Dear Reviewer,

We thank you for your helpful comments.

We have favorably answered to all the comments (see below).

Nadaya Cubas on behalf of the co-authors.

Reviewer 1:

Cubas and coauthors present a study that focuses on interplate deformation along the Chilean subduction zone. Applying the critical taper theory, Cubas and coauthors are capable of mapping plate interface deformation. Then, they compare it with a series of long-term and short-term observables of subduction dynamics including coastal uplift, historical record of large interplate earthquakes and geodetically derived coupling. At the end of the manuscript the Authors provide a conceptual model where large megathrust earthquakes are triggered and stop in correspondence of areas of interplate deformation. This model is crucial for seismic hazard assessment as it can be potentially used for mapping areas of the megathrust that might be prone to hosting large earthquakes in the future. The subject is of course very interesting.

This paper will be of interest for the structural geologists, and geoscientists specialized in tectonics, geodynamics and seismology and I think it will be a valuable contribution for SE.

The analysis is based on the critical taper theory. The Authors use an inversion procedure that allow them to retrieve friction of the wedge, the pore pressure ratio of the wedge and the effective friction of the megathrust as described in an earlier paper.

The manuscript is well structured and clearly written. Figures are clear and supporting material is helpful for complementing this study. Motivation, procedures and quantitative analysis are clearly explained.

I have only one minor concern and few technical corrections reported below.

Specific comments

Authors claim that “Once nucleated, large earthquakes propagate along well localized planes”. A reader can see that for the vast majority of the cases this is true but there are also some exceptions (independently from the slip model). Slip maps of Antofagasta, Maule and Iquique show some degree of overlap with areas of distributed deformation. Even near the location of highest slip as for Maule… This observation is against the model shown in figure 6. I suggest to add a few sentences in the discussion and/or in paragraph 3.3 where Authors justify the existence of such exceptions.

In paragraph 3.3, we have added:

A small portion of the earthquake ruptures do overlap with the plate interface deformation, but high slip areas are always clearly limited by plate interface deformation*.*

In the discussion:

Once nucleated, large earthquakes propagate along well localized and smoothed rate-weakening fault planes \citep{bletery2016mega} limited by elongate zones of underplating ***which, in addition, inhibit further rupture propagation and slip*** *(Fig. \ref{fig:1}, \ref{fig:5} - step 3).*

Technical corrections

Title: Consider adding information about the study area and/or the subduction environment.

Done.

In the abstract specify that the word “prediction” (line 2 and 16) indicates the location and extent (as correctly done in the introduction).

Done.

Line 100 “the inversion procedure” sentence is a repetition of the first few words of that same paragraph (line 93).

This paragraph has been reworked.

Line 175 “The high slip patch of the Mw 8.2 2015 Illapel and the Mw 8.7 2010 Maule earthquakes are both limited down-dip”. Limited by what?

Plate interface deformation, added.

Line 186: “seismic domain” consider using another word to prevent confusion with “domain” proposed by T. Lay for depth. Segment might work?

Ok, changed for *region*.

Line 187: figure 4a instead of 4d, right?

Corrected.

Doublecheck title of paragraph 4; i.e., delete “conclusion”

Corrected.

Figure 2: I find very helpful the colorcoding as in Figure s4. Consider modifying panels b and c.

We have added cross-sections to help readers instead.

Figure 4. It is important to avoid reader skepticism: how do blue bands in panels a-c are defined? They appear as local minima but criticism might rise from the fact that the blue band around 28 latitude is way higher than peaks (e.g., Tongoy). Be sure Authors specify underlying assumptions.

True, we now specify:

Segments with limited plate interface deformation ***($<$15\,km)*** *coincide with a significant number of rupture terminations (blue and grey overlays, respectively: Fig. \ref{fig:4}a-d),*

particularly in the southern region. Between 29 and 24^{o}S, rupture terminations coincide with segments where plate interface deformation is reduced.