Dear editors and reviewer(s), thank for your comments and suggestions. Replies as follows:

The paper "Coseismic deformation field derived from Sentinel-1A data and slip inversion of the 2015 Chile Mw8.3 earthquake" present surface deformation associated with the past year Chilean earthquake evaluated using the new ESA satellite Sentinel 1-Ain wide swath mode. The data are then modeled with a very simple (probably oversimplified) model using an elastic half space and simulating the fault plane as a single flat surface. The fault slip computed by this inversion is then used to compute Coulomb failure stress and compared it to the aftershock distribution.

The paper, in particular the last two part of it is very problematic from a scientific point of view. The English of the full paper need major reworking, with presence of many colloquialisms (eg. Line 29"huge" earthquake), sentences that do not make any sense (e.g. line 52 it reads like if modern geodesy we can deform the crust), strange use of technical terms (e.g. line13 "small-dip" single plane fault instead of shallow dip), very strange use of adverbs and conjunctions (e.g. line 29 "from" instead of "of"), and even subordinates sentences without verbs. Due to the level of English, the concepts within the text are very hard to understand and I am wondering if some of the largely negative comments I have on the scientific content are indeed related to this problem.

**Answer:**

We will check up the text of the manuscript carefully, and correct grammatical errors and usage errors, finally we will asked for a native speaker of English to read the revised manuscript and adjust some expressions.

From a scientific point of view, although the paper present results really relevant to natural hazards, the reason why the paper was submitted to this journal is never stated (it seems that the only problem is to figure out if the dip end of the seismic rupture is 30 or 50km deep without any explanation about the why we care (despite the large implication in the evaluation of the seismic hazard).

**Answer:**

(1) This journal is an authoritative magazine on natural disasters, I have read some articles about the earthquake disaster published in the journal article, so I want to contribute my article to this magazine.

(2) The significance of this article is to find out the characteristics of the surface deformation field and fault rupture of this Chile earthquake, and provide the basis for seismic disaster assessment and analysis of earthquake risk in the future in this region. In the revised version, we will add more relevant content.

The inversion scheme is not completely justified (single flat surface) nor the resolution of the inversion is analyzed. The use of a flat surface also has implication in the analysis of the coulomb stress vs aftershock location (more on this later). The discussion and conclusions make me worry that the authors have not fully understand the analysis they are doing (is it really a big results that using a scending and descending data improving the inversion? It is very well known that the use of ascending and descending data provide a full 3d displacement field while the use of only one of the two provide at most 2d displacement and more likely only line of site deformation).

**Answer:**

(1) The work of this paper is done at the early stage of the earthquake. We use only S1A ascending and descending data to invert the fault slip distribution. In the inversion, the sensitivity of slip distribution to the fault geometry is related to the used data type. When there is only InSAR data used, the influence of the curved and planar faults on the slip distribution is not very large. Zhang (2015) made a meaningful discussion about this question in his Article in Seismological Research Letters (http://srl.geoscienceworld.org/content/86/6/1578). In view of this, we used the plane fault.

(2) We will rewrite the discussion and conclusions based on the revised manuscript and reviewer's comments, and more deeply and clearly express the conclusion and significance of our paper.

(3) In the modified version, we will add a resolution test and analysis.

The step as follows: after we set up the fault model, we carried out the resolution test (Figure S1.). Firstly, we construct a new fault slip model, and use the initial fault slip to determine InSAR observation in LOS direction. Then we use this InSAR data from forward modeling to invert fault slip. By comparing the initially constructed fault slip with the inverted one, we find that the resolution in the shallow portion (0-150km along dip) is good. While in deeper portion the resolution is finite. The magnitude of slip in deeper zones is between 0m and 1m. Our fault slip model constraint by InSAR data sets is limited to the determination of deep slip. 150km along dip is equivalent to about 50km in depth (dip=18.3°), that is to say, the fault slip between 0km to 50km in our model is reliable.

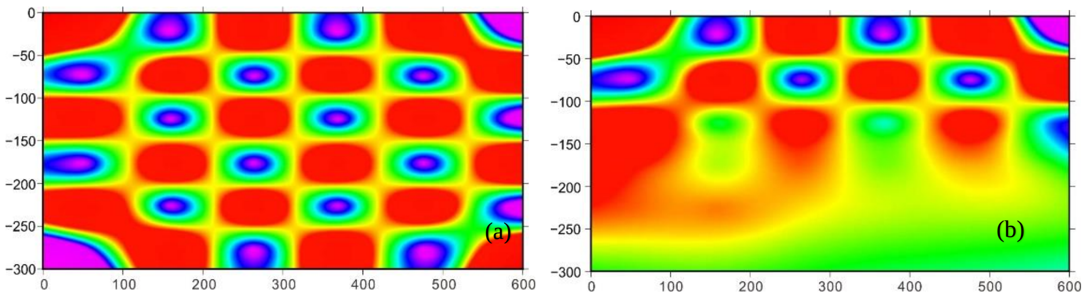



**Figure S1.** (a) The initial fault slip. (b) The inverted fault slip by our model. Red color indicate the slip value is 0m, and pink stands for slip value 1m.

(4) Indeed, the joint use of the ascending and descending InSAR data has better constraints on the interpretation of the deformation field and inversion of fault slip. Generally, the more geodetic data set used, the better fault slip can be obtained.

In addition, by using the the ascending and descending data, we calculate the vertical displacement and east–west (E-W) displacement (Figure S2), this will help us to better understand the earthquake induced ground displacement. Figure S2a is E-W component.

The maximum displacement to west is about 2.2m. Figure S2b is vertical component. The maximum uplift is about 0.2m and the maximum subsidence is about 0.2m too.

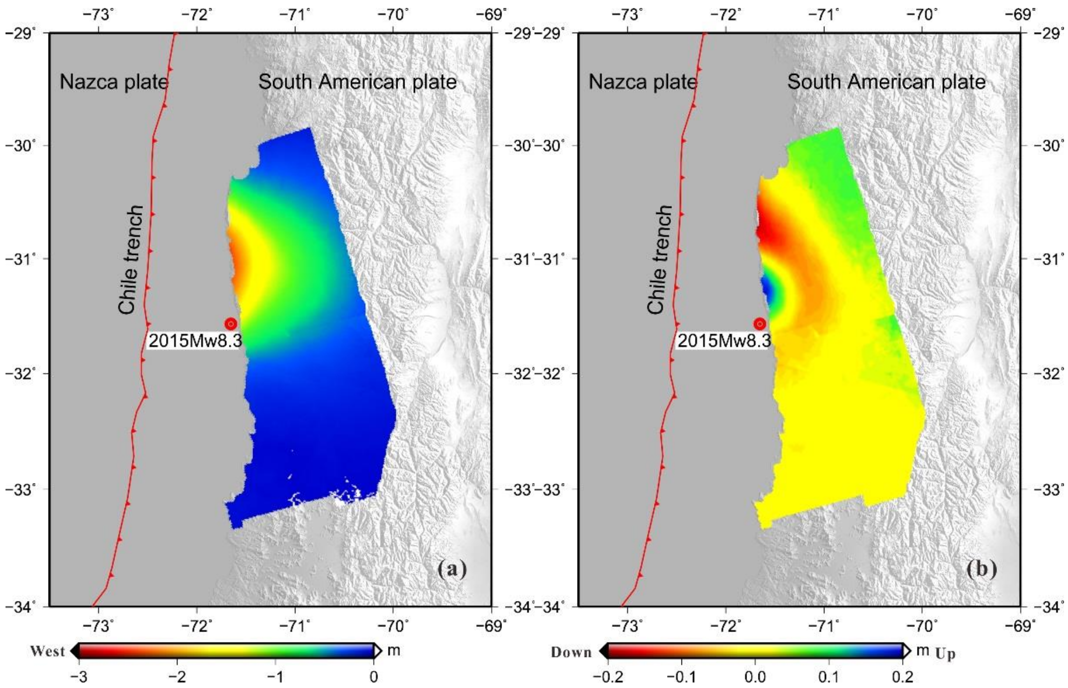



**Figure S2.** Displacement components computed from the descending and ascending deformation maps (a) displacement component in east–west; (b) displacement component in vertical.

The paper is missing in one of the most important aspect of the use of sentinel wide swath. As explained on the text the use of wide swath does allow observations of the near and far field in a single image but it presents lots of challenges that are not explained in the text at all (I was hoping that I was missing supplemental material!). I realize that this paper was submitted before the paper of Grandin etal (2016, doi:10.1002/2016GL067954) but it is interesting to note that just last week they published in GRL an analysis of the technical challenges to process sentinel data exactly for the same event while this explanation is completely missing in the present manuscript. I am pretty sure that the authors are aware of these challanges since the results in this manuscript are very similar to the one of Grandin et al. but no mention of them was made in the current version of the paper.

**Answer:**

The work of this paper is done at the early stage of the earthquake. In the new data processing, we really address some of the problems and get good results. In the modified version, we will add the introduction to new data processing methods and technology.

To conclude I want also to point out that the results of the Coulomb stress calculation are biased by the choice of a single flat fault plane in the fault slip inversion (explained more later).

**Answer:**

I agree with the comments of the reviewers. The enhanced area of Coulomb stress change is below the main rupture fault, and aftershocks, especially those below 30km are also located under the rupture fault, this indicates the fault dip probably changes steep in deep depth, maybe our used flat fault leads to the deviation. In the modified version, we will try bending fault and re-calculate the Coulomb stress changes, and give a reasonable explanation.

Principal criteria review -Scientific Significance Does the manuscript represent a substantial contribution to the understanding of natural hazards and their consequences (new concepts, ideas, methods, or data)? 3 Fair. The reason why the results are useful for seismic hazards are even not touched a single time in the paper.

**Answer:**

The purpose of this article is to find out the characteristics of the surface deformation field and fault rupture of this Chile earthquake, and provide the basis for seismic disaster assessment and analysis of earthquake risk in the future in this region. In the revised version, we will add more relevant content.

Scientific Quality Are the scientific and/or technical approaches and the applied methodsvalid? Are the results discussed in an appropriate and balanced way (clarity ofconcepts and discussion, consideration of related work, including appropriate references)?3 Fair. Apart from the lack of description of the methodology to process the data from this new satellite, the paper is missing completely an explanation of the resolution of the fault slip inversion, an explanation of why the simplification of a simple single plane geometry for the fault is sufficient (I think it could but then one would get the problem showed in the Coulomb stress calculation). Furthermore the last part of the paper fail in recognizing that the approximation of a bending subduction plane with a flat surface bias the location of the aftershock with respect to the selected fault plane.

**Answer:**

(1) During the new data (S1A TOPS mode) processing, we really address some problems and get good results. In the modified version, we will add the introduction to the new data and its processing methods and technology.

(2) In the modified version, we will add a resolution test and analysis. As described in the previous page.

(3) About the use of a flat plane fault in our inversion, see explanation described in the previous page.

(4) Thank you for the reminder that flat plane fault causes the bias of the location of the aftershock. We will give corresponding explanation in the discussion in new version.

Presentation Quality Are the scientific data, results and conclusions presented in a clear, concise, and well-structured way (number and quality of figures/tables, appropriateuse of technical and English language, simplicity of the language)? 4 Poor. I have already explained the problem with the English but also thing like presenting the interferogram as a phase figure instead of the unwrapped displacement make the paper very hard to understand. In conclusion I do not think if the paper should be rejected or be reconsidered after major revisions.

**Answer:**

We will make a major revisions according to the comments of the reviewers. We will redraw some of figs, such as interferogram, which will be expressed as unwrapped displacement instead of a phase figure, and we will re-organize and arrange the contents of the article, and we will ask for some person who are familiar with the English to modify the final text in modified version.

**More detailed review points:**

Line 11 and line 124 (and I think in other points). What is the meaning of half circle convex to the east? First you do not have the full displacement since the deformation in the west area is masked by the sea. Second a point source would always give a "circular" area of deformation. Do you want to say that the deformation is not elongated in the along strike direction (that is an interesting observation suggesting a small aspect ratio between length and width of the fault)

**Answer:**

Here, we would like to describe the shape of the deformation field observed on land, "half circle convex to the east" means the observed coseismic deformation field on land looks like semicircle, convex to the east. As reviewer said that suggesting a small aspect ratio between length and width of the fault. We will improve our English expression in in modified version.

Line 13 You can have small angle dip or shallow fault but not small-dip fault

**Answer:**

We will corrected it in the revised manuscript.

Line 29 What is the meaning of a huge earthquake? you should avoid to use term like huge big small since are all relative terms. For example the 2015 "huge" earthquake is pretty small with respect to the 1960 event. From is the wrong word Line 30 Take away of which More than say "at the latitude: : :." I would say at the location of the earthquake.

**Answer:**

We will modify these inappropriate expressions in the revised manuscript.

Line 32 Why "begins" the subduction? The subduction started at least 40Myr ago and definitely does not start geographically in this location.

**Answer:**

It has been modified in the revised manuscript

Lines 34-40 Please rewrite the full sentence. Try to use less subordinates, and be more descriptive. Also put the references in the correct position in the sentence. If the meaning of the sentence allows it put the references at the end.

**Answer:**

We will complete these changes in the modified version.

Line 40 In a statement like this you should specify from when to wen

**Answer:**

It has been modified in the revised manuscript.

Figure 1 More than the epicenters of the past events it would have been nicer the area of rupture (it could be derived by many publications, eg the referenced one of Vigny). Some text is not readable (e.g. “South Amarican plate” or Chile trench). Dots for aftershock and simbles for cities are too similar.

**Answer:**

We will modify the Fig1 according to requirements of reviewers in the revised manuscript.

Line 51 Why it is important to understand the subduction zone? Here it would be a perfect place to explain why it is important for natural hazards

**Answer:**

Studying the down dip limit of seismogenic rupture may provide insights into the rheological controls on the earthquake process, and also provide clues to understand the relationship between the down dip limit of stick slip behavior and the depth of the continental Moho at its intersection with the subduction interface.

Existing research shows that plate boundaries can be divided into three main zones as the depth increase: an aseismic up dip zone, the seismogenic zone, and a deep aseismic zone. Identifying the transitions between these zones and the processes controlling their locations are key goals in understanding the mechanics of slip along subduction zones.

Although we have a general understanding of the processes that occur in the subduction zones, many details remain obscure. For example, we know that earthquakes reflect the rapid release of strain associated with prior locking of the shallow plate interface and strain accumulation during interseismic periods lasting tens to hundreds of years. The reason why some interpolate subduction earthquake are relatively modest in size, rupturing relative small areas with limited along strike (trench-parallel) rupture length (<100km), while others, such as the great 1960 Chile earthquake rupture more than 1200km along strike, are still uncertain.

Here we use nearly complete coverage from S1A data to resolve the spatial variations of the seismogenic fault slip, and thus provide tight constraints on the depth of this rupture and transitions between seismic and aseismic zones

Line 52 I think “obtain” is the wrong verb. It sounds like if geodesy is deforming the crust.

**Answer:**

It is really not a proper word, we will use “measure” instead of “obtain” in the revised manuscript.

Line 55 Which one is “this issue”

**Answer:**

“This issue” is refer to the down-dip limit of the seismogenic zone.

Line 61 remove great

**Answer:**

It has been modified in the revised manuscript.

Line 64 remove both the, and downloaded (I suppose that if you process the data you obtain them somehow)

**Answer:**

It has been modified in the revised manuscript.

Line 66 You do not have “three different constraints” but you do three different inversions of three different dataset

**Answer:**

It has been modified in the revised manuscript.

Line 68 Why additionally?

**Answer:**

We have deleted “additionally” in the revised manuscript.

Line 86 I would say postseismic deformation more than aftershock deformation. There are multiple processes that can lead to postseismic deformation and afterslip is only one of them (and also not entirely explained by seismic deformation).

**Answer:**

We will change the text description according to reviewer’s opinion and references in the revised manuscript.

Line 97 What do you mean by many times? What are you really doing to do this critical step? How many times? Are you using a montecarlo method (if I read many times I would assume that). I am wondering if the jump visible in the residuals (panel I, J, and L in figure 2) are related to problems in this process.

**Answer:**

Considering that we need to achieve a high registration accuracy of a very small fraction of an SLC pixel, especially in azimuth direction. We estimate the offset by iteration, until the azimuth offset correction becomes at least smaller than 0.02 SLC pixel. In our work, we performed iteration 3 times. The jump visible in the residuals (panel I, J, and L in Figure 2) are not related to problems in this process. I think they may be the intersection of different frames (3 frames in descending track and 2 frames in ascending track). We processed each frame separately, and then stitching them together into a complete interferogram.

Figure 2 Why not unwrapping the images? From the phase image for example I can not see in any way what you state in line 132.

**Answer:**

We will redraw Figure 2 expressed as unwrapped displacement easy to see the size of the LOS displacement value in the revised manuscript. The old is rewrapped interferogram with color cycle 12cm.

Line 123 While is not the correct word, probably when will be more appropriate

**Answer:**

It has been modified in the revised manuscript.

Line 124 Half circle convex is a pretty bad description! And does not means anything

**Answer:**

It has been modified in the revised manuscript.

Line 126 why within??

**Answer:**

We have changed “within” to “about”

Line 126-132 needs to be completely rewritten it is very hard to understand. In particular since the unwrapped deformation is not presented in any figure.

**Answer:**

We will completely rewrite these sentences according to the remapped Figure 2 (expressed as unwrapped displacement).

Line 138 How do you see from focal mechanism that the surface trace closely follows the trench axis???

**Answer:**

Sorry, my expression is not clear here. We will change this expression in the revised manuscript. In fact, we determined the fault geometry according to focal mechanism and Inferred the top edge of the seismogenic fault follows the trench closely.

Line 138 Is a single fault plane a good approximation. It could be but it would strongly bias the determination of the lowest point of slip on the fault plane. In particular if like in this region the Benioff-Wadati plane (thus likely the slab itself)seems very much bending and the slab in this part of the trench is not a shallow dipping slab.

**Answer:**

We agree with the comments of the reviewers. We have realized that a flat fault approximation in our inversion does lead to a deviation from the aftershock and the deviation of the lowest point of slip on the fault plane from the actual position. We will take new inversion using bending fault plane in the revised manuscript.

Line 136-164 (VERY IMPORTANT!!!) Since your results are influenced very strongly by the choice of the parameterization of your model (thus the taxellation of your plane or the size of the patches), and by the selected smoothing (beta) you MUST explain how do you select the best smoothing factor and how good is the resolution of your model. Without this explanation the results are essentially meaningless, in particular regarding the depth of slip on the fault. I need to say that the paper of Melgar et al 2016 (also out the past week on GRL) obtain from seismic and geodetic data a similar slip pattern than the one found in this manuscript, suggesting the results be correct. Another very important point is if the resolution (and best smoothing) is the same for all 3 inversions.

**Answer:**

(1) The choice of the best smoothing factor in our inversion is through a model of the misfit and roughness trade-off curve (Figure S3). When the smooth factor value increase, the misfit value would increase, while the roughness would decrease. By using a trade-off curve, we find that smoothing factor 0.3 can best fit InSAR descending data. Because constraint degree by smooth factor in fault slip inversion for ascending and descending data is similar, we select same smooth factor 0.3 in three inversion.

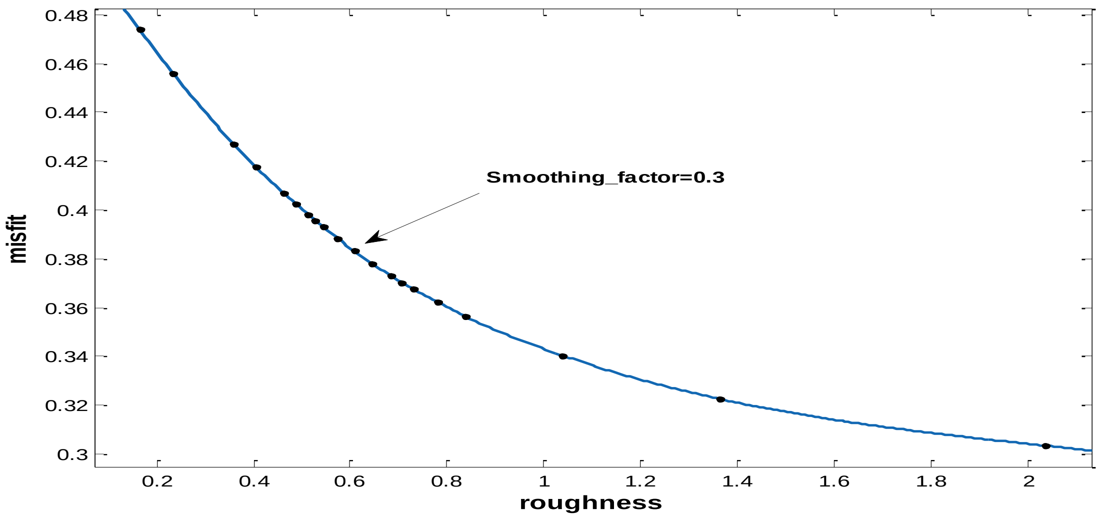
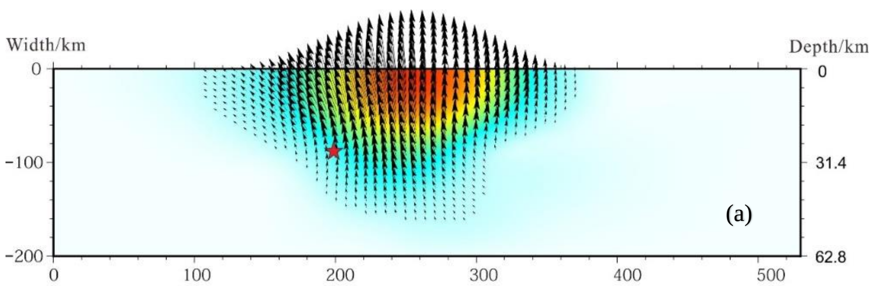



**Figure S3** The trade-off curve between roughness and misfit

(2) We have read the paper of Melgar et al published on GRL and other published papers, during the modification of our manuscript, we will refer to these articles.

(3) To assess the resolution capabilities of the fault grid, we conducted a test in version with six different grid sizes of the fault constrained by Sentinel-1A ascending and descending data jointly. We divide fault plane as rectangular patches with length 5×5 km, 10×10 km, 20×20 km, 30×30 km, 40×40 km, 50×50 km (Figure S4). The smaller the fault patches, the more clearly the sliding feature, but takes more time. We find that When the mesh size is 5km and 10km, the resultant slips are similar, but the computation time is longer for smaller grid size. When the patch size changes from 20×20km to 50×50km， the maximum fault slip becomes smaller, respectively , in turn 7.7m, 7.52m, 7.06m, 6.41m. The depth of slip area are all over 60km, which is different from other results published at present. So we chose grid patch size as 10km×10km in our inversion.



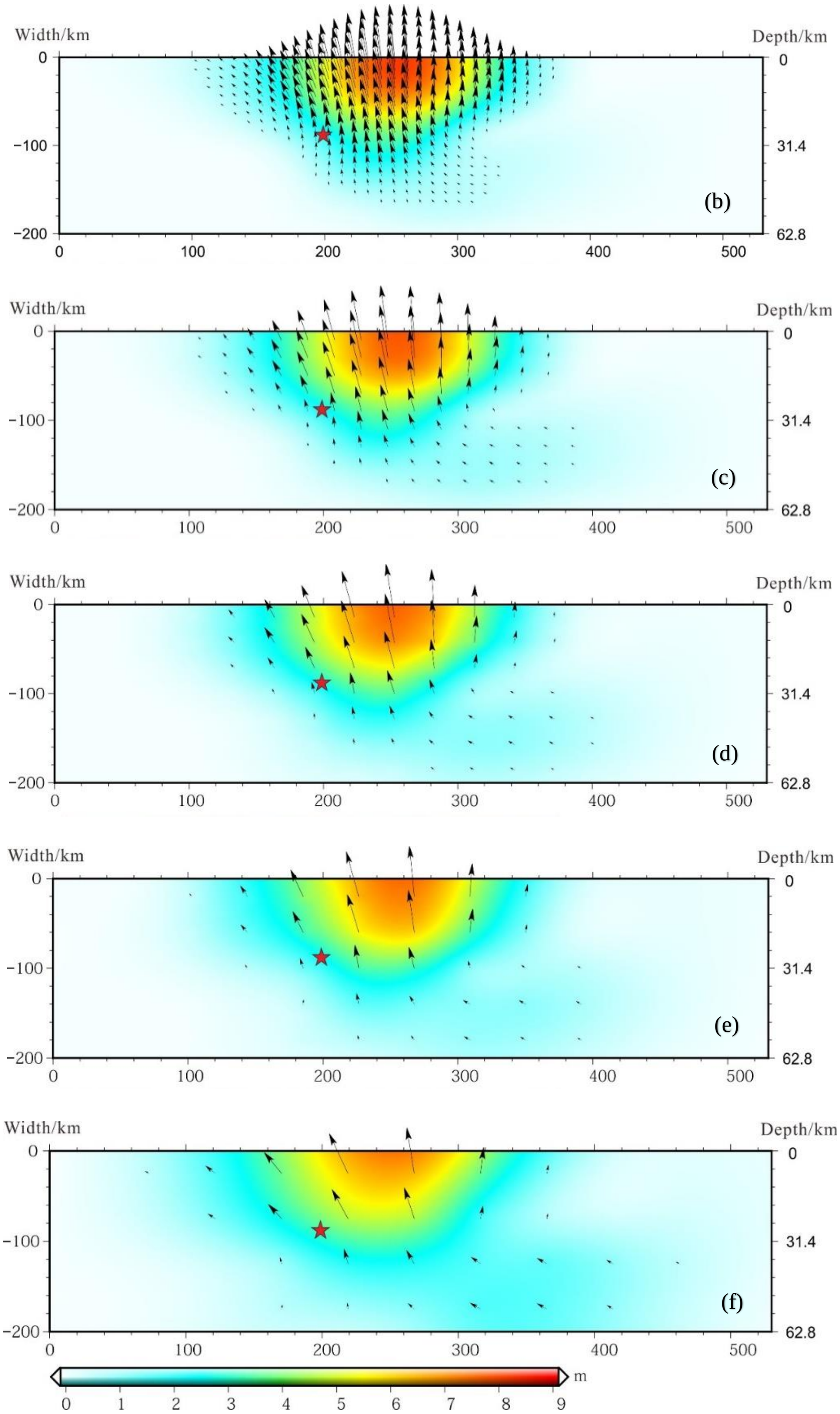



**Figure S4.** Fault slip resolution test with different fault patch size in the inversion constrained by Sentinel-1A ascending and descending data jointly. The fault patch size is (a) 5 km×5 km, (b) 10 km×10 km, (c) 20 km×20 km, (d) 30 km×30 km, (e) 40 km×40 km, (f) 50×50 km.

Line 153 “half space model using Okada” add (1985) at the end of line

**Answer:**

It has been modified in the revised manuscript.

Line 159 Is the rake fixed for all patches or every patch can have a different rake and the range is the value for the different patches.

**Answer:**

The rake is fixed for all patches.

Line 160 “to the surface” I think “to the trench” would be more correct. “steadily modified” what is the meaning of this? Which method did you use to modify the parameters?

**Answer:**

“to the surface” has been modified to “to the trench” in the revised manuscript. When we modify the parameter, we increase the value gradually. For example, when we set dip angle, we take trial values between 10° and 30° one by one manually. And find model of dip=18.3°can best fit observation. Then we change other parameters.

Line 162 How does this value compare with slab dip from models like slab1 (Hayes et al 2012)?

**Answer:**

The flat fault model derived from our inversion reflects a dip angle of 18.3° . And in slab1.0, the average dip angle of the interface in Central Chile is 16°, the transition depth between seismic and aseismic zones is about 50km. But considering that the model is just average with limited accuracy, while the dip angle of the fault may be steep in the deep part according to aftershocks distribution, so we will take new inversion using bending fault plane in the revised manuscript.

Line 164 What kind of resolution test did you make? Any results to show? It seems tome that 10km resolution at depth 50km could be to high resolution : (but it is possible to obtain it, if this is the case it needs to be shown).

**Answer:**

We did the resolution test, see the explanation above.

Line 182 It seems you should have enough point to constrain the deformation also for the ascending data alone pretty well. I am wondering if the problem is the unwrapping and the fact that the far field within your image is not really at 0 displacement (thus you get smaller displacement at surface than the real one. I am also wondering if the optimal smoothing in this inversion is different from the optimal smoothing in the other inversions

**Answer:**

(1) When unwrapping, we really set the deformation of the far field within the picture to 0. But just as you said, the actual far-field deformation is not 0 in ascending data due to incomplete coverage. We will make a careful check to the unwrapped result or re-unwrap it using different reference point at far field to get a good result in the revised manuscript.

(2) The optimal smoothing factor in ascending data inversion is the same as that in other inversions.

Line 185 It seems to me that the area of slip from the ascending data only is much smaller and the slip is really smaller so it seems strange that the 2 magnitudes are so similar (unless the color scale for the figure 3 is pretty bad and the slip and area of slip are after all not so different).

**Answer:**

We agree with you. We are aware of the two question. On the one hand, the much smaller slip value in ascending data inversion is likely to be related to the unwrapping, on the other hand, the color scale we used is not appropriate, so that distinction is not clear. We will seriously examine and revise these issues in order to improve the clarity and quality of the map in the revised manuscript.

Line 192 Why did you use the same weight for the ascending and descending in the combined inversion? What does happen if the two weight are different?

**Answer:**

We think the constraint ability of the ascending and descending data to the inversion is the same, so we used the same weight for the ascending and descending data in the combined inversion. But we will carry out the test with different weights in order to know what happen if the two weight are different in the revised manuscript.

Line 193 Symmetric with respect to what?

**Answer:**

Here we want to say the slip area looks like a semicircle shape slightly elongated in trench direction, and symmetrically distribute to the north and south sides along the trench.

Line 197 Not a big surprise! The combined dataset allow you to study the full 3d deformation at the surface (or if we assume that north south deformation is not so well constraint in the wide swath, at least a full 2d deformation! Not a surprise it is defined better the fault slip. It would have been nice to see a map of the unwrapped deformation from ascending, descending and combined.

**Answer:**

We are in favor of your opinion. We will give a maps of the unwrapped deformation from ascending and descending in the revised manuscript, we will also calculate the vertical and east–west displacement components by combining ascending and descending data.

Figure 3 It is very hard to read. I would take away topo-bathy and have a better color scale (for example going to a light color where you do not have deformation). By the way the paper of Melgar et al in GRL show the presence of different patches with higher slip. I am wondering if your results would also have them with different smoothing and/or different colorscale or your resolution is not good enough to have such patches.

**Answer:**

We will revise the Fig.3 according to the comments of the reviewers. We will use a appropriate color-scale to distinguish the slipping difference to make the fig easy to read. We will compare our new maps with the results of Melgar in the discussion of our new revision. Of course, Melgar et al used many kind of data, including high-rate GPS, strong motion data, and tide. Our sliding distribution may be different from theirs due to the use of different data constraints.

Line 210 It seem that you are not using your fault slip but the one from Lin 2004 and Toda 2004. Be sure to put the reference in the correct place in the sentence

**Answer:**

It has been modified in the revised manuscript.

Line 212 it is not that have great influence in earthquake activity but that can trigger seismicity already ready to go. I would rewrite this sentence.

**Answer:**

It has been modified in the revised manuscript.

Line 214 (very important) Assuming a single flat fault plane, your model does only aproximate the geometry of the plate boundary interface or of the slab. As for the local mechanism the best plane you will get is mainly influenced by the area with the largest slip (thus shallow). Since the slab in this area is not shallow dipping it is clear that the slab surface would tend to be lower than the one of the fault plane you are inverting for. THIS DOES NOT MEAN THAT SLIP ON YOUR PLANE INCREASES THE LIKELYHOOD OF EARTHQUAKE DEEPER THAN YOUR PREFERED SLIP MODEL!

**Answer:**

After reading the comments, we have realized the problems caused by the flat plane fault approximation in our inversion. The aftershock distribution should reflect the geometry of the main fault. That is to say the dip angle of the seismic fault is larger in the deeper portion (about 20 km below). The flat fault model leads to inappropriate interpretation. In the revised manuscript, we will take new inversion using bending fault plane and compare with the old one, and give more reasonable interpretation.

Figure 4b is perfectly compatible with the Benioff Wadati plane in the area. This is why before I was asking a comparison with Slab1! Probably your slip inversion should have been done on a surface following the seismicity more than on a flat surface. This is the real meaning of your figure 4b! By the way it is also important to point out that the location of the aftershock in the figure is from teleseismic and not relocated!

**Answer:**

We totally agree with you. We will use the surface which is consistent with the aftershock distribution to make a new inversion in our revised manuscript.

The location of the aftershocks in our paper is from teleseismic.

Line 219 In figure 4a it looks like if you have more events in the blue areas than in the red areas. You state that your computed Coulomb stress correlate very well with seismicity distribution. How do you compute the correlation? I am wondering if the seismicity in the blue area is in reality is around patches that did not rupture during the main shock as indicated by Melgar et al. (2016).

**Answer:**

As mentioned above, under the review of the comments, we have realized that these problems are caused by flat fault model and improper location of the receive fault. We will use bending fault model and another receive fault to improve the result and its interpretation in the revised manuscript.

In addition, similar to Melgar 's result, our inverted slip model also indicates the after shock seismicity mostly occurred at the edge of the main rupture zone(Fig.3).

Figure 4 A is the seismicity window for depth? B I can not see the blue line but I think the fault interface more than be a line is a curved plane. C it would be great to have seismicity also in this figure.

**Answer:**

Figure 4 A stands for Coulomb Failure Stress (CFS) changes at a depth of 30km.

We will redraw these Figs after new inversion based on curved plane fault and again calculates CFS, then we will present new Figs and add seismicity to Fig. C in the revised manuscript.

Line 247 You must show resolution tests!

**Answer:**

As mentioned before, we did it.

Line 270 "half circle"????

**Answer:**

It means semicircle shape.

Line 270-277 I can not understand what you are discussing here. Half circles, NS symmetric, connective rupture? No clue: : : By the way I am not expecting the subduction of nz uder sa to behave the same along the trench since there are huge differences in things like slab dip! How do you know about barrier or locking, coupling? You have only coseismic data not pre-seismic! What does your paper says about segmentation? I am pretty sure that a Mw8 would not have uniform slip without any barrier at all (indeed seismic data show significant complexity in the rupture)

**Answer:**

We are very sorry. This paragraph is really not expressed clearly. We will carefully modify the wording in the new version. Here we would like to compare the coseismic deformation field and the fault slip associated with this earthquake to that of the 2010's Mw8.8 event, discuss the differences between them, and further explain complexity of the subduction zone. Results from Bertrand et al (2010) based on static and high-rate GPS, InSAR and broadband teleseismic data, show that 2010 Mw8.8 earthquake rupture initiated at about 32 km depth and propagated bilaterally resulting in two main slip zones. While for this Mw8.3 event, our result from InSAR ascending and descending joint inversion indicates one slip zone. This may be related to the constraint capacity of different data, may also reflect the complexity and diversity of the subduction zones in different position.

Line 284 Not really until you show the resolution tests

**Answer:**

We did it. We will show it in the revised manuscript.

Line 297 more than speaking of % of fit it would be nice to give the metric used for the inversion (eg L2)

**Answer:**

We will use the metric representation rather than a percentage in the revised manuscript.

Here the fitting degree is defined as follows:

$$Corr = \frac{\sum_{n=1}^{N} O_n \cdot P_n}{\sqrt{\sum_{n=1}^{N} {O_n}^2 \cdot \sum_{n=1}^{N} {P_n}^2}}$$

'*Corr*' is the fitting degree, 'n' is the data points index, 'N' is the total sampled points in our inversion. 'O' is the observation data. 'P' is the prediction data. When $O_n \approx P_n$, $Corr \approx 1$.

Line 296-300 I do not agree with this conclusion based on the comments given before.

**Answer:**

We totally agree with you. We will make a major revision to the manuscript as stated above, and then we will rewrite the conclusion.