

# Understanding the Alps

Kelly Farina continues his new series to help you get the best from Alpine flying

## Part 2: Valley wind

Valley wind is a term for a wind that is found mainly in the Alps. It describes a low-level wind that can produce some easy rides out from practically ground level, and some pretty evil rotor if a pilot finds him or herself in the lee, grovelling low down.

The view that valley winds are caused by thermals leaving the ground and drawing in the air around them reveals only part of what's happening. In fact the volume of air drawn in on strong days is incomprehensibly high and can't be simply ascribed to thermal development. Valley winds can persist long after the sun has gone down, and the rate of air movement can reach 15 billion cubic metres an hour (4.1 billion litres per second). So there must be something else happening. I'm going to attempt to explain this somewhat complex phenomenon...

It's late spring and there is high pressure over Western Europe. Odds on it'll be a warm sunny day with light winds at altitude. A classic example of an excellent XC day over the Alps. Ideally a cold front passed through recently, and there will be a light north-west wind at high level. The airmass following the front is relatively unstable, but as the air pressure is rising and the air is drying out the threat of overdevelopment is low.

As the sun starts to warm the ground the first thermals start to form. This happens pretty much everywhere over Europe but the strongest activity is over the Alps and the Iberian peninsula. As the heating gets stronger throughout the day something very interesting happens to the air pressure over these areas.

Without going into the finer dynamics of what's happening, the air over these areas is heated and

expands. As it expands the pressure drops, creating what is called a 'heat low'. These lows are not to be confused with low pressure systems (cyclones), but they do rotate an airmass the same way and draw air in towards the centre.

As the low draws air in from the plains around the Alps it causes a low-level wind, its direction determined by which side of the Alps you're on. The air is running towards the centre, so if you're in the north-eastern Alps, as we are here at Mayrhofen, the main flow will be from the north-east. The valley layout will then control the direction. This wind can be between 500 and 1,200m thick, depending on time of year and location, and can sometimes exceed 40km/h in some parts of the Alps.

There are many entry points around the Alps from the surrounding plains. As the valley flows are low-level winds they cannot go through mountains and need large, wide open valleys to feed the heat low as it sucks in the air around it.

So how do we, as paraglider and hang glider pilots, work out which way a valley wind will be moving? The air is moving towards the centre of the Alps and the bigger mountains, and you can say that most of the time it will be moving opposite to the river flow, or simply uphill.

As the valley wind is a low-level phenomenon you won't feel its effects until you want to land or get low on a long valley crossing. It will usually peak in the late afternoon when the heat low is at its strongest.

The main clues to estimating its strength are the length of heating the day has had, and the thermal strength. If it's a long, warm, blue-sky day in spring and good activity is still going on late into the afternoon, a large amount of air will be drawn uphill

through the valleys to feed the heat low. Well defined clouds on the west-facing sides of the mountain will show this very well. These conditions can easily catch out an unwary pilot trying to push upwind towards the LZ, but will be great for an early evening soaring flight if there is a ridge that juts out into this flow.

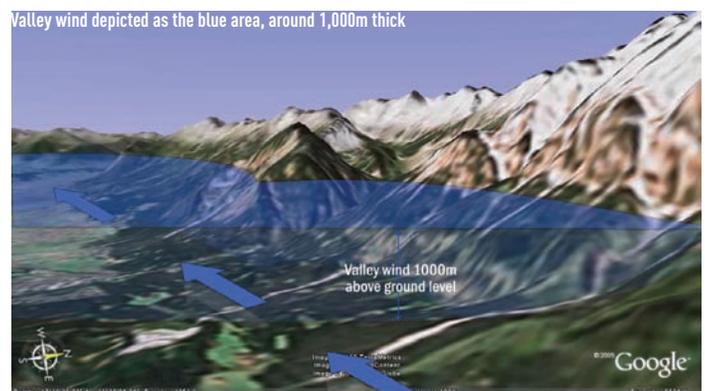
Once you've established the wind strength and direction, it's important to position yourself upwind of the LZ. Burning off height downwind is a sure way to land short in the strengthening wind. Only when pilots are upwind of the LZ should they think about big ears, spirals, etc.

As with all stronger winds, the valley wind can allow easy soaring... and some potentially nasty turbulence on the lee side of spurs and ridges. In future articles I'll be explaining the dynamics of the lee side and how to read the terrain.

Valley winds should not be confused with gust fronts which can also come from the same direction. These can pick up to over 80km/h and are definitely not flyable. Big clouds towards the mouth of the valley system you are in should be treated with respect. Gust fronts feel damp and cold while valley winds feel warm and buoyant. And the Foehn is something completely different again, but that's coming in the next article.

There's more information on these articles at my blog at [www.austrianarena.com/blog](http://www.austrianarena.com/blog). Take the time to register; you can then query or comment on any of the topics discussed.

*Kelly Farina has lived in the Alps for 12 years and has over 1600 hours of flying experience, mostly Alpine. Pilots wishing to learn to fly confidently in the Alps can contact him through his website at [www.austrianarena.com](http://www.austrianarena.com).*



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