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A Comparative Analytical and Observational Study
of North American Databases on Unidentified Aerial Phenomena

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Abstract

Databases concerning UFO sightings are analyzed in depth through the examination of three specific samples describing anomalous events reported in the last 60 years in the confining US states of New York and Connecticut and the Canadian province of Ontario. Temporal, spatial and typological analysis of these data show that UFO databases, though not explaining the intrinsic nature of the reported phenomenon, are able to demonstrate its existence whatever its nature may be, and to show quite clearly the way in which the witness perceives it in the same way at different locations both in terms of time intervals and in terms of the sighted shapes. Long-term temporal analysis demonstrates that the time-frequency of reported sightings is directly correlated with the evolution of communications technology and anti-correlated with the secular decrease of Earth's magnetic field, but also that throughout the general trend some really anomalous residual does emerge in the form of transient "flaps" that are intrinsic to the UFO phenomenon. A work hypothesis is discussed concerning an additional reason why mankind of the technological age tends to report a much higher number of UFO sightings than in the ancient past. Spatial analysis, excluding any connection of the location of their occurrence with magnetic and gravimetric anomalies, shows that the geographical frequency of UFO sightings is strictly correlated with the population number but also that, once a statistical pondered evaluation is done, a real spatial recurrence does exist and is circumscribed to specific areas. Astrometric analysis shows that UFO sightings tend to be reported more frequently when moonlight is low and very often when planetary conjunctions are visible. An explorative and instrumented mission to some locations of Ontario is described, where the testimony of a suspect sighting and the registration of apparently anomalous VLF and ELF data are presented and discussed in detail. Scientific methodology concerning the instrumental monitoring and measurements on the field is discussed throughout the text.

Introduction

Some UFO databases [Refs. 50, 96, 26] have been examined in order to attempt to verify both qualitatively and quantitatively how and if this source of information is useful or not to a scientific factorization of the issue. This analysis regarded witness data from January 1949 to July 2009 concerning UFO sightings reported in the following three North-American confining areas: the Ontario province in Canada and the New York and Connecticut states in USA. Many hundreds of “data points” have been used to build up several charts [Ref. 18], where the data of the three areas are cross-confronted, in order to search for a possibly similar trend and correlations that might be useful to understand a bit more on the UFO phenomenon as a whole. There is not really a special reason why these three areas (instead of others) have been chosen for thorough examination: they were just considered a quite well statistically represented sample and, consequently, a presumably suitable way to test if, how and how much testimonial cases concerning the “UFO phenomenon” can be effectively subject to some form of scientific analysis. The author of this work is not an ufologist [see CV at the end], but a scientific scholar who is interested in the problem and similar phenomena such as “earthlights” since a long time [Refs. 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 86, 88]. Therefore this investigation is not devoted to the study of single, more or less allegedly prominent, UFO incidents; in fact such individual cases demand very often a “police-like” investigative effort as it happens normally when well-dedicated ufologists investigate a given witness case [Refs. 8, 9, 23, 36, 42, 44, 46, 64, 89].

One of these three areas, the Ontario one, is quite well known to this author, who has kept track during many years for the sky-watching efforts carried out since 1997 by Project Orbwatch on the Ontario Lake shore [Refs. 10, 31]. The primary intent here was to make a preliminary wider study of the entire Ontario area in preparation of an instrumented mission on site, which has been then effectively carried out in Jul-Aug 2009. The results of this mission will be described in the last chapter of this paper. Clearly a preliminary statistical study of the Ontario cases was also very suitable for a confrontation with the confining New York and Connecticut US states. NY and CT states are in themselves quite interesting as “potential UFO areas”, the first one due in particular to the well-investigated cases in the Hudson Valley [Refs. 28, 26], which is confining with the CT state, where very recent sightings were effectively reported in March 2009 [Ref. 9]. This introductory work on databases, in addition to its possible utility for the preparation of the mission to Ontario, was then expected to furnish some insights on the UFO phenomenon as a whole. Which best way to study the UFO phenomenon than cross-confronting well statistically populated databases? This opportunity was promptly caught. The attempt and the consequent result was just a “test” to see if some additional “UFO science” can be extracted from databases [Refs. 62, 90]. After all the procedural techniques used in this specific context are not so different, in principle, than the ones employed by an astronomer who tries to derive the laws of stellar structure and evolution by analyzing statistically a large sample of stars [Ref. 24], such as in the case, for instance, of the overpopulated globular clusters. Or, to make another example, I could also mention the approach used by astronomers when, using stellar statistics, they intend to study the structure of a galaxy by analyzing all the most relevant physical parameters (such as

spectral type, colour index, absolute luminosity, radial velocity, proper motion, mass, density) characterizing all the stars that compose it. In few words, the intent here is to try to understand something general by analyzing all-together a large sample of data points.

Really, the attempt to apply this philosophy of approach to the case of UFO databases was mostly intended to verify if a witness case can be effectively used as a scientific datum or not. Certainly there was no presumption here to really derive physical laws of UFOs from databases cataloguing them. This (quite much time wasting effort) has been a pure and simple test to see how the information coming from this source may furnish some evidence on the reality and, in case, nature of the phenomenon itself. As it will be seen in the next pages the results emerging from this analysis show pretty well that when a scholar embarks in such an ambitious initiative he must be prepared to obtain a ratio * *results / work done* * that is less than one, even if not zero. The same consideration is valid also for the on-site investigation (using measurement instrumentation), when, instead of monitoring areas where really a recurrent light phenomenon occurs [Refs. 1, 4, 14, 16, 34, 37, 54, 57, 58, 61, 69, 70, 99], a researcher carries out sky-watching operations at locations where UFO cases have been reported at several stages in the – more or less recent – past but not exactly in a spatially recurrent way. Reoccurring anomalous light phenomena, such as the Hessdalen one in Norway [Ref. 69] and UFOs seem to be two quite different stuffs. Despite the fact that both phenomena may occasionally overlap together in the same area, the so called Hessdalen-like “earthlights” [Refs. 30, 51, 54] offer a quite high probability to be observed and studied, while UFO cases – namely: mostly structured aerial phenomena – are a totally random and elusive phenomenon, even if it occasionally occurs in the form of “flaps” [Refs. 2, 8, 44, 46, 89]. In general, the fact that UFOs have been reported many times at a given location doesn’t mean at all that such a manifestation is more or less constantly localized there. But also this – doing a field-mission to one of the areas that were previously studied on databases – was another test to see what happens when someone is just on the field.

So, this paper is divided into two parts. The first much more extensive part deals with the examination of some selected high-quality databases. The second more specialized part deals with the results of the mission to several locations belonging to one of these three big areas – the Ontario province of Canada – which was also motivated by some evidence of “phenomenon recurrence” in the past years [Ref. 31].

Let’s give now a summary of the content of Part 1. The study presented here regards both temporal and spatial distribution of reported UFO events, a comparative study of the reported typology, correlation analyses and the search for possible connections with geophysical and astronomical parameters. Search for correlation with the population number and the technological evolution of communication media has been done as well. I am now quite well confident that in this specific case a sufficient amount of data has been examined and that the most relevant variables therein (when available) have been weighed as accurately as possible. In order to furnish in some detail a short conceptual snapshot of what has been done, I anticipate here a succinct list of the statistical and graphical/numerical studies that have been carried out in this specific part of the study:

1. Number of UFO Cases vs. Time (overall and month by month), Month and Year;
2. Number of UFO Cases vs. Shape;
3. Time and Duration vs. Julian Date;
4. Low, medium and high-resolution Latitude-Longitude charts where UFO incidents were reported to occur;
5. Town Population Number vs. Number of UFO Cases, and consequent statistical selection of the towns (of whatever dimension) that were intrinsically more involved by the phenomenon independently from population number;
6. Identification of spatially clustered areas where the UFO phenomenon has been reported to occur.
7. *Google Earth* and *World Wind* geographic checks and exact localization of all the spots where UFO cases have been spatially plotted;
8. Correlation analyses, using both linear and polynomial fits, of all the plotted parameters for the three considered areas.
9. Correlation analysis between Moon phase and Moon height at the times of the sightings of structured objects.
10. Correlation analysis between the Number of Yearly UFO Cases and the evolution of technology in communication systems (cell phones).
11. Correlation analysis between the Number of Yearly UFO Cases and the Local Geomagnetic Field Intensity, Solar Activity, Magnetic Anomaly Zones and Gravimetric Anomaly Zones.
12. A study of incidence of UFO Cases with Astronomical Conjunctions.
13. General post-processing data analysis and detailed critical discussion of results.
14. Localization of the most important target-areas and preparation of a sky-watching plan using specifically chosen instruments in order to attempt to identify, measure, and test the phenomenon that might be in case in sight.

I need to anticipate that, although all the relevant witness data have been taken into account in order to prepare tables and graphs, a particular interest has been devoted to allegedly “geometrically structured” UFO cases (see Fig. 0).

Part II of this paper will mostly regard the description and discussion of the apparent anomalies recorded – during the mission to Ontario – using a VLF-ELF spectrometer and of a visual sighting having apparent anomalous characteristics.

1 – Working on UFO databases

Is it possible to extract scientific and practical information from UFO databases? This was the main question that motivated the preparation of this article. So far ufology is just characterized by an interminable succession of qualitative descriptions furnished mostly by witnesses. Such descriptions are sometimes interesting and detailed; indeed that which is reported therein is often so exciting that one would like to try to see how much real such descriptions are. The only way to do so is to try to identify measurable variables so that a quantitative analysis is possible. In such cases a quantitative analysis of a single case, whatever its importance and interest, is almost always impossible, except for very few cases [Refs. 38, 39, 45]. This just remains a sort of “tale”, which certainly often affects the reader emotionally but cannot be brought to more grounded bases. If information given in certain single cases are sufficiently detailed it is very often easy to verify if the phenomenon reported is really anomalous or not. For instance, it can be possible to check its location in the sky just to see if it is the result of the misinterpretation of a known astronomical object [Refs. 52, 65], in case seen through some aberrated atmospheric filter. Many of these cases can be interpreted as fireballs or meteors. Many other cases can be explained as human artefacts such as aircrafts, cars or even cottage lights seen through the fog or other filtering cause [Ref. 86]. Not-a-few other cases can be – more or less easily – explained as plain hoaxes and fakes [Ref. 88]. But several other cases do not furnish an immediate prosaic interpretation.

Skilled investigators can go deep into a single case in order to try to reconstruct an UFO incident – whatever it is – in the most logical and coherent way: most often this kind of investigator is using substantially the same skills as the ones used by a professional police inquirer or by an investigative journalist. In other cases proper scientific skills are used indeed [Refs. 17, 38, 39, 41, 45, 74, 97, 98, 100, 102, 104, 107, 108, 109, 110, 111, 112]. These two samples of serious investigative methodology – when driven by the search for objective facts and not by the necessity to demonstrate pre-constructed “truths” – can reveal themselves to be absolutely necessary for a possible further action that may be in case carried out by scientists wanting to take data directly on the field. Preliminary quantitative results may be interesting and also illuminating, especially when they are absolutely necessary to prepare the ground for on-field missions where it is reasonably possible to do them. But still we do not have in our hands any really quantitative proof of the concrete existence of the UFO phenomenon per se, considering in particular its possible exogenous technological nature [Ref. 14, 17, 41, 103].



Figure 0. Some photographic examples of “structured UFOs” that can be found on the Internet. Some of these cases might be surely hoaxes, but they all give a quite good idea of what people claims to effectively sight according to UFO databases. Here mostly geometric shapes are shown because this paper is mostly aimed at studying these typologies. The geometry can be inferred either by the intrinsic shape of the object or by the way in which the illumination system is disposed over it [two References: 94, 95].

As it has been already mentioned in a previous recent conceptual paper [Ref. 88], real scientific evidence can be obtained using only measurement instrumentation, deployed in areas where the reported phenomenon is reasonably recurrent both spatially and temporally. In order that this is rendered possible a joint collaboration between serious ufological investigators and scientists is still strongly invoked, despite the fact that here we are treating a phenomenology that is very difficult to survey due to its highly elusive and irreproducible intrinsic nature.

In the absence of detailed investigations of single cases and/or as a complement to them, it seems natural to think that the best way to start an investigation that might subsequently bring to a possible spatial and temporal localization (with an acceptable margin of error) of a given UFO phenomenology is to start to examine in detail the existing databases. The question now is if such databases – in spite of the meticulousness and richness of completeness with which they may have been built up – are sufficient alone to permit the extraction of some scientific information on UFOs as a global phenomenon reported from a given area, or not. This test has been done and the answer that can be immediately anticipated is that, whatever the sophistication used to analyze this kind of data, the information that can be extracted is little compared to the waste of time employed to carry out this work. The constructors themselves of the most important UFO databases now available in the world confirm this very honestly, and this, in addition to their huge and constant effort in collecting data, is highly praiseworthy [Ref. 101].

UFO cases reported in the world are really very many, and it was soon understood that the most economic way to carry out this test is to concentrate the attention on a few areas where many data are available. These locations were not chosen by chance, but this choice was done with a main goal in mind: preparing a field mission to be conducted to one of those areas.

So far the three areas that were chosen with this goal in mind are all in North America and they are geographically connected together. These areas are the province of Ontario in Canada and the US states of New York and Connecticut. All these locations have been, in the last 60 years, a theatre of quite important “UFO incidents”. Just to mention a few examples, none can easily forget the monitoring of unexplained aerial phenomena in Ontario since 1997 [Ref. 31], the events occurred in the Hudson Valley (especially in the eighties) [Refs. 26, 28] and the recent cases reported in Connecticut [Ref. 9]. Of course the three UFO database samples that have been examined are just only a little snapshot of the entire UFO phenomenon occurring sparsely all over the planet. These locations were chosen also due to the richness and completeness of the database describing them, despite the fact that the “strangeness and quality indexes” for these cases have not been usually evaluated according to a precise protocol that was set up by Hynek in the past years [Ref. 25]. Of course the number of reported cases in the entire world is so high that it may be virtually impossible to do this analysis for all. Clearly this work is much easier when the number of cases is much less and when diagnostics of all cases is done directly by researchers working on the field, such as the investigation carried out by Project Hessdalen in 1984, for instance [Ref. 70]. In fact, in reality the main goal of this research should be to try to measure the phenomenon directly on the field. This can clearly be done only if a certain area can be reasonably identified as a location where a given aerial phenomenon is recurrent, so that such a location might become a suitable “laboratory” using which some science might be constructed after using the appropriate measurement instrumentation [Ref. 71, 73, 74]. Therefore the primary goal of constructing a UFO database should be to prepare the ground for future expeditions on preferential sites. But in the reality of facts doing this is extremely difficult because only a few locations are characterized by a real recurrence.

An important question now inevitably arises. Are UFO cases – intended as “structured objects” – characterized by a spatial and/or temporal recurrence in the same way as

Hessdalen-like (presumably natural) phenomena? There is no doubt that some specific cases, as, for instance, the Area 51 in Nevada (USA), have been reported as a typical example of possible “UFO recurrence locations”. This should offer the chance to place locally instrumented in order to attempt to carry out scientific measurements of the aerial phenomenon. Unfortunately, it seems that such instrumented investigations have been carried out very rarely, even if valid exceptions do exist [Refs. 61, 68]. Moreover, it seems that so far the only data concerning alleged UFO recurrence locations are limited to witnesses and some videos. This is not certainly sufficient to build up some science. Videos and photos of UFOs that are being shown on the internet are nowadays very many and increasing more and more, but the number of frauds, fakes, hoaxes, and misinterpretations [Refs. 11, 27, 36, 40, 43, 51, 52, 63, 64, 86, 88] have grown as well in this field so that they alone seems to be sufficient to discredit, unfortunately, the entire UFO documentation. What is worldly propagated as an increasing “visit by aliens” seems to be in reality the result of the increase of human dishonesty mixed maybe with a “deception mechanism” [Ref. 88] of unknown origin whose scope is to avert the citizens of the world from being concentrated on more concrete problems of the everyday life and society.

In addition to good investigations of isolated UFO cases and related documentation, it seems to me that the only way to try to proceed seriously here is threefold: a) to ignore systematically all that which is propagated by the media and by journalists without scruples but their public visibility and money earning (UFO is a prolific business indeed); b) to analyze as much accurately as possible well selected databases in order to attempt to get a glimpse of the “UFO phenomenon” from the overall picture and also to see from all of this if a real UFO phenomenon does exist; c) doing missions on chosen sites using all the appropriate scientific instrumentation.

Before starting the presentation of this work it is necessary to describe the general characteristics and quality of the used databases. The New York and Connecticut UFO testimonial data have been obtained mainly from the NUFORC database with some addition concerning cases reported in the eighties taken from a Hynek & Imbrogno’s book [Refs. 26, 50]. Therefore the criterion with which these data have been collected is just the same for these two states. The Ontario testimonial data have been acquired both from the NUFORC and from the UFOINFO [Ref. 96] databases, where most relevant UFO reports were accurately screened by a UFO researcher [Ref. 32], who has a deep knowledge of the cases occurred in the area where she lives due to her frequent monitoring activity carried out directly in several of those locations and to her careful study of every specific UFO report concerning those cases. Her contribution in furnishing and screening the Ontario data has been invaluable, especially due to the precision with which the Ontario reports can be located on a geographic map. In the specific Ontario case, UFO sightings are not only generally ascribed to specific cities, towns or hamlets but also (in many cases) to specific streets, roads and intermediate locations among two or three inhabited centres. The procedure with which the Ontario cases were pondered produced inevitably a much better quality of the data to be used then for analysis. For instance, for this specific area the geographic positioning of UFO cases furnishes consequently a much better “spatially resolved” picture than in the case of the two US states. This better picture for the Ontario cases has the advantage of showing a very precise geographic positioning of UFO sightings, but has the disadvantage of not being

suitably comparable with the two US databases: this happens when statistics on population of specific inhabited centres is cross-confronted with the number of UFO cases occurred in those specific areas. Therefore when evaluating the spatial distribution of UFO cases the New York and Connecticut areas have been subject to a different treatment than the Ontario area. On the other hand, in the evaluation of the statistics in the dimension of time the two US states and the Ontario province have been evaluated all together. The reason of this is that what we are searching for here is not so much the intrinsic number of UFO cases occurred at a given time, but the general trend with which these data vary with time. For instance, if more data are added to a specific database it is expected that these additions do not alter the trend. On the contrary it is expected that a given trend (in this case, the trend in time) is showed with a much higher detail.

In conclusion here we'll show the analysis of two "low resolution databases" and of one "high resolution database", where the "low" and the "high" are cross-confronted mostly when the *time* and *UFO shape* parameters are considered, while they are subject to separate examination – except for some indicative general plot – when the *space* parameter is considered.

But let's start now to describe this (very limited) attempt of database study, which certainly has not the pretension of being all-comprehensive, but which might be maybe useful if used as an additional tool to analyses of the same kind carried out by other researchers.

2 – Temporal analyses

The tactical goal that induced me to make this quantitative screening was to verify if some significant trends can be identified both in space and in time. In order to achieve this task some parameters have been opportunely chosen. The most natural choice from a scientific point of view was to try to see if any trend (of any kind, not necessarily only linear or exponential, but also periodical) was detected in a sample of data containing a sufficiently statistically populated number of cases. This test started with the Connecticut cases, and in fact both the time and the duration of reported UFO sightings have been plotted against Julian Date, being confident that the Julian date system, normally used in astronomy for precision studies of variable celestial phenomena [Refs. 24, 105], might reveal something after a subsequent analysis was done. The final result was that time-series analysis [Ref. 93] showed no possible periodicity, no significant trend of any kind, except for the fact that the number of recorded sightings is clearly increasing with years both in terms of the number of cases at a given time and date and in terms of a widened hourly-range (see Fig. 1).

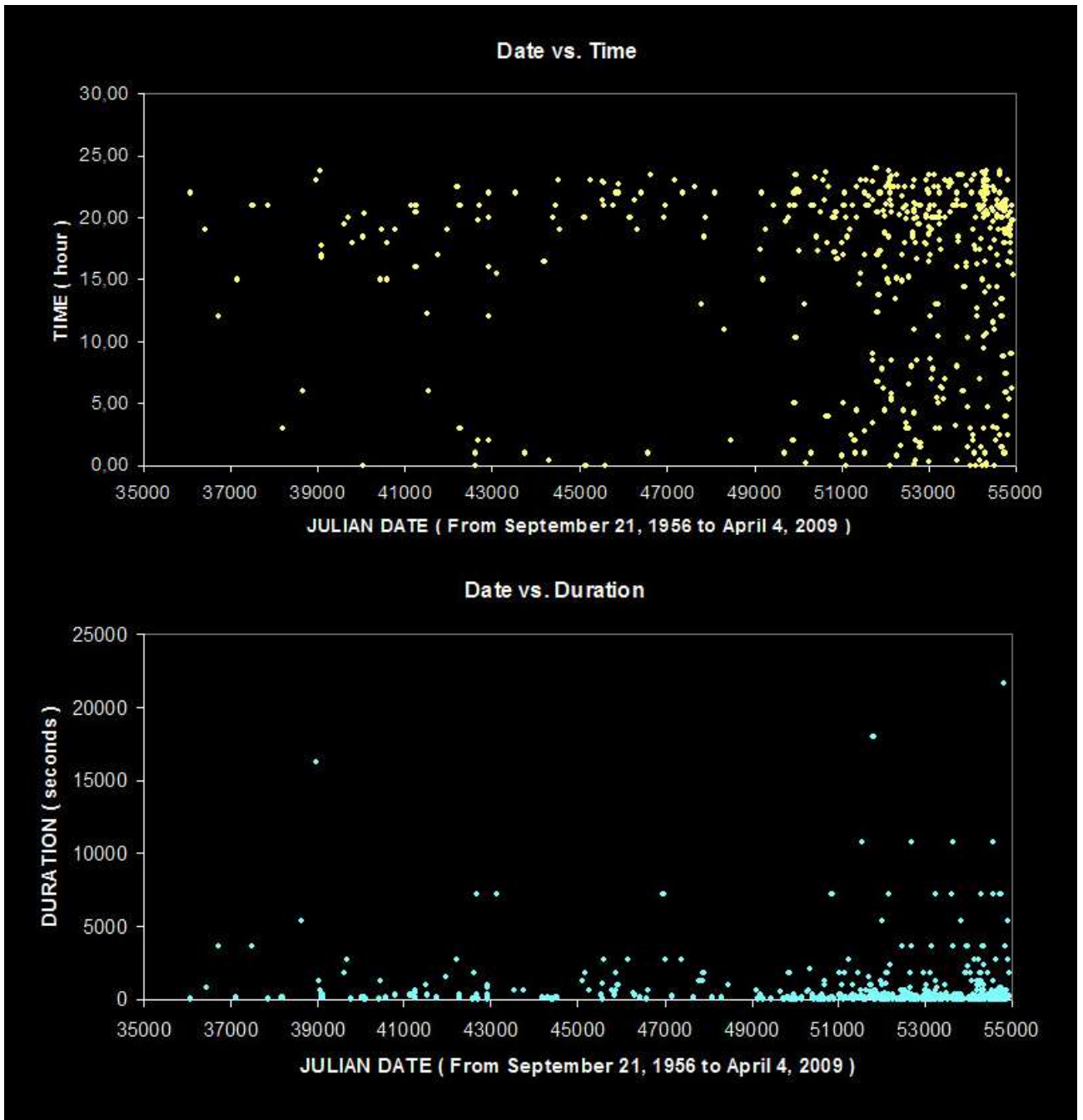


Figure 1. Variation of the Time (*up*, 525 data points) and of the Duration (*down*, 466 data points) of UFO sightings with Julian Date, in Connecticut, USA, from January 1956 to June 2009.

What is the meaning of all this? This will be discussed in a further section, when such an increase in number of UFO cases with time will show itself in a more marked and clear way. As it will be discussed later, this is not due to a real increase of UFO cases with time. The intention was just to start immediately with temporal analyses that are more refined than

normal histograms, using the same approach that astronomers normally use when they want to carry out variability studies on some particular classes of stars. In this case the Julian Date system is commonly used as a time precision tool. If then a periodicity can be identified then a “time phase” can be used as an independent variable, with a highly predictive valence. But the experiment done showed that this unfortunately doesn’t happen when the same procedure is applied to UFO databases. As it will be seen later, UFO sightings reported in Connecticut follow a very similar time trend as the New York and Ontario ones: so there was no convincing reason to waste new time in order to apply this kind of temporal analysis to the other two areas. Therefore, the globally disappointing results obtained with this first study, where the sample is quite well statistically represented, invited me not to repeat the same test for the Ontario and New York cases. After this choice was done, the analysis was from then on focussed on the choice of more general and classical parameters such as the number of UFO cases as a function of time range, month and year. If we consider the first one of these three statistical checks that were carried out, where the number is counted during the last 60 years, what we obtain is shown in Fig. 2, which shows that cases reported in Ontario, New York and Connecticut are quite well correlated together. This similarity in the time behaviour of the three cases is not surprising at all and probably tells almost nothing on the intrinsic nature of the investigated phenomenon. The reported behaviour most probably shows a very marked “selection effect” due to the fact that witnesses of UFO sightings are much more numerous in a time range in which they are freer (mostly from work time) to look at the sky and when they are still awake. The higher frequency of cases reported at certain hours at night is probably due to the perceptive effect [Ref. 102] of the witness in general: it is here expected that “nocturnal lights” (of the structured and unstructured kind) in general tend to attract the attention of people much more than daylight anomalous aerial phenomena. But maybe, as it is strongly suspected, the most important component affecting this statistics is due to the fact that witnesses very often tend to misinterpret well known astronomic, atmospheric and aerial phenomena, such as stars or planets that give the impression to “run in the sky” when really the clouds are moving, luminous planets (such as Jupiter, Venus, Saturn and Mars) taken alone or in occasional conjunction, meteors and fireballs, occasional ball lightning or natural phenomena of different kind [Refs. 5, 13, 19, 21, 48, 106], airplanes and/or helicopters seen through particular perspectives compared to the observer, very luminous orbital satellites and space stations, bird flocks illuminated by city lights, single birds (such as owls) occasionally illuminated by street lights, fireworks, military flares, mirages [Ref. 57], moving laser beams hitting the clouds, experimental military aircrafts, Chinese lanterns, cars moving on the top of hills during foggy days, simple cottage lights, and probably several other causes that might create the illusion of seeing an UFO.

A *real frequency* of the UFO phenomenon, intended as a really anomalous phenomenon, seems to be completely buried inside these perceptual and highly deceptive factors. Therefore the extraction of the signal from the noise is extremely difficult because any possible study to evaluate the noise involves many concomitant effects, which might also be different from state to state.

What is a bit surprising is that if we make the same hourly plots just monthly and not extended to all the sightings that were reported during 60 years, the picture changes quite consistently. In fact the previously recorded correlation almost vanishes, and the three areas

show a quite different hourly behaviour, despite the fact that here we can anyway see just a “general common increase” during dark hours. This can be seen quite precisely in Figs. 3A, 3B, 3C and 3D, where the Ontario, New York and Connecticut cases are considered together. How to explain this behaviour? Certainly one probable cause should be apparently given by the difference of daylight hours for areas that taken all together range from the parallel 41° (NY) to the parallel 54° (ON): this clearly shifts the time at which sightings are reported, with opposite conditions during extreme seasons such as winter and summer. Nevertheless this effect doesn't seem to be decisive due to the fact that the most northern areas (northern Ontario) are much less populated than the southern ones: for instance, it is sufficient to compare Long Island, NY area with the most northern border of the Ontario province in Canada. As it will be seen later this drastic difference in population number has a very marked effect on the number of reports of UFO sightings. Conclusively, the difference of daylight is a reasonable factor that must be taken into account per se, but in the case of this specific confining group of states it must be accurately weighed state by state. However as a general impression in this specific case this factor seems not to be important in determining the often marked difference that is seen when the statistics on time range is done month by month.

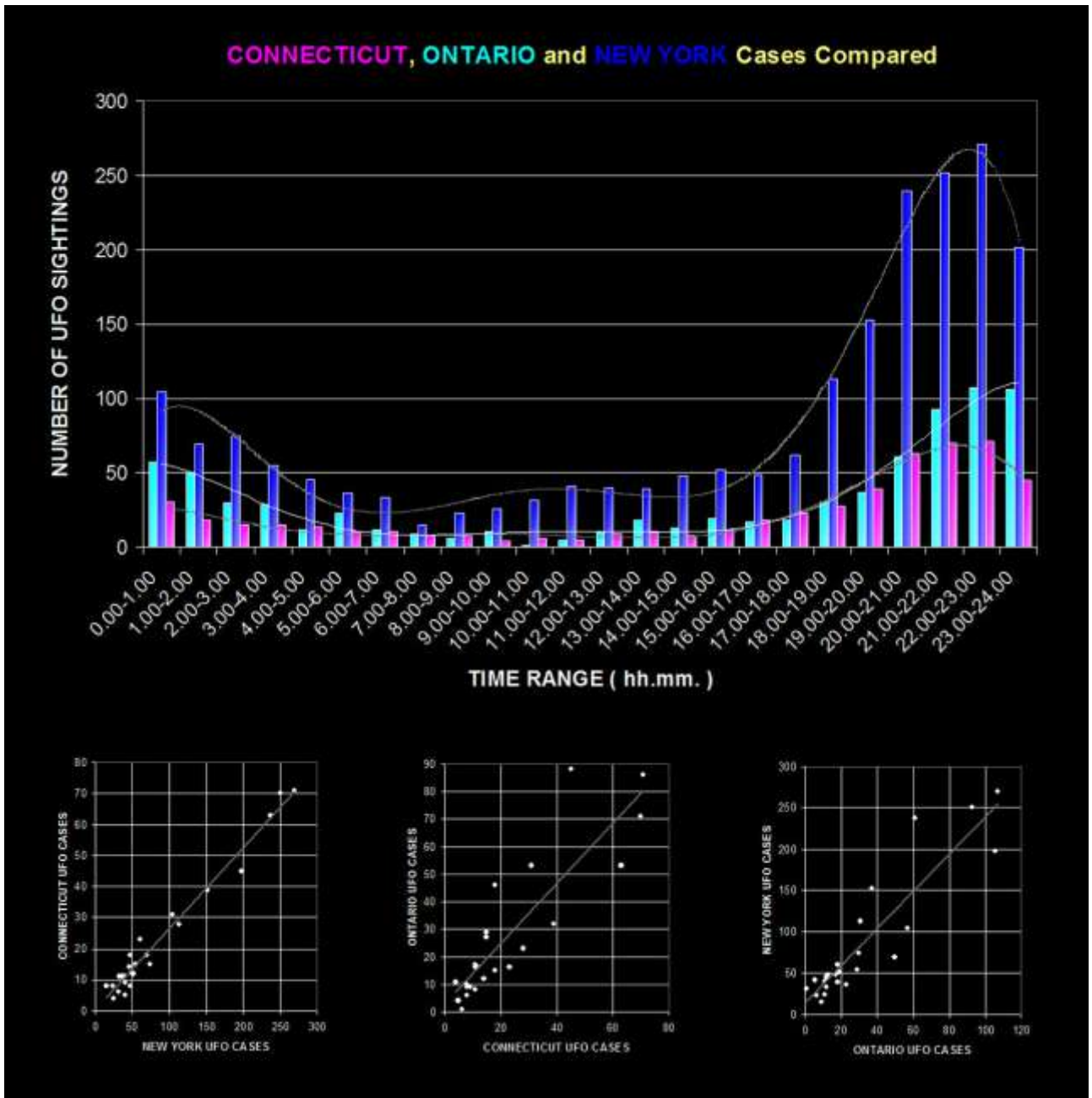


Figure 2. *Up.* Number of UFO Sightings plotted vs. Time Range for three compared areas: 1) Connecticut state (USA): 543 data points; 2) New York state (USA): 2057 data points; 3) Ontario province (Canada): 969 data points. *Down.* Correlation between the three cases.

All this said, it cannot be therefore excluded that the bulk of a possibly real UFO anomaly is hidden inside these last four charts, namely in the residual that comes out from the pondered difference of the number of UFO sightings at a given time slot and at specific months. This is the real reason of the importance of comparing together UFO sightings

reported in more than only one state, without limiting the statistics to only one. There is no doubt that the difference of the trend that is shown by the three cases contains in itself something that should be better evaluated. As it was discussed previously, fishing the signal from the noise here is a quite difficult operation. The scope of this study, as it can be seen now, is not to solve this problem once and for all, but to highlight this possible perspective for further studies when it will be inevitably necessary to embark into a multi-faceted analysis of the many accurately weighed factors that contribute in creating the “noise” inside these charts. This further study might maybe shed some light into the evidence of a real UFO phenomenon directly from UFO databases that are opportunely screened and where the individual cases are more carefully and accurately selected and chosen.

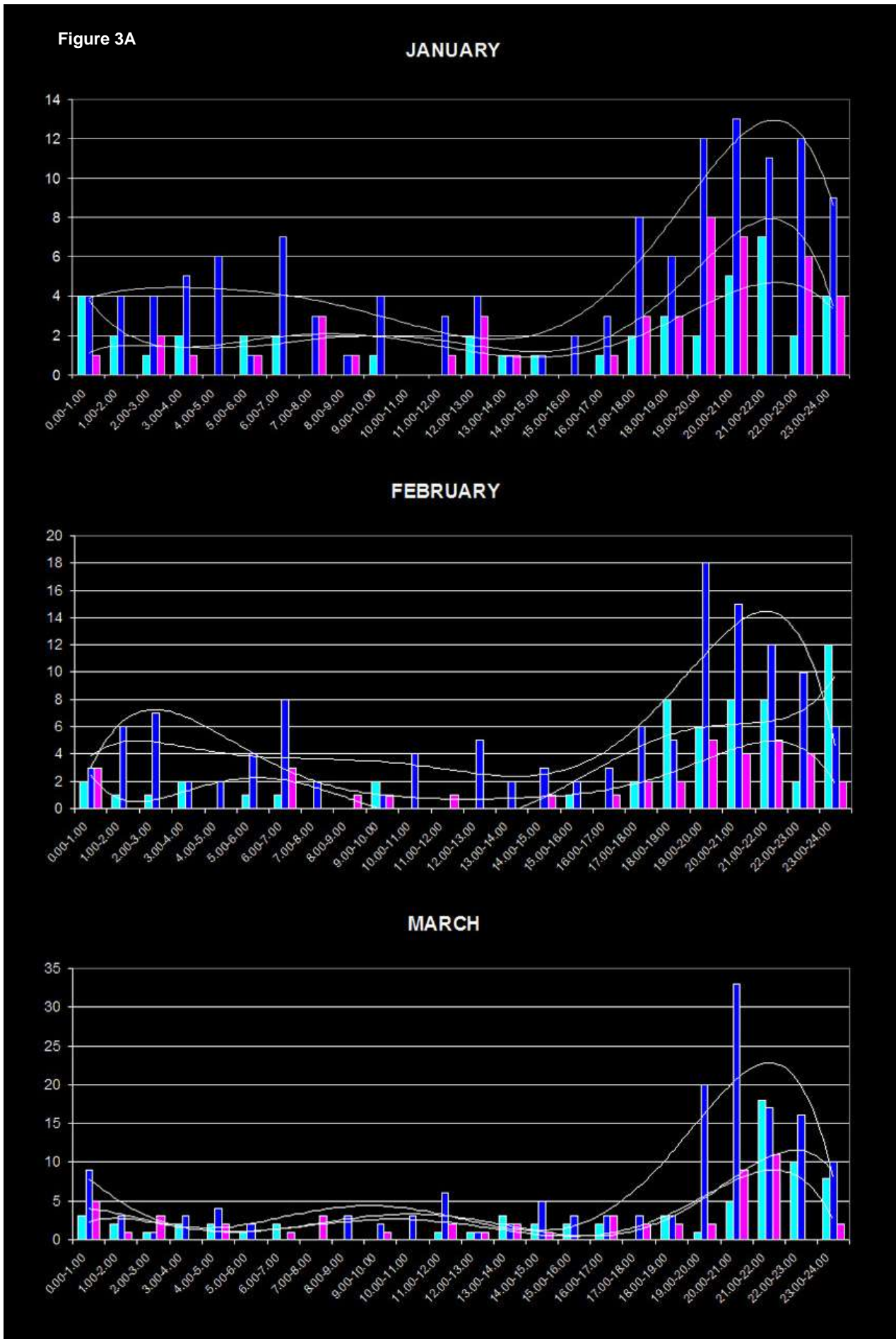
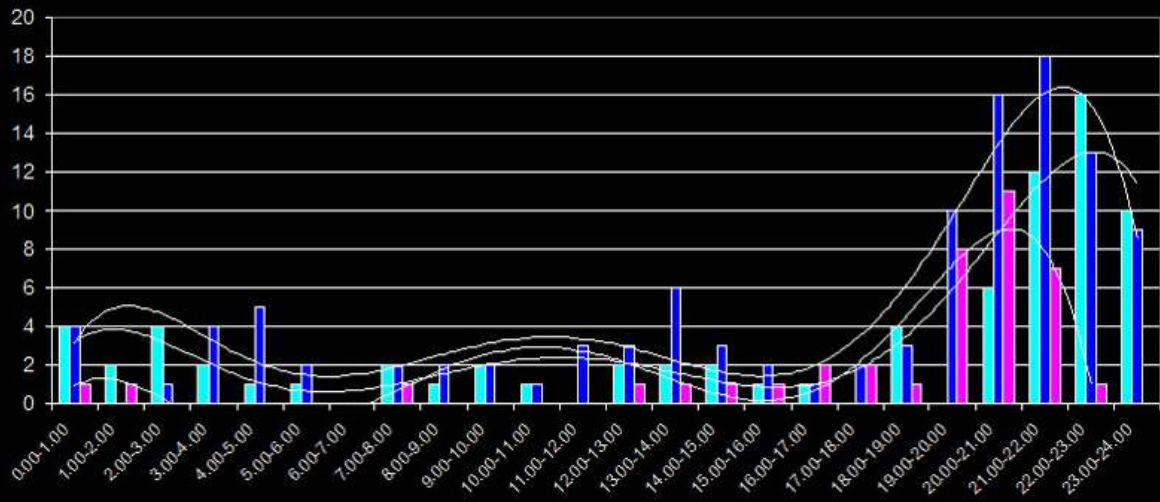
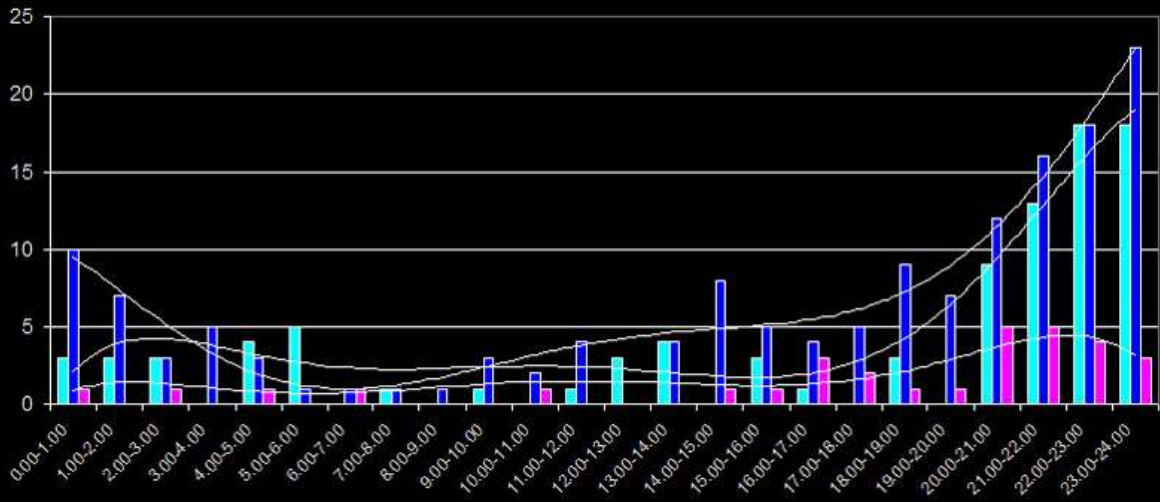


Figure 3B

APRIL



MAY



JUNE

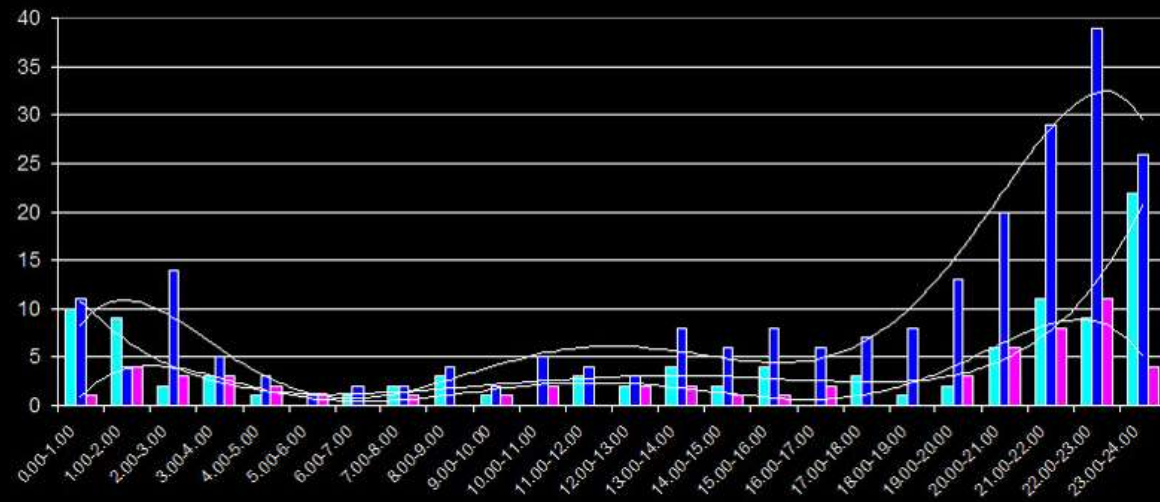


Figure 3C

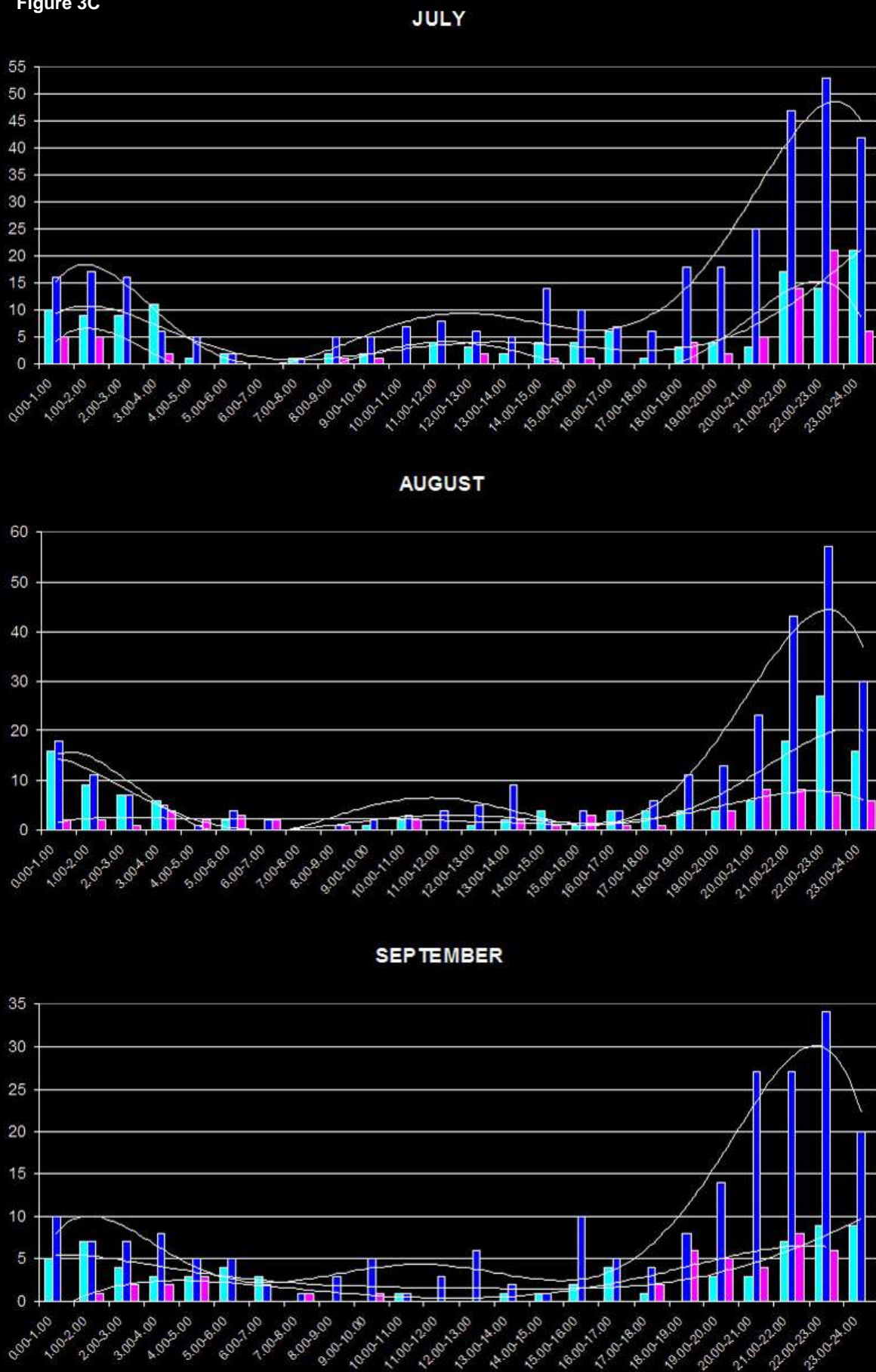
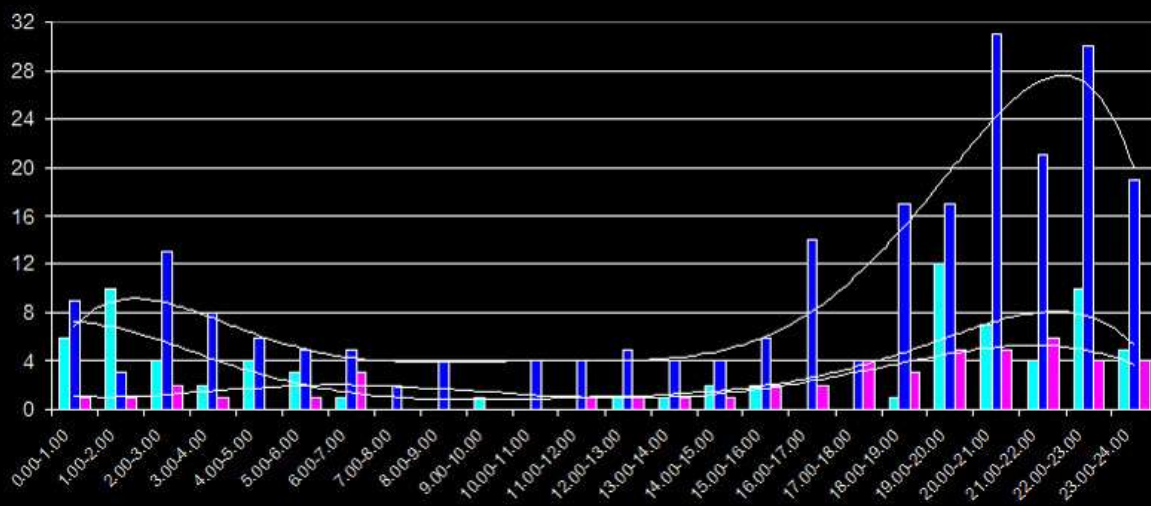
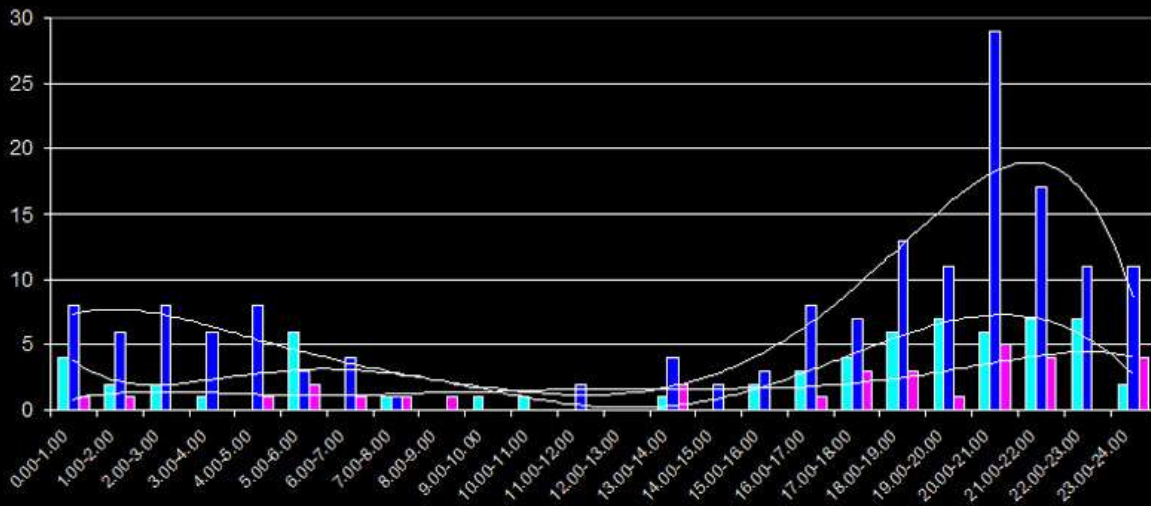


Figure 3D

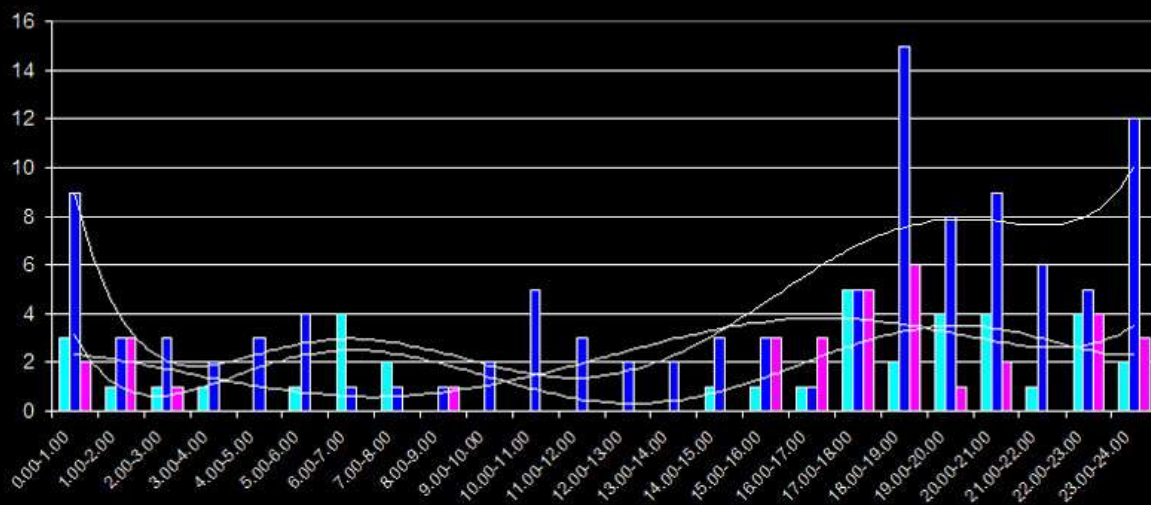
OCTOBER



NOVEMBER



DECEMBER



What about “UFO statistics” on a monthly and yearly base? Concerning the statistics by month (see Fig. 4) we clearly see that summer months are quite markedly favoured in all of the three states. This is logically expected due to the fact that summer months – in particular July and August – are the ones in which people pass their time more often outside due both to the good climate and to a less constraining link with work duties (and a consequent lesser necessity to go to bed earlier in these months). Nevertheless it is possible to notice some quite basic difference among the three considered areas.

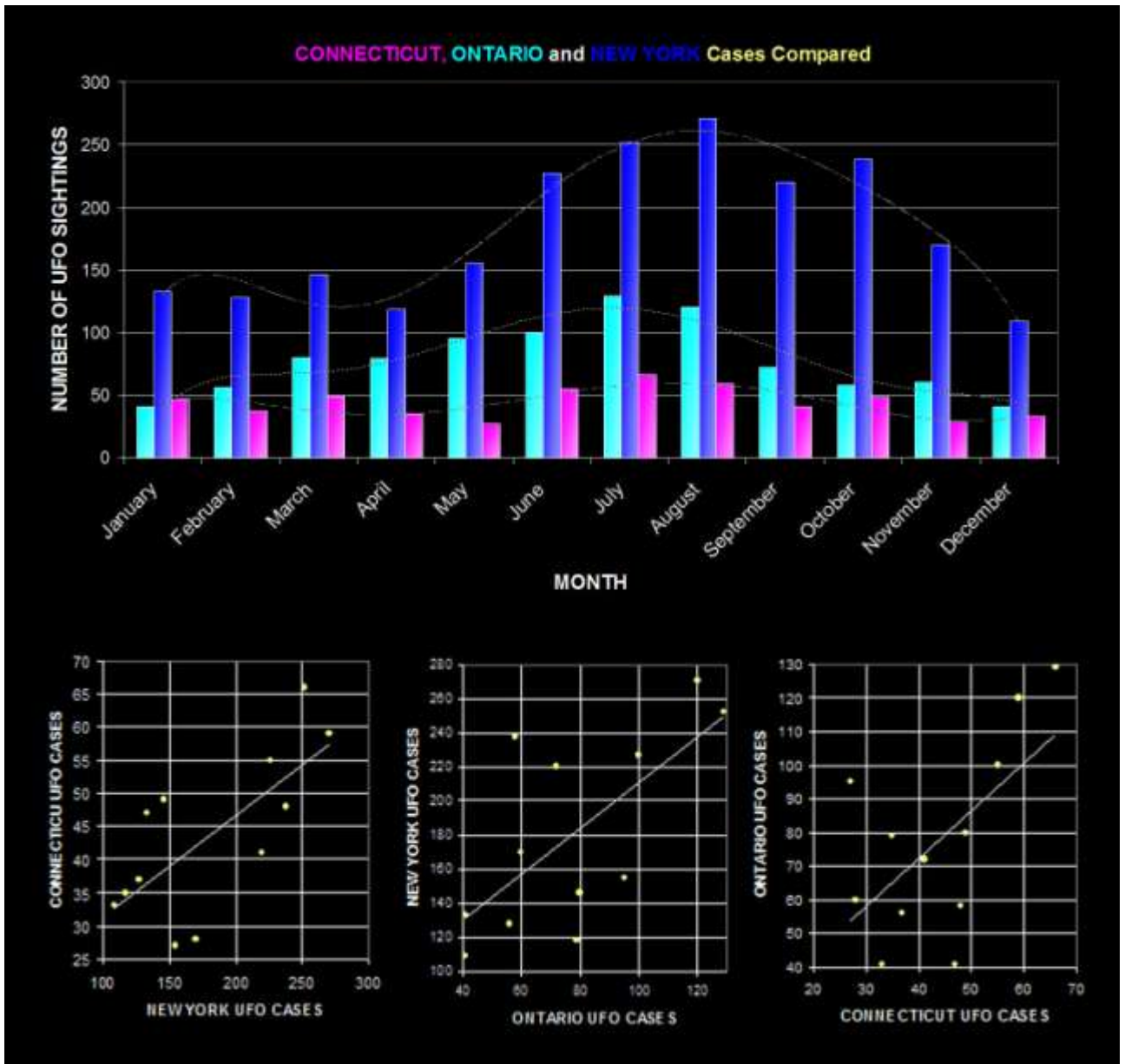


Figure 4. *Up.* Number of UFO Sightings plotted vs. Month for three compared areas: 1) Connecticut state (USA): 543 data points; 2) New York state (USA): 2057 data points; 3) Ontario province (Canada): 969 data points. *Down.* Correlation between the three cases.

The general trend shows only a quite vague, but not very strict, correlation. For instance if we look at the high peak reached in October by the New York state area and we compare it with the same month in the Connecticut and Ontario areas, we notice a pretty huge difference. The differences with which the curve grows or decreases in the three cases can be noticed also in some other months of the year. These differences, in particular the October behaviour for the New York case, might show the existence of a real “UFO flap” (or in case more than one, at different times) that is just “hidden” inside these curves. In few words some events that have nothing to do with prosaic perceptual factors might have occurred. It must be clarified that such a flap must not necessarily ascribed to extraterrestrial [Ref. 17] and/or interdimensional visitation. It can be caused by “everything”, most probably by occasional flybys of experimental aircrafts [Ref. 27] or to other specific factors that are peculiar of the locations where these events have been occurring. The trend by year (see Fig. 5) shows in all of the three areas a quite strict correlation. This is a very important result and, as it will be noticed soon, it is most probably not due to a real increase of UFO events.

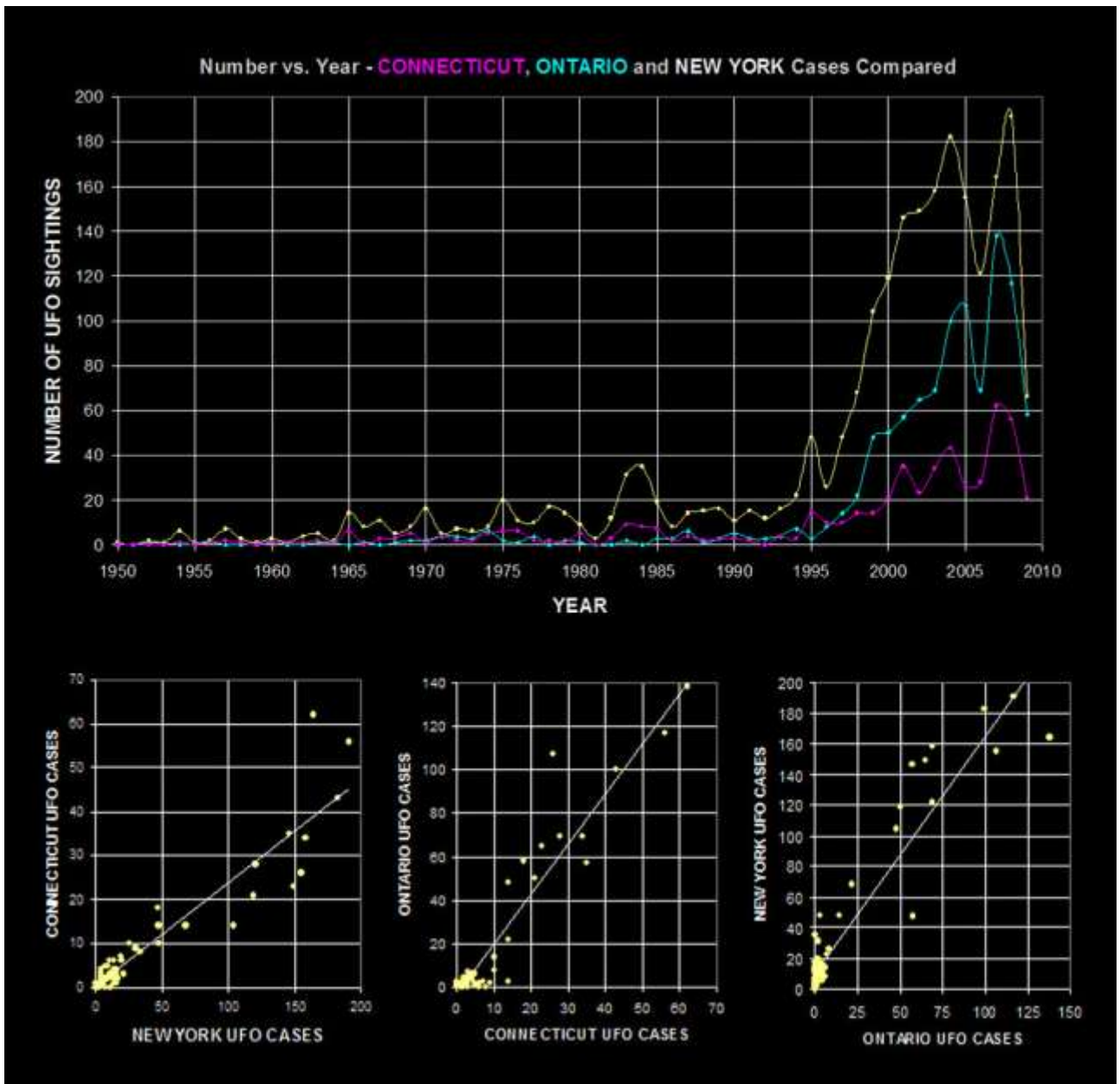


Figure 5. (Previous page) *Up*. Number of UFO Sightings plotted vs. Year for three compared areas: 1) Connecticut state (USA): 543 data points; 2) New York state (USA): 2057 data points; 3) Ontario province (Canada): 969 data points. *Down*. Correlation between the three cases.

Which other factor might account for this almost exponentially increasing trend with years? The answer is quite clear: the reason of this is mostly due to the exponential increase with time of the technology of communications. Statistics on the technological evolution and diffusion of Internet and cell phones is shown everywhere on internet. In the case of the signalling of a UFO incident, cell phones, whose worldwide diffusion [Ref. 7] follows approximately the same trend as the one of Internet, should be considered more important

because a witness can advise (sometimes in real time) an UFO centre from everywhere, including the car from which a given sighting has been just reported. Fig. 6 shows that a quite interesting correlation exists between the diffusion of cell phones in the world and the increase of UFO sightings with years. But this correlation is very sharp only for two thirds of the entire yearly curves. In fact the residuals might hold something relevant to UFOs.

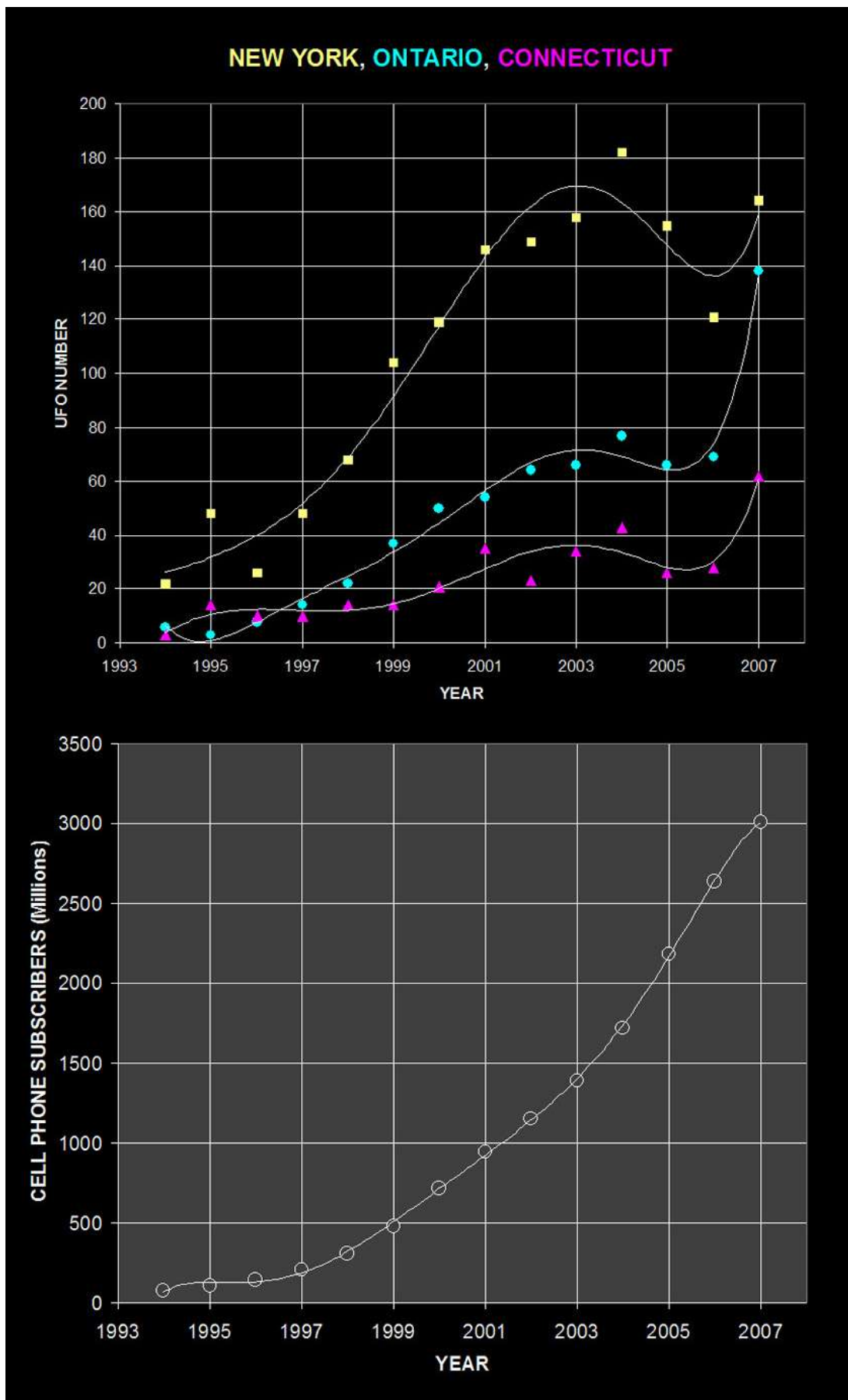


Figure 6. (Previous page) *Up*. Number of UFO Sightings plotted vs. Year for the three compared areas. *Down*. Evolution of diffusion of cell phones in North America. (2008 and 2009 data were not yet available for cell phones at the time of the writing of the present paper.)

What occurs in the last years seems to show that something that is probably inherent to the “phenomenon” itself is suddenly overlapped and this happens almost exactly in the same way for the New York, Connecticut and Ontario areas. Let’s comment more in detail what happens here.

- From 1994 to 2004 the number of UFO sightings grows more or less proportionally to the increase of cell phones diffusion. So, considering only this factor the intrinsic UFO number per year should be more or less intrinsically constant. It is not unreasonable to guess that, as in previous statistics, this is due to a purely perceptual effect and to many factors, including misinterpretation of known and prosaic objects in the sky, such as airplanes seen at different sight perspectives, for instance. Moreover, the increase of the number of airplanes, of the level of their technology and complexity of their illumination system at night, might be another determinant factor that contributes to the increase of UFO reports with years, by overlapping consequently with the main factor represented by cell phone diffusion. But peculiarities do exist, indeed: the gradual exponential growth of UFO sightings is occasionally broken in some years in the same way for all the three areas (even if with different amplitude). For instance, years 1983, 1985 and 1995, and secondarily 1954, 1957, 1965, 1970, 1975 and 1978 (see Fig. 5) show some more or less slight excess compared to the general time trend. Possibly a real incidence of true UFO incidents can be foreseen just in these years, maybe in form of true “temporal flaps”. These details might be quite important in trying to understand the behaviour of the true signal that we are searching for. It seems in fact that, apart from the constancy of the general trend (if we calibrate or normalize the diagrams by subtracting the cell phone trend) something real, even if quite tiny compared to the great numbers considered here, is occasionally occurring.
- From 2004 to 2006 UFO sightings decrease showing an occasional anti-correlation with cell phone increase. Namely: the UFO number drops intrinsically. This is quite interesting because suddenly the general trend is broken for two years and this happens for all the three considered areas. If UFO reports were referred to more prosaic causes this might show that in all the three areas people looked less at the sky during that period of time. This might be due to particularly unfavourable common weather conditions for the inhabitants of the three considered states or to some specific social phenomenon that must be still identified. If UFO reports are really referred to truly flying aerial anomalies (military experimental aircrafts and/or real signs of alien visitation) then this behaviour might be maybe interpreted in this way: since sixty years UFOs fly in the skies of Earth pretty constantly but, after some transient flaps, this constancy is suddenly slightly decreased due to some reason that is not possible to know at the present time: here any speculation is licit, of course.

- From 2006 to 2007 UFO sightings increase again and this time faster than the increase of the diffusion of cell phones. This means that the UFO number is not any more constant or transiently and occasionally decreasing as in the previous period of time but is subject to a slight intrinsic increase in the last years compared to a presumably constant behaviour. A quick extrapolation shows that this involves also 2008 and 2009 years [Ref. 50], where the increase of UFO number is particularly accentuated.

In conclusion it is highly reasonable to suspect that mostly the UFO number is correlated with the increasing diffusion of cell phones, but also that: A) in some specific years temporal flaps occurred transiently; B) in the last 6 years a sharp change of the constant trend occurred, characterized first by a decrease and then by a sharp increase. These ones might be intrinsic effects due to the UFO phenomenon: in fact this trend correlates NY, ON, and CT areas together quite well.

Another important feature should be noticed if we look at Figs. 5 and 6. Apart from the same trend that the three cases show quite sharply, we notice that the amplitude of the three curves is markedly different. Do UFO pilots prefer a state than another in order to build their “underground bases”? Maybe, but not as expected. The amplitude of the shown curves depends mostly on the number of inhabitants of the New York (19.000.000) and Connecticut (3.500.000) states and of the Ontario (13.000.000) province. In fact, as it will be seen more clearly in a subsequent section concerning spatial analyses, the number of UFO sightings is quite strictly dependent on the number of inhabitants of a given area. And it is also logical that it happens this way. But is all this totally explanatory and exclusive? To give the answer we should compare together the ratio given by the number of inhabitants and the number of reported UFO sightings. Results give the following values:

<i>New York state</i>	Ratio: 19.000.000 / 2.057	=	9.237
<i>Connecticut state</i>	Ratio: 3.500.000 / 543	=	6.446
<i>Ontario province</i>	Ratio: 13.000.000 / 969	=	13.416

Clearly here a smaller ratio is an indication of a bigger impact of UFO sightings (intended as reports and not necessarily an alien visitation). In fact these ratios show that the state that is more affected by the phenomenon is not New York (biggest amplitude of the curve) but Connecticut (smallest amplitude), while the Ontario state (intermediate amplitude) is the one where UFOs have less impact (in spite of the additional reports compared to the other two areas). This clearly shows that, apart from their trend in time and the peculiarities therein (which are what really counts in this study), the numerical amplitude of the histograms and the curves represented in the charts of Figs. 2 up to 6 are just illusory, namely: they are not numerically intrinsic to the signal that we are searching for.

3 – UFO sightings and the geomagnetic field

One of the first diagnoses that a researcher should do when many UFO sightings are reported from a given wide area such as the New York and Connecticut US states and the Ontario Canadian province is to verify if these areas are characterized by some anomalies from a geophysical point of view. Two geophysical variables that should be checked are anomalies of magnetic and gravitational fields, in addition to the incidence of fault lines, seismic and/or volcanic areas and Radon indoor losses. An opportunely prepared *World Wind* map [Ref. 49] shows an overall representation of the distribution of magnetic and gravimetric anomalies that characterize the North American continent (see Fig. 7): these maps show how fluctuations of these two parameters are distributed spatially. The three states can be seen within this general map. A careful comparison of the spatial distribution of UFO reported sightings (see, more forewords, Fig. 11) with the *World Wind* magnetic and gravimetric map shows that no real correlation exists between these geophysical fluctuations and UFO sightings. On the contrary, as it will be explained in a subsequent section, the spatial distribution of UFO sightings is correlated with a much more prosaic factor, namely the population number. Unlike the case of “earthlights” [Ref. 30], which are more likely anomalous geophysical phenomena and may be often correlated with the presence of fault lines and/or seismic areas [Ref. 19], UFO sightings seem not to have any precise and well-marked link with the geophysical characteristics of the territory, even if some of them may occasionally do. In fact we cannot ignore the probable fact that within the category of “UFO sightings” some more properly defined “earthlight phenomena” too may be mixed inside very likely, in particular inside many of the so called unstructured “nocturnal lights”. As it can be seen from the maps of Fig. 7, once compared with the chart of Fig. 11, the three considered geographic areas present a moderate level of gravimetric spatial fluctuation (ranging from -20 to +20 mGal), and magnetic fluctuations at various intensities that are more or less randomly scattered and that have no spatial coincidence with the distribution of UFO sightings all over the entire area. In conclusion, geophysical factors that are statically and spatially characterized (without considering time variability) have no impact in the spatial occurrence of UFO sightings.

Where the “magnetic factor” reveals to be decisive as a correlative element for UFO sightings is not in its spatial distribution but in its temporal variation, namely the “secular variation” to which the local Earth’s magnetic field is subject in time. This aspect, as it will be seen in brief, has a strict relation with the variation of the number of UFO sightings through the years. Therefore we now reconnect with the discussion that was started and developed from the statistical interpretation of Figs. 5 and 6.

After inserting the data concerning latitude, longitude, elevation and date inside software *Geomagix* [Ref. 29] of the National Geomagnetic Information Center (NGIC) of the US Geological Survey (USGS), it is easy to verify that the local geomagnetic field intensity decreases linearly of about 40 nT every year. If we then plot this parameter vs. the yearly number of UFO sightings we discover a quite strict exponential anti-correlation that is substantially the same for the New York, Connecticut and Ontario cases (see Fig. 8). Moreover, after checking the values of the secular variation of solar activity (deduced by the number of sunspots) during the years [Refs. 3, 66] it is easy to verify that solar activity is linearly correlated with Earth’s magnetic field intensity (see Fig. 9). Therefore it is

transitively deduced that the increase of the yearly UFO number is anti-correlated with the long-term time variation of both the terrestrial magnetic field intensity and solar activity.

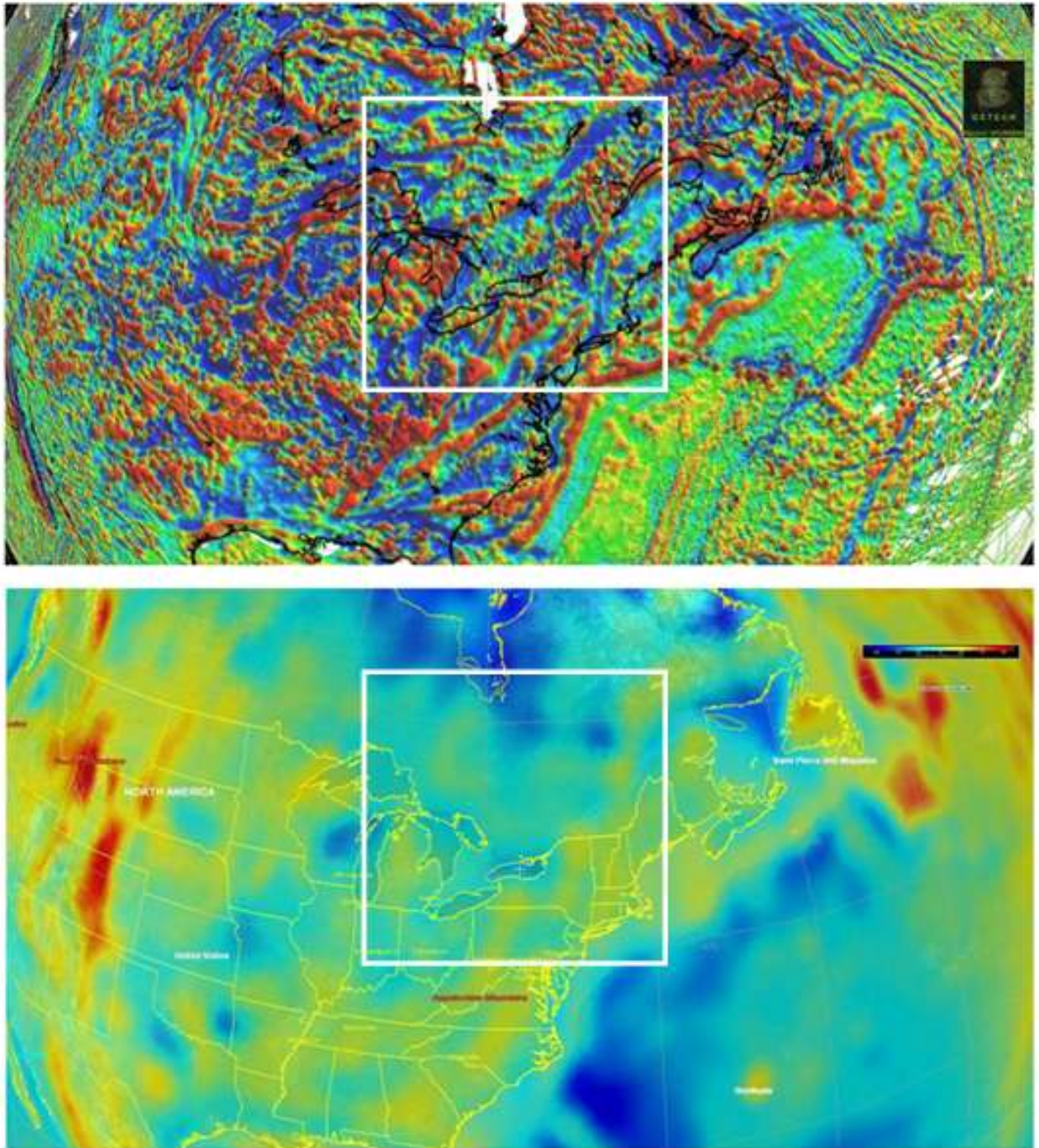


Figure 7. Geophysical anomalies in North America (which is deliberately shown entirely in order to permit a wider comparison of intensities). The area of interest (NY, CT and ON states) is represented by a white box. *Up*. Magnetic anomalies (dark blue colour: -200 nT, clear blue: -100 nT, yellow: +30 nT, red: +100 nT,

violet: +200 nT). *Down*. Gravimetric anomalies (dark blue colour: -60 mGal, clear blue: -20 mGal, green: 0 mGal, yellow: +20 mGal, red: +60 mGal). These maps have been obtained using the WDMAM option of the *World Wind* 1.4 software.

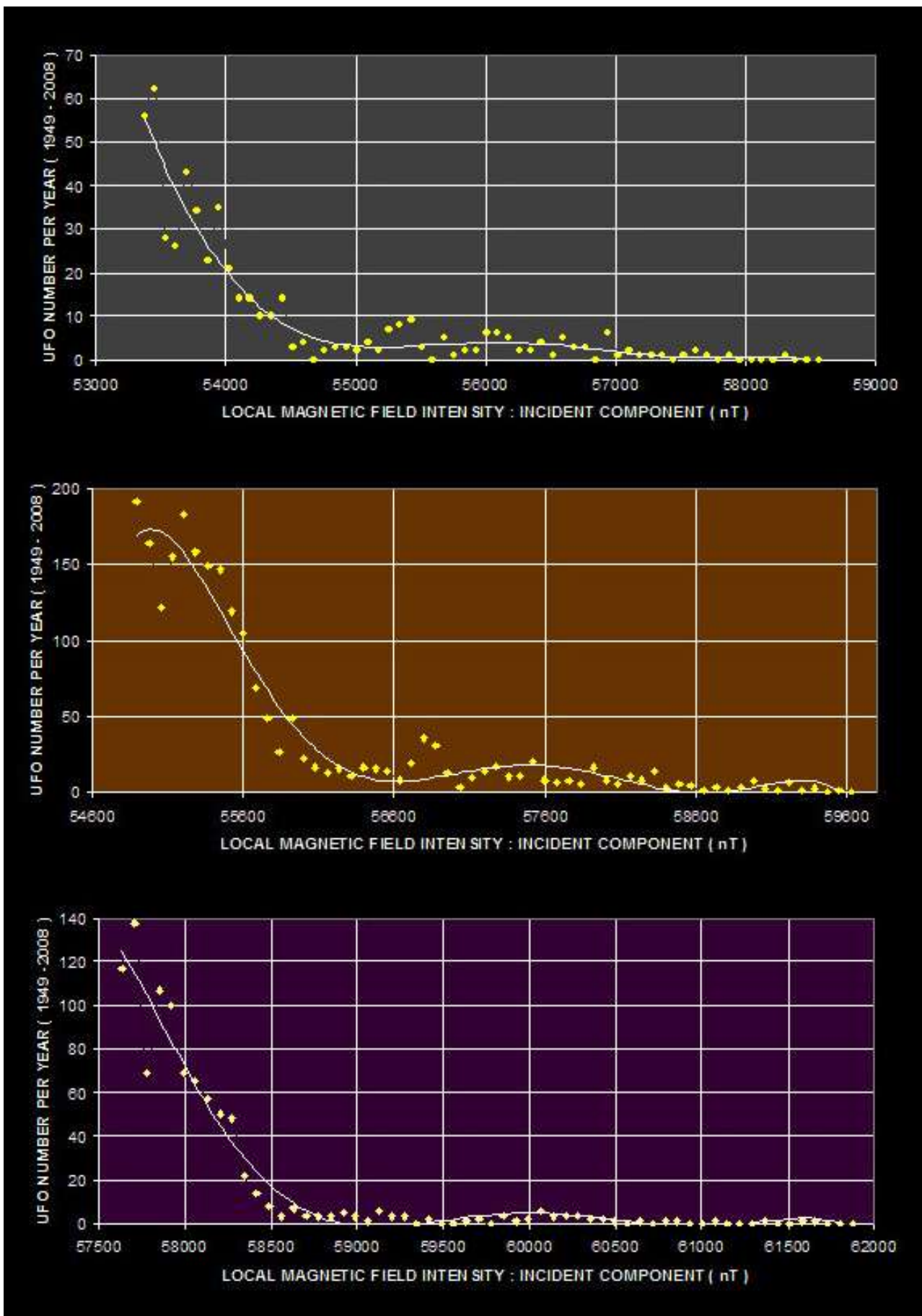


Figure 8. (Previous page) Yearly UFO Number vs. Local Magnetic Field Intensity (incident component) for the cases of Connecticut, New York and Ontario (from up). Data distribution has been fitted using a 6-th order polynomial function. The same trend is obtained for the X, Y, Z and H components of magnetic field intensity.

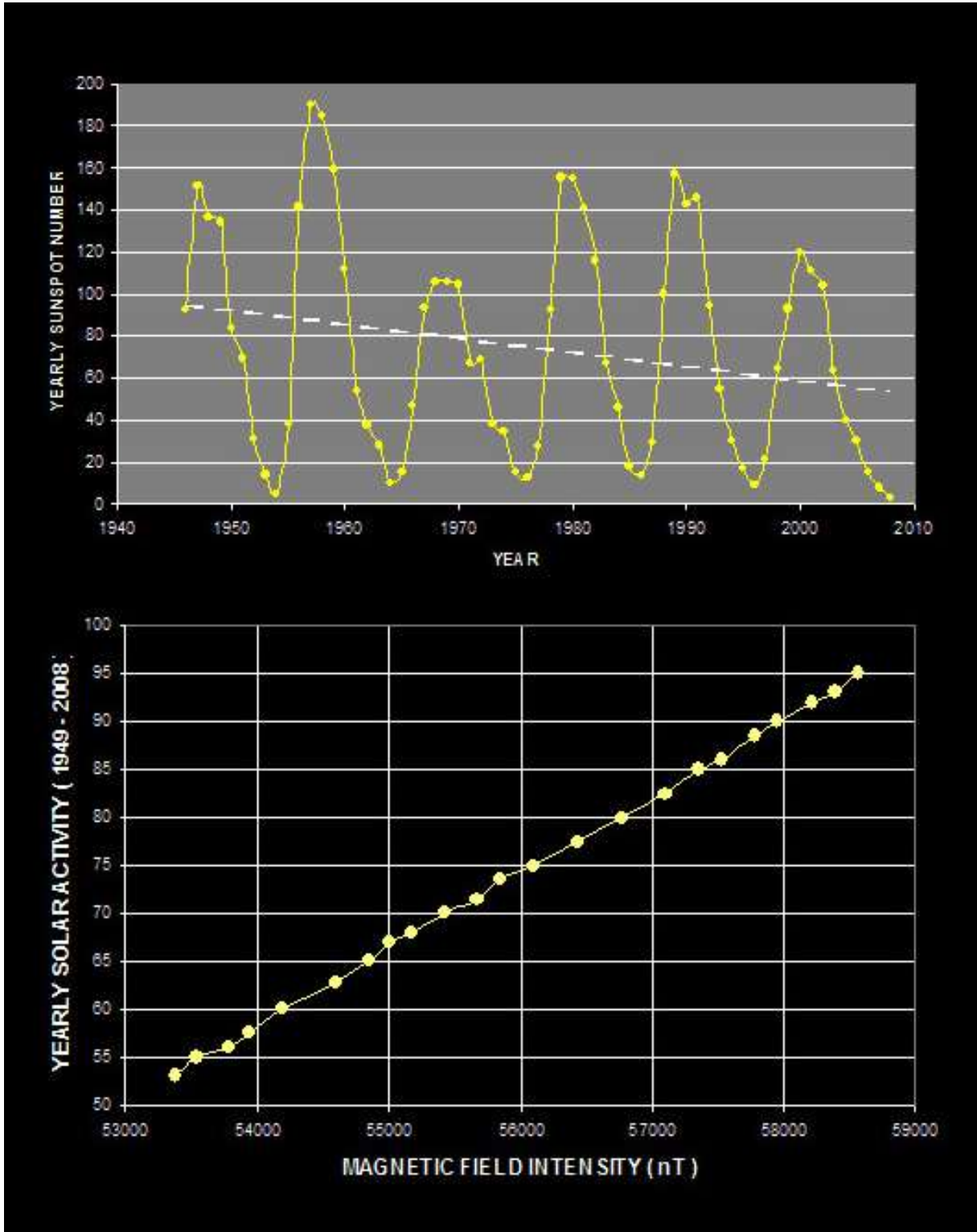


Figure 9. (Previous page) *Up.* Decrease of Solar Activity with Years. The trend line interpolates points showing a secular decrease of solar activity. *Down.* Correlation between Solar Activity and Earth's Magnetic Field Intensity.

In a few words it can be deduced that the yearly UFO number increases when solar activity and Earth's magnetic field intensity decrease. Is there any interpretation in all of this? Maybe we might be in a condition to venture several speculations if the yearly UFO number were not correlated with anything else. But, as we have already seen (Fig. 6), the yearly UFO number is very well (linearly) correlated with the yearly diffusion of cell phones. Therefore we might have discovered a sort of "serendipitous effect" that tells us that here the really meaningful correlation is just between Earth's magnetic field / solar activity and the evolution of human technology (and not the yearly UFO number). What does all of this mean? It seems to tell us that the products of the left hemisphere of human brain – namely rationality, science and technology as its most logical consequence – grow exponentially when Earth's magnetic field intensity decreases linearly. This is exactly what can be inferred from these charts. This result seems to show that the rational ability of the human brain is sensibly affected by magnetic fields, meaning that strong magnetic fields – plus correlated solar activity – tend to weaken our logical-mathematical skills. From accurately prepared and repeatable laboratory experiments where people's temporal lobes are stimulated artificially with a weak magnetic field and/or ELF-VLF electromagnetic fields, it has been ascertained since at least two decades that these fields are able to induce hallucinations and/or "religious states" [Refs. 20, 55, 56]. It is therefore logical and elementary to deduce that a hallucinated mind is not able to work properly in the rational sense. But what is exactly an "hallucinated mind"?

If we then go back to human history and extrapolate the value of the Earth's geomagnetic field, for instance, one millennium ago, we deduce that when our civilization was devoid of any form of technology the local magnetic field intensity was much higher than now. Its value was more than twice higher according to a quick calculation, namely as an order of magnitude, a value of 100.000 nT against one of. 50.000 nT of our times. At those times (middle age) art, religion, intuition, philosophy, metaphysics, alchemy, esoterism and witchcraft were characterizing the cultural values and often the habits of this period of the past, just the opposite than now. To quote just a few examples, strange beliefs in devils, angels, and "elementals" were much more diffused in the past than now (in spite of the "New Age phenomenon" of the present times). Was this due to a higher induced hallucinatory state of the human brain? This hypothesis should be investigated thoroughly by carrying out interdisciplinary studies, whose main goal should be the one of investigating and testing which is the appropriate intensity level of the local magnetic field (including the one produced by artificial means) to create a well-balanced state of our mind and psyche.

None really knows, apparently, if building a society only on science and technology is the correct approach to the life and mental sanity of an entire civilization. Does the "rational approach", when totally unbalanced compared to the human "intuitive qualities", create a really worth and healthy life or is there a worldwide problem with this? Are rational people really sure to have a perception of reality that is truly objective and in harmony with some "creative project"? Or does it maybe happen that when some aspects of life are lacking then a

“psychic factor”– and not mental or hallucinatory in the biophysical sense – suddenly emerges, maybe as an effect of some “energy conservation”, by causing itself a distorted perception of the external world, such as misinterpretation of known phenomena mistaken for UFOs? This second possibility might overlap in its turn with the “technology factor” in increasing the number of UFO sightings with time, and maybe psycho-social scientists should make some investigation. Questions here are potentially many and sound, and speculations alone never solve the problem but they maybe might stimulate someone to do it concretely.

Let’s try to resume now. Using UFO sightings as a “probe” we are in a condition to deduce from the analysis of numbers that our technological civilization is favoured by a low intensity level of the geomagnetic field, which, running parallel to the secular variability component of solar activity, is subject to a gradual and constant decrease with time and through the centuries. But “thinking clear” may not be the same thing as “living life in a full way”. The number of reported UFO sightings – apart from the described peculiarities – is evidently affected by the evolution of communication technology and, hypothetically (as it is suggested now as an additional factor), also by an unconscious need of humanity to re-balance its brain skills when a naturally “hallucinatory” biophysical effect is lacking. In few words it would really seem that mankind has not many possibilities to choose its own life style, unless someone will be able to “switch the Sun” and consequently to change the probably related geomagnetic activity in the same way in order to tune to an optimum level able to guarantee a balanced way (left and right brain hemispheres together) of using our brain and our psyche.

Maybe a really important issue has been raised here (thanks to the “UFO messengers”), because it seems it has a lot to do with the (maybe short-term) future of the entire mankind. All this, only partly speculative, reasoning is not intended to exclude at all that a real exogenous intrusion of some kind may occur in our world. After all some of the peculiar aspects that have been pointed out and discussed in the previous sections do overlap with some other “general trend”. A final question now might be if there any connection between this so potentially explainable general trend and the so called “peculiar aspects” overlapping it. How does something become suddenly real amidst so many illusions, delusions, self-induced fantasies and unconscious misinterpretation of reality? How is our mind and psyche connected to the cosmos in the creation [Refs. 33, 83, 84, 85, 87] of that which is called with the name of “material reality”? Maybe here is the true mystery.

4 – UFO sightings, the Moon and planetary conjunctions

Are UFO sightings affected by Moon phase and height over the horizon? In order to try to answer to this question I tried to select the data that seem more relevant to the entire UFO phenomenon, namely the so called “structured cases”: triangular, rectangular, diamond, boomerang and chevron shapes (see Fig. 0). These shapes are well distinct and detailed, much more than the more classic disk or oval shapes. How can the Moon light affect the sighting of these flying aerial structures? We might first depict the following two scenarios:

1. If these shapes are just dark or without any illumination it is clear that they can be seen much more easily when the Moon is illuminating the sky.

2. If the same shapes are just marked as precise “geometrical shapes” by some kind of illumination system (at the vertexes of these objects and/or all over the object) then it is evidently much easier to see them (and in much detail) when the Moon is not consistently illuminating the sky. This is just a question of classical signal-to-noise ratio [Refs. 24, 35], which in this case is given by the ratio of the object luminosity and the luminosity of the sky background.

Reports of UFO sightings deal with the second case for the very most part [Refs. 50, 96], therefore we must deduce that such alleged structured aerial objects have to be sighted much more likely when moonlight is low or absent.

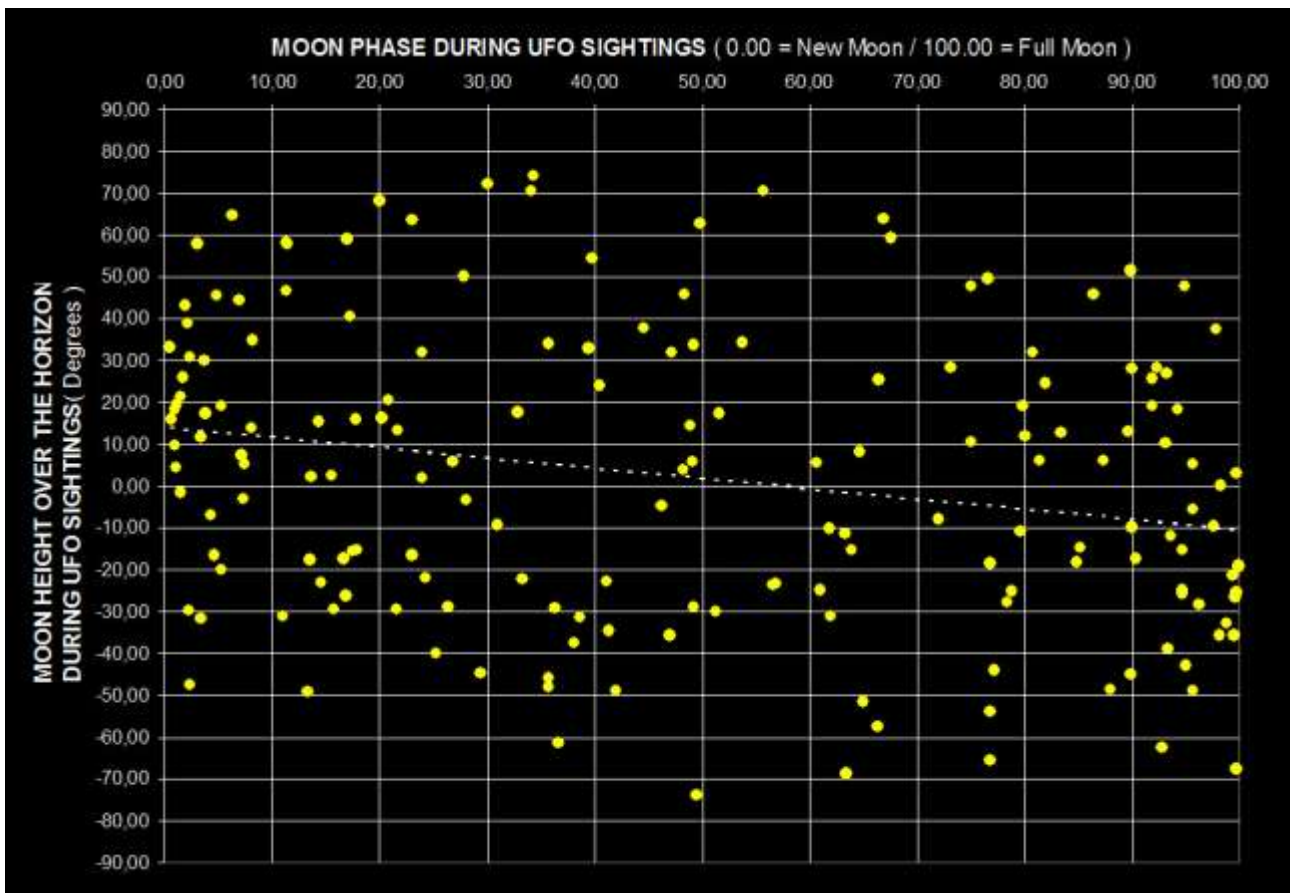


Figure 10A. Moon Height vs. Moon Phase at the time of structured UFO sightings reported in the Ontario area in the last 60 years (182 data points in total).

If we look at Fig. 10A, this perceptive effect is slightly confirmed, in fact these objects are seen more favourably when the Moon is low over the horizon and when it’s phase is far from being full [Ref. 65]. This effect is expected to be exactly the same if these objects are really anomalous or if they are a simple misinterpretation of the illumination system of some normal airplanes. How these two components are mixed together and in which percentage, this is not known yet. But it is quite well known that some perfectly human aircrafts may effectively

show those shapes due to the geometric disposition of their illumination system and to some particular view angles from which they are seen. The general ignorance of normal citizens concerning the “things of the sky” (aircrafts and astronomical objects) does the rest. Therefore this inevitable mixture of a possible “signal” with a very probable “noise” renders any search for an hypothetical “UFO visit strategy” impossible to evaluate.

What is rather interesting are the specific dates in which some of these specific UFO sightings have occurred, when compared with specific astronomical configurations [Ref. 65]. In fact 53 out of 182 of all the plotted data points (about 30%) are just referred to dates in which planetary/cometary conjunctions (of quite little separation) were present in the sky at the same time in which this particular kind of structured UFO sighting was reported (see Tab. 1). Certainly this might be a good opportunity to attract the attention of people towards the sky. At the same time some UFO sightings were effectively reported. Any speculation here is licit, including the possibility that “someone” might often decide to appear in the sky at acceptable conditions of visibility and also when people are expected to look more at the sky. If we now do the same chart as the one of Fig. 10A including only the data points of Tab. 1, we in fact obtain a correlation that is 10% better than the previous one (see Fig. 10B).

		MOON	MOON				MOON	MOON	
	DATE	TIME	PHASE	HEIGHT		DATE	TIME	PHASE	HEIGHT
	June, 15 - 1992	23.30	99,40	-21,50		September, 10 - 2004	22.00	13,60	2,24
	June, 15 - 1993	22.30	17,40	-15,72		November, 30 - 2004	5.00	89,90	51,55
	June, 20 - 1996	2.00	14,30	15,26		December, 5 - 2004	22.00	41,30	-34,47
	April, 1 - 1997	20.10	38,70	-31,50		April, 14 - 2005	22.00	34,30	74,15
	May, 1 - 1997	23.00	29,40	-44,75		April, 21 - 2005	22.23	93,20	10,15
	February, 8 - 1999	20.00	47,00	-35,82		May, 5 - 2005	5.50	10,90	-31,15
	April, 13 - 1999	1.00	13,30	-49,25		July, 7 - 2005	22.25	2,10	38,81
	October, 15 - 1999	19.30	3,83	17,47		July, 14 - 2005	23.45	53,70	34,22
	February, 10 - 2000	21.14	27,80	50,21		July, 27 - 2005	0.35	62,00	-31,21
	November, 21 - 2000	22.30	16,90	-26,30		February, 20 - 2006	6.30	60,70	5,71
	July, 8 - 2001	23.00	90,00	-45,00		March, 11 - 2006	22.45	91,90	25,61
	May, 10 - 2001	23.00	88,00	-48,80		May, 28 - 2006	1.30	1,00	4,40
	August, 14 - 2001	23.30	23,00	-16,62		July, 23 - 2006	2.30	4,60	-16,46
	September, 10 - 2001	21.00	5,29	-19,90		January, 20 - 2007	20.00	3,70	29,98
	July, 14 - 2001	23.30	38,10	-37,60		March, 20 - 2007	21.15	4,80	45,51
	August, 9 - 2002	21.20	1,90	43,30		March, 20 - 2007	21.15	4,80	45,37
	August, 11 - 2002	1.30	7,40	5,34		March, 21 - 2007	21.15	11,30	58,03
	March, 11 - 2003	3.00	48,40	45,74		June, 5 - 2007	22.00	76,90	-65,70
	June, 27 - 2003	23.10	3,30	11,77		June, 18 - 2007	22.10	17,00	58,94
	August, 26 - 2003	23.00	0,90	9,50		September, 17 - 2007	21.00	32,90	17,75
	February, 19 - 2004	19.30	0,60	15,87		November, 17 - 2007	18.30	48,30	3,86
	April, 14 - 2004	21.40	21,60	-29,34		August, 31 - 2008	22.00	1,50	21,30
	April, 15 - 2004	21.40	13,50	-17,55		September, 1 - 2008	22.30	5,20	19,14
	May, 17 - 2004	20.30	1,70	25,84		October, 29 - 2008	19.40	0,90	18,18
	May, 21 - 2004	20.30	6,30	64,73		November, 2 - 2008	19.10	20,20	16,28
	May, 27 - 2004	5.00	48,90	14,61		November, 28 - 2008	22.30	1,50	-1,54
	August, 14 - 2004	0.30	4,20	-7,15		May, 21 - 2009	23.09	6,90	44,47

Table 1. Dates at which UFO sightings were reported at the time of astronomical conjunctions.

Anyway all this is not at all sufficient to confirm that the selected data are really due to true alien visitors [Ref. 17] that wanted to appear just at the time of astronomical conjunctions. Some of these selected data points might be a coincidence with misinterpreted airplane lights. Maybe something that is really peculiar might be present just hidden inside these data too. Anyway the relatively high percentage of UFO sightings at the times of celestial conjunctions is quite interesting.

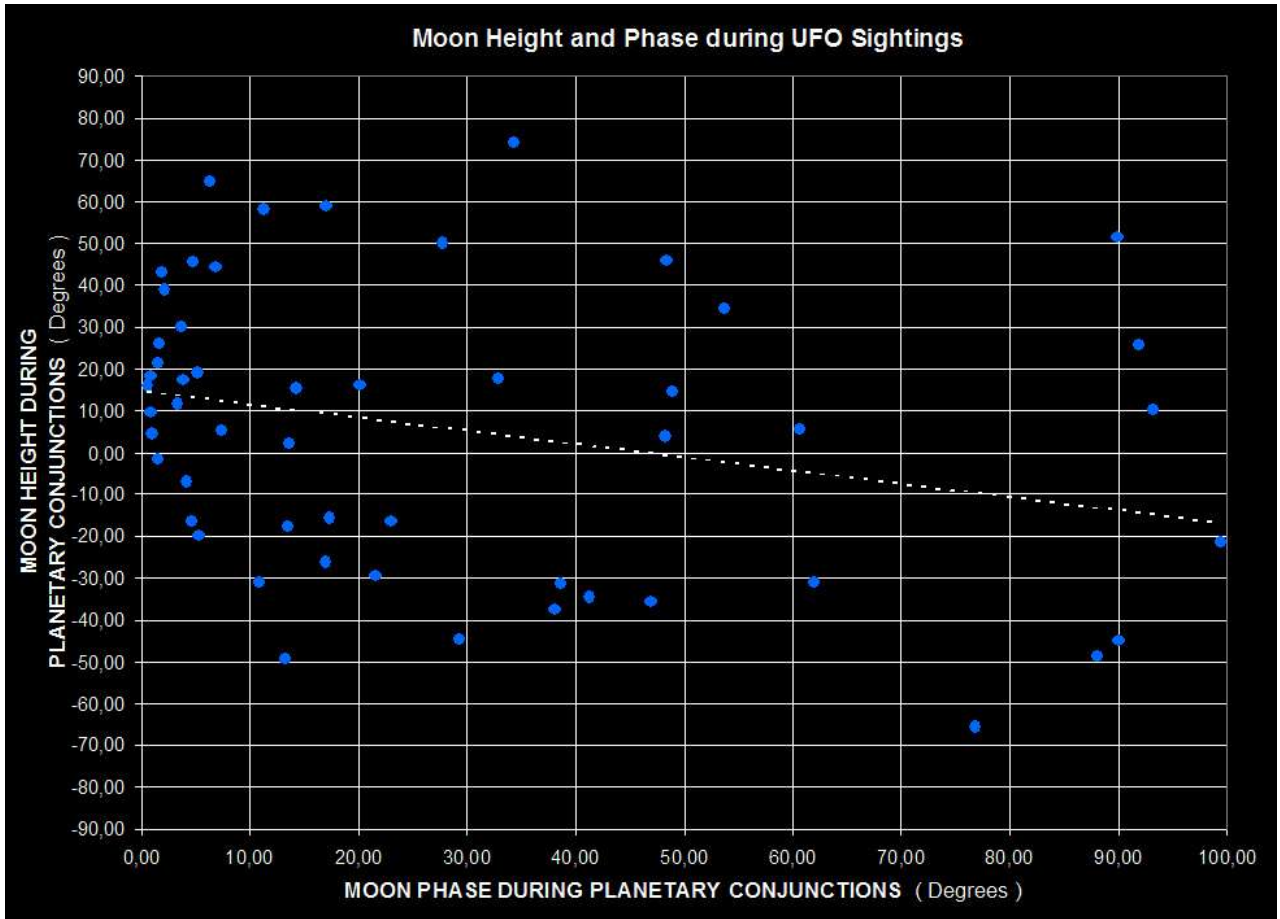


Figure 10B. Moon Height vs. Moon Phase at the time of structured UFO sightings reported in the Ontario area in the last 60 years and at the time in which planetary/cometary conjunctions were present in the sky (53 data points in total).

5 – Spatial analyses

So far we have discussed variables that mostly involve, in a way or another, the “time parameter”. We have seen how UFO sightings are distributed with Julian date, time range, month and year and how their increase with passing years is extraordinarily correlated with the diffusion of new technological communication means. We have also pointed out how this long-term temporal behaviour is markedly anti-correlated with the geomagnetic field and we ventured some work hypotheses that might explain the reason of this. We have already

introduced for a while the “space parameter” showing how the geographical distribution of UFO sightings has nothing to do with geophysical anomalies.

The following section will be entirely devoted to the analytical study of the spatial distribution of UFO sightings in the US states of New York and Connecticut and in the Canadian province of Ontario, using the same databases that were mentioned in the beginning of this paper. Before showing the results of these graphical-numerical studies it is important to make two important considerations (one specific and one general) concerning the accuracy and the reliability of this specific part of the study. These points are as follow:

1. As it has been already said in a previous section, the data describing Ontario UFO cases are much more complete and accurate [Ref. 32] than the data concerning the two US states. In particular the Ontario Latitude/Longitude charts do not include only inhabited centres but intermediate locations and roads too. Therefore the spatial resolution that can be obtained in this way is sensibly higher than in the two US cases. As it will be seen this offers both an advantage and a disadvantage.

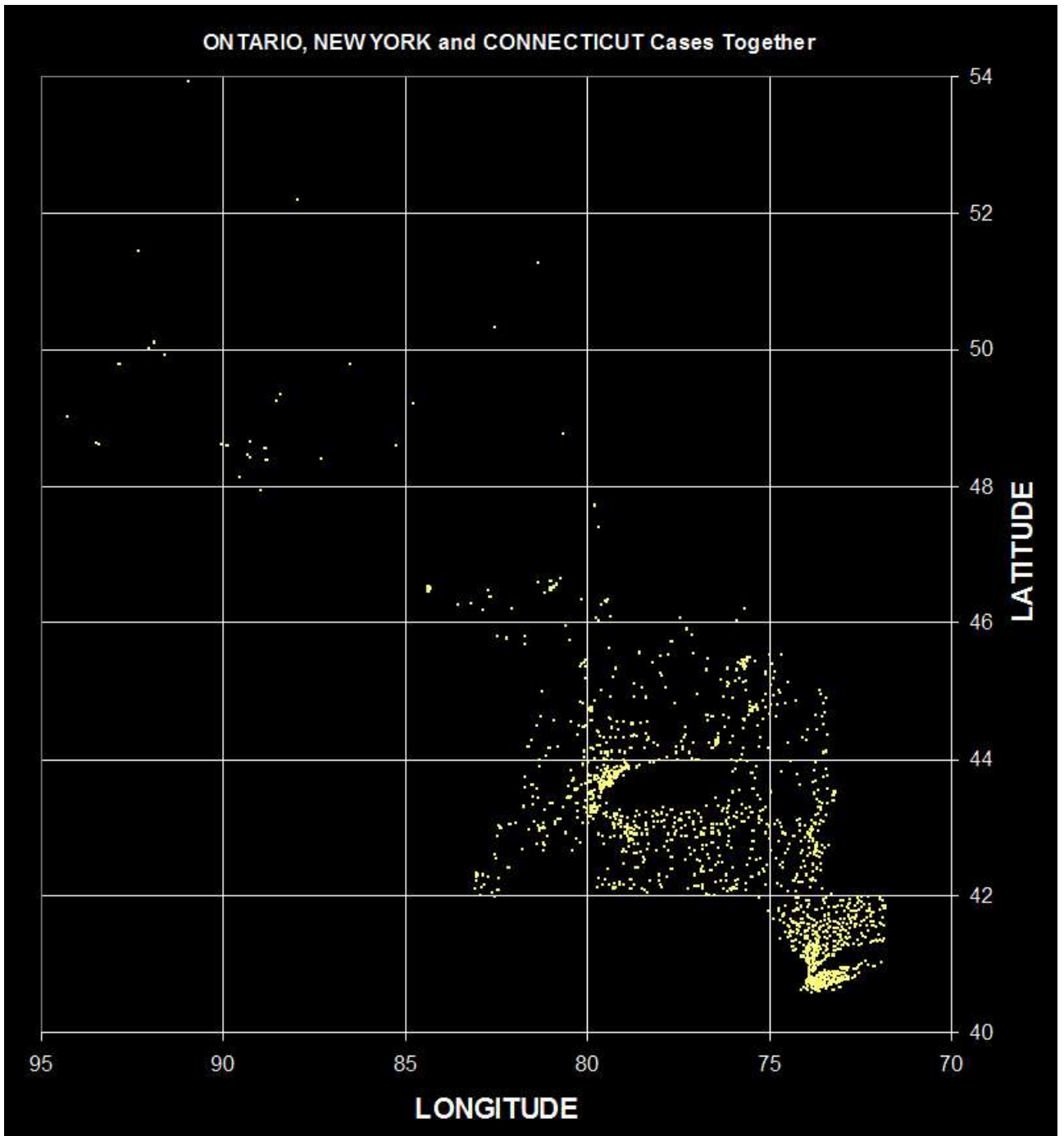


Figure 11. Geographical distribution of UFO sightings in the US states of New York and Connecticut and in the Canadian province of Ontario reported in the last 60 years (1949-2009). This chart includes 1546 data points, several of which are time repeaters (cities, towns and their surroundings where several or many sightings were reported in the course of time).

2. The geographical position at which a UFO sighting is reported is not referred to the UFO itself but to the position of the witness seeing it. Of course the object that is seen in the sky (according to probability theory) most of the times is not just on the vertical of the observer but at several angular height degrees far from it. This means that this angular distance compared to the zenith may be the result of the intrinsic distance of the UFO from that point, especially for objects that are seen very close to the horizon. Apart from the angular dimension of objects that is reasonably easy to resolve in their shape when they are sufficiently close to the observer, in the case of sightings occurring at night the real distance of an object doesn't depend only on its angular height but also on its intrinsic luminosity: this means that a very luminous object can be seen from large distance, while a weakly luminous object can be seen only at short distance. Clearly the observer is not able to evaluate the difference between apparent and absolute luminosity. All this means that data concerning the geographic position at which an UFO sighting is reported are referred to the sighting position itself and not to the real position of the UFO. This is a source of positioning error, which is not so easy to evaluate (mostly for sightings where the NESW directions are not given), but which might reasonably range from 1 to 30 Km or more. This cause of error must be considered implicit within every data point that will be shown in the Lat/Long charts that have been plotted using UFO databases.

Figure 11 shows the overall distribution of UFO sightings reported from 1949 to 2009, which includes the two US states and the Canadian province all together. As we can see data points mark quite well the shape of these states, except for the less inhabited areas (such as Northern Ontario). Just to reassure hard-cooked "UFO believers" this chart shows no "UFO invasion" and this will be demonstrated in the next sections. Fig. 12 shows UFO sightings reported in the entire Ontario area, while Fig. 13 shows a zoomed high-resolution snapshot of the places where UFO sightings have been reported more often inside this Canadian province.

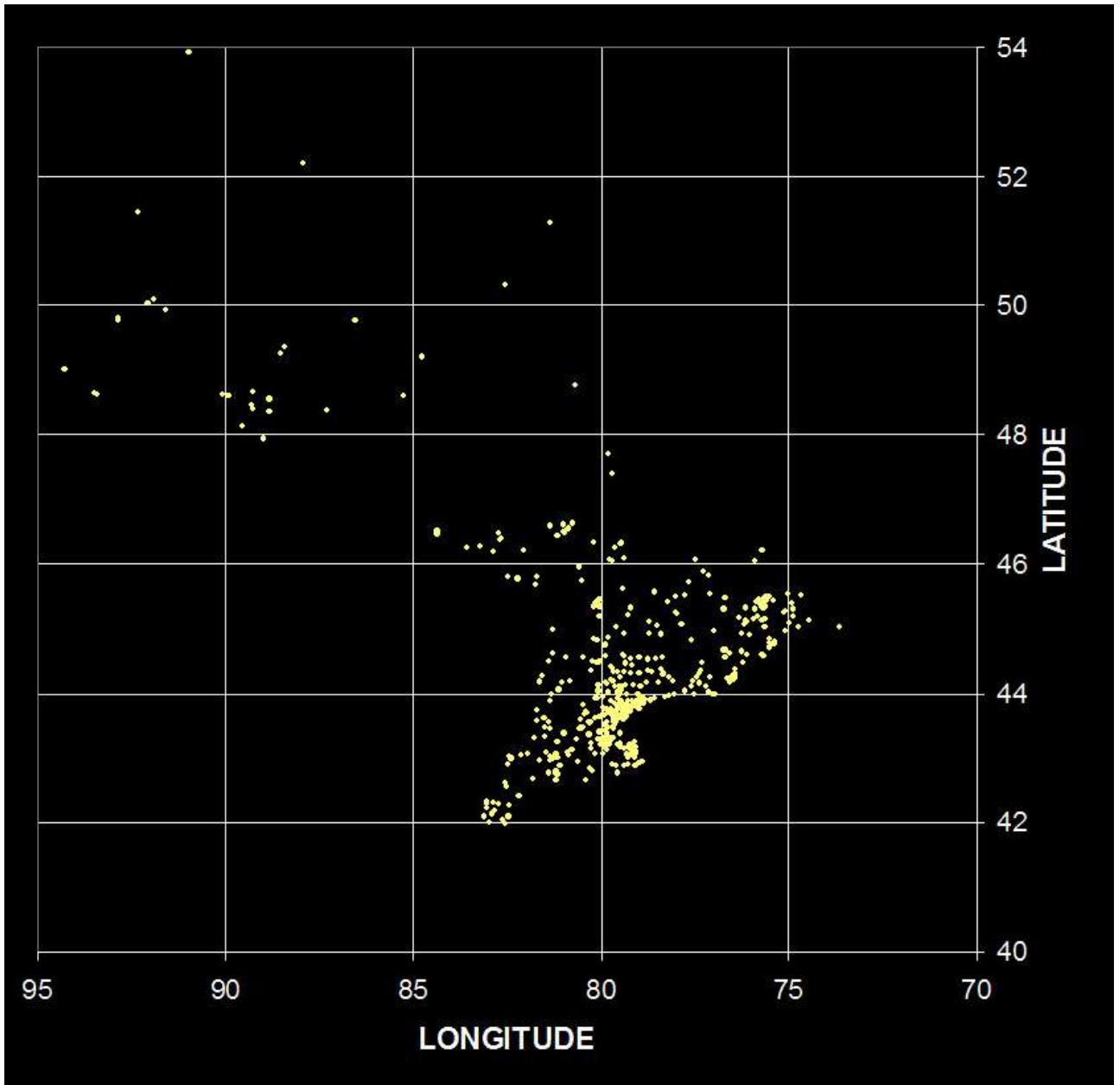


Figure 12. Geographical distribution of UFO sightings in the Canadian province of Ontario occurred in the last 60 years (1949-2009). This chart includes 599 data points, several of which are time repeaters (cities, towns, their surroundings, hamlets, intermediate locations and roads where several or many sightings were reported in the course of time).

Figure 13 shows the high spatial resolution with which these data have been obtained. These include inhabited centres (73%) and intermediate locations / specific positions at precise roads (27%). Some particularly clustered areas can be easily identified, especially the one between parallels 43° and 44° and meridians 79° and 80°. The Ontario “UFO map” is

certainly the most accurate among the three big areas that have been considered in this study. But all of this doesn't show at all an intrinsic UFO geographic distribution but a pure selection effect due to the population number. Most populated areas are of course those where more UFO sightings have been reported. In fact big cities and towns such as Toronto, Kingston, Ottawa, Oshawa, Etobicoke, Hamilton, London, Peterborough, Scarborough, Windsor, Mississauga, Sudbury, Whitby record each one many sightings in the last 60 years, typically ranging from 5 to 80. Repeated sightings at these same towns and cities cannot be easily shown in this map (where only the locations are plotted). At intermediate locations and specific roads, as it is expected, only one sighting for each is typically reported. Hamlets (of which it is not easy to obtain in this specific case the population number) record only one sighting too.

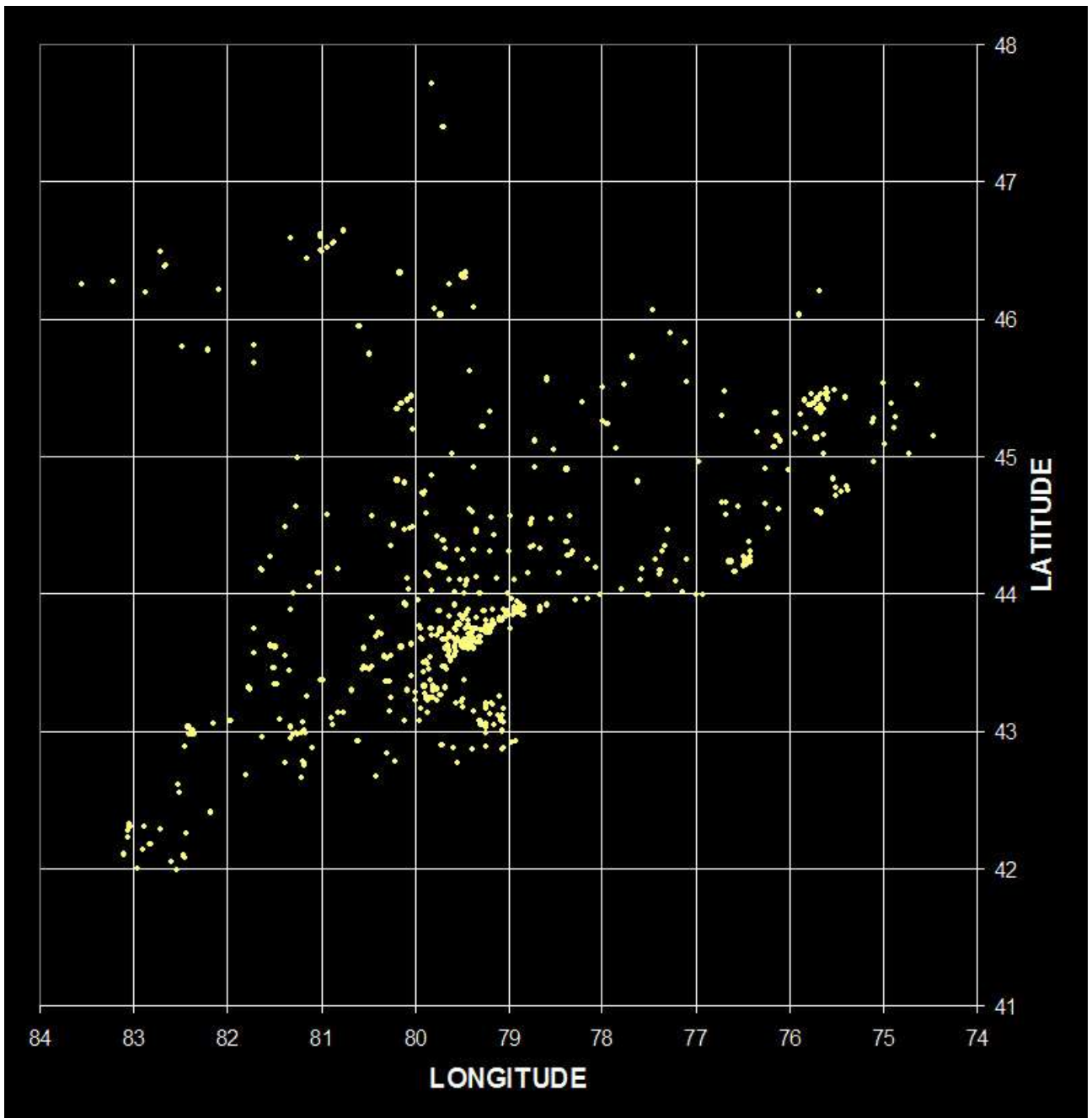


Figure 13. The part of the geographical distribution that was most “crowded” of UFO Sightings in the Canadian province of Ontario occurred in the last 60 years (1949-2009).

Despite the good details present in the Ontario map of Fig. 13, it is practically impossible to build up a pondered statistics on population vs. UFO sightings. Statistical studies might be limited to the big towns quoted above (of which population number is well known, including the one of smaller towns except for hamlets), but their too spread extension would make this survey uncertain and inaccurate. In order to make a good statistics where the real local

frequency of UFO sightings can be derived independently from the population number, we need to concentrate the study on smaller towns or hamlets (whose population number is known for an acceptable number of cases) where more than one sighting was reported during the last 60 years. As it will be seen soon, this procedure can be done quite well only for the cases of New York and Connecticut geographic areas.

Let's now see in detail the "UFO map" (see Figs. 14 and 15) for the cases of the US New York and Connecticut states. Here we have much less spatial resolution and precision, because intermediate locations (between towns) and specific positions at roads are not furnished.

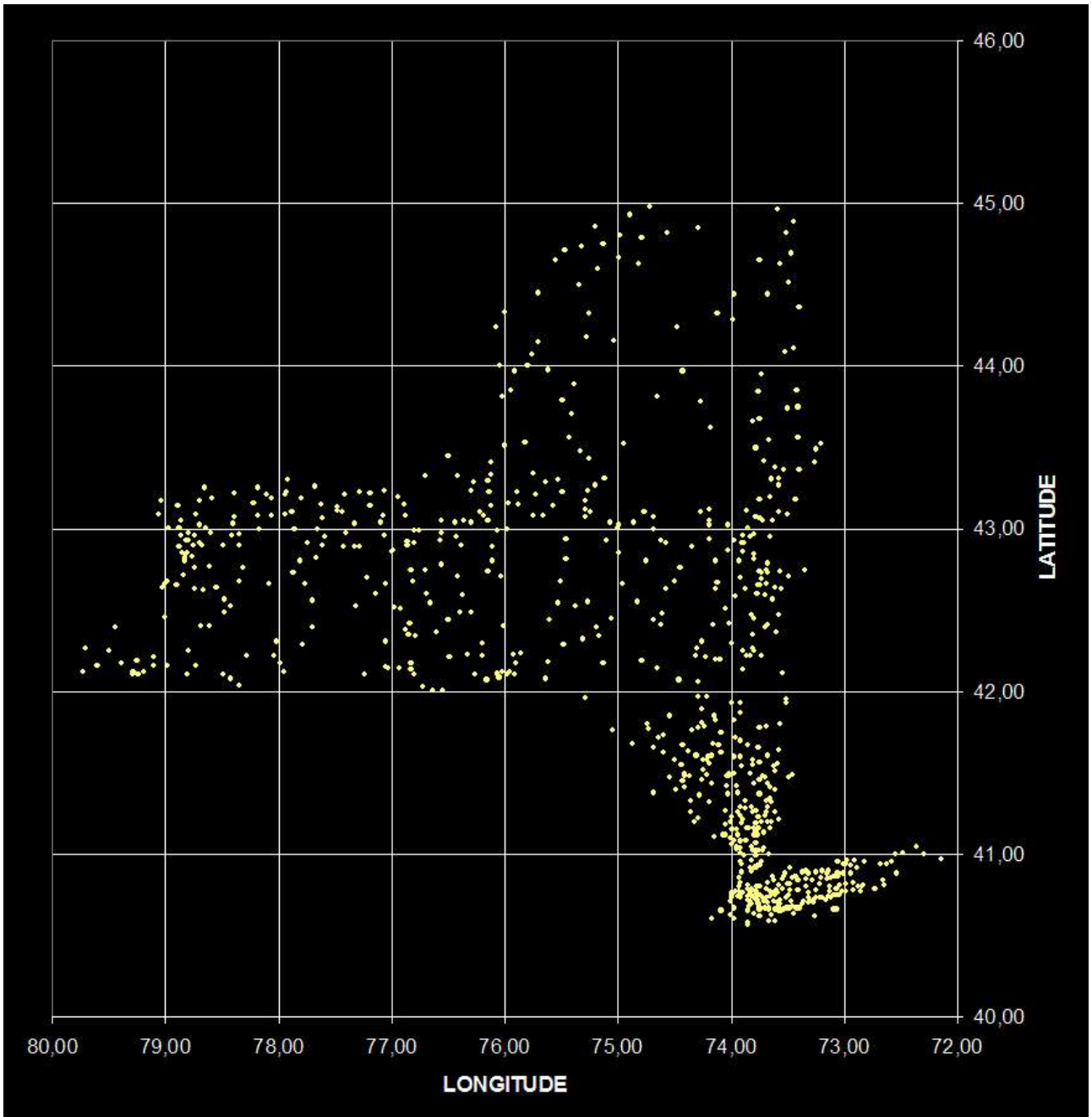


Figure 14. Geographical distribution of UFO sightings in New York state, reported in the last 60 years (1949-2009). This chart includes 794 data points, several of which are time repeaters (cities, towns, and hamlets where some or many sightings were reported in the course of time).

Therefore in these two cases we have to limit our analysis only on UFO sightings reported from cities, towns and hamlets. But here we have an important double advantage: a) the population number of many small towns and hamlets is available very often; b) many of these small centres register at least three UFO sightings in the course of 60 years. As we'll see soon this will permit us to derive something relevant concerning the real distribution of UFO sightings on a geographical map.

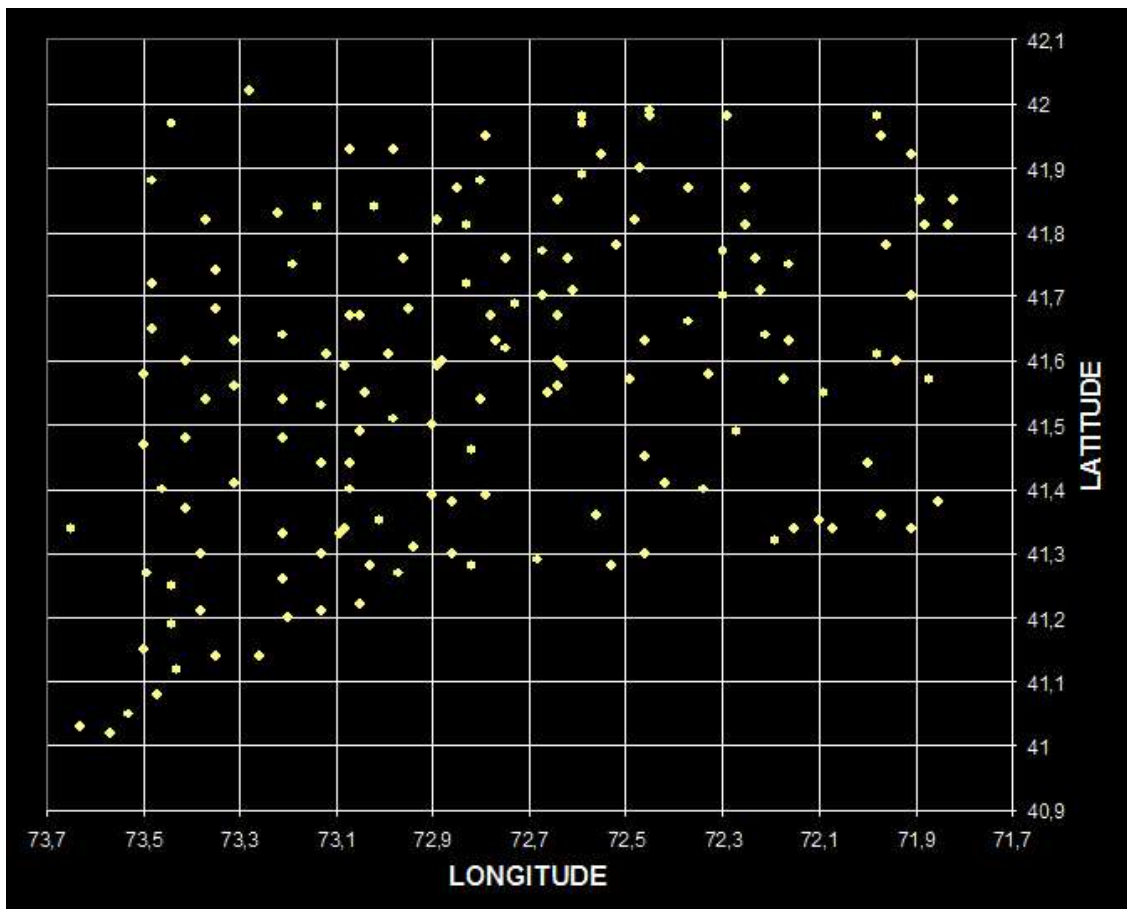


Figure 15. Geographical distribution of UFO sightings in the US state of Connecticut occurred in the last 60 years (1949-2009). This chart includes 154 data points, several of which are time repeaters (cities, towns, and hamlets where some or many sightings were reported in the course of time).

Before passing to the geo-statistics that has been announced before, let's first see how and how much the population number is able to affect the distribution of data points in these

maps. This is clearly shown in Figs. 16, 17 and 18. The geographic distribution of UFO sightings follows very strictly the population number of the areas where they have been reported [Refs. 12, 47, 53]. This behaviour can be verified more quantitatively [Ref. 92] from the graphs of Fig. 19, where it is possible to ascertain a correlation (of various factors for the ON, NY and CT areas) between the number of reported UFO sightings and the population number. This shows once and for all that a “UFO map” taken alone has really no sense if we really want to try to identify some “recurrence areas” in a given territory of the world. All this has been just a test to verify how and if the scientific method and data processing are able to treat properly that which comes out from UFO databases. The answer is negative if we simply limit our analysis to putting data points on a Lat/Long chart. In such a way there is no hope to find anything that is really able to inform us on the true behaviour of the UFO phenomenon that is reported so often. Of course this concept is valid not only for the three North American areas analyzed here but for whatever area in the world. The answer can be positive if we “adjust the shot” by using a subsequent procedure, on condition that data are available in order to achieve a result describing the distribution of UFO sightings independently from “noise factors”.

The only way to extract a scientifically reliable information here consists only in “weighing UFO sightings” reported from specific locations. Big towns are not suitable for this kind of analysis because the big extension of their surroundings renders the statistics very vague and inaccurate: in fact telling that, for instance, a UFO was seen in Toronto or New York City means that we are very often in the most total uncertainty (unless NE-SW directions are furnished by witnesses, but this happens only rarely) because that sighting was reported from an error box that might be of the order of 10.000 square kilometres or more. Moreover here we have also the complication that the location of a UFO sighting almost never coincides with the position of the UFO itself, which might also be quite far from the sighting point, being quite well visible only due to its possibly very high luminosity.

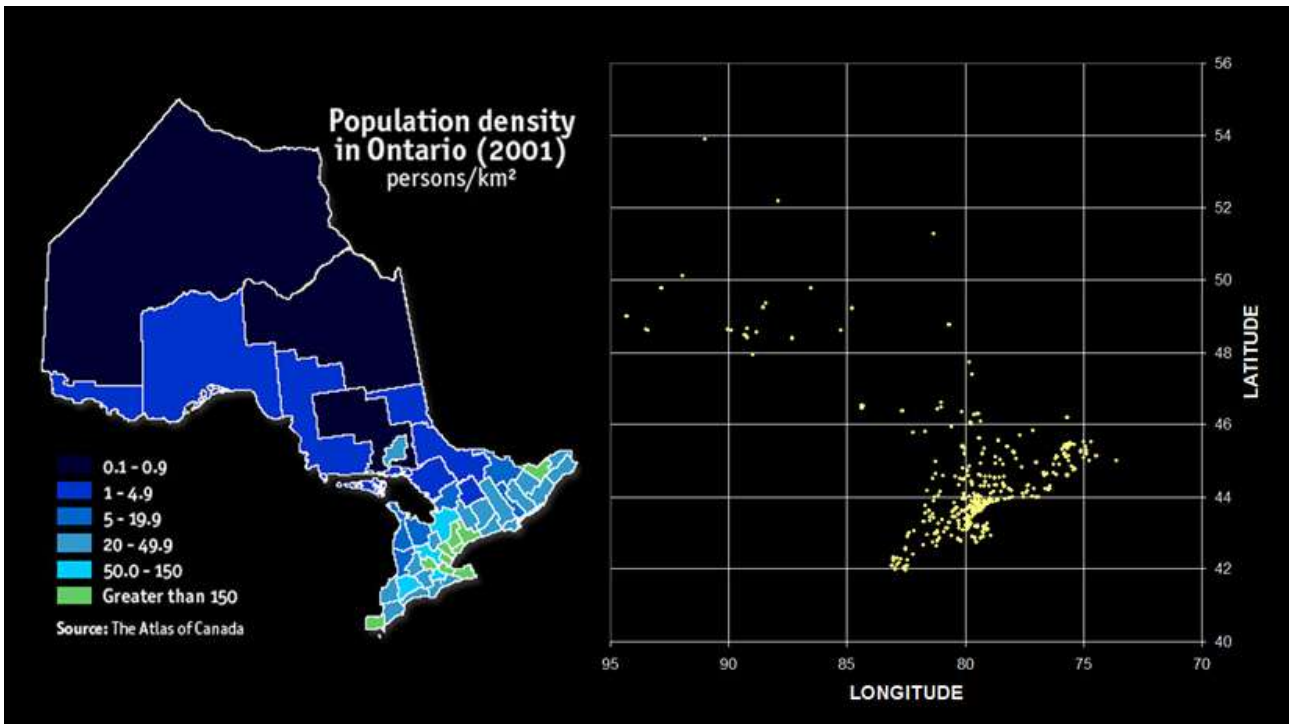


Figure 16. Comparison of the spatial distribution of UFO sightings in Ontario (*right*) and the population density of this province of Canada (*left*).

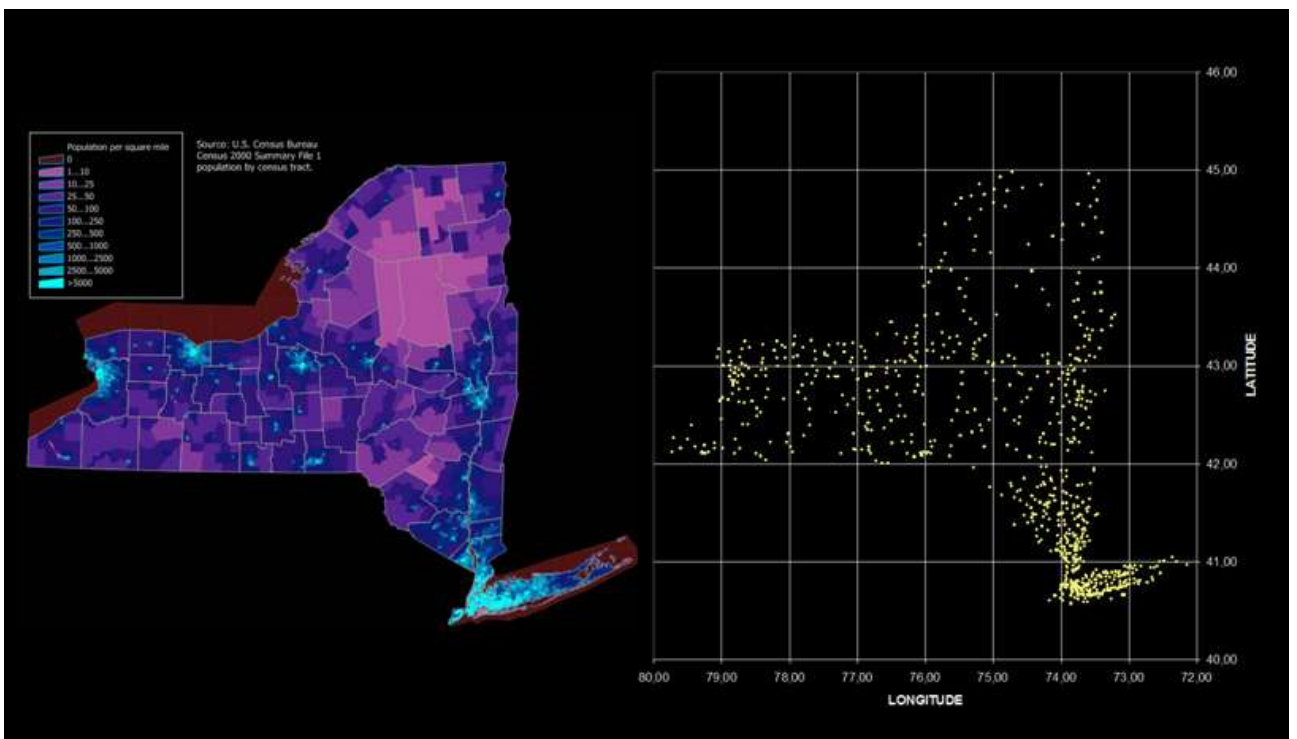


Figure 17. Comparison of the spatial distribution of UFO sightings in the US New York state (*right*) and the population density of this area (*left*).

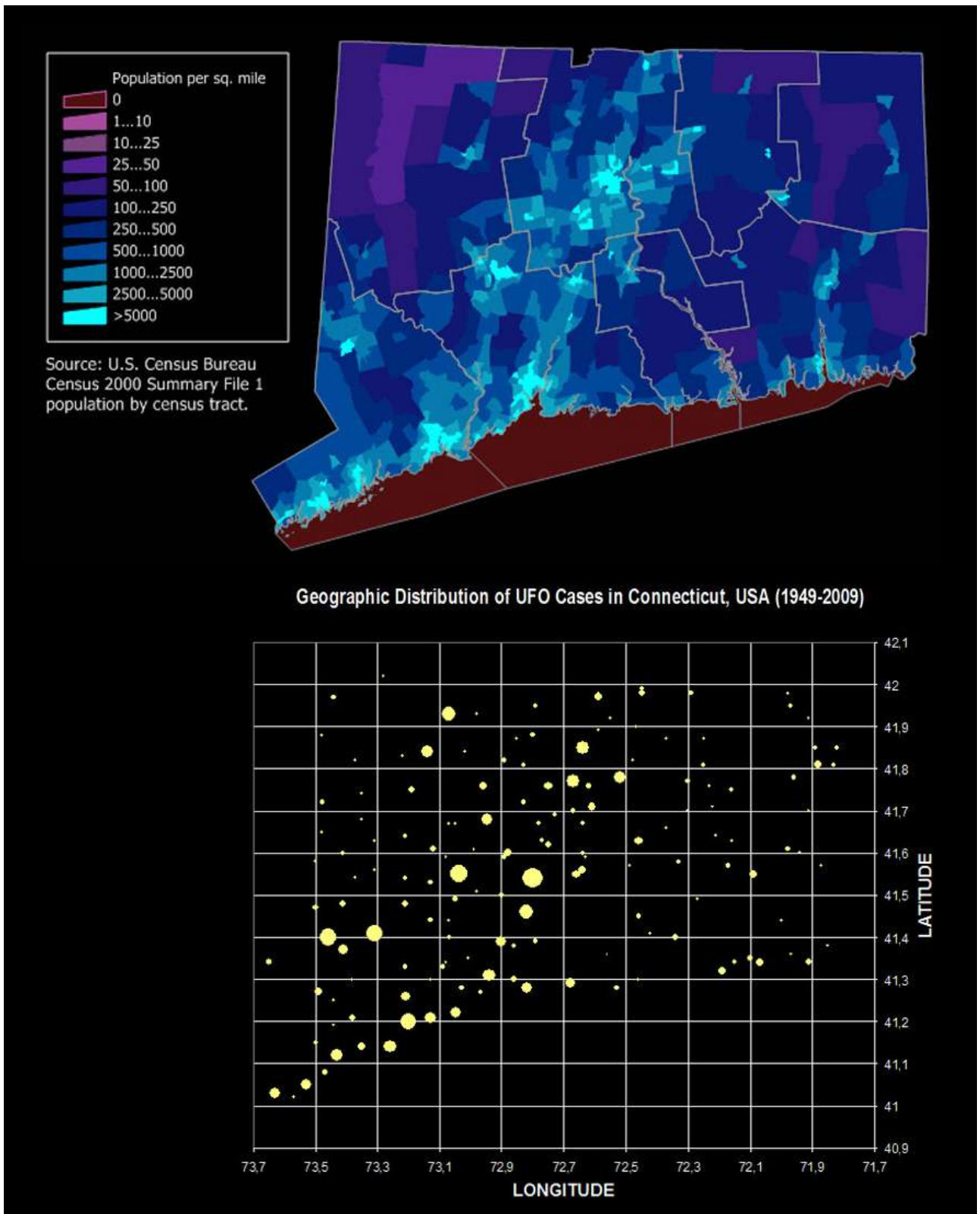


Figure 18. (Previous page) Comparison of the spatial distribution of UFO sightings in the US Connecticut state (*up*) and the population density of this area (*down*). The “UFO map” in this specific case doesn’t show only the geographic distribution of sightings but also the amplitude of time repeaters (represented by circles of different size).

Are we in a condition to skip such a severe uncertainty problem? If the data that we need are available we can certainly avoid the problem and try to focus more on what is really important, namely the intrinsic spatial distribution of UFO sightings despite the fact that data regarding this are obtained not from measurement instrumentation but from simple witness databases.

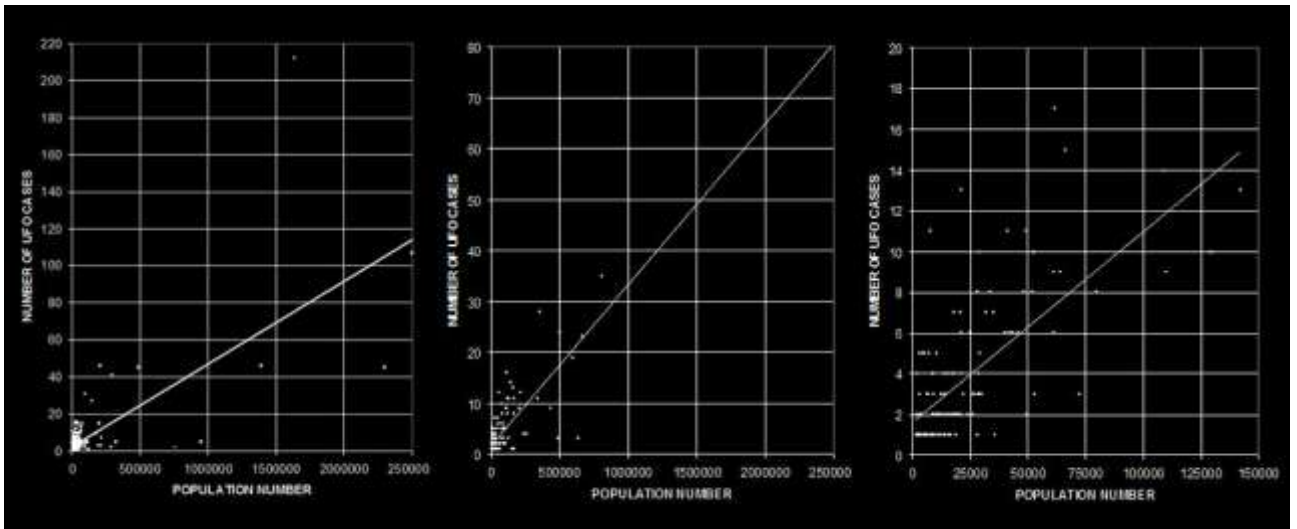


Figure 19. Number of UFO Cases vs. Population Number for US New York state (*left*), Canadian Ontario province (*centre*) and US Connecticut state (*right*). (New York state: 547 data points, Ontario province: 143 data points, Connecticut state: 141 data points).

After verifying that the necessary data are available in sufficient number for the New York and Connecticut states, a search has been done for all the inhabited centres of which population number was available and which have been registering at least three UFO sightings in the last 60 years. Due to the selection effect caused by population, obviously some big towns record up to 212 UFO sightings. Of course this doesn’t mean at all that these cities are preferred by UFO visitation: this is only an effect due to highly inhabited areas.

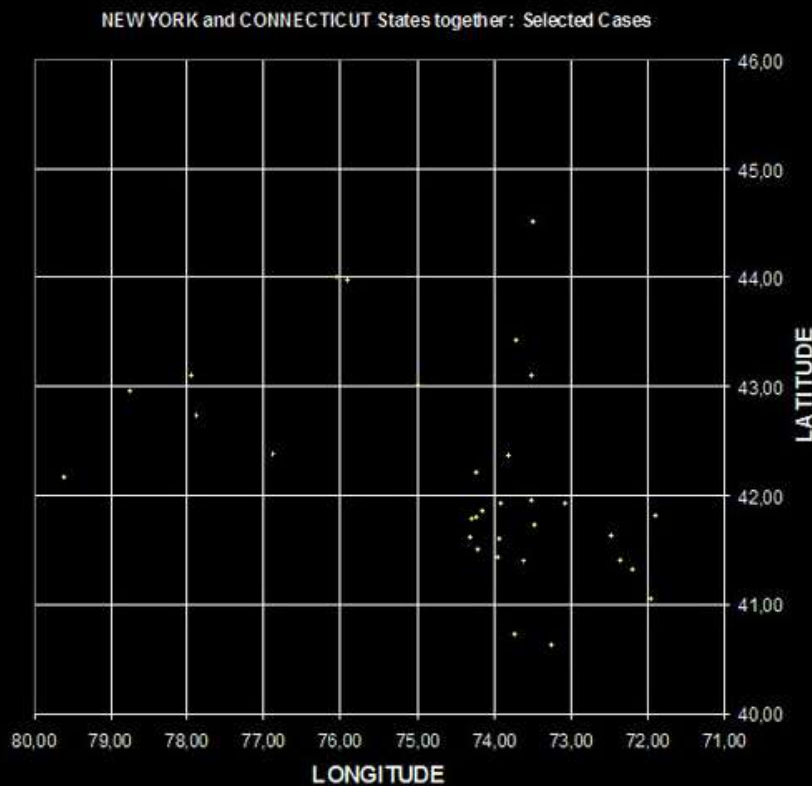
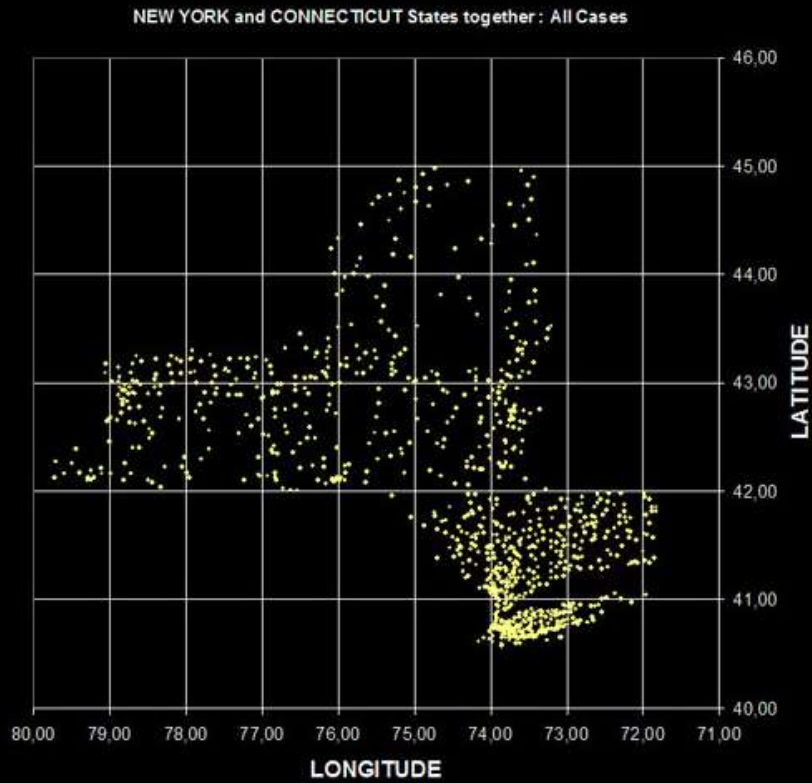
In order to try to restrict the most probable locations at which a real UFO phenomenon had an incidence, the following criterion of choice has been decided:

1. Due to the lack of sufficient data concerning the population number of small towns and hamlets and due to the lack of this kind of locations that have recorded more than only one

UFO sighting in 60 years, the Ontario area has been excluded by this statistics. Therefore, only the New York and Connecticut areas have been considered.

2. Only little towns and/or hamlets, which typically have a few thousands of inhabitants, have been considered, due to the fact that bigger towns are too much “spread out” and subject to a high level of inaccuracy concerning the localization of UFO sightings. Of these only the ones that recorded not less than 3 UFO sightings in the last 60 years have been included in the computation.
3. The following ratio has been adopted: $PL = NI / NU$, where PL stays for “Probable Location”, NI stays for “Number of Inhabitants” and NU stays for “Number of UFOs”. Only the inhabited centres having a PL ratio equal to $PL \leq 1000$ have been considered for this statistics.

Such a statistical screening was intended to identify only the inhabited centres that are characterized by a large excess of UFO sightings compared to the population number. The result of this procedure shows that a possibly real geographic frequency of UFO sightings that is not dependent on the number of inhabitants is limited to very little populated centres, typically ranging from 500 to 5000 inhabitants (see Fig. 20). This reduces to only 32 the inhabited centres that might have been really characterized by “UFO visitation” during the last 60 years, whatever the nature of the UFO phenomenon may be. This number is about a factor 30 smaller than the number of all the plotted NY and CT locations together. A few comparative examples are just shown here in order to show the order of magnitudes of the PL ratio: PL (Toronto) = 30100, PL (Brooklyn) = 23400, PL (Manhattan) = 7700, PL (Utica) = 4600, PL (Pine Bush) = 140. This means that only the last one can be chosen.



The selection furnishes the following small towns and hamlets:

- Pine Bush (NY)
- Montauk (NY)
- Watkins Glen (NY)
- Lake George (NY)
- Wappingers Falls (NY)
- Williamsville (NY)
- Rhinebeck (NY)
- Cold Spring (NY)
- Bergen (NY)
- Maybrook (NY)
- Greenwich (NY)
- Millerton (NY)
- Coxsachie (NY)
- Mount Morris (NY)
- Hunter (NY)
- Keeseville (NY)
- Kerhonkson (NY)
- Bellerose (NY)
- Mohawk (NY)
- Watertown (NY)
- Dexter (NY)
- Stone Ridge (NY)
- Brewster (NY)
- Accord (NY)
- Sherman (NY)
- Fire Island (NY)
- Danielson (CT)
- Marlborough (CT)
- Niantic (CT)
- Winsted (CT)
- Lyme (CT)
- Kent (CT)

Figure 20. (Previous page) Map of UFO sightings in the US states of New York and Connecticut, occurred in the last 60 years (1949-2009). *Up*. Without statistical selection (948 data points). *Down*. With statistical selection, where PL ratio is $PL \leq 1000$ (32 data points).

The most reasonable interpretations that can be done after this operation are as follows:

a) UFO sightings tend to be reported much more often from little inhabited centres and at locations that are quite isolated from big towns and cities.

c) As it can be seen from Fig. 20 the Hudson Valley (approximately between meridians 73° and 74.5°) is the most important “area of probability” for UFO sightings in the case of the New York state and the confining Connecticut state. This confirms thorough studies that have been carried out in the past both analyzing witness reports and doing monitoring operations on site [Refs. 6, 14, 15, 26, 58].

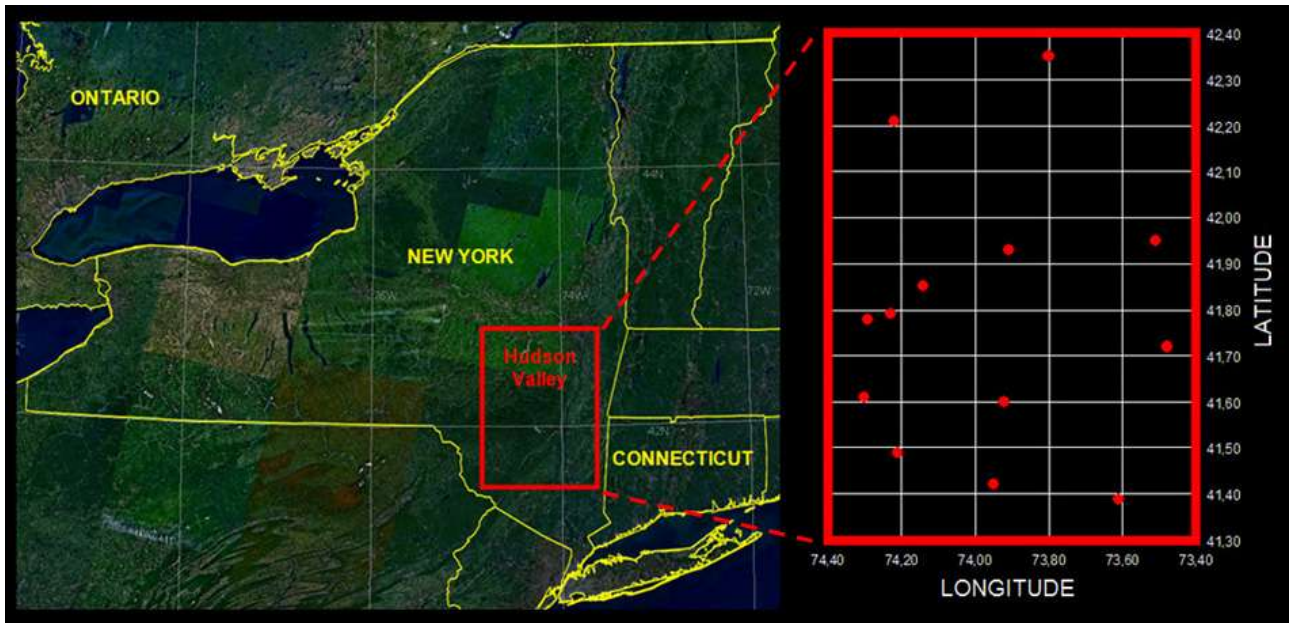


Figure 21. *Left*. Identification of the best probability area where UFO sightings have been reported: the Hudson Valley. *Right*. Exact geographic position of the nucleus of statistically selected cases.

Figure 21 shows what might be the “broadened nucleus” of the said area of probability, here located on a *World Wind* map. This area includes data points (present, among all the other data points, inside the lower chart of Fig. 20) where statistically selected UFO locations are more clustered together: this coincides with an important part of the Hudson Valley.

6 – Typological analysis

Witnesses of UFO phenomena have reported a wide range of shapes. The frequency distribution of such shapes can be studied comparatively, and UFO sightings reported in New York, Connecticut and Ontario can be so confronted together (see Fig. 22). What is important here is not so much the way in which UFO shapes are distributed statistically but the way in which the same shapes are reported in the three considered areas. Correlation analyses show that witnesses in these three areas tend to see in the same way anomalous objects in the sky. This comparison is not certainly accidental as the spectrum of variations of UFO shapes is quite rich, in fact the typology represented by databases is characterized by 18 different shapes, most of which (except for the cases of “Lights” and “Fireballs”) are very well characterized. This doesn’t demonstrate at all that what is seen is caused by extraterrestrial visitation, but shows a common effect of sight perception by the witnesses. This means that people really see what they see, independently from the real nature of these sightings. There is no doubt that some of these shapes might be due to a different view angle with which an apparently different shape is seen. For instance, a “Sphere” can be a “Disk” seen orthogonally to the sight line, an “Oval” can be a “Disk” seen obliquely, a “Cigar” can be a “Disk” seen edge-on, a “Formation” can be the result of the impression that a single object having a precise geometrical light disposition (such as: “Triangle”, “Rectangle”, “Chevron”, “Diamond, “Boomerang”) can trigger in the witness looking at that shape from far away (see again Fig. 0).

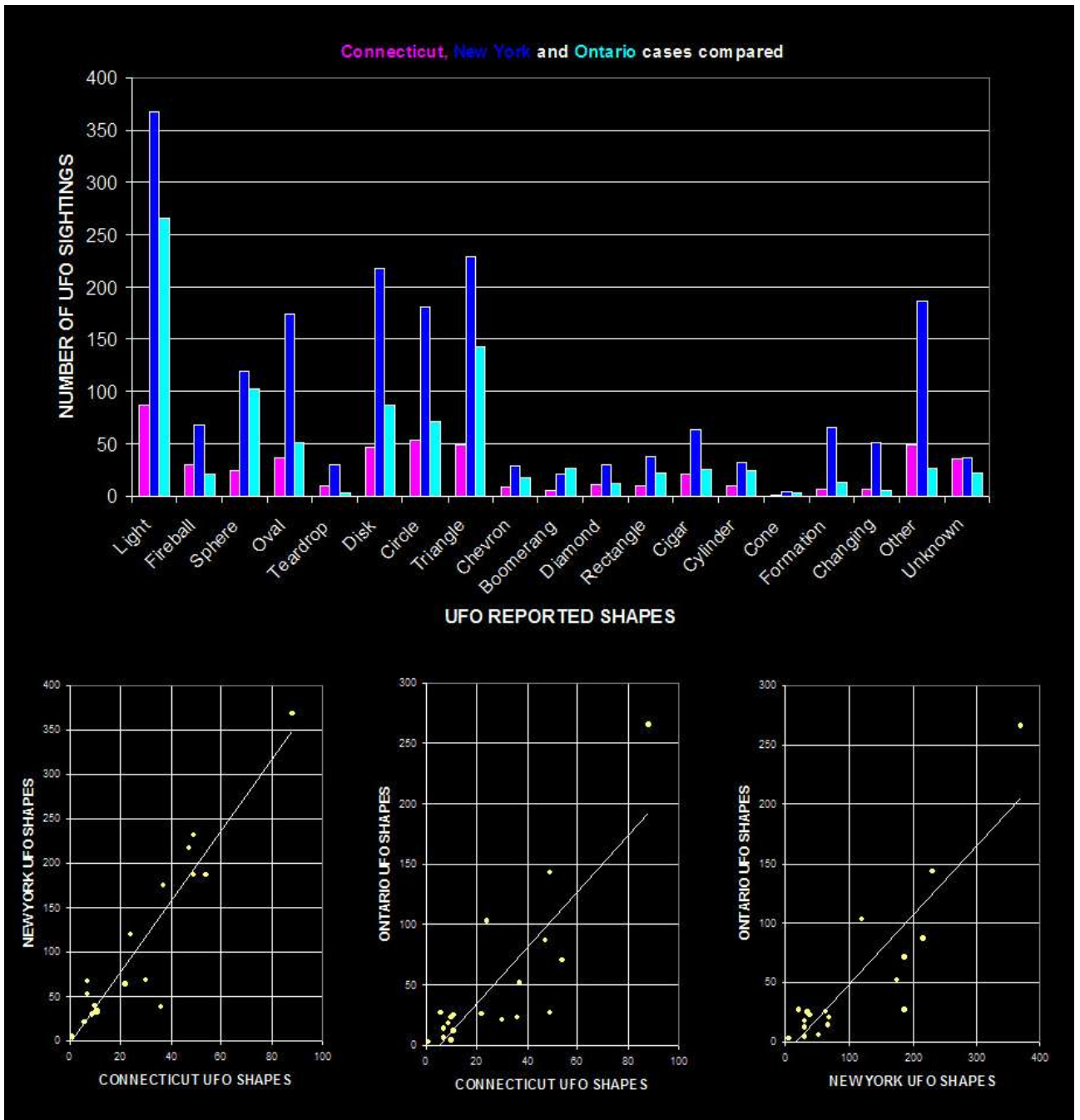


Figure 22. *Up.* Frequency distribution of UFO shapes reported by witness from the US states of New York and Connecticut and from the Canadian province of Ontario. *Down.* Correlation analysis between the three cases.

The better correlation between New York and Connecticut than from each one of them with Ontario is explained by the fact that Ontario data have been obtained from more than one database (NUFORC, UFOINFO plus some additions from Imbrogno’s book and a more accurate screening). Therefore the correlation between the two US states, where the data have

been obtained from the same source (NUFORC plus some additions from Imbrogno's book) can be considered representative of the obtained result, meaning that witnesses see the same thing and with the same detail in a specific area of the world. Clearly it is too early to extend this conclusion to the entire world. Unfortunately UFO databases are not available from all the areas of the world, and so no possible suitable comparison can be done so far. But certainly the example presented here shows how human perception (both visual and psychological, in case) is able to furnish many precise details, which are then registered in the same way even if from different locations. Any speculation on the true nature of what is really seen by witnesses is so far premature. In fact monitoring instrumentation is the only documentation means able to uncover the true nature of what is seen [Refs. 73, 74, 79].

7 – Conclusive remarks on obtained results

A test was done in order to verify if and how UFO databases can be of some utility in order to furnish some kind of scientific information on the so called "UFO phenomenon". The immediate answer is twofold: a) no information can be obtained on the nature of the UFO phenomenon itself; b) on the contrary, several important pieces of information can be obtained from the way in which UFO sightings have been described by witness in the last 60 years. This demonstrates that UFO databases can be very important in permitting to describe the way in which witnesses perceive the phenomenon, which is not the same thing as telling what the phenomenon really is. But databases of this kind, despite the frequent lack of important information, when they are statistically rich, can allow the construction of charts from which it is possible to see how UFO sightings behave both in space and in time, how they are related to the present status of our communication technology and to some important geophysical and astronomical parameters such as the secularly decreasing geomagnetic field, Moon phase and height and astronomical conjunctions. This (shy attempt of) statistical study on the data seems able both to construct a quite coherent picture describing the typology of the sighted events and to derive with a sufficient level of accuracy the real geographic frequency of UFO sightings. A cross-confrontation of databases concerning more than one geographic area (such as the cases of New York, Connecticut and Ontario) can permit to verify if UFO sightings occur randomly or if they follow some precisely coherent trend. By identifying and analyzing the "residuals" that can be deduced from some general prosaically explained trends, it is possible to localize both in space and in time the effect of a presumably real anomaly, whatever it is.

Let's now review precisely the really important results that have been obtained from this quite time-wasting (but not useless) investigation on UFO databases:

1. UFO sightings show no time periodicity but they increase with years due to the evolution of our communication technology and, partly, due to some possible "time flaps" that seem to be intrinsic to the phenomenon itself.
2. UFO sightings are reported more or less at the same hour range of the day if we consider the overall behaviour during the years, but some not-negligible peculiarities emerge when the three geographic areas (NY, CT and ON) are compared together at the different months of the year, so that the difference that is sometimes seen in the hourly behaviour

might be due to really occurring anomalies that overlap on a more general perceptive trend. Similar peculiarities emerge when the monthly frequency of UFO sightings is considered.

3. The numerical frequency of UFO sightings in the very long term (60 years, in this study) follows an apparently very coherent time trend for the three geographical areas. The trend shows an almost exponential increase. This general trend results to be due to the time evolution of cell phones diffusion, showing that it is not the UFO phenomenon that really increases but the capability of witnesses to report it. But, as in the cases of hourly and monthly behaviour the general yearly trend is overlapped with time flaps of short duration, which coherently are the same for all of the three geographic areas. Considering this all together it seems reasonable to assume that the “perception of UFO sightings” has been more or less constant during 60 years, except for flaps and a true short-lasting decrease in the last years. Time flaps in particular seem to show something really correlated with an anomaly in the sky.
4. Except for phenomena such as “earthlights” that might be mixed up inside the category of “unstructured nocturnal lights”, UFO sightings show no relation with geophysical anomalies.
5. UFO sightings tend slightly to appear when moonlight is weak and often when astronomical conjunctions are seen in the sky.
6. The geographical distribution of UFO sightings is not a real distribution of the reported phenomena but it is totally dependent on the population number of the inhabited centres from where UFO sightings are reported. A real geographical localization of UFO sightings can be derived only if a pondered weight on population number is evaluated. In such a way it is objectively possible to focus on the real spatial frequency of the sightings. Within the three investigated areas the Hudson Valley (NY) results to be the most important “UFO location of recurrence”.
7. People tend to perceive the shapes of UFO phenomena in the same way. Typology is not randomly distributed and people really see what is seen, independently from the real nature of the phenomenon.
8. As a serendipitous discovery within this study, it results that the intensity of Earth’s magnetic field seems to affect negatively human rational thinking. The evolution of technology is indeed correlated with a decrease of the geomagnetic field.

We have now in hands one important datum on which to concentrate our investigative focus: if we really decided to carry out an expedition to this part of North America in order to attempt to obtain some scientific data using measurement instrumentation we now know with a certain surety that Pine Bush and surroundings in the Hudson Valley would be surely the preferred locations. Clearly this is a choice that would be limited only to the considered NY, CT and ON areas. Apart from well known areas of recurrence concerning earthlights, we have not yet a clear quantitative picture telling which other locations of recurrence in the world are crucial to the UFO phenomenon.

Organizing a field-mission is always a quite time wasting and expensive task, and it requests necessarily some trusted contacts in the area. There was no contact in the Hudson

Valley area at the present time, but one very trustable contact existed in the Ontario area in Canada [Refs. 31, 32]. Therefore it was decided to carry out a mission there.

8 – Instrumental verifications on site: mission to Ontario

As it has been described in previous pages, the Ontario area, among the three considered in this study, is the one where the accuracy with which data on UFO sightings have been collected and carefully screened, has been of the highest level. Due to the reasons explained in previous sections, it has not been possible to localize intrinsically real areas of recurrence that can come out from the published database, but it has been possible to rely on the long-term experience of a “skywatcher” and investigative ufologist [Refs. 31, 32]. According to this reliable contact since 12 years it has been possible to know of an area (so far not accurately or sufficiently catalogued inside the present UFO databases [Ref. 90]) where apparent “UFO events” have been filmed many times over Lake Ontario. Moreover, the expertise of this scholar and investigator has been very useful and extremely instructive when trying to study in more detail prominent UFO sightings (independently from their recurrence in a given location or not) that occurred in the area North of or around lake Ontario. This scholar, who is skilled in examining very carefully the story told by witnesses, since a long time has been preparing very detailed maps indicating where sightings of importance have occurred in the last decades. It was then chosen to visit some of these areas (see Figs. 23, 24, 25), clearly depending on the available time for the mission (17 days) and on the clemency of the weather. The goal was threefold: 1) to verify if some of these areas show time repeaters and how often; 2) to use off-the-shelf portable instrumentation for measurements; 3) to test the organizational and efficiency level that can be reached both with transfers to the chosen areas and with the use of the instrumentation. Before describing the results of this explorative survey of these areas, it is necessary to list the instruments (see Fig. 26) that have been effectively used (avoiding listing the ones that have not been). The list is as follows:

1. VLF-ELF receiver connected to a dipole wire antenna, attached (in a spectrometric configuration) to an Asus *Eee PC* mini-laptop computer. This spectrometer was used in order to detect and record radio waves in the very low (0-1000 Hz) and extra low (1000-25000 Hz) frequency range [Refs. 59, 67, 91].
2. *Trifield* Natural EM Meter and long-range antenna. This analogic instrument was used to detect possible disturbances of the magnetic, electric and microwave fields, but it was mostly used as an atmospheric magnetometer and also as an alarming detector.
3. Portable Russian alpha-particle detector (Geiger counter).
4. Fuji *Finepix S-2 Pro* professional digital reflex camera attached to a Rainbow Optics Spectroscope (ROS) spectrographic grating and to a *Wratten* IR filter. This camera was used mostly for low-medium dispersion optical spectroscopy, for high-resolution photography and for near-IR photography.
5. Several simple additional instruments, such as a Nikon *Coolpix 5000* pocket digital camera, a compass, a visual X-ray detector, a 5 mW green Laser, two high-power Xenon and Halogen flashlights and a head-flashlight.



Figure 23. Locations (on a *World Wind* map) that were visited and monitored in the Canadian province of Ontario from July 24 to August 9, 2009. The shores of Lake Ontario and Lake Simcoe and some places of the up-country were the main visited places. (The Niagara-on-the-Lake area, on the southern shore of Lake Ontario, was visited too, but no instrumental monitoring operations were possible due to bad weather).

The area of Lake Ontario was well known to me due to the tireless work that was done quite constantly for several years through the monitoring and videoing operations carried out by Project Orbwatch [Ref. 31]. The many videos that have been acquired from several directions (mostly from Oakville shore and from Niagara-on-the-Lake) by sky watchers of Project Orbwatch show the clear evidence of unstructured light phenomena (more often

double and sometimes also triple) apparently entering inside the lake after doing a quite long-duration descent. Several observers pointed out that these are airplanes landing at an airport in distance, but this interpretation seems quite questionable due to the fact that the back of normal airplanes do not use a so powerful light: when an airplane is landing the landing light is obviously pointed to the opposite direction and not towards the observer. The possibility of military VTOL fighters of the Harrier kind landing to a possible carrier quite far on the lake has been ventured by me, not with the intent to quickly get rid of the phenomenon there but to try to survey all prosaic hypothetic possibilities in order to be more able to concentrate on the real phenomenon. After all this phenomenon has been witnessed in the past too, much before Orbwatch operations started [Ref. 10].



Figure 24. Photographs of the visited areas by the author. From left to right: Willow Beach (Lake Simcoe), sunset at Willow Beach, Oakland shore (Lake Ontario), Silver Creek – Halton Hills, Mono Cliffs provincial park, Spectrum Airways (close to air field), Cheltenham Badlands (East Caledon), Ajax shore (Lake Ontario), Sibbald Point (Lake Simcoe).



Figure 25. Near-IR high-resolution photographs (out of 8) taken from the shore of Oakland (reached coming from Burlington). Due to the very long exposure times needed (typically: 30 seconds at midday) this kind of IR photography cannot be used at night but only at daytime.



Figure 26. (Previous page) Instruments that were mainly used by this author during his monitoring operations. *Up* (from left). VLF-ELF spectrometer, Fuji *Finepix S-2 Pro* digital camera with optical spectrometer inserted on the lens. *Down*. Computer showing VLF-ELF data during recording, VLF-ELF receiver, Geiger counter, *Trifield* Natural EM Meter and its antenna.

With this philosophy in mind I have also ventured the possibility that some of the “bigger light phenomena” that a decade ago were videoed being “parked” just on the water surface might be caused either by sun reflection on some reflecting surface or by some possible flammable gas (such as methane for instance) coming out occasionally from the depth of the lake. Of course these ones are only hypotheses, certainly not the solution of the entire problem. Trying to distinguish the signal from the noise from this anyway spectacular phenomenon is not an easy thing so far, also because at the time of this mission to Ontario these phenomena were not seen, except for possibly (in a very weak and short-lasting mode) once when a monitor was done from Ajax (there was not sufficient time to aim the camera and the light was anyway too weak for getting good optical spectra using a reasonable exposure time). During the skywatching operations carried out at two locations (Oakland and Ajax) at Lake Ontario no (hypothetically permanent or occasional) anomaly was recorded either in the near infrared or in the VLF-ELF radio wavelength range.

These areas – not only the shore of Lake Ontario but also the up-country – are very often subject to the flyby of many airplanes (one after the other), some of which (quite clearly identifiable by the noise that is produced) showed occasionally a triangular or diamond-like light formation. This was clearly only one visual testimony, but the impression that it gave to me was just a suspicion that possibly some or many of the reported “structured lights” that have been passed for “UFO” by witnesses may be in reality airplanes having a particular light configuration. Moreover, the fact that often airplanes seem to stand still for quite a long time in the sky due to the zero apparent speed when they move in the direction of the observer and their very powerful landing light are surely an additional cause of (innocent) suggestion for the occasional observer. Concerning aircrafts having a specific geometric light configuration I am certainly not in a condition to exclude arbitrarily a “mimicry effect” [Ref. 14] due to their apparently conventional sound. I accept the possibility of mimicry by a hypothetical exogenous visitation [Refs. 81, 100] but I cannot demonstrate it yet: unfortunately I couldn't make an appropriate sound analysis at the time of sighting (being travelling in a highway as a passenger).

The optical spectrum was often recorded (see Fig. 27) when a nightly light was not identified yet as an airplane (thanks also to a radio-scanner promptly used by the Orbwatch person who gently accompanied me always to these locations), and it resulted to be always of continuum kind (no lines present therein): this is typical of halogen lights used by airplane illumination systems. This spectroscopic procedure was not only important to identify lights in the sky but it was also a very useful exercise of “speedy promptness” in the event that something really anomalous was caught. It is in fact expected that an anomalous aerial phenomenon (be it of technological, geophysical or atmospheric nature) present an anomalous spectrum as well [Ref. 77]. A spectral anomaly might be represented, for instance, by some broadening of spectral lines [Refs. 22, 24], such as that caused by the Zeeman and Stark effects (due respectively to a magnetic and an electric field), pressure-collision effect,

rotational and/or turbulence effects, gravitational effect, or by red or blue shifts of the spectral lines themselves (if effectively present). Optical spectroscopy can also be very useful to unmask, in case, a prosaic illumination system caused by “light artefacts” (such as military flares, Chinese lanterns, or other causes that are not due to a real (more or less exotic) propulsion system) [Refs. 78, 79, 80]. Taking a spectrum of an object that is moving in the sky, using a dispersion grating (of high quality in the case of ROS), is not an easy operation. The spectrum can be well exposed only if the object is sufficiently luminous and not moving too fast. But it can result to be of basic importance when it is necessary to identify any illuminated object at night both as a diagnostic tool able to unmask fakes in the sky or to promptly identify normal airplanes or to measure important physical properties at the atomic level [Ref. 22] from which it is possible to construct some physics of really anomalous objects. Apart from the promptness and efficiency at any time with all instruments, unfortunately no spectrum of interest was recorded among the ones that were taken, during the mission to Ontario.

But a visual sighting of something presumably anomalous did occur from the area of Cheltenham Badlands (a very interesting geologic formation in the off-country, Fig. 24). A sketch of the anomaly seen in the sky at that time is presented in Fig. 28. The sighting dealt with two yellow lights that were moving very close together, first vertically and then horizontally. The object was seen from the car for about two minutes (see Tab. 2) on the return from a monitoring mission on the Oakland shore of Lake Ontario. The impression was that this apparently anomalous object was moving with no acceleration and following a slightly “wavy” motion. No noise was heard. Of course at this time no instrument was in function (they were all packed inside the car after using them for some hours during a monitoring session at Oakland shore that ended two hours before). So it has been only possible to describe this sighting (two witnesses) but not to take any measurement of it. According to a witness reported in the NUFORC database [Ref. 50], a similar sighting was reported 4 days later.

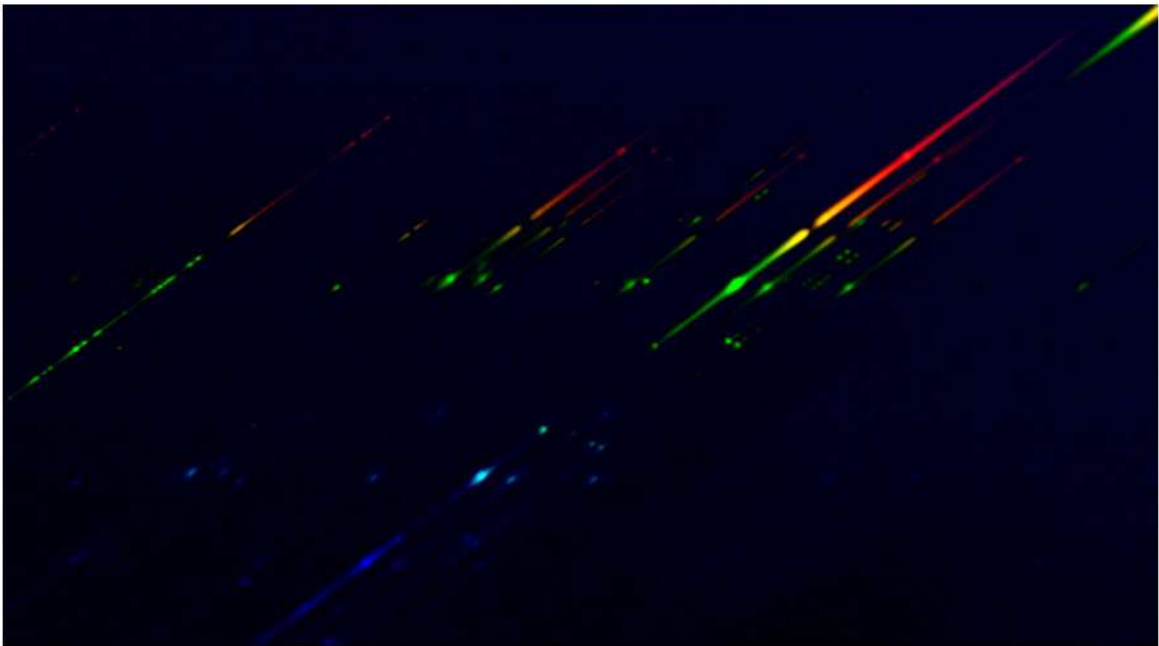
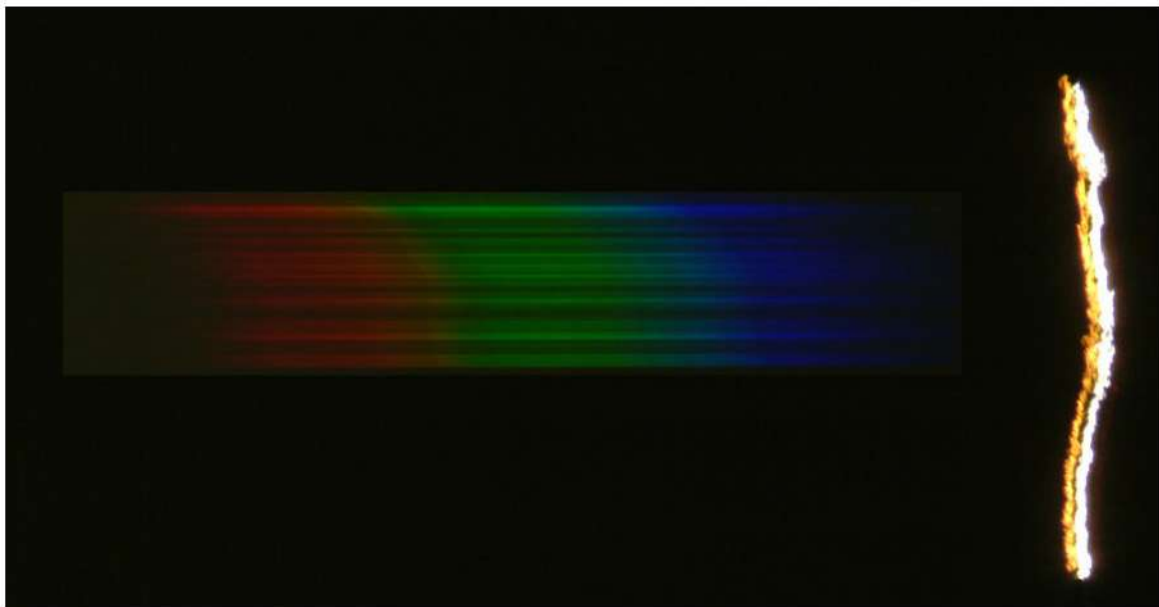


Figure 27. (Previous page) Optical low-medium resolution spectroscopy using a ROS diffraction grating attached to a Fuji *Finepix S-2 Pro* reflex digital camera. *Up*. Light trail produced by an airplane. *Centre*. Continuum spectrum produced by a very luminous moving airplane. *Down*. Line spectra produced by streetlights (of the Sodium vapour and the Mercury vapour kinds), which are normally used in order to calibrate in wavelength the spectrum of interest (using normally software *Visual Spec*)

Day 2009	Location	Latitude / Longitude (° ‘ ‘’)	VLF-ELF Recording Time Slot	Anomaly	Comments / Description
July 25	<i>Willow Beach, Lake Simcoe</i>	44 18 14 / 79 26 22	19:56 – 23:22	Possibly	<ul style="list-style-type: none"> • poor signal quality • VLF recorded
July 27	<i>Oakville (shore), Lake Ontario</i>	43 26 38 / 79 39 17	21:04 – 22:31	No	<ul style="list-style-type: none"> • poor signal quality
July 27/28	<i>Cheltenham Badlands, Caledon East</i>	43 46 31 / 79 56 52		Possibly	<ul style="list-style-type: none"> • suspect UFO sighting <i>hh:mm</i> 00:51 – 00:53, seen towards South and moving towards East • no VLF recording • no photos or video
July 29	<i>Cheltenham Badlands, Caledon East</i>	43 46 31 / 79 56 52	21:18 – 01:25	Possibly	<ul style="list-style-type: none"> • good signal quality • VLF recorded
July 30	<i>Willow Beach, Lake Simcoe</i>	44 18 14 / 79 26 22	21:23 – 22:29	No	<ul style="list-style-type: none"> • poor signal quality

July 31	<i>Silver Creek, Halton Hills</i>	43 39 44 / 79 56 27	21:11 – 21:24	No	<ul style="list-style-type: none"> • very bad signal quality
August 1	<i>Mono Cliffs Provincial Park</i>	44 02 20 / 80 04 28	20:34 – 20:54	No	<ul style="list-style-type: none"> • poor signal quality
August 2	<i>Newmarket</i>	44 03 37 / 79 27 21	21:16 – 22:04	No	<ul style="list-style-type: none"> • very bad signal quality
August 3	<i>Spectrum Airways, Milton</i>	43 26 40 / 79 50 40	20:05 – 00:28	<p>Possibly</p> <p>Possibly</p>	<ul style="list-style-type: none"> • poor signal quality • VLF recorded • bright spherical flash (hh:mm ~ 00:50)
August 5	<i>Cheltenham Badlands, Caledon East</i>	43 46 31 / 79 56 52	21:30 – 01:23	No	<ul style="list-style-type: none"> • good signal quality
August 6	<i>Ajax, Lake Ontario</i>	43 48 50 / 79 00 00	20:30 – 22:12	No	<ul style="list-style-type: none"> • poor signal quality
August 8	<i>Sibbald Point, Lake Simcoe</i>	44 20 07 / 79 19 38	15:30 – 17:00	Yes	<ul style="list-style-type: none"> • good signal quality • VLF recorded

Table 2. Time schedule of VLF-ELF recordings and skywatching.

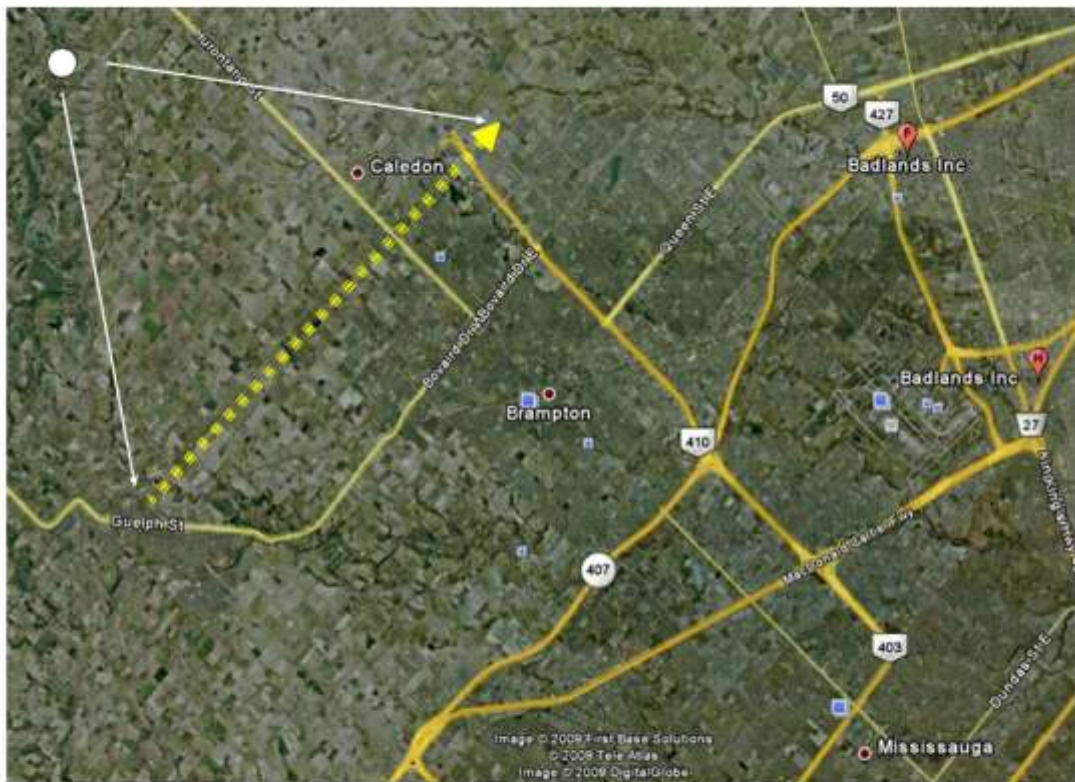


Figure 28. (Previous page) Visual sighting of suspect UFO nature reported in Badlands on July 27, 2009.

After sighting this probable anomaly in the sky it was decided to concentrate the next monitoring session in the area of Badlands. Two days later instruments were then mounted directly on the rock formation and the monitoring was carried out for some hours in the night. No magnetic alarm was recorded, radioactivity was at normal levels, and nothing anomalous was seen in the sky at that time. The same object was not seen anymore (even during a further monitoring session at Badlands, a week later). But that night the VLF-ELF spectrometer recorded occasionally transient signals of variable amplitude, which is not so easy to interpret (see Tabs. 2, 3 and Fig. 29). Of course the suspicion remains that this signal was caused by an interference caused by the used laptop computer (to which the VLF-ELF receiver was always connected), in fact this can happen many times [Refs. 59, 60]. The problem is that such a (sometimes extremely strong) signal manifested itself only during a few minutes in total and only during one single night out of over 20 hours of VLF-ELF registration sessions in more than two weeks and at 9 different locations, where the system configuration has been always the same. Moreover the same kind of signal has been never recorded in the course of previous registration sessions carried out in Italy using the same spectrometer configuration. Possible interference caused by other devices has always been carefully tested and examined in advance. Therefore this case, by my opinion, remains open. Unfortunately the very limited funds available for this mission didn't allow the use of an infrared device too [Ref. 113]. If something was not visible at that time in the sky it is not certainly possible to exclude that it was effectively present indeed very close to us (as the strength of the recorded VLF signal suggested): an IR thermo camera (properly equipped with a zoom lens) would have caught and identified it almost immediately. This instrument is extremely important when such monitoring operations are done.

Clearly the philosophy of this kind of "instrumented skywatching" is very simple. The main goal is to be able to acquire simultaneously an optical recording (video, photo or spectrum) and a VLF-ELF recording (in case assisted by the Natural EM Meter). This is the only way to validate the possible anomalous nature of a VLF-ELF signal, especially if this can be time-correlated with something anomalous in the sky. Experience shows that being able to obtain such simultaneity of measurements is an extremely difficult task. Probability to see something in the sky becomes very low especially if few occasional hours are dedicated to the monitoring, despite of the fact that this is done at areas where previous sightings have been reported. Clearly an automatic monitoring system, for instance similar to the Automatic Measurement Station used by Project Hessdalen in Norway [Ref. 69], might be an ideal system to increase the probability to catch something, but due to several reasons all this would be limited to video and/or VLF-ELF recording but not to optical spectroscopy (unless a particularly sophisticated automatic system is used). In few words instrumented skywatching operations carried out directly by personnel on site has the disadvantage of offering a low probability to record something but has the double advantage of permitting more complete and accurate scientific measurements and of mobility (a monitoring station is always fixed at a spot).

Therefore all these considerations show that this mission on site has been a further test both of efficiency and promptness (not so different, conceptually, than working at an anti-aircraft post) and of testing on the field what is the value of ratio * results / work done * when one attempts to monitor highly elusive phenomena such as “UFO” apparitions. Experience clearly shows that this ratio may be much higher (namely: favourable) if, instead of UFOs, areas of recurrence of Hessdalen-like phenomena (presumably natural) are monitored [Refs. 69, 77]. There are good reasons to suggest that UFO cases too can be monitored with the same effectiveness only when an “UFO flap” occurring around a given location can be promptly caught [Refs. 14, 61, 68]. But this has not been the case of this mission, where no UFO flap was really reported at that time. In spite of this such a mission has been a very useful (new) test and exercise of promptness and efficiency: this know-how and expertise can be turned to one’s advantage in the perspective of new more favourable occasions.

But the recording of VLF-ELF anomalies didn’t lack in the course of this mission. In addition to the strong suspicious signal described above other still unexplained anomalies (more or less suspected as such) were recorded indeed (see Tabs. 2, 3, and Figs. 30, 31, **32**), also considering that a quite rich database of known signals (of ionospheric and/or manmade nature) in this wavelength range is available since some years as an important tool to compare the “noise” with the “signal” that is effectively searched for [Refs. 59, 60]. Maybe some of the anomalies recorded in the course of this mission might enter into this data bank in the future if they will be clearly identified. Or maybe not.

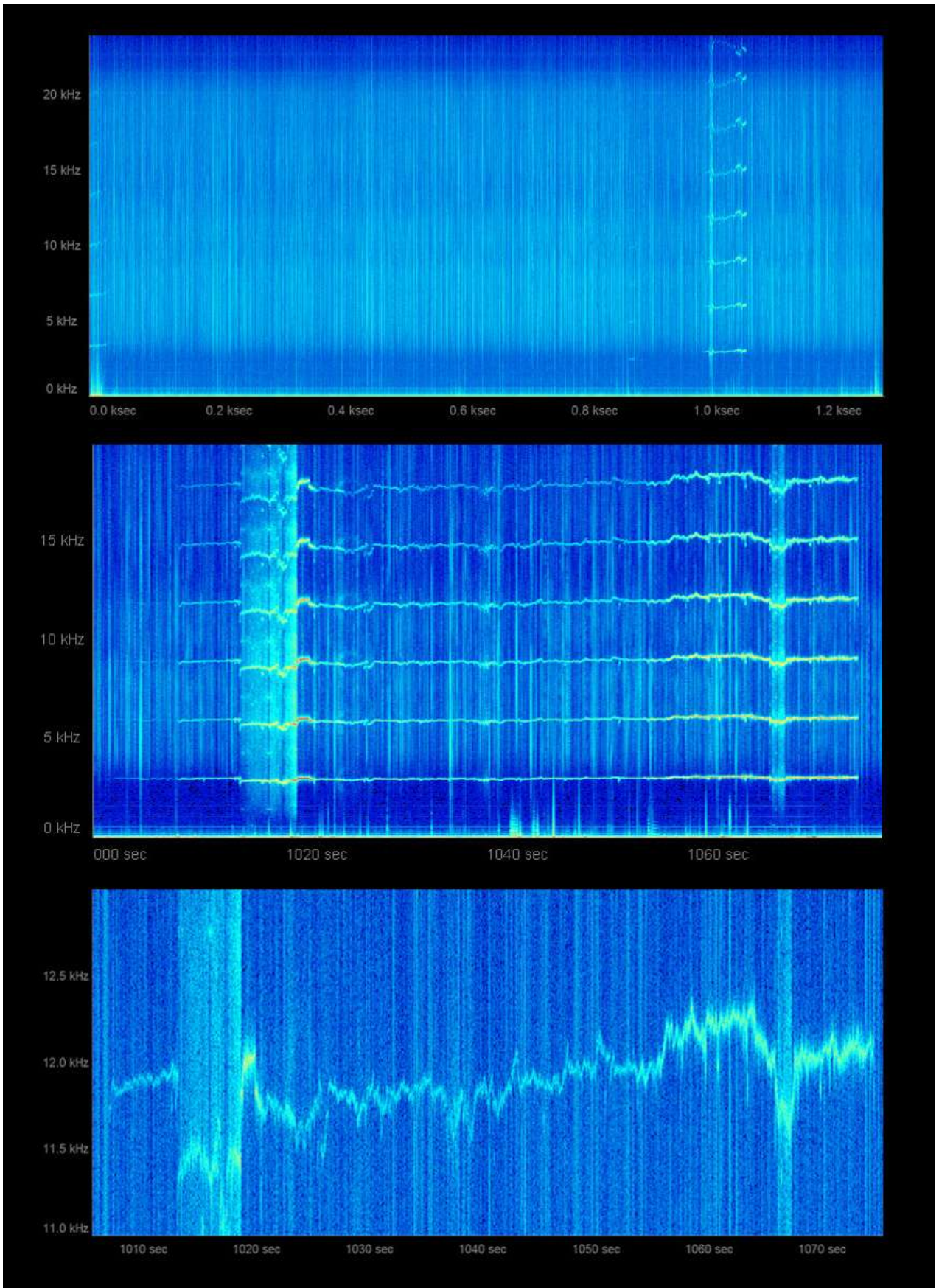


Figure 29. (Previous page) Suspected VLF anomaly recorded at Badlands, July 29, 2009. *Up.* The entire registration (20 minutes WAV file) inside which this anomaly was recorded. *Centre.* A detail of the strongest of these events between 0 and 20 KHz. *Down.* A high-resolution zoom of one of the strongest recorded signals. Vertical lines are well identified as “spherics”, of ionospheric origin. These data have been acquired and processed using *Spectrogram 16* software.

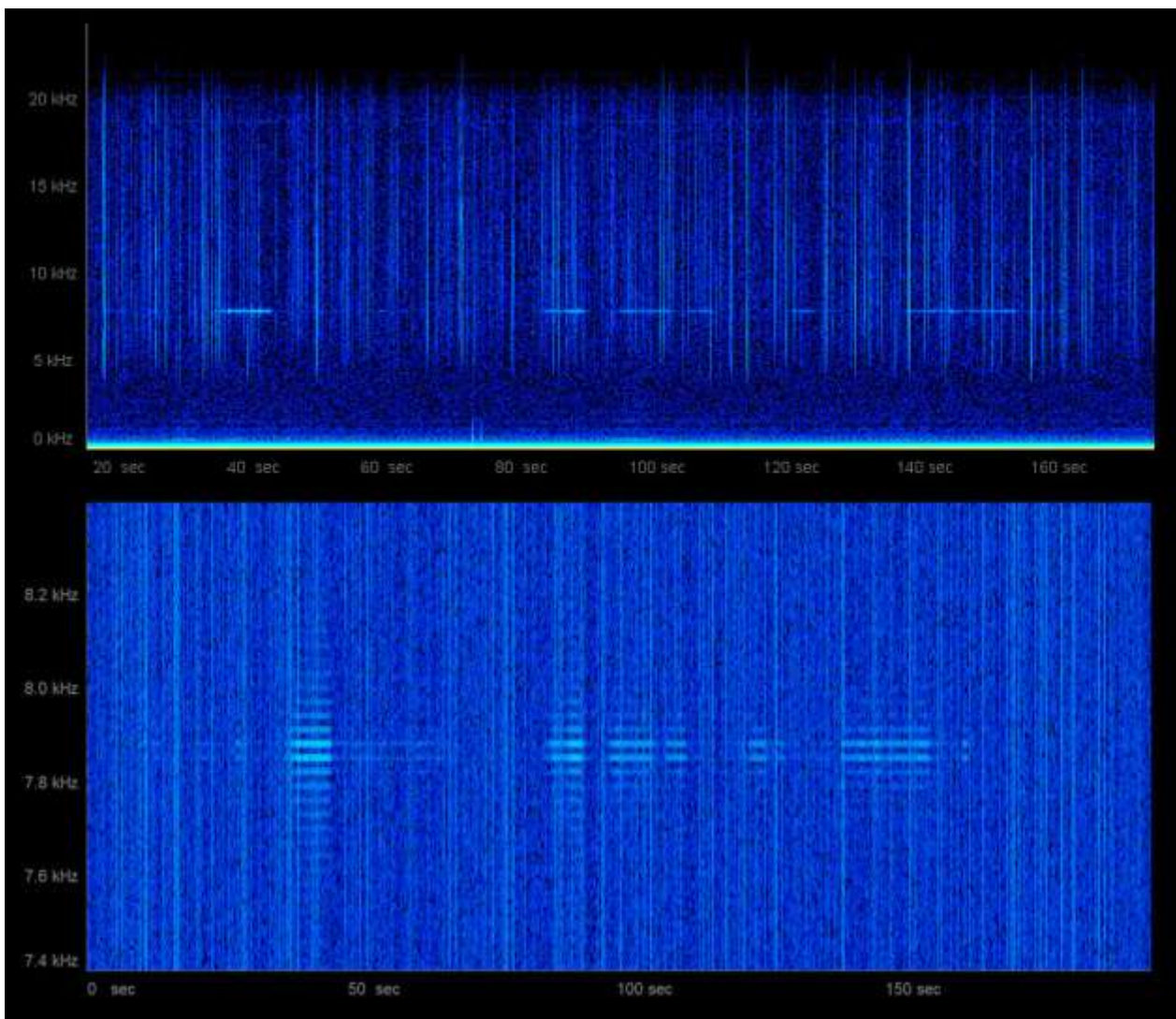


Figure 30. Marked VLF anomaly recorded at Sibbald Point (Lake Simcoe), August 8, 2009. Vertical lines are due to the “spherics” of ionospheric origin. *Up.* The entire spectrogram between 0 and 20 KHz is shown. *Down.* A high-resolution display is shown in the range 7.4-8.4 KHz. These data have been acquired and processed using *Spectrogram 16* software.

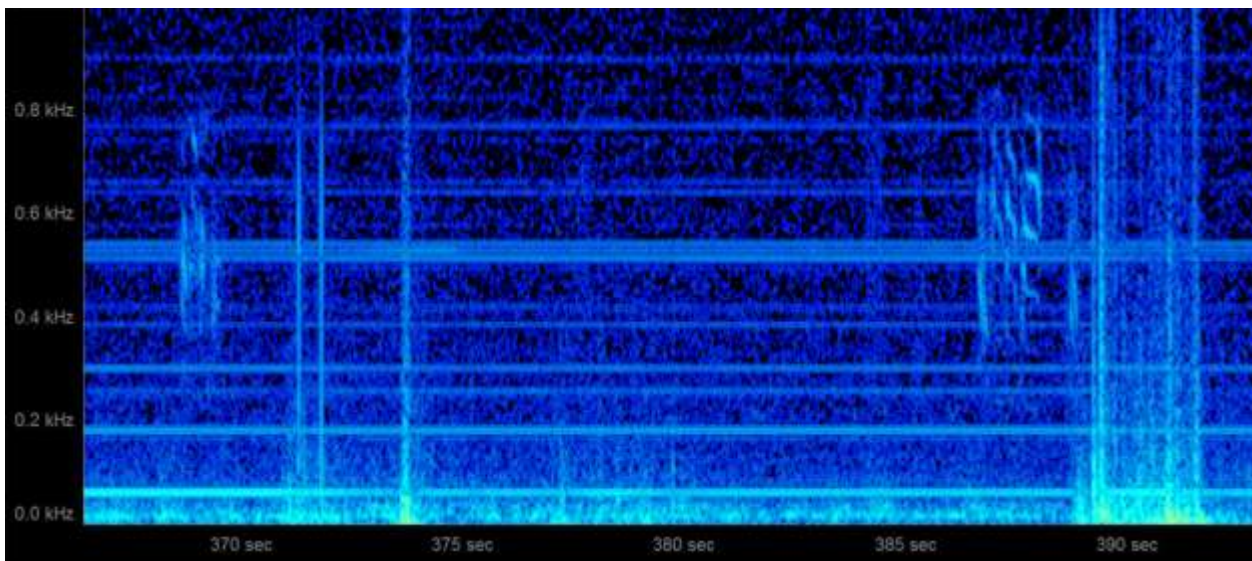


Figure 31. Suspected ELF anomaly recorded at the Spectrum Airways air field, August 3, 2009. Precursor “worm-like” signals precede quite strong vertical spikes. Horizontal lines are caused by well known manmade signals due to power lines. These data have been acquired and processed using *Spectrogram 16* software.

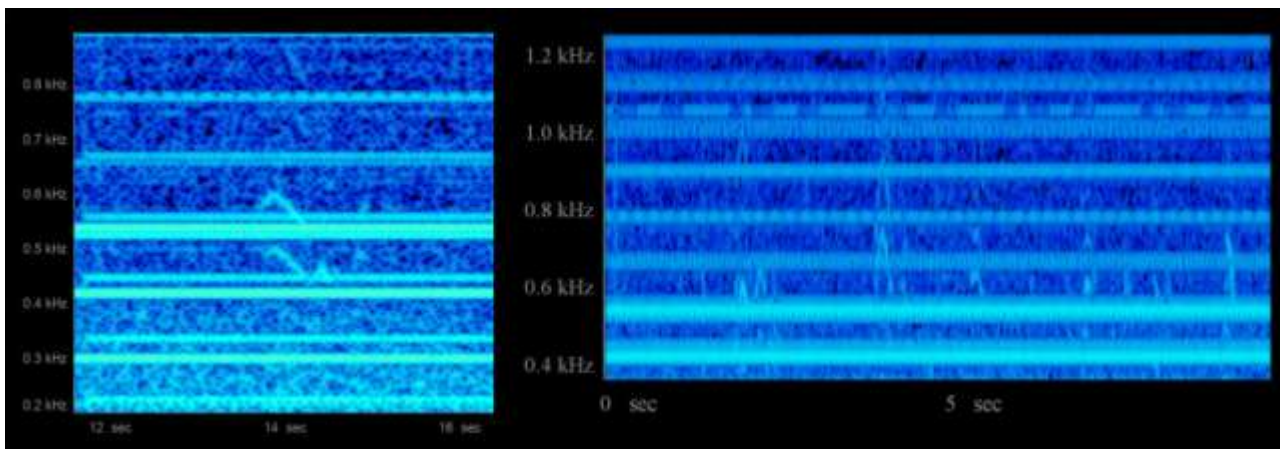


Figure 32. Suspected ELF anomalies recorded at Willow Beach (Lake Simcoe), July 25, 2009. The unexplained signals are represented by “curved and oblique lines” between 0.4 and 1.0 KHz. Horizontal lines are caused by well known man-made signals due to power lines. These data have been acquired and processed using *Spectrogram 16* software.

VLF-ELF RECORDED SUSPECTED ANOMALIES						
Day and Location	Frequency Occurrence	S/N Ratio	Frequency Width	Duration	Shape	Description / Possible Interpretation
2009	(KHz)		(Hz)	(sec)		
July 25 <i>Willow Beach</i>	0.4 – 1.0 (distributed)	1.5	~ 50	0.5 – 1.0	inclined and curved	<ul style="list-style-type: none"> • very little, transient and oscillating • unknown
July 29 <i>Cheltenham Badlands</i>	3, 6, 9, 12, 15, 18, 21, 23 all simultaneous	0.6 – 3.6	up to 1000	28, 5, 7, 3, 13, 75 sequentially	horizontal with slight upward inclination and occasional very strong intensity outburst	<ul style="list-style-type: none"> • 6 events having different duration and intensity : duration \propto intensity • PC interference suspected, but not fully convincing
August 3 <i>Spectrum Airways</i>	0.4 – 0.8	1.2 – 2.0	400	1.0 – 2.0	inclined, curved, steep, very narrow	<ul style="list-style-type: none"> • several events, all preceding (1-3 secs) outbursts of strong intensity (vertical spikes) • movement of air mass suspected
August 8 <i>Sibbald Point</i>	7.85 and 7.88 very close lines	0.8 – 1.6	~ 30	120	horizontal and irregularly intermittent in intensity	<ul style="list-style-type: none"> • accompanied with much weaker mirror signals below (up to 7.55) and above (up to 8.15) • unknown

Table 3. List of recorded VLF-ELF anomalies and their characteristics.

Is there some utility in recording electromagnetic anomalies when nothing is seen in the sky at the same time? Probably yes. The VLF-ELF tool alone might be an efficient method to alert next observers when/if new UFO sightings will be reported in the area from where such signals have been recorded, or it might be a suitable method to “map electromagnetically” a given area, in order to permit to know in advance important information such as the level of EM manmade disturbance (which tends to create a very bad or poor signal quality) recorded when measurements are done at certain specific locations and, of course, to evaluate the possibly persistence at such locations of unexplained EM anomalies, which might be both of geophysical and/or atmospheric nature or of an artificial nature that cannot be easily explained as a manmade one.

The other recorded anomalies are quite interesting, and in 5 years of quite constant VLF-ELF monitoring operations [Refs. 77, 78] in other countries (in particular, Norway and Northern and Central Italy), such signals have never been encountered before. The VLF anomaly recorded at Sibbald Point location (see Fig. 30) is particularly interesting and some of the best experts in VLF-ELF monitoring (deliberately consulted among the most skeptical ones) do not have an explanation yet [Ref. 60]. Another anomaly, in this case in the ELF range, was recorded at Spectrum Airways (see Fig. 31) air field location (where some quite important UFO sightings were reported several years ago). It was first suspected that the strong vertical outburst of emission might be caused by wind or by touching occasionally the antenna wires, but after doing several tests it was soon realized that this wasn't the explanation. What is interesting here is that such very strong vertical clustered spike-like signals were preceded by a sort of “worm-like” signal precursors. This kind of signal occurred several times at the end of the monitoring session. Experts suggest that this kind of signal might be caused by some “movement of air masses” [Ref. 60]. Clearly that one was an area that was very frequently flied over by *Cessna*-like first-level trainer airplanes (taking off, touching and going, and landing one after the other all the time), and that night this occurred up to 11:00 PM. This might be in itself a possible explanation of this kind of signal, but at the moment of airplane passages (also at very low height) no anomaly was recorded by the VLF-ELF spectrometer (whose antenna was set up to record the electric component of the field). Most prominent anomalies of this specific kind were recorded predominantly after 11:00 PM.

As an anecdote I should remember that after 00:30 PM (at the airfield) when I was about to pack all my instruments in the car towards which I had started to move, I suddenly saw a quite huge and almost blinding “spherical light ball” of white-blue-violet colour on the ground, which was located presumably some kilometres away from the observation point. This phenomenon lasted a few seconds and reminded (as a perceptive effect) an “atomic explosion” seen at its beginning and in distance. What was it? This is impossible to tell, and, once more it must be reminded that this was another totally unpredictable transient light event that, by the way, couldn't even be photographed in useful time even if the camera had been still in position (unless it had been taking a long exposure catching the specific time lapse of the light apparition). But certainly if the VLF-ELF device had been in function (I was typically recording sequential files that were each 20 minutes long) at the time of this big light flash, something might have been surely recorded. This sighting was seen only by the undersigned, as the other person accompanying me was occasionally looking at a different direction, while this very luminous lighting effect lasted very shortly. Once more, we see how

elusive these kinds of phenomena are, especially when we intend to obtain scientific measurements of them. And this one was another very useful test, which might be very instructive for future monitoring sessions. Trying to measure UFO or UFO-like phenomena is not exactly like aiming a telescope at a star... And it must be once more reminded that trying to acquire measurements of alleged UFO phenomena is much more difficult than doing the same of very spatially recurrent "earthlights" [Ref. 86], unless an aimed monitor of UFOs is promptly carried out as soon as a "time flap" occurs in a given area of the world. The success of an operation of this kind depends mostly on the availability of the necessary money funding for this research, which certainly requires necessarily more than two persons working on it and several additional (expensive) off-the-shelf and portable instruments. Nevertheless it must be also pointed out at a quite good level of confidence that being able to acquire simultaneously VLF-ELF recordings, optical spectra and videos of a possible anomalous aerial phenomenon that is in sight would be more than sufficient to obtain scientific data of a certain relevance. That's the reason why it was decided to carry out this mission even if some important sophisticated measurement facilities are presently lacking. Whatever is the success of this kind of instrumented missions, experience says that trying to do them is without no doubt an important exercise (maybe a bit similar to a military one) of efficiency and promptness, especially if these operations are carried out in the full darkness and at often impervious locations where all the instruments have to be deployed.

This session should be concluded just making a short list of the additional portable instrumentation and support personnel that the experience on the field necessary required (due to the present lack of it). The following items are necessary in order to be able to carry out a full scientific analysis:

1. An Infrared Thermo Camera attached to a 30-300 mm zoom lens, in order to permit the uncovering of apparently invisible objects in the sky and to record them for subsequent analysis.
2. A small Radar of maritime kind (with fully computer recordable tracking data), in order to be able to track these objects.
3. A Laser Range Finder, in order to be able to measure their distance (while apparent luminosity is measured by conventional high resolution photography at the same time) and to determine exactly their NESW direction.
4. A digital and computer interfaceable Magnetometer, in order to permit computer recording of this kind of data (the readings of an analogic magnetometer, whatever its sensitivity and precision, can be done only by eye).
5. A green High Power Laser (200-300 mW), in order to attempt several tests on anomalous targets, once their conventional nature (such as airplanes) has been promptly excluded using other means such as a radio scanner [Refs. 72, 73].
6. A Microwave Spectrometer in order to possibly detect high-energy radio waves (in the range 1-10 GHz) that might be correlated with an anomalous aerial object in the sky.
7. Two Ph.D. students (in physics, astronomy, engineering) or young scientists of equivalent culture and preparation, in order to assist technically one or two principal investigators [Ref. 82].

Experience teaches that the full success of this kind of scientific campaigns doesn't depend only on the availability of sophisticated instrumentation and on the presence of highly technically competent personnel but also on the organizational and logistics capabilities. In addition to the use of the available instrumentation, the last mentioned capabilities have been tested and wholly achieved during the mission carried out to Ontario, due to a quite well harmonized work between a physicist and an investigative ufologist of prominent general culture, specific preparation in the field of ufology (whatever the personal thoughts and beliefs on the UFO phenomenon may be) and excellent cartographic and explorative skills.

8 – Conclusions

The examination and thorough analysis of UFO databases, even if not being able to furnish information on the physical nature of the investigated phenomenon, is able to furnish several important insights concerning the effective existence of the phenomenon and the way in which it is perceived by witnesses, its behaviour in space and time and its possible connection with geophysical and astronomical phenomena. Serendipitous discoveries can be done too, where it may happen that the “UFO variable” can be used by chance as a “probe” to investigate the behaviour of other variables of interest. Experience teaches that the analysis of UFO databases is scarcely useful when scientific expeditions on sites of particular interest due to a high frequency of sightings are effectively done. There seems to be no real “spatial recurrence” of the UFO phenomenon intended as such; nevertheless measurements of the electromagnetic field of the areas that have been involved in the more or less recent past are worth doing, in fact there are some reasons to think that “UFO flaps” occurred for a brief time in some specific areas – or even some isolated prominent UFO sightings – might be induced or triggered by some specific characteristics of the territory in which this has been occurring. The elusive and unpredictable nature of the UFO phenomenon (pretty much differently from the earthlight phenomenon) renders any effort to monitor it scientifically, extremely difficult, unless a very well trained team of scientists and engineers is able to enter promptly into action as soon as a new UFO flap occurs. Probably such strategy and tactics can reveal to be the most cost-effective in the attempt of acquiring scientific data from this “fringe phenomenon”, provided that the appropriate scientific instrumentation is available, well tested and professionally deployed and used.

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