free.aero

WORLDWIDE PARAGLIDING AND PARAMOTORING MAGAZINE. FOR FREE.

THE WEATHER

FINDING THE RIGHT INFO TO GET HIGHER

Cover photo:
Armin Appel captured this amazing scene at Dudek's 20th anniversary party in October 2015. The Flyboard pilot played the role of pylon for the paramotor pilot.

Translation by Ruth Jessop

CONTENTS

THE BRIDE SENT FLYING

Aurelia Hallié is a paraglider and microlight pilot as well as paramotor instructor. As part of a recent film, the details of which are being kept under wraps until the film is released in 2016, some fairly unusual paragliding aerial shots were taken.

We're looking forward to hearing more about the film!

ICARO: THE PARUS AND ITS ACCELERATOR

The new Parus tandem is made using Skytex 38 and 32 in Sri Lanka. It is aimed at both amateur and professional pilots. For the latter, there are specially adapted colours for putting publicity logos on the underside.

What sets it apart, according to the manufacturer, is its easy inflation and take off, no matter what the wind is doing. The risers are relatively short and very clean. Icaro promise very good handling and, thanks to the SharkNose, good maximum speed as well as good behaviour with a low wind loading. The price and detailed information about this tandem haven't been disclosed yet.

The new foot accelerator can be easily adjusted by moving a knot on the inside of the bar. The extra chord fits into a compartment which is closed by a clasp. A strap reinforced by Nitinol thread allows the accelerator to be caught hold of very easily.

http://icaro-paragliders.com/

TREKKING :

COMING SOON, THE JUST ONE V1

The Just One V1, launched at the Coupe Icare, is Trekking's first single skin wing.

Inspired by the 19m2 Barretina Hyper Lite 2 created by Pere Casellas, it comes as a self assembly kit that you sew together yourself. It's a fun wing, well adapted for playing in the wind. According to Trekking, despite its manufacture with robust solid materials (not 'light'), it only weighs 3 kg and folds up small.

Surface: 19 m2
Projected surface: 15.6 m2
Flat wingspan: 9.7 m
Flat aspect ratio: 5
Projected aspect ratio: 4.13
Height of the line cone: 5.9 m
Maximum all up weight: 100 kg
Kit price: 880 €, ready to fly: 1 750 €.

www.trekking-parapentes.fr

WOODY VALLEY VIDEO CLIP

This clip, made by Woody Valley for one of their products, very clearly fits into the category of 'hard core publicity' but, all the same, it is really well made and will, no doubt, encourage non flyers to take a closer look at our sport.

https://youtu.be/f5r6aly-SS8

BGD ARE ON THE MOVE

It's been three years now since Bruce Goldsmith launched his own make, BGD, which is expanding rapidly. To be able to manage it properly, he even had to give up the presidency of the PMA. The development office in the south of France has moved to bigger premises and the company has opened a new distribution depot in Austria.
www.flybgd.com

The development office in France

The premises in Austria

PARAZOOM EASYUP

A new lightweight motor to propel you up into the thermals has been launched by the German company ParaZoom. A relatively low attachment system allows efficient piloting through the harness. The two-stroke, 170 cc, boxer motor should give 18 HP. The engine weighs 10.5 kg.

With an all up maximum weight of 100 kg, the 5 litre reservoir gives one hour of operation.

Price from 3,600 €
http://piloten-zubehoer.de/

KILOMETRES OVER BRAZIL

October and November are the best months for breaking distance records in Brazil. Frank Thoma Brown, Marcelo Pietro and Donizete Baldessar each registered a flight of 514 km with the FAI (unfortunately they didn't put viewable tracks on the classic servers). But for the three pilots (2 Ozone Enzo 2, 1 GIN Boomerang 10) it wasn't the first time they had done it.

Already in 2007, Frank Brown and Marcelo Prieto beat a world record in Brazil by flying 461 km. Also in Brazil, on the 26th of October, French pilot Julien Irilli set a tandem record on a Niviuk Peak (not certified in this configuration) of 362.73 km.
Furthermore, on the 4th of November, Robert Blum flew 406 km in 11 hours from Quixada on his Ozone Enzo 2:

www.dhv-xc.de/xc/modules/leonardo/index.php?name=leonardo&op=show_flight&flightID=689137

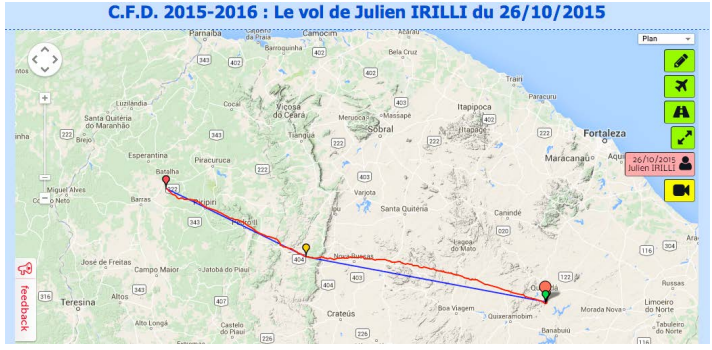
KONRAD'S KILOMETRES
Also in Brazil, the owner of AirCross, posted tracklogs and photos to make those of us back in Europe very jealous. On his U-Sport 2 wing, he's already flown more than 300 km three times, including a nine hour flight of 371 km registered on the server.

www.facebook.com/konrad.gorg

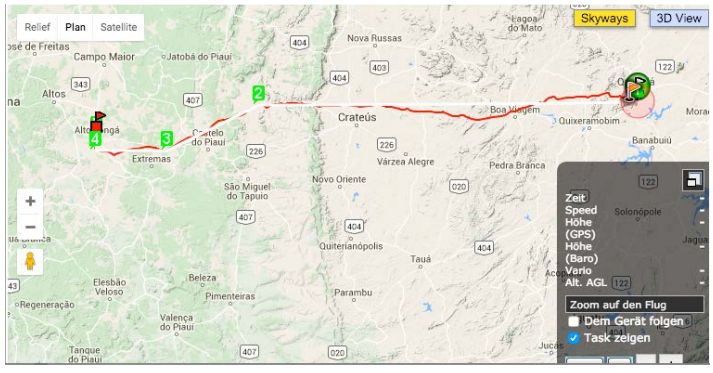
Recent Claims

SUB-CLASS	TYPE OF RECORD	PERFORMANCE	DATE	CLAIMANT	STATUS	ID
O-3	Free distance using up to 3 turn points - Multiplace	363.00 km	2015-10-26	Julien Irilli (FRA)	preliminary record claim received	17723
O-1	Straight distance - General	578,3 km	2015-10-09	Glauco Pinto (BRA)	preliminary record claim received	17703
O-3	Straight distance - General	514.00 km	2015-10-09	Donizete Baldessar Lemos (BRA)	preliminary record claim received	17706
O-3	Straight distance - General	514.00 km	2015-10-09	Marcelo Prieto (BRA)	preliminary record claim received	17705
O-3	Straight distance - General	514.00 km	2015-10-08	Frank Thoma Brown (BRA)	preliminary record claim received	17704

The actual declarations of the records on the FAI server.



The tandem flight by Julien on the FFVL server.



Konrad's kilometres, in pictures and tracklogs.

FORZA by OZONE

Speed. Comfort. Everything Else.

The Forza is a modern, sleek, high performance harness that is extremely comfortable, lightweight, and aerodynamic. Ergonomically designed from the ground up, the Forza is versatile with all the necessary features required by the modern discerning pilot.

FEATURES:

- 9 size combinations
- 3 color options
- 5.6kg weight in MM size with carabiners
- Easily removable neoprene pod, compatible with Ozium lightweight pod
- Integrated multi-functional cockpit, Anti-G pocket, removable flight deck
- Battery pocket, pen holder, and removable radio pocket
- Velcro mounting on the shoulder for mini vario or Spot messenger
- Hydration pocket and drinking tube routing
- Underseat ballast pocket
- 17 cm main foam (LTF certified)
- Additional 7 cm foam throughout the upper back and shoulder area
- Exemplary rescue release system (LTF certified), releases in all directions
- Anti-forget chest strap/pod closing system
- Included rescue inner bag & handle combination
- Compatible with steerable rescue systems and quick release carabiners
- Adjustable webbing speedbar with brummel hooks
- Additional attachment loops for 40 mm speedsystem pulley

WWW.FLYOZONE.COM

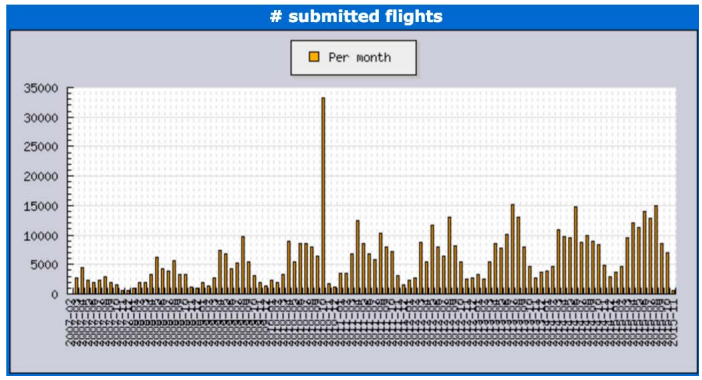
250 € for the 100,000th flight

The manufacturer Nova told us that in September 2015, Harry Mueller registered the 100,000th flight with a Nova wing on the DHV's XC league server. Incidentally, it was on his second wing, an old Mentor 1, and not on this usual Triton 2. He did a little ploof of less than 4 km in the Black Forest thus earning himself 250 € for having achieved this figure.
It puts Nova in the lead by far for the number of flights on this server which has collected those of most German pilots since 2007.

According to the published statistics, Skywalk are next with 66,000 flights, then Advance with 64,300 and Swing with 52,700 flights. These figures correspond roughly with the distribution of the makes of wings on the country's sites. Lots of makes which are very strong in other markets have always had problems getting established in free flying across the Rhine.

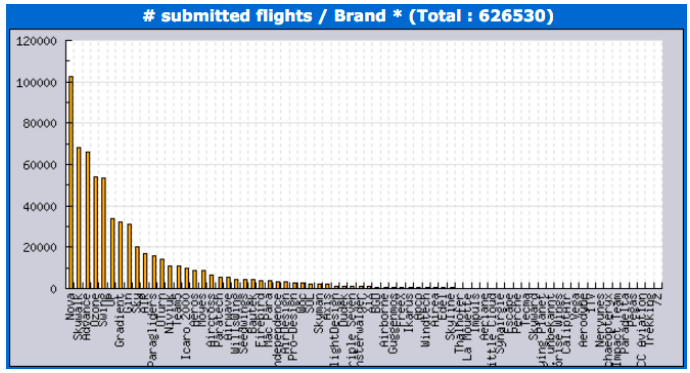
Statistics by manufacturer on the German server:

http://xc.dhv.de/xc/modules/leonardo/index.php?name=leonardo&op=stats



Flights by date since 2007.

Flights by manufacturer since 2007.




EXTRAORDINARILY
STEADY & ULTRALIGHT
OCTAGON
Rescue parachute · EN / LTF
niviuk.com
The Octagon is a plus to boost your confidence and safety level in all your flights.
Due to its octagonal shape, its oscillation and descent rate is reduced.

Photo: Markus Gründhammer / Skyman

WHICH WEATHER FORECAST FOR TOMORROW?

WEATHER MODELS: WHAT IT'S DOING AND WILL DO

Weather forecasting is based on models. Who makes these models and what do the weather forecasters do?

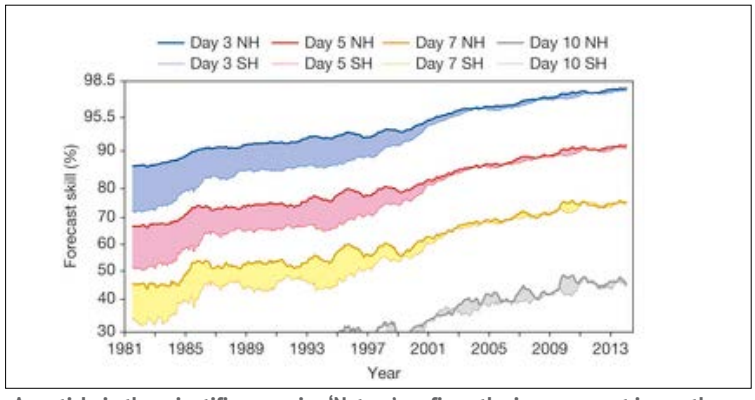
By Sascha Burkhardt

Weather forecasting isn't an exact science; there are too many random factors at play. But over the last decades, the reliability of the weather forecasts has greatly improved.

The main reason for this improvement is the increase in computing power. To forecast the weather, the forecasters need to take into account a phenomenal quantity of data describing the meteorological situation at any given time, to attempt to predict how it will evolve.

The data gathered at the moment is the pressure, temperature, humidity, speed and direction of the wind and precipitation as well as the cloud conditions at all levels. The sources are observations from

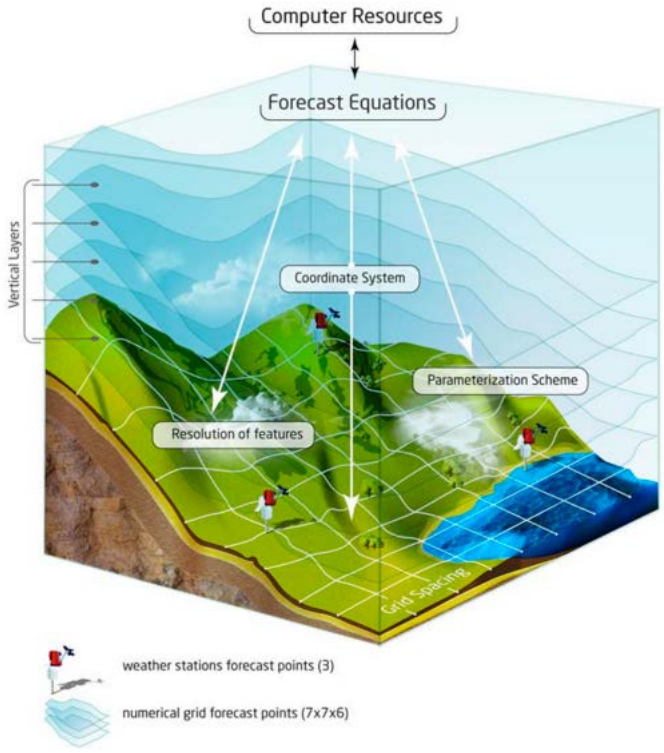
FORECASTS ARE IMPROVING...



An article in the scientific magazine 'Nature' confirms the improvement in weather forecasting in a graph.
www.nature.com/nature/journal/v525/n7567/full/nature14956.html

meteorological stations on the ground (such as airports), fixed or floating buoys in the sea, balloons with sensors which are released to analyse the vertical structure of the atmosphere and meteorological radars and satellites. Nowadays, the latter give most of the data.

The quantity of parameters available in real time at any one instant don't correspond to the quantity necessary to make the forecasting models work. During a procedure called 'assimilation' they mix the available data with calculations based on previous forecasts. This stage which uses a lot of computing power isn't available to small weather forecasting stations. According to Météo France, for example, about 22 million data observations are used each day by the models. To carry out the billions of calculations necessary to resolve the simplified mathematical equations which model the evolution of the atmosphere, Météo France use computers with a computing power of 1 petaflop (1 million billion operations per second).



The grid on forecasting models is becoming finer and finer. The Meteoblue service was one of the precursors: very early on, the Swiss service fine tuned the models available, like GFS for example, to go down locally to 3 kilometres.

Certain weather forecasting services like Windfinder or Meteo-Parapente (Pioupiou) encourage their users to have personal stations which can communicate; these measurements are also integrated with precaution into the elaboration/verification of models.

(See the tests of the stations in this edition.)

Photo: Markus Gründhammer / Skyman

Therefore there are only a few national services which are capable of supplying a reliable model. The best known, and for a long time the most used, is GFS from NOAA, in other words, the Global Forecast System from the National Oceanic and Atmospheric Administration.One of the advantages is that it is free: In the USA, the data created with public money must be given freely to the American tax payers. It is thus the opposite of certain European systems where the national services resell, at a high price to the tax payers, the fruit of work which has already been financed by the latter.

The rest of the world's population therefore also benefit from the GFS model for free, which provides our regions with forecasts based on a 25 kilometre grid (12 kilometres since 2015). The next 168 hours are specified with an interval of 3 hours and then, after that, with intervals of 6 hours. It's not bad but it hardly takes into account local effects, in particular convection systems and valley winds. Yet numerous forecasting services for the general public are happy to gather this data and derive simplistic weather forecasts.

That's were services like Meteoblue or Windfinder come in handy. They integrate, amongst others, the American models and adapt them, each in their own way, to the local topography, taking into account the effects of the relief and specific local features. Meteoblue was one of the first services, even before the national services, to reduce the local grid in the model for the Swiss Alps to 3 kilometres.

Convection systems are even more unpredictable than fronts. The weather forecasting services try to better understand the vertical movements by working with models on a smaller scale, taking into account the flow in the valleys and on the crests.

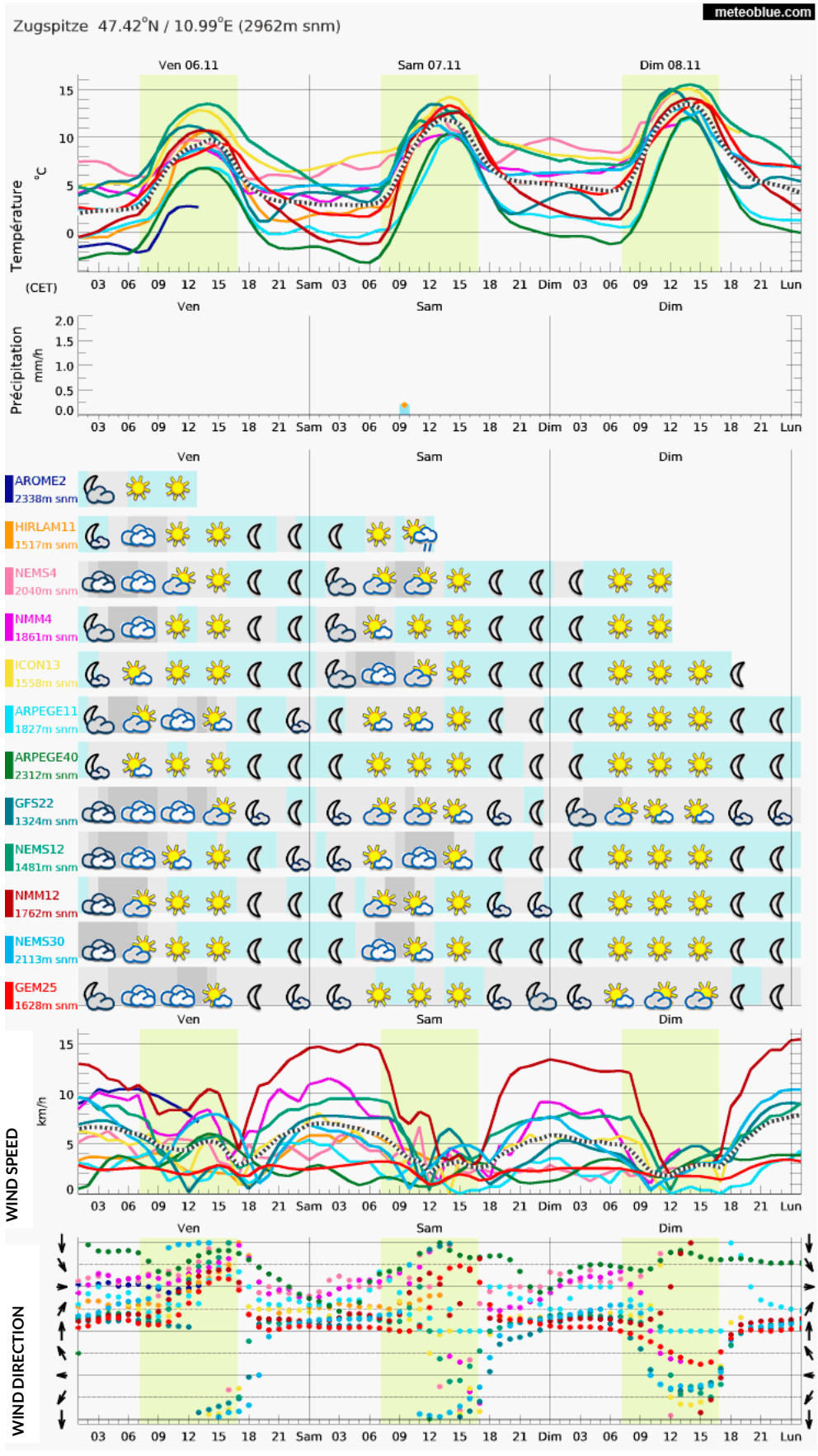
Photo: Jérôme Maupoint / GIN

WHICH MODEL?

Most weather forecasting services offer 'unique' forecasts: the meteorologists have deduced from the models, according to their own methods, a probable evolution which they publish. One of the big advantages of the Swiss Meteoblue service is the 'Multimodel' forecast. This shows different forecasts depending on the different models used. When all the models converge, the pilot can theoretically rely more on the forecast than if several models forecast over development, whilst others show only blue skies.

It should be noted that Météo France now has an Arome 2 km model.

This service is a great initiative: publish different probabilities rather than one single forecast.
www.meteoblue.com/fr/weather/forecast/multimodel/



The national services in Europe are also used. Since 2008, the AROME (Application de la recherche à l'opérationnel à méso-échelle) model by Météo France has been calculated using a 2.5 km grid and since April 2015, it has been based on a 1.3 km grid. At the same time, the data thus calculated has become more accessible to other parties. Nicolas Baldeck from Météo Parapente can now use the AROME model for free for his own forecasts adapted to paraglider pilots.

The advantage: it is more precise at a local level. The disadvantage: no service can calculate a similar model on a Europe wide scale. We don't (yet) have sufficient power to calculate it. The model therefore stops near the borders and still doesn't cover the east of the Alps.

FINER MORE CONVECTIVE MODELS

When models like AROME are based on smaller and smaller grids, they can better take into account small scale vertical movements such as convection systems, and that's exactly what we need.

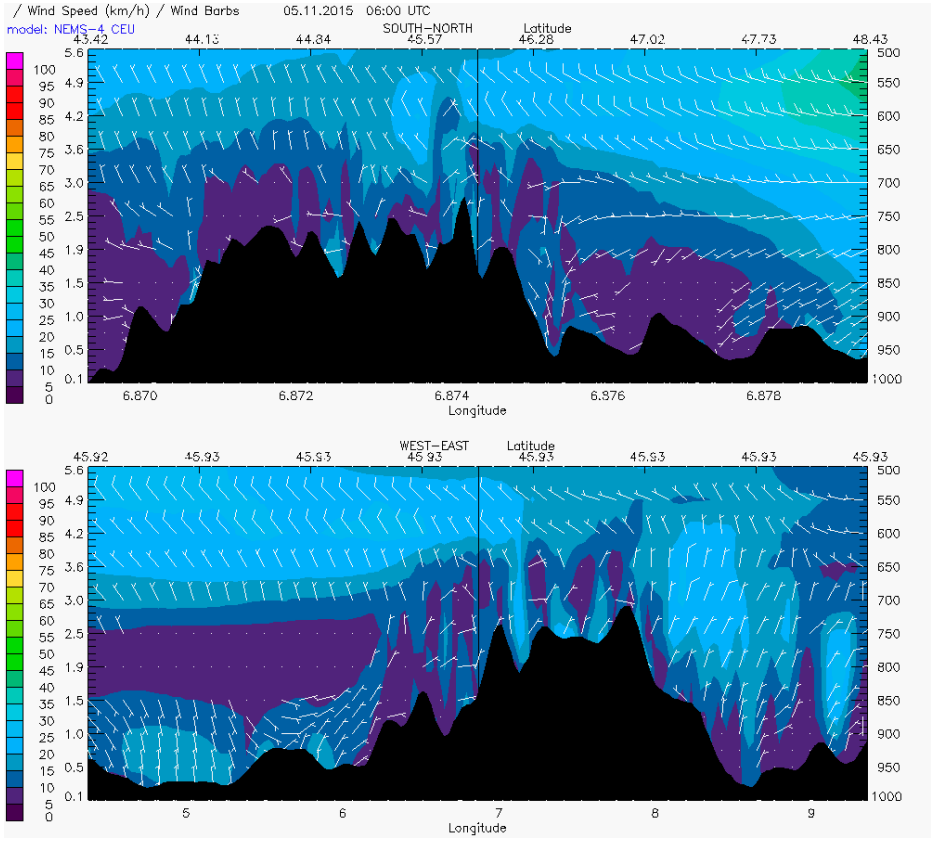
It isn't just interesting for us pilots, but for the forecast for a whole region. A building storm influences the development around it, and thus the whole model on a bigger scale. Better forecasting of vertical movements greatly increases the quality of the forecast when the precipitation is convective.

Photo: Luc Hentsch / Niviuk

The local valleys, especially glaciers, have a particular effect on the weather in a region. Meteoblue is one of the rare services which offers, for any area on the map, interesting graphics like breaks in the relief (subscription required), allowing a more precise visualisation of the local winds for example. Be careful: Based on a 4 km grid, certain summits can disappear on the diagrams and in the forecasts. According to where the cut is made, even Mont Blanc slips through the mesh.

Events due to fronts are very easy to forecast: the passage of a front at a given point can often be predicted to the nearest quarter of an hour. The development of convection clouds, on the other hand, is more difficult to calculate. As Karl Gutbrod from Meteoblue pointed out, the last two summers in the Alps were, for example, 2° warmer than previous summers. As a consequence, with more active convection systems, the developments were less predictable and the quality of the forecasts suffered.

With global warming, the weather is becoming less easy to predict, but the increase in the resolution of the models should correct that. In addition, the new models finally work at the scale of valleys, crests and our sites: for us pilots it's a mini revolution!



FORECASTING THE GOOD DAYS: THE ESSENTIALS IN EIGHT POINTS

Here's some essential information to help you work out the right forecast for good, safe flying. He's what you most need to look out for.

By Lucian Haas, lu-glidz

Photo: Felix Wölk/Ozone

Whether on a paraglider or a paramotor, before each potential flying day, it is strongly recommended that you keep an eye out for a few things which are easily visible on the numerous maps and weather forecasts available to us. On the following pages, Lucian Haas summaries the essentials for us.

Photo: Felix Wölk/Ozone

(1) PRESSURE AND FRONTS

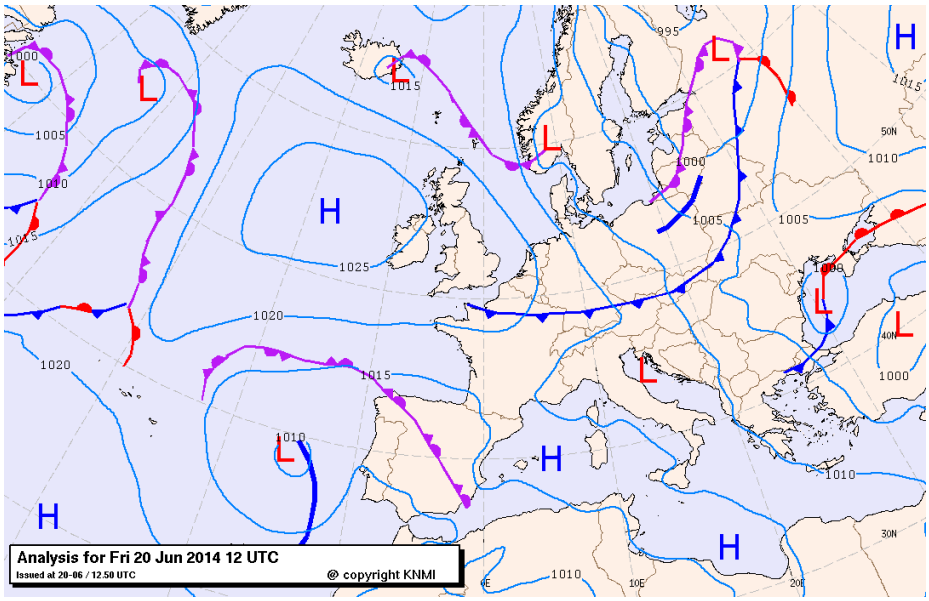
The isobar map is the best known tool. If the region is under the influence of a depression, vigilance is required for a possible instability of the air, with overdevelopment as well as a risk of rain. Therefore watch the cloud development. If cold fronts approach, be doubly vigilant.

The best conditions are found when there are moderate anticyclones. In a cumulus filled sky after a cold front, the days are good for flying distance. The cold air is unstable, but the increasing pressure avoids overdevelopment.

On the other hand, if the pressure increases too much (more than 1020 hPa), the thermals will be capped. Thermals staying close to the ground are dry, narrow and conducive to collapses.

In anticyclonic conditions, paraglider and paramotor pilots should be even more wary of areas in the lee. In stable air masses rotor and collapses in the lee of the wind are stronger!

On a paraglider, to find thermals that you can use in strong anti-cyclonic conditions, you need to take off from very high up in the mountains. There, you can even find good conditions for flying distance.



An isobar map showing fronts can be found here for example:
www.meteofrance.com/previsions-meteo-marine/carte-frontologie/fronts/proche_atl

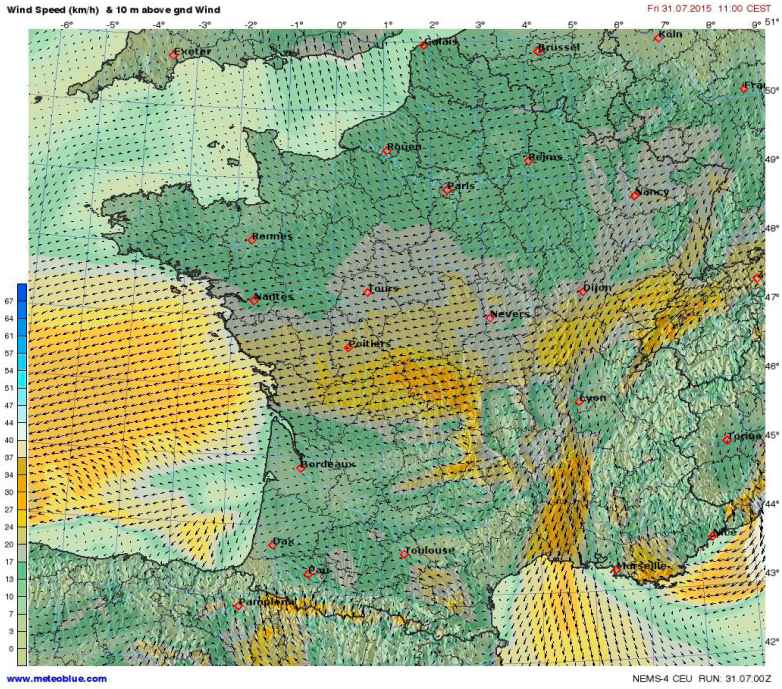
(2) METEO WIND AT GROUND LEVEL (WIND 10M)

This is very important for choosing a site. On the plains, the wind encountered at sites corresponds to the meteo wind. In the mountains, the local systems can replace the meteo winds or reinforce them.

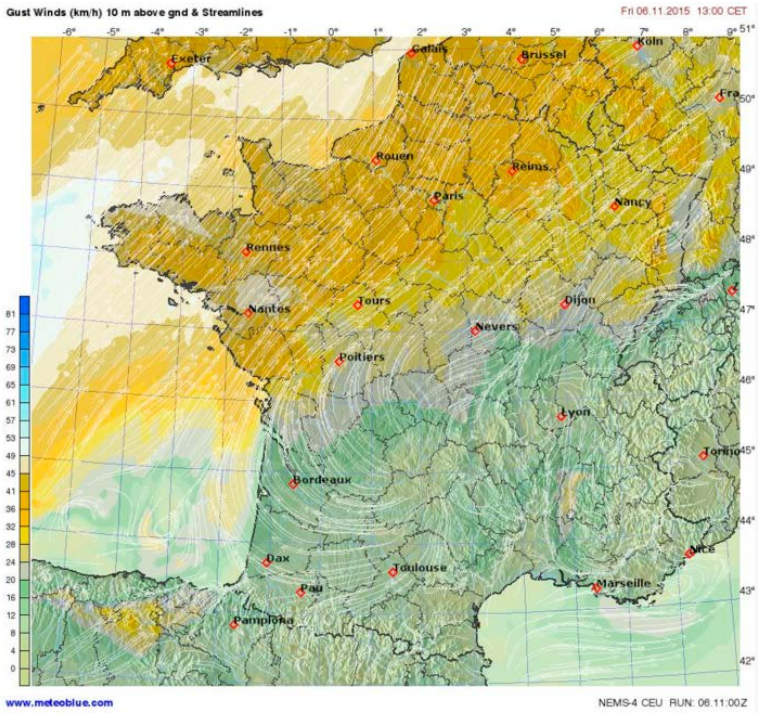
If the meteo wind and the valley breezes are blowing in the same direction, the breeze will be stronger too.

A simple rule to avoid situations prone to unpleasant turbulence: if the forecast is for winds on the ground of more than 10 km/h, it would be better to choose a take-off correctly oriented for this.

Wind on the ground of more than 10 knots or 18 km/h will cause strong, even dangerous conditions, except for sites facing the plain or the sea.



A map showing the winds at 10m can be found here for example:
www.meteoblue.com/fr/meteo/carte/10mwindarrow/france



Also of interest is a map showing the gusts forecast at 10m/ground.
https://www.meteoblue.com/fr/meteo/carte/10mgustwinds/france


THE PLEASURE
OF CHOOSING
HOOK 4
Progression · EN/LTF-B
niviuk.com
A potencial portal to new desires, sophisticated, with style of its own and truly exciting to fly. Piloting the new Hook 4 is pure pleasure at your fingertips.

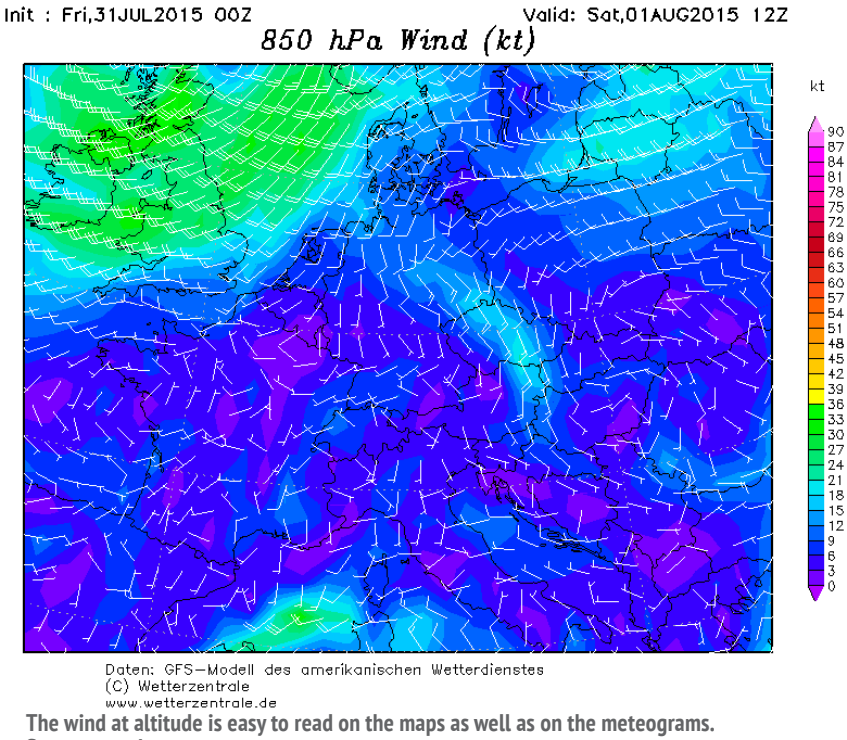
(3) THE WIND AT ALTITUDE

The third parameter to watch is the wind at altitude. More precisely, in the mountains, this is the meteorological wind, above the summits and far away from the valley wind systems. In the plain, it's the wind at 500-1000m, so in the upper part of rising thermals.

In mountains, the weaker it is the better. Already from 10 km/h upwards, at summit level, turbulence forms. At more than 20 km/h, the thermals are broken and the conditions are very difficult.

In the flats, having an average wind at altitude can be good: 15-20 km/h at 1000 metres is perfect for flying XC.

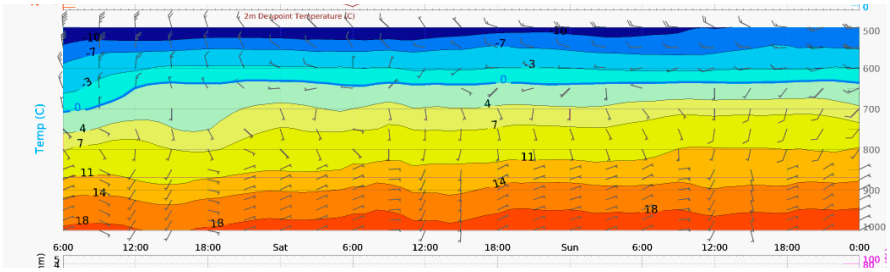
There are maps for several levels. For the flats, 925hPa (~800 m) and 850 hPa (~1500 m) are the most interesting levels, in the mountains 700 hPa (~3000 m).



The wind at altitude is easy to read on the maps as well as on the meteograms. Some examples:

www.wetterzentrale.de/topkarten/fsavneur.html

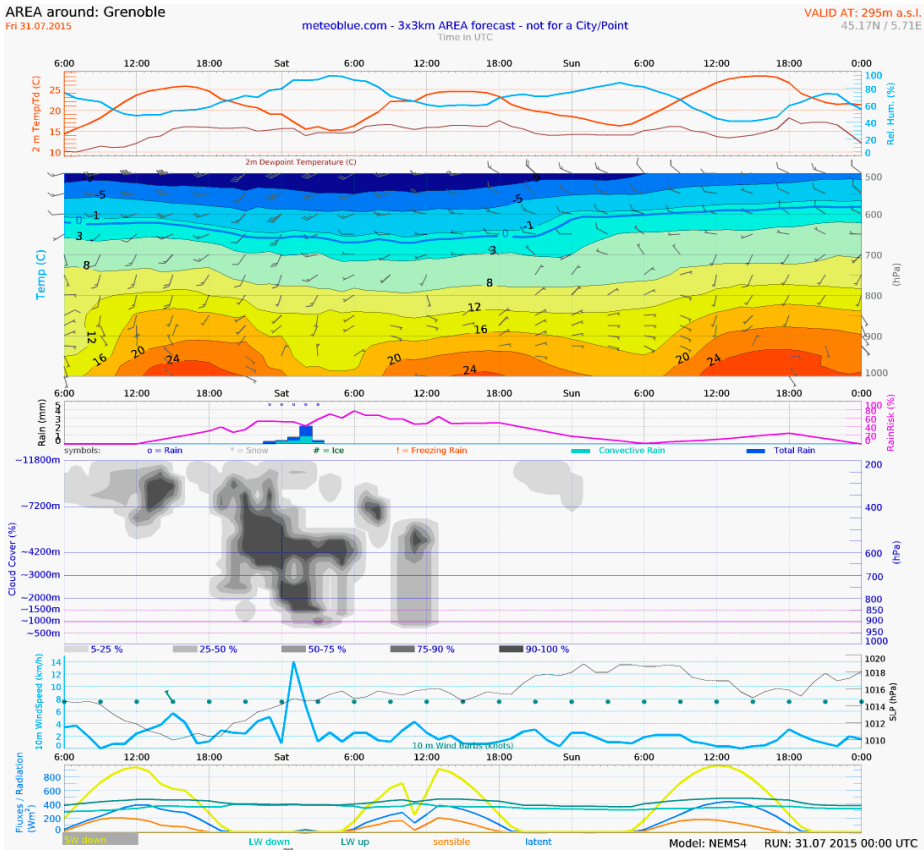
www.meteoblue.com/fr/meteo/prevision/air/chamonix-mont-blanc_france_3027301



The maps of the wind at altitude also allow pilots to deduce the turbulence at take off. A simple rule:

•The dominant wind at 500m above take-off can descend in gusts, keeping all its force, right down to the ground.
•The dominant wind at 1000m above take-off can descend down to the ground with about 2/3 of its force.

Clearly, if at 500m above the take-off 30 km/h winds are forecast, they can of course extend down to the take-off. If there are 30 km/h winds 1000 metres higher up, gusts of up to 20 km/h should be expected.

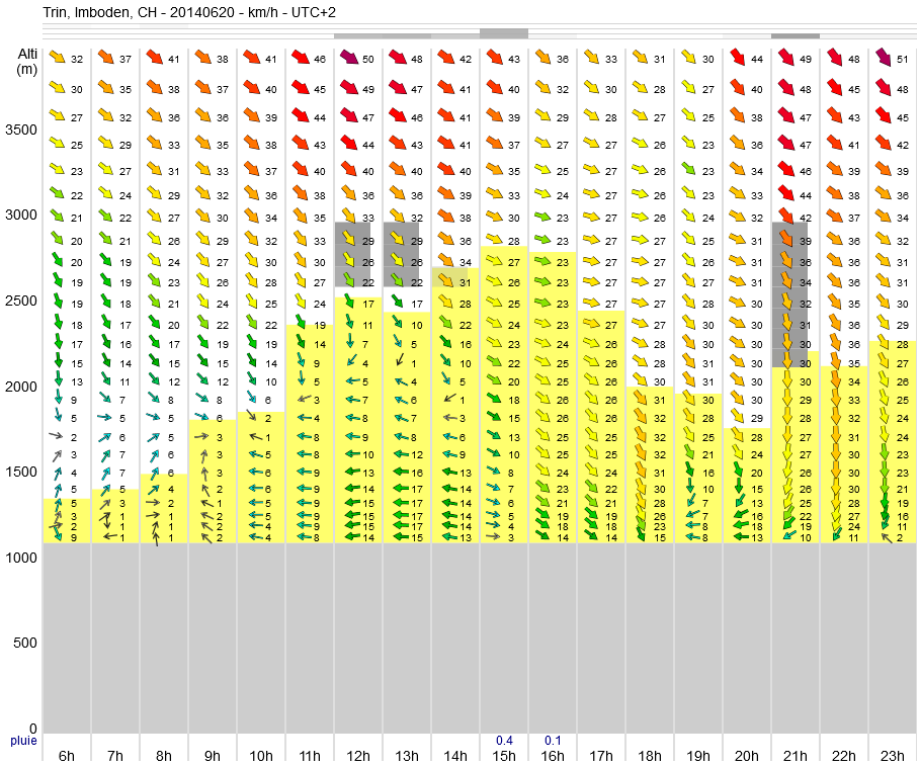


On the right you can see that the winds at altitude and lower down are blowing in opposite directions.

For a paramotor pilot cruising about, the choice of a layer with the wind on his back is as simple as in a hot air balloon. Photo: Paul Haxby.

(4) THE WIND GRADIENT

Almost as important as the wind speed in absolute values is its gradient. If the wind changes by more than 10 km/h over 1000 m, the thermals will be cut up. This effect will be further amplified if the direction changes. Even with low winds around 10 km/h, the turbulence can be significant when the winds at ground level and at altitude blow in opposing directions.



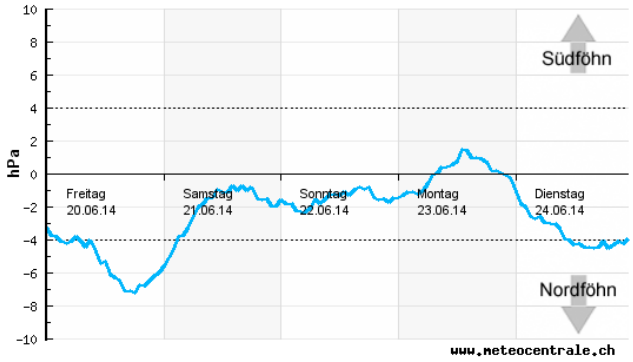
These diagrams can, for example, be found on meteo-parapente.com, by clicking on "vent/alti" after having chosen a point on the map.

(5) PRESSURE DIFFERENCES / THE FOEHN EFFECT

In mountains it is important to keep an eye on the pressure on both sides of the massif. It isn't the only determining factor, but in regions likely to have Foehn, 2-4 hPa of difference should be an indicator that a lot of prudence is required. The Foehn can strike without warning.

Also be aware of local winds like the Mistral, the Tramontane and the Bora.

The differences in pressure are visible on the traditional isobar maps. A useful warning can be found on: http://www.meteocentrale.ch/fr/meteo/foehn-et-bise/foehn.html



A similar diagram for the Mistral: http://www.vigilance-meteo.fr/fr/meteo/vents-regionaux/le-mistral.html or the Tramontane and Autan: http://www.vigilance-meteo.fr/fr/meteo/vents-regionaux/la-tramontane-et-lautan.html

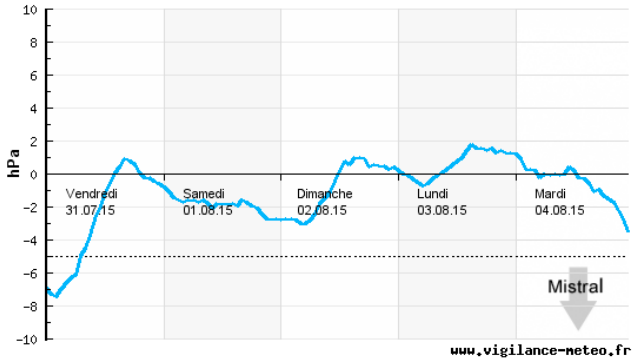
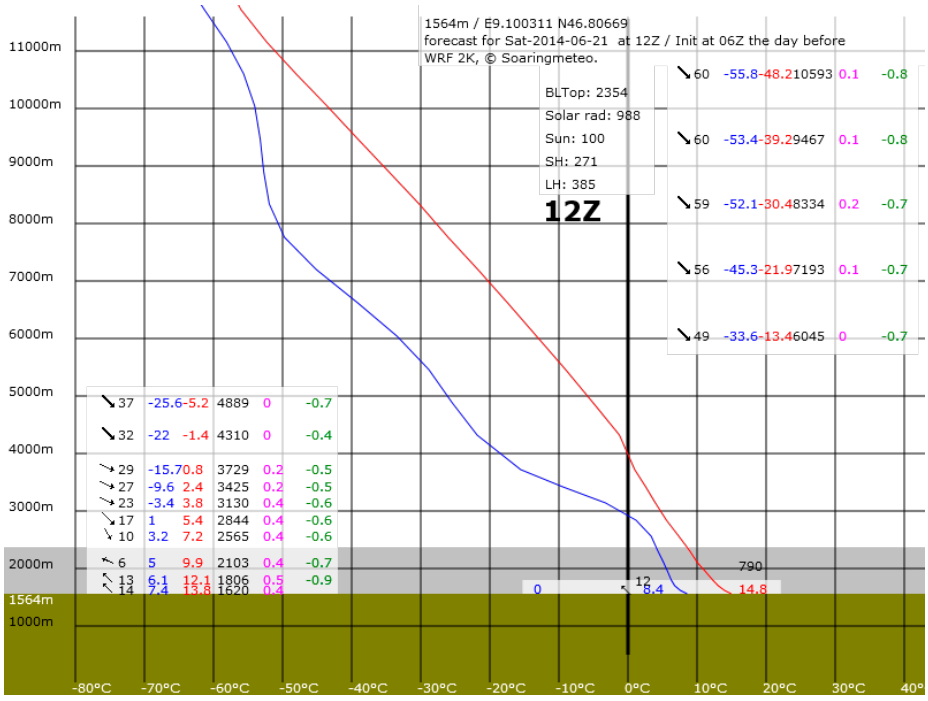


Photo: Jérôme Maupoint

(6) TEMPERATURE GRADIENT

It's well known that the more the temperature decreases with altitude the better the thermals go up. In practice, -1 °C/100 m creates strong, narrow, turbulent thermals, whilst a gradient of around 0.6-0.8 °C/100 m produces thermals that are nice and easy to use. At less than -0.5 °C/100 m, the thermals are often too weak. Weak thermals don't mean an absence of turbulence: stable days can lend themselves to turbulence in the lee of the relief.

The gradient is displayed on emagrams; more on this subject on page 30.

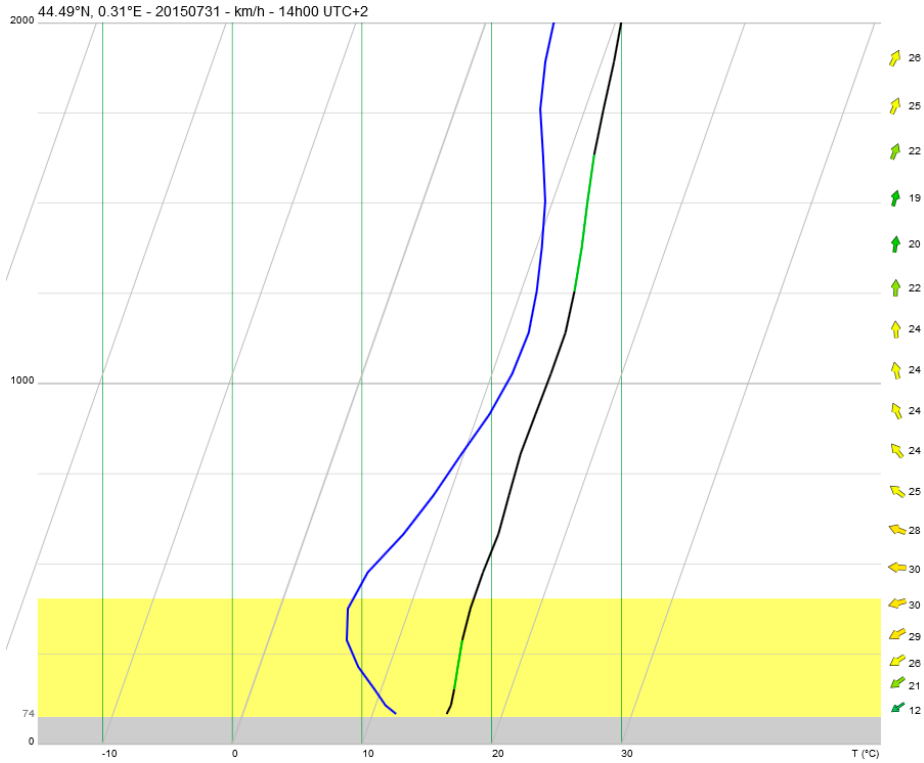


These diagrams can be found, for example, on meteo-parapente.com.
Click on "Emagram" after having chosen a point on the map.

(7) INVERSION

Equally visible on an emagram are the inversions which brake or prevent thermals from rising. But this isn't the only noticeable effect on our flying. If the inversion is less than 300 metres above the relief, it creates a Venturi effect between it and the latter, increasing the meteorological winds which may form. The inversion can thus provoke unexpected strong gusts, even if the wind is relatively weak elsewhere.

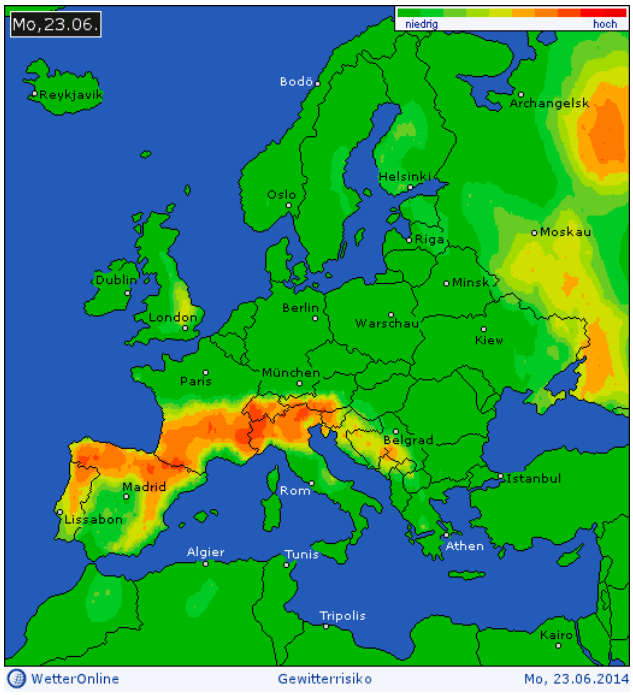
It's better to have an inversion at more than 500 to 1000 metres above the relief. There it can even be beneficial, by braking the vertical development of the clouds, whilst at the same time leaving a thermic layer thick enough to work with.



These diagrams can, for example, be found on meteo-parapente.com. Click on "Emagram" after having chosen a point on the map.

(8) RISK OF STORMS

Storms represent one of the greatest risks for our flights. Not just above the site, but also when they are relatively far away. In mountains, the descending cold air from a cunimb' rushes into the surrounding valleys, where it is channelled and accelerates. Such local phenomena are difficult to forecast. In addition, this air lifts the warmer air masses elsewhere and can thus provoke secondary storms.

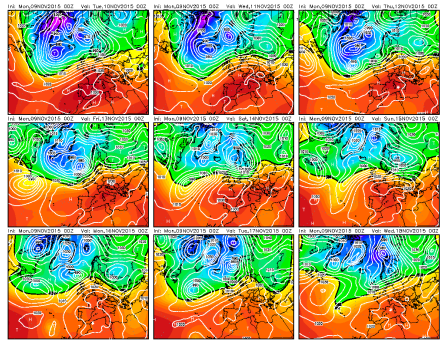


An example of a map warning of storms in Europe:
http://www.wetteronline.de/gewitterrisiko-karte/europa

Photo: Skywalk

SOME USEFUL ADDRESSES

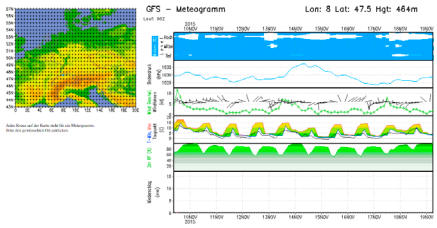
The weather in a few clicks: here is a list of some good sources to help you keep an eye on the three and seven day forecasts and on the eve of a great flying day.



9 days back to back.

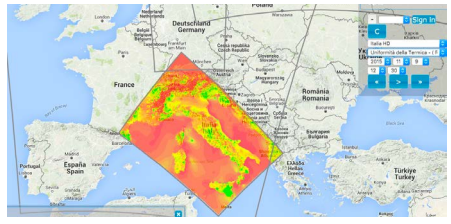
FOR THE COMING WEEK
To get an idea of the week ahead, it is hardly worth asking for a precise forecast of wind or temperatures. What counts are the large scale movements: where will the high and low pressure systems be? Where will the strong wind be?

www.wetterzentrale.de/pics/avnpanel1.html
(9 days back to back, the American GFS model)
www.wetterzentrale.de/pics/ecmpanel1.html
(9 days back to back, the European ECMWF model)
www.meteoblue.com/en/weather/map/precipitation/europe
(amongst other things, the cloud cover for the next 7 days)
www.soaringmeteo.ch/GFSw/googleMap.html
(thermal forecasts for up to 7 days based on the GFS model)
www.wetterzentrale.de/topkarten/fsavnmgeur.html (
(meteograms for the next ten days based on GFS)



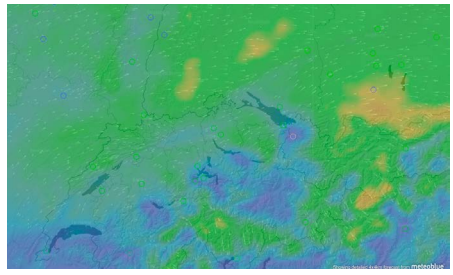
Meteograms for ten days

FOR THE NEXT THREE DAYS
www.meteoblue.com/en/weather/forecast/air
www.wetteralarm.at/de/wetter/foehndiagramme.html



Meteovolo

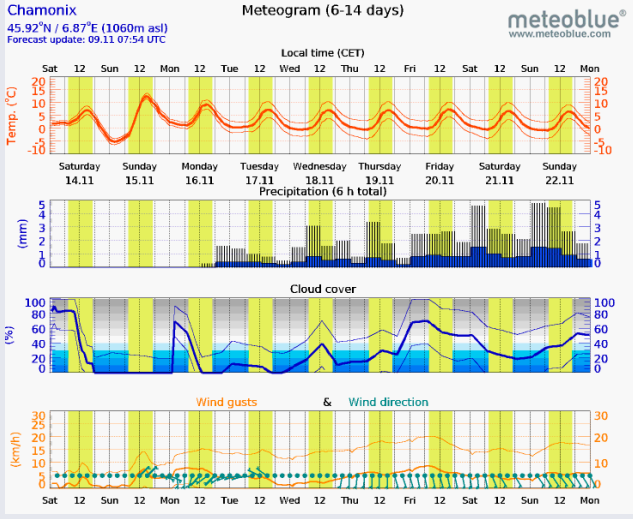
THE EVENING / MORNING BEFORE
On the eve or the morning of a flying day, it is very interesting to compare the prognosis collected up until then with the real situation. If they don't agree, you need to stay alert and integrate the possible changes announced by the 'secondary' models.
www.meteoblue.com/en/weather/forecast/multimodel
(to check they agree)
www.meteo-parapente.com (to obtain an emagram of the site)
www.meteovolo.it (thermal prognostics with parametrable colouring)
www.windyty.com (very nice visualization of the winds at every level)

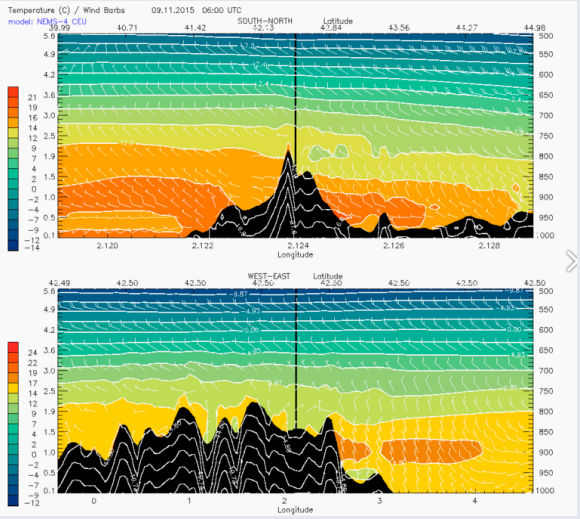


Windyty

THE ALL IN ONE

If you want to look regularly at relevant weather forecasts gathered together in just one place, paying a subscription is perhaps the best thing. One of the most comprehensive and most precise services is without a doubt Meteoblue. For free you can already get meteograms for three days for a location of your choice, as well as the multimodel comparison which is one of the top choices for keeping yourself informed. If you pay (50 € per year), they add, amongst other things, meteograms for up to fourteen days in advance as well as north/south or east/west cuts of the local topography.
www.meteoblue.com/fr/pointplus

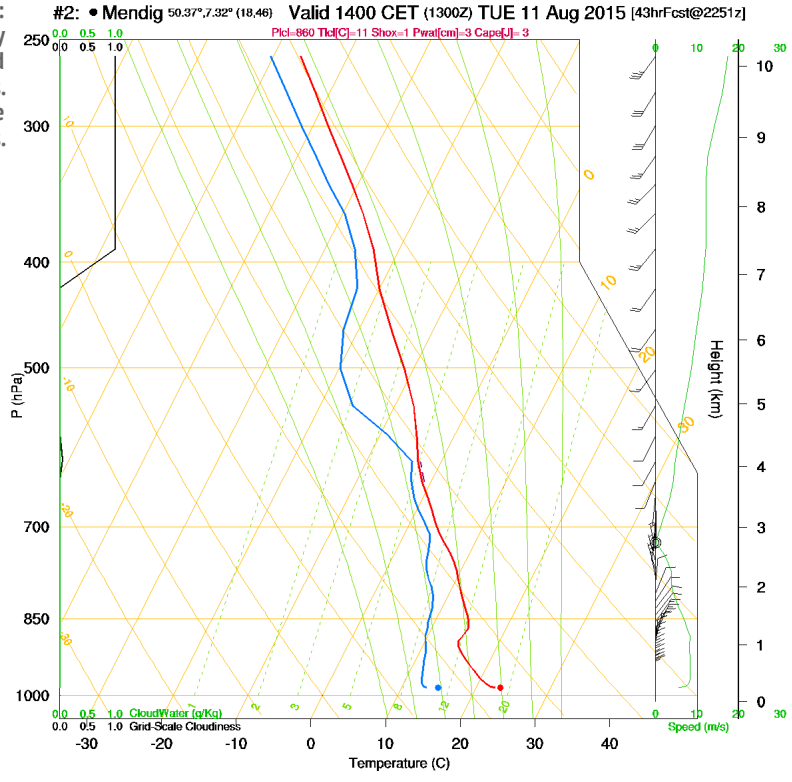




THE ENIGMA OF THE EMAGRAM IN SIMPLE TERMS,
PROBES FOR EVERYONE!

The emagram is an essential element for forecasting the thermals on a particular day at a given location. For lots of pilots, the standard diagram seems too complicated, but there are approaches which are a lot simpler.

By Lucian Haas, lu-glidz



A classic emagram: not necessarily very adapted to our needs. Fortunately there are alternatives.

CLASSIC EMAGRAMS

Emagrams are a very important way of forecasting the weather, especially thermals. On sites like Meteoblue or www. Meteo-Parapente.fr, pilots can let a balloon, with a virtual probe, take off at a point somewhere on the map and display a curve of dew points and temperatures. On Météo Parapente the emagram is specially adapted to paraglider pilots, even those who only have the minimum of meteorological knowledge.

SUP'AIR

VERSATILITY !

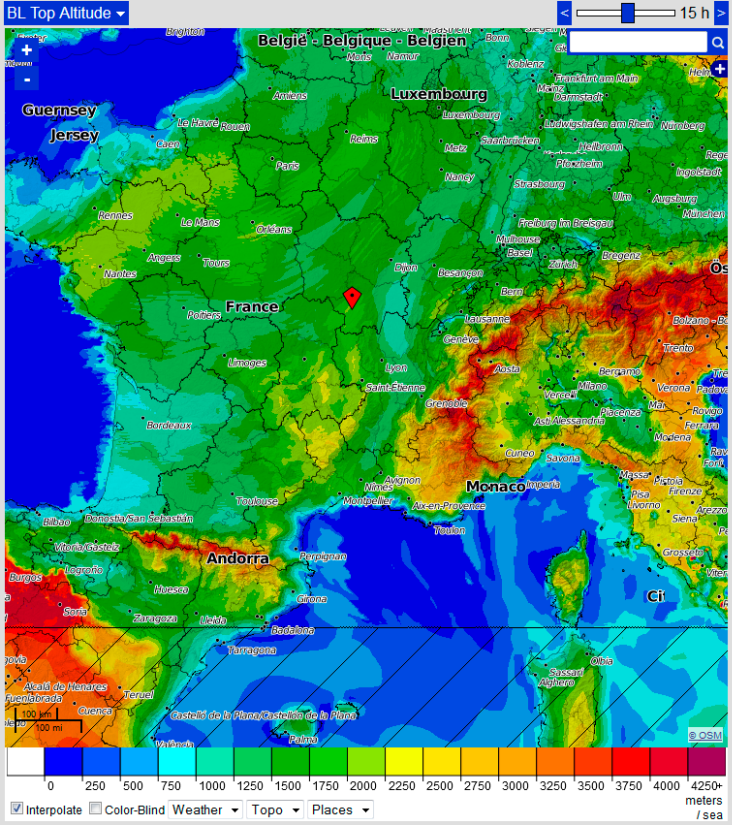
LIGHTWEIGHT CROSS-COUNTRY HARNESS
FOR SITE AND MOUNTAIN FLYING.

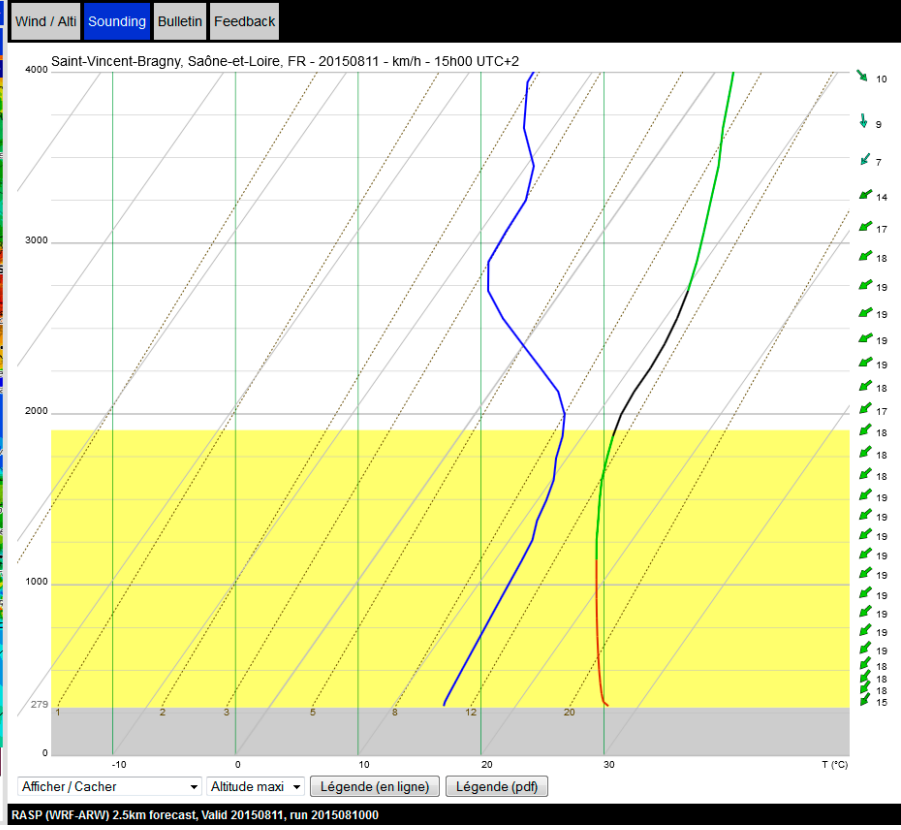
DELIGHT

100% MADE IN EUROPE

DESIGNED IN ANNECY

www.supair.com





A very nice day has been forecast. The yellow part showing the spacing of the thermals goes up to more than 1000m above the ground. The arrows showing the wind are all green and there isn't any abrupt change. The dew point curve (blue) doesn't touch the temperature curve (red-green-black). The spread in the top part is above 5°C; as a consequence, the clouds shouldn't, in theory, cast a shadow over the thermal sources on the ground.

As with a normal emagram, here are the four principal pieces of information given:

1. The strength and direction of the wind at all levels.
2. The maximum height of the thermals.
3. The quality of the thermals as a function of their height above the ground.
4. The cloud development which could curb the amount of sunshine.

What the 'paragliding adaptation' by Nicolas Baldeck from Meteo Parapente gives us:

The altitude in metres rather than hPa. The speed in km/h rather than in knots. A coloured curve for the temperatures so that it is easy to see the quality of the lift. Limitation of altitude to 'our' heights where we usually work, therefore giving a higher resolution in this range. The possibility of masking lines which aren't useful to us.

REASSURING:
Nicolas Baldeck has promised that in the new, totally revamped version of Meteo Parapente, due out in 2016, these emagrams will still be available.

POINT BY POINT, HOW TO USE THESE PARTICULAR EMAGRAMS

WIND

On the right hand side, the force and the direction of the wind are indicated by arrows and figures in km/h. The arrows change colour as a function of speed: green (good for paragliding) to orange, even red (run away).

It is also very easy to spot other significant gradients by direction and/or force, which will be sources of turbulence.

MAXIMUM HEIGHT OF THERMALS

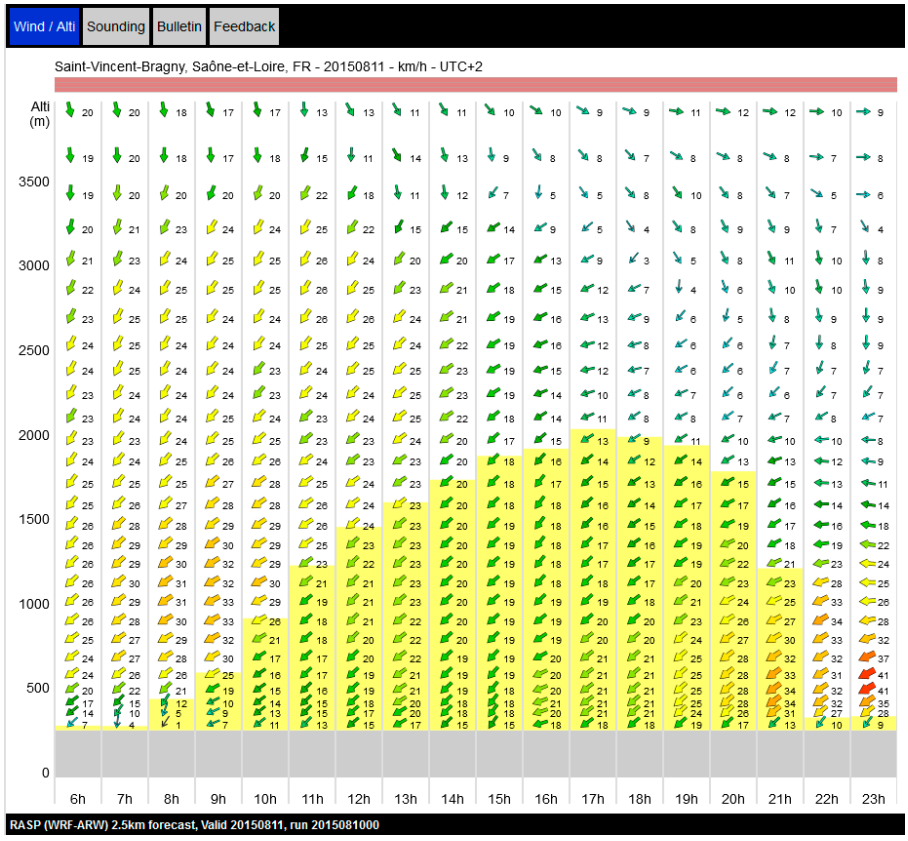
When a bubble of air rises from the ground, it cools down, typically at around 1 °C/100 m. As long as the ambient air is colder, it continues to rise, until it finds a layer whose temperature is the same as its own. Depending on the state of the different layers in the atmosphere that day, the weather forecast service can calculate the height of the layer where the thermals are active. This layer ("Boundary Layer") is coloured yellow in these "emagrams for paraglider pilotes".

Normally the thermals stop at the upper limit of this layer. As we can't use a thermal to its top, we should expect a useful platform of around 200-300 m lower, a piece of information which is very easy to understand and recognize on the day.

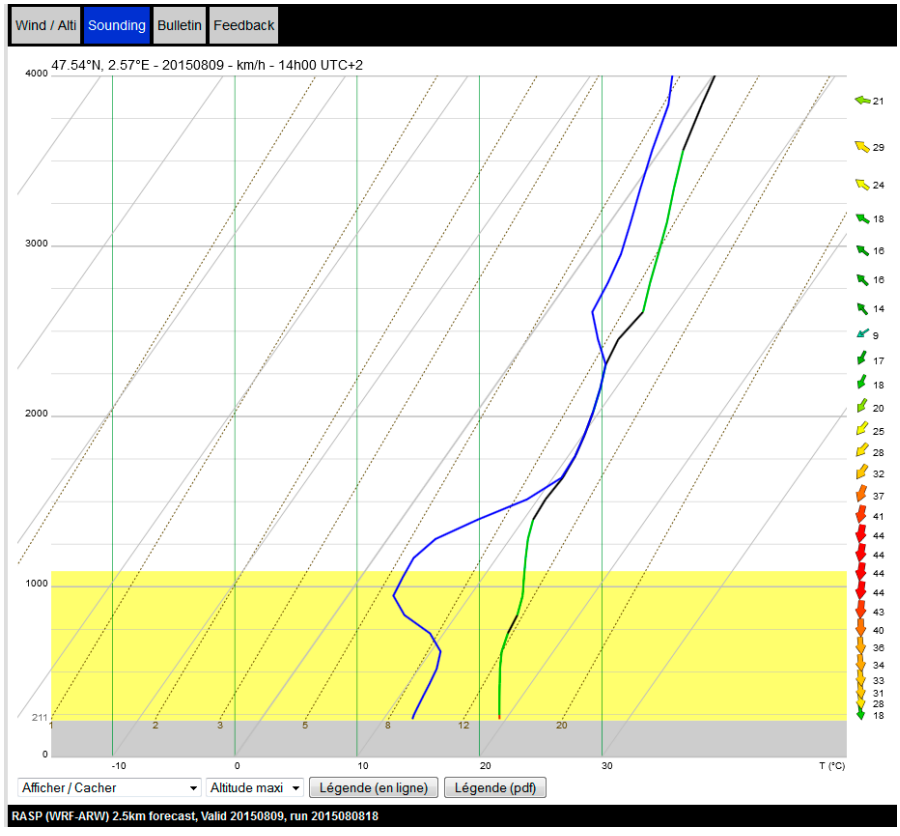
THERMAL QUALITY

As a function of the temperature gradient, the bubble which is rising goes up more or less quickly. For example if the gradient is -1 °C/100 m, the air which the bubble meets will still keep the same difference in temperature compared to the bubble which cools down at the same rate. The thermal continues to be strong. On the other hand, if the ambient air cools less at the increasing altitude, let's say -0.8 to -0.9 °C/100 m, the difference will be less and the strength of the thermal will decrease.

The quality of the thermal is colour coded: in red, the strong thermals with a gradient of at least -1 °C/100 m, in green,



This diagram from Météo Parapente is also very promising: already at 11 o'clock in the morning the thermals are going up at more than 1000 metres and then will go up even more. A relatively strong but regular wind, will permit, without a doubt, some good distance flights.



Not good: the wind at altitude is orange and red, and therefore too strong. The curves join together at 2000 metres, so we can expect cloud cover. Temperature curves: lots of black and green with almost no red.

an acceptable gradient of between -0.6 and -1 °C/100 m, and in black, the zones where the thermals are slowed, or indeed stopped (inversion).

In practice, if the black zones are low, a pilot looking for thermals needs to find a high take-off and to stay higher than the black area.

Be aware that the thermals in the green areas are not always weaker than those in the red layers. If two bubbles join together the increase in volume could accelerate their climb. In a simple summary, the higher the yellow layer goes, and the more

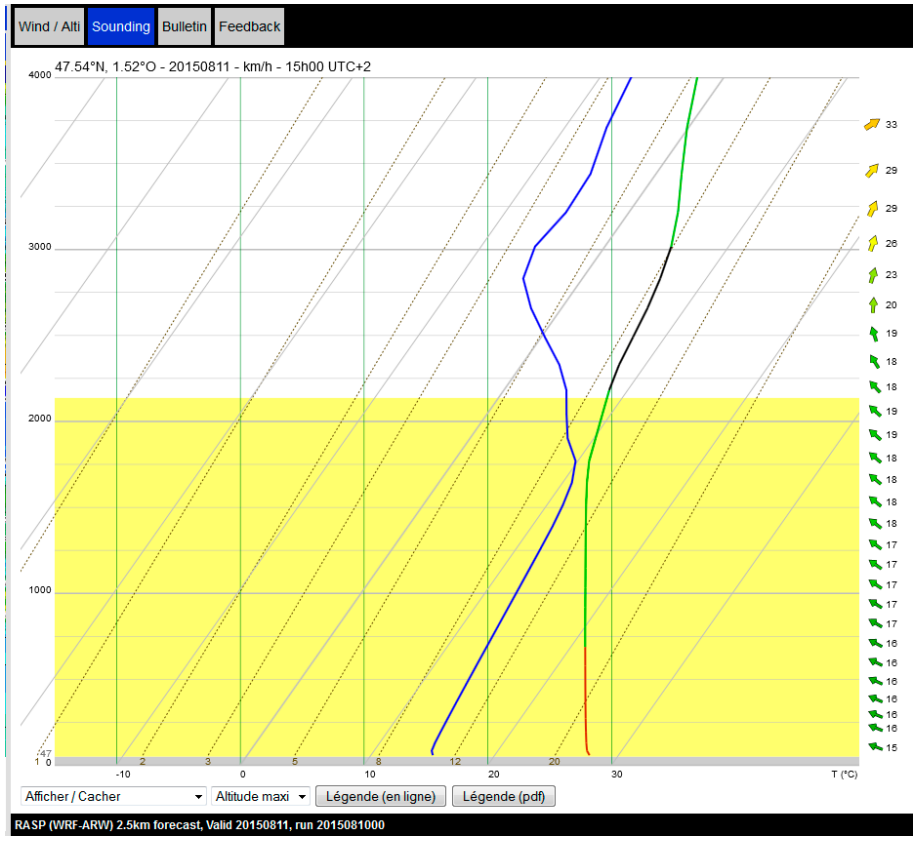
it contains red curves, the better it is for the thermals that day.

CLOUD THICKNESS

The dew point curve shows the temperature above which the water vapour contained in the air starts to condense into droplettes and thus clouds. The further the blue curve of dew points is from the temperature curve, the drier the air is. If the curve approaches the temperature curve, the air is more humid. If the two curves touch each other, the relative humidity is 100 %, and clouds form. Moreover, the higher the touching curves go, the thicker the cloud will be.

This information is useful for understanding the risk of cloud development which would curb the thermals. To avoid any misunderstandings, remember that the area where the curves touch each other isn't the base of the convective clouds crowning the thermals. This base is calculated differently, but it is a bit more complicated.

To make it easier, you need to start with the principal that if there are clouds at



An emagram which is theoretically very good for the flats but also has a big problem. For sure, the thermic area goes up well to more than 2000 metres above the ground. No black coloration darkens the temperature curve and the wind blows clearly from the south east to push the pilot north. But at 1700m, there is a spread of only 2°C between the two curves. As a consequence, cloud cover should be anticipated which will prevent thermals starting at ground level.

the top of the thermals, they will form slightly below the maximum height of the thermals, typically at the point where the curves are closest.

Much more important than the exact height of the base of the clouds is to know if the cumulus are going to disintegrate or darken the sky. This depends on the humidity: the drier the air, the quicker the thermal clouds will disappear.

If the 'spread', in other words the difference between the temperature curve and the dew point curve is more than 8°, the thermal will stay blue without forming clouds. If it's between 7° and 8°, we can forecast cloud cover of 2/8. For a spread of 4°-5°C, it will be 4/8. Below 2°, we can forecast a spread-out of the cumulus into a layer of cloud.

This is especially the case if a strong wind at altitude accelerates the spread.

HOW TO EASILY RECOGNISE A GOOD THERMIC DAY.

In summary, a quick glace at Nicolas Baldeck's emagrams should show whether it's going to be a good day. On the 2 o'clock emagram you should ideally find:

1. Only winds denoted by green arrows

2. A yellow layer 1000m thick, to give you space to work with.

3. A temperature curve coloured only in green or red. Black is only tolerated in the top part, in fact it's preferable, as it prevents overdevelopment.

4. The two curves never touch and stay apart, in the yellow part of the emagram, by at least 4°.

A FINAL BIT OF ADVICE
Météo Parapente don't just offer emagrams, but also diagrams showing the winds at all levels and their variation throughout the day. In these diagrams, the thermal sector is also coloured yellow and it increases throughout the morning. The more rapidly it increases, the better the thermals will be that day.

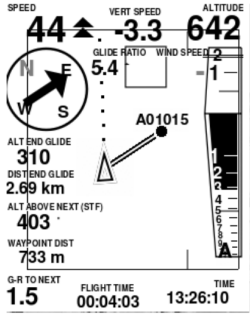
Our goal was to create the best flight instrument ever. We are certain to have succeeded.

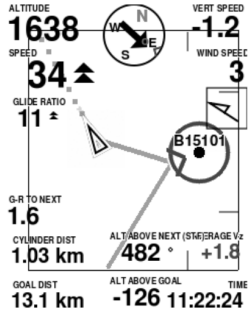
- Touch screen display
- Display absolute customization
- Sound absolute customization (CSS)
- C-Pilot EVO operative system
- Glide Over Terrain
- Auto-switch and auto-zoom in thermal mode
- Start - thermal - goal - glide automatic display
- airspaces automatic display
- multiple profiles modes
- FAI triangles (coming June 2015)
- Live tracking (optional)
- GOTO by touching a waypoint in the screen
- Bluetooth
- SD card
- Direct PC connection
- Easy interface
- C-Probe connection
- Hiper sensible variometer
- Airspace full management
- customizable polar
- Thermal assistant (Wind drift factor exclusion)

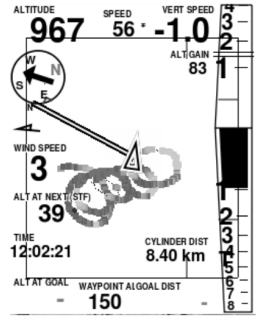
Triangle assistant &voice assistant are coming!

WWW.COMPASS-ITALY.COM

FREE TERRAIN MAPS AND AIRSPACES







Imagine the instrument.that you always wanted to have: Easy is exactly that instrument since anything can be customized as you want.

PRICE: € 599,00 EU tax included

DIRECT SALES TO PILOTS: sales@compass-italy.com

Compass devices are designed, made and assembled in Italy with respect of environment and protection of labor rights

Photo: Nils Louna

HAS THE BET BEEN WON?

THE PIOUPIOU GETS BIGGER...

In 2014 Nicolas Baldeck launched 'the weather station for all'. The Pioupiou spread very quickly and the long term results proved the concept.

In 2014 (see free.aero's 'Hi-tech' article), we reviewed the first version of the Pioupiou, a station costing 199 €, which transmits onto the web day and night the direction and strength of the wind. It works just as well on a Pyrenean peak as on a hill in Normandy. Pioupiou uses the radio network of the Toulouse company Sigfox, internet specialists in connected objects. With a very low bandwidth, in the order of 100 bits/s, this network has a long range and consumes very little energy, allowing the first Pioupiou to run on very small solar panels.

The idea was to offer an inexpensive station (purchase and subscription), allowing a maximum number of pilots to equip 'their' take-offs so that it was possible to always know the real conditions.

We equipped le Cambre d'Aze, a hike and fly site in the Pyrenees, which was an ideal candidate for the test. It is known for its difficult to forecast aerology. With a northerly influence giving a compression effect, it is often flyable in weak to nil wind, whilst the normal weather stations at Angles and Mauroux, both a dozen kilometres from there, show winds of 60-70 km/h.

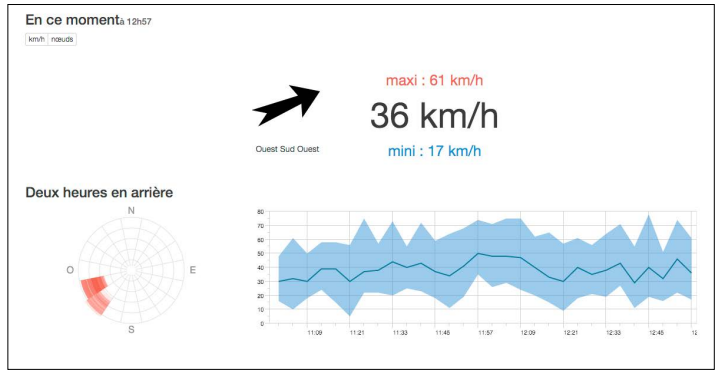
The first nice little take-off is on the west shoulder at more than 2,400 m, near where we have installed a Pioupiou (pioupiou.voler.info). After nearly a year, here are our principal observations:

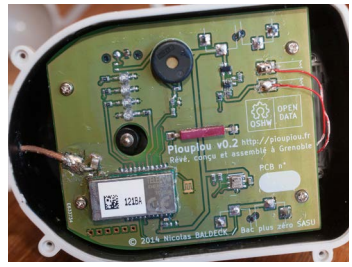
- The transmission of data was no problem; there were no failures at all.

- When we double-checked the data given with the conditions we experienced up there, we found that it matched perfectly.

- The only fault that we noticed on this prototype was the interruption to measurements for 'wind speed' after gusts of more than 110 km/h blew away two of the three cups. As this first prototype was based on anemometers for general use from the alsacien company "La Crosse Technologie", we were able to order replacement ones for 15 € including p&p.

- The information was very useful. On this type of site, no other information can equal the precise readings given by a weather station – without it, we were much more likely to go up for nothing.





One of the first Pioupiou prototypes worked for a year with no transmission problems at an altitude of 2400 metres, day and night, although the cups had to be replaced. Right: the made in France electronics never failed.

In the version which was finally commercialised, the cups have been replaced by a more resistant blade on a horizontal axis. The box has been specially designed by Nicolas Baldeck for his needs, just like the blade and the electronics.

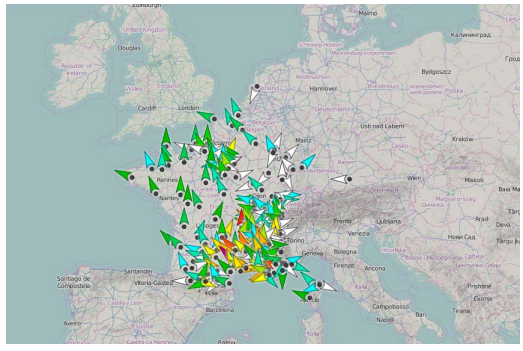
A worry is that the solar panel, which was one of the big plus points of the prototypes, has disappeared and has been replaced by a battery with a life of 3-4 years. It will cost about 20 €. The reason: maximum simplification. Even when run by solar power, a little battery acts as a barrier between the solar panel and the electronics which has to be changed every few years, so you may as well do away with the solar panel, according to Nicolas Baldeck.

Another great new addition is that the latest version is equipped with a GPS which can't be disconnected. It protects the station from theft and allows it to be correctly located on the Pioupiou map, even if its owner moves it to another mountain. The price has gone up: The ready to use station costs 324 €, but there is no longer an annual subscription to pay. That used to cost 20 € a year. Assembly is very simple, especially if you can use a chairlift pylon or similar. Pioupiou is a really fascinating and useful project, and one of the most important points about it, is that its founder is a defender of the Open Data principle, so all the data collected is available free for everyone on:

https://pioupiou.fr/fr/

TECHNICAL SPECIFICATIONS FROM THE MANUFACTURER

Approximate size:
45 cm x 20 cm x 15 cm
Weight: < 500 g
Communication:
Permanent automatic connection with the internet via Sigfox
Zones covered:
France (Mainland and Corsica), Spain, Netherlands
No subscription to pay
No configuration necessary.
Guarantee:
It receives or we reimburse
Power supply:
Lithium battery, 3 to 4 years life (replaceable)
Geolocalisation:
GPS chip (which can't be deactivated)
Wind speed measurements:
Average min, max over 4 minutes
Gust sampling:
2 seconds
Transmission range:
0 to 190 km/h
Transmission :
3 periods of 4 minutes, every 12 minutes..
Measurement of wind direction:
Average direction over 4 minutes
16 positions:
N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, NNW
Transmission of direction:
3 periods of 4 minutes every 12 minutes
Operating temperature:
-20 to +60 °C
Designed for marine and high mountain environments.



The Pioupiou weather stations are becoming more widespread: more than 500 have been sold (but not all put up yet) and the next 500 are on order. In 2016, there will be an international version, which will be compatible with the GSM network in all countries. It will, however, use more energy.

Nicolas Baldeck with the current version based on the Sigfox network. This station works in France, the Netherlands and Spain.

Photo: Sascha Burkhardt

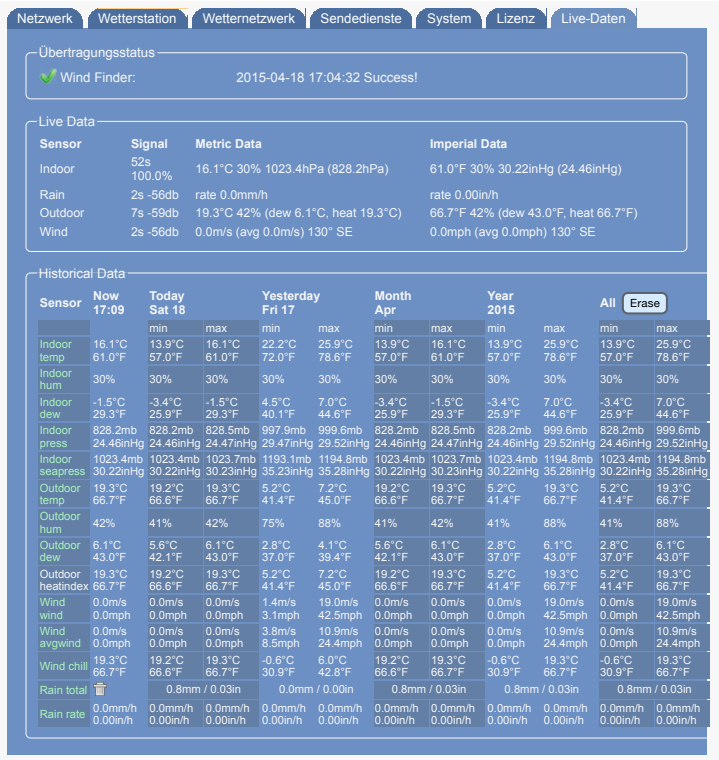
WINDFINDER

THE FULL STORY

For 540 €, you can kit your local club site or private house with a full meteo station. It will give you precise information about the conditions there and will also be part of the Windfinder network.

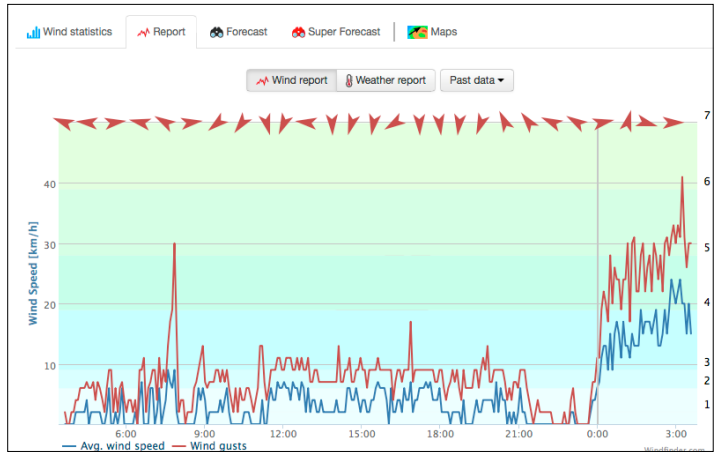
The Windfinder weather service is very well known by devotees of kites, sailing and free flight. In keeping with its name, the company, based in the north of Germany, is particularly used for its wind forecasts which it calculates for many wind and kite surfing sites as well as for mountain tops and paragliding sites. These precise adaptations of forecasts therefore concentrate mainly on places known to be used. Although it isn't possible to choose other points on the map, the grid of points available is very good and you can always find a forecast for a place which is fairly near. In addition to forecasts, Windfinder also publish real time measurements taken from their observation network. Most of the stations published correspond to professional observation stations such as airports, but you can also find values given by private stations. Often these can be stations that the owner has interfaced to the Internet. Windfinder are encouraging the creation of a better grid by selling a preconfigured Davis weather station. It arrives by post and all you then need to do is put it up on a mast at the landing field or on the roof of a building. It is autonomous as it is fed by a solar panel accompanied by a back up battery. The transmission of values is done by radio waves up to a hundred metres around the station.

By accessing the station via a local Wifi or Ethernet network, the pilot can access the detailed readings in their raw format.



On the Windfinder site you can find more informative diagrams from your own station.

For us pilots, the most interesting figures from a weather station remain the strength and direction of the wind.



A small box, also delivered with the station, acts as an internet server. It's a customised version of a portable router TP-Link TL-MR3020. It is preconfigured and receives the data from the station via a little radio dongle plugged in by USB. The router can be plugged into the internet via Ethernet, Wifi or even via the telephone or mobile network, if you connect a USB/GSM stick with a SIM card. The last solution (not tested) allows the station to be put up far from classic internet connections, for example at a take-off, but the mobile router still needs to be fed continuously by 5v. A ready to use solution, with a solar panel and battery would be welcome and is planned.

We successfully tested a typical configuration at the landing field, near our office equipped with classic internet, and successfully connected to the server, as easily by Wifi as by Ethernet. A few days after installation, the station was automatically integrated into the Windfinder network.

To easily obtain current and historical readings, we consulted the corresponding Windfinder page. In its classic configuration, the system doesn't offer a screen displaying the data. It is also possible to connect directly to the station, via the local network, with a computer or tablet/smartphone. The server replies with a table displaying all the measurements including those which aren't published on the Windfinder site.

The station gives the precise speed and direction of the wind, temperature, atmospheric pressure, humidity, dew point, the heat index (perceived wind chill), as well as the rainfall. By going into the menus on the server, you can also configure extra services: in addition to the automatic communication with the Windfinder services, you can ask 'your' station to regularly send emails with chosen values to predefined recipients, for example, to all the members of a club. You can also set parameters to send emails when defined values have been exceeded, for example, in the case of very strong winds.

The communication between the station and the internet is done via a radio dongle, plugged into a little server (the small box in the background).

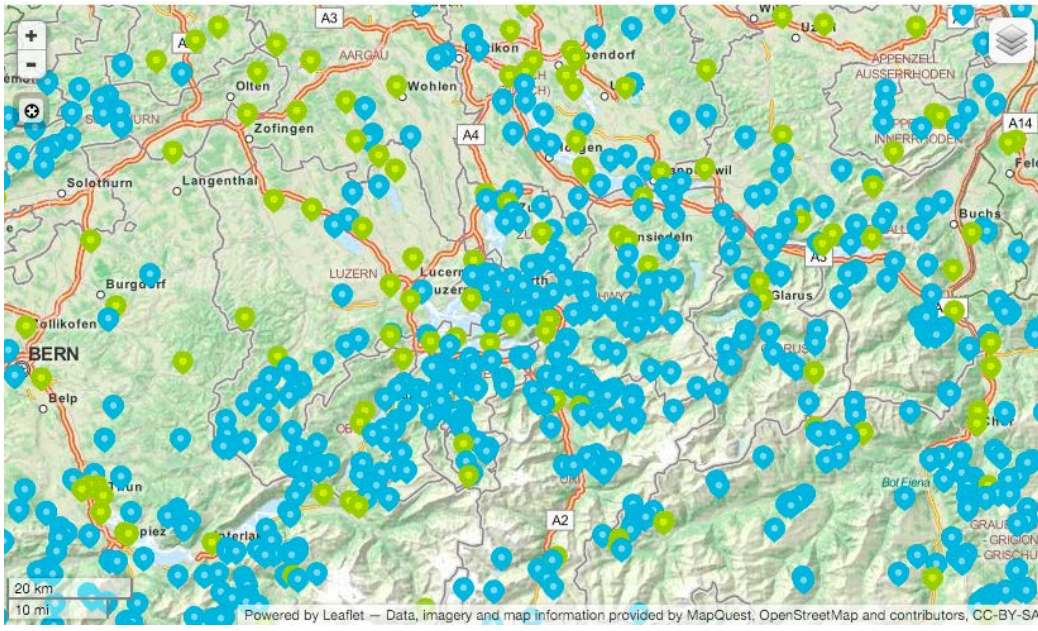
It is fed by solar energy and has a battery for night time.

When it is being assembled a spirit level helps to correctly orientate the station. Right, the funnel for the rain gauge.

Over and above what is normally published on Windfinder, you can also set up regular emails or trigger ones to be sent when a level has been exceeded.

The system for the rain gauge. As soon as a precise quantity drips into the spoon, it tips over and activates a contact, thus allowing the station to record the exact quantity.

Forecast points calculated (blue) and observed (green) on the Windfinder network. Lots of measurements come from professional stations (airports for example), but the part from stations maintained by individuals or associations should increase.



The full kit costs 539 € for the basic version and 664 € with the webcam option. It can be put up in an afternoon.
www.windfinder.com/weather-station/

Other options: ask the station to regularly tweet the chosen values, or for geeky users, send them by FTP or put them in a MySQL data base on an internet server.

The communication functions tested during our trials over several months worked perfectly well. There were interruptions to the service, spaced out over several months but they were very quickly repaired by simply reinitializing the server. The measurements displayed seemed coherent, only the atmospheric pressure values diverged slightly from our figures. It is also possible to plug an optional webcam into the mobile router, links to the images are integrated on the Windfinder page for the station. This function no doubt suits companies such as paragliding schools interested in using it for publicity.

Windfinder reward those who buy the weather station by using exactly this type of communication, by having a page on the Windfinder site which is regularly consulted by lots of pilots.

For clubs, the investment of a little over 500 euros is also good. An individual pilot can also have an account, if he has an internet connection and electricity at a strategic point to plan his days flying, for example, near the landing for his site.

The station and its server communicate all the important parameters, including cloud cover if the webcam option has been chosen and it offers lots of possibilities on a configuration level. On the other hand, it is more expensive than a Pioupiou and a lot less mobile than the latter.

The Windfinder station can be put up in any location in the world on the condition that there is internet and an electricity supply. Often a building is used in the nearest 'civilisation' to the landing field. Photo: Arnaud Dréan.

free.aero

WORLDWIDE PARAGLIDING AND PARAMOTORING MAGAZINE. FOR FREE.

Concept, editor in chief, webmaster Sascha Burkhardt
test pilots: Sascha Burkhardt, Sylvain Dupuis, Cédric Nieddu
Layout : Véronique Burkhardt
Translations: Ruth Jessop
iOS development : Hartwig Wiesmann, Skywind
Android development : Stéphane Nicole www.ppgps.info
Logo designed by Indalo: All rights reserved by Michael Sucker indalo@web.de
Magazine free.aero
SIRET 807821319 00017

Editor and director of the publication:
Sascha Burkhardt
F-66210 Saint Pierre dels Forcats
contact@free.aero
+33 6 70 15 11 16


free.aero
WORLDWIDE PARAGLIDING AND PARAMOTORING MAGAZINE. FOR FREE.
ALL ABOUT FLYING.
ANY TIME.
ANY PLACE.
ALL FOR FREE.
THE WORLDWIDE ALL DIGITAL
PARAGLIDING AND PARAMOTORING MAGAZINE.