

## **Authors Comments to Comments of Referee 2 (Mazova et al. “Evidence of ...”)**

1. *The present article apparently attempts to show that the earthquake and tsunami that took place on April 1st, 2014 near Pisagua, Chile had been predicted by an earlier article of some of the authors.*

**Answer:** In 1999, in a joint Chilean-Russian study of catastrophic earthquakes and tsunamis near the Chilean coast (see, e.g., Mazova R.Kh. and Ramirez J.F. “*Tsunami waves with an initial negative wave on the Chilean coast*” // Natural Hazards (1999)), it was proposed that a *catastrophic* earthquake similar to 1877 should occur over the next 10–20 years (i.e. in 2010–2020) of the *northwestern part* of the Chilean coast (see recurrence law in (Mazova R.Kh. and Ramirez J.F., 1999)). The present paper indicates that the *catastrophic* event of earthquake and tsunami that took place on April 1st, 2014 near Pisagua, Chile is supporting to such proposal of seismic gap for such event (100-150 years) presented in our earlier works (Mazova and Ramires, 1999; Mazova and Soloviev, 1995).

2. *I consciously stress that they \*apparently\* intend to do so, because the article itself clarity on this regard and this could be only inferred from the title and a passing comment on lacks the later stages of the article.*

**Answer:** In this paper, unlike all cited by the Referee, the authors consider a dynamical keyboard model of an earthquake. This model was successfully applied to the Kuril-Kamchatka subduction zone, which almost accurately indicated (first in the world!) the location of the epicenters of the three strongest tsunamigenic earthquakes, September 30, 2006, November 15, 2006, and January 13, 2007 that followed in the same region six months after the work was published (Lobkovsky, L.I., Mazova, R. Kh. et al., Doklady RAS, 2006). Since the paper (Mazova R.Kh. and Ramirez J.F., 1999) provides conclusions of the authors on the similarity of the continental slope of the deep sea trench near of northwestern part of the Chilean coast and Kuril-Kamchatka area, in this paper the keyboard model of the earthquake was also used. It should be noted that this model was additionally confirmed recently with satellite geodesy data (Lobkovsky et al., 2019).

3. *It is hard to find other evidence for such claim other than a brief reference to earlier work.*

**Answer:** In the paper, in addition to “a brief reference to earlier work” there are presented the number of other evidences supporting our proposal. We believe that our justification for the possibility of a *catastrophic* earthquake in the seismic gap of the middle Kuril Islands and its confirmation is sufficient to justify the possibility of a *catastrophic* earthquake and tsunami in the zone under consideration, based on the recurrence law for the Chilean coast, constructed in (Mazova R.Kh. and Ramirez J.F., 1999).

4. *Whether these correlate is not established at all bar the fact that an earthquake occurred in a seismic gap.*

**Answer:** The work deals with the repetition of a *catastrophic* tsunamigenic earthquake of a similar magnitude in the same section of the water area after a certain period of time.

5. *Upon reading the article, moreover, it is difficult to understand its actual aim and objectives.*

**Answer:** The “actual aim” of the paper is to indicate that a data and location of the event on April 1st, 2014 near Pisagua, Chile corresponds to predictions following from recurrence law constructed in our previous work (Mazova and Ramirez, 1999) (also, see above (points 1,2)). Also, a numerical simulation of this event was carried out within the framework of the keyboard model, which was compiled by the staff of the seismology laboratory of the Shirshov Institute of Oceanology of the Russian Academy of Sciences.

6. *The article not only lacks a clear structure and line of reasoning (and leaving aside the very poor English grammar), but constantly offers a wide range of information that does not relate to the main topic, which obfuscates the reading.*

**Answer:** We agree that the structure of the paper needs to be made more understandable. The grammar of the English language will be adjusted, and unnecessary information, where possible, will be reduced.

7. *While doing this, sometimes elements are omitted without explanation, which is even more confusing. For example, when reviewing the history of Chilean seismicity, events such as those of 1922 and 1943 are omitted despite its importance.*

**Answer:** The work mainly deals with the *catastrophic* events of this century, and the Table shows the *catastrophic* events of only this century, the rationale for which is given in reference to the work (Mazova and Soloviev, 1994), which refers to seismic activity around the perimeter of the Pacific Ocean to be increased significantly by the end of the 20th and the beginning of the 21st centuries.

8. *Tables and figures appear rather haphazardly and very often they have no explicit relation to the text.*

**Answer:** It is not clear to me what Tables and figures the reviewer speaks of, I need to write in detail.

9. *The referencing is mostly dated and self-referencing.*

**Answer:** The authors of this paper refer not to dated references but to classical works that determine the essence of the problem (such works are relevant in any paper). As for a large number of different works devoted to this earthquake and tsunami, as a rule, any similar event causes a series of the same type of work, slightly differing in ideological orientation. The references to our papers are only those including our original method not yet available in other papers, and are given only when it is necessary.

10. *This would not be a problem per se, but in doing so the authors ignore a large body of research published since the occurrence of the earthquake and tsunami of interest.*

**Answer:** Yes, we'll add a couple of papers to the list of references.

11. *Several of these works touch upon topics that are closely related to the ones of the present article, and they do so with greater detail.*

**Answer:** Yes, we'll add a couple of papers to the list of references.

1. Lay, T., H. Yue, E. E. Brodsky, and C. An (2014), The 1 April 2014 Iquique, Chile, Mw 8.1 earthquake rupture sequence, *Geophys. Res. Lett.*, 41, doi:10.1002/2014GL060238.
2. Gusman, A. R., S. Murotani, K. Satake, M. Heidarzadeh, E. Gunawan, S. Watada, and B. Schurr (2015), Fault slip distribution of the 2014 Iquique, Chile, earthquake estimated from ocean-wide tsunami waveforms and GPS data, *Geophys. Res. Lett.*, 42, 1053–1060, doi:10.1002/2014GL062604.

12. *It is therefore unclear why they are not considered at all.*

**Answer:** We know these works, however, for present work there is no special need to include them in the consideration, since each of these works has its own solution features and its own deficiencies in solving the problem (see, e.g. Chen et al., 2016).

13. *This poses a serious problem for the article as it adds no value to the current state of knowledge.*

**Answer:** The article gives a quite novel understanding of the problem of tsunami generation and propagation, since the dynamical structure of the key seismic source in the subduction zone, which is characteristic for Chilean subduction zone, is important for this problem.

14. *There are fundamental methodological errors as well.*

**Answer:** (see above).

15. *They use appear strike angle that bears no correlation with the physical configuration of the area under study, although it is not possible to know for sure from the data as presented, since for each block only the location and displacement are given.*

**Answer:** The choice of the earthquake source, its shape and location, was based on accurate seismic data from the USGS National Earthquake Information Center, summarized by the staff of the seismology laboratory of the Shirshov Institute of Oceanology of the Russian Academy of Sciences. An analysis of the dynamical transition process of the formation of the distribution of displacements of the seabed shows that the processes occurring in the seismic source are ultimately converted to the dynamical component of the vertical displacement of the bottom. Therefore, taking into account all the characteristic parameters of an earthquake, we recalculate them into a vertical displacement (reverse or fault). In this case, due to the incompressibility of the water and hydrostatic pressure, a tsunami source is formed, and the wave height above the seismic source will be the same as the displacement in the source.

16. *Moreover, they use a sparse set of sea surface elevation data to validate the modeling, omitting time series very close to the source such as that of Iquique and Pisagua. How it is possible to expect a valid source model omitting such relevant data?*

**Answer:** (see point 15).

17. *How it is possible to expect a valid source model omitting such relevant data?*

**Answer:** (see point 15).