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BRIEF REPORT

Exploratory Analysis of Changes in Global Parameters Around Sightings of Unidentified Aerial Phenomena

HIGHLIGHTS

Global reports of 'unidentified aerial phenomena' correlate with diverse geophysical and human events, perhaps suggesting a more complex mystery than previously assumed.

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ABSTRACT

Unidentified aerial phenomena (UAP) have long been associated with earthquakes and other geophysical occurrences and are seen by government agencies in the United States and elsewhere as possibly significant to national security. Despite that, the mechanisms driving UAP are unclear. This study contributes to their better understanding by looking at UAP as more than sighting reports and conducts an atheoretical, data-driven review that seeks to identify their statistical associations with global geophysical and anthropomorphic parameters. The analysis covers the period 1995-2020 and includes 19 variables with annual and monthly frequency. UAP sightings are from NUFORC and mainly cover North America, which encompasses 17 percent of Earth's land area and is a sample of global data. Here we show that reports of UAP sightings are preceded by changes of the same sign in stock prices and of the opposite sign in airliner crashes, atmospheric carbon dioxide, and earthquakes. UAP sightings are then accompanied or followed by changes of the same sign in airliner crashes, battle deaths, earthquakes, global temperature, sunspots, and volcanic eruptions; and by changes of the opposite sign in atmospheric carbon dioxide, cosmic radiation, mental health deaths, natural disasters, and tropical storms. This analysis highlights a potentially important scientific gap whereby UAP are associated with diverse global parameters, and provides a basis for further study.

KEYWORDS

UAP, geophysics, human events, sightings, correlation.

INTRODUCTION

Unidentified aerial phenomena (UAP) comprise objects and lights in the sky that cannot be identified as aircraft or other known phenomena. Their scientific relevance has long been recognized (Florinsky, 2016; Vallee & Aubeck, 2010). As examples, Seneca compiled the Romans' knowledge of earthquake lights that are frequently observed up to several months prior to earthquakes and reported an example where "immense columns of fire" accompanied the massive Delos earthquake in 373 BCE (Seneca, ca 65); and a 1911 article in *Nature* discussed many examples of links between natural events and earthquake lights and other UAP (Milne, 1911).

Established literature now documents links between luminous shapes and Earth's magnetic field, seismology, and aircraft crashes (Kovalyov, 2022), including earthquakes (Persinger & Derr, 2013), magnetism and electromagnetism (Teodorani, 2004), tornadoes and storms (Krasilnikov, 1997), and volcanoes (Diller, 1916). Analysis of links between 73 high quality UFO reports in the United States during 1957-1977 found associations with Earth's magnetic field, ionospheric effects, and solar flares (Accetta, 1980).

Further credibility has been afforded to UAP sightings after a number of governments see them as possibly important to national security, either as threats or powerful new technology. They engaged defense and intelligence agencies in reviews - such as the US Department of Defense (ODNI, 2021) - which highlighted UAPs' geopolitical significance. There is also literature that examines the nature of UAP observations (e.g., Druffel, Wood, & Kelson, 2000; Gross, 2013; Knuth, Powell, & Reali, 2019); provides bibliographies that cover UAP waves (Olmos, 2015) and books (Rasmussen, 1985); and offers a research guide (www.history.navy.mil/research/library/research-guides/ufo-research-guide.html).

Consistency in reports from a wide range of epochs and regions supports the reality of luminous phenomena in the sky that display variations in size, color, and shape. In addition, analyses have established their association with natural events involving large energy releases such as earthquakes, storms, and volcanic eruptions; global scale effects on Earth's magnetic field and ionosphere; and galactic effects such as radiation and Solar activity. This makes it likely that UAP sightings arise either naturally or artificially through a variety of mechanisms, including nuclear fusion, rock stresses along fault lines, plasma sources, piezoelectricity, or electric fields (Persinger & Derr, 2013).

This uncertainty and breadth of possible explanations motivate the following analysis which seeks to extend understanding of UAP sightings through a passive, data-driven search for statistically significant relationships between them and changes in global physical, demographic, and socio-economic parameters. Identifying what UAPs do beyond being observed and establishing their association with shocks that are sufficient to alter global dynamics should help better understand the phenomena.

The following sections discuss data used in the analysis, which comprise reports of UAP and time series of global parameters; then report results of statistical analyses, and the paper closes with a discussion of the results and implications for further work.

Data

The most important variable involves sightings of unidentified aerial phenomena (UAP). A number of databases are available, but this study uses the largest, longest-running dataset sourced from the National UFO Research Centre (NUFORC, https://nuforc.org/). NUFORC, based in Washington, USA, began collecting reports in 1974, and as of August 2022, had over 139,000 reports in its database, mostly for the USA (88.9 percent) and Canada (3.7).

NUFORC shifted to online reporting of UAP in 1994, and there is a structural break with prior data; so, for consistency, only data from January 1995 are included in the UAP database. After April 2018, the NUFORC database also included MADAR data that comprise an average of 39 magnetic anomalies each month that have been detected by instruments (Madar, 2019; https://madar.site/madar/more.html). As these are not aerial phenomena, they have been removed manually from the NUFORC data. This leaves 121,651 UAP observations.

NUFORC's database ignores obvious hoaxes but otherwise lacks any filters. Its verbatim reports of what observers considered to be unidentified, can – as eyewitness reports - be considered scientific data (Teodorani, 2009). Other advantages of NUFORC data are their scale and duration, and coverage of about 17 percent of Earth's land area, which – in light of a comparative analysis of UAP databases that found consistency in sightings (Teodorani, 2009) - give a significant sample of global activity.

Conversely, NUFORC data suffer two shortcomings whose impacts are impractical to quantify or remove. One is inconsistency in reporting across time. This incorporates an under-reporting bias because there is no systematic monitoring of UAP, and disincentives to report sightings from fear of ridicule or worse; an over-reporting bias since mid-2019 because of regular launches of Starlink satellites that are highly visible; and changes in observer behavior during Covid-19 lockdowns.

The second shortcoming is that sightings represent events which the observer cannot explain and are accepted at face value with little scientific evaluation, whereas other observers may subsequently offer a possible explanation for what was seen. Thus, they are of varying quality. Conversely, making any ex-post adjustment requires prejudgement as to what UAP reports should be measuring, and this is not compatible with my atheoretical approach.

Turning to analysis of the data, UAP sightings are plotted in figure 1 as a 12-month moving average. This shows a pronounced uptrend over time with interim peaks 4.1±1.1 years apart, and troughs 4.4±1.1 years apart. The length of peak to trough is 2.2±1.5 years, and from trough to peak is 2.1±0.6 years, which shows no evidence of the sawtooth pattern that is common in natural time series. Of possible relevance is that a four-year (quadrennial) cycle is common. Well-known artificial four-year cycles include Bitcoin price (Redelinghuys, 2019), leap years, the Olympics, and US presidential election. Natural four-year cycles include temperatures in Antarctica (French, Kleko-

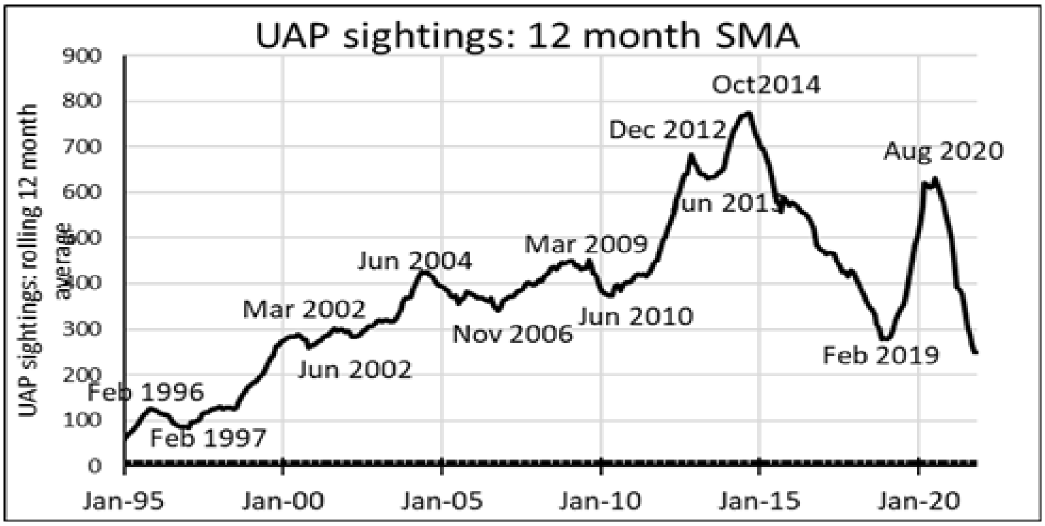

Figure 1. UAP Sighting Reports as a 12-Month Simple Moving Average.

ciuk, & Mulligan, 2020), fox, lemming, and other animal populations (Edwards & Edwards, 2011), and Jupiter's temperature (Cosentino et al., 2017). A number of variables in this analysis also display a four-year cycle, including – as shown in figure 2 - annual change in the number of earthquakes and average global temperature.

Another feature of figure 1 is a peak in UAP sightings in the second half of 2014. My own analysis of NUFORC data for June-December 2014 shows days with the highest number of reported sightings were in the first half of July (presumably somewhat elevated by Independence Day celebrations, although these could provide camouflage), mid-September, and August. Report totals by State were highest for California, Florida, Pennsylvania, New York, and Washington: and totals by shape were highest for light, circle, fireball, triangle, and sphere.

A study of data for 2014-5 did not identify any obvious explanations for the peak in UAP sightings (Krishnamurthy, Lafontant, & Yi, 2017). However, an indication of its significance is that the time series for many of the global variables in this analysis have similar peaks in 2014 or with a 1–2-year lag. Prominent examples include global temperature and battle deaths, as shown in figure 3.

The research question of this analysis is whether global UAP activity (as proxied by NUFORC sightings data) is associated with changes to any global parameters. Without a theoretical model to describe expected association, the choice of global parameters involves the risk of selection bias. To minimize this, the dataset comprises global geophysical parameters, human demographics, and socio-economic measures that have been reasonably reliable and available since at least 1995. Planetary dynamics are sourced from NASA and USGS; global demographics from WHO and World Bank (https://datacatalog.worldbank.org/search/dataset/0037712/World-Development-Indicators); and economic data from IMF. Two variables previously identified with UAP sightings were also added, namely airliner crashes and cetacean strandings. Table 1 sets out details of the 19 independent variables in the dataset, with their source and brief description.

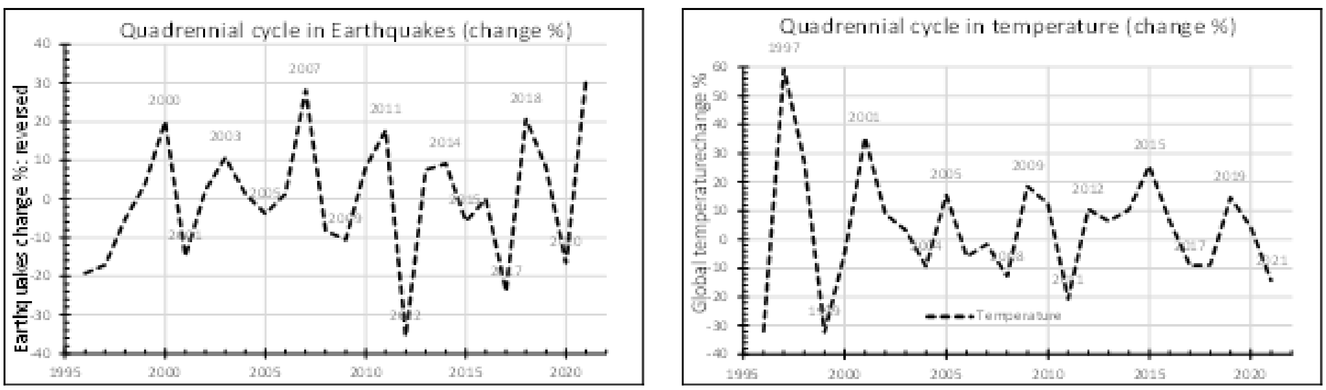

Figure 2. Four-year Cycles in Annual Change in Earthquakes and Global Temperature.

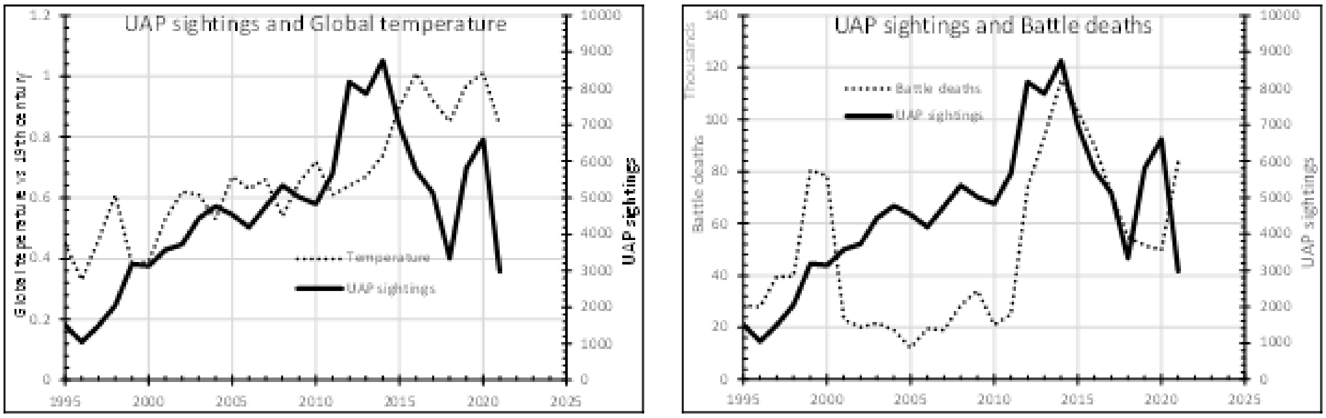

Figure 3. Global Parameters with Pronounced Peaks Around 2014

An issue with the analysis of time series is that spurious correlations can arise when values of dependent and independent variables are related to time. To avoid this, candidate variables that show monotonic trends were excluded (including those related to demographics and quality of life, such as measures of mortality and popula-

Table 1: Variables That are Tested for Links to UAP Sightings

Variable	Source	Description
Panel A: Planetary dynamics		
Atmospheric CO_2	https://gml.noaa.gov/ccgg/trends/gl_data.html	Global mean value. Monthly since 1958.
Cetacean strandings	Alvarado-Rybak et al. (2020)	Reported strandings on the Chilean coast. Monthly 1968-2018.
Cosmic radiation	https://cosmicrays.oulu.fi/	Measured at Oulu, Finland. Monthly since 1964.
Day length	www.timeanddate.com/time/earth-rotation.html	Deviations from the standard day (ms). Annual since 1973.
Earthquakes	http://earthquake.usgs.gov/earthquakes	Global earthquakes greater than magnitude six since 1899.
Geomagnetic field	www.ngdc.noaa.gov/geomag/calculators/magcalc.shtml?#igrfwmm	Declination of Earth's magnetic field in decimal degrees. Annual since 1590.
Natural disasters	https://public.emdat.be/	≥ 500 deaths or $US(2021) 1 billion damages. Since 1900.
Sea level	https://doi.org/10.5067/GMSLM-TJ151	Global mean sea level from NASA. Monthly since 1992.
Sunspots	www.sidc.be/silso/datafiles	Total sunspot number; Royal Observatory of Belgium. Monthly since 1749.
Temperature	www.ncei.noaa.gov/cag/global/time-series/globe/land_ocean/all/	The monthly global average since 1970. NOAA National Centers for Environmental information.
Tropical storms	https://tropical.colostate.edu/archive.html#Global	Global named tropical storms. 2000-2019 only.
Volcanic eruptions	https://volcano.si.edu	Global. Annual since 1960. Smithsonian Institution.
Panel B: Demographic and Economic parameters		
Airliner accidents	https://aviation-safety.net/statistics/period/stats.php	Aviation Safety Network. Global data for commercial airliners since 1942.
Battle deaths	https://ucdp.uu.se	Uppsala Conflict Data Program. Annual since 1989.
Communicable disease deaths	https://vizhub.healthdata.org/gbd-results/	Global Burden of Disease Study: deaths due to AIDS, respiratory and enteric infections, and other communicable disease. Annual since 1990.
Excess deaths	https://data.worldbank.org/	World crude death rate minus 1993-2021 trend. Annual since 1960. Percent change.
GDP change	www.imf.org	IMF. Annual since 1980.
Mental health deaths	https://vizhub.healthdata.org/gbd-results/	Deaths due to mental disorders (rate). Global Burden of Disease Study. Annual since 1990.
Stock prices	www.msci.com/end-of-day-data-search	MSCI World stock price index. Monthly since 1970. Absolute percent change.

Table 2. Correlation Between UAP Sightings and Parameters with Significant Contemporaneous or Lagged Relationships (values of R greater than 0.5 are bolded).

	UAP sightings	CO_2	Strandings	Radiation	Earthquakes	Geomagnetic field	Disasters	Temperature	Storms	Eruptions	Battle deaths	GDP change	Mental illness
UAP Sightings	1.00	**0.86**	**0.66**	-0.04	-0.06	**0.87**	0.39	**0.63**	-0.16	**0.70**	**0.55**	-0.03	0.08
Atmospheric CO_2	**0.86**	1.00	**0.88**	0.24	-0.11	**1.00**	**0.60**	**0.86**	-0.18	**0.69**	**0.51**	-0.04	0.02
Cetacean strandings	**0.66**	**0.88**	1.00	0.32	-0.19	**0.87**	**0.61**	**0.77**	0.02	**0.42**	**0.61**	-0.20	0.02
Cosmic radiation	-0.04	0.24	0.32	1.00	0.24	0.21	0.37	0.18	-0.12	0.05	-0.13	-0.12	-0.41
Earthquakes	-0.06	-0.11	-0.19	0.24	1.00	-0.11	-0.19	-0.23	-0.34	0.16	-0.37	0.27	-0.43
Geomagnetic field	**0.87**	**1.00**	**0.87**	0.21	-0.11	1.00	**0.58**	**0.86**	-0.18	**0.70**	**0.50**	-0.04	0.05
Natural disasters	0.39	**0.60**	**0.61**	0.37	-0.19	**0.58**	1.00	**0.62**	-0.21	0.16	0.31	0.11	0.04
Global temperature	**0.63**	**0.86**	**0.77**	0.18	-0.23	**0.86**	**0.62**	1.00	-0.13	**0.55**	0.37	-0.07	-0.01
Tropical storms	-0.16	-0.18	0.02	-0.12	-0.34	-0.18	-0.21	-0.13	1.00	-0.13	0.04	-0.16	-0.19
Volcanic eruptions	**0.70**	**0.69**	0.42	0.05	0.16	**0.70**	0.16	**0.55**	-0.13	1.00	0.21	0.21	-0.22
Battle deaths	**0.55**	**0.51**	**0.61**	-0.13	-0.37	**0.50**	0.31	0.37	0.04	0.21	1.00	-0.20	0.31
GDP change	-0.03	-0.04	-0.20	-0.12	0.27	-0.04	0.11	-0.07	-0.16	0.21	-0.20	1.00	-0.23
Mental illness deaths	0.08	0.02	0.02	-0.41	-0.43	0.05	0.04	-0.01	-0.19	-0.22	0.31	-0.23	1.00

tion). The remaining variables were examined for nonstationarity using the augmented Dickey–Fuller (ADF) test. Table 3 reports results for variables that prove significant in subsequent analysis, with a non-significant value indicating that the variable is non-stationary (i.e., it trends rather than moving around a mean).

Because half the variables are non-stationary, the analysis uses changes in UAP sightings and changes in the value of individual parameters in univariate, linear regression. The model is:

$$\Delta(\text{UAP sighting reports}_t) = \alpha_n + \beta_n . \Delta(\text{Global parameter}_{s,t}) \qquad (1)$$

Where α_n and β_n are constants, and Δ is an operator referring to percent change in each variable, except for cetacean sightings and sunspots, which are volatile and analyzed as the change in level. Data were analyzed using EViews 9.

Table 3. Unit Root Tests of Significant Variables

Variable	ADF test probability	
	Annual data: 1995-2020	**Monthly data: 1995-2020**
UAP sightings	0.304	0.194
Atmospheric carbon dioxide	1.000	0.999
Cosmic radiation	0.084 *	0.499
Earthquakes	0.003 **	
Natural disasters	0.109	0.001 ***
Temperature	0.817	0.020 **
Tropical storms	0.001 ***	
Volcanic eruptions	0.027 **	
Airliner accidents	0.697	0.001 ***
Battle deaths	0.319	
Mental health deaths	0.001 ***	
Stock prices	0.001 ***	

RESULTS

This section results from an analysis of the dataset described above. The initial step involves annual data, which are available for all variables over 1995-2020. Given the density of NUFORC data, a second set of analyses involves nine variables with monthly data.

Starting with annual data, typical relationships are shown in Figure 4. The upper charts are percent changes in tropical storms and battle deaths against changes in annual values of UAP sightings, and the lower charts are time series f° global temperature and earthquakes with UAP sightings.

Table 4 reports significant findings from linear regression using annual data for changes in UAP sightings and variables. Panel A has results of contemporaneous regressions, where three variables are significantly (≲ 0.10) related to UAP: sunspots, tropical storms, and bat-

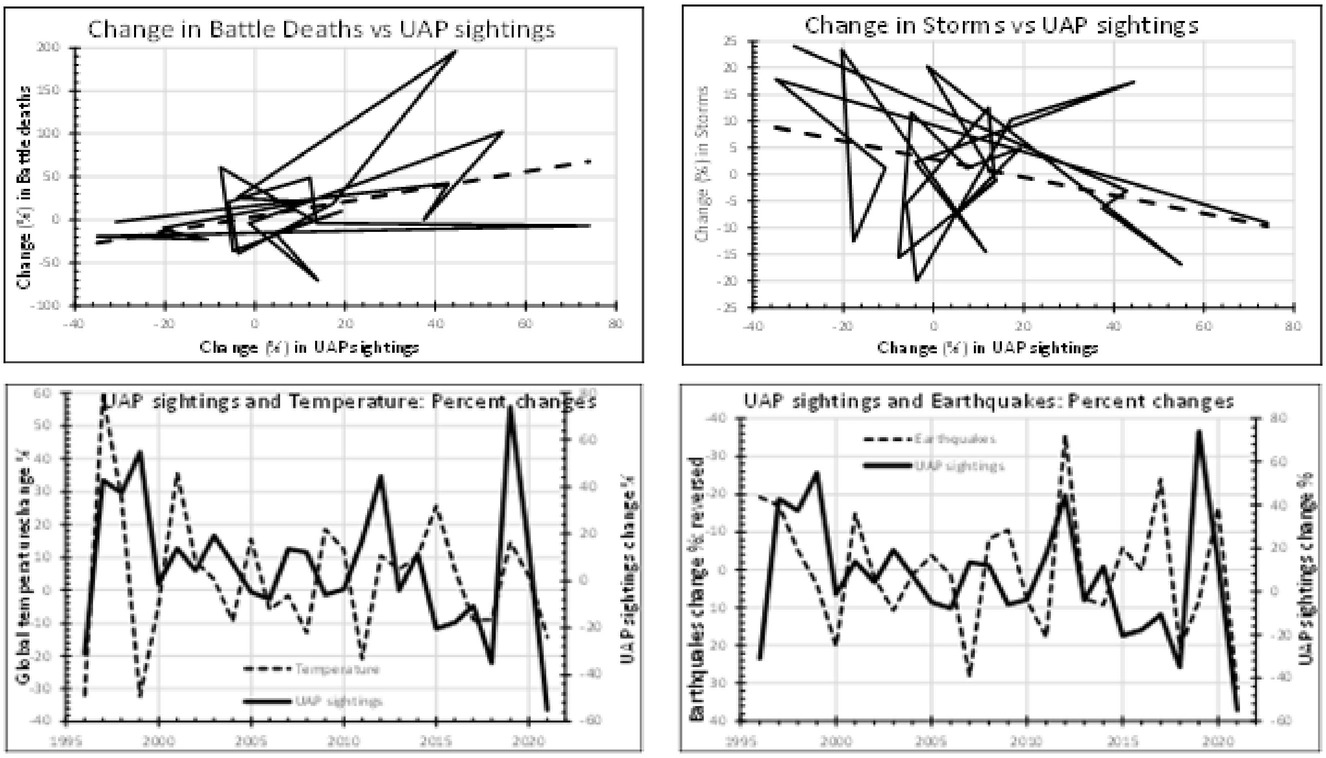

Figure 4. Typical relationships for annual data. The upper charts are scatter plots of percent changes in battle deaths and tropical storms vs. UAP sightings. Lower charts are time series of changes in UAP sightings and in global temperature and earthquakes.

tle deaths.

Panel B shows the results of linear regression of changes where leads and lags of one and two years are applied to variables. This shows that earthquakes, stock prices, mental illness deaths, and airliner accidents lead UAP sightings by one-two years, while cosmic radiation, earthquakes, natural disasters, volcanic eruptions, airliner accidents, and mental illness deaths lag UAP sightings by one-two years.

Table 5 repeats the analysis above using monthly data. This confirms the links identified in table 4 between UAP and earthquakes and natural disasters. Innovations are the lead/lag link between UAP and atmospheric CO_2, and the positive relationship with lagged global temperature.

An issue with interpreting these results is that they stem from data exploration without guidance from theoretical hypotheses, which raises the possibility of chance associations.

With 19 independent variables and leads and lags of one and two years, a total of 95 relationships are tested. Using a cut-off probability of $\lesssim 0.10$, about nine significant links would be expected by chance, whereas results identified 15 links.

To summarize results, five variables have positive relationships with UAP sightings: battle deaths, global temperature, stock prices, sunspots, and volcanic eruptions, and three variables have negative relationships with UAP sightings: cosmic radiation, natural disasters, and tropical storms. In addition, four variables have two or four-year cycles that give both lead and lag relationships with the four-year UAP cycle: airliner accidents, atmospheric carbon dioxide, earthquakes, and mental illness deaths.

DISCUSSION

The analysis above shows significant links between the frequency of UAP sightings and dynamics of Earth (atmospheric carbon dioxide, cosmic radiation, earthquakes, natural disasters, global temperature, tropical storms, and volcanic eruptions) and its human population (airliner crashes, battle deaths, mental illness deaths, and stock prices).

These results complement those from earlier studies, as discussed in the Introduction. In particular, my results confirm previously identified links between UAP and airliner crashes, earthquakes, storms, and volcanoes. However, they do not identify links between UAP and Earth's magnetic field, ionospheric effects, and solar activity. Innovative links identified in the analysis here are between UAP and atmospheric carbon dioxide, cosmic radiation, natural disasters, and global temperature, and with a number of human parameters, namely battle deaths,

Table 4. Univariate, Linear Regression of Annual Values of Individual Parameters Against UAP Sightings for 1995-2020. Panel A Reports Regressions of Contemporaneous Values of Variables. Panel B Reports the Most Significant Results for Regressions Where UAP Reports Lead or Lag Dependent Variables by One or Two Years

Panel A: Regression of UAP Sightings and Global Parameter: Annual Percent Changes

Global parameter	Intercept	Slope (probability)	Adjusted R-sqd
Sunspots	211.46	12.00 (0.090)	0.08
Tropical storms	9.730	-0.685 (0.103)	0.08
Battle deaths	6.375	0.222 (0.028)	0.16

Panel B: Regression of UAP Sightings and Lagged Global Parameter

Global parameter	Lead (yrs.)[1]	Intercept	Slope (probability)	Adjusted R-sqd
Airliner accidents	-1	10.725	0.975 (0.023)	0.12
	+1	7.272	-0.775 (0.051)	0.17
Cosmic radiation	+1	9.575	-3.784 (0.040)	0.14
Earthquakes	-2	8.881	-0.750 (0.025)	0.18
	+2	7.688	0.573 (0.102)	0.08
Stock prices	-2	13.984	0.074 (0.011)	0.23
Natural disasters	+2	11.072	-0.319 (0.048)	0.13
Volcanic eruptions	+1	7.475	1.091 (0.058)	0.11
Mental illness deaths	-2	7.526	10.159 (0.041)	0.15
	+1	9.876	-10.985 (0.046)	0.13

[1] Number of years parameter changes after UAP sightings change.

mental illness deaths, and stock prices.

Figure 5 uses data from tables 4 and 5 to show the sequencing and relative strength of changes in parameters around UAP sightings. One-two year before UAP sightings, changes of the same sign occur in atmospheric CO_2 and mental health deaths; and changes of the opposite sign occur in airliner accidents and earthquakes. Changes in UAP sightings co-move with battle deaths, global temperature, and sunspots, and sightings move inversely with tropical storms. One to two years later come changes of the same sign in airliner accidents, earthquakes, and volcanic eruptions; and changes of the opposite sign in atmospheric CO_2, cosmic radiation, mental illness deaths, and natural disasters.

How could figure 5 be interpreted? Several points stand out. Atmospheric CO_2, earthquakes, and mental illness deaths share a four-year cycle with UAP but are out of phase by two years. Another point is that battle deaths, global temperature, and tropical storms co-move with UAP. And UAP are lagged by cosmic radiation, natural disasters, and volcanic eruptions.

UAP appear to be causal or associated with an unknown force. They affect multiple parameters, which change following a delay related to the responsiveness of the systems driving them. Thus, parameters co-move, either due to simultaneous effects by UAP, or following knock-on effects from feedback of other systems' changes.

One possible explanation is that links are natural, so that atmospheric CO_2, earthquakes, mental illness deaths, and UAP are driven in a four-year cycle by an unknown means, and their changes affect battle deaths, cosmic radiation, global temperature, natural disasters, sunspots, tropical storms, and volcanic eruptions. Thus, these exotic, ill-understood behaviors reflect some unknown science. Just such anomalies have often been indicators of incomplete or incorrect theory and catalyzed re-assessment of knowledge paradigms that progressed science.

A second, more speculative explanation attributes the sequence of changes to deliberate actions by unknown intelligence on Earth or elsewhere, which applies an unknown treatment to Earth either to cause intended changes (along the lines of terraforming that manipulates Earth: Sleator & Smith, 2019), or while conducting experiments (in accordance with the laboratory hypothesis where Earth is the subject of experimentation: Barrett, 1983). Under this interpretation, treatment proxied by UAP occurs every four years and changes variables with a lag of up to one-two years. The intelligence may normally be cloaked but needs to uncloak or come close to Earth when initiating and/or observing experiments, which leads to UAP sightings. Supporting this external manipulation interpretation is that sunspots and cosmic radiation also vary with UAP sightings, which indicates impacts beyond Earth.

The data and findings above are insufficient to draw conclusions about the nature of UAP, but three points are

Table 5. Univariate, Linear Regression of Monthly Values of Individual Parameters Against UAP Sightings for 1995-2020. Panel A Reports Regressions of Contemporaneous Values of Variables. Panel B Reports the Most Significant Results for Regressions Where UAP Reports Lead or Lag-Dependent Variables

Panel A: Regression of UAP Sightings and Global Parameters: Monthly Percent Changes

Global parameter	Intercept	Slope (probability)	Adjusted R-sqd
Atmospheric CO_2	5.310	-14.474 (0.011)	0.02

Panel B: Regression of UAP Sightings and Lagged Dependent Variable

Global parameter	Lead (mos.)[1]	Intercept	Slope (probability)	Adjusted R-sqd
Earthquakes	-18	6.054	-0.058 (0.078)	0.02
	+25	0.057	0.056 (0.103)	0.01
Atmospheric CO_2	-24	5.316	-14.00 (0.017)	0.02
	24	5.366	-11.984 (0.040)	0.01
Natural disasters	+24	5.840	-0.037 (0.014)	0.02
Temperature	-3	4.347	0.172 (0.098)	0.01

[1] Number of months parameter changes after UAP sightings change.

noteworthy. First, UAP are not solely anthropocentric as depicted in the conventional UFO and SETI paradigms (Elliott, 2015). Certainly, sightings have strong relationships with human deaths, and other studies have shown that sightings are concentrated around population centers (Carlotto, 2021). Beyond that, though, the analysis here and in previous studies show that UAP are also associated with diverse impacts on Earth's geodynamics, including incident radiation, rotation, vulcanism, temperature, and natural disasters, and also impact sunspots and cosmic radiation.

Second, an increase in UAP sightings is accompanied by rises in airline crashes, battle deaths, global temperature, and volcanic eruptions; while a decrease in sightings increases cosmic radiation, mental illness deaths, natural disasters, and tropical storms. The net is that any change in UAP sightings brings damage.

Third is that UAP have a variety of impacts with leads and lags in relationships with geophysical parameters and social factors, and there is matching diversity in their reports which include lights and objects of various sizes, shapes, and behaviors. This diversity suggests UAP may be more than one type of phenomenon or have multiple functions.

IMPLICATIONS AND APPLICATIONS

This analysis points to several areas for further research. One is to examine the UAP-parameter links to better understand the science involved. This would re-evaluate known mechanisms that could manipulate global parameters through influences such as the cosmic microwave background radiation, which bathes Earth from all directions: and consider gaps in understanding of possibly relevant theories such as gravity which are evidenced by anomalies such as dark matter and dark energy (Loeb, 2021).

Research could test additional global parameters for links to UAP sightings, including those already suggested, such as power outages. The approach here could also be applied to other UAP databases, and results combined to compare different explanations (del Olmo, 2015a, 2015b).

Evidence that UAP sightings have a strong geophysical focus challenges paradigms underpinning SETI programs and UFO research, which assume an anthropocentric focus for any extra-terrestrial interaction (Tarter et al., 2010). Moreover, if ETs exist and do not intentionally conceal their UAP, they may view Earth in the same way as explorers viewed Africa, the Americas, and Australasia; that is, they came for plunder, not peace, and ignored occupants of the land while they rifled it. Instead of viewing ETs as scaled-up humans seeking to learn from interaction with us, models of exo-civilization development and ET motivations may need to be more nuanced.

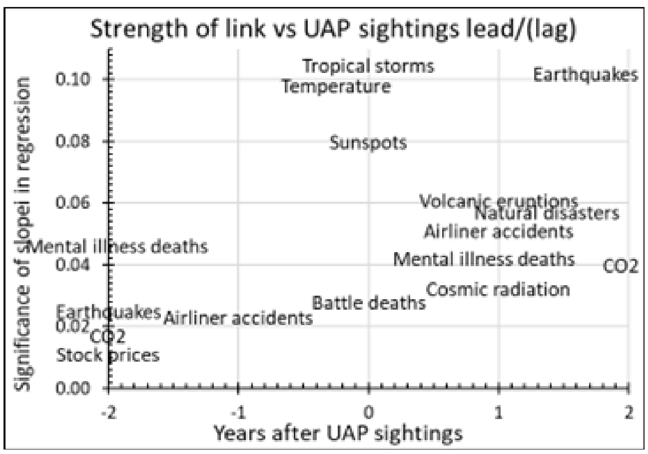

Figure 5: Strength of Relationships Between UAP Sightings and Variables (t-stat of slope in regression) as a Function of UAP Sightings Lead/(Lag).

A final research opportunity is to search for any possible global experimenter. However, it is not certain that such a project should be launched. The cost may be high, especially if surveillance technologies are employed. In addition, it would be unlikely to succeed if an experimenter with the technology to manipulate Earth did not want to be detected. Moreover, if the search did succeed, that would end this experiment, and the experimenter may decide to start over with a fresh set of unsuspecting Earthlings.

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