*[Annotations](https://tectonics-submit.agu.org/cgi-bin/main.plex?form_type=annotate_pdf&j_id=286&ms_id=822470&ms_rev_no=0&ms_id_key=ftdhfX2sATCQ9eYS67IvkuIw&object_id=5266379)*

*Key Points:*

*Line 9—10: Estimates of relative ages of deformation of major strike-slip faulting and en echelon thrusts from deformed and undeformed lake sediments.*

Ages? You don't detail that in the conclusion, is this a key point of the article?

**The session 4.4 is talking about the relative timing of recent earthquakes on the EPGFZ and secondary, en echelon thrust faults. In the revised paper, We delete this part from the key points.**

*Abstract:*

*Line 15 – 16: located 5 km north of the main, Caribbean-Gonâve plate boundary, a 1200 km-long, left-lateral, Enriquillo-Plantain Garden fault zone (EPGFZ).*

The EPGFZ is not the Caribbean-Gonâve plate boundary: the EPGFZ cross cuts the Southern Peninsula of Haiti, which is part of the Large Igneous Province belonging to the Caribbean plate. Replace by: one of the main Northern Caribbean plate boundary strike-slip faut.

We change the “plate boundary” to “one of the main Northern Caribbean plate boundary” and highlight the change with underline.

*Line 18 – 19: formed a boundary between a coseismically uplifted lowland north of the EPGFZ and a subsided area in the highlands south of the fault.*

The transition between uplifted and subsided areas is not really the EPGFZ trace (see Hayes et al. 2010 paper).

**We refer this conclusion to Hashimoto et al., [2011]’s InSAR study.**

*Line 25: than the adjacent, newly discovered, northwest-striking, northeast-dipping Jimani thrust fault*

This thrust appears on several published tectonic maps. Maybe say newly imaged?

**We don’t see any of these maps. And we are the first group that conduct lake chirp sonar profiling in Haiti, and also so far, the first to publish the result. So, we believe the thrust is newly discovered.**

Line 26 “transpressonal” to “transpressional”

**We correction this type and highlight it with underline.**

*Line 38: Multidisciplinary, geolog-38ical and geophysical studies of the 2010 epicentral area of south-central Haiti including:*

Where is the end of the phrase? What are the main conclusions of these studies? We have to look at an other paragraph, maybe you should reorganize this part.

**We merge the next paragraph to this paragraph.**

*Line 40 – 55:*

Please rewrite this part with entire sentences.

**The list of previous studies, give similar result. We state the result at the end of the list. IF we write them as sentences, the text will look deprecated. So, we think our writing represent our thoughts the best and insist with our way of writing.**

*Line 56: The consensus from these previous, on- and offshore, multidisciplinary studies*

You have not cited the offshore study of Leroy et al. (2015) which imaged the EPGFZ, the SOFZ and the Gulf of Gonâve with bathymetric and seismic reflection data.

**Leroy et al. (2015)'s paper focus on the west of the Hispaniola Island, which is not our study area.**

*Line 61: “These two thrust are”*

“thrusts”

**We correct this typo and highlight it with underline.**

*Line 92 – 99: “Oblique,en echelonthrusts spacing at distances of 1-8 km along the main strike-slip fault, obliquely intersect the main strike-slip fault at angles of 30 – 45 and strike northwestward away from the EPGFZ with individual oblique, fault lengths extending into the deeper basins at distances of 4-29 km (Figure 2A, Figure 3). As a result of this distinctive and regular intersecting fault geometry between these oblique thrusts and the linear and continuous EPGFZ, earthquake rupture initiating on an oblique thrust, as seen for the Léogâne fault in 2010, is likely confined to that vicinity and may not connect with other oblique thrusts or even the EPGFZ itself [Douilly et al., 2013, 2015].”*

It is your results/interpretations. It is not appropriate in this introductory part.

**These are not our results. They are from the previous studies.**

*Line 110 – 101: “Coseismic deformation along a large transpressional strike-slip fault, such as the100EPGFZ and Septentrional”*

The Septentrional fault zone (SOFZ) is not transpressive but almost pure senestrial strike-slip (see GPS and offshore studies).

**We delete Septentrional fault zone and highlight it with strike-out line.**

*Line 115 – 123: “These oblique anden echelonthrust faults in transpressional settings, including115large restraining bends like Hispaniola, potentially nucleate “uncharacteristic earthquakes”116of varying recurrence intervals and sizes that are distinct from the recurrence intervals117and sizes of the adjacent but independent strike-slip fault [Fielding et al., 2013]. Restrain-118ing bend areas like Hispaniola can lead to the generation and increased activities on more119favorably and obliquely oriented folds and thrusts whose coseismic rupture might alter-120nate with much longer ruptures along the adjacent strike-slip fault. The number of these121en echelon, thrust faults can be large at observed spacing of 5-10 km along strike-slip122faults that may be hundreds of kilometers in total length.”*

It seems that you confuse restraining bend and en echelon fault. Hispaniola is compared to a restraining bend because of the fold-and-thrust belt between the two major strike-slip faults (restraining bend = deformation at a step between two strike-slip). En echelon folds are restricted around only one fault trace.

**We are trying to talking about the en echelon shape faults in the restraining bend setting. To avoid further misleading, we rewrite this part and highlight the change with underline.**

*Line 136: “to the west 1B”*

Figure 1B?

**We correct this typo and highlight it with underline.**

*Line 141 – 150:*

This paragraph is descriptive so its place it's not in the objectives and method part.

**We separate this whole session into three sub-sessions. This paragraph is moved into the "Study area" sub-session.**

*Line 145: “the shallow (33 m)”*

the shallow (33m deep)

**We correct the writing accordingly and highlight it with underline.**

*Line 151 – 156:*

Idem, it is a descriptive paragraph.

**We separate this whole session into three sub-sessions. This paragraph is moved into the "Study area" sub-session.**

*Line 159 – 163: “we collected a total of 94 km of high-resolution (2-10 kHz) sonar profiles in 2014 from the 138 km2, brackish Lake Azuey (Figure 2A, B) and 37 km of profiles from the 14 km2, fresh-water Lake Miragoâne (Figure 1B). The EPGFZ strikes through both of the lakes, so 80% of our grid on Lake Azuey and 90% of our grid on Lake Miragoâne was dedicated to the across fault-strike, north-south profiles”*

When? Name of the survey? Is there any previous communications with this data?

**As we state in the text, in 2014. We had shown part of the data set during 2014 AGU (Poster).**

*Line 166 – 167: “These surveys were the first sonar surveys in Haitian lakes. Both lakes straddle the active trace of Haiti’s EPGFZ and its adjacent,”*

The fact that the lakes straddle the active trace of EPGFZ is your result/interpretation, you can't tell that in this part.

**We rewrite this part as “Both lakes straddle the possible active trace of Haiti's EPGFZ and its adjacent, transpressional fold-thrust belt”, and highlight the change with underline.**

*Line 176 – 178: “There are two regional structural models to explain the present-day structure of the broad, 250 km-wide zone of transpression spanning the entire width of the island of Hispaniola.”*

I think you should better explain the differences between what you call strike-slip and thrust belt models, because you talk about transpression in both.

**We explain them in the following subsessions. To better explain the differences, we add "regarding the driving force and the movement along the EPGFZ" to the sentence and highlight it with underline. We don't add more detail of description to this part to avoid duplication.**

*Section 3.1.1*

please do not a list over entire paragraph

**We rewrite the whole paragraph. Now it is not in the form of list.**

*Line 181: “thick and buoyant Bahama platform”*

Bahamas

**We correct this typo and highlight it with underline.**

*Line 184: “transpresssiona”*

transpressional

**This sentence is deleted from the text in the revised version.**

*Line 187 – 189: “as a result of transpression, the central Hispaniola has the highest topography, up to 3 km, in all of the northern Caribbean region;”*

And what about the Presq'île du Sud of Haiti? (Pic de la Selle at 2680m high).

**We don't see the conflict with our text.**

*Line 193:*

add Leroy et al., 2015

**We add Leroy et al., 2015 and highlight it with underline.**

*Line 194 – 196: “a strong, south-westward, backthrusting of the Gonâve microplate, in southern Hispaniola in Haiti and Dominican Republic to the southwest onto the Caribbean plate”*

There is no Gonâve microplate in Rep Dom

**There is a little bit, for example the Lake Enriquillo.**

*Line 197: “backthusting”*

Backthrusting

**We correct this error and highlight it with underline.**

*Line 200: “along the southern margin of Haiti”*

idem, not on the Gonâve microplate

**Here, we are not saying the sourthern margin of Haiit is on Gonâve microplate.**

*Line 219 – 223: “The thrust front of this feature was thought to be actively propagating from the main Trans-Haitian fold-and-thrust belt, located in the Chaîne des Matheux, southwestward into the area of the Léogâne plain and the Cul-de-Sac basin, further more, emerging into, as what we are proposing in this paper, the transpressional belt along the northern flank of the EPGFZ”*

where do you propose and discuss this point?

**We strike out "as what we are proposing in this paper".**

*Line 235 – 236: “as we propose in this paper based on the geologic data compiled on Figure 2A, B”*

Again you can't say that you agree a study before explaining and interpret your results.

**We strike out "as what we are proposing in this paper".**

*Line 287 – 303:*

Again it's a very long list...

**We rewrite this paragraph. Now it is now in the form of list.**

*Line 299 – 303:*

You can't talk about the results before describing the data.

**We move this part to the sonar section4.3.3**

*Line 304 – 305:*

You interpret the data before describing them...

**We move this part to the sonar section4.3.3**

*Line 310 – 313:*

Idem, you conclude before describing.

**We move this part to the sonar section4.3.3**

*Line 339 – 341: “A similar pattern of deformation is observed in Port-au-Prince urban where the central and northern edge of the Cul-de-Sac basin is undeformed [Massoni, 1955;Cox et al., 2011;McHugh et al., 2011;Saint Fleur et al., 2015] (Line B-B’ in Figure 3).”*

You talk about undeformed basin by citing the line B-B' but on this line all the sedimentary layers are folded?

**We are trying to say the north part is mostly uncompressed. We are "mostly" to the sentence and highlight it with underline.**

*Line 353: “Port-au-Prince are”*

Port-au-Prince area

**We correct this typo and highlight it with underline.**

*Line 357 – 361: “Structural cross-sections (Figure 3) from this and the previous works [Massoni,1955;Bourgueil et al., 1988;Cox et al., 2011;Douilly et al., 2015] (Line A–A’ and B–B’ in Figure 3) along this 120 km-long zone of deformation adjacent to the EPGFZ show–12–”*

Because careful when you compare cross-sections that have not the same orientation. Actually the thrusts are northeast dipping in majority.

**We change “north-dipping” to “northeast-dipping” and highlight it with underline.**

*Line 380 – 384:*

You describe this in the following section.

**We move this paragraph into the next one.**

*Line 387: “Line B1 and Line L19 correlate convincingly”*

In figure 4 there are lines B6 and L19. I am not convinced by this correlation: your discontinuities cut reflectors and the bigger ones imaged in the B6 line are not at the same depth than the ones of the line L19.

**As we said in the paper, the data from two lakes were acquired with different pieces of equipment at different times. The frequency range, source wavelet, the sampling rate, and so on, all these differences will cause the data look different, even for acquiring with different equipment at the same spot. So, naturally, there will be differences between our data and Rios et al., 2013’s data. But the similarity is appalling, even when there are so many factors that could cause the sonar image looks different. So, we believe this is not simply a coincident but similar geological process.**

*Line 389: “the same amount of sediment above the EPGFZ”*

Where do you describe the amount of sediment above EPGFZ in lake Enriquillo or Azuey? It's confusing.

**This part is largely re-organized. The amount of sediment is described in line 396, and line 449, respectively.**

*Line 389 – 392: “… it is reasonable to suggest that Lake Azuey and Lake Enriquillo share the same sedimentation history as well as the same structural style and seismicity related to the EPGFZ and its oblique, thrust faults”*

You discuss your observations but we are not in the discussion part...

**We think this is our analysis instead of result or discussion. There are too many components in this paper, if we leave everything but data description to the Discussion part, the discussion section will be very confusion. We think it is better to keep it this way.**

*Line 397: “EPGFZ would be dated some 270 years ago”*

Why it is 250yr in the legend of the fig. 6?

**We correct the error in the caption of Figure 6 and highlight it with underline.**

*Line 401: “4.5 Mapping of the EPGFZ trace from sonar data in deformed lake sediments of Lake Azuey, Haiti”*

Should be before the 4.4 section.

**We merge this part into 4.4 section and place it in the front part of subsection 4.4.**

*Line 403 – 404: In the Lake Azuey area (Figure 2A), we mapped a linear and east-west striking fault trace in deformed Holocene sediments along with its landfall (Figure 4A, B and Figure 5).*

There is no fault in the lake Azuey on the figure 4B.

**It should be figure of chirp sonar cross-section. We correct this typo and highlight it with underline.**

*Line 408: “eastward”*

Westward

**We correct this typo and highlight it with underline.**

*Line 410: “shown in Figure 2A”*

What is shown in fig. 2A? I don't see the stream channel offset.

**We meant the location of Dumay. We rewrite this part in order to avoid confusion. The new sentence is highlighted with underline.**

*Line 413 – 418: “(Line B–B’ in Figure4). Sonar profiles from the southernmost area of Lake Azuey (Figure 6) show that the most recent rupture of the EPGFZ is covered by about 0.7 m of Holocene sediment, suggesting that there has been no recent activity of the EPGFZ. We project this trace of the EPGFZ along a prominent fault valley at the town of Jimani that separates Lakes Azuey and Enriquillo (Figure 2A and Figure 5).”*

You cite fig. 3 then fig. 6 then fig. 2 and fig. 5. It's very confusing and difficult to read.

**We rearrange the position of Figure 4 – 6. Now it looks more continues.**

*Line 427: (Figure 1B)*

Figure 4A is better here.

**We add Figure 4A here and highlight it with underline.**

*Line 432: “Figure 1B and Figure 4A”*

There is no overthrust structures in the southern edges of the lakes in fig. 4A but only folds. Be precise.

**We move “Figure 1B and Figure 4A” forward in order to avoid the confusion. The new location is highlighted with underline.**

*Line 436 – 438: “The sonar results from both lakes show that the EPGFZ extends to at least to the eastern tip of Cabritos Island in the center of Lake Enriquillo, Dominican Republic [Mann et al., 1995]”*

Why did you cite a paper of 1995 here? Is it your results or is it already published? You should say "as previously proposed by".

**We strikeout this citation and highlight it with strikeout line.**

*Line 440: “Therefor,”*

Therefore

**We correct this typo and highlight it with underline.**

*Line 441 – 442: “where the recently documented uplift of the Holocene reef fringes Lake Enriquillo [Mann et al., 1995].”*

idem as previous comment about the citation. 1995 is not recently by the way.

**We move the citation forward to make it clear that the “documented uplift” is from the citation, not our sonar data. We also change “recently” to “previously”. We highlight the new sentence with underline.**

*Line 443: “in the western study area”*

Where? Name of the area?

**We add the study areas into the title and highlight them with underline.**

*Line 445: “Canal du Sud”*

Please place it on a map.

**We add it to Figure 1 and label it as CS (also explain it in the figure caption).**

*Line 456 – 458: “One of the most intense zones of coseismic, aftershock, and coastal uplift separates the oppositely-dipping Léogâne and Trois Baies faults, and may represent complex deformation at a transfer zone between the two faults (Figure 7A).”*

I don't see uplift between the two fault on this figure. The most intense zone of coastal uplift is near Léogâne, but it's not between the two faults (see Hayes et al., 2010).

**There are from Hashimoto et al., 2011,. We add this citation into the caption of Figure 7 and highlight it.**

*Line 458 – 460: “The aftershock study of the Trois Baies fault [Symithe and Calais, 2016] shows that it is comparable to the cross sections of the eastern area in Figure 3”*

This sentence needs to be completed: what is comparable to what?

**We rewrite this sentence as “The aftershock study of the Trois Baies fault [Symithe and Calais, 2016] shows that its geological structure of thrust faulting and spacial oblique relationship with the main EPGFZ is comparable to the cross sections of the eastern area in Figure 3” and highlight it with underline.**

*Line 460 – 462: “The overall structure of this western part of the study area mirrors the same geometry of the oblique thrusts and the main EPGFZ described at the eastern part of the study area (Figure 2).”*

Idem, describe in what the two areas are the same.

**We rewrite this sentence as “this western part of the study area mirrors the same geometrical relationship between the oblique thrusts (such as the Trois Baies thrust fault)” and highlight it with underline.**

*Line 486: “…with the adjacent Tapion du Petit Goâve restraining bend 12 km to the east…”*

Please add this place to a map.

**We add this label to Figure 7B.**

*Line 468: “which makes this actively faulted lake the deepest”*

I think you should explain why we can consider this lake as actively faulted. Is there any onlaps in the upper layer?

**We delete “actively faulted” from this sentence and will explain later why we consider this lake as actively faulted.**

*Line 469 – 470: “The 30 m of recognizable stratigraphy (Fig-469ure 8A, B)”*

Figure 8B and C

**We correct this error accordingly hand highlight it with underline.**

*Line 472 – 473: “The upper 7 m of the lake sediment was cored and dated as 10 ka at the bottom of the core”*

By who? When? Are the results of this study is published? If yes add a reference.

**We add the citation of Higuera-Gundy et al., 1999 and highlight it with underline.**

*Line 473 – 475: “Extrapolating the sedimentation rate to the observed thickness of 30 m in the lake allows a minimum of 33 ka to be calculated for the age of the pull-apart basin on the EPGFZ.”*

Detail your calculation.

**We rewrite this sentence and highlight it with underline.**

*Line 490 – 493: “Considering the historical document record [Bakun et al., 2012], the dating of the core and sonar interpretation in Lake Miragoâne suggest that the most recent rupture in this lake is likely related to a historic earthquake in 1770 [Bakun et al., 2012].”*

This part needs more explanations. How you can relate the core with the most recent rupture? Did you image a discontinuity in the stratigraphy?

**The ruptures can be seemed on both Figure 8B and C. They are buried about 0.5 m deep. Link the deep with the core dating result from Higuera-Gundy et al., 1999, we can estimate the rupture is about 300 years old, which is around 1714 A.D.. In the historical record, there was earthquake happened in this area at 1770 A.D., so we infer that the ruptures in the chip sonar data are the result of 1770 rupture of the earthquake. We rewrite the sentences and highlight them with underline.**

*Line 497 – 500: “In summary, our lake studies, along with previous work, favor a model of a 10 – 15 km-wide transpressional zone that deforms thick, loosely-consolidated, Miocene to recent clastic rocks in coastal, marine, and lake settings as shown in three dimensions (Figure 10).”*

It is better to favor a model after discussing your results... There is an inconsistency between the legend of the fig. 10 and this sentence: the transpressional zone is 10-15km wide or 40km wide?

**We still think stating our model at the beginning, then giving detail about the model is better and more intuitive. The 10 – 15 km is not the whole 3D schematic block, just the width of the transpressional belt we propose. In addition. We add “three-dimensional block diagram” to the sentence to make it clearer. The changes are highlighted with underline.**

*Line 514 – 516: “more consolidated carbonate rocks and basalts exposed in the highlands south of the EPGFZ515(Figure 2).”*

add references.

**We add citation of Mann et al., 1991 to the text hand highlight it with underline.**

*526 – 529: “Our results, including the eastward extension of the EPGFZ into Dominican Republic, support the “thick-skinned” strike-slip model for the deformation of Hispaniola region as opposed to the southwestward propagation of the Trans-Haitian fold-and-thrust belt proposed by Pubellier et al.[2000].”*

Move this part to the conclusion.

**We move this part to conclusion part 6 and highlight it with underline.**

*Line 536 – 542:*

Maybe this part will be better in the legend of the fig. 11.

**We add part of this paragraph into the caption of Figure 11. Also, we rewrite the paragraph and merge it into the previous paragraph. The wrote parts are highlight with underlines.**

*Line 547 – 551: “As in the 2010 Mw7.0 Haiti earthquake, a secondary, blind thrust fault beneath the surface trace of the Sargent fault that, and oblique to the main San Andreas strike-slip fault, played a major role in the 1989 fault rupture and resulting pattern of regional uplift show in red color to the southwest and regional subsidence shown in green color to the northeast [Olson, 1990].”*

Where? Place it on the map.

**It was placed in the inset map of Figure 11. We add more cross-reference to the text in order to make it clearer. The changes are highlighted with underlines.**

*Line 550 -- 551: “show in red color to the southwest and regional subsidence shown in green color to the550northeast [Olson, 1990].”*

Subsidence is in blue color on your map.

**We correct this error and highlight it with underline.**

*Line 571: “conclusion”*

conclusions

**We correct this typo and highlight it with underline.**

*Line 572 – 578:*

It is not a result shown by your study.

**We strikeout this paragraph and highlight it with strikeout lines.**

*Line 595 – 598: “Our survey confirmed the pull-apart origin of Lake Mirogoâne and the lack of historical deformation on this western segment of the EPGFZ. Integration of the geologic data across the study area show an alternation in dip along nine northwest-striking, thrust faults at spacing of 5 to 40 km.”*

What about the active folds imaged at the lake bottom?

**We rewrite this sentence as "lack of deformation on this western segment of the EPGFZ during the 2010 Mw 7.0 earthquake" and highlight it with underline.**

*Line 800: Figure 2.*

Add the zoom of the figure 2B on the figure 2A. Describe what are cross-sections A, B and C in the legend. Correct the number of the figures for the lake azuey.

**We modified the figure accordingly and update the caption. The change is highlighted with underline.**

*Line 810: “Aftershocks of the 2010 earthquake”*

Reference?

**We add citations of Douilly et al. [2013, 2015] and highlight them with underline.**

*Line 811 – 814: “B-B’:Cross section based on surface mapping showing north- and south-dipping reverse faults deforming Plio-Pleistocene sedimentary rocks. C-C’: Cross section based on both sonar survey and the surface mapping showing north- and south-dipping, reverse faults deforming Plio-Pleistocene sedimentary rocks.”*

References for the cross-sections and the substratum ages?

**We add citations of [Massoni, 1955; Cox et al., 2011; McHugh et al., 2011; Saint Fleur et al., 2015] and [Mann et al., 1991] into the caption and highlight them with underlines.**

*Figure 4.*

The colors must be the same between the profile and its enlargement.

**They are the same color. We use the “eyedropper tool” to copy the color, so they must be the same. Maybe because of they are on top of the sonar profile, so they seem different from the pure colored boxes.**

*Line 831 – 832: “The EPGFZ beneath Lake Azuey forms a 10 m-wide zone that can be traced as a lineament to the east and west of Lake Azuey (Figure 2).”*

Be careful and coherent: the deformation of the stratigraphic layers in the northern part of your two enlargements are the same, but you trace an inverse fault on the 6A and a normal fault on the 6B.

**We correct this error on the figure.**

*Line 833: “The two strands of the EPGFZ”*

You show three faults on the fig 6A enlargement.

**The extra fault on the north is a belong to Jimani fault system. It is not a strand.**

*Line 836: Figure 7.*

Add the water depth unit.

**We add it to Figure 7A.**

*Figure 7: Legend “2010 coseismic”*

Precise that there is an extensional surface fracture.

**We reduce the size of the fracture line in Figure 7B.**

*Line 837: “Structure [Prentice et al., 2010]”*

Prentice does not represents the EPGFZ curved onland south of the Trois Baies fault. The EPGFZ trace "disappears" east of Tapion ridge and "reappears" in Goâve.

**We correct the figure, and add reference of Cowgill et al., 2012. The change is highlighted with underline.**

*Line 837: “[Douilly et al., 2015]”*

Douilly et al. 2013

**We correct this error and highlight it with underline.**

*Line 842: Figure 8.*

Add the horizontal scale of your profiles.

**We already have the “100 m” legend in both profiles.**

*Line 845: pull-apart basin*

Explain how you can say that there was a pull-apart basin with the stratigraphic discontinuities. Explain how it is folded now. Where are located the two main extensional faults on the profiles? You trace them on the map but not on the profiles.

**We talk about this in the text. But since we are not showing the northen edge in this figure, we strikeout this sentence and highlight it with strikeout line.**

*Line 847: “East-west trending line M5 (location shown on Figure 7B).”*

Check your thrusts faults. You have forgotten the most important thrust at the origin of the bigger fold of the profile.

We add it to the Figure 8C.

*Line 854: “Black arrows show southwest direction of the Gonâve microplate relative to the Caribbean plate”*

Reference

**We add reference and highlight it with underline.**