On the relationship between seismic activity and other natural phenomena.

I joined CREDO after I met Piotr following a paper of his about 10.1-10.2-year periodicity he and co-authored derived in the paper.

I came across similar periodicity a few years so, from a rather different point of view when checking the influence of tidal forces on seismic activity. There are several types of such periodicity: 13-14 days, 27-28 days, 412-413 days, and 10.1-10.2 years. But why and how do the tidal forces affect seismic activity? The current establishment denies that the Moon and Sun can affect, let alone cause, earthquakes. Not only do tidal forces affect earthquakes, they also affect celestial phenomena; it's detected but remains unexplained.
It is also reasonable to expect a 12-hour-25-minute periodicity; yet, as Piotr has informed me, his work points toward a 12-hour periodicity. So, we've had an on-an-off argument about the missing 25 minutes. Here I attempt to explain why the tidal force is a major factor in seismic activity and why there should be a 12-hour-25-minute periodicity.

We start with the most overlooked property of Earth's geology that I call *(almost)-antipodal symmetry* that reflects chiral symmetry of continental borders.

Two points on the surface of the Earth are said to be *antipodal* if they are located on opposite sides of the Earth's surface. The coordinates of such points are either

$$x^{\circ}N,\ y^{\circ}E \quad \text{and} \quad -x^{\circ}S,\ (180-y)^{\circ}W$$

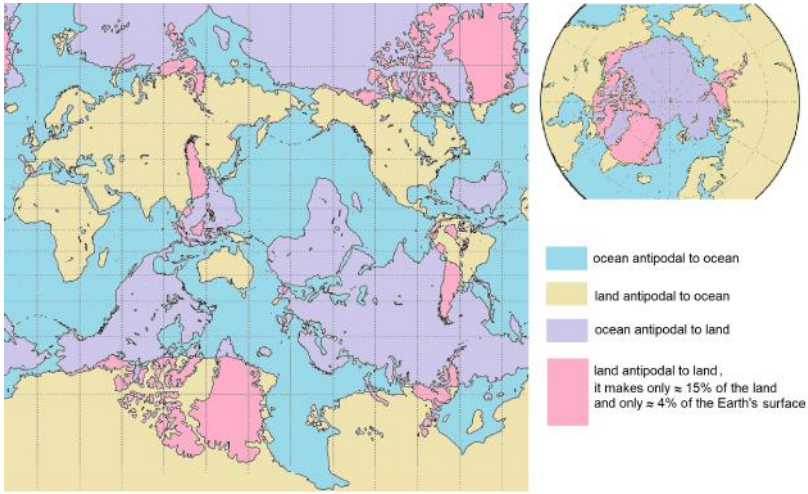
or

$$x^{\circ}S,\ y^{\circ}E \quad \text{and} \quad -x^{\circ}N,\ (180-y)^{\circ}W$$

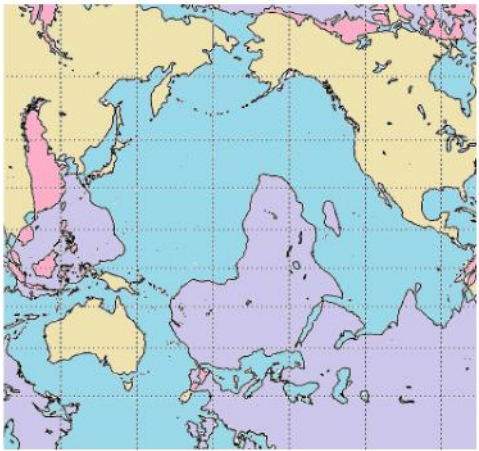
One point of such a pair is often called the *antipode* of the other point.

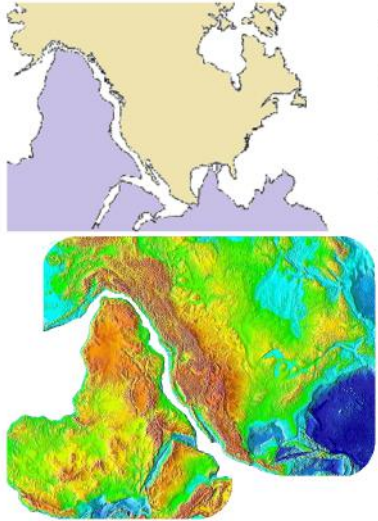
The *antipode of a geographical region* (be that a lake, a continent, an island, etc.) is the set of all points antipodal to the points of the region.

Map of antipodes.



We may notice that the antipode of Africa snugly fits into North America.





The antipode of the eastern boundary of Africa is practically identical to the western boundary of North America!

Why?

It cannot be explained by Continental Drift. To show that we may use the argument similar to set orientation taught in Calculus when the flow of vector field across a surface is discussed. We may say that a set and its antipode are *chiral on the Earth's surface*, unless the set posses a mirror symmetry by itself.

Africa

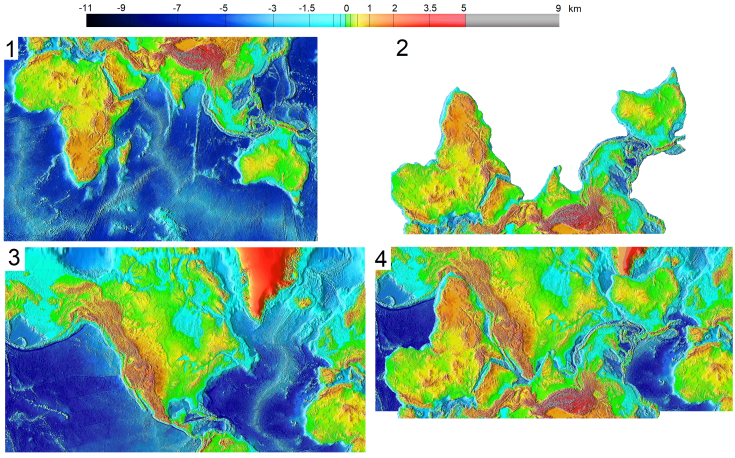
If you stand near Madagascar facing Saudi Arabia, Africa will be on your left and it will stay on your left as the continents drift

Antipode of Africa

Similar action applied to the antipode of Africa, will resilt in the antipode of Africa being on your right

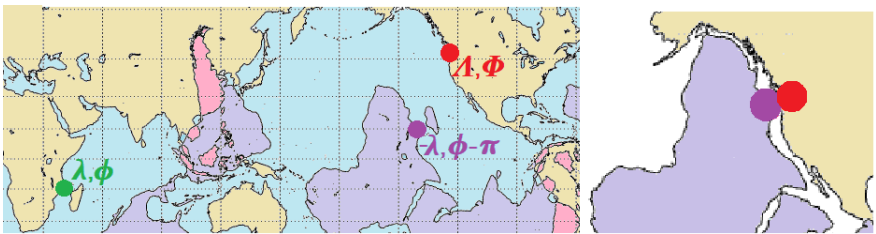
Antipode of Africa rotated by 180°

The matching of boundaries is not restricted to North America and the antipode of Africa.

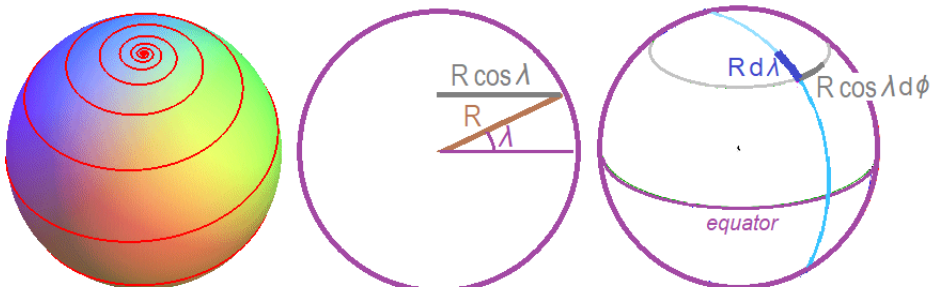


Although the fit is seen in many projections, it is best in the Mercator projection. Let (λ, ϕ) be the latitude and longitude of a point on the boundary of a continental shelf, $(-\lambda, \phi - 180^\circ \bmod 360^\circ)$ be the latitude and longitude of its antipode; (Λ, Φ)be the latitude and longitude of the point where $(-\lambda, \phi - 180^\circ \bmod 360^\circ)$ is moved. Then, due to the properties of the Mercator projection, the boundaries of the continents/continental shelves on opposite sides of the globe are related by two formulas

$$\Phi - \phi + 180^\circ \bmod 360^\circ \approx const = F \quad \text{and} \quad \frac{1-\sin\lambda}{1+\sin\lambda} \cdot \frac{1-\sin\Lambda}{1+\sin\Lambda} \approx const = L$$



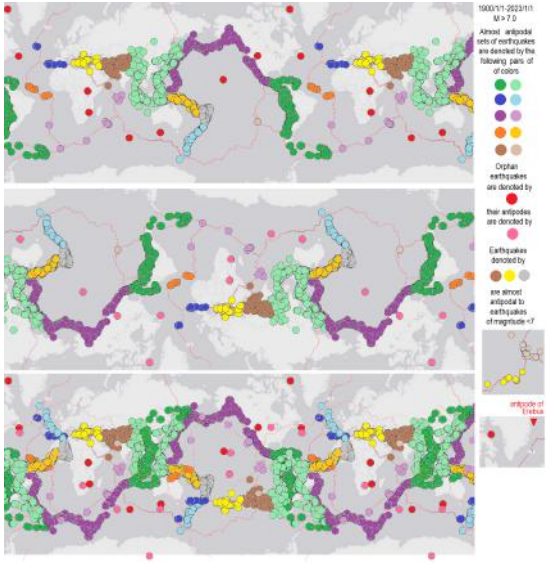
Straight lines in Mercator projection are spirals on the globe, also known as loxodromes or rhumb lines., determined by equation $\frac{d\lambda}{\cos\lambda\, d\phi} = k = constant.$ k may be expressed through L and F by integrating $\int_{-\lambda}^{\Lambda} \frac{d\lambda}{\cos\lambda} = k \int_{\phi-\pi}^{\Phi} d\phi.$



Even the formation of ice in Antarctica is governed by the antipodal symmetry.

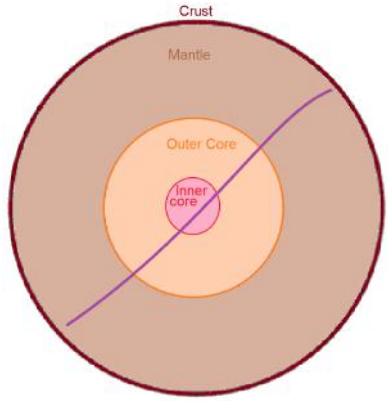
Notice that the fit is especially good in the seismically active area of Alaska and the antipode of the Antarctic Peninsula. What we have discussed here is merely a few facets of a rather rich phenomenon displaying itself in many different ways.

Seismic activity also shows almost-antipodal symmetry.

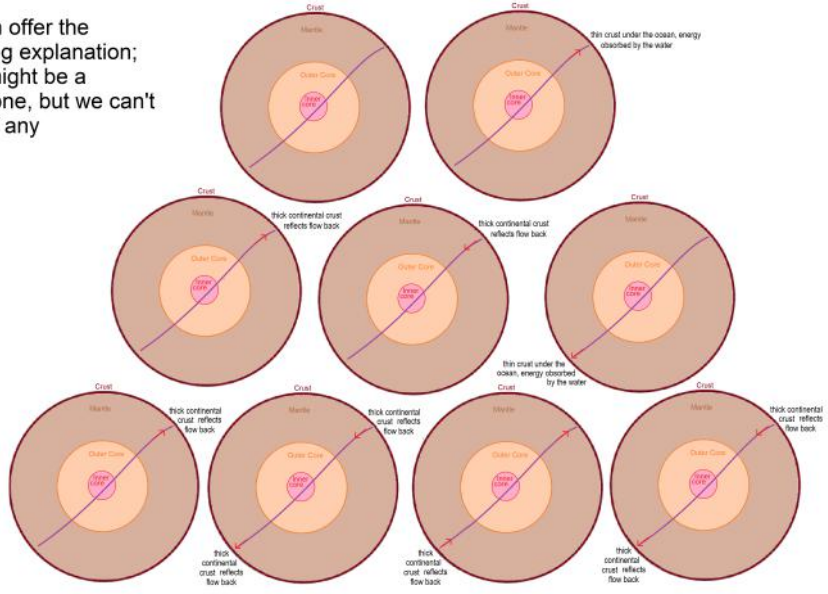


Given the omnipresence of (almost-)antipodal symmetry in the structure of the continents/continental shelves and seismic activity, we must conclude that THE FORCES RESPONSIBLE FOR TECTONIC AND SEISMIC ACTIVITIES MUST EXHIBIT ANTIPODAL SYMMETRY; but the only force with such symmetry is the tidal force produced by the Moon and Sun.

We hypothesize that the Earth's interior is crisscrossed with mioleholes connecting almost-antipodal to each other under-the-crust end-points and running almost-diagonally across the Earth's interior, like the one shown in purple. It is not clear whether the moleholes run across the inner core, but they certainly must cross the outer liquid core. If they run across the inner core, then that would mean that the inner core is not solid. Nor is it clear how close the moleholes get to the crust, it is likely the distance varies from molehole to molehole. It is also likely that moleholes and their properties vary from one to another. A recently published work described at https://scitechdaily.com/rapid-collective-motion-of-iron-atoms-discovered-in-earths-solid-inner-core/#google_vignette and https://www.nature.com/articles/s41586-023-06590-8 also confirms that.



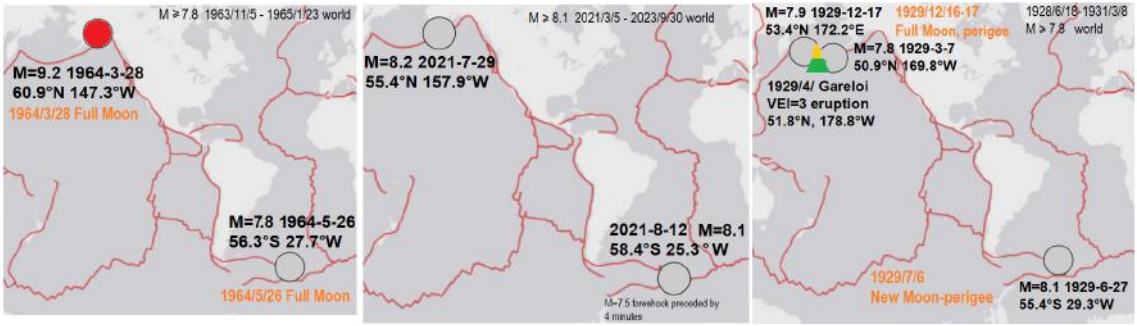
We can offer the following explanation; there might be a better one, but we can't think of any

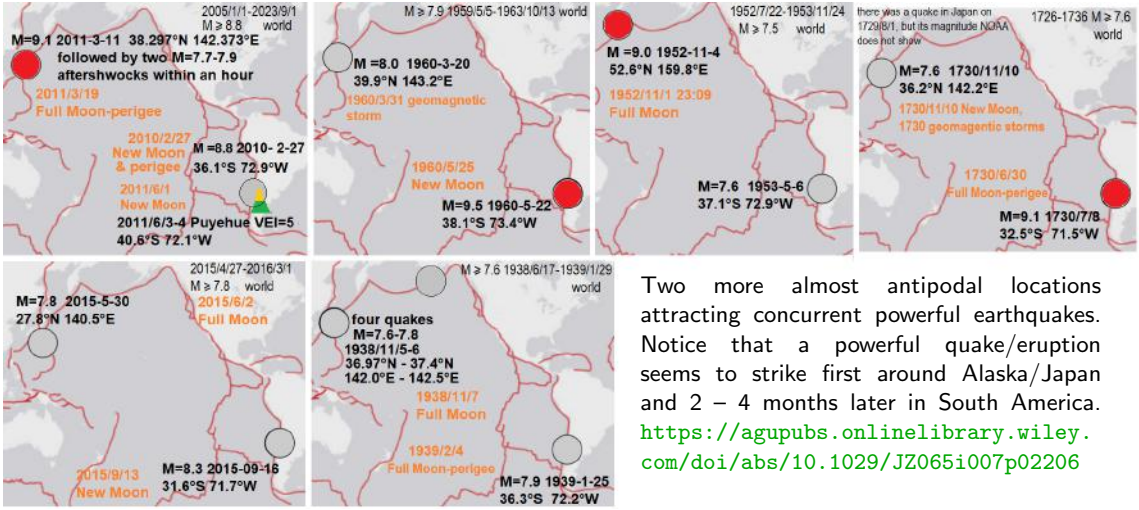


That would explain why most land is antipodal to water as well as the almost antipodal symmetry.

Our argument suggests that at least some seismic events may persistently appear at (almost)-antipodal pairs.

Here is an example of 2 almost antipodal locations attracting concurrent powerful quakes. Notice that a powerful quake/eruption first occurs in or near Alaska and 0.5 – 4 months later in South America.





Two more almost antipodal locations attracting concurrent powerful earthquakes. Notice that a powerful quake/eruption seems to strike first around Alaska/Japan and 2 – 4 months later in South America. https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/JZ065i007p02206

The table below shows that most powerful seismic activity in 1960 – 2022 cluster within synchronization periods, that's when New/Full Moon is separated from perigee by no more than 165 minutes.

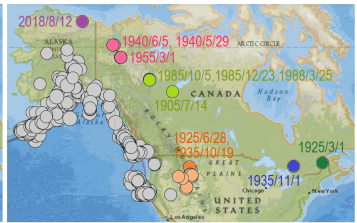
synchronized New/Full Mo on-perigees	sp re ad	nearby eclipse, lunar node, perihelion	New/ Full M	*aa* max- ima	$M \geqslant 8.5$ earthquakes and VEI $\geqslant 5$ eruptions	comments to earthquakes and eruptions,
2024/3/10	116		New			
2023/1/21	**4**	2023/1/4 perihelion	2y			
2021/12/4	137	2021/12/3 eclipse	97d		Hunga Tonga VEI=5, began	2022/1/17 Full Moon
2015/9/27 – 2021/12/4 = 6 years 67 days					2021/12/20, major 2022/1/15	2021/12/19 Full Moon
2015/9/28	65	2015/9/27 eclipse	Full	2015		
2014/8/10	27					2014/4/ solar maximum
2013/6/23	23		4 y			2012/4/6-10 Full Moon,
2012/5/6	**2**	2012/5/7 lunar node	193		2012/4/11 M=8.6 Indonesia	perigee, unar node
			d		2011/6/3-4 Puyehue VEI=4-5	2011/6/1 lunar eclipse
2011/3/19	59				2011/3/11 M=9.1 Japan	2011/3/10 CME
2010/1/30	165				2010/2/27 M=8.8 Chile	2010/2/25-28 Full Moon,
2005/1/10 – 2011/3/19 = 6 years 68 days						perigee, lunar node
2005/1/10	116	2005/1/2 perihelion	New		2005/3/28 M=8.6 Indonesia	2005/3/25 Full Moon
2003/11/23	**15**	2003/11/23 eclipse	2 y	2003	2004/12/26 M=9.1 Indonesia	2004/12/26 Full Moon
2002/10/6	120		96 d			2001/11/ solar maximum
1993/3/8 – 2002/10/6 = 9 years 214 days						
1993/3/8	71		Full			1991/8/8-10 New
1992/1/19	**58**	1992/1/18 lunar node	1 y		1991/8/8-12 Hudson VEI=5	Moon & lunar node
			48 d	1991	1991/6/15 Pinatubo VEI=6	1991/6/12-14 New Moon,
						perigee & lunar node
1985/11/12 – 1992/1/19 = 6 years 68 days						1991/6/1-15 five X12
1985/11/12	110	1985/11/11 eclipse	New			solar flares
1984/9/25	20					
1983/8/8	**13**		5 y			1989/11/ solar maximum
1982/6/21	17	1982/6/22 eclipse	241	1982	1982/3/-/5/Chichon VEI=5	1982 had four
1981/5/4	32		d			X9.8 - X12.9 solar flares

1980/3/16	93	1980/3/14 lunar node			1980/5/18 St Helen VEI=5	1979/12/ solar maximum
1974/1/8 – 1980/3/16 = 6 years 67 days						
1974/1/8	76	1974/1/7 lunar node	1 y	1974		
1972/11/20-21	**49**		48 d			1968/11/ solar maximum
1965/7/28 – 1972/11/20 = 7 years 115 days						1965/2/1 New Moon
1965/7/28	145		New		1965/2/4 M=8.7 Alaska	1965/2/5 proton event
1964/6/10	143	1964/6/11 eclipse			1964/3/28 M=9.2 Alaska	1964/3/28 Full Moon
1963/4/23	116		4 y		1963/10/13 M=8.5 Kurils	1960/5/13 proton event
1962/3/6	**39**	1962/3/4 lunar node	193		1963/3/18 Agung VEI=5	1960/5/4 solar flare
1961/1/16	89	1961/1/2 perihelion	d	1960	1960/5/22 M=9.5 Chile	1960/5/25 New Moon

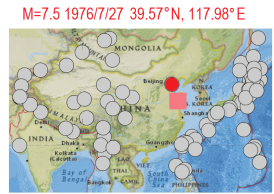
Since the liquid moving the moleholes most likely carries electric charges from the liquid core, we may expect electromagnetic phenomena accompanying seismic activity, which may explain earthquake lights, volcanic lightening. Moreover, we may expect that the movement of electric charges would re-arrange the charge distribution in the atmosphere leading to unexpected phenomena at the centers of seismic activity, e.g. UAP.

Here is a picture showing the five February 2023 UAP detected in North America and China.

The four UAP detected in February 2023



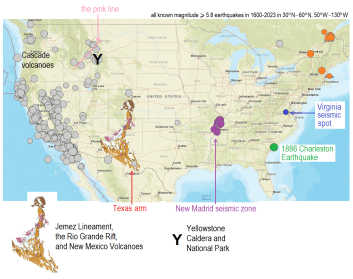
M ⩾ 6.1 1900 - 2022 40ºN - 70ºN, 165ºW - 60ºW

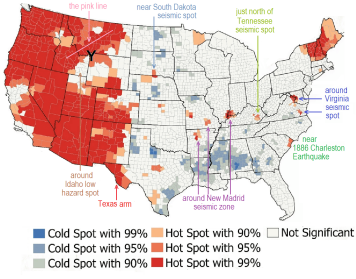


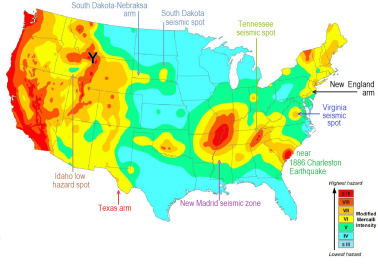
M ⩾ 7.5 1900 - 2022 15ºN - 60ºN, 70ºE - 147ºE

The appearance of the UAP was expected with high probability; I predicted that "... there will be a considerable but short-lived likelihood of increased seismic and UAP activity around 2023/1/21 ...", https://www.researchgate.net/publication/361741891_On_the_origins_of_unidentified_aerial_phenomena_UAP, the file was uploaded in November 2022, page 38; the prediction was also made in earlier versions. The prediction was fulfilled by the five aforementioned UAP and the 2023/2/6 magnitude 7.8 earthquake in Turkey.

A recently published paper showing the distribution of UAP per person in the US is in the middle picture. The hot spots of UAP are exactly at or close to the centers of seismic activity shown on the left. The picture on the right shows seismic hazards for 2014 by USGS.



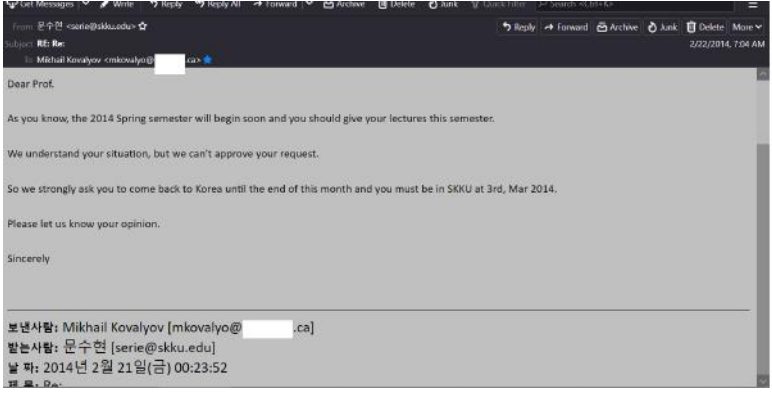




CONCLUSSION. The tidal force produced by the Moon and Sun is one of the most important factors in the production of earthquakes; thus periodicity of the tidal force should be present in the periodicity of seismic activity.

The hypothesis of moleholes not only explains many things, including earthquake lights, volcanic eruptions, UAP, but also allows us to predict them. Since UAP share the sky with airplanes, the periodicity of the tidal force should allows us to predict the increased probability of airplane crashes. For example, in February 2014, I predicted that the probability of airplane crashes would drastically increase and quit my dream job (6 months off every year, no grading of exams or homework) requiring frequent air commute.

This is a copy of one of many emails asking me to come back.



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From: 문수현 <serie@skku.edu>

Subject: RE: Re:

To: Mikhail Kovalyov <mkovalyo@ .ca>

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2/22/2014, 7:04 AM

Dear Prof.

As you know, the 2014 Spring semester will begin soon and you should give your lectures this semester.

We understand your situation, but we can't approve your request.

So we strongly ask you to come back to Korea until the end of this month and you must be in SKKU at 3rd, Mar 2014.

Please let us know your opinion.

Sincerely

보낸사람: Mikhail Kovalyov [mkovalyo@ .ca]
받는사람: 문수현 [serie@skku.edu]
날 짜: 2014년 2월 21일(금) 00:23:52
제 목: Re:

Indeed, the period saw an unusually large number of unexplained/poorly explained commercial airplane accidents, some of which are 1) 2013/11/29 LAM Mozambique Airline 470, attributed to the pilot's suicide; 2) 2014/3/7 Malaysia Airlines 370, simply vanished; 3) 2014/7/23 TransAsia Airways 222, unusual sounds before the crash could not be explained; 4) 2014/7/24 Air Algerie 5017, caused by obstruction of pressure sensors; 5) 2014/12/27 AirAsia 8501, could not be explained why the captain removed the breaker to cut power; 6) 2015/3/24 Germanwings 9525, attributed to the co-pilot's suicide despite evidence of otherwise; 7) 2015/10/31 Metrojet 9268, undetermined cause. That's at least 7 commercial airplane crashes and at least 960 fatalities within merely 23 months, never before or after so many commercial airliners crashed within such a short period of time. In 2019, the Trump administration announced almost daily encounters of US Navy pilots with UAP from mid-2014 till early 2015. A somewhat larger 2012/12/1 – 2016/12/1 period was also fraught with close calls when airplanes miraculously avoided deadly accidents.