

## Earth Sciences talk

Good morning Ladies & Gentlemen and thank you for inviting me here today to present a talk to you about the history and content of my Cyprus Storms live website. I was interested to hear from Keith that you have recently changed the focus of your group to include not only geology but also the other Earth Sciences which fits perfectly into the subject matter of my site and I was happy to be told that many of you here and your friends are regular viewers of the site. Can I thank you for that and invite you during my talk to note down any questions you may have and I will gladly try to answer them after the coffee break.

Firstly a little bit of background about myself. My name is Ian, 66 years of age and I was born in Bracknell in Berkshire but brought up in Scotland hence the Scottish accent. My hobbies include everything to do with Radio, Earth Sciences and computers. My hero's are Professor Steven Hawkins for his undoubted genius, Billy Connelly for his humour and David Attenborough for being...well..David Attenborough. In the Earth Sciences I can probably be described as an enthusiastic amateur, I have no degree in any 'ology' but I suspect like a lot of you here do possess several Degrees from the University of life. My programming skills are self taught and I can code in HTML, CSS and JavaScript and it is using these that the site has been built.

My interest in weather began at an early age when as a 12 year old boy the TV antenna on our house was struck by lightning and our TV set instantly became a charred smoking box with a piece of charred smoking carpet below it, every fuse in the house also blew at that instant..and worse of all it happened right in the middle of Top of the pops ! As we couldn't afford a new TV we were back to listening to Jimmy Clitheo, Billy Cottons band show and the man in black on the old steam radio. Since that day, I have had a healthy respect and curiosity about the weather in general and thunderstorms in particular.

During my working life I was a communications officer in Strathclyde Police and as such I was trained in the various police radio and computer systems including Major Incidents, contingency planning and casualty bureau training. We did training exercises for a variety of natural and man made disasters including nuclear incidents being close by to both the US and British nuclear bases at the Holy Loch and Fas lane. My training was put into practice on several occasions not least during a hurricane which struck the west coast of Scotland which saw roofs torn off of buildings, countless trees uprooted blocking roads all over the area, extensive flooding and the local authority radio masts were torn down and in general mayhem ensued. On that night I was not only controlling the Police response to the major incident but after changing the radio frequency on our backup transmitters my staff and I along with a rather soggy roads department manager who had managed to struggle his way to our office also ended up controlling the local authority response too. Another incident was on the occasion of a rail crash which involved casualties but fortunately no fatalities and finally being involved in the casualty bureau connected to the Locherby Air Disaster. As you can imagine the memories and knowledge gained has remained with me and has been applied to the various further pages on the website such as the Disaster Preparedness, seismic and Tsunami pages. I will come to those and the other pages in more detail later.

## The History of Cyprus Storms

The first incarnation of Cyprus Storms began in 2002 when I lived in Akrounta village in Limassol. It was at that time a single page site for both my weather observations and my radio hobby and basically for my own personal use. I operated on a dial up 56k internet connection so keeping the site updated was a laborious process. In 2004 I got my first DSL connection, speed increased and life became easier and more complicated at the same time and as the size and content of the site increased I had to separate the Weather related and radio related content into two different sites. The radio related content became Cyprus-server.net and the weather related content became Cyprus-Storms.net. About a year later partly due to the feedback I had begun to get from viewers to the site and the acquisition of my storm tracker unit I made the decision to take a different approach as opposed to other weather related sites on the internet to make the content in Cyprus Storms as far as possible live or near real time and the site was renamed Cyprus Storms Live. This policy sets Cyprus Storms live apart from many other weather sites which mostly only give weather forecasts. So over the recent years more and more live or near real time data has been added from numerous sources and you can see the results on the sites main page. The design of the site is deliberately aimed at being visual so that viewers can get information at a glance without having to click on links although more detailed information can be accessed by doing so in most cases. The idea is for the site to be a one stop shop so to speak for information about all aspects of weather and weather related subjects and indeed the comments in the on-site guest book bear out the fact that people are finding this to be the case.

It may interest you to know the Cyprus Storms Live website was recently ranked 128<sup>th</sup> in the world out of 30 million domains by the web ranking organisations webstatsdomains.com and Alexa. In 2018 Cyprus Storms Live received 103,911 unique visitors with 2,863,005 individual page views which confirms the sites popularity.

So lets examine the site page by page, I will take each page on my site in order starting with the main home page.

At the heart of the Cyprus Storms live website is my Boltek storm tracker unit. This is a PCI board which is in essence a low frequency radio receiver located inside the Cyprus Server computer and using the excellent Nexstorm software is capable of tracking thunderstorms and individual cells within those storms up to 1,200 km away although for increased accuracy it is generally set to 400 or 600km and provides detailed real time maps and reports on the storms it is tracking. It is capable of distinguishing between positive and negative intercloud strikes and positive and negative cloud to ground strikes and this can be important as if the storm is composed of predominantly inter-cloud discharges it can be characterised as an 'electrical storm' and usually provides a good light show, whereas if the storm is composed of predominantly cloud to ground strikes it is much more dangerous and more likely to cause damage to property and set off fires which is important to know during the summer months. There is of course the third mixed type with equal amounts of inter-cloud and cloud to ground discharges. If you have been on my site You will have seen for yourselves what the storm tracker can do.

It might be useful if I explained to you how the storm tracker unit works. The storm tracker PCI board is fed from a special directional antenna on the roof of my building. If you tune a medium or long wave radio between stations when there is lightning about you will hear the loud lightning crashes coming over the radio's speakers. Well the storm tracker operates on similar radio frequencies and the directional antenna detects the direction each lightning discharge is coming from and algorithms in the clever Nexstorm software works out the distance from the signal strength. This data is then plotted onto the map which you can see on-screen. The system has one limitation, it works in 2D and cannot work out the height of the lightning. As the system is so sensitive it is prone to interference from devices such as hedge trimmers (of which there are a lot), electric drills and any device really which uses electric motors with brushes which when poorly maintained can cause arcing which the storm tracker can detect as false strikes. The software mostly filters these out as 'noises' but if you are on the site and see a large spike on the storm tracker display please ignore it, the thunderstorm from hell is not about to strike !

A few years ago I collaborated with Professor Colin Price, head of the Geophysics Department at Tel Aviv University and his students who have a storm tracker unit identical to mine. The storm tracker unit each day produces raw data files which can be played back and what we did was to combine the data sets in an effort to produce more accurate models of storms in the Eastern Med which proved very useful and at that time had never been done before. Colin and his students were also involved in using high spec and high speed cameras located on mountain tops to try and capture on video the elusive sprites and elves which shoot out of the top of thunder clouds towards space. They were also involved in project 'Flash' which involved the prediction of where flash floods might occur using 3D topographical models gleaned from satellite data and you can find a link on the sidebar where you can find out the flood risk for where you live.

Complimenting the Storm-tracker data is my live webcam so viewers can see in real time on camera what the storm tracker is indicating and it might be worth mentioning here the site's weather cams page which includes in addition to my webcam other webcams from around Cyprus.

At the top of the main page are 2 scrolling tickers, the first shows any weather warnings issued by the Cyprus Meteorological Department and any announcements from myself. Weather warnings issued by the department are sent to an organisation called Meteoalarm and my site is registered with them. I have their app on my mobile phone and I get alerts as soon as they are issued so I can update the site.

The second ticker shows the current fire state. Over the years I have tried to find an official Cypriot government fire state on the internet but have been unsuccessful. So I generate my own using software adapted from that used by the Canadian Government forestry department in which you input parameters such as humidity, temperature, type of terrain, wind speed, number of days since it last rained and others, so when the software is run it generates the following results, LOW, MEDIUM, HIGH, VERY HIGH and EXTREME This process involves a certain amount of compromise in averaging the data from various parts of Cyprus and using the village of Platari as the centre point as it is roughly halfway in altitude between sea level and the top of mount Olympus. I run the software once a week.

There is a sidebar on the right side of the screen which appears on all the main pages of the site showing a variety of information which I will examine in more detail shortly. The main part of the page has various panels showing local radars, webcam, storm tracker, jet streams, desert sand etc.. the maps on a lot of these panels can be dragged by the viewer to show the information for their local area, so for instance a viewer in Italy could set up the Cyprus Storms site to show information for Italy and as the site uses cookies, the next time the viewer returns to the page their browser (if they have cookies allowed) will remember the settings used on the previous visit to the page. This ability to customise the site to a degree has also proved popular with viewers and has attracted viewers from all over the world.

Towards the bottom of the main page is an information panel giving links to things such as night pharmacy's, useful telephone numbers, civil defence, the Cyprus Government website etc. One of these is the well known Coptic Storm chart, I know of quite a few people who have printed this off and have it stuck onto the side of their fridges. It's obviously not very scientific but the storms shown on it do roughly speaking tend to appear although arguably there are others which do not appear on the chart.

Below this is a panel showing the various ways viewers can contact the site. Very important to me are our site members, viewers can join as a site member by clicking on the members area link on the main page. At present we have 120 site members and once registered they have access to certain facilities including the ability to upload any weather related or other relevant photos they have taken directly onto the photos page on the website, creating their own album or adding to one of the generic albums. Site members also have the facility to keep in contact with other members by email and get advance notice of any upcoming upgrades to the site. Most importantly as members and regular viewers they can make suggestions on how to improve the site and I am always open to such suggestions. Finally, from time to time I send out email blasts to members to keep them up to date on site news in general.

## SEISMIC PAGE

Next is the Seismic page which I suspect will be of interest to you. On this page are two news tickers showing on the left Mediterranean area quakes over Mag 4.0 and on the right worldwide quakes over Mag 6.0. Below those are the seismograms from all the Government operated seismic stations and a link to worldwide seismograms. Also shown on the page is the seismogram from Agnoyra operated by Keith which I consider as very important as to have access to a seismograph independent from the Government ones is desirable in case for some reason the Government seismic server went down.

As you know we live in a seismically active region near to the South Anatolian fault and in particular over or near to what is known as the Cyprian arc and we do get earthquakes from time to time although they tend to be of a lesser magnitude to those occurring in Turkey and Greece however as you can read on the page over history there have been notable exceptions. On the page there are also various links to the Cyprus Geological survey department and other useful information sources. I also maintain screenshots from the Mathiatis seismic station on the page from local earthquakes over Magnitude 4.0. One of these occurred on 15<sup>th</sup> April 2015 offshore from Peyia and was a magnitude 5.6. You may have felt it...I happened to be in the local pharmacy in Peyia at the time and the result was that everything that had been on the shelves ended up on the floor, as you do we all rushed outside as did the staff and customers of all the neighbouring shops (The people in the local pub next door seemed unfazed). I decided to return home to check on the building and make sure the contents of my flat were still in one piece. At this time I checked my seismic page and found that there were 742 viewers on the page so the jolt obviously woke people up. It also woke up my website service provider who sent me an urgent text wanting to know why there was a sudden surge in site traffic suspecting that the site was under attack from hackers.

Over the years I have carried out my own somewhat unconventional research in this area and have been involved in an internet group carrying out research into earthquake precursors using infra-sound receivers. The theory being that as the pressure deep underground builds up before an earthquake occurs sounds of cracking rocks, gas being released all produce sounds in the frequencies below the range of human hearing. This pressure can also produce a peizo electric effect as crystals in the rock under pressure fire off small electrical charges. These are too small to be detected individually but an increase in the overall background noise caused by millions of them firing off can be detected. The observations take place over relatively long periods of time trying to detect gradual increases in the background noise as pressure builds then noting any sudden decrease after a quake or tremor.

My equipment consisted of an antenna with 1000 feet of enamelled copper wire wound helically onto a PVC tube 6" in diameter and 5 feet long and 3 inches above the ground. This was aligned north and south lining up with the Earths magnetic field. The antenna was made more sensitive by filling the interior of the tube with iron and a material called mu-metal (similar to tinfoil but purer and thicker).(sort of like a giant ferrite rod antenna that you would get inside a transistor radio) In this configuration the antenna is inductively and magnetically coupled to the earths magnetic field. The antenna was connected to the microphone socket of my computers sound card and the software used was called Spectrum Laboratory or Speclab for short. The frequencies used were Extremely Low Frequencies between 0 (DC) and 50 hertz with special filters to eliminate the noise emanating from the 50 and 60 hertz European and American power systems and I also used very tight filters to filter out any harmonics from these. These low frequencies are in the range where the computers sound card can act as a ELF (extremely low frequency) receiver and is mostly below the hearing range of humans but when you adjust the output from the sound card into the human hearing range it is fascinating to hear the very low frequency background noise and rumbles coming out of the Earth, recording this and playing it back at a higher speed is even more interesting and you can almost hear the Earth breathing. The idea was to make daily observations of the noise floor and report to the group any rise in the noise noted so



these could be correlated. Unfortunately although still a member of the group after moving from my village house to a flat I cannot in my present situation continue with my observations. The Equipment is cheap and the software free so if any of you would like to have a go let me know.

In general I consider all the ongoing research into earthquake precursors very important due to its potential to save lives. It is a subject in itself and worthy of it's own talk. There are many scientists and amateurs all over the world working in this field. Earthquake precursor research includes such things as Seismic, behaviour prior to earthquakes of wild and domestic animals including some humans who seem to be sensitive to these things, sightings of earth lights and the recording and observations of long period harmonic tremors usually associated with volcanos. This is a fascinating area of research which the amateur can get involved in and there is a wealth of information on the internet to get you started.

## TSUNAMI PAGE

We now move on to the Tsunami page. The heading on this page states, ' A devastating Tsunami in the Mediterranean every century' another statistic is that the Mediterranean is the second most Tsunami prone region in the world.

When I lived in Limassol during a conversation on this subject I put these facts to an acquaintance who was a manager at the power station in the outskirts of Limassol, The one that blew up ? And we all remember the devastation and disruption that caused. His reaction was to shrug his shoulders, throw his hands up into the air and utter the Greek equivalent of 'if its Gods will'. And this seems to sum up the attitude of the Cypriot Government as well for it is a fact that all the Power stations and airports in the Republic are at sea level, this is in addition to the ports which by definition are at seal level, and God forbid a tsunami of any size occurred for the Island could quickly either suffer total loss of the electricity supply or at the least significant disruption. It is a given that the ports would most likely be put out of action but we could not even rely on the airports as depending on the direction of the waves one or both airports could also be

put out of action due to debris on and damage to the runways as well as possible damage to airport buildings thus preventing or delaying the speedy dispatch of aid to the Island.

Now it could be that if a large quake occurred near to the island there would simply be no time to issue warnings and this could be why there is no mention on the Cyprus Civil Defence website or public information as to any contingency plans for such an eventuality. This seems to be the nature of the beast as the people of Phuket and the numerous other parts of the world affected by the notorious Boxing day Tsunami found out and more closer to home the 6.7 Mag earthquake which occurred on 20th July 2017 north of the Island of Kos which resulted in a tsunami which caused considerable damage to the north coast of the Island, wrecking the harbour and relocating boats which had been in the harbour inland.(see the video on the page) If a 6.7 Mag quake can happen at Kos then it can happen in Cyprus or offshore from the Island. Remember the North African plate is still moving north !! Just don't be on a beach when the tide suddenly goes out !!

There is plenty of evidence on this page as to historical Tsunami's which have struck in the Mediterranean and admittedly most of these have affected the western and central Med but in my opinion we should not be complacent.

On the page is a ticker showing Earthquakes over Mag 6.0 in the Mediterranean area which have the potential to trigger a Tsunami and also the seismograms from the two undersea sensors of the TWERC expansion of the CYCOFOS system which is connected to the Mediterranean Tsunami early warning system. It is worth noting however the fact that they are located 20 miles offshore and Tsunami waves can travel at up to 500 miles per hour so you can work out for yourselves how little warning we could expect. But its not just me saying this, let me quote Dr. Georgious Georgiou, director of the Oceanography Centre of Cyprus. "An earthquake in the Central Mediterranean could trigger a tsunami that could reach Cyprus within an hour, giving very little time to evacuate and shut down industrial buildings such as power plants and chemical factories. " unquote.

It is my hope that the information on this page gives people pause for thought and makes them at least consider the possibility and make some sort of plan for themselves and their families (more about this later in the Disaster Preparedness page).

## VOLCANO CAMS PAGE

Continuing on our Earth Sciences theme we come to European Volcanos of which there are quite a few. Volcano's, Earthquakes and Tsunamis can be linked so I won't go into a lot of detail here as the page is self explanatory. This page shows webcams and where possible seismograms connected to European Volcanoes. Also on the page is the VEI scale which measures the strength of eruptions. We all remember a number of years ago when a volcano erupted in Iceland (which I won't even try to pronounce) effectively paralysed air travel all over Europe due to Volcanic ash in the air. Well there are a number of Volcanoes in the Mediterranean area equally capable of causing similar chaos. Italy in particular is prone to such eruptions from it's volcanoes. I won't go into each of them here but suffice it to say that if a major eruption happened we would do well to note that Cyprus lies downwind from Italy and depending on the weather systems over the Med at the time we could well feel some effects and possible changes to weather as well as possibly even more spectacular sunsets than we get already.

As in Earthquakes scientists are carrying out extensive research into precursors to try and predict when an eruption will occur. I have already mentioned research into Long period harmonic tremors, minor earthquake swarms are another indication and there is also research going on by measuring the amount of Hydrogen Sulphide and carbon dioxide being emitted as an increase in the amount of these gases could indicate magma rising for as pressure decreases as the magma rises these gases are released and therefore readings increase.

By the way, did you know that Cyprus is still volcanically active ??, well not really but a few years ago after getting a tip off I visited the site of a 'Healing volcanic sulphur springs hot water spa' hotel (or words to that

effect) which was under renovation just off the main road to Polis. Sure enough after some searching I found a pipe sticking out of the ground which had vaguely warm water coming out of it smelling strongly of sulphur. (at least I think it was sulphur ?) So now you know...

## Mediterranean Hurricanes or Medicanes.

Mediterranean tropical cyclones otherwise known as Mediterranean Hurricanes or Medicanes are a rare weather phenomenon. These systems have been subject of some debate within meteorological circles whether they closely fit the definition of tropical cyclones, subtropical cyclones, or polar lows. Their origins are typically non-tropical, and develop over open waters under strong, initially cold-core cyclones, similar to subtropical cyclones in the Atlantic Basin. Sea surface temperatures in late-August and early-September are quite high over the Mediterranean basin (+24/+28°C) and although research indicates water temperatures of 20 °C are normally required for development, cold air aloft appears to be the main trigger for instability in the development of these systems. So it would appear that it is the temperature differential between the sea temperature and the temperature in the high atmosphere that is important rather than the sea temperature alone. That said the suspicion is that global warming is slowly increasing the mean temperatures in the Med and could also be increasing the frequency and intensity of these storms. This is relatively new thinking which has transformed opinion in meteorological circles and If a "hurricane season" were ever to be demarcated in the Mediterranean, it would extend from August through January, based upon occurrences so far.

My own opinion is call it what you will, that if it looks like a hurricane, acts like a hurricane, has hurricane level wind speeds and causes hurricane like damage then it probably is a hurricane.

The Mediterranean Hurricanes page on the website shows various examples of storms which have been held up as examples of Medicanes

including one which was officially designated as 01M by NOAA in the US an official stamp of recognition if ever there was one.

The page also shows the Beaufort and Saffir-Simpson Wind Scales along with a chart showing live current wind conditions for the whole Mediterranean Sea area.

## SPACE WEATHER

An aspect of our weather which is often neglected is Space Weather and I included this page on the site to raise awareness of this. Our star the Sun is the ultimate driving force of our weather and has various cycles. Foremost among these is the 11 year sunspot cycle. At the moment we are at sunspot minimum but when at the maximum point in the cycle there is the potential for what are known as coronal mass ejections from the Sun. These take the following form, First, high-energy sunlight, mostly x-rays and ultraviolet light ionizes Earth's upper atmosphere, interfering with radio communications. Next comes a radiation storm, potentially dangerous to unprotected astronauts, indeed on several occasions astronauts on the International Space Station have had to move to special 'hardened' areas of the ISS during such storms. Finally comes a coronal mass ejection, or CME, a slower moving cloud of charged particles that can take several days to reach Earth's atmosphere. When a CME hits, the solar particles interact with the Earth's magnetic field to produce powerful electromagnetic fluctuations. On most occasions the Earth's magnetic field acts as a shield and either deflects the energy into space or channels the energy towards Earth's poles where Auroras are the result.

However on September 1-2 1859 there was the largest event ever recorded. That storm has been dubbed the Carrington Event, after British astronomer Richard Carrington, who witnessed the mega-flare and was the first to realize the link between activity on the sun and geomagnetic disturbances on Earth. At that time there were no computers or large electricity grids but there were the early telegraph systems, the internet of the time. All over the world the energy from that CME built up on the long telegraph wires and resulted in sparks flying, wires melting and the poor telegraph operators getting electric shocks from their brass Morse code keys, it was

reported at the time that one telegraph station actually burnt to the ground. In addition to this the solar storm set off powerful Auroras which could be seen as far south as the Canary Islands. Fast forward to today with our sophisticated electricity grids and various computer, cellphone, data networks and satellites you can imagine the potential effects such an event could have on us today. Governments and companies which could be affected are well aware of the danger and there are protocols in place to mitigate it. An early warning system by NASA is in place with a host of ground based observatories and satellites constantly monitoring the sun. If an event at or approaching the level of the Carrington event were to happen today electricity companies would isolate their grids in an effort to protect electrical transformers from being overloaded and blowing up. This would probably result in power cuts to millions but better than losing the grid altogether. and most modern satellites are built to a degree to withstand such events by automatically going into safe mode in an attempt to protect their electronic circuits. If this were to happen your satellite TV would disappear, the GPS on your mobile phone could stop working and financial transactions would halt as they mostly rely on satellites. Hopefully after the storm passed the satellite (if it survived) would return to normal working. According to a 2013 study conducted by the Lloyd's of London insurance company and Atmospheric and Environmental Research a storm of such intensity could have catastrophic effects on our society. the duration of these effects could last longer than a year, and costs could rise to 2.5 trillion dollars. These are numbers that should make us think". Fortunately events of such magnitude are extremely rare and most CME's are of a much lower magnitude and merely cause colourful Auroras. I was in Norfolk a few years ago when one struck and I could see the green glow of the Aurora to the north from a beach in north Norfolk near to Sandringham. (and no I wasn't visiting relatives near to there)

The space weather page contains live views of the Earth from the International Space Station along with a graphic showing where it is in real time. There are also many images from NASA and various sun observing satellites along with the NASA space weather scales which grade the strength of solar storms and details their possible effects. Also on

the page are webcams from the Arctic and Antarctic on which from time to time the auroras can be seen.

## FOREST FIRES PAGE

The forest fires page on the website is an informational page highlighting the danger and the excellent work carried out by the Cyprus Fire service and Forestry Department in combatting this annual danger. Unfortunately every year forest fires break out, a lot of these are in inaccessible areas where the firefighting aircraft have to be used. The page gives details of this and press accounts of serious fires in previous years. The three most common causes of these fires are 1. camping fires / Bar B Qs, 2. discarded cigarettes out of car windows, 3. farmers burning which gets out of control. There are other causes such as lightning strikes and discarded glass bottles acting as magnifying glasses for the suns rays. Whatever the reason hopefully this information page will help to educate the public to be more careful.

## EDUCATION

On the subject of Education, the Cyprus Storms Live site is informational and educational in nature and I have received emails on a number of occasions from Teachers/Educators informing me that they have been using the site as a teaching aid in their lessons. As a result of this. work is ongoing to prepare Education packs that the Teachers can download from the site and print out for their own use and that of their students. The packs will be divided into the various subjects covered on the site including information designed to compliment modules already covered on Civil Defence and citizenship. These packs should be ready by the summer for use after the summer school break.

## DISASTER PREPAREDNESS PAGE

As I explained earlier this page came about as a result of my own experiences and training in the Police. Its content also has to be seen in the context of a worldwide audience especially in North America where 'prepping' is widespread in popularity against the day when SHTF.

Here in a somewhat saner Europe and even more Laid back Cyprus in particular I have tried to provide useful information and links to information for sensible precautions against various man made and natural disasters. Most of it is plain common sense. Please take some time to have a read of this page as it also contains first aid tips and videos in addition to the 'preppers' advice.

## THE SIDEBAR

Finally we come to the sidebar which as I mentioned earlier is located on the right of all the main pages on the site. I will go down it from top to bottom and explain briefly what each feature shows.

At the top is the site status panel showing the status of the main server, either online or offline, below this is the visitor counter and below that the number of visitors currently on the site, not a lot of webmasters have the courage to reveal this information but I have no such hangup, sometimes the site is busy and sometimes the site is quiet..what's the problem ?. Below that is our guest book where visitors can leave their comments regarding the site. Then comes the Microsoft translator which allows visitors whose first language is not English to translate the text on the site into their native language.

Below this again is the live weather data panel which includes, Global lightning map, live European Lightning, if you click on this a window



opens showing live lightning all over Europe, then there is the Mediterranean lightning forecast and the European fax chart, this is legacy technology but still used by ships at sea. Next comes the surface pressure chart on which you can see the isobars of low and high pressure areas over Europe, below that is the CAPE forecast map, CAPE means Conductive Available Potential Energy and the higher the reading here the more likely it is of instability and storms will occur.

Then there is the Troodos web cam from the Ski Club at Mt Olympus with links to the Ski report and Road reports for roads leading to the mountains. Next comes the Desert Dust forecast map and below that the volcanic ash advisory link to the Met office in the uk and other relevant authorities, this has particular relevance to Aircraft and pilots.

Next we have the environmental warning panel which includes the Cyprus and European fire warning states, the Cyprus flooding risk, Cyprus Air Quality and Cyprus seismic status, clicking on this will take the viewer to the seismic page of the site.

Finally is the Astronomical panel which includes, The current moon phase, solar storm information, Cyprus sunrise and sunset times and tide times.

Other useful information can be accessed from the panel below the Members sign in panel. These include access to the Cyprus airports Arrivals and departures, information for plane-spotters, and currency exchange rates. There is also a PayPal link which allows viewers to make a donation to help keep the site running. Right from the very start I decided not to include ADS on any of my websites as they tend to take over and detract from the site content, however Running a website does cost money and although my site is a labour of love so to speak the annual running costs do come out of my own pocket.

Cyprus storms live is on Twitter under @cystorms feel free to follow the site and add your comments on there as well.

## IN CONCLUSION

So in conclusion, as I have just said, Cyprus Storms Live is a labour of love for me and I would like to think that I am providing a useful public service providing live and up to date information, certainly comments in our guestbook and emails I have received acknowledge this.

I am pleased that the site continues to grow and the number of people visiting the site is growing every year. I hope you have enjoyed my talk to you this morning and have found it interesting. I have spoken enough for the moment and desperately need a cup of coffee after which I will answer any questions you may have.

Thank you for your attention.