geodetic slip rates" modification done.

Referee #4-20. Page 9, Line 14: PS km-2.

Response #4-20: Done.

Referee #4-21. Page 9, Line 16: the highly dipping Hengchun Fault → the Hengchun Fault with high dip angle.

Response #4-21: "the Hengchun Fault with high dip angle" Done.

Referee #4-22. Page 9, Line 16: Choose either "interseismic" or "inter-seismic" throughout the manuscript.

Response #4-22: Done, "interseismic" is used in this manuscript.

Referee #4-23. Page 9, Line 23: due to (1) xxx, (2) xxx..

Response #4-23: Done.

Referee #4-24. Page 9, Line 23: to the low fault dip angle deduced from ….

Response #4-24: Done.

Referee #4-25. Page 9, Line 27: Suggest using "Nevertheless" than "Anyway".

Response #4-25: Done. "Anyway" replace by "Nevertheless".

Referee #4-26. Figure 3, Line 9: I cannot find NPP and MV in the figure.

Response #4-26: We indicate NPP on Fig.1, but removed MV.

Referee #4-27. Figure 8, Looks like the PS points in the southernmost part are not plotted, as they are shown in Fig. 9 in comparison with leveling measurements.
Response #4-27: We modified and redraw Nearly all figures in order to have the same studied area... Please see Figs. 1, 2, 3, 4, 5, 9, 10, 12, 14.

Referee #4-28. Figure 9: How the InSAR error bars were estimated?
Response #4-28: 90% of confidence.

Referee #4-29. Figure 10, Is the label (2) needed in this figure?
Response #4-29: Effectively It has been removed.

Referee #4-30. Figure 11, Is this figure showing offset between the hanging wall and the footwall? Where is the GPS measurement (HENC?) relative to?
Response #4-30: Yes. The GPS measurements (HENC) is relative to a Penghu-Taipei Line (see Yu S.B. et al., 1997). However, we do not develop too much this aspect as it is not the topic of this paper.

New comments:
Referee #n4-31. The quality of the revised manuscript has been improved, but I think the authors should consider rewriting their discussion and conclusions. Conclusions should be more or less a summary of their work without "new" statements or discussion, but I find a large portion in their conclusion section is in fact discussion.
Response #n4-31: We modified the end of our ms by adding only one paragraph on "discussion and conclusions

Referee #n4-32. In section 4, I think the authors need to add more details about their PSInSAR processing. It is not clear to me how the super master is determined. How they set up the coherence threshold, what kind/resolution of DEM they used (SRTM DEM?), how they determine the reference point (a single point or average of multiple points close to the station GS59?)

Response #n4-32: We have divided the above section into 4 separate questions (a to d), and responded these questions accordingly.

a) think the authors need to add more details about their PSInSAR processing. It is not clear to me how the super master is determined.

Response #n4-32a: The super master is determined by the mid-time serie as it was said in the text.

b) How they set up the coherence threshold

Response #n4-32b: Stamps specific processing.

c) What kind/resolution of DEM they used (SRTM DEM?)

Response #n4-32c: No, we used a local 40m ground resolution DTM.

d) How they determine the reference point (a single point or average of multiple points close to the station GS59?)

Response #n4-32d: Only one point but characterized by a continuous no to small displacement during the monitoring time period. etc.

All Response #n4-32: We did not intend to highlight too much on that technical points because of the points are well documented in Champenois PhD Thesis (2011A), and it is not the scope of this NHESS special UAS issue. We added references in the text to fill in that point.

Referee #n4-33. One other concern I have is that there is no clear connection between their new DTM and the results from PSInSAR. To me, they are two separate studies in a paper. Additionally, it is not clear to me what can only be resolved with the new 0.13m DTM if not already done with the 3m DEM. It seems to me the geologic interpretation in Figs 4 and 14 can already be drawn with the 3m DEM.

Response #n4-33: Effectively we did not use the HR DTM to make the PS-InSAR processing as it does not cover the same area. Since last january we are enlarging the acquisition area but it takes time. Of course as we have the whole Kenting Fault area and W and E Hengchun Peninsula, we will update the processing with the corresponding radar images and geodetic data...

Fig. 3 should answer this question as Fig.3 shows clearly the great technical differences in the resolution and the precision of the different DTM's. Fig.4 show definitely the input of a High resolution DTM even toward a 5m /3m or even to a 1m ground resolution DTM.

Referee #n4-34. This manuscript can be more interesting if the authors can demonstrate improvement of the understanding of the Hengchun and Kenting fault system by using both their high resolution DTM and PSInSAR. Something like identifying creeping/locked portion of the fault, surface evidence of the fault scarp from high resolution DTM, or inferred fault locking depth from using both DTM and PSInSAR will significantly make the study more interesting. I think it is also relevant to the scope of this journal.

Response #n4-34: Thanks for this remark as it is the aim and the scope of our paper. We locate through morphostructural interpretation the location of the active faults. Then we characterize them using geodetic and PS-InSAR datasets and we follow alongstrike the Hengchun Fault and evidence places where there is slow and active creeping areas. There is still work to be done for the Kenting Fault more complex to decipher.

Referee #n4-35. Page 6, lines 17-18: This sentence doesn't read well.

Response #n4-35: We modified "... The PS-InSAR base (black and white star) is chosen with the more stable place in the figure (very few displacements - see close to Haikou - north of the Hengchun Valley) within the monitoring time period."... as follow :

The PS-InSAR base (fixed GPS station: GS59, correspond to the black and white star see its location close to Checheng - N of the Hengchun valley, on Fig.1 and 9) is chosen as it presents a stable to very low continuous deformation during the monitoring time period...

Referee #n4-36. Page 10, lines 5-6: It could be due to folding or the shallow part of the fault is locked, right?

Response #n4-36: Not as clear... In the northern part the Hengchun Fault is narrow and clearly outcrops beolw the marine terraces with a measurable offset (see Fig. 4d). That contrast with the central and southern part where the Hengchun Fault is wider and submitted to active folding and only locally the fault is partially locked.

Referee #n4-37. Figure 9: Please increase the size of the PS points and/or adjust color scale. It is hard to see the PS points.

Response #n4-37: It is the maximum we can do to adjust the color for the PS points. There is no transparency. We tried to enlarge those but then they superimposed a lot and the result is confusing. In addition the DTM show an interesting contrast to help location. This was our choice.

Referee #n4-38. Page 7, lines 21-23 and Figure 12: As mentioned before, I think a better plot is taking the differences between hanging wall and footwall of the Henchung Fault. In this way it can better characterize the along-strike fault creeping behavior.

Response #n4-38: That is what we have done. We have taken the difference of altitude of the mobile average of both points situated on both side of the fault zone (see Champenois et al., 2012).

Referee #n4-39. Page 9, line 26: submitted also → also subject

Response #n4-39: done

Finally, we added references in the bibliography and we modified the list of authors, (removal of Benedicte Fruneau from the list of authors). Acknowledgements with Erwan Pathier and Benedicte Fruneau.