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## ***Interactive comment on “GPS derived ground motions (2005–2014) within the Gulf of Mexico region referred to a stable Gulf of Mexico reference frame” by J. Yu and G. Wang***

**Anonymous Referee #2**

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This paper presents largely a geodetic study of best estimating 3D GPS velocities in the Gulf of Mexico area. This part is presented rigorously, although I have some comments about the station selection in my detailed comments below. The remainder of the paper mentions some of the findings in places like southern Louisiana, Houston and Mexico city, but presumably the authors are working on some modeling studies on using these GPS results on e.g., inferring load changes or tectonic models to explain the observations. While I think that the result here deserves to be published, the real science that will result from these data is of real interest, and presumably that is still to come.

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Detailed comments.

P6655-L14 it is inappropriate to refer to DeMets et al. as that study did not minimize any (geodetic) velocities. There are hundreds of papers who apply this approach so I think no particular reference is needed here.

P6660-L5 Why have they be step-free? I understand why that may be important for the reference stations but in general you could solve for steps in your fitting procedure.

P6660-L5 Why use 4 years as a minimum cut-off? Blewitt and Lavalée (2002 (already mentioned by the authors) recommend a minimum of 2.5 years, although for the more uncertain vertical rates, a longer time may be considered.

P6660-L5 Given that you end up with using 148 stations, it is perhaps misleading to state the number of 450 station earlier. If the required absence of steps and 4 year minimum would be lifted, the authors could end up with a number close to 450.

Why did the authors not consider station INEG in Mexico City?

P6660-L6 It is important to not here that the transformation in this regional frame also reduces region-wide common-mode errors, making the date less noisy and allowing a better comparison between rates at stations that were operational over different time-spans.

I am surprised that the work of Blewitt et al (2013) on the NA12 reference frame was not mentioned. Their approach is very similar to the one in this paper, but for all of North America.

P6660-L7 You should tabulate the rates of all the stations presented here, not just those of the reference stations.

Typos:

P6652-L16 costal → coastal P6661-L3 add “area” after suburban

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 6651, 2015.

**NHESSD**

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