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Global Natural Disasters: An Earthquake Assessment

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Abstract:- Every day the Earth vibrate under our feet, the Earth is our home but we have not yet completely discovered the secrets it hides under its 100 km of crust and we do not know and cannot predict why, where and when it starts to quake. Everyday somewhere around the world dozens of Earthquakes occur, most of them being so small that we cannot even perceive but some are large and great depending on where they occur, they can cause very significant damage to both our lives and property. Earthquake monitoring of greater than or equals to four (4) Reikter scale was monitored for a period of five (5) months from August 2021 to December 2021 using ShakeNet software. A total of three thousand seven hundred and nine (3,709) earthquakes were recorded within this period. Analysis of the results revealed that on 9/10/2021 at about 10:58:30 an earthquake of magnitude 7.5 occurred, on 28/11/2021at about 10:52:13 an earthquake of magnitude 7.5 occurred, 02/10/2021 at about 6:29:19 an earthquake of magnitude 7.3 occurred, on 14/08/2021 at about 12:29:08 an earthquake of magnitude 7.2 occurred, on 08/09/2021 at about 01:47:47 an earthquake of magnitude 7.0 occurred. On 21/10/2021 at about 8:10:43am interestingly both the deepest and shallowest depth earthquake occurred at Chile-Argentina Border Region with 497m and 0m respectively. Lack of many monitoring stations in Africa is one of the biggest challenges faced when the station you are following is down for sometimes data might be missed.

I. INTRODUCTION

If a large earthquake strikes in a densely populated area, the damage that it will create will be significant, and will be watched/known and perceived by people all around the world. People know Earthquakes only from their effects and not from their causes; it is therefore important to understand the driving forces behind Earthquakes and hopefully find a way for seismic prediction.

On 21 December 1946, the Nankaido earthquake of 8.1 occurred along the Nankai Trough in a western region adjacent to the focal region of the Tonankai earthquake, [1] pointed out that the difference in tidal level between Tosashimizu in southwestern Shikoku and Hosojima on the east coast of Kyushu, seemed to change appreciably prior to the Nankaido earthquake.

It is generally recognized that slow crustal deformations play an important role in the earthquake mechanism. They have been often observed both preceeding and following larger earthquakes [2]. In the present paper, we consider a prolonged, slow ground deformation recorded prior to the 1976 Friuli (Italy) earthquakes. This earthquake sequence consisted of two main shocks of comparable magnitude *(M* = 6.5) which occurred on 6 May and 15 September 1976 respectively, and of a large number of aftershocks. During three years before the earthquake a tiltmeter placed near Tolmezzo, about 15 km north-west of the epicenter of the earthquake recorded an almost continuous ground tilt. The net tilt recorded during the whole period was unusually large, about 3 minutes of arc, approximately in the south direction.

The state of the art is well described by Zerva in a report of Drexel University [3] which Earthquakes are associated to the evolution of the early Earth, the drift of the continents from an original supercontinent called Pangaea and the formation of the tectonic plates in continuous movement

The association of plate tectonics and Earthquakes is due to the observation that the majority of Earthquakes occur along the boundaries of these tectonic plates and earthquake then may be caused by the sudden slip along a fault [4] associate the volcanic activity to Earthquakes because about 90% of the world's Earthquakes occur along the Ring of Fire, that surrounds the Pacific basin, where a large number of volcanic eruptions and about 90% of the world's earthquakes [5].

The sophisticated and complex monitoring networks distributed on continents and in the oceans, the continuous satellite measurements of the level of the crust and of the seas and recording gravity and magnetic field variations over extended time periods and regions do not explain the mechanism of a quake generation and the information available is insufficient for predicting large Earthquakes. Earthquakes are caused by three main reasons, all related to

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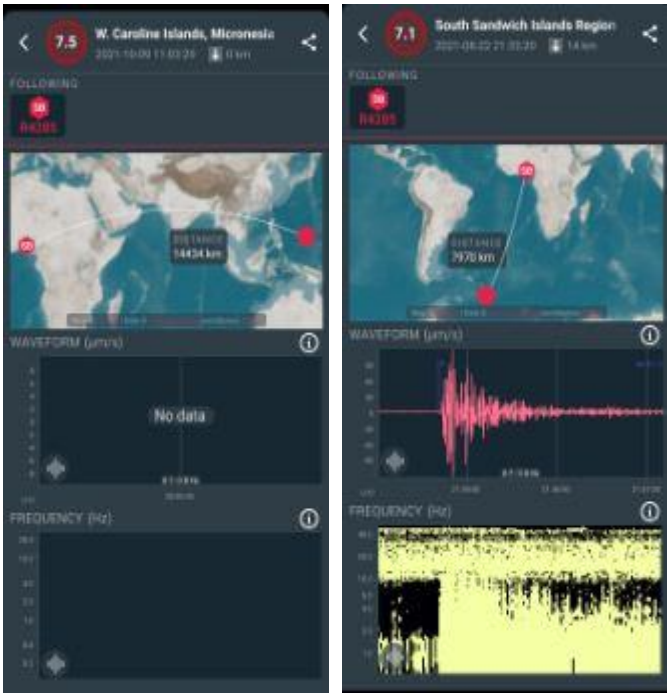
gravity: plate tectonic movement, volcanism and localized causes as cave collapses.

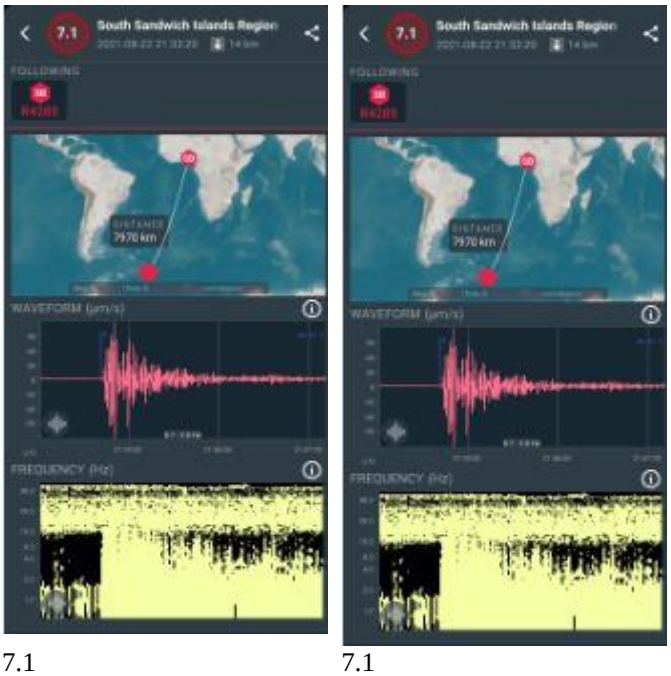
A. Research methodology

Earthquake monitoring of greater than or equals to four (4) Reikter scale was monitored for a period of five (5) months from August 2021 to December 2021 using ShakeNet software. A total of three thousand seven hundred and nine (3,709) earthquakes were recorded within this period.

B. Data analysis

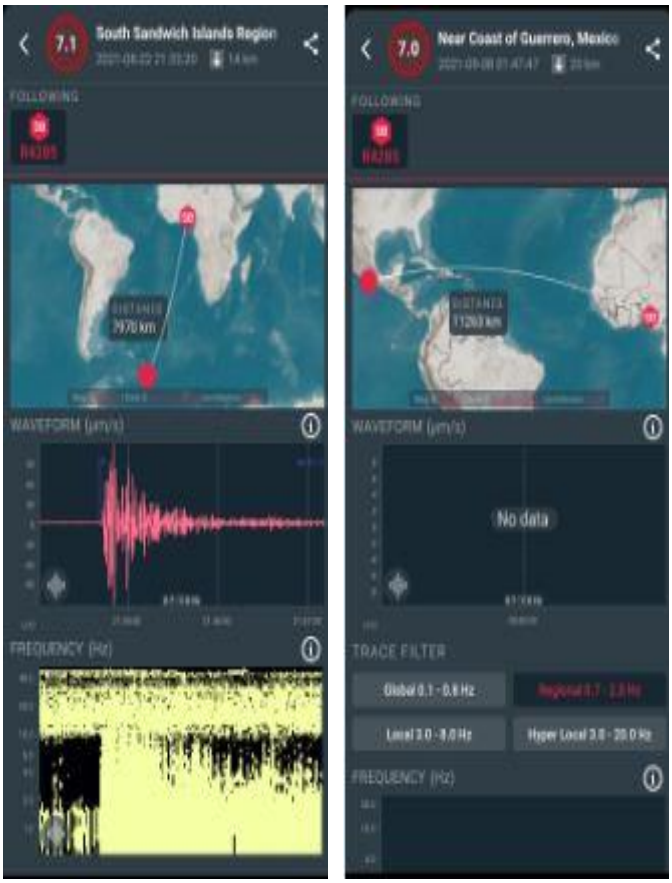


7.5 7.1

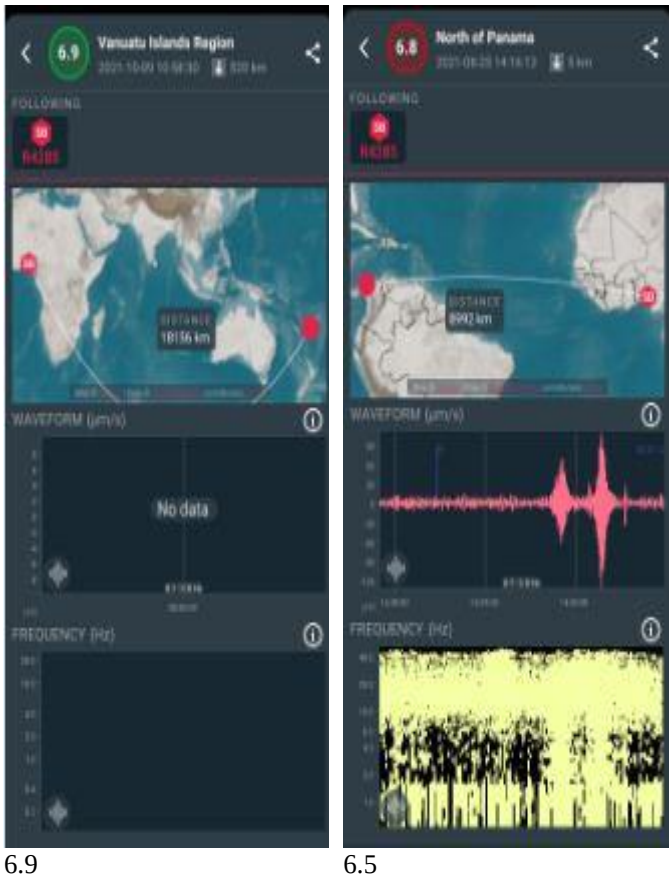


7.1 7.1

Fig 1: Earthquake magnitude of 7.1 to 7.5 scale



7.1 7.0



6.9 6.5

Fig 2: Earthquake magnitude of 7.1 to 6.5 scale

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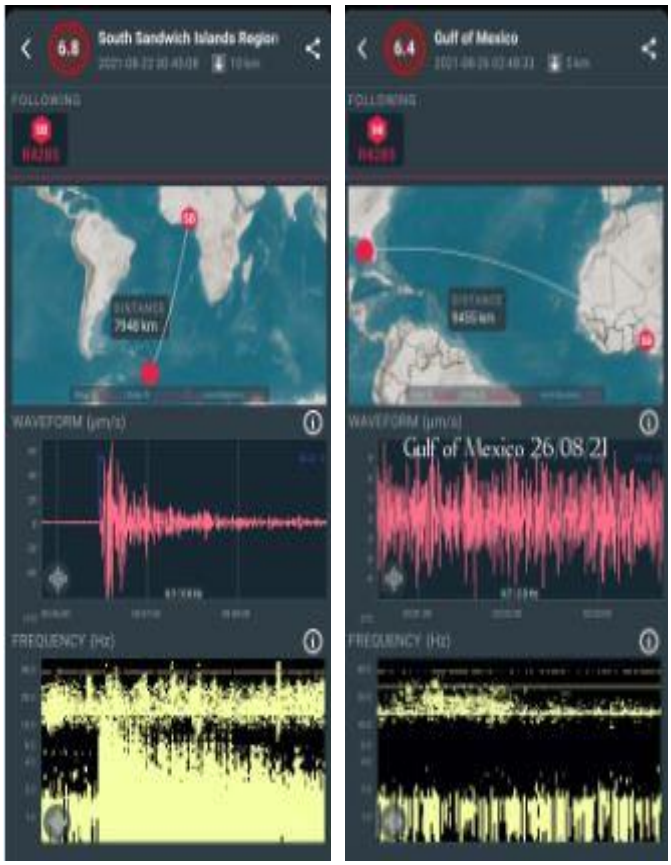
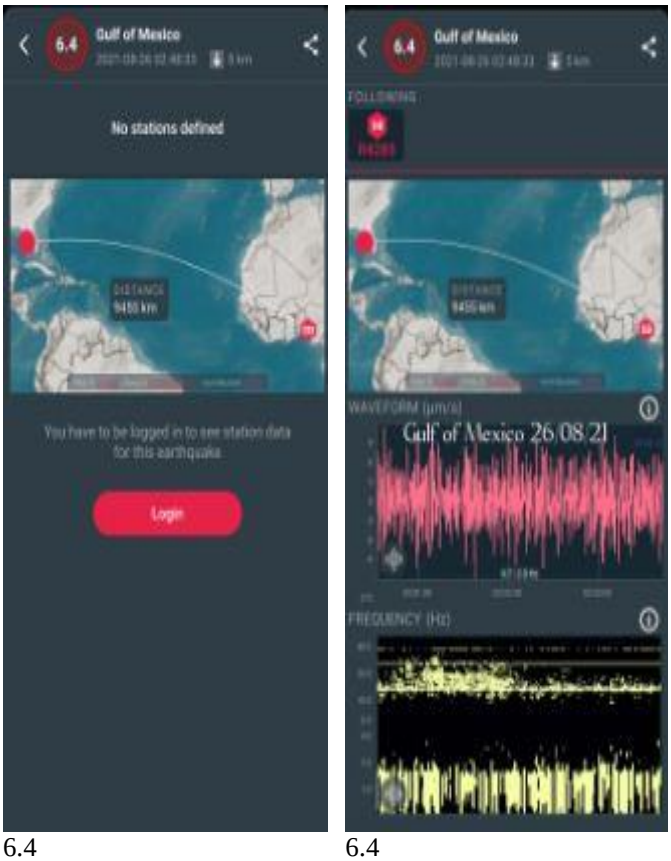
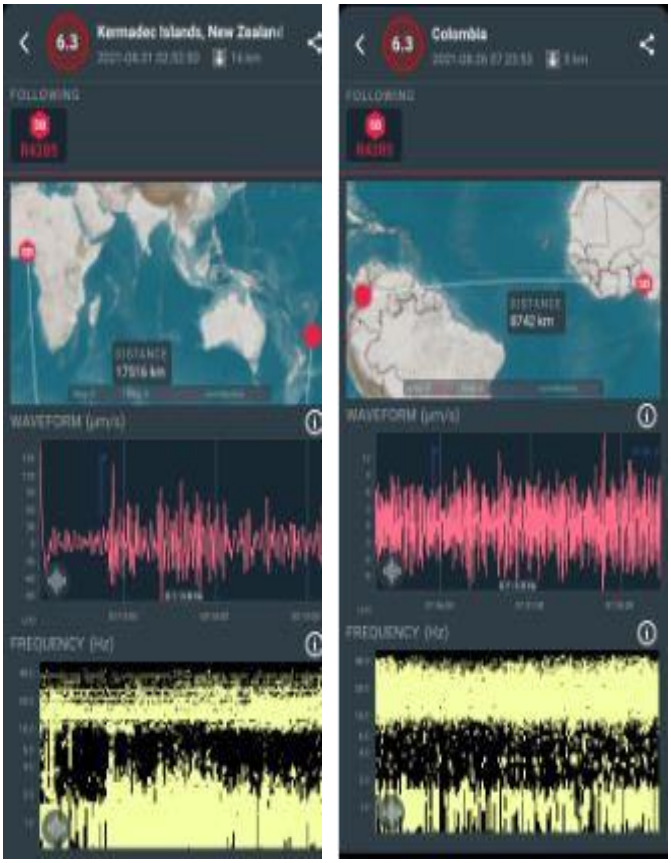


6.5 6.4

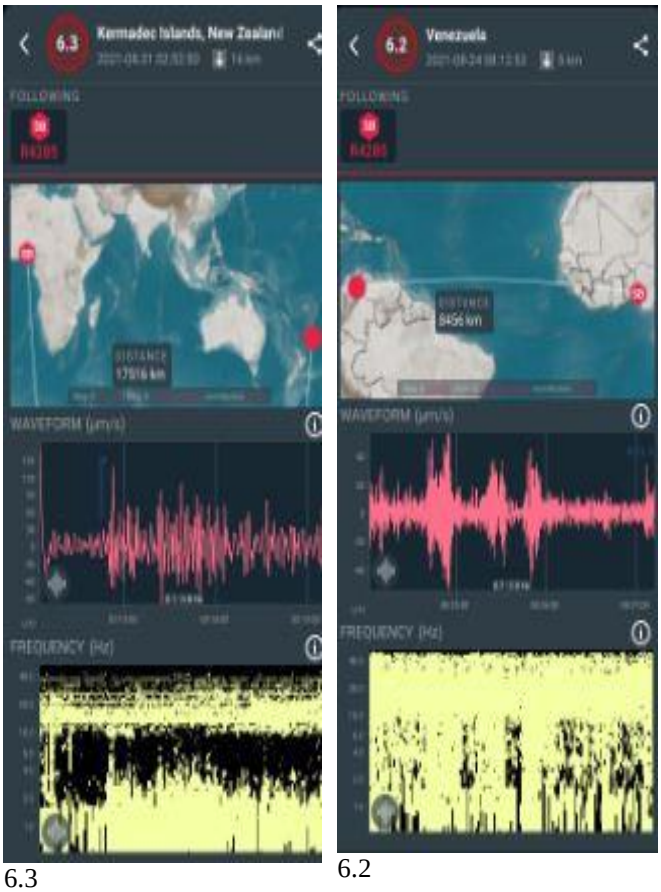


6.4 6.4

Fig 3: Earthquake magnitude of 6.5 to 6.4 scale



6.3 6.3



6.3 6.2

Fig 4: Earthquake magnitude of 6.3 to 6.2 scale

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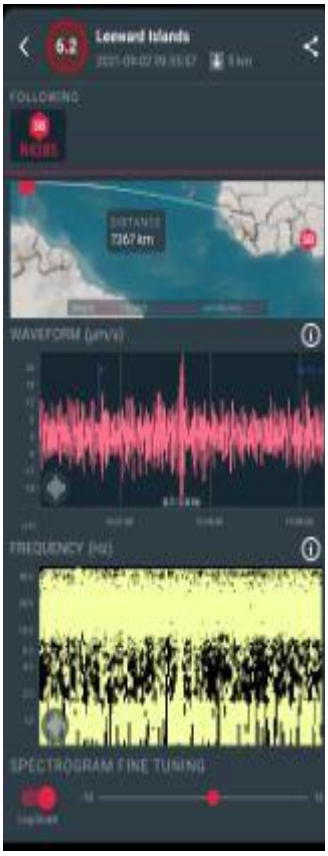
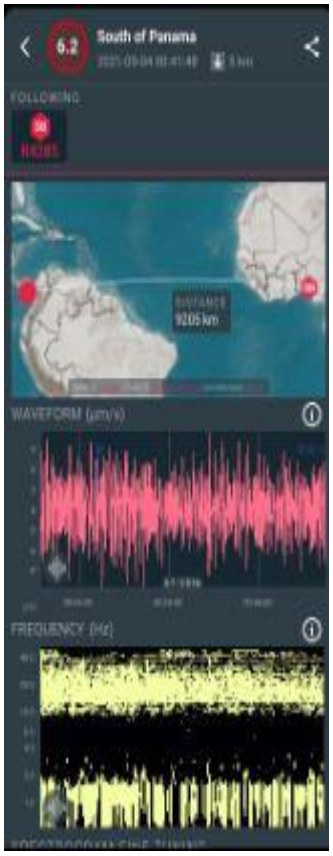
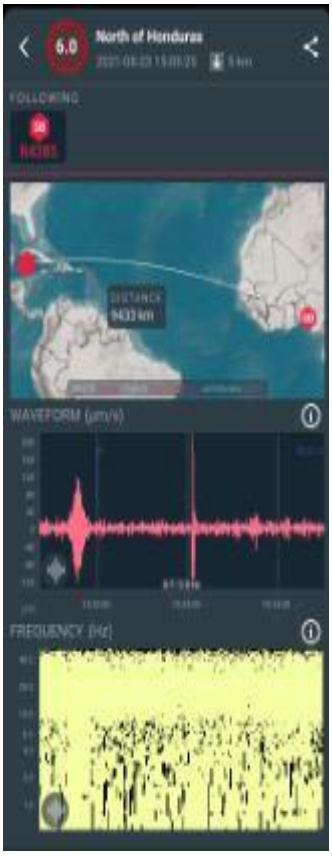


6.2



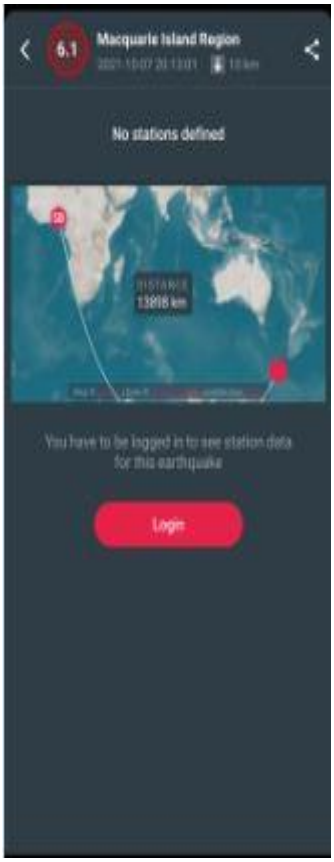
6.2

6.0



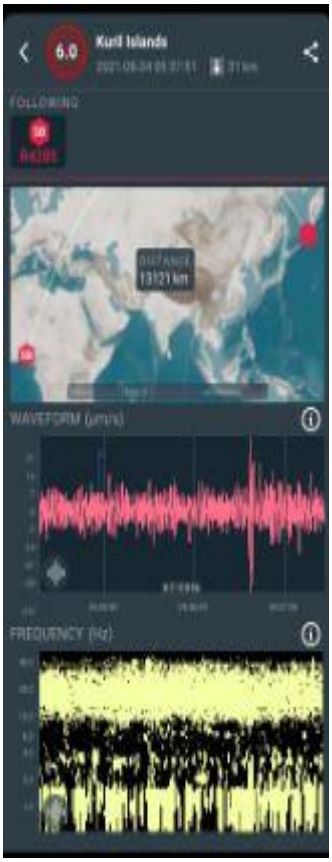
6.0

6.1

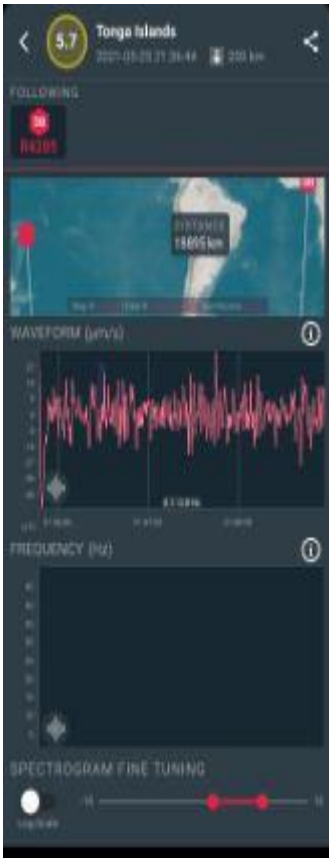


6.1

Fig 5: Earthquake magnitude of 6.2 to 6.1 scale



6.0



5.7

Fig 6: Earthquake magnitude of 6.0 to 5.7 scale

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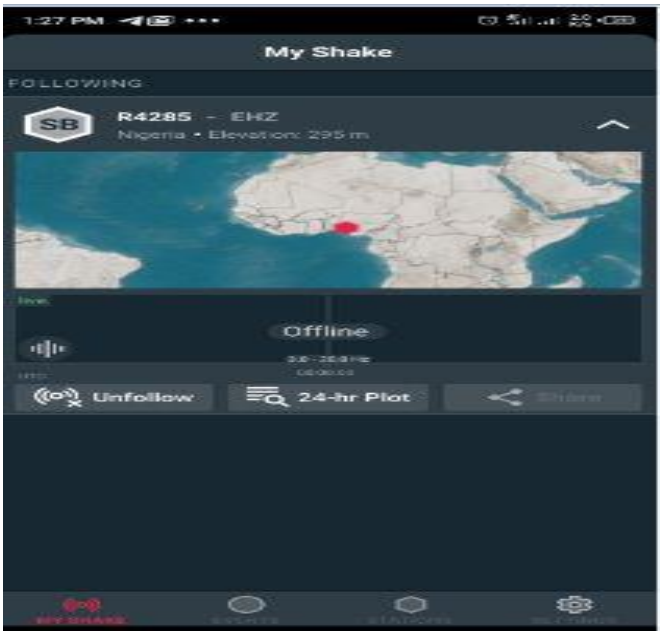

Fig 7: Monitoring station when it is down

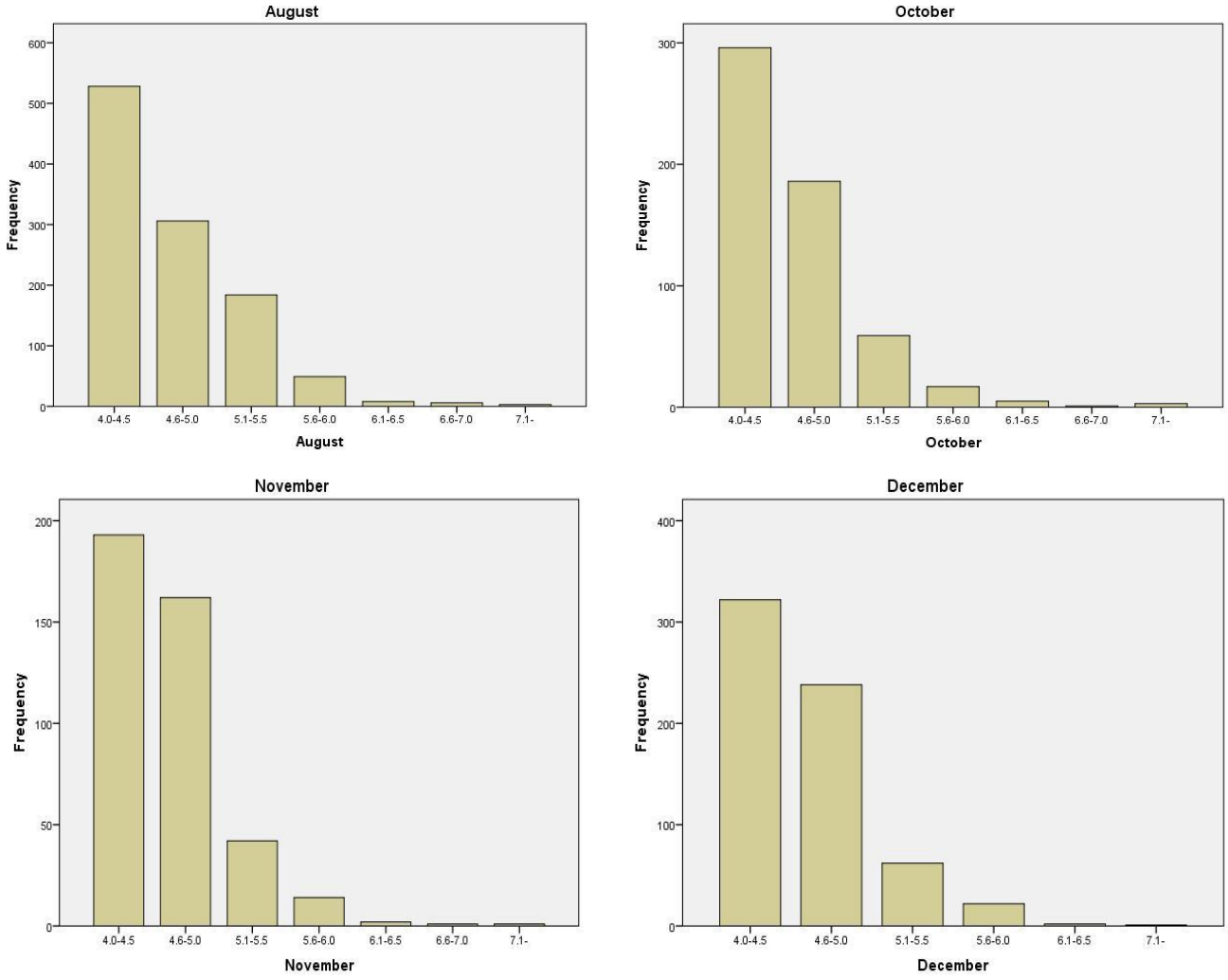

Fig 8: Histogram of monthly earthquake recorded

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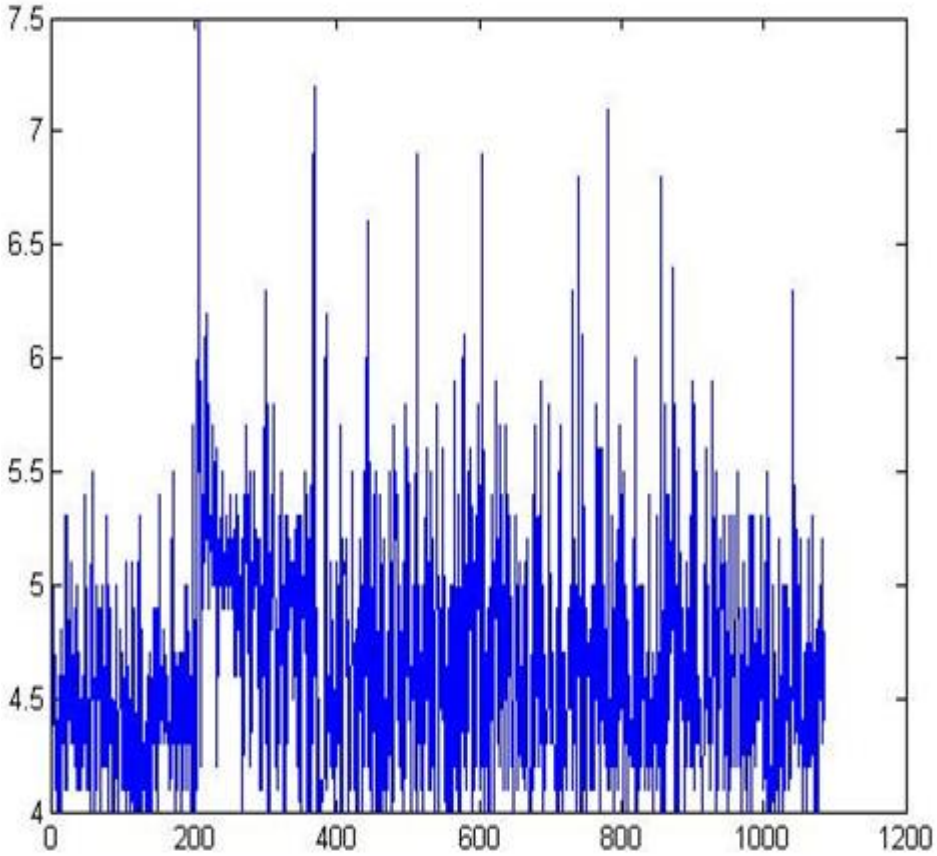

Fig 9: August Earthquake data

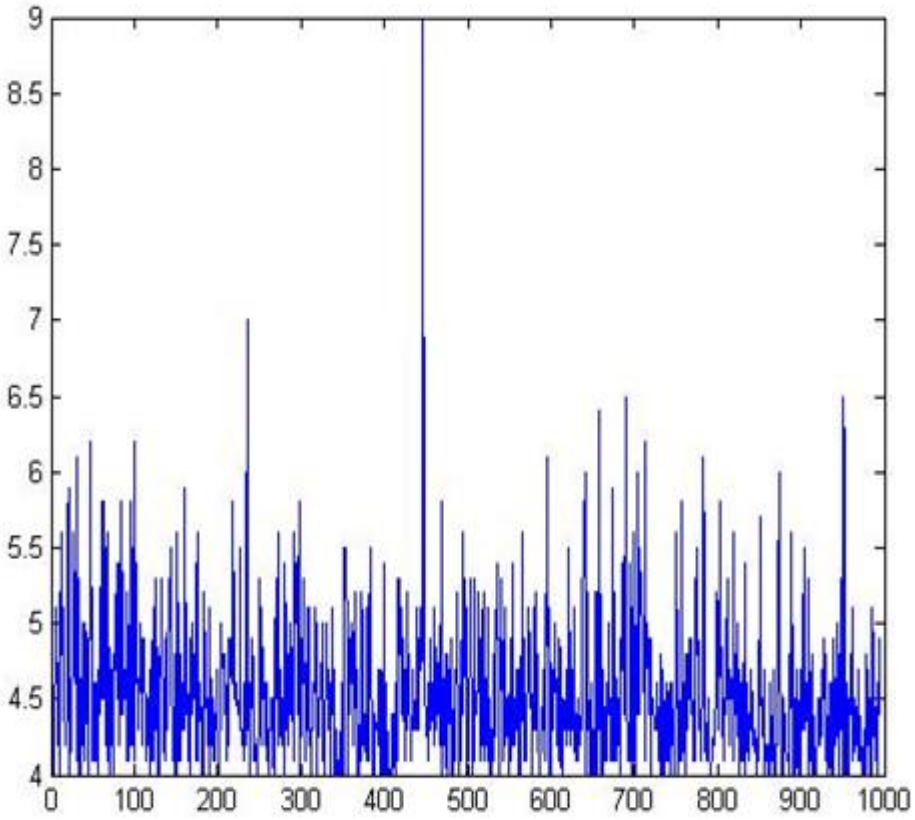

Fig 10: September Earthquake data

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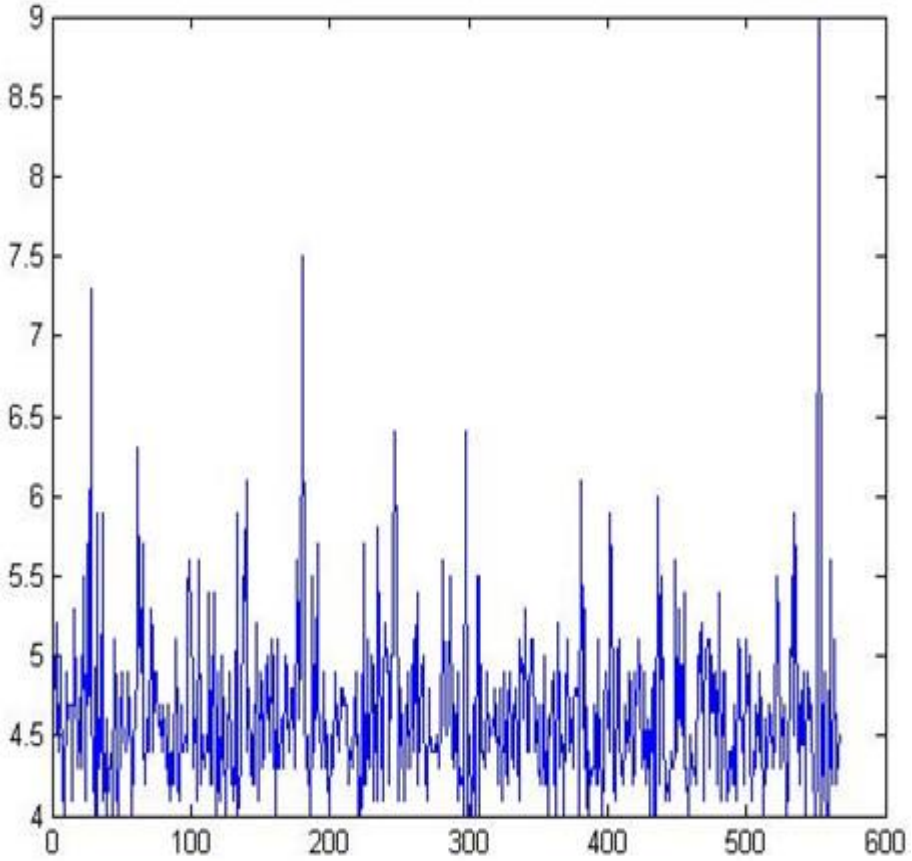

Fig 11: October Earthquake data

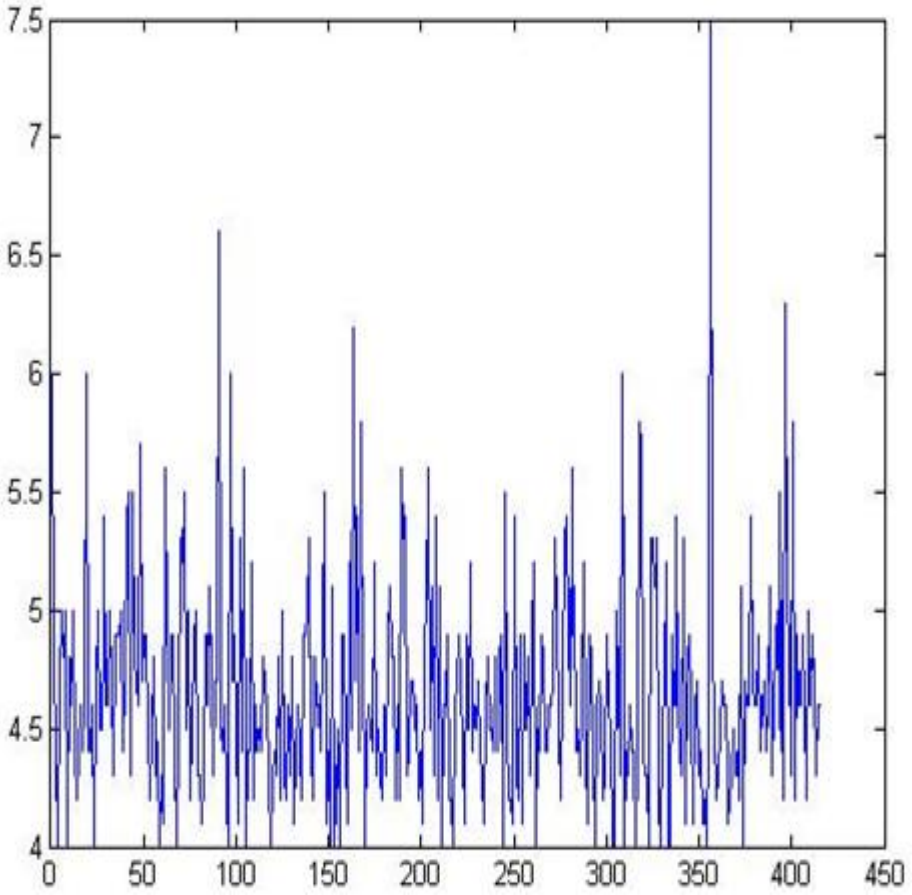

Fig 12: November Earthquake data

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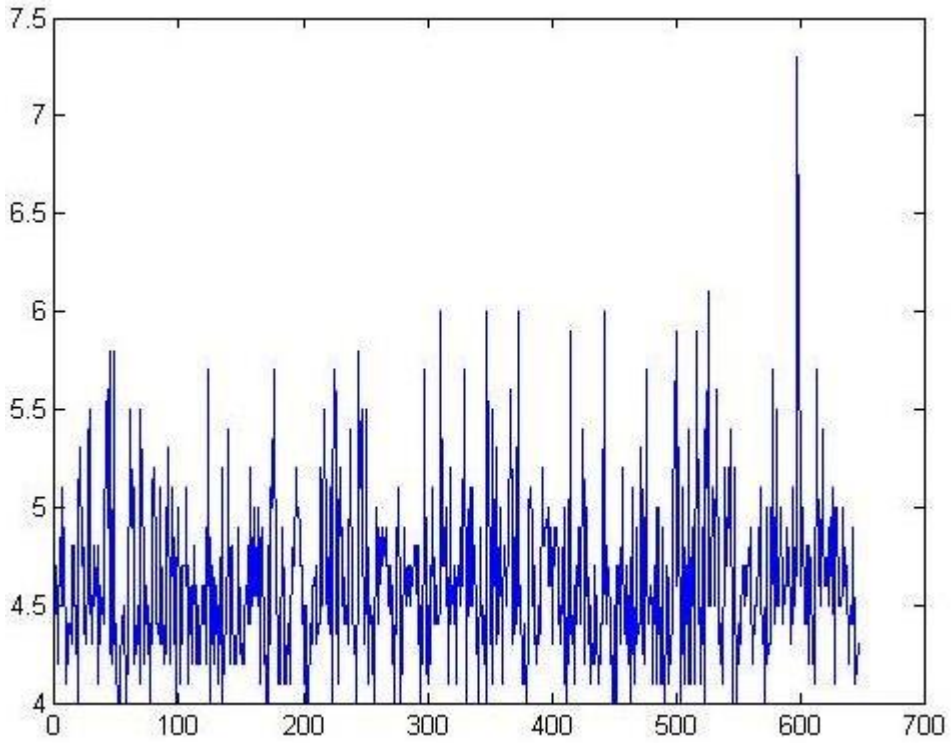

Fig 13: December Earthquake data

Table 1: General table showing the dates, magnitudes, Times, depths and places of the earthquakes

Date	Magnitude	Time	Depth(m)	Place
12/8/2021	6.2	19:44:55	62	
13/8/2021	6.3	10:34:29	10	
14/8/2021	6.9	11:57:44	33	
	7.2	12:29:08	10	Andreanof Islands, Aleutian islands
	6	14:11:57	5	Crete, Greece
15/8/2021	6.6	3:35:26	5	East of Kuril Islands
16/8/2021	6.9	11:10:36	14	Sea of Japan
17/8/2021	6	16:34:03	5	
	6.1	17:53:27	34	
18/9/2021	6.9	10:10:04	89	Crete, Greece
21/9/2021	6.3	17:06:38	5	
22/8/2021	6.8	0:45:08	10	Near Coast of Guerrero, Mexico
	6.1	8:42:21	5	Chile-Argentina Border Region
	7.1	21:33:20	14	Chile-Argentina Border Region
24/8/2021	6	15:09:25	5	
25/8/2021	6.8	14:16:13	5	
26/8/2021	6.4	2:48:33	5	Crete, Greece
31/8/2021	6.3	2:52:50	10	
1/9/2021	6.1	21:04:05	5	Gulf of Mexico
2/9/2021	6.2	9:55:57	5	Leeward Islands
4/9/2021	6.2	0:41:48	5	South of Panama
8/9/2021	7	1:47:47	20	Near Coast of Guerrero, Mexico
13/9/2021	6.2	5:18:13	193	Chile-Argentina Border Region
15/9/2021	6.4	4:24:35	200	Chile-Argentina Border Region
19/9/2021	6.1	17:30:48	5	
21/9/2021	6.4	13:14:31	17	
22/9/2021	6.5	9:57:08	31	Near Coast of Nicaragua
	6	13:53:20	5	Windward Islands
	6.2	19:09:14	5	
24/9/2021	6.1	11:52:31	40	Andreanof Islands, Aleutian islands

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27/9/2021	6	6:17:22	9	Crete, Greece
	6.5	8:37:05	401	East of Kuril Islands
	6.1	8:37:05	368	Sea of Japan
2/10/2021	7.3	6:29:19	536	Chile-Argentina Border Region
4/10/2021	6.3	3:54:07	10	
7/10/2021	6.1	20:16:33	10	Near Coast of Guerrero, Mexico
9/10/2021	6.9	10:58:30	520	Chile-Argentina Border Region
	7.5	11:03:29	0	Chile-Argentina Border Region
12/10/2021	6.4	9:24:03	10	
15/10/2021	6.4	2:44:57	23	Crete, Greece
18/10/2021	6.1	7:26:52	96	
21/10/2021	9	8:10:43	497	Chile-Argentina Border Region
1/11/2021	6	0:02:49	22	Andreanof Islands, Aleutian islands
15/1102021	6.6	15:45:13	10	Crete, Greece
	6	2:23:30	10	East of Kuril Islands
18/11/2021	6.2	14:18:05	35	Sea of Japan
25/11/2021	6	12:04:10	40	
28/11/2021	7.5	10:52:13	12	Crete, Greece
30/11/2921	6.3	10:36:18	10	

On 21/10/2021 at about 8:10:43 an earthquake of magnitude 9 occurred, on 9/10/2021 at about 10:58:30 an earthquake of magnitude 7.5 occurred, on 28/11/2021at about 10:52:13 an earthquake of magnitude 7.5 occurred, 02/10/2021 at about 6:29:19 an earthquake of magnitude 7.3 occurred, on 14/08/2021 at about 12:29:08 an earthquake of magnitude 7.2 occurred, on 08/09/2021 at about 01:47:47 an earthquake of magnitude 7.0 occurred. On 21/10/2021 at about 8:10:43am interestingly both the deepest and shallowest depth earthquake occurred at Chile-Argentina Border Region with 497m and 0m respectively.

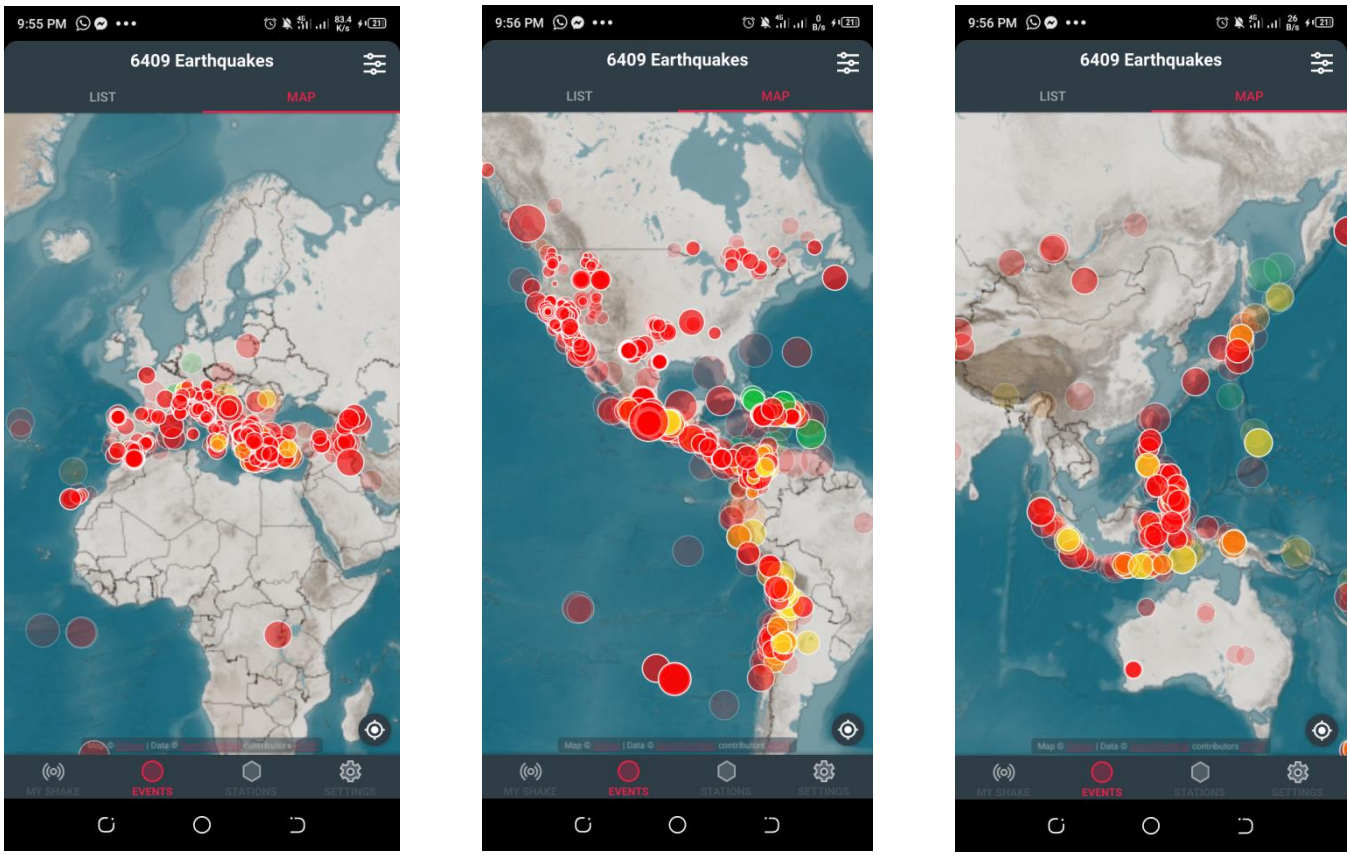

Fig 14: An example of 6,409 global Earthquakes during the data collection

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II. CONCLUSION

This short note shows how the Earth, we are living on, still hides many of its secrets: we can measure with great precision every centimeter of its surface but, when we imagine to drill the crust more than 100 km deep, things lose focus and clarity. On the other hand the crust is not so quiet and our life suffers from time to time terrifying catastrophes that scientists are striving to understand and possibly to predict. Our new view of gravity provides an additional explanation on the evolution of the Earth and on the formation of fractures in the crust, generating everyday vibration in all continents and under the oceans. This mechanism may now be incorporated by the experts in geological sciences and seismology in their future investigations.

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